Canalis and IEC 61439-1&6

The most reliable busbar trunking system

[100% IEC 61439-1&6]

Schneider Electric

IEC 61439-1&6

The power of a standard adapted to your needs

IEC standards are today legal or market references.
The new IEC 61439-1&6 is **the reference** for the construction of electrical LV busbar trunking systems.

IEC 61439 fully satisfies the requirements of designers and users of new generation LV busway: **safety of persons and equipment, electrical availability, long-term reliability and conformity.**

To guarantee these essential values, the standard sets a wide range of requirements.
These include designing a "system" compliant in all aspects, **checking interactions** and consistency between switchgear, busway and equipment, providing protection against electrical, mechanical and structural hazards, and simplifying system maintenance and upgrading cycles.

Schneider Electric/IEC Standard: a long success story

Ever since the construction of its first electrical busway, Schneider Electric has never ceased its commitment to Assembly Manufacturers to guarantee "fully compliant" systems, and so much more.
Schneider Electric has always considered that conformity of its solutions to IEC standards was a minimum, a springboard allowing it to go further still in its offer to users.
And indeed, in its role as Original Manufacturer, Schneider Electric constantly proves on an everyday basis that it does so.

30 years
experience in the construction of tested switchboards (and the associated standards).

60 years
experience in the construction of tested busway (and the associated standards).

100%
of busway architectures are tested and conform to IEC standards.

Full support
for panel-builders and contractors.

3 million
Schneider Electric tested LV electrical distribution switchboards in operation world-wide.

2 x
the distance around the world is the total length of the Canalis devices installed by Schneider Electric world-wide.

The main 10 functions of standard IEC 61439

All the verifications proposed by standard IEC 61439 contribute to the achievement of 3 basic goals: safety, continuity of service and compliance with end-user requirements

Safety

1 Voltage stress withstand capability
Insulation to withstand long-term voltages, transient and temporary overvoltages guaranteed through clearances, creepage distances and solid insulation.

2 Current-carrying capability
Protect against burns by limiting excessive temperatures:
- when any single circuit is continuously loaded to its rated current
- when any circuit is continuously loaded to its rated current multiplied by its rated diversity factor.

3 Short-circuit withstand capability
Withstand short-circuit thanks to short-circuit protection devices, short-circuit coordination, and capability to withstand the stresses resulting from short-circuit currents in all conductors.

4 Protection against electric shock
Hazardous live parts are not accessible (basic insulation protection) and accessible conductive parts are not hazardous for life (fault protection, and continuity of protective equipotential bonding).

5 Protection against fire or explosion hazard
Protect persons against fire hazards: resistance to internal glowing faulty elements through selection of materials and design provisions.

Continuity of service

6 Maintenance and modification capability
Capability to preserve continuity of supply without impairing safety during assembly maintenance or modification through basic and fault protection and optional removable parts.

7 Electro-Magnetic compatibility
Properly function and avoid generation of EMC disturbances through incorporation of electronic devices complying with the relevant EMC standard, and their correct installation.

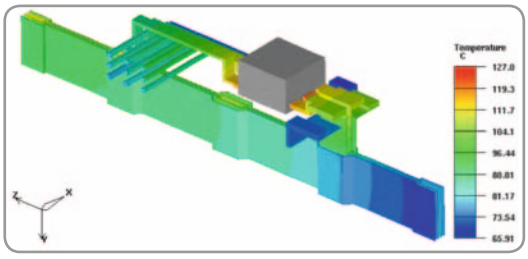
Compliance with end-user requirements

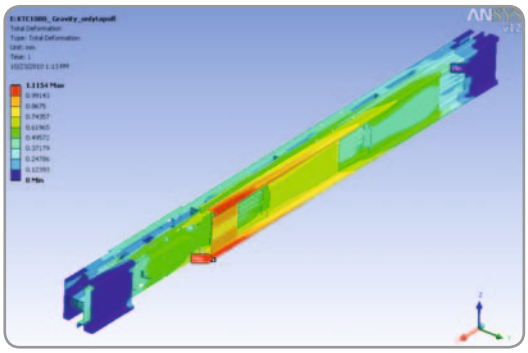
8 Capability to operate the electrical installation
Properly function, according to:
- The electrical diagram and the specifications (voltages, co-ordination, etc.) by selecting, installing and wiring the appropriate switching devices.
- The specified operating facilities (access to Human-Machine Interfaces, etc.) through accessibility and identification.

9 Capability to be installed on site
Withstand handling, transport, storage and installation constraints, and be capable to be constructed and connected through selection or design of the enclosure and the external terminals, and by provisions and documentation.

