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Building Energy Use and Cost Analysis Program

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Section

1

Envelope Libraries

This section contains the libraries used to construct the building envelope. Included here are:

- Materials Libraries
- Constructions
- Windows

MATERIAL LIBRARY

The following tables list the materials in the Library. Three categories are given: (1) building materials, (2) insulating materials and (3) air spaces.

The format of the tables is as follows. The left-hand column gives the code-word that you use as one of the entries in the list of values of the MATERIAL keyword in the LAYERS command. The next two columns give the description and thickness of the material. The last four columns give the thermophysical properties in both English and metric units.

Because the code-words contain blanks they must be enclosed in parentheses when used in your input. For example:

```
WA-1-2 = LAYERS
   MATERIAL          = ("Wood Sft 3/4in (WD01)",
                        "MinWool Batt R11 (IN02)",
                        "GypBd 1/2in (GP01)") ..
```

The portion of a code-word in parentheses gives the DOE-2.1E name for the material. For example, for the code-word "Wood Sft 3/4in (WD01)" the DOE-2.1E name is WD01.

Materials whose code-words contain "HF", such as "ClayTile 4in (HF-C1)" are so-called "ASHRAE" materials. These materials are listed in Table 11, Chapter 28 of *ASHRAE Handbook, 1997 Fundamentals*, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

Building Materials

Table 1 Building Materials

Code-Word	Description	Thickness ft (m)	Conductivity Btu/hr-ft^2-F (W/m-K)	Density lb/ft^3 (kg/m^3)	Specific Heat Btu/lb-F (kJ/kg-K)	Resistance hr-ft^2-F/Btu (K-m^2/W)
Acoustic Tile						
AcousTile 3/8in (AC01)	3/8 in (1 cm)	0.0313 (0.0095)	0.0330 (0.057)	18.0 (288)	0.32 (1339)	0.95 (0.167)
AcousTile 1/2in (AC02)	1/2 in (1.3cm)	0.0417 (0.0127)	0.0330 (0.057)	18.0 (288)	0.32 (1339)	1.26 (0.222)
AcousTile 3/4in (AC03)	3/4 in (1.9cm)	0.0625 (0.0191)	0.0330 (0.057)	18.0 (288)	0.32 (1339)	1.89 (0.333)
AcousTile (HF-E5)	3/4 in (1.9cm)	0.0625 (0.0191)	0.0350 (0.061)	30.0 (480)	0.20 (2142)	1.79 (0.313)
Aluminum or Steel Siding						
Steel Siding (AS01)		0.0050 (0.0015)	26.000 (44.97)	480.0 (7690)	0.10 (418)	1.9×10^{-4}(3.3×10^{-5})
Asbestos-Cement						
AbsCem Bd 1/8in (AB01)	Board, 1/8 in (0.32 cm)	0.0104 (0.0032)	0.3450 (0.597)	120.0 (1922)	0.2 (837)	0.03 (0.005)
AbsCem Bd 1/4in (AB02)	Board, 1/4 in (0.63 cm)	0.0208 (0.0063)	0.3450 (0.597)	120.0 (1922)	0.2 (837)	0.06 (0.011)
AbsCem Shingle (AB03)	Shingle					0.21 (0.037)

Table 1 Building Materials						
Code-Word	**Description**	**Thickness** ft (m)	**Conductivity** Btu/hr-ft²-F (W/m-K)	**Density** lb/ft³ (kg/m³)	**Specific Heat** Btu/lb-F (kJ/kg-K)	**Resistance** hr-ft²-F/Btu (K-m²/W)
AbsCem Siding (AB04)	Lapped Siding, 1/4 in (0.63 cm)					0.21 (0.037)
Asbestos Vinyl Tile						
AbsVinyl Tile (AV01)						0.05 (0.009)
Asphalt						
Asph Roll Roof (AR01)	Roofing Roll					0.15 (0.026)
Asph Siding (AR02)	Shingle and Siding					0.44 (0.078)
Ashp Tile (AR03)	Tile					0.05 (0.009)
Brick						
Com Brick 4in (BK01)	4 in (10.1cm) Common	0.3333 (0.1016)	0.4167 (0.721)	120.0 (1922)	0.20 (837)	0.80 (0.141)
Com Brick 8in (BK02)	8 in (20.3 cm) Common	0.6667 (0.2032)	0.4167 (0.721)	120.0 (1922)	0.20 (837)	1.60 (0.282)
Com Brick 12in (BK03)	12 in (30.5 cm) Common	1.0000 (0.3048)	0.4167 (0.721)	120.0 (1922)	0.20 (837)	2.40 (0.423)
Face Brick 3in (BK04)	3 in (7.6cm) Face	0.2500 (0.0762)	0.7576 (1.310)	130.0 (2083)	0.22 (921)	0.33 (0.058)
Face Brick 4in (BK05)	4 in (10.1cm) Face	0.3333 (0.1016)	0.7576 (1.310)	130.0 (2083)	0.22 (921)	0.44 (0.078)
Face Brick 4in (HF-A2)	4 in (10.1cm) Face	0.3333 (0.1016)	0.7700 (1.331)	130.0 (2083)	0.22 (921)	0.43 (0.076)
Face Brick 4in (HF-A7)	4 in (10.1cm) Face	0.3333 (0.1016)	0.7700 (1.331)	125.0 (2003)	0.22 (921)	0.43 (0.076)
Com Brick 4in (HF-C4)	4 in (10.1cm) Common	0.3333 (0.1016)	0.4200 (0.727)	120.0 (1922)	0.2 (837)	0.79 (0.140)
Com Brick 8in (HF-C9)	8 in (20.3cm) Common	0.6667 (0.2032)	0.4200 (0.727)	120.0 (1922)	0.2 (837)	1.59 (0.280)
Building Paper						
Bldg Paper Felt (BP01)	Permeable Felt					0.06 (0.011)
Bldg Paper Seal (BP02)	2-Layer Seal					0.12 (0.022)
Plastic Film Seal (BP03)	Plastic Film Seal					0.01 (0.002)
Built-Up Roof						
Blt-Up Roof 3/8in (BR01)	3/8 in (1 cm)	0.0313 (0.0095)	0.0939 (0.162)	70.0 (1121)	0.35 (1464)	0.33 (0.026)
Carpet						
Carpet & Fiber Pad (CP01)	With Fibrous Pad					2.08 (0.367)
Carpet & Rubber Pad (CP02)	With Rubber Pad					1.23 (0.217)
Cement						
Cmt Mortar 1in (CM01)	Mortar, 1in (2.5 cm)	0.0833 (0.0254)	0.4167 (0.721)	116.0 (1858)	0.2 (837)	0.20 (0.035)

Table 1 Building Materials						
Code-Word	**Description**	**Thickness** ft (m)	**Conductivity** Btu/hr-ft²-F (W/m-K)	**Density** lb/ft³ (kg/m³)	**Specific Heat** Btu/lb-F (kJ/kg-K)	**Resistance** hr-ft²-F/Btu (K-m²/W)
Cmt Mortar 1.75in (CM02)	Mortar, 1.75 in (4.4 cm)	0.1458 (0.0444)	0.4167 (0.721)	116.0 (1858)	0.2 (837)	0.35 (0.062)
Cmt Plaster 1in (CM03)	Plaster with Sand Aggregate, 1 in (2.5 cm)	0.0833 (0.0254)	0.4167 (0.721)	116.0 (1858)	0.2 (837)	0.20 (0.035
Clay Tile, Hollow						
Hol ClayTile 3in (CT01)	1 Cell, 3in (7.6cm)	0.2500 (0.0762)	0.3125 (0.498)	70.0 (1121)	0.2 (837)	0.80 (0.272)
Hol ClayTile 4in (CT02)	1 Cell, 4 in (10.1cm)	0.3333 (0.1016)	0.2999 (0.519)	70.0 (1121)	0.2 (837)	1.11 (0.196)
Hol ClayTile 6in (CT03)	2 Cells, 6 in (15.2 cm)	0.5000 (0.1524)	0.3300 (0.571)	70.0 (1121)	0.2 (837)	1.52 (0.268)
Hol ClayTile 8in (CT04)	2 Cells, 8 in (20.3cm)	0.6667 (0.2032)	0.3600 (0.623)	70.0 (1121)	0.2 (837)	1.85 (0.326)
Hol ClayTile 10in (CT05)	2 Cells, 10 in (25.4 cm)	0.8333 (0.2540)	0.3749 (0.648)	70.0 (1121)	0.2 (837)	2.22 (0.391)
Hol ClayTile 12in (CT06)	3 Cells, 12 in (30.5 cm)	1.0000 (0.3048)	0.4000 (0.692)	70.0 (1121)	0.2 (837)	2.50 (0.441)
ClayTile 4in (HF-C1)	4 in (10.1cm)	0.3333 (0.1016)	0.3300 (0.571)	70.0 (1121)	0.2 (837)	1.01 (0.178)
ClayTile 8in (HF-C6)	8 in (20.3cm)	0.6667 (0.2032)	0.3300 (0.571)	70.0 (1121)	0.2 (837)	2.02 (0.357)
Clay Tile, Paver						
ClayTile Paver 3/8in (CT11)	3/8 in (1 cm)	0.0313 (0.0095)	1.0416 (1.802)	120.0 (1922)	0.2 (837)	0.03 (0.005)
Concrete, Heavy Weight Dried Aggregate, 140 lbs.						
Conc HW 140lb 1.25in (CC01)	1.25 in (3.2 cm)	0.1042 (0.0318)	0.7576 (1.310)	140.0 (2243)	0.2 (837)	0.14 (0.025)
Conc HW 140lb 2in (CC02)	2 in (5.1 cm)	0.1667 (0.0508)	0.7576 (1.310)	140.0 (2243)	0.2 (837)	0.22 (0.039)
Conc HW 140lb 4in (CC03)	4 in (10.1cm)	0.3333 (0.1016)	0.7576 (1.310)	140.0 (2243)	0.2 (837)	0.44 (0.078)
Conc HW 140lb 6in (CC04)	6 in (15.2 cm)	0.5000 (0.1524	0.7576 (1.310)	140.0 (2243)	0.2 (837)	0.66 (0.116)
Conc HW 140lb 8in (CC05)	8 in (20.3cm)	0.6667 (0.2032)	0.7576 (1.310)	140.0 (2243)	0.2 (837)	0.88 (0.155)
Conc HW 140lb 10in (CC06)	10 in (25.4 cm)	0.8333 (0.2540)	0.7576 (1.310)	140.0 (2243)	0.2 (837)	1.10 (0.194)
Conc HW 140lb 12in (CC07)	12 in (30.5 cm)	1.0000 (0.3048)	0.7576 (1.310)	140.0 (2243)	0.2 (837)	1.32 (0.233)
Concrete, Heavy Weight Undried Aggregate, 140 lbs.						
Conc HW 140lb 3/4in (CC11)	3/4 in (1.9 cm)	0.0625 (0.0191)	1.0417 (1.802)	140.0 (2243)	0.2 (837)	0.06 (0.011)
Conc HW 140lb 1-3/8in (CC12)	1 3/8 in (3.5 cm)	0.1146 (0.0349)	1.0417 (1.802)	140.0 (2243)	0.2 (837)	0.11 (0.019)
Conc HW 140lb 3.25in (CC13)	3 1/4 in (8.3 cm)	0.2708 (0.0825)	1.0417 (1.802)	140.0 (2243)	0.2 (837)	0.26 (0.046)
Conc HW 140lb 4in (CC14)	4 in (10.2 cm)	0.3333 (0.1016)	1.0417 (1.802)	140.0 (2243)	0.2 (837)	0.32 (0.056)
Conc HW 140lb 6in (CC15)	6 in (15.2 cm)	0.5000 (0.1524)	1.0417 (1.802)	140.0 (2243)	0.2 (837)	0.48 (0.085)
Conc HW 140lb 18in (CC16)	8 in (20.2 cm)	0.6667 (0.2032)	1.0417 (1.802)	140.0 (2243)	0.2 (837)	0.64 (0.113)
Conc HW 140lb 2in (HF-C12)	2 in (5.1 cm)	0.1667 (0.0508)	1.0000 (1.730)	140.0 (2243)	0.2 (837)	0.17 (0.029)

Table 1 Building Materials						
Code-Word	**Description**	**Thickness** ft (m)	**Conductivity** Btu/hr-ft²-F (W/m-K)	**Density** lb/ft³ (kg/m³)	**Specific Heat** Btu/lb-F (kJ/kg-K)	**Resistance** hr-ft²-F/Btu (K-m²/W)
Conc HW 140lb 4in (HF-C5)	4 in (10.2 cm)	0.3333 (0.1016)	1.0000 (1.730)	140.0 (2243)	0.2 (837)	0.33 (0.059)
Conc HW 140lb 6in (HF-C13)	6 in (15.2 cm)	0.5000 (0.1524)	1.0000 (1.730)	140.0 (2243)	0.2 (837)	0.50 (0.088)
Conc HW 140lb 8in (HF-C10)	8 in (20.2 cm)	0.6667 (0.2032)	1.0000 (1.730)	140.0 (2243)	0.2 (837)	0.67 (0.118)
Conc HW 140lb 12in (HF-C11)	12 in (30.5 cm)	1.0000 (0.3048)	1.0000 (1.730)	140.0 (2243)	0.2 (837)	1.00 (0.176)
Concrete, Light Weight, 80 lb.						
ConcLW 80lb 3/4in (CC21)	3/4 in (1.9 cm)	0.0625 (0.0191)	0.2083 (0.360)	80.0 (1282)	0.2 (837)	0.30 (0.053)
ConcLW 80lb 1.25in (CC22)	1.25 in (3.2 cm)	0.1042 (0.0318)	0.2083 (0.360)	80.0 (1282)	0.2 (837)	0.50 (0.088)
ConcLW 80lb 2in (CC23)	2 in (5.1 cm)	0.1667 (0.0508)	0.2083 (0.360)	80.0 (1282)	0.2 (837)	0.80 (0.141)
ConcLW 80lb 4in (CC24)	4 in (10.2 cm)	0.3333 (0.1016)	0.2083 (0.360)	80.0 (1282)	0.2 (837)	1.60 (0.282)
ConcLW 80lb 6in (CC25)	6 in (15.2 cm)	0.5000 (0.1524)	0.2083 (0.360)	80.0 (1282)	0.2 (837)	2.40 (0.423)
ConcLW 80lb 8in (CC26)	8 in (20.2 cm)	0.6667 (0.2032)	0.2083 (0.360)	80.0 (1282)	0.2 (837)	3.20 (0.564)
Concrete, Light Weight, 30 lb.						
ConcLW 30lb 3/4in (CC31)	3/4 in (1.9 cm)	0.0625 (0.0191)	0.0751 (0.130)	30.0 (481)	0.2 (837)	0.83 (0.146)
ConcLW 30lb 1.25in (CC32)	1.25 in (3.2 cm)	0.1042 (0.0191)	0.0751 (0.130)	30.0 (481)	0.2 (837)	1.39 (0.245)
ConcLW 30lb 2in (CC33)	2 in (5.1 cm)	0.1667 (0.0508)	0.0751 (0.130)	30.0 (481)	0.2 (837)	2.22 (0.391)
ConcLW 30lb 4in (CC34)	4 in (10.2 cm)	0.3333 (0.1016)	0.0751 (0.130)	30.0 (481)	0.2 (837)	4.44 (0.782)
ConcLW 30lb 6in (CC35)	6 in (15.2 cm)	0.5000 (0.1524)	0.0751 (0.130)	30.0 (481)	0.2 (837)	6.66 (1.174)
ConcLW 30lb 8in (CC36)	8 in (20.2 cm)	0.6667 (0.2032)	0.0751 (0.130)	30.0 (481)	0.2 (837)	8.88 (1.565)
Concrete, Light Weight, 40 lb.						
ConcLW 40lb 4in (HF-C14)	4 in (10.2 cm)	0.3333 (0.1016)	0.1 (.173)	40.0 (641)	0.2 (837)	3.33 (0.587)
ConcLW 40lb 6in (HF-C15)	6 in (15.2 cm)	0.5000 (0.1524)	0.1 (.173)	40.0 (641)	0.2 (837)	5.00 (0.881)
ConcLW 40lb 8in (HF-C16)	8 in (20.2 cm)	0.6667 (0.2032)	0.1 (.173)	40.0 (641)	0.2 (837)	6.67 (1.175)
Concrete Block, Light Weight						
CMU LW 4in (HF-C2)	4 in (10.2 cm)	0.3333 (0.1016)	0.2200 (0.380)	38.0 (609)	0.2 (837)	1.51 (0.267)
Concrete Block, 4 inch (10.2 cm) Heavy Weight						
CMU HW 4in Hollow (CB01)	Hollow	0.3333 (0.1016)	0.4694 (0.812)	101.0 (1618)	0.2 (837)	0.71 (0.125)
CMU HW 4in ConcFill (CB02)	Concrete Filled	0.3333 (0.1016)	0.7575 (1.310)	140.0 (2234)	0.2 (837)	0.44 (0.078)
CMU HW 4in PerlFill (CB03)	Perlite Filled	0.3333 (0.1016)	0.3001 (0.384)	103.0 (1650)	0.2 (837)	1.11 (0.196)
CMU HW 4in PartFill (CB04)	Part-Filled Concrete *	0.3333 (0.1016)	0.5844 (1.011)	114.0 (1826)	0.2 (837)	0.57 (0.100)
CMU HW 4in Conc/Perl (CB05)	Concrete and Perlite **	0.3333 (0.1016)	0.4772 (0.825)	115.0 (1842)	0.2 (837)	0.70 (0.123)
* One filled and reinforced concrete core every 24 in (61 cm) of wall length ** One filled and reinforced concrete core every 24 in (61 cm) of wall length with the remaining cores filled with Perlite insulation						
Concrete Block, 6 inch (15.2 cm) Heavy Weight						
CMU HW 6in Hollow (CB06)	Hollow	0.5000 (0.1524)	0.5555 (0.961)	85.0 (1362)	0.2 (837)	0.90 (0.159)
CMU HW 6in ConcFill (CB07)	Concrete Filled	0.5000 (0.1524)	0.7575 (1.310)	140.0 (2243)	0.2 (837)	0.66 (0.116)

Table 1 Building Materials						
Code-Word	**Description**	**Thickness** ft (m)	**Conductivity** Btu/hr-ft^2-F (W/m-K)	**Density** lb/ft^3 (kg/m^3)	**Specific Heat** Btu/lb-F (kJ/kg-K)	**Resistance** hr-ft^2-F/Btu (K-m^2/W)
CMU HW 6in PerlFill (CB08)	Perlite Filled	0.5000 (0.1524)	0.2222 (0.384)	88.0 (1410)	0.2 (837)	2.25 (0.397)
CMU HW 6in PartFill (CB09)	Part-Filled Concrete*	0.5000 (0.1524)	0.6119 (1.058)	104.0 (1666)	0.2 (837)	0.82 (0.145)
CMU HW 6in Conc/Perl (CB10)	Concrete and Perlite**	0.5000 (0.1524)	0.4238 (0.733)	104.0 (1666)	0.2 (837)	1.18 (0.208)
Concrete Block, 8 inch (20.3 cm) Heavy Weight						
CMU HW 8in Hollow (CB11)	Hollow	0.6667 (0.2032)	0.6060 (1.048)	69.0 (1105)	0.2 (837)	1.10 (0.194)
CMU HW 8in ConcFill (CB12)	Concrete Filled	0.6667 (0.2032)	0.7575 (1.310)	140.0 (2243)	0.2 (837)	0.88 (0.155)
CMU HW 8in PerlFill (CB13)	Perlite Fill	0.6667 (0.2032)	0.2272 (0.393)	70.0 (1121)	0.2 (837)	2.93 (0.516)
CMU HW 8in PartFill (CB14)	Part-Filled Concrete*	0.6667 (0.2032)	0.6746 (1.167)	93.0 (1490)	0.2 (837)	0.99 (0.174)
CMU HW 8in Conc/Perl (CB15)	Concrete and Perlite**	0.6667 (0.2032)	0.4160 (0.720)	93.0 (1490)	0.2 (837)	1.60 (0.282)
Concrete Block, 12 inch (30.5 cm) Heavy Weight						
CMU HW 12in Hollow (CB16)	Hollow	1.0000 (0.3048)	0.7813 (1.350)	76.0 (1218)	0.2 (837)	1.28 (0.226)
CMU HW 12in ConcFill (CB17)	Concrete Filled	1.0000 (0.3048)	0.7575 (1.310)	140.0 (2243)	0.2 (837)	1.32 (0.233)
CMU HW 12in PartFill (CB18)	Part-Filled Concrete*	1.0000 (0.3048)	0.7773 (1.344)	98.0 (1570)	0.2 (837)	1.29 (0.227)
Concrete Block, 4 inch (10.1 cm) Medium Weight						
CMU MW 4in Hollow (CB21)	Hollow	0.3333 (0.1016)	0.3003 (0.519)	76.0 (1218)	0.2 (837)	1.11 (0.196)
CMU MW 4in ConcFill (CB22)	Concrete Filled	0.3333 (0.1016)	0.4456 (0.771)	115.0 (1842)	0.2 (837)	0.75 (0.132)
CMU MW 4in PerlFill (CB23)	Perlite Filled	0.3333 (0.1016)	0.1512 (0.262)	78.0 (1250)	0.2 (837)	2.20 (0.388)
CMU MW 4in PartFill (CB24)	Part-Filled Concrete*	0.3333 (0.1016)	0.3306 (0.572)	89.0 (1426)	0.2 (837)	1.01 (0.178)
CMU MW 4in Conc/Perl (CB25)	Concrete and Perlite**	0.3333 (0.1016)	0.2493 (0.431)	90.0 (1442)	0.2 (837)	1.34 (0.236)
* One filled and reinforced concrete core every 24 in (61 cm) of wall length ** One filled and reinforced concrete core every 24 in (61 cm) of wall length with the remaining cores filled with Perlite insulation						
Concrete Block, 6 inch (15.2 cm) Medium Weight						
CMU MW 6in Hollow (CB26)	Hollow	0.5000 (0.1524)	0.3571 (0.618)	65.0 (1041)	0.2 (837)	1.40 (0.247)
CMU MW 6in ConcFill (CB27)	Concrete Filled	0.5000 (0.1524)	0.4443 (0.768)	119.0 (1906)	0.2 (837)	1.13 (0.199)
CMU MW 6in PerlFill (CB28)	Perlite Filled	0.5000 (0.1524)	0.1166 (0.202)	67.0 (1073)	0.2 (837)	4.29 (0.756)
CMU MW 6in PartFill (CB29)	Part-Filled Concrete*	0.5000 (0.1524)	0.3686 (0.638)	83.0 (1330)	0.2 (837)	1.36 (0.240)
CMU MW 6in Conc/Perl (CB30)	Concrete and Perlite**	0.5000 (0.1524)	0.2259 (0.391)	84.0 (1346)	0.2 (837)	2.21 (0.389)
Concrete Block, 8 inch (20.3 cm) Medium Weight						

Table 1 Building Materials

Code-Word	Description	Thickness ft (m)	Conductivity Btu/hr-ft²-F (W/m-K)	Density lb/ft³ (kg/m³)	Specific Heat Btu/lb-F (kJ/kg-K)	Resistance hr-ft²-F/Btu (K-m²/W)
CMU MW 8in Hollow (CB31)	Hollow	0.6667 (0.2032)	0.3876 (0.670)	53.0 (849)	0.2 (837)	1.72 (0.303)
CMU MW 8in ConcFill (CB32)	Concrete Filled	0.6667 (0.2032)	0.4957 (0.857)	123.0 (1970)	0.2 (837)	1.34 (0.236)
CMU MW 8in PerlFill (CB33)	Perlite Filled	0.6667 (0.2032)	0.1141 (0.197)	56.0 (897)	0.2 (837)	5.84 (1.029)
CMU MW 8in PartFill (CB34)	Part-Filled Concrete*	0.6667 (0.2032)	0.4348 (0.752)	76.0 (1218)	0.2 (837)	1.53 (0.270)
CMU MW 8in PartFill (CB35)	Concrete and Perlite**	0.6667 (0.2032)	0.2413 (0.417)	77.0 (1234)	0.2 (837)	2.76 (0.486)
Concrete Block, 12 inch (30.5 cm) Medium Weight						
CMU MW 12in Hollow (CB36)	Hollow	1.0000 (0.3048)	0.4959 (0.858)	58.0 (929)	0.2 (837)	2.02 (0.356)
CMU MW 12in ConcFill (CB37)	Concrete Filled	1.0000 (0.3048)	0.4814 (0.833)	121.0 (1938)	0.2 (837)	2.08 (0.367)
CMU MW 12in PartFill (CB38)	Part-Filled Concrete*	1.0000 (0.3048)	0.4919 (0.851)	79.0 (1266)	0.2 (837)	2.03 (0.358)
Concrete Block, 4 inch (10.1 cm) Light Weight						
CMU LW 4in Hollow (CB41)	Hollow	0.3333 (0.1016)	0.2222 (0.384)	65.0 (1041)	0.2 (837)	1.50 (0.264)
CMU LW 4in ConcFill (CB42)	Concrete Filled	0.3333 (0.1016)	0.3695 (0.639)	104.0 (1666)	0.2 (837)	0.90 (0.159)
CMU LW 4in PerlFill (CB43)	Perlite Filled	0.3333 (0.1016)	0.1271 (0.220)	67.0 (1073)	0.2 (837)	2.62 (0.462)
CMU LW 4in PartFill (CB44)	Part-Filled Concrete*	0.3333 (0.1016)	0.2808 (0.486)	78.0 (1250)	0.2 (837)	1.19 (0.210)
CMU LW 4in Conc/Perl (CB45)	Concrete and Perlite**	0.3333 (0.1016)	0.2079 (0.360)	79.0 (1266)	0.2 (837)	1.60 (0.282)
* One filled and reinforced concrete core every 24 in (61 cm) of wall length ** One filled and reinforced concrete core every 24 in (61 cm) of wall length with the remaining cores filled with Perlite insulation						
Concrete Block, 6 inch (15.2 cm) Light Weight						
CMU LW 6in Hollow (CB46)	Hollow	0.5000 (0.1524)	0.2777 (0.480)	55.0 (881)	0.2 (837)	1.80 (0.317)
CMU LW 6in ConcFill (CB47)	Concrete Filled	0.5000 (0.1524)	0.3819 (0.661)	110.0 (1762)	0.2 (837)	1.31 (0.231)
CMU LW 6in PerlFill (CB48)	Perlite Filled	0.5000 (0.1524)	0.0985 (0.170)	57.0 (913)	0.2 (837)	5.08 (0.895)
CMU LW 6in PartFill (CB49)	Part-Filled Concrete*	0.5000 (0.1524)	0.3189 (0.552)	73.0 (1169)	0.2 (837)	1.57 (0.277)
CMU LW 6in Conc/Perl (CB50)	Concrete and Perlite**	0.5000 (0.1524)	0.1929 (0.334)	74.0 (1185)	0.2 (837)	2.59 (0.456)
Concrete Block, 8 inch (20.3 cm) Light Weight						
CMU LW 8in Hollow (CB51)	Hollow	0.6667 (0.2032)	0.3333 (0.576)	45.0 (721)	0.2 (837)	2.00 (0.352)
CMU LW 8in ConcFill (CB52)	Concrete Filled	0.6667 (0.2032)	0.4359 (0.754)	115.0 (1842)	0.2 (837)	1.53 (0.270)
CMU LW 8in PerlFill (CB53)	Perlite Filled	0.6667 (0.2032)	0.0963 (0.167)	48.0 (769)	0.2 (837)	6.92 (1.219)
CMU LW 8in PartFill (CB54)	Part-Filled Concrete*	0.6667 (0.2032)	0.3846 (0.665)	68.0 (1089)	0.2 (837)	1.73 (0.305)
CMU LW 8in Conc/Perl (CB55)	Concrete and	0.6667 (0.2032)	0.2095 (0.362)	69.0 (1105)	0.2 (837)	3.18 (0.560)

Table 1 Building Materials						
Code-Word	**Description**	**Thickness** ft (m)	**Conductivity** Btu/hr-ft²-F (W/m-K)	**Density** lb/ft³ (kg/m³)	**Specific Heat** Btu/lb-F (kJ/kg-K)	**Resistance** hr-ft²-F/Btu (K-m²/W)
	Perlite**					
Concrete Block, 12 inch (30.5 cm) Light Weight						
CMU LW 12in Hollow (CB56)	Hollow	1.0000 (0.3048)	0.4405 (0.762)	49.0 (785)	0.2 (837)	2.27 (0.400)
CMU LW 12in ConcFill (CB57)	Concrete Filled	1.0000 (0.3048)	0.4194 (0.725)	113.0 (1810)	0.2 (837)	2.38 (0.419)
CMU LW 12in PartFill (CB58)	Part-Filled Concrete*	1.0000 (0.3048)	0.4274 (0.739)	70.0 (1121)	0.2 (837)	2.34 (0.412)
Felt and Membrane						
Felt 3/8in (HF-E3)	3/8 in (1 cm)	0.0313 (0.0095)	0.1100 (0.190)	70.0 (1121)	0.4 (1674)	0.28 (0.050)
Finish (HF-A6)	1/2 in (1.3 cm)	0.0417 (0.0127)	0.2400 (0.415)	78.0 (1249)	0.26 (1088)	0.17 (0.031)
Gypsum or Plaster Board						
GypBd 1/2in (GP01)	1/2 in (1.3 cm)	0.0417 (0.0127)	0.0926 (0.160)	50.0 (801)	0.2 (837)	0.45 (0.079)
GypBd 5/8in (GP02)	5/8 in (1.6 cm)	0.0521 (0.0159)	0.0926 (0.160)	50.0 (801)	0.2 (837)	0.56 (0.099)
GypBd 3/4in (GP03)	3/4 in (1.9 cm)	0.0625 (0.0191)	0.0926 (0.160)	50.0 (801)	0.2 (837)	0.67 (0.118)
* One filled and reinforced concrete core every 24 in (61 cm) of wall length ** One filled and reinforced concrete core every 24 in (61 cm) of wall length with the remaining cores filled with Perlite insulation						
Gypsum Plaster						
Gypsum LW Agg 3/4in (GP04)	3/4 in (1.9cm) Lt. Wt. Aggregate	0.0625 (0.0191)	0.1330 (0.230)	45.0 (721)	0.2 (837)	0.47 (0.083)
Gypsum LW Agg 1in (GP05)	1 in (2.5 cm) Lt. Wt. Aggregate	0.0833 (0.0254)	0.1330 (0.230)	45.0 (721)	0.2 (837)	0.63 (0.111)
Gypsum Sand Agg 3/4in (GP06)	3/4 in (1.9cm) Sand Aggregate	0.0625 (0.0191)	0.4736 (0.819)	105.0 (1682)	0.2 (837)	0.13 (0.023)
Gypsum Sand Agg 1in (GP07)	1 in (2.5 cm) Sand Aggregate	0.0833 (0.0254)	0.4736 (0.819)	105.0 (1682)	0.2 (837)	0.18 (0.032)
Hard Board, 3/4 inch (1.9 cm)						
Hd Bd 3/4in Md Dens (HB01)	Medium Density Siding	0.0625 (0.0191)	0.0544 (0.094)	40.0 (641)	0.28 (1171)	1.15 (0.203)
Hd Bd 3/4in Md Dens (HB02)	Medium Density Others	0.0625 (0.0191)	0.0608 (0.105)	50.0 (801)	0.31 (1297)	1.03 (0.182)
Hd Bd 3/4in Std Temp (HB03)	High Density Standard Tempered	0.0625 (0.0191)	0.0683 (0.118)	55.0 (881)	0.33 (1381)	0.92 (0.162)
Hd Bd 3/4in Srv Temp (HB04)	High Density Service Tempered	0.0625 (0.0191)	0.0833 (0.144)	63.0 (1009)	0.33 (1381)	0.75 (0.132)
Linoleum Tile						
Linoleum Tile (LT01)						0.05 (0.009)
Particle Board						

Table 1 Building Materials						
Code-Word	**Description**	**Thickness** ft (m)	**Conductivity** Btu/hr-ft²-F (W/m-K)	**Density** lb/ft³ (kg/m³)	**Specific Heat** Btu/lb-F (kJ/kg-K)	**Resistance** hr-ft²-F/Btu (K-m²/W)
PartBd Lo Dens 3/4in (PB01)	Low Density, 3/4 in (1.9 cm)	0.0625 (0.0191)	0.0450 (0.078)	75.0 (1202)	0.31 (1297)	1.39 (0.245)
PartBd Md Dens 3/4in (PB02)	Medium Density, 3/4 in (1.9 cm)	0.0625 (0.0191)	0.7833 (1.355)	75.0 (1202)	0.31 (1297)	0.08 (0.014))
PartBd Hi Dens 3/4in (PB03)	High Density, 3/4 in (1.9 cm)	0.0625 (0.0191)	0.9833 (1.701)	75.0 (1202)	0.31 (1297)	0.06 (0.011)
PartBd Underlay 5/8in (PB04)	Underlayment, 5/8 in (1.6 cm)	0.0521 (0.0159)	0.1796 (0.311)	75.0 (1202)	0.29 (1213)	0.29 (0.051)
Plywood						
Plywd 1/4in (PW01)	1/4 in (0.64 cm)	0.0209 (0.0064)	0.0667 (0.115)	34.0 (545)	0.29 (1213)	0.31 (0.055)
Plywd 3/8in (PW02)	3/8 in (1 cm)	0.0313 (0.0095)	0.0667 (0.115)	34.0 (545)	0.29 (1213)	0.47 (0.083)
Plywd 1/2in (PW03)	1/2 in (1.3 cm)	0.0417 (0.0127)	0.0667 (0.115)	34.0 (545)	0.29 (1213)	0.63 (0.111)
Plywd 5/8in (PW04)	5/8 in (1.6 cm)	0.0521 (0.0159)	0.0667 (0.115)	34.0 (545)	0.29 (1213)	0.78 (0.137)
Plywd 3/4 (PW05)	3/4 in (1.9 cm)	0.0625 (0.0191)	0.0667 (0.115)	34.0 (545)	0.29 (1213)	0.94 (0.166)
Plywd 1in (PW06)	1 in (2.5 cm)	0.0833 (0.0254)	0.0667 (0.115)	34.0 (545)	0.29 (1213)	1.25 (0.220)
Roof Gravel or Slag						
Gravel 1/2in (RG01)	1/2 in (1.3cm)	0.0417 (0.0127)	0.8340 (1.442)	55.0 (881)	0.4 (1674)	0.05 (0.009)
Gravel 1in (RG02)	1 in (2.5 cm)	0.0833 (0.0254)	0.8340 (1.442)	55.0 (881)	0.4 (1674)	0.10 (0.018)
Rubber Tile						
Rubber Tile (RT01)						0.05 (0.009)
Slate						
Slate 1/2in (SL01)	1/2 in (1.3 cm)	0.0417 (0.0127)	0.8340 (1.442)	100.0 (1602)	0.35 (1464)	0.05 (0.009)
Soil						
Soil 12in	12in (30.5cm)	1.000 (0.3048)	1.000 (1.729)	115.0 (1842)	0.2 (837)	1.0000 (0.176)
Steel Siding						
Steel Siding (HF-A3)	0.06in (0.15cm)	0.0050 (0.0015)	26.000 (45.0)	480.0 (7690)	0.10 (419)	0.0002 (3.5x10^{-5})
Stone						
Stone 1in (ST01)	1 in (2.5 cm)	0.0833 (0.0254)	1.0416 (1.802)	140.0 (2243)	0.2 (837)	0.08 (0.014)
Stone1/2in (HF-E2)	1/2 in(1.3 cm)	0.0417 (0.0127)	0.8300 (1.435)	55.0 (881)	0.4 (1674)	0.05 (0.009)
Stucco						
Stucco 1in (SC01)	1 in (2.5 cm)	0.0833 (0.0254)	0.4167 (0.721)	166.0 (2659)	0.2 (837)	0.20 (0.035)
Terrazzo						
Terrazzo 1in (TZ01)	1 in (2.5 cm)	0.0833 (0.0254)	1.0416 (1.802)	140.0 (2243)	0.2 (837)	0.08 (0.014)
Wood, Soft						
Wood Sft 3/4in (WD01)	3/4 in (1.9 cm)	0.0625 (0.0191)	0.0667 (0.115)	32.0 (513)	0.33 (1381)	0.94 (0.166)
Wood Sft 1.5in (WD02	1.5 in (3.8 cm)	0.1250 (0.0381)	0.0667 (0.115)	32.0 (513)	0.33 (1381)	1.87 (0.330)
Wood Sft 2.5in (WD03	2.5 in (6.4 cm)	0.2083 (0.0635)	0.0667 (0.115)	32.0 (513)	0.33 (1381)	3.12 (0.550)

Table 1 Building Materials

Code-Word	Description	Thickness ft (m)	Conductivity Btu/hr-ft²-F (W/m-K)	Density lb/ft³ (kg/m³)	Specific Heat Btu/lb-F (kJ/kg-K)	Resistance hr-ft²-F/Btu (K-m²/W)
Wood Sft 3.5in (WD04	3.5 in (8.9 cm)	0.2917 (0.0889)	0.0667 (0.115)	32.0 (513)	0.33 (1381)	4.37 (0.770)
Wood Sft 4in (WD05	4 in (10.2 cm)	0.3333 (0.1016)	0.0667 (0.115)	32.0 (513)	0.33 (1381)	5.00 (0.881)
Wood, Hard						
Wood Hd 3/4in (WD11)	3/4 in (1.9 cm)	0.0625 (0.0191)	0.0916 (0.158)	45.0 (721)	0.30 (1255)	0.68 (0.120)
Wood Hd 1in (WD12)	1 in (2.5 cm)	0.0833 (0.0254)	0.0916 (0.158)	45.0 (721)	0.30 (1255)	0.91 (0.160
Wood, Shingle						
Wood Shingle (WS01)	For Wall	0.0583(.0178)	0.0667 (0.115)	32.0 (513)	0.30 (1255)	0.87 (0.153)
Wood Shingle (WS02)	For Roof					0.94 (0.166)
Wood						
Wood 1in (HF-B7)	1 in (2.5 cm)	0.0833 (0.0254)	0.0700 (0.121)	37.0 (593)	0.2 (837)	1.19 (0.210)
Wood 2in (HF-B10	2 in (3.1 cm)	0.1667 (0.0508)	0.0700 (0.121)	37.0 (593)	0.2 (837)	2.38 (0.420))
Wood 2.5in (HF-B8	2.5 in (6.4 cm)	0.2083 (0.0635)	0.0700 (0.121)	37.0 (593)	0.2 (837)	2.98 (0.526)
Wood 3in (HF-B11	3 in (7.6 cm)	0.2500 (0.0762)	0.0700 (0.121)	37.0 (593)	0.2 (837)	3.57 (0.630)
Wood 4in (HF-B9	4 in (10.2 cm)	0.3330 (0.1016)	0.0700 (0.121)	37.0 (593)	0.2 (837)	4.76 (0.840)

Insulating Materials

Table 1 Insulating Materials

Code-Word	Description	Thickness ft (m)	Conductivity Btu/hr-ft²-F (W/m-K)	Density lb/ft³ (kg/m³)	Specific Heat Btu/lb-F (kJ/kg-K)	Resistance hr-ft²-F/Btu (K-m²/W)
Mineral Wool/Fiber						
MinWool Batt R7 (IN01)	Batt, R-7*	0.1882 (0.0574)	0.0250 (0.043)	0.60 (10)	0.2 (837)	7.53 (1.327)
MinWool Batt R11 (IN02)	Batt, R-11	0.2957 (0.0901)	0.0250 (0.043)	0.60 (10)	0.2 (837)	11.83 (2.085)
MinWool Batt R19 (IN03)	Batt, R-19	0.5108 (0.1557)	0.0250 (0.043)	0.60 (10)	0.2 (837)	20.43 (3.600)
MinWool Batt R24 (IN04)	Batt, R-24	0.6969 (0.2124)	0.0250 (0.043)	0.60 (10)	0.2 (837)	27.88 (4.913)
MinWool Batt R30 (IN05)	Batt, R-30	0.8065 (0.2458)	0.0250 (0.043)	0.60 (10)	0.2 (837)	32.26 (5.685)
MinWool Fill 3.5in R11 (IN11)	Fill, 3.5 in (8.9 cm), R-11	0.2917 (0.0889)	0.0270 (0.046)	0.60 (10)	0.2 (837)	10.80 (1.903)
MinWool Fill 5.5in R19 (IN12)	Fill, 5.5 in (13.4 cm), R-19	0.4583 (0.1397)	0.0270 (0.046)	0.63 (11)	0.2 (837)	16.97 (2.991)
Cellulose Fill						
Cellulose 3.5in R-13 (IN13)	3.5 in (8.9 cm), R-13	0.2917 (0.0889)	0.0225 (0.039)	3.0 (48)	0.33 (1381)	12.96 (2.284)
Cellulose 5.5in R-20 (IN14)	5.5 in (13.4 cm), R-20	0.4583 (0.1397)	0.0225 (0.039)	3.0 (48)	0.33 (1381)	20.37 (3.590)
Insulation						
Insul Bd 1in (HF-B2)	1 in (2.5 cm)	0.0830 (0.0254)	0.0250 (0.043)	2.0 (32)	0.2 (837)	3.32 (0.585)
Insul Bd 2in (HF-B3)	2 in (3.1 cm)	0.1670 (0.0508)	0.0250 (0.043)	2.0 (32)	0.2 (837)	6.68 (1.177)
Insul Bd 3in (HF-B4)	3 in (7.6 cm)	0.2500 (0.0762)	0.0250 (0.043)	2.0 (32)	0.2 (837)	10.00 (1.762)
Insul Bd 1in (HF-B5)	1 in (2.5 cm)	0.0830 (0.0254)	0.0250 (0.043)	5.7 (91)	0.2 (837)	3.29 (0.580)
Insul Bd 2in (HF-B6)	2 in (3.1 cm)	0.1670 (0.0508)	0.0250 (0.043)	5.7 (91)	0.2 (837)	6.68 (1.177)
Insul Bd 3in (HF-B12)	3 in (7.6 cm)	0.2500 (0.0762)	0.0250 (0.043)	5.7 (91)	0.2 (837)	10.00 (1.762)
Preformed Mineral Board						
MinBd 7/8in R-3 (N21)	7/8 in (2.2 cm), R-3	0.0729 (0.0222)	0.0240 (0.042)	15.0 (240)	0.17 (711)	3.04 (0.536)
MinBd 1in R-3 (IN22)	1 in (2.5 cm), R-3.5	0.0833 (0.0254)	0.0240 (0.042)	15.0 (240)	0.17 (711)	3.47 (0.612)
MinBd 2in R-7 (IN23)	2 in (2.5 cm), R-7	0.1667 (0.0508)	0.0240 (0.042)	15.0 (240)	0.17 (711)	6.95 (1.225)
MinBd 3in R-10.4 (IN24)	3 in (7.6 cm), R-10.4	0.2500 (0.0762)	0.0240 (0.042)	15.0 (240)	0.17 (711)	10.42 (1.836)
Polystyrene, Expanded						
Polystyrene 1/2in (IN31)	1/2 in (1.3cm)	0.0417 (0.0127)	0.0200 (0.035)	1.8 (29)	0.29 (1213)	2.08 (0.367)
Polystyrene 3/4in (IN32)	3/4 in (1.9 cm)	0.0625 (0.0191)	0.0200 (0.035)	1.8 (29)	0.29 (1213)	3.12 (0.550)
Polystyrene 1in (IN33)	1 in (2.5 cm)	0.0833 (0.0254)	0.0200 (0.035)	1.8 (29)	0.29 (1213)	4.16 (0.733)
Polystyrene 1.25in (IN34)	1.25 in (3.2 cm)	0.1042 (0.0318)	0.0200 (0.035)	1.8 (29)	0.29 (1213)	5.21 (0.918)

Table 1 Insulating Materials						
Code-Word	Description	Thickness ft (m)	Conductivity Btu/hr-ft²-F (W/m-K)	Density lb/ft³ (kg/m³)	Specific Heat Btu/lb-F (kJ/kg-K)	Resistance hr-ft²-F/Btu (K-m²/W)
Polystyrene 2in (IN35)	2 in (3.1 cm)	0.1667 (0.0508)	0.0200 (0.035)	1.8 (29)	0.29 (1213)	8.33 (1.468)
Polystyrene 3in (IN36)	3 in (7.6 cm)	0.2500 (0.0762)	0.0200 (0.035)	1.8 (29)	0.29 (1213)	12.50 (2.203)
Polystyrene 4in (IN37)	4 in (10.2 cm)	0.3333 (0.1016)	0.0200 (0.035)	1.8 (29)	0.29 (1213)	16.66 (2.936)
Polyurethane, Expanded						
Polyurethane 1/2in (IN41)	1/2 in (1.3cm)	0.0417 (0.0127)	0.0133 (0.023)	1.5 (24)	0.38 (1590)	3.14 (0.553)
Polyurethane 3/4n (IN42)	3/4 in (1.9 cm)	0.0625 (0.0191)	0.0133 (0.023)	1.5 (24)	0.38 (1590)	4.67 (0.823)
Polyurethane 1in (IN43)	1 in (2.5 cm)	0.0833 (0.0254)	0.0133 (0.023)	1.5 (24)	0.38 (1590)	6.26 (1.103)
Polyurethane 1.25in (IN44)	1.25 in (3.2 cm)	0.1042 (0.0318)	0.0133 (0.023)	1.5 (24)	0.38 (1590)	7.83 (1.380)
Polyurethane 2in (IN45)	2 in (3.1 cm)	0.1667 (0.0508)	0.0133 (0.023)	1.5 (24)	0.38 (1590)	12.53 (2.208)
Polyurethane 3in (IN46)	3 in (7.6 cm)	0.2500 (0.0762)	0.0133 (0.023)	1.5 (24)	0.38 (1590)	18.80 (3.313)
Polyurethane 4in (IN47)	4 in (10.2 cm)	0.3333 (0.1016)	0.0133 (0.023)	1.5 (24)	0.38 (1590)	25.06 (4.416)
* Nominal thickness is 2 to 2-3/4 in (3.1 to 7 cm). Resistance value is based on a thickness of 2.26 in (5.74 cm).						
Urea Formaldehyde						
Urea Formald 3.5in R19 (IN51)	3.5 in (8.9 cm), R-15	0.2910 (0.0887)	0.0200 (0.035)	0.7 (11)	0.3 (1255)	14.55 (2.564)
Urea Formald 5.5in R23 (IN52)	5.5 in (13.4 cm), R-23	0.4580 (0.1396)	0.0200 (0.035)	0.7 (11)	0.3 (1255)	22.90 (4.036)
Insulation Board						
Insul Bd 1/2in (IN61)	Sheathing, 1/2 in (1.3cm)	0.0417 (0.0127)	0.0316 (0.055)	18.0 (288)	0.31 (1297)	1.32 (0.232)
Insul Bd 3/4in (IN62)	Sheathing, 3/4 in (1.9 cm)	0.0625 (0.0191)	0.0316 (0.055)	18.0 (288)	0.31 (1297)	1.98 (0.348)
Insul Bd 3/8in (IN63)	Shingle Backer, 3/8 in (1 cm)	0.0313 (0.0096)	0.0331 (0.058)	18.0 (288)	0.31 (1297)	0.95 (0.167)
Insul Bd 1/2in (IN64)	Nail Base Sheathing, 1/2 in (1.3cm)	0.0417 (0.0127)	0.0366 (0.064)	25.0 (400)	0.31 (1297)	1.14 (0.200)
Roof Insulation, Preformed						
Roof Insul 1/2in (IN71)	1/2 in (1.3cm)	0.0417 (0.0127)	0.0300 (0.052)	16.0 (256)	0.2 (837)	1.39 (0.244)
Roof Insul 1in (IN72)	1 in (2.5 cm)	0.0833 (0.0254)	0.0300 (0.052)	16.0 (256)	0.2 (837)	2.78 (0.489)
Roof Insul 1.5in (IN73)	1.5 in (3.8 cm)	0.1250 (0.0381)	0.0300 (0.052)	16.0 (256)	0.2 (837)	4.17 (0.732)
Roof Insul 2in (IN74)	2 in (3.1 cm)	0.1667 (0.0508)	0.0300 (0.052)	16.0 (256)	0.2 (837)	5.56 (0.977)
Roof Insul 2.5in (IN75)	2.5 in (6.4 cm)	0.2083 (0.0635)	0.0300 (0.052)	16.0 (256)	0.2 (837)	6.94 (1.220)
Roof Insul 3in (IN76)	3 in (7.6 cm)	0.2500 (0.0762)	0.0300 (0.052)	16.0 (256)	0.2 (837)	8.33 (1.464)

Air Spaces

Table 2 Air Spaces						
Code-Word	**Description**	**Thickness** ft (m)	**Conductivity** Btu/hr-ft²-F (W/m-K)	**Density** lb/ft³ (kg/m³)	**Specific Heat** Btu/lb-F (kJ/kg-K)	**Resistance** hr-ft²-F/Btu (K-m²/W)
Air Layer, 3/4 in (1.9 cm) or less						
Air Lay <3/4in Vert (AL11)	Vertical Walls					0.90 (0.158)
Air Lay <3/4in Slope (AL12)	Slope 45°					0.84 (0.148)
Air Lay <3/4in Horiz (AL13)	Horizontal Roofs					0.82 (0.144)
Air Layer, 3/4 in to 4 in (1.9 cm to 10.2 cm)						
Air Lay <4in Vert (AL21)	Vertical Walls					0.89 (0.156)
Air Lay <4in Slope (AL22)	Slope 45°					0.87 (0.152)
Air Lay <4in Horiz (AL23)	Horizontal Roofs					0.87 (0.152)
Air Layer, 4 in (10.2 cm) or more						
Air Lay >4in Vert (AL31)	Vertical Walls					0.92 (0.162)
Air Lay >4in Slope (AL32)	Slope 45°					0.89 (0.156)
Air Lay >4in Horiz (AL33)	Horizontal Roofs					0.92 (0.161)
* A more extensive list of data can be found in the 1993 ASHRAE Handbook of Fundamentals, Chap. 22, Table 2						

CONSTRUCTION LAYERS LIBRARY

The following tables list the constructions in the Library. Three categories are given: (1) exterior walls, (2) roofs, and (3) interior walls.

The format of the tables is as follows. The first column gives the code-word that you use as the value of the LAYERS keyword in LAYERS keyword in a CONSTRUCTION command. The second column gives a description of the construction. The third column lists the materials that make up the construction. For example the construction "ASH Wall-1" contains the materials

HF-A2, HF-B3, HF-C2 and HF-E1, listed from outside to inside. These materials can be found in the "Materials Library" in this document. For example HF-A2 corresponds to the material with code-word "Face Brick 4in (HF-A2)." These materials can also be found in Table 11, Chapter 26 of *ASHRAE Handbook, 1989 Fundamentals*, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

The constructions in the library are so-called "ASHRAE constructions." They are listed in Tables 13 and 18 of Chapter 26 of *ASHRAE Handbook, 1989 Fundamentals*.

Because the construction code-words contain blanks they must be enclosed in double quotes when used in your input. For example:

```
WALL-1 = CONSTRUCTION
   TYPE              = LAYERS
   LAYERS            = "ASH Wall-1"
   ..
```

Exterior-Wall Constructions

Table 3 Exterior-Wall Constructions		
LAYERS Code-word	**Description**	**Materials** (outside to inside)
ASH Wall-1	4 In. Face Brick, 2 In. Insulation, and 4 In. Light Wt. Concrete Block	HF-A2,HF-B3,HF-C2,HF-E1
ASH Wall-2	4 In. Light Weight Concrete	HF-C14,HF-E1
ASH Wall-3	4 In. Face Brick, Air Space and 8 In. Common Brick	HF-A2,HF-B1,HF-C9,HF-E1
ASH Wall-4	4 In. Face Brick, Air Space and 8 In. Heavy Wt. Concrete Block	HF-A2,HF-B1,HF-C8,HF-E1
ASH Wall-5	4 In. Face Brick, Air Space and 8 In. Light Weight Concrete Block	HF-A2,HF-B1,HF-C7,HF-E1
ASH Wall-6	4 In. Face Brick, Air Space and 8 In. Clay Tile	HF-A2,HF-B1,HF-C6,HF-E1
ASH Wall-7	4 In. Face Brick, Air Space and 2 In. Heavy Weight Concrete	HF-A2,HF-B1,HF-C12,HF-E1
ASH Wall-8	4 In. Face Brick, Air Space and 4 In. Common Brick	HF-A2,HF-B1,HF-C4,HF-E1
ASH Wall-9	4 In. Face Brick, Air Space and 4 In. Heavy Weight Concrete Block	HF-A2,HF-B1,HF-C3,HF-E1
ASH Wall-10	4In. Face Brick, Air Space and 4 In. Light Weight Concrete Block	HF-A2,HF-B1,HF-C2,HF-E1
ASH Wall-11	12 In. Heavy Weight Concrete	HF-A1,HF-C11,HF-E1
ASH Wall-12	8 In. Heavy Weight Concrete with 2 In. Insulation	HF-A1,HF-C10,HF-B6,HF-E1
ASH Wall-13	8 In. Heavy Weight Concrete with 1 In. Insulation	HF-A1,HF-C10,HF-B5,HF-E1
ASH Wall-14	8 In. Heavy Weight Concrete with Air Space	HF-A1,HF-C10,HF-B1,HF-E1
ASH Wall-15	8 In. Heavy Weight Concrete	HF-A1,HF-C10,HF-E1
ASH Wall-16	4 In. Face Brick, 8 In. Common Brick with 1 In. Insulation	HF-A2,HF-C9,HF-B2,HF-E1
ASH Wall-17	4 In. Face Brick, 8 In. Common Brick with Air Space	HF-A2,HF-C9,HF-B1,HF-E1
ASH Wall-18	4 In. Face Brick, Air Space and 4 In. Light Weight Block	HF-A7,HF-B1,HF-C14
ASH Wall-19	Wall with 3 In. Fiberglass Insulation and Stucco Outside Finish	HF-A6,HF-B4,HF-A6
ASH Wall-20	Two-sided Brick Wall with Air Space	HF-A7,HF-B1,HF-A2
ASH Wall-21	Brick Wall, 8 In. Concrete Block and No Air Space	HF-A7,HF-C7,HF-A6
ASH Wall-22	Brick Wall with 4 In. Concrete Block	HF-A7,HF-B1,HF-C3,HF-A6
ASH Wall-23	Brick Wall with 8 In. Concrete Block	HF-A7,HF-B1,HF-C8,HF-A6
ASH Wall-24	Brick Wall with 6 In. Concrete	HF-A7,HF-B1,HF-C15,HF-A6
ASH Wall-25	Frame Wall with 2 In. Insulation and 4 In. Brick Veneer	HF-A7,HF-B6,HF-A6
ASH Wall-26	Frame Wall with 2 In. Insulation	HF-A6,HF-B6,HF-A6
ASH Wall-27	Metal Curtain Wall with 3 In. Insulation	HF-A3,HF-B12,HF-A3
ASH Wall-28	Metal Curtain Wall with 2 In. Insulation	HF-A3,HF-B6,HF-A3
ASH Wall-29	Metal Curtain Wall with 1 In. Insulation	HF-A3,HF-B5,HF-A3
ASH Wall-30	Wall 12 In. Concrete with 2 In. Insulation on the Outside	HF-A3,HF-B6,HF-C11,HF-A6
ASH Wall-31	Wall 8 In. Concrete with 2 In. Insulation on the Outside	HF-A3,HF-B6,HF-C10,HF-A6
ASH Wall-32	Wall 4 In. Concrete with 2 In. Insulation on the Outside	HF-A3,HF-B6,HF-C5,HF-A6
ASH Wall-33	Wall 12 In. Concrete with 2 In. Insulation on the Inside	HF-C11,HF-B6,HF-A6
ASH Wall-34	Wall 8 In. Concrete with 2 In. Insulation on the Inside	HF-C10,HF-B6,HF-A6
ASH Wall-35	Wall 4 In. Concrete with 2 In. Insulation on the Inside	HF-C5,HF-B6,HF-A6
ASH Wall-36	Frame Wall with 3 In. Insulation	HF-A1,HF-B1,HF-B4,HF-E1
ASH Wall-37	Frame Wall with 2 In. Insulation	HF-A1,HF-B1,HF-B3,HF-E1
ASH Wall-38	Frame Wall with 1 In. Insulation	HF-A1,HF-B1,HF-B2,HF-E1
ASH Wall-39	Frame Wall without Insulation	HF-A1,HF-B1,HF-E1
ASH Wall-40	2 In. Insulation with 12 In. Heavy Weight Concrete	HF-A1,HF-B3,HF-C11,HF-E1
ASH Wall-41	2 in. Insulation with 8 In. Heavy Weight Concrete	HF-A1,HF-B3,HF-C10,HF-E1
ASH Wall-42	2 In. Insulation with 8 In. Common Brick	HF-A1,HF-B3,HF-C9,HF-E1
ASH Wall-43	2 In. Insulation with 8 In. Heavy Weight Concrete Block	HF-A1,HF-B3,HF-C8,HF-E1
ASH Wall-44	2 In. Insulation with 8 In. Light Weight Concrete Block	HF-A1,HF-B3,HF-C7,HF-E1
ASH Wall-45	2 In. Insulation with 8 In. Clay Tile	HF-A1,HF-B3,HF-C6,HF-E1
ASH Wall-46	2 In. Insulation with 4 In. Heavy Weight Concrete	HF-A1,HF-B3,HF-C5,HF-E1
ASH Wall-47	2 In. Insulation with 4 In. Common Brick	HF-A1,HF-B3,HF-C4,HF-E1
ASH Wall-48	2 In. Insulation with 4 In. Heavy Weight Concrete Block	HF-A1,HF-B3,HF-C3,HF-E1
ASH Wall-49	2 In. Insulation with 4 In. Light Weight Concrete Block	HF-A1,HF-B3,HF-C2,HF-E1
ASH Wall-50	2 In. Insulation with 4 In. Clay Tile	HF-A1,HF-B3,HF-C1,HF-E1
ASH Wall-51	4 In. Face Brick, 2 In. Insulation and 12 In. Heavy Weight Concrete	HF-A2,HF-B3,HF-C11,HF-E1
ASH Wall-52	4 In. Face Brick, 2 In. Insulation and 8 In. Heavy Weight Concrete	HF-A2,HF-B3,HF-C10,HF-E1
ASH Wall-53	4 In. Face Brick, 2 In. Insulation and 8 In. Common Brick	HF-A2,HF-B3,HF-C9,HF-E1
ASH Wall-54	4 In. Face Brick, Air Space and 12 In. Heavy Weight Concrete	HF-A2,HF-B1,HF-C11,HF-E1

Table 3 Exterior-Wall Constructions

LAYERS Code-word	**Description**	**Materials** (outside to inside)
ASH Wall-55	4 In. Face Brick, Air Space and 8 In. Heavy Weight Concrete	HF-A2,HF-B1,HF-C10,HF-E1
ASH Wall-56	4 In. Face Brick, 2 In. Insulation and 8 In. Heavy Weight Concrete Block	HF-A2,HF-B3,HF-C8,HF-E1
ASH Wall-57	4 In. Face Brick, 2 In. Insulation and 8 In. Light Weight Concrete Block	HF-A2,HF-B3,HF-C7,HF-E1
ASH Wall-58	2 In. Face Brick, 2 In. Insulation and 8 In. Clay Tile	HF-A2,HF-B3,HF-C6,HF-E1
ASH Wall-59	4 In. Face Brick, 2 In. Insulation and 4 In. Heavy Weight Concrete	HF-A2,HF-B3,HF-C5,HF-E1
ASH Wall-60	4 In. Face Brick, 2 In. Insulation and 4 In. Common Brick	HF-A2,HF-B3,HF-C4,HF-E1
ASH Wall-61	4 In. Face Brick, 2 In. Insulation and 4 In. Heavy Weight Concrete Block	HF-A2,HF-B3,HF-C3,HF-E1
ASH Wall-62	4 In. Face Brick with 8 In. Common Brick	HF-A2,HF-C9,HF-E1
ASH Wall-63	8 In. Heavy Weight Concrete Block with 1 In. Insulation	HF-A1,HF-C8,HF-B2,HF-E1
ASH Wall-64	8 In. Heavy Weight Concrete Block	HF-A1,HF-C8,HF-E1
ASH Wall-65	8 In. Light Weight Concrete Block with Insulation	HF-A1,HF-C7,HF-B2,HF-E1
ASH Wall-66	8 In. Light Weight Concrete Block	HF-A1,HF-C7,HF-E1
ASH Wall-67	4 In. Face Brick, 8 In. Clay Tile and 1 In. Insulation	HF-A2,HF-C6,HF-B2,HF-E1
ASH Wall-68	4 In. Face Brick, 8 In. ClayTile and Air Space	HF-A2,HF-C6,HF-B1,HF-E1
ASH Wall-69	4 In. Face Brick with 8 In. Clay Tile	HF-A2,HF-C6,HF-E1
ASH Wall-70	8 In. Clay Tile with 1 In.Insulation	HF-A1,HF-C6,HF-B2,HF-E1
ASH Wall-71	8 In. Clay Tile with Air Space	HF-A1,HF-C6,HF-B1,HF-E1
ASH Wall-72	8 In. Clay Tile	HF-A1,HF-C6,HF-E1
ASH Wall-73	4 In. Heavy Weight Concrete with 2 In. Insulation	HF-A1,HF-C5,HF-B3,HF-E1
ASH Wall-74	4 In. Heavy Weight Concrete with 1 In. Insulation	HF-A1,HF-C5,HF-B2,HF-E1
ASH Wall-75	4 In. Heavy Weight Concrete with Air Space	HF-A1,HF-C5,HF-B1,HF-E1
ASH Wall-76	4 In. Heavy Weight Concrete	HF-A1,HF-C5,HF-E1
ASH Wall-77	4 In. Face Brick, 4 In. Common Brick and 1 In. Insulation	HF-A2,HF-C4,HF-B2,HF-E1
ASH Wall-78	4 In. Face Brick, 4 In. Common Brick and Air Space	HF-A2,HF-C4,HF-B1,HF-E1
ASH Wall-79	4 In. Face Brick with 4 In. Common Brick	HF-A2,HF-C4,HF-E1
ASH Wall-80	4 In. Common Brick	HF-A1,HF-C4,HF-E1
ASH Wall-81	4 In. Heavy Weight Concrete Block	HF-A1,HF-C3,HF-E1
ASH Wall-82	4 In. Face Brick, 4 In. Light Wt. Concrete Block and 1 In. Insulation	HF-A2,HF-C2,HF-B2,HF-E1
ASH Wall-83	4 In. Face Brick, 4 In. Light Wt. Concrete Block and Air Space	HF-A2,HF-C2,HF-B1,HF-E1
ASH Wall-84	4 In. Face Brick with 4 In. Light Weight Concrete Block	HF-A2,HF-C2,HF-E1
ASH Wall-85	4 In. Light Weight Concrete Block and 1 In. Insulation	HF-A1,HF-C2,HF-B2,HF-E1
ASH Wall-86	4 In. Light Weight Concrete Block and Air Space	HF-A1,HF-C2,HF-B1,HF-E1
ASH Wall-87	4 In. Light Weight ConcreteBlock	HF-A1,HF-C2,HF-E1
ASH Wall-88	4 In. Face Brick, 4 In. Clay Tile and 1 In. Insulation	HF-A2,HF-C1,HF-B2,HF-E1
ASH Wall-89	4 In. Face Brick, 4 In. Clay Tile and Air Space	HF-A2,HF-C1,HF-B1,HF-E1
ASH Wall-90	4 In. Face Brick and 4 In. Clay Tile	HF-A2,HF-C1,HF-E1
ASH Wall-91	4 In. Clay Tile and 1 In. Insulation	HF-A1,HF-C1,HF-B2,HF-E1
ASH Wall-92	4 In. Clay Tile and Air Space	HF-A1,HF-C1,HF-B1,HF-E1
ASH Wall-93	4 In. Clay Tile	HF-A1,HF-C1,HF-E1
ASH Wall-94	Sheet Metal with 1 In. Insulation	HF-A3,HF-B2,HF-B1,HF-A3
ASH Wall-95	Sheet Metal with 2 In. Insulation	HF-A3,HF-B3,HF-B1,HF-A3
ASH Wall-96	Sheet Metal with 3 In. Insulation	HF-A3,HF-B4,HF-B1,HF-A3

Roof Constructions

Table 4 Roof Constructions		
LAYERS Code-word	**Description**	**Materials** (outside to inside)
ASH Roof-1	Roof Terrace System	HF-C12,HF-B1,HF-B6,HF-E2,HF-E3,HF-C5,HF-E4,HF-E5
ASH Roof-2	4 In. Wood with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-B9,HF-E4,HF-E5
ASH Roof-3	2.5 In. Wood with 2 In.Insulation	HF-E2,HF-E3,HF-B6,HF-B8,HF-E4,HF-E5
ASH Roof-4	4 In. Wood with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-B7,HF-E4,HF-E5
ASH Roof-5	4 In. Wood with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-B9,HF-E4,HF-E5
ASH Roof-6	2.5 In. Wood with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-B8,HF-E4,HF-E5
ASH Roof-7	1 In. Wood with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-B7,HF-E4,HF-E5
ASH Roof-8	8 In. Light Weight Concrete	HF-E2,HF-E3,HF-C16,HF-E4,HF-E5
ASH Roof-9	6 In. Light Weight Concrete	HF-E2,HF-E3,HF-C15,HF-E4,HF-E5
ASH Roof-10	4 In. Light Weight Concrete	HF-E2,HF-E3,HF-C14,HF-E4,HF-E5
ASH Roof-11	6 In. Heavy Weight Concrete with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-C13,HF-E4,HF-E5
ASH Roof-12	4 In. Heavy Weight Concrete with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-C5,HF-E4,HF-E5
ASH Roof-13	2 In. Heavy Weight Concrete with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-C12,HF-E4,HF-E5
ASH Roof-14	6 In. Heavy Weight Concrete with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-C13,HF-E4,HF-E5
ASH Roof-15	4 In. Heavy Weight Concrete with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-C5,HF-E4,HF-E5
ASH Roof-16	2 In. Heavy Weight Concrete with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-C12,HF-E4,HF-E5
ASH Roof-17	Steel Sheet with 2 In. Insulationn	HF-E2,HF-E3,HF-B6,HF-A3,HF-E4,HF-E5
ASH Roof-18	Steel Sheet with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-A3,HF-E4,HF-E5
ASH Roof-19	Roof Terrace System	HF-C12,HF-B1,HF-B6,HF-E2,HF-E3,HF-C5
ASH Roof-20	4 In. Wood with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-B9
ASH Roof-21	2.5 In. Wood with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-B8
ASH Roof-22	1 In. Wood with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-B7
ASH Roof-23	4 In. Wood with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-B9
ASH Roof-24	2.5 In. Wood with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-B8
ASH Roof-25	1 In. Wood with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-B7
ASH Roof-26	8 In. Light Weight Concrete	HF-E2,HF-E3,HF-C16
ASH Roof-27	6 In. Light Weight Concrete	HF-E2,HF-E3,HF-C15
ASH Roof-28	4 In. Light Weight Concrete	HF-E2,HF-E3,HF-C14
ASH Roof-29	6 In. Heavy Weight Concrete with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-C13
ASH Roof-30	4 In. Heavy Weight Concrete with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-C5
ASH Roof-31	2 In. Heavy Weight Concrete with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-C12
ASH Roof-32	6 In. Heavy Weight Concrete with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-C13
ASH Roof-33	4 In. Heavy Weight Concrete with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-C5
ASH Roof-34	2 In. Heavy Weight Concrete with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-C12
ASH Roof-35	Steel Sheet with 2 In. Insulation	HF-E2,HF-E3,HF-B6,HF-A3
ASH Roof-36	Steel Sheet with 1 In. Insulation	HF-E2,HF-E3,HF-B5,HF-A3

Interior-Wall Constructions

Table 5 Interior-Wall Constructions		
LAYERS Code-word	**Description**	**Materials** (outside to inside)
ASH Int Wall-1	4 In. Clay Tile with 0.75 In.Plaster	HF-E1,HF-C1,HF-E1
ASH Int Wall-2	4 In. Light Weight ConcreteBlock with 0.75 In. Plaster	HF-E1,HF-C2,HF-E1
ASH Int Wall-3	4 In. Heavy Weight ConcreteBlock with 0.75 In. Plaster	HF-E1,HF-C3,HF-E1
ASH Int Wall-4	4 In. Common Brick with 0.75 In. Plaster	HF-E1,HF-C4,HF-E1
ASH Int Wall-5	4 In. Heavy Weight Concretewith 0.75 In. Plaster	HF-E1,HF-C5,HF-E1
ASH Int Wall-6	5 In. Clay Tile with 0.75 In. Plaster	HF-E1,HF-C6,HF-E1
ASH Int Wall-7	8 In. Light Weight Concrete Block, Plastered Both Sides	HF-E1,HF-C7,HF-E1
ASH Int Wall-8	8 In. Heavy Weight Concrete Block, Plastered Both Sides	HF-E1,HF-C8,HF-E1
ASH Int Wall-9	8 In. Common Brick, Plastered Both Sides	HF-E1,HF-C9,HF-E1
ASH Int Wall-10	8 In. Heavy Concrete, Plastered Both Sides	HF-E1,HF-C10,HF-E1
ASH Int Wall-11	12 In. Heavy Concrete, Plastered Both Sides	HF-E1,HF-C11,HF-E1
ASH Int Wall-12	4 In. Clay Tile	HF-C1
ASH Int Wall-13	4 In. Light Weight Concrete Block	HF-C2
ASH Int Wall-14	4 In. Heavy Weight Concrete Block	HF-C3
ASH Int Wall-15	4 In. Common Brick	HF-C4
ASH Int Wall-16	4 In. Heavy Weight Concrete	HF-C5
ASH Int Wall-17	8 In. Clay Tile	HF-C6
ASH Int Wall-18	8 In. Light Weight Concrete Block	HF-C7
ASH Int Wall-19	8 In. Heavy Weight Concrete Block	HF-C8
ASH Int Wall-20	8 In. Common Brick	HF-C9
ASH Int Wall-21	8 In. Heavy Weight Concrete	HF-C10
ASH Int Wall-22	12 In. Heavy Weight Concrete	HF-C11
ASH Int Wall-23	Frame Partition with 0.75 In. Gypsum Board	HF-E1,HF-B1,HF-E1
ASH Int Wall-24	1 In. Wood	HF-B7
ASH Int Wall-25	2 In. Wood	HF-B10
ASH Int Wall-26	3 In. Wood	HF-B11
ASH Int Wall-27	4 In. Wood	HF-B9
ASH Int Wall-28	Frame Partition with 1 In. Wood	HF-B7,HF-B1,HF-B7
ASH Int Wall-29	2 In. Furniture	HF-B10,HF-B1,HF-B10
ASH Int Wall-30	3 In. Furniture	HF-B11,HF-B1,HF-B11
ASH Int Wall-31	2 In. Heavy Weight Concrete Floor Deck	HF-C12
ASH Int Wall-32	4 In. Heavy Weight Concrete Floor Deck	HF-C5
ASH Int Wall-33	2 In. Light Weight Concrete Floor Deck	HF-C5
ASH Int Wall-34	8 In. Heavy Weight Concrete Floor Deck	HF-C10
ASH Int Wall-35	8 In. Light Weight Concrete Floor Deck	HF-C7
ASH Int Wall-36	2 In. Wood Deck	HF-B10
ASH Int Wall-37	3 In. Wood Deck	HF-B11
ASH Int Wall-38	2 In. Heavy Weight Concrete Deck with False Ceiling	HF-C10,HF-E4,HF-E5
ASH Int Wall-39	4 In. Heavy Weight Concrete Deck with False Ceiling	HF-C5,HF-E4,HF-E5
ASH Int Wall-40	4 In. Light Weight Concrete Deck with False Ceiling	HF-C2,HF-E4,HF-E5
ASH Int Wall-41	8 In. Heavy Weight Concrete Deck with False Ceiling	HF-C10,HF-E4,HF-E5
ASH Int Wall-42	8 In. Light Weight Concrete Deck with False Ceiling	HF-C7,HF-E4,HF-E5
ASH Int Wall-43	2 In. Wood Deck with False Ceiling	HF-B10,HF-E4,HF-E5
ASH Int Wall-44	3 In. Wood Deck with False Ceiling	HF-B11,HF-E4,HF-E5
ASH Int Wall-45	12 In. Heavy Weight Concrete Deck with False Ceiling	HF-C11,HF-E4,HF-E5
ASH Int Wall-46	4 In. Wood Deck with False Ceiling	HF-B9,HF-E4,HF-E5
ASH Int Wall-47	Steel Deck with False Ceiling	HF-A3,HF-E4,HF-E5

WINDOW LIBRARY

This section summarizes the available glazings in the window library. Single-pane entries are given first, followed by double-, triple-, and quadruple-pane. For a given number of panes, clear and low-iron glazings are given first, followed by tinted, reflective, low-E, and electrochromic options.

You can find the best GLASS-TYPE-CODE for a particular glazing product by matching the number of panes, glass thickness, gap width, tint, coating, and gas fill from the manufacturer's data sheet with the corresponding information in Table 6. Manufacturer's values for shading coefficient, transmittance, and reflectance can be used to check your selection. If you can't find a good match, you can create your own glazing layer-by-layer using the Window Layer Method.

The terminology used in the glazing descriptions is as follows:

Table 7 Library Terminology

Term	Description
Clear:	No impurities added to the glass mix.
Low Iron:	Clear glass with a low iron content, resulting in higher transmittance.
Tint:	Outer pane is tinted with inorganic materials to increase absorption in certain areas of the visible spectrum in order to produce a certain color.
Ref:	Reflective; i.e., a metallic coating is applied to one surface of a pane in order to increase solar reflection. Ref-A refers to stainless steel coatings, Ref-B to titanium, Ref-C to pewter, and Ref-D to tin-oxide. L, M, and H used with Clear and Tint refer to low, medium, and high transmittance coating, respectively.
Low-E:	A low emissivity metallic coating is applied in order to increase thermal IR reflectance. The coated surface is indicated by en = v, where n = 1 is the outside of the outer pane, n = 2 is the inside of the outer pane, etc., and v is the emissivity (see, for example, G-T-C = 2635, where e2 = 0.1 indicates a coating with an emissivity of 0.1 on surface #2).
Film:	A polyester film (with low-E coating) stretched between glass panes. The approximate visible transmittance of the film (in percent) is shown as (nn); see, for example, G-T-C = 3641.
Electrochromic:	A coating that makes the glazing more absorbing or more reflecting as the voltage applied to glazing changes.
Bleached:	The clearest state of electrochromic glass.
Colored:	The darkest state of electrochromic glass.

Table 8 Column Headings in Glazing Table

Heading	Description
G-T-C:	The GLASS-TYPE-CODE. The first digit is the number of panes. The second digit is 0 for clear or low-iron; 2 for tinted but no coating; 4 for reflective coating with clear or tinted glass; 6 for low-E coating on clear or tinted glass, and 8 for electrochromic glass.
U-SI:	Center-of-glass U-value in SI units (W/m2-K) for ASHRAE winter conditions [-17.8C (0F) outside temperature, 21.1C (70F) inside temperature, 6.71 m/s (15 mph) windspeed and zero incident solar radiation]. The program calculates the overall conductance of a window as the area-weighted average of the center-of-glass U-value, the edge-of-glass U-value and the frame U-value. The center-of-glass U-value includes a combined convective plus radiative outside air film conductance of 28.7 W/m2-K.
U-IP:	Center-of-glass U-value in inch-pound units (Btu/ft2-h-F) for ASHRAE winter conditions. Includes a combined convective plus radiative outside air film conductance of 5.0 Btu/ft2-h-F.
SC:	Center-of-glass ASHRAE shading coefficient for ASHRAE summer conditions [35C (95F) outside temperature, 24C (75F) inside temperature, 3.3 m/s (7.5 mph) windspeed, and near-normal incident solar radiation of 783 W/m2 (248 Btu/h-ft2)].
SHGC:	Center-of-glass solar heat gain coefficient at near normal incidence for ASHRAE summer conditions.
Tsol:	Center-of-glass solar transmittance for all glazing layers, at normal incidence.
Rfsol:	Center-of-glass solar reflectance for all glazing ayers for radiation incident from the front at normal incidence.
Tvis:	Center-of-glass visible transmittance for all glazing layers, at normal incidence.
Rfvis:	Center-of-glass visible reflectance for all glazing layers for radiation incident from the front at normal incidence.
Pane #n ID:	Identification number of the nth solid layer (pane) in the glazing assembly. The panes are numbered from the outdoor side of the window to the room side. (For windows in an interior wall between a sunspace and adjacent room, the "outdoor" side is the sunspace side.) The properties of this layer are given in the "Glass Layers Library" in this document. Although called the "Window Layer Library", some of the entries are for plastic films. (This library was used with WINDOW-4 to create the Window Library.)
Pane #n Wid:	Thickness of the nth pane (mm).
GAP #n Gas:	Type of gas (air, argon, etc.) in the nth gap. Gaps are numbered from the outdoor side of the window to the room side.
Gap #n Wid:	Thickness of the nth gap (mm).

Legacy DOE-2 Window Library

The Following tables 9-15 contain the legacy version of the DOE-2 Window Library as it was previously published for DOE-2.1E and DOE-2.2 prior to version 44d.

Table 6 Windows - Single Glazing

									Pane #1	
G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Id	Wid
Single Clear										
1000	6.31	1.11	1.00	.86	.84	.08	.90	.08	2	3.0
1001	6.17	1.09	.95	.81	.77	.07	.88	.08	3	6.0
Single Low Iron										
1002	6.31	1.11	1.05	.90	.90	.08	.91	.08	14	3.0
1003	6.22	1.10	1.04	.90	.89	.08	.91	.08	16	5.0
Single Tint Bronze										
1200	6.31	1.11	.84	.73	.64	.06	.69	.06	5	3.0
1201	6.17	1.09	.71	.61	.48	.05	.53	.06	6	6.0
Single Tint Green										
1202	6.31	1.11	.83	.72	.63	.06	.82	.08	11	3.0
1203	6.17	1.09	.71	.61	.49	.06	.75	.07	12	6.0
Single Tint Grey										
1204	6.31	1.11	.83	.71	.63	.06	.61	.06	8	3.0
1205	6.17	1.09	.69	.59	.46	.05	.43	.05	9	6.0
Single Tint Blue										
1206	6.17	1.09	.71	.61	.48	.05	.57	.06	17	6.0
Single Ref-A Clear-L										
1400	4.90	.86	.23	.19	.07	.34	.08	.41	200	6.0
Single Ref-A Clear-L										
1401	5.11	.90	.29	.25	.11	.27	.14	.31	201	6.0
Single Ref-A Clear-L										
1402	5.41	.95	.36	.31	.16	.22	.20	.25	202	6.0
Single Ref-A Tint-L										
1403	4.93	.87	.26	.22	.04	.15	.05	.17	210	6.0
Single Ref-A Tint-M										
1404	5.11	.90	.29	.25	.06	.13	.09	.14	211	6.0
Single Ref-A Tint-H										
1405	5.29	.93	.34	.29	.10	.11	.10	.11	212	6.0
Single Ref-B Clear-L										
1406	5.44	.96	.35	.31	.15	.22	.20	.23	220	6.0
Single Ref-B Clear-H										
1407	5.50	.97	.45	.39	.24	.16	.30	.16	221	6.0
Single Ref-B Tint-L										
1408	4.93	.87	.26	.23	.04	.13	.05	.09	230	6.0
Single Ref-B Tint-M										
1409	5.05	.89	.33	.28	.10	.11	.13	.10	231	6.0
Single Ref-B Tint-H										
1410	5.50	.97	.40	.34	.15	.09	.18	.08	232	6.0
Single Ref-C Clear-L										
1411	4.99	.88	.29	.25	.11	.25	.13	.28	240	6.0
Single Ref-C Clear-M										
1412	5.23	.92	.37	.32	.17	.20	.19	.21	241	6.0
Single Ref-C Clear-H										
1413	5.35	.94	.41	.35	.20	.16	.22	.17	242	6.0
Single Ref-C Tint-L										
1414	4.99	.88	.29	.25	.07	.13	.08	.13	250	6.0
Single Ref-C Tint-M										
1415	5.23	.92	.34	.29	.10	.10	.11	.10	251	6.0
Single Ref-C Tint-H										
1416	5.35	.94	.37	.31	.12	.09	.13	.09	252	6.0
Single Ref-D Clear										
1417	6.12	1.08	.58	.50	.43	.31	.33	.45	260	6.0
Single Ref-D Tint										
1418	6.12	1.08	.53	.46	.30	.14	.25	.18	270	6.0
Single Low-E Clear (e2=.4)										
1600	4.99	.88	.91	.78	.75	.10	.85	.12	300	3.0
Single Low-E Clear (e2=.2)										
1601	4.34	.76	.89	.77	.74	.09	.82	.11	350	3.0

									Pane #1	
G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Id	Wid
1602	4.27	.75	.84	.72	.68	.09	.81	.11	351	6.0
Single Electrochromic Absorbing Bleached/Colored										
1800	6.17	1.09	.98	.84	.81	.09	.85	.10	700	6.0
1801	6.17	1.09	.36	.31	.11	.18	.13	.08	701	6.0
Single Electrochromic Reflecting Bleached/Colored										
1802	6.17	1.09	.85	.73	.69	.17	.82	.11	702	6.0
1803	6.17	1.09	.34	.29	.10	.22	.16	.07	703	6.0

Table 7 Windows - Double Glazed

									Pane #1		Gap #1		Pane #2	
G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Id	Wid	Gas	Wid	Id	Wid
Double Clear														
2000	3.23	.57	.88	.76	.70	.13	.81	.15	2	3.0	Air	6.3	2	3.0
2001	2.79	.49	.89	.76	.70	.13	.81	.15	2	3.0	Air	12.7	2	3.0
2002	2.61	.46	.89	.76	.70	.13	.81	.15	2	3.0	Arg	12.7	2	3.0
2003	3.16	.56	.81	.69	.60	.11	.78	.14	3	6.0	Air	6.3	3	6.0
2004	2.74	.48	.81	.70	.60	.11	.78	.14	3	6.0	Air	12.7	3	6.0
2005	2.56	.45	.81	.70	.60	.11	.78	.14	3	6.0	Arg	12.7	3	6.0
Double Low Iron														
2006	3.23	.57	.96	.83	.81	.14	.84	.15	14	3.0	Air	6.3	14	3.0
2007	2.79	.49	.96	.83	.81	.14	.84	.15	14	3.0	Air	12.7	14	3.0
2008	2.61	.46	.96	.83	.81	.14	.84	.15	14	3.0	Arg	12.7	14	3.0
2009	3.18	.56	.95	.82	.80	.14	.83	.15	16	5	Air	6.3	16	5.0
2010	2.76	.49	.95	.82	.80	.14	.83	.15	16	5	Air	12.7	16	5.0
2011	2.58	.45	.95	.82	.80	.14	.83	.15	16	5	Arg	12.7	16	5.0
Double Tint Bronze														
2200	3.23	.57	.72	.62	.54	.09	.62	.10	5	3.0	Air	6.3	2	3.0
2201	2.79	.49	.72	.62	.54	.09	.62	.10	5	3.0	Air	12.7	2	3.0
2202	2.61	.46	.72	.62	.54	.09	.62	.10	5	3.0	Arg	12.7	2	3.0
2203	3.16	.56	.57	.49	.38	.07	.47	.08	6	6.0	Air	6.3	3	6.0
2204	2.74	.48	.57	.49	.38	.07	.47	.08	6	6.0	Air	12.7	3	6.0
2205	2.56	.45	.56	.49	.38	.07	.47	.08	6	6.0	Arg	12.7	3	6.0
Double Tint Green														
2206	3.23	.57	.72	.62	.53	.09	.74	.13	11	3.0	Air	6.3	2	3.0
2207	2.79	.49	.71	.61	.53	.09	.74	.13	11	3.0	Air	12.7	2	3.0
2208	2.61	.46	.71	.61	.53	.09	.74	.13	11	3.0	Arg	12.7	2	3.0
2209	3.16	.56	.58	.50	.38	.07	.66	.12	12	6.0	Air	6.3	3	6.0
2210	2.74	.48	.57	.49	.38	.07	.66	.12	12	6.0	Air	12.7	3	6.0
2211	2.56	.45	.57	.49	.38	.07	.66	.12	12	6.0	Arg	12.7	3	6.0
Double Tint Grey														
2212	3.23	.57	.71	.61	.53	.09	.55	.09	8	3.0	Air	6.3	2	3.0
2213	2.79	.49	.71	.61	.53	.09	.55	.09	8	3.0	Air	12.7	2	3.0
2214	2.61	.46	.70	.61	.53	.09	.55	.09	8	3.0	Arg	12.7	2	3.0
2215	3.16	.56	.55	.47	.35	.07	.38	.07	9	6.0	Air	6.3	3	6.0
2216	2.74	.48	.54	.47	.35	.07	.38	.07	9	6.0	Air	12.7	3	6.0
2217	2.56	.45	.54	.47	.35	.07	.38	.07	9	6.0	Arg	12.7	3	6.0
Double Tint Blue														
2218	3.16	.56	.57	.49	.37	.07	.50	.09	17	6.0	Air	6.3	3	6.0
2219	2.74	.48	.57	.49	.37	.07	.50	.09	17	6.0	Air	12.7	3	6.0
2220	2.56	.45	.56	.49	.37	.07	.50	.09	17	6.0	Arg	12.7	3	6.0

Table 8 Windows - Reflective Glazing

									Pane #1	Gap #1	Pane			
G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Id	Wid	Gas	Wid	Id	Wid
Double Ref-A Clear-L														
2400	2.79	.49	.17	.14	.05	.34	.07	.41	200	6.0	Air	6.3	3	6.0
2401	2.26	.40	.15	.13	.05	.34	.07	.41	200	6.0	Air	12.7	3	6.0
2402	2.02	.36	.14	.12	.05	.34	.07	.41	200	6.0	Arg	12.7	3	6.0
Double Ref-A Clear-M														
2403	2.86	.50	.22	.19	.09	.27	.13	.31	201	6.0	Air	6.3	3	6.0
2404	2.35	.41	.20	.17	.09	.27	.13	.31	201	6.0	Air	12.7	3	6.0
2405	2.13	.38	.20	.17	.09	.27	.13	.31	201	6.0	Arg	12.7	3	6.0
Double Ref-A Clear-H														
2406	2.95	.52	.27	.23	.13	.22	.18	.25	202	6.0	Air	6.3	3	6.0
2407	2.47	.44	.26	.22	.13	.22	.18	.25	202	6.0	Air	12.7	3	6.0
2408	2.26	.40	.25	.22	.13	.22	.18	.25	202	6.0	Arg	12.7	3	6.0
Double Ref-A Tint-L														
2410	2.80	.49	.18	.15	.03	.15	.05	.17	210	6.0	Air	6.3	3	6.0
2411	2.27	.40	.15	.13	.03	.15	.05	.17	210	6.0	Air	12.7	3	6.0
2412	2.04	.36	.15	.13	.03	.15	.05	.17	210	6.0	Arg	12.7	3	6.0
Double Ref-A Tint-M														
2413	2.86	.50	.20	.17	.05	.13	.08	.14	211	6.0	Air	6.3	3	6.0
2414	2.35	.41	.18	.15	.05	.13	.08	.14	211	6.0	Air	12.7	3	6.0
2415	2.13	.38	.17	.15	.05	.13	.08	.14	211	6.0	Arg	12.7	3	6.0
Double Ref-A Tint-H														
2416	2.92	.51	.24	.21	.08	.11	.09	.11	212	6.0	Air	6.3	3	6.0
2417	2.42	.43	.22	.19	.08	.11	.09	.11	212	6.0	Air	12.7	3	6.0
2418	2.21	.39	.21	.19	.08	.11	.09	.11	212	6.0	Arg	12.7	3	6.0
Double Ref-B Clear-L														
2420	2.96	.52	.27	.23	.12	.22	.18	.23	220	6.0	Air	6.3	3	6.0
2421	2.48	.44	.25	.22	.12	.22	.18	.23	220	6.0	Air	12.7	3	6.0
2422	2.27	.40	.25	.21	.12	.22	.18	.23	220	6.0	Arg	12.7	3	6.0
Double Ref-B Clear-H														
2426	2.98	.53	.35	.30	.19	.16	.27	.17	221	6.0	Air	6.3	3	6.0
2427	2.50	.44	.34	.29	.19	.16	.27	.17	221	6.0	Air	12.7	3	6.0
2428	2.30	.41	.34	.29	.19	.16	.27	.17	221	6.0	Arg	12.7	3	6.0
Double Ref-B Tint-L														
2430	2.80	.49	.18	.15	.03	.13	.05	.09	230	6.0	Air	6.3	3	6.0
2431	2.27	.40	.16	.14	.03	.13	.05	.09	230	6.0	Air	12.7	3	6.0
2432	2.04	.36	.15	.13	.03	.13	.05	.09	230	6.0	Arg	12.7	3	6.0
Double Ref-B Tint-M														
2433	2.84	.50	.24	.20	.08	.11	.12	.10	231	6.0	Air	6.3	3	6.0
2434	2.33	.41	.22	.19	.08	.11	.12	.10	231	6.0	Air	12.7	3	6.0
2435	2.10	.37	.21	.18	.08	.11	.12	.10	231	6.0	Arg	12.7	3	6.0
Double Ref-B Tint-H														
2436	2.98	.53	.29	.25	.12	.09	.16	.08	232	6.0	Air	6.3	3	6.0
2437	2.50	.44	.27	.23	.12	.09	.16	.08	232	6.0	Air	12.7	3	6.0
2438	2.30	.41	.27	.23	.12	.09	.16	.08	232	6.0	Arg	12.7	3	6.0
Double Ref-C Clear-L														
2440	2.82	.50	.22	.19	.09	.25	.12	.28	240	6.0	Air	6.3	3	6.0
2441	2.30	.41	.20	.18	.09	.25	.12	.28	240	6.0	Air	12.7	3	6.0
2442	2.07	.36	.20	.17	.09	.25	.12	.28	240	6.0	Arg	12.7	3	6.0
Double Ref-C Clear-M														
2443	2.90	.51	.28	.24	.14	.20	.17	.21	241	6.0	Air	6.3	3	6.0
2444	2.40	.42	.27	.23	.14	.20	.17	.21	241	6.0	Air	12.7	3	6.0
2445	2.18	.38	.26	.23	.14	.20	.17	.21	241	6.0	Arg	12.7	3	6.0
Double Ref-C Clear-H														
2446	2.94	.52	.32	.27	.16	.16	.20	.17	242	6.0	Air	6.3	3	6.0
2447	2.45	.43	.30	.26	.16	.16	.20	.17	242	6.0	Air	12.7	3	6.0
2448	2.23	.39	.30	.26	.16	.16	.20	.17	242	6.0	Arg	12.7	3	6.0
Double Ref-C Tint-L														
2450	2.82	.50	.21	.18	.06	.13	.07	.13	250	6.0	Air	6.3	3	6.0
2451	2.30	.41	.19	.16	.06	.13	.07	.13	250	6.0	Air	12.7	3	6.0
2452	2.07	.36	.18	.15	.06	.13	.07	.13	250	6.0	Arg	12.7	3	6.0

									Pane #1	Gap #1	Pane			
G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Id	Wid	Gas	Wid	Id	Wid
Double Ref-C Tint-M														
2453	2.90	.51	.24	.21	.08	.10	.10	.10	251	6.0	Air	6.3	3	6.0
2454	2.40	.42	.22	.19	.08	.10	.10	.10	251	6.0	Air	12.7	3	6.0
2455	2.18	.38	.21	.19	.08	.10	.10	.10	251	6.0	Arg	12.7	3	6.0
Double Ref-D Tint-H														
2456	2.94	.52	.26	.23	.10	.09	.12	.09	252	6.0	Air	6.3	3	6.0
2457	2.45	.43	.24	.21	.10	.09	.12	.09	252	6.0	Air	12.7	3	6.0
2458	2.23	.39	.24	.20	.10	.09	.12	.09	252	6.0	Arg	12.7	3	6.0
Double Ref-D Clear														
2460	3.15	.56	.49	.42	.34	.32	.31	.46	260	6.0	Air	6.3	3	6.0
2461	2.72	.48	.49	.42	.34	.32	.31	.46	260	6.0	Air	12.7	3	6.0
2462	2.54	.45	.49	.42	.34	.32	.31	.46	260	6.0	Arg	12.7	3	6.0
Double Ref-D Tint														
2470	3.15	.56	.41	.35	.24	.15	.23	.19	270	6.0	Air	6.3	3	6.0
2471	2.72	.48	.40	.35	.24	.15	.23	.19	270	6.0	Air	12.7	3	6.0
2472	2.54	.45	.40	.34	.24	.15	.23	.19	270	6.0	Arg	12.7	3	6.0

Table 9 Windows – Low-emissivity Glazings

									Pane #1	Gap #1	Pane			
G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Id	Wid	Gas	Wid	Id	Wid
Double Low-E (e3=.4) Clear														
2600	2.85	.50	.84	.72	.63	.15	.77	.18	2	3.0	Air	6.3	300	3.0
2601	2.30	.41	.85	.73	.63	.15	.77	.18	2	3.0	Air	12.7	300	3.0
2602	2.05	.36	.85	.73	.63	.15	.77	.18	2	3.0	Arg	12.7	300	3.0
Double Low-E (e3=.2) Clear														
2610	2.61	.46	.84	.72	.62	.15	.74	.18	2	3.0	Air	6.3	350	3.0
2611	1.99	.35	.85	.73	.62	.15	.74	.18	2	3.0	Air	12.7	350	3.0
2612	1.70	.30	.86	.74	.62	.15	.74	.18	2	3.0	Arg	12.7	350	3.0
2613	2.57	.45	.77	.66	.53	.13	.72	.17	3	6.0	Air	6.3	351	6.0
2614	1.96	.35	.78	.67	.53	.13	.72	.17	3	6.0	Air	12.7	351	6.0
2615	1.67	.29	.79	.68	.53	.13	.72	.17	3	6.0	Arg	12.7	351	6.0
Double Low-E (e2=.1) Clear														
2630	2.47	.44	.69	.60	.54	.22	.77	.14	400	3.0	Air	6.3	2	3.0
2631	1.81	.32	.69	.60	.54	.22	.77	.14	400	3.0	Air	12.7	2	3.0
2632	1.48	.26	.69	.59	.54	.22	.77	.14	400	3.0	Arg	12.7	2	3.0
2633	2.43	.43	.65	.56	.47	.20	.75	.11	401	6.0	Air	6.3	3	6.0
2634	1.78	.31	.65	.56	.47	.20	.75	.11	401	6.0	Air	12.7	3	6.0
2635	1.46	.26	.66	.56	.47	.20	.75	.11	401	6.0	Arg	12.7	3	6.0
Double Low-E (e2=.1) Tint														
2636	2.43	.43	.45	.39	.28	.10	.44	.05	451	6.0	Air	6.3	3	6.0
2637	1.78	.31	.43	.37	.28	.10	.44	.05	451	6.0	Air	12.7	3	6.0
2638	1.46	.26	.43	.37	.28	.10	.44	.05	451	6.0	Arg	12.7	3	6.0
Double Low-E (e3=.1) Clear														
2640	2.47	.44	.74	.63	.54	.23	.77	.13	2	3.0	Air	6.3	400	3.0
2641	1.81	.32	.75	.64	.54	.23	.77	.13	2	3.0	Air	12.7	400	3.0
2642	1.48	.26	.75	.65	.54	.23	.77	.13	2	3.0	Arg	12.7	400	3.0
Double Low-E (e2=.04) Clear														
2660	2.38	.42	.51	.44	.39	.36	.70	.12	500	3.0	Air	6.3	2	3.0
2661	1.68	.30	.51	.44	.39	.36	.70	.12	500	3.0	Air	12.7	2	3.0
2662	1.34	.24	.50	.43	.39	.36	.70	.12	500	3.0	Arg	12.7	2	3.0
Double Low-E (e3=.04) Clear														
2663	2.41	.42	.49	.42	.34	.31	.68	.12	501	6.0	Air	6.3	3	6.0
2664	1.67	.29	.48	.42	.34	.31	.68	.12	501	6.0	Air	12.7	3	6.0
2665	1.32	.23	.48	.42	.34	.31	.68	.12	501	6.0	Arg	12.7	3	6.0
Double Low-E (e2=.04) Tint														
2666	2.41	.42	.35	.31	.21	.14	.41	.08	550	6.0	Air	6.3	3	6.0
2667	1.67	.29	.33	.29	.21	.14	.41	.08	550	6.0	Air	12.7	3	6.0
2668	1.32	.23	.32	.28	.21	.14	.41	.08	550	6.0	Arg	12.7	3	6.0

Table 10 Windows – Electrochromic Glazings

									Pane #1	Gap #1	Pane			
G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Id	Wid	Gas	Wid	Id	Wid
Double Electrochromic Absorbing Bleached/Colored, 6.3-mm Gap														
2800	2.43	0.43	.85	.73	.64	.14	.76	.16	704F	6.0	Air	6.3	709	6.0
2801	2.43	0.43	.21	.18	.09	.18	.12	.08	705F	6.0	Air	6.3	709	6.0
Double Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap														
2802	1.78	0.31	.86	.74	.64	.14	.76	.16	704F	6.0	Air	12.7	709	6.0
2803	1.78	0.31	.19	.20	.16	.18	.12	.08	705F	6.0	Air	12.7	709	6.0
Double Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap, Argon														
2804	1.49	0.26	.86	.74	.64	.14	.76	.16	704F	6.0	Arg	12.7	709	6.0
2805	1.49	0.26	.18	.15	.09	.18	.12	.08	705F	6.0	Arg	12.7	709	6.0
Double Electrochromic Reflecting Bleached/Colored, 6.3-mm Gap														
2820	2.43	0.43	.73	.63	.55	.21	.73	.17	706F	6.0	Air	6.3	709	6.0
2821	2.43	0.43	.20	.17	.09	.22	.14	.08	707F	6.0	Air	6.3	709	6.0
Double Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap														
2822	1.78	0.31	.74	.64	.55	.21	.73	.17	706F	6.0	Air	12.7	709	6.0
2823	1.78	0.31	.17	.15	.09	.22	.14	.08	707F	6.0	Air	12.7	709	6.0
Double Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap, Argon														
2824	1.49	0.26	.74	.64	.55	.21	.73	.17	706F	6.0	Arg	12.7	709	6.0
2825	1.49	0.26	.16	.15	.09	.22	.14	.08	707F	6.0	Arg	12.7	709	6.0
Double Low-E (e2=.029) Electrochromic Absorbing Bleached/Colored, 6.3-mm Gap														
2840	2.33	0.41	.51	.44	.34	.33	.66	.14	704F	6.0	Air	6.3	708F	5.7
2841	2.33	0.41	.18	.16	.06	.19	.10	.08	705F	6.0	Air	6.3	708F	5.7
Double Low-E (e2=.029) Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap														
2842	1.64	0.29	.59	.51	.34	.33	.66	.14	704F	6.0	Air	12.7	708F	5.7
2843	1.64	0.29	.15	.13	.06	.19	.10	.08	705F	6.0	Air	12.7	708F	5.7
Double Low-E (e2=.029) Electrochromic Absorbing Bleached/Colored, 12.7-mm Gap, Argon														
2844	1.33	0.23	.60	.52	.34	.33	.66	.14	704F	6.0	Arg	12.7	708F	5.7
2845	1.33	0.23	.14	.12	.06	.19	.10	.08	705F	6.0	Arg	12.7	708F	5.7
Double Low-E (e2=.029) Electrochromic Reflecting Bleached/Colored, 6.3-mm Gap														
2860	2.33	0.41	.54	.46	.32	.32	.64	.14	706F	6.0	Air	6.3	708F	5.7
2861	2.33	0.41	.18	.16	.07	.22	.12	.08	707F	6.0	Air	6.3	708F	5.7
Double Low-E (e2=.029) Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap														
2862	1.64	0.29	.55	.47	.32	.32	.64	.14	706F	6.0	Air	12.7	708F	5.7
2863	1.64	0.29	.16	.14	.07	.22	.12	.08	707F	6.0	Air	12.7	708F	5.7
Double Low-E (e2=.029) Electrochromic Reflecting Bleached/Colored, 12.7-mm Gap, Argon														
2864	1.33	0.23	.56	.48	.32	.32	.64	.14	706F	6.0	Arg	12.7	708F	5.7
2865	1.33	0.23	.15	.13	.07	.22	.12	.08	707F	6.0	Arg	12.7	708F	5.7

Table 11 Windows – Triple Glazing

									Pane #1		Gap #1		Pane #2		Gap #2		Pane #3	
G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Id	Wid	Gas	Wid	Id	Wid	Gas	Wid	Id	Wid
Triple Clear																		
3001	2.19	.39	.79	.68	.60	.17	.74	.20	2	3.0	Air	6.3	2	3.0	Air	6.3	2	3.0
3002	1.79	.32	.79	.68	.60	.17	.74	.20	2	3.0	Air	12.7	2	3.0	Air	12.7	2	3.0
3002	1.64	.29	.79	.68	.60	.17	.74	.20	2	3.0	Arg	12.7	2	3.0	Arg	12.7	2	3.0
Triple Low-E (e5=.1) Clear																		
3601	1.81	.32	.67	.57	.46	.24	.70	.18	2	3.0	Air	6.3	2	3.0	Air	6.3	400	3.0
3602	1.28	.23	.67	.58	.46	.24	.70	.18	2	3.0	Air	12.7	2	3.0	Air	12.7	400	3.0
3603	1.06	.19	.67	.58	.46	.24	.70	.18	2	3.0	Arg	12.7	2	3.0	Arg	12.7	400	3.0
Triple Low-E (e2=e5=.1) Clear																		
3621	1.55	.27	.54	.47	.36	.29	.66	.17	400	3.0	Air	6.3	2	3.0	Air	6.3	400	3.0
3622	.99	.17	.55	.47	.36	.29	.66	.17	400	3.0	Air	12.7	2	3.0	Air	12.7	400	3.0
3623	.77	.14	.55	.47	.36	.29	.66	.17	400	3.0	Arg	12.7	2	3.0	Arg	12.7	400	3.0
Triple Low-E Film (88) Clear																		
3641	1.83	.32	.66	.57	.48	.28	.71	.18	2	3.0	Air	6.3	600	0.1	Air	6.3	2	3.0
3642	1.32	.23	.67	.57	.48	.28	.71	.18	2	3.0	Air	12.7	600	0.1	Air	12.7	2	3.0
Triple Low-E Film (77) Clear																		
3651	1.79	.32	.53	.46	.38	.38	.64	.24	2	3.0	Air	6.3	601	0.1	Air	6.3	2	3.0
3652	1.26	.22	.54	.47	.38	.38	.64	.24	2	3.0	Air	12.7	601	0.1	Air	12.7	2	3.0
Triple Low-E Film (66) Clear																		
3661	1.75	.31	.41	.35	.26	.40	.54	.31	3	6.0	Air	6.3	602	0.1	Air	6.3	3	6.0
3662	1.23	.22	.42	.36	.26	.40	.54	.31	3	6.0	Air	12.7	602	0.1	Air	12.7	3	6.0
Triple Low-E Film (66) Tint																		
3663	1.75	.31	.30	.26	.16	.18	.32	.14	6	6.0	Air	6.3	602	0.1	Air	6.3	3	6.0
3664	1.23	.22	.29	.25	.16	.18	.32	.14	6	6.0	Air	12.7	602	0.1	Air	12.7	3	6.0
Triple Low-E Film (55) Clear																		
3671	1.74	.31	.35	.30	.21	.44	.45	.37	3	6.0	Air	6.3	603	0.1	Air	6.3	3	6.0
3672	1.22	.22	.36	.31	.21	.44	.45	.37	3	6.0	Air	12.7	603	0.1	Air	12.7	3	6.0
Triple Low-E Film (55) Tint																		
3673	1.74	.31	.26	.23	.13	.19	.27	.16	6	6.0	Air	6.3	603	0.1	Air	6.3	3	6.0
3674	1.22	.22	.25	.22	.13	.19	.27	.16	6	6.0	Air	12.7	603	0.1	Air	12.7	3	6.0
Triple Low-E Film (44) Tint																		
3681	1.74	.31	.23	.20	.10	.21	.22	.18	6	6.0	Air	6.3	604	0.1	Air	6.3	3	6.0
3682	1.21	.21	.22	.19	.10	.21	.22	.18	6	6.0	Air	12.7	604	0.1	Air	12.7	3	6.0
Triple Low-E Film (33) Tint																		
3691	1.74	.31	.19	.16	.07	.23	.17	.23	6	6.0	Air	6.3	605	0.1	Air	6.3	3	6.0
3692	1.20	.21	.17	.15	.07	.23	.17	.23	6	6.0	Air	12.7	605	0.1	Air	12.7	3	6.0

Table 12 Windows – Quadruple Glazing

									Pane #1		Gap #1		Pane #2		Gap #2		Pane #3		Gap #3		Pane #4	
G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Id	Wid	Gas	Wid	Id	Wid	Gas	Wid	Id	Wid	Gas	Wid	Id	Wid
Quadruple, Two Low-E Glass, Two Low-E Film, Clear. Krypton																						
4651	.66	.12	.52	.45	.34	.34	.62	.21	2	3.0	Kry	7.9	600	0.1	Kry	3.2	600	0.1	Kry	7.9	2	3.0

Window Manufacturers Window Library

These window entries reflect actual products sold on the market as of mid-2006. Depending on whether the glazing system is single glazed, double glazed or triple glazed, the user can select a window with a glazing system from a specific glass manufacturer. The user needs to be familiar with the glass types offered by a manufacturer in order to select the corresponding window system from the library. A listing of the new window library follows this discussion. The listing is set up the same way as the existing DOE-2 Window Library with the addition of the name for each pane of glass. If the user cannot find the window in the library, we recommend creating the window in WINDOW 5 and importing it to eQUEST.

