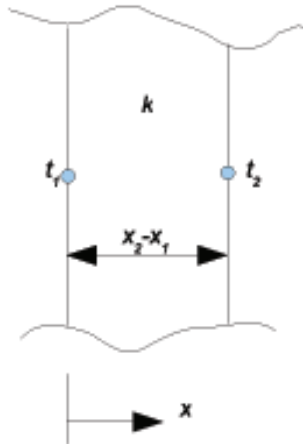


**Errata to
Load Calculation Applications Manual (2009)
(I-P Edition)**

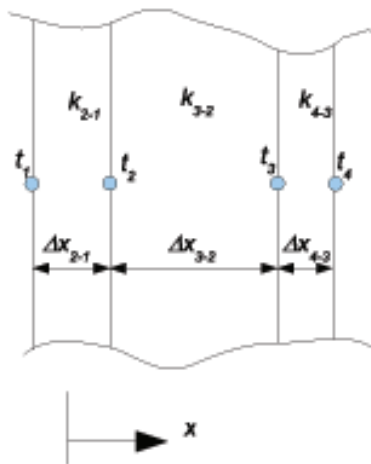
January 23, 2013

Shaded items have been added since the previously published errata sheet dated May 17, 2011.

Page 6: Figure 2.1 is difficult to read; replace it with the following.

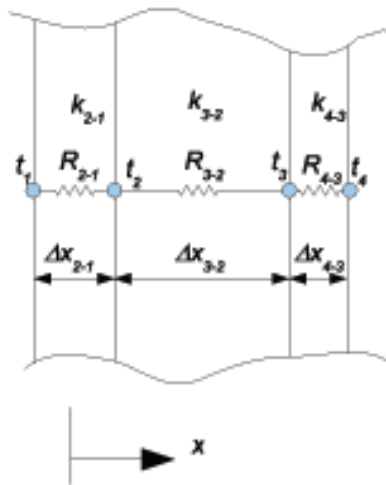


Page 7: Figure 2.2 is difficult to read; replace it with the following.



Page 8:

Figure 2.3 is difficult to read; replace it with the following.



Page 11:

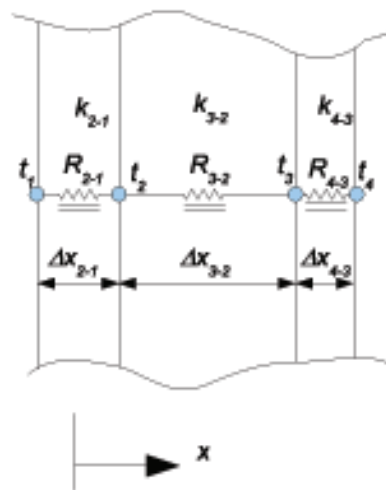
Example 2.4 should mention that the area is 100 ft^2 .

Page 11:

In the solution equation for Example 2.4, there should not be an equal sign between “ $\text{Btu/h}\cdot\text{ft}^2\cdot^\circ\text{F}$ ” and “ (100 ft^2) ”.

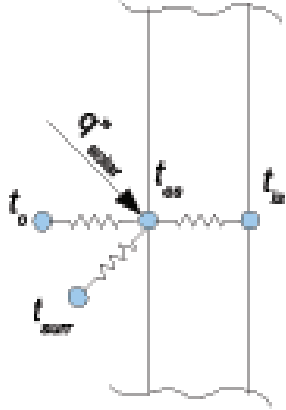
Page 11:

Figure 2.4 is difficult to read; replace it with the following.



Page 15:

Figure 2.6 is difficult to read; replace it with the following.



Page 15:

In the first full sentence on the page, instead of “ δR ” it should read “ $\epsilon \delta R / h_o$.”

Page 25:

The numerical values that correspond with the section labeled “Stone, Lime, or Sand” should be moved down so that the row beginning with 180 lines up with “Quartzitic and Sandstone.”

