

Appendix F

BASIC BDL SUMMARY

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INTRODUCTION

This *Basic BDL Summary* contains only a partial list of commands and keywords found in the DOE-2 Building Description Language (BDL). Information contained herein is considered appropriate for the beginning DOE-2 user. A complete list of all commands and keywords can be found in the *BDL Summary (2.1E)*. A discussion of commands and keywords can be found in the *Reference Manual (2.1A)*, and the *Supplement (2.1E)*.

COMMAND(abbrev.,max allowed) [comments]

- **KEYWORD**(abbrev.)(**default**;range and dimension)
KEYWORD(abbrev.)(**default**;range and dimension)
KEYWORD(abbrev.)(**default**;range and dimension)

About Commands and Keywords

•	indicates a required keyword
Suggested Inputs	To indicate their relative importance, we have bold-faced certain keywords that are most commonly used.
=	in front of a command means that a u-name is mandatory
(=)	in front of a command means that a u-name is optional Otherwise no u-name is permitted
LIKE	Unless otherwise noted, the LIKE keyword is permitted for each command.
Default Values	For easier reference, the default values of all keywords are bold-faced. Some keywords are shown with a long dash (—) as the default instead of a given value; in these cases, the user must define the value.
Terminator	A two-dot terminator, (..), is required to end each input. If a comment is to follow the terminator, put a space between the terminator and the comment.

LOADS SUMMARY

INPUT LOADS Required for Loads input

TITLE(5) LINE-n *Up to 40 characters enclosed by asterisks*
where n=1,2,...,5

[Note: In SYSTEMS, PLANT, and ECONOMICS, lines may be replaced, up to an overall total of 5.
Also, any particular LINE-n may be substituted for lines input in LOADS by using TITLE command
followed by LINE-n *changed text*, where n is the line to be changed.]

ABORT(ERRORS;ERRORS, WARNINGS, CAUTIONS)

DIAGNOSTIC(LIST) takes up to six optional code-words
WARNINGS;ERRORS, WARNINGS, CAUTIONS, DEFAULTS, COMMENTS
(default;options) is as follows:
ECHO;ECHO, NO-ECHO

RUN-PERIOD(1) Required for LOADS input

BUILDING-LOCATION(B-L,1)
LATITUDE(LAT)(*; -66.5 to 66.5°)
LONGITUDE(LON)(*; -180.0 to 180.0°)
ALTITUDE(ALT)(0.0; -1000.0 to 20000.0 ft)
TIME-ZONE(T-Z)(*; -12 to (all integers))
GROSS-AREA(G-A)(**; 0.0 to 10⁷ ft²)
AZIMUTH(AZ)(0.0; -360.0 to 360.0°)
HOLIDAY(HOL)(YES; YES, NO)
DAYLIGHT-SAVINGS(D-S)(YES; YES, NO)
GROUND-T(G-T)(***; -100.0 to 150.0°F)
CLEARNESS-NUMBER(C-N)(***; 0.5 to 1.2)

[Note: HOL = YES ~ U.S. Holidays assumed; HOL = NO ~ no holidays assumed]

[Note: D-S = YES ~ Daylight Savings correction; D-S = NO ~ no Daylight Savings correction]

- * Default is taken from the weather file
- ** Defaults to net area, i.e., the sum of areas of all conditioned SPACE's.
- *** Takes a list of twelve values; one per month. Default is taken from the weather file.

= GLASS-TYPE(G-T,32)
PANES(P)(1; 1 to 3) (all integers)
• SHADING-COEF(S-C)(-; 0.0 to 1.0)
GLASS-CONDUCTANCE(G-C)(*; 0.0 to 10.0 Btu/hr-ft²-°F)

- * See page 2.14 of this manual for GLASS-CONDUCTANCE defaults.
[For typical values, see Chapter 27 of the ASHRAE Handbook of Fundamentals, 1989.]

= DAY-SCHEDULE(D-SCH,300)

(see example below)

[Note: All 24 hours must be accounted for]

In its simplest form, the input for DAY-SCHEDULE takes the form:

U-NAME = DAY-SCHEDULE (hours covered) (values for each hour) ..

For example, for weekdays:

LTG-1 = DAY-SCHEDULE (1,24) (0,0,0,0,0,0,0,0,3,6,8,1,1,1,1,1,1,0,0,0,0,0) ..

Optionally, this can be shortened by writing:

LTG-1 = DAY-SCHEDULE (1,8)(0) (9,11) (.3,.6,8) (12,18) (1) (19,24) (0) ..

For week-ends and holidays:

LTG-2 = DAY-SCHEDULE (1,24)(0) ..