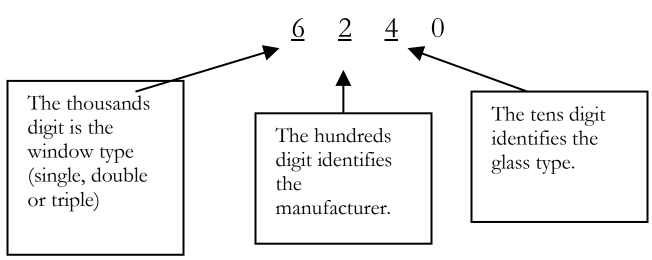
The new windows were created in WINDOW 5.2 using glass from release 14.4 of the International Glazing Database (IGDB 14.4). The International Glazing Database includes spectral data for glass manufactured by all glass manufacturers who have chosen to submit their data for peer review to Lawrence Berkeley National Laboratory. Use of these windows improves the accuracy of the calculations because the windows represent actual products and the simulations employ the angular properties of the glazing systems from WINDOW 5.2.

The new Glass Manufacturer Window Library is organized by type of window (single, double, triple), the manufacturer, and the glass type. The user selects single, double or triple-glazed units by manufacturer. The list of products offered by a manufacturer has a window name and a description. The window name gives an abbreviated name for each glazing layer separated by the gas fill type, e.g. Brz /Air/Clr 6. . The description of the glazing system indicates the window library identification number, U-Factor, SHGC and visible light transmittance for the glazing system.

In the window name, the first glazing listed represents the outboard lite. In units with multiple glazings, the gas fill is either air or argon (Arg). For air, two different widths were modeled. Air1 designates a 6.3 mm (0.25 in) gap in the double and triple glazed units. In the double glazed units, Air or Arg corresponds to a 12.7 mm (0.5 in) gap. In the triple glazed units with suspended films, Air corresponds to a 9.5 mm (0.375 in.) gap width.

The thickness of the glass in the glazing system is given at the end of the window name. There is 3mm (3) and 6mm (6) glass. Typically, 3mm glass is used on residential-scale projects and 6mm glass is used for commercial applications. All double-glazed units with 6mm glass have a gap that is air-filled and 12.7 mm (o.5 in) wide. It is rare to see the narrower gap widths on commercial projects; however, a user can use WINDOW 5.2 to create such a product.

The window ID number can be used to reference the window library documentation and see the details of the glazing system. In the window ID number, the first three digits have significance:



In this set of library entries all window ID's in the 5000 range are single glazed; those in the 6000 range are double glazed and those in the 7000 range are triple glazed. Within each of these window types, glass manufacturer have been assigned a range of ID's. Window ID numbers between 5000 and 5100, and 6000 and 6100 represent generic glazing. Clr/Tint glazings are those glass types that are produced by multiple manufacturers and have nearly the same performance, such as clear, bronze, grey and green. The range of ID's for AFG are in the 100's, so 5100 to 5199 and 6100 to 6199 are AFG products.

Because there are so many different types of glass, the library attempts to segregate the most common glass types. Windows with clear glass are assigned ID's between 0 and 10 within the window type and manufacturer categories. For example, a window ID of 6120 is a double-glazed window from AFG and has grey tinted glass. Coding by glass types falls apart with all the different kinds of coatings, so verify that you have selected the appropriate window. The table below shows the corresponding ID's for each manufacturer.

Guide to Glass Manufacturer Window Library ID's					
Window		**Manufacturer**		**Glass Type**	
ID	**Type**	**ID**	**Name**	**ID**	**Type**
5000	Single	<100	Clr/Tint	<10	Clear
6000	Double	100	AFG	10	Bronze
7000	Triple	200	Visteon	20	Grey
		300	Cardinal	30	Green
		400	Guardian	40	Blue
		500	PPG	45	Bluegreen
		600	Viracon	>50	Low-E on Clear
		700	Interpane (not included)		
		800	Pilkington		

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name
Single Clr/Tint												
5000	Clr 3	5.88	1.04	0.99	0.86	0.83	0.08	0.90	0.08	102	3.0	Generic Clear Glass
5001	Clr 6	5.78	1.02	0.94	0.82	0.77	0.07	0.88	0.08	103	5.7	Generic Clear Glass
5002	Optiwhite 3	5.88	1.04	1.04	0.91	0.90	0.08	0.91	0.09	9811	2.9	Optiwhite
5003	Optiwhite 6	5.78	1.02	1.03	0.90	0.89	0.08	0.91	0.08	9814	5.8	Optiwhite
5004	Lexan XL 3	5.63	0.99	0.96	0.83	0.80	0.09	0.86	0.09	3501	3.0	Lexan XL
5005	Lexan XL 6	5.17	0.91	0.93	0.81	0.77	0.08	0.81	0.08	3503	6.0	Lexan XL
5006	Plexiglas MC 3	5.63	0.99	1.00	0.87	0.85	0.07	0.92	0.07	2601	3.0	Plexiglas MC
5007	Plexiglas MC 6	5.16	0.91	0.99	0.86	0.83	0.07	0.92	0.07	2604	6.0	Plexiglas MC
5010	Brz 3	5.87	1.03	0.84	0.73	0.65	0.06	0.68	0.07	100	3.1	Generic Bronze Glass
5011	Brz 6	5.78	1.02	0.71	0.62	0.49	0.05	0.53	0.06	101	5.7	Generic Bronze Glass
5020	Gry 3	5.87	1.03	0.81	0.70	0.61	0.06	0.62	0.06	104	3.1	Generic Grey Glass
5021	Gry 6	5.79	1.02	0.69	0.60	0.45	0.05	0.47	0.05	1334	5.7	Versalux Grey
5030	Grn Float 3	5.88	1.04	0.80	0.70	0.60	0.06	0.83	0.08	3023	3.0	Green Float Glass
5031	Grn Float 6	5.79	1.02	0.68	0.59	0.44	0.06	0.76	0.07	3026	5.6	Green Float Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name
Single Visteon												
5212	Versalux Brz RC 6	5.79	1.02	0.47	0.41	0.28	0.28	0.21	0.35	1315	5.7	Versalux Bronze RC
5220	Versalux Gry 2000 6	5.79	1.02	0.38	0.33	0.07	0.04	0.08	0.04	1336	5.7	Versalux Grey 2000
5222	Versalux Gry RC 6	5.79	1.02	0.45	0.39	0.26	0.28	0.18	0.35	1338	5.7	Versalux Grey RC
5230	Versalux Grn 2000 3	5.87	1.03	0.70	0.61	0.48	0.05	0.76	0.07	1323	3.2	Versalux Green 2000
5231	Versalux Grn 2000 6	5.79	1.02	0.59	0.51	0.33	0.05	0.66	0.06	1326	5.7	Versalux Green 2000
5232	Versalux Grn RC 6	5.79	1.02	0.43	0.38	0.23	0.27	0.30	0.35	1330	5.7	Versalux Green RC
5233	Versalux Grn 2000 R 6	5.78	1.02	0.37	0.32	0.15	0.27	0.25	0.35	1328	5.9	Versalux Green 2000 R
5240	Versalux Blu 6	5.78	1.02	0.70	0.61	0.47	0.05	0.57	0.06	1305	5.9	Versalux Blue
5241	Versalux Blu 2000 6	5.78	1.02	0.57	0.50	0.31	0.05	0.43	0.05	1302	5.9	Versalux Blue 2000
5242	Versalux Blu RC 6	5.78	1.02	0.46	0.40	0.27	0.28	0.22	0.35	1307	5.9	Versalux Blue RC
5243	Versalux Blu2 RC 6	5.78	1.02	0.37	0.32	0.16	0.27	0.16	0.35	1309	5.9	Versalux Blue RC
Single PPG												
5501	Starphire 6	5.79	1.02	1.03	0.90	0.89	0.08	0.91	0.08	5004	5.7	Starphire
5511	Solarcool SolarBrz 6	5.79	1.02	0.45	0.40	0.27	0.30	0.21	0.36	5108	5.7	Solarcool Solarbronze
5521	Solargray 6	5.79	1.02	0.66	0.57	0.42	0.05	0.44	0.06	5052	5.7	Solargray
5522	Graylite 6	5.79	1.02	0.53	0.46	0.26	0.05	0.14	0.05	5057	5.7	Graylite
5523	Solarcool Solargray 6	5.79	1.02	0.42	0.36	0.23	0.30	0.17	0.36	5120	5.7	Solarcool Solargray
5524	Optigray 23 6	5.79	1.02	0.48	0.42	0.19	0.05	0.23	0.05	5294	5.7	Optigray 23
5531	SolarGrn 6	5.79	1.02	0.60	0.52	0.34	0.05	0.67	0.07	5028	5.7	Solargreen
5541	Azurlite 6	5.79	1.02	0.58	0.51	0.32	0.05	0.68	0.07	5036	5.7	Azurlite
5542	Caribia 6	5.79	1.02	0.58	0.51	0.32	0.05	0.68	0.07	5326	5.7	Caribia
5543	Solarcool Azurlite 6	5.79	1.02	0.35	0.30	0.14	0.30	0.26	0.36	5095	5.7	Solarcool Azurlite
5544	Solarcool Caribia 6	5.79	1.02	0.35	0.30	0.14	0.30	0.26	0.36	5336	5.7	Solarcool Caribia

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name
Single Pilkington												
5820	SuperGry 3	5.87	1.03	0.51	0.44	0.23	0.04	0.25	0.05	9891	3.2	SuperGrey
5821	SuperGry 6	5.79	1.02	0.39	0.34	0.08	0.04	0.09	0.04	9894	5.7	SuperGrey
5830	EverGrn 3	5.87	1.03	0.71	0.62	0.49	0.06	0.77	0.07	9881	3.2	EverGreen
5831	EverGrn 6	5.78	1.02	0.59	0.51	0.33	0.05	0.66	0.06	9889	5.9	EverGreen
5840	Arctic Blu 6	5.78	1.02	0.59	0.51	0.33	0.05	0.53	0.06	9989	5.9	Arctic Blue
5845	Optifloat Blu-Grn 6	5.78	1.02	0.71	0.62	0.48	0.06	0.75	0.07	9879	5.9	Optifloat Blue-Green
5850	Eclipse AdvClr 6	3.66	0.65	0.71	0.62	0.58	0.19	0.67	0.25	9909	5.9	Eclipse AdvantageClear
5851	Eclipse AdvBrz 6	3.66	0.65	0.51	0.45	0.35	0.10	0.38	0.11	9908	5.9	Eclipse AdvantageBronze
5852	Eclipse AdvGry 6	3.66	0.65	0.46	0.40	0.29	0.09	0.32	0.10	9911	5.9	Eclipse AdvantageGrey
5853	Eclipse Adv EverGrn 6	3.66	0.65	0.41	0.36	0.23	0.08	0.48	0.16	9910	5.9	Eclipse AdvantageEverGreen
5854	Eclipse Adv Arctic Blu 6	3.66	0.65	0.41	0.36	0.23	0.08	0.39	0.12	9906	5.9	Eclipse Advantagerctic Blue
5855	Eclipse Adv Blu-Grn 6	3.66	0.65	0.51	0.45	0.35	0.11	0.56	0.19	9907	5.9	Eclipse AdvantageBlue-Green
5860	Energy Adv LowE 3	3.51	0.62	0.83	0.72	0.69	0.11	0.82	0.11	9921	3.0	Energy AdvantageLow-E
5861	Energy Adv LowE 6	3.48	0.61	0.80	0.70	0.66	0.10	0.82	0.10	9924	5.6	Energy AdvantageLow-E
5870	Solar E 3	3.49	0.62	0.63	0.55	0.48	0.08	0.60	0.08	9931	3.0	Solar E
5871	Solar E 6	3.49	0.62	0.61	0.53	0.46	0.07	0.61	0.07	9935	5.7	Solar E
5880	Activ Clr 3	5.88	1.04	0.95	0.82	0.80	0.12	0.84	0.15	9937	3.0	Activon Clear
5881	Activ Clr 6	5.79	1.02	0.90	0.78	0.75	0.12	0.83	0.15	9941	5.6	Activon Clear

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double Clr/Tint New																	
6000	Clr/Air1/Clr 3	3.12	0.55	0.87	0.76	0.70	0.13	0.81	0.15	102	3.0	Generic Clear Glass	Air	6.3	102	3.0	Generic Clear Glass
6001	Clr/Air1/Clr 6	3.07	0.54	0.80	0.70	0.61	0.11	0.79	0.14	103	5.7	Generic Clear Glass	Air	6.3	103	5.7	Generic Clear Glass
6002	Clr/Air/Clr 3	2.73	0.48	0.88	0.76	0.70	0.13	0.81	0.15	102	3.0	Generic Clear Glass	Air	12.7	102	3.0	Generic Clear Glass
6003	Clr/Air/Clr 6	2.68	0.47	0.81	0.70	0.61	0.11	0.79	0.14	103	5.7	Generic Clear Glass	Air	12.7	103	5.7	Generic Clear Glass
6010	Brz /Air1/Clr 3	3.12	0.55	0.72	0.63	0.55	0.09	0.61	0.10	100	3.1	Generic Bronze Glass	Air	6.3	102	3.0	Generic Clear Glass
6011	Brz /Air1/Clr 6	3.09	0.54	0.59	0.52	0.41	0.07	0.48	0.08	101	5.7	Generic Bronze Glass	Air	6.3	102	3.0	Generic Clear Glass
6012	Brz /Air/Clr 3	2.72	0.48	0.72	0.62	0.55	0.09	0.61	0.10	100	3.1	Generic Bronze Glass	Air	12.7	102	3.0	Generic Clear Glass
6013	Brz /Air/Clr 6	2.71	0.48	0.59	0.51	0.41	0.07	0.48	0.08	101	5.7	Generic Bronze Glass	Air	12.7	102	3.0	Generic Clear Glass
6020	Gry /Air1/Clr 3	3.12	0.55	0.69	0.60	0.51	0.09	0.56	0.09	104	3.1	Generic Grey Glass	Air	6.3	102	3.0	Generic Clear Glass
6021	Versalux Gry/Air1/Clr 6	3.07	0.54	0.55	0.48	0.36	0.07	0.41	0.07	1334	5.7	Versalux Grey	Air	6.3	103	5.7	Generic Clear Glass
6022	Gry /Air/Clr 3	2.72	0.48	0.69	0.60	0.51	0.09	0.56	0.09	104	3.1	Generic Grey Glass	Air	12.7	102	3.0	Generic Clear Glass
6023	Versalux Gry/Air/Clr 6	2.69	0.47	0.55	0.48	0.36	0.07	0.41	0.07	1334	5.7	Versalux Grey	Air	12.7	103	5.7	Generic Clear Glass
6030	Grn Float /Air1/Clr 3	3.12	0.55	0.69	0.60	0.51	0.09	0.75	0.13	3023	3.0	Green Float Glass	Air	6.3	102	3.0	Generic Clear Glass
6031	Grn Float /Air1/Clr 6	3.07	0.54	0.55	0.48	0.37	0.07	0.67	0.12	3026	5.6	Green Float Glass	Air	6.3	103	5.7	Generic Clear Glass
6032	Grn Float /Air/Clr 3	2.73	0.48	0.68	0.59	0.51	0.09	0.75	0.13	3023	3.0	Green Float Glass	Air	12.7	102	3.0	Generic Clear Glass
6033	Grn Float /Air/Clr 6	2.69	0.47	0.55	0.47	0.37	0.07	0.67	0.12	3026	5.6	Green Float Glass	Air	12.7	103	5.7	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double AFG																	
6170	Comfort E Clr/Air1/Clr 3	2.54	0.45	0.75	0.65	0.59	0.14	0.75	0.15	907	3.1	Comfort E on Clear	Air	6.3	102	3.0	Generic Clear Glass
6171	Comfort E Clr/Air1/Clr 6	2.5	0.44	0.71	0.62	0.52	0.13	0.73	0.14	910	5.6	Comfort E on Clear	Air	6.3	103	5.7	Generic Clear Glass
6172	Comfort E Clr/Air/Clr 3	1.98	0.35	0.75	0.65	0.59	0.14	0.75	0.15	907	3.1	Comfort E on Clear	Air	12.7	102	3.0	Generic Clear Glass
6173	Comfort E Clr/Air/Clr 6	1.95	0.34	0.71	0.62	0.52	0.13	0.73	0.14	910	5.6	Comfort E on Clear	Air	12.7	103	5.7	Generic Clear Glass
6174	Comfort E Clr/Arg/Clr 3	1.76	0.31	0.75	0.65	0.59	0.14	0.75	0.15	907	3.1	Comfort E on Clear	Arg	12.7	102	3.0	Generic Clear Glass
6175	Comfort E Clr/Arg/Clr 6	1.73	0.30	0.71	0.62	0.52	0.13	0.73	0.14	910	5.6	Comfort E on Clear	Arg	12.7	103	5.7	Generic Clear Glass
6176	Comfort Ti-AC LowE/Air1/Clr 3	2.31	0.41	0.46	0.40	0.36	0.41	0.61	0.29	917	3.1	Comfort Ti-AC LowE on Clear	Air	6.3	102	3.0	Generic Clear Glass
6177	Comfort Ti-AC LowE/Air1/Clr 6	2.28	0.40	0.44	0.38	0.32	0.36	0.59	0.29	919	5.6	Comfort Ti-AC LowE on Clear	Air	6.3	103	5.7	Generic Clear Glass
6178	Comfort Ti-AC LowE/Air/Clr 3	1.67	0.29	0.46	0.40	0.36	0.41	0.61	0.29	917	3.1	Comfort Ti-AC LowE on Clear	Air	12.7	102	3.0	Generic Clear Glass
6179	Comfort Ti-AC LowE/Air/Clr 6	1.65	0.29	0.43	0.38	0.32	0.36	0.59	0.29	919	5.6	Comfort Ti-AC LowE on Clear	Air	12.7	103	5.7	Generic Clear Glass
6180	Comfort Ti-AC LowE/Arg/Clr 3	1.41	0.25	0.46	0.40	0.36	0.41	0.61	0.29	917	3.1	Comfort Ti-AC LowE on Clear	Arg	12.7	102	3.0	Generic Clear Glass
6181	Comfort Ti-AC LowE/Arg/Clr 6	1.39	0.25	0.43	0.37	0.32	0.36	0.59	0.29	919	5.6	Comfort Ti-AC LowE on Clear	Arg	12.7	103	5.7	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double AFG (cont.)																	
6182	Comfort Ti-PS LowE/Air1/Clr 3	2.34	0.41	0.64	0.56	0.50	0.25	0.77	0.12	921	3.1	Comfort Ti - PS LowE on Clear	Air	6.3	102	3.0	Generic Clear Glass
6183	Comfort Ti-PS LowE/Air1/Clr 6	2.32	0.41	0.61	0.53	0.45	0.21	0.75	0.12	923	5.7	Comfort Ti - PS LowE on Clear	Air	6.3	103	5.7	Generic Clear Glass
6184	Comfort Ti-PS LowE/Air/Clr 3	1.72	0.30	0.63	0.55	0.50	0.25	0.77	0.12	921	3.1	Comfort Ti - PS LowE on Clear	Air	12.7	102	3.0	Generic Clear Glass
6185	Comfort Ti-PS LowE/Air/Clr 6	1.71	0.30	0.61	0.53	0.45	0.21	0.75	0.12	923	5.7	Comfort Ti - PS LowE on Clear	Air	12.7	103	5.7	Generic Clear Glass
6186	Comfort Ti-PS LowE/Arg/Clr 3	1.46	0.26	0.63	0.55	0.50	0.25	0.77	0.12	921	3.1	Comfort Ti - PS LowE on Clear	Arg	12.7	102	3.0	Generic Clear Glass
6187	Comfort Ti -PS LowE/Arg/Clr 6	1.45	0.26	0.60	0.53	0.45	0.21	0.75	0.12	923	5.7	Comfort Ti - PS LowE on Clear	Arg	12.7	103	5.7	Generic Clear Glass
6188	Comfort Ti-R LowE/Air1/Clr 3	2.3	0.41	0.55	0.48	0.43	0.36	0.71	0.21	925	3.2	Comfort Ti-R LowE on Clear	Air	6.3	102	3.0	Generic Clear Glass
6189	Comfort Ti-R LowE/Air1/Clr 6	2.28	0.40	0.50	0.44	0.37	0.30	0.66	0.21	927	5.6	Comfort Ti-R LowE on Clear	Air	6.3	103	5.7	Generic Clear Glass
6190	Comfort Ti-R LowE/Air/Clr 3	1.67	0.29	0.54	0.47	0.43	0.36	0.71	0.21	925	3.2	Comfort Ti-R LowE on Clear	Air	12.7	102	3.0	Generic Clear Glass
6191	Comfort Ti-R LowE/Air/Clr 6	1.65	0.29	0.50	0.43	0.37	0.30	0.66	0.21	927	5.6	Comfort Ti-R LowE on Clear	Air	12.7	103	5.7	Generic Clear Glass
6192	Comfort Ti-R LowE/Arg/Clr 3	1.4	0.25	0.54	0.47	0.43	0.36	0.71	0.21	925	3.2	Comfort Ti-R LowE on Clear	Arg	12.7	102	3.0	Generic Clear Glass
6193	Comfort Ti-R LowE/Arg/Clr 6	1.39	0.25	0.49	0.43	0.37	0.30	0.66	0.21	927	5.6	Comfort Ti-R LowE on Clear	Arg	12.7	103	5.7	Generic Clear Glass
6194	Radiance3.AFG/Air1/Clr 3	2.89	0.51	0.78	0.68	0.62	0.18	0.69	0.26	970	3.1	Radiance3.AFG	Air	6.3	102	3.0	Generic Clear Glass
6195	Radiance3.AFG/Air/Clr 3	2.43	0.43	0.78	0.68	0.62	0.18	0.69	0.26	970	3.1	Radiance3.AFG	Air	12.7	102	3.0	Generic Clear Glass
6196	Radiance3.AFG/Arg/Clr 3	2.26	0.40	0.78	0.68	0.62	0.18	0.69	0.26	970	3.1	Radiance3.AFG	Arg	12.7	102	3.0	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double Visteon																	
6212	Versalux Brz RC/Air/Clr 6	2.69	0.47	0.36	0.31	0.21	0.28	0.19	0.35	1315	5.7	Versalux Bronze RC	Air	12.7	103	5.7	Generic Clear Glass
6220	Versalux Gry 2000/Air/Clr 6	2.69	0.47	0.23	0.20	0.05	0.04	0.07	0.04	1336	5.7	Versalux Grey 2000	Air	12.7	103	5.7	Generic Clear Glass
6221	Versalux Gry RC/Air/Clr 6	2.69	0.47	0.34	0.30	0.20	0.28	0.16	0.35	1338	5.7	Versalux Grey RC	Air	12.7	103	5.7	Generic Clear Glass
6230	Versalux Grn 2000/Air1/Clr 3	2.72	0.48	0.58	0.51	0.41	0.08	0.69	0.12	1323	3.2	Versalux Green 2000	Air	12.7	102	3.0	Generic Clear Glass
6231	Versalux Grn 2000/Air1/Clr 6	2.69	0.47	0.45	0.40	0.28	0.06	0.59	0.10	1326	5.7	Versalux Green 2000	Air	12.7	103	5.7	Generic Clear Glass
6232	Versalux Grn RC/Air/Clr 6	2.69	0.47	0.33	0.28	0.19	0.28	0.27	0.36	1330	5.7	Versalux Green RC	Air	12.7	103	5.7	Generic Clear Glass
6233	Versalux Grn 2000 R/Air/Clr 6	2.68	0.47	0.26	0.23	0.12	0.28	0.23	0.35	1328	5.9	Versalux Green 2000 R	Air	12.7	103	5.7	Generic Clear Glass
6240	Versalux Blu/Air/Clr 6	2.68	0.47	0.56	0.49	0.37	0.07	0.51	0.08	1305	5.9	Versalux Blue	Air	12.7	103	5.7	Generic Clear Glass
6241	Versalux Blu 2000/Air/Clr 6	2.68	0.47	0.43	0.37	0.25	0.06	0.38	0.07	1302	5.9	Versalux Blue 2000	Air	12.7	103	5.7	Generic Clear Glass
6242	Versalux Blu RC/Air/Clr 6	2.68	0.47	0.35	0.31	0.21	0.28	0.19	0.35	1307	5.9	Versalux Blue RC	Air	12.7	103	5.7	Generic Clear Glass
6243	Versalux Blu2 RC/Air/Clr 6	2.68	0.47	0.26	0.23	0.12	0.28	0.15	0.35	1309	5.9	Versalux Blue RC	Air	12.7	103	5.7	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double Cardinal																	
6308	Brz /Air1/LoE 270 Clr 3	2.31	0.41	0.43	0.37	0.26	0.26	0.53	0.09	100	3.1	Generic Bronze Glass	Air	6.3	2026	3.0	LoE 270 on Clear
6309	Brz /Air1/LoE 270 Clr 6	2.28	0.40	0.36	0.32	0.19	0.16	0.41	0.07	101	5.7	Generic Bronze Glass	Air	6.3	2029	6.0	LoE 270 on Clear
6310	Brz /Air/LoE 270 Clr 3	1.67	0.29	0.42	0.37	0.26	0.26	0.53	0.09	100	3.1	Generic Bronze Glass	Air	12.7	2026	3.0	LoE 270 on Clear
6311	Brz /Air/LoE 270 Clr 6	1.65	0.29	0.35	0.30	0.19	0.16	0.41	0.07	101	5.7	Generic Bronze Glass	Air	12.7	2029	6.0	LoE 270 on Clear
6312	Gry /Air1/LoE 270 Clr 3	2.31	0.41	0.41	0.36	0.24	0.24	0.48	0.08	104	3.1	Generic Grey Glass	Air	6.3	2026	3.0	LoE 270 on Clear
6313	Versalux Gry/Air1/LoE 270 Clr 6	2.28	0.40	0.34	0.30	0.17	0.15	0.35	0.06	1334	5.7	Versalux Grey	Air	6.3	2029	6.0	LoE 270 on Clear
6314	Gry /Air/LoE 270 Clr 3	1.67	0.29	0.40	0.35	0.24	0.24	0.48	0.08	104	3.1	Generic Grey Glass	Air	12.7	2026	3.0	LoE 270 on Clear
6315	Versalux Gry/Air/LoE 270 Clr 6	1.65	0.29	0.33	0.28	0.17	0.15	0.35	0.06	1334	5.7	Versalux Grey	Air	12.7	2029	6.0	LoE 270 on Clear
6316	Grn Float /Air1/LoE 270 Clr 3	2.31	0.41	0.46	0.40	0.28	0.18	0.64	0.11	3023	3.0	Green Float Glass	Air	6.3	2026	3.0	LoE 270 on Clear
6317	Grn Float /Air1/LoE 270 Clr 6	2.28	0.40	0.41	0.36	0.23	0.10	0.58	0.10	3026	5.6	Green Float Glass	Air	6.3	2029	6.0	LoE 270 on Clear
6318	Grn Float /Air/LoE 270 Clr 3	1.67	0.29	0.45	0.39	0.28	0.18	0.64	0.11	3023	3.0	Green Float Glass	Air	12.7	2026	3.0	LoE 270 on Clear
6319	Grn Float /Air/LoE 270 Clr 6	1.65	0.29	0.39	0.34	0.23	0.10	0.58	0.10	3026	5.6	Green Float Glass	Air	12.7	2029	6.0	LoE 270 on Clear
6360	LoE 178 Clr/Air1/Clr 3	2.38	0.42	0.67	0.59	0.53	0.24	0.78	0.12	2006	3.0	LoE 178 on Clear	Air	6.3	102	3.0	Generic Clear Glass
6361	LoE 178 Clr/Air1/Clr 6	2.35	0.41	0.63	0.55	0.47	0.20	0.76	0.11	2009	5.7	LoE 178 on Clear	Air	6.3	103	5.7	Generic Clear Glass
6362	LoE 178 Clr/Air/Clr 3	1.77	0.31	0.67	0.58	0.53	0.24	0.78	0.12	2006	3.0	LoE 178 on Clear	Air	12.7	102	3.0	Generic Clear Glass
6363	LoE 178 Clr/Air/Clr 6	1.75	0.31	0.63	0.55	0.47	0.20	0.76	0.11	2009	5.7	LoE 178 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6364	LoE 178 Clr/Arg/Clr 3	1.51	0.27	0.67	0.58	0.53	0.24	0.78	0.12	2006	3.0	LoE 178 on Clear	Arg	12.7	102	3.0	Generic Clear Glass
6365	LoE 178 Clr/Arg/Clr 6	1.5	0.26	0.63	0.55	0.47	0.20	0.76	0.11	2009	5.7	LoE 178 on Clear	Arg	12.7	103	5.7	Generic Clear Glass
6366	LoE-272 Clr/Air1/Clr 3	2.32	0.41	0.49	0.42	0.38	0.35	0.72	0.11	2011	3.0	LoE-272 on 3 mm Clear	Air	6.3	102	3.0	Generic Clear Glass
6367	LoE-272 Clr/Air1/Clr 6	2.29	0.40	0.47	0.41	0.34	0.29	0.69	0.11	2014	5.7	LoE-272 on 6 mm Clear	Air	6.3	103	5.7	Generic Clear Glass
6368	LoE-272 Clr/Air/Clr 3	1.68	0.30	0.48	0.42	0.38	0.35	0.72	0.11	2011	3.0	LoE-272 on 3 mm Clear	Air	12.7	102	3.0	Generic Clear Glass
6369	LoE-272 Clr/Air/Clr 6	1.67	0.29	0.46	0.40	0.34	0.29	0.69	0.11	2014	5.7	LoE-272 on 6 mm Clear	Air	12.7	103	5.7	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double Cardinal (cont.)																	
6370	LoE-272 Clr/Arg/Clr 3	1.42	0.25	0.47	0.41	0.38	0.35	0.72	0.11	2011	3.0	LoE-272 on 3 mm Clear	Arg	12.7	102	3.0	Generic Clear Glass
6371	LoE-272 Clr/Arg/Clr 6	1.41	0.25	0.46	0.40	0.34	0.29	0.69	0.11	2014	5.7	LoE-272 on 6 mm Clear	Arg	12.7	103	5.7	Generic Clear Glass
6375	LoE 270 Clr/Air1/Clr 3	2.31	0.41	0.43	0.38	0.34	0.39	0.70	0.12	2026	3.0	LoE 270 on Clear	Air	6.3	102	3.0	Generic Clear Glass
6376	LoE 270 Clr/Air1/Clr 6	2.28	0.40	0.43	0.37	0.31	0.32	0.67	0.12	2029	6.0	LoE 270 on Clear	Air	6.3	103	5.7	Generic Clear Glass
6377	LoE 270 Clr/Air/Clr 3	1.68	0.30	0.48	0.42	0.38	0.35	0.72	0.11	2011	3.0	LoE-272 on 3 mm Clear	Air	12.7	102	3.0	Generic Clear Glass
6378	LoE 270 Clr/Air/Clr 6	1.65	0.29	0.41	0.36	0.31	0.32	0.67	0.12	2029	6.0	LoE 270 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6379	LoE 270 Clr/Arg/Clr 3	1.41	0.25	0.42	0.37	0.34	0.39	0.70	0.12	2026	3.0	LoE 270 on Clear	Arg	12.7	102	3.0	Generic Clear Glass
6380	LoE 270 Clr/Arg/Clr 6	1.39	0.25	0.41	0.36	0.31	0.32	0.67	0.12	2029	6.0	LoE 270 on Clear	Arg	12.7	103	5.7	Generic Clear Glass
6381	LoE 240 Clr/Air1/Clr 3	2.34	0.41	0.32	0.27	0.21	0.31	0.40	0.14	2044	3.0	LoE 240 on Clear	Air	6.3	102	3.0	Generic Clear Glass
6382	LoE 240 Clr/Air1/Clr 6	2.31	0.41	0.30	0.27	0.19	0.27	0.37	0.13	2047	5.7	LoE 240 on Clear	Air	6.3	103	5.7	Generic Clear Glass
6383	LoE 240 Clr/Air/Clr 3	1.71	0.30	0.30	0.26	0.21	0.31	0.40	0.14	2044	3.0	LoE 240 on Clear	Air	12.7	102	3.0	Generic Clear Glass
6384	LoE 240 Clr/Air/Clr 6	1.69	0.30	0.28	0.25	0.19	0.27	0.37	0.13	2047	5.7	LoE 240 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6385	LoE 240 Clr/Arg/Clr 3	1.45	0.26	0.29	0.25	0.21	0.31	0.40	0.14	2044	3.0	LoE 240 on Clear	Arg	12.7	102	3.0	Generic Clear Glass
6386	LoE 240 Clr/Arg/Clr 6	1.44	0.25	0.28	0.24	0.19	0.27	0.37	0.13	2047	5.7	LoE 240 on Clear	Arg	12.7	103	5.7	Generic Clear Glass
6390	LoE2-138 Clr/Air1/Clr 3	2.33	0.41	0.30	0.26	0.20	0.31	0.38	0.13	2092	3.0	LoE2-138 on 3 mm clear	Air	6.3	102	3.0	Generic Clear Glass
6391	LoE2-138 Clr/Air1/Clr 6	2.3	0.41	0.30	0.26	0.18	0.26	0.37	0.12	2095	5.7	LoE2-138 on 6 mm clear	Air	6.3	103	5.7	Generic Clear Glass
6392	LoE2-138 Clr/Air/Clr 3	1.7	0.30	0.28	0.24	0.20	0.31	0.38	0.13	2092	3.0	LoE2-138 on 3 mm clear	Air	12.7	102	3.0	Generic Clear Glass
6393	LoE2-138 Clr/Air/Clr 6	1.68	0.30	0.28	0.24	0.18	0.26	0.37	0.12	2095	5.7	LoE2-138 on 6 mm clear	Air	12.7	103	5.7	Generic Clear Glass
6394	LoE2-138 Clr/Arg/Clr 3	1.44	0.25	0.27	0.24	0.20	0.31	0.38	0.13	2092	3.0	LoE2-138 on 3 mm clear	Arg	12.7	102	3.0	Generic Clear Glass
6395	LoE2-138 Clr/Arg/Clr 6	1.42	0.25	0.27	0.23	0.18	0.26	0.37	0.12	2095	5.7	LoE2-138 on 6 mm clear	Arg	12.7	103	5.7	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double Guardian																	
6450	Sun-Guard SN-68 Clr/Air/Clr 6	1.66	0.29	0.43	0.37	0.32	0.30	0.67	0.10	3110	5.6	Sun-Guard SN-68 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6451	Sun-Guard LE63 Clr/Air/Clr 6	1.97	0.35	0.58	0.51	0.42	0.14	0.62	0.13	3122	5.6	Sun-Guard LE63 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6452	Sun-Guard LE63/Air/Clr 6	1.97	0.35	0.39	0.34	0.25	0.08	0.52	0.11	3123	5.6	Sun-Guard LE63 on Green	Air	12.7	103	5.7	Generic Clear Glass
6453	Sun-Guard NP-61 Clr/Air/Clr 6	1.74	0.31	0.46	0.40	0.34	0.29	0.60	0.21	3124	5.6	Sun-Guard NP-61 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6454	Sun-Guard LE-50 Clr/Air/Clr 6	1.9	0.33	0.45	0.39	0.31	0.19	0.50	0.15	3128	5.6	Sun-Guard LE-50 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6455	Sun-Guard LE-50/Air/Clr 6	1.9	0.33	0.33	0.29	0.20	0.09	0.42	0.12	3129	5.6	Sun-Guard LE-50 on Green	Air	12.7	103	5.7	Generic Clear Glass
6456	Sun-Guard AG-43 Clr/Air/Clr 6	1.72	0.30	0.34	0.30	0.24	0.35	0.43	0.31	3130	5.6	Sun-Guard AG-43 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6457	Sun-Guard AG-43/Air/Clr 6	1.72	0.30	0.27	0.23	0.16	0.15	0.37	0.24	3131	5.6	Sun-Guard AG-43 on Green	Air	12.7	103	5.7	Generic Clear Glass
6458	Sun-Guard LE-40 Clr/Air/Clr 6	1.88	0.33	0.36	0.32	0.24	0.22	0.40	0.18	3132	5.6	Sun-Guard LE-40 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6459	Sun-Guard LE-40/Air/Clr 6	1.88	0.33	0.28	0.24	0.16	0.10	0.34	0.15	3133	5.6	Sun-Guard LE-40 on Green	Air	12.7	103	5.7	Generic Clear Glass
6460	Sun-Guard Silver-32/Air/Clr 6	2.4	0.42	0.34	0.30	0.19	0.18	0.28	0.22	3136	5.6	Sun-Guard Silver-32 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6461	Sun-Guard Silver-20/Air/Clr 6	2.26	0.40	0.24	0.21	0.12	0.28	0.18	0.32	3138	5.6	Sun-Guard Silver-20 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6470	Perf Plus II Clr/Air1/Clr 3	2.32	0.41	0.48	0.42	0.37	0.39	0.69	0.19	3213	3.0	Performance Plus II on Clear	Air	6.3	102	3.0	Generic Clear Glass
6471	Perf Plus II Clr/Air1/Clr 6	2.29	0.40	0.46	0.40	0.34	0.33	0.67	0.18	3216	5.6	Performance Plus II on Clear	Air	6.3	103	5.7	Generic Clear Glass
6472	Perf Plus II Clr/Air/Clr 3	1.69	0.30	0.47	0.41	0.37	0.39	0.69	0.19	3213	3.0	Performance Plus II on Clear	Air	12.7	102	3.0	Generic Clear Glass
6473	Perf Plus II Clr/Air/Clr 6	1.67	0.29	0.45	0.40	0.34	0.33	0.67	0.18	3216	5.6	Performance Plus II on Clear	Air	12.7	103	5.7	Generic Clear Glass
6474	Perf Plus II Clr/Arg/Clr 3	1.42	0.25	0.47	0.41	0.37	0.39	0.69	0.19	3213	3.0	Performance Plus II on Clear	Arg	12.7	102	3.0	Generic Clear Glass
6475	Perf Plus II Clr/Arg/Clr 6	1.41	0.25	0.45	0.39	0.34	0.33	0.67	0.18	3216	5.6	Performance Plus II on Clear	Arg	12.7	103	5.7	Generic Clear Glass
6480	Perf Plus II Grn/Air1/Clr 3	2.32	0.41	0.42	0.36	0.29	0.19	0.63	0.16	3223	3.0	Performance Plus II Green	Air	6.3	102	3.0	Generic Clear Glass
6481	Perf Plus II Grn/Air1/Clr 6	2.29	0.40	0.37	0.32	0.23	0.12	0.56	0.14	3226	5.6	Performance Plus II Green	Air	6.3	103	5.7	Generic Clear Glass
6482	Perf Plus II Grn/Air/Clr 3	1.69	0.30	0.40	0.35	0.29	0.19	0.63	0.16	3223	3.0	Performance Plus II Green	Air	12.7	102	3.0	Generic Clear Glass
6483	Perf Plus II Grn/Air/Clr 6	1.67	0.29	0.34	0.30	0.23	0.12	0.56	0.14	3226	5.6	Performance Plus II Green	Air	12.7	103	5.7	Generic Clear Glass
6484	Perf Plus II Grn/Arg/Clr 3	1.42	0.25	0.39	0.34	0.29	0.19	0.63	0.16	3223	3.0	Performance Plus II Green	Arg	12.7	102	3.0	Generic Clear Glass
6485	Perf Plus II Grn/Arg/Clr 6	1.41	0.25	0.33	0.29	0.23	0.12	0.56	0.14	3226	5.6	Performance Plus II Green	Arg	12.7	103	5.7	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double PPG																	
6501	Starphire/Air/Clr 6	2.69	0.47	0.90	0.78	0.69	0.14	0.81	0.15	5004	5.7	Starphire	Air	12.7	103	5.7	Generic Clear Glass
6502	SB 60 on Starphire/Air/Clr 6	1.65	0.29	0.45	0.40	0.35	0.43	0.72	0.11	5349	5.7	Solarban 60 on Starphire	Air	12.7	103	5.7	Generic Clear Glass
6503	SB 70XL on Starphire/Air/Clr 6	1.64	0.29	0.32	0.28	0.24	0.51	0.64	0.11	5000	5.7	Solarban 70XL on Starphire	Air	12.7	103	5.7	Generic Clear Glass
6511	Solarcool SolarBrz/Air/Clr 6	2.69	0.47	0.35	0.30	0.21	0.31	0.18	0.37	5108	5.7	Solarcool Solarbronze	Air	12.7	103	5.7	Generic Clear Glass
6521	Solargray/Air/Clr 6	2.69	0.47	0.52	0.45	0.33	0.07	0.40	0.07	5052	5.7	Solargray	Air	12.7	103	5.7	Generic Clear Glass
6522	Graylite/Air/Clr 6	2.69	0.47	0.39	0.34	0.19	0.05	0.12	0.05	5057	5.7	Graylite	Air	12.7	103	5.7	Generic Clear Glass
6523	Solarcool Solargray/Air/Clr 6	2.69	0.47	0.31	0.27	0.17	0.30	0.15	0.37	5120	5.7	Solarcool Solargray	Air	12.7	103	5.7	Generic Clear Glass
6524	Optigray/Air/Clr 6	2.69	0.47	0.34	0.29	0.15	0.05	0.21	0.05	5294	5.7	Optigray 23	Air	12.7	103	5.7	Generic Clear Glass
6525	SB 60 on Solargray/Air/Clr 3	1.66	0.29	0.34	0.30	0.23	0.20	0.48	0.08	5286	3.3	Solarban 60 on Solargray	Air	12.7	103	5.7	Generic Clear Glass
6531	SolarGrn/Air/Clr 6	2.69	0.47	0.46	0.40	0.29	0.06	0.60	0.11	5028	5.7	Solargreen	Air	12.7	103	5.7	Generic Clear Glass
6541	Azurlite/Air/Clr 6	2.69	0.47	0.41	0.36	0.19	0.06	0.48	0.10	5036	5.7	Azurlite	Air	12.7	5036	5.7	Azurlite
6542	Caribia/Air/Clr 6	2.69	0.47	0.41	0.36	0.18	0.06	0.47	0.10	5326	5.7	Caribia	Air	12.7	5036	5.7	Azurlite
6544	Solarcool Caribia/Air/Clr 6	2.69	0.47	0.25	0.21	0.12	0.30	0.23	0.37	5336	5.7	Solarcool Caribia	Air	12.7	103	5.7	Generic Clear Glass
6560	Sungate 100 Clr/Air1/Clr 3	3.09	0.54	0.64	0.55	0.49	0.29	0.75	0.10	5142	3.3	Sungate 100 on Clear	Air	6.3	102	3.0	Generic Clear Glass
6561	Sungate 100 Clr/Air1/Clr 6	3.04	0.54	0.60	0.52	0.44	0.29	0.73	0.10	5148	5.7	Sungate 100 on Clear	Air	6.3	103	5.7	Generic Clear Glass
6562	Sungate 100 Clr/Air/Clr 3	2.7	0.48	0.63	0.55	0.49	0.29	0.75	0.10	5142	3.3	Sungate 100 on Clear	Air	12.7	102	3.0	Generic Clear Glass
6563	Sungate 100 Clr/Air/Clr 6	2.67	0.47	0.60	0.52	0.44	0.29	0.73	0.10	5148	5.7	Sungate 100 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6564	Sungate 100 Clr/Arg/Clr 3	2.56	0.45	0.63	0.55	0.49	0.29	0.75	0.10	5142	3.3	Sungate 100 on Clear	Arg	12.7	102	3.0	Generic Clear Glass
6565	Sungate 100 Clr/Arg/Clr 6	2.53	0.45	0.60	0.52	0.44	0.29	0.73	0.10	5148	5.7	Sungate 100 on Clear	Arg	12.7	103	5.7	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double PPG (cont.)																	
6570	Sungate 500 Clr/Air1/Clr 3	2.55	0.45	0.76	0.66	0.60	0.15	0.76	0.17	5242	3.3	Sungate 500 on Clear	Air	6.3	102	3.0	Generic Clear Glass
6571	Sungate 500 Clr/Air1/Clr 6	2.52	0.44	0.71	0.62	0.52	0.13	0.73	0.16	5248	5.7	Sungate 500 on Clear	Air	6.3	103	5.7	Generic Clear Glass
6572	Sungate 500 Clr/Air/Clr 3	1.99	0.35	0.76	0.66	0.60	0.15	0.76	0.17	5242	3.3	Sungate 500 on Clear	Air	12.7	102	3.0	Generic Clear Glass
6573	Sungate 500 Clr/Air/Clr 6	1.97	0.35	0.71	0.62	0.52	0.13	0.73	0.16	5248	5.7	Sungate 500 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6574	Sungate 500 Clr/Arg/Clr 3	1.77	0.31	0.76	0.66	0.60	0.15	0.76	0.17	5242	3.3	Sungate 500 on Clear	Arg	12.7	102	3.0	Generic Clear Glass
6575	Sungate 500 Clr/Arg/Clr 6	1.76	0.31	0.71	0.62	0.52	0.13	0.73	0.16	5248	5.7	Sungate 500 on Clear	Arg	12.7	103	5.7	Generic Clear Glass
6576	Clr/Air/Sungate 500 Clr 3	1.99	0.35	0.81	0.71	0.60	0.17	0.76	0.18	102	3.0	Generic Clear Glass	Air	12.7	5242	3.3	Sungate 500 on Clear
6577	Clr/Air/Sungate 500 Clr 6	1.97	0.35	0.75	0.66	0.52	0.15	0.73	0.17	103	5.7	Generic Clear Glass	Air	12.7	5248	5.7	Sungate 500 on Clear
6578	Clr/Arg/Sungate 500 Clr 3	1.77	0.31	0.82	0.71	0.60	0.17	0.76	0.18	102	3.0	Generic Clear Glass	Arg	12.7	5242	3.3	Sungate 500 on Clear
6579	Clr/Arg/Sungate 500 Clr 6	1.76	0.31	0.76	0.66	0.52	0.15	0.73	0.17	103	5.7	Generic Clear Glass	Arg	12.7	5248	5.7	Sungate 500 on Clear
6580	Solarban 60 Clr/Air1/Clr 3	2.3	0.41	0.46	0.40	0.35	0.35	0.72	0.11	5281	3.3	Solarban 60 on Clear	Air	6.3	102	3.0	Generic Clear Glass
6581	Solarban 60 Clr/Air1/Clr 6	2.28	0.40	0.45	0.39	0.33	0.29	0.70	0.11	5284	5.7	Solarban 60 on Clear	Air	6.3	103	5.7	Generic Clear Glass
6582	Solarban 60 Clr/Air/Clr 3	1.67	0.29	0.45	0.39	0.35	0.35	0.72	0.11	5281	3.3	Solarban 60 on Clear	Air	12.7	102	3.0	Generic Clear Glass
6583	Solarban 60 Clr/Air/Clr 6	1.65	0.29	0.44	0.38	0.33	0.29	0.70	0.11	5284	5.7	Solarban 60 on Clear	Air	12.7	103	5.7	Generic Clear Glass
6584	Solarban 60 Clr/Arg/Clr 3	1.4	0.25	0.44	0.39	0.35	0.35	0.72	0.11	5281	3.3	Solarban 60 on Clear	Arg	12.7	102	3.0	Generic Clear Glass
6585	Solarban 60 Clr/Arg/Clr 6	1.39	0.25	0.43	0.38	0.33	0.29	0.70	0.11	5284	5.7	Solarban 60 on Clear	Arg	12.7	103	5.7	Generic Clear Glass
6590	Solarban 80 Clr/Air1/Clr 3	2.29	0.40	0.29	0.25	0.21	0.44	0.49	0.33	5313	3.3	SOLARBAN 80 on clear	Air	6.3	102	3.0	Generic Clear Glass
6591	Solarban 80 Clr/Air1/Clr 6	2.26	0.40	0.29	0.25	0.19	0.38	0.47	0.33	5316	5.7	SOLARBAN 80 on clear	Air	6.3	103	5.7	Generic Clear Glass
6592	Solarban 80 Clr/Air/Clr 3	1.65	0.29	0.28	0.24	0.21	0.44	0.49	0.33	5313	3.3	SOLARBAN 80 on clear	Air	12.7	102	3.0	Generic Clear Glass
6593	Solarban 80 Clr/Air/Clr 6	1.63	0.29	0.27	0.24	0.19	0.38	0.47	0.33	5316	5.7	SOLARBAN 80 on clear	Air	12.7	103	5.7	Generic Clear Glass
6594	Solarban 80 Clr/Arg/Clr 3	1.38	0.24	0.27	0.23	0.21	0.44	0.49	0.33	5313	3.3	SOLARBAN 80 on clear	Arg	12.7	102	3.0	Generic Clear Glass
6595	Solarban 80 Clr/Arg/Clr 6	1.37	0.24	0.27	0.23	0.19	0.38	0.47	0.33	5316	5.7	SOLARBAN 80 on clear	Arg	12.7	103	5.7	Generic Clear Glass

										Pane #1		Pane #1 IGDB	Gap #1		Pane #2		Pane #2 IGDB
G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Id	Wid	Glass Name	Gas	Wid	Id	Wid	Glass Name
Double Viracon																	
6600	VE12M Clr/Air/Clr 6	1.66	0.29	0.43	0.38	0.33	0.31	0.70	0.11	6046	5.7	LowE on Clear	Air	12.7	103	5.7	Generic Clear Glass
6601	VE140 Clr/Air/Clr 6	1.76	0.31	0.32	0.28	0.21	0.25	0.36	0.15	6047	5.7	LowE on Clear	Air	12.7	103	5.7	Generic Clear Glass
6602	VE152/Air/Clr 6	1.78	0.31	0.46	0.40	0.32	0.20	0.50	0.16	6048	5.7	LowE on Clear	Air	12.7	103	5.7	Generic Clear Glass
6603	VE155 Clr/Air/Clr 6	1.76	0.31	0.40	0.35	0.28	0.22	0.47	0.11	6049	5.7	LowE on Clear	Air	12.7	103	5.7	Generic Clear Glass
6604	VE185 Clr/Air/Clr 6	1.75	0.31	0.62	0.54	0.47	0.21	0.76	0.12	6050	5.7	LowE on Clear	Air	12.7	103	5.7	Generic Clear Glass
6610	VE42M Brz/Air/Clr 6	1.66	0.29	0.30	0.27	0.20	0.15	0.41	0.07	6061	5.7	LowE on Bronze	Air	12.7	103	5.7	Generic Clear Glass
6611	VE440 Brz/Air/Clr 6	1.76	0.31	0.24	0.21	0.13	0.13	0.22	0.08	6062	5.7	LowE on Bronze	Air	12.7	103	5.7	Generic Clear Glass
6612	VE452 Brz/Air/Clr 6	1.78	0.31	0.32	0.28	0.20	0.11	0.30	0.08	6063	5.7	LowE on Bronze	Air	12.7	103	5.7	Generic Clear Glass
6613	VE455 Brz/Air/Clr 6	1.76	0.31	0.29	0.25	0.17	0.12	0.27	0.07	6064	5.7	LowE on Bronze	Air	12.7	103	5.7	Generic Clear Glass
6614	VE485 Brz/Air/Clr 6	1.75	0.31	0.43	0.37	0.28	0.11	0.45	0.07	6065	5.7	LowE on Bronze	Air	12.7	103	5.7	Generic Clear Glass
6620	VE32M Gry/Air/Clr 6	1.66	0.29	0.28	0.24	0.17	0.12	0.35	0.06	6056	5.7	LowE on Gray	Air	12.7	103	5.7	Generic Clear Glass
6621	VE340 Gry/Air/Clr 6	1.76	0.31	0.22	0.19	0.11	0.11	0.18	0.07	6057	5.7	LowE on Gray	Air	12.7	103	5.7	Generic Clear Glass
6622	VE352 Gry/Air/Clr 6	1.78	0.31	0.29	0.26	0.17	0.09	0.25	0.07	6058	5.7	LowE on Gray	Air	12.7	103	5.7	Generic Clear Glass
6623	VE355 Gry/Air/Clr 6	1.76	0.31	0.26	0.23	0.14	0.10	0.23	0.06	6059	5.7	LowE on Gray	Air	12.7	103	5.7	Generic Clear Glass
6624	VE385 Gry/Air/Clr 6	1.75	0.31	0.38	0.33	0.25	0.10	0.38	0.07	6060	5.7	LowE on Gray	Air	12.7	103	5.7	Generic Clear Glass
6630	VE22M Grn/Air/Clr 6	1.66	0.29	0.36	0.31	0.24	0.10	0.60	0.09	6051	5.7	LowE on Green	Air	12.7	103	5.7	Generic Clear Glass
6631	VE240 Grn/Air/Clr 6	1.76	0.31	0.26	0.22	0.14	0.10	0.32	0.12	6052	5.7	LowE on Green	Air	12.7	103	5.7	Generic Clear Glass
6632	VE252 Grn/Air/Clr 6	1.78	0.31	0.34	0.29	0.21	0.09	0.43	0.12	6053	5.7	LowE on Green	Air	12.7	103	5.7	Generic Clear Glass
6633	VE255 Grn/Air/Clr 6	1.76	0.31	0.30	0.26	0.18	0.09	0.40	0.10	6054	5.7	LowE on Green	Air	12.7	103	5.7	Generic Clear Glass
6634	VE285 Grn/Air/Clr 6	1.75	0.31	0.45	0.39	0.31	0.09	0.65	0.10	6055	5.7	LowE on Green	Air	12.7	103	5.7	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double Pilkington																	
6820	SuperGry/Air1/Clr 3	3.12	0.55	0.38	0.33	0.19	0.05	0.23	0.05	9891	3.2	SuperGrey	Air	6.3	102	3.0	Generic Clear Glass
6821	SuperGry/Air1/Clr 6	3.07	0.54	0.26	0.22	0.06	0.04	0.08	0.04	9894	5.7	SuperGrey	Air	6.3	103	5.7	Generic Clear Glass
6822	SuperGry/Air/Clr 3	2.72	0.48	0.37	0.32	0.19	0.05	0.23	0.05	9891	3.2	SuperGrey	Air	12.7	102	3.0	Generic Clear Glass
6823	SuperGry/Air/Clr 6	2.69	0.47	0.24	0.21	0.06	0.04	0.08	0.04	9894	5.7	SuperGrey	Air	12.7	103	5.7	Generic Clear Glass
6824	SuperGry/Air1/Energy Adv LowE 3	2.48	0.44	0.33	0.28	0.16	0.05	0.21	0.05	9891	3.2	SuperGrey	Air	6.3	9921	3.0	Energy AdvantageLow-E
6825	SuperGry/Air1/Energy Adv LowE 6	2.45	0.43	0.21	0.18	0.05	0.04	0.07	0.04	9894	5.7	SuperGrey	Air	6.3	9924	5.6	Energy AdvantageLow-E
6826	SuperGry/Air/Energy Adv LowE 3	1.9	0.33	0.30	0.26	0.16	0.05	0.21	0.05	9891	3.2	SuperGrey	Air	12.7	9921	3.0	Energy AdvantageLow-E
6827	SuperGry/Air/Energy Adv LowE 6	1.88	0.33	0.18	0.15	0.05	0.04	0.07	0.04	9894	5.7	SuperGrey	Air	12.7	9924	5.6	Energy AdvantageLow-E
6828	SuperGry/Arg/Energy Adv LowE 3	1.66	0.29	0.29	0.25	0.16	0.05	0.21	0.05	9891	3.2	SuperGrey	Arg	12.7	9921	3.0	Energy AdvantageLow-E
6829	SuperGry/Arg/Energy Adv LowE 6	1.65	0.29	0.16	0.14	0.05	0.04	0.07	0.04	9894	5.7	SuperGrey	Arg	12.7	9924	5.6	Energy AdvantageLow-E
6830	EverGrn/Air1/Clr 3	3.12	0.55	0.59	0.52	0.42	0.08	0.69	0.12	9881	3.2	EverGreen	Air	6.3	102	3.0	Generic Clear Glass
6831	EverGrn/Air1/Clr 6	3.06	0.54	0.47	0.41	0.28	0.06	0.58	0.10	9889	5.9	EverGreen	Air	6.3	103	5.7	Generic Clear Glass
6832	EverGrn/Air/Clr 3	2.72	0.48	0.59	0.51	0.42	0.08	0.69	0.12	9881	3.2	EverGreen	Air	12.7	102	3.0	Generic Clear Glass
6833	EverGrn/Air/Clr 6	2.68	0.47	0.46	0.40	0.28	0.06	0.58	0.10	9889	5.9	EverGreen	Air	12.7	103	5.7	Generic Clear Glass
6834	EverGrn/Air1/Energy Adv LowE 3	2.48	0.44	0.53	0.47	0.35	0.09	0.64	0.14	9881	3.2	EverGreen	Air	6.3	9921	3.0	Energy AdvantageLow-E
6835	EverGrn/Air1/Energy Adv LowE 6	2.45	0.43	0.42	0.36	0.24	0.07	0.54	0.11	9889	5.9	EverGreen	Air	6.3	9924	5.6	Energy AdvantageLow-E
6836	EverGrn/Air/Energy Adv LowE 3	1.9	0.33	0.52	0.46	0.35	0.09	0.64	0.14	9881	3.2	EverGreen	Air	12.7	9921	3.0	Energy AdvantageLow-E
6837	EverGrn/Air/Energy Adv LowE 6	1.88	0.33	0.40	0.35	0.24	0.07	0.54	0.11	9889	5.9	EverGreen	Air	12.7	9924	5.6	Energy AdvantageLow-E
6838	EverGrn/Arg/Energy Adv LowE 3	1.66	0.29	0.52	0.45	0.35	0.09	0.64	0.14	9881	3.2	EverGreen	Arg	12.7	9921	3.0	Energy AdvantageLow-E
6839	EverGrn/Arg/Energy Adv LowE 6	1.65	0.29	0.39	0.34	0.24	0.07	0.54	0.11	9889	5.9	EverGreen	Arg	12.7	9924	5.6	Energy AdvantageLow-E

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double Pilkington (cont.)																	
6840	Arctic Blu/Air1/Clr 6	3.06	0.54	0.46	0.40	0.27	0.06	0.47	0.08	9989	5.9	Arctic Blue	Air	6.3	103	5.7	Generic Clear Glass
6841	Arctic Blu/Air/Clr 6	2.68	0.47	0.45	0.39	0.27	0.06	0.47	0.08	9989	5.9	Arctic Blue	Air	12.7	103	5.7	Generic Clear Glass
6842	Arctic Blu/Air1/Energy Adv LoE 6	2.45	0.43	0.41	0.36	0.23	0.07	0.43	0.09	9989	5.9	Arctic Blue	Air	6.3	9924	5.6	Energy AdvantageLow-E
6843	Arctic Blu/Air/Energy Adv LowE 6	1.88	0.33	0.39	0.34	0.23	0.07	0.43	0.09	9989	5.9	Arctic Blue	Air	12.7	9924	5.6	Energy AdvantageLow-E
6844	Arctic Blu/Arg/Energy Adv LowE 6	1.65	0.29	0.38	0.33	0.23	0.07	0.43	0.09	9989	5.9	Arctic Blue	Arg	12.7	9924	5.6	Energy AdvantageLow-E
6845	Optifloat Blu-Grn/Air1/Clr 6	3.06	0.54	0.58	0.51	0.39	0.08	0.67	0.12	9879	5.9	Optifloat Blue-Green	Air	6.3	103	5.7	Generic Clear Glass
6846	Optifloat Blu-Grn/Air/Clr 6	2.68	0.47	0.58	0.50	0.39	0.08	0.67	0.12	9879	5.9	Optifloat Blue-Green	Air	12.7	103	5.7	Generic Clear Glass
6847	Opti BluGrn/Air1/EnergyAdv LoE 6	2.45	0.43	0.53	0.46	0.34	0.09	0.62	0.13	9879	5.9	Optifloat Blue-Green	Air	6.3	9924	5.6	Energy AdvantageLow-E
6848	Opti BluGrn/Air/EnergyAdv LowE 6	1.88	0.33	0.52	0.45	0.34	0.09	0.62	0.13	9879	5.9	Optifloat Blue-Green	Air	12.7	9924	5.6	Energy AdvantageLow-E
6849	Opti BluGrn/Arg/EnergyAdv LowE 6	1.65	0.29	0.52	0.45	0.34	0.09	0.62	0.13	9879	5.9	Optifloat Blue-Green	Arg	12.7	9924	5.6	Energy AdvantageLow-E
6850	Eclipse AdvClr/Air/Clr 6	1.96	0.35	0.63	0.55	0.46	0.21	0.60	0.29	9909	5.9	Eclipse AdvantageClear	Air	12.7	103	5.7	Generic Clear Glass
6851	Eclipse AdvBrz/Air/Clr 6	1.96	0.35	0.43	0.38	0.28	0.11	0.34	0.13	9908	5.9	Eclipse AdvantageBronze	Air	12.7	103	5.7	Generic Clear Glass
6852	Eclipse AdvGry/Air/Clr 6	1.96	0.35	0.38	0.33	0.23	0.09	0.29	0.11	9911	5.9	Eclipse AdvantageGrey	Air	12.7	103	5.7	Generic Clear Glass
6853	Eclipse AdvEverGrn/Air/Clr 6	1.96	0.35	0.33	0.29	0.20	0.09	0.43	0.17	9910	5.9	Eclipse AdvantageEverGreen	Air	12.7	103	5.7	Generic Clear Glass
6854	Eclipse AdvArctic Blu/Air/Clr 6	1.96	0.35	0.33	0.29	0.19	0.09	0.35	0.13	9906	5.9	Eclipse Advantagerctic Blue	Air	12.7	103	5.7	Generic Clear Glass
6855	Eclipse AdvBlu-Grn/Air/Clr 6	1.96	0.35	0.44	0.38	0.29	0.12	0.51	0.21	9907	5.9	Eclipse AdvantageBlue-Green	Air	12.7	103	5.7	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name
Double Pilkington (cont.)																	
6860	Energy Adv Low-E/Air1/Clr 3	2.48	0.44	0.75	0.65	0.59	0.15	0.75	0.17	9921	3.0	Energy AdvantageLow-E	Air	6.3	102	3.0	Generic Clear Glass
6861	Energy Adv Low-E/Air1/Clr 6	2.45	0.43	0.71	0.62	0.52	0.13	0.73	0.16	9924	5.6	Energy AdvantageLow-E	Air	6.3	103	5.7	Generic Clear Glass
6862	Energy Adv Low-E/Air/Clr 3	1.9	0.33	0.75	0.65	0.59	0.15	0.75	0.17	9921	3.0	Energy AdvantageLow-E	Air	12.7	102	3.0	Generic Clear Glass
6863	Energy Adv Low-E/Air/Clr 6	1.88	0.33	0.71	0.62	0.52	0.13	0.73	0.16	9924	5.6	Energy AdvantageLow-E	Air	12.7	103	5.7	Generic Clear Glass
6864	Energy Adv Low-E/Arg/Clr 3	1.66	0.29	0.75	0.65	0.59	0.15	0.75	0.17	9921	3.0	Energy AdvantageLow-E	Arg	12.7	102	3.0	Generic Clear Glass
6865	Energy Adv Low-E/Arg/Clr 6	1.65	0.29	0.71	0.62	0.52	0.13	0.73	0.16	9924	5.6	Energy AdvantageLow-E	Arg	12.7	103	5.7	Generic Clear Glass
6866	Clr/Air1/Energy Adv LowE 3	2.48	0.44	0.80	0.70	0.59	0.16	0.75	0.18	102	3.0	Generic Clear Glass	Air	6.3	9921	3.0	Energy AdvantageLow-E
6867	Clr/Air1/Energy Adv LowE 6	2.45	0.43	0.75	0.65	0.52	0.14	0.73	0.17	103	5.7	Generic Clear Glass	Air	6.3	9924	5.6	Energy AdvantageLow-E
6868	Clr/Air/Energy Adv LowE 3	1.9	0.33	0.81	0.71	0.59	0.16	0.75	0.18	102	3.0	Generic Clear Glass	Air	12.7	9921	3.0	Energy AdvantageLow-E
6869	Clr/Air/Energy Adv LowE 6	1.88	0.33	0.76	0.66	0.52	0.14	0.73	0.17	103	5.7	Generic Clear Glass	Air	12.7	9924	5.6	Energy AdvantageLow-E
6870	Clr/Arg/Energy Adv LowE 3	1.66	0.29	0.82	0.71	0.59	0.16	0.75	0.18	102	3.0	Generic Clear Glass	Arg	12.7	9921	3.0	Energy AdvantageLow-E
6871	Clr/Arg/Energy Adv LowE 6	1.65	0.29	0.77	0.67	0.52	0.14	0.73	0.17	103	5.7	Generic Clear Glass	Arg	12.7	9924	5.6	Energy AdvantageLow-E
6875	Solar E/Air1/Clr 3	2.47	0.44	0.57	0.49	0.41	0.10	0.54	0.11	9931	3.0	Solar E	Air	6.3	102	3.0	Generic Clear Glass
6876	Solar E/Air1/Clr 6	2.45	0.43	0.54	0.47	0.36	0.09	0.54	0.10	9935	5.7	Solar E	Air	6.3	103	5.7	Generic Clear Glass
6877	Solar E/Air/Clr 3	1.89	0.33	0.55	0.48	0.41	0.10	0.54	0.11	9931	3.0	Solar E	Air	12.7	102	3.0	Generic Clear Glass
6878	Solar E/Air/Clr 6	1.88	0.33	0.53	0.46	0.36	0.09	0.54	0.10	9935	5.7	Solar E	Air	12.7	103	5.7	Generic Clear Glass
6879	Solar E/Arg/Clr 3	1.66	0.29	0.55	0.48	0.41	0.10	0.54	0.11	9931	3.0	Solar E	Arg	12.7	102	3.0	Generic Clear Glass
6880	Solar E/Arg/Clr 6	1.66	0.29	0.52	0.45	0.36	0.09	0.54	0.10	9935	5.7	Solar E	Arg	12.7	103	5.7	Generic Clear Glass
6890	Activ Clr/Air/Clr 3	2.73	0.48	0.84	0.73	0.68	0.17	0.76	0.21	9937	3.0	Activon Clear	Air	12.7	102	3.0	Generic Clear Glass
6891	Activ Clr/Air/Clr 6	2.69	0.47	0.78	0.68	0.59	0.16	0.74	0.21	9941	5.6	Activon Clear	Air	12.7	103	5.7	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name	Gap #2 Gas	Gap #2 Wid	Pane #3 Id	Pane #3 Wid	Pane #3 IGDB Glass Name
Triple Clr/Tint New																						
7000	Clr/Air1/Clr /Air1/Clr 3	2.14	0.38	0.78	0.68	0.60	0.17	0.74	0.21	102	3.0	Generic Clear Glass	Air	6.3	102	3.0	Generic Clear Glass	Air	6.3	102	3.0	Generic Clear Glass
7001	Clr/Air/Clr /Air/Clr 3	1.77	0.31	0.78	0.68	0.60	0.17	0.74	0.21	102	3.0	Generic Clear Glass	Air	12.7	102	3.0	Generic Clear Glass	Air	12.7	102	3.0	Generic Clear Glass
7002	Clr/Arg/Clr /Arg/Clr 3	1.64	0.29	0.79	0.68	0.60	0.17	0.74	0.21	102	3.0	Generic Clear Glass	Arg	-0.1	102	3.0	Generic Clear Glass	Arg	-0.1	102	3.0	Generic Clear Glass

G-T-C	Name	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane #1 Id	Pane #1 Wid	Pane #1 IGDB Glass Name	Gap #1 Gas	Gap #1 Wid	Pane #2 Id	Pane #2 Wid	Pane #2 IGDB Glass Name	Gap #2 Gas	Gap #2 Wid	Pane #3 Id	Pane #3 Wid	Pane #3 IGDB Glass Name
Triple Southwall																						
7054	Clr/Air1/HM44 Susp/Air1/Clr 6	1.71	0.30	0.28	0.24	0.17	0.50	0.37	0.48	103	5.7	Generic Clear Glass	Air	6.3	1502	0.1	Heat Mirror44 Susp Film	Air	6.3	103	5.7	Generic Clear Glass
7055	Clr/Air/HM44 Susp/Air/Clr 6	1.36	0.24	0.28	0.24	0.17	0.50	0.37	0.48	103	5.7	Generic Clear Glass	Air	9.5	1502	0.1	Heat Mirror44 Susp Film	Air	9.5	103	5.7	Generic Clear Glass
7056	Clr/Air1/HM55 Susp/Air1/Clr 6	1.71	0.30	0.34	0.29	0.21	0.45	0.45	0.39	103	5.7	Generic Clear Glass	Air	6.3	1503	0.1	Heat Mirror55 Susp Film	Air	6.3	103	5.7	Generic Clear Glass
7057	Clr/Air/HM55 Susp/Air/Clr 6	1.37	0.24	0.34	0.29	0.21	0.45	0.45	0.39	103	5.7	Generic Clear Glass	Air	9.5	1503	0.1	Heat Mirror55 Susp Film	Air	9.5	103	5.7	Generic Clear Glass
7058	Clr/Air1/HM66 Susp/Air1/Clr 6	1.72	0.30	0.39	0.34	0.26	0.40	0.53	0.32	103	5.7	Generic Clear Glass	Air	6.3	1504	0.1	Heat Mirror66 Susp Film	Air	6.3	103	5.7	Generic Clear Glass
7059	Clr/Air/HM66 Susp/Air/Clr 6	1.38	0.24	0.39	0.34	0.26	0.40	0.53	0.32	103	5.7	Generic Clear Glass	Air	9.5	1504	0.1	Heat Mirror66 Susp Film	Air	9.5	103	5.7	Generic Clear Glass
7060	Clr/Air1/HM77 Susp/Air1/Clr 6	1.74	0.31	0.49	0.43	0.33	0.32	0.63	0.22	103	5.7	Generic Clear Glass	Air	6.3	1505	0.1	Heat Mirror77 Susp Film	Air	6.3	103	5.7	Generic Clear Glass
7061	Clr/Air/HM77 Susp/Air/Clr 6	1.41	0.25	0.50	0.43	0.33	0.32	0.63	0.22	103	5.7	Generic Clear Glass	Air	9.5	1505	0.1	Heat Mirror77 Susp Film	Air	9.5	103	5.7	Generic Clear Glass
7062	Clr/Air1/HM88 Susp/Air1/Clr 6	1.78	0.31	0.62	0.54	0.43	0.22	0.70	0.18	103	5.7	Generic Clear Glass	Air	6.3	1506	0.1	Heat Mirror88 Susp Film	Air	6.3	103	5.7	Generic Clear Glass
7063	Clr/Air/HM88 Susp/Air/Clr 6	1.46	0.26	0.62	0.54	0.43	0.22	0.70	0.18	103	5.7	Generic Clear Glass	Air	9.5	1506	0.1	Heat Mirror88 Susp Film	Air	9.5	103	5.7	Generic Clear Glass
7064	Clr/Air1/SC75 Susp/Air1/Clr 6	1.7	0.30	0.41	0.36	0.28	0.34	0.60	0.22	103	5.7	Generic Clear Glass	Air	6.3	1510	0.1	Heat MirrorSingle Coat 75 Susp	Air	6.3	103	5.7	Generic Clear Glass
7065	Clr/Air/SC75 Susp/Air/Clr 6	1.36	0.24	0.40	0.35	0.28	0.34	0.60	0.22	103	5.7	Generic Clear Glass	Air	9.5	1510	0.1	Heat MirrorSingle Coat 75 Susp	Air	9.5	103	5.7	Generic Clear Glass
7066	Clr/Air1/TC88 Susp/Air1/Clr 6	1.53	0.27	0.55	0.48	0.35	0.22	0.63	0.13	103	5.7	Generic Clear Glass	Air	6.3	1511	0.1	Heat MirrorTwin Coat 88 Susp	Air	6.3	103	5.7	Generic Clear Glass
7067	Clr/Air/TC88 Susp/Air/Clr 6	1.19	0.21	0.55	0.48	0.35	0.22	0.63	0.13	103	5.7	Generic Clear Glass	Air	9.5	1511	0.1	Heat MirrorTwin Coat 88 Susp	Air	9.5	103	5.7	Generic Clear Glass

WINDOW-LAYER LIBRARY

The following is a list of the window layers in the Library. The meaning of each entry is as follows.

The bold-faced text is the U-name of the window layer to be used as value of the keyword WINDOW-LAYERS in the WINDOW command. For example, to construct a double-pane window with both panes equal to the first glass layer in the library (which has U-name Clear-3mm) and with the gap between the glass layers equal to the first gap in the library (which has U-name Air-6.3) your input would look like:

```
WIN-1 = WINDOW
   WIN-SPEC-METHOD   = LAYERS-INPUT
   WINDOW-LAYERS     = (Clear-3mm,Air-6.3,Clear-3mm)
   ....
```

On the far right, on the same line as the U-name, is the layer category. There are four categories: glass layer, gap layer, blind layer and pull-down shade. Note that the pull-down shades are actually blind layers with the slats closed.

The next one or two lines, beginning with $, give a brief description of the layer. The glass and gap layers in this library were used with the WINDOW 4 program to produce the windows in the "Window Library" in this document. For glass layers, the ID number shown in the description corresponds to values labeled "Id"in the Window Library.

The remaining lines give the value of keywords (in English units) for this layer. The program will use these values in the window calculation. For a description of these keywords, see "WINDOW-LAYER Command" in the *Command/Keyword Dictionary*.

Table 13 Window Layers Library

```
Clear-3mm                                        Glass Layer
$Clear, 3mm
$ID=2
TYPE = GLASS          THICKNESS   = 0.00984  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.837  REFL-SOL-BB = 0.075    BACKREFL-SOL-BB = 0.075
TRANS-VIS-BB = 0.898  REFL-VIS-BB = 0.081    BACKREFL-VIS-BB = 0.081
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..

Clear-6mm                                        Glass Layer
$Clear, 6mm
$ID=3
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.775  REFL-SOL-BB = 0.071    BACKREFL-SOL-BB = 0.071
TRANS-VIS-BB = 0.881  REFL-VIS-BB = 0.080    BACKREFL-VIS-BB = 0.080
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..

Clear-12mm                                       Glass Layer
$Clear, 12mm
$ID=4
TYPE = GLASS          THICKNESS   = 0.03937  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.653  REFL-SOL-BB = 0.064    BACKREFL-SOL-BB = 0.064
TRANS-VIS-BB = 0.841  REFL-VIS-BB = 0.077    BACKREFL-VIS-BB = 0.077
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..

Bronze-3mm                                       Glass Layer
$Bronze, 3mm
$ID=5
TYPE = GLASS          THICKNESS   = 0.00984  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.645  REFL-SOL-BB = 0.062    BACKREFL-SOL-BB = 0.062
TRANS-VIS-BB = 0.685  REFL-VIS-BB = 0.065    BACKREFL-VIS-BB = 0.065
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..

Bronze-6mm                                       Glass Layer
$Bronze, 6mm
$ID=6
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.482  REFL-SOL-BB = 0.054    BACKREFL-SOL-BB = 0.054
TRANS-VIS-BB = 0.534  REFL-VIS-BB = 0.057    BACKREFL-VIS-BB = 0.057
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..

Bronze-10mm                                      Glass Layer
$Bronze, 10mm
$ID=7
TYPE = GLASS          THICKNESS   = 0.03282  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.326  REFL-SOL-BB = 0.048    BACKREFL-SOL-BB = 0.048
TRANS-VIS-BB = 0.379  REFL-VIS-BB = 0.050    BACKREFL-VIS-BB = 0.050
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..

Grey-3mm                                         Glass Layer
$Grey, 3mm
$ID=8
TYPE = GLASS          THICKNESS   = 0.00984  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.626  REFL-SOL-BB = 0.061    BACKREFL-SOL-BB = 0.061
TRANS-VIS-BB = 0.611  REFL-VIS-BB = 0.061    BACKREFL-VIS-BB = 0.061
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..

Grey-6mm                                         Glass Layer
$Grey, 6mm
$ID=9
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.455  REFL-SOL-BB = 0.053    BACKREFL-SOL-BB = 0.053
TRANS-VIS-BB = 0.431  REFL-VIS-BB = 0.052    BACKREFL-VIS-BB = 0.052
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..

Grey-12mm                                        Glass Layer
$Grey, 12mm
$ID=10
TYPE = GLASS          THICKNESS   = 0.03937  CONDUCTIVITY    = 0.52
```

```
TRANS-SOL-BB = 0.217  REFL-SOL-BB = 0.044    BACKREFL-SOL-BB = 0.044
TRANS-VIS-BB = 0.187  REFL-VIS-BB = 0.045    BACKREFL-VIS-BB = 0.045
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..
```

Green-3mm Glass Layer

```
$Green, 3mm
$ID=11
TYPE = GLASS          THICKNESS   = 0.00984  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.635  REFL-SOL-BB = 0.063    BACKREFL-SOL-BB = 0.063
TRANS-VIS-BB = 0.822  REFL-VIS-BB = 0.075    BACKREFL-VIS-BB = 0.075
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..
```

Green-6mm Glass Layer

```
$Green, 6mm
$ID=12
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.487  REFL-SOL-BB = 0.056    BACKREFL-SOL-BB = 0.056
TRANS-VIS-BB = 0.749  REFL-VIS-BB = 0.070    BACKREFL-VIS-BB = 0.070
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..
```

Low-Iron-2.5mm Glass Layer

```
$Low Iron, 2.5mm
$ID=13
TYPE = GLASS          THICKNESS   = 0.00820  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.904  REFL-SOL-BB = 0.080    BACKREFL-SOL-BB = 0.080
TRANS-VIS-BB = 0.914  REFL-VIS-BB = 0.083    BACKREFL-VIS-BB = 0.083
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..
```

Low-Iron-3mm Glass Layer

```
$Low Iron, 3mm
$ID=14
TYPE = GLASS          THICKNESS   = 0.00984  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.899  REFL-SOL-BB = 0.079    BACKREFL-SOL-BB = 0.079
TRANS-VIS-BB = 0.913  REFL-VIS-BB = 0.082    BACKREFL-VIS-BB = 0.082
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..
```

Low-Iron-4mm Glass Layer

```
$Low Iron, 4mm
$ID=15
TYPE = GLASS          THICKNESS   = 0.01312  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.894  REFL-SOL-BB = 0.079    BACKREFL-SOL-BB = 0.079
TRANS-VIS-BB = 0.911  REFL-VIS-BB = 0.082    BACKREFL-VIS-BB = 0.082
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..
```

Low-Iron-5mm Glass Layer

```
$Low Iron, 5mm
$ID=16
TYPE = GLASS          THICKNESS   = 0.01640  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.889  REFL-SOL-BB = 0.079    BACKREFL-SOL-BB = 0.079
TRANS-VIS-BB = 0.910  REFL-VIS-BB = 0.082    BACKREFL-VIS-BB = 0.082
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..
```

Blue-6mm Glass Layer

```
$Blue, 6mm
$ID=17
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.480  REFL-SOL-BB = 0.050    BACKREFL-SOL-BB = 0.050
TRANS-VIS-BB = 0.570  REFL-VIS-BB = 0.060    BACKREFL-VIS-BB = 0.060
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.84 ..
```

Ref-Steel-Clear-Lo-6mm Glass Layer

```
$Reflective low-trans steel coating
$Clear glass, 6mm, ID=200
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.066  REFL-SOL-BB = 0.341    BACKREFL-SOL-BB = 0.493
TRANS-VIS-BB = 0.080  REFL-VIS-BB = 0.410    BACKREFL-VIS-BB = 0.370
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.40 ..
```

Ref-Steel-Clear-Mid-6mm Glass Layer

```
$Reflective mid-trans steel coating
$Clear glass, 6mm, ID=201
```

```
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.110  REFL-SOL-BB = 0.270    BACKREFL-SOL-BB = 0.430
TRANS-VIS-BB = 0.140  REFL-VIS-BB = 0.310    BACKREFL-VIS-BB = 0.350
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.47 ..
```

Ref-Steel-Clear-Hi-6mm Glass Layer

```
$Reflective hi-trans steel coating
$Clear glass, 6mm, ID=202
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.159  REFL-SOL-BB = 0.220    BACKREFL-SOL-BB = 0.370
TRANS-VIS-BB = 0.200  REFL-VIS-BB = 0.250    BACKREFL-VIS-BB = 0.320
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.57 ..
```

Ref-Steel-Tint-Lo-6mm Glass Layer

```
$Refl low-trans steel coating
$Tinted glass, 6mm, ID=210
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.040  REFL-SOL-BB = 0.150    BACKREFL-SOL-BB = 0.470
TRANS-VIS-BB = 0.050  REFL-VIS-BB = 0.170    BACKREFL-VIS-BB = 0.370
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.41 ..
```

Ref-Steel-Tint-Mid-6mm Glass Layer

```
$Refl mid-trans steel coating
$Tinted glass, 6mm, ID=211
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.060  REFL-SOL-BB = 0.130    BACKREFL-SOL-BB = 0.420
TRANS-VIS-BB = 0.090  REFL-VIS-BB = 0.140    BACKREFL-VIS-BB = 0.350
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.47 ..
```

Ref-Steel-Tint-Hi-6mm Glass Layer

```
$Refl hi-trans steel coating
$Tinted glass, 6mm, ID=212
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.100  REFL-SOL-BB = 0.110    BACKREFL-SOL-BB = 0.380
TRANS-VIS-BB = 0.100  REFL-VIS-BB = 0.110    BACKREFL-VIS-BB = 0.320
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.53 ..
```

Ref-Titanium-Clear-Lo-6mm Glass Layer

```
$Reflective low-trans titanium coating
$Clear glass, 6mm, ID=220
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.150  REFL-SOL-BB = 0.220    BACKREFL-SOL-BB = 0.380
TRANS-VIS-BB = 0.200  REFL-VIS-BB = 0.230    BACKREFL-VIS-BB = 0.330
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.58 ..
```

Ref-Titanium-Clear-Hi-6mm Glass Layer

```
$Reflective hi-trans titanium coating
$Clear glass, 6mm, ID=221
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.240  REFL-SOL-BB = 0.160    BACKREFL-SOL-BB = 0.290
TRANS-VIS-BB = 0.300  REFL-VIS-BB = 0.160    BACKREFL-VIS-BB = 0.290
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.60 ..
```

Ref-Titanium-Tint-Lo-6mm Glass Layer

```
$Reflective lo-trans titanium coating
$Tinted glass, 6mm, ID=230
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.040  REFL-SOL-BB = 0.130    BACKREFL-SOL-BB = 0.420
TRANS-VIS-BB = 0.050  REFL-VIS-BB = 0.090    BACKREFL-VIS-BB = 0.280
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.41 ..
```

Ref-Titanium-Tint-Mid-6mm Glass Layer

```
$Reflective mid-trans titanium coating
$Tinted glass, 6mm, ID=231
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.100  REFL-SOL-BB = 0.110    BACKREFL-SOL-BB = 0.410
TRANS-VIS-BB = 0.130  REFL-VIS-BB = 0.100    BACKREFL-VIS-BB = 0.320
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.45 ..
```

Ref-Titanium-Tint-Hi-6mm Glass Layer

```
$Reflective hi-trans titanium coating
```

```
$Tinted glass, 6mm, ID=232
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.150  REFL-SOL-BB = 0.090    BACKREFL-SOL-BB = 0.330
TRANS-VIS-BB = 0.180  REFL-VIS-BB = 0.080    BACKREFL-VIS-BB = 0.280
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.60 ..
```

Ref-Pewter-Clear-Lo-6mm Glass Layer

```
$Reflective low-trans pewter coating
$Clear glass, 6mm, ID=240
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.110  REFL-SOL-BB = 0.250    BACKREFL-SOL-BB = 0.490
TRANS-VIS-BB = 0.130  REFL-VIS-BB = 0.280    BACKREFL-VIS-BB = 0.420
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.43 ..
```

Ref-Pewter-Clear-Mid-6mm Glass Layer

```
$Reflective mid-trans pewter coating
$Clear glass, 6mm, ID=241
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.170  REFL-SOL-BB = 0.200    BACKREFL-SOL-BB = 0.420
TRANS-VIS-BB = 0.190  REFL-VIS-BB = 0.210    BACKREFL-VIS-BB = 0.380
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.51 ..
```

Ref-Pewter-Clear-Hi-6mm Glass Layer

```
$Reflective hi-trans pewter coating
$Clear glass, 6mm, ID=242
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.200  REFL-SOL-BB = 0.160    BACKREFL-SOL-BB = 0.390
TRANS-VIS-BB = 0.220  REFL-VIS-BB = 0.170    BACKREFL-VIS-BB = 0.350
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.55 ..
```

Ref-Pewter-Tint-Lo-6mm Glass Layer

```
$Reflective lo-trans pewter coating
$Tinted glass, 6mm, ID=250
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.070  REFL-SOL-BB = 0.130    BACKREFL-SOL-BB = 0.490
TRANS-VIS-BB = 0.080  REFL-VIS-BB = 0.130    BACKREFL-VIS-BB = 0.420
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.43 ..
```

Ref-Pewter-Tint-Mid-6mm Glass Layer

```
$Reflective mid-trans pewter coating
$Tinted glass, 6mm, ID=251
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.100  REFL-SOL-BB = 0.100    BACKREFL-SOL-BB = 0.420
TRANS-VIS-BB = 0.110  REFL-VIS-BB = 0.100    BACKREFL-VIS-BB = 0.380
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.51 ..
```

Ref-Pewter-Tint-Hi-6mm Glass Layer

```
$Reflective hi-trans pewter coating
$Tinted glass, 6mm, ID=252
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.120  REFL-SOL-BB = 0.090    BACKREFL-SOL-BB = 0.390
TRANS-VIS-BB = 0.130  REFL-VIS-BB = 0.090    BACKREFL-VIS-BB = 0.350
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.55 ..
```

Ref-Tin-Oxide-Clear-6mm Glass Layer

```
$Reflective tin-oxide coating
$Clear glass, 6mm, ID=260
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.429  REFL-SOL-BB = 0.308    BACKREFL-SOL-BB = 0.379
TRANS-VIS-BB = 0.334  REFL-VIS-BB = 0.453    BACKREFL-VIS-BB = 0.505
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.82 ..
```

Ref-Tin-Oxide-Tint-6mm Glass Layer

```
$Reflective tin-oxide coating
$Tinted glass, 6mm, ID=270
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.300  REFL-SOL-BB = 0.140    BACKREFL-SOL-BB = 0.360
TRANS-VIS-BB = 0.250  REFL-VIS-BB = 0.180    BACKREFL-VIS-BB = 0.450
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.82 ..
```

Pyrolytic-A-Clear-3mm Glass Layer

```
$Pyrolytic A coating
$Clear glass, 3mm, ID=300
TYPE = GLASS          THICKNESS   = 0.00984  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.750  REFL-SOL-BB = 0.100    BACKREFL-SOL-BB = 0.100
TRANS-VIS-BB = 0.850  REFL-VIS-BB = 0.120    BACKREFL-VIS-BB = 0.120
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.40 ..
```

Pyrolytic-B-Clear-3mm Glass Layer

```
$Pyrolytic B coating
$Clear glass, 3mm, ID=350
TYPE = GLASS          THICKNESS   = 0.00984  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.740  REFL-SOL-BB = 0.090    BACKREFL-SOL-BB = 0.100
TRANS-VIS-BB = 0.820  REFL-VIS-BB = 0.110    BACKREFL-VIS-BB = 0.120
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.20 ..
```

Pyrolytic-B-Clear-6mm Glass Layer

```
$Pyrolytic B coating
$Clear glass, 6mm, ID=351
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.680  REFL-SOL-BB = 0.090    BACKREFL-SOL-BB = 0.100
$TRANS-VIS-BB = 0.810  REFL-VIS-BB = 0.110    BACKREFL-VIS-BB = 0.120
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.20 ..
```

Pyrolytic-Low-E-Clear-3mm Glass Layer

```
$Pyrolytic Low-E coating
$Clear glass, 3mm, ID=400
TYPE = GLASS          THICKNESS   = 0.00984  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.630  REFL-SOL-BB = 0.190    BACKREFL-SOL-BB = 0.220
TRANS-VIS-BB = 0.850  REFL-VIS-BB = 0.079    BACKREFL-VIS-BB = 0.056
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.10 ..
```

Pyrolytic-Low-E-Clear-6mm Glass Layer

```
$Pyrolytic Low-E coating
$Clear glass, 6mm, ID=401
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.600  REFL-SOL-BB = 0.170    BACKREFL-SOL-BB = 0.220
TRANS-VIS-BB = 0.840  REFL-VIS-BB = 0.055    BACKREFL-VIS-BB = 0.078
 TRANS-IR    = 0.0    EMIS-IR     = 0.84     BACKEMIS-IR     = 0.10 ..
```

Pyrolytic-Low-E-Tint-6mm Glass Layer

```
$Pyrolytic Low-E coating
$Tinted glass, 6mm, ID=451
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.360  REFL-SOL-BB = 0.093    BACKREFL-SOL-BB = 0.200
TRANS-VIS-BB = 0.500  REFL-VIS-BB = 0.035    BACKREFL-VIS-BB = 0.054
TRANS-IR    = 0.0     EMIS-IR     = 0.84     BACKEMIS-IR     = 0.10 ..
```

Spectral-Selective-Clear-3mm Glass Layer

```
$Spectrally selective coating
$Clear glass, 3mm, ID=500
TYPE = GLASS          THICKNESS   = 0.00984  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.450  REFL-SOL-BB = 0.340    BACKREFL-SOL-BB = 0.370
TRANS-VIS-BB = 0.780  REFL-VIS-BB = 0.070    BACKREFL-VIS-BB = 0.050
TRANS-IR    = 0.0     EMIS-IR     = 0.84     BACKEMIS-IR     = 0.04 ..
```

Spectral-Selective-Clear-6mm Glass Layer

```
$Spectrally selective coating
$Clear glass, 6mm, ID=501
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.430  REFL-SOL-BB = 0.300    BACKREFL-SOL-BB = 0.420
TRANS-VIS-BB = 0.770  REFL-VIS-BB = 0.070    BACKREFL-VIS-BB = 0.060
TRANS-IR    = 0.0     EMIS-IR     = 0.84     BACKEMIS-IR     = 0.03 ..
```

