

§ 434.513

10 CFR Ch. II (1–1–10 Edition)

TABLE 512.2.B—MULTI-FAMILY HIGH RISE RESIDENTIAL BUILDING SCHEDULES-TWO-ZONE DWELLING UNIT—Continued

[Internal loads per dwelling unit Btu/h]

Hour	Bedrooms & bathrooms					Other rooms				
	Occupants		Lights	Equipment		Occupants		Lights	Equipment	
	Sensible	Latent	Sensible	Sensible	Latent	Sensible	Latent	Sensible	Sensible	Latent
5	300	260	0	750	110					
6	300	260	0	750	110					
7	300	260	0	750	110					
8	210	260	980	1250	190					
9	100	80	840	2600	420					
10	100	80	0	1170	180					
11	100	80	0	1270	190					
12	100	80	0	2210	330					
13	100	80	0	2210	330					
14	100	80	0	1270	190					
15	100	80	0	1270	190					
16	100	80	0	1270	190					
17	100	80	0	1270	190					
18	300	260	0	3040	450					
19	300	260	0	3360	500					
20	300	260	960	1490	220					
21	300	260	960	1490	220					
22	300	260	960	1490	220					
23	300	260	960	1060	160					
24	300	260	960	1060	160					

TABLE 512.2.B—MULTI-FAMILY HIGH RISE RESIDENTIAL BUILDING SCHEDULES-TWO-ZONE DWELLING UNIT

[Internal loads per dwelling unit Btu/h]

Hour	Bedrooms & bathrooms					Other rooms				
	Occupants		Lights	Equipment		Occupants		Lights	Equipment	
	Sensible	Latent	Sensible	Sensible	Latent	Sensible	Latent	Sensible	Sensible	Latent
1	300	260	0	100	20	0	0	0	650	90
2	300	260	0	100	20	0	0	0	650	90
3	300	260	0	100	20	0	0	0	650	90
4	300	260	0	100	20	0	0	0	650	90
5	300	260	0	100	20	0	0	0	650	90
6	300	260	0	100	20	0	0	0	650	90
7	200	180	680	200	40	100	80	300	1050	150
8	110	120	240	200	40	100	80	600	2400	380
9	0	0	0	100	20	100	80	0	1070	160
0	0	0	0	100	20	100	80	0	1170	170
0	0	0	0	100	20	100	80	0	1170	170
0	0	0	0	100	20	100	80	0	2110	310
0	0	0	0	100	20	100	80	0	2110	310
14	0	0	0	100	20	100	80	0	1170	170
15	0	0	0	100	20	100	80	0	1170	170
16	0	0	0	100	20	100	80	0	1170	170
17	0	0	0	100	20	100	80	0	1170	170
18	0	0	0	100	20	300	260	0	2940	430
19	0	0	0	100	20	300	260	0	3260	480
20	100	80	320	300	60	200	180	640	1190	160
21	100	80	320	300	60	200	180	640	1190	160
22	150	130	480	700	90	150	130	480	790	130
23	300	260	640	410	70	0	0	320	650	90
24	300	260	640	410	70	0	0	320	650	90

§ 434.513 Occupancy.

5131 Occupancy schedules are default assumptions. The same assumptions shall be made in computing De-

sign Energy Consumption as were used in calculating the Energy Cost Budget.

513.2 Table 513.2.a, Occupancy Density, establishes the density, in ft² per person of conditioned floor area, to be

Department of Energy

§ 434.513

used for each building type. Table 513.2.b, Building Schedule Percentage Multipliers, establishes the percentage of total occupants in the building by hour of the day for each building type.

TABLE 513.2.A—OCCUPANCY DENSITY

Building type	Conditioned floor area Ft ² person
Assembly	50
Office	275
Retail	300

TABLE 513.2.A—OCCUPANCY DENSITY—Continued

Building type	Conditioned floor area Ft ² person
Warehouse	15000
School	75
Hotel/Motel	250
Restaurant	100
Health/Institutional	200
Multi-family High-rise Residential	2 per unit . ¹

¹ Heat generation: Btu/h per person: 230 Btu/h per person sensible, and 190 Btu/h per person latent. See Tables 512.2 a and b.

