Volume

4

DOE-2.2

Building Energy Use and Cost Analysis Program
Volume 4: Libraries & Reports

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DOE-2.2 BUILDING ENERGY USE AND COST ANALYSIS PROGRAM

Volume 4: Libraries & Reports

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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

MATERIALS 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.

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)
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)	$1.9x10^{-4}(3.3x10^{-5})$
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)
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)

Table 1 Building Materials (Continued)

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)
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)
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)

Table 1 Building Materials (Continued)

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)
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)
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

Table 1 Building Materials (Continued)

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)
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)
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)

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Table 1 Building Materials (Continued)

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)
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						
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)

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Table 1 Building Materials (Continued)

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)
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 Perlite**	0.6667 (0.2032)	0.2095 (0.362)	69.0 (1105)	0.2 (837)	3.18 (0.560)
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)

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Table 1 Building Materials (Continued)

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)
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						
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)

Table 1 Building Materials (Continued)

Code-Word	Description	Thickness	Conductivity	Density	Specific Heat	Resistance
		ft (m)	Btu/hr-ft²-F (W/m-K)	lb/ft³ (kg/m³)	Btu/lb-F (kJ/kg-K)	hr-ft²-F/Btu (K-m²/W)
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)
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)

Table 2 Insulating Materials

Code-Word	Description	Thickness	Conductivity	Density	Specific Heat	Resistance
		ft (m)	Btu/hr-ft²-F (W/m-K)	lb/ft³ (kg/m³)	Btu/lb-F (kJ/kg-K)	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)
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).

Table 2 Insulating Materials (Continued)

Code-Word	Description	Thickness	Conductivity	Density	Specific Heat	Resistance
		ft (m)	Btu/hr-ft²-F (W/m-K)	lb/ft³ (kg/m³)	Btu/lb-F (kJ/kg-K)	hr-ft²-F/Btu (K-m²/W)
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)

Table 3 Air Spaces

Code-Word	Description	Thickness	Conductivity	Density	Specific Heat	Resistance
		ft (m)	Btu/hr-ft²-F (W/m-K)	lb/ft³ (kg/m³)	Btu/lb-F (kJ/kg-K)	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 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"
   ..
```

Table 4 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

Table 4 Exterior-Wall Constructions (Continued)

LAYERS Code-word	Description	Materials (outside to inside)
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
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

Table 5 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

Table 6 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 9. 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.

Table 7 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).

The terminology used in the glazing descriptions is as follows:

Table 8 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 9 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 10 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 11 Windows - Reflective Glazing

G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane Id	Gap Wid	Pane Gas	Pane 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

G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane Id	Gap Wid	Pane Gas	Wid	Id	Wid
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
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 12 Windows – Low-emissivity Glazings

G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane Id	Gap Wid	Pane Gas	Gap Wid	Pane Id	Pane 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 13 Windows – Electrochromic Glazings

G-T-C	U-SI	U-IP	SC	SHGC	Tsol	Rfsol	Tvis	Rfvis	Pane Id	Gap Wid	Pane Gas	Gap Wid	Pane Id	Pane 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 14 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 15 Windows – Quadruple 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
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

Gap #3		Pane #4	
Gas	Wid	Id	Wid
Kry	7.9	2	3.0

WINDOW LAYERS 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 16 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 ..


.
```

Section 2

Lighting Libraries

This section contains libraries for lamps and luminaires

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LAMP 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 17 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
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 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
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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
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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
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*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    *
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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
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 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
```

LUMINAIRE 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 18 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 sumulation 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.

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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 ①	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

① *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

		Building HVAC Load Summary	Building HVAC Load Hours	Building HVAC Fan Electric	Bldg HVAC Equip. Performance	System Loads Summary	System Loads Summary	System Load Hours	System Utility Energy Use	Sensible/Latent Summary	Peak Heating & Cooling	Space Temperature Summary	Zone Performance Summary	Fan Electric Energy Use	Relative Humidity Summary	System Heat/Cool Performance	HP Heat/Cool Performance	Zone Loads Summary	Zone Demand Summary
		BUILDING				**AIR HANDLER**												**ZONE**	
		SS-D	SS-E	SS-M	SS-P ①	SS-A	SS-B	SS-C	SS-H	SS-I	SS-J	SS-K	SS-R	SS-L	SS-N	SS-P ②	SS-Q	SS-G	SS-F
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/*
	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	Utility & Fuel Use Summary	Equipment Loads & Energy Use	Circulation Loop Loads	Energy End-Use, by Utility Type	Energy End-Use, by Utility Meter	Building Energy Performance
			PS-A	PS-B	PS-C	PS-D	PS-E ②	PS-F ③	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

			Annual Operations Costs & Savings	Life-Cycle Non-Energy Costs	Energy Savings & Life-Cycle Costs	Energy Cost Summary	Utility Rate Summary	Block Charges & Ratchets, by Utility Rate	Summary of Pollutants	Pollutant Production, by Block Charge
			ES-A	ES-B	ES-C	ES-D	ES-E ①	ES-F ②	ES-G	ES-H
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 REPORTS

REPORT LV-A GENERAL PROJECT AND BUILDING INPUT

```
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
```

REPORT LV-B SUMMARY OF SPACES OCCURRING IN THE PROJECT

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

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

REPORT 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

XB (FT)	YB (FT)	ZB (FT)	SPACE AZIMUTH (DEG)	SPACE*FLOOR MULTIPLIER	HEIGHT (FT)	AREA (SQFT)	VOLUME (CUFT)
0.00	0.00	0.00	0.00	1.0	8.00	1056.00	8448.00

TOTAL NUMBER OF SURFACES	NUMBER OF EXTERIOR SURFACES	NUMBER OF INTERIOR SURFACES	NUMBER OF UNDERGROUND SURFACES	DAYLIGHTING	SUNSPACE
6	1	4	1	NO	NO

NUMBER OF SUBSURFACES

TOTAL	EXTERIOR WINDOWS	DOORS	INTERIOR WINDOWS
2	2	0	0

FLOOR WEIGHT (LB/SQFT)	CALCULATION TEMPERATURE (F)
0.0	70.0

INFILTRATION

SCHEDULE	INFILTRATION CALCULATION METHOD	FLOW RATE (CFM/SQFT)	AIR CHANGES PER HOUR
INFIL-SCH	AIR-CHANGE	0.033	0.25

PEOPLE

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

(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

REPORT LV-D DETAILS OF EXTERIOR SURFACES IN THE PROJECT

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	0.000	0.00	0.067	200.00	0.067	200.00	NORTH
in space: PLENUM-1							
BACK-1	0.531	229.00	0.067	571.00	0.200	800.00	NORTH
in space: SPACE3-1							
RIGHT-1	0.428	100.00	0.067	300.00	0.157	400.00	EAST
in space: SPACE2-1							
WALL-1PR	0.000	0.00	0.067	100.00	0.067	100.00	EAST
in space: PLENUM-1							
WALL-1PF	0.000	0.00	0.067	200.00	0.067	200.00	SOUTH
in space: PLENUM-1							
FRONT-1	0.554	244.00	0.067	556.00	0.216	800.00	SOUTH
in space: SPACE1-1							
WALL-1PL	0.000	0.00	0.067	100.00	0.067	100.00	WEST
in space: PLENUM-1							
LEFT-1	0.428	100.00	0.067	300.00	0.157	400.00	WEST
in space: SPACE4-1							
TOP-1	0.000	0.00	0.168	5000.00	0.168	5000.00	ROOF
in space: PLENUM-1							
F1-1	0.000	0.00	0.453	1056.00	0.453	1056.00	UNDERGRND
in space: SPACE1-1							
F2-1	0.000	0.00	0.453	456.00	0.453	456.00	UNDERGRND
in space: SPACE2-1							
F3-1	0.000	0.00	0.453	1056.00	0.453	1056.00	UNDERGRND
in space: SPACE3-1							
F4-1	0.000	0.00	0.453	456.00	0.453	456.00	UNDERGRND
in space: SPACE4-1							
F5-1	0.000	0.00	0.453	1976.00	0.453	1976.00	UNDERGRND
in space: SPACE5-1							

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

REPORT LV-E DETAILS OF UNDERGROUND SURFACES IN THE PROJECT

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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- LV-E  Details of Underground Surfaces in the Project                          WEATHER FILE- TRY  CHICAGO
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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

REPORT LV-F DETAILS OF INTERIOR SURFACES IN THE PROJECT

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

	ADJACENT SPACES	
SURFACE NAME	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

REPORT LV-G DETAILS OF SCHEDULES OCCURRING IN THE PROJECT

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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- 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
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REPORT LV-H DETAILS OF WINDOWS OCCURRING IN THE PROJECT

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-H Details of Windows Occurring in the Project WEATHER FILE- TRY CHICAGO

NUMBER OF WINDOWS 6

(Note: u-values include outside air film)

WINDOW NAME	MULTIPLIER	GLASS AREA (SQFT)	GLASS HEIGHT (FT)	GLASS WIDTH (FT)	LOCATION OF ORIGIN IN SURFACE COORDINATES X (FT)	Y (FT)	FRAME AREA (SQFT)	FRAME U-VALUE (BTU/HR-SQFT-F)
WF-1	1.0	180.00	4.00	45.00	10.00	3.00	0.00	0.384
DF-1	1.0	64.00	8.00	8.00	70.00	0.00	0.00	0.384
WR-1	1.0	100.00	4.00	25.00	12.50	3.00	0.00	0.384
WB-1	1.0	180.00	4.00	45.00	10.00	3.00	0.00	0.384
DB-1	1.0	49.00	7.00	7.00	70.00	0.00	0.00	0.384
WL-1	1.0	100.00	4.00	25.00	12.50	3.00	0.00	0.384

WINDOW NAME	SETBACK (FT)	GLASS SHADING COEFF	NUMBER OF PANES	CENTER-OF-GLASS U-VALUE (BTU/HR-SQFT-F)	GLASS VISIBLE TRANS	GLASS SOLAR TRANS
WF-1	0.00	0.89	2	0.447	0.812	0.705
DF-1	0.00	0.83	1	1.003	0.611	0.626
WR-1	0.00	0.89	2	0.447	0.812	0.705
WB-1	0.00	0.89	2	0.447	0.812	0.705
DB-1	0.00	0.83	1	1.003	0.611	0.626
WL-1	0.00	0.89	2	0.447	0.812	0.705

REPORT LV-I DETAILS OF CONSTRUCTIONS OCCURRING IN THE PROJECT

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

REPORT LV-J: DETAILS OF BUILDING SHADES OCCURRING IN THE PROJECT

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

REPORT 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

REPORT 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.

Part 1 Input Information

Space-Related Quantities

SPACE
is the U-name of space.

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

AV REFL
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.

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

VW-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 keyword.

Window-Related Quantities

WINDOW
is the window U-name.

SH-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

REF PT NO.
is the number of reference point (1 or 2)

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).

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.

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.

Part 2 Calculated Values

Calculated Daylight Factors

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%.