Page 32:

In Table 3.2, change the column headers from “0.5 in. Air Space^c” and “0.75 in. Air Space^c” to “1.5 in. Air Space^c” and “3.5 in. Air Space^c,” respectively.

Page 73:

In the final paragraph of Section 4.2.3, change the second sentence from “The mean of annual extremes, column 22...” to “The mean of annual extremes, column 16...”

Page 83:

Equation 5.6b should be changed from

$$\Delta p_{st} = \rho_o \left(\frac{T_o - T_i}{T_i} \right) g (H_{NPL} - H)$$

to

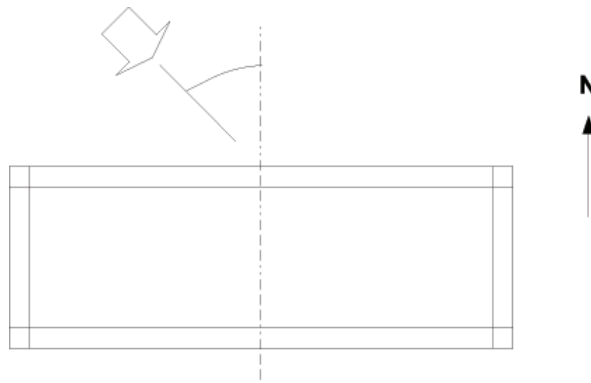
$$\Delta p_{st} = \rho_o \left(\frac{T_i - T_o}{T_i} \right) g (H_{NPL} - H)$$

Page 84:

In the first sentence on the page, delete the “m” after Δp_{st} .

Page 89:

Figure 5.7 is difficult to read; replace it with the following.



- Page 91:** In the “Wind pressure difference (twelfth floor)” section of the table, under “East wall, leeward,” $\theta = 1340^\circ$ should read $\theta = 140^\circ$.
- Page 94:** In Example 5.2, for “First floor” and “Equation 5.14,” the subscript “w” for “North wall (windward)” $(Q/A)_w$ and Q_w should instead be “n”.
- Page 95:** In Example 5.2, for “First floor” and “Equation 5.14,” the subscript “s” for “West wall (windward)” $(Q/A)_s$ and Q_w should instead be “w”.
- Page 95:** In Example 5.2, for “First floor” and “Equation 5.14,” the subscript “1” for “East wall (leeward)” $(Q/A)_1$ and Q_1 should instead be “e”.
- Page 95:** In Example 5.2, for “First floor” and “Equation 5.14,” the units for the infiltration rates for “West wall (windward)” and “South wall (leeward)” are given as “cfm²” but in both instances should read “cfm.”
- Page 95:** In Example 5.2, for “Total, first floor,” the equation

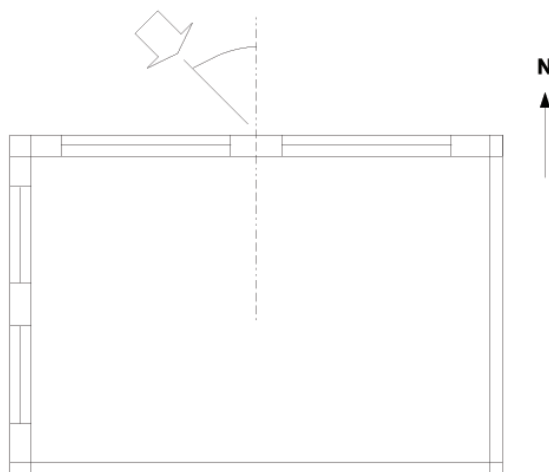
$$Q_1 = Q_w + Q_s + Q_1$$

should read:

$$Q_1 = Q_n + Q_w + Q_s + Q_1$$

- Page 96:** In Table 5.3, in the “Other Types” column for “Average-fitting window,” the “Nonweatherstripped average gap” value of “1/62 in.” given in the Note should read “1/64 in.”