Spectral-Selective-Tint-6mm Glass Layer

```
$Spectrally selective coating
$Tinted glass, 6mm, ID=550
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.260  REFL-SOL-BB = 0.140    BACKREFL-SOL-BB = 0.410
TRANS-VIS-BB = 0.460  REFL-VIS-BB = 0.060    BACKREFL-VIS-BB = 0.040
TRANS-IR    = 0.0     EMIS-IR     = 0.84     BACKEMIS-IR     = 0.03 ..
```

```
Spectral-Selective-Low-E-6mm                  Glass Layer
$Spectrally selective
$Low-E coating, 6mm, ID=708
TYPE = GLASS          THICKNESS   = 0.01969  CONDUCTIVITY    = 0.52
TRANS-SOL-BB = 0.406  REFL-SOL-BB = 0.288    BACKREFL-SOL-BB = 0.353
TRANS-VIS-BB = 0.780  REFL-VIS-BB = 0.060    BACKREFL-VIS-BB = 0.050
TRANS-IR    = 0.0     EMIS-IR     = 0.84     BACKEMIS-IR     = 0.04 ..

Heat-Mirror-Film-88                           Glass Layer
$Heat mirror 88
$Low-E film, ID=600
TYPE = GLASS          THICKNESS   = 0.00017  CONDUCTIVITY    = 0.081
TRANS-SOL-BB = 0.656  REFL-SOL-BB = 0.249    BACKREFL-SOL-BB = 0.227
TRANS-VIS-BB = 0.868  REFL-VIS-BB = 0.064    BACKREFL-VIS-BB = 0.060
TRANS-IR    = 0.0     EMIS-IR     = 0.136    BACKEMIS-IR     = 0.720 ..

Heat-Mirror-Film-77                           Glass Layer
$Heat mirror 77
$Low-E film, ID=601
TYPE = GLASS          THICKNESS   = 0.00017  CONDUCTIVITY    = 0.081
TRANS-SOL-BB = 0.504  REFL-SOL-BB = 0.402    BACKREFL-SOL-BB = 0.398
TRANS-VIS-BB = 0.766  REFL-VIS-BB = 0.147    BACKREFL-VIS-BB = 0.167
TRANS-IR    = 0.0     EMIS-IR     = 0.075    BACKEMIS-IR     = 0.720 ..

Heat-Mirror-Film-66                           Glass Layer
$Heat mirror 66
$Low-E film, ID=602
TYPE = GLASS          THICKNESS   = 0.00017  CONDUCTIVITY    = 0.081
TRANS-SOL-BB = 0.403  REFL-SOL-BB = 0.514    BACKREFL-SOL-BB = 0.515
TRANS-VIS-BB = 0.658  REFL-VIS-BB = 0.256    BACKREFL-VIS-BB = 0.279
TRANS-IR    = 0.0     EMIS-IR     = 0.057    BACKEMIS-IR     = 0.720 ..

Heat-Mirror-Film-55                           Glass Layer
$Heat mirror 55
$Low-E film, ID=603
TYPE = GLASS          THICKNESS   = 0.00017  CONDUCTIVITY    = 0.081
TRANS-SOL-BB = 0.320  REFL-SOL-BB = 0.582    BACKREFL-SOL-BB = 0.593
TRANS-VIS-BB = 0.551  REFL-VIS-BB = 0.336    BACKREFL-VIS-BB = 0.375
TRANS-IR    = 0.0     EMIS-IR     = 0.046    BACKEMIS-IR     = 0.720 ..

Heat-Mirror-Film-44                           Glass Layer
$Heat mirror 44
$Low-E film, ID=604
TYPE = GLASS          THICKNESS   = 0.00017  CONDUCTIVITY    = 0.081
TRANS-SOL-BB = 0.245  REFL-SOL-BB = 0.626    BACKREFL-SOL-BB = 0.641
TRANS-VIS-BB = 0.439  REFL-VIS-BB = 0.397    BACKREFL-VIS-BB = 0.453
TRANS-IR    = 0.0     EMIS-IR     = 0.037    BACKEMIS-IR     = 0.720 ..

Air-6.3mm                                     Gap
$Air, 6.3mm (1/4-in)
TYPE = GAP              THICKNESS      = 0.02067
CONDUCTIVITY = 0.013934 D-CONDUCTIVITY = 2.43954
VISCOSITY    = 1.16251  D-VISCOSITY    = 3.7332
DENSITY      = 0.08053  D-DENSITY      = -.0001526
PRANDTL-NUMB = 0.72     D-PRANDTL-NUMB = 0.001 ..

Air-12.7mm                                    Gap
$Air, 12.7mm (1/2-in)
TYPE = GAP              THICKNESS      = 0.04167
CONDUCTIVITY = 0.013934 D-CONDUCTIVITY = 2.43954
VISCOSITY    = 1.16251  D-VISCOSITY    = 3.7332
DENSITY      = 0.08053  D-DENSITY      = -.0001526
PRANDTL-NUMB = 0.72     D-PRANDTL-NUMB = 0.001 ..

Argon-6.3mm                                   Gap
$Argon, 6.3mm (1/4-in)
TYPE = GAP              THICKNESS      = 0.02067
CONDUCTIVITY = 0.00936  D-CONDUCTIVITY = 1.6049
VISCOSITY    = 1.41786  D-VISCOSITY    = 2.35189
DENSITY      = 0.10612  D-DENSITY      = -.000208
PRANDTL-NUMB = 0.68     D-PRANDTL-NUMB = 0.0003667 ..
```

```
Argon-12.7mm                                    Gap
$Argon, 12.7mm (1/2-in)
TYPE = GAP              THICKNESS      = 0.04167
CONDUCTIVITY = 0.00936  D-CONDUCTIVITY = 1.6049
VISCOSITY    = 1.41786  D-VISCOSITY    = 2.35189
DENSITY      = 0.10612  D-DENSITY      = -.000208
PRANDTL-NUMB = 0.68     D-PRANDTL-NUMB = 0.0003667 ..

Krypton-6.3mm                                   Gap
$Krypton, 6.3mm (1/4-in)
TYPE = GAP              THICKNESS      = 0.02067
CONDUCTIVITY = 0.0497   D-CONDUCTIVITY = 0.89874
VISCOSITY    = 1.53209  D-VISCOSITY    = 2.7999
DENSITY      = 0.23345  D-DENSITY      = -.00047
PRANDTL-NUMB = 0.66     D-PRANDTL-NUMB = 0.000011  ..

Krypton-12.7mm                                  Gap
$Krypton, 12.7mm (1/2-in)
TYPE = GAP              THICKNESS      = 0.04167
CONDUCTIVITY = 0.0497   D-CONDUCTIVITY = 0.89874
VISCOSITY    = 1.53209  D-VISCOSITY    = 2.7999
DENSITY      = 0.23345  D-DENSITY      = -.00047
PRANDTL-NUMB = 0.66     D-PRANDTL-NUMB = 0.000011  ..

Metal-1in-Lt                                    Blind
$Metal, 1.0in, light color
$Horizontal
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.52
SLAT-ANGLE = 45       SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0833   SLAT-SEPARATION = 0.0625
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.0     TRANS-SOL-HH    = 0.0
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.0     TRANS-VIS-HH    = 0.0
REFL-SOL-BH  = 0.7    REFL-SOL-HH  = 0.7     BACKREFL-SOL-BH = 0.7
REFL-VIS-BH  = 0.7    REFL-VIS-HH  = 0.7     BACKREFL-VIS-BH = 0.7
BACKREFL-SOL-HH = 0.7 BACKREFL-VIS-HH = 0.7
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..

Metal-1in-Med                                   Blind
$Metal, 1.0in, medium color
$Horizontal
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.52
SLAT-ANGLE = 45       SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0833   SLAT-SEPARATION = 0.0625
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.0     TRANS-SOL-HH    = 0.0
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.0     TRANS-VIS-HH    = 0.0
REFL-SOL-BH  = 0.5    REFL-SOL-HH  = 0.5     BACKREFL-SOL-BH = 0.5
REFL-VIS-BH  = 0.5    REFL-VIS-HH  = 0.5     BACKREFL-VIS-BH = 0.5
BACKREFL-SOL-HH = 0.5 BACKREFL-VIS-HH = 0.5
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..

Metal-1in-Dark                                  Blind
$Metal, 1.0in, dark color
$Horizontal
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.52
SLAT-ANGLE = 45       SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0833   SLAT-SEPARATION = 0.0625
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.0     TRANS-SOL-HH    = 0.0
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.0     TRANS-VIS-HH    = 0.0
REFL-SOL-BH  = 0.3    REFL-SOL-HH  = 0.3     BACKREFL-SOL-BH = 0.3
REFL-VIS-BH  = 0.3    REFL-VIS-HH  = 0.3     BACKREFL-VIS-BH = 0.3
BACKREFL-SOL-HH = 0.3 BACKREFL-VIS-HH = 0.3
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..

Shade-Thin-T05-R10                              Pull-down shade
$Pull-down shade, thin, fabric
$5% transmittance, 10% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.05    TRANS-SOL-HH    = 0.05
```

```
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.05    TRANS-VIS-HH    = 0.05
REFL-SOL-BH  = 0.10   REFL-SOL-HH  = 0.10    BACKREFL-SOL-BH = 0.10
REFL-VIS-BH  = 0.10   REFL-VIS-HH  = 0.10    BACKREFL-VIS-BH = 0.10
BACKREFL-SOL-HH = 0.10 BACKREFL-VIS-HH = 0.10
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

Shade-Thin-T05-R30 Pull-down shade

```
$Pull-down shade, thin, fabric
$5% transmittance, 30% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.05    TRANS-SOL-HH    = 0.05
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.05    TRANS-VIS-HH    = 0.05
REFL-SOL-BH  = 0.30   REFL-SOL-HH  = 0.30    BACKREFL-SOL-BH = 0.30
REFL-VIS-BH  = 0.30   REFL-VIS-HH  = 0.30    BACKREFL-VIS-BH = 0.30
BACKREFL-SOL-HH = 0.30 BACKREFL-VIS-HH = 0.30
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

Shade-Thin-T05-R50 Pull-down shade

```
$Pull-down shade, thin, fabric
$5% transmittance, 50% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.05    TRANS-SOL-HH    = 0.05
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.05    TRANS-VIS-HH    = 0.05
REFL-SOL-BH  = 0.50   REFL-SOL-HH  = 0.50    BACKREFL-SOL-BH = 0.50
REFL-VIS-BH  = 0.50   REFL-VIS-HH  = 0.50    BACKREFL-VIS-BH = 0.50
BACKREFL-SOL-HH = 0.50 BACKREFL-VIS-HH = 0.50
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

Shade-Thin-T05-R70 Pull-down shade

```
$Pull-down shade, thin, fabric
$5% transmittance, 70% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.05    TRANS-SOL-HH    = 0.05
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.05    TRANS-VIS-HH    = 0.05
REFL-SOL-BH  = 0.70   REFL-SOL-HH  = 0.70    BACKREFL-SOL-BH = 0.70
REFL-VIS-BH  = 0.70   REFL-VIS-HH  = 0.70    BACKREFL-VIS-BH = 0.70
BACKREFL-SOL-HH = 0.70 BACKREFL-VIS-HH = 0.70
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

Shade-Thin-T05-R90 Pull-down shade

```
$Pull-down shade, thin, fabric
$5% transmittance, 90% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.05    TRANS-SOL-HH    = 0.05
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.05    TRANS-VIS-HH    = 0.05
REFL-SOL-BH  = 0.90   REFL-SOL-HH  = 0.90    BACKREFL-SOL-BH = 0.90
REFL-VIS-BH  = 0.90   REFL-VIS-HH  = 0.90    BACKREFL-VIS-BH = 0.90
BACKREFL-SOL-HH = 0.90 BACKREFL-VIS-HH = 0.90
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

Shade-Thin-T10-R10 Pull-down shade

```
$Pull-down shade, thin, fabric
$10% transmittance, 10% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.10    TRANS-SOL-HH    = 0.10
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.10    TRANS-VIS-HH    = 0.10
REFL-SOL-BH  = 0.10   REFL-SOL-HH  = 0.10    BACKREFL-SOL-BH = 0.10
REFL-VIS-BH  = 0.10   REFL-VIS-HH  = 0.10    BACKREFL-VIS-BH = 0.10
BACKREFL-SOL-HH = 0.10 BACKREFL-VIS-HH = 0.10
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

```
Shade-Thin-T10-R30                                Pull-down shade
$Pull-down shade, thin, fabric
$10% transmittance, 30% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.10    TRANS-SOL-HH    = 0.10
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.10    TRANS-VIS-HH    = 0.10
REFL-SOL-BH  = 0.30   REFL-SOL-HH  = 0.30    BACKREFL-SOL-BH = 0.30
REFL-VIS-BH  = 0.30   REFL-VIS-HH  = 0.30    BACKREFL-VIS-BH = 0.30
BACKREFL-SOL-HH = 0.30 BACKREFL-VIS-HH = 0.30
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..

Shade-Thin-T10-R50                                Pull-down shade
$Pull-down shade, thin, fabric
$10% transmittance, 50% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.10    TRANS-SOL-HH    = 0.10
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.10    TRANS-VIS-HH    = 0.10
REFL-SOL-BH  = 0.50   REFL-SOL-HH  = 0.50    BACKREFL-SOL-BH = 0.50
REFL-VIS-BH  = 0.50   REFL-VIS-HH  = 0.50    BACKREFL-VIS-BH = 0.50
BACKREFL-SOL-HH = 0.50 BACKREFL-VIS-HH = 0.50
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..

Shade-Thin-T10-R70                                Pull-down shade
$Pull-down shade, thin, fabric
$10% transmittance, 70% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.10    TRANS-SOL-HH    = 0.10
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.10    TRANS-VIS-HH    = 0.10
REFL-SOL-BH  = 0.70   REFL-SOL-HH  = 0.70    BACKREFL-SOL-BH = 0.70
REFL-VIS-BH  = 0.70   REFL-VIS-HH  = 0.70    BACKREFL-VIS-BH = 0.70
BACKREFL-SOL-HH = 0.70 BACKREFL-VIS-HH = 0.70
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..

Shade-Thin-T10-R80                                Pull-down shade
$Pull-down shade, thin, fabric
$10% transmittance, 80% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.10    TRANS-SOL-HH    = 0.10
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.10    TRANS-VIS-HH    = 0.10
REFL-SOL-BH  = 0.80   REFL-SOL-HH  = 0.80    BACKREFL-SOL-BH = 0.80
REFL-VIS-BH  = 0.80   REFL-VIS-HH  = 0.80    BACKREFL-VIS-BH = 0.80
BACKREFL-SOL-HH = 0.80 BACKREFL-VIS-HH = 0.80
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..

Shade-Thin-T20-R10                                Pull-down shade
$Pull-down shade, thin, fabric
$20% transmittance, 10% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.20    TRANS-SOL-HH    = 0.20
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.20    TRANS-VIS-HH    = 0.20
REFL-SOL-BH  = 0.10   REFL-SOL-HH  = 0.10    BACKREFL-SOL-BH = 0.10
REFL-VIS-BH  = 0.10   REFL-VIS-HH  = 0.10    BACKREFL-VIS-BH = 0.10
BACKREFL-SOL-HH = 0.10 BACKREFL-VIS-HH = 0.10
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..

Shade-Thin-T20-R30                                Pull-down shade
$Pull-down shade, thin, fabric
$20% transmittance, 30% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
```

```
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.20    TRANS-SOL-HH    = 0.20
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.20    TRANS-VIS-HH    = 0.20
REFL-SOL-BH  = 0.30   REFL-SOL-HH  = 0.30    BACKREFL-SOL-BH = 0.30
REFL-VIS-BH  = 0.30   REFL-VIS-HH  = 0.30    BACKREFL-VIS-BH = 0.30
BACKREFL-SOL-HH = 0.30 BACKREFL-VIS-HH = 0.30
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

Shade-Thin-T20-R50 Pull-down shade

```
$Pull-down shade, thin, fabric
$20% transmittance, 50% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.20    TRANS-SOL-HH    = 0.20
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.20    TRANS-VIS-HH    = 0.20
REFL-SOL-BH  = 0.50   REFL-SOL-HH  = 0.50    BACKREFL-SOL-BH = 0.50
REFL-VIS-BH  = 0.50   REFL-VIS-HH  = 0.50    BACKREFL-VIS-BH = 0.50
BACKREFL-SOL-HH = 0.50 BACKREFL-VIS-HH = 0.50
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

Shade-Thin-T20-R70 Pull-down shade

```
$Pull-down shade, thin, fabric
$20% transmittance, 70% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.20    TRANS-SOL-HH    = 0.20
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.20    TRANS-VIS-HH    = 0.20
REFL-SOL-BH  = 0.70   REFL-SOL-HH  = 0.70    BACKREFL-SOL-BH = 0.70
REFL-VIS-BH  = 0.70   REFL-VIS-HH  = 0.70    BACKREFL-VIS-BH = 0.70
BACKREFL-SOL-HH = 0.70 BACKREFL-VIS-HH = 0.70
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

Shade-Thin-T30-R10 Pull-down shade

```
$Pull-down shade, thin, fabric
$30% transmittance, 10% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.30    TRANS-SOL-HH    = 0.30
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.30    TRANS-VIS-HH    = 0.30
REFL-SOL-BH  = 0.10   REFL-SOL-HH  = 0.10    BACKREFL-SOL-BH = 0.10
REFL-VIS-BH  = 0.10   REFL-VIS-HH  = 0.10    BACKREFL-VIS-BH = 0.10
BACKREFL-SOL-HH = 0.10 BACKREFL-VIS-HH = 0.10
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

Shade-Thin-T30-R30 Pull-down shade

```
$Pull-down shade, thin, fabric
$30% transmittance, 30% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.30    TRANS-SOL-HH    = 0.30
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.30    TRANS-VIS-HH    = 0.30
REFL-SOL-BH  = 0.30   REFL-SOL-HH  = 0.30    BACKREFL-SOL-BH = 0.30
REFL-VIS-BH  = 0.30   REFL-VIS-HH  = 0.30    BACKREFL-VIS-BH = 0.30
BACKREFL-SOL-HH = 0.30 BACKREFL-VIS-HH = 0.30
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

Shade-Thin-T30-R50 Pull-down shade

```
$Pull-down shade, thin, fabric
$30% transmittance, 50% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.30    TRANS-SOL-HH    = 0.30
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.30    TRANS-VIS-HH    = 0.30
REFL-SOL-BH  = 0.50   REFL-SOL-HH  = 0.50    BACKREFL-SOL-BH = 0.50
REFL-VIS-BH  = 0.50   REFL-VIS-HH  = 0.50    BACKREFL-VIS-BH = 0.50
BACKREFL-SOL-HH = 0.50 BACKREFL-VIS-HH = 0.50
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

Shade-Thin-T30-R60 Pull-down shade

```
$Pull-down shade, thin, fabric
$30% transmittance, 60% reflectance
TYPE = BLIND          THICKNESS   = 0.00066  CONDUCTIVITY    = 0.0667
SLAT-ANGLE = 89.95    SLAT-ORIENTATION = HORIZONTAL
SLAT-WIDTH = 0.0840   SLAT-SEPARATION = 0.0833 SLAT-ANGLE-MAX = 90
TRANS-SOL-BB = 0.0    TRANS-SOL-BH = 0.30    TRANS-SOL-HH    = 0.30
TRANS-VIS-BB = 0.0    TRANS-VIS-BH = 0.30    TRANS-VIS-HH    = 0.30
REFL-SOL-BH  = 0.60   REFL-SOL-HH  = 0.60    BACKREFL-SOL-BH = 0.60
REFL-VIS-BH  = 0.60   REFL-VIS-HH  = 0.60    BACKREFL-VIS-BH = 0.60
BACKREFL-SOL-HH = 0.60 BACKREFL-VIS-HH = 0.60
 TRANS-IR    = 0.0    EMIS-IR     = 0.9      BACKEMIS-IR     = 0.9 ..
```

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Section
2

Lighting Libraries

This section contains libraries for lamps and luminaires

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LIGHTING-SYSTEM LAMP-TYPE LIBRARY

The following is a list of the lamp types in the Library. The meaning of each entry is as follows. The bold-faced text is the U-name of the lamp type to be used as the value of the keyword LAMP-TYPE in the LIGHTING-SYSTEM command. For example, to choose the first lamp in the library, which has the U-name **F17T8/ES-Rap**, your input would look like:

```
LS-1 = LIGHTING-SYSTEM
   LIGHTING-CALC-METHOD = LUMINAIRE-LAMP
   LAMP-TYPE          = F17T8/ES-Rap
   ....
```

Following the U-name is the lamp classification, such as "T8 ES Fluor." Here, the following abbreviations are used: Tn = tube diameter in eighths of an inch, ES = energy saving, Fluor = fluorescent, CFL = compact fluorescent lamp, Incand = incandescent, and Press = pressure.

The second line of an entry gives a description of the lamp type. The remaining lines give the value of the CATEGORY through LUMEN-DEPREC keywords for this lamp type. The program will use the indicated keyword values in the lighting system calculation. For a description of these keywords, see "LAMP-TYPE Command" in the *Command/Keyword Dictionary*.

Table 14 Lamp Library

```
F17T8/ES-Rap                                         T8 ES Fluor
*24" Fluor, Energy Saving, Rapid Start, 78 lum/watt               *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-24-IN
 POWER-INPUT = 17  INIT-LUMEN-OUT = 1325  LUMEN-DEPREC = .77

F25T8/ES-Rap                                         T8 ES Fluor
*36" Fluor, Energy Saving, Rapid Start, 85 lum/watt               *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-36-IN
 POWER-INPUT = 25  INIT-LUMEN-OUT = 2125  LUMEN-DEPREC = .81

F32T8/ES-Rap                                         T8 ES Fluor
*48" Fluor, Energy Saving, Rapid Start, 89 lum/watt               *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-48-IN
 POWER-INPUT = 32  INIT-LUMEN-OUT = 2850  LUMEN-DEPREC = .84

F40T12/ES-Rap                                        T12 ES Fluor
*48" Fluor, Energy Saving, Rapid Start, 76 lum/watt               *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-48-IN
 POWER-INPUT = 34  INIT-LUMEN-OUT = 2670  LUMEN-DEPREC = .82

F48T12/ES-HO-Rap                                     T12 ES Fluor
*48" Fluor, Energy Saving, High Output, Rapid Start, 70 lum/watt *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-48-IN
 POWER-INPUT = 55  INIT-LUMEN-OUT = 3850  LUMEN-DEPREC = .82

F96T12/ES-HO-Rap                                     T12 ES Fluor
*96" Fluor, Energy Saving, High Output, Rapid Start, 84 lum/watt *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-96-IN
 POWER-INPUT = 95  INIT-LUMEN-OUT = 8020  LUMEN-DEPREC = .82

F48T12/ES-Ins                                        T12 ES Fluor
*48" Fluor, Energy Saving, Instant Start, 82 lum/watt             *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-48-IN
 POWER-INPUT = 32  INIT-LUMEN-OUT = 2610  LUMEN-DEPREC = .82

F96T8/ES-Ins                                         T8 ES Fluor
*96" Fluor, Energy Saving, Instant Start, 86 lum/watt             *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-96-IN
 POWER-INPUT = 40  INIT-LUMEN-OUT = 3450  LUMEN-DEPREC = .82

F96T12/ES-Ins                                        T12 ES Fluor
*96" Fluor, Energy Saving, Instant Start, 91 lum/watt             *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-96-IN
 POWER-INPUT = 60  INIT-LUMEN-OUT = 5430  LUMEN-DEPREC = .82

F40T12/ES-Ins                                        T12 ES Fluor
*48" Fluor, Energy Saving, Instant Start, 80 lum/watt             *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-48-IN
 POWER-INPUT = 35  INIT-LUMEN-OUT = 2800  LUMEN-DEPREC = .82

F40T12/ES-Rap                                        T12 ES Fluor
*48" Fluor, Energy Saving, Rapid Start, 80 lum/watt               *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-48-IN
 POWER-INPUT = 35  INIT-LUMEN-OUT = 2800  LUMEN-DEPREC = .82

F40T12/U/6-ES-Rap                                    T12 ES Fluor
*24" U-Tube Fluor, Energy Saving, Rapid Start, 82 lum/watt        *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-24-IN
 POWER-INPUT = 34  INIT-LUMEN-OUT = 2800  LUMEN-DEPREC = .77

F30T12/Rap                                           T12 Fluor
*36" Fluor, Rapid Start, 78 lum/watt                              *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-36-IN
 POWER-INPUT = 30  INIT-LUMEN-OUT = 2350  LUMEN-DEPREC = .81

F40T12/Rap                                           T12 Fluor
*48" Fluor, Rapid Start, 76 lum/watt                              *
CATEGORY = FULL-SIZE-FLUOR  SIZE = T-48-IN
```

POWER-INPUT = 40 INIT-LUMEN-OUT = 3050 LUMEN-DEPREC = .84

F40T10/Rap T10 Fluor
*48" Fluor, Rapid Start, 78 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-48-IN
POWER-INPUT = 40 INIT-LUMEN-OUT = 3100 LUMEN-DEPREC = .84

F24T12/HO-Rap T12 Fluor
*24" Fluor, High Output, Rapid Start, 47 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-24-IN
POWER-INPUT = 35 INIT-LUMEN-OUT = 1640 LUMEN-DEPREC = .77

F36T12/HO-Rap T12 Fluor
*36" Fluor, High Output, Rapid Start, 60 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-36-IN
POWER-INPUT = 47 INIT-LUMEN-OUT = 2815 LUMEN-DEPREC = .77

F48T12/HO-Rap T12 Fluor
*48" Fluor, High Output, Rapid Start, 68 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-48-IN
POWER-INPUT = 60 INIT-LUMEN-OUT = 4067 LUMEN-DEPREC = .82

F72T12/HO-Rap T12 Fluor
*72" Fluor, High Output, Rapid Start, 75 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-72-IN
POWER-INPUT = 85 INIT-LUMEN-OUT = 6367 LUMEN-DEPREC = .82

F96T12/HO-Rap T12 Fluor
*96" Fluor, High Output, Rapid Start, 80 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-96-IN
POWER-INPUT = 110 INIT-LUMEN-OUT = 8830 LUMEN-DEPREC = .82

F48T10/Rap T10 Fluor
*48" Fluor, Rapid Start, 56 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-48-IN
POWER-INPUT = 110 INIT-LUMEN-OUT = 6200 LUMEN-DEPREC = .66

F72T10/Rap T10 Fluor
*72" Fluor, Rapid Start, 61 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-72-IN
POWER-INPUT = 160 INIT-LUMEN-OUT = 9700 LUMEN-DEPREC = .66

F96T10/VHO-Rap T10 Fluor
*96" Fluor, Very High Output, Rapid Start, 69 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-96-IN
POWER-INPUT = 195 INIT-LUMEN-OUT = 13500 LUMEN-DEPREC = .66

F48T12/Rap T12 Fluor
*48" Fluor, Rapid Start, 60 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-48-IN
POWER-INPUT = 110 INIT-LUMEN-OUT = 6617 LUMEN-DEPREC = .69

F72T12/Rap T12 Fluor
*72" Fluor, Rapid Start, 64 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-72-IN
POWER-INPUT = 165 INIT-LUMEN-OUT = 10617 LUMEN-DEPREC = .72

F96T12/Rap T12 Fluor
*96" Fluor, Rapid Start, 66 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-96-IN
POWER-INPUT = 217 INIT-LUMEN-OUT = 14400 LUMEN-DEPREC = .72

F24T12/Ins T12 Fluor
*24" Fluor, Instant Start, 58 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-24-IN
POWER-INPUT = 20 INIT-LUMEN-OUT = 1150 LUMEN-DEPREC = .81

F36T12/Ins T12 Fluor
*36" Fluor, Instant Start, 65 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-36-IN
POWER-INPUT = 30 INIT-LUMEN-OUT = 1940 LUMEN-DEPREC = .81

F48T12/Ins T12 Fluor
*48" Fluor, Instant Start, 74 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-48-IN
POWER-INPUT = 39 INIT-LUMEN-OUT = 2890 LUMEN-DEPREC = .82

F72T12/Ins T12 Fluor
*72" Fluor, Instant Start, 81 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-72-IN
POWER-INPUT = 55 INIT-LUMEN-OUT = 4480 LUMEN-DEPREC = .89

F96T12/Ins T12 Fluor
*96" Fluor, Instant Start, 88 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-96-IN
POWER-INPUT = 75 INIT-LUMEN-OUT = 6620 LUMEN-DEPREC = .89

F72T8/Ins T8 Fluor
*72" Fluor, Instant Start, 82 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-72-IN
POWER-INPUT = 37 INIT-LUMEN-OUT = 3025 LUMEN-DEPREC = .83

F96T8/Ins T8 Fluor
*96" Fluor, Instant Start, 81 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-96-IN
POWER-INPUT = 50 INIT-LUMEN-OUT = 4025 LUMEN-DEPREC = .89

FB16T8/Rap T8 U-Tube Fluor
*12" U-Tube Fluor, Rapid Start, 78 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-12-IN
POWER-INPUT = 16 INIT-LUMEN-OUT = 1250 LUMEN-DEPREC = .80

FB24T8/Rap T8 U-Tube Fluor
*18" U-Tube Fluor, Rapid Start, 85 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-18-IN
POWER-INPUT = 24 INIT-LUMEN-OUT = 2050 LUMEN-DEPREC = .80

FB31T8/Rap T8 U-Tube Fluor
*24" U-Tube Fluor, Rapid Start, 90 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-24-IN
POWER-INPUT = 31 INIT-LUMEN-OUT = 2800 LUMEN-DEPREC = .80

FB35T12/Rap T12 U-Tube Fluor
*22.5" U-Tube Fluor, Rapid Start, 67 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-24-IN
POWER-INPUT = 35 INIT-LUMEN-OUT = 2350 LUMEN-DEPREC = .80

FB40T12/Rap T12 U-Tube Fluor
*22.5" U-Tube Fluor, Rapid Start, 75 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-24-IN
POWER-INPUT = 40 INIT-LUMEN-OUT = 3000 LUMEN-DEPREC = .80

FT18W/2G11-Rap Twin-Tube Fluor
*11" U-Tube Fluor, Rapid Start, 69 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-12-IN
POWER-INPUT = 18 INIT-LUMEN-OUT = 1250 LUMEN-DEPREC = .80

FT39W/2G11-Rap Twin-Tube Fluor
*17" U-Tube Fluor, Rapid Start, 73 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-18-IN
POWER-INPUT = 39 INIT-LUMEN-OUT = 2850 LUMEN-DEPREC = .80

FT40W/2G11-Rap Twin-Tube Fluor
*11" U-Tube Fluor, Rapid Start, 79 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-24-IN
POWER-INPUT = 40 INIT-LUMEN-OUT = 3150 LUMEN-DEPREC = .80

FT50W/2G11-Rap Twin-Tube Fluor
*23" U-Tube Fluor, Rapid Start, 80 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-24-IN
POWER-INPUT = 50 INIT-LUMEN-OUT = 4000 LUMEN-DEPREC = .80

FT55W/2G11-Rap Twin-Tube Fluor
*21" U-Tube Fluor, Rapid Start, 87 lum/watt *
CATEGORY = FULL-SIZE-FLUOR SIZE = T-24-IN
POWER-INPUT = 55 INIT-LUMEN-OUT = 4800 LUMEN-DEPREC = .80

CFT5W/G23 Twin-Tube CFL
*5-Watt Twin-Tube Compact T4 Fluorescent, 50 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-0-6-IN
POWER-INPUT = 5 INIT-LUMEN-OUT = 250 LUMEN-DEPREC = .80

CFT7W/G23 Twin-Tube CFL
*7-Watt Twin-Tube Compact T4 Fluorescent, 57 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-0-6-IN
POWER-INPUT = 7 INIT-LUMEN-OUT = 400 LUMEN-DEPREC = .80

CFT9W/G23 Twin-Tube CFL
*9-Watt Twin-Tube Compact T4 Fluorescent, 67 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-6-12-IN
POWER-INPUT = 9 INIT-LUMEN-OUT = 600 LUMEN-DEPREC = .80

CFT13W/GX23 Twin-Tube CFL
*13-Watt Twin-Tube Compact T4 Fluorescent, 69 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-6-12-IN
POWER-INPUT = 13 INIT-LUMEN-OUT = 900 LUMEN-DEPREC = .80

CFT18W Twin-Tube CFL
*18-Watt Twin-Tube Compact T5 Fluorescent, 10.5", 69 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-6-12-IN
POWER-INPUT = 18 INIT-LUMEN-OUT = 1250 LUMEN-DEPREC = .83

CFT27W Twin-Tube CFL
*27-Watt Twin-Tube Compact T5 Fluorescent, 12.8", 67 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-12-IN
POWER-INPUT = 27 INIT-LUMEN-OUT = 1800 LUMEN-DEPREC = .83

CFT39W Twin-Tube CFL
*39-Watt Twin-Tube Compact T5 Fluorescent, 16.5", 73 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-18-IN
POWER-INPUT = 39 INIT-LUMEN-OUT = 2850 LUMEN-DEPREC = .80

CFT50W Twin-Tube CFL
*39-Watt Twin-Tube Compact T5 Fluorescent, 22.5", 80 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-24-IN
POWER-INPUT = 50 INIT-LUMEN-OUT = 4000 LUMEN-DEPREC = .74

CFQ9W/G23 Quad-Tube CFL
*9-Watt Quad-Tube Compact T4 Fluorescent, 67 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-0-6-IN
POWER-INPUT = 9 INIT-LUMEN-OUT = 600 LUMEN-DEPREC = .80

CFQ13W/GX23 Quad-Tube CFL
*13-Watt Quad-Tube Compact T4 Fluorescent, 66 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-0-6-IN
POWER-INPUT = 13 INIT-LUMEN-OUT = 860 LUMEN-DEPREC = .80

CFQ15W/GX32D Quad-Tube CFL
*15-Watt Quad-Tube Compact T4 Fluorescent, 60 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-0-6-IN
POWER-INPUT = 15 INIT-LUMEN-OUT = 900 LUMEN-DEPREC = .80

CFQ18W/G24D Quad-Tube CFL
*18-Watt Quad-Tube Compact T4 Fluorescent, 69 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-6-12-IN
POWER-INPUT = 18 INIT-LUMEN-OUT = 1250 LUMEN-DEPREC = .80

CFQ20W/GX32D Quad-Tube CFL
*20-Watt Quad-Tube Compact T4 Fluorescent, 60 lum/watt *
CATEGORY = COMPACT-FLUOR SIZE = T-6-12-IN
POWER-INPUT = 20 INIT-LUMEN-OUT = 1200 LUMEN-DEPREC = .80

CFQ26W/G24D Quad-Tube CFL

```
*26-Watt Quad-Tube Compact T4 Fluorescent, 69 lum/watt          *
CATEGORY = COMPACT-FLUOR  SIZE = T-6-12-IN
 POWER-INPUT = 26  INIT-LUMEN-OUT = 1800  LUMEN-DEPREC = .80
```

CFH13W Hex-Tube CFL

```
*13-Watt Hex-Tube Compact T4 Fluorescent, 4.2", 65 lum/watt     *
CATEGORY = COMPACT-FLUOR  SIZE = T-0-6-IN
 POWER-INPUT = 13  INIT-LUMEN-OUT = 840  LUMEN-DEPREC = .73
```

CFH18W Hex-Tube CFL

```
*18-Watt Hex-Tube Compact T4 Fluorescent, 4.6", 62 lum/watt     *
CATEGORY = COMPACT-FLUOR  SIZE = T-0-6-IN
 POWER-INPUT = 18  INIT-LUMEN-OUT = 1120  LUMEN-DEPREC = .73
```

CFH26W Hex-Tube CFL

```
*26-Watt Hex-Tube Compact T4 Fluorescent, 5.2", 62 lum/watt     *
CATEGORY = COMPACT-FLUOR  SIZE = T-0-6-IN
 POWER-INPUT = 26  INIT-LUMEN-OUT = 1610  LUMEN-DEPREC = .74
```

CFH32W Hex-Tube CFL

```
*32-Watt Hex-Tube Compact T4 Fluorescent, 5.8", 69 lum/watt     *
CATEGORY = COMPACT-FLUOR  SIZE = T-0-6-IN
 POWER-INPUT = 32  INIT-LUMEN-OUT = 2200  LUMEN-DEPREC = .74
```

Incand50W/A19 Incand Frosted

```
*50-Watt INCANDESCENT, Inside Frosted, A19, 14 lum/watt         *
CATEGORY = INCANDESCENT  SIZE = ALPHA-0-21
 POWER-INPUT = 50  INIT-LUMEN-OUT = 680  LUMEN-DEPREC = .88
```

Incand75W/A19 Incand Frosted

```
*75-Watt INCANDESCENT, Inside Frosted, A19, 16 lum/watt         *
CATEGORY = INCANDESCENT  SIZE = ALPHA-0-21
 POWER-INPUT = 75  INIT-LUMEN-OUT = 1190  LUMEN-DEPREC = .92
```

Incand100W/A19 Incand Frosted

```
*100-Watt INCANDESCENT, Inside Frosted, A19, 17 lum/watt        *
CATEGORY = INCANDESCENT  SIZE = ALPHA-0-21
 POWER-INPUT = 100  INIT-LUMEN-OUT = 1740  LUMEN-DEPREC = .91
```

Incand150W/A21 Incand Frosted

```
*150-Watt INCANDESCENT, Inside Frosted, A21, 19 lum/watt        *
CATEGORY = INCANDESCENT  SIZE = ALPHA-0-21
 POWER-INPUT = 150  INIT-LUMEN-OUT = 2873  LUMEN-DEPREC = .89
```

Incand200W/A23 Incand Frosted

```
*200-Watt INCANDESCENT, Inside Frosted, A23, 20 lum/watt        *
CATEGORY = INCANDESCENT  SIZE = ALPHA-22-30
 POWER-INPUT = 200  INIT-LUMEN-OUT = 4003  LUMEN-DEPREC = .89
```

Incand300W/PS30 Incand Frosted

```
*300-Watt INCANDESCENT, Inside Frosted, PS30, 20 lum/watt       *
CATEGORY = INCANDESCENT  SIZE = ALPHA-22-30
 POWER-INPUT = 300  INIT-LUMEN-OUT = 6103  LUMEN-DEPREC = .83
```

Incand500W/PS40 Incand Frosted

```
*500-Watt INCANDESCENT, Inside Frosted, PS40, 20 lum/watt       *
CATEGORY = INCANDESCENT  SIZE = ALPHA-31-50
 POWER-INPUT = 500  INIT-LUMEN-OUT = 10035  LUMEN-DEPREC = .89
```

Incand1000W/PS52 Incand Frosted

```
*1000-Watt INCANDESCENT, Inside Frosted, PS52, 24 lum/watt      *
CATEGORY = INCANDESCENT  SIZE = ALPHA-31-50
 POWER-INPUT = 1000  INIT-LUMEN-OUT = 23510  LUMEN-DEPREC = .89
```

Incand1500W/PS52 Incand Frosted

```
*1500-Watt INCANDESCENT, Inside Frosted, PS52, 23 lum/watt      *
CATEGORY = INCANDESCENT  SIZE = ALPHA-31-50
 POWER-INPUT = 1500  INIT-LUMEN-OUT = 33850  LUMEN-DEPREC = .78
```

Incand45W/PAR38 Incand Flood

```
*45-Watt INCANDESCENT Parabolic Reflector, PAR38, 12 lum/watt   *
```

CATEGORY = INCANDESCENT SIZE = REFL-31-50
 POWER-INPUT = 45 INIT-LUMEN-OUT = 540 LUMEN-DEPREC = .88

Incand75W/PAR38 Incand Flood
*75-Watt INCANDESCENT Parabolic Reflector, PAR38, 12 lum/watt *
CATEGORY = INCANDESCENT SIZE = REFL-31-50
 POWER-INPUT = 75 INIT-LUMEN-OUT = 900 LUMEN-DEPREC = .88

Incand100W/PAR38 Incand Flood
*100-Watt INCANDESCENT Parabolic Reflector, PAR38, 13 lum/watt *
CATEGORY = INCANDESCENT SIZE = REFL-31-50
 POWER-INPUT = 100 INIT-LUMEN-OUT = 1250 LUMEN-DEPREC = .91

Incand150W/PAR38 Incand Flood
*150-Watt INCANDESCENT Parabolic Reflector, PAR38, 12 lum/watt *
CATEGORY = INCANDESCENT SIZE = REFL-31-50
 POWER-INPUT = 150 INIT-LUMEN-OUT = 1735 LUMEN-DEPREC = .89

Incand250W/PAR38 Incand Flood
*250-Watt INCANDESCENT Parabolic Reflector, PAR38, 13 lum/watt *
CATEGORY = INCANDESCENT SIZE = REFL-31-50
 POWER-INPUT = 250 INIT-LUMEN-OUT = 3200 LUMEN-DEPREC = .89

Incand500W/PAR64 Incand Flood
*500-Watt INCANDESCENT Parabolic Reflector, PAR64, 13 lum/watt *
CATEGORY = INCANDESCENT SIZE = REFL-31-50
 POWER-INPUT = 500 INIT-LUMEN-OUT = 6500 LUMEN-DEPREC = .89

Incand1000W/PAR64 Incand Flood
*1000-Watt INCANDESCENT Parabolic Reflector, PAR64, 18 lum/watt *
CATEGORY = INCANDESCENT SIZE = REFL-31-50
 POWER-INPUT = 1000 INIT-LUMEN-OUT = 17700 LUMEN-DEPREC = .89

Incand50W/R20 Incand Flood
*50-Watt INCANDESCENT Reflector, R20, 8 lum/watt *
CATEGORY = INCANDESCENT SIZE = REFL-0-21
 POWER-INPUT = 50 INIT-LUMEN-OUT = 415 LUMEN-DEPREC = .89

Incand75W/R30 Incand Flood
*75-Watt INCANDESCENT Reflector, R30, 12 lum/watt *
CATEGORY = INCANDESCENT SIZE = REFL-22-30
 POWER-INPUT = 75 INIT-LUMEN-OUT = 865 LUMEN-DEPREC = .89

Incand120W/R40 Incand Flood
*120-Watt INCANDESCENT Reflector, R40, 13 lum/watt *
CATEGORY = INCANDESCENT SIZE = REFL-31-50
 POWER-INPUT = 120 INIT-LUMEN-OUT = 1600 LUMEN-DEPREC = .89

Incand300W/R40 Incand Flood
*300-Watt INCANDESCENT Reflector, R40, 14 lum/watt *
CATEGORY = INCANDESCENT SIZE = REFL-31-50
 POWER-INPUT = 300 INIT-LUMEN-OUT = 4250 LUMEN-DEPREC = .89

Incand500W/R40 Incand Flood
*500-Watt INCANDESCENT Reflector, R40, 13 lum/watt *
CATEGORY = INCANDESCENT SIZE = REFL-31-50
 POWER-INPUT = 500 INIT-LUMEN-OUT = 6500 LUMEN-DEPREC = .89

MetalHalide32W/E17 Metal Halide
*32-Watt Metal Halide, Vertical, Screw Base, E17, 78 lum/watt *
CATEGORY = HID-MET-HALIDE SIZE = ALPHA-0-21
 POWER-INPUT = 32 INIT-LUMEN-OUT = 2500 LUMEN-DEPREC = .89

MetalHalide75W/ED17 Metal Halide
*75-Watt Metal Halide, Vertical, Screw Base, ED17, 75 lum/watt *
CATEGORY = HID-MET-HALIDE SIZE = ALPHA-0-21
 POWER-INPUT = 75 INIT-LUMEN-OUT = 5600 LUMEN-DEPREC = .89

MetalHalide150W/ED17 Metal Halide
*150-Watt Metal Halide, Vertical, Screw Base, ED17, 83 lum/watt *
CATEGORY = HID-MET-HALIDE SIZE = ALPHA-0-21

```
 POWER-INPUT = 150  INIT-LUMEN-OUT = 12500   LUMEN-DEPREC = .89
```

MetalHalide250W/ED28 Metal Halide
```
*250-Watt Metal Halide, Vertical, Screw Base, ED28, 92 lum/watt  *
CATEGORY = HID-MET-HALIDE  SIZE = ALPHA-22-30
 POWER-INPUT = 250  INIT-LUMEN-OUT = 23000  LUMEN-DEPREC = .89
```

MetalHalide400W/ED37 Metal Halide
```
*400-Watt Metal Halide, Vertical, Screw Base, ED37, 100 lum/watt *
CATEGORY = HID-MET-HALIDE  SIZE = ALPHA-31-50
 POWER-INPUT = 400  INIT-LUMEN-OUT = 40000  LUMEN-DEPREC = .89
```

MetalHalide70W/T6.5 Metal Halide
```
*75-Watt Metal Halide, Horizont, Double End, T6.5, 79 lum/watt   *
CATEGORY = HID-MET-HALIDE  SIZE = T-6-12-IN
 POWER-INPUT = 70  INIT-LUMEN-OUT = 5500   LUMEN-DEPREC = .89
```

MetalHalide100W/T7.5 Metal Halide
```
*100-Watt Metal Halide, Horizont, Double End, T7.5, 68 lum/watt  *
CATEGORY = HID-MET-HALIDE  SIZE = T-6-12-IN
 POWER-INPUT = 100  INIT-LUMEN-OUT = 6800   LUMEN-DEPREC = .89
```

MetalHalide150W/T7.5 Metal Halide
```
*150-Watt Metal Halide, Horizont, Double End, T7.5, 80 lum/watt  *
CATEGORY = HID-MET-HALIDE  SIZE = T-6-12-IN
 POWER-INPUT = 150  INIT-LUMEN-OUT = 12000   LUMEN-DEPREC = .89
```

MetalHalide250W/T9.5 Metal Halide
```
*150-Watt Metal Halide, Horizont, Double End, T9.5, 80 lum/watt  *
CATEGORY = HID-MET-HALIDE  SIZE = T-6-12-IN
 POWER-INPUT = 250  INIT-LUMEN-OUT = 20000   LUMEN-DEPREC = .89
```

MetalHalide400W/T10 Metal Halide
```
*400-Watt Metal Halide, Horizont, Double End, T10, 85 lum/watt   *
CATEGORY = HID-MET-HALIDE  SIZE = T-6-12-IN
 POWER-INPUT = 400  INIT-LUMEN-OUT = 34000   LUMEN-DEPREC = .89
```

HPS35W/E17 Hi Press Sodium
```
*35-Watt HPS, Universal Position, Screw Base, E17, 64 lum/watt   *
CATEGORY = HID-HI-PR-SODIUM  SIZE = ALPHA-0-21
 POWER-INPUT = 35  INIT-LUMEN-OUT = 2250     LUMEN-DEPREC = .89
```

HPS70W/E17 Hi Press Sodium
```
*70-Watt HPS, Universal Position, Screw Base, E17, 90 lum/watt   *
CATEGORY = HID-HI-PR-SODIUM  SIZE = ALPHA-0-21
 POWER-INPUT = 70  INIT-LUMEN-OUT = 6300     LUMEN-DEPREC = .89
```

HPS150W/B17 Hi Press Sodium
```
*150-Watt HPS, Universal Position, Screw Base, B17, 107 lum/watt *
CATEGORY = HID-HI-PR-SODIUM  SIZE = ALPHA-0-21
 POWER-INPUT = 150  INIT-LUMEN-OUT = 16000     LUMEN-DEPREC = .89
```

HPS250W/ED18 Hi Press Sodium
```
*250-Watt HPS, Universal Position, Screw Base, ED18, 110 lum/watt*
CATEGORY = HID-HI-PR-SODIUM  SIZE = ALPHA-0-21
 POWER-INPUT = 250  INIT-LUMEN-OUT = 27500    LUMEN-DEPREC = .89
```

HPS400W/ED18 Hi Press Sodium
```
*400-Watt HPS, Universal Position, Screw Base, ED18, 125 lum/watt*
CATEGORY = HID-HI-PR-SODIUM  SIZE = ALPHA-0-21
 POWER-INPUT = 400  INIT-LUMEN-OUT = 50000    LUMEN-DEPREC = .89
```

TungHal75W/T3 Tungsten Halogen
```
*75-Watt Tungsten Halogen, Single Ended, T3, 19 lum/watt         *
CATEGORY = TUNGSTEN-HALOGEN  SIZE = T-0-6-IN
 POWER-INPUT = 75  INIT-LUMEN-OUT = 1400    LUMEN-DEPREC = .96
```

TungHal100W/T4 Tungsten Halogen
```
*100-Watt Tungsten Halogen, Single Ended, T4, 18 lum/watt        *
CATEGORY = TUNGSTEN-HALOGEN  SIZE = T-0-6-IN
 POWER-INPUT = 100  INIT-LUMEN-OUT = 1800    LUMEN-DEPREC = .96
```

```
TungHal150W/T4                                  Tungsten Halogen
*150-Watt Tungsten Halogen, Single Ended, T4, 19 lum/watt        *
CATEGORY = TUNGSTEN-HALOGEN  SIZE = T-0-6-IN
 POWER-INPUT = 150  INIT-LUMEN-OUT = 2900    LUMEN-DEPREC = .96

TungHal250W/T4                                  Tungsten Halogen
*250-Watt Tungsten Halogen, Single Ended, T4, 19 lum/watt        *
CATEGORY = TUNGSTEN-HALOGEN  SIZE = T-0-6-IN
 POWER-INPUT = 250  INIT-LUMEN-OUT = 4850    LUMEN-DEPREC = .96

TungHal500W/T4                                  Tungsten Halogen
*500-Watt Tungsten Halogen, Single Ended, T4, 23 lum/watt        *
CATEGORY = TUNGSTEN-HALOGEN  SIZE = T-0-6-IN
 POWER-INPUT = 500  INIT-LUMEN-OUT = 11500    LUMEN-DEPREC = .96
```

LIGHTING-SYSTEM LUMINAIRE-TYPE LIBRARY

The following is a list of the luminaire types in the Library. The meaning of each entry is as follows.

The bold-faced text is the U-name of the luminaire type to be used as the value of the keyword LUMINAIRE-TYPE in the LIGHTING-SYSTEM command. For example, to choose the first luminaire in the library, which has the U-name Troffer-2X4-2-Lamp, your input would look like:

```
LS-1 = LIGHTING-SYSTEM
   LIGHTING-CALC-METHOD = LUMINAIRE-LAMP
   LUMINAIRE-TYPE     = Troffer-2X4-2-Lamp
   ....
```

Following the U-name is the luminaire category, such as "Full-size Fluor."

The second line of an entry gives a description of the luminaire type. The remaining lines give the value of the CU-RCR-1 through ACCEPT-CONFIG keywords for this luminaire type. The program will use the indicated keyword values in the lighting system calculation. For a description of these keywords, see "LUMINAIRE-TYPE Command" in the *Command/Keyword Dictionary*.

Table 15 Luminaire Library

```
Troffer-2X4-2-Lamp                               Full-Size Fluor
*Troffer, 2'x4', 2 Lamps, Pattern Acrylic Diffuser                *
CU-RCR-1  =  (.69,.71,.72,.71,.73,.75,.72,.77,.80)
CU-RCR-5  =  (.41,.45,.49,.41,.45,.50,.42,.46,.52)
CU-RCR-10 =  (.22,.25,.30,.22,.25,.30,.22,.26,.32)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (RECESS-STATIC)

Troffer-2X4-3-Lamp                               Full-Size Fluor
*Troffer, 2'x4', 3 Lamps, Pattern Acrylic Diffuser                *
CU-RCR-1  =  (.65,.66,.67,.67,.68,.70,.68,.72,.75)
CU-RCR-5  =  (.39,.42,.46,.39,.42,.47,.39,.44,.49)
CU-RCR-10 =  (.20,.24,.26,.21,.24,.29,.21,.24,.30)
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (RECESS-STATIC)

Troffer-2X4-4-Lamp                               Full-Size Fluor
*Troffer, 2'x4', 4 Lamps, Pattern Acrylic Diffuser                *
CU-RCR-1  =  (.62,.64,.65,.64,.66,.68,.65,.69,.72)
CU-RCR-5  =  (.37,.40,.44,.37,.41,.45,.38,.42,.47)
CU-RCR-10 =  (.20,.23,.27,.20,.23,.27,.20,.23,.28)
NO-OF-LAMPS = 4   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (RECESS-STATIC)

Air-Handling-Troffer-2X4-2-Lamp                  Full-Size Fluor
*Air Handling Troffer, 2'x4', 2 Lamps, Pattern Acrylic Diffuser  *
CU-RCR-1  =  (.66,.67,.69,.68,.70,.72,.71,.74,.76)
CU-RCR-5  =  (.38,.41,.45,.38,.42,.47,.39,.43,.49)
CU-RCR-10 =  (.20,.23,.26,.20,.23,.28,.20,.24,.29)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (RECESS-VENTED)

Air-Handling-Troffer-2X4-3-Lamp                  Full-Size Fluor
*Air Handling Troffer, 2'x4', 3 Lamps, Pattern Acrylic Diffuser  *
CU-RCR-1  =  (.60,.62,.63,.62,.64,.66,.65,.68,.70)
CU-RCR-5  =  (.35,.38,.42,.35,.38,.43,.36,.40,.45)
CU-RCR-10 =  (.18,.21,.25,.18,.22,.26,.19,.22,.27)
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (RECESS-VENTED)

Air-Handling-Troffer-2X4-4-Lamp                  Full-Size Fluor
*Air Handling Troffer, 2'x4', 4 Lamps, Acrylic Diffuser           *
CU-RCR-1  =  (.58,.59,.61,.60,.62,.63,.63,.65,.67)
CU-RCR-5  =  (.33,.36,.40,.34,.37,.41,.34,.38,.43)
CU-RCR-10 =  (.18,.21,.25,.18,.21,.25,.18,.21,.26)
NO-OF-LAMPS = 4   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (RECESS-VENTED)

Parabolic-Troffer-2X4-2-Lamp                     Full-Size Fluor
*Parabolic Troffer, 2'x4', 2 Lamps, Louvered                      *
CU-RCR-1  =  (.72,.74,.75,.75,.76,.78,.75,.81,.83)
CU-RCR-5  =  (.41,.44,.49,.41,.45,.50,.42,.46,.53)
CU-RCR-10 =  (.20,.23,.28,.20,.24,.29,.20,.24,.30)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)

Parabolic-Troffer-2X4-3-Lamp                     Full-Size Fluor
*Parabolic Troffer, 2'x4', 3 Lamps, Louvered                      *
CU-RCR-1  =  (.67,.68,.69,.69,.70,.72,.70,.74,.76)
CU-RCR-5  =  (.40,.43,.47,.40,.44,.48,.41,.45,.50)
CU-RCR-10 =  (.21,.24,.28,.21,.24,.29,.21,.24,.30)
```

```
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)
```

Parabolic-Troffer-2X4-4-Lamp Full-Size Fluor

```
*Parabolic Troffer, 2'x4', 4 Lamps, Louvered                    *
CU-RCR-1  =  (.59,.60,.60,.60,.62,.63,.61,.65,.67)
CU-RCR-5  =  (.36,.39,.42,.36,.39,.43,.37,.40,.45)
CU-RCR-10 =  (.19,.22,.26,.19,.22,.26,.19,.22,.27)
NO-OF-LAMPS = 4   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)
```

Surf/Susp-Parabolic-2X4-2-Lamp Full-Size Fluor

```
*Surface or Suspended Parabolic, 2'x4', 2 Lamps, Louvered       *
CU-RCR-1  =  (.72,.74,.75,.75,.76,.78,.75,.81,.83)
CU-RCR-5  =  (.41,.44,.49,.41,.45,.50,.42,.46,.53)
CU-RCR-10 =  (.20,.23,.28,.20,.24,.29,.20,.24,.30)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Surf/Susp-Parabolic-2X4-3-Lamp Full-Size Fluor

```
*Surface or Suspended Parabolic, 2'x4', 3 Lamps, Louvered       *
CU-RCR-1  =  (.67,.68,.69,.69,.70,.72,.70,.74,.76)
CU-RCR-5  =  (.40,.43,.47,.40,.44,.48,.41,.45,.50)
CU-RCR-10 =  (.21,.24,.28,.21,.24,.29,.21,.24,.30)
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE =T-48-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Surf/Susp-Parabolic-2X4-4-Lamp Full-Size Fluor

```
*Surface or Suspended Parabolic, 2'x4', 4 Lamps, Louvered       *
CU-RCR-1  =  (.59,.60,.60,.60,.62,.63,.61,.65,.67)
CU-RCR-5  =  (.36,.39,.42,.36,.39,.43,.37,.40,.45)
CU-RCR-10 =  (.19,.22,.26,.19,.22,.26,.19,.22,.27)
NO-OF-LAMPS = 4   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Air-Handling-Troffer-2X4-4-Lamp Full-Size Fluor

```
*Air Handling Troffer, 2'x4', 4 Lamps, Floating Louver          *
CU-RCR-1  =  (.52,.53,.53,.53,.54,.55,.56,.57,.59)
CU-RCR-5  =  (.33,.35,.38,.34,.36,.39,.34,.37,.41)
CU-RCR-10 =  (.18,.20,.23,.18,.20,.24,.18,.21,.25)
NO-OF-LAMPS = 4   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-VENTED)
```

Air-Handling-Troffer-2X2-2-Lamp Full-Size Fluor

```
*Air Handling Troffer, 2'x2', 2 Lamps, Floating Louver          *
CU-RCR-1  =  (.46,.47,.48,.48,.49,.50,.50,.52,.53)
CU-RCR-5  =  (.30,.32,.34,.30,.32,.35,.31,.33,.37)
CU-RCR-10 =  (.16,.18,.21,.16,.18,.21,.16,.18,.22)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-24-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-VENTED)
```

Air-Handling-Troffer-1X4-2-Lamp Full-Size Fluor

```
*Air Handling Troffer, 1'x4', 2 Lamps, Floating Louver          *
CU-RCR-1  =  (.46,.47,.48,.48,.49,.50,.50,.51,.53)
CU-RCR-5  =  (.31,.32,.35,.31,.33,.36,.31,.34,.37)
CU-RCR-10 =  (.17,.19,.22,.17,.19,.22,.17,.20,.23)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-VENTED)
```

Sur/Susp-Wraparound-1.3X4-4-Lamp Full-Size Fluor

```
*Surf or Suspend Wraparound, 16''x4', 4 Lamps, Acrylic Prism Dif *
CU-RCR-1  =  (.55,.57,.58,.59,.59,.61,.62,.64,.66)
CU-RCR-5  =  (.33,.36,.39,.34,.37,.41,.35,.38,.43)
```

```
CU-RCR-10 =  (.18,.20,.24,.18,.21,.25,.19,.22,.26)
NO-OF-LAMPS = 4   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (SURFACE-CLOSED,SUSPEND-CLOSED)
```

Sur/Susp-Wraparound-0.8X4-2-Lamp Full-Size Fluor

```
*Surf or Suspend Wraparound, 11''x4', 2 Lamps, Acrylic Prism Dif *
CU-RCR-1  =  (.57,.58,.60,.60,.62,.63,.65,.67,.69)
CU-RCR-5  =  (.34,.37,.40,.35,.38,.42,.36,.40,.45)
CU-RCR-10 =  (.18,.21,.24,.19,.22,.26,.19,.23,.26)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (SURFACE-CLOSED,SUSPEND-CLOSED)
```

Sur/Susp-Wraparound-1.5X4-2-Lamp Full-Size Fluor

```
*Surf or Suspend Wraparound, 18''x4', 2 Lamps, Acrylic Prism Dif *
CU-RCR-1  =  (.68,.69,.71,.70,.72,.75,.75,.78,.81)
CU-RCR-5  =  (.38,.42,.46,.39,.43,.48,.40,.45,.51)
CU-RCR-10 =  (.19,.22,.27,.19,.23,.28,.20,.24,.30)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (SURFACE-CLOSED,SUSPEND-CLOSED)
```

Sur/Susp-Wraparound-1.5X4-4-Lamp Full-Size Fluor

```
*Surf or Suspend Wraparound, 18''x4', 4 Lamps, Acrylic Prism Dif *
CU-RCR-1  =  (.63,.65,.66,.66,.68,.70,.70,.73,.76)
CU-RCR-5  =  (.35,.38,.43,.36,.39,.44,.36,.41,.47)
CU-RCR-10 =  (.18,.21,.25,.18,.21,.26,.18,.22,.28)
NO-OF-LAMPS = 4   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (SURFACE-CLOSED,SUSPEND-CLOSED)
```

Sur/Susp-Wraparound-1.3X8-4-Lamp Full-Size Fluor

```
*Surf or Suspend Wraparound, 16''x8', 4 Lamps, Acrylic Prism Dif *
CU-RCR-1  =  (.55,.57,.58,.59,.59,.61,.62,.64,.66)
CU-RCR-5  =  (.33,.36,.39,.34,.37,.41,.35,.38,.43)
CU-RCR-10 =  (.18,.20,.24,.18,.21,.25,.19,.22,.26)
NO-OF-LAMPS = 4   ACCEPT-LAMP-SIZE = T-96-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (SURFACE-CLOSED,SUSPEND-CLOSED)
```

Sur/Susp-Wraparound-0.8X8-2-Lamp Full-Size Fluor

```
*Surf or Suspend Wraparound, 11''x8', 2 Lamps, Acrylic Prism Dif *
CU-RCR-1  =  (.57,.58,.60,.60,.62,.63,.65,.67,.69)
CU-RCR-5  =  (.34,.37,.40,.35,.38,.42,.36,.40,.45)
CU-RCR-10 =  (.18,.21,.24,.19,.22,.26,.19,.23,.26)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-96-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (SURFACE-CLOSED,SUSPEND-CLOSED)
```

Sur/Susp-Wraparound-1.5X8-2-Lamp Full-Size Fluor

```
*Surf or Suspend Wraparound, 18''x8', 2 Lamps, Acrylic Prism Dif *
CU-RCR-1  =  (.68,.69,.71,.70,.72,.75,.75,.78,.81)
CU-RCR-5  =  (.38,.42,.46,.39,.43,.48,.40,.45,.51)
CU-RCR-10 =  (.19,.22,.27,.19,.23,.28,.20,.24,.30)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-96-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (SURFACE-CLOSED,SUSPEND-CLOSED)
```

Sur/Susp-Wraparound-1.5X8-4-Lamp Full-Size Fluor

```
*Surf or Suspend Wraparound, 18''x8', 4 Lamps, Acrylic Prism Dif *
CU-RCR-1  =  (.63,.65,.66,.66,.68,.70,.70,.73,.76)
CU-RCR-5  =  (.35,.38,.43,.36,.39,.44,.36,.41,.47)
CU-RCR-10 =  (.18,.21,.25,.18,.21,.26,.18,.22,.28)
NO-OF-LAMPS = 4   ACCEPT-LAMP-SIZE = T-96-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (SURFACE-CLOSED,SUSPEND-CLOSED)
```

Corridor-Wraparound-0.6X4-1-Lamp Full-Size Fluor

```
*Corridor Wraparound, 7''x4', 1 Lamp, Acrylic Prismatic Dif      *
CU-RCR-1  =  (.61,.63,.65,.67,.69,.72,.76,.79,.83)
```

```
CU-RCR-5  =  (.32,.36,.41,.35,.39,.45,.38,.44,.51)
CU-RCR-10 =  (.16,.20,.24,.17,.21,.27,.19,.23,.30)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (SURFACE-CLOSED,SUSPEND-CLOSED)
```

Corridor-Wraparound-0.6X4-2-Lamp Full-Size Fluor

```
*Corridor Wraparound, 7''x4', 2 Lamps, Acrylic Prismatic Dif     *
CU-RCR-1  =  (.54,.56,.58,.59,.61,.63,.66,.69,.71)
CU-RCR-5  =  (.29,.32,.36,.30,.34,.39,.33,.38,.44)
CU-RCR-10 =  (.15,.17,.22,.15,.19,.23,.16,.20,.26)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (SURFACE-CLOSED,SUSPEND-CLOSED)
```

Louvered-Commercial-1.1X4-2-Lamp Full-Size Fluor

```
*Commercial, 13''x4', 2 Lamps, Louvered                          *
CU-RCR-1  =  (.52,.53,.54,.62,.64,.65,.78,.81,.84)
CU-RCR-5  =  (.29,.32,.35,.33,.37,.42,.40,.46,.53)
CU-RCR-10 =  (.15,.18,.21,.17,.20,.25,.20,.25,.31)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-II
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Louvered-Commercial-1.5X4-4-Lamp Full-Size Fluor

```
*Commercial, 17''x4', 4 Lamps, Louvered                          *
CU-RCR-1  =  (.45,.46,.48,.55,.57,.58,.71,.74,.77)
CU-RCR-5  =  (.26,.28,.31,.30,.33,.37,.37,.42,.48)
CU-RCR-10 =  (.14,.16,.19,.16,.19,.23,.19,.23,.29)
NO-OF-LAMPS = 4   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-II
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Turret-Industrial-1.1X4-3-Lamp Full-Size Fluor

```
*Turret Industrial, 13''x6', 3 Lamps, No Diffuser or Louver      *
CU-RCR-1  =  (.68,.70,.71,.73,.75,.77,.81,.84,.87)
CU-RCR-5  =  (.36,.39,.44,.37,.42,.48,.40,.46,.53)
CU-RCR-10 =  (.17,.21,.26,.18,.22,.28,.19,.24,.31)
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE = T-72-IN
LUM-MAINT-CAT = LUM-MAINT-III
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Turret-Industrial-1.1X8-3-Lamp Full-Size Fluor

```
*Turret Industrial, 13''x8', 3 Lamps, No Diffuser or Louver      *
CU-RCR-1  =  (.68,.70,.71,.73,.75,.77,.81,.84,.87)
CU-RCR-5  =  (.36,.39,.44,.37,.42,.48,.40,.46,.53)
CU-RCR-10 =  (.17,.21,.26,.18,.22,.28,.19,.24,.31)
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE = T-96-IN
LUM-MAINT-CAT = LUM-MAINT-III
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Parabol-Industrial-1.1X4-2-Lamp Full-Size Fluor

```
*Parabolic Industrial, 13''x4', 2 Lamps, No Diffuser or Louver   *
CU-RCR-1  =  (.69,.70,.72,.74,.76,.78,.83,.86,.89)
CU-RCR-5  =  (.39,.43,.47,.41,.45,.50,.44,.49,.56)
CU-RCR-10 =  (.20,.24,.28,.21,.25,.30,.22,.27,.33)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-III
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Parabol-Industrial-1.1X6-2-Lamp Full-Size Fluor

```
*Parabolic Industrial, 13''x6', 2 Lamps, No Diffuser or Louver   *
CU-RCR-1  =  (.69,.70,.72,.74,.76,.78,.83,.86,.89)
CU-RCR-5  =  (.39,.43,.47,.41,.45,.50,.44,.49,.56)
CU-RCR-10 =  (.20,.24,.28,.21,.25,.30,.22,.27,.33)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-72-IN
LUM-MAINT-CAT = LUM-MAINT-III
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Parabol-Industrial-1.1X8-2-Lamp Full-Size Fluor

```
*Parabolic Industrial, 13''x8', 2 Lamps, No Diffuser or Louver   *
```

```
CU-RCR-1  =  (.69,.70,.72,.74,.76,.78,.83,.86,.89)
CU-RCR-5  =  (.39,.43,.47,.41,.45,.50,.44,.49,.56)
CU-RCR-10 =  (.20,.24,.28,.21,.25,.30,.22,.27,.33)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-96-IN
LUM-MAINT-CAT = LUM-MAINT-III
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Strip-Light-0.25X1.5-1-Lamp Full-Size Fluor

```
*Strip Light, 3''x1.5', 1 Lamp, No Diffuser or Louver            *
CU-RCR-1  =  (.62,.65,.68,.69,.72,.76,.79,.84,.89)
CU-RCR-5  =  (.28,.32,.38,.30,.36,.43,.34,.41,.50)
CU-RCR-10 =  (.13,.17,.23,.14,.19,.25,.16,.21,.29)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = T-18-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Strip-Light-0.25X2-1-Lamp Full-Size Fluor

```
*Strip Light, 3''x2', 1 Lamp, No Diffuser or Louver              *
CU-RCR-1  =  (.62,.65,.68,.69,.72,.76,.79,.84,.89)
CU-RCR-5  =  (.28,.32,.38,.30,.36,.43,.34,.41,.50)
CU-RCR-10 =  (.13,.17,.23,.14,.19,.25,.16,.21,.29)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = T-24-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Strip-Light-0.25X3-1-Lamp Full-Size Fluor

```
*Strip Light, 3''x3', 1 Lamp, No Diffuser or Louver              *
CU-RCR-1  =  (.62,.65,.68,.69,.72,.76,.79,.84,.89)
CU-RCR-5  =  (.28,.32,.38,.30,.36,.43,.34,.41,.50)
CU-RCR-10 =  (.13,.17,.23,.14,.19,.25,.16,.21,.29)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = T-36-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Strip-Light-0.25X4-1-Lamp Full-Size Fluor

```
*Strip Light, 3''x4', 1 Lamp, No Diffuser or Louver              *
CU-RCR-1  =  (.62,.65,.68,.69,.72,.76,.79,.84,.89)
CU-RCR-5  =  (.28,.32,.38,.30,.36,.43,.34,.41,.50)
CU-RCR-10 =  (.13,.17,.23,.14,.19,.25,.16,.21,.29)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Strip-Light-0.25X6-1-Lamp Full-Size Fluor

```
*Strip Light, 3''x6', 1 Lamp, No Diffuser or Louver              *
CU-RCR-1  =  (.62,.65,.68,.69,.72,.76,.79,.84,.89)
CU-RCR-5  =  (.28,.32,.38,.30,.36,.43,.34,.41,.50)
CU-RCR-10 =  (.13,.17,.23,.14,.19,.25,.16,.21,.29)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = T-72-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Strip-Light-0.25X8-1-Lamp Full-Size Fluor

```
*Strip Light, 3''x8', 1 Lamp, No Diffuser or Louver              *
CU-RCR-1  =  (.62,.65,.68,.69,.72,.76,.79,.84,.89)
CU-RCR-5  =  (.28,.32,.38,.30,.36,.43,.34,.41,.50)
CU-RCR-10 =  (.13,.17,.23,.14,.19,.25,.16,.21,.29)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = T-96-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Channel-0.7X4-3-Lamp Full-Size Fluor

```
*General Purpose Channel, 9''x4', 3 Lamps, No Diffuser or Louver *
CU-RCR-1  =  (.69,.72,.74,.73,.76,.79,.80,.84,.88)
CU-RCR-5  =  (.33,.37,.43,.34,.39,.46,.36,.42,.51)
CU-RCR-10 =  (.16,.20,.25,.16,.20,.27,.17,.22,.29)
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Channel-0.7X6-3-Lamp Full-Size Fluor

```
*General Purpose Channel, 9''x6', 3 Lamps, No Diffuser or Louver *
CU-RCR-1  =  (.69,.72,.74,.73,.76,.79,.80,.84,.88)
CU-RCR-5  =  (.33,.37,.43,.34,.39,.46,.36,.42,.51)
CU-RCR-10 =  (.16,.20,.25,.16,.20,.27,.17,.22,.29)
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE = T-72-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Channel-0.7X8-3-Lamp Full-Size Fluor

```
*General Purpose Channel, 9''x8', 3 Lamps, No Diffuser or Louver *
CU-RCR-1  =  (.69,.72,.74,.73,.76,.79,.80,.84,.88)
CU-RCR-5  =  (.33,.37,.43,.34,.39,.46,.36,.42,.51)
CU-RCR-10 =  (.16,.20,.25,.16,.20,.27,.17,.22,.29)
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE = T-96-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Turret-Channel-0.7X4-3-Lamp Full-Size Fluor

```
*Turret Channel, 9''x4', 3 Lamps, No Diffuser or Louver          *
CU-RCR-1  =  (.64,.66,.68,.70,.73,.76,.81,.84,.89)
CU-RCR-5  =  (.31,.35,.41,.34,.39,.45,.38,.44,.52)
CU-RCR-10 =  (.15,.19,.24,.16,.21,.26,.18,.23,.30)
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE = T-48-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Turret-Channel-0.7X6-3-Lamp Full-Size Fluor

```
*Turret Channel, 9''x6', 3 Lamps, No Diffuser or Louver          *
CU-RCR-1  =  (.64,.66,.68,.70,.73,.76,.81,.84,.89)
CU-RCR-5  =  (.31,.35,.41,.34,.39,.45,.38,.44,.52)
CU-RCR-10 =  (.15,.19,.24,.16,.21,.26,.18,.23,.30)
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE = T-72-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Turret-Channel-0.7X8-3-Lamp Full-Size Fluor

```
*Turret Channel, 9''x8', 3 Lamps, No Diffuser or Louver          *
CU-RCR-1  =  (.64,.66,.68,.70,.73,.76,.81,.84,.89)
CU-RCR-5  =  (.31,.35,.41,.34,.39,.45,.38,.44,.52)
CU-RCR-10 =  (.15,.19,.24,.16,.21,.26,.18,.23,.30)
NO-OF-LAMPS = 3   ACCEPT-LAMP-SIZE = T-96-IN
LUM-MAINT-CAT = LUM-MAINT-I
  ACCEPT-CONFIG = (SURFACE-OPEN,SUSPEND-OPEN)
```

Parabolic-Troffer-1X1-2-Lamp Compact T Lamp

```
*Parabolic Troffer, 1'x1', 2 Compact T Lamps, Louvered           *
CU-RCR-1  =  (.55,.56,.57,.56,.58,.59,.59,.61,.62)
CU-RCR-5  =  (.35,.37,.40,.35,.38,.41,.36,.39,.43)
CU-RCR-10 =  (.19,.21,.25,.19,.22,.25,.19,.22,.26)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-6-12-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)
```

4-In-Black-Baffle Compact Refl Lmp

```
*Black Baffle, 4" Round, 1 Reflector Lamp, No Diffuser or Louver *
CU-RCR-1  =  (.70,.73,.74,.75,.76,.77,.78,.80,.81)
CU-RCR-5  =  (.54,.57,.60,.55,.58,.61,.56,.59,.63)
CU-RCR-10 =  (.39,.43,.47,.41,.44,.47,.41,.44,.48)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = REFL-0-21
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)
```

4-In-Reflector-Cone Compact Refl Lmp

```
*Refl Cone, 4" Round, 1 Reflector Lamp, No Diffuser or Louver    *
CU-RCR-1  =  (.87,.88,.89,.90,.91,.92,.94,.96,.98)
CU-RCR-5  =  (.65,.68,.71,.65,.69,.73,.67,.70,.75)
CU-RCR-10 =  (.48,.52,.56,.48,.52,.56,.49,.52,.57)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = REFL-0-21
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)
```

```
6-In-Black-Baffle-1                              Compact Refl Lmp
Black Baffle, 6" Round
*Black Baffle, 6" Round, 1 Reflector Lamp, No Diffuser or Louver *
CU-RCR-1  =  (.60,.61,.62,.62,.63,.64,.65,.66,.68)
CU-RCR-5  =  (.42,.45,.48,.43,.46,.49,.44,.47,.51)
CU-RCR-10 =  (.29,.32,.35,.30,.33,.36,.30,.33,.37)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = REFL-22-30
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)

6-In-Black-Baffle-2                              Compact Refl Lmp
*Black Baffle, 6" Round, 1 Reflector Lamp, No Diffuser or Louver *
CU-RCR-1  =  (.6970,.71,.70,.72,.74,.74,.76,.78)
CU-RCR-5  =  (.48,.51,.54,.47,.51,.55,.49,.53,.57)
CU-RCR-10 =  (.32,.36,.40,.32,.36,.40,.34,.37,.41)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = REFL-31-50
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)

6-In-Reflector-Cone                              Compact Refl Lmp
*Refl Cone, 6" Round, 1 Reflector Lamp, No Diffuser or Louver    *
CU-RCR-1  =  (.85,.86,.87,.88,.89,.90,.92,.94,.96)
CU-RCR-5  =  (.61,.65,.69,.62,.66,.70,.64,.68,.73)
CU-RCR-10 =  (.45,.49,.53,.45,.49,.53,.46,.50,.55)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = REFL-22-30
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)

6-In-Ellipsoid-Reflect-Baffled                   Cmpct A-Like Lmp
*Refl Ellipse, Black Baffle, 6", 1 A-Like Lamp, No Diff or Louver*
CU-RCR-1  =  (.57,.58,.59,.59,.60,.61,.62,.63,.65)
CU-RCR-5  =  (.39,.42,.45,.40,.43,.46,.41,.44,.48)
CU-RCR-10 =  (.27,.30,.33,.27,.30,.33,.28,.30,.34)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = ALPHA-0-21
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)

6-In-Ellipsoid-Reflect-Open                      Cmpct A-Like Lmp
*Refl Ellipse, 6", 1 A-Like Lamp, No Diffuser or Louver          *
CU-RCR-1  =  (.59,.60,.61,.61,.62,.63,.64,.65,.67)
CU-RCR-5  =  (.44,.46,.48,.43,.46,.49,.45,.47,.51)
CU-RCR-10 =  (.31,.34,.37,.31,.34,.37,.32,.34,.38)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = ALPHA-0-21
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)

8-In-Ellipsoid-Reflect-Baffled                   Cmpct A-Like Lmp
Reflctr Ellipse, Black Baffle, 8"
*Refl Ellipse, Black Baffle, 8", 1 A-Like Lamp, No Diff or Louver*
CU-RCR-1  =  (.59,.60,.60,.61,.62,.63,.64,.65,.66)
CU-RCR-5  =  (.44,.47,.50,.45,.48,.51,.47,.49,.52)
CU-RCR-10 =  (.35,.37,.39,.34,.37,.40,.35,.37,.40)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = ALPHA-22-30
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)

8-In-Ellipsoid-Reflect-Open                      Cmpct A-Like Lmp
*Refl Ellipse, Open, 8", 1 A-Like Lamp, No Diffuser or Louver    *
CU-RCR-1  =  (.62,.63,.64,.65,.66,.67,.68,.69,.71)
CU-RCR-5  =  (.48,.50,.52,.47,.50,.53,.49,.51,.55)
CU-RCR-10 =  (.35,.38,.41,.35,.38,.41,.36,.38,.42)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = ALPHA-22-30
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)

8-In-Reflector-Lens                              Cmpct A-Like Lmp
*Reflector, 8" Round, 1 A-Like Lamp, Prismatic Glass Diffuser    *
CU-RCR-1  =  (.46,.47,.48,.48,.49,.50,.50,.52,.53)
CU-RCR-5  =  (.29,.32,.35,.30,.33,.36,.31,.34,.37)
CU-RCR-10 =  (.20,.22,.24,.19,.22,.25,.20,.22,.25)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = ALPHA-0-21
```

```
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (RECESS-STATIC)
```

10-In-Reflector-Lens Cmpct A-Like Lmp

```
*Reflector, 10" Round, 1 A-Like Lamp, Prismatic Glass Diffuser   *
CU-RCR-1  =  (.47,.48,.49,.48,.49,.50,.51,.52,.53)
CU-RCR-5  =  (.32,.34,.36,.31,.34,.37,.33,.35,.38)
CU-RCR-10 =  (.22,.24,2.6,.21,.24,.27,.22,.24,.27)
NO-OF-LAMPS = 1   ACCEPT-LAMP-SIZE = ALPHA-22-30
LUM-MAINT-CAT = LUM-MAINT-V
  ACCEPT-CONFIG = (RECESS-STATIC)
```

6-In-Reflector-Open-T Cmpct T-Type Lmp

```
*Reflector, 6" Round, 2 T-Type Lamps, No Diffuser or Louver      *
CU-RCR-1  =  (.41,.42,.42,.42,.43,.44,.44,.45,.47)
CU-RCR-5  =  (.27,.29,.31,.28,.30,.32,.28,.30,.33)
CU-RCR-10 =  (.18,.20,.22,.18,.20,.22,.18,.20,.23)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-0-6-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)
```

8-In-Reflector-Open-T Cmpct T-Type Lmp

```
*Reflector, 8" Round, 2 T-Type Lamps, No Diffuser or Louver      *
CU-RCR-1  =  (.65,.66,.67,.67,.68,.69,.70,.71,.73)
CU-RCR-5  =  (.44,.47,.50,.43,.47,.51,.45,.49,.53)
CU-RCR-10 =  (.29,.32,.35,.28,.32,.36,.30,.33,.37)
NO-OF-LAMPS = 2   ACCEPT-LAMP-SIZE = T-6-12-IN
LUM-MAINT-CAT = LUM-MAINT-IV
  ACCEPT-CONFIG = (RECESS-STATIC)
```

Section 3

Mechanical Equipment Libraries

This section is a place holder for future libraries of mechanical equipment.

Section

4

Reports

Reports fall into three main categories:

1. Verification reports – summarize the model input, as well as design values calculated by the program

2. Summary reports – present the results of the program simulation

3. Hourly reports – tabulate the hourly values of a user-selected set of simulation variables.

The following sections present a map of the reports to reference for simulation results, verification and summary reports, and hourly reports. The sample reports in this section are in English units. For metric runs the corresponding units can be determined from Report LV-M, Units Table.

.

REPORT MAP

This section consists of four tables, one each for LOADS, SYSTEMS, PLANT and EONOMICS, that show in which reports you can find various calculated quantities, like space loads, cooling peaks, temperatures, etc.

LOADS SUMMARY REPORTS

		Space Peak Loads	Space Peak Load Components	Bldg Peak Load Components	Building Monthly Loads	Space Monthly Load Components	Bldg Monthly Load Components	Space Daylighting Summary
	Bldg Level Info	LS-A		LS-C	LS-D		LS-F	
	Space Level Info	LS-A	LS-B			LS-E		LS-G
THERMAL LOAD	Total (Sens&Lat) Heat/Cool Space Load		*P*	*P*		*T*	*T*	
	Sensible Heat/Cool Space Load	*P*	*P*	*P*	*P/T*	*T*	*T*	
	Latent Cooling Space Load		*P*	*P*		*T*	*T*	
	Heat/Cool Space Load Components		*P*	*P*		*T*	*T*	
	Heat/Cool Peak Hour, Date, OA	n	n	n				
ELECTRIC ENERGY	Total (Lights/Plugs/Process)				*P/T*			
	Lights							
	Equipment / Plugs							
	Process Electric							
OTHER ENERGY	Process Fuel							
	Domestic Hot Water							
	Solar Gain							
DAYLIGHTING	% Lighting Reduction							n
	% Lighting Reduction Scatter Plot							
	Ave. Daylight Illuminance							n
	Ave. Glare Index							n
	% Hrs. Glare Too High							n
	Frequenceny of Illuminance Levels							
OTHER	Floor Area & Volume		n	n				
	Weather File Name	n	n	n	n	n	n	n
	DESIGN-DAY reports provided ➀	n	n	n	n	n	n	n

NOTES:

T = Total energy or Total load reported for these items

P = Peak demand or Peak load reported for these items

➀ *Duplicate reports are provided for each LOADS report (if DESIGN-DAYs are used) where the first set of reports provides results for the design day conditions. A complete second set reports the annual simulation results.*

left-to-right order of report columns above corresponds to top-down order of reports printed in DOE2 output files

SYSTEMS SUMMARY REPORTS

		SS-D Building HVAC Load Summary	SS-E Building HVAC Load Hours	SS-M Building HVAC Fan Electric	SS-P ① Bldg HVAC Equip. Performance	SS-A System Loads Summary	SS-B System Loads Summary	SS-C System Load Hours	SS-H System Utility Energy Use	SS-I Sensible/Latent Summary	SS-J Peak Heating & Cooling	SS-K Space Temperature Summary	SS-R Zone Performance Summary	SS-L Fan Electric Energy Use	SS-N Relative Humidity Summary	SS-P ② System Heat/Cool Performance	SS-Q HP Heat/Cool Performance	SS-G Zone Loads Summary	SS-F Zone Demand Summary
		BUILDING				**AIR HANDLER**												**ZONE**	
THERMAL ENERGY	Total (Sens&Lat) Heat/Cool Coil Load	*P/T*			*P/T*	*P/T*				*P*	*P*					*P/T*	*T*	*P/T*	
	Sensible Heat/Cool Coil Load									*T*									
	Latent Heat/Cool Coil Load									*T*									
	Zone Coil Heat/Cool Load						*P/T*												
	Baseboard Heat						*P/T*												*P/T*
	Pre-heat						*P/T*												
	Heat/Cool Addition/Extraction																		*T*
	Cooling Peak Hour, Date, OA	n			n	n				n	n					n		n	
	Heating Peak Hour, Date, OA	n			n	n					n					n		n	
	Heat/Cool Peak Load Hourly Profile										*P*								
	Max Daily Integrated Cooling Load	*P*									*P*								
	Heat Coincident w Cool Peak		*P*					*P*											
	Natural Ventilation Cooling ③						*P/T*												
ELECTRIC ENERGY	Total Elec (LOADS + Fans, DX, Reheat)	*P/T*			*T*	*P/T*										*T*		*P/T*	
	Total Elec Coincident w Cool Peak		*P*					*P*											
	Heating/Cooling Elec Use				*P/T*				*P/T*							*P/T*			
	Fan Total Elec				*P/T*				*P/T*							*P/T*	*T*		
	Fan Elec for H/C/Coincident/Float			*T*										*T*					
	Fan Elec for Supply/Return/Hot Deck													*T*					
	Auxiliary/Fan/Pump Elec				*P/T*		*P/T*									*P/T*	*T*		
OTHER ENERGY	Heating/Cooling Fuel Use				*T*				*P/T*							*T*			
	Waste Heat																*T*		
HOURS	Hours Heat/Cool/Float/Available		n					n									n		
	Fan Hours		n					n						n					
	Hours Night Venting/Night Cycle On		n					n											
	Hours Loads Not Met												n						n
	Zone Hrs at Max Demand												n						n
	Hours at RH ranges														n				n
SPACE TEMPERATURE	Average (H/C/Fans On/Off)											n							
	Min / Max																		n
	Indoor/Outdoor Temp. Delta											n							
	Scatter Plot																		
OTHER	Air Flow				n						*P*					n			
	Heat/Cool Capacity				n											n			
	Heat/Cool E-I-R				n											n	n		
	Relative Humidity Scatter Plot														n				
	Sensible Heat Ratio									n	n								
	Delta Humidity Ratio											n							
	Equipment Part Load Ratio				n								n	n		n			
	Weather File Name	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
	DESIGN-DAY report provided										n								

NOTES:

T = Total energy or Total load reported for these items

P = Peak demand or Peak load reported for these items

① *SS-P at building level is provided for DHW tanks, water loop heat pumps and hydronic economizers used with unitary systems*

② *SS-P at air handler level is provided for unitary systems*

③ *Ventilative Cooling is provided only for system types: RESYS, PSZ*

left-to-right order of report columns above corresponds to top-down order of reports printed in DOE2 output files

PLANT SUMMARY REPORTS

			Plant Energy Utilization PS-A	Utility & Fuel Use Summary PS-B	Equipment Loads & Energy Use PS-C	Circulation Loop Loads PS-D	Energy End-Use, by Utility Type PS-E ②	Energy End-Use, by Utility Meter PS-F ③	Building Energy Performance BEPS
THERMAL LOAD	**by Total Plant**	Cooling & Heating	*T*						
		Waste Heat Recovery	*T*						
	by Plant Equipment ①	Circulation Loop Loads				*P/T*			
		Boilers, Chillers, Pumps, Towers, etc. Loads			*P/T*				
		Equipment Capacity							
		Equipment Part Load Ratio			**n**	**n**			
		Loads Not Satisfied (Loops only)				*P/T*			
		Thermal Losses (Loops & Pumps only)				*P/T*			
UTILITY ENERGY	**by Total Plant, Site**	Annual	*T*						*T*
		Monthly	*T*						
		Energy Use Intensity (EUI)							*T*
		Total Electric & Total Fuel Use	*T*				*T*		
		Electric Generation Fuel Use	*T*						
	by Total Plant, Source	Annual	*T*						*T*
		Monthly							
	by Utility Type ②	Annual		*P/T*			*P/p/T*		
		Monthly		*P/T*			*P/p/T*		
	by Utility Meter ③	Annual		*P/T*				*P/p/T*	*T*
		Monthly		*P/T*				*P/p/T*	
	by End Use	Annual, by utility type					*P/p/T*		
		Monthly, by utility type					*P/p/T*		
		Annual, by utility meter						*P/p/T*	*T*
		Monthly, by utility meter						*P/p/T*	
		Cooling & Heating (only) Input	*T*						
	by Plant Equipment ①	Boilers, Chillers, Pumps, Towers, etc.			*P/T*				
HOURS		Hour & Date of Peak		**n**	**n**	**n**	**n**	**n**	
		Equipment Operations Hours			**n**	**n**			
		% Hours Outside Throttling Range							**n**
		% Hours Loads Not Met							**n**

NOTES:

T = Total load or Total energy reported for these items

P = Peak load or Peak demand (COINCIDENT) reported for these items

p = NON-COINCIDENT Peak demand reported for these items

① *One copy of the PS-H report is produced for each plant component, i.e., for each circulation loop, pump, chiller, etc.*

② *One copy of the PS-E report is produced for each utility type, i.e., for all electric use and for all fuel use.*

③ *One copy of the PS-F report is produced for each utility meter, i.e., one report for each electric or fuel meter.*

left-to-right order of report columns above corresponds to top-down order of reports printed in DOE2 output files

ECONOMICS SUMMARY REPORTS

Results	Grouping	Item	ES-A Annual Operations Costs & Savings	ES-B Life-Cycle Non-Energy Costs	ES-C Energy Savings & Life-Cycle Costs	ES-D Energy Cost Summary	ES-E ① Utility Rate Summary	ES-F ② Block Charges & Ratchets, by Utility Rate	ES-G Summary of Pollutants	ES-H Pollutant Production, by Block Charge
ANNUAL Results	**by Utility Rate** ①	Energy Use				*T*				
		Total Utility Costs ($)				*T*	*T*			
		Total Utility Costs ($/sqft)				*T*				
		Total Utility Costs (ave $/billing unit)				*T*				
		Component Charges					*P/T*			
		Metered & Billing Use					*P/T*			
	by Block or TOU Charge ②	Total Utility Costs ($)						*T*		
		Component Charges						*P/T*		
		Pollutant Production							*T*	*T*
MONTHLY Results	**by Utility Rate** ①	Total Utility Costs ($)					*T*			
		Component Charges					*P/T*			
	by Block or TOU Charge ②	Total Utility Costs ($)						*T*		
		Component Charges						*P/T*		
		Pollutant Production							*T*	*T*
LIFE-CYCLE Results	**Costs**	Installation, Repair, Replacement		*T*	*T*					
		Energy	*T*		*T*					
		Operations	*T*		*T*					
	Savings	Energy	*T*		*T*					
		Operations	*T*		*T*					
		Energy + Operations	*T*		*T*					
	Investment Statistics	Discounted Payback			*T*					
		S-I-R, cost			*T*					
		S-I-R, energy			*T*					

NOTES:

T = Total energy or Total costs reported for these items

P = Peak demand or Peak demand costs reported for these items

① *One copy of the ES-E report is produced for each utility rate.*

② *One copy of the ES-F report is produced for each utility rate that includes at least one BLOCK-CHARGE.*

left-to-right order of report columns above corresponds to top-down order of reports printed in DOE2 output files

LOADS-REPORT

LV-A General Project Parameters

```
Simple Structure Run 3, Chicago     Divide into zones; add plenum     DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- LV-A  General Project and Building Input                                            WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------


PERIOD OF STUDY

    STARTING DATE    ENDING DATE    NUMBER OF DAYS


       7 JAN 1997     7 JAN 1997                 1
       5 AUG 1997     5 AUG 1997                 1
       1 JAN 1997    31 DEC 1997               365

SITE CHARACTERISTIC DATA

                                                                  BUILDING
    STATION             LATITUDE  LONGITUDE   ALTITUDE       TIME    AZIMUTH
    NAME                   (DEG)      (DEG)       (FT)       ZONE      (DEG)


TRY  CHICAGO                42.0       88.0       610.    6  CST        30.0
```

LV-B Summary of Spaces

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- LV-B  Summary of Spaces Occurring in the Project                                WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------


 NUMBER OF SPACES    6          EXTERIOR    5     INTERIOR    1


                                                      LIGHTS         EQUIP
                             SPACE*FLOOR SPACE       (WATT /        (WATT / INFILTRATION              AREA       VOLUME
 SPACE                        MULTIPLIER  TYPE   AZIM  SQFT ) PEOPLE  SQFT )       METHOD   ACH     (SQFT )      (CUFT )



 Spaces on floor: Building-Floor

 PLENUM-1                            1.0   EXT    0.0    0.00    0.0    0.00   NO-INFILT.  0.00      5000.0      10000.0
 SPACE1-1                            1.0   EXT    0.0    1.50   11.0    1.00   AIR-CHANGE  0.25      1056.0       8448.0
 SPACE2-1                            1.0   EXT  -90.0    1.50    5.0    1.00   AIR-CHANGE  0.25       456.0       3648.0
 SPACE3-1                            1.0   EXT  180.0    1.50   11.0    1.00   AIR-CHANGE  0.25      1056.0       8448.0
 SPACE4-1                            1.0   EXT   90.0    1.50    5.0    1.00   AIR-CHANGE  0.25       456.0       3648.0
 SPACE5-1                            1.0   INT    0.0    1.50   20.0    1.00   AIR-CHANGE  0.25      1976.0      15808.0
                                                               ------                             ---------   ----------
 BUILDING TOTALS                                                 52.0                               10000.0      50000.0
```

LV-C Details of Space <space name>

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- LV-C Details of Space               SPACE1-1                                      WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------

 DATA FOR SPACE    SPACE1-1                          IN FLOOR    Building-Floor


 LOCATION OF ORIGIN IN
 BUILDING COORDINATES                 SPACE
                                    AZIMUTH         SPACE*FLOOR             HEIGHT              AREA              VOLUME
  XB (FT)  YB (FT)  ZB (FT)           (DEG)          MULTIPLIER               (FT)            (SQFT )            (CUFT )

     0.00     0.00     0.00            0.00                 1.0               8.00            1056.00            8448.00

       TOTAL    NUMBER OF    NUMBER OF     NUMBER OF
      NUMBER     EXTERIOR     INTERIOR   UNDERGROUND
 OF SURFACES     SURFACES     SURFACES      SURFACES          DAYLIGHTING    SUNSPACE

           6            1            4             1                   NO          NO

 NUMBER OF SUBSURFACES

          EXTERIOR           INTERIOR
 TOTAL    WINDOWS    DOORS    WINDOWS

     2          2        0          0


                             CALCULATION
 FLOOR WEIGHT                TEMPERATURE
  (LB/SQFT  )                    (F    )

          0.0                       70.0

 INFILTRATION

                                      INFILTRATION
                                      CALCULATION                  FLOW RATE        AIR CHANGES
     SCHEDULE                         METHOD                      (CFM/SQFT)           PER HOUR

     INFIL-SCH                        AIR-CHANGE                       0.033               0.25

 PEOPLE

                                                                    AREA PER             PEOPLE             PEOPLE
                                                                      PERSON           SENSIBLE             LATENT
     SCHEDULE                                          NUMBER        (SQFT )          (BTU/HR )          (BTU/HR )

     OCCUPY-1                                            11.0           96.0              252.2              130.3
```

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- LV-C Details of Space              SPACE1-1                                           WEATHER FILE- TRY  CHICAGO
--------------------------------------------------------------------------------------------------------------(CONTINUED)--------
```

LIGHTING

SCHEDULE	LIGHTING TYPE	LOAD (WATTS/ SQFT)	LOAD (KW)	FRACTION OF LOAD TO SPACE
LIGHTS-1	REC-FLUOR-RV	1.50	1.58	0.80

ELECTRICAL EQUIPMENT

SCHEDULE	ELEC LOAD (WATTS/ SQFT)	ELEC LOAD (KW)	FRACTION OF LOAD TO SPACE SENSIBLE	LATENT
EQUIP-1	1.00	1.06	1.00	0.00

INTERIOR SURFACES (U-VALUE INCLUDES BOTH AIR FILMS)

SURFACE	AREA (SQFT)	CONSTRUCTION	U-VALUE (BTU/HR-SQFT-F)
C1-1	1056.00	CLNG-1	0.270
SB12	135.76	SB-U	1.500
SB14	135.76	SB-U	1.500
SB15	608.00	SB-U	1.500

SURFACE	SURFACE-TYPE	ADJACENT SPACE
C1-1	QUICK STANDARD	PLENUM-1
SB12	QUICK AIR	SPACE2-1
SB14	QUICK AIR	SPACE4-1
SB15	QUICK AIR	SPACE5-1

EXTERIOR SURFACES (U-VALUE EXCLUDES OUTSIDE AIR FILM)

SURFACE	MULTIPLIER	AREA (SQFT)	CONSTRUCTION	U-VALUE (BTU/HR-SQFT-F)	SURFACE TYPE
FRONT-1	1.0	800.00	WALL-1	0.069	DELAYED

SURFACE	AZIMUTH (DEG)	TILT (DEG)	LOCATION OF ORIGIN IN BUILDING COORDINATES XB (FT)	YB (FT)	ZB (FT)	LOCATION OF ORIGIN IN SPACE COORDINATES X (FT)	Y (FT)	Z (FT)
FRONT-1	-180.0	90.0	0.00	0.00	0.00	0.00	0.00	0.00

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- LV-C Details of Space               SPACE1-1                                          WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------(CONTINUED)--------
```

UNDERGROUND SURFACES (U-VALUE INCLUDES INSIDE AIR FILM)

SURFACE	MULTIPLIER	AREA (SQFT)	CONSTRUCTION	U-VALUE (BTU/HR-SQFT-F)
F1-1	1.0	1056.00	FLOOR-1	0.45

EXTERIOR WINDOWS (U-VALUE INCLUDES OUTSIDE AIR FILM)

WINDOW	MULTIPLIER	GLASS AREA (SQFT)	GLASS WIDTH (FT)	GLASS HEIGHT (FT)	SET-BACK (FT)	NUMBER OF PANES	CENTER-OF-GLASS U-VALUE (BTU/HR-SQFT-F)	GLASS SHADING COEFF	GLASS VISIBLE TRANS	GLASS SOLAR TRANS
WF-1	1.0	180.00	45.00	4.00	0.00	2	0.447	0.89	0.812	0.705
DF-1	1.0	64.00	8.00	8.00	0.00	1	1.003	0.83	0.611	0.626

WINDOW	LOCATED IN SURFACE	LOCATION OF ORIGIN IN BUILDING COORDINATES XB (FT)	YB (FT)	ZB (FT)	LOCATION OF ORIGIN IN SURFACE COORDINATES X (FT)	Y (FT)
WF-1	FRONT-1	10.00	0.00	3.00	10.00	3.00
DF-1	FRONT-1	70.00	0.00	0.00	70.00	0.00

LV-D Details of Exterior Surfaces

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- LV-D  Details of Exterior Surfaces in the Project                                WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------

 NUMBER OF EXTERIOR SURFACES   9
 (U-VALUE INCLUDES OUTSIDE AIR FILM; WINDOW INCLUDES FRAME, IF DEFINED)
```

SURFACE	- - - W I N D O W S - - - U-VALUE (BTU/HR-SQFT-F)	AREA (SQFT)	- - - - W A L L - - - - U-VALUE (BTU/HR-SQFT-F)	AREA (SQFT)	-W A L L + W I N D O W S- U-VALUE (BTU/HR-SQFT-F)	AREA (SQFT)	AZIMUTH
WALL-1PB in space: PLENUM-1	0.000	0.00	0.067	200.00	0.067	200.00	NORTH
BACK-1 in space: SPACE3-1	0.531	229.00	0.067	571.00	0.200	800.00	NORTH
RIGHT-1 in space: SPACE2-1	0.428	100.00	0.067	300.00	0.157	400.00	EAST
WALL-1PR in space: PLENUM-1	0.000	0.00	0.067	100.00	0.067	100.00	EAST
WALL-1PF in space: PLENUM-1	0.000	0.00	0.067	200.00	0.067	200.00	SOUTH
FRONT-1 in space: SPACE1-1	0.554	244.00	0.067	556.00	0.216	800.00	SOUTH
WALL-1PL in space: PLENUM-1	0.000	0.00	0.067	100.00	0.067	100.00	WEST
LEFT-1 in space: SPACE4-1	0.428	100.00	0.067	300.00	0.157	400.00	WEST
TOP-1 in space: PLENUM-1	0.000	0.00	0.168	5000.00	0.168	5000.00	ROOF
F1-1 in space: SPACE1-1	0.000	0.00	0.453	1056.00	0.453	1056.00	UNDERGRND
F2-1 in space: SPACE2-1	0.000	0.00	0.453	456.00	0.453	456.00	UNDERGRND
F3-1 in space: SPACE3-1	0.000	0.00	0.453	1056.00	0.453	1056.00	UNDERGRND
F4-1 in space: SPACE4-1	0.000	0.00	0.453	456.00	0.453	456.00	UNDERGRND
F5-1 in space: SPACE5-1	0.000	0.00	0.453	1976.00	0.453	1976.00	UNDERGRND

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- LV-D  Details of Exterior Surfaces in the Project                                         WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------(CONTINUED)--------
```

	AVERAGE U-VALUE/WINDOWS (BTU/HR-SQFT-F)	AVERAGE U-VALUE/WALLS (BTU/HR-SQFT-F)	AVERAGE U-VALUE WALLS+WINDOWS (BTU/HR-SQFT-F)	WINDOW AREA (SQFT)	WALL AREA (SQFT)	WINDOW+WALL AREA (SQFT)
NORTH	0.531	0.067	0.173	229.00	771.00	1000.00
EAST	0.428	0.067	0.139	100.00	400.00	500.00
SOUTH	0.554	0.067	0.186	244.00	756.00	1000.00
WEST	0.428	0.067	0.139	100.00	400.00	500.00
ROOF	0.000	0.168	0.168	0.00	5000.00	5000.00
ALL WALLS	0.509	0.067	0.166	673.00	2327.00	3000.00
WALLS+ROOFS	0.509	0.136	0.167	673.00	7327.00	8000.00
UNDERGRND	0.000	0.453	0.453	0.00	5000.00	5000.00
BUILDING	0.509	0.264	0.277	673.00	12327.00	13000.00

LV-E Details of Underground Surfaces

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum           DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- LV-E  Details of Underground Surfaces in the Project                                WEATHER FILE- TRY  CHICAGO
----------------------------------------------------------------------------------------------------------------------------------
```