```
DAYLIGHTING EXAMPLE                    FLOOR OF OFFICE BUILDING IN CHICAGO            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- LV-L  DAYLIGHT FACTOR SUMMARY FOR          SOUTHZONE
```

SPACE--SOUTHZONE
AREA(SQFT) 600.0
AV REFL 0.46
MAX-GLARE 100.0
VW-AZ(DEG) 270.0

WINDOW--SOUTHWIND
SC 1.00 GTC 2 VIS-TRANS 0.75
H(FT) 3.0 W(FT) 20.0
AZIM(DEG) 180.0 TILT(DEG) 90.0
DAY-X-DIV 8 DAY-Y-DIV 8
X(FT) 0.0 Y(FT) 0.0 Z(FT) 4.0
WIN-SHADE-TYPE MOVABLE-INTERIOR

REF PT NO.--1
X(FT) 10.0 Y(FT) 10.0 Z(FT) 2.5
ZONE-FRACTION 0.50
LTG-SET-POINT(FC) 50.0
LTG-CTRL-TYPE CONTINUOUS

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.	1323.1	160.2	43.3	13.5	0.0	0.4	0.0429	0.0028	1.1379	0.0000	0.0047	0.0013	13.7
1	1	2	10.	290.	1323.1	160.2	22.0	17.1	0.4	0.3	0.0296	0.0048	0.5384	0.0871	0.0060	0.0010	10.7
1	2	1	10.	290.	366.9	0.0	7.5	3.0	0.0	0.0	0.0288	0.0000	0.6413	0.0000	0.0038	0.0000	5.0
1	2	2	10.	290.	366.9	0.0	4.8	3.7	0.0	0.0	0.0233	0.0000	0.4239	0.0000	0.0047	0.0000	2.6
2	1	1	10.	235.	1323.1	160.2	91.0	24.4	0.0	8.0	0.0872	0.0500	2.5785	0.0000	0.0085	0.0231	16.5
2	1	2	10.	235.	1323.1	160.2	42.5	33.0	14.6	11.4	0.0571	0.1623	1.0375	2.9513	0.0116	0.0329	14.4
3	1	1	10.	180.	1323.1	160.2	198.5	35.4	160.2	15.4	0.1768	1.0963	4.4449	0.0000	0.0124	0.0446	18.2
3	1	2	10.	180.	1323.1	160.2	63.3	49.2	28.5	22.2	0.0850	0.3168	1.5449	5.7586	0.0172	0.0642	15.8
4	1	1	10.	125.	1323.1	160.2	91.0	24.4	0.0	8.0	0.0872	0.0500	2.5785	0.0000	0.0085	0.0231	16.5
4	1	2	10.	125.	1323.1	160.2	42.5	33.0	14.6	11.4	0.0571	0.1623	1.0375	2.9513	0.0116	0.0329	14.4
5	1	1	10.	70.	1323.1	160.2	43.3	13.5	0.0	0.4	0.0429	0.0028	1.1379	0.0000	0.0047	0.0013	13.7
5	1	2	10.	70.	1323.1	160.2	22.0	17.1	0.4	0.3	0.0296	0.0048	0.5384	0.0871	0.0060	0.0010	10.7
6	1	1	31.	290.	2082.3	2128.4	57.1	19.0	0.0	5.9	0.0365	0.0028	0.9490	0.0000	0.0042	0.0013	14.7
6	1	2	31.	290.	2082.3	2128.4	30.4	23.7	5.7	4.5	0.0260	0.0048	0.4722	0.0871	0.0053	0.0010	12.7
7	1	1	31.	235.	2082.3	2128.4	114.9	32.5	0.0	33.6	0.0708	0.0158	1.9458	0.0000	0.0072	0.0073	16.9
7	1	2	31.	235.	2082.3	2128.4	55.8	43.4	57.8	44.9	0.0476	0.0482	0.8658	0.8771	0.0097	0.0098	16.3
8	1	1	31.	180.	2082.3	2128.4	229.7	45.4	0.0	65.2	0.1321	0.0306	3.2192	0.0000	0.0101	0.0142	18.2
8	1	2	31.	180.	2082.3	2128.4	80.0	62.2	117.1	91.1	0.0683	0.0978	1.2410	1.7779	0.0138	0.0198	17.7
9	1	1	31.	125.	2082.3	2128.4	114.9	32.5	0.0	33.6	0.0708	0.0158	1.9458	0.0000	0.0072	0.0073	16.9
9	1	2	31.	125.	2082.3	2128.4	55.8	43.4	57.8	44.9	0.0476	0.0482	0.8658	0.8771	0.0097	0.0098	16.3
10	1	1	31.	70.	2082.3	2128.4	57.1	19.0	0.0	5.9	0.0365	0.0028	0.9490	0.0000	0.0042	0.0013	14.7
10	1	2	31.	70.	2082.3	2128.4	30.4	23.7	5.7	4.5	0.0260	0.0048	0.4722	0.0871	0.0053	0.0010	12.7
11	1	1	51.	290.	2531.1	4564.7	62.2	21.6	0.0	12.6	0.0331	0.0028	0.8387	0.0000	0.0040	0.0013	14.9
11	1	2	51.	290.	2531.1	4564.7	34.3	26.6	12.3	9.6	0.0241	0.0048	0.4375	0.0871	0.0049	0.0010	13.7
12	1	1	51.	235.	2531.1	4564.7	99.0	31.3	0.0	34.9	0.0515	0.0077	1.3074	0.0000	0.0057	0.0035	16.2
12	1	2	51.	235.	2531.1	4564.7	52.4	40.8	54.3	42.2	0.0368	0.0211	0.6693	0.3843	0.0075	0.0043	16.1
13	1	1	51.	180.	2531.1	4564.7	144.5	39.6	0.0	68.7	0.0727	0.0151	1.7680	0.0000	0.0072	0.0070	16.8
13	1	2	51.	180.	2531.1	4564.7	68.1	52.9	117.7	91.5	0.0478	0.0458	0.8691	0.8333	0.0097	0.0093	17.6
14	1	1	51.	125.	2531.1	4564.7	99.0	31.3	0.0	34.9	0.0515	0.0077	1.3074	0.0000	0.0057	0.0035	16.2
14	1	2	51.	125.	2531.1	4564.7	52.4	40.8	54.3	42.2	0.0368	0.0211	0.6693	0.3843	0.0075	0.0043	16.1
15	1	1	51.	70.	2531.1	4564.7	62.2	21.6	0.0	12.6	0.0331	0.0028	0.8387	0.0000	0.0040	0.0013	14.9
15	1	2	51.	70.	2531.1	4564.7	34.3	26.6	12.3	9.6	0.0241	0.0048	0.4375	0.0871	0.0049	0.0010	13.7
16	1	1	72.	290.	3100.3	6170.7	74.0	26.2	0.0	17.0	0.0323	0.0028	0.7992	0.0000	0.0039	0.0013	15.4
16	1	2	72.	290.	3100.3	6170.7	41.5	32.3	16.6	12.9	0.0238	0.0048	0.4328	0.0871	0.0048	0.0010	14.5
17	1	1	72.	235.	3100.3	6170.7	91.3	31.1	0.0	23.6	0.0395	0.0038	0.9692	0.0000	0.0047	0.0018	16.0
17	1	2	72.	235.	3100.3	6170.7	50.8	39.5	28.9	22.5	0.0291	0.0083	0.5292	0.1515	0.0059	0.0017	15.4
18	1	1	72.	180.	3100.3	6170.7	104.5	34.5	0.0	36.3	0.0448	0.0059	1.0885	0.0000	0.0051	0.0027	16.2
18	1	2	72.	180.	3100.3	6170.7	57.0	44.3	52.8	41.0	0.0327	0.0152	0.5944	0.2764	0.0066	0.0031	16.2
19	1	1	72.	125.	3100.3	6170.7	91.3	31.1	0.0	23.6	0.0395	0.0038	0.9692	0.0000	0.0047	0.0018	16.0
19	1	2	72.	125.	3100.3	6170.7	50.8	39.5	28.9	22.5	0.0291	0.0083	0.5292	0.1515	0.0059	0.0017	15.4
20	1	1	72.	70.	3100.3	6170.7	74.0	26.2	0.0	17.0	0.0323	0.0028	0.7992	0.0000	0.0039	0.0013	15.4
20	1	2	72.	70.	3100.3	6170.7	41.5	32.3	16.6	12.9	0.0238	0.0048	0.4328	0.0871	0.0048	0.0010	14.5