- Page 102:** Figure 5.17 is difficult to read; replace it with the following.



- Page 149:** At the top of the page, the first full sentence that ends “... hourly cooling loads according to Equation 7.4” should read “... hourly cooling loads according to Equation 7.5.”
- Page 149:** Equation 7.4 should be numbered Equation 7.5.

Page 207: The solution equation for Example 9.3 reads “ $cfm_m + 300(5)...$ ” but should read “ $cfm_m = 300(5)...$ ”

Page 211: The second to last equation in the solution for Example 9.4 reads q_{es} but should read q_{cs} .

Page 214: The Example 9.5 bubble and the grey shading are too high. The example should start with the paragraph that begins “A space...,” and the example bubble should be level with this paragraph.

Page 219: In the first sentence of the last paragraph of Example 9.6, “62°F DB” should read “58°F DB.”

Page 228: Change Equation 10.6 from

$$J_{avg,bf} = \frac{2k_{soil}}{\pi w_b} \times \left[\ln\left(\frac{w_b}{2} + \frac{z_f}{2} + \frac{k_{soil}R_{other}}{\pi}\right) - \ln\left(\frac{z_f}{2} + \frac{2k_{soil}R_{other}}{\pi}\right) \right]$$

to

$$J_{avg,bf} = \frac{2k_{soil}}{\pi w_b} \times \left[\ln\left(\frac{w_b}{2} + \frac{z_f}{2} + \frac{k_{soil}R_{other}}{\pi}\right) - \ln\left(\frac{z_f}{2} + \frac{k_{soil}R_{other}}{\pi}\right) \right]$$

Page 246: The first bullet point reads “32.174 ft²” but should read “32.174 ft/s²”.

Page 305: The end of the last sentence of the paragraph before Equation D.1, “, or it can be related to the day of the year, η , by” and Equation D.1 should be **deleted**.

Page 308: Equation D.11 gives values for Y but includes incorrect signs in the “for $\cos\theta$ ” lines. These lines should read as follows:

$$\text{for } \cos\theta < -0.20$$

$$\text{for } \cos\theta \geq -0.20$$

Page 309: The left-hand sides of Equations D.15 and D.16 are switched. The equations should read as follows:

$$S_W = P_V \times |\tan\gamma| \quad (D.15)$$

$$S_H = P_H \times \tan\Omega \quad (D.16)$$

Page 310: In the last paragraph, the values 0.026 and 0.052 should be replaced with **0.15** and **0.3**, respectively.

Page 319: In Equation E.5, the units for k_{Hom} are given as “ft²·°F·h/Btu·in.” but should be “**Btu·in./h·ft²·°F.**”

Pages 320–322:

In Example E.1, at the bottom of the page, the value for the weighting parameter, p , is given as 0.278 but the correct value is **0.449**. Revised equations for this entire example are as follows.

$$R_{CL} = \frac{1}{\frac{A_{f,metal}}{R_{metal}} + \frac{A_{f,insulation}}{R_{insulation}}} = 2.451 \text{ ft}^2 \cdot \text{h} \cdot ^\circ\text{F}/\text{Btu} \quad (\text{E.8})$$

$$R_{max} = \frac{1}{\frac{A_{f,metal}}{R_{mp}} + \frac{A_{f,insulation}}{R_{ip}}} = 23.428 \text{ ft}^2 \cdot \text{h} \cdot ^\circ\text{F}/\text{Btu} \quad (\text{E.9})$$

$$p = 0.8(13.016/23.428) + 0.44 - 0.1(1.5/1.5) - 0.2(24/16) - 0.04(3.5/4) = 0.449$$

$$R_T = 0.449 \cdot 23.428 + (1 - 0.449)13.016 = 17.696 \text{ ft}^2 \cdot \text{h} \cdot ^\circ\text{F}/\text{Btu}$$

