B&R Enclosures Pty Ltd

AS/NZS 61439

Information Paper

WHAT IS AS/NZS 61439?

AS/NZS 61439 is the new series of standards for low-voltage (LV) switchgear and controlgear assemblies. The standard series is an adoption of the IEC 61439 series, with variations to include Australian and New Zealand conditions.

Parts 1 and 2 of the standard are addressed in this document, covering general rules, how the standard applies to power switchgear and controlgear assemblies, and how any changes will affect relevant parties.

WHEN DOES AS/NZS 61439 COME INTO EFFECT?

AS/NZS 61439 will supercede AS/NZS 3439 in 2021.

There is a 5 year transitional period beginning after the standard was introduced in May, 2016. The transition allows Manufacturers time to transition to full compliance with the new standard.

Until that time, switchboards can be compliant according to AS/NZS 3439 or AS/NZS 61439.

WHAT IS AS/NZS 61439 REPLACING?

AS/NZS 61439 series replaces the AS/NZS 3439 series, which has been in place since 2002.

AS/NZS 61439 series consists of six parts, including a Specifiers Guide in Part 0, General Rules in Part 1, and Power Switchgear and Controlgear Assemblies in Part 2.

The AS/NZS 61439 series can be purchased online at www.saiglobal.com

WHAT ARE THE KEY POINTS IN AS/NZS 61439?

Verification Methods

AS/NZS 61439.1 specifies three methods for verification, replacing TTA and PTTA; verification by testing, design rules, or assessment.

1. Verification by testing – this involves conducting tests proving the design fulfils the requirements of the standard.
2. Verification by comparison with reference design – this involves comparison with a design verified by test.
3. Verification by assessment – uses calculations and design rules for an assembly to show that the design meets the requirements of the standard.

WHAT ARE TTA AND PTTA?

According to AS/NZS 3439.1, a Type Tested Assembly (TTA) is a low-voltage switchgear and controlgear assembly conforming to an established type or system, verified in accordance with AS/NZS 3439, with no deviations likely to significantly influence the performance of the assembly.

A Partially Type Tested Assembly (PTTA) is defined as "a low-voltage switchgear and controlgear assembly, containing both type tested and non type tested arrangements, provided that the latter are derived (e.g. by calculation) from type tested arrangements [complying] with the relevant tests."

Verification Tests

AS/NZS 61439.1 retains all previous verification tests listed in AS/NZS 3439.1, and includes additional tests required for full compliance.

Table D1 of Annexure D provides design verification options permissible for each assembly characteristic.

Verification tests conducted according to AS/NZS 3439.1 do not need to be repeated if they fulfil the verification requirements of AS/NZS 61439.1.

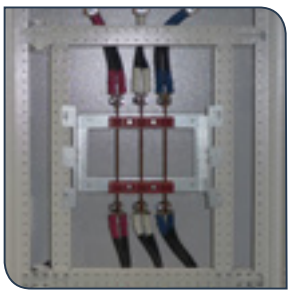
Comparison with Reference Design

Comparison with reference design according to AS/NZS 61439.1 introduces device substitution rules which compare thermal properties and performance with a similar tested device within a functional unit.

AS/NZS 61439.1 also introduces a Short Circuit Verification checklist (Table 13) for comparison with a reference design, including:

- Busbar assemblies
- Conductor materials
- Short circuit protective device operation and performance characteristics
- Compartment type / design

Annexure P provides an assessment method for busbar assemblies for comparison with a tested design, and considers busbar configurations, short circuit withstand, busbar support types, support distances and busbar connection methods.