NUMBER OF UNDERGROUND SURFACES 5

SURFACE NAME	MULTIPLIER	AREA (SQFT)	CONSTRUCTION NAME	U-VALUE (BTU/HR-SQFT-F)
F1-1	1.0	1056.00	FLOOR-1	0.453
F2-1	1.0	456.00	FLOOR-1	0.453
F3-1	1.0	1056.00	FLOOR-1	0.453
F4-1	1.0	456.00	FLOOR-1	0.453
F5-1	1.0	1976.00	FLOOR-1	0.453

LV-F Details of Interior Surfaces

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum           DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- LV-F  Details of Interior Surfaces in the Project                                  WEATHER FILE- TRY  CHICAGO
-----------------------------------------------------------------------------------------------------------------------------------
```

Number of Interior Surfaces 13
(U-VALUE includes both air films)

SURFACE NAME	AREA (SQFT)	CONSTRUCTION NAME	SURFACE TYPE		U-VALUE (BTU/HR-SQFT-F)
C1-1	1056.00	CLNG-1	QUICK	STANDARD	0.270
SB12	135.76	SB-U	QUICK	AIR	1.500
SB14	135.76	SB-U	QUICK	AIR	1.500
SB15	608.00	SB-U	QUICK	AIR	1.500
C2-1	456.00	CLNG-1	QUICK	STANDARD	0.270
SB23	135.76	SB-U	QUICK	AIR	1.500
SB25	208.00	SB-U	QUICK	AIR	1.500
C3-1	1056.00	CLNG-1	QUICK	STANDARD	0.270
SB34	135.76	SB-U	QUICK	AIR	1.500
SB35	608.00	SB-U	QUICK	AIR	1.500
C4-1	456.00	CLNG-1	QUICK	STANDARD	0.270
SB45	208.00	SB-U	QUICK	AIR	1.500
C5-1	1976.00	CLNG-1	QUICK	STANDARD	0.270

SURFACE NAME	ADJACENT SPACES SPACE-1	SPACE-2
C1-1	SPACE1-1	PLENUM-1
SB12	SPACE1-1	SPACE2-1
SB14	SPACE1-1	SPACE4-1
SB15	SPACE1-1	SPACE5-1
C2-1	SPACE2-1	PLENUM-1
SB23	SPACE2-1	SPACE3-1
SB25	SPACE2-1	SPACE5-1
C3-1	SPACE3-1	PLENUM-1
SB34	SPACE3-1	SPACE4-1
SB35	SPACE3-1	SPACE5-1
C4-1	SPACE4-1	PLENUM-1
SB45	SPACE4-1	SPACE5-1
C5-1	SPACE5-1	PLENUM-1

LV-G Details of Schedules

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- LV-G  Details of Schedules Occurring in the Project                                   WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------


 NUMBER OF SCHEDULES  12


     Schedule: OCCUPY-1                            Type of Schedule: FRACTION

         THROUGH 31 12

             FOR DAYS  SUN SAT HOL

         HOUR  1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16   17   18   19   20   21   22   23
24

            0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00

             FOR DAYS  MON TUE WED THU FRI

         HOUR  1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16   17   18   19   20   21   22   23
24

            0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 1.00 1.00 1.00 0.80 0.40 0.80 1.00 1.00 1.00 1.00 0.50 0.10 0.10 0.00 0.00
0.00

             FOR DAYS  HDD

         HOUR  1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16   17   18   19   20   21   22   23
24

            0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00

             FOR DAYS  CDD

         HOUR  1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16   17   18   19   20   21   22   23
24

            1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
1.00
```

LV-H Details of Windows

This report contains the summary information on the location as well as glass, frame and curb areas and standard performance values.

```
Project 3                                                                     DOE-2.2-44d5   9/20/2006    17:06:43  BDL RUN  1

REPORT- LV-H Details of Windows                                                          WEATHER FILE- CZ06RV2 WYEC2
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NUMBER OF WINDOWS  8

(Note: u-values include outside air film)

                                                                        LOCATION OF ORIGIN
                                                  GLASS   GLASS  GLASS         IN SURFACE     FRAME    CURB   FRAME   CURB
WINDOW                                             AREA  HEIGHT  WIDTH        COORDINATES         AREA           U-VALUE
NAME                                MULTIPLIER   (SQFT )   (FT)   (FT)      X (FT)    Y (FT)       (SQFT )    (BTU/HR-SQFT-F)

South Win (G.S1.E1.W1)                     1.0    232.38    5.00  46.45        4.61      3.11     11.19    0.00   1.519   0.000
East Win (G.E2.E2.W1)                      1.0    232.38    5.00  46.45        4.61      3.11     11.19    0.00   1.519   0.000
North Win (G.N3.E3.W1)                     1.0    232.38    5.00  46.45        4.61      3.11     11.19    0.00   1.519   0.000
West Win (G.W4.E4.W1)                      1.0    232.38    5.00  46.45        4.61      3.11     11.19    0.00   1.519   0.000
South Win (T.S11.E9.W1)                    1.0    513.28    5.00 102.59        4.61      3.11     23.36    0.00   1.519   0.000
Skylt (T.S11.I26.S1)                       1.0      0.00    0.00   0.00       55.90      7.50      0.00    0.00   0.384   0.349
Skylt (T.S11.I26.S2)                       1.0      0.00    0.00   0.00       77.28      7.50      0.00    0.00   0.384   0.349
Skylt (T.S11.I26.S3)                       1.0      0.00    0.00   0.00       34.52      7.50      0.00    0.00   0.384   0.349

                                                 GLASS      NUMBER          CENTER-OF-       GLASS     GLASS   SURFACE TO
WINDOW                                 SETBACK  SHADING         OF       GLASS U-VALUE     VISIBLE     SOLAR   ROUGH OPEN
NAME                                      (FT)    COEFF      PANES     (BTU/HR-SQFT-F)       TRANS     TRANS   AREA RATIO

South Win (G.S1.E1.W1)                    0.00     0.57          2               0.536       0.473     0.375     1.000
East Win (G.E2.E2.W1)                     0.00     0.57          2               0.536       0.473     0.375     1.000
North Win (G.N3.E3.W1)                    0.00     0.81          2               0.468       0.781     0.604     1.000
West Win (G.W4.E4.W1)                     0.00     0.57          2               0.536       0.473     0.375     1.000
South Win (T.S11.E9.W1)                   0.00     0.57          2               0.536       0.473     0.375     1.000
Skylt (T.S11.I26.S1)                      0.00     0.54          1               1.101       0.495     0.878     1.196
Skylt (T.S11.I26.S2)                      0.00     0.54          1               1.101       0.495     0.878     1.196
Skylt (T.S11.I26.S3)                      0.00     0.54          1               1.101       0.495     0.878     1.196
```

LV-I Details of Constructions

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum           DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- LV-I  Details of Constructions Occurring in the Project                           WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------

 NUMBER OF CONSTRUCTIONS   5          DELAYED   3     QUICK   2
```

CONSTRUCTION NAME	U-VALUE (BTU/HR-SQFT-F)	SURFACE ABSORPTANCE	SURFACE ROUGHNESS INDEX	SURFACE TYPE	NUMBER OF RESPONSE FACTORS
WALL-1	0.069	0.70	3	DELAYED	9
ROOF-1	0.180	0.70	3	DELAYED	5
CLNG-1	0.270	0.70	3	QUICK	0
SB-U	1.500	0.70	3	QUICK	0
FLOOR-1	0.453	0.70	3	DELAYED	16

LV-J Details of Building Shades

SINGLE FAMILY RESIDENCE ===WITH ATTACHED SUNSPACE===

REPORT- LV-J DETAILS OF BUILDING SHADES IN THE PROJECT WEATHER FILE- TRY CHICAGO

NUMBER OF BUILDING SHADES 2 RECTANGULAR 2 OTHER 0

RECTANGULAR SHADES

SHADE NAME	TRANSMITTANCE	HEIGHT (FT)	WIDTH (FT)	AZIMUTH (DEG)	TILT (DEG)	LOCATION OF ORIGIN BUILDING COORDINATES XB (FT)	YB (FT)	ZB (FT)
	0.00	1.5	42.0	180.	180.	0.0	0.0	8.0
	0.00	1.5	21.0	180.	0.	0.0	28.0	8.0

LV-K Weighting Factor Summary

The entries in this report can be a combination of custom weighting factors (for spaces with FLOOR-WEIGHT = 0) and ASHRAE weighting factors (for spaces with FLOOR-WEIGHT > 0).

At the top of the report is the U-name of each SPACE (SP NAME) along with the U-name of the set of weighting factors for that space (WF NAME). WF NAME will be blank except for library creation runs and for those spaces in a LOADS run that use custom weighting factors from a user library.

Down the left side of the report are six groupings of variable names that label the six types of weighting factors:

- Solar
- General lighting
- Task lighting
- People/equipment
- Conduction
- Air temperature

The weighting factors V0, V1, V2, W1, V2, G0*, G1, G2, G3, P1, and P2 are defined in the DOE-2 Engineers Manual (2.1A), p.II.67ff.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum      Fri Jan  9 15:25:08 1998BDL  RUN 1
Design-day sizing of VAV system        Show All Reports
REPORT- LV-K  WEIGHTING FACTOR SUMMARY
---------------------------------------------------------------------------------------------------------------
```

SP NAME--	PLENUM-1	SPACE1-1	SPACE2-1	SPACE3-1	SPACE4-1	SPACE5-1
SOLAR						
V0	0.50123	0.28789	0.28964	0.28893	0.28964	0.19700
V1	0.19470	-0.31695	-0.31317	-0.31749	-0.31317	-0.06700
V2	0.00000	0.06073	0.05625	0.06042	0.05625	0.00000
W1	0.30408	1.35264	1.34679	1.35243	1.34679	0.87000
W2	0.00000	-0.39084	-0.38577	-0.39054	-0.38577	0.00000
GENERAL LIGHTING						
V0	0.70580	0.64109	0.64837	0.64222	0.64837	0.59000
V1	-0.00988	-0.72695	-0.73092	-0.72752	-0.73092	-0.46000
V2	0.00000	0.14887	0.14697	0.14852	0.14697	0.00000
W1	0.30408	1.20584	1.20330	1.20552	1.20330	0.87000
W2	0.00000	-0.27570	-0.27431	-0.27539	-0.27431	0.00000
TASK LIGHTING						
V0	0.68697	0.59243	0.60069	0.59371	0.60069	0.50000
V1	0.00895	-0.66346	-0.66820	-0.66414	-0.66820	-0.37000
V2	0.00000	0.13201	0.13000	0.13165	0.13000	0.00000
W1	0.30408	1.20740	1.20474	1.20707	1.20474	0.87000
W2	0.00000	-0.27605	-0.27464	-0.27574	-0.27464	0.00000
PEOPLE-EQUIPMENT						
V0	0.80413	0.57418	0.58281	0.57552	0.58281	0.68100
V1	-0.10821	-0.63965	-0.64468	-0.64037	-0.64468	-0.55100
V2	0.00000	0.12568	0.12364	0.12532	0.12364	0.00000
W1	0.30408	1.20800	1.20529	1.20766	1.20529	0.87000
W2	0.00000	-0.27619	-0.27476	-0.27588	-0.27476	0.00000
CONDUCTION						
V0	0.80413	0.61369	0.62209	0.61491	0.62209	0.68100
V1	-0.10821	-0.69121	-0.69636	-0.69183	-0.69636	-0.55100
V2	0.00000	0.13938	0.13762	0.13902	0.13762	0.00000
W1	0.30408	1.20623	1.20366	1.20591	1.20366	0.87000
W2	0.00000	-0.27578	-0.27439	-0.27548	-0.27439	0.00000
AIR TEMP	(BTU/HR-SQFT-F)					
G0*	1.11200	0.38719	0.41898	0.39146	0.41898	1.81000
G1*	-1.12493	-0.58182	-0.63280	-0.58840	-0.63280	-1.89000
G2*	0.01293	0.19652	0.21583	0.19885	0.21583	0.08000
G3*	0.00000	-0.00189	-0.00201	-0.00191	-0.00201	0.00000
P1	-0.30408	-1.25528	-1.24751	-1.25441	-1.24751	-0.87000
P2	0.00000	0.32209	0.31549	0.32128	0.31549	0.00000

LV-L Daylight Factor Summary

This report is printed for each combination of window and reference point in a daylit space. The first part of the report summarizes some of the daylighting-related input information for the space, window, and reference point. The second part lists the daylight factors that were calculated by the daylighting preprocessor for 20 values of solar altitude and azimuth covering the annual range of sun positions at the location being analyzed.

```
Project 11                                                                              DOE-2.2-44d5   9/30/2006    20:31:34  BDL RUN  1

REPORT- LV-L Daylighting Factors Ref Pnt 1  South Win (G.S1.E1.W1)                                WEATHER FILE- CZ06RV2 WYEC2
---------------------------------------------------------------------------------------------------------------------------------

Parent SPACE: South Perim Spc (G.S1)          WINDOW-TYPE: STANDARD          GLASS-TYPE: Window Type #2 GT
                                             SHADING-COEF: 0.570              VIS-TRANS: 0.473

Space Data:                Window Data:   AREA(SQFT)   232.383        Ref Point: X(FT)    27.830  Y(FT)    4.950  Z(FT)  2.500
AREA(SQFT)    1452.0       H(FT)        5.003  W(FT)    46.446                   ZONE-FRACTION      0.50 MAX-GLARE       20.0
Ave Reflectance 0.44       AZIM(DEG)    180.0  TILT(DEG)  90.0                   LTG-SET-POINT(FC)  50.0 VIEW-AZ(DEG)   270.0
                           DAY-X-DIV       37  DAY-Y-DIV     8                   LTG-CTRL-TYPE: DISCRETE
                           X(FT)    4.606  Y(FT)    0.000  Z(FT)  3.108          WELL-EFFICIENCY    1.000
                           WIN-SHADE-TYPE: NO-SHADE                              OBSTRUCTIONS FRAC 1.000
```

SUN POS NO.	DAY TYP	WIN SHD IND	SUN ALT (DEG)	SUN AZIM (DEG)	EXT ILL -SKY (FC)	EXT ILL -SUN (FC)	DIR ILL -SKY (FC)	REFL ILL -SKY (FC)	DIR ILL -SUN (FC)	REFL ILL -SUN (FC)	DAY ILL FAC -SKY	DAY ILL FAC -SUN	WIN LUM FAC -SKY	WIN LUM FAC -SUN	BACKG LUM FAC -SKY	BACKG LUM FAC -SUN	GLARE INDEX
1	1	1	10.	290.	1093.6	301.1	119.7	13.5	0.0	1.1	0.1217	0.0037	0.5321	0.0000	0.0054	0.0016	16.3
1	1	2	10.	290.	1093.6	301.1	0.0	18.2	0.0	0.8	0.0166	0.0027	0.0000	0.0000	0.0072	0.0012	0.0
1	2	1	10.	290.	366.9	0.0	38.1	3.6	0.0	0.0	0.1136	0.0000	0.2881	0.0000	0.0043	0.0000	8.1
1	2	2	10.	290.	366.9	0.0	0.0	4.7	0.0	0.0	0.0127	0.0000	0.0000	0.0000	0.0056	0.0000	0.0
2	1	1	10.	235.	1093.6	301.1	252.1	24.1	190.5	15.9	0.2525	0.6855	1.1762	99.0000	0.0096	0.0231	28.3
2	1	2	10.	235.	1093.6	301.1	0.0	35.3	0.0	24.8	0.0323	0.0824	0.0000	0.0000	0.0141	0.0359	0.0
3	1	1	10.	180.	1093.6	301.1	371.4	38.4	296.0	41.3	0.3747	1.1203	0.8508	0.0000	0.0153	0.0598	17.5
3	1	2	10.	180.	1093.6	301.1	0.0	58.5	0.0	65.9	0.0535	0.2188	0.0000	0.0000	0.0233	0.0954	0.0
4	1	1	10.	125.	1093.6	301.1	252.1	24.1	190.5	15.9	0.2525	0.6855	1.1762	0.0000	0.0096	0.0231	19.2
4	1	2	10.	125.	1093.6	301.1	0.0	35.3	0.0	24.8	0.0323	0.0824	0.0000	0.0000	0.0141	0.0359	0.0
5	1	1	10.	70.	1093.6	301.1	119.7	13.5	0.0	1.1	0.1217	0.0037	0.5321	0.0000	0.0054	0.0016	16.3
5	1	2	10.	70.	1093.6	301.1	0.0	18.2	0.0	0.8	0.0166	0.0027	0.0000	0.0000	0.0072	0.0012	0.0
6	1	1	33.	290.	1606.4	3226.7	149.3	17.5	0.0	12.0	0.1038	0.0037	0.4231	0.0000	0.0048	0.0016	16.9
6	1	2	33.	290.	1606.4	3226.7	0.0	23.0	0.0	8.7	0.0143	0.0027	0.0000	0.0000	0.0062	0.0012	0.0
7	1	1	33.	235.	1606.4	3226.7	337.5	28.9	0.0	46.0	0.2281	0.0143	0.8314	0.0000	0.0079	0.0062	19.0
7	1	2	33.	235.	1606.4	3226.7	0.0	41.5	0.0	63.7	0.0259	0.0198	0.0000	0.0000	0.0113	0.0086	0.0
8	1	1	33.	180.	1606.4	3226.7	549.6	42.6	2913.5	118.6	0.3686	0.9397	0.7756	0.0000	0.0116	0.0160	17.7
8	1	2	33.	180.	1606.4	3226.7	0.0	63.6	0.0	181.2	0.0396	0.0562	0.0000	0.0000	0.0173	0.0245	0.0
9	1	1	33.	125.	1606.4	3226.7	337.5	28.9	0.0	46.0	0.2281	0.0143	0.8314	0.0000	0.0079	0.0062	19.0
9	1	2	33.	125.	1606.4	3226.7	0.0	41.5	0.0	63.7	0.0259	0.0198	0.0000	0.0000	0.0113	0.0086	0.0
10	1	1	33.	70.	1606.4	3226.7	149.3	17.5	0.0	12.0	0.1038	0.0037	0.4231	0.0000	0.0048	0.0016	16.9
10	1	2	33.	70.	1606.4	3226.7	0.0	23.0	0.0	8.7	0.0143	0.0027	0.0000	0.0000	0.0062	0.0012	0.0
11	1	1	56.	290.	1910.6	5999.5	165.4	19.6	0.0	22.3	0.0968	0.0037	0.3422	0.0000	0.0045	0.0016	16.8
11	1	2	56.	290.	1910.6	5999.5	0.0	25.4	0.0	16.1	0.0133	0.0027	0.0000	0.0000	0.0058	0.0012	0.0
12	1	1	56.	235.	1910.6	5999.5	278.0	26.5	0.0	33.1	0.1594	0.0055	0.4842	0.0000	0.0061	0.0024	17.9
12	1	2	56.	235.	1910.6	5999.5	0.0	36.6	0.0	33.6	0.0191	0.0056	0.0000	0.0000	0.0083	0.0024	0.0
13	1	1	56.	180.	1910.6	5999.5	392.4	33.1	0.0	81.1	0.2227	0.0135	0.5333	0.0000	0.0076	0.0059	17.4
13	1	2	56.	180.	1910.6	5999.5	0.0	47.2	0.0	111.3	0.0247	0.0186	0.0000	0.0000	0.0108	0.0081	0.0
14	1	1	56.	125.	1910.6	5999.5	278.0	26.5	0.0	33.1	0.1594	0.0055	0.4842	0.0000	0.0061	0.0024	17.9
14	1	2	56.	125.	1910.6	5999.5	0.0	36.6	0.0	33.6	0.0191	0.0056	0.0000	0.0000	0.0083	0.0024	0.0
15	1	1	56.	70.	1910.6	5999.5	165.4	19.6	0.0	22.3	0.0968	0.0037	0.3422	0.0000	0.0045	0.0016	16.8
15	1	2	56.	70.	1910.6	5999.5	0.0	25.4	0.0	16.1	0.0133	0.0027	0.0000	0.0000	0.0058	0.0012	0.0
16	1	1	80.	290.	2556.7	7346.2	225.8	26.2	0.0	27.3	0.0986	0.0037	0.3074	0.0000	0.0045	0.0016	17.4
16	1	2	80.	290.	2556.7	7346.2	0.0	33.9	0.0	19.7	0.0133	0.0027	0.0000	0.0000	0.0058	0.0012	0.0
17	1	1	80.	235.	2556.7	7346.2	264.6	28.6	0.0	27.3	0.1147	0.0037	0.3394	0.0000	0.0049	0.0016	17.7
17	1	2	80.	235.	2556.7	7346.2	0.0	37.8	0.0	19.7	0.0148	0.0027	0.0000	0.0000	0.0064	0.0012	0.0
18	1	1	80.	180.	2556.7	7346.2	287.9	30.1	0.0	27.6	0.1244	0.0038	0.3544	0.0000	0.0051	0.0016	17.8
18	1	2	80.	180.	2556.7	7346.2	0.0	40.2	0.0	20.2	0.0157	0.0028	0.0000	0.0000	0.0069	0.0012	0.0
19	1	1	80.	125.	2556.7	7346.2	264.6	28.6	0.0	27.3	0.1147	0.0037	0.3394	0.0000	0.0049	0.0016	17.7
19	1	2	80.	125.	2556.7	7346.2	0.0	37.8	0.0	19.7	0.0148	0.0027	0.0000	0.0000	0.0064	0.0012	0.0
20	1	1	80.	70.	2556.7	7346.2	225.8	26.2	0.0	27.3	0.0986	0.0037	0.3074	0.0000	0.0045	0.0016	17.4
20	1	2	80.	70.	2556.7	7346.2	0.0	33.9	0.0	19.7	0.0133	0.0027	0.0000	0.0000	0.0058	0.0012	0.0

NOTE -- Above factors use VISIBLE TRANSMITTANCE = 1.0 for glass and shading device. Hourly calculation uses real transmittances.

Part 1 Input Information

Space-Related Quantities

Parent SPACE

is the U-name of space.

AREA

is the floor area of space (before multiplication by space multiplier).

Ave Reflectance

is the area-weighted average inside surface visible reflectance of space, which is calculated from INSIDE-VIS-REFL values for EXTERIOR-WALL, INTERIOR-WALL, UNDERGROUND-FLOOR, UNDERGROUND-WALL and WINDOW.

Window-Related Quantities

WINDOW-TYPE

is the value specified for the WINDOW-TYPE keyword; either STANDARD, SKYLIGHT-FLAT, SKYLIGHT-DOMED, SKYLIGHT-TUBULAR.

GLASS-TYPE

is the U-name of the GLASS-TYPE for the WINDOW.

SHADING-COEF

is the shading coefficient of the glazing.

VIS-TRANS

is the visible transmittance of the glazing at normal incidence.

H

is the height of the glazing,

W

is the width of the glazing.

AZIM and TILT

are the azimuth and tilt angle, respectively, of the window outward normal in the building coordinate system. AZIM is measured clockwise from the building y-axis.

DAY-X-DIV and DAY-Y-DIV

are the number of elements into which the window is divided along its WIDTH and HEIGHT, respectively, for the integration which determines the daylight reaching the reference point from the window. DAY-X-DIV and DAY-Y-DIV are automatically determined by the program to insure an accurate integration.

X, Y, Z

are the coordinates of the glazing origin in the space coordinate system. For vertical windows, Z is the sill height.

WIN-SHADE-TYPE

is the type of shading device on the window, if any, as entered with the WIN-SHADE-TYPE keyword.

Reference Point-Related Quantities

X, Y, Z

are the coordinates of reference point in the space coordinate system.

ZONE-FRACTION

is the fraction of the space floor area controlled by the lighting system at this reference point (value of ZONE-FRACTION1 or ZONE-FRACTION2 keyword).

MAX-GLARE

is the threshold for closing window shades to control glare (MAX-GLARE or MAX-GLARE2 keyword value; defaults to 100, which means no glare control).

LTG-SET-POINT

is the illuminance setpoint as entered with keyword LIGHT-SET-POINT1 for reference point 1, or with LIGHT-SET-POINT2 for reference point 2.

VIEW-AZ

(view azimuth) is the azimuth angle, measured clockwise from north, of the occupant's direction of view; used to calculate the daylight glare index. It is entered (relative to the SPACE y-axis) with the VIEW-AZIMUTH and VIEW-AZIMUTH2 keywords.

LTG-CTRL-TYPE

is the lighting control type as entered with keyword LIGHT-CTRL-TYPE1 for reference point 1, or with or LIGHT-CTRL-TYPE2 for reference point 2.

WELL-EFFICIENCY

is the well efficiency, either calculated or specified, for the light well under this window if it is a skylight.

OBSTRUCTIONS FRAC

is the obstruction factor, either calculated or specified, for the daylight from this window to the reference point.

Part 2 Calculated Daylighting Factor Values

SUN POS NO.

(sun position number) is the sun-position index corresponding to different pairs of solar altitude and azimuth values (see SUN ALT and SUN AZIM, below).

DAY TYP

(day type) is 1 for clear sky and 2 for overcast sky. For the latter, the daylight factors for only one sun position are calculated.

WIN SHD IND

(window shade index) is 1 for bare window (shading device off), and 2 for window with shading device on. Visible transmittance of shade is taken to be 1.0 for daylight factor calculation.

SUN ALT

is the altitude of sun above the horizon. It has four equally-spaced values ranging from 10o to the maximum altitude the sun can reach at the location being analyzed.

SUN AZIM

is the azimuth of sun measured clockwise from North.

EXT ILL –SKY

is the exterior horizontal illuminance due to diffuse light from sky (excludes direct sun).

EXT ILL –SUN

is the exterior horizontal illuminance due to direct sun.

EXT ILL -SKY and EXT ILL –SUN

are calculated for standard CIE skies using, for clear sky, the atmospheric turbidity and moisture for the month of May.

The following quantities relate to the interior of the space. For WIN SHD IND = 2 (window with shade), the shade is assumed to have 100% transmittance; the actual shade transmittance is taken into account in the hourly loads calculation.

DIR ILL –SKY

(direct illuminance -sky) is the direct horizontal illuminance at the reference point produced by light which originates in the sky and reaches the reference point without reflection from the interior surfaces of the space. For an unshaded window (WIN SHD IND = 1), this includes the light coming directly from the sky or by reflection of sky light from exterior BUILDING-SHADEs. For a window with shade (WIND SHD IND = 2 and WIN-SHADE-TYPE other than NO-SHADE), the light source is the shade itself, a diffusely transmitting surface illuminated by direct light from the sky, sky light reflected from the ground, and sky light reflected from exterior obstructions.

REFL ILL –SKY

(reflected illuminance -sky) is the illuminance at the reference point produced by daylight which originates in the sky and reaches the reference point after reflecting from the interior surfaces of the space.

DIR ILL –SUN

(direct illuminance -sun): for an unshaded window (WIN SHD IND = 1), this is the direct horizontal illuminance at the reference point produced by light from the sun reaching the reference point without reflection from the interior surfaces of the space. For a window with shade (WIN SHD IND = 2), the light source is the shade illuminated by direct sunlight and by sunlight reflected by the ground and exterior obstructions.

REFL ILL –SUN

(reflected illuminance -sun) is the indirect horizontal illuminance at the reference point produced by sunlight which reflects from interior surfaces before reaching the reference point.

DAY ILL FAC –SKY

(daylight illuminance factor -sky) is the ratio (DIR ILL -SKY + REFL ILL -SKY)/(EXT ILL -SKY).

DAY ILL FAC –SUN

(daylight illuminance factor -sun) is the ratio (DIR ILL -SUN + REFL ILL -SUN)/(EXT ILL -SUN).

WIN LUM FAC –SKY

(window luminance factor -sky) is the average luminance of the window (as seen from the reference point) due to light originating in the sky, divided by EXT ILL -SKY. It has units footlamberts/footcandle (English) or candelas/m2/lux (metric).

WIN LUM FAC –SUN

(window luminance factor -sun) is the ratio between the average luminance of the window (as seen from the reference point) due to light originating at the sun, divided by EXT ILL -SUN. This quantity is not calculated for an unshaded window.

BACKG LUM FAC –SKY

(background luminance factor -sky) is the average luminance of interior surfaces due to light originating in the sky, divided by EXT ILL -SKY. It has units footlamberts/footcandle (English) or (candelas/m2)/lux (metric).

BACKG LUM FAC –SUN

(background luminance factor -sun) is the average luminance of interior surfaces due to light originating at the sun, divided by EXT ILL -SUN.

GLARE INDEX

is the daylight glare index at the reference point due to this window. (It assumes 100% shade transmittance for a shaded window (WIN SHD IND = 2). The actual glare index in the hourly calculation will generally be lower for shade transmittance < 100%.

LV-M DOE-2.2 Units Conversion Table

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2-44a2   9/24/2004    18:18:14  BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- LV-M DOE-2.2 Units Conversion Table                                                 WEATHER FILE- TRY  CHICAGO
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```

	ENGLISH	MULTIPLIED BY GIVES	METRIC	MULTIPLIED BY GIVES	ENGLISH
1		1.000000		1.000000	
2		1.000000		1.000000	
3	BTU	0.293000	WH	3.412969	BTU
4	BTU/HR	0.293000	WATT	3.412969	BTU/HR
5	BTU/LB-F	4183.830078	J/KG-K	0.000239	BTU/LB-F
6	BTU/HR-SQFT-F	5.674460	W/M2-K	0.176228	BTU/HR-SQFT-F
7	DEGREES	1.000000	DEGREES	1.000000	DEGREES
9	SQFT	0.092903	M2	10.763915	SQFT
10	CUFT	0.028317	M3	35.314724	CUFT
11	LB/HR	0.453592	KG/HR	2.204624	LB/HR
12	LB/CUFT	16.018459	KG/M3	0.062428	LB/CUFT
13	MPH	0.447040	M/S	2.236936	MPH
14	BTU/HR-F	0.527178	W/K	1.896893	BTU/HR-F
15	FT	0.304800	M	3.280840	FT
16	BTU/HR-FT-F	1.729600	W/M-K	0.578168	BTU/HR-FT-F
17	BTU/HR- SQFT	3.152480	WATT /M2	0.317211	BTU/HR- SQFT
18	IN	2.540000	CM	0.393701	IN
19	UNITS/IN	0.393700	UNITS/CM	2.540005	UNITS/IN
20	UNITS	1.000000	UNITS	1.000000	UNITS
21	LB	0.453592	KG	2.204624	LB
22	FRAC.OR MULT.	1.000000	FRAC.OR MULT.	1.000000	FRAC.OR MULT.
23	HOURS	1.000000	HRS	1.000000	HOURS
24	PERCENT-RH	1.000000	PERCENT-RH	1.000000	PERCENT-RH
25	CFM	1.699010	M3/H	0.588578	CFM
26	IN-WATER	25.400000	MM-WATER	0.039370	IN-WATER
27	LB/SQFT	4.882400	KG/M2	0.204817	LB/SQFT
28	KW	1.000000	KW	1.000000	KW
29	W/SQFT	10.763920	W/M2	0.092903	W/SQFT
30	THERMS	25.000000	THERMIES	0.040000	THERMS
31	KNOTS	0.514440	M/SEC	1.943861	KNOTS
32	HR-SQFT-F /BTU	0.176228	M2-K /W	5.674467	HR-SQFT-F /BTU
33	$DOLLARS	1.000000	$DOLLARS	1.000000	$DOLLARS
34	MBTU/HR	0.293000	MWATT	3.412969	MBTU/HR
35	YEARS	1.000000	YEARS	1.000000	YEARS
36	$/HR	1.000000	$/HR	1.000000	$/HR
37	HRS/YEARS	1.000000	HRS/YEARS	1.000000	HRS/YEARS
38	PERCENT	1.000000	PERCENT	1.000000	PERCENT
39	$/MONTH	1.000000	$/MONTH	1.000000	$/MONTH
40	GALLONS/MIN/TON	1.078000	LITERS/MIN/KW	0.927644	GALLONS/MIN/TON
41	BTU/LB	0.645683	WH/KG	1.548748	BTU/LB
42	LBS/SQIN-GAGE	68.947571	MBAR-GAGE	0.014504	LBS/SQIN-GAGE
43	$/UNIT	1.000000	$/UNIT	1.000000	$/UNIT
44	BTU/HR/PERSON	0.293000	W/PERSON	3.412969	BTU/HR/PERSON
45	LBS/LB	1.000000	KGS/KG	1.000000	LBS/LB
46	BTU/BTU	1.000000	KWH/KWH	1.000000	BTU/BTU
47	LBS/KW	0.453590	KG/KW	2.204634	LBS/KW
48	REV/MIN	1.000000	REV/MIN	1.000000	REV/MIN
49	KW/TON	1.000000	KW/TON	1.000000	KW/TON
50	MBTU	0.293000	MWH	3.412969	MBTU
51	GAL	3.785410	LITER	0.264172	GAL
52	GAL/MIN	3.785410	LITERS/MIN	0.264172	GAL/MIN
53	BTU/F	1897.800049	J/K	0.000527	BTU/F
54	KWH	1.000000	KWH	1.000000	KWH
55	$/UNIT-HR	1.000000	$/UNIT-HR	1.000000	$/UNIT-HR
56	KW/CFM	0.588500	KW/M3/HR	1.699235	KW/CFM
57	BTU/SQFT-F	20428.400391	J/M2-K	0.000049	BTU/SQFT-F
58	HR/HR	1.000000	HR/HR	1.000000	HR/HR
59	BTU/FT-F	6226.479980	J/M-K	0.000161	BTU/FT-F
60	R	0.555556	K	1.799999	R
61	INCH MER	33.863800	MBAR	0.029530	INCH MER
62	UNITS/GAL/MIN	0.264170	UNITS/LITER/MIN	3.785441	UNITS/GAL/MIN
63	(HR-SQFT-F/BTU)2	0.031056	(M2-K /W)2	32.199585	(HR-SQFT-F/BTU)2
64	KBTU/HR	0.293000	KW	3.412969	KBTU/HR
65	KBTU	0.293000	KWH	3.412969	KBTU
66	CFM	0.471900	L/S	2.119093	CFM
67	CFM/SQFT	18.288000	M3/H-M2	0.054681	CFM/SQFT
68	1/R	1.799900	1/K	0.555586	1/R
69	1/KNOT	1.943860	SEC/M	0.514440	1/KNOT
70	FOOTCANDLES	10.763910	LUX	0.092903	FOOTCANDLES
71	FOOTLAMBERT	3.426259	CANDELA/M2	0.291864	FOOTLAMBERT
72	LUMEN / WATT	1.000000	LUMEN / WATT	1.000000	LUMEN / WATT
73	KBTU/SQFT-YR	3.152480	KWH/M2-YR	0.317211	KBTU/SQFT-YR
74	F (DELTA)	0.555556	C (DELTA)	1.799999	F (DELTA)
75	BTU/DAY	0.012202	WATT	81.953773	BTU/DAY
76	$/YEAR	1.000000	$/YEAR	1.000000	$/YEAR
77	BTU/WATT	0.293000	WATT/WATT	3.412969	BTU/WATT
78	RADIANS	1.000000	RADIANS	1.000000	RADIANS

79	WATT/BTU	3.413000	WATT/WATT	0.292997	WATT/BTU
80	BTU	0.000293	KWH	3412.969482	BTU
81	WATT	1.000000	WATT	1.000000	WATT
82	LUMENS	1.000000	LUMENS	1.000000	LUMENS
83	BTU/HR-FT-R2	3.115335	W/M-K2	0.320993	BTU/HR-FT-R2
84	LB/FT-S	1.488163	KG/M-S	0.671969	LB/FT-S
85	LB/FT-S-R	2.678693	KG/M-S-K	0.373316	LB/FT-S-R
86	LB/CUFT-R	28.833212	KG/M3-K	0.034682	LB/CUFT-R
87	BTU/HR-FT-R	1.730741	W/M-K	0.577787	BTU/HR-FT-R
88	THERM	2.831700	M3	0.353145	THERM
89	THERM/HR	2.831700	M3/HR	0.353145	THERM/HR
90	TON	0.907180	TONNE	1.102317	TON
91	TON/HR	0.907180	TONNE/HR	1.102317	TON/HR
92	BTU/UNIT	1.000000	BTU/UNIT	1.000000	BTU/UNIT
93	$	1.000000	$	1.000000	$
94	KW/GAL/MIN	0.264170	KW/LITER/MIN	3.785441	KW/GAL/MIN
95	CUFT/GAL	0.448831	M3-MIN/H-LITERS	2.228010	CUFT/GAL
96	MINUTES	1.000000	MINUTES	1.000000	MINUTES
97	UNUSED	1.000000	UNUSED	1.000000	UNUSED
98	UNUSED	1.000000	UNUSED	1.000000	UNUSED
99	UNUSED	1.000000	UNUSED	1.000000	UNUSED
100	UNUSED	1.000000	UNUSED	1.000000	UNUSED
101	UNUSED	1.000000	UNUSED	1.000000	UNUSED
102	UNUSED	1.000000	UNUSED	1.000000	UNUSED
103	UNUSED	1.000000	UNUSED	1.000000	UNUSED
104	UNUSED	1.000000	UNUSED	1.000000	UNUSED
105	UNUSED	1.000000	UNUSED	1.000000	UNUSED
106	UNUSED	1.000000	UNUSED	1.000000	UNUSED
107	UNUSED	1.000000	UNUSED	1.000000	UNUSED
108	UNUSED	1.000000	UNUSED	1.000000	UNUSED
109	UNUSED	1.000000	UNUSED	1.000000	UNUSED
110	UNUSED	1.000000	UNUSED	1.000000	UNUSED
111	UNUSED	1.000000	UNUSED	1.000000	UNUSED
112	UNUSED	1.000000	UNUSED	1.000000	UNUSED
113	BTU-F/BTU	0.555560	KWH-C/KWH	1.799986	BTU-F/BTU
114	UNUSED	1.000000	UNUSED	1.000000	UNUSED
115	VOLTS	1.000000	VOLTS	1.000000	VOLTS
116	C	1.000000	C	1.000000	C
117	AMPS	1.000000	AMPS	1.000000	AMPS
118	VOLTS/C	1.000000	VOLTS/C	1.000000	VOLTS/C
119	1/C	1.000000	1/C	1.000000	1/C
120	FT/MIN	0.005080	M/S	196.850388	FT/MIN
121	GAL/MIN	227.160004	LITERS/HR	0.004402	GAL/MIN
122	KW/CFM	588.500000	W/M3/HR	0.001699	KW/CFM
123	BTU/HR-F	0.000527	KW/C	1896.892578	BTU/HR-F
124	HP	0.102000	kW	9.803922	HP
125	CFM/TON	0.483200	(M3/H)/KW	2.069536	CFM/TON
126	UNUSED	1.000000	UNUSED	1.000000	UNUSED
127	UNUSED	1.000000	UNUSED	1.000000	UNUSED
128	UNUSED	1.000000	UNUSED	1.000000	UNUSED
129	UNUSED	1.000000	UNUSED	1.000000	UNUSED
130	1/VOLTS	1.000000	1/VOLTS	1.000000	1/VOLTS
131	(C-M2)/W	1.000000	(C-M2)/W	1.000000	(C-M2)/W
132	(C-M-SEC)/W	1.000000	(C-M-SEC)/W	1.000000	(C-M-SEC)/W
133	W/M2	1.000000	W/M2	1.000000	W/M2
134	TDV-MBTUH	0.293000	TDV-MW	3.412969	TDV-MBTUH
135	TDV-MBTU	0.293000	TDV-MWH	3.412969	TDV-MBTU
136	TDV-KBTU/KWH	0.293000	TDV-KWH/KWH	3.412969	TDV-KBTU/KWH
137	TDV-KBTU/THERM	0.010000	TDV-KWH/KWH	100.000000	TDV-KBTU/THERM

LV-N Building Coordinate Geometry

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2-44a2   9/24/2004    18:18:14  BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- LV-N Building Coordinate Geometry                                               WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------
SPACE.................. (SPACE ORIGIN)
    WALL............... (VERTEX1) (VERTEX2) (...)
        WINDOW......... (VERTEX1) (VERTEX2) (...)
---------------------------------------------------------------------------------------------------------------------------------

PLENUM-1............... (   0.0     0.0     8.0)
    WALL-1PF........... (   0.0     0.0    10.0) (   0.0     0.0     8.0) ( 100.0     0.0     8.0) ( 100.0     0.0    10.0)
    WALL-1PR........... ( 100.0     0.0    10.0) ( 100.0     0.0     8.0) ( 100.0    50.0     8.0) ( 100.0    50.0    10.0)
    WALL-1PB........... ( 100.0    50.0    10.0) ( 100.0    50.0     8.0) (   0.0    50.0     8.0) (   0.0    50.0    10.0)
    WALL-1PL........... (   0.0    50.0    10.0) (   0.0    50.0     8.0) (   0.0     0.0     8.0) (   0.0     0.0    10.0)
    TOP-1   ........... (   0.0     0.0    10.0) ( 100.0     0.0    10.0) ( 100.0    50.0    10.0) (   0.0    50.0    10.0)
    C1-1............... (   0.0     0.0     8.0) ( 100.0     0.0     8.0) (  88.0    12.0     8.0) (  12.0    12.0     8.0)
    C2-1............... ( 100.0     0.0     8.0) ( 100.0    50.0     8.0) (  88.0    38.0     8.0) (  88.0    12.0     8.0)
    C3-1............... ( 100.0    50.0     8.0) (   0.0    50.0     8.0) (  12.0    38.0     8.0) (  88.0    38.0     8.0)
    C4-1............... (   0.0    50.0     8.0) (   0.0     0.0     8.0) (  12.0    12.0     8.0) (  12.0    38.0     8.0)
    C5-1............... (  12.0    12.0     8.0) (  88.0    12.0     8.0) (  88.0    38.0     8.0) (  12.0    38.0     8.0)
SPACE1-1............... (   0.0     0.0     0.0)
    FRONT-1 ........... (   0.0     0.0     8.0) (   0.0     0.0     0.0) ( 100.0     0.0     0.0) ( 100.0     0.0     8.0)
        WF-1........... (  10.0     0.0     7.0) (  10.0     0.0     3.0) (  55.0     0.0     3.0) (  55.0     0.0     7.0)
        DF-1........... (  70.0     0.0     8.0) (  70.0     0.0     0.0) (  78.0     0.0     0.0) (  78.0     0.0     8.0)
    C1-1............... (   0.0     0.0     8.0) ( 100.0     0.0     8.0) (  88.0    12.0     8.0) (  12.0    12.0     8.0)
    SB12............... ( 100.0     0.0     8.0) ( 100.0     0.0     0.0) (  88.0    12.0     0.0) (  88.0    12.0     8.0)
    SB14............... (  12.0    12.0     8.0) (  12.0    12.0     0.0) (   0.0     0.0     0.0) (   0.0     0.0     8.0)
    SB15............... (  88.0    12.0     8.0) (  88.0    12.0     0.0) (  12.0    12.0     0.0) (  12.0    12.0     8.0)
SPACE2-1............... ( 100.0     0.0     0.0)
    RIGHT-1 ........... ( 100.0     0.0     8.0) ( 100.0     0.0     0.0) ( 100.0    50.0     0.0) ( 100.0    50.0     8.0)
        WR-1........... ( 100.0    12.5     7.0) ( 100.0    12.5     3.0) ( 100.0    37.5     3.0) ( 100.0    37.5     7.0)
    SB12............... ( 100.0     0.0     8.0) ( 100.0     0.0     0.0) (  88.0    12.0     0.0) (  88.0    12.0     8.0)
    C2-1............... ( 100.0     0.0     8.0) ( 100.0    50.0     8.0) (  88.0    38.0     8.0) (  88.0    12.0     8.0)
    SB23............... ( 100.0    50.0     8.0) ( 100.0    50.0     0.0) (  88.0    38.0     0.0) (  88.0    38.0     8.0)
    SB25............... (  88.0    38.0     8.0) (  88.0    38.0     0.0) (  88.0    12.0     0.0) (  88.0    12.0     8.0)
SPACE3-1............... ( 100.0    50.0     0.0)
    BACK-1  ........... ( 100.0    50.0     8.0) ( 100.0    50.0     0.0) (   0.0    50.0     0.0) (   0.0    50.0     8.0)
        WB-1........... (  90.0    50.0     7.0) (  90.0    50.0     3.0) (  45.0    50.0     3.0) (  45.0    50.0     7.0)
        DB-1........... (  30.0    50.0     7.0) (  30.0    50.0     0.0) (  23.0    50.0     0.0) (  23.0    50.0     7.0)
    SB23............... ( 100.0    50.0     8.0) ( 100.0    50.0     0.0) (  88.0    38.0     0.0) (  88.0    38.0     8.0)
    C3-1............... ( 100.0    50.0     8.0) (   0.0    50.0     8.0) (  12.0    38.0     8.0) (  88.0    38.0     8.0)
    SB34............... (   0.0    50.0     8.0) (   0.0    50.0     0.0) (  12.0    38.0     0.0) (  12.0    38.0     8.0)
    SB35............... (  12.0    38.0     8.0) (  12.0    38.0     0.0) (  88.0    38.0     0.0) (  88.0    38.0     8.0)
SPACE4-1............... (   0.0    50.0     0.0)
    LEFT-1  ........... (   0.0    50.0     8.0) (   0.0    50.0     0.0) (   0.0     0.0     0.0) (   0.0     0.0     8.0)
        WL-1........... (   0.0    37.5     7.0) (   0.0    37.5     3.0) (   0.0    12.5     3.0) (   0.0    12.5     7.0)
    SB14............... (  12.0    12.0     8.0) (  12.0    12.0     0.0) (   0.0     0.0     0.0) (   0.0     0.0     8.0)
    SB34............... (   0.0    50.0     8.0) (   0.0    50.0     0.0) (  12.0    38.0     0.0) (  12.0    38.0     8.0)
    C4-1............... (   0.0    50.0     8.0) (   0.0     0.0     8.0) (  12.0    12.0     8.0) (  12.0    38.0     8.0)
    SB45............... (  12.0    12.0     8.0) (  12.0    12.0     0.0) (  12.0    38.0     0.0) (  12.0    38.0     8.0)
SPACE5-1............... (  12.0    12.0     0.0)
    SB15............... (  88.0    12.0     8.0) (  88.0    12.0     0.0) (  12.0    12.0     0.0) (  12.0    12.0     8.0)
    SB25............... (  88.0    38.0     8.0) (  88.0    38.0     0.0) (  88.0    12.0     0.0) (  88.0    12.0     8.0)
    SB35............... (  12.0    38.0     8.0) (  12.0    38.0     0.0) (  88.0    38.0     0.0) (  88.0    38.0     8.0)
    SB45............... (  12.0    12.0     8.0) (  12.0    12.0     0.0) (  12.0    38.0     0.0) (  12.0    38.0     8.0)
    C5-1............... (  12.0    12.0     8.0) (  88.0    12.0     8.0) (  88.0    38.0     8.0) (  12.0    38.0     8.0)
```

LS-A Space Peak Loads Summary

This report lists each space by U-name and shows the number of times each space is repeated (based on the keywords MULTIPLIER and FLOOR-MULTIPLIER) on the left of the report.

The individual space peak sensible cooling load with the month, day and hour it occurred is reported in the center. The sum of the cooling loads for all spaces (which is the non-coincident building peak load) is also reported.

The coincident building peak cooling load (the "block" load) is reported directly below the non-coincident peak, but it does not include the plenum load. The outside drybulb and wetbulb temperatures are also reported for the time of the peak load in each space and for the building. All hours are given in standard time.

The heating peak loads are treated similarly on the right.

A "load" here is defined as the amount of heat that must be added or removed from the space air per hour to maintain a constant air temperature equal to the TEMPERATURE keyword value in SPACE. These loads are modified in the SYSTEMS program to account for time-varying air temperatures.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- LS-A Space Peak Loads Summary                                      DESIGN DAY    WEATHER FILE- TRY  CHICAGO
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                           MULTIPLIER   COOLING LOAD        TIME OF   DRY-  WET-    HEATING LOAD        TIME OF   DRY-  WET-
 SPACE NAME               SPACE  FLOOR      (KBTU/HR)           PEAK   BULB  BULB       (KBTU/HR)           PEAK   BULB  BULB

 PLENUM-1                    1.      1.        68.071   AUG  5  4 PM   94.F  74.F         -71.422   JAN  7  7 AM   -5.F  -6.F
 SPACE1-1                    1.      1.        27.707   AUG  5  5 PM   94.F  74.F         -14.109   JAN  7  8 AM   -5.F  -6.F
 SPACE2-1                    1.      1.        13.641   AUG  5 11 AM   80.F  70.F          -5.793   JAN  7  7 AM   -5.F  -6.F
 SPACE3-1                    1.      1.        19.296   AUG  5  9 AM   75.F  68.F         -15.393   JAN  7  7 AM   -5.F  -6.F
 SPACE4-1                    1.      1.        13.261   AUG  5  7 PM   92.F  73.F          -6.230   JAN  7  7 AM   -5.F  -6.F
 SPACE5-1                    1.      1.        19.881   AUG  5  1 AM   82.F  71.F          -4.895   JAN  7 12 MDNT -5.F  -6.F
                                            ---------                                   ---------
 SUM                                          161.856                                    -117.842
```

LS-B Space Peak Load Components <space name>

This report gives a breakdown of cooling and heating peak loads, according to the source of the load, for each space. A "load" here is defined as the amount of heat that must be added or removed from the space air per hour to maintain a constant air temperature equal to the TEMPERATURE keyword value in SPACE. These loads are modified in the SYSTEMS program to account for time-varying air temperatures.

The time of occurrence (in local standard time) of the peaks is indicated along with the corresponding outside conditions. The load components are:

WALL CONDUCTION

is the load due to conduction through exterior walls (TILT ³ 45°).

ROOF CONDUCTION

is the load due to conduction through roof sections (exterior walls with TILT < 45°).

WINDOW GLASS+FRM COND

is the load due to UADT heat gain through all the exterior windows (glass plus frames) plus solar energy absorbed by the glass and frames and conducted into the space.

WINDOW GLASS SOLAR

is the load caused by direct and diffuse solar radiation transmitted by the window glass into the space. Note that all sensible loads are calculated as delayed in time with weighting factors so that it is possible to have load contributions from WINDOW GLASS SOLAR at night.

DOOR CONDUCTION

is the load due to conduction through external doors in the space.

INTERNAL SURFACE COND

is the load due to conduction through INTERIOR-WALLs such as partitions and drop ceilings. These loads will be zero in this report if you choose the same LOADS calculation temperature for all spaces (as was the case in this example).

UNDERGROUND SURF COND

is the load due to conduction through basement floors and walls or slabs on grade.

The next five entries are the loads due to

Occupants

(resulting from user-supplied entries for keywords PEOPLE-SCHEDULE, NUMBER-OF-PEOPLE, AREA-PERSON, and PEOPLE-HEAT-GAIN)

Electric lighting

(from keywords LIGHTING-SCHEDULE, LIGHTING-TYPE, LIGHTING-W/AREA, TASK-LT-W/AREA, etc., or from commands LIGHTING-SYSTEM, LUMINAIRE-TYPE, LAMP-TYPE, etc.)

Equipment

(from keywords EQUIP-SCHEDULE, EQUIPMENT-W/AREA, etc.)

Process

(from keywords SOURCE-SCHEDULE, SOURCE-TYPE, SOURCE-POWER, etc.)

Infiltration of outside air

(from keywords INF-SCHEDULE, INF-METHOD, AIR-CHANGES/HR, etc.).

The RUN number in the upper right hand corner refers to the number of the pass through the LOADS program. For example, if you were doing parametric runs as part of the same job, successive passes through LOADS would be recorded as RUN 1, RUN 2, RUN 3, etc.

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum           DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- LS-B Space Peak Load Components     SPACE1-1                                      WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------

 SPACE  SPACE1-1
 SPACE TEMPERATURE USED FOR THE LOADS CALCULATION IS   70 F /  21 C


                    MULTIPLIER        1.0         FLOOR MULTIPLIER        1.0

                    FLOOR  AREA      1056  SQFT       98   M2
                    VOLUME           8448  CUFT      239   M3

                                          COOLING  LOAD                            HEATING  LOAD
                                     ==========================               ==========================
     TIME                                   OCT 22  4PM                             JAN 12  8AM

     DRY-BULB TEMP                     70 F            21 C                  -7 F            -22 C
     WET-BULB TEMP                     55 F            13 C                  -7 F            -22 C
     TOT HORIZONTAL SOLAR RAD         119 BTU/H.SQFT   375 W/M2               3 BTU/H.SQFT     8 W/M2
     WINDSPEED AT SPACE               8.3 KTS          4.3 M/S              5.1 KTS          2.6 M/S
     CLOUD AMOUNT 0(CLEAR)-10           0                                     0


                                  SENSIBLE          LATENT                             SENSIBLE
                               (KBTU/H)    ( KW )  (KBTU/H)  ( KW )                 (KBTU/H)  ( KW )
                               --------    ------  --------  ------                 --------  --------

      WALL CONDUCTION             0.860     0.252     0.000  0.000                    -2.418    -0.708
      ROOF CONDUCTION             0.000     0.000     0.000  0.000                     0.000     0.000
      WINDOW GLASS+FRM COND       1.655     0.485     0.000  0.000                    -8.995    -2.636
      WINDOW GLASS SOLAR         20.144     5.902     0.000  0.000                     0.968     0.284
      DOOR CONDUCTION             0.000     0.000     0.000  0.000                     0.000     0.000
      INTERNAL SURFACE COND       0.000     0.000     0.000  0.000                     0.000     0.000
      UNDERGROUND SURF COND      -0.665    -0.195     0.000  0.000                    -1.814    -0.532
      OCCUPANTS TO SPACE          2.080     0.609     1.433  0.420                     0.012     0.003
      LIGHT     TO SPACE          3.494     1.024     0.000  0.000                     0.210     0.061
      EQUIPMENT TO SPACE          2.053     0.602     0.000  0.000                     0.641     0.188
      PROCESS   TO SPACE          0.000     0.000     0.000  0.000                     0.000     0.000
      INFILTRATION                0.000     0.000     0.000  0.000                    -1.689    -0.495
                               --------   -------   -------  ------                 --------  --------
      TOTAL                      29.621     8.679     1.433  0.420                   -13.086    -3.834
      TOTAL / AREA                0.028     0.088     0.001  0.004                    -0.012    -0.039

      TOTAL LOAD                 31.054 KBTU/H       9.099  KW              -13.086 KBTU/H       -3.834  KW
      TOTAL LOAD / AREA          29.41  BTU/H.SQFT  92.745  W/M2             12.392 BTU/H.SQFT   39.081  W/M2


                                 ****************************************************************
                                 *                                                              *
                                 *  NOTE  1)THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR     *
                                 *  ----    LOADS                                               *
                                 *        2)TIMES GIVEN IN STANDARD TIME FOR THE LOCATION       *
                                 *          IN CONSIDERATION                                    *
                                 *        3)THE ABOVE LOADS ARE CALCULATED ASSUMING A           *
                                 *          CONSTANT INDOOR SPACE TEMPERATURE                   *
                                 *                                                              *
                                 ****************************************************************
```

LS-C Building Peak Load Components

This report is similar in format to LS-B. The major difference is that LS-C is generated at the "building level," i.e., the space loads are summed each hour to give the building coincident load and the peak values of this load are shown here.

"Floor area" in this report is that of conditioned spaces only (ZONE-TYPE = CONDITIONED); it excludes plenums and other unconditioned spaces (ZONE-TYPE = PLENUM or UNCONDITIONED). "Volume" is that of conditioned spaces and plenums; it excludes ZONE-TYPE = UNCONDITIONED.

The building coincident peak load does not include plenums (ZONE-TYPE = PLENUM) or other unconditioned spaces (ZONE-TYPE = UNCONDITIONED).

Although no infiltration is indicated for the peak cooling load in this example, the user should realize how DOE-2 treats infiltration loads. The sensible portion is treated as an instantaneous heat gain or loss. The latent portion is reported in LOADS, but is passed to SYSTEMS as a flow with the calculated humidity ratio for each hour. The contribution of the latent heat (negative or positive in relation to room humidity) is then calculated from a mass balance of moisture in the space to determine the return air humidity ratio. In dry climates the infiltration may actually result in a decreased space latent load and thus a decreased total SYSTEMS load. The opposite is true in humid climates where infiltration acts to increase the SYSTEMS load.

The heat gain or loss that occurs in plenums, including heat due to lights, is accounted for in the SYSTEMS simulation and causes a temperature change in the return air flowing through the plenum. Therefore, you should not specify plenums unless they are actually return air plenums. Unconditioned, non-return-air spaces should be specified in the SPACE command with ZONE-TYPE = UNCONDITIONED.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- LS-C Building Peak Load Components                                                   WEATHER FILE- TRY  CHICAGO
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 *** BUILDING ***



                     FLOOR  AREA      5000  SQFT       465   M2
                     VOLUME          50000  CUFT      1416   M3

                                          COOLING  LOAD                              HEATING  LOAD
                                     ==========================                ==========================
     TIME                                   JUL  9  4PM                              MAR 24  6AM

     DRY-BULB TEMP                        94 F            34 C                     8 F            -13 C
     WET-BULB TEMP                        74 F            23 C                     7 F            -14 C
     TOT HORIZONTAL SOLAR RAD            228 BTU/H.SQFT   717 W/M2                 0 BTU/H.SQFT     0 W/M2
     WINDSPEED AT SPACE                  5.4 KTS          2.8 M/S                9.4 KTS          4.8 M/S
     CLOUD AMOUNT 0(CLEAR)-10             4                                        7


                                  SENSIBLE          LATENT                               SENSIBLE
                             (KBTU/H)    ( KW )  (KBTU/H)  ( KW )                   (KBTU/H)  ( KW )
                             --------    ------  --------  ------                   --------  --------

      WALL CONDUCTION          3.987      1.168     0.000   0.000                     -6.123    -1.794
      ROOF CONDUCTION          0.000      0.000     0.000   0.000                      0.000     0.000
      WINDOW GLASS+FRM COND   10.157      2.976     0.000   0.000                    -19.651    -5.758
      WINDOW GLASS SOLAR      22.881      6.704     0.000   0.000                      2.414     0.707
      DOOR CONDUCTION          0.000      0.000     0.000   0.000                      0.000     0.000
      INTERNAL SURFACE COND    0.000      0.000     0.000   0.000                      0.000     0.000
      UNDERGROUND SURF COND   -1.093     -0.320     0.000   0.000                     -5.645    -1.654
      OCCUPANTS TO SPACE      10.434      3.057     6.776   1.985                      0.004     0.001
      LIGHT     TO SPACE      16.957      4.968     0.000   0.000                      0.969     0.284
      EQUIPMENT TO SPACE      10.332      3.027     0.000   0.000                      0.807     0.237
      PROCESS   TO SPACE       0.000      0.000     0.000   0.000                      0.000     0.000
      INFILTRATION             0.000      0.000     0.000   0.000                    -11.157    -3.269
                             --------   -------   -------  ------                   --------  --------
      TOTAL                   73.656     21.581     6.776   1.985                    -38.381   -11.246
      TOTAL / AREA             0.015      0.046     0.001   0.004                     -0.008    -0.024

      TOTAL LOAD              80.431 KBTU/H       23.566  KW            -38.381 KBTU/H      -11.246  KW
      TOTAL LOAD / AREA       16.09  BTU/H.SQFT   50.733  W/M2            7.676 BTU/H.SQFT   24.210  W/M2


                                 ****************************************************************
                                 *                                                              *
                                 *  NOTE  1)THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR     *
                                 *  ----    LOADS                                               *
                                 *        2)TIMES GIVEN IN STANDARD TIME FOR THE LOCATION       *
                                 *          IN CONSIDERATION                                    *
                                 *        3)THE ABOVE LOADS ARE CALCULATED ASSUMING A           *
                                 *          CONSTANT INDOOR SPACE TEMPERATURE                   *
                                 *                                                              *
                                 ****************************************************************
```

LS-D Building Monthly Loads Summary

This report gives a summary of monthly cooling, heating, and electrical requirements plus annual total energy requirements and maximum monthly peak loads. Unconditioned spaces (ZONE-TYPE = UNCONDITIONED or PLENUM) are not included in this report's monthly load.

Once again, you should be aware that these loads are based on a constant temperature within each SPACE (that is, no setback, no floating, and no other temperature variations within the SPACE). Additionally, these loads do not account for conditioning of outside ventilation air. Later, in SYSTEMS, these items will be accounted for.

COOLING, HEATING, and ELEC

are the three sections of this building level report.

COOLING ENERGY

is the monthly sensible cooling load for all conditioned SPACEs in the building.

MAXIMUM COOLING LOAD

is the peak coincident sensible cooling load for all conditioned SPACEs in the building. To the left of this column are the day and hour (local standard time) of the peak cooling load along with the outside drybulb and wetbulb temperatures at that time.

HEATING ENERGY

is the monthly heating load for all conditioned SPACEs in the building.

MAXIMUM HEATING LOAD

is the peak coincident heating load for all conditioned SPACEs in the building. To the left of this column are the day and hour (local standard time) of the peak heating load along with the outside drybulb and wetbulb temperatures at that time.

ELECTRICAL ENERGY

is the monthly electrical consumption for lights, convenience outlets and non-HVAC equipment.

MAXIMUM ELEC LOAD

is the monthly peak electrical consumption in a one-hour period for lights, convenience outlets, and miscellaneous equipment input as SOURCE.

TOTAL

is the annual total for the cooling load, heating load and electrical load of the building.

MAX

is the highest monthly peak cooling load, heating load and electrical load.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- LS-D Building Monthly Loads Summary                                                      WEATHER FILE- TRY  CHICAGO
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	- - - - - - - - C O O L I N G - - - - - - - -						- - - - - - - - H E A T I N G - - - - - - - -						- - - E L E C - - -	
MONTH	COOLING ENERGY (MBTU)	TIME OF MAX DY	TIME OF MAX HR	DRY-BULB TEMP	WET-BULB TEMP	MAXIMUM COOLING LOAD (KBTU/HR)	HEATING ENERGY (MBTU)	TIME OF MAX DY	TIME OF MAX HR	DRY-BULB TEMP	WET-BULB TEMP	MAXIMUM HEATING LOAD (KBTU/HR)	ELEC-TRICAL ENERGY (KWH)	MAXIMUM ELEC LOAD (KW)
JAN	5.38947	31	15	30.F	25.F	45.418	-10.065	12	3	1.F	0.F	-37.352	3027.	12.000
FEB	4.90776	28	15	52.F	42.F	44.295	-9.185	4	6	7.F	6.F	-36.168	2654.	12.000
MAR	6.74509	3	16	79.F	62.F	52.219	-6.658	24	6	8.F	7.F	-38.381	2936.	12.000
APR	12.32965	2	15	69.F	53.F	57.821	-2.017	8	6	32.F	29.F	-16.160	2994.	12.000
MAY	14.45126	20	14	76.F	67.F	63.784	-0.757	9	5	40.F	38.F	-10.506	2936.	12.000
JUN	18.19720	20	15	90.F	77.F	69.729	-0.075	23	5	52.F	48.F	-4.085	2903.	12.000
JUL	22.84128	9	15	94.F	74.F	73.656	0.000	0	0	0.F	0.F	0.000	3027.	12.000
AUG	20.40500	19	16	90.F	71.F	72.721	-0.001	5	5	55.F	54.F	-0.557	2936.	12.000
SEP	16.13781	17	15	82.F	66.F	70.483	-0.371	22	6	35.F	31.F	-10.162	2903.	12.000
OCT	12.67929	10	15	68.F	54.F	65.100	-1.562	21	6	30.F	29.F	-13.971	3027.	12.000
NOV	6.27171	7	15	55.F	46.F	58.931	-5.518	28	7	26.F	24.F	-23.169	2629.	12.000
DEC	5.11098	10	15	41.F	35.F	47.798	-9.108	22	8	15.F	15.F	-30.361	3027.	12.000
	---------					----------	---------					----------	--------	-------
TOTAL	145.467						-45.318						34996.	
MAX						73.656						-38.381		12.000

LS-E Space Monthly Load Components <space name>

This report gives a breakdown of loads for each space on a monthly basis, according to the source of the load. All entries are in MBtu/month or MWh/month. Each load is broken down into three types: heating (HEATNG), sensible cooling (SEN CL) and latent cooling (LAT CL). Latent cooling loads are accumulated only for those hours in each month that have a net sensible cooling load. Positive entries correspond to heat gain, negative entries correspond to heat loss, and all sensible loads are calculated as delayed in time with weighting factors.

The load sources, listed across the top of the report, are described below. The corresponding headings from Report LS-B are given in brackets.

WALLS

is the heat conduction through exterior walls with TILT greater than 45o, plus conduction through doors located in exterior walls. [WALLS plus DOOR]

ROOFS

is the heat conduction through exterior walls with TILT less than 45o. [ROOFS]

INT SUR

is the heat conduction through interior walls. This entry will be non-zero only if there are one or more adjoining spaces with a loads calculation temperature that is different from that of the space being reported. [INTERNAL SURFACES]

UND SUR

is the heat conduction through underground surfaces. [UNDERGROUND SURFACES]

INFIL

is the load due to air infiltration. [INFILTRATION]

WIN CON

is the sum of the UADT load through the windows (glass plus frames) plus solar energy absorbed by the glass and frames and conducted into the space. [WINDOW CONDUCTION]

WIN SOL

is the load from direct and diffuse solar radiation transmitted by the window glass. [WINDOW SOLAR]

OCCUP

is the heat gain from occupants. [OCCUPANTS TO SPACE]

LIGHTS

is the heat gain from lights. [LIGHT TO SPACE]

EQUIP

is the load resulting from equipment. These values are calculated from user-supplied entries for EQUIP-SCHEDULE, EQUIPMENT-KW, EQUIPMENT-W/SQFT (AREA??), EQUIP-SENSIBLE and EQUIP-LATENT. [EQUIPMENT TO SPACE]

SOURCE

is the load resulting from internal heating loads other than people, lights, or equipment. These values are calculated from the user-supplied entries for SOURCE-SCHEDULE, SOURCE-TYPE, SOURCE-BTU/HR, SOURCE-SENSIBLE, and SOURCE-LATENT. [PROCESS TO SPACE]

The LS-E Report is printed once for the combined DESIGN-DAY intervals (if one or more DESIGN-DAYs are specified) and once for the combined RUN-PERIOD intervals that use the weather file.

To illustrate how the entries in this report are accumulated, consider a sequence of four hours in January in which the load components from conduction through walls and heat from lights are as follows (the other load components are assumed to be zero):

	Walls	**Lights**
hour 1:	-0.01	0.03
hour 2:	-0.02	0.03
hour 3:	-0.04	0.03
hour 4:	-0.05	0.03

In hours 1 and 2 the net loads are (-0.01 + 0.03) = 0.02, and (-0.02 + 0.03) = 0.01, respectively. Thus, both these hours have a net (sensible) cooling load. In hours 3 and 4, on the other hand, the net loads are (-0.04 + 0.03) = -0.01 and (-0.05 + 0.03) = -0.02, respectively. Thus, these hours have a net heating load. The entries in the LS-E Report for January would then be (assuming all other hours have zero loads):

		WALLS	**LIGHTS**	**TOTAL**
	HEATNG	-0.09	0.06	-0.03 (from hours 3 and 4)
JAN	SEN CL	-0.03	0.06	0.03 (from hours 1 and 2)
	LAT CL	0.	0.	0.

Simple Structure Run 3, Chicago Divide into zones; add plenum DOE-2.2b-027 Fri Jan 9 15:25:08 1998BDL RUN
Design-day sizing of VAV system Show All Reports
REPORT- LS-E Space Monthly Load Components SPACE1-1 WEATHER FILE- TRY CHICAGO

(UNITS=MBTU)		WALLS	ROOFS	INT SUR	UND SUR	INFIL	WIN CON	WIN SOL	OCCUP	LIGHTS	EQUIP	SOURCE	TOTAL
	HEATNG	-0.810	0.000	0.000	-0.996	-0.395	-2.914	1.028	0.228	0.458	0.357	0.000	-3.045
JAN	SEN CL	-0.153	0.000	0.000	-0.354	-0.155	-0.737	1.362	0.291	0.528	0.357	0.000	1.138
	LAT CL					0.000			0.199		0.000	0.000	0.199
	HEATNG	-0.682	0.000	0.000	-0.965	-0.504	-2.556	1.035	0.193	0.392	0.316	0.000	-2.770
FEB	SEN CL	-0.122	0.000	0.000	-0.375	-0.163	-0.632	1.461	0.258	0.469	0.319	0.000	1.216
	LAT CL					0.000			0.176		0.000	0.000	0.176
	HEATNG	-0.511	0.000	0.000	-0.928	-0.417	-1.971	1.062	0.120	0.273	0.262	0.000	-2.110
MAR	SEN CL	-0.128	0.000	0.000	-0.467	-0.206	-0.657	1.565	0.379	0.680	0.441	0.000	1.608
	LAT CL					0.006			0.260		0.000	0.000	0.265
	HEATNG	-0.223	0.000	0.000	-0.427	0.000	-0.856	0.569	0.055	0.128	0.114	0.000	-0.640
APR	SEN CL	-0.056	0.000	0.000	-0.706	0.000	-0.483	2.453	0.468	0.858	0.585	0.000	3.119
	LAT CL					0.000			0.303		0.000	0.000	0.303
	HEATNG	-0.131	0.000	0.000	-0.240	0.000	-0.502	0.411	0.027	0.077	0.087	0.000	-0.271
MAY	SEN CL	-0.014	0.000	0.000	-0.616	0.000	-0.376	2.517	0.474	0.878	0.617	0.000	3.480
	LAT CL					0.000			0.292		0.000	0.000	0.292
	HEATNG	-0.024	0.000	0.000	-0.037	0.000	-0.090	0.090	0.005	0.016	0.015	0.000	-0.026
JUN	SEN CL	0.124	0.000	0.000	-0.487	0.000	0.123	2.851	0.492	0.928	0.673	0.000	4.705
	LAT CL					0.000			0.292		0.000	0.000	0.292
	HEATNG	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
JUL	SEN CL	0.348	0.000	0.000	-0.271	0.000	0.823	3.174	0.522	0.990	0.714	0.000	6.302
	LAT CL					0.000			0.306		0.000	0.000	0.306
	HEATNG	-0.001	0.000	0.000	0.000	0.000	-0.003	0.003	0.000	0.001	0.000	0.000	0.000
AUG	SEN CL	0.260	0.000	0.000	-0.180	0.000	0.506	3.180	0.501	0.955	0.704	0.000	5.925
	LAT CL					0.000			0.292		0.000	0.000	0.292
	HEATNG	-0.052	0.000	0.000	-0.028	0.000	-0.197	0.123	0.008	0.026	0.027	0.000	-0.095
SEP	SEN CL	0.052	0.000	0.000	-0.233	0.000	-0.216	3.399	0.489	0.918	0.660	0.000	5.070
	LAT CL					0.000			0.292		0.000	0.000	0.292
	HEATNG	-0.168	0.000	0.000	-0.141	0.000	-0.625	0.369	0.027	0.078	0.084	0.000	-0.377
OCT	SEN CL	-0.063	0.000	0.000	-0.353	0.000	-0.554	2.872	0.496	0.912	0.630	0.000	3.939
	LAT CL					0.000			0.306		0.000	0.000	0.306
	HEATNG	-0.438	0.000	0.000	-0.464	-0.314	-1.650	0.669	0.100	0.230	0.227	0.000	-1.640
NOV	SEN CL	-0.126	0.000	0.000	-0.319	-0.169	-0.684	1.652	0.331	0.606	0.429	0.000	1.720
	LAT CL					0.003			0.226		0.000	0.000	0.229
	HEATNG	-0.716	0.000	0.000	-0.853	-0.472	-2.648	0.634	0.201	0.418	0.350	0.000	-3.087
DEC	SEN CL	-0.150	0.000	0.000	-0.271	-0.140	-0.674	0.876	0.319	0.569	0.363	0.000	0.893
	LAT CL					0.000			0.221		0.000	0.000	0.221
	HEATNG	-3.756	0.000	0.000	-5.080	-2.102	-14.013	5.990	0.965	2.096	1.839	0.000	-4.060
TOT	SEN CL	-0.026	0.000	0.000	-4.632	-0.834	-3.560	27.361	5.020	9.292	6.493	0.000	9.114
	LAT CL					0.009			3.164		0.000	0.000	3.173

LS-F Building Monthly Load Components

This report gives a breakdown of loads on a monthly basis for the entire building, according to the source of the load. The loads in unconditioned spaces (ZONE-TYPE = UNCONDITIONED or PLENUM) are not included; all entries are in millions of Btu/month.

Like Report LS-E, three types of loads are shown: heating (HEATNG), sensible cooling (SEN CL), and latent cooling (LAT CL). The reported sources of the load (WALLS, ROOFS, etc.) are defined in the LS-E report description.

For multizone buildings, the load components are obtained by summing the corresponding load components for each conditioned space after multiplication by the space MULTIPLIER or FLOOR-MULTIPLIER. For example, consider a building with two spaces, Z-1 and Z-2, with space MULTIPLIERs of 2 and 3, respectively. If the heating load components in January due to glass conduction are -5.90 MBtu for Z-1 and -2.30 MBtu for Z-2, then the corresponding building load component is 2 x (-5.90) + 3 x (-2.30) = -18.70 MBtu.The total monthly heating and sensible cooling loads in the last column of this report are the same as those given in Report LS-D, Building Monthly Loads Summary, under the headings HEATING ENERGY and COOLING ENERGY.

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Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN
Design-day sizing of VAV system        Show All Reports
REPORT- LS-F Building Monthly Load Components in   MBTU                                      WEATHER FILE- TRY  CHICAGO
```

(UNITS=MBTU)		WALLS	ROOFS	INT SUR	UND SUR	INFIL	WIN CON	WIN SOL	OCCUP	LIGHTS	EQUIP	SOURCE	TOTAL
	HEATNG	-2.799	0.000	0.000	-3.225	-1.462	-8.167	1.914	0.793	1.600	1.280	0.000	-10.065
JAN	SEN CL	-0.440	0.000	0.000	-0.839	-1.145	-1.535	1.993	1.796	3.279	2.282	0.000	5.389
	LAT CL					0.000			1.059		0.000	0.000	1.059
	HEATNG	-2.339	0.000	0.000	-3.142	-1.932	-7.154	2.157	0.667	1.391	1.168	0.000	-9.185
FEB	SEN CL	-0.374	0.000	0.000	-0.894	-1.224	-1.363	2.308	1.581	2.869	2.006	0.000	4.908
	LAT CL					0.000			0.943		0.000	0.000	0.943
	HEATNG	-1.668	0.000	0.000	-2.911	-1.566	-5.276	2.515	0.392	0.928	0.928	0.000	-6.658
MAR	SEN CL	-0.453	0.000	0.000	-1.290	-1.383	-1.684	3.096	2.093	3.783	2.584	0.000	6.745
	LAT CL					0.032			1.274		0.000	0.000	1.306
	HEATNG	-0.730	0.000	0.000	-1.419	0.000	-2.334	1.517	0.174	0.406	0.368	0.000	-2.017
APR	SEN CL	-0.223	0.000	0.000	-1.992	0.000	-1.238	5.759	2.429	4.471	3.123	0.000	12.330
	LAT CL					0.000			1.439		0.000	0.000	1.439
	HEATNG	-0.394	0.000	0.000	-0.697	0.000	-1.271	1.064	0.078	0.218	0.246	0.000	-0.757
MAY	SEN CL	-0.071	0.000	0.000	-1.880	0.000	-1.002	7.210	2.417	4.509	3.269	0.000	14.451
	LAT CL					0.000			1.379		0.000	0.000	1.379
	HEATNG	-0.069	0.000	0.000	-0.102	0.000	-0.226	0.224	0.014	0.044	0.040	0.000	-0.075
JUN	SEN CL	0.397	0.000	0.000	-1.475	0.000	0.348	8.448	2.460	4.626	3.392	0.000	18.197
	LAT CL					0.000			1.380		0.000	0.000	1.380
	HEATNG	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
JUL	SEN CL	1.084	0.000	0.000	-0.816	0.000	2.142	9.365	2.602	4.898	3.566	0.000	22.841
	LAT CL					0.000			1.446		0.000	0.000	1.446
	HEATNG	-0.003	0.000	0.000	-0.002	0.000	-0.010	0.009	0.001	0.002	0.002	0.000	-0.001
AUG	SEN CL	0.743	0.000	0.000	-0.541	0.000	1.216	8.254	2.495	4.725	3.514	0.000	20.405
	LAT CL					0.000			1.380		0.000	0.000	1.380
	HEATNG	-0.219	0.000	0.000	-0.126	0.000	-0.694	0.390	0.039	0.118	0.121	0.000	-0.371
SEP	SEN CL	0.038	0.000	0.000	-0.660	0.000	-0.631	7.096	2.433	4.550	3.311	0.000	16.138
	LAT CL					0.000			1.380		0.000	0.000	1.380
	HEATNG	-0.663	0.000	0.000	-0.575	0.000	-2.035	0.905	0.125	0.330	0.350	0.000	-1.562
OCT	SEN CL	-0.296	0.000	0.000	-0.913	0.000	-1.349	4.979	2.476	4.567	3.215	0.000	12.679
	LAT CL					0.000			1.444		0.000	0.000	1.444
	HEATNG	-1.506	0.000	0.000	-1.556	-1.159	-4.603	1.399	0.316	0.767	0.822	0.000	-5.518
NOV	SEN CL	-0.445	0.000	0.000	-0.801	-1.129	-1.651	2.648	1.826	3.369	2.454	0.000	6.272
	LAT CL					0.019			1.107		0.000	0.000	1.126
	HEATNG	-2.319	0.000	0.000	-2.632	-1.612	-6.999	1.292	0.656	1.371	1.135	0.000	-9.108
DEC	SEN CL	-0.507	0.000	0.000	-0.751	-1.287	-1.673	1.461	1.934	3.508	2.427	0.000	5.111
	LAT CL					0.000			1.160		0.000	0.000	1.160
	HEATNG	-12.887	0.000	0.000	-16.491	-8.028	-39.333	13.566	3.256	7.176	6.461	0.000	-6.280
TOT	SEN CL	-0.488	0.000	0.000	-12.892	-6.169	-8.286	62.964	26.834	49.616	35.526	0.000	147.104
	LAT CL					0.051			15.556		0.000	0.000	15.607

LS-G Space Daylighting Summary <space name>

This report gives monthly-average lighting energy reduction, illuminance, and glare for each daylit space. If only one lighting reference point is specified, the entries under REF PT 2 will be zero. Task lighting energy, as determined by TASK-LIGHTING-KW or TASK-LT-W/AREA, is not considered.

PERCENT LIGHTING ENERGY REDUCTION BY DAYLIGHTING (ALL HOURS)

gives the percentage by which electric lighting energy is reduced, due to daylighting, for the entire space (TOTAL ZONE), and for the lighting zones at each lighting reference point (REF PT 1 and REF PT 2). In this section of the report, all hours of the day are taken into account, including nighttime hours when the lighting energy reduction due to daylighting is zero.

PERCENT LIGHTING ENERGY REDUCTION BY DAYLIGHTING (REPORT SCHEDULE HOURS)

gives the percentage by which electric lighting energy is reduced, due to daylighting, for the entire space (TOTAL ZONE), and for the lighting zones at each lighting reference point (REF PT 1 and REF PT 2). In this section of the report, only those hours are taken into account for which the value of DAYLIGHT-REP-SCH for this space is non-zero (the default). If DAYLIGHT-REP-SCH is not defined the entries will be the same as those in Part 1 above.

In the following four sections, only those hours are taken into account for which the sun is up and the value of DAYLIGHT-REP-SCH is non-zero (the default).

AVERAGE DAYLIGHT ILLUMINANCE

gives the average illuminance due to daylight at each lighting reference point.

PERCENT HOURS DAYLIGHT ILLUMINANCE ABOVE SETPOINT

gives the percentage of hours that the illuminance from daylight exceeds the required illuminance level as specified by LIGHT-SET-POINT1 at REF PT 1 and LIGHT-SET-POINT2 at REF PT 2. (See Report LS-J for the frequency of occurrence distribution for daylight illuminance.)

AVERAGE GLARE INDEX

gives the average daylight glare index at each lighting reference point (REF PT 1 and REF PT 2).

PERCENT HOURS GLARE TOO HIGH

gives the percentage of hours at each lighting reference point that the daylight glare index exceeds the MAX-GLARE value (or a value of 22, the maximum recommended for general office work, if MAX-GLARE has not been specified).

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DAYLIGHTING EXAMPLE                     FLOOR OF OFFICE BUILDING IN CHICAGO     DOE-2.2b-027  Fri Jan 30 14:26:19 1998BDL RUN
30-FT DEEP PERIM OFFS DAYLIT TO 15 FT   AUTO SHADE MANAGEMENT FOR SUN CONTROL
REPORT- LS-G Space Daylighting Summary      SOUTHZONE                                    WEATHER FILE- TRY  CHICAGO
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SPACE SOUTHZONE

	PERCENT LIGHTING ENERGY REDUCTION BY DAYLIGHTING (ALL HOURS)			PERCENT LIGHTING ENERGY REDUCTION BY DAYLIGHTING (REPORT SCHEDULE HOURS)			REPORT SCHEDULE HOURS WITH SUN UP: AVERAGE DAYLIGHT ILLUMINANCE (FOOTCANDLES)		PERCENT HOURS DAYLIGHT ILLUMINANCE ABOVE SETPOINT		AVERAGE GLARE INDEX		PERCENT HOURS GLARE TOO HIGH	
MONTH	TOTAL ZONE	REF PT 1	REF PT 2	TOTAL ZONE	REF PT 1	REF PT 2	REF PT 1	REF PT 2	REF PT 1	REF PT 2	REF PT 1	REF PT 2	REF PT 1	REF PT 2
JAN	16.2	32.4	0.0	21.0	42.0	0.0	71.5	0.0	33.0	0.0	6.0	0.0	0.0	0.0
FEB	21.7	43.4	0.0	27.8	55.6	0.0	77.0	0.0	39.3	0.0	7.1	0.0	0.0	0.0
MAR	25.1	50.3	0.0	31.5	63.1	0.0	76.3	0.0	52.7	0.0	7.8	0.0	0.0	0.0
APR	27.6	55.3	0.0	33.7	67.3	0.0	95.6	0.0	73.3	0.0	9.1	0.0	0.0	0.0
MAY	29.0	57.9	0.0	34.4	68.8	0.0	92.6	0.0	83.5	0.0	9.1	0.0	0.0	0.0
JUN	29.9	59.8	0.0	34.8	69.7	0.0	96.1	0.0	87.4	0.0	9.5	0.0	0.0	0.0
JUL	30.0	60.1	0.0	34.7	69.4	0.0	103.5	0.0	93.2	0.0	9.8	0.0	0.0	0.0
AUG	29.2	58.3	0.0	34.5	68.9	0.0	105.6	0.0	87.1	0.0	9.8	0.0	0.0	0.0
SEP	28.0	56.0	0.0	33.9	67.8	0.0	122.3	0.0	80.0	0.0	10.0	0.0	0.0	0.0
OCT	24.4	48.8	0.0	30.8	61.7	0.0	107.1	0.0	59.5	0.0	8.8	0.0	0.0	0.0
NOV	17.0	33.9	0.0	21.7	43.4	0.0	79.3	0.0	37.0	0.0	6.6	0.0	0.0	0.0
DEC	14.4	28.8	0.0	18.6	37.1	0.0	47.7	0.0	21.5	0.0	5.0	0.0	0.0	0.0
ANNUAL	24.5	48.9	0.0	29.9	59.7	0.0	89.6	0.0	62.4	0.0	8.2	0.0	0.0	0.0

LS-H Energy Reduction By Daylight <space name>

For each daylit space this report gives the monthly lighting energy reduction due to daylighting for each hour of the day, and for all hours of the day combined (including nighttime hours). HOUR OF DAY is given in standard time, even if DAYLIGHT-SAVINGS = YES. Hour 1 is 12 midnight to 1 am, hour 2 is 1 am to 2 am, etc. The schedule DAYLIGHT-REP-SCH has no effect on this report. Task lighting energy, as determined by TASK-LIGHTING-KW or TASK-LT-W/AREA, is not considered. The daylighting report schedule has no affect on this report.

See Report LS-I for lighting energy reduction vs. hour of day for the entire building.

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DAYLIGHTING EXAMPLE                    FLOOR OF OFFICE BUILDING IN CHICAGO     DOE-2.2b-027  Fri Jan 30 14:26:19 1998BDL RUN  1
30-FT DEEP PERIM OFFS DAYLIT TO 15 FT   AUTO SHADE MANAGEMENT FOR SUN CONTROL
REPORT- LS-H Energy Reduction By Daylight   SOUTHZONE                                    WEATHER FILE- TRY  CHICAGO
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SPACE SOUTHZONE

HOUR OF DAY

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	ALL HOURS
JAN	0	0	0	0	0	0	0	1	14	21	26	28	29	27	24	20	2	0	0	0	0	0	0	0	16
FEB	0	0	0	0	0	0	0	10	25	29	32	33	33	32	29	24	14	0	0	0	0	0	0	0	22
MAR	0	0	0	0	0	0	4	22	29	32	34	35	35	34	33	29	23	4	0	0	0	0	0	0	25
APR	0	0	0	0	0	2	18	29	34	35	35	35	35	35	35	33	27	12	0	0	0	0	0	0	28
MAY	0	0	0	0	0	10	26	31	34	35	35	35	35	35	35	34	28	18	3	0	0	0	0	0	29
JUN	0	0	0	0	1	13	25	34	35	35	35	35	35	35	35	35	30	24	9	0	0	0	0	0	30
JUL	0	0	0	0	0	10	29	33	35	35	35	35	35	35	35	35	33	26	9	0	0	0	0	0	30
AUG	0	0	0	0	0	3	23	32	34	35	35	35	35	35	35	34	31	20	2	0	0	0	0	0	29
SEP	0	0	0	0	0	0	17	31	33	35	35	35	35	35	35	32	28	5	0	0	0	0	0	0	28
OCT	0	0	0	0	0	0	5	27	30	33	34	35	34	33	30	27	7	0	0	0	0	0	0	0	24
NOV	0	0	0	0	0	0	0	12	23	27	28	30	29	26	22	12	0	0	0	0	0	0	0	0	17
DEC	0	0	0	0	0	0	0	2	16	21	25	26	27	23	20	10	0	0	0	0	0	0	0	0	14
ANNUAL	0	0	0	0	0	4	16	27	29	31	32	33	33	32	31	27	16	8	2	0	0	0	0	0	24

PERCENT LIGHTING ENERGY REDUCTION BY DAYLIGHT

NOTE- THE ENTRIES IN THIS REPORT ARE NOT
SUBJECT TO THE DAYLIGHTING REPORT SCHEDULE

LS-I Energy Reduction By Daylight BUILDING

For the building as a whole this report gives the monthly lighting energy reduction due to daylighting for each hour of the day and for all hours of the day combined (including nighttime hours). HOUR OF DAY is given in standard time, even if DAYLIGHT-SAVINGS = YES. Hour 1 is 12 pm to 1 am, hour 2 is 1 am to 2 am, etc. All spaces in the building are included in this report, even those that are not daylit (i.e., have DAYLIGHTING = NO). This report is not affected by DAYLIGHT-REP-SCH. Task lighting energy, as determined by TASK-LIGHTING-KW or TASK-LT-W/AREA, is not considered. The daylighting report schedule has no affect on this report.

See Report LS-H for lighting energy reduction vs. hour of day for individual daylit spaces.

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DAYLIGHTING EXAMPLE                       FLOOR OF OFFICE BUILDING IN CHICAGO     DOE-2.2b-027  Fri Jan 30 14:26:19 1998BDL RUN  1
30-FT DEEP PERIM OFFS DAYLIT TO 15 FT   AUTO SHADE MANAGEMENT FOR SUN CONTROL
REPORT- LS-I Energy Reduction By Daylight   Building                                        WEATHER FILE- TRY  CHICAGO
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*** BUILDING ***

HOUR OF DAY

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	ALL HOURS
JAN	0	0	0	0	0	0	0	0	6	9	11	12	12	12	10	7	1	0	0	0	0	0	0	0	7
FEB	0	0	0	0	0	0	0	4	10	11	14	14	15	14	12	10	6	0	0	0	0	0	0	0	9
MAR	0	0	0	0	0	0	2	9	12	14	15	16	16	15	15	12	9	2	0	0	0	0	0	0	11
APR	0	0	0	0	0	1	8	13	15	16	16	16	16	16	15	14	11	6	0	0	0	0	0	0	12
MAY	0	0	0	0	0	6	12	14	16	16	16	16	16	16	16	15	12	9	2	0	0	0	0	0	13
JUN	0	0	0	0	0	8	12	15	16	16	16	16	16	16	16	16	14	12	6	0	0	0	0	0	14
JUL	0	0	0	0	0	7	13	15	16	16	16	16	16	16	16	15	15	13	6	0	0	0	0	0	14
AUG	0	0	0	0	0	2	11	14	15	16	16	16	16	16	16	15	14	10	1	0	0	0	0	0	13
SEP	0	0	0	0	0	0	8	12	13	15	16	16	16	15	15	13	11	3	0	0	0	0	0	0	12
OCT	0	0	0	0	0	0	3	10	11	13	14	14	14	14	12	10	3	0	0	0	0	0	0	0	10
NOV	0	0	0	0	0	0	0	5	9	11	12	13	13	11	9	5	0	0	0	0	0	0	0	0	7
DEC	0	0	0	0	0	0	0	1	6	9	11	11	12	10	8	4	0	0	0	0	0	0	0	0	6
ANNUAL	0	0	0	0	0	3	8	11	12	14	14	15	15	14	13	11	7	4	1	0	0	0	0	0	11

PERCENT LIGHTING ENERGY REDUCTION BY DAYLIGHT

NOTE- THE ENTRIES IN THIS REPORT ARE NOT
SUBJECT TO THE DAYLIGHTING REPORT SCHEDULE

LS-J Daylight Illuminance Frequency <space name>

For each daylit space this report gives the monthly daylight-illuminance frequency-of-occurrence distribution at each lighting reference point. If only one lighting reference point is specified, entries under REF-PT-2 will be zero. Note that the hours considered for this report are those with the sun up and the daylighting report schedule "on."

PERCENT OF HOURS IN ILLUMINANCE RANGE

gives the percentage of hours (with sun up and DAYLIGHT-REP-SCH value non-zero) that the daylight illuminance falls in the indicated range: 0-10, 10-20, ..., 70-80, and greater than 80 footcandles (or, for metric output, 0-100, 100-200, ..., 700-800, and greater than 800 lux). Note: because of roundoff, the sum of these percentages for any given month may not be exactly 100.

PERCENT OF HOURS ILLUMINANCE LEVEL EXCEEDED

gives the percentage of hours (with sun up and DAYLIGHT-REP-SCH value non-zero) that the daylight illuminance is higher than the indicated illuminance level.

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DAYLIGHTING EXAMPLE                     FLOOR OF OFFICE BUILDING IN CHICAGO     DOE-2.2b-027  Fri Jan 30 14:26:19 1998BDL RUN  1
30-FT DEEP PERIM OFFS DAYLIT TO 15 FT   AUTO SHADE MANAGEMENT FOR SUN CONTROL
REPORT- LS-J Daylight Illuminance Frequency SOUTHZONE                                      WEATHER FILE- TRY  CHICAGO
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 SPACE  SOUTHZONE
PERCENT OF HOURS IN ILLUMINANCE RANGE                  PERCENT OF HOURS ILLUMINANCE LEVEL EXCEEDED
                        ------------------------------------       -------------------------------------------
ILLUMINANCE RANGE (FOOTCANDLES)                            ILLUMINANCE LEVEL (FOOTCANDLES)
        REF
 MONTH   PT   0 -- 10 -- 20 -- 30 -- 40 -- 50 -- 60 -- 70 -- 80 -ABOVE       0     10     20     30     40     50     60     70     80

 JAN    -1-     15     21     24      6      1      4      1      2     27       100     85     64     40     34     33     29     28     27
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 FEB    -1-      4     10     20     21      6      5      2      2     31       100     96     86     66     45     39     35     32     31
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 MAR    -1-      0      4     15     14     13      4      5      7     36       100    100     96     80     66     53     48     43     36
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 APR    -1-      0      0      6     10     10      4      3      6     61       100    100    100     94     83     73     70     67     61
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 MAY    -1-      0      0      2      8      6      5      6     12     60       100    100    100     97     90     84     78     72     60
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 JUN    -1-      0      0      0      3     10      4      8      4     71       100    100    100    100     97     87     83     76     71
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 JUL    -1-      0      0      0      2      4      5      8      7     73       100    100    100     99     97     93     88     80     73
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 AUG    -1-      0      0      3      5      6      5      6      9     67       100    100    100     97     93     87     82     77     67
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 SEP    -1-      0      1      7      6      6      1      4      7     68       100    100     99     92     86     80     79     75     68
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 OCT    -1-      3      6     12     11      9      1      3      3     53       100     97     91     79     68     59     59     56     53
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 NOV    -1-     17     13     23     10      0      1      3      2     31       100     83     70     48     37     37     36     33     31
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 DEC    -1-     21     28     28      2      0      1      2      1     18       100     79     51     23     22     22     20     18     18
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0
              --------------------------------------------------------     --------------------------------------------------

 ANNUAL -1-      5      7     12      8      6      3      4      5     50       100     95     88     76     68     62     59     55     50
        -2-      0      0      0      0      0      0      0      0      0         0      0      0      0      0      0      0      0      0

 NOTE- THE HOURS CONSIDERED IN THIS REPORT ARE THOSE
       WITH SUN UP AND DAYLIGHTING REPORT SCHEDULE ON
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LS-K Space Input Fuels Summary <space name>

This report gives monthly summaries of the fuel inputs required by each space for lighting, equipment and processes. Following the reports for each space is a separate building level report that gives the sum of the input fuels for the building as a whole.

Lighting, equipment and process are the three major sections of this report, which is printed once for each space and once for the building as a whole.

TASK LIGHTING

is the electricity used by the space for all task lighting.

TOTAL LIGHTING

is the electricity used by the space for all lighting including task and overhead.

GENERAL EQUIPMENT

is the electricity used by the space for running all equipment (i.e., computers, copy machines, etc.). For the building report, this includes building equipment such as elevators which may not be included in any space.

PROCESS ELECTRIC

is all electricity used to maintain any of the processes in the space.

PROCESS GAS

is all gas used to maintain any of the processes in the space.

PROCESS HOT WATER

is the total hot water used in all processes in the space.

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Simple Structure Run 3, Chicago         Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- LS-K Space Input Fuels Summary      SPACE1-1                                            WEATHER FILE- TRY  CHICAGO
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SPACE SPACE1-1

MONTH	TASK LIGHTING (KWH)	TOTAL LIGHTING (KWH)	GENERAL EQUIPMENT (KWH)	PROCESS ELECTRIC (KWH)	PROCESS GAS (MBTU)	PROCESS HOT WATER (MBTU)
	- - - - L I G H T I N G - - - -		E Q U I P M E N T	- - - - - - - - - - P R O C E S S	- - - - - - - - -	
JAN	0.00	402.18	237.05	0.00	0.0000	0.0000
FEB	0.00	349.67	210.95	0.00	0.0000	0.0000
MAR	0.00	386.57	233.42	0.00	0.0000	0.0000
APR	0.00	400.28	231.98	0.00	0.0000	0.0000
MAY	0.00	386.57	233.42	0.00	0.0000	0.0000
JUN	0.00	384.67	228.35	0.00	0.0000	0.0000
JUL	0.00	402.18	237.05	0.00	0.0000	0.0000
AUG	0.00	386.57	233.42	0.00	0.0000	0.0000
SEP	0.00	384.67	228.35	0.00	0.0000	0.0000
OCT	0.00	402.18	237.05	0.00	0.0000	0.0000
NOV	0.00	337.87	217.45	0.00	0.0000	0.0000
DEC	0.00	402.18	237.05	0.00	0.0000	0.0000
ANNUAL	0.00	4625.43	2765.53	0.00	0.0000	0.0000

LS-L Management and Solar Summary <space name>

This report gives monthly summaries of window shade management and solar radiation into the space.

Column 1 is the count of the number of hours that window shade management would be employed in the space for each month. Management is employed under any of the following conditions:

- The shading schedule for an exterior window specifies management.
- If the transmitted direct solar gain through an exterior window exceeds a pre-specified value, MAX-SOLAR-SCH, then shades will be in effect with a probability of SUN-CTRL-PROB.
- If daylighting is requested (DAYLIGHTING=YES) and the daylight glare exceeds a pre-specified value MAX-GLARE, then the shades will be in effect.

Column 2 is the average solar radiation into the space through all glazing areas in Btu or Wh per day.

Column 3 is the maximum solar radiation into the space through all glazing areas for all hours in the month. The unit of measure is Btu/hr or W.

Note that the entries in this report are solar heat gains, not solar loads; i.e., weighting factors to convert heat gains into delayed loads have not been applied. The solar heat gain is due to solar radiation transmitted through windows plus solar radiation absorbed by the windows and re-conducted into the space.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- LS-L Management and Solar Summary   SPACE1-1                                         WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------

 DATA FOR SPACE    SPACE1-1

        NUMBER OF HOURS   AVERAGE DAILY      MAXIMUM HOURLY
          MANAGEMENT      SOLAR RADIATION   SOLAR RADIATION
           WOULD BE         INTO SPACE        INTO SPACE
 MONTH     EMPLOYED          (BTU/DAY )        (BTU/HR  )


 JAN              0.        92725.312         45517.965

 FEB              0.       107067.641         44765.695

 MAR              0.       101555.164         41114.320

 APR              0.       121276.719         32348.395

 MAY              0.       113858.781         24972.248

 JUN              0.       118545.953         19746.131

 JUL              0.       123403.203         22385.572

 AUG              0.       124248.797         28500.076

 SEP              0.       141774.109         36847.043

 OCT              0.       124876.234         41848.086

 NOV              0.        92896.164         43870.461

 DEC              0.        58697.254         43582.469
             --------     ------------     -------------

 ANNUAL           0.       110008.266         45517.965
```

LS-M Daylight Illuminance Ref Pnt <1 or 2> <space name>

This report provides monthly summaries of average footcandles of daylight illuminence, by month and solar time hour of the day, at the daylighting reference point within the space. This report will only be produced for each SPACE that has DAYLIGHTING=YES specified and only for defined daylighting reference points (either point 1, or both point 1 and point 2.)

Project 3 DOE-2.2-44d5 9/20/2006 17:06:43 BDL RUN 1

REPORT- LS-M Daylight Illuminance Ref Pnt 1 South Perim Spc (G.S1) DESIGN DAY WEATHER FILE- CZ06RV2 WYEC2

SPACE South Perim Spc (G.S1) Average Illuminence at Reference Point 1

HOUR OF DAY

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	ALL HOURS
DEC	0	0	0	0	0	0	0	7	33	57	73	81	80	69	51	26	3	0	0	0	0	0	0	0	44
JUL	0	0	0	0	0	13	101	144	108	114	119	121	121	119	114	107	144	100	13	0	0	0	0	0	103
AUG	0	0	0	0	0	7	113	199	109	117	121	126	125	120	116	108	200	99	5	0	0	0	0	0	112
SEP	0	0	0	0	0	1	103	304	123	183	280	199	220	288	114	227	248	35	0	0	0	0	0	0	174
OCT	0	0	0	0	0	0	47	365	383	554	913	1189	984	685	335	422	134	2	0	0	0	0	0	0	492
NOV	0	0	0	0	0	0	12	302	589	823	1324	1856	1455	936	635	404	37	0	0	0	0	0	0	0	761
ANNUAL	0	0	0	0	0	5	77	276	249	344	532	658	555	421	244	259	165	53	6	0	0	0	0	0	296

AVERAGE FOOTCANDLES OF ILLUMINENCE BY DAYLIGHT

NOTE- The values on this report are for all hour the sun is up and are not subject to a specified daylighting report schedule

LS-P Shading Surface Summary <surface name>

This report provides monthly summaries of the fraction of maximum solar energy that actually reaches a surface, after being reduced by all shading effects. The fraction is expressed as a percentage of unshaded solar, where 100 percent means that the surface was completely unshaded, and 0 percent means that the surface was completely shaded. The calculations are made only when the sun is up.