$$R_{Hom} = R_T - \sum_{i=1}^N R_i \quad (\text{E.3})$$

$$R_{Hom} = 17.696 - 10.564 = 7.132 \text{ ft}^2 \cdot \text{h} \cdot ^\circ\text{F}/\text{Btu}$$

$$k_{Hom} = \frac{3.5}{7.132} = 0.49 \text{ Btu} \cdot \text{in.}/^\circ\text{F} \cdot \text{ft}^2 \cdot \text{h}$$

$$y_{steel} = \frac{(3.5 + 2 \times 1.5) \times 0.059}{3.5 \times 16} = 0.007$$

$$y_{insulation} = 1 - \frac{(3.5 + 2 \times 1.5) \times 0.059}{3.5 \times 16} = 0.993$$

$$\rho_H = 474.5 \times 0.007 + 0.905 \times 0.993 = 4.15 \text{ lb}_m/\text{ft}^3$$

$$c_p = \frac{(474.5 \times 0.120 \times 0.007 + 0.905 \times 0.170 \times 0.993)}{4.15} = 0.13 \text{ Btu}/\text{lb}_m \cdot ^\circ\text{F}$$

Page 322:

In the text description of Step 3 of Example E.1, it reads that the thermal conductivity is calculated using Equation E.4, but it should state that it was Equation **E.5**.

Page 322:

The second equation in Step 4 of Example E.1 reads y_{steel} but should read $y_{insulation}$.

Page 322:

In Example E.1, the values for resistances listed in the paragraph toward the bottom of the page beginning with “The astute reader...” should be corrected as follows (resulting from the weighting factor error):

15.949 should be **17.707**

15.912 should be **17.696**

0.65 should be **0.49**

0.6544 should be **0.4908**

Page 323:

In Table E.4, the EHL values for Conductivity should be changed from 0.65 to **0.49** and for Resistance from 5.385 to **7.143**, corresponding to revised values based on the weighting factor error.

- Page 323:** In Table E.4, the values for the outside and inside air films are reversed; outside should be **0.250** and inside should be **0.688**.
- Page 326:** The third bullet in Example F.1 refers to Table 10.6 but should refer to Table **10.3**.
- Page 327:** The second bullet at top of this page mislabels the specific heat units as “Btu/lb_m”; they should be “**Btu/lb_m·°F**.”
- Page 328:** In the nomenclature in the middle of the page, in the line explaining Fp , the reference to Table 10.6 should read “Table **10.3**.”
- Page 332:** In Example G.1, in the second bullet point under the bullet point beginning with “The window U-factor,” “1.46 /h·ft²·°F” should read “1.46 **Btu/h·ft²·°F**.”
- Page 333:** The first bullet at the top of the page that reads “The total interior surface area, including exterior walls, interior partitions, windows, ceiling, floor, and furniture may be determined by adding all of the areas in Tables 8.2a and 8.2b, and comes to 1262 ft²” should be changed to “The total interior surface area, including exterior walls, interior partitions, windows, ceiling, floor, and furniture, **at or below the level of the dropped ceiling, is approximately 1262 ft²**.”
- Page 334:** In Figure G.2, the vertical axis is mislabeled with the wrong units of “Btu/h·ft²”; it should have the units of “**Btu/h**.”

Table 8.10a Solar Heat Gain Calculations for the Southwest-Facing Windows, Part 1