= WEEK-SCHEDULE(W-SCH,200)

(see example below)

[Note: Code-word for days of week and holidays is first three letters of name.

ALL ~ Monday thru Sunday + Holidays; WEH ~ weekends + Holidays; and WD ~ weekdays]

[Note: Must preserve order of Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, Holiday]

[Note: All days of week + Holiday must be accounted for]

In its simplest form, the input for WEEK-SCHEDULE takes the form:

U-NAME = WEEK-SCHEDULE (†) (U-NAME of DAY-SCHEDULE referenced) ..

† days of week covered

Using the previously defined DAY-SCHEDULEs LTG-1 and LTG-2, the example can be carried forward with:

**NORMAL = WEEK-SCHEDULE (MON,FRI) LTG-1
(SAT,HOL) LTG-2 ..**

VACATION = WEEK-SCHEDULE (ALL) LTG-2 ..

Optionally, NORMAL can be shortened to:

NORMAL = WEEK-SCHEDULE (WD) LTG-1 (WEH) LTG-2 ..

where (WD) stands for week-days and (WEH) for week-ends and holidays.

If Saturday is considered part of the normal week, you must write

(MON,SAT) LTG-1 (SUN,HOL) LTG-2.

= SCHEDULE(SCH,100) [Note: LIKE keyword not allowed]

(see example below)

[Note: Every day of run period must be accounted for]

[Note: Code-word for month is first three letters of month name]

[Note: A maximum of 52 THRU's per command]

In its simplest form, the input for SCHEDULE takes the form:

U-NAME = SCHEDULE(THRU †)(U-NAME of WEEK-SCHEDULE referenced) ..
 † calendar period covered

To finalize the example:

LIGHTS = SCHEDULE THRU JUN 10 NORMAL
THRU SEP 5 VACATION
THRU DEC 31 NORMAL ..

Alternatively, explicit use of DAY-SCHEDULE and WEEK-SCHEDULE can be bypassed by writing:

LIGHTS = SCHEDULE THRU JUN 10 (WD)(1,8)(0)(9,11)(.3,.6,.8)(12,18)(1)(19,24)(0)(WEH)(1,24)(0)
THRU SEP 5 (ALL)(1,24)(0)
THRU DEC 31 (WD) (1,8)(0)(9,11)(.3,.6,.8)(12,18)(1)(19,24)(0)(WEH)(1,24)(0) ..

= LAYERS(LA,16) *
• MATERIAL(MAT) **
THICKNESS(TH) ***
INSIDE-FILM-RES(I-F-R)(0.68;0.0 to 40.0 hr-ft²-°F/Btu)

- * LIKE keyword not allowed
- ** Value must be a list of either the u-names of MATERIALs or code-words from the Materials Library; see Appendix D. Also, list the materials (a maximum of 9) from outside to inside; don't specify inside or outside air film as a material
- *** THICKNESS must be specified if any thickness is different from those specified in MATERIAL commands or Materials Library. Order of list must correspond to list following MATERIALs

= CONSTRUCTION(CONS,64)
• LAYERS(LA) u-name or code-word
or
• U-VALUE(U)(—;0.0 to 20.0 Btu/hr-ft²-°F)*
ABSORPTANCE(ABS)(0.7;0.0 to 1.0)**
ROUGHNESS(RO)(3;1 to 6) (all integers)**

- * For interior surfaces, includes resistance of both air films;
for exterior surfaces, includes inside film resistance, but not outside film resistance.
- ** See pages 2.11-12 for ABSORPTANCE and ROUGHNESS values.
Not used for interior walls, underground walls, or underground floors

= SPACE-CONDITIONS(S-C,50)

PEOPLE-SCHEDULE(P-SCH) u-name

NUMBER-OF-PEOPLE(N-O-P)(0.0;0.0 to 10000.0)

AREA/PERSON(A/P)(100.0;0.0 to 10000.0ft²)[Used only if NUMBER-OF-PEOPLE not specified]

PEOPLE-HEAT-GAIN(P-H-G)(0.0;350.0 to 2000.0 Btu/hr-pers)†

or

PEOPLE-HG-LAT(P-H-L)(0.0;0.0 to 2000.0 Btu/hr-pers)†

and

PEOPLE-HG-SENS(P-H-S)(0.0;0.0 to 2000.0 Btu/hr-pers)†

LIGHTING-SCHEDULE(L-SCH) u-name

LIGHTING-TYPE(L-T)(SUS-FLUOR; Options are: SUS-FLUOR,
REC-FLUOR-RV, REC-FLUOR-RSV, REC-FLUOR-NV, and INCAND.)