```
NOTE -- The following visible transmittance is used for the above values:
        For unshaded window or window with regular shade: 1.0
        For window with blind: actual visible transmittance at first slat angle
        In either case, actual transmittances are used in the hourly calculation.
```

REPORT LV-M DOE-2 ENGLISH/METRIC CONVERSION TABLE

	Metric Unit	English Unit	Multiplier on English Unit to get Metric Unit
3	WH	BTU	0.293000
4	WATT	BTU/HR	0.293000
5	J/KG-K	BTU/LB-F	4183.830078
6	W/M2-K	BTU/HR-SQFT-F	5.674460
7	DEGREES	DEGREES	1.000000
8	C	F	0.555556
9	M2	SQFT	0.092903
10	M3	CUFT	0.028317
11	KG/HR	LB/HR	0.453592
12	KG/M3	LB/CUFT	16.018459
13	M/S	MPH	0.447040
14	W/K	BTU/HR-F	0.527178
15	M	FT	0.304800
16	W/M-K	BTU/HR-FT-F	1.729600
17	WATT /M2	BTU/HR- SQFT	3.152480
18	CM	IN	2.540000
19	UNITS/CM	UNITS/IN	0.393700
20	UNITS	UNITS	1.000000
21	KG	LB	0.453592
22	FRAC.OR MULT.	FRAC.OR MULT.	1.000000
23	HRS	HOURS	1.000000
24	PERCENT-RH	PERCENT-RH	1.000000
25	M3/H	CFM	1.699010
26	MM-WATER	IN-WATER	25.400000
27	KG/M2	LB/SQFT	4.882400
28	KW	KW	1.000000
29	W/M2	W/SQFT	10.763920
30	THERMIES	THERMS	25.000000
31	M/SEC	KNOTS	0.514440
32	M2-K /W	HR-SQFT-F /BTU	0.176228
33	$DOLLARS	$DOLLARS	1.000000
34	MWATT	MBTU/HR	0.293000
35	YEARS	YEARS	1.000000
36	$/HR	$/HR	1.000000
37	HRS/YEARS	HRS/YEARS	1.000000
38	PERCENT	PERCENT	1.000000
39	$/MONTH	$/MONTH	1.000000
40	LITERS/MIN/KW	GALLONS/MIN/TON	1.078000
41	WH/KG	BTU/LB	0.645683
42	MBAR-GAGE	LBS/SQIN-GAGE	68.947571
43	$/UNIT	$/UNIT	1.000000
44	W/PERSON	BTU/HR/PERSON	0.293000
45	KGS/KG	LBS/LB	1.000000
46	KWH/KWH	BTU/BTU	1.000000
47	KG/KW	LBS/KW	0.453590
48	REV/MIN	REV/MIN	1.000000
49	KW/TON	KW/TON	1.000000
50	MWH	MBTU	0.293000
51	LITER	GAL	3.785410
52	LITERS/MIN	GAL/MIN	3.785410
53	J/K	BTU/F	1897.800049
54	KWH	KWH	1.000000
55	$/UNIT-HR	$/UNIT-HR	1.000000
56	KW/M3/HR	KW/CFM	0.588500
57	J/M2-K	BTU/SQFT-F	20428.400391
58	HR/HR	HR/HR	1.000000
59	J/M-K	BTU/FT-F	6226.479980
60	K	R	0.555556
61	MBAR	INCH MER	33.863800
62	UNITS/LITER/MIN	UNITS/GAL/MIN	0.264170
63	(M2-K /W)2	(HR-SQFT-F/BTU)2	0.031056
64	KW	KBTU/HR	0.293000
65	KWH	KBTU	0.293000
66	L/S	CFM	0.471900

67	M3/H-M2	CFM/SQFT	18.288000
68	1/K	1/R	1.799900
69	SEC/M	1/KNOT	1.943860
70	LUX	FOOTCANDLES	10.763910
71	CANDELA/M2	FOOTLAMBERT	3.426259
72	LUMEN / WATT	LUMEN / WATT	1.000000
73	KWH/M2-YR	KBTU/SQFT-YR	3.152480
74	C (DELTA)	F (DELTA)	0.555556
75	WATT	BTU/DAY	0.012202
76	$/YEAR	$/YEAR	1.000000
77	WATT/WATT	BTU/WATT	0.293000
78	RADIANS	RADIANS	1.000000
79	WATT/WATT	WATT/BTU	3.413000
80	KWH	BTU	0.000293
81	WATT	WATT	1.000000
82	LUMENS	LUMENS	1.000000
83	W/M-K2	BTU/HR-FT-R2	3.115335
84	KG/M-S	LB/FT-S	1.488163
85	KG/M-S-K	LB/FT-S-R	2.678693
86	KG/M3-K	LB/CUFT-R	28.833212
87	W/M-K	BTU/HR-FT-R	1.730741
88	M3	THERM	2.831700
89	M3/HR	THERM/HR	2.831700
90	TONNE	TON	0.907180
91	TONNE/HR	TON/HR	0.907180
92	BTU/UNIT	BTU/UNIT	1.000000
93	$	$	1.000000
94	KW/LITER/MIN	KW/GAL/MIN	0.264170
95	M3-MIN/H-LITERS	CUFT/GAL	0.448831
96	MINUTES	MINUTES	1.000000
97	KG/MWH	LB/MBTU	1.548100
98	UNUSED	UNUSED	1.000000

REPORT 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
-------------------------------------------------------------------------------------------------------------------------------

                          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
```

REPORT 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.

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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-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                   *
                  *                                                              *
                  ****************************************************************
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REPORT 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

*** 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 (KBTU/H)	SENSIBLE (KW)	LATENT (KBTU/H)	LATENT (KW)	SENSIBLE (KBTU/H)	SENSIBLE (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                    *
*                                                               *
*****************************************************************
```

REPORT 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

	- - - - - - - - C O O L I N G - - - - - - - -						- - - - - - - - H E A T I N G - - - - - - - -						- - - E L E C - - -	
MONTH	COOLING ENERGY (MBTU)	TIME OF DY	MAX HR	DRY-BULB TEMP	WET-BULB TEMP	MAXIMUM COOLING LOAD (KBTU/HR)	HEATING ENERGY (MBTU)	TIME OF DY	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

REPORT 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 1
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	-14.060
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	39.114
	LAT CL					0.009			3.164		0.000	0.000	3.173

REPORT LS-F BUILDING MONTHLY LOAD COMPONENTS IN <MBTU or MWH>

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.

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-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	-46.280
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

REPORT 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).

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-G Space Daylighting Summary SOUTHZONE WEATHER FILE- TRY CHICAGO

SPACE SOUTHZONE

	PERCENT LIGHTING ENERGY REDUCTION BY DAYLIGHTING (ALL HOURS)			PERCENT LIGHTING ENERGY REDUCTION BY DAYLIGHTING (REPORT SCHEDULE HOURS)			AVERAGE DAYLIGHT ILLUMINANCE (FOOTCANDLES)		PERCENT HOURS DAYLIGHT ILLUMINANCE ABOVE SETPOINT		AVERAGE GLARE INDEX		PERCENT HOURS GLARE TOO HIGH	
							----------REPORT SCHEDULE HOURS WITH SUN UP----------							
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

REPORT 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.

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

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

REPORT 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.

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

*** 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

REPORT 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.

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

SPACE SOUTHZONE

		PERCENT OF HOURS IN ILLUMINANCE RANGE									PERCENT OF HOURS ILLUMINANCE LEVEL EXCEEDED								
		ILLUMINANCE RANGE (FOOTCANDLES)									ILLUMINANCE LEVEL (FOOTCANDLES)								
MONTH	REF PT	0 -- 10	10 -- 20	20 -- 30	30 -- 40	40 -- 50	50 -- 60	60 -- 70	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

REPORT 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.

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

SPACE SPACE1-1

	- - - - L I G H T I N G - - - -		E Q U I P M E N T	- - - - - - - - - - P R O C E S S		- - - - - - - - -
MONTH	TASK LIGHTING (KWH)	TOTAL LIGHTING (KWH)	GENERAL EQUIPMENT (KWH)	PROCESS ELECTRIC (KWH)	PROCESS GAS (MBTU)	PROCESS HOT WATER (MBTU)
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

REPORT 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
```

HVAC AIRSIDE REPORTS

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 even though DOE-2 requires that any flows you enter in SYSTEMS be at sea level.

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.

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. If you have not entered COOL-SH-CAP at the system level for a central system, 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.

Design-day sizing of VAV system Show All Reports
REPORT- SV-A System Design Parameters for SYST-1 WEATHER FILE- TRY CHICAGO

SYSTEM TYPE	ALTITUDE FACTOR	FLOOR AREA (SQFT)	MAX PEOPLE	OUTSIDE AIR RATIO	COOLING CAPACITY (KBTU/HR)	SENSIBLE (SHR)	HEATING CAPACITY (KBTU/HR)	COOLING EIR (BTU/BTU)	HEATING EIR (BTU/BTU)	HEAT PUMP SUPP-HEAT (KBTU/HR)
VAVS	1.020	5000.0	52.	0.179	241.081	0.662	-50.000	0.000	0.000	0.000

FAN TYPE	CAPACITY (CFM)	DIVERSITY FACTOR (FRAC)	POWER DEMAND (KW)	FAN DELTA-T (F)	STATIC PRESSURE (IN-WATER)	TOTAL EFF (FRAC)	MECH EFF (FRAC)	FAN PLACEMENT	FAN CONTROL	MAX FAN RATIO (FRAC)	MIN FAN RATIO (FRAC)
SUPPLY	5924.	1.00	6.817	3.63	5.5	0.55	0.72	DRAW-THRU	SPEED	1.10	0.30

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

REPORT SV-A SYSTEM DESIGN PARAMETERS (REFRIGERATED EQUIPMENT IN <space name>)

When refrigerated equipment is input, an alternate SV-A report is printed. The top half of the report is identical to that as previously described. The bottom half, titled REFRIGERATED EQUIP IN <space name>, covers the design parameters for three categories: ZONE, COMPRESSOR and CONDENSER.

Report SV-A has been expanded to include a line for each fan detailing its capacity, rated capacity, diversity factor (Capacity*[MAX-FAN-RATIO] / [Sum of zone airflows]), 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. For systems having mixing sections, (dual-duct and multizone systems), an additional section has been added detailing the cold duct, hot duct, and total zonal airflows, as well as the minimum airflow ratios for these quantities. Note that the static pressure may have a value of 0. This simply means that the variable was not specified by the user, and was not used to calculate fan power consumption.

UNIT
identifies the units input in the list of up to three entries of REFG-ZONE-LOAD.

DISCHARGE TEMP
is the temperature inside the cases.

SENSIBLE LOADS TEMP
is the sensible cooling effect at the constant temperature used in the LOADS module.

SENSIBLE HEAT TEMP
is the sensible cooling effect at the zone's design heating temperature.

SENSIBLE COOL TEMP
is the sensible cooling effect at the zone's design cooling temperature.

COMPRESSOR CAPACITY
is the compressor capacity at the design operating conditions. Notice that when two or more compressors are multiplexed (using keyword REFG-COMP-GROUP), their combined capacity is indicated for the unit at the lowest evaporator temperature.

COMPRESSOR EFFICIENCY
is the compressor EER (Energy Efficiency Ratio).

DESIGN HEAT REJ
is the combined condenser heat rejection of all the compressors input.

FAN ENERGY
is the tower fan or air cooled condenser fan rating.

PUMP ENERGY
is the tower condenser pump rating; it is zero for air cooled applications.

OFFICE BUILDING & DELI/RESTAURANT ELECTROCHROMIC GLAZING IN ATRIUM
VAV SYSTEM IN OFFICE & PSZ IN ATRIUM GAS ENGINE DRIVEN CHILLER & HEAT RECY SAMP3.INP RUN 3
REPORT- SV-A SYSTEM DESIGN PARAMETERS FS-SYS1 WEATHER FILE- TRY CHICAGO

SYSTEM NAME	SYSTEM TYPE	ALTITUDE MULTIPLIER	FLOOR AREA (SQFT)	MAX PEOPLE
FS-SYS1	PSZ	1.020	1800.0	6.

