New Standard for Low-Voltage Busbar Withstand Voltage

Overview

IEC 61439 is the core standard for low-voltage switchgear and controlgear assemblies up to 1000 V AC or 1500 V DC.

Key Takeaways

The IEC 61439 series establishes the new standard for low-voltage busbar withstand voltage, requiring verification of dielectric strength, short-circuit performance, and temperature rise for assemblies up to 1000 V AC or 1500 V DC.

Overview of IE

C 61439The IEC 61439 standard, introduced in 2009, replaces the older IEC 60439 series and governs the design, verification, and testing of low-voltage switchgear and controlgear assemblies, including busbars. It applies to assemblies with voltage ratings up to 1000 V AC and 1500 V DC and covers power distribution, photovoltaic systems, and general low-voltage applications. The standard eliminates the distinction between Type-Tested Assemblies (TTA) and Partially Type-Tested Assemblies (PTTA), requiring all assemblies to meet uniform safety and performance benchmarks.

Withstand Voltage Requirements

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Dielectric withstand voltage is a critical aspect of IEC 61439 compliance. Busbars and assemblies must be tested to ensure they can withstand overvoltages without insulation breakdown. Verification can be performed through: Design calculations based on reference assembliesActual testing of the assembly under specified voltage conditionsComparison with previously tested assemblies meeting the same construction and material criteria The standard specifies that the average ambient temperature during testing should not exceed 35 °C, and the assembly must maintain insulation integrity under rated voltage conditions.

Short-

Circuit and Thermal VerificationIn addition to dielectric testing, IEC 61439 requires verification of: Short-circuit withstand strength, ensuring busbars can handle fault currents without mechanical or thermal failureTemperature rise limits, preventing insulation degradation and fire hazards under rated current conditions These tests ensure that busbars maintain safe operation under both normal and fault conditions. Key Changes from Previous StandardsCompared to IEC 60439, the new standard: Introduces uniform verification methods for all assembliesProvides detailed guidance on dielectric properties, short-circuit performance, and rated diversity factorAllows verification by calculation or testing, provided the assembly meets reference design criteria Emphasizes documentation of assembly drawings, technical specifications, and test reports for compliance Practical ImplicationsManufacturers and system designers must ensure that low-voltage busbars: Are designed and tested according to IEC 61439 dielectric and thermal requirementsCan safely withstand rated voltages and fault currentsInclude proper documentation for regulatory compliance and market access By adhering to IEC 61439, busbar assemblies achieve enhanced safety, reliability, and performance, meeting modern low-voltage electrical system requirements.

Article Content

IEC 61439 Busbar Standard: A Guide to Low-Voltage

The IEC 61439 standard applies to busbar assemblies that will be installed in electrical applications with a voltage rating up to 1000 V (for AC) and

IEC 61439 Standards-R1

Rated impulse withstand voltage, referred to as Uimp, is the peak value of an impulse voltage of prescribed form and polarity that the equipment is capable of withstanding without failure under

IEC 61439 Low Voltage Switchgear Design: Complete 2026 Guide

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IEC 61439 permits design rule verification of busbar short-circuit withstand strength through calculation or comparison with tested reference designs, provided all criteria including conductor dimensions,

IEC 61439 Short-Circuit Withstand for Busbar Design

IEC 61439 is the core standard for low-voltage switchgear and controlgear assemblies up to 1000 V AC or 1500 V DC. Its short-circuit withstand strength requirements ensure that an

IEC 61439 standard for low voltage switchgear and controlgear ...

IEC 60439, the standard for low-voltage switchgear and controlgear assemblies, was under restructuring from the last decade. The new series of IEC 61439 standards were published in

Work book The standard IEC 61439 in practice

This workbook includes general and special information which is essential for safe, reliable and economical low voltage switchgear and controlgear ASSEMBLY operation.

Switchgear Busbar Ratings per IEC 61439 | PDF

It lists nominal continuous current ratings and typical short-time withstand ratings for various applications, including small distribution boards, large LV panels, and EHV substations.

Guide_Normes_IEC 61439_GB dd

This standard aims to standardize all the rules and requirements applicable to the low voltage switchgear and controlgear assemblies (Assemblies) in order to make the requirements and checks

IEC Standard For Busbar Sizing: Complete Guide To

These standards specify the parameters that should be considered when sizing busbars, including current rating, short-circuit withstand capacity,

AS/NZS 61439 Guide: IEC 61439 Testing & Compliance

IEC 61439 and its Australian/New Zealand counterpart AS/NZS 61439 are the foundational standards for low voltage switchgear and controlgear assemblies, essential for ensuring

Busbar Market Size, Share, Growth Trends & Forecast

These clients demand high-performance, compliant, and customizable busbar solutions tailored to specific operational parameters such as voltage levels, environmental conditions, and

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Busbar Systems: A Complete Guide to Busbar Trunking in Electrical ...

A complete guide to busbar trunking: standards, fire performance, busbar vs cable, and design considerations for contractors and specifiers.

What is a Busbar? Types, Functions, Uses & Advantages

Learn what a busbar is, how it works, its types, applications, advantages, and differences between busbars and cables in electrical systems.

Busbar connections best practices guide for reliable electrical ...

Learn why full overlap is not required for copper busbar connections. This guide explains how proper busbar torque specification, contact resistance, and international standards ensure safe,

Technical Management and Risk Prevention and Control of High and Low ...

Abstract This paper comprehensively explores the technical management and risk prevention of high and low voltage complete sets of equipment in power engineering.

Switchgear

Typically, switchgear in substations is located on both the high- and low-voltage sides of large power transformers. The switchgear on the low-voltage side of the

Global Busbar Systems Market Size, Industry Growth & Forecast

For example, the IEC 61439 standard specifies performance and safety criteria for low-voltage busbar trunking systems, compelling manufacturers to innovate with materials and protective

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