TABLE 513.2.b
BUILDING SCHEDULE PERCENTAGE MULTIPLIERS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
L-ASSEMBLY																								
WEEKDAY:	0	0	0	0	0	0	0	0	20	20	20	20	80	80	80	80	80	80	20	20	20	20	0	0
SATURDAY:	0	0	0	0	0	0	0	0	20	20	20	20	60	60	60	60	60	60	60	60	60	60	0	0
SUNDAY:	0	0	0	0	0	0	0	0	10	10	10	10	70	70	70	70	70	70	70	70	70	70	0	0
WEEKDAY:	0	0	0	0	0	0	40	40	40	75	75	75	75	75	75	75	75	75	75	75	75	75	0	0
SATURDAY:	0	0	0	0	0	0	30	30	30	50	50	50	50	50	50	50	50	50	50	50	50	50	0	0
SUNDAY:	0	0	0	0	0	0	30	30	30	30	30	30	65	65	65	65	65	65	65	65	65	65	0	0
WEEKDAY:	Off	Off	Off	Off	Off	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	Off	Off
SATURDAY:	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
SUNDAY:	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
WEEKDAY:	0	0	0	0	0	0	0	0	5	5	5	35	5	5	5	5	5	5	0	0	0	0	0	0
SATURDAY:	0	0	0	0	0	0	0	0	5	5	5	20	0	0	0	0	0	0	0	65	30	0	0	0
SUNDAY:	0	0	0	0	0	0	0	0	5	5	5	10	0	0	0	0	0	0	0	65	30	0	0	0
2-OFFICE																								
WEEKDAY:	0	0	0	0	0	0	0	10	20	95	95	45	45	95	95	95	95	95	30	10	10	10	0	0
SATURDAY:	0	0	0	0	0	0	0	10	10	30	30	30	30	10	10	10	10	10	0	0	0	0	0	0
SUNDAY:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEEKDAY:	0	0	0	0	0	0	10	30	90	90	90	80	90	90	90	90	90	90	30	30	20	20	0	0
SATURDAY:	0	0	0	0	0	0	10	30	30	30	15	15	15	15	15	15	15	15	0	0	0	0	0	0
SUNDAY:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEEKDAY:	Off	Off	Off	Off	Off	Off	On	On	On	On	On	On	On	On	On	On	On	On	Off	Off	Off	Off	Off	Off
SATURDAY:	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
SUNDAY:	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
WEEKDAY:	0	0	0	0	0	0	0	15	30	35	35	45	55	50	30	30	40	20	10	15	5	0	0	0
SATURDAY:	0	0	0	0	0	0	0	10	10	20	15	20	15	10	10	10	10	0	0	0	0	0	0	0
SUNDAY:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 513.2.b
BUILDING SCHEDULE PERCENTAGE MULTIPLIERS (cont.)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3. RETAIL																								
WEEKDAY:	0	0	0	0	0	0	0	0	20	20	20	20	80	80	80	80	80	80	20	20	20	20	0	0
SATURDAY:	0	0	0	0	0	0	0	0	20	20	20	20	60	60	60	60	60	60	60	60	60	60	0	0
SUNDAY:	0	0	0	0	0	0	0	0	10	10	10	10	70	70	70	70	70	70	70	70	70	70	0	0
WEEKDAY:	0	0	0	0	0	0	40	40	40	75	75	75	75	75	75	75	75	75	75	75	75	75	0	0
SATURDAY:	0	0	0	0	0	0	30	30	30	50	50	50	50	50	50	50	50	50	50	50	50	50	0	0
SUNDAY:	0	0	0	0	0	0	30	30	30	30	30	65	65	65	65	65	65	65	65	65	65	65	0	0
WEEKDAY:	Off	Off	Off	Off	Off	Off	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	Off	Off
SATURDAY:	Off	Off	Off	Off	Off	Off	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	Off	Off
SUNDAY:	Off	Off	Off	Off	Off	Off	Off	On	On	On	On	On	On	On	On	On	On	On	On	On	On	Off	Off	Off
WEEKDAY:	0	0	0	0	0	0	10	20	30	40	55	60	60	45	40	45	45	45	40	30	30	0	0	0
SATURDAY:	0	0	0	0	0	0	15	20	25	40	50	55	55	45	45	45	45	45	40	35	25	20	0	0
SUNDAY:	0	0	0	0	0	0	0	10	25	30	35	35	30	30	30	35	30	20	0	0	0	0	0	0
WEEKDAY:	0	0	0	0	0	0	15	70	90	90	90	50	85	85	20	0	0	0	0	0	0	0	0	0
4. WAREHOUSE																								
OCCUPANCY	0	0	0	0	0	0	0	0	20	20	20	20	10	10	10	10	10	0	0	0	0	0	0	0
SUNDAY:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WAREHOUSE	0	0	0	0	0	0	40	70	90	90	90	90	90	90	90	90	90	0	0	0	0	0	0	0
LTNG & RECEP	0	0	0	0	0	0	0	0	10	25	25	10	10	10	10	10	0	0	0	0	0	0	0	0
SUNDAY:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WAREHOUSE	Off	Off	Off	Off	Off	Off	On	On	On	On	On	On	On	On	On	On	On	Off	Off	Off	Off	Off	Off	Off
HVAC	Off	Off	Off	Off	Off	Off	Off	On	On	On	On	On	On	On	On	On	On	Off	Off	Off	Off	Off	Off	Off
SUNDAY:	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
WEEKDAY:	0	0	0	0	0	0	5	25	35	35	45	55	50	35	50	15	0	0	0	0	0	0	0	0
SATURDAY:	0	0	0	0	0	0	0	10	10	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUNDAY:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

