
Temperature of Cable Terminations and Cable Compartments in Switchgear

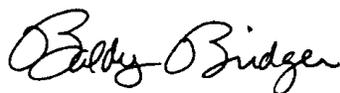
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One of the important features of almost all low-voltage and medium-voltage switchgear is provision for terminating power cables. Power cables are sensitive to the temperature of the surrounding air, and must be chosen carefully to operate in the various environments in which they are installed. A single run of power cable may pass through several different environments, and the effect of each environment on the cable selection must be considered. One of these environments may be within the switchgear cable area.

In metal-enclosed switchgear, power cables usually terminate on buswork, not directly on the terminals of the main switching device. This is in contrast to panelboard, switchboard and motor control center construction, where power cables may terminate on the terminals of molded-case circuit breakers or starters. The allowable temperature rise of the connections to insulated cables and the allowable temperature of the air surrounding these cables is given in the ANSI switchgear standards, ANSI/IEEE C37.20.1 for low-voltage switchgear, ANSI/IEEE C37.20.2 for metal-clad switchgear, and ANSI/IEEE C37.20.3 for metal-enclosed interrupter switchgear.

All three of these standards require the same temperature for these features. §4.5.5 of each of these standards limits the temperature of the air surrounding insulated power cables to 65°C, when the switchgear assembly is equipped with devices having the maximum current rating for which the assembly is designed, is carrying rated continuous current, and is in an ambient temperature of 40°C. Table 4 of each standard limits the temperature rise of silver or tin-surfaced connections to insulated cables to 45°C, or a total temperature of 85°C. The tests to demonstrate conformance with these limiting temperature rises require including appropriate sizes and lengths of power cables in the continuous current path.

When cables are connected to metal-enclosed switchgear, the cable selection must take into account the air and terminal temperatures encountered in the switchgear.



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