Two entries are given for each month. The first entry is for direct solar radiation only. The second entry is for total solar radiation, and includes both the direct and diffuse components. For each hour of the day, the average fraction for the month is reported. The "Total" column to the far right reports the average fraction for the month, for all hours that the sun was up. The "Total" row at the bottom reports the average solar fraction for each hour of the year.

```
Project 2                                                                   DOE-2.2-48f   12/04/2012    15:31:04  BDL RUN  1

REPORT- LS-P Shading Surface Summary       South Wall (G.S1.E1)                        WEATHER FILE- Atlanta Hartsfield I
-----------------------------------------------------------------------------------------------------------------------------
```

PERCENT UNSHADED SOLAR BY MONTH AND TIME OF DAY

	HOUR:	1AM	2	3	4	5	6	7	8	9	10	11	12	1PM	2	3	4	5	6	7	8	9	10	11	12	TOTAL
JAN	DIRECT	0	0	0	0	0	0	0	11	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	TOTAL	0	0	0	0	0	0	0	18	24	12	13	13	12	13	12	12	11	10	35	0	0	0	0	0	13
FEB	DIRECT	0	0	0	0	0	0	0	44	22	0	0	0	0	0	0	0	0	8	28	0	0	0	0	0	2
	TOTAL	0	0	0	0	0	0	0	38	26	11	12	13	14	15	16	15	14	17	28	0	0	0	0	0	15
MAR	DIRECT	0	0	0	0	0	0	0	77	58	32	14	7	7	6	7	7	15	36	66	93	0	0	0	0	14
	TOTAL	0	0	0	0	0	0	0	47	46	35	26	22	22	21	22	22	26	38	51	43	0	0	0	0	26
APR	DIRECT	0	0	0	0	0	0	0	0	100	89	82	80	79	78	74	76	74	82	100	0	0	0	0	0	78
	TOTAL	0	0	0	0	0	0	92	34	41	56	59	62	63	61	58	59	56	54	49	36	33	0	0	0	58
MAY	DIRECT	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	0	0	0	0	0	0	100
	TOTAL	0	0	0	0	0	0	33	37	41	45	58	64	66	64	62	60	55	46	41	37	34	0	0	0	58
JUN	DIRECT	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	0	0	0	0	0	0	0	100
	TOTAL	0	0	0	0	0	0	34	38	42	45	50	59	62	63	61	57	51	44	42	38	35	0	0	0	55
JUL	DIRECT	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	0	0	0	0	0	0	100
	TOTAL	0	0	0	0	0	0	33	37	42	45	51	57	62	59	60	57	53	44	41	38	34	0	0	0	54
AUG	DIRECT	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	100	0	0	0	0	0	100
	TOTAL	0	0	0	0	0	0	34	35	39	49	60	64	63	64	64	60	60	52	40	36	34	0	0	0	59
SEP	DIRECT	0	0	0	0	0	0	0	100	100	90	84	80	77	81	80	78	83	87	100	100	0	0	0	0	82
	TOTAL	0	0	0	0	0	0	0	34	55	61	63	61	58	60	56	56	60	59	55	34	0	0	0	0	59
OCT	DIRECT	0	0	0	0	0	0	0	100	77	41	17	13	13	13	13	13	14	43	80	100	0	0	0	0	19
	TOTAL	0	0	0	0	0	0	0	61	59	40	25	23	23	23	23	23	23	41	62	52	0	0	0	0	27
NOV	DIRECT	0	0	0	0	0	0	0	33	16	0	0	0	0	0	0	0	0	17	39	0	0	0	0	0	2
	TOTAL	0	0	0	0	0	0	0	31	22	13	13	13	14	13	13	13	12	24	33	0	0	0	0	0	14
DEC	DIRECT	0	0	0	0	0	0	0	26	10	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	1
	TOTAL	0	0	0	0	0	0	0	27	16	11	12	12	12	12	12	12	10	18	0	0	0	0	0	0	12
YR	DIRECT	0	0	0	0	0	0	0	35	27	17	20	25	28	29	29	29	30	45	79	94	0	0	0	0	27
	TOTAL	0	0	0	0	0	0	33	34	33	29	31	33	34	35	35	35	36	42	47	37	34	0	0	0	34

```
**********************************************************************************
*                                                                                *
*  NOTES:  1) THE SOLAR SHADING CALCULATIONS ARE MADE ONLY WHEN THE SUN IS UP.   *
*          2) EACH ENTRY IS THE RATIO OF THE ACTUAL RADIATION TO THE RADIATION   *
*             THAT WOULD HAVE EXISTED WITHOUT SHADING, AS A PERCENT.             *
*          3) THE FIRST ENTRY IS FOR DIRECT RADIATION ONLY, EXCLUDING DIFFUSE.   *
*             THE SECOND ENTRY IS FOR THE TOTAL RADIATION, INCLUDING DIFFUSE.    *
*                                                                                *
**********************************************************************************
```

SYSTEM-REPORT

SV-A System Design Parameters for <system name>

This report echoes your input to the program for each system as interpreted by the SYSTEMS design routines. See "DESIGN-DAY Command" in the Topics Manual. The report is divided into three sections: System-Level Design Values, Fan Design Values and Zone-Level Design Values.

For systems having mixing sections (dual-duct and multizone systems) an additional section appears detailing the cold duct, hot duct, and total zonal air flows, as well as the minimum air flow ratios for these quantities.

Note: the quantities in this report have been adjusted for altitude.

```
Design-day sizing of VAV system         Show All Reports
REPORT- SV-A System Design Parameters for   SYST-1                                            WEATHER FILE- TRY  CHICAGO
-----------------------------------------------------------------------------------------------------------------------------------
                            FLOOR                 OUTSIDE    COOLING                HEATING    COOLING    HEATING  HEAT PUMP
   SYSTEM   ALTITUDE         AREA         MAX        AIR   CAPACITY   SENSIBLE   CAPACITY        EIR        EIR  SUPP-HEAT
     TYPE     FACTOR     (SQFT )      PEOPLE       RATIO  (KBTU/HR)      (SHR)  (KBTU/HR)  (BTU/BTU)  (BTU/BTU)  (KBTU/HR)

 VAVS          1.020     5000.0         52.       0.179    241.081      0.662    -50.000      0.000      0.000      0.000


                       DIVERSITY     POWER       FAN     STATIC    TOTAL     MECH                               MAX FAN    MIN FAN
      FAN   CAPACITY      FACTOR    DEMAND   DELTA-T   PRESSURE      EFF      EFF        FAN        FAN      RATIO      RATIO
     TYPE     (CFM )      (FRAC)      (KW)       (F) (IN-WATER)   (FRAC)   (FRAC)  PLACEMENT    CONTROL     (FRAC)     (FRAC)

   SUPPLY      5924.        1.00     6.817      3.63        5.5     0.55     0.72  DRAW-THRU      SPEED       1.10       0.30


                                  SUPPLY   EXHAUST              MINIMUM   OUTSIDE   COOLING            EXTRACTION   HEATING  ADDITION
       ZONE                         FLOW      FLOW        FAN      FLOW  AIR FLOW  CAPACITY  SENSIBLE        RATE  CAPACITY      RATE ZONE
       NAME                       (CFM )    (CFM )       (KW)    (FRAC)    (CFM ) (KBTU/HR)    (FRAC) (KBTU/HR) (KBTU/HR) (KBTU/HR) MULT

 ZONE1-1                           1623.        0.      0.000     0.300      224.      0.00      0.00     32.64    -87.91    -54.50   1.
 ZONE2-1                            784.        0.      0.000     0.300      102.      0.00      0.00     15.78    -42.49    -26.34   1.
 ZONE3-1                           1207.        0.      0.000     0.300      224.      0.00      0.00     24.28    -65.40    -40.55   1.
 ZONE4-1                            765.        0.      0.000     0.300      102.      0.00      0.00     15.40    -41.46    -25.71   1.
 ZONE5-1                           1545.        0.      0.000     0.300      408.      0.00      0.00     31.08    -83.72    -51.91   1.

  PLENUM-1-Z                           0.        0.      0.000     0.000        0.      0.00      0.00      0.00      0.00      0.00
1.
```

System-Level Design Values

SYSTEM TYPE

is the code-word identifying the type of system.

ALTITUDE FACTOR

is the altitude adjustment factor for air flows; it multiplies air flows at sea level to get air flows at the actual altitude of the building.

FLOOR AREA

is the total floor area of all zones served by the system that have ZONE-TYPE = CONDITIONED or UNCONDITIONED, or, for ZONE-TYPE = PLENUM, that have non-zero occupancy.

MAX PEOPLE

is the maximum number of people in all of the zones served by the system that have ZONE-TYPE = CONDITIONED or UNCONDITIONED, or, for ZONE-TYPE = PLENUM, that have non-zero occupancy. The maximum number of people in a zone is determined by the NUMBER-OF-PEOPLE or AREA/PERSON keywords in the SPACE command; any variation in occupancy resulting from PEOPLE-SCHEDULE is ignored in calculating MAX PEOPLE.

OUTSIDE AIR RATIO

is the ratio of outside air flow to supply air flow at design conditions for central systems. Its value is either the user input value of MIN-OUTSIDE-AIR or is calculated by SYSTEMS from the ventilation or exhaust input at the zone level divided by the supply fan flow (as listed in the Fan Design Values section, below) . This is a design quantity and so does not reflect values entered through the MIN-AIR-SCH keyword. For zonal systems, this value will be zero.

When OUTSIDE AIR RATIO is determined from zone ventilation rates, it is the sum of the values under OUTSIDE AIR FLOW (in the Zone-Level Design Values section, below) divided by the supply fan flow. This outside air ratio is what the program will use as the minimum outside air ratio. It is assumed that the outside air is brought in at the main system fan and is distributed to the individual zones in proportion to the supply air to each zone.

Note: The SYSTEMS design routine does not examine the values entered in schedules. Consequently, if you specify the outside air ratio through MIN-AIR-SCH but want SYSTEMS to size the equipment, you should also specify MIN-OUTSIDE-AIR.

COOLING CAPACITY

is either the value you enter for the keyword COOLING-CAPACITY at the system level or is computed by SYSTEMS from the peak (sensible plus latent) cooling load. For DX cooling coils, this value is translated to the rated temperatures (RATED-EDB, RATED-EWB, RATED-ECT). For chilled-water coils, this value is not translated to the rated-temperatures, as there are no standard set of conditions for rating cooling coils.

SENSIBLE (SHR)

is the sensible heat ratio, i.e., the fraction of the total cooling capacity that is sensible cooling capacity at the peak or design condition. This value is calculated from a simulation of the conditions at peak loads.

HEATING CAPACITY

is the maximum value for heating. It reflects either the user input or a calculation from peak loads. Like COOLING CAPACITY, this value will be zero for zonal systems, where the capacity is shown at the zone level.

COOLING EIR

is the electric input ratios for cooling. Values are taken from user input or are default values.

HEATING EIR

is the electric input ratios for heating. Values are taken from user input or are default values.

HEAT PUMP SUPP-HEAT

is the heat pump supplemental heating capacity.

Fan Design Values

This section gives the characteristics of the system supply and return fans. Given for each fan are: type, capacity, rated capacity, diversity factor (capacity*[MAX-FAN-RATIO] / [sum of zone air flows]), power demand, fan temperature rise, static pressure, supply efficiency, supply mechanical efficiency, fan placement, type of fan control, and the maximum and minimum fan ratios.

Note that the static pressure may have a value of zero. This simply means that the static pressure was not specified and was not used to calculate fan power consumption.

Zone-Level Design Values

The following quantities apply to the base zone and have not been multiplied by the number of identical zones (as given by the product of MULTIPLIER and FLOOR-MULTIPLIER).

SUPPLY FLOW

is the calculated or user-specified supply flow for each zone. Only if you have specified a value for the ASSIGNED-FLOW keyword in the ZONE-AIR command will the value here correspond to your input. The ZONE keywords AIR-CHANGES/HR and FLOW/AREA will be accepted by SYSTEMS only if they are consistent with the user-supplied HEATING-CAPACITY and COOLING-CAPACITY and are equivalent to a flow larger than that of the exhaust from or the ventilation to the zone. The ALTITUDE FACTOR will be applied.

EXHAUST FLOW

is the airflow exhausted directly from the zone via an exhaust fan.

FAN

is the total of the zone supply and exhaust fan electrical consumption at design conditions. This is zero in the example because there are no zone fans.

MINIMUM FLOW

reflects the your input for MIN-FLOW-RATIO, unless that input is in conflict with exhaust or ventilation requirements. In the absence of user input, SYSTEMS will calculate the minimum flow ratio for VAV systems from the minimum flow needed to meet the minimum ventilation requirements and the required heating capacity.

OUTSIDE AIR FLOW

reflects the user-specified outside air quantity entered at the zone level. If OUTSIDE-AIR-FLOW is specified, its value is multiplied by the ALTITUDE FACTOR and reported here. Otherwise the reported value is the maximum of the flow-equivalent values of OA-CHANGES and OA-FLOW/PER, multiplied by ALTITUDE FACTOR. For the actual amount of outside air delivered to the zone for central systems, see OUTSIDE AIR RATIO above.

COOLING CAPACITY

will be zero at the zone level for central systems. For zonal systems it will either be the value you specify for COOLING-CAPACITY or it will be calculated by SYSTEMS to meet the peak loads at the rated conditions for HP, PTAC, and FC systems or at any conditions for IU systems. This is done similarly for HEATING CAPACITY for the above-mentioned systems and for UVT and UHT systems.

SENSIBLE

is the cooling sensible heat ratio for zonal systems.

EXTRACTION RATE

is the cooling extraction rate at design conditions. This is not the value used in the simulation; that value is recalculated hourly and depends on the loads, the conditions, the thermostat type and the thermostat throttling range. ADDITION RATE (heating) is treated similarly.

HEATING CAPACITY

is the design capacity of the zonal heating equipment, if any.

ZONE MULT

is the user-specified number of identical zones (product of MULTIPLIER and FLOOR-MULTIPLIER for the zone).

For systems having mixing sections (dual-duct and multizone systems), an additional section details the cold duct, hot duct and total zonal air flows, as well as the minimum air flow ratios for these quantities.

SV-B Zone Fan Data <system name> (PIU systems only)

This report is produced whenever a Powered Induction Unit (PIU) system is specified.

U-name

The U-name of the HVAC system is given after ZONE FAN DATA (PIU).

ZONE NAME

is the zone U-name.

FAN FLOW

is the calculated (or input) capacity of the PIU box fan.

SUPPLY FLOW

is the flow rate of air delivered by the central system.

MIN FLOW RATIO

is the minimum stop position of primary air supply to the PIU box.

REHEAT-DELTA-T

is the temperature rise of the reheat coil in the PIU box.

FAN-DELTA-T

is the temperature rise due to the PIU box's fan motor.

FAN KW

is the PIU box's fan motor electrical requirement.

```
31-STORY OFFICE BLDG, CHICAGO - LOAD2    RUN 5 POWERED INDUCTION UNITS          DOE-2.1E-092  Wed Oct  8 16:17:08 1997SDL RUN  5
                                         SINGLE-ZONE UNIT IN BASEMENT
REPORT- SV-B  ZONE FAN DATA                     MAIN                     WEATHER FILE- TRY  CHICAGO
----------------------------------------------------------------------------------------------------
```

ZONE NAME	FAN FLOW (CFM)	SUPPLY FLOW (CFM)	MIN FLOW RATIO	REHEAT DELTA-T (F)	FAN DELTA-T (F)	FAN KW
RZ1	0.	10924.	0.500	50.0	0.00	0.000
TZ1	0.	8497.	0.500	50.0	0.00	0.000
PLEN1	0.	0.	0.000	0.0	0.00	0.000
PLEN2	0.	0.	0.000	0.0	0.00	0.000
RZ2	687.	859.	0.200	50.0	1.02	0.227
RZ3	547.	498.	0.200	50.0	1.02	0.181
RZ4	675.	844.	0.200	50.0	1.02	0.223
RZ5	822.	1027.	0.200	50.0	1.02	0.271
TZ2	673.	842.	0.200	50.0	1.02	0.222
TZ3	483.	439.	0.200	50.0	1.02	0.159
TZ4	659.	824.	0.200	50.0	1.02	0.217
TZ5	799.	998.	0.200	50.0	1.02	0.264

SV-C System Coil Sizing Summary for <system name>

This report summarizes the sizing parameters for all heating and cooling coils in a system. The report is divided into two sections: Coils within the central air handler (if any), and coils at the zonal level. At the zonal level, coils may be within a zonal air handler (such as a fan coil or unit heater), contained within a terminal unit (such as a reheat coil in a VAV terminal), or provide auxiliary energy (such as a baseboard).

Note that air flows in this report have been adjusted for altitude.

Depending on the type of coil, either two or three lines of information are displayed. The first line presents the conditions associated with the design-day peak load (time and outdoor temperature at peak load, airflow, temperatures). The second line presents the as-designed coil capacity at peak load conditions.

A third line of information exists for equipment which has a set of standard rating conditions, such as packaged DX equipment, heat pumps, and variable-refrigerant flow indoor units (VRF). The design data (capacity, airflow) displayed on the second line is translated to the standard rating conditions.

Note that most coil types are assumed to not have standard rating conditions. For example, a chilled water coil may be defined with a wide variety of entering drybulb/wetbulb temperatures, air flow rates, and chilled-water entering temperatures and flowrates. There is no set of standardized rating conditions that allow different chilled-water coils to be compared and contrasted.

ALTITUDE FACTOR

is the altitude adjustment factor for air flows; it multiplies air flows at sea level to get air flows at the actual altitude of the building.

TIME/OUTDOOR DRYBULB/WETBULB (DBT, WBT)

is the month/day/hr at which the coil peaks on the design day(s), and the corresponding outdoor drybulb and wetbulb temperature.

TOTAL CAPACITY

is the capacity of the coil. For a cooling coil, this capacity includes both the sensible and latent loads.

This capacity is often the same as the peak load on the design day; however it may be modified by other considerations. Some of the most common modifiers include:

- User-specified capacity - If the user specifies the capacity and temperatures associated with the capacity, then the default capacity is suppressed and the user-specified capacity/temperatures are displayed.
- Non-coincident airflow and peak load - The air handler air flow peaks when the zone airflows peak, but a cooling coil may peak at a lower airflow, but higher entering wetbulb; corresponding to a more humid condition. In this case, the coil airflow will be raised to the peak airflow of the air handler, and the capacity scaled in proportion.
- Overridden airflow - If the user overrides the design day airflow with a larger value (such as via the SUPPLY-FLOW keyword), the coil capacity will be increased proportionately.
- Heat pump - A heat pump provides both heating and cooling, and the two modes are listed as separate coils. However the capacities of the two 'coils' are actually linked via the HEAT/COOL-CAP ratio, with the capacity determined by the load that requires the largest equipment. The line for rated capacity will reflect the heating and cooling capacities at the rated temperatures.

- Two-Pipe fan coils - similar to a heat pump, a two-pipe fan coil contains a single coil, and the heating and cooling capacities are related.

- Variable refrigerant flow indoor coils – Like a heat pump, a single indoor coil provides both heating and cooling, and the two modes are listed as separate coils. However the capacities of the two 'coils' are related by the coil characteristics (embedded as a simplified 'UA' product). The line for rated capacity will reflect the heating and cooling capacities at the rated temperatures and airflow.

RATED CAPACITY

for direct-expansion air conditioners and heat pumps, a third line is included which converts the capacity at the design-day conditions to the "rated capacity" at the rated indoor entering drybulb/wetbulb and rated outdoor (or water-cooled) temperature. The rated temperatures are defined by the keywords RATED-EDB, RATED-EWB, RATED-ECT, etc., and the defaults are typically the ARI temperatures. However, the program will use any set of "rated" temperatures the user specifies in translating the design sizing capacity to the rated capacity.

The airflow shown on this line is the "rated airflow", i.e. the airflow at which the rated capacity is achieved (defined by FLOW/CAPACITY). Like all airflows in this report, this value is adjusted for altitude; divide by the altitude factor to convert to sea level.

SENSIBLE HEAT RATIO (SHR)

for cooling coils, is the sensible heat ratio at the design conditions. This value is provided for informational purposes only.

This value will typically NOT be the same as the sensible heat ratio as defined by the optional keyword SENS-HEAT-RATIO. This keyword is used to calculate the coil bypass factor as a function of the rated FLOW/CAPACITY, RATED-EDB, and RATED-EWB. The coil bypass factor is the term used in simulating the coil hourly. At the time of the cooling peak, the actual ratio of air flow to capacity may be different than rated, and the entering conditions will also usually be different. As a result, the sensible heat ratio at peak design conditions will not be the same as at rated conditions.

For packaged DX equipment, the sensible heat ratio displayed on the third (rated) line should approximate the specified sensible heat ratio. The two values might not exactly match however, as the program converts the specified sensible heat ratio to a coil bypass factor, which then gets converted back to a sensible heat ratio. The conversion algorithms are iterative, and some of the psychrometric algorithms do not invert exactly. The result is that the values will rarely match exactly.

AIRFLOW

is the airflow corresponding to the coil capacity. This airflow may , or may not, be the same as the design supply airflow of the system.

This airflow is adjusted for altitude; divide by the altitude factor to convert to sea level.

ENTERING DRYBULB (EDB)

is the entering indoor drybulb temperature at peak conditions.

For DX air conditioners and heat pumps, a third line is included for the coil that shows the capacity at rated conditions. On this line, the entering drybulb corresponds to the RATED-EDB keyword.

ENTERING WETBULB (EWB)

is the entering indoor wetbulb temperature at peak conditions.

For DX air conditioners and heat pumps, a third line is included for the coil that shows the capacity at rated conditions. On this line, the entering wetbulb corresponds to the RATED-EWB keyword.

LEAVING DRYBULB (EDB)

is the leaving indoor drybulb temperature at peak conditions. This value is displayed for informational purposes only.

LEAVING WETBULB (LWB)

is the leaving indoor wetbulb temperature at peak conditions. This value is displayed for informational purposes only.

BYPASS FACTOR

for cooling coils, is the coil bypass factor. This value is at rated conditions for design-day (line 1) and rated (line 3) conditions. It is the same as the COIL-BF if the SENS-HEAT-RATIO is not specified. If SENS-HEAT-RATIO is specified, then the coil bypass factor is calculated as a function of the specified sensible heat ratio, the ratio of airflow to capacity FLOW/CAPACITY, and the entering drybulb and wetbulb temperatures, RATED-EDB and RATED-EWB.

For design sizing (line 2) the bypass factor is adjusted for off-rated design air flow.

SOURCE FLOW

is the design loop flow for hot- or chilled-water coils, and water-cooled DX units.

For hot- and chilled-water coils, this flow is calculated as a function of the coil capacity shown and the specified loop temperature change.

For DX units, the flow is calculated as a function of the heat rejection load at the *rated* capacity, and the specified loop temperature change. rated capacity and rated temperatures. For water-source heat pumps, the flow is based on the rated cooling capacity, and assumed to be the same in both the cooling and heating mode.

SOURCE ENTERING TEMPERATURE

is the design loop temperature entering the coil. This is the CIRCULATION-LOOP:DESIGN-HEAT-T or DESIGN-COOL-T, if specified, or the loop HEAT-SETPT-T or COOL-SETPT-T if the design temperature is not specified.

SOURCE DELTA

for hot- or chilled-water coils and water-cooled DX units, is the specified loop temperature change used to set the coil's loop flow.

Example Report

The following report is a composite of a several different system types and configurations. The intent is to illustrate the various types of heating and cooling devices, and how information is reported for each. Entries in italics are comments added for clarification. The discussion that follows highlights major features.

Example 23 DOE-2.3 6/06/2011 11:17:38 BDL RUN 1

REPORT- SV-C System Coil Design Summary for Sys1 (FanCoil) (G) WEATHER FILE- CZ06RV2 WYEC2

ALTITUDE FACTOR: 1.004

COIL LOCATION / FUNCTION TYPE	TIME/OUTDOOR MO/DY/HR	DBT (F)	WBT (F)	CAPACITY TOTAL (KBTU/HR)	SHR (FRAC)	AIRSIDE AIRFLOW (CFM)	EDB (F)	EWB (F)	LDB (F)	LWB (F)	BYPASS FACTOR	SOURCE FLOW (GPM)	ENT T (F)	DELTA (F)
Central Airhandler Coils														
(Hot/chilled water)														
Cooling ChillWtr														
Design Day Peak	7/ 7/17	99.5	73.7	578.22	0.68	11856.	89.00	68.64	52.48	51.87	0.0370		44.00	
Design Capacity				571.46	0.70	11856.	89.00	68.64	52.18	52.11	0.0104	96.3	44.00	12.00
Heating HotWtr														
Design Day Peak	1/16/ 8	17.0	13.6	-193.64		9083.	28.49	21.20	52.44				0.00	
Design Capacity				-754.08		12737.	28.49	21.20	95.00			50.2	0.00	-30.00
Preheat HotWtr														
Design Day Peak	1/16/ 8	17.0	13.6	-153.21		9083.	28.49	21.20	47.44				0.00	
Design Capacity				-173.90		9083.	28.49	21.20	50.00			11.6	0.00	-30.00
(Packaged rooftop with gas furnace)														
Cooling DX Air														
Design Day Peak	7/ 7/15	101.5	71.6	104.96	0.79	2956.	85.80	65.86	55.10	53.45	0.1140		101.49	
Design Capacity				104.96	0.85	3522.	85.80	65.86	57.81	55.74	0.1140		101.49	
Rated Capacity				109.45	0.65	3522.	80.00	67.00			0.1140		95.00	
Heating Furnace														
Design Day Peak	1/12/ 8	30.0	24.7	-77.96		3186.	58.35	39.71	85.79					
Design Capacity				-118.34		3186.	58.35	39.71	100.00					
(Packaged rooftop with heat pump)														
Cooling DX Air														
Design Day Peak	11/17/13	89.9	66.4	74.67	0.97	2965.	76.81	60.65	54.49	51.77	0.1900		89.89	
Design Capacity				74.67	0.93	2691.	76.81	60.65	53.24	50.78	0.1900		89.89	
Rated Capacity				80.45	0.74	2691.	80.00	67.00			0.1900		95.00	
Heating HtPmpAir														
Design Day Peak	12/27/10	37.0	31.1	-8.72		2965.	68.37	49.99	71.04				37.00	
Design Capacity				-59.92		2691.	68.37	49.99	88.95				37.00	
Rated Capacity				-72.41		2691.	70.00						47.00	
HtPmSupp Electric														
Design Day Peak	12/27/10	37.0	31.1	-8.72		2965.	68.37	49.99	71.04					
Design Capacity				-36.20		2691.	68.37	49.99	80.80					
(Packaged rooftop with water-source heat pump)														
Cooling DX Wtr														
Design Day Peak	11/17/13	101.5	69.9	79.83	0.97	3116.	77.34	61.80	54.51	52.87	0.1500		60.00	
Design Capacity				79.83	0.89	2599.	77.34	61.80	52.18	50.91	0.1500		60.00	
Rated Capacity				77.73	0.76	2599.	80.00	67.00			0.1500	17.7	77.00	10.00
Heating HtPmpWtr														
Design Day Peak	12/21/17	30.0	25.3	-13.19		3116.	68.10	49.58	72.01				30.00	
Design Capacity				-56.77		2599.	68.10	49.58	88.28				30.00	
Rated Capacity				-58.30		2599.	70.00					17.7	32.00	10.00
Zonal Coils														
(Zonal 4-pipe fan coil)														
South Perim Zn (G.S1)														
Cooling ChillWtr														
Design Day Peak	11/17/13	99.6	68.0	76.78	0.98	3104.	77.70	61.86	55.18	53.29	0.1400		44.00	
Design Capacity				77.37	0.96	3104.	77.70	61.86	55.46	53.21	0.1644	15.3	44.00	10.00
Heating HotWtr														
Design Day Peak	12/27/ 9	23.0	19.2	-23.80		3104.	68.14	46.83	75.32				0.00	
Design Capacity				-88.94		3104.	68.14	46.83	95.00			4.4	0.00	-40.00
(Zonal Water-loop heat pump)														
South Perim Zn (G.S1)														
Cooling DX Wtr														
Design Day Peak	11/17/13	101.5	69.9	78.69	0.97	3089.	77.35	60.53	54.78	51.52	0.2410		70.00	
Design Capacity				78.69	0.91	2701.	77.35	60.53	52.94	50.08	0.2410		70.00	
Rated Capacity				80.79	0.72	2701.	80.00	67.00			0.2410	18.4	77.00	10.00
Heating HtPmpWtr														
Design Day Peak	12/27/ 9	30.0	25.3	-19.51		624.	60.13	43.67	89.08				30.00	
Design Capacity				-59.96		2701.	60.13	43.67	80.68				30.00	
Rated Capacity				-60.59		2701.	70.00					18.4	32.00	10.00

COIL LOCATION	TIME/OUTDOOR			CAPACITY		AIRSIDE						SOURCE		
FUNCTION TYPE	MO/DY/HR	DBT (F)	WBT (F)	TOTAL (KBTU/HR)	SHR (FRAC)	AIRFLOW (CFM)	EDB (F)	EWB (F)	LDB (F)	LWB (F)	BYPASS FACTOR	FLOW (GPM)	ENT T (F)	DELTA (F)
(VAV reheat terminal coils, hot-water and electric)														
EL1 South Perim Zn (G.S1)														
Reheat HotWtr														
Design Day Peak	1/10/15	17.0	13.6	-69.48		1951.	33.97	24.54	73.97				0.00	
Design Capacity				-106.01		1951.	33.97	24.54	95.00			7.1	0.00	-30.00
EL1 East Perim Zn (G.E2)														
Reheat Electric														
Design Day Peak	1/10/ 9	17.0	13.6	-42.10		1182.	31.68	23.17	71.68					
Design Capacity				-66.64		1182.	31.68	23.17	95.00					
(Induction unit terminal heating and cooling)														
South Perim Zn (G.S1)														
Recool ChillWtr														
Design Day Peak	11/17/13	99.6	68.0	51.73		2396.	75.10	61.45	55.10				44.00	
Design Capacity				53.92		2504.	75.10	61.45	55.15			10.8	44.00	10.00
Reheat HotWtr														
Design Day Peak	12/27/17	23.0	19.2	-23.29		727.	71.61	49.26	101.63				0.00	
Design Capacity				-18.15		727.	71.61	49.26	95.00			0.9	0.00	-40.00
(VAV reheat and baseboard)														
South Perim Zn (G.S1)														
Reheat HotWtr														
Design Day Peak	12/27/ 8	23.0	19.2	-33.82		1347.	55.00	38.79	78.57				0.00	
Design Capacity				-57.39		1347.	55.00	38.79	95.00			2.9	0.00	-40.00
BaseBrd HotWtr														
Design Day Peak	12/27/ 8	23.0	19.2	-16.08			71.95						180.00	
Design Capacity				-16.08			71.95					0.8	180.00	-40.00

Central Air Handler Coils

If the system has a single air handler with heating and/or cooling coils (i.e., not a fan coil or similar system where every zone has an air handler), then the first section lists the coils and sizing information for each coil.

- Coil function and type - Coils are listed by function (cooling, heating, preheat, etc.) and type (chilled- or hot-water, direct expansion, evaporative, etc.)
- Capacity and temperatures - Lists the capacity determined during design sizing, together with the temperatures at which that capacity is achieved. To capture the coil capacity and freeze it for subsequent runs, see the section "Correlation to SYSTEM/ZONE Keywords".
- Sensible heat ratio (SHR), leaving wetbulb (LWB) - These values are relevant only for cooling coils. They are not printed for other types of coils. While the SHR may be entered as a design variable, it is recommended that the coil bypass factor be specified instead.
- Bypass factor – These values are relevant only for cooling coils. The COIL-BF is specified at the rated airflow; defined using the keyword FLOW/CAPACITY (cfm/ton). If both COOLING-CAPACITY and RATED-FLOW are defined, then FLOW/CAPACITY = RATED-FLOW / (COOLING-CAPACITY / 12000 Btu/ton); otherwise FLOW/CAPACITY can be defined directly or allowed to default. For the design capacity (line 2), the rated coil bypass factor is modified by the off-rated airflow.
- Source flow, delta T - This values are relevant only for hot- and chilled-water coils, and water-cooled DX equipment. They are not printed for other types of coils.
- Direct expansion equipment - A third line is output for direct expansion air conditioners and heat pumps. This line translates the design capacity (line 2) at the design day conditions to the capacity at the rated conditions (RATED-EDB, RATED-EWB, RATED-ECT). It also displays the airflow at which the capacity is achieved (either via the FLOW/CAPACITY keyword, or the RATED-FLOW / COOLING-CAPACITY). This facilitates the specification of the equipment, and also makes it easier to freeze the size

for subsequent runs (see below).

The use of data on the third (rated) line is the recommended method to specify capacity for DX equipment. The first 'Design Capacity' line (line 2) may be used, together with the temperatures on that line. However, the report does not display the ELEC-INPUT-RATIO (EIR)associated with those temperatures; the user would have to manually translate the EIR to those temperatures.

Note that, for the air-cooled heat pump example, the rated cooling capacity (80.45) is directly related to the rated heating capacity (-72.41) by the ratio HEAT/COOL-CAP; by default this ratio is 0.9 for air-cooled equipment (rated capacity (line 3); not design capacity (line 2)). The same is true for the water-source heat pump example, except the default ratio is 0.75 for the given rated temperatures.

Zonal Air Handler Coils

Zonal coils may be associated with zone-by-zone air handlers such as fan coils, water-loop heat pumps, unit heaters, etc. Alternatively, they may be associated with zone terminals such as a VAV terminal with a reheat coil. Both types are listed in this section. Similar comments apply to these coils as for coils at the central air handler level. Note that baseboard coils do not have an airflow, as no airflow is simulated with this type of coil.

Correlation to SYSTEM/ZONE Keywords

A one-to-one relationship exists between many of the fields in this report, and keywords in the SYSTEM, ZONE, and CIRCUATION-LOOP components. This makes it possible to take information from this report and freeze the coil size in subsequent runs. The following is a map of the field positions in this report to the corresponding keywords. The map may utilize multiple lines per coil, as many keywords may have too many characters to fit within the corresponding numeric field. Keywords in italics may be optionally input, but do not actually affect the coil sizing. "From loop" means the value arises from input in the associated CIRCULATION-LOOP.

```
Example 23                                                                        DOE-2.3        6/06/2011    11:17:38  BDL RUN  1

REPORT- SV-C System Coil Design Summary for Sys1 (FanCoil) (G)                               WEATHER FILE- CZ06RV2 WYEC2
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ALTITUDE FACTOR: 1.004

COIL LOCATION       ---- TIME/OUTDOOR ---  ---- CAPACITY ---  ------------------ AIRSIDE ------------------  ------- SOURCE ------
 FUNCTION TYPE      MO/DY/HR   DBT    WBT    TOTAL      SHR    AIRFLOW    EDB    EWB    LDB    LWB   BYPASS  FLOW   ENT T   DELTA
                                (F)    (F)  (KBTU/HR)  (FRAC)   (CFM )    (F)    (F)    (F)    (F)   FACTOR  (GPM)   (F)     (F)
                    --------  -----  ----  ---------  ------  --------  ------  -----  ------  -----  ------  -----  ------  ------

Central Airhandler Coils  (Utilize SYSTEM keywords)
------------------------

 Cooling  ChillWtr
   Design Capacity                          COOLING-CAPACITY   RATED-FLOW        RATED-EWB             COIL-BF        From Loop
                                                                         RATED-EDB                                      CHW-COIL-DT

 Cooling  DX Air
   Design Capacity (better to use rated)   COOLING-CAPACITY   RATED-FLOW        RATED-EWB             COIL-BF        RATED-ECT
                                                                         RATED-EDB
   Rated Capacity  (preferred)              COOLING-CAPACITY   allow RATED- keywords to remain unchanged

 Cooling  DX Wtr
   Design Capacity                          COOLING-CAPACITY   RATED-FLOW        RATED-EWB             COIL-BF        RATED-ECT
                                                                         RATED-EDB                                       CW-COIL-DT
   Rated Capacity  (preferred)              COOLING-CAPACITY   allow RATED- keywords to default       COIL-BF

 Heating  HotWtr
   Design Capacity                          HEATING-CAPACITY   HRATED-FLOW                                           From Loop
                                                                         HT-RATED-EDB                                     HW-COIL-DT

 Heating  Electric
   Design Capacity                          HEATING-CAPACITY   HRATED-FLOW
                                                                         HT-RATED-EDB

 Heating  Furnace
   Design Capacity                          HEATING-CAPACITY   HRATED-FLOW
                                                                         HT-RATED-EDB

 Heating  HtPmpAir
   Design Capacity                          HEATING-CAPACITY   HRATED-FLOW                                             HT-RATED-ECT
     or                                                                  HT-RATED-EDB
   Rated Capacity                    best to just specify the corresponding COOLING-CAPACITY and let the heating capacity default

 HtPmSupp Electric
   Design Capacity                          SUPP-HEAT-CAP      HT-RATED-EDB

 Heating  HtPmpWtr
   Design Capacity                          HEATING-CAPACITY   HRATED-FLOW                                             HT-RATED-ECT
                                                                         HT-RATED-EDB
       or Rated Cap                    best to just specify the corresponding COOLING-CAPACITY and let the heating capacity default

 Preheat  HotWtr
   Design Capacity                          PREHEAT-CAPACITY   PHT-RATED-FLOW                                        From Loop
                                                                         PHT-RATED-EDB                                   PHW-COIL-DT

 Preheat  Electric
   Design Capacity                          PREHEAT-CAPACITY   PHT-RATED-FLOW
                                                                         PHT-RATED-EDB

 Preheat  Furnace
   Design Capacity                          PREHEAT-CAPACITY   PHT-RATED-FLOW
                                                                         PHT-RATED-EDB

Zonal Coils
-----------

Zone coils utilize the same keywords as for central coils, but specified within each ZONE component, rather than at the SYSTEM
level. For zonal air handlers such as fan coils (FC) or water-loop heat pumps (HP), the keywords may be specified at the SYSTEM
level, and expressions will copy the SYSTEM level keywords into the ZONE level keywords, where they may be overridden.

Additions to the above:

 Recool   ChillWtr (induction assumed dry)
   Design Capacity                          COOLING-CAPACITY   RATED-FLOW                                               CHW-COIL-DT
                                                                         RATED-EDB

 Reheat   HotWtr
   Design Capacity                          HEATING-CAPACITY   HRATED-FLOW                                           From Loop
                                                                         HT-RATED-EDB                                     HW-COIL-DT

 Reheat   Electric
   Design Capacity                          HEATING-CAPACITY   HRATED-FLOW
                                                                         HT-RATED-EDB

 Reheat   Furnace
```

Design Capacity	HEATING-CAPACITY	*HRATED-FLOW* *HT-RATED-EDB*	
BaseBrd HotWtr			
Design Capacity	BASEBOARD-RATING	BBRD-RATED-EDB	From Loop BBRD-COIL-DT
BaseBrd Electric			
Design Capacity	BASEBOARD-RATING		
BaseBrd Furnace			
Design Capacity	BASEBOARD-RATING		

SS-* Overview of Report Family

Report SS-A is always created for each system input. In the following, we describe the reports in alphabetical order (except for special report REFG for refrigerated casework, which is described last). However, we caution you to be aware that in a DOE-2.2 run, SYSTEMS reports are not printed alphabetically but are grouped according to a plant, system and zone hierarchy (see, for example, the output of sample run simstr3). The report hierarchy follows.

Plant Level:

SS-D Building HVAC Load Summary

SS-E Building HVAC Load Hours

SS-M Building HVAC Fan Elec Energy

System level:

SS-A System Loads Summary for

SS-B System Loads Summary for

SS-C System Load Hours for

SS-H System Utility Energy Use for

SS-I Sensible/Latent Summary for

SS-J Peak Heating and Cooling for

SS-K Space Temperature Summary for

SS-R Zone Performance Summary for

SS-L Fan Electric Energy Use for

SS-N Relative Humidity Summary for

SS-P Heating Performance Summary of

SS-P Cooling Performance Summary of

SS-Q Heat Pump Cooling Summary for

SS-Q Heat Pump Cooling Summary for

Zone level:

SS-G Zone Loads Summary for

SS-F Zone Demand Summary for

SS-O Space Temperature Summary for

SS-P	Heating Performance Summary of
SS-P	Cooling Performance Summary of

The following reports are related and their formats are identical at the Plant, System and Zone levels:

Plant	**System**	**Zone**
SS-D	SS-A	SS-G
SS-E	SS-C	None
SS-M	SS-L	None

SS-A System Loads Summary for <system name>

This report is always printed by the program for each HVAC system modeled. It shows monthly cooling, heating and electrical loads. The loads shown are the sum of zone-level loads and central air-handling-unit loads. (Zone-level loads are shown separately in Report SS-G.). This report is for comparison of monthly cooling and heating needs for the HVAC system. DX cooling loads are reported here (for PSZ, PMZS, PVAVS, PTAC, PVVT, RESVVT, RESYS and RESYS2 systems) but are not passed to the PLANT program.

Title

The title of the report shows the user name of the HVAC system being summarized (SYST-1).

COOLING, HEATING and ELEC

are the three sections of this system-level report.

COOLING ENERGY

is the monthly sum of energy (sensible and latent) extracted by the HVAC system during the operation hours of the system and passed as a load to PLANT.

MAXIMUM COOLING LOAD

includes sensible and latent space cooling loads, ventilation air and fan heat. The peak cooling load shown here is often the start-up load after the system has been shut down overnight. Notice, however, that when the system size is inadequate to meet the start-up load there is no indication of this problem on the report. You should first inspect the PLANT program BEPS or BEPU report, which shows the "Percent of Hours Any System Zone Outside of Throttling Range," for a macro view, and Report SS-O or SS-F for a zonal report of overheated or undercooled hours.

To the left of the MAXIMUM COOLING LOAD column are the day and hour (in standard time) of the peak cooling load along with the outside drybulb and wetbulb temperatures at the time of the peak.

HEATING ENERGY

is the monthly sum of heat delivered by the secondary HVAC system during the operation hours of the system and passed as a load to PLANT.

MAXIMUM HEATING LOAD

includes space heating loads, ventilation, and humidification. Again, the peak heating load is often due to start-up conditions after the system has been shut down overnight. To the left of this column are the day and hour of the peak heating load along with the outside drybulb and wetbulb temperatures at the time of the peak.

ELECTRICAL ENERGY

is the monthly electrical consumption for lights, convenience outlets, supply and return fans, and energy consumed by packaged HVAC units (all electrical energy in the building except for central plant equipment (boilers, chillers, dw-heaters, cooling towers, pumps) and except electricity specified within an electric meter).

MAXIMUM ELEC LOAD

is the monthly peak electrical consumption in a one-hour period for lights, convenience outlets, energy consumed by packaged HVAC units, and fans for the zones served by the HVAC system.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum         DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1

Design-day sizing of VAV system        Show All Reports
REPORT- SS-A System Loads Summary for      SYST-1                                                  WEATHER FILE- TRY  CHICAGO
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MONTH	COOLING ENERGY (MBTU)	TIME OF MAX DY	TIME OF MAX HR	DRY-BULB TEMP	WET-BULB TEMP	MAXIMUM COOLING LOAD (KBTU/HR)	HEATING ENERGY (MBTU)	TIME OF MAX DY	TIME OF MAX HR	DRY-BULB TEMP	WET-BULB TEMP	MAXIMUM HEATING LOAD (KBTU/HR)	ELEC-TRICAL ENERGY (KWH)	MAXIMUM ELEC LOAD (KW)
	- - - - - - - - C O O L I N G					- - - - - - - -	- - - - - - - - H E A T I N G					- - - - - - - -	- - - E L E C	- - -
JAN	0.00000	31	24	22.F	19.F	0.000	-34.185	2	8	4.F	3.F	-302.628	3345.	12.808
FEB	0.00000	28	24	31.F	28.F	0.000	-26.459	4	8	7.F	6.F	-282.776	2938.	12.813
MAR	0.29252	3	17	78.F	61.F	38.440	-14.241	24	8	6.F	5.F	-288.753	3137.	12.817
APR	2.21315	28	15	78.F	68.F	88.418	-3.037	8	8	31.F	28.F	-165.791	3165.	12.898
MAY	5.73766	21	14	85.F	75.F	134.605	-0.417	9	8	43.F	39.F	-83.966	3126.	13.459
JUN	13.74432	20	16	90.F	77.F	168.344	0.000	30	1	67.F	56.F	0.000	3206.	14.930
JUL	26.51843	14	14	96.F	77.F	198.804	0.000	31	1	70.F	62.F	0.000	3540.	15.757
AUG	20.47318	11	16	88.F	74.F	158.441	0.000	31	1	63.F	52.F	0.000	3322.	14.419
SEP	9.37699	11	15	87.F	72.F	131.353	-0.239	23	8	36.F	34.F	-86.821	3140.	13.710
OCT	2.91350	30	17	74.F	67.F	52.422	-2.618	20	8	42.F	36.F	-176.753	3193.	12.680
NOV	0.00000	30	24	34.F	32.F	0.000	-11.372	28	8	24.F	22.F	-243.944	2802.	12.756
DEC	0.00000	31	24	33.F	33.F	0.000	-25.084	26	8	15.F	15.F	-278.370	3313.	12.799
	---------					----------	---------					----------	--------	-------
TOTAL	81.270						-117.652						38225.	
MAX						198.804						-302.628		15.757

SS-B System Loads Summary for <system name>

This is a summary of the heating and cooling required by all the zones (combined) served by the HVAC system. The items summarized are zone-level cooling, zone-level heating, zone baseboard heating, and preheat energy. In addition, this report lists the preheat energy required and the peak preheat load. The preheat coils raise the temperature of the mixed air to a specified temperature. When you specify baseboard heating in a zone the heating supplied is reported under the heading BASEBOARD HEATING ENERGY.

Title

The U-name of the HVAC system (SYST-1) is printed on the title line.

COOLING BY ZONE COILS OR NAT VENTIL, MAXIMUM COOLING BY ZONE COILS OR NAT VENTIL

are, respectively, the monthly total and peak sensible plus latent cooling supplied by coils located in the zone(s) or by natural ventilation. (The cooling of the primary supply air in the system is summarized in Report SS-A.) Loads met by DX units are reported here and an electrical demand is passed to PLANT.

HEATING BY ZONE COILS OR FURNACE, MAXIMUM HEATING BY ZONE COILS OR FURNACE

are the monthly total heating and peak heating, respectively, supplied by coils or a furnace (oil- or gas-fired) in the zones. The furnace loads, met here in SYSTEMS, are not passed to PLANT but rather a utility demand for oil or gas is passed to PLANT. Baseboard heating is not included. In this example, the zone coils are electric resistance coils and the electrical demand will be passed to PLANT. For RESYS and RESYS2 systems only, these columns report the heating load on the furnace.

BASEBOARD HEATING ENERGY, MAXIMUM BASEBOARD HEATING ENERGY

are, respectively, the monthly total heating and peak heating supplied by baseboard heaters in all the zones served by the system. These loads are passed to PLANT unless BASEBOARD-SOURCE is set equal to ELECTRIC or FURNACE, in which case the load is met in SYSTEMS and a utility demand is passed to PLANT.

PREHEAT COIL ENERGY OR ELEC FOR FURN FAN (millions of Btu), MAXIMUM PREHEAT COIL ENERGY OR ELEC FOR FURN FAN

are, respectively, the monthly total heating and peak heating supplied by the preheat coil(s) to raise the temperature of the mixed air (return air plus makeup air) to a specified value, PREHEAT-T, or, for RESYS and RESYS2 systems only, the monthly and peak electricity use by the furnace fan. The preheat loads are passed to PLANT unless PREHEAT-SOURCE is set equal to ELECTRIC or FURNACE, in which case the load is met in SYSTEMS and a utility demand is passed to PLANT.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- SS-B System Loads Summary for       SYST-1                                         WEATHER FILE- TRY  CHICAGO
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MONTH	--ZONE COOLING-- COOLING BY ZONE COILS OR NAT VENTIL (MBTU)	MAXIMUM COOLING BY ZONE COILS OR NAT VENTIL (KBTU/HR)	--ZONE HEATING-- HEATING BY ZONE COILS OR FURNACE (MBTU)	MAXIMUM HEATING BY ZONE COILS OR FURNACE (KBTU/HR)	--BASEBOARDS-- BASEBOARD HEATING ENERGY (MBTU)	MAXIMUM BASEBOARD HEATING ENERGY (KBTU/HR)	--PREHEAT OR FURN FAN ELEC-- PREHEAT COIL ENERGY OR ELEC FOR FURN FAN (MBTU)	MAXIMUM PREHEAT COIL ENERGY OR ELEC FOR FURN FAN (KBTU/HR)
JAN	0.00000	0.000	-16.01356	-220.092	0.00000	0.000	-9.02215	-60.000
FEB	0.00000	0.000	-12.72717	-215.489	0.00000	0.000	-6.00675	-52.242
MAR	0.00000	0.000	-8.64450	-214.292	0.00000	0.000	-1.63046	-45.949
APR	0.00000	0.000	-2.10624	-139.546	0.00000	0.000	-0.05452	-14.030
MAY	0.00000	0.000	-0.28904	-72.240	0.00000	0.000	-0.00123	-1.231
JUN	0.00000	0.000	0.00000	0.000	0.00000	0.000	0.00000	0.000
JUL	0.00000	0.000	0.00000	0.000	0.00000	0.000	0.00000	0.000
AUG	0.00000	0.000	0.00000	0.000	0.00000	0.000	0.00000	0.000
SEP	0.00000	0.000	-0.13039	-62.131	0.00000	0.000	-0.00219	-2.185
OCT	0.00000	0.000	-1.92327	-159.822	0.00000	0.000	-0.05401	-12.100
NOV	0.00000	0.000	-7.42374	-199.828	0.00000	0.000	-0.64055	-21.261
DEC	0.00000	0.000	-14.15183	-215.598	0.00000	0.000	-2.94054	-38.964
	----------	----------	----------	----------	----------	----------	----------	----------
TOTAL	0.000		-63.410		0.000		-20.352	
MAX		0.000		-220.092		0.000		-60.000

SS-C System Load Hours for <system name>

The number of cooling and heating hours and fan operating hours for each month are reported for the system. Included are the hours when both heating and cooling are required. In addition, this report gives the heating and electrical loads at the time of the cooling peak. Note: the hour counts in this report are incremented by 1.0 when the relevant condition (e.g., "fans on") applies for all or part of the hour.

HOURS COOLING LOAD, HOURS HEATING LOAD

give the total hours in each month when the HVAC system is operating with a cooling load or a heating load, respectively.

HOURS COINCIDENT COOL-HEAT LOAD

gives the number of hours in each month when the HVAC system is operating with simultaneous heating and cooling loads.

The above numbers do not include hours when the only load was from pilot lights or crankcase heating.

HOURS FLOATING

is the total number of hours that no heating or cooling was provided (with the fans on or off).

HOURS HEATING AVAIL.

is the number of hours that heating equipment is available, as determined by HEATING-SCHEDULE.

HOURS COOLING AVAIL.

is the number of hours that cooling equipment is available, as determined by COOLING-SCHEDULE.

HOURS FANS ON

is the number of hours that fans are in operation, including cycling of fans on to maintain night setback or setup temperature setpoint.

HOURS FANS CYCLE ON

is the number of hours fans were cycled on to maintain night setback or setup temperature setpoint.

HOURS NIGHT VENTING

is the number of hours fans were on to maintain the night venting setpoint.

HOURS FLOATING WHEN FANS ON

is the number of hours that no heating or cooling was provided (with the fans on).

HEATING LOAD AT COOLING PEAK

is the heating load at the time of maximum cooling. It provides an assessment of oversizing for simultaneous heating/cooling systems (e.g., reheat systems).

ELECTRIC LOAD AT COOLING PEAK

is the demand of all electric equipment calculated in LOADS and SYSTEMS at the time of maximum cooling.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- SS-C System Load Hours for        SYST-1                                         WEATHER FILE- TRY  CHICAGO
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MONTH	HOURS COOLING LOAD	HOURS HEATING LOAD	HOURS COINCIDENT COOL-HEAT LOAD	HOURS FLOATING	HOURS HEATING AVAIL.	HOURS COOLING AVAIL.	HOURS FANS ON	HOURS FANS CYCLE ON	HOURS NIGHT VENTING	HOURS FLOATING WHEN FANS ON	HEATING LOAD AT COOLING PEAK (KBTU/HR)	ELECTRIC LOAD AT COOLING PEAK (KW)
	- - - - - - - - - - - - - - - - - N U M B E R					O F		H O U R S - - - - - - - - - - - - - - - - -			--COINCIDENT LOADS--	
JAN	0	416	0	328	744	0	416	174	0	0	0.000	0.475
FEB	0	372	0	300	672	0	372	163	0	0	0.000	0.475
MAR	10	252	0	482	711	29	269	39	0	7	0.000	10.680
APR	67	107	1	547	504	204	234	0	0	61	0.000	12.889
MAY	116	31	0	597	452	259	213	0	0	66	0.000	13.089
JUN	209	0	0	511	147	549	217	0	0	8	0.000	13.523
JUL	245	0	0	499	2	737	245	5	0	0	0.000	15.013
AUG	224	0	0	520	30	701	226	0	0	2	0.000	13.827
SEP	152	16	0	552	314	374	215	0	0	47	0.000	13.710
OCT	96	94	1	555	494	233	234	0	0	45	0.000	10.680
NOV	0	224	0	496	676	34	232	35	0	8	-42.282	2.055
DEC	0	371	0	373	744	0	371	129	0	0	0.000	0.475
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ANNUAL	1119	1883	2	5760	5490	3120	3244	545	0	244		

SS-D Building HVAC Load Summary

The cooling, heating and electrical energy required by the systems and zones served by the central plant are reported monthly along with the peak cooling, heating and electrical loads for the combined systems, and the time of occurrence. Note that these peak loads may result from startup after the building has been shut down overnight. Cooling done in SYSTEMS by DX units is not included here in cooling loads but in electrical loads.

COOLING ENERGY

is the sensible plus latent monthly cooling required by the HVAC systems from the central plant. For water loop heat pump systems the value reported here is the heat rejected to the plant's cooling tower.

TIME OF MAX

gives the day and hour in local standard time that the maximum cooling load occurs.

DRY-BULB TEMP and WET-BULB TEMP

are the outside drybulb wetbulb temperatures during the peak cooling load.

MAXIMUM COOLING LOAD

gives the peak cooling load for each month and for the year.

HEATING ENERGY

is the total monthly heating required by the HVAC systems from the central plant. For water loop heat pump systems the value reported here is the supplementary heat from the plant's hot water boiler.

TIME OF MAX

shows the day and hour in local standard time of the maximum heating load.

DRY-BULB TEMP and WET-BULB TEMP

are the outside drybulb wetbulb temperatures during the peak heating load.

MAXIMUM HEATING LOAD

gives the peak heating load for each month and for the year.

ELECTRICAL ENERGY

is the monthly electrical requirement for lights and convenience outlets for the building zones served by the plant. In addition, the electrical energy contains the fan energy requirement for the HVAC systems and electric energy for cooling and heating in packaged units. It does not include the electrical energy associated with central plant equipment such as pumps, cooling towers and chillers. These are reported in the PLANT program.

MAXIMUM ELEC LOAD

is the monthly peak electrical demand for the items in (9), ELECTRICAL ENERGY, above.

Bottom of Report

At the bottom of the report are the peak daily integrated cooling load for the design day (DES DAY) and for the annual run using the weather file (WTH FILE). These numbers are used by PLANT to size cold storage systems.

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- SS-D Building HVAC Load Summary                                                   WEATHER FILE- TRY  CHICAGO
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	- - - - - - - - C O O L I N G - - - - - - - -					- - - - - - - - H E A T I N G - - - - - - - -					- - - E L E C - - -	
MONTH	COOLING ENERGY (MBTU)	TIME OF MAX DY HR	DRY-BULB TEMP	WET-BULB TEMP	MAXIMUM COOLING LOAD (KBTU/HR)	HEATING ENERGY (MBTU)	TIME OF MAX DY HR	DRY-BULB TEMP	WET-BULB TEMP	MAXIMUM HEATING LOAD (KBTU/HR)	ELEC-TRICAL ENERGY (KWH)	MAXIMUM ELEC LOAD (KW)
JAN	0.00000	31 24	22.F	19.F	0.000	-34.185	2 8	4.F	3.F	-302.628	3345.	12.808
FEB	0.00000	28 24	31.F	28.F	0.000	-26.459	4 8	7.F	6.F	-282.776	2938.	12.813
MAR	0.29252	3 17	78.F	61.F	38.440	-14.241	24 8	6.F	5.F	-288.753	3137.	12.817
APR	2.21315	28 15	78.F	68.F	88.418	-3.037	8 8	31.F	28.F	-165.791	3165.	12.898
MAY	5.73766	21 14	85.F	75.F	134.605	-0.417	9 8	43.F	39.F	-83.966	3126.	13.459
JUN	13.74432	20 16	90.F	77.F	168.344	0.000	30 1	67.F	56.F	0.000	3206.	14.930
JUL	26.51843	14 14	96.F	77.F	198.804	0.000	31 1	70.F	62.F	0.000	3540.	15.757
AUG	20.47318	11 16	88.F	74.F	158.441	0.000	31 1	63.F	52.F	0.000	3322.	14.419
SEP	9.37699	11 15	87.F	72.F	131.353	-0.239	23 8	36.F	34.F	-86.821	3140.	13.710
OCT	2.91350	30 17	74.F	67.F	52.422	-2.618	20 8	42.F	36.F	-176.753	3193.	12.680
NOV	0.00000	30 24	34.F	32.F	0.000	-11.372	28 8	24.F	22.F	-243.944	2802.	12.756
DEC	0.00000	31 24	33.F	33.F	0.000	-25.084	26 8	15.F	15.F	-278.370	3313.	12.799
	---------				----------	---------				----------	--------	-------
TOTAL	81.270					-117.652					38225.	
MAX					198.804					-302.628		15.757

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MAXIMUM DAILY INTEGRATED COOLING LOAD (DES DAY )           0.000 (KBTU)
MAXIMUM DAILY INTEGRATED COOLING LOAD (WTH FILE)        1997.705 (KBTU)
```

SS-E Building HVAC Load Hours

Just as the monthly load hours are reported for an HVAC system in Report SS-C, the combined load hours for all of the HVAC systems served by the central plant are shown in this report. Heating and electrical loads for the plant at the time of the cooling peak are also reported. Note: the hour counts in this report are incremented by 1.0 when the relevant condition (e.g., "fans on") applies for all or part of the hour.

HOURS COOLING LOAD

HOURS HEATING LOAD

are the required operation hours of the central plant for supplying cooling or heating, respectively, to the HVAC systems served.

HOURS COINCIDENT COOL-HEAT LOAD

gives the number of hours in each month when the central plant is operating with simultaneous heating and cooling loads.

HOURS FLOATING

is the total number of hours (with fans on or off) that space temperatures are not at thermostat set points.

HOURS HEATING AVAIL.

is the number of hours that heating equipment is available, as determined by HEATING-SCHEDULE.

HOURS COOLING AVAIL.

is the number of hours that cooling equipment is available, as determined by COOLING-SCHEDULE.

HOURS FANS ON

is the number of fan operating hours. This includes times when fans cycle on at night to maintain the setback or setup temperature set point or to provide night ventilation.

HOURS FANS CYCLE ON

is the number of hours fans were cycled on to satisfy night setback or setup temperature set point.

HOURS NIGHT VENTING

is the number of hours fans were on to maintain the night ventilation set point.

HOURS FLOATING WHEN FANS ON

is the number of hours (with the fans on) that no heating or cooling was provided.

HEATING LOAD AT COOLING PEAK

is the heating load at the time of maximum cooling. It provides an assessment of oversizing for simultaneous heating/cooling systems (e.g., reheat systems).

ELECTRIC LOAD AT COOLING PEAK

is the electric demand of all electric equipment calculated in LOADS and SYSTEMS at the time of maximum cooling.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum         DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- SS-E Building HVAC Load Hours                                                  WEATHER FILE- TRY  CHICAGO
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MONTH	HOURS COOLING LOAD	HOURS HEATING LOAD	HOURS COINCIDENT COOL-HEAT LOAD	HOURS FLOATING	HOURS HEATING AVAIL.	HOURS COOLING AVAIL.	HOURS FANS ON	HOURS FANS CYCLE ON	HOURS NIGHT VENTING	HOURS FLOATING WHEN FANS ON	HEATING LOAD AT COOLING PEAK (KBTU/HR)	ELECTRIC LOAD AT COOLING PEAK (KW)
	NUMBER OF HOURS										--COINCIDENT LOADS--	
JAN	0	416	0	328	744	0	416	174	0	0	0.000	0.475
FEB	0	372	0	300	672	0	372	163	0	0	0.000	0.475
MAR	10	252	0	482	715	29	269	39	0	7	0.000	10.680
APR	67	107	1	547	516	204	234	0	0	61	0.000	12.889
MAY	116	31	0	597	485	259	213	0	0	66	0.000	13.089
JUN	209	0	0	511	171	549	217	0	0	8	0.000	13.523
JUL	245	0	0	499	7	737	245	5	0	0	0.000	15.013
AUG	224	0	0	520	43	701	226	0	0	2	0.000	13.827
SEP	152	16	0	552	346	374	215	0	0	47	0.000	13.710
OCT	96	94	1	555	511	233	234	0	0	45	0.000	10.680
NOV	0	224	0	496	686	34	232	35	0	8	-42.282	2.055
DEC	0	371	0	373	744	0	371	129	0	0	0.000	0.475
ANNUAL	1119	1883	2	5760	5640	3120	3244	545	0	244		

SS-F Zone Demand Summary for <zone name>

For a zone, this report gives monthly monthly sums for zone heating and cooling demands from the HVAC system, minimum and maximum zone air temperatures, and the number of hours the loads are not met in the zone.

HEAT EXTRACTION ENERGY and HEAT ADDITION ENERGY

are the sensible cooling energy and heating energy requirements, respectively, of this zone during the HVAC system's operating hours. For the RESYS and RESYS2 systems, the heat extraction may include natural ventilation. For plenums, these values are for heat removed from or added to the return air. For unconditioned zones, these values should be zero.

BASEBOARD ENERGY and MAXIMUM BASEBOARD LOAD

When the keyword BASEBOARD-RATIO is used, the zone heating is supplied by baseboards. Monthly heating energy requirements for these baseboards are reported in addition to the peak heating requirement.

MAXIMUM ZONE TEMPERATURE and MINIMUM ZONE TEMPERATURE

The monthly maximum and minimum air temperatures in the zone when system fans are operating.

HOURS UNDERHEATED and HOURS UNDERCOOLED

If the capacity of the HVAC system is less than the heat extraction or addition needed to hold the zone thermostat set point (defined as the zone temperature being more than 1°F outside of the thermostat throttling range), a load-not-met condition occurs that is recorded as either an underheated or undercooled hour. These hours may include startups after a night shutdown of the HVAC system.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- SS-F Zone Demand Summary for       ZONE1-1                                         WEATHER FILE- TRY  CHICAGO
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	- - - -D E M A N D S- - - - -		- -B A S E B O A R D S- - -		- -T E M P E R A T U R E S- -		- -L O A D S N O T M E T- -	
MONTH	HEAT EXTRACTION ENERGY (MBTU)	HEAT ADDITION ENERGY (MBTU)	BASEBOARD ENERGY (MBTU)	MAXIMUM BASEBOARD LOAD (KBTU/HR)	MAXIMUM ZONE TEMP (F)	MINIMUM ZONE TEMP (F)	HOURS UNDER HEATED	HOURS UNDER COOLED
JAN	0.39591	-2.314	0.00000	0.000	77.1	55.8	0	0
FEB	0.38562	-1.840	0.00000	0.000	76.4	55.8	0	0
MAR	0.91858	-0.989	0.00000	0.000	76.7	55.8	10	0
APR	1.85465	-0.221	0.00000	0.000	77.4	62.8	4	0
MAY	2.30360	-0.023	0.00000	0.000	77.8	62.9	2	0
JUN	3.10090	0.000	0.00000	0.000	77.9	72.6	0	0
JUL	4.22996	0.000	0.00000	0.000	89.5	73.5	0	0
AUG	3.67799	0.000	0.00000	0.000	78.2	73.6	0	0
SEP	3.12406	-0.011	0.00000	0.000	78.2	70.6	0	0
OCT	2.09386	-0.178	0.00000	0.000	78.0	63.0	1	0
NOV	0.56666	-0.712	0.00000	0.000	77.6	55.9	0	0
DEC	0.37838	-1.925	0.00000	0.000	77.1	55.8	0	0

SS-G Zone Loads Summary for <zone name>

Zone cooling, heating and electrical requirements are reported in this monthly summary. The cooling and heating energy reported is supplied only at the zone level (such as for reheat coils). Often heating and cooling loads are reported as zero in this report when the central HVAC system (e.g., a dual-duct system) provides all the heating and cooling.

COOLING ENERGY and HEATING ENERGY

The monthly cooling and heating energy, respectively, delivered by zone coils and baseboards during scheduled operation hours.

MAXIMUM COOLING LOAD and MAXIMUM HEATING LOAD

The peak energy delivered by zone coils and baseboards for cooling and heating, respectively. Includes sensible and latent space cooling loads, ventilation air and fan heat. To the left of these columns are the day and hour (in local standard time) of the peak cooling load along with the outside drybulb and wetbulb temperatures at the time of the peak.

The peak cooling load shown here is often the start-up load after the system has been shut down overnight. Notice, however, that when the system size is inadequate to meet the start-up load there is no indication of this problem on the report. You should first inspect the PLANT program BEPS or BEPU report, which shows "Percent of Hours Any System Zone Outside of Throttling Range", for a macro view, and at SS-O (Space Temperature Summary) or SS-F (Zone Demand Summary) for a zonal report of where "loads not met" conditions prevail.

ELECTRICAL ENERGY and MAXIMUM ELEC LOAD

The monthly total and peaks of electrical energy use in this zone, including lights, fans, and compressors and electric coils in packaged HVAC units.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- SS-G Zone Loads Summary for       ZONE1-1                                            WEATHER FILE- TRY  CHICAGO
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        - - - - - - - - C O O L I N G - - - - - - - -      - - - - - - - - H E A T I N G - - - - - - - -       - - - E L E C - - -

                                               MAXIMUM                                                MAXIMUM        ELEC-     MAXIMUM
           COOLING     TIME    DRY-   WET-      COOLING        HEATING     TIME    DRY-   WET-         HEATING       TRICAL       ELEC
            ENERGY   OF MAX    BULB   BULB         LOAD         ENERGY   OF MAX    BULB   BULB            LOAD       ENERGY       LOAD
 MONTH      (MBTU)   DY  HR    TEMP   TEMP    (KBTU/HR)         (MBTU)   DY  HR    TEMP   TEMP       (KBTU/HR)        (KWH)       (KW)

 JAN       0.00000   31  24   22.F  19.F         0.000         -3.459   13   8     7.F   6.F         -44.670         639.      2.534
 FEB       0.00000   28  24   31.F  28.F         0.000         -2.764   24   8    20.F  18.F         -44.503         561.      2.534
 MAR       0.00000   31  24   39.F  36.F         0.000         -1.779   24   8     6.F   5.F         -46.699         620.      2.534
 APR       0.00000   30   1   55.F  48.F         0.000         -0.551    8   8    31.F  28.F         -26.684         632.      2.534
 MAY       0.00000   31   1   54.F  49.F         0.000         -0.118    9   8    43.F  39.F         -17.443         620.      2.534
 JUN       0.00000   30   1   67.F  56.F         0.000          0.000   30   1    67.F  56.F           0.000         613.      2.534
 JUL       0.00000   31   1   70.F  62.F         0.000          0.000   31   1    70.F  62.F           0.000         639.      2.534
 AUG       0.00000   31   1   63.F  52.F         0.000          0.000   31   1    63.F  52.F           0.000         620.      2.534
 SEP       0.00000   30   1   46.F  40.F         0.000         -0.047   23   8    36.F  34.F         -16.880         613.      2.534
 OCT       0.00000   31  24   70.F  62.F         0.000         -0.475   20   8    42.F  36.F         -29.587         639.      2.534
 NOV       0.00000   30  24   34.F  32.F         0.000         -1.621   28   8    24.F  22.F         -39.539         555.      2.534
 DEC       0.00000   31  24   33.F  33.F         0.000         -3.099   22   8    15.F  15.F         -44.911         639.      2.53
        ---------                              ----------      ---------                            ----------     --------    -------

 TOTAL       0.000                                              -13.913                                             7391.

 MAX                                             0.000                                               -46.699                   2.534
```

SS-H System Utility Energy Use for <system name>

This report gives monthly values of electrical energy for fans, gas/oil energy for heating and cooling, and electrical energy for heating and cooling for an HVAC system.

FAN ELEC

shows the total and maximum hourly electrical consumption of the supply, return, exhaust and zonal fans.

FUEL HEAT

shows the total fuel consumption by packaged systems for heating. This will be zero unless one of the heat sources is FURNACE.

FUEL COOL

shows the total fuel consumption by packaged systems for cooling.

ELEC HEAT

shows the electrical consumption for heating. This includes electric baseboards and reheat coils as well as the electrical load attributable to the heating cycle of a heat pump.

ELEC COOL

shows the electrical consumption and hourly maxima for cooling.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- SS-H System Utility Energy Use for  SYST-1                                               WEATHER FILE- TRY  CHICAGO
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	- -F A N E L E C- - -		- -F U E L H E A T- -		- -F U E L C O O L- -		-E L E C H E A T- -		-E L E C C O O L- -	
MONTH	FAN ENERGY (KWH)	MAXIMUM FAN LOAD (KW)	GAS OIL ENERGY (MBTU)	MAXIMUM GAS OIL LOAD (KBTU/HR)	GAS OIL ENERGY (MBTU)	MAXIMUM GAS OIL LOAD (KBTU/HR)	ELECTRIC ENERGY (KWH)	MAXIMUM ELECTRIC LOAD (KW)	ELECTRIC ENERGY (KWH)	MAXIMUM ELECTRIC LOAD (KW)
JAN	318.	3.087	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
FEB	284.	3.002	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
MAR	202.	2.972	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
APR	171.	1.398	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
MAY	190.	1.959	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
JUN	304.	3.591	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
JUL	513.	4.971	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
AUG	386.	3.080	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
SEP	237.	2.391	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
OCT	166.	1.415	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
NOV	172.	2.649	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
DEC	286.	3.041	0.000	0.000	0.000	0.000	0.	0.000	0.	0.000
TOTAL	3230.		0.000		0.000		0.		0.	
MAX		4.971		0.000		0.000		0.000		0.000

SS-I Sensible/Latent Summary for <system name>

This is a summary of the monthly cooling and heating energy provided by each HVAC system. The quantities shown are the sum of zone-level loads and central air-handling-unit loads.

SENSIBLE COOLING ENERGY

is the monthly sum of sensible energy extracted by the HVAC system.

LATENT COOLING ENERGY

is the monthly sum of latent energy extracted by the HVAC system. The sum of (1) and (2) should equal COOLING ENERGY in Report SS-A.

MAX TOTAL COOLING ENERGY

is the hourly peak energy (sensible plus latent) extracted by the system during the month.

SENSIBLE HEAT RATIO AT MAX

is the sensible heat ratio ([sensible cooling]/[total cooling]) for the hour that the maximum total cooling occurs.

TIME OF MAX

is the day and hour (in local standard time) that the total peak cooling load occurred.

SENSIBLE HEATING ENERGY

is the monthly sum of sensible energy added by the HVAC system.

LATENT HEATING ENERGY

is the monthly sum of latent energy extracted by the HVAC system. The sum of (6) and (7) should equal HEATING ENERGY in Report SS-A.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- SS-I Sensible/Latent Summary for    SYST-1                                         WEATHER FILE- TRY  CHICAGO
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MONTH	SENSIBLE COOLING ENERGY (MBTU)	LATENT COOLING ENERGY (MBTU)	MAX TOTAL COOLING ENERGY (KBTU/HR)	SENSIBLE HEAT RATIO AT MAX	TIME OF MAX DY	TIME OF MAX HR	SENSIBLE HEATING ENERGY (MBTU)	LATENT HEATING ENERGY (MBTU)	MAX TOTAL HEATING ENERGY (KBTU/HR)
JAN	0.00000	0.00000	0.000				-34.18526	0.00000	-302.62750
FEB	0.00000	0.00000	0.000				-26.45858	0.00000	-282.77591
MAR	0.26943	0.02309	38.440	1.000	3	17	-14.24075	0.00000	-288.753
APR	1.96484	0.24831	88.418	0.805	28	15	-3.03746	0.00000	-165.791
MAY	4.91520	0.82246	134.605	0.739	21	14	-0.41691	0.00000	-83.966
JUN	12.11147	1.63286	168.344	0.749	20	16	0.00000	0.00000	0.000
JUL	22.16018	4.35825	198.804	0.800	14	14	0.00000	0.00000	0.000
AUG	17.12798	3.34520	158.441	0.781	11	16	0.00000	0.00000	0.000
SEP	8.36948	1.00751	131.353	0.803	11	15	-0.23907	0.00000	-86.821
OCT	2.66797	0.24553	52.422	0.788	30	17	-2.61819	0.00000	-176.753
NOV	0.00000	0.00000	0.000				-11.37247	0.00000	-243.94443
DEC	0.00000	0.00000	0.000				-25.08353	0.00000	-278.36969
	---------	---------	---------	---------			---------	---------	---------
TOTAL	69.587	11.683					-117.652	0.000	
MAX			198.804	0.800					-302.628

SS-J Peak Heating and Cooling for <system name>

For each HVAC system, this report gives an hourly profile of three types of peak day that occur during the RUN-PERIOD:

1. Under --COOLING--,the day that contains the hour with the maximum (sensible plus latent) cooling energy.

2. Under --HEATING--, the day that contains the hour with the maximum heating energy.

3. Under DAY COOLING PEAK, the day whose integrated cooling load (i.e., load summed over 24 hours) is highest. This day can be used to size thermal energy storage systems; however, to insure that the peak integrated load shown here is truly represented, you should examine reports SS-O (Space Temperature Summary) or SS-F (Zone Demand Summary), which show the number of hours that cooling loads are not met.

HOUR

gives the hour of the day, ranging from hour 1 (midnight to 1am) to hour 24 (11pm to midnight). The hour shown is in local standard time even if DAYLIGHT-SAVINGS = YES.

HOURLY COOLING LOAD

is the total hourly energy, sensible plus latent, extracted by the HVAC system. The cooling load is followed by an asterisk (*) when the system is unable to meet the cooling demand for that hour. This means that in at least one zone served by this system there is an unmet cooling load and the zone temperature is outside the throttling range.

SENSIBLE HEAT RATIO

is the ratio of sensible to total cooling energy for the hour.

DRYBULB TEMP and WETBULB TEMP

are the outside drybulb and wetbulb temperatures, respectively, for the given hour.

HOURLY HEATING LOAD

is the hourly heating energy delivered by the HVAC system. For SYSTEM:TYPE = RESYS and RESVVT, this includes baseboard heating energy. The heating load is followed by an asterisk (*) when the system is unable to meet the heating demand for that hour. This means that in at least one zone served by the system, there is an unmet heating load and the zone temperature is outside the throttling range.

A separate report is provided whenever DESIGN-DAY is input.

Bottom of Report - Some additional information is shown at the bottom of the report:

SYSTEM-TYPE

is the DOE-2 code-word for the type of this HVAC system.

SQFT/TON

is the area served by this system divided by the peak cooling in tons.

COOLING PEAK

is the peak cooling divided by the area served by this system.

HEATING PEAK

is the peak heating divided by the area served by this system.

SUPPLY AIR PEAK FLOW

is the design supply air flow divided by area served by this system.

MIN-OA/PERSON

is the design minimum outside air flow divided by the maximum number of people in all the zones served by this system.

OA FRAC AT CLG PEAK

is the outside air fraction (outside air flow divided by supply flow) at the peak cooling hour.

OA FRAC AT HTG PEAK

is the outside air fraction (outside air flow divided by supply flow) at the peak heating hour.

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum           DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- SS-J Peak Heating and Cooling for   SYST-1                                          WEATHER FILE- TRY  CHICAGO
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           - - - - - C O O L I N G - - - - -       - - - H E A T I N G - - -      D A Y   C O O L I N G   P E A K

                        JUL 14                                JAN  2                                JUL 14


           HOURLY                                     HOURLY                           HOURLY
          COOLING    SENSIBLE    DRY-   WET-          HEATING    DRY-   WET-          COOLING    SENSIBLE    DRY-   WET-
             LOAD        HEAT    BULB   BULB             LOAD    BULB   BULB             LOAD        HEAT    BULB   BULB
 HOUR      (KBTU)       RATIO    TEMP   TEMP           (KBTU)    TEMP   TEMP           (KBTU)       RATIO    TEMP   TEMP

    1       0.000       0.000    83.F   72.F         -105.596     1.F    0.F            0.000       0.000    83.F   72.F
    2       0.000       0.000    81.F   72.F         -106.951     1.F    0.F            0.000       0.000    81.F   72.F
    3       0.000       0.000    80.F   71.F         -107.897     1.F    0.F            0.000       0.000    80.F   71.F
    4       0.000       0.000    78.F   71.F         -107.401     2.F    1.F            0.000       0.000    78.F   71.F
    5       0.000       0.000    77.F   70.F         -110.220     2.F    1.F            0.000       0.000    77.F   70.F
    6       0.000       0.000    78.F   71.F         -107.897     2.F    1.F            0.000       0.000    78.F   71.F
    7     142.068 *     0.890    79.F   71.F         -109.054     3.F    2.F          142.068 *     0.890    79.F   71.F
    8     191.428 *     0.797    82.F   72.F         -302.628     4.F    3.F          191.428 *     0.797    82.F   72.F
    9     177.026 *     0.778    86.F   74.F         -192.600     4.F    3.F          177.026 *     0.778    86.F   74.F
   10     179.816 *     0.791    88.F   74.F         -157.094     5.F    4.F          179.816 *     0.791    88.F   74.F
   11     185.444 *     0.781    91.F   76.F         -142.285     6.F    5.F          185.444 *     0.781    91.F   76.F
   12     182.825       0.807    94.F   76.F         -125.894     8.F    7.F          182.825       0.807    94.F   76.F
   13     198.804       0.800    96.F   77.F         -120.275     9.F    9.F          198.804       0.800    96.F   77.F
   14     190.141       0.797    87.F   74.F         -106.301    11.F   11.F          190.141       0.797    87.F   74.F
   15     175.715       0.778    76.F   71.F         -100.302    12.F   12.F          175.715       0.778    76.F   71.F
   16     161.530       0.763    78.F   72.F          -95.847    14.F   13.F          161.530       0.763    78.F   72.F
   17     151.517       0.753    78.F   72.F          -93.170    15.F   14.F          151.517       0.753    78.F   72.F
   18       0.000       0.000    89.F   75.F          -91.288    15.F   15.F            0.000       0.000    89.F   75.F
   19       0.000       0.000    87.F   75.F            0.000    17.F   16.F            0.000       0.000    87.F   75.F
   20       0.000       0.000    84.F   74.F            0.000    17.F   16.F            0.000       0.000    84.F   74.F
   21       0.000       0.000    84.F   74.F            0.000    18.F   18.F            0.000       0.000    84.F   74.F
   22       0.000       0.000    82.F   74.F            0.000    17.F   17.F            0.000       0.000    82.F   74.F
   23       0.000       0.000    80.F   72.F            0.000    17.F   17.F            0.000       0.000    80.F   72.F
   24       0.000       0.000    78.F   72.F            0.000    17.F   17.F            0.000       0.000    78.F   72.F
         --------                                  --------                        ---------
 SUM                                                                                1936.315
 MAX      198.804                                  -302.628

               SYSTEM-TYPE         VAVS                    SQFT/TON             301.8
               COOLING PEAK          39.76 (BTU/HR- SQFT)   HEATING PEAK         -60.53 (BTU/HR- SQFT)
               SUPPLY AIR PEAK FLOW   1.18 (CFM/SQFT)       MIN-OA/PERSON         20.40 (CFM )
               OA FRAC AT CLG PEAK   0.245                  OA FRAC AT HTG PEAK   0.276

               * ASTERISKS INDICATE HOURS LOADS NOT MET
```

SS-K Space Temperature Summary for <system name>

This report gives a monthly summary of various temperature quantities for the spaces served by an HVAC system. It can be used to determine the potential for night ventilation as a cooling strategy. Blank entries indicate that no hours existed in a particular category. The averages given are over all spaces served by the system.

AVERAGE SPACE TEMP ALL HOURS

is the average space temperature for all hours in the run.

AVERAGE SPACE TEMP COOLING HOURS

is the average space temperature for hours when cooling is required.

AVERAGE SPACE TEMP HEATING HOURS

is the average space temperature for hours when heating is required.

AVERAGE SPACE TEMP FAN ON HOURS

is the average space temperature when the fans are running.

AVERAGE SPACE TEMP FAN OFF HOURS

is the average space temperature when the fans are not running.

AVERAGE TEMPERATURE DIFFERENCE BETWEEN OUTDOOR & ROOM AIR, ALL HOURS

is the average value of [outdoor temperature minus space air temperature] over all hours.

AVERAGE TEMPERATURE DIFFERENCE BETWEEN OUTDOOR & ROOM AIR, FAN ON HOURS

is the average value of [outdoor temperature minus space air temperature] when the fans are on.

AVERAGE TEMPERATURE DIFFERENCE BETWEEN OUTDOOR & ROOM AIR, FAN OFF HOURS

is the average value of [outdoor temperature minus space air temperature] when the fans are off.

SUMMED TEMP DIFFERENCE BETWEEN OUTDOOR & ROOM AIR, HEATING HOURS

is the sum of the absolute value of [outdoor temperature minus room air temperature] for hours when heating is required, divided by 24. This is a degree day-like quantity.

SUMMED TEMP DIFFERENCE BETWEEN OUTDOOR & ROOM AIR, ALL HOURS

is the sum of the absolute value of [outdoor temperature minus room air temperature] for all hours, divided by 24. This is a degree day-like quantity.

HUMIDITY RATIO DIFFERENCE BETWEEN OUTDOOR & ROOM AIR

is the average value of [outdoor humidity ratio minus return air humidity ratio] for all hours.

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Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- SS-K Space Temperature Summary for  SYST-1                                           WEATHER FILE- TRY  CHICAGO
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MONTH	A V E R A G E S P A C E T E M P ALL HOURS (F)	COOLING HOURS (F)	HEATING HOURS (F)	FAN ON HOURS (F)	FAN OFF HOURS (F)	AVERAGE TEMPERATURE DIFFERENCE BETWEEN OUTDOOR& ROOM AIR ALL HOURS (F)	BETWEEN OUTDOOR& ROOM AIR FAN ON HOURS (F)	BETWEEN OUTDOOR& ROOM AIR FAN OFF HOURS (F)	SUMMED TEMP DIFFERENCE BETWEEN OUTDOOR& ROOM AIR HEATING HOURS (F)	BETWEEN OUTDOOR& ROOM AIR ALL HOURS (F)	HUMIDITY RATIO DIFFERENCE BETWEEN OUTDOOR AND ROOM AIR (FRAC.OR MULT.)
JAN	61.63	0.00	62.66	62.66	60.33	-36.29	-41.03	-30.29	711.11	1125.03	-0.00080
FEB	61.66	0.00	62.66	62.66	60.41	-34.14	-36.24	-31.54	561.72	955.93	-0.00081
MAR	63.96	63.27	67.21	67.20	62.12	-25.59	-30.81	-22.63	342.62	802.70	-0.00052
APR	71.59	74.32	70.22	72.53	71.13	-20.00	-20.24	-19.88	120.10	601.15	-0.00071
MAY	75.52	76.87	70.62	75.21	75.65	-18.75	-15.24	-20.16	31.51	583.28	-0.00122
JUN	80.61	77.82	0.00	77.74	81.84	-13.51	-6.96	-16.34	0.00	417.12	-0.00002
JUL	83.80	78.93	0.00	78.93	86.19	-8.23	-0.53	-12.02	0.00	318.53	0.00231
AUG	82.10	78.19	0.00	78.18	83.81	-10.25	-2.18	-13.77	0.00	355.19	0.00167
SEP	77.30	77.26	70.62	76.14	77.80	-15.92	-9.84	-18.51	17.00	491.29	-0.00053
OCT	71.50	73.85	69.94	72.29	71.13	-17.85	-16.19	-18.61	92.55	553.79	-0.00060
NOV	64.72	0.00	67.12	67.33	63.48	-23.77	-28.55	-21.50	269.06	713.72	-0.00094
DEC	61.80	0.00	63.92	63.92	59.69	-30.07	-32.54	-27.61	503.05	932.13	-0.00083
ANNUAL	71.40	77.28	65.04	69.96	72.25	-21.12	-22.67	-20.21	2648.73	7849.84	-0.00024

SS-L Fan Electric Energy Use for <system name>

This report gives a breakdown of monthly electric energy for fans (central and zone-level) and fan part load operation for an HVAC system.

FAN ELECTRIC ENERGY DURING HEATING

is the total electric energy used by the fans for hours when only heating is required.

FAN ELECTRIC ENERGY DURING COOLING

is the total electric energy used by the fans for hours when only cooling is required.

FAN ELECTRIC ENERGY DURING HEATING-COOLING

is the total electric energy used by the fans for hours when both heating and cooling are required.

FAN ELECTRIC ENERGY DURING FLOATING

is the total electric energy used by the fans when neither heating nor cooling is provided.

The right-hand side of the report shows the part-load operation of the fans. The number of operating hours within each part load band (0-10 percent, 10-20 percent, etc.) is given as well as the total hours of operation. If the fan operates during an hour, its part load in percent is 100*(total flow)/(design flow).

BREAKDOWN OF ANNUAL FAN POWER USAGE

gives the annual electric energy for the system's supply, return and exhaust fans.

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Simple Structure Run 3, Chicago         Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- SS-L Fan Electric Energy Use for    SYST-1                                                WEATHER FILE- TRY  CHICAGO
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MONTH	FAN ELEC DURING HEATING (KWH)	FAN ELEC DURING COOLING (KWH)	FAN ELEC DURING HEAT & COOL (KWH)	FAN ELEC DURING FLOATING (KWH)	-------- Number of hours within each PART LOAD range --------- 00 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 100	100 +	TOTAL RUN HOURS
JAN	318.090	0.000	0.000	0.000	0	0	0	395	10	4	7	0	0	0	0	416
FEB	283.986	0.000	0.000	0.000	0	0	0	356	5	3	8	0	0	0	0	372
MAR	190.102	6.798	0.000	4.759	0	0	0	254	10	3	2	0	0	0	0	269
APR	74.480	53.102	0.680	44.094	0	0	0	224	10	0	0	0	0	0	0	234
MAY	21.075	119.405	0.000	49.758	0	0	0	170	40	3	0	0	0	0	0	213
JUN	0.000	295.147	0.000	8.699	0	0	0	86	93	29	8	1	0	0	0	217
JUL	0.000	513.332	0.000	0.000	0	0	0	29	62	96	48	9	1	0	0	245
AUG	0.000	382.394	0.000	3.914	0	0	0	41	84	90	11	0	0	0	0	226
SEP	10.877	189.057	0.000	37.108	0	0	0	138	57	20	0	0	0	0	0	215
OCT	65.035	68.979	0.680	32.738	0	0	0	233	1	0	0	0	0	0	0	234
NOV	166.180	0.000	0.000	6.131	0	0	0	222	7	2	1	0	0	0	0	232
DEC	285.966	0.000	0.000	0.000	0	0	0	350	11	3	7	0	0	0	0	371
ANNUAL	1415.759	1628.213	1.360	187.201	0	0	0	2498	390	253	92	10	1	0	0	3244

BREAKDOWN OF ANNUAL FAN POWER USAGE

FAN TYPE	ANNUAL FAN ELEC (KWH)
SUPPLY	3230.
TOTAL	3230.

SS-M Building HVAC Fan Elec Energy

This report gives a breakdown of electric energy used by all fans in the building.

FAN ELECTRIC ENERGY DURING HEATING

is the total electric energy used by the fans when only heating is required.

FAN ELECTRIC ENERGY DURING COOLING

is the total electric energy used by the fans when only cooling is required.

FAN ELECTRIC ENERGY DURING HEATING-COOLING

is the total electric energy used by the fans when both heating and cooling are required.

FAN ELECTRIC ENERGY DURING FLOATING

is the total electric energy used by the fans when neither heating nor cooling is provided.

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Simple Structure Run 3, Chicago         Divide into zones; add plenum           DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- SS-M Building HVAC Fan Elec Energy                                                         WEATHER FILE- TRY  CHICAGO
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MONTH	FAN ELECTRIC ENERGY DURING HEATING (KWH)	FAN ELECTRIC ENERGY DURING COOLING (KWH)	FAN ELECTRIC ENERGY DURING HEATING-COOLING (KWH)	FAN ELECTRIC ENERGY DURING FLOATING (KWH)
JAN	318.090	0.000	0.000	0.000
FEB	283.986	0.000	0.000	0.000
MAR	190.102	6.798	0.000	4.759
APR	74.480	53.102	0.680	44.094
MAY	21.075	119.405	0.000	49.758
JUN	0.000	295.147	0.000	8.699
JUL	0.000	513.332	0.000	0.000
AUG	0.000	382.394	0.000	3.914
SEP	10.877	189.057	0.000	37.108
OCT	65.035	68.979	0.680	32.738
NOV	166.180	0.000	0.000	6.131
DEC	285.966	0.000	0.000	0.000
ANNUAL	1415.759	1628.213	1.360	187.201

SS-N Relative Humidity Summary for <system name>

In this scatter plot, the vertical axis, at the left, shows relative humidity bins. The horizontal azis, at the top, shows hours of the day (in local standard time), where "1AM" is midnight to 1:00am, "2" is 1:00am to 2:00am, etc. The cells of the plot contain number of hours during the run period for which the relative humidity of the system return air was in the particular relative humidity bin for a particular hour of the day. Only hours for which the fans are on are counted in this plot, except that hours the fans are on due to NIGHT-CYCLE-CTRL are not counted.

The TOTAL column at the far right is the sum of the entries in each row. It shows the frequency of relative humidity values for the run period. (Because the relative humidity counts are made only for hours when the fans are on, the sum the values in this column will generally not be equal to the number of hours in the run.)

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- SS-N Relative Humidity Summary for  SYST-1                                            WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------
```

TOTAL HOURS AT RELATIVE HUMIDITY LEVEL AND TIME OF DAY

HOUR	1AM	2	3	4	5	6	7	8	9	10	11	12	1PM	2	3	4	5	6	7	8	9	10	11	12	TOTAL
90-100	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
80-89	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	6
70-79	0	0	0	0	0	0	0	0	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4
60-69	0	0	0	0	0	0	0	2	2	3	4	3	1	3	1	5	5	4	0	0	0	0	0	0	33
50-59	0	0	0	0	0	0	0	45	45	31	19	10	12	7	9	9	13	5	0	0	0	0	0	0	205
40-49	0	0	0	0	0	0	0	46	60	70	74	77	78	81	73	77	77	6	0	0	0	0	0	0	719
30-39	0	0	0	0	0	0	0	31	60	63	64	58	44	58	67	61	57	26	0	0	0	0	0	0	599
20-29	0	0	0	0	0	0	0	17	65	64	65	64	75	72	72	72	70	49	0	0	0	0	0	0	685
10-19	0	0	0	0	0	0	0	0	17	19	25	38	39	29	28	28	30	21	0	0	0	0	0	0	274
0-09	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	14

```
****************************************************************
*                                                              *
*  NOTE  1)THE RELATIVE HUMIDITY COUNTS ARE MADE ONLY FOR      *
*          THE HOURS WHEN THE FANS ARE ON                      *
*                                                              *
****************************************************************
```

SS-O Space Temperature Summary for <zone name>

In this scatter plot the vertical axis, at the left, shows temperature bins. The horizontal axis, at the top, gives hours of the day in local standard time, where "1AM" is midnight to 1:00am, "2" is 1:00am to 2:00am, etc. Entered in each cell of the plot is the number of hours during the run period for which the zone air temperature was in the particular bin for the particular hour of the day. Only hours for which the fans are on are counted in this plot, except that hours the fans are on due to NIGHT-CYCLE-CTRL are not counted.

The column at the far right labeled "TOTAL" is the sum of the entries in each row. It shows the frequency of temperature values for the run period. Because the temperature counts are only made for hours when the fans are on, summing the totals column will not sum to the number of hours in the run.