10 Protection of the assembly against environmental conditions
Protect the assembly against mechanical and atmospheric conditions through selection of materials and design provisions.

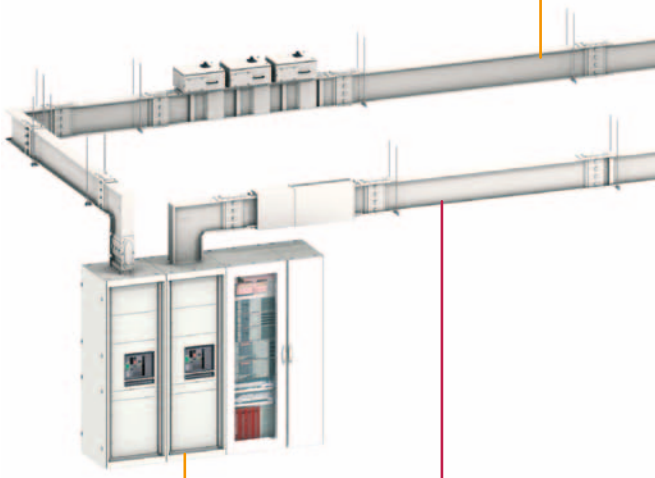
Canalis... 100% and more

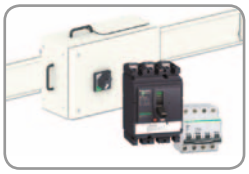




Current-carrying capability

- Canalis offers high safety and reliability standards that ensure proper temperature rise limits. Schneider Electric completes temperature rise tests with numerical simulations to cover all customer configurations and busway ratings.
- Busbars, connections and tap-off units have been tested to avoid connection damage, reduction of insulation performance, risk of burning and faulty operation of devices.





Short-circuit withstand capability

- Conditional short-circuit tests are passed due to the full coordination of the entire Schneider Electric system, from MV/LV transformers to load feeders, through Canalis busway and tap-off units, breakers and fuses. Short-circuit tests are completed by numeric simulations to cover all customer configurations.

Capability to be installed on site

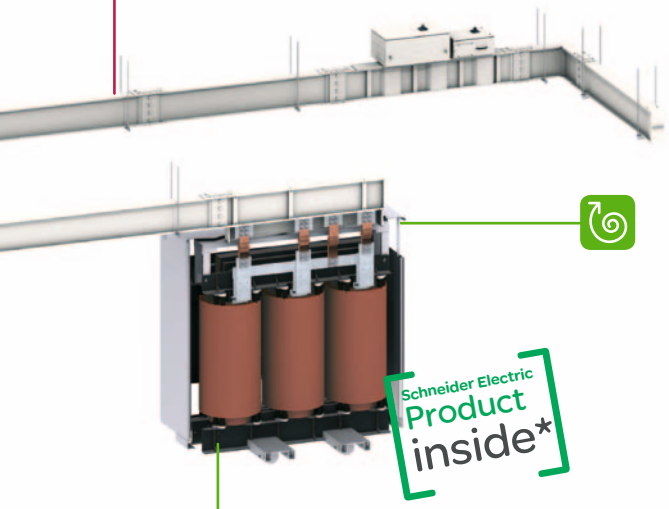
- Test are performed to ensure withstand to lifting (IEC 62208), mechanical impact (IEC 62208), and mechanical loads standards.

than IEC standard!

100% IEC 61439-1&6

Protection of the assembly against environmental conditions

- All Canalis ranges are sprinkler proof. They withstand water projection in case of sprinkler nuisance trippings.
- Canalis is fire resistant in building penetration, and prevents flame propagation and fire spread. In addition, Canalis is designed with halogen free components, and does not emit toxic gases in case of fire.
- Labs tests are performed to verify withstand to thermal cycling, corrosion, ultra-violet (UV) radiation…



Electro-Magnetic compatibility (EMC)

- Emission classes of Schneider Electric embedded devices are precisely established using EMC tests. This know-how optimizes installation design and compactness.
- Thanks to the optimum design of Canalis which reduces the distances between busway conductors, electro-magnetic compatibility is improved compared to cables. Electromagnetic emissions are controlled and independent of the implementation. Canalis helps reduce the effects of EMC on people and electrical equipment.

Maintenance and modification capability

- Canalis incorporates safe and protective systems, preventing on-load operation to guarantee safer and easier operation, maintenance, and upgrades.
- Interruptions are made shorter without risk of mistakes therefore decreasing down time and improving service continuity.