Local Time	Apparent Solar Time [Eqn. D.2]	Hour Angle, ° [Eqn. D.3]	Solar Altitude Angle, ° [Eqn. D.4]	Solar Azimuth Angle, ° [Eqn. D.5b]	Surface Solar Azimuth Angle, ° [Eqn. D.6]	Incident Angle, ° [Eqn. D.7]	Incident Beam Radiation Btu/(h·ft ²) [Eqn. D.9]	Incident Diffuse Radiation Btu/(h·ft ²) [Eqns. D.10 and D.13]
7	5.27	-101.0	2.7	66.9	-173.1	172.6	0.0	0.5
8	6.27	-86.0	14.4	74.6	-165.4	159.6	0.0	15.4
9	7.27	-71.0	26.7	82.0	-158.0	146.0	0.0	25.7
10	8.27	-56.0	39.1	89.7	-150.3	132.4	0.0	33.3
11	9.27	-41.0	51.6	99.1	-140.9	118.9	0.0	39.2
12	10.27	-26.0	63.6	112.8	-127.2	105.6	0.0	43.3
13	11.27	-11.0	73.7	140.4	-99.6	92.7	0.0	48.6
14	12.27	4.0	76.5	196.2	-43.8	80.3	44.8	52.8
15	13.27	19.0	68.7	237.1	-2.9	68.8	95.6	55.5
16	14.27	34.0	57.3	255.4	15.4	58.6	134.6	56.0
17	15.27	49.0	44.9	266.2	26.2	50.6	157.2	53.5
18	16.27	64.0	32.5	274.5	34.5	45.9	158.4	47.0
19	17.27	79.0	20.1	281.9	41.9	45.7	131.0	35.1
20	18.27	94.0	8.1	289.4	49.4	49.9	55.5	13.8

Table 8.11a Solar Heat Gain Calculations for the Southeast-Facing Windows, Part 1

Local Time	Apparent Solar Time [Eqn. D.2]	Hour Angle, ° [Eqn. D.3]	Solar Altitude Angle, ° [Eqn. D.4]	Solar Azimuth Angle, ° [Eqn. D.5b]	Surface Solar Azimuth Angle, ° [Eqn. D.6]	Incident Angle, ° [Eqn. D.7]	Incident Beam Radiation Btu/(h·ft ²) [Eqn. D.9]	Incident Diffuse Radiation Btu/(h·ft ²) [Eqns. D.10 and D.13]
7	5.27	-101.0	2.7	66.9	-83.1	83.1	0.7	0.6
8	6.27	-86.0	14.4	74.6	-75.4	75.9	37.3	20.2
9	7.27	-71.0	26.7	82.0	-68.0	70.5	71.2	34.0
10	8.27	-56.0	39.1	89.7	-60.3	67.4	92.3	43.8
11	9.27	-41.0	51.6	99.1	-50.9	66.9	99.5	50.4
12	10.27	-26.0	63.6	112.8	-37.2	69.2	92.8	53.9
13	11.27	-11.0	73.7	140.4	-9.6	74.0	73.3	54.6
14	12.27	4.0	76.5	196.2	46.2	80.7	42.9	52.6
15	13.27	19.0	68.7	237.1	87.1	89.0	4.8	48.6
16	14.27	34.0	57.3	255.4	105.4	98.2	0.0	42.9
17	15.27	49.0	44.9	266.2	116.2	108.2	0.0	36.3
18	16.27	64.0	32.5	274.5	124.5	118.5	0.0	29.5
19	17.27	79.0	20.1	281.9	131.9	128.9	0.0	20.7
20	18.27	94.0	8.1	289.4	139.4	138.8	0.0	7.8

Table 8.21 Return Air Cooling Load and System Cooling Load, Btu/h (Without Interior Shading)

Hour	Lighting to Return Air	Roof Heat Gain to Return Air	Total Heat Gain to Return Air	System Sensible Cooling Load
1	67	-12	55	1177
2	67	-20	47	1010
3	67	-26	41	867
4	67	-31	36	735
5	67	-36	31	618
6	67	-39	27	522
7	67	-42	25	483
8	334	-32	302	2815
9	668	22	690	5707
10	668	101	769	6669
11	668	182	851	7383
12	668	257	926	8035
13	668	320	988	8659
14	668	365	1033	9167
15	668	389	1057	9521
16	668	389	1057	10170
17	668	365	1033	10967
18	334	318	653	9341
19	67	252	318	6934
20	67	170	237	4924
21	67	87	153	2939
22	67	34	101	2145
23	67	10	77	1697
24	67	-2	64	1399