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- SS-O Space Temperature Summary for  ZONE1-1                                         WEATHER FILE- TRY  CHICAGO
```

TOTAL HOURS AT TEMPERATURE LEVEL AND TIME OF DAY

HOUR	1AM	2	3	4	5	6	7	8	9	10	11	12	1PM	2	3	4	5	6	7	8	9	10	11	12	TOTAL
ABOVE 85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80-85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75-80	0	0	0	0	0	0	0	54	72	83	94	103	121	137	141	142	126	1	0	0	0	0	0	0	1074
70-75	0	0	0	0	0	0	0	85	176	168	157	148	130	114	110	108	125	108	0	0	0	0	0	0	1429
65-70	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	4
60-65	0	0	0	0	0	0	0	2	2	1	1	1	1	1	0	1	1	2	0	0	0	0	0	0	13
BELOW 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

```
****************************************************************
*                                                              *
*  NOTE  1)THE TEMPERATURE COUNTS ARE MADE ONLY FOR            *
*          THE HOURS WHEN THE FANS ARE ON                      *
*                                                              *
****************************************************************
```

SS-P Heating/Cooling Performance Summary of <zone or system name>

Two SS-P reports are produced for each unit or system: one for heating operation and one for cooling operation. These reports are provided for:

- each PSZ, PVAVS, RESYS, RESVVT, or PVVT system if Report SS-H is requested;
- each zone in a PTAC, HP, FC, UHT, UVT system if Report SS-H or SS-L is requested in the SYSTEMS-REPORT command.

UNIT TYPE

is the DOE-2 code-word for this HVAC system.

HEATING-CAPACITY and HEATING-EIR or COOLING-CAPACITY and COOLING-EIR and SUPPLY-FLOW

are as reported on SV-A for this system.

UNIT LOAD

gives the monthly sum and peak load on the unit and time of occurrence of peak in local standard time .

ENERGY USE

gives the monthly sum and peak electric energy used by the unit and time of occurrence of peak. Energy use includes that from the compressor, outdoor fans, pumps, auxiliaries (specified by UNIT-AUX-KW), crankcase heat and evaporative precooler.

COMPRESSOR

gives the monthly sum and peak electric energy used by the engine/motor, not including the crankcase heat, and time of occurrence of the peak.

FAN ENERGY

gives the monthly sum and peak fan energy during the time the unit is in the heating/cooling mode, and the time of occurrence of the peak.

Number of hours within each PART LOAD range

For each month, shows the number of hours that the unit (top line) or indoor fan (bottom line) spent in various part load ranges (0-10%, 10-20%, etc.). If the unit is on during the hour and the operation is within the specified range, the count of hours is incremented by 1.

DOE-2.2b-130 Wed Feb 12 14:57:23 1997BDL RUN 1

REPORT- SS-P Cooling Performance Summary of System 1 WEATHER FILE- LOS ANGELES, CA

UNIT TYPE is PSZ COOLING-CAPACITY = 110.949 (KBTU/HR) COOLING-EIR = 0.360 (BTU/BTU) SUPPLY-FLOW = 3895. (CFM)

MONTH	SUM / PEAK	UNIT LOAD SUM (MBTU) PEAK (KBTU/HR)	ENERGY USE (KWH) (KW)	COMPRESSOR (KWH) (KW)	FAN ENERGY (KWH) (KW)		00-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 +	TOTAL RUN HOURS
							-------- Number of hours within each PART LOAD range ----											
JAN	SUM	1.527	140.908	135.708	1701.129	CMP	0	0	14	12	16	0	0	0	0	0	0	42
	PEAK	55.358	4.737	4.737	2.286	FAN	0	0	0	0	0	0	0	0	0	0	42	42
	DAY/HR	11/15	11/15	11/15	31/24													
FEB	SUM	1.050	96.190	92.040	1536.501	CMP	0	0	3	6	8	6	0	0	0	0	0	23
	PEAK	60.188	5.157	5.157	2.286	FAN	0	0	0	0	0	0	0	0	0	0	23	23
	DAY/HR	13/16	13/16	13/16	28/24													
MAR	SUM	2.074	183.247	179.647	1701.129	CMP	0	0	8	5	18	14	0	0	0	0	0	45
	PEAK	64.816	5.565	5.565	2.286	FAN	0	0	0	0	0	0	0	0	0	0	45	45
	DAY/HR	6/16	6/16	6/16	31/24													
APR	SUM	5.323	469.032	468.832	1646.253	CMP	0	0	20	13	35	39	5	0	0	0	0	112
	PEAK	71.524	6.317	6.317	2.286	FAN	0	0	0	0	0	0	0	0	0	0	112	112
	DAY/HR	22/16	22/16	22/16	30/ 1													
MAY	SUM	11.011	961.959	961.959	1701.129	CMP	0	0	23	31	57	76	22	2	0	0	0	211
	PEAK	78.657	7.146	7.146	2.286	FAN	0	0	0	0	0	0	0	0	0	0	211	211
	DAY/HR	29/17	29/16	29/16	31/ 1													
JUN	SUM	12.232	1066.793	1066.793	1646.253	CMP	0	0	25	33	71	72	30	2	0	0	0	233
	PEAK	78.545	7.113	7.113	2.286	FAN	0	0	0	0	0	0	0	0	0	0	233	233
	DAY/HR	20/17	20/17	20/17	30/ 1													
JUL	SUM	18.125	1610.477	1610.477	1701.129	CMP	0	0	52	46	82	85	71	9	0	0	0	345
	PEAK	80.497	7.844	7.844	2.286	FAN	0	0	0	0	0	0	0	0	0	0	345	345
	DAY/HR	10/17	10/17	10/17	31/ 1													
AUG	SUM	20.744	1891.062	1891.062	1701.129	CMP	0	0	77	56	61	88	84	27	3	2	0	398
	PEAK	93.582	10.261	10.261	2.286	FAN	0	0	0	0	0	0	0	0	0	0	398	398
	DAY/HR	31/17	31/15	31/15	31/ 1													
SEP	SUM	16.612	1492.149	1492.149	1646.253	CMP	0	0	56	51	66	92	56	4	0	0	0	325
	PEAK	78.350	7.418	7.418	2.286	FAN	0	0	0	0	0	0	0	0	0	0	325	325
	DAY/HR	7/17	7/16	7/16	30/ 1													
OCT	SUM	9.943	880.284	879.984	1701.129	CMP	0	0	42	42	65	56	10	0	0	0	0	215
	PEAK	74.318	6.866	6.866	2.286	FAN	0	0	0	0	0	0	0	0	0	0	215	215
	DAY/HR	1/16	1/15	1/15	31/24													
NOV	SUM	4.618	406.664	405.214	1646.253	CMP	0	0	21	25	56	6	0	0	0	0	0	108
	PEAK	58.215	5.316	5.316	2.286	FAN	0	0	0	0	0	0	0	0	0	0	108	108
	DAY/HR	29/15	29/15	29/15	30/24													
DEC	SUM	2.950	277.788	269.190	1701.129	CMP	0	0	24	21	26	6	0	0	0	0	0	77
	PEAK	62.773	6.122	6.122	2.286	FAN	0	0	0	0	0	0	0	0	0	0	77	77
	DAY/HR	19/15	19/15	19/15	31/24													
YR	SUM	106.208	9476.502	9453.041	20029.475	CMP	0	0	365	341	561	540	278	44	3	2	0	2134
	PEAK	93.582	10.261	10.261	2.286	FAN	0	0	0	0	0	0	0	0	0	0	2134	2134
	MON/DAY	8/31	8/31	8/31	12/31													

SS-Q Heat Pump Cooling/Heating Summary for <system name>

Two reports, one for cooling operation and one for heating operation, are produced for each system that contains an electric or gas heat pump. These reports are provided for each PSZ, PVAVS, RESYS, RESVVT and PTAC system if SS-A is requested.

UNIT RUN TIME

is the total run time for all the gas heat pumps or the sum of the hourly part load ratios for all the electric heat pumps in the system. If a system serves several zones, each of which has a separate heat pump, the run time is the total run time of all the heat pumps. For example, if, in a particular hour, each of the heat pumps in three zones runs for 0.5 hours, then UNIT RUN TIME is incremented by 3 x 0.5 = 1.5.

TOTAL LOAD ON UNIT

is the total load on all the units (including the defrost load for heat pumps in the heating mode) in the system. For a heat pump in the heating mode, excluded is the superheat recovered to a domestic water heater (see Waste Heat Use for this item).

ENERGY INTO UNIT

is the electric or fuel energy into all of the units to provide heating or cooling. Does not include auxiliaries for the unit except those included in the base EIR or HIR.

AUXILIARY ENERGY

is the energy for outdoor fans, evaporative precoolers, auxiliary electrical, or pumps for the units.

SUP UNIT LOAD

is the total load on the supplemental heating units. This includes time when the supplemental unit is operating alone or in conjunction with the heat pump.

SUP UNIT ENERGY

is the energy into the supplemental heating units.

WASTE HEAT GENERATED

is the recoverable waste heat generated by the units.

WASTE HEAT USE

is the amount of waste heat used to meet the domestic hot water loads, or recovered for space heating.

DEFROST LOAD

for heating summary only, is the heating load imposed when running in defrost mode.

INDOOR FAN ENERGY

is the electric consumption of the indoor fans.

CSPF (WITH PARASITICS) and CSPF (WITHOUT PARASITICS), or HSPF (WITH PARASITICS) and HSPF (WITHOUT PARASITICS)

are the cooling and heating season performance factors, respectively, as computed with and without parasitics. The value without parasitics is the total load (main and supplemental) divided by the total energy consumed (main plus supplemental).

The value with parasitics adds all the auxiliaries (pumps, fans, etc.) to the energy consumed and subtracts the indoor fan heat from the load (which increases heating load and decreases cooling load).

DOE-2.2b-130 Wed Feb 12 14:57:23 1997BDL RUN 1

REPORT- SS-Q Heat Pump Cooling Summary for System 1   WEATHER FILE- LOS ANGELES, CA

	UNIT RUN TIME (HOURS)	TOTAL LOAD ON UNIT (MBTU)	ENERGY IN TO UNIT (MBTU)	AUXILIARY ENERGY (MBTU)	SUP UNIT LOAD (MBTU)	SUP UNIT ENERGY (MBTU)	WASTE HEAT GENERATED (MBTU)	WASTE HEAT USE (MBTU)		INDOOR FAN ENERGY (MBTU)
JAN	15.	1.527	0.463	0.018	0.000	0.000	0.000	0.000	0.000	1.545
FEB	10.	1.050	0.314	0.014	0.000	0.000	0.000	0.000	0.000	1.440
MAR	19.	2.074	0.613	0.012	0.000	0.000	0.000	0.000	0.000	1.744
APR	50.	5.323	1.600	0.001	0.000	0.000	0.000	0.000	0.000	2.185
MAY	100.	11.011	3.283	0.000	0.000	0.000	0.000	0.000	0.000	2.969
JUN	110.	12.232	3.641	0.000	0.000	0.000	0.000	0.000	0.000	3.192
JUL	166.	18.125	5.497	0.000	0.000	0.000	0.000	0.000	0.000	4.042
AUG	193.	20.744	6.454	0.000	0.000	0.000	0.000	0.000	0.000	4.272
SEP	152.	16.612	5.093	0.000	0.000	0.000	0.000	0.000	0.000	3.703
OCT	92.	9.943	3.003	0.001	0.000	0.000	0.000	0.000	0.000	2.903
NOV	42.	4.618	1.383	0.005	0.000	0.000	0.000	0.000	0.000	1.927
DEC	28.	2.950	0.919	0.029	0.000	0.000	0.000	0.000	0.000	1.810
0ANNUAL	978.	106.208	32.263	0.080	0.000	0.000	0.000	0.000	0.000	31.733

CSPF (WITH PARASITICS) = 1.66 (KBTU/HR)
CSPF (WITHOUT PARASITICS) = 3.29 (BTU/BTU)

SS-R Zone Performance Summary for <system name>

This report has been added to provide information on the part-load performance of VAV boxes in zones as well as to identify those zones that influence the WARMEST and COLDEST supply air reset controls.

ZONE OF MAXIMUM HTG DMND

is the number of hours this zone has the highest heating demand of all the zones.

ZONE OF MAXIMUM CLG DMND

is the number of hours this zone has the highest cooling demand of all the zones.

ZONE UNDER HEATED

is the number of hours that the zone is being conditioned and the zone air temperature is below the heating thermostat throttling range by more than 1°F.

ZONE UNDER COOLED

is the number of hours that the zone is being conditioned and the zone air temperature is above the cooling thermostat throttling range by more than 1°F.

Number of hours in each PART LOAD range

is the number of hours the airflow part load ratio was in each bin, where the airflow part load ratio is defined as the hourly flow divided by the design flow as reported in SV-A

TOTAL RUN HOURS

is the total number of hours in which there was a non-zero airflow into the zone.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- SS-R Zone Performance Summary for   SYST-1                                              WEATHER FILE- TRY  CHICAGO
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ZONE	ZONE OF MAXIMUM HTG DMND (HOURS)	ZONE OF MAXIMUM CLG DMND (HOURS)	ZONE UNDER HEATED (HOURS)	ZONE UNDER COOLED (HOURS)	Number of hours within each PART LOAD range 00-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 +	TOTAL RUN HOURS
ZONE1-1	0	0	17	0	0	0	0	2684	322	172	63	3	0	0	0	3244
ZONE2-1	0	0	17	0	0	0	0	2688	388	119	42	6	1	0	0	3244
ZONE3-1	0	0	21	0	0	0	0	2522	360	272	75	13	0	2	0	3244
ZONE4-1	0	0	35	0	0	0	0	2880	261	83	17	3	0	0	0	3244
ZONE5-1	0	0	31	12	0	0	0	2263	199	353	216	93	36	84	0	3244
TOTAL	0	0	121	12												

SUPL Evap/ Desiccant Cooling for <system name>

This report is printed for each system that has a desiccant or evaporative cooling unit to supplement the mechanical cooling. These are systems for which the user has specified DESICCANT = LIQ-VENT-AIR-1, LIQ-VENT-AIR-2, or SOL-VENT-AIR-1; or EVAP-CL-TYPE = INDIRECT or INDIRECT-DIRECT. This report will not be printed for stand-alone desiccant or evaporative cooling systems (SYSTEM:TYPE = PTGSD or EVAP-COOL). In this case the usual SYSTEMS reports are used.

TOTAL COOLING ENERGY

is the monthly sum of the energy (sensible and latent) removed by the supplemental unit from the supply air before it reaches the cooling coil.

SENSIBLE COOLING ENERGY

is the monthly sum of the sensible energy removed by the supplemental unit.

LATENT COOLING ENERGY

is the monthly sum of the latent energy removed by the supplemental unit.

HOURS ON

is the total number of hours the unit was operating during the month.

ELECTRIC ENERGY

is the monthly electrical consumption by the supplemental unit.

GAS OIL ENERGY

is the fuel consumed by the supplemental unit for the month.

```
SMALL BAR/LOUGE                         DEMO DESICCANT & EVAPORATIVE COOLING    DOE-2.1E-092  Wed Oct  8 16:41:48 1997SDL RUN  2
NEW FEATURES IN DOE2.1E RUN 2           SYSTEM 2: PKG ROOFTOP PSZ AC UNIT       DESICCANT COOLING OF MIN OA
REPORT- SUPL  SYSTEM SUPPLEMENTAL EVAPORATIVE OR DESICCANT COOLING FOR  SYS1                WEATHER FILE- TRY  CHICAGO
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MONTH	TOTAL COOLING ENERGY (MBTU)	SENSIBLE COOLING ENERGY (MBTU)	LATENT COOLING ENERGY (MBTU)	HOURS ON	ELECTRIC ENERGY (KWH)	GAS OIL ENERGY (MBTU)
JAN	0.00000	0.00000	0.00000	0	0.	0.00000
FEB	0.00000	0.00000	0.00000	0	0.	0.00000
MAR	0.44183	0.12643	0.31541	29	17.	1.15190
APR	2.96209	1.60152	1.36056	204	116.	6.79351
MAY	3.90973	0.96668	2.94304	249	144.	9.95194
JUN	8.92682	2.58435	6.34247	533	307.	20.52970
JUL	13.88187	0.88956	12.99232	705	411.	31.03108
AUG	12.53177	0.90114	11.63064	671	391.	29.44838
SEP	5.70114	2.40156	3.29958	360	205.	12.66627
OCT	3.29700	1.76097	1.53603	226	128.	7.46790
NOV	0.52543	0.22485	0.30058	34	19.	1.22540
DEC	0.00000	0.00000	0.00000	0	0.	0.00000
TOTAL	52.17781	11.45708	40.72067	3011	1739.	120.26609

ERV Energy Recovery Summary for <system name>

This report is printed for each system that has an energy recovery ventilator (ERV) that acts as a heat-recovery device between the the central exhaust and the outside air makeup. These are systems for which the user has specified RECOVER-EXHAUST = YES. The first set of items are design information:

AIRFLOW

is the design airflow of the outdoor, exhaust, and purge airstreams.

POWER CONSUMPTION

for ERVs with self-contained fans, is the electric energy used by the outside and exhaust fans. For heat wheels, is also the energy used by the motor that rotates the wheel.

PREHEAT

is the capacity of the preheat coil, if any. Note that this preheat coil is not the same as the air-handler's preheat coil. This coil is used strictly to prevent frosting in the exhaust airstream.

The next set of items summarize performance:

SENSIBLE HEATING, COOLING

is the sensible heating and cooling energy recovered.

TOTAL HEATING, COOLING

is the total heating and cooling energy recovered, including latent.

EXCESS SENSIBLE HEATING, COOLING

is the sensible heating and cooling energy recovered that is beyond that needed, and that results in overheating or overcooling of the mixed air.

POWER FANS&HX

is the power of the fans and heat-wheel motor. If the ERV does not have self-contained fans, but instead relies upon the HVAC fans, this entry includes the HVAC fan energy penalty associated with the increased static pressure loss across the heat exchanger. *Note that other reports for HVAC fan energy do not include this penalty.*

PREHEAT HOT WATER, ELECTRIC

is the preheat energy used to prevent condensation and/or frost build-up within the heat exchanger.

HOURS HEAT, COOL

is the number of hours the ERV was operating in the heating mode (raising the mixed-air temperature), and in the cooling mode (lowering the mixed-air temperature). Note that, depending on the manner in which the ERV is controlled, the ERV may be in the heating mode while the air handler is in the cooling mode (using its cooling coil to lower the supply temperature). The opposite is also true.

EXHAUST OUTLET WET, FROSTED

is the number of hours the exhaust air was cooled to the point where condensation or frost developed on the heat exchanger. For an enthalpy exchanger, moisture exchange may be contributing to this process.

MAKE-UP OUTLET WET, FROSTED

is the number of hours the outside air outlet was cooled to the point where condensation or frost developed on the heat exchanger. For an enthalpy exchanger, moisture exchange may be contributing to this process.

CONDENSATE CONTROL

is the number of hours that one of the condensate control mechanisms was active (preheat, outside-air bypass, or exhaust bypass).

ERV Example Report DOE-2.2-42h 12/15/2003 16:44:20 BDL RUN 1

REPORT- ERV Energy Recovery Summary for: AHU-1 WEATHER FILE- Chicago IL TMY2

AIR FLOW: OUTDOOR (CFM)	AIR FLOW: EXHAUST (CFM)	AIR FLOW: PURGE (CFM)	POWER CONSUMPTION: OA FAN (KW)	POWER CONSUMPTION: EXH FAN (KW)	POWER CONSUMPTION: HT EXCH (KW)	PREHEAT (KBTU/HR)
624.	624.	0.	0.191	0.191	0.053	0.

MON	SUM / PEAK	SENSIBLE HEATING (MBTU) (KBTU/HR)	SENSIBLE COOLING (MBTU) (KBTU/HR)	TOTAL HEATING (MBTU) (KBTU/HR)	TOTAL COOLING (MBTU) (KBTU/HR)	EXCESS SENSIBLE HEATING (MBTU) (KBTU/HR)	EXCESS SENSIBLE COOLING (MBTU) (KBTU/HR)	POWER FANS&HX (KWH) (KW)	PREHEAT HOT WATER (MBTU) (KBTU/HR)	PREHEAT ELECTRIC (KWH) (KW)	HOURS HEAT	HOURS COOL
JAN	SUM	-1.447	0.000	-1.972	0.000	0.000	0.000	69.166	0.000	0.000	172	0
	PEAK	-25.585	0.000	-38.649	0.000	0.000	0.000	0.434	0.000	0.000		
	DAY/HR	27/18	0/ 0	27/18	0/ 0	0/ 0	0/ 0	2/13	0/ 0	0/ 0		
FEB	SUM	-0.407	0.000	-0.482	0.000	0.000	0.000	45.812	0.000	0.000	116	0
	PEAK	-18.563	0.000	-18.651	0.000	0.000	0.000	0.424	0.000	0.000		
	DAY/HR	8/ 9	0/ 0	8/ 9	0/ 0	0/ 0	0/ 0	1/ 9	0/ 0	0/ 0		
MAR	SUM	-0.045	0.011	-0.052	0.003	0.000	0.000	20.515	0.000	0.000	49	3
	PEAK	-12.904	4.618	-13.329	2.515	0.000	0.000	0.434	0.000	0.000		
	DAY/HR	3/ 9	31/14	3/ 9	31/14	0/ 0	0/ 0	14/11	0/ 0	0/ 0		
APR	SUM	-0.044	0.010	-0.095	0.002	0.000	0.000	25.705	0.000	0.000	61	4
	PEAK	-5.095	3.125	-9.051	2.331	0.000	0.000	0.434	0.000	0.000		
	DAY/HR	1/11	7/14	18/18	3/14	0/ 0	0/ 0	1/11	0/ 0	0/ 0		
MAY	SUM	-0.050	0.169	-0.117	0.116	0.000	0.000	34.665	0.000	0.000	47	37
	PEAK	-5.576	7.531	-8.621	16.570	0.000	0.000	0.434	0.000	0.000		
	DAY/HR	15/11	5/14	13/16	30/18	0/ 0	0/ 0	3/12	0/ 0	0/ 0		
JUN	SUM	-0.007	0.439	-0.011	0.937	0.000	0.000	37.718	0.000	0.000	3	84
	PEAK	-3.483	7.717	-6.020	24.328	0.000	0.000	0.434	0.000	0.000		
	DAY/HR	24/11	6/17	24/11	20/15	0/ 0	0/ 0	3/13	0/ 0	0/ 0		
JUL	SUM	0.000	0.633	0.000	1.711	0.000	0.000	43.884	0.000	0.000	0	101
	PEAK	0.000	10.188	0.000	26.274	0.000	0.000	0.434	0.000	0.000		
	DAY/HR	0/ 0	9/17	0/ 0	2/15	0/ 0	0/ 0	1/11	0/ 0	0/ 0		
AUG	SUM	-0.001	0.276	0.000	1.010	0.000	0.000	29.463	0.000	0.000	2	66
	PEAK	-0.937	6.194	-0.343	31.642	0.000	0.000	0.434	0.000	0.000		
	DAY/HR	19/ 9	21/15	19/ 9	4/17	0/ 0	0/ 0	1/13	0/ 0	0/ 0		
SEP	SUM	-0.019	0.149	-0.030	0.249	0.000	0.000	22.103	0.000	0.000	23	30
	PEAK	-4.313	7.966	-7.154	14.486	0.000	0.000	0.434	0.000	0.000		
	DAY/HR	30/11	27/17	30/11	6/14	0/ 0	0/ 0	4/14	0/ 0	0/ 0		
OCT	SUM	-0.104	0.007	-0.174	0.008	0.000	0.000	34.130	0.000	0.000	84	2
	PEAK	-7.651	3.746	-12.112	4.233	0.000	0.000	0.434	0.000	0.000		
	DAY/HR	15/11	4/16	15/11	4/16	0/ 0	0/ 0	4/15	0/ 0	0/ 0		
NOV	SUM	-0.048	0.000	-0.076	0.000	0.000	0.000	25.519	0.000	0.000	65	0
	PEAK	-4.145	0.000	-7.031	0.000	0.000	0.000	0.399	0.000	0.000		
	DAY/HR	13/11	0/ 0	13/11	0/ 0	0/ 0	0/ 0	26/13	0/ 0	0/ 0		

PowerDOE Default Minimum Project DOE-2.2-42h 12/15/2003 16:44:20 BDL RUN 1

REPORT- ERV Energy Recovery Summary for: VAV AH#1 WEATHER FILE- Chicago IL TMY2

(CONTINUED)

MON	SUM / PEAK	SENSIBLE HEATING	SENSIBLE COOLING	TOTAL HEATING	TOTAL COOLING	EXCESS SENSIBLE HEATING	EXCESS SENSIBLE COOLING	POWER FANS&HX	PREHEAT HOT WATER	PREHEAT ELECTRIC	HOURS HEAT	HOURS COOL
DEC	SUM	-0.397	0.000	-0.470	0.000	0.000	0.000	39.035	0.000	0.000	99	0
	PEAK	-28.248	0.000	-31.666	0.000	0.000	0.000	0.418	0.000	0.000		
	DAY/HR	31/ 9	0/ 0	31/11	0/ 0	0/ 0	0/ 0	31/ 9	0/ 0	0/ 0		
YR	SUM	-2.569	1.693	-3.479	4.035	0.000	0.000	427.715	0.000	0.000	721	327
	PEAK	-28.248	10.188	-38.649	31.642	0.000	0.000	0.434	0.000	0.000		
	MON/DAY	12/31	7/ 9	1/27	8/ 4	0/ 0	0/ 0	1/ 2	0/ 0	0/ 0		

	EXHAUST OUTLET: WET	EXHAUST OUTLET: FROSTED	MAKE-UP OUTLET: WET	MAKE-UP OUTLET: FROSTED	CONDENSATE CONTROL
ANNUAL HOURS:	0	4	0	3	7

PLANT-REPORT

PV-A Plant Design Parameters

This report summarizes the design information for each component simulated in the central plant(s)

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- PV-A Plant Design Parameters                                                     WEATHER FILE- TRY  CHICAGO
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 *** CIRCULATION LOOPS ***

    HEATING     COOLING      LOOP       TOTAL      SUPPLY      SUPPLY      RETURN      RETURN       LOOP     FLUID HEAT
   CAPACITY    CAPACITY      FLOW        HEAD    UA PRODUCT   LOSS DT    UA PRODUCT   LOSS DT      VOLUME     CAPACITY
   (MBTU/HR)   (MBTU/HR) (GAL/MIN   )    (FT)     (BTU/HR-F)    (F)      (BTU/HR-F)     (F)       ( GAL )   (BTU/LB-F)
  ----------  ----------  ----------  ----------  ----------  ----------  ----------  ----------  ----------  ----------

 Heating-Loop
      -0.430       0.000        21.5        36.6         0.0        0.00         0.0        0.00        32.3        1.00

 Cooling-Loop
       0.000       0.244        48.2        56.6         0.0        0.00         0.0        0.00        72.3        1.00

 *** PUMPS ***                                                   HEAD     CAPACITY                MECHANICAL    MOTOR
                                             FLOW        HEAD   SETPOINT    CONTROL       POWER    EFFICIENCY  EFFICIENCY
             ATTACHED TO                 (GAL/MIN   )   (FT)      (FT)                    (KW)       (FRAC)      (FRAC)
  --------------------------------  ----------  ----------  ----------  ----------  ----------  ----------  ----------

 Heating-Pump                       1 PUMP(s)
    Heating-Loop                              21.5        43.9         0.0  ONE-SPEED       0.331       0.770       0.700
    PRIMARY LOOP

 Cooling-Pump                       1 PUMP(s)
    Cooling-Loop                              48.2        67.9         0.0  ONE-SPEED       1.001       0.770       0.800
    PRIMARY LOOP

 *** PRIMARY EQUIPMENT ***
                                                                   CAPACITY      FLOW         EIR         HIR     AUXILIARY
    EQUIPMENT TYPE              ATTACHED TO                        (MBTU/HR) (GAL/MIN   )   (FRAC)      (FRAC)        (KW)
  ----------------  --------------------------------  ----------  ----------  ----------  ----------  ----------

 Boiler-1
   HW-BOILER         Heating-Loop                              -0.430        21.5       0.000       1.250       0.000

 Chiller-1
   ELEC-HERM-REC     Cooling-Loop                               0.244        48.7       0.274       0.000       0.000
```

Circulation-Loops

For each circulation loop simulated, the report lists the loop's U-name, and:

HEATING CAPACITY

reports the non-coincident heating capacity. Depending on the value of the loop's SIZING-OPTION, the value represents either the sum of all loop demanders (SECONDARY), or loop suppliers (PRIMARY).

COOLING CAPACITY

reports the non-coincident heating capacity. Depending on the value of the loop's SIZING-OPTION, the value represents either the sum of all loop demanders (SECONDARY), or loop suppliers (PRIMARY).

LOOP FLOW

is the flow at the larger of the HEATING-CAPACITY or COOLING-CAPACITY, at the design loop temperature change.

TOTAL HEAD

is the sum of the maximum demander head (friction and static), the piping head (friction and static), and maximum primary equipment heat (friction and static).

SUPPLY UA PRODUCT

is the loss coefficient of the supply piping.

SUPPLY LOSS DT

is the design temperature change of the supply piping due to thermal losses.

RETURN UA PRODUCT

is the loss coefficient of the return piping.

RETURN LOSS DT

is the design temperature change of the return piping due to thermal losses.

LOOP VOLUME

is the volume of fluid within the circulation loop

FLUID HEAT CAPACITY

is the heat capacity of the fluid within the circulation loop – used to calculate the thermal effect of a change in supply/return temperature.

Pumps

For each pump simulated, the report lists the pump's U-name, the number of identical pumps, and:

ATTACHED TO

lists the U-Name of the circulation loop or the primary equipment unit (boiler, chiller, etc.) to which this pump is attached. Also listed is the function of the pump.

FLOW

is the design flow of the pump,

HEAD

is the design head of the pump

HEAD SETPOINT

is the user-specified head setpoint for the pump; should be non-zero only if a loop is powered by more than one pump attached to equipment (instead of directly to the loop), and the pumps must operate at different heads.

CAPACITY CONTROL

specifies the capacity control mechanism for the pump. ONE-SPEED implies that the pump simply rides its curve. TWO-SPEED implies that the pump has two-speeds, but will also ride its curve as required at a given speed. If more that one pump is specified, pumps will also stage.

POWER

is the design electrical power of the pump.

MECHANICAL EFFICIENCY

is the mechanical efficiency of the impeller.

MOTOR EFFICIENCY

is the efficiency of the pump's motor.

Primary Equipment

For each boiler or chiller simulated, the report lists the component's U-name, and:

EQUIPMENT TYPE

lists the type of equipment which is identical to the TYPE code-word originally specified by the user.

ATTACHED TO

lists the circulation-loop(s) to which the equipment is attached. If a component is attached to more than one loop, each loop will be listed.

CAPACITY

is the nominal supply capacity or demand load of the equipment, relative to the loop(s) to which it is attached. For example, an absorption chiller has a given capacity it can supply to a chilled-water loop, a demand on a hot-water loop, and an additional demand on a condenser-water loop.

FLOW

is the nominal flow of the component on the given attachment.

EIR

is the electric input ratio.

HIR

is the heat input ratio

AUXILIARY

is any auxiliary power required by the component.

PS-A Plant Energy Utilization

This report shows monthly site energy use and demand for the central plant disaggregated into various categories. It also gives the total source energy. Thermal quantities are given in MBtu (English) or MWh (metric). Electrical quantities are given in MWh.

TOTAL HEAT LOAD

Total heating energy that the plant must provide. It is calculated as load from SYSTEMS + load from PLANT (absorption chillers + steam turbines + heat dissipated from storage tanks + domestic hot water + heat stored in tanks but not used) + circulation loop losses. The values here are identical to those under HEATING ENERGY in the SS-D report (Building HVAC Load Summary) except that the heat energy delivered to an absorption chiller, steam turbine, domestic hot water, circulation-loop thermal losses, and pump heat is included. Also included is the heat input to a storage tank from a boiler.

TOTAL COOLING LOAD

Total cooling energy that the plant must provide. It is equal to the value shown under COOLING ENERGY in the SS-D report plus tank and circulation loop losses, and pump heat.

TOTAL ELECTR LOAD

Total electrical energy consumed by lights, equipment and system fans plus the additional energy consumed by chiller motors, pumps, cooling towers, and any other electrical site use.

RECVRED ENERGY

Recovered heat used to reduce heating loads. It includes waste heat from turbines, diesels and chillers. It does not include the superheat of DX units recovered directly to domestic water heaters.

WASTED RECVRABL ENERGY

Heat that could have been recovered if had there been a need for it.

FUEL INPUT COOLING

Fuel used to drive engine chillers and gas fired absorption chiller/heaters, and regeneration fuel for desiccant cooling systems.

ELEC INPUT COOLING

Electric energy used to drive chillers and to supply power to heat rejection equipment. It excludes pumps.

FUEL INPUT HEATING

Fuel used for heating by boilers, furnaces and domestic water heaters.

ELEC INPUT HEATING

Electrical energy used in association with supplying heating, including the electrical consumption by draft fans, electric boilers and electric domestic water heaters. It excludes pumps.

FUEL INPUT ELEC

Fuel used by diesel and gas turbine generators.

TOTAL FUEL INPUT

Total fuel use.

TOTAL SITE ENERGY

The sum of purchased fuel, electricity, chilled water and steam.

TOTAL SOURCE ENERGY

The energy used at the source. For each ELEC-METER, FUEL-METER, etc., the energy consumption at the site is divided by the corresponding SOURCE-SITE-EFF to arrive at the energy consumed and transmitted by the generating station; the results are summed. To avoid double-counting energy, submeters are excluded in this calculation.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- PS-A Plant Energy Utilization                                                      WEATHER FILE- TRY  CHICAGO
------------------------------------------------------------------------------------------------------------------------------
```

	S I T E E N E R G Y												SOURCE
	2	3	4	5	6	7	8	9	10	11	12	13	14
MONTH	TOTAL HEAT LOAD (MBTU)	TOTAL COOLING LOAD (MBTU)	TOTAL ELECTR LOAD (MWH)	RCVRED ENERGY (MBTU)	WASTED RCVRABL ENERGY (MBTU)	FUEL INPUT COOLING (MBTU)	ELEC INPUT COOLING (MWH)	FUEL INPUT HEATING (MBTU)	ELEC INPUT HEATING (MWH)	FUEL INPUT ELECT (MBTU)	TOTAL FUEL INPUT (MBTU)	TOTAL SITE ENERGY (MBTU)	TOTAL SOURCE ENERGY (MBTU)
JAN	-33.9	0.0	3.5	0.0	0.0	0.0	0.0	58.8	0.0	0.0	58.8	70.7	94.5
FEB	-26.2	0.0	3.1	0.0	0.0	0.0	0.0	47.1	0.0	0.0	47.1	57.6	78.4
MAR	-14.0	0.3	3.3	0.0	0.0	0.0	0.0	27.0	0.0	0.0	27.0	38.2	60.5
APR	-2.9	2.4	3.6	0.0	0.0	0.0	0.3	7.4	0.0	0.0	7.4	19.6	44.0
MAY	-0.3	6.1	3.9	0.0	0.0	0.0	0.6	1.4	0.0	0.0	1.4	14.8	41.5
JUN	0.0	14.3	4.9	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	16.6	49.8
JUL	0.0	27.2	6.4	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	21.7	65.2
AUG	0.0	21.1	5.6	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	19.1	57.3
SEP	-0.2	9.8	4.3	0.0	0.0	0.0	1.0	0.7	0.0	0.0	0.7	15.4	45.0
OCT	-2.5	3.2	3.7	0.0	0.0	0.0	0.4	6.6	0.0	0.0	6.6	19.3	44.7
NOV	-11.2	0.0	2.9	0.0	0.0	0.0	0.0	22.5	0.0	0.0	22.5	32.3	52.0
DEC	-24.8	0.0	3.4	0.0	0.0	0.0	0.0	45.3	0.0	0.0	45.3	57.0	80.5
TOTAL	-116.0	84.3	48.5	0.0	0.0	0.0	8.4	216.8	0.0	0.0	216.8	382.3	713.3

PS-B Utility and Fuel Use Summary

This report shows the monthly total consumption and peak hourly consumption (and associated time of occurrence) for all of the electric meters, fuel meters, etc., including submeters.

Usage is displayed in the actual units of consumption (kWh, therms, etc.).

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- PS-B Utility and Fuel Use Summary                                                    WEATHER FILE- TRY  CHICAGO
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                  JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC    TOTAL
              -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------

 EM1  ELECTRICITY
KWH             3482.    3061.    3272.    3574.    3919.    4864.    6367.    5592.    4333.    3721.    2878.    3435.   48498.
MAX KW           13.1     13.1     17.5     22.7     26.9     30.4     35.0     29.7     27.6     18.9     13.1     13.1     35.0
DAY/HR          13/11    24/11     3/15    28/15    21/14    20/16    14/14    19/16    11/15    31/15    17/11    22/11     7/14

FUEL NATURAL-GAS
THERM            588.     471.     270.      74.      14.       0.       0.       0.       7.      66.     225.     453.    2168.
MAX THERM/HR      4.0      3.7      3.8      2.8      1.9      0.0      0.0      0.0      1.9      2.9      3.5      3.8      4.0
DAY/HR           2/ 8     4/ 8    24/ 8     8/ 8     9/ 8     0/ 0     0/ 0     0/ 0    23/ 8    20/ 8    12/ 8    10/ 8     1/ 2
```

PS-C Equipment Loads and Energy Use

For each central plant component, this report lists the unit's yearly heating and/or cooling load, the electrical and fuel consumption, and performance information in a bin format. This report is for the central plant equipment comonents only; report PS-D summarizes the performance of circulation loops.

Bin information is presented in terms of the number of hours the load, fuel consumption, etc. fell into the appropriate part load bin. The part load is calculated in terms of the hourly load divided by the design capacity or consumption.

COOL LOAD

is the total cooling load placed on the component during the run. The load includes the effect of any pump attached to the component. For cooling towers, the cooling load is the heat-rejection load.

HEAT LOAD

is the total heating load placed on the component during the run. The load includes the effect of any pump attached to the component.

ELEC USED

is the total electrical demand of the component during the run.

FUEL USED

is the total fuel demand of the component during the run. For consistency across components, fuel consumption is reported in Btu's rather than units of consumption, unlike the meter-based reports.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- PS-C Equipment Loads and Energy Use                                             WEATHER FILE- TRY  CHICAGO
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            COOL LOAD   HEAT LOAD   ELEC USE    FUEL USE      ----  Number of hours within each PART LOAD range  ---- TOTAL
      SUM    (MBTU)      (MBTU)      (KWH)       (MBTU)         00   10   20   30   40   50   60   70   80   90   100   RUN
 MON  PEAK  (KBTU/HR)   (KBTU/HR)     (KW)      (KBTU/HR)       10   20   30   40   50   60   70   80   90  100    +  HOURS
 ---  ----  ----------  ----------  ----------  ----------      ---- ---  ---  ---  ---  ---  ---  ---  ---  ---  ----  ----

 Boiler-1
      SUM                   -116.0                   216.8 LOAD 713  765  235   50   41   30   13    0    0    0     0  1847
      PEAK                  -299.2                   396.5 FUEL 231  741  568  177   35   46   45    4    0    0     0  1847
   MON/DAY                    1/ 2                    1/ 2

 Chiller-1
      SUM        84.3                   8439.4             LOAD 166  234  195  198  161   98   40   26    1    0     0  1119
      PEAK      201.3                     18.9             ELEC   0  199  222  212  183  153   85   41   23    1     0  1119
   MON/DAY       7/14                     7/14

 Heating-Pump
      SUM                                713.3             FLOW   0    0    0    0    0    0    0    0    0    0  2158  2158
      PEAK                                 0.3              RPM   0    0    0    0    0    0    0    0    0    0  2158  2158
   MON/DAY                                1/ 1             ELEC   0    0    0    0    0    0    0    0    0    0  2158  2158

 Cooling-Pump
      SUM                               1119.8             FLOW   0    0    0    0    0    0    0    0    0    0  1119  1119
      PEAK                                 1.0              RPM   0    0    0    0    0    0    0    0    0    0  1119  1119
   MON/DAY                                3/ 3             ELEC   0    0    0    0    0    0    0    0    0    0  1119  1119
```

PS-D Circulation Loop Loads

This report summarizes the performance of all the circulation-loops. Only loop performance is reported here; report PS-C summarizes the performance of the primary equipment attached to the loops.

For each central plant component, this report lists the unit's yearly coil/process load (actual demands), the thermal heat gain of the piping, the net load including the effect of pump heat, and the overload, if any. Additional lines report the peaks of these quantities and the time the peak occurred.

The adjustment for pump heat includes any pump directly attached to the loop, as well as pumps attached to equipment serving the loop. For example, if a chilled-water loop has its own pump, and a chiller serving that loop has an evaporator pump, the net cooling load shown in this report includes the heat of both pumps.

Bin information is presented in terms of the number of hours the load, and flow fell into the appropriate part load bin. The part load ratio is calculated in terms of the hourly value divided by the design value.

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum           DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- PS-D Circulation Loop Loads                                                          WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------
            COIL LOAD  PIPE GAIN  NET LOAD   OVERLOAD      --------  Number of hours within each PART LOAD range  --------- TOTAL
      SUM    (MBTU)     (MBTU)     (MBTU)     (MBTU)           00    10    20    30    40    50    60    70    80    90   100   RUN
MON  PEAK   (KBTU/HR)  (KBTU/HR)  (KBTU/HR)  (KBTU/HR)         10    20    30    40    50    60    70    80    90   100     + HOURS
---  ----   ---------- ---------- ---------- ----------      ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----

Heating-Loop
      SUM      -117.7        0.0     -116.0        0.0 HEAT 713   765   235    50    41    30    13     0     0     0     0  1847
     PEAK      -302.6        0.0     -299.2        0.0 FLOW   0     0     0     0     0     0     0     0     0     0  2158  2158
  MON/DAY        1/ 2       0/ 0       1/ 2       0/ 0

Cooling-Loop
      SUM        81.3        0.0       84.3        0.0 COOL 156   217   191   207   166   115    50    16     1     0     0  1119
     PEAK       198.8        0.0      201.3        0.0 FLOW   0     0     0     0     0     0     0     0     0     0  1119  1119
  MON/DAY        7/14       0/ 0       7/14       0/ 0
```

PS-E Energy End-Use Summary for all <Electric/Fuel> Meters

There are up to four PS-E reports, one for electricity usage, one for fuel usage, one for steam utility usage (if one or more steam meters is defined), and one for chilled-water utility usage (if one or more chilled-water meters is defined). For each month, these reports list, for different end uses, the total usage, the peak usage, and the day/hour during which the peak occurred. Also listed, for each end-use, is that end-use's consumption at the time of the total peak consumption, and the percentage of the total peak that end-use represents.

No distinction is made between the various fuel types that may be present, or different electrical meters. However, the energy consumption of submeters is not double counted. In other words, this report summarizes the demands of meters that draw energy from utilities.

Fuel consumed by electric generators and consumed on-site is allocated to the building end-uses. However, the portion of fuel used to generate power that is sold to a utility, if any, is not allocated to any of these categories, but is included in the total. In this case, the total will not match the sum of the reported end-uses.

The end uses listed across the top of this report are as follows:

LIGHTS	Overhead lighting.
TASK LIGHTS	Task lighting.
MISC EQUIP	Plug loads.
SPACE HEATING	Space heating by boilers, furnaces, etc.)
SPACE COOLING	Space cooling by chillers, etc.
HEAT REJECT	Cooling towers and other heat rejection devices.
PUMPS & AUX	Circulation pumps and auxiliary power consumed by various components. Auxiliary power includes furnace auxiliary (blower motor), electric humidification, DX crankcase heat, the motor energy of an energy recovery ventilator, desiccant auxiliary, gas heat pump auxiliary and pump; loop, boiler, chiller, tower (including pan heater), thermal storage, generator and dw-heater energy defined via the auxiliary power keywords in each of those components.
VENT FANS	Supply, return and exhaust fans.
REFRIG DISPLAY	Refrigerated display cases, and associated refrigeration systems.
HT PUMP SUPPLEM	Supplemental heat pump energy.
DOMESTIC HOT WTR	Domestic hot water.
EXT USAGE	Energy usage exterior to building, such as for exterior lighting.

The following descriptions are for electrical consumption. Identical descriptors apply to fuel, steam, and chilled-water meter reports.

kWh

The total power consumed for each end-use during the month

Max kW

The maximum power consumption for each end-use and total during the month. This is the peak consumption per end-use; the peak for a given end-use may not be coincident with the peak for the meter, or with the peaks for other end-uses. The meter's peak is in the last column.

Day/Hr

The day and hour at which the peak and total end-use consumption occurred

Peak Enduse

The power consumption of each end-use at the time of the meter's peak (coincident peak of all demands on the meter)

Peak Pct

The percent of each end-use's consumption at the meter's peak.

Main Facility with shading DOE-B2.2-031 7/03/2000 15:10:48 BDL RUN 1

REPORT- PS-E Energy End-Use Summary for all Electric Meters WEATHER FILE- CZ10RV2 WYEC2

	LIGHTS	TASK LIGHTS	MISC EQUIP	SPACE HEATING	SPACE COOLING	HEAT REJECT	PUMPS & AUX	VENT FANS	REFRIG DISPLAY	HT PUMP SUPPLEM	DOMEST HOT WTR	EXT USAGE	TOTAL
JAN													
KWH	141212.	0.	96675.	0.	51025.	568.	31795.	128810.	0.	0.	0.	0.	450087.
MAX KW	477.8	0.0	220.6	0.0	510.9	8.4	161.4	362.4	0.0	0.0	0.0	0.0	1740.7
DAY/HR	2/ 9	0/ 0	2/ 9	0/ 0	29/15	30/15	2/ 8	2/ 9	0/ 0	0/ 0	0/ 0	0/ 0	29/15
PEAK ENDUSE	477.8	0.0	220.6	0.0	510.9	8.2	161.4	361.9	0.0	0.0	0.0	0.0	
PEAK PCT	27.4	0.0	12.7	0.0	29.3	0.5	9.3	20.8	0.0	0.0	0.0	0.0	
FEB													
KWH	135851.	0.	91003.	0.	60000.	684.	33116.	113613.	0.	0.	0.	0.	434269.
MAX KW	477.8	0.0	220.6	0.0	468.2	6.9	161.4	362.5	0.0	0.0	0.0	0.0	1697.2
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	7/14	6/12	1/ 9	7/17	0/ 0	0/ 0	0/ 0	0/ 0	7/14
PEAK ENDUSE	477.8	0.0	220.6	0.0	468.2	6.9	161.4	362.4	0.0	0.0	0.0	0.0	
PEAK PCT	28.2	0.0	13.0	0.0	27.6	0.4	9.5	21.4	0.0	0.0	0.0	0.0	
MAR													
KWH	186974.	0.	114574.	0.	65776.	754.	36467.	133184.	0.	0.	0.	0.	537729.
MAX KW	477.8	0.0	220.6	0.0	473.8	6.4	161.4	362.8	0.0	0.0	0.0	0.0	1702.5
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	23/14	23/14	3/11	23/17	0/ 0	0/ 0	0/ 0	0/ 0	23/14
PEAK ENDUSE	477.8	0.0	220.6	0.0	473.8	6.4	161.4	362.6	0.0	0.0	0.0	0.0	
PEAK PCT	28.1	0.0	13.0	0.0	27.8	0.4	9.5	21.3	0.0	0.0	0.0	0.0	
APR													
KWH	156874.	0.	101780.	0.	78083.	1059.	37505.	123797.	0.	0.	0.	0.	499100.
MAX KW	477.8	0.0	220.6	0.0	498.0	8.1	161.4	363.2	0.0	0.0	0.0	0.0	1728.8
DAY/HR	2/ 9	0/ 0	2/ 9	0/ 0	27/15	25/15	2/ 7	5/17	0/ 0	0/ 0	0/ 0	0/ 0	27/15
PEAK ENDUSE	477.8	0.0	220.6	0.0	498.0	8.0	161.4	363.0	0.0	0.0	0.0	0.0	
PEAK PCT	27.6	0.0	12.8	0.0	28.8	0.5	9.3	21.0	0.0	0.0	0.0	0.0	
MAY													
KWH	141212.	0.	96675.	0.	103177.	1466.	46895.	128896.	0.	0.	0.	0.	518324.
MAX KW	477.8	0.0	220.6	0.0	523.6	9.3	161.4	363.7	0.0	0.0	0.0	0.0	1755.7
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	7/16	11/15	1/ 6	7/16	0/ 0	0/ 0	0/ 0	0/ 0	7/16
PEAK ENDUSE	477.8	0.0	220.6	0.0	523.6	8.7	161.4	363.7	0.0	0.0	0.0	0.0	
PEAK PCT	27.2	0.0	12.6	0.0	29.8	0.5	9.2	20.7	0.0	0.0	0.0	0.0	
JUN													
KWH	136010.	0.	93209.	0.	138801.	2137.	52560.	128345.	0.	0.	0.	0.	551064.
MAX KW	477.8	0.0	220.6	0.0	598.8	9.4	161.4	365.9	0.0	0.0	0.0	0.0	1811.3
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	25/19	25/14	1/10	25/16	0/ 0	0/ 0	0/ 0	0/ 0	25/14
PEAK ENDUSE	477.8	0.0	220.6	0.0	576.5	9.4	161.4	365.7	0.0	0.0	0.0	0.0	
PEAK PCT	26.4	0.0	12.2	0.0	31.8	0.5	8.9	20.2	0.0	0.0	0.0	0.0	
JUL													
KWH	137125.	0.	95478.	0.	157616.	2630.	51943.	124357.	0.	0.	0.	0.	569150.
MAX KW	477.8	0.0	220.6	0.0	649.8	12.0	161.4	368.1	0.0	0.0	0.0	0.0	1882.2
DAY/HR	2/ 9	0/ 0	2/ 9	0/ 0	27/10	13/17	2/ 8	9/16	0/ 0	0/ 0	0/ 0	0/ 0	27/10
PEAK ENDUSE	477.8	0.0	220.6	0.0	649.8	9.4	161.4	363.4	0.0	0.0	0.0	0.0	
PEAK PCT	25.4	0.0	11.7	0.0	34.5	0.5	8.6	19.3	0.0	0.0	0.0	0.0	
AUG													
KWH	123853.	0.	77579.	0.	166968.	2703.	57781.	134304.	0.	0.	0.	0.	563190.
MAX KW	477.8	0.0	157.6	0.0	749.4	11.6	161.4	366.9	0.0	0.0	0.0	0.0	1796.5
DAY/HR	1/15	0/ 0	1/13	0/ 0	7/12	14/15	1/ 6	13/16	0/ 0	0/ 0	0/ 0	0/ 0	14/15
PEAK ENDUSE	477.8	0.0	157.6	0.0	621.8	11.6	161.4	366.4	0.0	0.0	0.0	0.0	
PEAK PCT	26.6	0.0	8.8	0.0	34.6	0.6	9.0	20.4	0.0	0.0	0.0	0.0	

Main Facility with shading DOE-B2.2-031 7/03/2000 15:10:48 BDL RUN 1

REPORT- PS-E Energy End-Use Summary for all Electric Meters WEATHER FILE- CZ10RV2 WYEC2

-----(CONTINUED)-----

SEP													
KWH	127834.	0.	90814.	0.	125650.	1852.	48458.	118421.	0.	0.	0.	0.	513032.
MAX KW	477.8	0.0	220.6	0.0	620.0	10.8	161.4	368.5	0.0	0.0	0.0	0.0	1858.8
DAY/HR	4/ 9	0/ 0	4/ 9	0/ 0	24/15	24/15	1/ 7	24/14	0/ 0	0/ 0	0/ 0	0/ 0	24/15
PEAK ENDUSE	477.8	0.0	220.6	0.0	620.0	10.8	161.4	368.3	0.0	0.0	0.0	0.0	
PEAK PCT	25.7	0.0	11.9	0.0	33.4	0.6	8.7	19.8	0.0	0.0	0.0	0.0	
OCT													
KWH	141212.	0.	96675.	0.	110244.	1434.	46756.	129054.	0.	0.	0.	0.	525377.
MAX KW	477.8	0.0	220.6	0.0	600.4	7.8	161.4	365.4	0.0	0.0	0.0	0.0	1823.4
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	3/18	18/15	1/ 9	15/15	0/ 0	0/ 0	0/ 0	0/ 0	2/17
PEAK ENDUSE	477.8	0.0	220.6	0.0	591.2	7.7	161.4	364.7	0.0	0.0	0.0	0.0	
PEAK PCT	26.2	0.0	12.1	0.0	32.4	0.4	8.9	20.0	0.0	0.0	0.0	0.0	
NOV													
KWH	131444.	0.	92012.	0.	68926.	853.	34454.	118747.	0.	0.	0.	0.	446438.
MAX KW	477.8	0.0	220.6	0.0	500.0	8.3	161.4	363.0	0.0	0.0	0.0	0.0	1719.0
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	6/13	6/13	1/ 9	7/15	0/ 0	0/ 0	0/ 0	0/ 0	9/14
PEAK ENDUSE	477.8	0.0	220.6	0.0	489.9	6.7	161.4	362.7	0.0	0.0	0.0	0.0	
PEAK PCT	27.8	0.0	12.8	0.0	28.5	0.4	9.4	21.1	0.0	0.0	0.0	0.0	
DEC													
KWH	133515.	0.	94280.	0.	53490.	526.	32873.	123048.	0.	0.	0.	0.	437734.
MAX KW	477.8	0.0	220.6	0.0	454.1	5.9	161.4	362.5	0.0	0.0	0.0	0.0	1681.9
DAY/HR	3/ 9	0/ 0	3/ 9	0/ 0	28/15	28/15	1/10	26/ 9	0/ 0	0/ 0	0/ 0	0/ 0	28/15
PEAK ENDUSE	477.8	0.0	220.6	0.0	454.1	5.9	161.4	362.1	0.0	0.0	0.0	0.0	
PEAK PCT	28.4	0.0	13.1	0.0	27.0	0.4	9.6	21.5	0.0	0.0	0.0	0.0	
	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	========
KWH	1693116.	0.	1140756.	0.	1179757.	16667.	510603.	1504578.	0.	0.	0.	0.	6045495.
MAX KW	477.8	0.0	220.6	0.0	749.4	12.0	161.4	368.5	0.0	0.0	0.0	0.0	1882.2
MON/DY	1/ 2	0/ 0	1/ 2	0/ 0	8/ 7	7/13	1/ 2	9/24	0/ 0	0/ 0	0/ 0	0/ 0	7/27
PEAK ENDUSE	477.8	0.0	220.6	0.0	649.8	9.4	161.4	363.4	0.0	0.0	0.0	0.0	
PEAK PCT	25.4	0.0	11.7	0.0	34.5	0.5	8.6	19.3	0.0	0.0	0.0	0.0	

TDV2 TDV Energy End-Use Summary for All <Electric/Fuel> Meters

This report is a summation of the individual TDV3 reports that print for each electric and fuel meter. There are up to two TDV2 reports, one for electricity usage and one for fuel usage. This report prints automatically for electric and fuel meters whenever the PS-E reports are specified, and time-dependent valuation is enabled. Time-dependent valuation (TDV) is automatically enabled whenever the weather file is one of California's official compliance weather files; CZ01 thru CZ16 (See *Time-Dependent Valuation* in the Dictionary for more information). As California does not recognize steam or chilled-water utilities in compliance analysis, no reports are provided for those meter types.

No distinction is made between the various fuel types that may be present, or different electrical meters. However, the energy consumption of submeters is not double counted. In other words, this report summarizes the demands of meters that draw energy from utilities.

For each month, these reports list, for different TDV-weighted source end uses, the total usage, the peak usage, and the day/hour during which the peak occurred. Also listed, for each end-use, is the average load-weighted TDV multiplier for each end-use.

Fuel consumed by electric generators and consumed on-site is allocated to the building end-uses. However, the portion of fuel used to generate power that is sold to a utility, if any, is not allocated to any of these categories, but is included in the total. In this case, the total will not match the sum of the reported end-uses.

The end uses listed across the top of this report are as follows. By default, all exterior usage is excluded from this report, but end-use categories may be added or deleted via the MASTER-METERS:EXCLUDE-FROM-TDV keyword.

LIGHTS	Overhead lighting.
TASK LIGHTS	Task lighting.
MISC EQUIP	Plug loads.
SPACE HEATING	Space heating by boilers, furnaces, etc.)
SPACE COOLING	Space cooling by chillers, etc.
HEAT REJECT	Cooling towers and other heat rejection devices.
PUMPS & AUX	Circulation pumps and auxiliary power consumed by various components.
VENT FANS	Supply, return and exhaust fans.
REFRIG DISPLAY	Refrigerated display cases, and associated refrigeration systems.
HT PUMP SUPPLEM	Supplemental heat pump energy.
DOMESTIC HOT WTR	Domestic hot water.
EXT USAGE	Energy usage exterior to building, such as for exterior lighting.

The following descriptions are for electrical consumption. Identical descriptors apply to fuel reports.

TDV-MBTU

The total site energy consumed for each end-use during the month, converted to 'TDV energy'. TDV energy is calculated hourly by taking the actual site energy consumed by an end-use, and multiplying by the hourly value of the California Energy Commission's 'TDV energy' multiplier. This multiplier roughly converts site energy to source energy, but takes into account the impact of season, outdoor temperature and time of day on the cost to produce and deliver the site energy.

Max TDV-MBtu

The TDV energy for each end-use and total during the month. This is the peak consumption per end-use; the peak for a given end-use may not be coincident with the peak for the meter, or with the peaks for other end-uses. The meter's peak is in the last column.

Day/Hr

The day and hour at which the peak and total end-use consumption occurred

TDV-kBtu/kWh

The load-weighted average TDV energy factor for the month. This is calculated by summing the hourly site-energy consumption multiplied by the hourly TDV energy factor, and dividing by the sum of the site-energy consumption. Compared to the unweighted average value (next row), this value gives an indication of how heavily the power consumption of each end-use coincides with the time periods where the time-of-use penalty is the worst. For example, if the average monthly TDV factor is 18, and the load-weighted factor for the cooling end-use category is 35, this is an indication that the building is demanding the majority of its cooling energy during the on-peak times when the TDV factor is the greatest. Changes to the building and/or the HVAC system may be justified to reduce this impact.

Medium Office Building Sample Output DOE-2.2-44 9/24/2004 16:59:32 BDL RUN 1

REPORT- TDV2 TDV Energy End-Use Summary for All Electric Meters WEATHER FILE- CZ12RV2 WYEC2

	LIGHTS	TASK LIGHTS	MISC EQUIP	SPACE HEATING	SPACE COOLING	HEAT REJECT	PUMPS & AUX	VENT FANS	REFRIG DISPLAY	HT PUMP SUPPLEM	DOMEST HOT WTR	EXT USAGE	TOTAL
JAN													
TDV-MBTU	189.1	0.0	94.6	0.0	10.2	0.0	13.5	33.1	0.0	0.0	0.0	0.0	340.5
MAX TDV-MBTU	0.75	0.00	0.38	0.00	0.15	0.00	0.07	0.23	0.00	0.00	0.00	0.00	1.41
DAY/HR	8/11	0/ 0	8/11	0/ 0	23/16	0/ 0	23/16	2/ 8	0/ 0	0/ 0	0/ 0	0/ 0	23/16
TDV-KBTU/KWH	17.07	0.00	17.07	0.00	17.13	0.00	17.11	17.07	0.00	0.00	0.00	0.00	17.07
FEB													
TDV-MBTU	164.2	0.0	82.1	0.0	17.4	0.0	13.4	28.2	0.0	0.0	0.0	0.0	305.3
MAX TDV-MBTU	0.72	0.00	0.36	0.00	0.32	0.00	0.08	0.14	0.00	0.00	0.00	0.00	1.54
DAY/HR	5/11	0/ 0	5/11	0/ 0	28/16	28/16	26/17	11/ 7	0/ 0	0/ 0	0/ 0	0/ 0	28/17
TDV-KBTU/KWH	16.33	0.00	16.33	0.00	16.46	16.30	16.40	16.35	0.00	0.00	0.00	0.00	16.34
MAR													
TDV-MBTU	170.0	0.0	85.0	0.0	22.0	0.0	14.8	29.1	0.0	0.0	0.0	0.0	320.9
MAX TDV-MBTU	0.67	0.00	0.34	0.00	0.31	0.00	0.08	0.12	0.00	0.00	0.00	0.00	1.46
DAY/HR	5/11	0/ 0	5/11	0/ 0	20/16	20/16	19/17	5/ 7	0/ 0	0/ 0	0/ 0	0/ 0	20/16
TDV-KBTU/KWH	15.24	0.00	15.24	0.00	15.35	15.48	15.29	15.27	0.00	0.00	0.00	0.00	15.25
APR													
TDV-MBTU	166.5	0.0	83.2	0.0	34.0	0.3	15.8	27.7	0.0	0.0	0.0	0.0	327.4
MAX TDV-MBTU	0.64	0.00	0.32	0.00	0.43	0.01	0.08	0.11	0.00	0.00	0.00	0.00	1.59
DAY/HR	1/14	0/ 0	1/14	0/ 0	30/17	30/17	30/14	30/17	0/ 0	0/ 0	0/ 0	0/ 0	30/17
TDV-KBTU/KWH	14.53	0.00	14.53	0.00	14.62	14.73	14.52	14.47	0.00	0.00	0.00	0.00	14.54
MAY													
TDV-MBTU	172.0	0.0	86.0	0.0	72.2	1.2	20.7	31.7	0.0	0.0	0.0	0.0	383.8
MAX TDV-MBTU	1.68	0.00	0.84	0.00	1.33	0.05	0.23	0.35	0.00	0.00	0.00	0.00	4.45
DAY/HR	30/17	0/ 0	30/17	0/ 0	30/17	30/17	31/16	30/17	0/ 0	0/ 0	0/ 0	0/ 0	30/17
TDV-KBTU/KWH	15.42	0.00	15.42	0.00	17.12	19.38	16.12	15.92	0.00	0.00	0.00	0.00	15.80
JUN													
TDV-MBTU	176.9	0.0	88.4	0.0	106.4	2.8	22.6	34.6	0.0	0.0	0.0	0.0	431.7
MAX TDV-MBTU	2.28	0.00	1.14	0.00	2.10	0.07	0.28	0.57	0.00	0.00	0.00	0.00	6.44
DAY/HR	17/17	0/ 0	17/17	0/ 0	17/17	17/17	17/17	17/17	0/ 0	0/ 0	0/ 0	0/ 0	17/17
TDV-KBTU/KWH	16.04	0.00	16.04	0.00	18.23	19.79	16.76	16.81	0.00	0.00	0.00	0.00	16.65
JUL													
TDV-MBTU	260.4	0.0	130.2	0.0	191.8	6.5	33.9	55.0	0.0	0.0	0.0	0.0	677.9
MAX TDV-MBTU	2.80	0.00	1.40	0.00	2.96	0.14	0.36	0.76	0.00	0.00	0.00	0.00	8.41
DAY/HR	24/17	0/ 0	24/17	0/ 0	24/17	24/16	24/17	24/17	0/ 0	0/ 0	0/ 0	0/ 0	24/17
TDV-KBTU/KWH	22.62	0.00	22.62	0.00	26.55	29.64	23.42	24.30	0.00	0.00	0.00	0.00	23.85
AUG													
TDV-MBTU	319.5	0.0	159.8	0.0	227.9	7.2	42.1	68.2	0.0	0.0	0.0	0.0	824.7
MAX TDV-MBTU	3.50	0.00	1.75	0.00	3.55	0.15	0.44	0.97	0.00	0.00	0.00	0.00	10.33
DAY/HR	20/17	0/ 0	20/17	0/ 0	20/17	20/17	20/17	7/17	0/ 0	0/ 0	0/ 0	0/ 0	20/17
TDV-KBTU/KWH	28.64	0.00	28.64	0.00	34.81	39.77	29.81	30.94	0.00	0.00	0.00	0.00	30.45
SEP													
TDV-MBTU	274.1	0.0	137.1	0.0	146.5	3.7	33.3	51.7	0.0	0.0	0.0	0.0	646.4
MAX TDV-MBTU	2.84	0.00	1.42	0.00	2.63	0.11	0.35	0.68	0.00	0.00	0.00	0.00	8.02
DAY/HR	4/17	0/ 0	4/17	0/ 0	4/17	4/17	4/17	4/17	0/ 0	0/ 0	0/ 0	0/ 0	4/17
TDV-KBTU/KWH	24.86	0.00	24.86	0.00	28.39	31.36	25.91	25.74	0.00	0.00	0.00	0.00	25.74

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Medium Office Building              Sample Output                           DOE-2.2-44    9/24/2004    16:59:32  BDL RUN  1

REPORT- TDV2 TDV End-Use Summary for all    Electric Meters                           WEATHER FILE- CZ12RV2 WYEC2
-------------------------------------------------------------------------------------------------------------(CONTINUED)--------

OCT
TDV-MBTU       209.8      0.0    104.9      0.0     68.2      1.0     22.3     35.9      0.0      0.0      0.0      0.0     442.1
MAX TDV-MBTU    1.14     0.00     0.57     0.00     0.85     0.03     0.13     0.23     0.00     0.00     0.00     0.00      2.94
DAY/HR          3/17     0/ 0     3/17     0/ 0     3/17     3/17     3/17     3/17     0/ 0     0/ 0     0/ 0     0/ 0      3/17
TDV-KBTU/KWH   18.22     0.00    18.22     0.00    18.64    18.95    18.36    18.27     0.00     0.00     0.00     0.00     18.30

NOV
TDV-MBTU       173.9      0.0     86.9      0.0     23.4      0.1     15.2     30.2      0.0      0.0      0.0      0.0     329.6
MAX TDV-MBTU    0.79     0.00     0.39     0.00     0.42     0.01     0.09     0.16     0.00     0.00     0.00     0.00      1.78
DAY/HR          5/11     0/ 0     5/11     0/ 0     4/16     4/16     4/14     28/ 7    0/ 0     0/ 0     0/ 0     0/ 0      4/15
TDV-KBTU/KWH   17.72     0.00    17.72     0.00    17.83    17.66    17.81    17.78     0.00     0.00     0.00     0.00     17.74

DEC
TDV-MBTU       206.8      0.0    103.4      0.0     11.1      0.0     14.8     35.6      0.0      0.0      0.0      0.0     371.6
MAX TDV-MBTU    0.80     0.00     0.40     0.00     0.10     0.00     0.06     0.19     0.00     0.00     0.00     0.00      1.45
DAY/HR          3/11     0/ 0     3/11     0/ 0     4/14     0/ 0     4/14     26/ 7    0/ 0     0/ 0     0/ 0     0/ 0     17/14
TDV-KBTU/KWH   17.96     0.00    17.96     0.00    17.98     0.00    18.00    17.95     0.00     0.00     0.00     0.00     17.96
             ======= ======= ======= ======= ======= ======= ======= ======= ======= ======= ======= ======= ========

TDV-MBTU      2483.2      0.0   1241.6      0.0    931.0     22.9    262.3    461.0      0.0      0.0      0.0      0.0    5402.0
MAX TDV-MBTU    3.50     0.00     1.75     0.00     3.55     0.15     0.44     0.97     0.00     0.00     0.00     0.00     10.33
MON/DY          8/20     0/ 0     8/20     0/ 0     8/20     8/20     8/20     8/ 7     0/ 0     0/ 0     0/ 0     0/ 0      8/20
TDV-KBTU/KWH   18.75     0.00    18.75     0.00    23.29    28.54    19.69    19.49     0.00     0.00     0.00     0.00     19.54
```

PS-F Energy End-Use Summary for <meter name>

There is one PS-F report for each meter defined, whether electricity, fuel, steam, and/or chilled-water. For each month, these reports list, for different end uses, the total usage, the peak usage, and the day/hour during which the peak occurred. Also listed, for each end-use, is that end-use's consumption at the time of the total peak consumption, and the percentage of the total peak that end-use represents.

Fuel consumed by electric generators and consumed on-site is allocated to the building end-uses. However, the portion of fuel used to generate power that is sold to a utility, if any, is not allocated to any of these categories, but is included in the total. In this case, the total will not match the sum of the reported end-uses.

The end uses listed across the top of this report are as follows:

LIGHTS	Overhead lighting.
TASK LIGHTS	Task lighting.
MISC EQUIP	Plug loads.
SPACE HEATING	Space heating by boilers, furnaces, etc.)
SPACE COOLING	Space cooling by chillers, etc.
HEAT REJECT	Cooling towers and other heat rejection devices.
PUMPS & AUX	Circulation pumps and auxiliary power consumed by various components.
VENT FANS	Supply, return and exhaust fans.
REFRIG DISPLAY	Refrigerated display cases, and associated refrigeration systems.
HT PUMP SUPPLEM	Supplemental heat pump energy.
DOMESTIC HOT WTR	Domestic hot water.
EXT USAGE	Energy usage exterior to building, such as for exterior lighting.

The following descriptions are for electrical consumption. Identical descriptors apply to fuel, steam, and chilled-water meter reports.

kWh

The total power consumed for each end-use during the month

Max kW

The maximum power consumption for each end-use and total during the month. This is the peak consumption per end-use; the peak for a given end-use may not be coincident with the peak for the meter, or with the peaks for other end-uses. The meter's peak is in the last column.

Day/Hr

The day and hour at which the peak and total end-use consumption occurred

Peak Enduse

The power consumption of each end-use at the time of the meter's peak (coincident peak of all demands on the meter)

Peak Pct

The percent of each end-use's consumption at the meter's peak.

Yearly Transformer Losses

The electric power lost due to the transformer inefficiency.

Main Facility with shading DOE-B2.2-031 7/03/2000 15:10:48 BDL RUN 1

REPORT- PS-F Energy End-Use Summary for EM1 WEATHER FILE- CZ10RV2 WYEC2

	LIGHTS	TASK LIGHTS	MISC EQUIP	SPACE HEATING	SPACE COOLING	HEAT REJECT	PUMPS & AUX	VENT FANS	REFRIG DISPLAY	HT PUMP SUPPLEM	DOMEST HOT WTR	EXT USAGE	TOTAL
JAN													
KWH	141212.	0.	96675.	0.	51025.	568.	31795.	128810.	0.	0.	0.	0.	450087.
MAX KW	477.8	0.0	220.6	0.0	510.9	8.4	161.4	362.4	0.0	0.0	0.0	0.0	1740.7
DAY/HR	2/ 9	0/ 0	2/ 9	0/ 0	29/15	30/15	2/ 8	2/ 9	0/ 0	0/ 0	0/ 0	0/ 0	29/15
PEAK ENDUSE	477.8	0.0	220.6	0.0	510.9	8.2	161.4	361.9	0.0	0.0	0.0	0.0	
PEAK PCT	27.4	0.0	12.7	0.0	29.3	0.5	9.3	20.8	0.0	0.0	0.0	0.0	
FEB													
KWH	135851.	0.	91003.	0.	60000.	684.	33116.	113613.	0.	0.	0.	0.	434269.
MAX KW	477.8	0.0	220.6	0.0	468.2	6.9	161.4	362.5	0.0	0.0	0.0	0.0	1697.2
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	7/14	6/12	1/ 9	7/17	0/ 0	0/ 0	0/ 0	0/ 0	7/14
PEAK ENDUSE	477.8	0.0	220.6	0.0	468.2	6.9	161.4	362.4	0.0	0.0	0.0	0.0	
PEAK PCT	28.2	0.0	13.0	0.0	27.6	0.4	9.5	21.4	0.0	0.0	0.0	0.0	
MAR													
KWH	186974.	0.	114574.	0.	65776.	754.	36467.	133184.	0.	0.	0.	0.	537729.
MAX KW	477.8	0.0	220.6	0.0	473.8	6.4	161.4	362.8	0.0	0.0	0.0	0.0	1702.5
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	23/14	23/14	3/11	23/17	0/ 0	0/ 0	0/ 0	0/ 0	23/14
PEAK ENDUSE	477.8	0.0	220.6	0.0	473.8	6.4	161.4	362.6	0.0	0.0	0.0	0.0	
PEAK PCT	28.1	0.0	13.0	0.0	27.8	0.4	9.5	21.3	0.0	0.0	0.0	0.0	
APR													
KWH	156874.	0.	101780.	0.	78083.	1059.	37505.	123797.	0.	0.	0.	0.	499100.
MAX KW	477.8	0.0	220.6	0.0	498.0	8.1	161.4	363.2	0.0	0.0	0.0	0.0	1728.8
DAY/HR	2/ 9	0/ 0	2/ 9	0/ 0	27/15	25/15	2/ 7	5/17	0/ 0	0/ 0	0/ 0	0/ 0	27/15
PEAK ENDUSE	477.8	0.0	220.6	0.0	498.0	8.0	161.4	363.0	0.0	0.0	0.0	0.0	
PEAK PCT	27.6	0.0	12.8	0.0	28.8	0.5	9.3	21.0	0.0	0.0	0.0	0.0	
MAY													
KWH	141212.	0.	96675.	0.	103177.	1466.	46895.	128896.	0.	0.	0.	0.	518324.
MAX KW	477.8	0.0	220.6	0.0	523.6	9.3	161.4	363.7	0.0	0.0	0.0	0.0	1755.7
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	7/16	11/15	1/ 6	7/16	0/ 0	0/ 0	0/ 0	0/ 0	7/16
PEAK ENDUSE	477.8	0.0	220.6	0.0	523.6	8.7	161.4	363.7	0.0	0.0	0.0	0.0	
PEAK PCT	27.2	0.0	12.6	0.0	29.8	0.5	9.2	20.7	0.0	0.0	0.0	0.0	
JUN													
KWH	136010.	0.	93209.	0.	138801.	2137.	52560.	128345.	0.	0.	0.	0.	551064.
MAX KW	477.8	0.0	220.6	0.0	598.8	9.4	161.4	365.9	0.0	0.0	0.0	0.0	1811.3
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	25/19	25/14	1/10	25/16	0/ 0	0/ 0	0/ 0	0/ 0	25/14
PEAK ENDUSE	477.8	0.0	220.6	0.0	576.5	9.4	161.4	365.7	0.0	0.0	0.0	0.0	
PEAK PCT	26.4	0.0	12.2	0.0	31.8	0.5	8.9	20.2	0.0	0.0	0.0	0.0	
JUL													
KWH	137125.	0.	95478.	0.	157616.	2630.	51943.	124357.	0.	0.	0.	0.	569150.
MAX KW	477.8	0.0	220.6	0.0	649.8	12.0	161.4	368.1	0.0	0.0	0.0	0.0	1882.2
DAY/HR	2/ 9	0/ 0	2/ 9	0/ 0	27/10	13/17	2/ 8	9/16	0/ 0	0/ 0	0/ 0	0/ 0	27/10
PEAK ENDUSE	477.8	0.0	220.6	0.0	649.8	9.4	161.4	363.4	0.0	0.0	0.0	0.0	
PEAK PCT	25.4	0.0	11.7	0.0	34.5	0.5	8.6	19.3	0.0	0.0	0.0	0.0	
AUG													
KWH	123853.	0.	77579.	0.	166968.	2703.	57781.	134304.	0.	0.	0.	0.	563190.
MAX KW	477.8	0.0	157.6	0.0	749.4	11.6	161.4	366.9	0.0	0.0	0.0	0.0	1796.5
DAY/HR	1/15	0/ 0	1/13	0/ 0	7/12	14/15	1/ 6	13/16	0/ 0	0/ 0	0/ 0	0/ 0	14/15
PEAK ENDUSE	477.8	0.0	157.6	0.0	621.8	11.6	161.4	366.4	0.0	0.0	0.0	0.0	
PEAK PCT	26.6	0.0	8.8	0.0	34.6	0.6	9.0	20.4	0.0	0.0	0.0	0.0	
SEP													
KWH	127834.	0.	90814.	0.	125650.	1852.	48458.	118421.	0.	0.	0.	0.	513032.
MAX KW	477.8	0.0	220.6	0.0	620.0	10.8	161.4	368.5	0.0	0.0	0.0	0.0	1858.8
DAY/HR	4/ 9	0/ 0	4/ 9	0/ 0	24/15	24/15	1/ 7	24/14	0/ 0	0/ 0	0/ 0	0/ 0	24/15
PEAK ENDUSE	477.8	0.0	220.6	0.0	620.0	10.8	161.4	368.3	0.0	0.0	0.0	0.0	
PEAK PCT	25.7	0.0	11.9	0.0	33.4	0.6	8.7	19.8	0.0	0.0	0.0	0.0	

Main Facility with shading DOE-B2.2-031 7/03/2000 15:10:48 BDL RUN 1

REPORT- PS-F Energy End-Use Summary for EM1 WEATHER FILE- CZ10RV2 WYEC2

(CONTINUED)

OCT													
KWH	141212.	0.	96675.	0.	110244.	1434.	46756.	129054.	0.	0.	0.	0.	525377.
MAX KW	477.8	0.0	220.6	0.0	600.4	7.8	161.4	365.4	0.0	0.0	0.0	0.0	1823.4
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	3/18	18/15	1/ 9	15/15	0/ 0	0/ 0	0/ 0	0/ 0	2/17
PEAK ENDUSE	477.8	0.0	220.6	0.0	591.2	7.7	161.4	364.7	0.0	0.0	0.0	0.0	
PEAK PCT	26.2	0.0	12.1	0.0	32.4	0.4	8.9	20.0	0.0	0.0	0.0	0.0	
NOV													
KWH	131444.	0.	92012.	0.	68926.	853.	34454.	118747.	0.	0.	0.	0.	446438.
MAX KW	477.8	0.0	220.6	0.0	500.0	8.3	161.4	363.0	0.0	0.0	0.0	0.0	1719.0
DAY/HR	1/ 9	0/ 0	1/ 9	0/ 0	6/13	6/13	1/ 9	7/15	0/ 0	0/ 0	0/ 0	0/ 0	9/14
PEAK ENDUSE	477.8	0.0	220.6	0.0	489.9	6.7	161.4	362.7	0.0	0.0	0.0	0.0	
PEAK PCT	27.8	0.0	12.8	0.0	28.5	0.4	9.4	21.1	0.0	0.0	0.0	0.0	
DEC													
KWH	133515.	0.	94280.	0.	53490.	526.	32873.	123048.	0.	0.	0.	0.	437734.
MAX KW	477.8	0.0	220.6	0.0	454.1	5.9	161.4	362.5	0.0	0.0	0.0	0.0	1681.9
DAY/HR	3/ 9	0/ 0	3/ 9	0/ 0	28/15	28/15	1/10	26/ 9	0/ 0	0/ 0	0/ 0	0/ 0	28/15
PEAK ENDUSE	477.8	0.0	220.6	0.0	454.1	5.9	161.4	362.1	0.0	0.0	0.0	0.0	
PEAK PCT	28.4	0.0	13.1	0.0	27.0	0.4	9.6	21.5	0.0	0.0	0.0	0.0	
	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	========
KWH	1693116.	0.	1140756.	0.	1179757.	16667.	510603.	1504578.	0.	0.	0.	0.	6045495.
MAX KW	477.8	0.0	220.6	0.0	749.4	12.0	161.4	368.5	0.0	0.0	0.0	0.0	1882.2
MON/DY	1/ 2	0/ 0	1/ 2	0/ 0	8/ 7	7/13	1/ 2	9/24	0/ 0	0/ 0	0/ 0	0/ 0	7/27
PEAK ENDUSE	477.8	0.0	220.6	0.0	649.8	9.4	161.4	363.4	0.0	0.0	0.0	0.0	
PEAK PCT	25.4	0.0	11.7	0.0	34.5	0.5	8.6	19.3	0.0	0.0	0.0	0.0	

YEARLY TRANSFORMER LOSSES = 0.0 KWH

TDV3 TDV End-Use Summary for <meter name>

This report is created automatically for each electric and fuel meter whenever the PS-F reports are specified, and time-dependent valuation is enabled. Time-dependent valuation (TDV) is automatically enabled whenever the weather file is one of California's official compliance weather files; CZ01 thru CZ16 (See *Time-Dependent Valuation* in the Dictionary for more information). As California does not recognize steam or chilled-water utilities in compliance analysis, no reports are provided for those meter types.

For each month, these reports list, for different TDV-weighted source end uses, the total usage, the peak usage, and the day/hour during which the peak occurred. Also listed, for each end-use, is the average load-weighted TDV multiplier for each end-use, and the unweighted maximum, minimum, and average TDV multiplier for the month. Fuel consumed by electric generators and consumed on-site is allocated to the building end-uses. However, the portion of fuel used to generate power that is sold to a utility, if any, is not allocated to any of these categories, but is included in the total. In this case, the total will not match the sum of the reported end-uses.

The end uses listed across the top of this report are as follows. By default, all exterior usage is excluded from this report, but end-use categories may be added or deleted via the MASTER-METERS:EXCLUDE-FROM-TDV keyword.

LIGHTS	Overhead lighting.
TASK LIGHTS	Task lighting.
MISC EQUIP	Plug loads.
SPACE HEATING	Space heating by boilers, furnaces, etc.)
SPACE COOLING	Space cooling by chillers, etc.
HEAT REJECT	Cooling towers and other heat rejection devices.
PUMPS & AUX	Circulation pumps and auxiliary power consumed by various components.
VENT FANS	Supply, return and exhaust fans.
REFRIG DISPLAY	Refrigerated display cases, and associated refrigeration systems.
HT PUMP SUPPLEM	Supplemental heat pump energy.
DOMESTIC HOT WTR	Domestic hot water.
EXT USAGE	Energy usage exterior to building, such as for exterior lighting.

The following descriptions are for electrical consumption. Identical descriptors apply to fuel reports.

TDV-MBTU

The total site energy consumed for each end-use during the month, converted to 'TDV energy'. TDV energy is calculated hourly by taking the actual site energy consumed by an end-use, and multiplying by the hourly value of the California Energy Commission's 'TDV energy' multiplier. This multiplier roughly converts site energy to source energy, but takes into account the impact of season, outdoor temperature and time of day on the cost to produce and deliver the site energy.

Max TDV-MBtu

The TDV energy for each end-use and total during the month. This is the peak consumption per end-use; the peak for a given end-use may not be coincident with the peak for the meter, or with the peaks for other end-uses. The meter’s peak is in the last column.

Day/Hr

The day and hour at which the peak and total end-use consumption occurred

TDV-kBtu/kWh

The load-weighted average TDV energy factor for the month. This is calculated by summing the hourly site-energy consumption multiplied by the hourly TDV energy factor, and dividing by the sum of the site-energy consumption.

Compared to the unweighted average value (next row), this value gives an indication of how heavily the power consumption of each end-use coincides with the time periods where the time-of-use penalty is the worst. For example, if the average monthly TDV factor is 18, and the load-weighted factor for the cooling end-use category is 35, this is an indication that the building is demanding the majority of its cooling energy during the on-peak times when the TDV factor is the greatest. Changes to the building and/or the HVAC system may be justified to reduce this impact.

Unweighted Max/Min/Avg

The maximum, minimum, and average TDV energy factor for the month. While the average reported in the row above is weighted by the actual loads, this average is simply the unweighted average per month. Comparing the load-weighted average with these values can give the user an idea of how heavily the consumption is weighted toward the on-peak times.

Yearly Transformer Losses

The electric power lost due to the transformer inefficiency, converted to TDV energy.

Medium Office Building Sample Output DOE-2.2-44 9/20/2004 16:44:30 BDL RUN 1

REPORT- TDV3 TDV End-Use Summary for EM1 WEATHER FILE- CZ12RV2 WYEC2

	LIGHTS	TASK LIGHTS	MISC EQUIP	SPACE HEATING	SPACE COOLING	HEAT REJECT	PUMPS & AUX	VENT FANS	REFRIG DISPLAY	HT PUMP SUPPLEM	DOMEST HOT WTR	EXT USAGE	TOTAL
JAN													
TDV-MBTU	0.0	0.0	94.6	0.0	0.0	0.0	13.5	33.1	0.0	0.0	0.0	0.0	141.2
MAX TDV-MBTU	0.00	0.00	0.38	0.00	0.00	0.00	0.07	0.23	0.00	0.00	0.00	0.00	0.56
DAY/HR	0/ 0	0/ 0	8/11	0/ 0	0/ 0	0/ 0	23/16	2/ 8	0/ 0	0/ 0	0/ 0	0/ 0	2/ 9
TDV-KBTU/KWH	0.00	0.00	17.07	0.00	0.00	0.00	17.11	17.07	0.00	0.00	0.00	0.00	7.08
UNWEIGHTED													
MAX/MIN/AVG	19.36	13.33	16.26										
FEB													
TDV-MBTU	0.0	0.0	82.1	0.0	0.0	0.0	13.4	28.2	0.0	0.0	0.0	0.0	123.7
MAX TDV-MBTU	0.00	0.00	0.36	0.00	0.00	0.00	0.08	0.14	0.00	0.00	0.00	0.00	0.54
DAY/HR	0/ 0	0/ 0	5/11	0/ 0	0/ 0	28/16	26/17	11/ 7	0/ 0	0/ 0	0/ 0	0/ 0	26/17
TDV-KBTU/KWH	0.00	0.00	16.33	0.00	0.00	16.30	16.40	16.35	0.00	0.00	0.00	0.00	6.62
UNWEIGHTED													
MAX/MIN/AVG	18.44	12.92	15.57										
MAR													
TDV-MBTU	0.0	0.0	85.0	0.0	0.0	0.0	14.8	29.1	0.0	0.0	0.0	0.0	128.9
MAX TDV-MBTU	0.00	0.00	0.34	0.00	0.00	0.00	0.08	0.12	0.00	0.00	0.00	0.00	0.51
DAY/HR	0/ 0	0/ 0	5/11	0/ 0	0/ 0	20/16	19/17	5/ 7	0/ 0	0/ 0	0/ 0	0/ 0	19/17
TDV-KBTU/KWH	0.00	0.00	15.24	0.00	0.00	15.48	15.29	15.27	0.00	0.00	0.00	0.00	6.13
UNWEIGHTED													
MAX/MIN/AVG	17.14	12.35	14.61										
APR													
TDV-MBTU	0.0	0.0	83.2	0.0	0.0	0.3	15.8	27.7	0.0	0.0	0.0	0.0	126.9
MAX TDV-MBTU	0.00	0.00	0.32	0.00	0.00	0.01	0.08	0.11	0.00	0.00	0.00	0.00	0.52
DAY/HR	0/ 0	0/ 0	1/14	0/ 0	0/ 0	30/17	30/14	30/17	0/ 0	0/ 0	0/ 0	0/ 0	30/17
TDV-KBTU/KWH	0.00	0.00	14.53	0.00	0.00	14.73	14.52	14.47	0.00	0.00	0.00	0.00	5.64
UNWEIGHTED													
MAX/MIN/AVG	15.27	11.25	13.84										
MAY													
TDV-MBTU	0.0	0.0	86.0	0.0	0.0	1.2	20.7	31.7	0.0	0.0	0.0	0.0	139.6
MAX TDV-MBTU	0.00	0.00	0.84	0.00	0.00	0.05	0.23	0.35	0.00	0.00	0.00	0.00	1.43
DAY/HR	0/ 0	0/ 0	30/17	0/ 0	0/ 0	30/17	31/16	30/17	0/ 0	0/ 0	0/ 0	0/ 0	30/17
TDV-KBTU/KWH	0.00	0.00	15.42	0.00	0.00	19.38	16.12	15.92	0.00	0.00	0.00	0.00	5.75
UNWEIGHTED													
MAX/MIN/AVG	46.15	9.15	13.85										
JUN													
TDV-MBTU	0.0	0.0	88.4	0.0	0.0	2.8	22.6	34.6	0.0	0.0	0.0	0.0	148.4
MAX TDV-MBTU	0.00	0.00	1.14	0.00	0.00	0.07	0.28	0.57	0.00	0.00	0.00	0.00	2.06
DAY/HR	0/ 0	0/ 0	17/17	0/ 0	0/ 0	17/17	17/17	17/17	0/ 0	0/ 0	0/ 0	0/ 0	17/17
TDV-KBTU/KWH	0.00	0.00	16.04	0.00	0.00	19.79	16.76	16.81	0.00	0.00	0.00	0.00	5.73
UNWEIGHTED													
MAX/MIN/AVG	54.08	8.88	14.17										
JUL													
TDV-MBTU	0.0	0.0	130.2	0.0	0.0	6.5	33.9	55.0	0.0	0.0	0.0	0.0	225.7
MAX TDV-MBTU	0.00	0.00	1.40	0.00	0.00	0.14	0.36	0.76	0.00	0.00	0.00	0.00	2.65
DAY/HR	0/ 0	0/ 0	24/17	0/ 0	0/ 0	24/16	24/17	24/17	0/ 0	0/ 0	0/ 0	0/ 0	24/17
TDV-KBTU/KWH	0.00	0.00	22.62	0.00	0.00	29.64	23.42	24.30	0.00	0.00	0.00	0.00	
7.94													
UNWEIGHTED													
MAX/MIN/AVG	66.52	11.05	18.52										
AUG													
TDV-MBTU	0.0	0.0	159.8	0.0	0.0	7.2	42.1	68.2	0.0	0.0	0.0	0.0	277.3
MAX TDV-MBTU	0.00	0.00	1.75	0.00	0.00	0.15	0.44	0.97	0.00	0.00	0.00	0.00	3.27
DAY/HR	0/ 0	0/ 0	20/17	0/ 0	0/ 0	20/17	20/17	7/17	0/ 0	0/ 0	0/ 0	0/ 0	20/17
TDV-KBTU/KWH	0.00	0.00	28.64	0.00	0.00	39.77	29.81	30.94	0.00	0.00	0.00	0.00	10.24
UNWEIGHTED													
MAX/MIN/AVG	83.07	13.36	23.05										

```
Medium Office Building              Sample Output                         DOE-2.2-44    9/20/2004    16:44:30  BDL RUN  1

REPORT- TDV3 TDV End-Use Summary for       EM1                                      WEATHER FILE- CZ12RV2 WYEC2
---------------------------------------------------------------------------------------------------------(CONTINUED)--------

SEP
TDV-MBTU          0.0       0.0     137.1       0.0       0.0       3.7      33.3      51.7       0.0       0.0       0.0       0.0      225.8
MAX TDV-MBTU     0.00      0.00      1.42      0.00      0.00      0.11      0.35      0.68      0.00      0.00      0.00      0.00       2.55
DAY/HR           0/ 0      0/ 0      4/17      0/ 0      0/ 0      4/17      4/17      4/17      0/ 0      0/ 0      0/ 0      0/ 0       4/17
TDV-KBTU/KWH     0.00      0.00     24.86      0.00      0.00     31.36     25.91     25.74      0.00      0.00      0.00      0.00       8.99
UNWEIGHTED
  MAX/MIN/AVG   67.42     15.30     21.86

OCT
TDV-MBTU          0.0       0.0     104.9       0.0       0.0       1.0      22.3      35.9       0.0       0.0       0.0       0.0      164.1
MAX TDV-MBTU     0.00      0.00      0.57      0.00      0.00      0.03      0.13      0.23      0.00      0.00      0.00      0.00       0.95
DAY/HR           0/ 0      0/ 0      3/17      0/ 0      0/ 0      3/17      3/17      3/17      0/ 0      0/ 0      0/ 0      0/ 0       3/17
TDV-KBTU/KWH     0.00      0.00     18.22      0.00      0.00     18.95     18.36     18.27      0.00      0.00      0.00      0.00       6.79
UNWEIGHTED
  MAX/MIN/AVG   26.95     12.65     17.20

NOV
TDV-MBTU          0.0       0.0      86.9       0.0       0.0       0.1      15.2      30.2       0.0       0.0       0.0       0.0      132.4
MAX TDV-MBTU     0.00      0.00      0.39      0.00      0.00      0.01      0.09      0.16      0.00      0.00      0.00      0.00       0.60
DAY/HR           0/ 0      0/ 0      5/11      0/ 0      0/ 0      4/16      4/14      28/ 7     0/ 0      0/ 0      0/ 0      0/ 0       4/15
TDV-KBTU/KWH     0.00      0.00     17.72      0.00      0.00     17.66     17.81     17.78      0.00      0.00      0.00      0.00       7.12
UNWEIGHTED
  MAX/MIN/AVG   20.34     13.76     16.89

DEC
TDV-MBTU          0.0       0.0     103.4       0.0       0.0       0.0      14.8      35.6       0.0       0.0       0.0       0.0      153.7
MAX TDV-MBTU     0.00      0.00      0.40      0.00      0.00      0.00      0.06      0.19      0.00      0.00      0.00      0.00       0.57
DAY/HR           0/ 0      0/ 0      3/11      0/ 0      0/ 0      0/ 0      4/14      26/ 7     0/ 0      0/ 0      0/ 0      0/ 0      17/14
TDV-KBTU/KWH     0.00      0.00     17.96      0.00      0.00      0.00     18.00     17.95      0.00      0.00      0.00      0.00       7.43
UNWEIGHTED
  MAX/MIN/AVG   20.60     13.87     17.10
             =======   =======   =======   =======   =======   =======   =======   =======   =======   =======   =======   =======   ========

TDV-MBTU          0.0       0.0    1241.6       0.0       0.0      22.9     262.3     461.0       0.0       0.0       0.0       0.0     1987.8
MAX TDV-MBTU     0.00      0.00      1.75      0.00      0.00      0.15      0.44      0.97      0.00      0.00      0.00      0.00       3.27
MON/DY           0/ 0      0/ 0      8/20      0/ 0      0/ 0      8/20      8/20      8/ 7      0/ 0      0/ 0      0/ 0      0/ 0       8/20
TDV-KBTU/KWH     0.00      0.00     18.75      0.00      0.00     28.54     19.69     19.49      0.00      0.00      0.00      0.00       7.19
UNWEIGHTED
  MAX/MIN/AVG   83.07      8.88     16.92

    YEARLY TRANSFORMER LOSSES =       0.00 TDV-MBTU
```

PS-H Loads and Energy Usage for <loop name>

For each circulation loop, this report summarizes relevant design information as well as monthly and yearly performance. This report is an expansion of the information provided in PV-A and PS-D; most of the information will be identical with the exception of the monthly performance. For this report to print, PS-H must be specified in PLANT-REPORTS, and the circulation loop's EQUIPMENT-REPORTS = YES.

The design information are the first entries in the report:

HEATING CAPACITY

reports the non-coincident heating capacity. Depending on the value of the loop's SIZING-OPTION, the value represents either the sum of all loop demanders (SECONDARY), or loop suppliers (PRIMARY).

COOLING CAPACITY

reports the non-coincident heating capacity. Depending on the value of the loop's SIZING-OPTION, the value represents either the sum of all loop demanders (SECONDARY), or loop suppliers (PRIMARY).

LOOP FLOW

is the flow at the larger of the HEATING-CAPACITY or COOLING-CAPACITY, at the design loop temperature change.

TOTAL HEAD

is the sum of the maximum demander head (friction and static), the piping head (friction and static), and maximum primary equipment heat (friction and static).

SUPPLY UA PRODUCT

is the loss coefficient of the supply piping.

SUPPLY LOSS DT

is the design temperature change of the supply piping due to thermal losses.

RETURN UA PRODUCT

is the loss coefficient of the return piping.

RETURN LOSS DT

is the design temperature change of the return piping due to thermal losses.

LOOP VOLUME

is the volume of fluid within the circulation loop

FLUID HEAT CAPACITY

is the heat capacity of the fluid within the circulation loop. It is used to calculate the thermal effect of a change in supply/return temperature.

Following the design data is the monthly and yearly performance summary:

COIL LOAD

is the total load of all demanders on the loop, including coils, primary equipment loads, and process loads.

PIPE GAIN

is the heat gain/loss of the piping.

NET LOAD

is the net load on the primary equipment, including the effects of thermal losses and pump heat. The adjustment for pump heat includes any pump directly attached to the loop, as well as pumps attached to equipment serving the loop. For example, if a chilled-water loop has its own pump, and a chiller serving that loop has an evaporator pump, the net cooling load shown in this report includes the heat of both pumps.

OVERLOAD

is the load the circulation loop was unable to meet. Note that, even if the loop is highly overloaded, the overload reported here may not be very large. This is because the circulation loops feed overload information back up to the coils, so that the coil capacities (and supply air temperatures) become limited in subsequent hours (the program is not yet fully capable of iterating over the entire system to solve the problem in a single hour). This feedback to subsequent hours causes the zone temperatures to rise, which reduces the load, thereby reducing the "overload" on the central plant. As a result, it is important to review the performance data on the air-side of the HVAC system, particularly zone temperatures, to verify the overall performance of the HVAC system.

For each month and for the year, information is presented on the category total, peak monthly or yearly value, and the time when the peak occurred. Bin information is presented in terms of the number of hours the load, and flow fell into the appropriate part load bin. The part load bin is calculated in terms of the hourly value divided by the design value.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- PS-H Loads and Energy Usage for     Heating-Loop                                          WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------

    HEATING     COOLING       LOOP       TOTAL       SUPPLY      SUPPLY      RETURN      RETURN       LOOP     FLUID HEAT
   CAPACITY    CAPACITY       FLOW        HEAD     UA PRODUCT   LOSS DT    UA PRODUCT   LOSS DT     VOLUME     CAPACITY
   (MBTU/HR)   (MBTU/HR) (GAL/MIN   )     (FT)     (BTU/HR-F)     (F)      (BTU/HR-F)     (F)      ( GAL )   (BTU/LB-F)
  ----------  ---------- ----------  ----------  ----------  ----------  ----------  ----------  ----------  ----------

      -0.430       0.000       21.5        36.6         0.0        0.00         0.0        0.00        32.3        1.00

           COIL LOAD  PIPE GAIN  NET LOAD   OVERLOAD      --------  Number of hours within each PART LOAD range  --------- TOTAL
      SUM  (MBTU)     (MBTU)     (MBTU)     (MBTU)           00    10    20    30    40    50    60    70    80    90   100   RUN
MON  PEAK  (KBTU/HR)  (KBTU/HR)  (KBTU/HR)  (KBTU/HR)        10    20    30    40    50    60    70    80    90   100     + HOURS
---  ---- ---------- ---------- ---------- ----------      ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----

JAN   SUM    -34.185      0.000    -33.886      0.000 HEAT  88   177   114    14    11     7     5     0     0     0     0   416
     PEAK   -302.628      0.000   -299.176      0.000 FLOW   0     0     0     0     0     0     0     0     0     0   416   416
   DAY/HR       2/ 8       0/ 0       2/ 8       0/ 0

FEB   SUM    -26.459      0.000    -26.165      0.000 HEAT  78   221    45    12     4     8     4     0     0     0     0   372
     PEAK   -282.776      0.000   -279.307      0.000 FLOW   0     0     0     0     0     0     0     0     0     0   372   372
   DAY/HR       4/ 8       0/ 0       4/ 8       0/ 0

MAR   SUM    -14.241      0.000    -14.036      0.000 HEAT 131    77    18     9    10     3     1     0     0     0     0   249
     PEAK   -288.752      0.000   -285.343      0.000 FLOW   0     0     0     0     0     0     0     0     0     0   259   259
   DAY/HR      24/ 8       0/ 0      24/ 8       0/ 0

APR   SUM     -3.037      0.000     -2.912      0.000 HEAT  73    16     3     4     0     0     0     0     0     0     0    96
     PEAK   -165.791      0.000   -163.064      0.000 FLOW   0     0     0     0     0     0     0     0     0     0   170   170
   DAY/HR       8/ 8       0/ 0       8/ 8       0/ 0

MAY   SUM     -0.417      0.000     -0.340      0.000 HEAT  23     2     0     0     0     0     0     0     0     0     0    25
     PEAK    -83.966      0.000    -82.054      0.000 FLOW   0     0     0     0     0     0     0     0     0     0   104   104
   DAY/HR       9/ 8       0/ 0       9/ 8       0/ 0

JUN   SUM      0.000      0.000      0.000      0.000 HEAT   0     0     0     0     0     0     0     0     0     0     0     0
     PEAK      0.000      0.000      0.000      0.000 FLOW   0     0     0     0     0     0     0     0     0     0    17    17
   DAY/HR       0/ 0       0/ 0       0/ 0       0/ 0

JUL   SUM      0.000      0.000      0.000      0.000 HEAT   0     0     0     0     0     0     0     0     0     0     0     0
     PEAK      0.000      0.000      0.000      0.000 FLOW   0     0     0     0     0     0     0     0     0     0     0     0
   DAY/HR       0/ 0       0/ 0       0/ 0       0/ 0

AUG   SUM      0.000      0.000      0.000      0.000 HEAT   0     0     0     0     0     0     0     0     0     0     0     0
     PEAK      0.000      0.000      0.000      0.000 FLOW   0     0     0     0     0     0     0     0     0     0     4     4
   DAY/HR       0/ 0       0/ 0       0/ 0       0/ 0

SEP   SUM     -0.239      0.000     -0.162      0.000 HEAT   9     1     0     0     0     0     0     0     0     0     0    10
     PEAK    -86.821      0.000    -80.548      0.000 FLOW   0     0     0     0     0     0     0     0     0     0    69    69
   DAY/HR      23/ 8       0/ 0      23/ 8       0/ 0

OCT   SUM     -2.618      0.000     -2.499      0.000 HEAT  65    13     5     2     0     0     0     0     0     0     0    85
     PEAK   -176.753      0.000   -171.187      0.000 FLOW   0     0     0     0     0     0     0     0     0     0   144   144
   DAY/HR      20/ 8       0/ 0      20/ 8       0/ 0

NOV   SUM    -11.372      0.000    -11.187      0.000 HEAT 127    69    15     3     4     5     0     0     0     0     0   223
     PEAK   -243.944      0.000   -240.548      0.000 FLOW   0     0     0     0     0     0     0     0     0     0   232   232
   DAY/HR      28/ 8       0/ 0      28/ 8       0/ 0

DEC   SUM    -25.084      0.000    -24.791      0.000 HEAT 119   189    35     6    12     7     3     0     0     0     0   371
     PEAK   -278.370      0.000   -274.909      0.000 FLOW   0     0     0     0     0     0     0     0     0     0   371   371
   DAY/HR      26/ 8       0/ 0      26/ 8       0/ 0
========== ========== ========== ==========   =======     ====  ====  ====  ====  ====  ====  ====  ====  ====  ====  ====  ====

YR    SUM   -117.652      0.000   -115.978      0.000 HEAT 713   765   235    50    41    30    13     0     0     0     0  1847
     PEAK   -302.628      0.000   -299.176      0.000 FLOW   0     0     0     0     0     0     0     0     0     0  2158  2158
  MON/DAY       1/ 2       0/ 0       1/ 2       0/ 0
```

PS-H Loads and Energy Usage for <pump name>

For each pump, this report summarizes relevant design information as well as monthly and yearly performance. This report is an expansion of the information provided in PV-A and PS-C; most of the information will be identical with the exception of the monthly performance. For this report to print, PS-H must be specified in PLANT-REPORTS, and the pump's EQUIPMENT-REPORTS = YES.

The first entry lists the number of pumps this component represents. All quantities are for the sum of all pumps represented by this component. The next entries are design information:

ATTACHED TO

lists the U-Name of the circulation loop or the primary equipment unit (boiler, chiller, etc.) to which this pump is attached. Also listed is the function of the pump.

FLOW

is the design flow of the pump,

HEAD

is the design head of the pump

SETPOINT

is the user-specified head setpoint for the pump; should be non-zero only if a loop is powered by more than one pump attached to equipment (instead of directly to the loop), and the pumps must operate at different heads.

CAPACITY CONTROL

specifies the capacity control mechanism for the pump. ONE-SPEED implies that the pump simply rides its curve. TWO-SPEED implies that the pump has two-speeds, but will also ride its curve as required at a given speed. If more that one pump is specified, pumps will also stage.

POWER

is the design electrical power of the pump.

MECHANICAL EFFICIENCY

is the mechanical efficiency of the impeller.

MOTOR EFFICIENCY

is the efficiency of the pump's motor.

Following the design data is the monthly and yearly performance summary:

HEAT GAIN

is the heat gain to the pumped fluid caused by the action of the pump. All of the pump's energy is assumed to heat the fluid, other than the energy consumed in the motor inefficiency.

ENERGY USE

is the electrical consumption of the pump's motor.

For each month and for the year, information is presented on the category total, peak monthly or yearly value, and the time when the peak occurred. Bin information is presented in terms of the number of hours the flow and power consumption fell into the appropriate part load bin. The part load bin is calculated in terms of the hourly value divided by the design value.

The final entry reports the number of hours the pump could not meet the flow requirement. Usually, this value will be non-zero only if the pump encounters an unexpectedly large head. The most common cause of this will be when a component such as a chiller is allocated more than its design flow. In this case, the head loss through the chiller may be substantially higher than design, and the pump may not be able to deliver the required flow at the resulting head. Refer to the Topics Manual for more information on allocating flow to primary equipment units.

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- PS-H Loads and Energy Usage for     Heating-Pump                                         WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------
 NOTE:  DATA BELOW IS FOR THE SUM OF 1 PUMP(s)
                                                                                CAPACITY                 MECHANICAL    MOTOR
                                            FLOW        HEAD       SETPOINT     CONTROL       POWER    EFFICIENCY  EFFICIENCY
             ATTACHED TO                 (GAL/MIN   )   (FT)         (FT)                      (KW)       (FRAC)      (FRAC)
  --------------------------------  ----------  ----------  ----------  ----------  ----------  ----------  ----------
   Heating-Loop                                21.5        43.9         0.0   ONE-SPEED       0.331       0.770       0.700
   PRIMARY LOOP

              HEAT GAIN  ENERGY USE                               --------  Number of hours within each PART LOAD range  --------- TOTAL
      SUM     (MBTU)      (KWH)                                     00    10    20    30    40    50    60    70    80    90   100   RUN
MON  PEAK   (KBTU/HR)     (KW)                                      10    20    30    40    50    60    70    80    90   100     +  HOURS
---  ----  ----------  ----------  ---------- ---------           ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----

JAN   SUM         0.3       137.5                          FLOW    0     0     0     0     0     0     0     0     0     0   416   416
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0   416   416
   DAY/HR        1/ 1        1/ 1                          ELEC    0     0     0     0     0     0     0     0     0     0   416   416

FEB   SUM         0.3       123.0                          FLOW    0     0     0     0     0     0     0     0     0     0   372   372
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0   372   372
   DAY/HR        1/16        1/16                          ELEC    0     0     0     0     0     0     0     0     0     0   372   372

MAR   SUM         0.2        85.6                          FLOW    0     0     0     0     0     0     0     0     0     0   259   259
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0   259   259
   DAY/HR        4/ 8        4/ 8                          ELEC    0     0     0     0     0     0     0     0     0     0   259   259

APR   SUM         0.1        56.2                          FLOW    0     0     0     0     0     0     0     0     0     0   170   170
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0   170   170
   DAY/HR        1/ 8        1/ 8                          ELEC    0     0     0     0     0     0     0     0     0     0   170   170

MAY   SUM         0.1        34.4                          FLOW    0     0     0     0     0     0     0     0     0     0   104   104
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0   104   104
   DAY/HR        1/ 9        1/ 9                          ELEC    0     0     0     0     0     0     0     0     0     0   104   104

JUN   SUM         0.0         5.6                          FLOW    0     0     0     0     0     0     0     0     0     0    17    17
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0    17    17
   DAY/HR        2/ 9        2/ 9                          ELEC    0     0     0     0     0     0     0     0     0     0    17    17

JUL   SUM         0.0         0.0                          FLOW    0     0     0     0     0     0     0     0     0     0     0     0
     PEAK       0.000       0.000                           RPM    0     0     0     0     0     0     0     0     0     0     0     0
   DAY/HR        0/ 0        0/ 0                          ELEC    0     0     0     0     0     0     0     0     0     0     0     0

AUG   SUM         0.0         1.3                          FLOW    0     0     0     0     0     0     0     0     0     0     4     4
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0     4     4
   DAY/HR        4/ 9        4/ 9                          ELEC    0     0     0     0     0     0     0     0     0     0     4     4

SEP   SUM         0.1        22.8                          FLOW    0     0     0     0     0     0     0     0     0     0    69    69
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0    69    69
   DAY/HR        2/ 9        2/ 9                          ELEC    0     0     0     0     0     0     0     0     0     0    69    69

OCT   SUM         0.1        47.6                          FLOW    0     0     0     0     0     0     0     0     0     0   144   144
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0   144   144
   DAY/HR        1/ 8        1/ 8                          ELEC    0     0     0     0     0     0     0     0     0     0   144   144

NOV   SUM         0.2        76.7                          FLOW    0     0     0     0     0     0     0     0     0     0   232   232
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0   232   232
   DAY/HR        3/ 9        3/ 9                          ELEC    0     0     0     0     0     0     0     0     0     0   232   232

DEC   SUM         0.3       122.6                          FLOW    0     0     0     0     0     0     0     0     0     0   371   371
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0   371   371
   DAY/HR        1/ 1        1/ 1                          ELEC    0     0     0     0     0     0     0     0     0     0   371   371
           ==========  ==========  ========== =========   ====  ====  ====  ====  ====  ====  ====  ====  ====  ====  ====  ====

YR    SUM         1.7       713.3                          FLOW    0     0     0     0     0     0     0     0     0     0  2158  2158
     PEAK       0.790       0.331                           RPM    0     0     0     0     0     0     0     0     0     0  2158  2158
  MON/DAY        1/ 1        1/ 1                          ELEC    0     0     0     0     0     0     0     0     0     0  2158  2158

 Hours pump could not meet flow requirements:   0
```

PS-H Loads and Energy Usage for <equipment name>

This report summarizes the performance of primary equipment components such as boilers, chillers, cooling towers, etc. The reports vary by component, but are very similar in format. This presentation uses a boiler as the example. For the component, this report summarizes relevant design information as well as monthly and yearly performance. This report is an expansion of the information provided in PV-A and PS-C; most of the information will be identical with the exception of the monthly performance. For this report to print, PS-H must be specified in PLANT-REPORTS, and the component's EQUIPMENT-REPORTS = YES.

The first set of data is design information:

EQUIPMENT TYPE

lists the type of equipment which is identical to the TYPE code-word originally specified by the user.

ATTACHED TO

lists the circulation-loop(s) to which the equipment is attached. If the component is attached to more than one loop, each loop will be listed.

CAPACITY

is the nominal supply capacity or demand load of the equipment, relative to the loop(s) to which it is attached.

FLOW

is the nominal flow of the component on the given attachment.

EIR

is the electric input ratio.

HIR

is the heat input ratio

AUXILIARY

is any auxiliary power required by the component.

Following the design data is the monthly and yearly performance summary:

HEAT LOAD

is the heating load this component supplies. If the equipment has an attached pump, the load reported has been adjusted for the pump heat.

ELEC USE

is the electrical use of an electric boiler element, or the draft fan, fuel pump, etc. of a fuel boiler.

FUEL USE

is the fuel consumed by a fuel boiler.

AUX ENERGY

is any energy specified by the component's AUX-KW keyword

For each month and for the year, information is presented on the category total, peak monthly or yearly value, and the time when the peak occurred. Bin information is presented in terms of the number of hours the load, electric, and fuel consumption fell into the appropriate part load bin. The part load bin is calculated in terms of the hourly value divided by the design value.

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum           DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- PS-H Loads and Energy Usage for     Boiler-1                                         WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------

                                                       CAPACITY      FLOW        EIR         HIR     AUXILIARY
   EQUIPMENT TYPE              ATTACHED TO            (MBTU/HR) (GAL/MIN   )    (FRAC)      (FRAC)      (KW)
  ----------------  ------------------------------  ----------  ----------  ----------  ----------  ----------

  HW-BOILER         Heating-Loop                        -0.430        21.5       0.000       1.250       0.000

           HEAT LOAD  ELEC USE    FUEL USE   AUX ENERGY     --------  Number of hours within each PART LOAD range  -------- TOTAL
     SUM   (MBTU)     (KWH)       (MBTU)      (KWH)          00    10    20    30    40    50    60    70    80    90   100   RUN
MON  PEAK  (KBTU/HR)   (KW)       (KBTU/HR)    (KW)          10    20    30    40    50    60    70    80    90   100    +  HOURS
---  ----  ----------  ---------  ----------  ----------    ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ----  ---

JAN   SUM     -33.886      0.000      58.804      0.000 LOAD  88   177   114    14    11     7     5     0     0     0     0  416
     PEAK    -299.176      0.000     396.535      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR        2/ 8       0/ 0        2/ 8       0/ 0 FUEL  10   108   182    84     9    10    10     3     0     0     0  416
FEB   SUM     -26.165      0.000      47.102      0.000 LOAD  78   221    45    12     4     8     4     0     0     0     0  372
     PEAK    -279.307      0.000     374.429      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR        4/ 8       0/ 0        4/ 8       0/ 0 FUEL  22   132   159    34     7     5    13     0     0     0     0  372

MAR   SUM     -14.036      0.000      27.007      0.000 LOAD 131    77    18     9    10     3     1     0     0     0     0  249
     PEAK    -285.343      0.000     381.164      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR       24/ 8       0/ 0       24/ 8       0/ 0 FUEL  41   113    59    16     2    13     4     1     0     0     0  249

APR   SUM      -2.912      0.000       7.377      0.000 LOAD  73    16     3     4     0     0     0     0     0     0     0   96
     PEAK    -163.064      0.000     282.962      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR        8/ 8       0/ 0        8/ 8       0/ 0 FUEL  51    27     8     3     5     2     0     0     0     0     0   96

MAY   SUM      -0.340      0.000       1.418      0.000 LOAD  23     2     0     0     0     0     0     0     0     0     0   25
     PEAK     -82.054      0.000     187.941      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR        9/ 8       0/ 0        9/ 8       0/ 0 FUEL  15     7     2     1     0     0     0     0     0     0     0   25

JUN   SUM       0.000      0.000       0.000      0.000 LOAD   0     0     0     0     0     0     0     0     0     0     0    0
     PEAK       0.000      0.000       0.000      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR        0/ 0       0/ 0        0/ 0       0/ 0 FUEL   0     0     0     0     0     0     0     0     0     0     0    0

JUL   SUM       0.000      0.000       0.000      0.000 LOAD   0     0     0     0     0     0     0     0     0     0     0    0
     PEAK       0.000      0.000       0.000      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR        0/ 0       0/ 0        0/ 0       0/ 0 FUEL   0     0     0     0     0     0     0     0     0     0     0    0

AUG   SUM       0.000      0.000       0.000      0.000 LOAD   0     0     0     0     0     0     0     0     0     0     0    0
     PEAK       0.000      0.000       0.000      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR        0/ 0       0/ 0        0/ 0       0/ 0 FUEL   0     0     0     0     0     0     0     0     0     0     0    0

SEP   SUM      -0.162      0.000       0.653      0.000 LOAD   9     1     0     0     0     0     0     0     0     0     0   10
     PEAK     -80.548      0.000     186.145      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR       23/ 8       0/ 0       23/ 8       0/ 0 FUEL   5     4     0     1     0     0     0     0     0     0     0   10

OCT   SUM      -2.499      0.000       6.582      0.000 LOAD  65    13     5     2     0     0     0     0     0     0     0   85
     PEAK    -171.187      0.000     292.324      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR       20/ 8       0/ 0       20/ 8       0/ 0 FUEL  45    24     5     7     2     2     0     0     0     0     0   85

NOV   SUM     -11.187      0.000      22.500      0.000 LOAD 127    69    15     3     4     5     0     0     0     0     0  223
     PEAK    -240.548      0.000     354.393      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR       28/ 8       0/ 0       12/ 8       0/ 0 FUEL  38   128    33     8     6     5     5     0     0     0     0  223

DEC   SUM     -24.791      0.000      45.314      0.000 LOAD 119   189    35     6    12     7     3     0     0     0     0  371
     PEAK    -274.909      0.000     375.958      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
   DAY/HR       26/ 8       0/ 0       10/ 8       0/ 0 FUEL   4   198   120    23     4     9    13     0     0     0     0  371
=========  ===========  =======  ==========  ----====     ====  ====  ====  ====  ====  ====  ====  ====  ====  ====  ----  ----

YR    SUM    -115.978      0.000     216.756      0.000 LOAD 713   765   235    50    41    30    13     0     0     0     0 1847
     PEAK    -299.176      0.000       0.397      0.000 ELEC   0     0     0     0     0     0     0     0     0     0     0    0
  MON/DAY        1/ 2       0/ 0        1/ 2       0/ 0 FUEL 231   741   568   177    35    46    45     4     0     0     0 1847
```

PS-H Loads and Energy Usage for <GLHX name>

This report summarizes the performance of ground-loop heat-exchangers. For the component, this report summarizes relevant design information as well as monthly and yearly performance. This report is an expansion of the information provided in PV-A and PS-C; most of the information will be identical with the exception of the monthly performance. For this report to print, PS-H must be specified in PLANT-REPORTS, and the component's EQUIPMENT-REPORTS = YES.

U-TUBE FLOW

is the nominal flow of fluid through a single well.

U-TUBE VELOCITY

is the fluid velocity through a single well. Applies only to types that allow the inside pipe diameter to be specified.

U-TUBE HEAD

is the head of the heat-exchanger

BOREHOLE RESISTANCE

is the resistance between the fluid and the far ground. Applies only to types that calculate this parameter.

Following the design data is the monthly and yearly performance summary:

COOL LOAD

is the cooling load this component supplies.

HEAT LOAD

is the heating load this component supplies.

For each month and for the year, information is presented on the category total, peak monthly or yearly value, and the time when the peak occurred.

Temperature bin information is presented in terms of the number of hours the leaving fluid temperature fell into the appropriate temperature bin, for operation in the cooling mode and heating mode respectively. Maximum/minimum temperatures encountered are also reported.

Demonstration GLHX system DOE-2.2-44d6 4/13/2007 16:17:37 BDL RUN 1

REPORT- PS-H Loads and Energy Usage for GLHX (VertWell-CM) WEATHER FILE- Chicago IL TMY2

U-TUBE FLOW (GPM)	U-TUBE VELOCITY (FT/S)	U-TUBE HEAD (FT)	BOREHOLE RESISTANCE (HR-FT-F/BTU)
7.57	2.67	30.00	0.17365

MON	SUM / PEAK	COOL LOAD SUM (MBTU) PEAK (KBTU/HR)	HEAT LOAD SUM (MBTU) PEAK (KBTU/HR)		- 20.0	20.0 30.0	30.0 40.0	40.0 50.0	50.0 60.0	60.0 70.0	70.0 80.0	80.0 90.0	90.0 100.0	100.0 110.0	110.0 120.0	120.0 +	TOTAL RUN HOURS	MAX SUPPLY (F)	MIN SUPPLY (F)
					---------- Number of hours within each temperature range -----------														
JAN	SUM	0.808	-41.727	COOL	0	0	0	0	0	93	0	0	0	0	0	0	93	65.3	64.1
	PEAK	38.011	-175.602	HEAT	0	0	0	0	0	651	0	0	0	0	0	0	651	64.8	60.8
	DAY/HR	22/16	7/ 4																
FEB	SUM	2.815	-23.399	COOL	0	0	0	0	0	183	0	0	0	0	0	0	183	66.4	63.6
	PEAK	99.111	-135.047	HEAT	0	0	0	0	0	489	0	0	0	0	0	0	489	64.9	61.5
	DAY/HR	22/17	11/ 4																
MAR	SUM	13.025	-6.170	COOL	0	0	0	0	0	459	0	0	0	0	0	0	459	69.5	64.4
	PEAK	244.424	-83.971	HEAT	0	0	0	0	0	285	0	0	0	0	0	0	285	65.3	63.1
	DAY/HR	31/18	4/ 4																
APR	SUM	56.879	0.000	COOL	0	0	0	0	0	663	57	0	0	0	0	0	720	72.7	65.7
	PEAK	365.234	0.000	HEAT	0	0	0	0	0	0	0	0	0	0	0	0	0	-888.0	888.0
	DAY/HR	27/17	0/ 0																
MAY	SUM	143.443	0.000	COOL	0	0	0	0	0	220	524	0	0	0	0	0	744	79.1	67.4
	PEAK	542.752	0.000	HEAT	0	0	0	0	0	0	0	0	0	0	0	0	0	-888.0	888.0
	DAY/HR	22/18	0/ 0																
JUN	SUM	208.664	0.000	COOL	0	0	0	0	0	0	680	40	0	0	0	0	720	82.0	72.0
	PEAK	605.786	0.000	HEAT	0	0	0	0	0	0	0	0	0	0	0	0	0	-888.0	888.0
	DAY/HR	15/17	0/ 0																
JUL	SUM	247.058	0.000	COOL	0	0	0	0	0	0	530	214	0	0	0	0	744	84.5	73.5
	PEAK	667.993	0.000	HEAT	0	0	0	0	0	0	0	0	0	0	0	0	0	-888.0	888.0
	DAY/HR	13/18	0/ 0																
AUG	SUM	218.676	0.000	COOL	0	0	0	0	0	0	551	193	0	0	0	0	744	84.5	75.4
	PEAK	628.077	0.000	HEAT	0	0	0	0	0	0	0	0	0	0	0	0	0	-888.0	888.0
	DAY/HR	2/18	0/ 0																
SEP	SUM	157.436	0.000	COOL	0	0	0	0	0	0	635	85	0	0	0	0	720	83.4	72.8
	PEAK	565.435	0.000	HEAT	0	0	0	0	0	0	0	0	0	0	0	0	0	-888.0	888.0
	DAY/HR	5/17	0/ 0																
OCT	SUM	70.854	0.000	COOL	0	0	0	0	0	0	743	0	0	0	0	0	743	78.9	71.2
	PEAK	413.942	0.000	HEAT	0	0	0	0	0	0	0	0	0	0	0	0	0	-888.0	888.0
	DAY/HR	4/17	0/ 0																
NOV	SUM	16.988	-2.440	COOL	0	0	0	0	0	0	540	0	0	0	0	0	540	78.1	70.0
	PEAK	362.050	-36.038	HEAT	0	0	0	0	0	96	84	0	0	0	0	0	180	70.9	69.5
	DAY/HR	2/16	22/ 3																
DEC	SUM	0.686	-32.617	COOL	0	0	0	0	0	86	9	0	0	0	0	0	95	70.1	68.8
	PEAK	22.793	-163.741	HEAT	0	0	0	0	0	648	0	0	0	0	0	0	648	69.9	65.6
	DAY/HR	12/14	31/24																

Demonstration GLHX system DOE-2.2-44d6 4/13/2007 16:17:37 BDL RUN 1

REPORT- PS-H Loads and Energy Usage for GLHX (VertWell-CM) WEATHER FILE- Chicago IL TMY2

(CONTINUED)

YR	SUM	1137.331	-106.353	COOL	0	0	0	0	0	1704	4269	532	0	0	0	0	6505	84.5	63.6
	PEAK	667.993	-175.602	HEAT	0	0	0	0	0	2169	84	0	0	0	0	0	2253	70.9	60.8
	MON/DAY	7/13	1/ 7																

NOTE: THE TEMPERATURE COUNTS ARE MADE ONLY FOR THE HOURS WHEN THE FANS AND HEAT PUMPS ARE ON

PS-H Loads and Energy Usage for <condensing-unit name>

This report summarizes the performance of an outdoor condensing unit, most commonly associated with a variable-refrigerant flow system. For the component, this report summarizes relevant design information as well as monthly and yearly performance. This report is an expansion of the information provided in PV-A and PS-C; most of the information will be identical with the exception of the monthly performance. For this report to print, PS-H must be specified in PLANT-REPORTS, and the component's EQUIPMENT-REPORTS = YES.

This example illustrates a user-defined cooling and heating capacity that is undersized for the design loads.

The first set of data is design information:

EQUIPMENT TYPE

specifies the type of equipment which is identical to the TYPE code-word originally specified by the user.

FUNCTION

entries may be for cooling only, or for cooling/heating (heat pump). Cooling/heating data is listed on separate lines.

RATED CONDITIONS

Entries are for (cooling on first line, heating on second)

- the number of independent VRF systems represented by the condensing unit
- the number of outdoor units per VRF system
- the cooling/heating capacity at rated conditions (in this example user-defined),
- power at rated conditions,
- the rated discharge temperature at the compressor,
- the rated suction temperature at the compressor
- the rated outdoor drybulb temperature ,
- the rated electric input ratio,
- the crankcase heater power.

DESIGN CONDITIONS

Entries are for

- The peak design-day cooling load or heating load. This value is independent of the actual capacity specified.
- The cooling/heating capacity at the peak design conditions. If the capacity is defaulted, the capacity will be the peak design-day load, adjusted by the sizing ratio. For a heat pump, the defaulted capacity will be based on either the peak heating or cooling load, whichever requires the largest unit. If capacity is user-specified, the capacity is translated from the rated conditions to the peak design conditions.

- The power at the design conditions. This is compressor power only; auxiliary and crankcase heat is not included.
- The compressor discharge temperature at the peak conditions
- The compressor suction temperature at the peak conditions
- For heating mode, the outdoor ambient wetbulb temperature at the peak conditions.

Following the design data is the monthly and yearly performance summary:

COOL LOAD

is the cooling load on the unit.

HEAT LOAD

is the heating load on the unit.

ELEC USE

is the total electrical use of the unit, including compressor, auxiliary and crankcase; excluding indoor units.

AUX ENERGY

is the auxiliary and crankcase power.

For each month and for the year, information is presented on the category total, peak monthly or yearly value, and the time when the peak occurred. Bin information is presented in terms of the number of hours the cooling load, heating load, and power fell into the appropriate part load bin. The part load bin is calculated in terms of the hourly value divided by the design value.

Following the performance summary is the annual thermal loss from refrigerant piping during heating and cooling.

The number of hours the unit was overloaded is reported at the bottom of the report.

REPORT- PS-H Loads and Energy Usage for CondUnit2 WEATHER FILE- CZ01ARCATA-AP

RATED CONDITIONS

EQUIPMENT TYPE	FUNCTION	NUM SYSTEMS	OUTDOOR UNITS/ SYSTEM	CAPACITY (MBTU/HR)	POWER (KW)	SDT (F)	SST (F)	AMB DB (F)	EIR (FRAC)	HEATER (KW)
VRF-HEAT-RCVR	Cooling	16	3	2.535	236.9	124.0	38.0	95.0	0.319	0.000
	Heating			-2.162	218.5	116.0	116.0	47.0	0.345	

CAPACITY = (CAP/OD UNIT) * (OUTDOOR UNITS/SYSTEM) * (NUM-SYSTEMS)

DESIGN CONDITIONS

EQUIPMENT TYPE	FUNCTION	PEAK LOAD (MBTU/HR)	CAPACITY (MBTU/HR)	POWER (KW)	SDT (F)	SST (F)	AMB DB (F)	AMB WB (F)
VRF-HEAT-RCVR	Cooling	1.899	2.774	172.9	105.1	36.4	76.1	
	Heating	-1.890	-1.890	188.3	117.5	12.5	31.5	31.5

PIPING DESIGN

EQUIPMENT TYPE	PIPE	LENGTH (FT)	SUCTION DIA (Low P) (IN)	DISCHARGE DIA (Hi P) (IN)
VRF-HEAT-RCVR	LEADER	70.0	1.107	0.883
	HEADER	65.0	0.809	0.629

MON	SUM PEAK	COOL LOAD (MBTU) (KBTU/HR)	HEAT LOAD (MBTU) (KBTU/HR)	ELEC USE (KWH) (KW)	AUX ENERGY (KWH) (KW)		00 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 100	100 +	TOTAL RUN HOURS
JAN	SUM	58.090	-50.922	5715.742	0.000	COOL	168	57	0	0	0	0	0	0	0	0	0	225
	PEAK	735.460	-1265.486	110.639	0.000	HEAT	134	35	9	4	3	1	0	0	0	0	0	186
	DAY/HR	13/11	3/ 8	22/ 8	0/ 0	ELEC	199	58	11	6	3	0	0	0	0	0	0	277
FEB	SUM	72.919	-49.638	5887.878	0.000	COOL	146	79	3	0	0	0	0	0	0	0	0	228
	PEAK	982.870	-1163.076	109.043	0.000	HEAT	148	24	17	3	4	0	0	0	0	0	0	196
	DAY/HR	6/16	9/ 8	9/ 8	0/ 0	ELEC	171	56	14	9	4	0	0	0	0	0	0	254
MAR	SUM	93.225	-42.613	6091.283	0.000	COOL	147	105	6	2	0	0	0	0	0	0	0	260
	PEAK	1215.751	-995.935	93.751	0.000	HEAT	173	25	9	5	0	0	0	0	0	0	0	212
	DAY/HR	31/16	28/ 8	28/ 8	0/ 0	ELEC	201	66	13	7	0	0	0	0	0	0	0	287
APR	SUM	89.445	-51.148	5776.989	0.000	COOL	133	123	1	0	0	0	0	0	0	0	0	257
	PEAK	841.982	-1127.851	109.308	0.000	HEAT	200	21	7	3	1	0	0	0	0	0	0	232
	DAY/HR	16/15	4/ 8	4/ 8	0/ 0	ELEC	219	54	7	5	1	0	0	0	0	0	0	286
MAY	SUM	121.395	-11.908	5960.277	0.000	COOL	103	139	25	0	0	0	0	0	0	0	0	267
	PEAK	1081.153	-617.394	50.446	0.000	HEAT	73	6	1	0	0	0	0	0	0	0	0	80
	DAY/HR	28/16	5/ 8	5/ 8	0/ 0	ELEC	147	126	4	0	0	0	0	0	0	0	0	277
JUN	SUM	163.388	-6.078	7790.311	0.000	COOL	102	149	42	11	2	0	0	0	0	0	0	306
	PEAK	1493.507	-275.875	72.704	0.000	HEAT	59	0	0	0	0	0	0	0	0	0	0	59
	DAY/HR	29/11	13/ 8	29/11	0/ 0	ELEC	146	148	18	2	0	0	0	0	0	0	0	314
JUL	SUM	189.337	-1.895	8957.222	0.000	COOL	89	138	78	9	1	0	0	0	0	0	0	315
	PEAK	1426.399	-152.685	73.549	0.000	HEAT	25	0	0	0	0	0	0	0	0	0	0	25
	DAY/HR	27/16	31/ 8	27/16	0/ 0	ELEC	110	175	27	3	0	0	0	0	0	0	0	315

Heat recovery VRF with cond DOAS DOE-2.3-49m 12/07/2016 13:25:16 BDL RUN 38

REPORT- PS-H Loads and Energy Usage for CondUnit2 WEATHER FILE- CZ01ARCATA-AP (CONTINUED)

MON	SUM PEAK	COOL LOAD	HEAT LOAD	ELEC USE	AUX ENERGY		00 10	10 20	20 30	30 40	40 50	50 60	60 70	70 80	80 90	90 100	100 +	TOTAL RUN HOURS
AUG	SUM	185.477	-1.427	8900.320	0.000	COOL	81	111	77	20	2	0	0	0	0	0	0	291
	PEAK	1503.008	-152.791	74.103	0.000	HEAT	30	0	0	0	0	0	0	0	0	0	0	30
	DAY/HR	6/17	24/ 8	6/17	0/ 0	ELEC	107	137	45	2	0	0	0	0	0	0	0	291
SEP	SUM	173.414	-10.599	8608.943	0.000	COOL	71	118	63	16	2	3	0	0	0	0	0	273
	PEAK	1893.075	-623.193	106.845	0.000	HEAT	60	5	1	0	0	0	0	0	0	0	0	66
	DAY/HR	18/16	30/ 8	18/16	0/ 0	ELEC	112	126	40	3	2	0	0	0	0	0	0	283
OCT	SUM	116.085	-19.960	6122.834	0.000	COOL	123	125	16	1	0	0	0	0	0	0	0	265
	PEAK	1165.383	-706.977	62.210	0.000	HEAT	94	14	1	0	0	0	0	0	0	0	0	109
	DAY/HR	16/15	30/ 8	30/ 8	0/ 0	ELEC	175	108	5	0	0	0	0	0	0	0	0	288
NOV	SUM	73.346	-38.935	5298.074	0.000	COOL	146	83	2	0	0	0	0	0	0	0	0	231
	PEAK	917.353	-1320.346	125.694	0.000	HEAT	114	24	11	0	2	1	0	0	0	0	0	152
	DAY/HR	4/15	28/ 8	28/ 8	0/ 0	ELEC	177	69	10	1	2	1	0	0	0	0	0	260
DEC	SUM	69.112	-57.982	6332.149	0.000	COOL	141	88	1	0	0	0	0	0	0	0	0	230
	PEAK	814.705	-1173.228	112.506	0.000	HEAT	146	44	12	5	2	0	0	0	0	0	0	209
	DAY/HR	23/15	1/ 8	1/ 8	0/ 0	ELEC	188	77	13	6	2	0	0	0	0	0	0	286
Yr	SUM	1405.233	-343.104	81442.023	0.000	COOL	1450	1315	314	59	7	3	0	0	0	0	0	3148
	PEAK	1893.075	-1320.346	125.694	0.000	HEAT	1256	198	68	20	12	2	0	0	0	0	0	1556
	MON/DAY	9/18	11/28	11/28	0/ 0	ELEC	1952	1200	207	44	14	1	0	0	0	0	0	3418

	COOLING	HEATING
ANNUAL THERMAL LOSS FROM PIPING, (MBTU):	-15.496	27.045

Number of Hours Overloaded Cool: 0 Heat: 0

BEPS Building Energy Performance

This report makes it possible to quickly review annual building energy use according to energy type (ELECTRICITY, NATURAL-GAS, etc.) and category of use (LIGHTS, SPACE HEATING, etc.). The energy types shown are those that you have specified with the ELEC-METER, FUEL-METER, STEAM-METER, and CHW-METER commands in PLANT. The categories of use (also called energy end uses) are defined under the description of Report PS-E.

The energy values in this report are all in the same units (MBtu in English units or MWh in metric units). This allows a direct comparison of end-use intensities. Report BEPU provides the same information as BEPS, but in "utility units," such as kWh, therms, etc. Energy is reported only for meters that draw or supply power across the building boundary. The consumption of submeters is excluded, so that energy is not double-counted.

TOTAL SITE ENERGY

is the overall energy use at the building site for all energy types and categories of use.

TOTAL SOURCE ENERGY

is the energy use at point of production. It is obtained by dividing site energy use by the user-specified value of SOURCE-SITE-EFF in the FUEL-METER, ELEC-METER, STEAM-METER and CHW-METER commands.

Site and source energy are given per unit of net area (the sum of the floor areas of conditioned zones) and per unit of gross area (the value of GROSS-AREA in the BUILD-PARAMETERS command in LOADS, which defaults to net area).

When a hot or cold storage tank is present, a note is printed on the BEPS report stating that the hot water storage tank can get energy from many sources. Any time there is residual energy in the storage tanks, the totals in the BEPS report will not agree with those in report PS-B, because the BEPS report includes only the energy used for the above categories, whereas PS-B includes the energy that is left in the tanks as well.

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE

is the percentage of hours when the temperature in any conditioned zone is outside of the zone thermostat's throttling range by more than 1°F. This is a measure of the HVAC systems'ability to hold zone thermostat set points.

Note that, in a given hour, it does not matter how many zones are outside the throttling range; as long as at least one zone is outside the throttling range, the hour is counted.

PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED

is the percentage of hours that the central plant cannot meet the demand on the plant from the secondary systems. A large percentage here usually means that one or more pieces of primary equipment (boiler, chiller, etc.) is undersized.

HOURS ANY ZONE ABOVE COOLING THROTTLING RANGE

is the percentage of hours when the temperature in any conditioned zone is above the zone thermostat's cooling throttling range by more than 1°F. This is a measure of the HVAC systems'ability to hold zone thermostat set points.

Note that, in a given hour, it does not matter how many zones are above the cooling throttling range; as long as at least one zone is above the throttling range, the hour is counted. For this reason, the value may or may not match the total shown in report(s) SS-F and SS-R.

HOURS ANY ZONE BELOW HEATING THROTTLING RANGE

is the percentage of hours when the temperature in any conditioned zone is below the zone thermostat's heating throttling range by more than 1°F. This is a measure of the HVAC systems'ability to hold zone thermostat set points.

Note that, in a given hour, it does not matter how many zones are below the heating throttling range; as long as at least one zone is below the throttling range, the hour is counted. For this reason, the value may or may not match the total shown in report(s) SS-F and SS-R.

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system         Show All Reports
REPORT- BEPS Building Energy Performance                                                            WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------

                          TASK     MISC    SPACE    SPACE     HEAT    PUMPS     VENT   REFRIG  HT PUMP   DOMEST      EXT
              LIGHTS   LIGHTS    EQUIP  HEATING  COOLING   REJECT    & AUX     FANS  DISPLAY  SUPPLEM  HOT WTR    USAGE     TOTAL
             -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  --------
 EM1  ELECTRICITY
   MBTU         74.7      0.0     44.7      0.0     28.8      0.0      6.3     11.0      0.0      0.0      0.0      0.0     165.5
 FUEL NATURAL-GAS
   MBTU          0.0      0.0      0.0    216.8      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0     216.8
             =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  =======  ========

   MBTU         74.7      0.0     44.7    216.8     28.8      0.0      6.3     11.0      0.0      0.0      0.0      0.0     382.3


                    TOTAL SITE ENERGY       382.28 MBTU     76.5 KBTU/SQFT-YR GROSS-AREA     76.5 KBTU/SQFT-YR NET-AREA
                    TOTAL SOURCE ENERGY     713.33 MBTU    142.7 KBTU/SQFT-YR GROSS-AREA    142.7 KBTU/SQFT-YR NET-AREA

                    PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  2.2
                    PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED                =  0.0
                    HOURS ANY ZONE ABOVE COOLING THROTTLING RANGE                =   12
                    HOURS ANY ZONE BELOW HEATING THROTTLING RANGE                =   35

                    NOTE:  ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.
```

TDV1 TDV Energy Performance Summary

This report prints automatically whenever the BEPS report is specified, and time-dependent valuation is enabled. Time-dependent valuation (TDV) is automatically enabled whenever the weather file is one of California's official compliance weather files; CZ01 thru CZ16 (See *Time-Dependent Valuation* in the Dictionary for more information).

This report makes it possible to quickly review annual TDV energy use according to energy type (ELECTRICITY, NATURAL-GAS, or PROPANE) and category of use (LIGHTS, SPACE HEATING, etc.). The energy types shown are those that you have specified with the ELEC-METER and FUEL-METER commands. As California does not recognize steam or chilled-water in compliance analysis, no entries are provided for those meter types. Fuels other than natural gas or propane are recognized as being equivalent to propane. The categories of use (called energy end uses) are defined under the description of Report PS-E.

The energy values in this report are all in the same units (TDV-MBtu in English units or TDV-MWh in metric units). This allows a direct comparison of end-use intensities. Report BEPS provides the same information as TDV1, but in site units, and BEPU reports energy usage in "utility units," such as kWh, therms, etc. Energy is reported only for meters that draw or supply power across the building boundary. The consumption of submeters is excluded, so that energy is not double-counted.

TOTAL SITE ENERGY

is the overall energy use at the building site for all energy types and categories of use.

TOTAL TDV SOURCE ENERGY

The total site energy consumed for each end-use during the month, converted to 'TDV energy'. TDV energy is calculated hourly by taking the actual site energy consumed by an end-use, and multiplying by the hourly value of the California Energy Commission's 'TDV energy' multiplier. This multiplier roughly converts site energy to source energy, but takes into account the impact of season, outdoor temperature and time of day on the cost to produce and deliver the site energy.

Site and TDV energy are given per unit of net area (the sum of the floor areas of conditioned zones) and per unit of gross area (the value of GROSS-AREA in the BUILD-PARAMETERS command in LOADS, which defaults to net area).

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE

is the percentage of hours when the temperature in any conditioned zone is outside of the zone thermostat's throttling range. This is a measure of the HVAC systems' ability to hold zone thermostat set points.

PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED

is the percentage of hours that the central plant cannot meet the demand on the plant from the secondary systems. A large percentage here usually means that one or more pieces of primary equipment (boiler, chiller, etc.) is undersized.

Medium Office Building Sample Output DOE-2.2-44 9/20/2004 16:44:30 BDL RUN 1

REPORT- TDV1 TDV Energy Performance Summary WEATHER FILE- CZ12RV2 WYEC2

	LIGHTS	TASK LIGHTS	MISC EQUIP	SPACE HEATING	SPACE COOLING	HEAT REJECT	PUMPS & AUX	VENT FANS	REFRIG DISPLAY	HT PUMP SUPPLEM	DOMEST HOT WTR	EXT USAGE	TOTAL
EM1 ELECTRICITY													
TDV-MBTU	0.0	0.0	1241.6	0.0	0.0	22.9	262.3	461.0	0.0	0.0	0.0	0.0	1987.8
FM1 NATURAL-GAS													
TDV-MBTU	0.0	0.0	0.0	471.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	471.3
TDV-MBTU	0.0	0.0	1241.6	471.3	0.0	22.9	262.3	461.0	0.0	0.0	0.0	0.0	2459.1

TOTAL SITE ENERGY 779.95 MBTU 25.0 KBTU/SQFT-YR GROSS-AREA 25.0 KBTU/SQFT-YR NET-AREA
TOTAL TDV ENERGY 2459.14 MBTU 78.8 KBTU/SQFT-YR GROSS-AREA 78.8 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 3.3
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE: ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.

BEPU Building Utility Performance

This report is identical to the BEPS report, except that the end use breakdown for each of the energy types is given in the actual units of consumption, such as kWh or therms. In addition, the total site energy consumption (TOTAL ELECTRICITY, TOTAL NATURAL-GAS, etc.) is given for each energy type.

Note that report PS-A groups heat rejection energy with cooling, while BEPS, BEPU, PS-E, and PS-F report heat rejection energy as a separate category.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- BEPU Building Utility Performance                                                   WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------

                       TASK     MISC    SPACE    SPACE     HEAT    PUMPS     VENT   REFRIG  HT PUMP   DOMEST      EXT
              LIGHTS   LIGHTS    EQUIP  HEATING  COOLING   REJECT    & AUX     FANS  DISPLAY  SUPPLEM  HOT WTR    USAGE     TOTAL
             -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  -------  --------
 EM1  ELECTRICITY
   KWH        21902.       0.   13094.       0.    8439.       0.    1833.    3230.       0.       0.       0.       0.    48498.
 FUEL NATURAL-GAS
   THERM          0.       0.       0.    2168.       0.       0.       0.       0.       0.       0.       0.       0.     2168.


            TOTAL ELECTRICITY     48498. KWH        9.700 KWH     /SQFT-YR GROSS-AREA    9.700 KWH     /SQFT-YR NET-AREA
            TOTAL NATURAL-GAS      2168. THERM      0.434 THERM   /SQFT-YR GROSS-AREA    0.434 THERM   /SQFT-YR NET-AREA

            PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE =  2.2
            PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED                =  0.0

            NOTE:  ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.
```

PS-O Heating/Cooling Temperature Plot for <circulation-loop name>

This scatter plot is output for circulation loops to show the distribution of loop temperatures vs. time.

For a water-loop heat pump loop (WLHP), two reports are generated for each primary loop: one for any hour in which a component attached to the loop has a heating demand, and the other for hours in which one or more components places a cooling demand on the loop. For this reason, if simultaneous heating and cooling coil loads ever exist, the sum of the annual hours of the two reports will exceed the total number of hours of loop operation.

The vertical axis, at the left, shows the temperature bins. For the WLHP loop, the temperature range is based on the MAX-ALARM-T and MIN-ALARM-T selected for the loop. The actual minimum and maximum temperatures encountered are displayed toward the bottom of the report.

The horizontal axis, at the top, gives hours of the day in local standard time, where “1AM” is midnight to 1:00am, “2” is 1:00am to 2:00am, etc. Entered in each cell of the plot is the number of hours during the run period for which the loop supply temperature was in the particular bin for the particular hour of the day. Only hours for which a load exists on the loop are counted in this plot.

The totals for each row and column are also displayed. Because the temperature counts are only made for hours in which a load exists, the total hours may not sum to the number of hours in the run.

```
Example PS-O Report                                                                DOE-2.2-D26e   7/11/2011    10:13:37  BDL RUN  1

REPORT- PS-O Heating Temperature Plot for   GSHP Water Loop                                     WEATHER FILE- CZ12RV2 WYEC2
---------------------------------------------------------------------------------------------------------------------------------


                                       TOTAL HOURS AT TEMPERATURE LEVEL AND TIME OF DAY

               HOUR    1AM  2   3   4   5   6   7   8   9  10  11  12  1PM  2   3   4   5   6   7   8   9  10  11  12  TOTAL
                       --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---  -----
      115.0 - 120.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
      110.0 - 115.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
      105.0 - 110.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
      100.0 - 105.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
       95.0 - 100.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0

       90.0 -  95.0F    1   2   2   1   2   1   4  22   9   1   0   0   1   1   0   0   0   0   0   0   0   0   0   1     48
       85.0 -  90.0F    0   0   0   0   0   0  10   9   2   2   2   2   1   1   1   1   1   1   0   0   0   0   0   0     33
       80.0 -  85.0F    0   0   0   0   0   0   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      2
       75.0 -  80.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
       70.0 -  75.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0

       65.0 -  70.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
       60.0 -  65.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
       55.0 -  60.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
       50.0 -  55.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
       45.0 -  50.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0

       40.0 -  45.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
       35.0 -  40.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
       30.0 -  35.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
       25.0 -  30.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
       20.0 -  25.0F    0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0      0
                       === === === === === === === === === === === === === === === === === === === === === === === ===  =====

                        1   2   2   1   2   1  15  32  11   3   2   2   2   2   1   1   1   1   0   0   0   0   0   1     83

        Minimum/Maximum temperatures when a heating load exists:   84.0F   91.6F

                                  ****************************************************************
                                  *                                                              *
                                  *  Notes 1) The temperature count is made only for the         *
                                  *           hours the loop has a heating load                  *
                                  *        2) Bin range is determined by the MIN/MAX-ALARM-Ts    *
                                  *                                                              *
                                  ****************************************************************
```

Example PS-O Report DOE-2.2-D26e 7/11/2011 10:13:37 BDL RUN 1

REPORT- PS-O Cooling Temperature Plot for GSHP Water Loop WEATHER FILE- CZ12RV2 WYEC2

TOTAL HOURS AT TEMPERATURE LEVEL AND TIME OF DAY

HOUR	1AM	2	3	4	5	6	7	8	9	10	11	12	1PM	2	3	4	5	6	7	8	9	10	11	12	TOTAL
115.0 - 120.0F	0	0	0	0	0	0	0	0	0	0	0	0	2	4	13	16	13	7	1	0	0	0	0	0	56
110.0 - 115.0F	0	0	0	0	0	0	0	0	0	6	14	19	38	63	68	67	62	59	44	15	2	0	0	0	457
105.0 - 110.0F	0	0	0	0	0	0	0	12	29	51	77	85	83	65	58	60	51	47	53	58	39	0	0	0	768
100.0 - 105.0F	0	0	0	0	0	8	14	25	61	69	49	46	42	35	32	29	36	28	15	18	9	0	0	0	516
95.0 - 100.0F	1	0	0	0	0	1	4	48	49	47	48	50	50	43	47	47	43	42	36	19	15	7	1	1	599
90.0 - 95.0F	0	0	0	0	0	0	1	4	8	12	12	27	34	42	41	35	24	10	1	1	1	0	0	0	253
85.0 - 90.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80.0 - 85.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75.0 - 80.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.0 - 75.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65.0 - 70.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60.0 - 65.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55.0 - 60.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50.0 - 55.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45.0 - 50.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40.0 - 45.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35.0 - 40.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30.0 - 35.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25.0 - 30.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20.0 - 25.0F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	9	19	89	147	185	200	227	249	252	259	254	229	193	150	111	66	7	1	1	2649

Minimum/Maximum temperatures when a cooling load exists: 92.2F 118.2F

```
*****************************************************************
*                                                               *
*  Notes 1) The temperature count is made only for the          *
*           hours the loop has a cooling load                   *
*        2) Bin range is determined by the MIN/MAX-ALARM-Ts     *
*                                                               *
*****************************************************************
```

ECONOMICS-REPORT

EV-A Life-Cycle Costing Parameters

```
SIMPLE STRUCTURE RUN 3A, CHICAGO        INCREASED ROOF INSULATION
DESIGN-DAY SIZING OF VAV SYSTEM         SHOW ALL REPORTS
REPORT- EV-A  LIFE-CYCLE COSTING PARAMETERS
---------------------------------------------------------------------------------------------------------------------------------


                                             LIFE-CYCLE COSTING PARAMETERS
                                             -----------------------------

                                                   LABOR      MATERIALS
                                   DISCOUNT     INFLATION     INFLATION        PROJECT
                                       RATE          RATE          RATE           LIFE
                                  (PERCENT)     (PERCENT)     (PERCENT)          (YRS)
                                  ---------     ---------     ---------       --------

                                        5.0           0.0           0.0           25.0



                                    BUILDING COMPONENT COST INPUT DATA (CURRENT DOLLARS)
                                    ---------------------------------------------------

                                                                   UNIT      UNIT      UNIT                UNIT
                                                         UNIT    INSTALL    ANNUAL     MINOR      MINOR      MAJOR      MAJOR
                                                        FIRST     -ATION     MAINT   OVERHAUL   OVERHAUL   OVERHAUL   OVERHAUL
                      NUMBER                     LIFE    COST       COST      COST      COST    INTERVAL      COST    INTERVAL
COST NAME           OF UNITS  UNIT NAME          (YRS)     ($)        ($)       ($)       ($)      (YRS)       ($)       (YRS)
---------           --------  ---------          -----    -----    -------    ------  --------   --------   --------   --------

ROOF-INSUL            5000.0  SQFT               999.0     0.80       0.30      0.00      0.00     999.00       0.00     999.00
```

LIFE-CYCLE COSTING PARAMETERS

This section echoes data entered in the BASELINE command. For a discussion of life-cycle costing methods and associated terminology see "Life-Cycle Costing" in the DOE-2.2 Topics Manual.

DISCOUNT RATE

is the rate in percent used in calculating present value.

LABOR INFLATION RATE

is the annual inflation rate (relative to general inflation) of labor cost, in percent. Installation, maintenance, and overhaul costs are inflated at this rate in calculating present values.

MATERIALS INFLATION RATE

is the annual inflation rate (relative to general inflation) of material costs, in percent. Capital replacement costs are inflated at this rate in calculating present values.

PROJECT LIFE

is the period, in years, over which the life-cycle cost analysis is performed. This number can range from 1 to 25 years.

BUILDING COMPONENT COST INPUT DATA

This section echoes building (nonplant) component cost data input with each COMPONENT-COST command. The costs here are in current dollars, i.e., they correspond to the prices that apply at the start of the life-cycle analysis period.

COST NAME

is the U-name of the component.

NUMBER OF UNITS

multiplies all costs. Defaults to 1.0 if not specified.

UNIT NAME

is the name you assigned to the unit (such as SQFT or CUFT) to identify the size or type of the unit. This name is arbitrary and optional and is for user convenience only.

LIFE

is the life expectancy of the component, in years. It is used in calculating replacement costs. Defaults to 999 years if not specified.

UNIT FIRST COST

is the purchase price of each unit of the component, in dollars, exclusive of installation.

UNIT INSTALLATION COST

is the installation cost for each unit of the component, in dollars.

UNIT ANNUAL MAINT COST

is the yearly maintenance cost of each unit of the component, in dollars.

UNIT MINOR OVERHAUL COST

is the cost, in dollars, of a minor overhaul for each unit of the component.

MINOR OVERHAUL INTERVAL

is the number of years between minor overhauls.

UNIT MAJOR OVERHAUL COST

is the cost, in dollars, of a major overhaul for each unit of the component.

MAJOR OVERHAUL INTERVAL

is the number of years between major overhauls.

ES-A Annual Costs and Savings

This report gives the present value of energy and operations costs for each year of the project lifetime. Costs are given both for the baseline and for the building being analyzed in the present run. Operations include costs of annual maintenance and major and minor overhauls. For the building being analyzed in this run, operations costs are given separately for plant equipment and for the building (non-plant) components specified using COMPONENT-COST instructions.

ENERGY COST BASELINE

is the present value of the yearly baseline energy cost. These values echo those input using the BASELINE command.

ENERGY COST THIS RUN

is the present value of the yearly energy cost for the building being analyzed in this run.

ENERGY COST SAVINGS

is the difference between the above two quantities (1 minus 2).

OPRNS COST BASELINE

is the present value of the yearly baseline operations cost.

OPRNS COST--THIS RUN

gives the present value of the yearly operations cost for plant equipment and building components, and for the sum, for the building being analyzed in this run.

OPRNS COST SAVINGS

is OPRNS COST BASELINE minus OPRNS COST--THIS RUN, TOTAL.

TOTAL SAVINGS-ENERGY PLUS OPRNS

is the sum of ENERGY COST SAVINGS and OPRNS COST SAVINGS.

The bottom line of this report (TOTALS) gives the present value of the life cycle energy and operations costs and savings.

Note: You must enter baseline cost data using the BASELINE command. Otherwise, the "savings" values in this report will not be meaningful.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2-44a2   9/24/2004    18:18:14  BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- ES-A Annual Costs and Savings                                                  WEATHER FILE- TRY  CHICAGO
-------------------------------------------------------------------------------------------------------------------------------
```

YEAR	ENERGY ($) ENERGY COST BASELINE	ENERGY COST THIS RUN	ENERGY COST SAVINGS	OPERATIONS ($) OPRNS COST BASELINE	OPRNS COST -- THIS RUN PLANT	BUILDING	TOTAL	OPRNS COST SAVINGS	TOTAL SAVINGS- ENERGY PLUS OPRNS
1	4369.	4115.	254.	249.	249.	0.	249.	0.	254.
2	4431.	4177.	254.	238.	238.	0.	238.	0.	255.
3	4493.	4240.	253.	314.	226.	0.	226.	88.	341.
4	4557.	4305.	252.	216.	215.	0.	215.	1.	253.
5	4622.	4370.	252.	205.	205.	0.	205.	0.	251.
6	4688.	4437.	251.	272.	195.	0.	195.	77.	327.
7	4756.	4506.	250.	186.	186.	0.	186.	0.	250.
8	4824.	4575.	249.	412.	177.	0.	177.	235.	483.
9	4894.	4646.	248.	236.	169.	0.	169.	67.	315.
10	4966.	4718.	248.	161.	161.	0.	161.	0.	248.
11	5038.	4792.	246.	212.	153.	0.	153.	59.	305.
12	5113.	4867.	246.	146.	146.	0.	146.	0.	246.
13	5188.	4944.	244.	139.	139.	0.	139.	0.	245.
14	5265.	5022.	243.	828.	132.	0.	132.	696.	939.
15	5344.	5101.	243.	126.	126.	0.	126.	0.	243.
16	5424.	5182.	242.	279.	120.	0.	120.	159.	401.
17	5505.	5264.	241.	159.	114.	0.	114.	45.	285.
18	5588.	5348.	240.	109.	109.	0.	109.	0.	240.
19	5673.	5434.	239.	104.	104.	0.	104.	0.	239.
20	5759.	5521.	238.	531.	99.	0.	99.	432.	670.
21	5847.	5610.	237.	94.	94.	0.	94.	0.	237.
22	5936.	5701.	235.	124.	90.	0.	90.	34.	270.
23	6027.	5793.	234.	85.	85.	0.	85.	0.	234.
24	6120.	5887.	233.	189.	81.	0.	81.	108.	341.
25	6215.	5983.	232.	108.	77.	0.	77.	31.	263.
TOTALS($)	130642.	124539.	6103.	5722.	3691.	0.	3691.	2031.	8134.

ES-B Life-Cycle Non-Energy Costs

This report summarizes life cycle costs (other than for energy) for plant equipment and for each building component.

FIRST COST

is the initial purchase price, including installation.

REPLACEMENTS

is the present value of the life-cycle replacement costs.

OPERATIONS

is the present value of the life-cycle cost for annual maintenance and major and minor overhauls.

TOTAL

gives the sum of the previous three quantities.

INVESTMENT

is the sum of the first two quantities, FIRST COST and REPLACEMENTS. Note that the investment does not include operations or energy costs.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2-44a2   9/24/2004    18:18:14  BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- ES-B Life-Cycle Non-Energy Costs                                                 WEATHER FILE- TRY  CHICAGO
-----------------------------------------------------------------------------------------------------------------------------


                                    LIFE-CYCLE BUILDING AND PLANT NON-ENERGY COSTS ($)
                                    -------------------------------------------------



                                                                                           INVESTMENT
                                 FIRST COST                                               (FIRST COST
                                 (INCLUDING                                                      PLUS
                     COST NAME        INSTALLATION)   REPLACEMENTS  OPERATIONS     TOTAL   REPLACEMENTS)
                     ---------        -------------  --------------  ----------     -----   -------------

                     ROOF-INSUL               5500.              0.          0.     5500.           5500.

                     PLANT EQUIPMENT         29273.              0.       3691.    32964.          29273.
                                      -------------  --------------  ----------     -----   -------------

                     TOTALS                  34773.              0.       3691.    38464.          34773.
```

ES-C Life-Cycle Investment Savings

ENERGY SAVINGS

This section summarizes the annual energy use at the site and at the source for the baseline building and for the present building.

INVESTMENT STATISTICS:

INVESTMENT THIS RUN

is the total investment associated with the present building. This number is the same as the total investment in building components and plant equipment given in Report ES-B.

The following quantities are meaningful only if baseline costs and energy use have been specified.

BASELINE REPLACEMENT COSTS

gives the present value of life-cycle replacement costs for the baseline. This quantity is specified by the keyword REPLACE-COST of the BASELINE command.

INCREMENTAL INVESTMENT

is the INVESTMENT THIS RUN minus the sum of BASELINE REPLACEMENT COSTS and BASELINE FIRST COST (as given below under OVERALL LIFE-CYCLE COSTS).

COST SAVINGS

is the present value of the life cycle savings in energy and operations costs. This number is also given in Report ES-A.

RATIO OF SAVINGS TO INCREMENTAL INVESTMENT (SIR)

gives dollars saved per dollar invested. It is the ratio of COST SAVINGS and INCREMENTAL INVESTMENT. If this ratio is greater than 1.0, the investment may be cost effective.

DISCOUNTED PAYBACK PERIOD

is the number of years it takes for the accumulated cost savings to equal the incremental investment. The shorter the payback period, the more cost effective is the investment.

RATIO OF LIFE CYCLE ENERGY SAVINGS (AT SITE) TO INCREMENTAL INVESTMENT

gives the life-cycle site energy saved per incremental investment dollar.

RATIO OF LIFE CYCLE ENERGY SAVINGS (AT SOURCE) TO INCREMENTAL INVESTMENT

gives the life-cycle source energy saved (in units of per incremental investment dollar.

OVERALL LIFE-CYCLE COSTS

This section summarizes the life cycle costs and savings for the following categories: first cost (including installation), operations, replacements, energy, and sum of all these.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2-44a2   9/24/2004    18:18:14  BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- ES-C Life-Cycle Investment Savings                                              WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------
```

ENERGY SAVINGS

	ANNUAL ENERGY USE BASELINE (MBTU)	(MWH)	ANNUAL ENERGY USE THIS RUN (MBTU)	(MWH)	ANNUAL ENERGY SAVINGS (MBTU)	(MWH)	ANNUAL ENERGY SAVINGS (PCT)
AT SITE	363.93	106.63	318.47	93.31	45.46	13.32	12.5
AT SOURCE	709.67	207.93	671.09	196.63	38.58	11.30	5.4

INVESTMENT STATISTICS

PROJECT LIFE 25.0 YEARS

INVESTMENT THIS RUN ($)	BASELINE REPLACEMENT COSTS ($)	INCREMENTAL INVESTMENT ($)	COST SAVINGS ($)	RATIO OF SAVINGS TO INCREMENTAL INVESTMENT (SIR)	DISCOUNTED PAYBACK PERIOD (YEARS)	RATIO OF LIFE CYCLE ENERGY SAVINGS (AT SITE) TO INCREMENTAL INVESTMENT (MBTU/$)	(MWH/$)	RATIO OF LIFE-CYCLE ENERGY SAVINGS (AT SOURCE) TO INCREMENTAL INVESTMENT (MBTU/$)	(MWH/$)
34773.	0.	5475.	8134.	1.49	16.42	0.21	0.06	0.18	0.05

OVERALL LIFE-CYCLE COSTS ($)

	FIRST COST	OPRNS COST	REPLACEMENTS	ENERGY COST	T O T A L
BASELINE	29298.	5722.	0.	130642.	165662.
THIS RUN	34773.	3691.	0.	124539.	163003.
SAVINGS($)	-5475.	2031.	0.	6103.	2659.
(PCT)	-18.7	35.5	0.0	4.7	1.6

ES-D Energy Cost Summary

This report summarizes the yearly energy consumption and cost for all UTILITY-RATEs that have been defined.

UTILITY-RATE

lists the U-name of each UTILITY-RATE.

RESOURCE

lists the RESOURCE.

METERS

lists the meter names for each UTILITY-RATE.

METERED ENERGY

is the actual metered energy of the meters, not adjusted for any minimum energy requirements.

TOTAL CHARGE

is the total yearly charge.

VIRTUAL RATE

is the total yearly charge divided by the metered energy.

RATE USED ALL YEAR?

If NO, the rate was not used for all 12 billing cycles, either because the rate did not qualify all months, the QUAL-SCH was not active all months, or the run period was less than 12 months.

ENERGY COST/ GROSS BLDG AREA

ENERGY COST/ NET BLDG AREA

give the energy cost per unit area. Here, gross building area is the value of the keyword GROSS-AREA in the BUILD-PARAMETERS command in LOADS. NET BLDG AREA is the sum of the floor areas of the conditioned zones. If not specified, GROSS-AREA defaults to NET BDLG AREA.

The program does a check to ensure that all energy passed from PLANT is accounted for in one or more UTILITY-RATEs. If not, or if double counting of energy has occurred, a warning will be printed at the bottom of this report.

```
Simple Structure Run 3, Chicago        Divide into zones; add plenum          DOE-2.2b-027  Fri Jan  9 15:25:08 1998BDL RUN  1
Design-day sizing of VAV system        Show All Reports
REPORT- ES-D Energy Cost Summary                                                                 WEATHER FILE- TRY  CHICAGO
---------------------------------------------------------------------------------------------------------------------------------

                                                              METERED             TOTAL       VIRTUAL
                                                               ENERGY            CHARGE          RATE    RATE USED
 UTILITY-RATE        RESOURCE            METERS               UNITS/YR              ($)      ($/UNIT)    ALL YEAR?
 ----------------    ----------------    -----------    -------------------    ----------    ----------    ---------
 ELEC-TARIFF         ELECTRICITY         EM1                48498. KWH            3059.        0.0631       YES
 GAS-RATE            NATURAL-GAS         FUEL                2168. THERM          1301.        0.6000       YES

                                                                               ==========
                                                                                    4360.


                                                  ENERGY COST/GROSS BLDG AREA:      0.87
                                                    ENERGY COST/NET BLDG AREA:      0.87
```

ES-E Summary of Utility-Rate: <utility rate name>

This report summarizes the key costs for each UTILITY-RATE. The top of the report contains general information regarding the UTILITY-RATE as input by the user or defaulted (see description of UTILITY-RATE keywords in the Command/Keyword Dictionary). The remainder of the report summarizes costs by month.

Note that the values listed here for consumption and demand will be the summed consumption and maximum demand passed through the meters (METERED ENERGY and DEMAND columns) with any minimums and ratchets applied (BILLING ENERGY and BILLING DEMAND columns) for this billing period. These may not represent the value used to calculate the billing periods energy or demand charge (ENERGY CHARGE and DEMAND CHARGE columns) due to TOU or SEASONAL schedules assocated with charges. See Report ES-F for details on components of the energy and demand charge.

MONTH

is the billing period ending with the BILLING-DAY.

METERED ENERGY

is the energy in the meters as consumed in the building.

BILLING ENERGY

is the energy used for billing purposes. This amount may be greater than the metered energy if a minimum energy qualifier is used. This amount will be 0.0 if the UTILITY-RATE did not qualify for this month.

METERED DEMAND

is the maximum demand in the meters in this billing period as consumed in the building. The value will be either the hourly or daily demand as specified by the DEMAND-WINDOW.

BILLING DEMAND

is the demand used for billing purposes. This amount may be either greater or less than the metered demand depending on the minimum demand qualifier and/or ratchets. This value will be 0.0 if the UTILITY-RATE did not qualify for this month.

ENERGY CHARGE

are all energy charges, including BLOCK-CHARGEs.

DEMAND CHARGE

are all demand charges, including BLOCK-CHARGEs.

ENERGY CST ADJ

are the energy cost adjustments.

TAXES

are the sum of per unit and percentage taxes.

SURCHRG

are the sum of per unit and percentage surcharges.

FIXED CHARGE

are the MONTH-CHGS defined by the user.

MINIMUM CHARGE

is the minimum monthly charge as determined by the MIN-MON-CHG or the MIN-MON-DEM-CHG.

VIRTUAL RATE

is the total charge divided by the metered energy. This rate should not exceed the RATE-LIMITATION plus fixed charges.

TOTAL CHARGE

is the sum of all charges.

```
SIMPLE STRUCTURE RUN 3A, CHICAGO       INCREASED ROOF INSULATION            DOE-2.2b-027  Fri Jan  9 13:55:16 1998BDL RUN  1

REPORT- ES-E Summary of Utility-Rate:       ELEC-RATE                                   WEATHER FILE- Chicago IL TMY2
---------------------------------------------------------------------------------------------------------------------------------

 UTILITY-RATE:  ELEC-RATE              RESOURCE:  ELECTRICITY        DEMAND-WINDOW:   15                  3413. BTU/KWH
                                    BILLING-DAY:  31               RATE-LIMITATION:   0.0000
                                         METERS:  EM1
                                   POWER-FACTOR:  0.80            EXCESS-KVAR-FRAC:  0.75           EXCESS-KVAR-CHG:   0.0000

  RATE-QUALIFICATIONS                  BLOCK-CHARGES                          DEMAND-RATCHETS       MIN-MON-RATCHETS
 --------------------------------     ------------------------------------    ----------------      ----------------
    MIN-ENERGY:         0.0            WINTER-OFF-PK       WINTER-DEMAND
    MAX-ENERGY:         0.0            WINTER-SHLDR        SUMMER-DEMAND
    MIN-DEMAND:         0.0            WINTER-ON-PK
    MAX-DEMAND:         0.0            SUMMER-OFF-PK
  QUALIFY-RATE:  ALL-MONTHS            SUMMER-SHLDR
  USE-MIN-QUAL:          NO            SUMMER-ON-PK
```

MONTH	METERED ENERGY KWH	BILLING ENERGY KWH	METERED DEMAND KW	BILLING DEMAND KW	ENERGY CHARGE ($)	DEMAND CHARGE ($)	ENERGY CST ADJ ($)	TAXES ($)	SURCHRG ($)	FIXED CHARGE ($)	MINIMUM CHARGE ($)	VIRTUAL RATE ($/UNIT)	TOTAL CHARGE ($)
JAN	3427	3427	14.3	14.3	159	68	0	0	0	0	0	0.0664	227
FEB	2947	2947	14.1	14.1	137	68	0	0	0	0	0	0.0696	205
MAR	3231	3231	16.6	16.6	151	83	0	0	0	0	0	0.0722	233
APR	3436	3436	20.2	20.2	161	96	0	0	0	0	0	0.0747	257
MAY	4441	4441	29.1	29.1	240	294	0	0	0	0	0	0.1204	535
JUN	5193	5193	34.5	34.5	309	180	0	0	0	0	0	0.0942	489
JUL	6287	6287	39.9	39.9	374	222	0	0	0	0	0	0.0949	597
AUG	5862	5862	35.4	35.4	349	201	0	0	0	0	0	0.0938	550
SEP	4734	4734	28.7	28.7	252	308	0	0	0	0	0	0.1184	560
OCT	3848	3848	21.7	21.7	180	109	0	0	0	0	0	0.0751	289
NOV	2971	2971	14.1	14.1	138	68	0	0	0	0	0	0.0694	206
DEC	3251	3251	14.1	14.1	151	68	0	0	0	0	0	0.0675	219
	========	========	========		=======	=======	=======	=======	=======	=======		=======	=======
TOTAL	49629	49629	39.9		2602	1765	0	0	0	0		0.0880	4368

ES-F Block-Charges and Ratchets for <utility rate name>

For each UTILITY-RATE this report summarizes the costs associated with each BLOCK-CHARGE, and the monthly RATCHET values. The summary varies somewhat for energy and demand BLOCK-CHARGEs.

BLOCK-CHARGES

lists the U-name of each BLOCK-CHARGE.

JAN, FEB, etc.

is the billing period ending at the BILLING-DAY of the parent UTILITY-RATE.

METERED ENERGY

is the metered energy as passed to the BLOCK-CHARGE from the parent UTILITY-RATE for each billing period, and as modified by any BLOCK-SCH for actual activity. This value will be less than the value shown for the parent UTILITY-RATE in report ES-E if the BLOCK-CHARGE was not active the whole billing period.

BILLING ENERGY

is the energy used for billing calculations. This value may be larger than the metered energy if a minimum energy qualifier is used. In addition, when costs are to be prorated between two blocks sharing the same billing period (i.e., when the season changes), this value is the total energy for the billing period.

PRORATE FACTOR

is shown only if a block is not used for an entire billing period. It is the multiplier used to split the costs between two BLOCK-CHARGEs sharing the same billing period. For seasonal changes, it is the ratio of the total hours this BLOCK-CHARGE was active to the total hours in the billing period. For seasonal changes involving seasonal or time of use charges, it is the ratio of the total hours this BLOCK-CHARGE was active to the sum of these hours plus the active hours of the other BLOCK-CHARGE.

METERED DEMAND

is the metered demand as passed to the BLOCK-CHARGE from the parent UTILITY-RATE for each billing period, and as modified by any BLOCK-SCH for actual activity.

BILLING DEMAND

is the demand used for billing calculations. This value includes any minimum demands and also ratchets. For time of use blocks sharing a TOU-SEASON-LINK, the demand will be the maximum demand of either block when both share the same billing period.

ENERGY CHGS

are the charges for the billing period. These charges are based on the billing energy, multiplied by any prorate factor shown.

TOTAL ENERGY

is the total billing energy accounted for in all BLOCK-CHARGEs. If this value does not match the quantity shown in report ES-E for the parent UTILITY-RATE, a warning will be printed indicating whether the BLOCK-CHARGEs are undercounting or double counting energy.

TOTAL CHARGES

are the total charges for energy and demand BLOCK-CHARGEs.

RATCHETS

is the U-name of each RATCHET.

TYPE

is the type of peak load calculation defined; the value is either PEAK or AVERAGE.

JAN, FEB, etc.

is the billing period ending on the BILLING-DAY. For each billing period, the value of the ratchet is listed. The user should review these values carefully to ensure that the ratchet is functioning as intended.

```
SIMPLE STRUCTURE RUN 3A, CHICAGO       INCREASED ROOF INSULATION             DOE-2.2b-027  Fri Jan  9 13:55:16 1998BDL RUN  1

REPORT- ES-F Block-Charges and Ratchets for ELEC-RATE                                  WEATHER FILE- Chicago IL TMY2
---------------------------------------------------------------------------------------------------------------------------
  UTILITY-RATE: ELEC-RATE
      RESOURCE: ELECTRICITY
  ENERGY-UNITS: KWH
  DEMAND-UNITS: KW
 DEMAND-WINDOW:  15

BLOCK-CHARGES                 JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC    YEAR
-------------------------  ------- ------- ------- ------- ------- ------- ------- ------- ------- ------- ------- ------- ------
-
WINTER-OFF-PK     USE: TIME-OF-USE
         METERED ENERGY:      297     248     241     200      96       0       0       0     126     205     234     263
         BILLING ENERGY:      297     248     241     200      96       0       0       0     126     205     234     263    1909
         METERED DEMAND:      9.7     9.5     7.1     3.0     1.4     0.0     0.0     0.0    17.2     2.7     4.5     9.2
         BILLING DEMAND:      0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
         ENERGY CHGS($):       12      10      10       8       4       0       0       0       5       8       9      11      76

WINTER-SHLDR      USE: TIME-OF-USE
         METERED ENERGY:     1804    1554    1717    1820     999       0       0       0    1165    1978    1593    1723
         BILLING ENERGY:     1804    1554    1717    1820     999       0       0       0    1165    1978    1593    1723   14352
         METERED DEMAND:     14.3    14.1    15.4    20.2    24.9     0.0     0.0     0.0    25.4    21.1    14.1    14.1
         BILLING DEMAND:      0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
         ENERGY CHGS($):       81      70      77      82      45       0       0       0      52      89      72      78     646

WINTER-ON-PK      USE: TIME-OF-USE
         METERED ENERGY:     1326    1145    1273    1417     869       0       0       0    1068    1665    1145    1266
         BILLING ENERGY:     1326    1145    1273    1417     869       0       0       0    1068    1665    1145    1266   11174
         METERED DEMAND:     13.6    13.6    16.6    19.2    25.5     0.0     0.0     0.0    27.2    21.7    13.6    13.6
         BILLING DEMAND:      0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
         ENERGY CHGS($):       66      57      64      71      43       0       0       0      53      83      57      63     559

SUMMER-OFF-PK     USE: TIME-OF-USE
         METERED ENERGY:        0       0       0       0     119     326     445     385     148       0       0       0
         BILLING ENERGY:        0       0       0       0     119     326     445     385     148       0       0       0    1423
         METERED DEMAND:      0.0     0.0     0.0     0.0    18.2    25.5    27.8    26.9    13.8     0.0     0.0     0.0
         BILLING DEMAND:      0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
         ENERGY CHGS($):        0       0       0       0       5      15      20      17       7       0       0       0      64

SUMMER-SHLDR      USE: TIME-OF-USE
         METERED ENERGY:        0       0       0       0    1069    2186    2569    2430    1001       0       0       0
         BILLING ENERGY:        0       0       0       0    1069    2186    2569    2430    1001       0       0       0    9255
         METERED DEMAND:      0.0     0.0     0.0     0.0    29.1    34.5    39.9    35.4    27.7     0.0     0.0     0.0
         BILLING DEMAND:      0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
         ENERGY CHGS($):        0       0       0       0      59     120     141     134      55       0       0       0     509

SUMMER-ON-PK      USE: TIME-OF-USE
         METERED ENERGY:        0       0       0       0    1288    2681    3273    3047    1225       0       0       0
         BILLING ENERGY:        0       0       0       0    1288    2681    3273    3047    1225       0       0       0   11514
         METERED DEMAND:      0.0     0.0     0.0     0.0    27.8    30.0    37.1    33.4    28.7     0.0     0.0     0.0
         BILLING DEMAND:      0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
         ENERGY CHGS($):        0       0       0       0      84     174     213     198      80       0       0       0     748

WINTER-DEMAND     USE: TIME-OF-USE
         METERED ENERGY:     1326    1145    1273    1417     869       0       0       0    1068    1665    1145    1266
         BILLING ENERGY:        0       0       0       0       0       0       0       0       0       0       0       0   11183
         METERED DEMAND:     13.6    13.6    16.6    19.2    25.5     0.0     0.0     0.0    27.2    21.7    13.6    13.6
         BILLING DEMAND:     13.6    13.6    16.6    19.2    25.5     0.0     0.0     0.0    27.2    21.7    13.6    13.6
         DEMAND CHGS($):       68      68      83      96     127       0       0       0     136     109      68      68     823

SUMMER-DEMAND     USE: TIME-OF-USE
         METERED ENERGY:        0       0       0       0    1288    2681    3273    3047    1225       0       0       0
         BILLING ENERGY:        0       0       0       0       0       0       0       0       0       0       0       0   11519
         METERED DEMAND:      0.0     0.0     0.0     0.0    27.8    30.0    37.1    33.4    28.7     0.0     0.0     0.0
         BILLING DEMAND:      0.0     0.0     0.0     0.0    27.8    30.0    37.1    33.4    28.7     0.0     0.0     0.0
         DEMAND CHGS($):        0       0       0       0     167     180     222     201     172       0       0       0     942
                          ======= ======= ======= ======= ======= ======= ======= ======= ======= ======= ======= ======= =======
           TOTAL ENERGY:     3427    2947    3231    3436    4441    5193    6287    5862    4733    3848    2971    3251   49629
      TOTAL CHARGES ($):      227     205     233     257     535     489     597     550     560     289     206     219    4368
```

ES-G Summary of Pollutant Production

This report gives monthly values of atmospheric pollutant production associated with the combustion of various types of fuel, both on-site and off-site at the utility power plant that supplies electricity to the building. Six types of pollutants are listed: carbon dioxide, sulphur dioxide, nitrogen oxides, carbon monoxide, hydrocarbons and particulate matter. (The following report, ES-H, gives pollutant production by time-of-use period.) See "Pollutant Production Calculation" in the *Topics Manual*.

```
SIMPLE STRUCTURE RUN 3A, CHICAGO        INCREASED ROOF INSULATION           DOE-2.2b-027  Fri Jan  9 13:55:16 1998BDL RUN  1
REPORT- ES-G Summary of Pollutant Production                                                WEATHER FILE- Chicago IL TMY2
```

MONTH	CARBON DIOXIDE (LB)	SULPHER DIOXIDE (LB)	NITROGEN OXIDES (LB)	CARBON MONOXIDE (LB)	HYDRO-CARBONS (LB)	PARTICULATE MATTER (LB)
JAN	8378.1	78.62238	17.64021	1.97866	0.10554	1.78545
FEB	6199.2	67.59749	13.97099	1.40433	0.08568	1.50900
MAR	5618.3	74.11236	13.91426	1.19124	0.08800	1.62381
APR	3899.3	78.81496	12.32568	0.65315	0.08313	1.67291
MAY	4346.2	101.85219	15.10340	0.63920	0.10394	2.14390
JUN	5082.1	119.09686	17.66057	0.74743	0.12153	2.50688
JUL	6153.1	144.19458	21.38225	0.90494	0.14714	3.03516
AUG	5737.2	134.44791	19.93694	0.84377	0.13720	2.83001
SEP	4632.5	108.56061	16.09818	0.68131	0.11078	2.28510
OCT	3836.9	88.25845	13.17182	0.57480	0.09042	1.85960
NOV	4750.3	68.15607	12.30003	0.97235	0.07883	1.48248
DEC	7006.5	74.58499	15.61343	1.59872	0.09538	1.66931
TOTAL	65638.3	1138.26819	189.11319	12.18972	1.24755	24.40296

ES-H Pollutant Production by Block-Charge

This report shows monthly atmospheric pollutant production according to time of use in the month. As in Report ES-G, "Summary of Pollutant Production," six pollutants are listed: carbon dioxide, sulphur dioxide, nitrogen oxides, carbon monoxide, hydrocarbons and particulate matter. These pollutants are produced on-site and at the utility power plant that supplies electricity to the building.

The time of use is determined by blocks, which in this examples are named WINTER-OFF-PK, WINTER-SHLDR, WINTER-ON-PK, SUMMER-OFF-PK, etc. These blocks have been defined with BLOCK-CHARGE commands and are associated with an electric UTILITY-RATE, in this case one named ELEC-RATE. See "Pollutant Production Calculation" in the *Topics Manual*.

Note that the monthly values at the end of this report under "TOTAL" should correspond to the monthly values in Report ES-G.

SIMPLE STRUCTURE RUN 3A, CHICAGO INCREASED ROOF INSULATION DOE-2.2b-027 Fri Jan 9 13:55:16 1998BDL RUN 1

REPORT- ES-H Pollutant Production by Block-Charge WEATHER FILE- Chicago IL TMY2

UTILITY-RATE: ELEC-RATE

POLLUTANT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
BLOCK: WINTER-OFF-PK					USE: TIME-OF-USE								
CO2 (LB):	1797.8	1224.4	871.0	313.6	94.2	0.0	0.0	0.0	123.1	219.7	695.9	1151.9	6491.6
SO2 (LB):	6.829	5.688	5.535	4.581	2.207	0.000	0.000	0.000	2.885	4.695	5.359	6.036	43.815
NOx (LB):	2.806	2.012	1.577	0.820	0.327	0.000	0.000	0.000	0.428	0.719	1.351	1.960	12.001
CO (LB):	0.488	0.326	0.222	0.064	0.014	0.000	0.000	0.000	0.018	0.035	0.172	0.302	1.642
HC (LB):	0.015	0.011	0.009	0.005	0.002	0.000	0.000	0.000	0.003	0.005	0.008	0.011	0.068
PM (LB):	0.183	0.145	0.133	0.099	0.046	0.000	0.000	0.000	0.061	0.099	0.125	0.150	1.042
BLOCK: WINTER-SHLDR					USE: TIME-OF-USE								
CO2 (LB):	4068.1	2945.6	2805.0	2116.9	978.0	0.0	0.0	0.0	1140.4	1974.9	2389.9	3433.8	21852.4
SO2 (LB):	41.379	35.644	39.375	41.740	22.919	0.000	0.000	0.000	26.724	45.375	36.533	39.516	329.202
NOx (LB):	8.878	6.982	7.178	6.589	3.399	0.000	0.000	0.000	3.963	6.775	6.407	7.941	58.110
CO (LB):	0.940	0.645	0.580	0.361	0.144	0.000	0.000	0.000	0.168	0.296	0.475	0.765	4.374
HC (LB):	0.054	0.044	0.046	0.044	0.023	0.000	0.000	0.000	0.027	0.046	0.041	0.049	0.375
PM (LB):	0.931	0.787	0.858	0.887	0.482	0.000	0.000	0.000	0.563	0.956	0.791	0.877	7.132
BLOCK: WINTER-ON-PK					USE: TIME-OF-USE								
CO2 (LB):	2512.2	2029.1	1942.3	1468.8	850.7	0.0	0.0	0.0	1045.7	1642.3	1664.4	2420.9	15576.4
SO2 (LB):	30.414	26.266	29.203	32.494	19.935	0.000	0.000	0.000	24.505	38.188	26.264	29.032	256.302
NOx (LB):	5.956	4.977	5.159	4.916	2.956	0.000	0.000	0.000	3.634	5.678	4.542	5.713	43.531
CO (LB):	0.550	0.433	0.389	0.228	0.125	0.000	0.000	0.000	0.154	0.243	0.326	0.532	2.980
HC (LB):	0.037	0.031	0.033	0.034	0.020	0.000	0.000	0.000	0.025	0.039	0.030	0.036	0.285
PM (LB):	0.672	0.576	0.633	0.686	0.420	0.000	0.000	0.000	0.516	0.804	0.567	0.642	5.515
BLOCK: SUMMER-OFF-PK					USE: TIME-OF-USE								
CO2 (LB):	0.0	0.0	0.0	0.0	116.6	318.9	435.4	377.1	144.8	0.0	0.0	0.0	1392.8
SO2 (LB):	0.000	0.000	0.000	0.000	2.731	7.472	10.203	8.837	3.394	0.000	0.000	0.000	32.639
NOx (LB):	0.000	0.000	0.000	0.000	0.405	1.108	1.513	1.310	0.503	0.000	0.000	0.000	4.840
CO (LB):	0.000	0.000	0.000	0.000	0.017	0.047	0.064	0.055	0.021	0.000	0.000	0.000	0.205
HC (LB):	0.000	0.000	0.000	0.000	0.003	0.008	0.010	0.009	0.003	0.000	0.000	0.000	0.033
PM (LB):	0.000	0.000	0.000	0.000	0.057	0.157	0.215	0.186	0.071	0.000	0.000	0.000	0.687
BLOCK: SUMMER-SHLDR					USE: TIME-OF-USE								
CO2 (LB):	0.0	0.0	0.0	0.0	1046.1	2139.0	2514.2	2378.3	979.9	0.0	0.0	0.0	9057.5
SO2 (LB):	0.000	0.000	0.000	0.000	24.516	50.128	58.920	55.733	22.963	0.000	0.000	0.000	212.258
NOx (LB):	0.000	0.000	0.000	0.000	3.635	7.433	8.737	8.265	3.405	0.000	0.000	0.000	31.475
CO (LB):	0.000	0.000	0.000	0.000	0.154	0.315	0.370	0.350	0.144	0.000	0.000	0.000	1.332
HC (LB):	0.000	0.000	0.000	0.000	0.025	0.051	0.060	0.057	0.023	0.000	0.000	0.000	0.217
PM (LB):	0.000	0.000	0.000	0.000	0.516	1.055	1.240	1.173	0.483	0.000	0.000	0.000	4.468
BLOCK: SUMMER-ON-PK					USE: TIME-OF-USE								
CO2 (LB):	0.0	0.0	0.0	0.0	1260.7	2624.2	3203.4	2981.8	1198.6	0.0	0.0	0.0	11268.8
SO2 (LB):	0.000	0.000	0.000	0.000	29.543	61.497	75.071	69.877	28.089	0.000	0.000	0.000	264.078
NOx (LB):	0.000	0.000	0.000	0.000	4.381	9.119	11.132	10.362	4.165	0.000	0.000	0.000	39.159
CO (LB):	0.000	0.000	0.000	0.000	0.185	0.386	0.471	0.439	0.176	0.000	0.000	0.000	1.657
HC (LB):	0.000	0.000	0.000	0.000	0.030	0.063	0.077	0.071	0.029	0.000	0.000	0.000	0.269
PM (LB):	0.000	0.000	0.000	0.000	0.622	1.294	1.580	1.471	0.591	0.000	0.000	0.000	5.559
BLOCK: WINTER-DEMAND					USE: TIME-OF-USE								
CO2 (LB):	2512.2	2029.1	1942.3	1468.8	850.7	0.0	0.0	0.0	1045.7	1642.3	1664.4	2420.9	15576.4
SO2 (LB):	30.414	26.266	29.203	32.494	19.935	0.000	0.000	0.000	24.505	38.188	26.264	29.032	256.302
NOx (LB):	5.956	4.977	5.159	4.916	2.956	0.000	0.000	0.000	3.634	5.678	4.542	5.713	43.531
CO (LB):	0.550	0.433	0.389	0.228	0.125	0.000	0.000	0.000	0.154	0.243	0.326	0.532	2.980
HC (LB):	0.037	0.031	0.033	0.034	0.020	0.000	0.000	0.000	0.025	0.039	0.030	0.036	0.285
PM (LB):	0.672	0.576	0.633	0.686	0.420	0.000	0.000	0.000	0.516	0.804	0.567	0.642	5.515
BLOCK: SUMMER-DEMAND					USE: TIME-OF-USE								
CO2 (LB):	0.0	0.0	0.0	0.0	1260.7	2624.2	3203.4	2981.8	1198.6	0.0	0.0	0.0	11268.8
SO2 (LB):	0.000	0.000	0.000	0.000	29.543	61.497	75.071	69.877	28.089	0.000	0.000	0.000	264.078
NOx (LB):	0.000	0.000	0.000	0.000	4.381	9.119	11.132	10.362	4.165	0.000	0.000	0.000	39.159
CO (LB):	0.000	0.000	0.000	0.000	0.185	0.386	0.471	0.439	0.176	0.000	0.000	0.000	1.657
HC (LB):	0.000	0.000	0.000	0.000	0.030	0.063	0.077	0.071	0.029	0.000	0.000	0.000	0.269
PM (LB):	0.000	0.000	0.000	0.000	0.622	1.294	1.580	1.471	0.591	0.000	0.000	0.000	5.559
TOTAL													
CO2 (LB):	8378.1	6199.2	5618.3	3899.3	4346.2	5082.1	6153.1	5737.2	4632.5	3836.9	4750.3	7006.5	65638.3
SO2 (LB):	78.622	67.597	74.112	78.815	101.852	119.097	144.195	134.448	108.561	88.258	68.156	74.585	1138.268
NOx (LB):	17.640	13.971	13.914	12.326	15.103	17.661	21.382	19.937	16.098	13.172	12.300	15.613	189.113
CO (LB):	1.979	1.404	1.191	0.653	0.639	0.747	0.905	0.844	0.681	0.575	0.972	1.599	12.190
HC (LB):	0.106	0.086	0.088	0.083	0.104	0.122	0.147	0.137	0.111	0.090	0.079	0.095	1.248
PM (LB):	1.785	1.509	1.624	1.673	2.144	2.507	3.035	2.830	2.285	1.860	1.482	1.669	24.403

HOURLY-REPORT AND REPORT-BLOCK

Introduction

Hourly reports are user designed. You choose the variables to be displayed from lists in the following tables. For instructions on setting up hourly reports see the HOURLY-REPORT and REPORT-BLOCK commands in the *Command/Keyword Dictionary*.

Hourly reports can be printed from the LOADS and HVAC sub-programs. You may mix REPORT-BLOCKS from the two subprograms in the same HOURLY-REPORT. However, because these two sub-programs execute sequentially (rather than in the same time step), only the variables in the report-blocks applicable to a given subprogram will print in the report following that subprogram's execution. In other words, if you mix variables from the two subprograms in the same report, the program will output the report twice; once for the LOADS variables, and again for the HVAC variables. The example shown here is from LOADS. The U-name of the HOURLY-REPORT command associated with the report is shown at the beginning of the third line. The first column of the report, headed by MMDDHH, gives the month, day and hour (in local standard time; this means that daylight savings is not taken into account in this report even if DAYLIGHT-SAVINGS = YES). Succeeding columns give the following:

variable type (GLOBAL, BUILDING-LOADS, U-name of space, etc. as found listed in the sections below);
variable name (DRY BULB TEMP, etc.);
units (F, BTU/HR, etc.);
variable-list number, in parentheses, chosen from the sections below; and
the values of the variable for hours 1 to 24.

Statistical summaries are printed at the bottom of the page. DAILY SUMMARY displays the minimum (MN), maximum (MX), sum (SM), and average (AV) values over the day for each variable. A MONTHLY SUMMARY and YEARLY SUMMARY are printed if this is the last scheduled day of the month and run period, respectively. It is important to note that the MONTHLY SUMMARY includes only those days that satisfy three conditions:

1. in the month indicated,
2. in the RUN-PERIOD, and
3. in the REPORT-SCHEDULE.

Similarly, YEARLY SUMMARY includes only the days that are

1. in the RUN-PERIOD, and
2. in the REPORT-SCHEDULE.

You may suppress printing of hourly data and print only the DAILY, MONTHLY or YEARLY Summary by using REPORT-FREQUENCY, which is a keyword in the LOADS-REPORT, SYSTEMS-REPORT, PLANT-REPORT and ECONOMICS-REPORT commands.

Hourly values may be written to files in different formats for display by spreadsheet programs and other post-processor software. See "Saving Files of Hourly Output for Postprocessing" in this manual.

```
Simple Structure Run 3, Chicago         Divide into zones; add plenum           DOE-2.2b-027  Fri Jan  9
Design-day sizing of VAV system         Show All Reports
HOURLY REPORT- LDS-REP-1                                                           WEATHER FILE- TRY  CHICAGO
--------------------------------------------------------------------------------------------------------------
MMDDHH  GLOBAL    GLOBAL   GLOBAL    GLOBAL      BUILDING
                                                 -LOADS
        DRY BULB  WET BULB WIND      GLOBAL      SENSIBLE
        TEMP      TEMP     SPEED     SOLAR       CLG LOAD
        F         F        KNOTS     BTU/HR-     BTU/HR
                                     SQFT
        ----( 4)  ----( 3) ----(17)  ----(15)    ----(19)
 8 5 1      80.2      70.0      6.5       0.0        58102.
 8 5 2      78.4      69.5      6.5       0.0        56903.
 8 5 3      76.9      69.1      6.5       0.0        55801.
 8 5 4      75.7      68.7      6.5       0.0        54807.
 8 5 5      74.8      68.5      6.5       0.0        53939.
 8 5 6      74.2      68.3      6.5      14.7        58179.
 8 5 7      74.0      68.2      6.5      73.1        66613.
 8 5 8      74.8      68.5      6.5     134.4        70543.
 8 5 9      76.9      69.1      6.5     189.2        71352.
 8 510      80.2      70.0      6.5     233.6        71341.
 8 511      84.0      71.1      6.5     264.8        72382.
 8 512      87.8      72.2      6.5     280.6        74127.
 8 513      91.1      73.0      6.5     280.0        76189.
 8 514      93.2      73.6      6.5     263.0        79329.
 8 515      94.0      73.8      6.5     230.8        82668.
 8 516      93.8      73.7      6.5     185.5        84785.
 8 517      93.2      73.6      6.5     130.1        84450.
 8 518      92.3      73.4      6.5      68.6        80472.
 8 519      91.1      73.0      6.5      11.3        72162.
 8 520      89.6      72.6      6.5       0.0        66833.
 8 521      87.8      72.2      6.5       0.0        64239.
 8 522      86.0      71.6      6.5       0.0        62343.
 8 523      84.0      71.1      6.5       0.0        60785.
 8 524      82.0      70.6      6.5       0.0        59391.
DAILY SUMMARY (AUG  5)
    MN      74.0      68.2      6.5       0.0        53939.
    MX      94.0      73.8      6.5     280.6        84785.
    SM    2016.0    1705.4    156.0    2359.9      1637735.
    AV      84.0      71.1      6.5      98.3        68239.
MONTHLY SUMMARY (AUG)
    MN      74.0      68.2      6.5       0.0        53939.
    MX      94.0      73.8      6.5     280.6        84785.
    SM    2016.0    1705.4    156.0    2359.9      1637735.
    AV      84.0      71.1      6.5      98.3        68239.
YEARLY SUMMARY
    MN      74.0      68.2      6.5       0.0        53939.
    MX      94.0      73.8      6.5     280.6        84785.
    SM    2016.0    1705.4    156.0    2359.9      1637735.
    AV      84.0      71.1      6.5      98.3        68239.
```

HOURLY REPORT PLOT

The following example is an HOURLY-REPORT in graphic form. The month, day, and hours appear in the left-hand column. The next entry to the right is the first possible value. A period (.) indicates that there is no value at or below this value; an asterisk (*) indicates that two or more values occupy this position. The numerical values appearing on the plot are correlated to the symbol numbers in the table above the plot. Component name, in the table, is the VARIABLE-TYPE of which the variable is a part. If a value appears at the last possible position on the right it means either that the value is at this point or that the value is higher than this point.

The original input that created the following sample plot is as follows:

```
PLOTER1 = REPORT-BLOCK
   VARIABLE-TYPE     = GLOBAL
   VARIABLE-LIST     = (15) .. $GLOBAL HORIZONTAL SOLAR$

PLOTER2 = REPORT-BLOCK
   VARIABLE-TYPE     = SOUTHZONE
   VARIABLE-LIST     = (49) .. $DAYL ILLUM, REF PT 1$
```

```
PLOTD = HOURLY-REPORT
   REPORT-SCHEDULE    = PLTSCH
   REPORT-BLOCK       = (PLOTER1,PLOTER2)
   OPTION             = PLOT
   AXIS-ASSIGN        = (1,2)
   AXIS-TITLES        = (*EXTERIOR SOLAR, *INTERIOR DAYLITE*)
   AXIS-MAX           = (500, 100)
   AXIS-MIN           = (0,0)
   DIVIDE             = (1,1,) ..
```

```
DAYLIGHTING EXAMPLE                      FLOOR OF OFFICE BUILDING IN CHICAGO
30-FT DEEP PERIM OFFS DAYLIT TO 15 FT   AUTO SHADE MANAGEMENT FOR SUN CONTROL
PLOTD           = HOURLY-REPORT                                                                      PAGE  1
-------------------------------------------------------------------------------------------------------------


         SYMBOL    COMPONENT NAME      (NO.)  DESCRIPTION    AXIS     UNIT

            1      GLOBAL              (15)   GLOBAL  SOLAR    1    BTU/HR- SQFT
            2      SOUTHZONE           (49)   DAYL ILLREF PT 1 2    FOOTCANDLES


                                           INTERIOR DAYLITE
    0.00000E+00         0.20000E+02         0.40000E+02         0.60000E+02         0.80000E+02
          I......... .........I......... .........I......... .........I......... .........I......
                                           EXTERIOR SOLAR
    0.00000E+00         0.10000E+03         0.20000E+03         0.30000E+03         0.40000E+03
          I......... .........I......... .........I......... .........I......... .........I......
   1 2  7 *
   1 2  8 12
   1 2  9 .  1      2
   1 2 10 .     1         2
   1 2 11 .        1                2
   1 2 12 .         1                   2
   1 2 13 .         1                   2
   1 2 14 .       1                2
   1 2 15 .     1         2
   1 2 16 . 1    2
   1 2 17 *
   1 2 18 *
   1 2 19 *
          I......... .........I......... .........I......... .........I......... .........I......
```

The following tables describe each of the hourly report variables that you can have printed from LOADS and HVAC (SYSTEMS and PLANT). Hourly reports are not available for ECONOMICS.

The units shown here are English units; for metric output runs, the corresponding metric units that will be printed can be determined from the DOE-2 Units Table (see "Metric Input and Output")

GLOBAL

Global variables are applicable to both the LOADS and HVAC subprograms. However, the HVAC subprogram does not use many of these variables (particularly the solar data), and unused fields will be blank..

Variable-List Number	Variable in FORTRAN Code	Description
1	CLRNES	Atmospheric clearness number
2	TGNDR	Ground temperature (Rankine)
3	WBT	Outside wetbulb temperature (F)
4	DBT	Outside drybulb temperature (F)
5	PATM	Atmospheric pressure (in. Hg)
6	CLDAMT	Cloud amount, 0 to 10 (0 = clear, 10 = overcast)
7	ISNOW	Snow flag (1 = snowfall); not used in simulation
8	IRAIN	Rain flag (1 = rainfall); not used in simulation
9	IWNDDR	Wind direction (0-15) (0=north, 4=east, 8=south, 12=west)
10	HUMRAT	Humidity ratio (lb H_20/lb air)
11	DENSTY	Outside air density (lb/ft^3)
12	ENTHAL	Specific enthalpy of outside air (Btu/lb)
13		Unused
14	DIRSOL	Direct normal solar radiation from the weather file; zero when no solar on weather file (Btu/hr-ft^2)
15	SOLRAD	Total horizontal solar radiation from the weather file; if non-solar weather file, = calculated total horizontal solar radiation (direct plus diffuse) (Btu/hr-ft^2)
16	ICLDTY	Cloud type (0=cirrus, 1=stratus, 2=halfway between cirrus and stratus)
17	WNDSPD	Wind speed at weather station (knots). See also variable No.58, Variable-Type = U-name of SPACE, for windspeed at the building.
18	DPT	Dew-point temp (F)
19	WNDDRR	Wind direction in radians (clockwise from North)
20	CLDCOV	Cloud cover multiplier
21	RDNCC	Direct normal solar radiation. If non-solar weather tape, = clear day direct normal solar radiation times CLDCOV. If solar tape, = measured direct normal solar radiation (DIRSOL) (Btu/hr-ft2)
22	BSCC	Diffuse horizontal solar radiation from the sky. If non-solar weather tape, = clear day diffuse horizontal solar radiation times CLDCOV. If solar tape, = measured diffuse horizontal solar (total horizontal minus direct horizontal) (Btu/hr-ft^2)
23	-	Unused
24	DBTR	Outside drybulb temperature (Rankine)
25	ISUNUP	Sun up flag (= 1 if sun is up; = 0 if down)

Variable-List Number	Variable in FORTRAN Code	Description
26	GUNDOG	Hour angle of sunrise for the day (radians)
27	HORANG	Current hour angle (radians)
28	TDECLN	Tangent of solar declination angle
29	EQTIME	Value of the solar equation of time (hr)
30	SOLCON	Fitted "solar constant" (Btu/hrft^2). See *Engineers Manual (2.1A), p.III.24.*
31	ATMEXT	Atmospheric extinction coefficient
32	SKYDFF	Sky diffusivity factor
33	RAYCOS(1)	Solar direction cosine (x) in building coordinate system
34	RAYCOS(2)	Solar direction cosine (y) in building coordinate system
35	RAYCOS(3)	Solar direction cosine (z) in building coordinate system
36	RDN	Direct normal solar radiation intensity on a clear day [calculated] Btu/hr-ft^2)
37	BSUN	Diffuse solar intensity on a horizontal surface on a clear day [calculated] Btu/hr-ft^2)
38	IYR	Year
39	IMO	Month
40	IDAY	Day
41	IHR	Hour (local time; with Daylight Saving Time if appropriate)
42	IDOY	Day of year (1-365)
43	IDOW	Day of week (1-7) (1 = Sunday, 2 = Monday, ...)
44	ISCHR	Schedule hour (DST corrected IHR + IDSTF)
45	ISCDOW	Schedule day of week (Day of week, 1 = Sunday, 2 = Monday ... 8 = holiday)
46	IDSTF	Daylight saving time flag (1 if daylight saving in effect, 0 if not)
47	PTWV	Pressure caused by wind velocity (inches of water)
48	ATMTUR(IMO)	Atmospheric turbidity factor according to Angstrom
49	ATMMOI(IMO)	Atmospheric moisture (inches of precipitable water)
50	PHSUND	Solar altitude (degrees above horizon)
51	THSNHR	Solar azimuth (degrees) measured clockwise from North
52	ETACLD	Cloudiness factor; ranges from 0 for overcast sky to 1.0 for clear sky
53	CHISKF	Exterior horizontal illuminance from clear part of sky (footcandles)
54	OHISKF	Exterior horizontal illuminance from overcast part of sky (footcandles)
55	HISUNF	Exterior horizontal illuminance from direct sun (footcandles).
56	ALFAD	Ratio of exterior horizontal illuminance calculated from insolation and luminous efficacy to exterior horizontal illuminance calculated from theoretical CIE sky luminance distributions.

Variable-List Number	Variable in FORTRAN Code	Description
57	CDIRLW	Luminance efficacy of direct solar radiation (lumens/watt)
58	CDIFLW	Luminance efficacy of diffuse solar radiation from clear part of sky (lumens/watt)
59	ODIFLW	Luminance efficacy of diffuse solar radiation from overcast part of the sky (lumens/watt)
60	ModeDD	When SYSTEM-REPORT:DUMP-OPTIONS = (SIMULATION or DEBUG)combination of Initialization day (7,6,5,4,3,2,1; DEBUG only), iDDFlg (1= heating 2=cooling), and ModeDD (14 Terminals, 12 Fans/Coils, 10 Boilers/Chillers, 8 Heat Rej, 6 Loops/Pumps, 4 Plenums).

BUILDING-LOADS

For each hour, entries are summed for all spaces with a heating load that hour and appear in BLDDTH (1-18), VARIABLE-LIST numbers 1-18; similarly, entries are summed for all zones with a cooling load and appear in BLDDTC (1-18), VARIABLE-LIST numbers 19-36. For example, if a building has three spaces, S1, S2, and S3, and for a given hour, S1 and S2 each have a net heating load, and S3 has a net cooling load, then: (1) the sensible heating load for S1 and S2 appears in VARIABLE-LIST number 1, the latent heating load appears in VARIABLE-LIST number 2, etc.; (2) the sensible cooling load for S3 appears in VARIABLE-LIST number 19, the latent cooling load for S3 appears in VARIABLE-LIST number 20, etc. All loads are in Btu/hr, including electric. "Sensible load" is heat extraction from space air required to maintain constant air temperature; "sensible loads" are obtained from corresponding instantaneous heat gains by application of weighting factors that account for heat storage and release by building mass. "Walls" below are exterior surfaces with tilt ≥ 45°; "roofs" are exterior surfaces with tilt < 45°. (All gains and loads reported here are calculated at *constant space air temperatures*. Corrections for variable space temperature are made in the SYSTEMS calculation.)

Variable-List Number	Variable in FORTRAN Code	Description
1	BLDDTH(1)	Building heating load (sensible)
2	BLDDTH(2)	Building heating load (latent)
3	BLDDTH(3)	Building heating load from wall conduction
4	BLDDTH(4)	Building heating load from roof conduction
5	BLDDTH(5)	Building heating load from window conduction
6	BLDDTH(6)	Building heating load from solar radiation through exterior windows
7	BLDDTH(7)	Building sensible heating load from infiltration
8	BLDDTH(8)	Building heating load from interior wall conduction
9	BLDDTH(9)	Building heating load from conduction through underground walls and floors
10	BLDDTH(10)	Building lighting heating load
11	BLDDTH(11)	Building heating load from doors
12	BLDDTH(12)	Building equipment (electrical) heating load (sensible)
13	BLDDTH(13)	Building source heating load (sensible)
14	BLDDTH(14)	Building people heating load (sensible)
15	BLDDTH(15)	Building people heating load (latent)
16	BLDDTH(16)	Building equipment (electrical) heating load (latent)
17	BLDDTH(17)	Building source heating load (latent)
18	BLDDTH(18)	Building infiltration heating load (latent)
19	BLDDTC(1)	Building cooling load (sensible)
20	BLDDTC(2)	Building cooling load (latent)
21	BLDDTC(3)	Building cooling load from wall conduction
22	BLDDTC(4)	Building cooling load from roof conduction
23	BLDDTC(5)	Building cooling load from window conduction
24	BLDDTC(6)	Building cooling load from solar radiation through exterior windows
25	BLDDTC(7)	Building cooling sensible infiltration load

Variable-List Number	Variable in FORTRAN Code	Description
26	BLDDTC(8)	Building cooling load from conduction through interior walls
27	BLDDTC(9)	Building cooling load from conduction through underground walls and floors
28	BLDDTC(10)	Building lighting cooling load
29	BLDDTC(11)	Building cooling load from door conduction
30	BLDDTC(12)	Building equipment (electrical) cooling load (sensible)
31	BLDDTC(13)	Building source cooling load (sensible)
32	BLDDTC(14)	Building people cooling load (sensible)
33	BLDDTC(15)	Building people cooling load (latent)
34	BLDDTC(16)	Building equipment (electrical) cooling load (latent)
35	BLDDTC(17)	Building source cooling load (latent)
36	BLDDTC(18)	Building infiltration cooling load (latent)
37	QBELEC	Building electric total
38	QBGAS	Building gas total
39	QBHW	Building hot water total
40	QBEQEL	Building equipment electric total
41	QBLTEL	Building lighting electric total

SPACE

All space gains and loads are in Btu/hr, including electric. "Sensible gain" means the instantaneous heat gain before application of weighting factors. "Sensible load" is the heat extraction from space air required to maintain constant air temperature; "loads" are obtained from corresponding gains by application of weighting factors that account for heat storage and release by building mass. "Walls" below are exterior surfaces with tilt greater than or equal to 45°; "roofs" are exterior surfaces with tilt less than 45°. (All sensible gains and loads reported here are calculated at constant space air temperatures. Corrections for variable space temperature are made in the SYSTEMS calculation.) All quantities are before multiplication by space multiplier or floor multiplier.