** Using only Schneider Electric devices guaranties the compliance with IEC as well as the reliability of installations.*

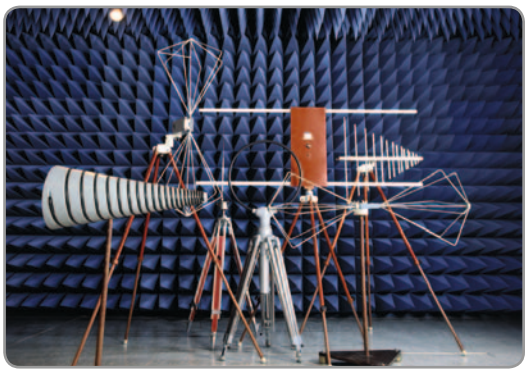
Test labs according to
the IEC 61439-6 standard

Busway are tested in independent IEC accredited labs according to the IEC 61439-6 standard to get the relevant certificates and certify the quality.

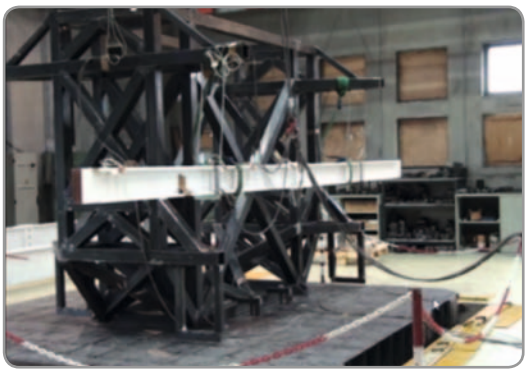
Schneider Electric validates technical design by **performing tests in its own labs** to cover all IEC standard requirements. **25 verifications** are performed for all ratings, and for entire product range to ensure full compliance.

In addition, yearly **continuous surveillance tests** ensure the compliance with IEC standard, whatever the improvements of technical design and manufacturing processes.