REVISED VERSION
September 14, 2000

Table 513.2.b
BUILDING SCHEDULE PERCENTAGE MULTIPLIERS (cont.)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
7. RESTAURANT																								
WEEKDAY:	15	15	5	0	0	0	0	5	5	5	20	50	80	70	40	20	25	50	80	80	50	35	20	0
SATURDAY:	30	25	5	0	0	0	0	5	5	20	45	50	50	35	30	30	30	70	90	70	65	55	35	0
SUNDAY:	20	20	5	0	0	0	0	0	0	0	20	25	25	15	20	25	35	55	65	70	35	20	20	0
WEEKDAY:	15	15	15	15	15	20	40	40	60	60	90	90	90	90	90	90	90	90	90	90	90	90	50	30
LTNG & RECEP	20	15	15	15	15	15	30	30	60	60	80	80	80	80	80	80	80	90	90	90	90	90	50	30
WEEKDAY:	20	15	15	15	15	15	30	30	50	70	70	70	70	70	70	60	60	60	60	60	60	60	50	30
WEEKDAY:	On	On	Off	Off	Off	Off	Off	Off	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On
SATURDAY:	On	On	Off	Off	Off	Off	Off	Off	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On
SUNDAY:	On	On	Off	Off	Off	Off	Off	Off	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On
WEEKDAY:	20	15	15	0	0	0	0	0	60	55	45	40	45	40	35	30	30	40	55	60	50	55	45	25
WEEKDAY:	20	15	15	0	0	0	0	0	50	45	50	50	40	40	35	40	35	40	55	55	50	55	40	30
SATURDAY:	25	20	20	0	0	0	0	0	0	50	50	40	40	40	30	30	40	50	50	40	50	40	50	20
WEEKDAY:	0	0	0	0	0	0	0	10	50	80	80	80	80	80	80	80	80	50	30	30	20	20	0	0
8. HEALTH																								
OCCUPANCY	0	0	0	0	0	0	0	0	10	30	40	40	40	40	40	40	40	10	10	0	0	0	0	0
WEEKDAY:	0	0	0	0	0	0	0	0	5	5	5	5	5	5	5	5	5	0	0	0	0	0	0	0
SATURDAY:	0	0	0	0	0	0	0	0	50	90	90	90	90	90	90	90	90	30	30	30	30	30	0	0
WEEKDAY:	0	0	0	0	0	0	0	0	20	40	40	40	40	40	40	40	40	10	0	0	0	0	0	0
SATURDAY:	0	0	0	0	0	0	0	0	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0	0
WEEKDAY:	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On
SATURDAY:	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On	On
WEEKDAY:	0	0	0	5	5	80	70	50	40	20	20	25	50	50	70	35	20	15	15	5	5	5	0	
WEEKDAY:	0	0	0	0	0	0	0	0	20	45	50	30	30	30	70	90	70	65	55	35	30	25	5	0
SATURDAY:	0	0	0	0	0	0	0	0	20	25	15	20	25	35	55	65	70	35	20	20	20	20	5	0
SUNDAY:	0	0	0	0	0	0	0	0	20	25	15	20	25	35	55	65	70	35	20	20	20	20	5	0

REVISED VERSION
September 14, 2000

**Table 513.2.b
BUILDING SCHEDULE PERCENTAGE MULTIPLIERS (cont.)**

NOTES FOR TABLE 513.2.b

- (1) Reference: Recommendations for Energy Conservation Standards and Guidelines for New Commercial Buildings, Vol. III, App. A Pacific Northwest Laboratory, PNL-4870-8, 1983.*
- (2) Table 513.2.b contains multipliers for converting the nominal values for building occupancy (Table 515.2), receptacle power density (Table 516.2) service hot water (Table), and lighting energy (§434.515) into time series data for estimating building loads under the Standard Calculation Procedure.
- (3) *For each standard building profile there are three series - one each for weekdays, Saturday and Sunday. There are 24 elements per series. These represent the multiplier that should be used to estimate building loads from 12 a.m. to 1 a.m. (series element #1) through 11 p.m. to 12 a.m. (series element #24). The estimated load for any hour is simply the multiplier from the appropriate standard profile multiplied by the appropriate value from the tables cited above.*
- (4) The Building HVAC System Schedule listed in Table 517.1.1 lists the hours when the HVAC system shall be considered "on" or "off" in accordance with §434.514.*

REVISED VERSION
September 14, 2000

187

§ 434.514 Lighting.

514.1 Interior Lighting Power Allowance (ILPA), for calculating the Energy Cost Budget shall be determined from subsection 401.3.2. The lighting power used to calculate the Design Energy Consumption shall be the actual adjusted power for lighting in the Pro-

posed Design. If the lighting controls in the Proposed Design are more effective at saving energy than those required by subsection 401.3.1 and 401.3.2, the actual installed lighting power shall be used along with the schedules reflecting the action of the controls to calculate the Design Energy Consumption. This actual installed lighting