Variable-List Number	Variable in FORTRAN Code	Description
1	QWALQ	Quick wall conduction gain
2	QCELQ	Quick roof conduction gain
3	QWINC	Window conduction gain (UAΔT conduction plus absorbed solar radiation that is conducted into the space)
4	QWALD	Delayed wall conduction gain
5	QCELD	Delayed roof conduction gain
6	QINTW	Interior wall conduction gain
7	QUGF	Underground floor conduction gain
8	QUGW	Underground wall conduction gain
9	QDOOR	Door conduction gain
10	QEQPS	Electrical equipment sensible gain
11	QEQPS2	Source sensible gain
12	QPPS	People sensible gain
13	QTSKL	Task light gain
14	QSOL	Glass transmitted solar gain (from exterior windows only)
15	QPLENUM	Light heat gain to return air
16	QWALD	Quick wall conduction load
17	QCELQ	Quick roof conduction load
18	QWINC	Window conduction load (UAΔT conduction plus absorbed solar radiation that is conducted into the space)
19	QWALD	Delayed wall conduction load
20	QCELD	Delayed roof conduction load
21	QINTW	Interior wall conduction load
22	QUGF	Underground floor conduction load
23	QUGW	Underground wall conduction load
24	QDOOR	Door conduction load
25	QEQPS	Equipment sensible load
26	QEQPS2	Source sensible load
27	QPPS	People sensible load

Variable-List Number	Variable in FORTRAN Code	Description
28	QPPL	People latent gain
29	QEQPL	Equipment latent gain
30	QEQPL2	Source latent gain
31	QINFL	Infiltration latent gain
32	QTSKL	Task lighting load
33	QSOL	Glass transmitted solar load (from exterior windows only)
34	ZLTOTH	Light heat gain to other space
35	QLITE	Light gain
36	QLITEW	Light load
37	QINFS	Infiltration sensible gain
38	QELECT	Electric load for space
39	CFMINF	Infiltration flow rate (cfm)
40	QSUMW	Sum of all weighted loads except infiltration and latent
41	ZCOND	Space conductance (Btu/hr-F)
42	QZS	Space sensible load
43	QZL	Space latent load
44	QZTOT	Space total load
45	QZLTEL	Space electric from lights
46	QZEQEL	Space electric from equipment
47	QZGAS	Space gas
48	QZHW	Space hot water
49	RDAYIL(1)	Daylight illuminance at LIGHT-REF-POINT1 (footcandles)
50	RDAYIL(2)	Daylight illuminance at LIGHT-REF-POINT2 (footcandles)
51	BACLUM(1)	Background luminance (footlamberts) for glare calculation at LIGHT-REF-POINT1.
52	BACLUM(2)	same as BACLUM(1) but for REF-POINT2.
53	GLRNDX(1)	Daylight glare index at LIGHT-REF-POINT1 calculated after window management (if any) has been employed as a response to MAX-GLARE, MAX-SOLAR-SCH, and/or CONDUCT-TMIN-SCH.
54	GLRNDX(2)	Daylight glare index at LIGHT-REF-POINT2 calculated after window management (if any) has been employed as a response to MAX-GLARE, MAX-SOLAR-SCH, and/or CONDUCT-TMIN-SCH.
55	FPHRP(1)	Multiplier, due to daylighting, on electric lighting power for the lighting zone at LIGHT-REF-POINT1 (varies from 1.0 if no lighting energy reduction to 0.0 if lighting energy reduced to zero).
56	FPHRP(2)	Multiplier, due to daylighting, on electric lighting power for the lighting zone at LIGHT-REF-POINT2 (varies from 1.0 if no lighting energy reduction to 0.0 if lighting energy reduced to zero).

Variable-List Number	Variable in FORTRAN Code	Description
57	<POWER-RED-FAC>	Net multiplier, due to daylighting, on electric lighting power for the entire space (= FPHRP(1) * ZONE-FRACTION1 + FPHRP(2) * ZONE-FRACTION2 + [1- (ZONE-FRACTION1) - (ZONE-FRACTION2)]).
58	WNDSPZ	Free-stream windspeed at the location of the space (knots). This is the weather station windspeed (Variable #17, VARIABLE-TYPE = GLOBAL) corrected for terrain, shielding, and space height effects.

EXTERIOR-WALL

Variable-List Number	Variable in FORTRAN Code	Description
1	SOLI	Total solar radiation on wall (direct and diffuse) after shading Btu/hr-ft^2)
2	XGOLGE	Fraction of the wall that is shaded from direct solar radiation
3	FILMU	Outside air film U-value, radiative plus convective (Btu/hr-ft^2-F)
4	PCO	Pressure difference across wall caused by wind velocity and stack effect (inches. of water)
5	Q	Heat transfer from the wall to the zone, unweighted (Btu/hr)
6	T	Outside surface temperature (Rankine)
7	CFM	Crack method air flow for wall (cfm)
8	C2	Used in response factor determination of Q and T for delayed walls
9	C3	Used in response factor determination of Q and T for delayed walls
10	SUMXDT	Used in response factor determination of Q and T for delayed walls
11	SUMYDT	Used in response factor determination of Q and T for delayed walls
12	DT	Used in response factor determination of Q and T for delayed walls
13	XSXCMP	Used in response factor determination of Q and T for delayed walls
14	XSQCMP	Used in response factor determination of Q and T for delayed walls
15	ETA	Cosine of the angle between the direction of the sun and the surface outward normal
16	BG	Solar radiation reflected from ground (Btu/hr-ft^2) [total horizontal solar radiation x ground reflectance]. This is *not* equal to the ground diffuse solar radiation incident on the wall.
17	<DIREWSH>	Intensity of direct solar radiation on the surface *before* shading (Btu/hr-ft^2)
18	<DIFEWSH>	Intensity of diffuse solar radiation on the surface from the sky and ground, *after* shading (Btu/hr-ft^2) incident on the wall.
19		Total solar intensity

WINDOW

Except as noted, the following variables are applicable to both exterior windows (WINDOW in EXTERIOR-WALL) and interior windows (WINDOW in INTERIOR-WALL between a sunspace and a non-sunspace). The effect of a window MULTIPLIER, if specified, is not taken into account.

Variable -List Number	Variable in FORTRAN Code	Description
1	UAVE	Area-weighted average of glass plus frame and curb U-value (glass U-value is multiplied by CONDUCT-SCHEDULE if defined). Includes inside and outside film coefficients (Btu/hr-ft²-F).
2	TDIR	Direct radiation transmission coefficient of all panes of glass in the window. If SHADING-COEF is specified, equals direct transmission coefficient of 1/8" clear reference glass.
3	ADIRO	Direct radiation absorption coefficient (outer pane). If SHADING-COEF is specified, equals direct absorption coefficient of 1/8" clear reference glass.
4	TDIF	Net diffuse radiation transmission coefficient of all panes of glass int he window. If SHADING-COEF is specified, equals diffuse transmission coefficient of 1/8" clear reference glass.
5	ADIFO	Diffuse radiation absorption coefficient (outer pane). If SHADING-COEF is specified, equals diffuse absorption coefficient of 1/8" clear reference glass.
6	ADIRI	Direct radiation absorption coefficient (inner pane). Zero if SHADING-COEF is specified or single pane.
7	ADIFI	Diffuse radiation absorption coefficient (inner pane). Zero if SHADING-COEF is specified or single pane.
8	FI	Inward-flowing fraction of heat from solar radiation absorbed by the inner pane. Zero if SHADING-COEF is specified or single pane.
9	FO	Inward-flowing fraction of heat from solar radiation absorbed by the inner pane..
10	AGOLGE	Fraction of window area that is shaded from direct solar radiation. [Exterior WINDOW only]
11	QDIR	Direct solar radiation incident on window (after shading by setback, overhang, etc.) divided by the total window area (Btu/hr-ft²).
12	QDIF	Diffuse solar radiation incident on window (after shading by setback, overhang, etc.) divided by the total window area (Btu/hr-ft²).
13	QTRANS	Direct and diffuse solar energy transmitted through glass (after shading by setback, overhang, etc.) divided by glass area (Btu/hr-ft²), before multiplication by glass shading coefficient, if applicable, and by SHADING-SCHEDULE value. [Exterior WINDOW only]
14	QABS	Direct and diffuse solar energy absorbed by glass (after shading by set-back, overhang, etc.) and conducted into the space, divided by glass area (Btu/hr-ft²), before multiplication by glass shading coefficient, if applic-able, and by SHADING-SCHEDULE value. [Exterior WINDOW only]
15	QSOLG+QABS G	Transmitted plus reconducted solar heat gain through window (glass plus frame) (after shading by setback, overhang, etc.)(Btu/hr). For exterior WINDOW: [(QTRANS+QABS)* (glass area) * (shading coefficient of glass)* (SHADING-SCHEDULE value if defined and shade is in place)] + [direct and diffuse solar

Variable -List Number	Variable in FORTRAN Code	Description
		energy absorbed by frame and conducted into the space]. shading coefficient is 1.0 if GLASS-TYPE-CODE is used.
16	GSHACO	Shading coefficient of glass. Used only if SHADING-COEF is specified. 1.0 if GLASS-TYPE-CODE is <= 11.
17	QCON+QC/ETEMONFR	Conduction heat gain through window (glass plus frame) (Btu/hr): = UAVE * (glass area + frame area) (outside DBT - zone temp) - (exterior IR radiation correction) [exterior WINDOW only; for interior WINDOWs see Variable No. 58, VARIABLE-TYPE = ZONE, in SYSTEMS.
18	SWFAC	Switching factor. 0.0 = unswitched; 1.0 = fully switched. [Exterior WINDOW only]
19	SHMULT	Value by which solar heat gain of glazing is multiplied when glass is covered by a shading device. Determined by SHADING-SCHEDULE
20	SOLGMX	Transmitted direct solar gain threshold for activation of glass shading device (Btu/ft^2). Determined by MAX-SOLAR-SCH.
21	none	Visible transmittance of glazing (excluding shading device) for direct solar radiation. [Exterior WINDOW only]
22	TAU1	Value by which visible transmittance of glazing is multiplied when glass is covered by a shading device. Determined by VIS-TRANS-SCH. [Exterior WINDOW only]
23	<SHADING-FLAG>	Disposition of window shading device: 0 = no shade assigned to window; 1 = shade assigned but open this hour; 2 = shade assigned and closed this hour due to solar gain, outside dry bulb temperature, or glare test, or for daylit spaces because WIN-SHADE-TYPE = FIXED-INTERIOR or FIXED-EXTERIOR; 3 = shade assignedand closed this hour but no solar gain, outside dry bulb temperature, or glare test requested (preset schedule control)
24	$<ILLUMW>_1$	Contribution of window to daylight illuminance at LIGHT-REF-POINT1 with no shading device on glass (footcandles). [Exterior WINDOW only]
25	$<ILLUMW>_2$	Contribution of window to daylight illuminance at LIGHT-REF-POINT2 with no shading device on window (footcandles). [Exterior WINDOW only]
26	$<ILLUMW>_3$	Contribution of window to daylight illuminance at LIGHT-REF-POINT1 with glass covered by shading device on window (footcandles). [Exterior WINDOW only]
27	$<ILLUMW>_4$	Contribution of window to daylight illuminance at LIGHT-REF-POINT2 with glass covered by shading device (footcandles). [Exterior WINDOW only]
28	BLDCOV	Fraction of window covered by blind (-999 if no blind).
29	ANGSLATADJ	Slat angle for window with blind (-999 if no blind).
30	qconfr + qabsgf	Frame gains from convection and solar absorption.

Variable-List Number	Variable in FORTRAN Code	Description
31	qconcurb + qabsgc	Curb gains from convection and solar absorption.

DOOR

Variable-List Number	Variable in FORTRAN Code	Description
1	FILMU	Outside air film U-value, radiative plus convective (Btu/hr-ft^2-F)
2	DRGOLG	Fraction of door shaded from direct solar radiation
3	SOLID	Solar radiation incident on door (Btu/hr-f^2)
4	TSOLD	Outside surface temperature (R)
5	QD	Heat flow through door (Btu/hr-ft^2-F)
6	CFMD	Crack method infiltration air flow (cfm)

ZONE

Variable-List Number	Variable in FORTRAN Code	Description
1	zn.Qs-Lds'	Sensible load at constant zone temperature (from LOADS) (Btu/hr)
2	zn.QlatInt	Latent load at constant zone temperature, excluding infiltration (from LOADS) (Btu/hr)
3	zn.kW-Lds	Zone electrical load (from LOADS) (kW)
4	zn.QltRet'	Light heat to return air (from LOADS) (Btu/hr)
5	zn.CFMinf	Outdoor air infiltration rate (from LOADS) (cfm)
6	zn.Tzone	Current hour zone temperature (F).
7	zn.Tset	Current hour zone thermostat setting
8	zn.ERnet	Current hour heat extraction rate. Excludes heat extraction due to interzone convection across interior wall between sunspace and non-sunspace. For sunspaces, excludes heat extraction due to venting.
9	zn.Conduct'	Sum of exterior wall + interior wall thermal conductances from LOADS (Btu/hr-F)
10	zn.Wzone	Zone humidity ratio
11	zn.CFMexh	Exhaust air flow rate (cfm)
12	zn.CFMhd	Hot air flow rate (cfm)
13	zn.CFMcd	Cold air flow rate (cfm)
14	zn.CFMt	Zone supply air flow rate (cfm)
15	zn.Qbbrd	Baseboard heat output to zone (Btu/hr)
16	zn.Qover	Amount of extra heat extraction needed to hold setpoint if load not met (Btu/hr)
17	zn.Theat	Thermostat setpoint for heating (F)
18	zn.Tcool	Thermostat setpoint for cooling (F)
19	zn.ERtop	Heat extraction rate at top of throttling band (meaningful only within the current thermostat band) (Btu/hr)
20	zn.ERbot	Heat extraction rate at bottom of throttling band (meaningful only within the current thermostat band) (Btu/hr)
21	zn.Ttrial	Trial zone temperature (if no zone coil activity) (F)
22	zn.F	F in temperature variation calculation (TEMDEV subroutine) (Btu/hr)
23	zn.dQiw	A part of the correction in SYSTEMS for the contribution to the zone load due to conduction from adjacent zones (partially calculated in LOADS) (Btu/hr)
24	zn.G0	Air temperature weighting factors (Btu/hr-F)
25	zn.G1	Air temperature weighting factors (Btu/hr-F)
26	zn.G2	Air temperature weighting factors (Btu/hr-F)

Variable-List Number	Variable in FORTRAN Code	Description
27	zn.G3	Air temperature weighting factors (Btu/hr-F)
28	zn.SigmaG	Unused in 2.3
29	zn.Thd	Induced air temperature for induction terminals (IU, SZCI, fan-powered) (F)
30	zn.Qreheat	Portion of reheat load that would bring the supply temperature to the zone temperature (Btu/hr)
31	TAVE	Unused in 2.3
32	zn.Qht	Zone coil heating (Btu/hr)
33	zn.Qcl	Zone coil cooling (Btu/hr)

Note: Variables 34 through 48 apply only to the systems indicated

		FC	HP	UHT	UVT	PTAC	
34	ah.Tcd	x	x	-	x	x	Cold deck temp (F)
35	hc.Qcoil	x	x	x	x	x	Zone heating (Btu/hr)
36	cc.Qcoil	x	x	-	-	x	Zone cooling (Btu/hr)
37	FanKWcd+ FanKWhd+FanKWret	x	x	x	x	x	Zone fan energy (Btu/hr)
38	ah.Tmix	x	x	x	x	x	Mixed air temp (F)
39	ah.Wret	x	x	x	x	x	WR = return humidity ratio TC = coil leaving temp
40	ah.Wmix	x	x	x	x	x	Mixed air humidity ratio ($lb H_2O/lb$ dry air)
41	ah.Wcd	x	x	-	-	x	Humidity ratio of air leaving cooling coil ($lb H_2O/lb$ dry air)
42	ah.Poa	x	x	-	x	x	Ratio of outside air to total supply air
43	cc.Qlat	x	x	-	-	x	Latent load (Btu/hr)
44	cc.PLR	-	x	-	-	x	Cap. part load ratio (clg)
45	hc.PLR	-	x	-	-	x	Cap. part load ratio (ht)
46	cc.EIR	-	x	-	-	x	Electric input ratio
47	cc.Tewb	x	x	-	-	x	Zone wetbulb temp (F)
48	cl.Qcoil	x	x	-	-	x	Supp heat load for zone heat pumps this hour (Btu/hr)
49	ACFM						Unused in 2.3
50	zn.kWt						Total zone elec (kW)

51	ah.TcdMinZn		Minimum zone supply air temperature (F)
52	ah.ThdMaxZn		Maximum zone supply air temperature (F)
53	zn.ERmaxM	All air systems	Extraction rate, top of deadband (Btu/hr)
54	zn.ERminM	All air systems	Extraction rate, bottom of deadband (Btu/hr)
55	zn.THR		(THROTTLING-RANGE) 2 (F)

In the following descriptions, "sunspace" is a SPACE with SUNSPACE = YES; and "room" is a SPACE with SUNSPACE = NO (the default) that is adjacent to a sunspace.

Variable-List Number	Variable in FORTRAN Code	Description
56	SGIW0	For room only: total heat gain (unweighted) due to solar radiation coming from adjacent sunspaces through interior windows (Btu/hr).
57	SLIW0	For room only: total solar load (weighted) through interior windows from all adjacent sunspaces (Btu/hr).
58	QGWIN	For room or sunspace: heat gain by conduction (unweighted) through interior windows (Btu/hr), calculated with the air temperature of the zone in question fixed at the LOADS calculation temperature and actual previous-hour temperatures for adjacent zones.
59	QSNABT	For room or sunspace: solar radiation absorbed on the sunspace side (opaque part) of interior walls (Btu/hr).
60	QGOPWL	For room or sunspace: heat gain by conduction (unweighted) through opaque part of interior walls (Btu/hr), calculated with the air temperature of the zone in question fixed at the LOADS calculation temperature and actual previous-hour temperatures for adjacent zones.
61	QGVEC	For room or sunspace: heat extraction from convection across interior wall. For room, includes contribution from fan heat if AIR-FLOW-TYPE = FORCED-RECIRC (Btu/hr).
62	CFMCVT	For room or sunspace: average airflow due to convection across interior wall (cfm)
63	CFMVNT	For sunspace only: average airflow due to venting (cfm).
64	QGVNT	For sunspace only: heat extraction due to venting (Btu/hr)
65	GPMZ	(Unused in 2.3) Flow through unit condenser (GPM)
66	GPMHZ	(Unused in 2.3) Flow during unit heating (GPM)
67	GPMCZ	(Unused in 2.3) Flow during unit cooling (GPM)
68	QHLUPZ	(Unused in 2.3) Heat taken from loop (Btu/hr)
69	QCLUPZ	(Unused in 2.3) Heat added to loop (Btu/hr)
70	zn.Qnv	Cooling due to natural ventilation (Btu/Hr)
71	zn.CFMnv	Natural ventilation flow (cuft/min)

Variable-List Number	Variable in FORTRAN Code	Description
72	See description	<zn.CFMnv>*60.0 / <zn:VOLUME> - the natural ventilation air changes/hr
73	zn.Tnv	Natural ventilation setpoint temperature (Deg F)
74	zn.Qplume	Heat plumes that bypass zone terminal, Btuh
75	CAPAIR	(Unused in 2.3) Heat transport capacity on air side of water-side economizer
76	CAPWTR	(Unused in 2.3) Heat transport capacity on water side of water-side economizer
77	QCWSEM	(Unused in 2.3) Max possible water-side economizer exchange
78	QCWSE	(Unused in 2.3) Actual water-side economizer exchange
79	WSEDTA	(Unused in 2.3) Air temperature drop through water-side economizer
80	WSEDTW	(Unused in 2.3) Water temperature rise through water-side economizer
81	WSEXEF	(Unused in 2.3) Heat-exchanger efficiency of water-side economizer
82	zn.Tsup	Supply temperature leaving terminal
83	zn.Tret	Return temperature leaving space
84	WSEQMX	Unused
85	WSEPLR	(Unused in 2.3)
86	WSEDT	(Unused in 2.3) Difference between entering air and water temperatures for WS econo
87	ir;Qconv	Ice rink - Ice load due to convection (Btu/hr)
88	ir;Qlat	Ice rink - Ice load due to latent heat gain (Btu/hr)
89	ir;QceilRad	Ice rink - Ice load from ceiling radiation (Btu/hr)
90	ir;Qlights	Ice rink - Ice load due to lights, weighted (Btu/hr)
91	ir;Qsolar	Ice rink - Ice load due to solar transmittance, weighted (Btu/hr)
92	ir;Qsubfloor	Ice rink - Ice load due to subfloor heating (Btu/hr)
93	ir;Qresurf	Ice rink - Ice load due to resurfacing (Btu/hr)
94	ir;Qskaters	Ice rink - Ice load due to skaters, weighted (Btu/hr)
95	ir;Qrink	Ice rink - Gross ice load, unweighted (Btu/hr)
96	ir;Qbrine	Ice rink - Net brine load, weighted (Btu/hr)
97	ir;Tceil	Ice rink - Ceiling surface temperature (Deg F by subtracting 460.)
98	ir;Trink	Ice rink - Rink temperature (Deg F)
99	ir;Wrink	Ice rink - Humidity ratio at ice temperature (lb/lb)
100	zn.CFMoa	Hourly zone OA CFM requirement for DCV calculation (cuft/min)
101	zn.Zpz	Hourly zone OA/total flow for DCV calculation (cfm/cfm)

VARIABLES BY SYSTEM-TYPE FOR ZONE

V-L No.	1	2	3	4	5	6	7	8
SYSTEM-TYPE	SENS LOAD-IN	LATENT LOAD-IN	ELEC LOAD-IN	PLENUM LOAD-IN	INFL CFM	ZONE TEMP	THERMOSTAT SETPT	EXTRAC-TION RATE
SUM	A	A	A	A	A	A	A	A
SZRH	A	A	A	A	A	A	A	A
MZS	A	A	A	A	A	A	A	A
DDS	A	A	A	A	A	A	A	A
SZCI	A	A	A	A	A	A	A	A
UHT	A	A	A	A	A	A	A	A
UVT	A	A	A	A	A	A	A	A
FPH	A	A	A	A	A	A	A	A
TPFC	A	A	A	A	A	A	A	A
FPFC	A	A	A	A	A	A	A	A
TPIU	A	A	A	A	A	A	A	A
FPIU	A	A	A	A	A	A	A	A
VAVS	A	A	A	A	A	A	A	A
PIU	A	A	A	A	A	A	A	A
RHFS	A	A	A	A	A	A	A	A
HP	A	A	A	A	A	A	A	A
HVSYS	A	A	A	A	A	A	A	A
CBVAV	A	A	A	A	A	A	A	A
RESYS	A	A	A	A	A	A	A	A
PSZ	A	A	A	A	A	A	A	A
PMZS	A	A	A	A	A	A	A	A
PVAVS	A	A	A	A	A	A	A	A
PTAC	A	A	A	A	A	A	A	A
PVVT	A	A	A	A	A	A	A	A
RESVVT								

V-L No.	9	10	11	12	13	14	15	16
SYSTEM-TYPE	TOTAL UA FOR HOUR	UNUSED	EXH CFM	HOT DECK CFM	COLD DECK CFM	SUPPLY CFM	BBRD HEAT RATE	LOAD NOT MET
SUM	A	N	N	N	N	N	A	A
SZRH	A	N	A	N	N	A	A	A
MZS	A	N	A	A	A	A	A	A
DDS	A	N	A	A	A	A	A	A
SZCI	A	N	A	N	N	A	A	A
UHT	A	N	N	A	N	A	A	A
UVT	A	N	N	A	N	A	A	A
FPH	A	N	N	N	N	N	A	A
TPFC	A	N	A	N	N	A	A	A
FPFC	A	N	A	N	N	A	A	A
TPIU	A	N	A	N	N	A	A	A
FPIU	A	N	A	N	N	A	A	A
VAVS	A	N	A	N	N	A	A	A
PIU	A	N	A	N	N	A	A	A
RHFS	A	N	A	N	N	A	A	A
HP	A	N	A	A	A	A	A	A
HVSYS	A	N	A	N	N	A	A	A
CBVAV	A	N	A	N	N	A	A	A
RESYS	A	N	N	N	N	N	A	A
PSZ	A	N	A	N	N	A	A	A
PMZS	A	N	A	A	A	A	A	A
PVAVS	A	N	A	N	N	A	A	A
PTAC	A	N	N	A	A	A	A	A
PVVT	A	N	A	N	N	A	A	A
RESVVT								

Legend:
A = Appropriate
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V-L No. SYSTEM-TYPE	17 HEAT SET POINT	18 COOL SET POINT	19 MAX COOLING	20 MAX HEATING	21 FLOAT TEMP	22 F IN TEMDEV	23 INT TRAN TO ZONE	24 TEMDEV VAR G0
SUM	A	A	A	A	A	D	A	D
SZRH	A	A	A	A	A	D	A	D
MZS	A	A	A	A	A	D	D	D
DDS	A	A	A	A	A	D	A	D
SZCI	A	A	A	A	A	D	A	D
UHT	A	A	A	A	A	D	A	D
UVT	A	A	A	A	A	D	A	D
FPH	A	A	A	A	A	D	A	D
TPFC	A	A	A	A	A	D	A	D
FPFC	A	A	A	A	A	D	A	D
TPIU	A	A	A	A	A	D	A	D
FPIU	A	A	A	A	A	D	A	D
VAVS	A	A	A	A	A	D	A	D
PIU	A	A	A	A	A	D	A	D
RHFS	A	A	A	A	A	D	A	D
HP	A	A	A	A	A	D	A	D
HVSYS	A	A	A	A	A	D	A	D
CBVAV	A	A	A	A	A	D	A	D
RESYS	A	A	A	A	A	D	A	D
PSZ	A	A	A	A	A	D	A	D
PMZS	A	A	A	A	A	D	A	D
PVAVS	A	A	A	A	A	D	A	D
PTAC	A	A	A	A	A	D	A	D
PVVT	A	A	A	A	A	D	A	D
RESVVT						D		D

V-L No. SYSTEM-TYPE	25 TEMDEV VAR G1	26 TEMDEV VAR G2	27 TEMDEV VAR G3	28 TEMDEV SIG-MAG	29 IND UNIT AIR TEMP	30 HEAT TO ZONE T	31 COOL TO ZONE T	32 HEATING BY COILS
SUM	D	D	D	D	N	N	N	N
SZRH	D	D	D	D	N	A	N	A
MZS	D	D	D	D	N	N	N	N
DDS	D	D	D	D	N	N	N	N
SZCI	D	D	D	D	N	A	N	A
UHT	D	D	D	D	N	N	N	A
UVT	D	D	D	D	N	N	N	A
FPH	D	D	D	D	N	N	N	A
TPFC	D	D	D	D	N	N	N	A
FPFC	D	D	D	D	N	N	N	A
TPIU	D	D	D	D	A	N	N	A
VAVS	D	D	D	D	N	A	N	A
PIU	D	D	D	D	N	A	N	A
RHFS	D	D	D	D	N	A	N	A
HP	D	D	D	D	N	N	N	A
HVSYS	D	D	D	D	N	A	N	A
CBVAV	D	D	D	D	N	A	N	A
RESYS	D	D	D	D	N	N	N	N
PSZ	D	D	D	D	N	A	N	A
PMZS	D	D	D	D	N	N	N	N
PVAVS	D	D	D	D	N	A	N	A
PTAC	D	D	D	D	N	N	N	A
PVVT	D	D	D	D	N	A	N	A
RESVVT	D	D	D	D				

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V-L No. SYSTEM-TYPE	33 COOLING BY COILS	34 UNIT SUP TEMP	35 UNIT HEATING	36 UNIT COOLING	37 UNIT FAN KW	38 UNIT MIX TEMP	39 UNIT WR OR TC	40 UNIT MIX HUM
SUM	N	N	N	N	N	N	N	N
SZRH	N	N	N	N	N	N	N	N
MZS	N	N	N	N	N	N	N	N
DDS	N	N	N	N	N	N	N	N
SZCI	N	N	N	N	N	N	N	N
UHT	A	A	A	A	A	A	S	A
UVT	A	A	A	A	A	A	S	A
FPH	N	N	N	N	N	N	N	N
TPFC	A	A	A	A	A	A	A	A
FPFC	A	A	A	A	A	A	A	A
TPIU	N	N	N	N	N	N	N	N
FPIU	N	N	N	N	N	N	N	N
VAVS	N	N	N	N	N	N	N	N
PIU	N	N	N	N	N	N	N	N
RHFS	N	N	N	N	N	N	N	N
HP	A	A	A	A	A	A	A	A
HVSYS	A	N	N	N	N	N	N	N
CBVAV	N	N	N	N	N	N	N	N
RESYS	N	N	N	N	N	N	N	N
PSZ	N	N	N	N	N	N	N	N
PMZS	N	N	N	N	N	N	N	N
PVAVS	N	N	N	N	N	N	N	N
PTAC	A	A	A	A	A	A	S	A
PVVT	A	N	N	N	N	N	N	N
RESVVT								

V-L No. SYSTEM-TYPE	41 UNIT COIL HUM	42 UNIT OA-RATIO	43 UNIT LAT COOL	44 UNIT COOL PLR	45 UNIT HEAT PLR	46 UNIT EIR	47 UNIT WETBULB	48 UNIT DEFROST
SUM	N	N	N	N	N	N	N	N
SZRH	N	N	N	N	N	N	N	N
MZS	N	N	N	N	N	N	N	N
DDS	N	N	N	N	N	N	N	N
SZCI	N	N	N	N	N	N	N	N
UHT	A	A	A	A	A	A	A	N
UVT	A	A	A	A	A	A	A	N
FPH	N	N	N	N	N	N	N	N
TPFC	A	A	A	A	A	A	A	N
FPFC	A	A	A	A	A	A	A	N
TPIU	N	N	N	N	N	N	N	N
FPIU	N	N	N	N	N	N	N	N
VAVS	N	N	N	N	N	N	N	N
PIU	N	N	N	N	N	N	N	N
RHFS	N	N	N	N	N	N	N	N
HP	A	A	A	A	A	A	A	N
HVSYS	N	N	N	N	N	N	N	A
CBVAV	N	N	N	N	N	N	N	N
RESYS	N	N	N	N	N	N	N	N
PSZ	N	N	N	N	N	N	N	N
PMZS	N	N	N	N	N	N	N	N
PVAVS	N	N	N	N	N	N	N	N
PTAC	A	A	A	A	A	A	A	A
PVVT	N	N	N	N	N	N	N	N
RESVVT								

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V-L No.	49	50	51	52	53	54	55	56
SYSTEM-TYPE	WEIGHTED CFM	TOTAL ELECTRIC	MIN COOL T	MAX HEAT T	DEADBAND MAX EXTR	DEADBAND MIN EXTR	THROTTLE OVER TWO	COM WIN SOL GAIN (Btu/hr)
SUM	N	A	N	N	N	N	N	A
SZRH	A	A	A	A	A	A	A	A
MZS	A	A	A	A	A	A	A	A
DDS	A	A	A	A	A	A	A	A
SZCI	A	A	A	A	A	A	A	A
UHT	N	A	A	A	A	A	A	A
UVT	N	A	A	A	A	A	A	A
FPH	N	A	N	N	N	N	N	A
TPFC	N	A	A	A	A	A	A	A
FPFC	N	A	A	A	A	A	A	A
TPIU	A	A	A	A	A	A	A	A
FPIU	A	A	A	A	A	A	A	A
VAVS	A	A	A	A	A	A	A	A
PIU	A	A	A	A	A	A	A	A
RHFS	A	A	A	A	A	A	A	A
HP	N	A	A	A	A	A	A	A
HVSYS	A	A	A	A	A	A	A	A
CBVAV	A	A	A	A	A	A	A	A
RESYS	N	A	A	A	A	A	A	A
PSZ	A	A	A	A	A	A	A	A
PMZS	A	A	A	A	A	A	A	A
PVAVS	A	A	A	A	A	A	A	A
PTAC	N	A	A	A	A	A	A	A
PVVT	A	A	A	A	A	A	A	A
RESVVT								

V-L No.	57	58	59	60	61	62	63	64
SYSTEM-TYPE	COM WIN SOL LOAD BTU/HR	COM WIN CONDUC BTU/HR	COM WIN ABSD SOL BTU/HR	COM WALL CONDUC BTU/HR	CONVEC HT GAIN BTU/HR	CONVEC AIR FLOW CFM	SUNSPACE FAN POWR KW	SUNSPACE VENT FLOW CFM
SUM	A	A	A	A	A	A	A	A
SZRH	A	A	A	A	A	A	A	A
MZS	A	A	A	A	A	A	A	A
DDS	A	A	A	A	A	A	A	A
SZCI	A	A	A	A	A	A	A	A
UHT	A	A	A	A	A	A	A	A
UVT	A	A	A	A	A	A	A	A
FPH	A	A	A	A	A	A	A	A
TPFC	A	A	A	A	A	A	A	A
FPFC	A	A	A	A	A	A	A	A
TPIU	A	A	A	A	A	A	A	A
FPIU	A	A	A	A	A	A	A	A
VAVS	A	A	A	A	A	A	A	A
PIU	A	A	A	A	A	A	A	A
RHFS	A	A	A	A	A	A	A	A
HP	A	A	A	A	A	A	A	A
HVSYS	A	A	A	A	A	A	A	A
CBVAV	A	A	A	A	A	A	A	A
RESYS	A	A	A	A	A	A	A	A
PSZ	A	A	A	A	A	A	A	A
PMZS	A	A	A	A	A	A	A	A
PVAVS	A	A	A	A	A	A	A	A
PTAC	A	A	A	A	A	A	A	A
PVVT	A	A	A	A	A	A	A	A
RESVVT								

Legend:
A = Appropriate
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X = Unused
D = Used for program code debugging only
S = System (or configuration) dependent

SYSTEM

Variable-List Number	Variable in FORTRAN Code	Description
1	ah.Thd	Temperature of air leaving the heating coil - hot deck temperature (F)
2	ah.Tcd	Temperature of air leaving cooling coil - cold deck temp (F)
3	ah.Tmix	Temperature of air entering coil (F)
4	ah.Tret"	Return air temp downstream of the return fan and plenums (F)
5	sy.Qht	Total central heating coil energy input (Btu/hr)
6	sy.Qcl	Total central cooling coil energy input (Btu/hr)
7	sy.QhtZn	Total zone heating energy input (Btu/hr)
8	sy.QclZn	For SYSTEM:TYPE = RESYS this is the cooling by natural ventilation
9	sy.Qbbrd	Total baseboard heating energy input (Btu/hr)
10	sy.Qpht	Total preheat coil energy input (Btu/hr)
11	sy.Qhum	Humidification energy input (for RESYS and RESVVT: electrical resistance heat load) (Btu/hr)
12	sy.Qdhum	Sensible dehumidification reheat input (for RESYS and RESVVT: defrost load) (Btu/hr)
13	ah.TcdMinZn	minimum temperature air handler could supply (F)
14	ah.ThdMaxZn	maximum temperature air handler could supply (F)
15	sy.QlatInt	(Unused in 2.3) Total system latent heat load from LOADS (Btu/hr)
16	sy.QltPlen	Total system light heat to return (Btu/hr)
17	ah.CFMt	Total system supply air flow rate (cfm)
18	ah.CFMhd	Total system hot supply air flow rate (DDS, MZS, PMZS) (cfm)
19	ah.CFMcd	Total system cold supply air flow rate (DDS, MZS, PMZS) (cfm)
20	ah.CFMret"	Total system return air flow rate (cfm)
21	ah.CFMexh	Total system exhaust air flow rate (cfm)
22	sy.CFMinf	Outside air infiltration rate (cfm)
23	sy.FanOnCD	Fan on/off flag(1 = on, 0 = off, -1 cannot cycle on for NIGHT-CYCLE-CTRL)
24	sy.HeatOn	Heating on/off flag (1 = on, 0 = off)
25	sy.CoolOn	Cooling on/off flag (1 = on, 0 = off)
26	sy.BbrdOn	Baseboard heater on-off flag (ratio from RESET-SCHEDULE)
27	ah.Btuh/CFM-F	In the equation Q = <ah.Btuh/CFM-F> * CFM * ΔT, <ah.Btuh/CFM-F> = 0.24 + 0.44 * HUMRAT) * 60.0/V(*DBT, HUMRAT, PATM) = 1.08 at standard conditions
28	ah.Btuh/CFM-W	In the equation Q = <ah.Btuh/CFM-W> * CFM * DW, <ah.Btuh/CFM-W> = 1061.0 * 60.0/V(*DBT, HUMRAT, PATM) = 4790 at standard conditions

Variable-List Number	Variable in FORTRAN Code	Description
29	sy.F/in-wg	Convert fan pressure to kW: <sy.F/in-wg> = 0.3996/<ah.Btuh/CFM-F>, 0.363 at STP
30	HD Airflow Ratio	For dual duct systems: ratio of hot duct flow to total flow
31	CD Airflow Ratio	For dual duct systems: ratio of cold duct cfm to total cfm
32	sy.kWt	Hourly total electrical consumption, system and zones (kW)
33	sy.FanKWt	Total of supply fan, return fan, and exhaust fan electrical consumption
34	unused	Unused
35	ah.Wret	Return air humidity ratio (lb H_20/lb dry air)
36	ah.Wmix	Mixed air humidity ratio (lb H_20/lb dry air)
37	ah.Wcd	Humidity ratio of air leaving cooling coil (lb h_20/lb dry air)
38	See description	Water (moisture) added/removed from air for (de)humidification (lb/lb)
39	ah.Poa	Ratio of outside air flow to total supply air flow
40	ah.Lb/CFM-Hr	Density of air x 60 min/hr (lb/ft^3 x min/hr)
41	--	Unused in 2.3
42	ah.TcdRng	Effect of controller on cooling coil setpoint (F)
43	hc.Qcap	Adjusted capacity of heat pump this hour for (Btu/hr)
44	--	Unused in 2.3
45	SGAS	Total gas heating (Btu/hr)
46	sy.kWht	Electrical input to heating (kW)
47	sy.kWcl	Electrical input to cooling (kW)
48	sy.QclLat	Latent part of total cooling (Btu/hr)
49	ah.FanKWcd	Supply fan electrical (kW)
50	ah.FanKWret	Return fan electrical (kW)
51	sy.NiteCycle	System can be night cycled: -1 for heating, 0 for no cycle, 1 for cooling
52	cc.Wsurf	Humidity retio at saturation at coil surface temperature
53	RWalkinQ	Unused in 2.3
54	cc.Tsurf	Coil surface temperature at supply setpoint (F)
55	sy.TretHD	(Unused in 2.3) Return temperature - dual duct hot side (return fan may be for cold only)
56	cc.CoilBF'	Coil bypass factor: (COIL-BF) * CBF1 * CBF2
57	sy.CoilBF-T	Temperature correction to COIL-BF
58	sy.CoilBF-CFM	Flow correction to COIL-BF
59	sy.FanOnExh	Exhaust fan schedule: 0=off, 1=on
60	Airflow ratio	(Current hour cfm)/(design cfm)
61	cc.PLR	Capacity part load ratio for cooling (also see PLRCC below)
62	hc.PLR	Capacity part load ratio for heating

Variable-List Number	Variable in FORTRAN Code	Description
63	cc.CapfT	Temperature correction to COOLING-CAPACITY
64	sy.CapClS-fT	(Unused in 2.3) Temperature correction to COOL-SH-CAP
65	hc.CapfT	Temperature correction to HEATING-CAPACITY
66	cc.EIRfT	Temperature correction to COOLING-EIR
67	cc.EIRfPLR	Part load correction to COOLING-EIR
68	cc.EIR	(COOLING-EIR) * EIRM1 * EIRM2 (Btu/Btu)
69	cc.ElecRej	Outside fan power (kW)
70	cc.Qcap	Total cooling capacity (Btu/hr)
71	Sens Heat Ratio	Cooling sensible heat ratio (Btu/hr)
72	ah.WretMax	Maximum humidity setpoint (lb H20/lb)
73	ah.WretMin	Minimum humidity setpoint (dry air)
74	ah.CFMrMaxCD	Maximum ratio of zone flow (for supply fans smaller than sum of zones)
75	Duct Ht Gain	Heat gains to DUCT&PIPE-ZONE from pipes and ducting
76	Pipe Ht Gain	Heat losses from DUCT&PIPE-ZONE from pipes and ducting
77	RON	Heat recovery on/off (0/1) flag
78	hc.Qcap	The total heating capacity (Btu/hr) for central AHU
79	TPOMIN	(pending in 2.3) Mixed air temperature at minimum OA damper position for central AHU
80	ah.PoaMin	The minimum OA damper position (fraction) for central AHU
81	sy.QhtSup	The total supplemental heat load for RESYS, RESVVT, PSZ and PTAC (Btu/hr)
82	--	
83	--	
84	--	
85	--	
86	--	
87	--	
88	--	
89	sy.CFMexhPlen	Plenum exhaust flow rate (cfm)
90	cc.Fuel	Gas used for cooling (Btu/hr)
91	QREG	Regeneration energy (Btu/hr)
92	Return wetbulb	Return air wetbulb temperature (F)
93		
94		
95		
96		

Variable-List Number	Variable in FORTRAN Code	Description
97		
98		
99		
100		
101-107		
108		
109		
110		
1111		
112	ah.Toa	drybulb temperature of air leaving desiccant or evaporative supplemental cooling unit (F)
113	ah.Woa	humidity ratio of air leaving desiccant or evaporative supplemental unit (lb H_2O/lb air)
114		
115		
116		
117		
118		
119		
120	POA	ratio of air flowing through supplemental desiccant or evaporative unit to total supply air
121	EVKW	auxiliary electricity used by the supplemental evaporative cooler (kW)
122	QCEVT	total cooling done by the evaporative cooling unit (Btu/hr)
123	QCEVS	sensible cooling by the evaporative cooling unit (Btu/hr)
124	QCEVL	latent cooling by the evaporative cooling unit (Btu/hr)
125	HPDefE	heat pump defrost load (Btu), average for hour
126	ah.FanDTcd	Supply air stream temperature rise across the supply fan (Deg F)
127	ah.FanDTret	Supply air stream temperature rise across the return fan (Deg F)
128	TDuctEnv	(unused in 2.3) Temperature of environment (zone after loss adjustment) of duct location
129-133 and 139-150 for SYSTEM-TYPE=HP and CONDENSER-TYPE=WATER-COOLED only		
129	GPMS	(unused in 2.3) Condenser water flow (GPM)
130	hc.GPM	Condenser flow for heating (GPM)
131	cc.GPM	Condenser flow for cooling (GPM)
132	hc.Qloop	Heat taken from loop (Btu/hr)
133	cc.Qloop	Heat added to loop (Btu/hr)
134	Nat Vent Flag	Natural Ventilation – venting is being used 0=no

Variable-List Number	Variable in FORTRAN Code	Description
135	INT(VENTF)	Natural Ventilation – venting scheduled available 0=no 1=yes
136	IVENTG	(unused in 2.3) Natural Ventilation – venting allowed (scheduled or OA enthalpy < zone)
137	sy.Qnv	Natural Ventilation – total cooling for ventilation (Btu/hr)
138	sy.NatVntX	Natural Ventilation – random number used for venting probability (0 to 1)
139	CAPAIR	Heat transport capacity of air side of water-side economizer (Btu/hr-F)
140	CAPWTR	Heat transport capacity of water side of water-side of economizer (Btu/hr-F)
141	QCWSEM	Max possible water-side economizer exchange (Btu/hr)
142	QCWSE	Actual water-side economizer exchange (Btu/hr)
143	WSEDTA	Temperature change of air (F)
144	WSEDTW	Temperature change of water (F)
145	WSEXEF	Water-side economizer heat-exchanger effectiveness
146	WSENTU	Unused
147	WSEUA	Unused
148	WSEQMX	Unused
149	WSEPLR	Fraction of water-side economizer max flow used
150	WSEDT	Air/water temperature difference
151-153	WSE13/14/15	Unused WSE variables
154	PLRCC	(unused in 2.3) Compressor PLR (accounting for MIN-UNLOAD/HGB-RATIOs)
Variables 155-213 are for HEAT-SOURCE = GAS-HEAT-PUMP or COMPRESSOR-TYPE = VARIABLE SPEED		
		Cooling Mode:
155	QCRUN	(Unused in 2.3) Run time of compressor (hours)
156	QCLOAD	(Unused in 2.3) Output of unit (Btu/hr)
157	QCGAS	(Unused in 2.3) Gas or electricity consumed by unit for cooling (Btu/hr)
158	QCAUX	(Unused in 2.3) Fans/Pumps/Aux energy (Btu/hr)
159	QCGSLD	(Unused in 2.3) Unmet cooling load (Btu/hr)
160	QCGSUP	(Unused in 2.3) Unused
161	QCWAS	Waste heat generated (Btu/hr)
162	QCWASU	Waste heat used (Btu/hr)
163	QCGSAV1	Unused
164	QCFAN	Indoor fan energy (Btu/hr)
		Heating Mode:
165	QHRUN	Run time of compressor (hours)

Variable-List Number	Variable in FORTRAN Code	Description
166	QHLOAD	Output of Unit (Btu/hr)
167	QHGAS	Gas or electricity consumed by unit for heating (Btu/hr)
168	QHAUX	Fans/Pumps/Aux energy (Btu/hr)
169	QHGSLD	All non-compressor heating loads (supplemental, reheat, etc.) (Btu/hr)
170	QHGSUP	Energy input to supp (Btu/hr)
171	QHWAS	Waste heat generated (Btu/hr)
172	QHWASU	Waste heat used (Btu/hr)
173	QHGDFR	Defrost imposed heat (Btu/hr)
174	QHFAN	Indoor fan energy (Btu/hr)
175	COIL-BF-FPLR	Value of COIL-BF-FPLR used this hour
176-177	-	Unused
178	COOL-EIR-FRPMT	Value of COOL-EIR-FRPMT used this hour
179	COOL-RPM-FPLR	Value of COOL-RPM-FPLR used this hour
180	COOL-WH-FT	Value of COOL-WH-FT used this hour
181	COOL-WH-FRPMT	Value of COOL-WH-FRPMT used this hour
182	COOL-CFM-FPLR	Value of COOL-CFM-FPLR used this hour
183	OUTSIDE-FAN-CFLT	(pending in 2.3) Value of OUTSIDE-FAN-CFLT used this hour
184	HEAT-EIR-FRPMT	Value of HEAT-EIR-FRPMT used this hour
185	HEAT-RPM-FPLR	Value of HEAT-RPM-FPLR used this hour
186	HEAT-WH-FT	Value of HEAT-WH-FT used this hour
187	HEAT-WH-FRPMT	Value of HEAT-WH-FRPMT used this hour
188	HEAT-CFM-FPLR	Value of HEAT-CFM-FPLR used this hour
189	OUTSIDE-FAN-HFLT	(pending in 2.3) Value of OUTSIDE-FAN-HFLT used this hour
190	hc.fCycle	Value of HEAT-LOS-FPLR used this hour
191	cc.fCycle	Value of COOL-LOS-FPLR used this hour
192	DEFROST-FRAC-FT	Ratio of defrost/heating time
193	DEFROST-CAP-FT	Heating fraction for defrost
194	DEFROST-PWR-FT	EIR in defrost mode
195	COOL-CAP-FRPMT	Value of COOL-CAP-FRPMT curve used this hour
196	HEAT-CAP-FRPMT	Value of HEAT-CAP-FRPMT curve used this hour
197-201	-	Unused
202	ah.CFMwipe	Fraction of dual duct cold air that “wipes” the heating coil first
203	ISZCZ	(Unused in 2.3) Single zone system control zone flag 0=not control zone 1=is C-Z
204	GCAP(1)	(Unused in 2.3) Capacity at maximum RPM (Btu/hr)
205	GCAP(2)	(Unused in 2.3) Capacity at minimum RPM (Btu/hr)

Variable-List Number	Variable in FORTRAN Code	Description
206	GEDB	(Unused in 2.3) Entering mixed air temperature (F)
207	hc.HPDefE	Gas or electricity used in defrost mode (Btu/hr)
208	GRPM	(Unused in 2.3) Speed of compressor (RPM)
209	cl.PLR	PLR of supplemental heating unit
210	ah.FanOn'	Fraction fan are on for INDOOR-FAN-MODE=INTERMITTENT
211	sy.CycleLossPLR	Cycling loss PLR (fraction)
212	sy.CFMvvt	Flow fraction for PVVT (fraction)
213	sy.QHZHP	(Unused in 2.3) Total zone heating load for gas heat pump (Btu/hr)
214	cc.Tsrc	Coil source temperature in cooling (eg. refrig or water T)
215	sy.FanOnHD	Hot deck fan on/off
216	ah.FanKWhd	Hot deck fan power consumption. Note that item #33 is *total* kw for all fans
217	ah.FanDThd	Hot deck air temperature rise
218	ah.CFMrMaxHD	Ratio of hot fan max flow/hourly zonal demand
219	FONNGTh	(Unused in 2.3) Hot deck fan on for night cycle
220	ah.CFMret"	Return flow to mixed air plenum
221	sy.CFMret'	(Unused in 2.3) Air moved by return/relief fan
222	EXFIL	(Unused in 2.3) Exfiltration from building pressurization, excluding zonal exhaust
223	ex.dTfluid	Duct temperature rise/fall due to losses (F)
224	ex.dTfluid	Hot duct temperature rise/fall due to losses (for two-duct systems) (F)
225	ah.TcdZn	Duct air temperature (F)
226	ah.ThdZn	Hot duct air temp (for two duct systems) (F)
227-291	Refrigeration variables	Unused in 2.3
292	rv;CFMoa	ERV Outdoor airflow
293	rv;CFMexh	ERV Exhaust airflow
294	rv;effSensible	ERV Sensible effectiveness
295	rv;effLatent	ERV Latent effectiveness
296	rv;Qsensible	ERV Sensible heat transfer (heating of OA is negative)
297	rv;Qlatent	ERV Latent heat transfer (moisture gain of OA is negative)
298	rv;QHexcess	ERV Excess heat transfer (heating of OA is negative)
299	rv;QCexcess	ERV Excess coolth transfer (cooling of OA is positive)
300	rv;TervReqd	ERV required leaving temperature to maintain mixed-air setpoint

Variable-List Number	Variable in FORTRAN Code	Description
301	rv;TervSetpt	ERV Temperature setpoint for air supply to mixed air plenum
302	rv;ToaHXi	ERV Outdoor air temperature entering HX, after preheat
303	rv;ToaHXo	ERV Outdoor air temperature leaving HX (to mixed air plenum)
304	rv;TexhHXi	ERV Exhaust air temperature entering HX, after preheat
305	rv;TexhHXo	ERV Exhaust air temperature leaving HX (to outdoors)
306	rv;WoaHXi	ERV Outdoor air humidity ratio entering HX
307	rv;WoaHXo	ERV Outdoor air humidity ratio leaving HX (to mixed air plenum)
308	rv;WexhHXi	ERV Exhaust air humidity ratio entering HX
309	rv;WexhHXo	ERV Exhaust air humidity ratio leaving HX (to outdoors)
310	rv;PLRhx	ERV Capacity modulation of HX
311	rv;OAbypass or rv;ExhBypass	ERV Fraction of air bypassed around HX; OA or exhaust
312	rv;OAecono	ERV Fraction of OA thru economizer to maintain setpoint
313	rv;kWoa + rv;kWexh	ERV Power of integral fans
314	rv;kWhx	ERV Power of HX (heat wheel motor)
315	rv;kWpreheat	ERV Power of preheat coil
316	rv;Qpreheat	ERV HW load of preheat coil
317	rv;ExhWetFlag	ERV flag indicating that exhaust air is at dewpoint within hx
318	rv;OAWetFlag	ERV flag indicating that outside air is at dewpoint within hx
319	ah.CFMoa	Hourly summed ZONE OA CFM for DCV calculation (cuft/min)
320	ah.Ev	Not used
321	sy.NatVentKW	Power of fan-assisted natural ventilation
322	sy.QsuppDef	Cooling effect at indoor coil due to defrost, average for hour, Btu/hr
323	sy.ElecDef	Compressor power during defrost, average for hour, kW
324	hc.Tsrc	Coil source temperature in heating (eg. refrig or water T)
325	hc.dTsat	Coil branch pipe DTsat due to pressure drop, heating mode
326	cc.dTsat	Coil branch pipe DTsat due to pressure drop, cooling mode

VARIABLES BY SYSTEM-TYPE FOR SYSTEM

V-L No.	1	2	3	4	5	6	7	8
SYSTEM-TYPE	HEATING COIL AIR TEMP	COOLING COIL AIR TEMP	MIXED AIR TEMP	RETURN AIR TEMP	TOTAL HEATING COIL BTU	TOTAL COOLING COIL BTU	TOTAL ZONE HEATING BTU	TOTAL ZONE COOLING BTU
SUM	N	N	N	N	A	A	N	N
SZRH	N	A	A	A	A	A	A	A
MZS	A	A	A	A	A	A	N	N
DDS	A	A	A	A	A	A	N	N
SZCI	N	A	A	A	A	A	A	A
UHT	N	N	N	N	A	A	A	N
UVT	N	N	N	N	A	A	A	N
FPH	N	N	N	N	A	N	A	N
TPFC	N	N	N	N	A	A	A	A
FPFC	N	N	N	N	A	A	A	A
TPIU	N	A	A	A	A	A	A	A
FPIU	N	A	A	A	A	A	A	A
VAVS	N	A	A	A	A	A	A	A
PIU	N	A	A	A	A	A	A	A
RHFS	N	A	A	A	A	A	A	A
HP	N	N	N	N	A	A	A	A
HVSYS	A	N	A	A	A	N	A	N
CBVAV	N	A	A	A	A	A	A	A
RESYS	A	A	A	A	A	A	A	A
PSZ	N	A	A	A	A	A	A	A
PMZS	A	A	A	A	A	A	N	N
PVAVS	N	A	A	A	A	A	A	A
PTAC	A	N	N	N	A	A	A	A
PTGSD	N	D	A	A	A	A	N	N
PVVT	N	A	A	A	A	A	A	A
RESVVT								

V-L No.	9	10	11	12	13	14	15	16
SYSTEM-TYPE	TOTAL BBRD ENERGY	TOTAL PREHEAT ENERGY	HUMID-CN HEATING	DEHUMID REHEAT	MIN SUP T	MAX SUP T	SUM ZONE LAT HEAT	SUM ZONE PLN HEAT
SUM	N	N	N	N	N	N	A	A
SZRH	A	A	A	A	A	A	A	A
MZS	A	A	A	A	A	A	A	A
DDS	A	A	A	A	A	A	A	A
SZCI	A	A	A	A	A	A	A	A
UHT	A	N	N	N	N	N	N	N
UVT	A	N	N	N	N	N	N	N
FPH	A	N	N	N	N	N	N	N
TPFC	A	N	A	A	N	N	N	N
FPFC	A	N	A	A	N	N	N	N
TPIU	A	A	A	A	A	A	A	A
FPIU	A	A	A	A	A	A	A	A
VAVS	A	A	A	A	A	A	A	A
PIU	A	A	A	A	A	A	A	A
RHFS	A	A	A	A	A	A	A	A
HP	A	N	N	N	N	N	N	N
HVSYS	A	A	A	N	A	A	A	A
CBVAV	A	A	A	A	A	A	A	A
RESYS	A	A	S	S	A	A	A	A
PSZ	A	A	A	A	A	A	A	A
PMZS	A	A	A	A	A	A	A	A
PVAVS	A	A	A	A	A	A	A	A
PTAC	A	N	N	N	N	N	N	N
PTGSD	A	N	N	N	A	A	A	A
PVVT	A	A	A	A	A	A	A	A
RESVVT								

Legend:
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V-L No. SYSTEM-TYPE	17 TOTAL SYSTEM CFM	18 TOTAL HOT CFM	19 TOTAL COLD CFM	20 RETURN CFM	21 EXHAUST CFM	22 INF CFM	23 FANS ON/OFF	24 HEAT ON/OFF
SUM	N	N	N	N	N	A	A	A
SZRH	A	N	N	A	A	A	A	A
MZS	A	A	A	A	A	A	A	A
DDS	A	A	A	A	A	A	A	A
SZCI	A	N	N	A	A	A	A	A
UHT	N	N	N	N	N	N	A	A
UVT	N	N	N	N	N	N	A	A
FPH	N	N	N	N	N	N	N	A
TPFC	N	N	N	N	N	N	A	A
FPFC	N	N	N	N	N	N	A	A
TPIU	A	N	N	A	A	A	A	A
FPIU	A	N	N	A	A	A	A	A
VAVS	A	N	N	A	A	A	A	A
PIU	A	N	N	A	A	A	A	A
RHFS	A	N	N	A	A	A	A	A
HP	N	N	N	N	N	N	A	A
HVSYS	A	N	N	A	A	A	A	A
CBVAV	A	N	N	A	A	A	A	A
RESYS	A	N	N	N	N	A	A	A
PSZ	A	N	N	A	A	A	A	A
PMZS	A	A	A	A	A	A	A	A
PVAVS	A	N	N	A	A	A	A	A
PTAC	N	N	N	N	N	N	A	A
PTGSD	A	N	N	A	A	A	A	A
PVVT	A	N	N	A	A	A	A	A
RESVVT								

V-L No. SYSTEM-TYPE	25 COOL ON/OFF	26 BBRDSCH RATIO	27 CONSTANT (1.08)	28 CONSTANT (0.689)	29 CONSTANT (0.363)	30 HOT AIR FRAC	31 COLD AIR FRAC	32 TOTAL ELECTRIC KW
SUM	A	N	N	N	N	N	N	A
SZRH	A	A	A	A	A	N	N	A
MZS	A	A	A	A	A	A	A	A
DDS	A	A	A	A	A	A	A	A
SZCI	A	A	A	A	A	N	N	A
UHT	A	A	A	A	A	N	N	A
UVT	A	A	A	A	A	N	N	A
FPH	N	A	N	N	N	N	N	A
TPFC	A	A	A	A	A	N	N	A
FPFC	A	A	A	A	A	N	N	A
TPIU	A	A	A	A	A	N	N	A
FPIU	A	A	A	A	A	N	N	A
VAVS	A	A	A	A	A	N	N	A
PIU	A	A	A	A	A	N	N	A
RHFS	A	A	A	A	A	N	N	A
HP	A	A	A	A	A	N	N	A
HVSYS	A	A	A	A	A	N	N	A
CBVAV	A	A	A	A	A	N	N	A
RESYS	A	A	A	A	A	N	N	A
PSZ	A	A	A	A	A	N	N	A
PMZS	A	A	A	A	A	A	A	A
PVAVS	A	A	A	A	A	N	N	A
PTAC	A	A	A	A	A	N	N	A
PTGSD	N	A	A	A	A	N	N	A
PVVT	A	A	A	A	A	N	N	A
RESVVT								

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V-L No.	33	34	35	36	37	38	39	40
SYSTEM-TYPE	TOTAL FAN ELEC	DELTA-T RECOV	RET HUMID	MAX HUMID	HUMID LEAVING COIL	MOIST CHG	OUTSIDE/TOTAL CFM	DENSITY (AIR*60)
SUM	N	N	N	N	N	N	N	N
SZRH	A	A	A	A	A	A	A	A
MZS	A	A	A	A	A	A	A	A
DDS	A	A	A	A	A	A	A	A
SZCI	A	A	A	A	A	A	A	A
UHT	A	N	N	N	N	N	N	N
UVT	A	N	N	N	N	N	N	N
FPH	A	N	N	N	N	N	N	N
TPFC	A	N	N	N	N	N	N	N
FPFC	A	N	N	N	N	N	N	N
TPIU	A	A	A	A	A	A	A	A
FPIU	A	A	A	A	A	A	A	A
VAVS	A	A	A	A	A	A	A	A
PIU	A	A	A	A	A	A	A	A
RHFS	A	A	A	A	A	A	A	A
HP	A	N	N	N	N	N	N	N
HVSYS	A	A	A	A	A	A	A	A
CBVAV	A	A	A	A	A	A	A	A
RESYS	A	N	N	A	A	A	N	N
PSZ	A	A	A	A	A	A	A	A
PMZS	A	A	A	A	A	A	A	A
PVAVS	A	A	A	A	A	A	A	A
PTAC	A	N	N	N	N	N	N	N
PTGSD	A	N	A	A	A	A	A	A
PVVT	A	A	A	A	A	A	A	N
RESVVT								

V-L No.	41	42	43	44	45	46	47	48
SYSTEM-TYPE	FLUID TEMP	COOL-CTR EFFECT	QHR	QCR	HEATING GAS	HEATING ELEC	COOLING ELEC	LATENT COOLING
SUM	N	N	N	N	A	A	N	N
SZRH	N	A	A	N	A	A	A	A
MZS	N	A	N	N	A	A	A	A
DDS	N	A	N	N	A	A	A	A
SZCI	N	A	A	N	A	A	A	A
UHT	N	N	N	N	A	A	N	N
UVT	N	N	N	N	A	A	N	N
FPH	N	N	N	N	N	A	N	N
TPFC	N	N	N	N	A	A	N	A
FPFC	N	N	N	N	A	A	N	A
TPIU	N	A	N	N	A	A	N	A
FPIU	N	A	N	N	A	A	N	A
VAVS	N	A	A	N	A	A	N	A
PIU	N	A	A	N	A	A	N	A
RHFS	N	A	A	N	A	A	N	A
HP	A	N	N	N	N	A	A	A
HVSYS	N	N	N	N	A	A	N	N
CBVAV	N	A	A	N	A	A	N	A
RESYS	N	N	N	N	A	A	A	A
PSZ	N	A	A	N	A	A	A	A
PMZS	N	A	A	N	A	A	A	A
PVAVS	N	A	A	N	A	A	A	A
PTAC	N	N	N	N	A	A	A	A
PTGSD	N	A	N	N	A	N	N	A
PVVT	N	A	A	A	A	A	A	A
RESVVT								

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V-L No.	49	50	51	52	53	54	55	56
SYSTEM-TYPE	SUPPLY ELEC	RETURN ELEC	CYCLE ON/H OFF C	SURFACE HUMIDITY	Walkin Q	SURFACE TEMP	DD heating coil entering temp	BYPASS FACTOR
SUM	N	N	N	N	N	A	N	N
SZRH	A	A	A	N	A	A	N	A
MZS	A	A	N	N	N	A	A	A
DDS	A	A	N	N	N	A	A	A
SZCI	A	A	A	N	A	A	N	A
UHT	N	N	N	N	N	A	N	N
UVT	N	N	N	N	N	A	N	N
FPH	N	N	N	N	N	A	N	N
TPFC	N	N	N	N	N	A	N	A
FPFC	N	N	N	N	N	A	N	A
TPIU	A	A	N	N	N	A	N	A
FPIU	A	A	N	N	N	A	N	A
VAVS	A	A	A	N	A	A	N	A
PIU	A	A	A	N	N	A	N	A
RHFS	A	A	A	N	A	A	N	A
HP	A	N	N	N	N	A	N	A
HVSYS	A	A	N	N	N	A	N	N
CBVAV	A	A	A	N	N	A	N	A
RESYS	A	N	N	N	N	A	N	A
PSZ	A	A	A	N	A	A	N	A
PMZS	A	A	A	N	N	A	A	A
PVAVS	A	A	A	N	A	A	N	A
PTAC	N	N	N	N	N	A	N	A
PTGSD	A	A	N	N	N	N	N	A
PVVT	A	A	A	A	A	A	N	A
RESVVT					N			

V-L No.	57	58	59	60	61	62	63	64
SYSTEM-TYPE	CBF F (WB,DB)	CBF F CFM	EXHAUST FANS ON/OFF	PLR CFM	PLR COOLING	PLR HEATING	COOL-CAP F (WB, DB)	COOL-SH F (WB,DB)
SUM	N	N	N	N	N	N	N	N
SZRH	A	A	A	A	A	N	A	A
MZS	A	A	A	A	A	N	A	A
DDS	A	A	A	A	A	N	A	A
SZCI	A	A	A	A	A	N	A	A
UHT	N	N	N	N	N	N	N	N
UVT	N	N	N	N	N	N	N	N
FPH	N	N	N	N	N	N	N	N
TPFC	N	N	N	N	N	N	N	N
FPFC	N	N	N	N	N	N	N	N
TPIU	A	A	A	A	A	N	A	A
FPIU	A	A	A	A	A	N	A	A
VAVS	A	A	A	A	A	N	A	A
PIU	A	A	A	A	A	N	A	A
RHFS	A	A	A	A	A	N	A	A
HP	N	N	N	N	N	N	N	N
HVSYS	N	N	A	N	N	N	N	N
CBVAV	A	A	A	A	A	N	A	A
RESYS	A	A	N	A	A	A	A	A
PSZ	A	A	A	A	A	A	A	A
PMZS	A	A	A	A	A	N	A	A
PVAVS	A	A	A	A	A	A	A	A
PTAC	N	N	N	N	N	N	N	N
PTGSD	N	N	N	A	N	N	N	N
PVVT	A	A	A	A	A	A	A	A
RESVVT			N					

Legend:

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V-L No.	65	66	67	68	69	70	71	72
SYSTEM-TYPE	HEAT-CAP F (TEMP)	EIR F (WB,DB)	EIR F (PLR)	EIR	OUTSIDE FAN KW	COOLING CAPACITY	SENSIBLE CAPACITY	MAX HUMID SETPOINT
SUM	N	N	N	N	N	N	N	N
SZRH	N	N	N	N	N	A	A	A
MZS	N	N	N	N	N	A	A	A
DDS	N	N	N	N	N	A	A	A
SZCI	N	N	N	N	N	A	A	A
UHT	N	N	N	N	N	N	N	N
UVT	N	N	N	N	N	N	N	N
FPH	N	N	N	N	N	N	N	N
TPFC	N	N	N	N	N	N	N	N
FPFC	N	N	N	N	N	N	N	N
TPIU	N	N	N	N	N	A	A	A
FPIU	N	N	N	N	N	A	A	A
VAVS	N	N	N	N	N	A	A	A
PIU	N	N	N	N	N	A	A	A
RHFS	N	N	N	N	N	A	A	A
HP	N	N	N	N	N	N	N	N
HVSYS	N	N	N	N	N	A	A	A
CBVAV	N	N	N	N	N	A	A	A
RESYS	A	A	A	A	A	A	A	A
PSZ	A	A	A	A	A	A	A	A
PMZS	N	A	A	A	A	A	A	A
PVAVS	N	A	A	A	A	A	A	A
PTAC	N	N	N	N	N	A	A	A
PTGSD	N	N	N	N	N	A	A	A
PVVT RESVVT	A	A	A	A	A	A	A	A

V-L No.	73	74	75	76	77	78	79	80
SYSTEM-TYPE	MIN HUMID SETPOINT	VAV MAX CFM RATE	PIPE DUCT LOSS	PIPE DUCT LOSS	ERV SCHED ULE	HEATING CAPACITY	TEMP AT MIN OA	MIN OA EST
SUM	N	N	N	N	X	N	N	N
SZRH	A	A	S	S	A	A	A	A
MZS	A	A	S	S	A	A	A	A
DDS	A	A	S	S	A	A	A	A
SZCI	A	N	S	S	A	A	A	A
UHT	N	N	S	S	X	N	N	N
UVT	N	N	S	S	X	N	N	N
FPH	N	N	S	S	X	N	N	N
TPFC	N	N	S	S	A	N	N	N
FPFC	N	N	S	S	A	N	N	N
TPIU	A	N	S	S	A	A	A	A
FPIU	A	N	S	S	A	A	A	A
VAVS	A	A	S	S	A	A	A	A
PIU	A	A	S	S	A	A	A	A
RHFS	A	A	S	S	A	A	A	A
HP	N	N	S	S	X	N	N	N
HVSYS	A	N	S	S	A	A	A	A
CBVAV	A	N	S	S	A	A	A	A
RESYS	A	N	S	S	X	N	N	N
PSZ	A	A	S	S	A	A	A	A
PMZS	A	A	S	S	A	A	A	A
PVAVS	A	A	S	S	A	A	A	A
PTAC	A	N	S	S	X	N	N	N
PTGSD	N	N	S	S	X	N	N	A
PVVT RESVVT	A	A	S	S	A	A	A	A

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V-L No.	81	82	83	84	85	86	87	88
SYSTEM-TYPE	HP SUPP HEAT	REFG ZONE SENS HT	REFG ZONE LAT HT	REFG SYS REC HT	REFG SYS REJ HT	REFG SYS COMP KW	REFG SYS DEF KW	REFG SYS AUX KW
SUM	N	N	N	N	N	N	N	N
SZRH	N	A	A	A	A	A	A	A
MZS	N	N	N	N	N	N	N	N
DDS	N	N	N	N	N	N	N	N
SZCI	N	A	A	A	A	A	A	A
UHT	N	N	N	N	N	N	N	N
UVT	N	N	N	N	N	N	N	N
FPH	N	N	N	N	N	N	N	N
TPFC	N	N	N	N	N	N	N	N
FPFC	N	N	N	N	N	N	N	N
TPIU	N	N	N	N	N	N	N	N
FPIU	N	N	N	N	N	N	N	N
VAVS	N	A	A	A	A	A	A	A
PIU	N	N	N	N	N	N	N	N
RHFS	N	A	A	A	A	A	A	A
HP	N	N	N	N	N	N	N	N
HVSYS	N	N	N	N	N	N	N	N
CBVAV	N	N	N	N	N	N	N	N
RESYS	A	N	N	N	N	N	N	N
PSZ	A	A	A	A	A	A	A	A
PMZS	N	N	N	N	N	N	N	N
PVAVS	A	A	A	A	A	A	A	A
PTAC	A	N	N	N	N	N	N	N
PTGSD	N	N	N	N	N	N	N	N
PVVT	A	A	A	A	A	A	A	A
RESVVT		N	N	N	N	N	N	N

V-L No.	89	90	91	92	93	94	95	96
SYSTEM-TYPE	PLEN EXH FLOW RATE	COOL GAS	REGEN POWER	RETURN WB TEMP	WB8	T8	W8	WB9
SUM	N	N	N	N	N	N	N	N
SZRH	A	N	N	N	N	N	N	N
MZS	A	N	N	N	N	N	N	N
DDS	A	N	N	N	N	N	N	N
SZCI	A	N	N	N	N	N	N	N
UHT	N	N	N	N	N	N	N	N
UVT	N	N	N	N	N	N	N	N
FPH	N	N	N	N	N	N	N	N
TPFC	N	N	N	N	N	N	N	N
FPFC	N	N	N	N	N	N	N	N
TPIU	A	N	N	N	N	N	N	N
FPIU	A	N	N	N	N	N	N	N
VAVS	A	N	N	N	N	N	N	N
PIU	A	N	N	N	N	N	N	N
RHFS	A	N	N	N	N	N	N	N
HP	N	N	N	N	N	N	N	N
HVSYS	A	N	N	N	N	N	N	N
CBVAV	A	N	N	N	N	N	N	N
RESYS	N	N	N	N	N	N	N	N
PSZ	A	N	N	N	N	N	N	N
PMZS	A	N	N	N	N	N	N	N
PVAVS	A	N	N	N	N	N	N	N
PTAC	N	N	N	N	N	N	N	N
PTGSD	A	N	A	A	A	A	A	A
PVVT	A	N	N	N	N	N	N	N
RESVVT								

Legend:
A = Appropriate
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S = System (or configuration) dependent

V-L No.	97	98	99	100	101	102	103	104
SYSTEM-TYPE	T9	W9	EFF	DTON	MODE 1	MODE 2	MODE 3	MODE 4
SUM	N	N	N	N	N	N	N	N
SZRH	N	N	N	N	N	N	N	N
MZS	N	N	N	N	N	N	N	N
DDS	N	N	N	N	N	N	N	N
SZCI	N	N	N	N	N	N	N	N
UHT	N	N	N	N	N	N	N	N
UVT	N	N	N	N	N	N	N	N
FPH	N	N	N	N	N	N	N	N
TPFC	N	N	N	N	N	N	N	N
FPFC	N	N	N	N	N	N	N	N
TPIU	N	N	N	N	N	N	N	N
FPIU	N	N	N	N	N	N	N	N
VAVS	N	N	N	N	N	N	N	N
PIU	N	N	N	N	N	N	N	N
RHFS	N	N	N	N	N	N	N	N
HP	N	N	N	N	N	N	N	N
HVSYS	N	N	N	N	N	N	N	N
CBVAV	N	N	N	N	N	N	N	N
RESYS	N	N	N	N	N	N	N	N
PSZ	N	N	N	N	N	N	N	N
PMZS	N	N	N	N	N	N	N	N
PVAVS	N	N	N	N	N	N	N	N
PTAC	N	N	N	N	N	N	N	N
PTGSD	A	A	A	A	A	A	A	A
PVVT	N	N	N	N	N	N	N	N
RESVVT								

V-L No.	105	106	107	108	109	110	111
SYSTEM-TYPE	MODE 5	MODE 6	MODE 7	ERMAX 4	ERMAX 4	ERMAX 4	MODE 4
SUM	N	N	N	N	N	N	N
SZRH	N	N	N	N	N	N	N
MZS	N	N	N	N	N	N	N
DDS	N	N	N	N	N	N	N
SZCI	N	N	N	N	N	N	N
UHT	N	N	N	N	N	N	N
UVT	N	N	N	N	N	N	N
FPH	N	N	N	N	N	N	N
TPFC	N	N	N	N	N	N	N
FPFC	N	N	N	N	N	N	N
TPIU	N	N	N	N	N	N	N
FPIU	N	N	N	N	N	N	N
VAVS	N	N	N	N	N	N	N
PIU	N	N	N	N	N	N	N
RHFS	N	N	N	N	N	N	N
HP	N	N	N	N	N	N	N
HVSYS	N	N	N	N	N	N	N
CBVAV	N	N	N	N	N	N	N
RESYS	N	N	N	N	N	N	N
PSZ	N	N	N	N	N	N	N
PMZS	N	N	N	N	N	N	N
PVAVS	N	N	N	N	N	N	N
PTAC	N	N	N	N	N	N	N
PTGSD	A	A	A	A	A	A	A
PVVT	N	N	N	N	N	N	N
RESVVT							

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BUILDING-HVAC

Variable-List Number	Variable in FORTRAN Code	Description
1	QCPL	Total cooling load (Btu/hr)
2	QHPL	Total heating load (Btu/hr)
3	PKW	Total electrical load (kW)
4	PGAS	Total gas load (Btu/hr)
5	PKWQH	Portion of <PKW> used for heating (kW)
6	PKWQC	Portion of <PKW> used for cooling (kW)
7	PFANKW	Portion of <PKW> used for fans (kW)
8		unused
9	PCGAS	Gas used for cooling (packaged equipment)
10	-	unused

VARIABLES BY SYSTEM-TYPE FOR BUILDING-HVAC

V-L No.	1	2	3	4	5	6	7	8
SYSTEM-TYPE	COOLING LOAD	HEATING LOAD	ELEC KW LOAD	HEATING GAS	HEATING ELEC KW	COOLING ELEC KW	FANS ELEC KW	HEATING OIL
SUM	A	A	A	A	A	N	N	X
SZRH	A	A	A	A	A	N	A	X
MZS	A	A	A	A	A	N	A	X
DDS	A	A	A	A	A	N	A	X
SZCI	A	A	A	A	A	N	A	X
UHT	A	A	A	A	A	N	A	X
UVT	A	A	A	A	A	N	A	X
FPH	A	A	A	A	A	N	A	X
TPFC	A	A	A	A	A	N	A	X
FPFC	A	A	A	A	A	N	A	X
TPIU	A	A	A	A	A	N	A	X
FPIU	A	A	A	A	A	N	A	X
VAVS	A	A	A	A	A	N	A	X
PIU	A	A	A	A	A	N	A	X
RHFS	A	A	A	A	A	N	A	X
HP	A	A	A	A	A	A	A	X
HVSYS	A	A	A	A	A	N	A	X
CBVAV	A	A	A	A	A	N	A	X
RESYS	A	A	A	A	A	A	A	X
PSZ	A	A	A	A	A	A	A	X
PMZS	A	A	A	A	A	A	A	X
PVAVS	A	A	A	A	A	A	A	X
PTAC	A	A	A	A	A	A	A	X
PVVT	A	A	A	A	A	A	A	X
PTGSD								
RESVVT								

V-L No.	9	10
SYSTEM-TYPE	COOLING GAS	UNUSED
SUM		X
SZRH		X
MZS		X
DDS		X
SZCI		X
UHT		X
UVT		X
FPH		X
TPFC		X
FPFC		X
TPIU		X
FPIU		X
VAVS		X
PIU		X
RHFS		X
HP		X
HVSYS		X
CBVAV		X
RESYS		X
PSZ		X
PMZS		X
PVAVS		X
PTAC		X
PVVT		X
PTGSD		
RESVVT		

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CIRCULATION-LOOP

Variable-List Number	Variable in FORTRAN Code	Description
1	RunLoop	0 = Loop Off, 1 = Loop Active
2	ModeCtrl	0 = Floating, 1 = Heating, 2 = Cooling
3	GPMs	Flow rate on supply side (gpm)
4	GPMr	Flow rate on return side (gpm)
5	QloopNet	Net loop load, including pump heat and thermal losses
6	QcoilH	Heating loads of loop end-uses (coils, etc.)
7	QcoilC	Cooling loads of loop end-uses (coils, etc.)
8	Q2nd	Load on primary loop from secondary loops
9	Q1st	Load on primary loop from primary equipment (absorption chillers, etc.)
10	QCp	Load on loop due to loop temperature swing
11	QlossS	Thermal loss, supply side
12	QlossR	Thermal loss, return side
13	Tenv	Temperature of loop's environment
14	Tset	Supply temperature setpoint
15	Tsupply	Supply temperature
16	TcoilEnt	Temperature entering coils (supply minus thermal dT)
17	TcoilExit	Temperature exiting coils, entering return
18	Treturn	Temperature at return outlet (entering chillers, etc.)
19	dTsc	Loop temperature rise, supply side
20	dTrc	Loop temperature rise, return side
21	TavgS	Average loop temperature, supply side
22	TavgR	Average loop temperature, return side
23	TavgPast	Last hours's average loop temperature, supply and return
24	Tfloat	Temperature loop will achieve if no active heating/cooling
25	HDpump	Head pressure across pump
26	Qpump	Heat gain from pump
27	dTpump	Fluid temperature rise from pump
28	GPM21	Flow from a secondary loop onto primary (2ndary loops only)
29	HEAD21f	Friction from a secondary loop onto primary (excludes static heads)
30	Qover	Primary equipment overload
31	QpumpEq	Heat gain due to primary equipment pumps
32	GMPpumpEq	Flow of primary equipment pumps (valid only if powering loop)
33	dTpumpEq	Temperature rise of primary equipment pumps
34	PipeFriction	Head due to loop friction (excluding coils, chillers, etc.)

Variable-List Number	Variable in FORTRAN Code	Description
35	DesEqGPM	Design flow through all active primary equipment units
36	PLRpipe	Flow ratio of loop (fraction of nominal flow)
37	TotalLoopCap	Total capacity of all active primary equipment units
38	CapRatio	Capacity limit (<1 if loop overloaded previous hour)
39	GPM2	Flow from all attached secondary loops
40	Friction	Net head loss of loop and attachments, excluding static
41	Qhtrec	Total heat recovered to loop
42	Thtrec	Return temperature after heat recovery
43	dTover	Temperature rise due to loop overload (WLHP loops only)
44	TcoilEst	Estimated temperature entering SYSTEM coils (CW and WLHP loops only)
45	Qprocess	Process load on this loop
46	Tinlet	Make-up water inlet temperature (DHW loops only)
47	QoverNew	Loop overload not carried over from previous hour
48	HeadCoil	Maximum head of attached coils
49	lp.RunFraction	For LOOP-OPERATION = SUBHOUR-DEMAND, the fraction of the hour the loop pump operates (CW and WLHP loops only)
50		unused

PUMP

Variable-List Number	Variable in FORTRAN Code	Description
1	PMPgpm	Pump flow
2	PMPkw	Pump power
3	PMPnum	Number of pumps running
4	RPMr	Speed ratio (fraction of nominal)
5	PMPfrac	Fraction of hour running
6	PMPset	Head required at setpoint
7	PMPhead	Actual head developed
8	PMPfric	Head on pump due to friction of all components (coils, piping, etc.)
9	PMPstatic	Static head on pump due to static head of components
10	HEADr	Head ratio (fraction of nominal)
11	PMPGPMr	Flow ratio (fraction of nominal)
12	GPMmax	Maximum flow per pump at actual head
13	HPRPM	RPMr ** <pm:POWER-EXP>
14	XGPMR	PMPGPMr / RPMr
15	PMPHPR	Output of curve <pm:HP-fGPM> with XGPMr as input
16	PMPQ	Pump heat added to fluid
17	PMDdT	Temperature rise across pump
18	PMPVFDloss	Loss in variable-frequency drive

CHILLER

Variable-List Number	Variable in FORTRAN Code	Description
1	EQload	Equipment load
2	EQrun	Operating point of machine (greater than load if HGB or cycling)
3	EQhgb	Load due to hot-gas bypass
4	OperCap	Available capacity at current conditions
5	Frac	Fraction of hour this equipment ran
6	PLR	Part load ratio (fraction of Available)
7	EQsupplyT	Supply temperature
8	Tcond	Entering condenser temperature; adjusted for off-rated flow
9	EIRPLR	Electric input ratio as f(PLR)
10	EIRFT	Electric input ratio as f(EQsupplyT, ECT)
11	EQeir	Net electric input ratio
12	EQelec	Electric demand
13	EQfanKW	Electric demand of air-cooled condenser
14	EQaux	Electric demand of auxiliaries
15	HIRPLR	Heat input ratio as f(PLR)
16	HIRFT	Heat input ratio as f(EQsupplyT, ECT)
17	EQHIR	Net heat input ratio
18	EQfuel	Fuel/thermal demand
19	EQcond	Rejected heat
20	EQrecvr	Recoverable heat
21	HWflow	Flow to/from hot water loop
22	HWhead	Head on hot water loop
23	CHWflow	Flow to/from chilled water loop
24	CHWhead	Head on chilled water loop
25	CWflow	Flow to/from condenser water loop
26	CWhead	Head on condenser water loop
27	HTRECflow	Flow to/from heat-recovery loop
28	HTREChead	Head on heat-recovery loop
29	ForcePump	Flag indicating equipment pump must run, even if no load
30	EQstart	Start-up load
31	EQloadH	Equipment load (heating side of gas-fired chiller heater only)
32	EqstartH	Start-up load (heating side of gas-fired chiller heater only)
33	PLRh	Part load ratio (heating side of gas-fired chiller heater only)
34	FracH	Fraction of hour operating (heating side of gas-fired chiller heater only)

35	EQfuelH	Fuel consumption (heating side of gas-fired chiller heater only)
36	EQelecH	Electric consumption (heating side of gas-fired chiller heater only)

BOILER

Variable-List Number	Variable in FORTRAN Code	Description
1	EQload	Equipment load
2	EQrun	Operating point of machine (greater than load if HGB or cycling)
3		unused
4	OperCap	Available capacity at current conditions
5	Frac	Fraction of hour this equipment ran
6	PLR	Part load ratio (fraction of Available)
7	EQsupplyT	Supply temperature
8	ECT	Environment temperature
9	EIRPLR	Electric input ratio as f(PLR)
10		unused
11	EQeir	Net electric input ratio
12	EQelec	Electric demand
13		unused
14	EQaux	Electric demand of auxiliaries
15	HIRPLR	Heat input ratio as f(PLR)
16	HIRFT	Heat input ratio as f(ECT)
17	EQHIR	Net heat input ratio
18	EQfuel	Fuel demand
19		unused
20		unused
21	HWflow	Flow to/from hot water loop
22	HWhead	Head on hot water loop
23		unused
24		unused
25		unused
26		unused
27		unused
28		unused
29	ForcePump	Flag indicating equipment pump must run, even if no load
30	EQstart	Start-up load
31		unused
32		unused
33		unused
34		unused

35	unused
36	unused

ELEC-GENERATOR

Variable-List Number	Variable in FORTRAN Code	Description
1	EQload	Equipment load
2		unused
3		unused
4	OperCap	Available capacity at current conditions
5	Frac	Fraction of hour this equipment ran
6	PLR	Part load ratio (fraction of Available)
7		unused
8		unused
9	EIRPLR	EIR correction as function of PLR (PV-ARRAY only)
10		unused
11	EQEIR	Electric input ratio (EIR) (PV-ARRAY only)
12	EQelec	Direct-current input from PV-MODULE (PV-ARRAY only)
13		unused
14	EQaux	Electric demand of auxiliaries
15	HIRPLR	Heat input ratio as f(PLR)
16	HIRFT	Heat input ratio as f(drybulb)
17	EQHIR	Net heat input ratio
18	EQfuel	Fuel demand
19		unused
20	EQrecvr	Recoverable heat
21		unused
22		unused
23		unused
24		unused
25	CWflow	Flow to/from condenser water loop
26	CWhead	Head on condenser water loop
27		unused
28		unused
29		unused
30	EQstart	Start-up load
31		unused
32		unused
33		unused
34		unused

35	unused
36	unused

PV-MODULE

Variable-List Number	Variable in FORTRAN Code	Description
1	n/a	DC power output
2	Vmp	Voltage at maximum power point
3	Imp	Current at maximum power point
4	SOLRAD	Total horizontal solar radiation
5	Edirect	Direct radiation on module surface
6	Ediffuse	Diffuse radiation on module surface
7	Eground	Ground reflected radiation on module surface
8	AOI	Angle of incidence, 0° = normal to surface
9	fAOI	Angle of incidence optical correction factor
10	AirMass	Relative air mass, 1 = sun directly overhead at sea level
11	fAirMass	Air mass spectral correction factor
12	Epoa	Plane-of-array irradiation
13	Eeffective	Ratio of plane-of-array irradiation to reference irradiation, suns
14	Tcell	Internal cell temperature
15		unused
16		unused
17		unused
18		unused
19		unused
20		unused
21		unused
22		unused
23		unused
24		unused
25		unused
26		unused
27		unused
28		unused
29		unused
30		unused

DW-HEATER

Variable-List Number	Variable in FORTRAN Code	Description
1	EQload	Equipment load
2	EQrun	Operating point of machine (greater than load if HGB or cycling)
3		unused
4	OperCap	Available capacity at current conditions
5	Frac	Fraction of hour this equipment ran
6	PLR	Part load ratio (fraction of Available)
7	EQsupplyT	Supply temperature
8	ECT	Environment temperature
9	EIRPLR	Electric input ratio as f(PLR)
10	EIRFT	Electric input ratio as f(EQsupplyT, ECT)
11	EQeir	Net electric input ratio
12	EQelec	Electric demand
13		unused
14	EQaux	Electric demand of auxiliaries
15	HIRPLR	Heat input ratio as f(PLR)
16	HIRFT	Heat input ratio as f(ECT)
17	EQHIR	Net heat input ratio
18	EQfuel	Fuel demand
19		unused
20		unused
21		unused
22		unused
23		unused
24		unused
25		unused
26		unused
27		unused
28		unused
29	Qenvir	Heat lost to environment, jacket and off-hours stack, Btu/F
30		unused
31		unused
32		unused
33		unused
34		unused

35	unused
36	unused

HEAT-REJECTION

Variable-List Number	Variable in FORTRAN Code	Description
1	TWRload	Equipment load
2	TCAP	Available capacity
3	TWRrej	Net heat rejected, including tower pump
4	CWgpm	Circulation loop flow to this tower
5	TWRgpm	Flow internal to tower
6	TWRsupply	Leaving tower temperature
7	TWRset	Leaving tower temperature setpoint
8	Ttower	Leaving tower temperature (same as TWRsupply)
9	RANGE	Temperature drop through tower
10	APP	Leaving tower temperature minus wetbulb temperature
11		unused
12	GPMra	Flow capacity ratio (fraction of nominal) (design variable only)
13	GPMcap	Flow capacity at current conditions
14	GPMcell	Assigned flow per cell
15	NumCells	Number of cells operating
16	MinCells	Minimum number of cells that can handle flow
17	MaxCells	Maximum number of cells that can handle flow
18	Ttop	Temperature at top of throttling range
19	GPMtop	Flow capacity at top of throttling range
20	Tbot	Temperature at bottom of throttling range
21	GPMbot	Flow capacity at bottom of throttling range
22	CFMra	Required airflow (fraction of nominal)
23	FankWr	Fan power ratio (fraction of nominal)
24	FankW	Fan power, all cells
25	TWRaux	Auxiliary power
26	QpanLoss	Pan heat loss
27	QcoilLoss	Coil heat loss (fluid cooler only)
28	SpraykW	Spray pump power (fluid cooler only)
29	Twet1	Wetbulb temperature, limited to allowable range
30	Tstart	Condenser water temperature at beginning of hour

THERMAL-STORAGE

Variable-List Number	Variable in FORTRAN Code	Description
1	Qcharge	Charging demand
2	Qdischarge	Discharging load
3	Qloss	Thermal loss
4	Qfreeze	Heating load to prevent tank freeze-up
5	Qtank	Heat/Coolth in tank relative to reference temperature
6	CapMax	Available discharge capacity
7	AuxkW	Auxiliary electric demand
8	TtankEnv	Environmental temperature
9	Ttank	Temperature in tank
10	NumChrgHours	Number of hours required to charge tank
11	NumHoursToSt	Number of hours until tank will start charging
12	ChrgHours	Number of hours tank has been charging
13	DChrgHours	Number of hours tank has been discharging
14	StoredKWh	Boiler/Chiller electrical consumption stored in tank
15	StoredFuel	Boiler/Chiller fuel consumption stored in tank

CONDENSING-UNIT

Variable-List Number	Variable in FORTRAN Code	Description
1	cu.CoilOnHt	Heating coil run fraction (frac)
2	cu.CoilOnCl	Cooling coil run fraction (frac)
3	cu.fCycle	Cycle loss (frac)
4	cu.FracOn	Condensing unit run fraction (frac)
5	cu.SST	Saturated suction temperature (°F)
6	cu.SSTcoil	Sat Suction temp at Coil (°F)
7	cu.SSTsetpt	SST setpoint at compressor (°F)
8	cu.QcoilCl	Cooling load (Btu/hr)
9	cu.QcoilCl'	Cool load while cycled on (Btu/hr)
10	cu.CapfT	Cool capacity fT (frac)
11	cu.QcapCl	Cool capacity (Btu/hr)
12	cu.PLRcl	Cooling PLR (frac)
13	cu.EIRfPLRcl	Cooling EIR fPLR (frac)
14	cu.EIRfTcl	Cooling EIR fT (frac)
15	cu.EIRcl	Cooling Adjust. EIR (Btu/Btu)
16	cu.kWcl	Cooling Compressor power (kW)
17	cu.SDT	Saturated discharge temperature (°F)
18	cu.SDTcoil	SDT at coil (°F)
19	cu.SDTsetpt	SDT setpoint at compressor (°F)
20	cu.QcoilHt	Heating load (Btu/hr)
21	cu.QcoilHt'	Heat load while cycled on(Btu/hr)
22	cu.CapfT	Heating capacity fT (frac)
23	cu.DefCap	Unused
24	cu.QcapHt	Heating capacity (Btu/hr)
25	cu.PLRht	Heating PLR (frac)
26	cu.EIRfPLRht	Heating EIR fPLR (frac)
27	cu.EIRfTht	Heating EIR fT (frac)
28	cu.EIRht	Heating Adjust. EIR (Btu/Btu)
29	cu.kWht	Heating compressor power (kW)
30	cu.kWaux	Auxiliary power (kW)
31	cu.kWcrank	Crankcase heater power (kW)
32	pe.kWtotal	Total power (kW)
33	cu.CompKW	Compressor power (kW)
34	cu.CompKW'	Compressor power while cycled on (kW)

35	cu.FanKW	Fan power (kW)
36	cu.QcoilOA	Heat Rejected (Btu/hr)
37	cu.QcoilOA'	Heat rejected while cycled on (Btu/hr)
38	cu.Mair	Outdoor air mass flow (lb/hr)
39	cu.CpAir	Outdoor air specific heat (Btu/lb-F)
40	cu.OperMode	Operating mode (-1=Off,1=Heat,2=Cool,4=DualHeat,5=DualCool)
41	cu.ThrmLossHiPG	Thermal loss in discharge pipe/ heating
42	cu.ThrmLossLoPG	Thermal loss in suction pipe/ cooling
43	cu.DTsat-HiPG	SDT loss in discharge pipe due to friction (°F)
44	cu.DTsat-LoPG	SST loss in suction pipe due to friction (°F)
45	cu.DTsatBrnMaxHt	Max DTsat of any branch in heating mode (change in discharge temperature in branch due to friction)
46	cu.DTsatBrnMaxCl	Max DTsat of any branch in cooling mode (change in suction temperature in branch due to friction)
47	cu.DTsatHt-HiPG	SDT loss in discharge pipe due to pipe height (°F)
48	cu.DTsatHt-LoPG	SST loss in suction pipe due to pipe height (°F)
49	cu.Mrefg	Mass flow of refrigerant for friction calcs (lb/hr)
50	cu.Nfull	Number of units operating at full capacity
51	cu.Nmod	Number of units modulating
52	cu.OvrldCl	Value is 1 if system is overloaded in cooling.
53	cu.OvrldHt	Value is 1 if system is overloaded in heating.
54	cu.QhtOn	Heating load when on and not defrosting (Btu/hr)
55	cu.DefOn	Fraction of hour defrosting
56	cu.DefKW	Average power to defrost (kW)

ELEC-METER

Variable-List Number	Variable in FORTRAN Code	Description
1	<em;LIGHT>	End-use, lights
2	<em;TASK>	End-use, task lights
3	<em;EQUIP>	End-use, equipment
4	<em;HEAT>	End-use, space heating equipment
5	<em;COOL>	End-use, space cooling equipment
6	<em;HTREJ>	End-use, heat-rejection equipment, except pumps
7	<em;AUX>	End-use, auxiliary loads
8	<em;VENT>	End-use, vent fans
9	<em;REFG>	End-use, refrigeration equipment
10	<em;SUPP>	End-use, supplemental heat pump heating
11	<em;DHW>	End-use, domestic water heating
12	<em;EXTERIOR>	End-use, exterior loads
13	<em;CogenSurplus>	End-use, generator surplus
14		unused
15		unused
16		unused
17		unused
18		unused
19	<em;TES_ADJUST>	End-use, thermal storage adjustment factor
20	<em;TOTAL>	Total usage
21	<em;TRANSFORMER>	Transformer loss
22	<em.TDVsrc>	Multiplier to convert site energy to source 'TDV energy'

FUEL-METER

Variable-List Number	Variable in FORTRAN Code	Description
1	<fm;LIGHT>	End-use, lights
2	<fm;TASK>	End-use, task lights
3	<fm;EQUIP>	End-use, equipment
4	<fm;HEAT>	End-use, space heating equipment
5	<fm;COOL>	End-use, space cooling equipment
6	<fm;HTREJ>	End-use, heat-rejection equipment, except pumps
7	<fm;AUX>	End-use, auxiliary loads
8	<fm;VENT>	End-use, vent fans
9	<fm;REFG>	End-use, refrigeration equipment
10	<fm;SUPP>	End-use, supplemental heat pump heating
11	<fm;DHW>	End-use, domestic water heating
12	<fm;EXTERIOR>	End-use, exterior loads
13		unused
14		unused
15		unused
16		unused
17		unused
18		unused
19	<fm;TES_ADJUST>	End-use, thermal storage adjustment factor
20	<fm;TOTAL>	Total usage
21		unused
22	<fm.TDVsrc>	Multiplier to convert site energy to source 'TDV energy'

STEAM-METER

Variable-List Number	Variable in FORTRAN Code	Description
1	<sm;LIGHT>	End-use, lights
2	<sm;TASK>	End-use, task lights
3	<sm;EQUIP>	End-use, equipment
4	<sm;HEAT>	End-use, space heating equipment
5	<sm;COOL>	End-use, space cooling equipment
6	<sm;HTREJ>	End-use, heat-rejection equipment, except pumps
7	<sm;AUX>	End-use, auxiliary loads
8	<sm;VENT>	End-use, vent fans
9	<sm;REFG>	End-use, refrigeration equipment
10	<sm;SUPP>	End-use, supplemental heat pump heating
11	<sm;DHW>	End-use, domestic water heating
12	<sm;EXTERIOR>	End-use, exterior loads
13		unused
14		unused
15		unused
16		unused
17		unused
18		unused
19	<sm;TES_ADJUST>	End-use, thermal storage adjustment factor
20	<sm;TOTAL>	Total usage
21		unused

CHW-METER

Variable-List Number	Variable in FORTRAN Code	Description
1	<cm;LIGHT>	End-use, lights
2	<cm;TASK>	End-use, task lights
3	<cm;EQUIP>	End-use, equipment
4	<cm;HEAT>	End-use, space heating equipment
5	<cm;COOL>	End-use, space cooling equipment
6	<cm;HTREJ>	End-use, heat-rejection equipment, except pumps
7	<cm;AUX>	End-use, auxiliary loads
8	<cm;VENT>	End-use, vent fans
9	<cm;REFG>	End-use, refrigeration equipment
10	<cm;SUPP>	End-use, supplemental heat pump heating
11	<cm;DHW>	End-use, domestic water heating
12	<cm;EXTERIOR>	End-use, exterior loads
13		unused
14		unused
15		unused
16		unused
17		unused
18		unused
19	<cm;TES_ADJUST>	End-use, thermal storage adjustment factor
20	<cm;TOTAL>	Total usage
21		unused

GROUND-LOOP-HX

Variable-List Number	Variable in FORTRAN Code	Description
1	Qload	Thermal load
2	GPM	Fluid flow
3	OperCap	Available capacity at current conditions
4	OutletT	Outlet temperature
5	FarGroundT	Far field ground temperature
6	GroundDeltaT	Ground temperature rise at well bore
7	QdeltaT	Ground temperature rise due to current load
8	LoopDeltaT	Fluid temperature rise
9	Qrate	Rate of heat addition/removal (including cycling)
10	Runtime	Fraction of hour running