EMC test



Seismic test



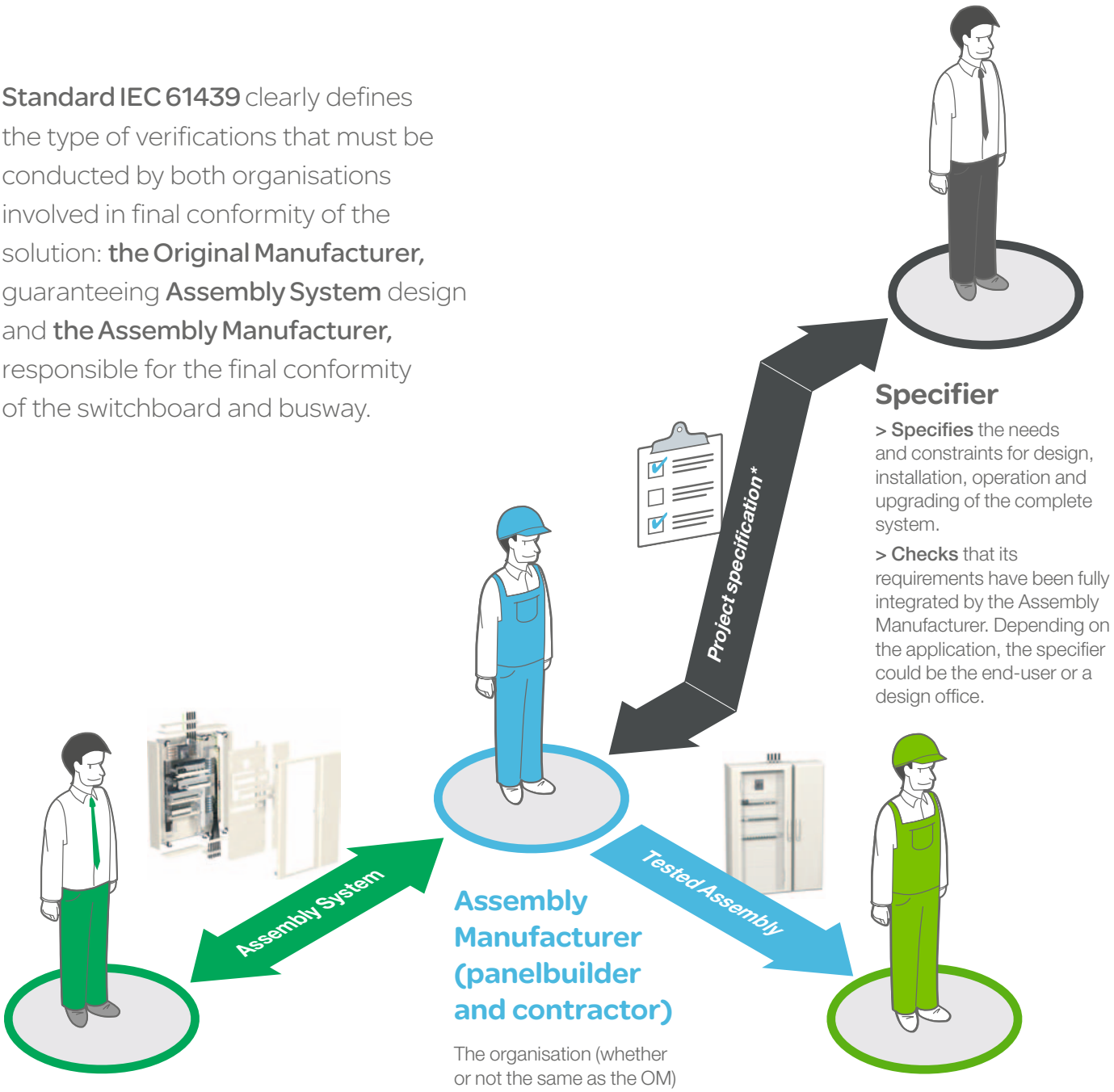
Fire barrier test

Fire resistant test

Flame propagation test

Original Manufacturer and Assembly Manufacturer:
Both involved in tested assemblies

Standard IEC 61439 clearly defines the type of verifications that must be conducted by both organisations involved in final conformity of the solution: **the Original Manufacturer,** guaranteeing **Assembly System** design and **the Assembly Manufacturer,** responsible for the final conformity of the switchboard and busway.



Specifier

> **Specifies** the needs and constraints for design, installation, operation and upgrading of the complete system.

> **Checks** that its requirements have been fully integrated by the Assembly Manufacturer. Depending on the application, the specifier could be the end-user or a design office.

Original Manufacturer

The organisation that has carried out the original design and the associated verification of an **Assembly System**.

He is responsible for the **"Design verifications"** listed by IEC 61439-6 standards including many electrical tests.

Assembly Manufacturer (panelbuilder and contractor)

The organisation (whether or not the same as the OM) responsible for the completed **Assembly**.

He is responsible for **"Routine verifications"** on each panel and busway produced, according to the standard.

If he derivates from the instructions of the original manufacturer he has to carry out again design verifications.

End-User

Should ask for a certified LV switchboard and busway. By systematically requesting routine verifications, he ensures that the Assembly System used is compliant.

** Schneider Electric has developed a specification guide.*

Few upgrades
for enhanced safety and durability

IEC 61439-1, -2 & -6 standards* = Only "Tested Assemblies"

new

General Rules

> IEC 61439-1

Power SC Assemblies**	Distribution Boards	Construction Sites	Public networks	Busbar Trunking
> IEC 61439-2	> IEC 61439-3	> IEC 61439-4	> IEC 61439-5	> IEC 61439-6

** IEC 61439-1 & -2 are published since January 2009, and IEC 61439-6 is published since May 2012.*
*** Switchgear and Controlgear Assemblies.*

IEC 60439 -1 = "Type Tested" & "partially Type Tested"

old

General Rules + Type Tested Assemblies / Partially Type Tested Assemblies

> IEC 60439-1

	Distribution Boards	Construction Sites	Cable Distrib. Cab.	Busbar Trunking
	> IEC 60439-3	> IEC 60439-4	> IEC 60439-5	> IEC 60439-2

Overview of the main verification changes (IEC 61439 vs IEC 60439)

> Design verification

- Increased requirements for insulating materials and transient overvoltages withstand tests.
- Temperature rise verification:
  - Verification by test of each functional unit loaded alone with its rated current
  - Clear methods for the selection of representative samples of an Assembly system to be tested
  - Test done in 4 steps: individual functional units, main and distribution busbars, and complete Assembly
  - Heating resistors only allowed to simulate circuits adjacent to a circuit under test
  - Possible verification by comparison with a tested design under strict conditions, including derating
  - Exemption of test (calculation) only allowed up to 1600 A instead of 3150 A under strict conditions, including a 20% derating.
- Possible short-circuit withstand verification by comparison with a tested design under strict condition
- 200 operating cycles instead of 50 for locking, interlocking and withdrawable parts
- Lifting test (from IEC 62208)
- Corrosion resistance test for metallic parts (from IEC 62208).

> Routine verification

- More detailed list of the verifications
- More severe requirements for clearances

Schneider Electric Industries SAS
35, rue Joseph Monier
CS 30323
F- 92506 Rueil Malmaison Cedex

RCS Nanterre 954 503 439
Capital social 896 313 776 €
www.schneider-electric.com

Printed on ecological paper

Publication: Schneider Electric Industries SAS
Layout: SEDOC
Printing: