

Article Overview

IEC 61439 defines the design, testing, and operational requirements for low-voltage busbar assemblies, including tubular busbars, ensuring safe current conduction and thermal performance.

Overview of IEC 61439 for Busbars

IEC 61439 is the international standard governing low-voltage switchgear and controlgear assemblies, including tubular busbars. It specifies design verification, thermal performance, and testing requirements for busbar assemblies used in electrical distribution systems with voltage ratings up to 1000 V AC or 1500 V DC . The standard ensures that busbars operate safely under continuous load and short-circuit conditions while maintaining structural integrity and electrical functionality .

Key Requirements for Tubular Busbars

- o **Current-Carrying Capacity:** Busbars must be sized to carry the rated current without exceeding permissible temperature rise. Copper and aluminum are the primary materials, with copper offering higher conductivity and aluminum requiring larger cross-sections for the same current .
- o **Thermal Limits:** IEC 61439-1 sets the maximum operating temperature for busbars at 140°C, which is 105 K above an ambient temperature of 35°C. Temperature rise limits are typically 70°C for copper and 55°C for aluminum above ambient .
- o **Short-Circuit Withstand:** Busbars must withstand short-circuit currents for specified durations (usually 1-3 seconds) without mechanical or thermal failure .
- o **Diversity Factor:** The standard accounts for the fact that busbars rarely operate at full load continuously. A diversity factor is applied to calculate the main busbar current requirement based on total equipment load .
- o **Environmental and Mechanical Tests:** Tubular busbars must pass tests for corrosion resistance, electromagnetic compatibility, mechanical impact, and degree of protection (IP rating) to ensure reliability in various conditions .

Design and Installation Considerations

- o **Material Selection:** Copper is preferred for high-current, compact installations, while aluminum is lighter and cost-effective but requires larger dimensions .
- o **Mounting Orientation:** Vertical or horizontal installation affects cooling and heat dissipation, which must be considered in sizing calculations .
- o **Enclosure Type:** Open-air or enclosed assemblies influence thermal performance and airflow around the busbar .
- o **Voltage Drop:** IEC 61439 specifies maximum voltage drop limits (typically 3%) to ensure efficient power distribution .

Summary

Tubular busbars under IEC 61439 must meet strict thermal, electrical, and mechanical standards to ensure safe and reliable operation in low-voltage assemblies. Proper sizing, material selection, and compliance with testing requirements are essential to prevent overheating, voltage drops, and equipment failure while maintaining energy efficiency and safety .

Electrical field standards: IEC 60865, IEC 61597, IEC 61936, IEC 60439, IEC 62271 For alloy-specific conductor choices and

Aluminium tubular busbars are made from high-purity aluminium or its alloys (e.g., 6061, 6063). Their tubular design optimizes the

Although busbar systems should normally be designed for lowest lifetime cost - which means a lower working temperature to reduce

The test shall be carried out according to IEC 60068-2-2 Test Bb, at a temperature of 70 °C, with natural air circulation, for a duration

200 °C IEC 865 - Short circuit currents - Calculation of effects. 2 IEC 909 - Short circuit current calculations in three phase AC

8US busbar systems are used for mounting current-limiting devices (protective devices), such as fuse switch disconnectors, circuit

Professional busbar sizing calculator with current-carrying capacity per IEC 61439,

Learn the IEC standard for busbar sizing as per IEC 61439, including current-carrying

PMAX is a patented range of Busbar trunking that is utilised within building and industrial applications to deliver power to Electrical

Impedance In the design of laminated bus bars, you should consider maintaining the impedance at the lowest possible level. This will

The performance of a busbar trunking system (BTS) using either aluminium or copper busbars will be the same for any given

Undersized busbars are one of the leading causes of switchgear failures: they overheat,

Tubular busbar IEC

Aluminium tubular busbars are subject to wind-generated vibration and oscillation. Because of the low self-damping of tubular

The document specifies the technical parameters for HV tubular busbars including: - The busbar shall be made of 6101T6 aluminum

The Busbar Size Calculator helps engineers and electricians find the right copper or aluminum busbar dimensions

The busbar sizing calculator determines the required busbar dimensions based on the

Web: <https://bssoda.pl>

