most installations is specifically provided for in Article 220. If loads are not calculated in accordance with the requirements of Article 220, the table ampacities, even if corrected in accordance with ambient correction factors and the notes to the tables, might be higher than needed for the actual load.

See also

310.14(B) and **Informative Annex B** for more information

(B) Ambient Temperature Correction Factors.

(1) General. Ampacities for ambient temperatures other than those shown in the ampacity tables shall be corrected in accordance with Table 310.15(B)(1)(1) or Table 310.15(B)(1)(2), or shall be permitted to be calculated using Equation 310.15(B)(1).

$$I' = I\sqrt{\frac{T_c - T'_a}{T_c - T_a}} \qquad \textbf{[310.15(B)(1)]}$$

where:

I' = ampacity corrected for ambient temperature
I = ampacity shown in the tables
T_c = temperature rating of conductor (°C)
T_a' = new ambient temperature (°C)
T_a = ambient temperature used in the table (°C)

Δ **(2) Rooftop.** For raceways or cables exposed to direct sunlight on or above rooftops where the distance above the roof to the bottom of the raceway or cable is less than 19 mm (¾ in.), a temperature adder of 33°C (60°F) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Table 310.15(B)(1)(1) or Table 310.15(B)(1)(2).

Exception: Type XHHW-2 insulated conductors shall not be subject to this ampacity adjustment.

Informational Note: The *ASHRAE Handbook — Fundamentals* is one source for the ambient temperatures in various locations.

Conductors in outdoor conduits or cables installed less than ¾ inches above the surface of the roof are subject to a significant increase in temperature when the roof is exposed to direct sunlight.

Calculation Example

A feeder installed in IMC runs across the top of a commercial building in St. Louis, Missouri (MO). The calculated load on the feeder is 175 A. The lateral portion of the raceway is exposed to sunlight and secured to supports elevated less than ¾ in. above the finished rooftop surface. Determine the minimum size circuit conductor using aluminum 90°C THWN-2 insulation, taking into consideration only the exposure to sunlight. None of the loads are continuous, and the neutral is not considered a current-carrying conductor. The design temperature is based on the averaged June, July, and August 2-percent design temperature from the 2009 *ASHRAE Handbook — Fundamentals*.

Solution

Step 1. Determine the ambient temperature (compensated for proximity of conduit to the rooftop exposure to sunlight):

a. Compensated ambient temperature = design temperature + 60°F as required by 310.15(B)(2)

TABLE 310.15(B)(1)(1) *Ambient Temperature Correction Factors Based on 30°C (86°F)*

For ambient temperatures other than 30°C (86°F), multiply the ampacities specified in the ampacity tables by the appropriate correction factor shown below.

Ambient Temperature (°C)	Temperature Rating of Conductor			Ambient Temperature (°F)
	60°C	75°C	90°C	
10 or less	1.29	1.20	1.15	50 or less
11–15	1.22	1.15	1.12	51–59
16–20	1.15	1.11	1.08	60–68
21–25	1.08	1.05	1.04	69–77
26–30	1.00	1.00	1.00	78–86
31–35	0.91	0.94	0.96	87–95
36–40	0.82	0.88	0.91	96–104
41–45	0.71	0.82	0.87	105–113
46–50	0.58	0.75	0.82	114–122
51–55	0.41	0.67	0.76	123–131
56–60	—	0.58	0.71	132–140
61–65	—	0.47	0.65	141–149
66–70	—	0.33	0.58	150–158
71–75	—	—	0.50	159–167
76–80	—	—	0.41	168–176
81–85	—	—	0.29	177–185

Note: Table 310.15(B)(1)(1) shall be used with Table 310.16 and Table 310.17 as required.