SUPPLY FAN (CFM)	ELEC (KW)	DELTA-T (F)	RETURN FAN (CFM)	ELEC (KW)	DELTA-T (F)	OUTSIDE AIR RATIO	COOLING CAPACITY (KBTU/HR)	SENSIBLE (SHR)	HEATING CAPACITY (KBTU/HR)	COOLING EIR (BTU/BTU)	HEATING EIR (BTU/BTU)
1924.	1.476	2.4	0.	0.000	0.0	0.352	79.077	0.621	-112.077	0.36	0.37

ZONE NAME	SUPPLY FLOW (CFM)	EXHAUST FLOW (CFM)	FAN (KW)	MINIMUM FLOW RATIO	OUTSIDE AIR FLOW (CFM)	COOLING CAPACITY (KBTU/HR)	SENSIBLE (SHR)	EXTRACTION RATE (KBTU/HR)	HEATING CAPACITY (KBTU/HR)	ADDITION RATE (KBTU/HR)	MULTIPLIER
ATZ1	1924.	0.	0.000	1.000	678.	0.00	0.00	39.49	0.00	-62.35	1.0

REFRIGERATED EQUIP IN ATZ1

	ZONE				COMPRESSOR		CONDENSER		
UNIT	DISCHARGE TEMP (F)	SENSIBLE LOADS TEMP (KBTU/HR)	SENSIBLE HEAT TEMP (KBTU/HR)	SENSIBLE COOL TEMP (KBTU/HR)	COMPRESSOR CAPACITY (KBTU/HR)	COMPRESSOR EFFICIENCY (BTU/WATT)	DESIGN HEAT REJ (KBTU/HR)	FAN ENERGY (KW)	PUMP ENERGY (KW)
1	-10.0	-8.894	-8.471	-8.894	14.547	3.8	51.693	0.271	0.064
2	23.0	-3.923	-3.615	-3.923	16.390	7.0			
3	30.0	-5.280	-4.800	-5.280	0.000	7.3			

REPORT SV-B ZONE FAN DATA (PIU) <system name>

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

REPORT SS-* Overview

Report SS-A is always printed 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; the most often used reports are preceded by an asterisk.

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 (always printed)
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 AND COOLING
SS-K	SPACE TEMPERATURE SUMMARY
SS-R	ZONE PERFORMANCE SUMMARY
SS-L	FAN ELECTRIC ENERGY USE
SS-N	RELATIVE HUMIDITY SUMMARY
SS-Q	HP COOLING PERFORMANCE SUMMARY
SS-Q	HP HEATING PERFORMANCE SUMMARY

Zone level:

SS-G	ZONE LOADS SUMMARY
SS-F	ZONE DEMAND SUMMARY
*SS-O	SPACE TEMPERATURE SUMMARY

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

REPORT SS-A SYSTEM LOADS SUMMARY <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

	- - - - - - - - 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	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

REPORT SS-B SYSTEM MONTHLY 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

	- -Z O N E C O O L I N G- -		- -Z O N E H E A T I N G -		- - B A S E B O A R D S - -		--PREHEAT OR FURN FAN ELEC--	
MONTH	COOLING BY ZONE COILS OR NAT VENTIL (MBTU)	MAXIMUM COOLING BY ZONE COILS OR NAT VENTIL (KBTU/HR)	HEATING BY ZONE COILS OR FURNACE (MBTU)	MAXIMUM HEATING BY ZONE COILS OR FURNACE (KBTU/HR)	BASEBOARD HEATING ENERGY (MBTU)	MAXIMUM BASEBOARD HEATING ENERGY (KBTU/HR)	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

REPORT 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

	NUMBER OF HOURS										--COINCIDENT LOADS--	
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)
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
ANNUAL	1119	1883	2	5760	5490	3120	3244	545	0	244		

REPORT 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

	- - - - - - - - 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	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

MAXIMUM DAILY INTEGRATED COOLING LOAD (DES DAY) 0.000 (KBTU)
MAXIMUM DAILY INTEGRATED COOLING LOAD (WTH FILE) 1997.705 (KBTU)

REPORT 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

	- - - - - - - - - - - - - - - - - - N U M B E R O F H O U R S - - - - - - - - - - - - - - - - - -										--COINCIDENT LOADS--	
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)
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		

REPORT 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, 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.

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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-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- -

            HEAT          HEAT                    MAXIMUM          MAXIMUM        MINIMUM
         EXTRACTION      ADDITION      BASEBOARD   BASEBOARD           ZONE           ZONE          HOURS           HOURS
             ENERGY        ENERGY         ENERGY        LOAD           TEMP           TEMP          UNDER           UNDER
MONTH        (MBTU)        (MBTU)         (MBTU)    (KBTU/HR)            (F)            (F)         HEATED          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
```

REPORT 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
```

REPORT 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.

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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-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

REPORT 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.

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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-I Sensible/Latent Summary for    SYST-1                                                  WEATHER FILE- TRY  CHICAGO
 ------------------------------------------------------------------------------------------------------------------------------
            SENSIBLE         LATENT      MAX TOTAL                                    SENSIBLE        LATENT       MAX TOTAL
             COOLING        COOLING        COOLING       SENSIBLE       TIME         HEATING        HEATING        HEATING
              ENERGY         ENERGY         ENERGY     HEAT RATIO     OF MAX          ENERGY         ENERGY         ENERGY
 MONTH         (MBTU)         (MBTU)      (KBTU/HR)         AT MAX     DY  HR          (MBTU)         (MBTU)      (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
```

REPORT 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.

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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-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			
HOUR	HOURLY COOLING LOAD (KBTU)	SENSIBLE HEAT RATIO	DRY-BULB TEMP	WET-BULB TEMP	HOURLY HEATING LOAD (KBTU)	DRY-BULB TEMP	WET-BULB TEMP	HOURLY COOLING LOAD (KBTU)	SENSIBLE HEAT RATIO	DRY-BULB TEMP	WET-BULB 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

REPORT 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.

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

	AVERAGE SPACE TEMP					AVERAGE TEMPERATURE DIFFERENCE BETWEEN OUTDOOR& ROOM AIR			SUMMED TEMP DIFFERENCE BETWEEN OUTDOOR& ROOM AIR		
MONTH	ALL HOURS (F)	COOLING HOURS (F)	HEATING HOURS (F)	FAN ON HOURS (F)	FAN OFF HOURS (F)	ALL HOURS (F)	FAN ON HOURS (F)	FAN OFF HOURS (F)	HEATING HOURS (F)	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

REPORT 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.

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

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.

REPORT 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

REPORT 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                      *
*                                                               *
*****************************************************************
```

REPORT 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                    *
*                                                            *
**************************************************************
```

REPORT SS-P HEATING PERFORMANCE SUMMARY OF <system name>
or COOLING PERFORMANCE SUMMARY OF <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 PTAC system if Report SS-H is requested;
- each zone in a PTAC or HP 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		UNIT LOAD SUM (MBTU) PEAK (KBTU/HR)	ENERGY USE SUM (KWH) PEAK (KW)	COMPRESSOR SUM (KWH) PEAK (KW)	FAN ENERGY SUM (KWH) PEAK (KW)		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	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													

REPORT SS-Q HEAT PUMP COOLING SUMMARY FOR <system name>
or HEAT PUMP 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.

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.

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)

REPORT SS-R ZONE PERFORMANCE SUMMARY

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.

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.

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												

REPORT SUPL SYSTEM SUPPLEMENTAL EVAPORATIVE OR 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

REPORT REFG REFRIGERATION EQUIPMENT SUMMARY

This report gives monthly energy use for each system in which there is refrigerated case work.

ZONAL SENSIBLE ENERGY
is the sensible heat gain to the zone from the refrigerated case work.

ZONAL LATENT ENERGY
is the latent heat gain to the zone from the refrigerated case work.

CONDENSER RECOVERED ENERGY
is the energy recovered from the condensers and used for space heating in the heat recovery mode.

CONDENSER REJECTED ENERGY
is the energy rejected from the condensers.

ELECTRIC COMPRESSOR ENERGY
is the electrical energy consumed by the compressors.

ELECTRIC DEFROST ENERGY
is the electrical energy consumed by the defrosters.

ELECTRIC AUXILIARY ENERGY
is the electrical energy consumed by lights, fans, and anti-sweat heaters in the refrigerated cases.

ELECTRIC TOTAL ENERGY
is the total electric energy used by the refrigerated case work.

OFFICE BUILDING & DELI/RESTAURANT ELECTROCHROMIC GLAZING IN ATRIUM DOE-2.1E-092 Wed Oct 8 16:27:41 1997SDL RUN 3
VAV SYSTEM IN OFFICE & PSZ IN ATRIUM GAS ENGINE DRIVEN CHILLER & HEAT RECY SAMP3.INP RUN 3
REPORT- REFG REFRIGERATION EQUIPMENT SUMMARY IN FS-SYS1 FOR ATZ1 WEATHER FILE- TRY CHICAGO

	- - - ZONAL - - -		- CONDENSER -		- - - - - - - - - ELECTRIC - - - - - - - - -			
MONTH	SENSIBLE ENERGY (MBTU)	LATENT ENERGY (MBTU)	RECOVERED ENERGY (MBTU)	REJECTED ENERGY (MBTU)	COMPRESSOR ENERGY (KWH)	DEFROST ENERGY (KWH)	AUXILIARY ENERGY (KWH)	TOTAL ENERGY (KWH)
JAN	-8.044	-0.205	6.872	8.454	1793.721	35.586	424.873	2254.171
FEB	-7.333	-0.139	6.118	7.759	1623.323	28.050	363.958	2015.326
MAR	-8.388	-0.384	6.356	9.848	1876.455	58.974	507.071	2442.493
APR	-8.317	-0.608	2.966	13.260	1837.378	84.105	515.206	2436.680
MAY	-8.497	-0.895	1.886	15.085	1908.137	115.087	521.514	2544.724
JUN	-8.742	-1.101	0.099	17.615	1980.749	136.389	516.831	2633.956
JUL	-9.068	-1.266	0.000	18.899	2173.137	154.434	528.234	2855.792
AUG	-9.032	-1.291	0.000	18.752	2132.244	157.062	528.234	2817.528
SEP	-8.495	-0.887	0.678	16.155	1874.964	113.648	510.110	2498.710
OCT	-8.406	-0.701	2.733	13.758	1860.607	94.491	520.973	2476.060
NOV	-7.877	-0.458	5.338	9.977	1763.958	67.666	481.192	2312.804
DEC	-8.047	-0.262	6.928	8.507	1806.185	46.456	467.373	2320.006
TOTAL	-100.245	-8.196	39.975	158.068	22630.859	1091.948	5885.571	29608.250

PLANT REPORTS

REPORT PV-A PLANT DESIGN PARAMETERS

This report summarizes the design information for each component simulated in the central plant(s)

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.

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

*** CIRCULATION LOOPS ***

	HEATING CAPACITY (MBTU/HR)	COOLING CAPACITY (MBTU/HR)	LOOP FLOW (GAL/MIN)	TOTAL HEAD (FT)	SUPPLY UA PRODUCT (BTU/HR-F)	SUPPLY LOSS DT (F)	RETURN UA PRODUCT (BTU/HR-F)	RETURN LOSS DT (F)	LOOP VOLUME (GAL)	FLUID HEAT CAPACITY (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 ***

ATTACHED TO	FLOW (GAL/MIN)	HEAD (FT)	HEAD SETPOINT (FT)	CAPACITY CONTROL	POWER (KW)	MECHANICAL EFFICIENCY (FRAC)	MOTOR EFFICIENCY (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 ***

EQUIPMENT TYPE	ATTACHED TO	CAPACITY (MBTU/HR)	FLOW (GAL/MIN)	EIR (FRAC)	HIR (FRAC)	AUXILIARY (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

REPORT 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
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	SITE ENERGY												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

REPORT 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

REPORT 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. 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.

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

REPORT 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.

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
```

REPORT PS-E ENERGY END-USE SUMMARY FOR ALL <type> 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.
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	

REPORT 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

REPORT 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.