AS/NZS 61439 – Table D1

No.	Characteristic to be verified	Verification options available: Testing	Comparison with Reference Design	Assessment
1	Strength of material and parts:			
	a. Resistance to corrosion	✓	×	×
	b. Properties of insulating materials			
	i. Thermal stability	✓	×	×
	ii. Resistance to abnormal heat and fire due to internal electric effects	✓	×	✓
	c. Resistance to ultra-violet (UV) radiation	✓	×	✓
	d. Lifting	✓	×	×
	e. Mechanical impact	✓	×	×
	f. Marking	✓	×	×
2	Degree of protection of enclosures	✓	×	✓
3	Clearances	✓	×	×
4	Creepage distances	✓	×	×
5	Protection against electric shock and integrity of protective circuits:			
	a. Effective continuity between the exposed conductive parts of the assembly and the protective circuit	✓	×	×
	b. Short-circuit withstand strength of the protective circuit	✓	✓	×
6	Incorporation of switching devices and components	×	×	✓
7	Internal electrical circuits and connections	×	×	✓
8	Terminals for external conductors	×	×	✓
9	Dielectric properties:			
	a. Power-frequency withstand voltage	✓	×	×
	b. Impulse withstand voltage	✓	×	✓
10	Temperature rise limits	✓	✓	✓*
11	Short-circuit withstand strength	✓	✓^	×
12	Electromagnetic compatibility (EMC)	✓	×	✓
13	Mechanical operation	✓	×	×

* Temperature rise limits (Clause 10) may be made by calculation for single compartment assemblies with rated current not exceeding 630A; assemblies with single or multiple compartments not exceeding 1600A can be verified by assessment, providing all conditions, as described in Clause 10.10.4.2 and Clause 10.10.4.3 respectively, are fulfilled.

Using the verification by assessment method, the continuous load of each switching device or electrical component in the main circuit must not exceed the permissible load at the calculated air temperature, and not more than 80% of the rated free air thermal current.

The standard will introduce restricted conditions under which switchgear devices tested in a verified assembly can be substituted with alternate brands or models. A device may be substituted with a similar device providing:

- it does not exceed 3150A (if from another manufacturer),
- its power loss or terminal temperature is the same or lower, and
- the physical arrangement and rating of functional unit is thermally the same or better.

^ The standard also introduces criteria for short circuit verification by comparison with a reference tested design. If all requirements listed in Table 13 of AS/NZS 61439 are met then no further verification is required.

Short-circuit protective devices of the same manufacturer but of different series or a different manufacturer may be considered equivalent if the performance characteristics are the same or better than the original tested device.

An assessment to verify the main busbar of an assembly shall be made by comparison with a reference design in accordance with Annexure P of AS/NZS 61439, and applicable requirements of Table 13 of AS/NZS 61439.1, providing the short circuit current is no greater than the tested design.

HOW WILL AS/NZS 61439 IMPACT MANUFACTURERS, ASSEMBLERS, AND END USERS?

Clarification of Responsibilities:

AS/NZS 61439 now defines the duties of the Original Manufacturer and the Assembly Manufacturer, and notes that these entities may be the same or separate organisations.

According to AS/NZS 61439.1, the Original Manufacturer is the organisation that has carried out the original design and the associated verification of an assembly in accordance with the relevant standard.

The Assembly Manufacturer is the organisation taking responsibility for the completed assembly that is supplied to the user.

The User is defined in the new standard as the party who will specify, purchase, use and/or operate the assembly, or someone acting on their behalf.

AS/NZS 61439 prescribes verification methods the Assembly Manufacturer will utilise to ensure compliance.

The Assembly Manufacturer ensures compliance to the standard using the Original Manufacturer's verified design or, where deviating from this design, undertakes verification for compliance.

Table D1 of AS/NZS 61439.1 Annexure D lists 13 characteristics of an assembly to be verified.

HOW IS B&R PREPARING?

B&R Enclosures is committed to providing Assembly Manufacturers with the flexibility to select a preferred brand of switchgear and/or controlgear.

As an Original Manufacturer, B&R has anticipated the need to conduct additional testing to be ready for AS/NZS 61439. B&R is well advanced in their testing program to ensure their commitment to Assembly Manufacturers is met.

B&R's Modular Switchboard system, Infinity 3G, has been successfully tested for compliance with AS/NZS 61439. This range been designed to provide a modular solution for commercial and residential power distribution and metering applications up to 630 Amps.

B&R's Signature SE range has been extensively NATA tested and ASTA certified to AS/NZS 3439.1. The results of many tests comply with the requirements of AS/NZS 61439:2016 Parts 1 and 2. Commencing in 2016, a recertification program is currently in progress with a range of verification tests successfully completed.

For more information or assistance preparing for AS/NZS 61439

Call 1300 ENCLOSURES (1300 362 567) to talk to our team of experts, or visit the B&R website.

Modular switchboard

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TP01.4: AS/NZS 61439 Information Paper v04. Originally published 27/05/2016. This version published 04/2020