LIGHTING-W/SQFT(L-W)(0.0;0.0 to 10.0 W/ft²) [If both specified, contribution is added.]

or

LIGHTING-KW(L-KW)(0.0;0.0 to 200.0 kW)[If both specified, contribution is added.]

LIGHT-TO-SPACE(L-T-S)(*;0.0 to 1.0)

TASK-LIGHT-SCH(T-L-SCH) u-name

TASK-LT-W/SQFT(T-L-W)(0.0;0.0 to 10.0 W/ft²)[If both specified, contribution is added.]

or

TASK-LIGHTING-KW(T-L-KW)(0.0;0.0 to 200.0 kW)[If both specified, contribution is added.]

EQUIP-SCHEDULE(E-SCH) u-name

EQUIPMENT-W/SQFT(E-W)(0.0;0.0 to 100.0 W/ft²) [If both specified, contribution is added.]

or

EQUIPMENT-KW(E-KW)(0.0;0.0 to 200.0 kW)[If both specified, contribution is added.]

EQUIP-SENSIBLE(E-S)(1.0;0.0 to 1.0)

EQUIP-LATENT(E-L)(0.0;0.0 to 1.0)

SOURCE-SCHEDULE(S-SCH) u-name

SOURCE-TYPE(S-T)(GAS;GAS,ELECTRIC,HOT-WATER,PROCESS)

SOURCE-BTU/HR(S-B)(0.0;-1000000.0 to 1000000.0 Btu/hr)

SOURCE-SENSIBLE(S-S)(1.0;-1.0 to 1.0)

SOURCE-LATENT(S-L)(0.0;0.0 to 1.0)

TEMPERATURE(T)((70.0);0.0 to 120.0°F) (list of 1)

FLOOR-WEIGHT(F-W)(70.0;0.0 to 200.0 lb/ft²)

INF-SCHEDULE(I-SCH) u-name **

INF-METHOD(I-M)(NONE;NONE,CRACK,AIR-CHANGE,RESIDENTIAL,S-G) **

AIR-CHANGES/HR(A-C)(0.0;0.0 to 30.0) [If both specified, contribution is added.] **

or

INF-CFM/SQFT(I-CFM)(0.0;0.0 to 20.0 cfm/ft²)[If both specified, contribution is added.] **

RES-INF-COEF(R-I-C)((0.252,0.0251,0.0084);0.0 to 20.0, mixed units) **

* See the table below, "Default Table for LIGHTING-TYPES"

** See the table on the next page, "Default Table for INF-METHODs"

† If no value is input, there is no contribution from people. If all are specified, the contribution is cumulative.

Default Table for LIGHTING-TYPES

KEYWORD	SUS- FLUOR	REC- FLUOR-RV	REC- FLUOR-RSV	INCAND	REC- FLUOR-NV
LIGHT-TO-SPACE	1.0	0.8	0.8	1.0	1.0

KEYWORD	Default Table for INF-METHODs				
	NONE	AIR-CHANGE		CRACK	RESI-DENTIAL
		With wind correction	Without wind correction		
AIR-CHANGES/HR	not used	required	not used	not used	not used
INF-CFM-SQFT	not used	not used	required	not used	not used
INF-SCHEDULE	not used	†	†	†	†
RES-INF-COEF	not used	not used	not used	not used	‡
† If not specified, always on ‡ If not specified, takes default value					
* This keyword is input under the EXTERIOR-WALL, DOOR, and WINDOW commands. [Note: For INF-METHOD= RESIDENTIAL, wind and temperature dependence is given through the RES-INF-COEF keyword.]					

= SPACE(S,128)
 • AREA(A)(—;0.0+ to 100000.0 ft²)
 • VOLUME(V)(—;0.0 to 10⁶ ft³)
 FLOOR-MULTIPLIER(F-M)(1.0;1.0 to 200.0)
 SPACE-CONDITIONS(S-C) u-name §

§ Any keyword from this subcommand may be placed in the SPACE command.

(=) EXTERIOR-WALL(E-W) or ROOF(300)
 • HEIGHT(H)(—;0.0 to 2000.0 ft)
 • WIDTH(W)(—;0.0 to 2000.0 ft)
 • CONSTRUCTION(CONS) u-name
 AZIMUTH(AZ)(0.0;—360.0 to 360.0°)
 TILT(90.0;0.0 to 180.0°) [Tilt for ROOF must be input, otherwise it will default to 90°]
 MULTIPLIER(M)(1.0;0.0 to 99.0)
 GND-REFLECTANCE(G-R)(0.2;0.0 to 1.0) [See page 2.25 for typical values.]

(=) INTERIOR-WALL(I-W,512)
 • AREA(A)(—;0.0 to 100000.0 ft²)
 • CONSTRUCTION(CONS) u-name
 NEXT-TO(N-T) u-name of adjacent SPACE

(=) UNDERGROUND-WALL(U-W) or UNDERGROUND-FLOOR(U-F)(64)
 • AREA(A)(—;0.0 to 100000.0 ft²)
 • CONSTRUCTION(CONS) u-name

(=) WINDOW(WI)(200)

- HEIGHT(H)(—;0.0 to 40.0 ft)
- WIDTH(W)(—;0.0 to 1000.0 ft)
- GLASS-TYPE(G-T) u-name
 - SETBACK(SETB)(0.0;0.0 to 10.0 ft) [Unused for interior windows]
 - SHADING-SCHEDULE(S-SCH) u-name
 - MAX-SOLAR-SCH(M-S-SCH) u-name
 - CONDUCT-SCHEDULE(C-SCH) u-name
 - CONDUCT-TMIN-SCH(C-T-SCH) u-name
 - OVERHANG-A(OH-A)(0.0;no limits - ft) [Unused for interior windows]
 - OVERHANG-B(OH-B)(0.0;no limits - ft) [Unused for interior windows]
 - OVERHANG-W(OH-W)(0.0;0.0 to no limits - ft) [Unused for interior windows]*
 - and*
 - OVERHANG-D(OH-D)(0.0;0.0 to no limits - ft) [Unused for interior windows]*
 - OVERHANG-ANGLE(OH-ANG)(90.0;0.0 to 180°) [Unused for interior windows]
 - LEFT-FIN-A(L-F-A)(0.0;no limits - ft) [Unused for interior windows]
 - LEFT-FIN-B(L-F-B)(0.0;no limits - ft) [Unused for interior windows]
 - LEFT-FIN-H(L-F-H)(0.0;0.0 to no limits - ft) [Unused for interior windows]*
 - and*
 - LEFT-FIN-D(L-F-D)(0.0;0.0 to no limits - ft) [Unused for interior windows]*
 - RIGHT-FIN-A(R-F-A)(0.0;no limits - ft) [Unused for interior windows]
 - RIGHT-FIN-B(R-F-B)(0.0;no limits - ft) [Unused for interior windows]
 - RIGHT-FIN-H(R-F-H)(0.0;0.0 to no limits - ft) [Unused for interior windows]*
 - and*
 - RIGHT-FIN-D(R-F-D)(0.0;0.0 to no limits - ft) [Unused for interior windows]*

* Either both or neither of these should be specified. If not specified, shading calculation will not be done.

(=) DOOR(64)

- HEIGHT(H)(—;0.0 to 40.0 ft)
- WIDTH(W)(—;0.0 to 1000.0 ft)
- CONSTRUCTION(CONS) u-name of a quick-type (U-value) CONSTRUCTION
- SETBACK(SETB)(0.0;0.0 to 10.0 ft)
- OVERHANG-A(OH-A)(0.0;no limits - ft)
- OVERHANG-B(OH-B)(0.0;no limits - ft)
- OVERHANG-W(OH-W)(0.0;0.0 to no limits - ft)*
- and*
- OVERHANG-D(OH-D)(0.0;0.0 to no limits - ft)*
- OVERHANG-ANGLE(OH-ANG)(90.0;0.0 to 180°)
- LEFT-FIN-A(L-F-A)(0.0;no limits - ft)
- LEFT-FIN-B(L-F-B)(0.0;no limits - ft)
- LEFT-FIN-H(L-F-H)(0.0;0.0 to no limits - ft)*
- and*
- LEFT-FIN-D(L-F-D)(0.0;0.0 to no limits - ft)*
- RIGHT-FIN-A(R-F-A)(0.0;no limits - ft)
- RIGHT-FIN-B(R-F-B)(0.0;no limits - ft)
- RIGHT-FIN-H(R-F-H)(0.0;0.0 to no limits - ft)*
- and*
- RIGHT-FIN-D(R-F-D)(0.0;0.0 to no limits - ft)*

* Either both or neither of these should be specified. If not specified, shading calculation will not be done.

LOADS-REPORT(L-R,1)
 VERIFICATION(V)((—);LV-A,LV-B,...,LV-M)
 SUMMARY(S)((LS-D);LS-A,LS-B,...,LS-L)

END
 Required at end of LOADS input and before FUNCTION command, if specified.

COMPUTE LOADS
 Required to do Loads simulation