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 CAPACITY (MBTU/HR)	COOLING CAPACITY (MBTU/HR)	LOOP FLOW (GAL/MIN)	TOTAL HEAD (FT)	SUPPLY UA PRODUCT (BTU/HR-F)	SUPPLY LOSS DT (F)	RETURN UA PRODUCT (BTU/HR-F)	RETURN LOSS DT (F)	LOOP VOLUME (GAL)	FLUID HEAT CAPACITY (BTU/LB-F)
-0.430	0.000	21.5	36.6	0.0	0.00	0.0	0.00	32.3	1.00

MON		COIL LOAD (MBTU)	PIPE GAIN (MBTU)	NET LOAD (MBTU)	OVERLOAD (MBTU)		Number of hours within each PART LOAD range 00	10	20	30	40	50	60	70	80	90	100 +	TOTAL RUN HOURS
	PEAK	(KBTU/HR)	(KBTU/HR)	(KBTU/HR)	(KBTU/HR)		10	20	30	40	50	60	70	80	90	100		
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													

REPORT 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
```

REPORT 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.

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

EQUIPMENT TYPE	ATTACHED TO	CAPACITY (MBTU/HR)	FLOW (GAL/MIN)	EIR (FRAC)	HIR (FRAC)	AUXILIARY (KW)
HW-BOILER	Heating-Loop	-0.430	21.5	0.000	1.250	0.000

MON		HEAT LOAD (MBTU) (KBTU/HR)	ELEC USE (KWH) (KW)	FUEL USE (MBTU) (KBTU/HR)	AUX ENERGY (KWH) (KW)		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	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

REPORT 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. 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.

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

	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													
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

NOTE: ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.

REPORT 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
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                      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.
```

ECONOMICS REPORTS

REPORT EV-A LIFE-CYCLE COSTING PARAMETERS

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.

```
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

DISCOUNT RATE (PERCENT)	LABOR INFLATION RATE (PERCENT)	MATERIALS INFLATION RATE (PERCENT)	PROJECT LIFE (YRS)
5.0	0.0	0.0	25.0

BUILDING COMPONENT COST INPUT DATA (CURRENT DOLLARS)

COST NAME	NUMBER OF UNITS	UNIT NAME	LIFE (YRS)	UNIT FIRST COST ($)	UNIT INSTALL -ATION COST ($)	UNIT ANNUAL MAINT COST ($)	UNIT MINOR OVERHAUL COST ($)	MINOR OVERHAUL INTERVAL (YRS)	UNIT MAJOR OVERHAUL COST ($)	MAJOR OVERHAUL INTERVAL (YRS)
ROOF-INSUL	5000.0	SQFT	999.0	0.80	0.30	0.00	0.00	999.00	0.00	999.00

REPORT ES-A ANNUAL ENERGY AND OPERATIONS 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 3A, CHICAGO INCREASED ROOF INSULATION
DESIGN-DAY SIZING OF VAV SYSTEM SHOW ALL REPORTS
REPORT- ES-A ANNUAL ENERGY AND OPERATIONS COSTS AND SAVINGS

	E N E R G Y ($)			O P E R A T I O N S ($)					TOTAL
					OPRNS COST -- THIS RUN				SAVINGS-
	ENERGY	ENERGY	ENERGY	OPRNS				OPRNS	ENERGY
	COST	COST	COST	COST				COST	PLUS
YEAR	BASELINE	THIS RUN	SAVINGS	BASELINE	PLANT	BUILDING	TOTAL	SAVINGS	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.

REPORT ES-B LIFE-CYCLE BUILDING AND PLANT 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 3A, CHICAGO        INCREASED ROOF INSULATION
DESIGN-DAY SIZING OF VAV SYSTEM         SHOW ALL REPORTS
REPORT- ES-B  LIFE-CYCLE BUILDING AND PLANT NON-ENERGY COSTS
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LIFE-CYCLE BUILDING AND PLANT NON-ENERGY COSTS ($)

COST NAME	FIRST COST (INCLUDING INSTALLATION)	REPLACEMENTS	OPERATIONS	TOTAL	INVESTMENT (FIRST COST PLUS REPLACEMENTS)
ROOF-INSUL	5500.	0.	0.	5500.	5500.
PLANT EQUIPMENT	29273.	0.	3691.	32964.	29273.
TOTALS	34773.	0.	3691.	38464.	34773.

REPORT ES-C ENERGY SAVINGS, INVESTMENT STATISTICS, AND OVERALL LIFE-CYCLE COSTS

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 3A, CHICAGO INCREASED ROOF INSULATION
DESIGN-DAY SIZING OF VAV SYSTEM SHOW ALL REPORTS
REPORT- ES-C ENERGY SAVINGS, INVESTMENT STATISTICS, AND OVERALL LIFE-CYCLE COSTS

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

REPORT 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
```

REPORT 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
MIN-ENERGY: 0.0
MAX-ENERGY: 0.0
MIN-DEMAND: 0.0
MAX-DEMAND: 0.0
QUALIFY-RATE: ALL-MONTHS
USE-MIN-QUAL: NO

BLOCK-CHARGES
WINTER-OFF-PK WINTER-DEMAND
WINTER-SHLDR SUMMER-DEMAND
WINTER-ON-PK
SUMMER-OFF-PK
SUMMER-SHLDR
SUMMER-ON-PK

DEMAND-RATCHETS

MIN-MON-RATCHETS

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

REPORT 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.

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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
```

REPORT 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

REPORT 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-REPORTS

Introduction

Hourly reports are user designed. You choose the variables to be displayed from lists in the following tablesl. 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. Because these two sub-programs execute sequentially (rather than in the same time step), you must define hourly reports separately for the two. In other words, you cannot mix variables calculated in the LOADS module with variables calculated in the HVAC module. 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.);

variable name (DRY BULB TEMP, etc.);

units (F, BTU/HR, etc.);

variable-list number, in parentheses, chosen from Appendix A; 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")

VARIABLE-TYPE = GLOBAL (LOADS)

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	ISCDAY	Schedule day (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

Variable-List Number	Variable in FORTRAN Code	Description
		luminance distributions.
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)

VARIABLE-TYPE = BUILDING

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

Variable-List Number	Variable in FORTRAN Code	Description
24	BLDDTC(6)	Building cooling load from solar radiation through exterior windows
25	BLDDTC(7)	Building cooling sensible infiltration load
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

VARIABLE-TYPE = U-name of 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

Variable-List Number	Variable in FORTRAN Code	Description
26	QEQPS2	Source sensible load
27	QPPS	People sensible load
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).

Variable-List Number	Variable in FORTRAN Code	Description
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).
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.

VARIABLE-TYPE = U-name of 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

VARIABLE-TYPE = U-name of 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 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]

Variable -List Number	Variable in FORTRAN Code	Description
15	QSOLG+QABSG	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 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

Variable -List Number	Variable in FORTRAN Code	Description
		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).

VARIABLE-TYPE = U-name of 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)

VARIABLE-TYPE = U-name of ZONE

Variable-List Number	Variable in FORTRAN Code	Description
1	<QS>	Sensible load at constant zone temperature (from LOADS) (Btu/hr)
2	<QL>	Latent load at constant zone temperature, excluding infiltration (from LOADS) (Btu/hr)
3	<ZKW>	Zone electrical load (from LOADS) (kW)
4	<QP>	Light heat to return air (from LOADS) (Btu/hr)
5	<CFMINF>	Outdoor air infiltration rate (from LOADS) (cfm)
6	<TNOW>	Current hour zone temperature (F).
7	<TSET>	Current hour zone thermostat setting; a diagnostic variable not meaningful when <TNOW> is outside the throttling range of either HEAT-TEMP-SCH or COOL-TEMP-SCH (F)
8	<QNOW>	Current hour heat extraction rate; a diagnostic variable not meaningful when <TNOW> is outside the throttling range of either HEAT-TEMP-SCH or COOL-TEMP-SCH (F). Excludes heat extraction due to interzone convection across interior wall between sunspace and non-sunspace. For sunspaces, excludes heat extraction due to venting.
9	<CONDUCHR>	Sum of exterior wall + interior wall thermal conductances from LOADS (Btu/hr-F)
10	-	Unused
11	EXCFM	Exhaust air flow rate (cfm)
12	FH	Hot air flow rate (cfm)
13	FC	Cold air flow rate (cfm)
14	CFMZ	Zone supply air flow rate (cfm)
15	QHBZ	Baseboard heat output to zone (Btu/hr)
16	QOVER	Amount of extra heat extraction needed to hold setpoint if load not met (Btu/hr)
17	THZ	Thermostat setpoint for heating (F)
18	TCZ	Thermostat setpoint for cooling (F)
19	ERMAX	Maximum heat extraction rate (meaningful only within the current thermostat band) (Btu/hr)
20	ERMIN	Minimum heat extraction rate (meaningful only within the current thermostat band) (Btu/hr)
21	TRY	Trial zone temperature (if no zone coil activity) (F)
22	FTD	F in temperature variation calculation (TEMDEV subroutine) (Btu/hr)
23	CORINT	A part of the correction in SYSTEMS for the contribution to the zone load due to conduction from adjacent zones (partially calculated in LOADS)

Variable-List Number	Variable in FORTRAN Code	Description
		(Btu/hr)
24	G0	Air temperature weighting factors (Btu/hr-F)
25	G1	Air temperature weighting factors (Btu/hr-F)
26	G2	Air temperature weighting factors (Btu/hr-F)
27	G3	Air temperature weighting factors (Btu/hr-F)
28	SIGMAG	G0 + G1 + G2 + G3 (Btu/hr-F)
29	TL	Induced air temperature for IU, SZCI (F)
30	ZQHR	Portion of reheat load that would bring the supply temperature to the zone temperature (Btu/hr)
31	TAVE	The average zone air temperature during this hour (F). This is the value used for the energy calculation.
32	ZQH	Zone coil heating (Btu/hr)
33	ZQC	Zone coil cooling (Btu/hr)

Note: Variables 34 through 48 apply only to the systems indicated

		FC	HP	UHT	UVT	PTAC	
34	FCHPS (1)	TC	TS	-	TS	TS	Cold deck temp (F)
35	FCHPS (2)	QH	ZQH	ZQH	ZQH	ZQH	Zone heating (Btu/hr)
36	FCHPS (3)	QC	ZQC	-	-	ZQC	Zone cooling (Btu/hr)
37	FCHPS (4)	SFKW+ RFKW	ZFANKW	ZFANKW	ZFANKW	ZFANKW	Zone fan energy (Btu/hr)
38	FCHPS (5)	TM	TM	-	TM	TM	Mixed air temp (F)
39	FCHPS (6)	WR	TC	-	-	TC	WR = return humidity ratio TC = coil leaving temp
40	FCHPS (7)	WM	WM	-	-	WM	Mixed air humidity ratio (lb H_2O/lb dry air)
41	FCHPS (8)	WCOIL	WCOIL	-	-	WCOIL	Humidity ratio of air leaving cooling coil (lb H_2O/lb dry air)
42	FCHPS (9)	PO	PO	-	PO	PO	Ratio of outside air to total supply air
43	FCHPS(10)	QCLAT	QCLATZ	-	-	QCLATZ	Latent load (Btu/hr)
44	FCHPS(11)	PLRC	PLRC	-	-	PLRC	Cap. part load ratio (clg)
45	FCHPS(12)	-	PLRH	-	-	PLRH	Cap. part load ratio (ht)
46	FCHPS(13)	-	EIR	-	-	EIR	Electric input ratio

47	FCHPS(14)	WBTZ	WBTZ	-	-	WBTZ	Zone wetbulb temp (F)
48	FCHPS(15)	-	-	-	-	EIRM3	Supp heat load for zone heat pumps this hour (Btu/hr)
49	ACFM						Weighted plenum flow rate (cuft/min)
50	ZKW						Total zone elec (kW)
51	TCMINZ						Minimum zone supply air temperature (F)
52	THMAXZ						Maximum zone supply air temperature (F)
53	ERMAXM		All air systems				Extraction rate, top of deadband (Btu/hr)
54	ERMINM		All air systems				Extraction rate, bottom of deadband (Btu/hr)
55	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)

Variable-List Number	Variable in FORTRAN Code	Description
65	GPMZ	Flow through unit condenser (GPM)
66	GPMHZ	Flow during unit heating (GPM)
67	GPMCZ	Flow during unit cooling (GPM)
68	QHLUPZ	Heat taken from loop (Btu/hr)
69	QCLUPZ	Heat added to loop (Btu/hr)
70		unused
71		unused
72		unused
73		unused
74		unused
75	CAPAIR	Heat transport capacity on air side of water-side economizer
76	CAPWTR	Heat transport capacity on water side of water-side economizer
77	QCWSEM	Max possible water-side economizer exchange
78	QCWSE	Actual water-side economizer exchange
79	WSEDTA	Air temperature drop through water-side economizer
80	WSEDTW	Water temperature rise through water-side economizer
81	WSEXEF	Heat-exchanger efficiency of water-side economizer
82	WSENTU	unused
83	WSEUA	unused
84	WSEQMX	unused
85	WSEPLR	Ratio of actual load to maximum capacity for water-side economizer
86	WSEDT	Difference between entering air and water temperatures for WS econo
87		unused
88		unused
89		unused
90		unused

VARIABLES BY SYSTEM-TYPE FOR VARIABLE-TYPE = 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.	17	18	19	20	21	22	23	24
SYSTEM-TYPE	HEAT SET POINT	COOL SET POINT	MAX COOLING	MAX HEATING	FLOAT TEMP	F IN TEMDEV	INT TRAN TO ZONE	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.	25	26	27	28	29	30	31	32
SYSTEM-TYPE	TEMDEV VAR G1	TEMDEV VAR G2	TEMDEV VAR G3	TEMDEV SIG-MAG	IND UNIT AIR TEMP	HEAT TO ZONE T	COOL TO ZONE T	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				

Legend:

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V-L No.	33	34	35	36	37	38	39	40
SYSTEM-TYPE	COOLING BY COILS	UNIT SUP TEMP	UNIT HEATING	UNIT COOLING	UNIT FAN KW	UNIT MIX TEMP	UNIT WR OR TC	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 RESVVT	A	N	N	N	N	N	N	N

V-L No.	41	42	43	44	45	46	47	48
SYSTEM-TYPE	UNIT COIL HUM	UNIT OA-RATIO	UNIT LAT COOL	UNIT COOL PLR	UNIT HEAT PLR	UNIT EIR	UNIT WETBULB	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 RESVVT	N	N	N	N	N	N	N	N

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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:

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D = Used for program code debugging only
S = System (or configuration) dependent

VARIABLE-TYPE = U-name of SYSTEM

Variable-List Number	Variable in FORTRAN Code	Description
1	TH	Temperature of air leaving the heating coil - hot deck temperature (F)
2	TC	Temperature of air leaving cooling coil - cold deck temp (F)
3	TM	Temperature of air entering coil (F)
4	TR	Return air temp on the downstream side of the return fan and plenums (F)
5	QH	Total central heating coil energy input (Btu/hr)
6	QC	Total central cooling coil energy input (Btu/hr)
7	QHZ	Total zone heating energy input (Btu/hr)
8	QCZ	For SYSTEM:TYPE = RESYS this is the cooling by natural ventilation
9	QHB	Total baseboard heating energy input (Btu/hr)
10	QHP	Total preheat coil energy input (Btu/hr)
11	QHUM	Humidification energy input (for RESYS and RESVVT: electrical resistance heat load) (Btu/hr)
12	QDHUM	Sensible dehumidification reheat input (for RESYS and RESVVT: defrost load) (Btu/hr)
13	TCMIN	minimum temperature air handler could supply (F)
14	THMAX	maximum temperature air handler could supply (F)
15	QLSUM	Total system latent heat load from LOADS (Btu/hr)
16	QPSUM	Total system light heat to return (Btu/hr)
17	CFM	Total system supply air flow rate (cfm)
18	CFMH	Total system hot supply air flow rate (DDS, MZS, PMZS) (cfm)
19	CFMC	Total system cold supply air flow rate (DDS, MZS, PMZS) (cfm)
20	RCFM	Total system return air flow rate (cfm)
21	ECFM	Total system exhaust air flow rate (cfm)
22	CINF	Outside air infiltration rate (cfm)
23	FON	Fan on/off flag(1 = on, 0 = off, -1 cannot cycle on for NIGHT-CYCLE-CTRL)
24	HON	Heating on/off flag (1 = on, 0 = off)
25	CON	Cooling on/off flag (1 = on, 0 = off)
26	BON	Baseboard heater on-off flag (ratio from RESET-SCHEDULE)
27	CONS(1)	In the equation Q = CONS(1) * CFM * ΔT, CONS(1) = 0.24 + 0.44 * HUMRAT) * 60.0/V(*DBT, HUMRAT, PATM) = 1.08 at standard conditions
28	CONS(2)	In the equation Q = CONS(2) * CFM * DW, CONS(2) = 1061.0 * 60.0/V(*DBT, HUMRAT, PATM) = 4790 at standard conditions

Variable-List Number	Variable in FORTRAN Code	Description
29	CONS(3)	Conversion factor for fan pressure to kW: CONS(3) = 0.3996/CONS(1), = 0.363 at standard conditions
30	PH	For dual duct systems: ratio of hot duct flow to total flow
31	PC	For dual duct systems: ratio of cold duct cfm to total cfm
32	SKW	Hourly total electrical consumption (kW)
33	FANKW	Total of supply fan, return fan, and exhaust fan electrical consumption
34	DTREC	Makeup air temperature obtainable from recovery system (F)
35	WR	Return air humidity ratio (lb H_20/lb dry air)
36	WM	Mixed air humidity ratio (lb H_20/lb dry air)
37	WCOIL	Humidity ratio of air leaving cooling coil (lb h_20/lb dry air)
38	WW	Moisture added or removed from air for (de)humidification (lb h_20/lb dry air)
39	PO	Ratio of outside air flow to total supply air flow
40	D	Density of air x 60 min/hr (lb/ft^3 x min/hr)
41	FTEMP	Temperature of circulating fluid for HP system (F)
42	TCR	Effect of controller on cooling coil setpoint (F)
43	QHR	Adjusted capacity of heat pump this hour for RESYS, RESVVT, and PTAC (Btu/hr)
44	QCR	Unused
45	SGAS	Total gas heating (Btu/hr)
46	SKWQH	Electrical input to heating (kW)
47	SKWQC	Electrical input to cooling (kW)
48	QCLAT	Latent part of total cooling (Btu/hr)
49	SFKW	Supply fan electrical (kW)
50	RFKW	Return fan electrical (kW)
51	FONNGT	If system can be cycled on at night, = -1 for heating, = 0 for no cycle, = +1 for cooling
52	WSURF	Humidity retio at saturation at coil surface temperature
53	WSURFM	WSURF for coil temperature TSURFM
54	TSURF	Coil surface temperature at supply setpoint (F)
55	TSURFM	Minimum obtainable surface temp for humidity control F)
56	CBF	Coil bypass factor: (COIL-BF) * CBF1 * CBF2
57	CBF1	Temperature correction to COIL-BF
58	CBF2	Cfm correction to COIL-BF

Variable-List Number	Variable in FORTRAN Code	Description
59	SOIL	Oil consumption by system (Btu/hr)
60	PLRCFM	(Current hour cfm)/(design cfm)
61	PLRC	Capacity part load ratio for cooling
62	PLRH	Capacity part load ratio for heating
63	QCM1	Temperature correction to COOLING-CAPACITY
64	QCM2	Temperature correction to COOL-SH-CAP
65	QHM1	Temperature correction to HEATING-CAPACITY
66	EIRM1	Temperature correction to COOLING-EIR
67	EIRM2	Part load correction to COOLING-EIR
68	EIR	(COOLING-EIR) * EIRM1 * EIRM2 (Btu/Btu)
69	OFKW	Outside fan power (kW)
70	QCT	Total cooling capacity (Btu/hr)
71	QCS	Sensible cooling capacity (Btu/hr)
72	WRMAX	Maximum humidity setpoint (lb H20/lb)
73	WRMIN	Minimum humidity setpoint (dry air)
74	CFMRAT	Mafximum ratio of zone cfm that can be obtained this hour (mainly for COINCIDENT-sized fans)
75	QdistG	Heat gains to DUCT&PIPE-ZONE from pipes and ducting
76	QdistL	Heat losses from DUCT&PIPE-ZONE from pipes and ducting
77	RON	Heat recovery on/off (0/1) flag
78*	QHT	The total heating capacity (Btu/hr) Note: this variable does not apply to SUM, FPH, or any zonal SYSTEM-TYPE.
79*	TPOMIN	The mixed air temperature for minimum OA damper position (percent). Note: this variable does not apply to SUM, FPH, or any zonal SYSTEM-TYPE.
80*	POMIN	The minimum OA damper position (percent) Note: this variable does not apply to SUM, FPH, or any zonal SYSTEM-TYPE.
81	QHSUP	The total supplemental heat load for RESYS, RESVVT, PSZ and PTAC (Btu/hr)
82	QRSENS	Sensible heat gain to zone from refrigerated casework (PSZ only) (Btu/hr)
83	QRLAT	Latent heat gain to zone from refrigerated casework (PSZ only) (Btu/hr)
84	QRREC	Energy recovered from condenser and used for space heating in heat recovery mode (PSZ only) (Btu/hr)
85	QRREJ	Energy rejected from condenser (PSZ only) (Btu/hr)
86	RCOMKW	Electrical energy consumed by compressors (PSZ only) (kW)
87	RDEFKW	Electrical energy consumed by defrosters (PSZ only) (kW)
88	RAUXKW	Electrical energy consumed by lights, fans, and anti-sweat heaters in

Variable-List Number	Variable in FORTRAN Code	Description
		refrigerated casework (PSZ only) (kW)
89	ECFMP	Plenum exhaust flow rate (cfm)
90	SCGAS	Gas used for cooling (Btu/hr)
91	QREG	Regeneration energy (Btu/hr)
92	WBR	Return air wetbulb temperature (F)
93-98		Debug variables for PTGSD
99	EFF	Direct evaporative cooler effectiveness
100	DTON	Fraction of hour on
101-111		**Debug variables for PTGSD**
112	DBOA	drybulb temperature of air leaving desiccant or evaporative supplemental cooling unit (F)
113	WOA	humidity ratio of air leaving desiccant or evaporative supplemental unit (lb H_2O/lb air)
114	DGAS	gas used to desiccate the air for integrated (supplemental) units (Btu/hr)
115	DKW	auxiliary electricity used by the integrated(supplemental) desiccant unit (kW)
116	TCOND	temperature of water sent to condenser (DUBLSORB) (F)
117	QCDTOT	total cooling done by desiccant unit (Btu/hr)
118	QCDS	sensible cooling done by desiccant unit (Btu/hr)
119	QCDL	latent cooling done by desiccant unit (Btu/hr)
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 energy (Btu)
126	SHWht	Water heating by service hot water heat pump (Btu/hr)
127	SHWzc	Zone cooling by service hot water heat pump (Btu/hr)
128	SHWen	Energy consumed by service hot water heat pump (Btu/hr)
129-150 for SYSTEM-TYPE=HP and CONDENSER-TYPE=WATER-COOLED only		
129	GPMS	Condenser water flow (GPM)
130	GPMHS	Condenser flow for heating (GPM)
131	GPMCS	Condenser flow for cooling (GPM)
132	QHLUPS	Heat taken from loop (Btu/hr)
133	QCLUPS	Heat added to loop (Btu/hr)

Variable-List Number	Variable in FORTRAN Code	Description
134	WSEGPS	Water-side economizer flow for cooling (not HP) (GPM)
135	QCWSES	Water-side economizer heat added to loop (Btu/hr)
136-138	-	Unused
139	CAPAIR	Heat transport capacity of air side of water-side economizer (Btu/hr-F)
140	CAPWTR	Heat transport capacity of water sied 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
151-154	-	Unused
Variables 155-213 are for HEAT-SOURCE = GAS-HEAT-PUMP or COMPRESSOR-TYPE = VARIABLE SPEED		
		Cooling Mode:
155	QCRUN	Run time of compressor (hours)
156	QCLOAD	Output of unit (Btu/hr)
157	QCGAS	Gas or electricity consumed by unit for cooling (Btu/hr)
158	QCAUX	Fans/Pumps/Aux energy (Btu/hr)
159	QCGSLD	Unmet cooling load (Btu/hr)
160	QCGSUP	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)
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	Load on supp heat (Btu/hr)

Variable-List Number	Variable in FORTRAN Code	Description
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	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	Value of OUTSIDE-FAN-HFLT used this hour
190	HEAT-LOS-FPLR	Value of HEAT-LOS-FPLR used this hour
191	COOL-LOS-FPLR	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
197-203	-	Unused
204	GCAP(1)	Capacity at maximum RPM (Btu/hr)
205	GCAP(2)	Capacity at minimum RPM (Btu/hr)
206	GEDB	Entering mixed air temperature (F)
207	QHDFRG	Gas or electricity used in defrost mode (Btu/hr)
208	GRPM	Speed of compressor (RPM)
209	PLRSUP	PLR of supplemental heating unit
210	PLRCC	PLR in cooling mode

Variable-List Number	Variable in FORTRAN Code	Description
211	CLPLR	Cycling loss PLR
212	CFMVVT	Flow fraction for PVVT
213	QHZHP	Total zone heating load for gas heat pump (Btu/hr)
214	EDB	Condenser entering temperature (evaporative precooler exit temperature) (F)
215	FONh	Hot deck fan on/off
216	SFKWh	Hot deck fan power consumption. Note that item #33 is *total* kw for all fans
217	DTSh	Hot deck air temperature rise
218	CFMRATh	Ratio of hot fan max flow/hourly zonal demand
219	FONNGTh	Hot deck fan on for night cycle
220	RCFMmix	Return flow to mixed air plenum
221	RfanCFM	Air moved by return/relief fan
222	EXFIL	Exfiltration from building pressurization, excluding zonal exhaust
223	DTDUCT	Duct temperature rise/fall due to losses (F)
224	DTDUCTh	Hot duct temperature rise/fall due to losses (for two-duct systems) (F)
225	TCDFSR	Duct air temperature (F)
226	THDFSR	Hot duct air temp (for two duct systems) (F)
227	QRNOW	Display case load at LOADS temperature
228	CRNOW	Display case conductance
229	QR(1)	Lowest temperature display case load
230	QR(2)	Intermediate temperature display case load
231	QR(3)	Highest temperature display case load
232	RQSSCH(1)	Lowest temperature conductance schedule value
233	RQSSCH(3)	Intermediate temperature conductance schedule value
234	RQSSCH(3)	Highest temperature conductance schedule value
235	AUXSCH(1)	Lowest temperature auxiliary schedule value
236	AUXSCH(2)	Intermediate temperature auxiliary schedule value
237	AUXSCH(3)	Highest temperature auxiliary schedule value
238	QSENS(1)	Lowest temperature sensible load
239	QSENS(2)	Intermediate temperature sensible load
240	QSENS(3)	Highest temperature sensible load
241	QLAT(1)	Lowest temperature latent load
242	QLAT(2)	Intermediate temperature latent load
243	QLAT(3)	Highest temperature latent load
244	QDEF(1)	Lowest temperature defrost energy

Variable-List Number	Variable in FORTRAN Code	Description
245	QDEF(2)	Intermediate temperature defrost energy
246	QDEF(3)	Highest temperature defrost energy
247	SWEATKW(1)	Lowest temperature anti-sweat energy
248	SWEATKW(2)	Intermediate temperature anti-sweat energy
249	SWEATKW(3)	Highest temperature anti-sweat energy
250	COMPKW1(1)	Lowest temperature compressor energy, no htrec
251	COMPKW1(2)	Intermediate temperature compressor energy, no htrec
252	COMPKW1(3	Highest temperature compressor energy, no htrec
253	COMPKW2(1)	Lowest temperature compressor energy, htrec
254	COMPKW2(2)	Intermediate temperature compressor energy, htrec
255	COMPKW2(3)	Highest temperature compressor energy, htrec
256	QREC1(1)	Lowest temperature recoverable heat, no htrec
257	QREC1(2)	Intermediate temperature recoverable heat, no htrec
258	QREC1(3)	Lowest temperature recoverable heat, no htrec
259	QREC2(1)	Lowest temperature recoverable heat, htrec
260	QREC2(2)	Intermediate temperature recoverable heat, htrec
261	QREC2(3)	Highest temperature recoverable heat, htrec
262	QREJ1(1)	Lowest temperature condenser heat, no htrec
263	QREJ1(2)	Intermediate temperature condenser heat, no htrec
264	QREJ1(3)	Highest temperature condenser heat, no htrec
265	QREJ2(1)	Lowest temperature condenser heat, htrec
266	QREJ2(2)	Intermediate temperature condenser heat, htrec
267	QREJ2(3)	Highest temperature condenser heat, htrec
268	TcondR	Condenser temperature
269	PLR(1)	Lowest temperature part load ratio
270	PLR(2)	Intermediate temperature part load ratio
271	PLR(3)	Highest temperature part load ratio
272	TREJ1	Total condenser heat, no htrec
273	TREJ2	Total condenser heat, htrec
274	TREC1	Total recoverable heat, no htrec
275	TREC2	Total recoverable heat, htrec
276	EIR1(1)	Lowest temperature electric input ratio, part load correction
277	EIR1(2)	Intermediate temperature electric input ratio, part load correction
278	EIR1(3)	Highest temperature electric input ratio, part load correction
279	EIR1r(1)	Lowest temp electric input ratio, part load correction, htrec mode
280	EIR1r(2)	Intermediate temp electric input ratio, part load corr, htrec mode

Variable-List Number	Variable in FORTRAN Code	Description
281	EIR1r(3)	Highest temp electric input ratio, part load correction, htrec mode
282	EIR2(1)	Lowest temperature electric input ratio, temperature correction
283	EIR2(2)	Intermediate temp electric input ratio, temperature correction
284	EIR2(3)	Highest temperature electric input ratio, temperature correction
285	GPMcw	Condenser water flow, water-cooled
286	FRAC1	Fraction of hour in non-htrec mode
287	FRAC2	Fraction of hour in htrec mode
288	CONDcap	Condenser capacity
289	CONDplr	Condenser fan part load ratio
290	TcondFloat	Condenser temperature when floating above setpoint
291	EIR3	Condenser fan power part load correction factor

VARIABLES BY SYSTEM-TYPE FOR VARIABLE-TYPE = 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:

A = Appropriate
N = Not appropriate
X = Unused
D = Used for program code debugging only
S = System (or configuration) dependent

V-L No.	17	18	19	20	21	22	23	24
SYSTEM-TYPE	TOTAL SYSTEM CFM	TOTAL HOT CFM	TOTAL COLD CFM	RETURN CFM	EXHAUST CFM	INF CFM	FANS ON/OFF	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.	25	26	27	28	29	30	31	32
SYSTEM-TYPE	COOL ON/OFF	BBRDSCH RATIO	CONSTANT (1.08)	CONSTANT (0.689)	CONSTANT (0.363)	HOT AIR FRAC	COLD AIR FRAC	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								

Legend:
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S = System (or configuration) dependent

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								

Legend:

A = Appropriate
N = Not appropriate
X = Unused
D = Used for program code debugging only
S = System (or configuration) dependent

V-L No.	49	50	51	52	53	54	55	56
SYSTEM-TYPE	SUPPLY ELEC	RETURN ELEC	CYCLE ON/H OFF C	SURFACE HUMIDITY	SURFACE MIN HUMIDITY	SURFACE TEMP	SURFACE MIN TEMP	BYPASS FACTOR
SUM	N	N	N	N	A	A	N	N
SZRH	A	A	A	N	A	A	A	A
MZS	A	A	N	N	A	A	A	A
DDS	A	A	N	N	A	A	A	A
SZCI	A	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	A	A	N	N	A	A	N	A
FPIU	A	A	N	N	A	A	N	A
VAVS	A	A	A	N	A	A	N	A
PIU	A	A	A	N	A	A	N	A
RHFS	A	A	A	N	A	A	N	A
HP	A	N	N	N	N	A	A	A
HVSYS	A	A	N	N	A	A	N	N
CBVAV	A	A	A	N	A	A	N	A
RESYS	A	N	N	N	A	A	A	A
PSZ	A	A	A	N	A	A	A	A
PMZS	A	A	A	N	A	A	A	A
PVAVS	A	A	A	N	A	A	A	A
PTAC	N	N	N	N	A	A	A	A
PTGSD	A	A	N	N	A	N	N	A
PVVT	A	A	A	A	A	A	A	A
RESVVT								

V-L No.	57	58	59	60	61	62	63	64
SYSTEM-TYPE	CBF F (WB,DB)	CBF F CFM	HEATING OIL	PLR CFM	PLR COOLING	PLR HEATING	COOL-CAP F (WB, DB)	COOL-SH F (WB,DB)
SUM	N	N	X	N	N	N	N	N
SZRH	A	A	X	A	A	N	A	A
MZS	A	A	X	A	A	N	A	A
DDS	A	A	X	A	A	N	A	A
SZCI	A	A	X	A	A	N	A	A
UHT	N	N	X	N	N	N	N	N
UVT	N	N	X	N	N	N	N	N
FPH	N	N	X	N	N	N	N	N
TPFC	N	N	X	N	N	N	N	N
FPFC	N	N	X	N	N	N	N	N
TPIU	A	A	X	A	A	N	A	A
FPIU	A	A	X	A	A	N	A	A
VAVS	A	A	X	A	A	N	A	A
PIU	A	A	X	A	A	N	A	A
RHFS	A	A	X	A	A	N	A	A
HP	N	N	X	N	N	N	N	N
HVSYS	N	N	X	N	N	N	N	N
CBVAV	A	A	X	A	A	N	A	A
RESYS	A	A	X	A	A	A	A	A
PSZ	A	A	X	A	A	A	A	A
PMZS	A	A	X	A	A	N	A	A
PVAVS	A	A	X	A	A	A	A	A
PTAC	N	N	X	N	N	N	N	N
PTGSD	N	N	X	A	N	N	N	N
PVVT	A	A	X	A	A	A	A	A
RESVVT								

Legend:

A = Appropriate
N = Not appropriate
X = Unused

D = Used for program code debugging only
S = System (or configuration) dependent

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	A	A	A	A	A	A	A	A
RESVVT								

V-L No.	73	74	75	76	77	78	79	80
SYSTEM-TYPE	MIN HUMID SETPOINT	VAV MAX CFM RATE	ITEM	NOT USED	NOT USED	HEATING CAPACITY	TEMP AT MIN OA	MIN OA EST
SUM	N	N	N	X	X	N	N	N
SZRH	A	A	N	X	X	A	A	A
MZS	A	A	S	X	X	A	A	A
DDS	A	A	S	X	X	A	A	A
SZCI	A	N	N	X	X	A	A	A
UHT	N	N	N	X	X	N	N	N
UVT	N	N	N	X	X	N	N	N
FPH	N	N	N	X	X	N	N	N
TPFC	N	N	N	X	X	N	N	N
FPFC	N	N	N	X	X	N	N	N
TPIU	A	N	N	X	X	A	A	A
FPIU	A	N	N	X	X	A	A	A
VAVS	A	A	N	X	X	A	A	A
PIU	A	A	N	X	X	A	A	A
RHFS	A	A	N	X	X	A	A	A
HP	N	N	N	X	X	N	N	N
HVSYS	A	N	N	X	X	A	A	A
CBVAV	A	N	N	X	X	A	A	A
RESYS	A	N	A	X	X	N	N	N
PSZ	A	A	N	X	X	A	A	A
PMZS	A	A	S	X	X	A	A	A
PVAVS	A	A	N	X	X	A	A	A
PTAC	A	N	N	X	X	N	N	N
PTGSD	N	N	N	X	X	N	N	A
PVVT	A	A	N	X	X	A	A	A
RESVVT								

Legend:
A = Appropriate
N = Not appropriate
X = Unused
D = Used for program code debugging only
S = System (or configuration) dependent

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	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	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	N	N	N	N	N	N	N
PTAC	A	N	N	N	N	N	N	N
PTGSD	N	N	N	N	N	N	N	N
PVVT	A	N	N	N	N	N	N	N
RESVVT								

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
N = Not appropriate
X = Unused
D = Used for program code debugging only
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							

Legend:

A = Appropriate
N = Not appropriate
X = Unused
D = Used for program code debugging only
S = System (or configuration) dependent

VARIABLE-TYPE = 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
11	QHMP	Main coil heating load (Btu/hr)
12	TMP	Main coil average entering temperature (F)
13	CFMP	Main coil flow rate (cfm)
14	QHPP	Preheat coil heating load (Btu/hr)
15	CFMPP	Preheat coil flow rate (if in outside air duct) (cfm)
16	QHZP	Zone coil load (Btu/hr)
17	TZP	Zone coil average entering temperature (F). Loop temperature for HP or zone temperature for RESYS.
18	CFMZP	Zone coil flow rate (cfm)
19	QHBP	Baseboard load (Btu/hr); includes HP load for loop.
20	-	unused
21	QRECP	Desiccant unit regeneration energy (Btu/hr).
22	TCONDP	Desiccant unit condenser temperature (F).

VARIABLES BY SYSTEM-TYPE FOR VARIABLE-TYPE = 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	11	12	13	14	15	16
SYSTEM-TYPE	UNUSED	UNUSED	MAIN HC CBS LOAD	MAIN HC CBS TEMP	PREHEAT CBS LOAD	PREHEAT CBS LOAD	PREHEAT CBS CFM	ZONE HEAT CBS LOAD
SUM	X	X	X	X	X	X	X	X
SZRH	X	X	X	X	X	X	X	X
MZS	X	X	X	X	X	X	X	X
DDS	X	X	X	X	X	X	X	X
SZCI	X	X	X	X	X	X	X	X
UHT	X	X	X	X	X	X	X	X
UVT	X	X	X	X	X	X	X	X
FPH	X	X	X	X	X	X	X	X
TPFC	X	X	X	X	X	X	X	X
FPFC	X	X	X	X	X	X	X	X
TPIU	X	X	X	X	X	X	X	X
FPIU	X	X	X	X	X	X	X	X
VAVS	X	X	X	X	X	X	X	X
PIU	X	X	X	X	X	X	X	X
RHFS	X	X	X	X	X	X	X	X
HP	X	X	X	X	X	X	X	X
HVSYS	X	X	X	X	X	X	X	X
CBVAV	X	X	X	X	X	X	X	X
RESYS	X	X	X	X	X	X	X	X
PSZ	X	X	X	X	X	X	X	X
PMZS	X	X	X	X	X	X	X	X
PVAVS	X	X	X	X	X	X	X	X
PTAC	X	X	X	X	X	X	X	X
PVVT	X	X	X	X	X	X	X	X
PTGSD								
RESVVT								

Legend:

A = Appropriate
N = Not appropriate
X = Unused
D = Used for program code debugging only
S = System (or configuration) dependent

V-L No.	17	18	19	
SYSTEM-TYPE	ZONE HEAT CBS TEMP	ZONE HEAT CBS CFM	BBRD CBS LOAD	
SUM	X	X	X	X
SZRH	X	X	X	X
MZS	X	X	X	X
DDS	X	X	X	X
SZCI	X	X	X	X
UHT	X	X	X	X
UVT	X	X	X	X
FPH	X	X	X	X
TPFC	X	X	X	X
FPFC	X	X	X	X
TPIU	X	X	X	X
FPIU	X	X	X	X
VAVS	X	X	X	X
PIU	X	X	X	X
RHFS	X	X	X	X
HP	X	X	X	X
HVSYS	X	X	X	X
CBVAV	X	X	X	X
RESYS	X	X	X	X
PSZ	X	X	X	X
PMZS	X	X	X	X
PVAVS	X	X	X	X
PTAC	X	X	X	X
PVVT	X	X	X	X
PTGSD				
RESVVT				

Legend:

A = Appropriate
N = Not appropriate
X = Unused
D = Used for program code debugging only
S = System (or configuration) dependent

VARIABLE-TYPE = U-name of 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

Variable-List Number	Variable in FORTRAN Code	Description
34	PipeHead	Head due to loop friction (excluding coils, chillers, etc.)
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 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		unused
49		unused
50		unused

VARIABLE-TYPE = U-name of 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

VARIABLE-TYPE = U-name of 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	ECT	Entering condenser 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	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)

VARIABLE-TYPE = U-name of 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		unused
22		unused
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

VARIABLE-TYPE = U-name of 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		unused
10		unused
11		unused
12		unused
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

VARIABLE-TYPE = U-name of 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	ForcePump	Flag indicating equipment pump must run, even if no load
30		unused
31		unused
32		unused
33		unused

34	unused
35	unused
36	unused

VARIABLE-TYPE = U-name of 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		unused
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

VARIABLE-TYPE = U-name of 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

VARIABLE-TYPE = U-name of 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

VARIABLE-TYPE = U-name of 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	<fm;CogenSurplus>	End-use, generator surplus
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

VARIABLE-TYPE = U-name of 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	<sm;CogenSurplus>	End-use, generator surplus
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

VARIABLE-TYPE = U-name of 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

VARIABLE-TYPE = U-name of 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