



BE Switchcraft implementing AS/NZS 61439:2016

Australia Standard, published in May 2016

BE Switchcraft has been performing tests since 1968 and these play an influential role in our design and construction processes. These tests are the foundation of our switchboard design and enable us to manufacture a high quality, fully compliant product.

For us, making sure our customers are receiving the very best long-term solution is at the core of the way we work and our proactive role in testing to the new Standard (AS/NZS 61439:2016) is another example of this.

Coinciding with the release of the new Australian/New Zealand Standard AS/NZS 61439:2016, B.E. Switchcraft embarked on a series of tests at:

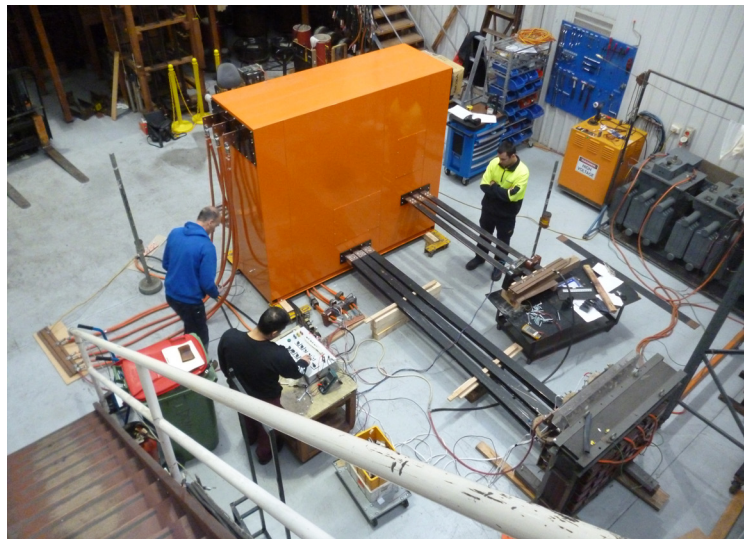
TUV Rheinland Australia Pty. Ltd.

High Power Laboratory in Heidelberg, Victoria.

Austest Laboratories Pty. Ltd. 2/9 Packard Avenue, Castle Hill, NSW.

Austest Laboratories Pty. Ltd. 12 Newfield Road, Para Hills West, SA.

This standard applies to low-voltage switchgear and control gear ASSEMBLIES; also, this standard applies to ASSEMBLIES intended for use in connection with the generation, transmission, distribution and conversion of electric energy and for the control of electric energy consuming equipment.



Evolution of the LV Switchboard Australian Standard:

PREVIOUS STANDARD (2002)

AS/NZS 3439.1:2002

Type-tested and partially type-tested assemblies

AS/NZS 3439.3:2002

Distribution Boards

AS/NZS 3439.4:2002

Requirements for assemblies for construction sites (ACS)

AS/NZS 3439.5:2002

Requirements for assemblies for power distribution in public networks

CURRENT STANDARD (2016)

AS/NZS 61439:2016-1

General Rules

AS/NZS 61439:2016-2

Power switchgear and control gear assemblies

AS/NZS 61439:2016-3

Distribution boards

AS/NZS 61439:2016-4

Assemblies for construction sites

AS/NZS 61439:2016-5

Assemblies for power distribution in public networks

BE Switchcraft verification methods according to AS/NZS 61439:2016

AS/NZS 61439:2016, stipulates the verification methodology substituting TTA (Type Tested Assemblies) and PTTA (Partial Type Tested Assemblies), for verification by testing, comparison with a reference design or by assessment. No longer can you claim that an assembly is PTTA.

> Testing

The various methods include:

1. *Verification testing; Testing at various NATA Test labs;*
2. *Verification comparison with a compliant tested reference design;*
3. *Verification assessment, i.e. confirmation of the correct application of calculation and design rules, including use of appropriate safety margins.*

> Comparison with reference design

> Assessment

The 13 steps of verification are stipulated within Table D.1 below:

The more common requirements, such as temperature rise limits and short circuit withstand capacity can be verified by test, comparison and calculations. The new standard also requires testing on the below mechanical items which are ***more detailed than previous standards***, and can only be verified by testing:

- ✓ Mechanical impact (IK test in accordance with IEC 62262)
- ✓ Lifting
- ✓ Resistance to corrosion (i.e. coating systems)
- ✓ Properties of insulation materials (Manufacture/supplier demonstrate compliance).



Doug Davidson
ELECTRICAL TESTING SUPERVISOR

Bianca Fernandez
ENGINEERING MANAGER

BE Switchcraft verification methods according to AS/NZS 61439:2016

No.	TABLE D.1: Characteristics to be verified	Clause	Verification Options		
			By Testing	By Comparison	By Assessment
1	Strength of material and parts:	10.2			
	Resistance to corrosion	10.2.2	YES	NO	NO
	Properties of insulation materials:	10.2.3			
	Thermal Stability	10.2.3.1	YES	NO	NO
	Resistance to abnormal heat and fire due to internal electric effects	10.2.3.2	YES	NO	YES
	Resistance to Ultra-violet (UV)	10.2.4	YES	NO	YES
	Lifting	10.2.5	YES	NO	NO
	Mechanical impact	10.2.6	YES	NO	NO
	Marking	10.2.7	YES	NO	NO
2	Degree of protection of enclosures	8.3	YES	NO	YES
3	Clearances	10.4	YES	NO	NO
4	Creepage distances	10.4	YES	NO	NO
5	Protection against electric shock and integrity of protective circuits:	10.5			
	Effective continuity between the exposed conductive parts of the ASSEMBLY and the protective circuit	10.5.2	YES	NO	NO
	Short-circuit withstand strength of the protective circuit	10.5.3	YES	YES	NO
6	Incorporation of switching devices and components	10.6	NO	NO	YES
7	Internal electrical circuits and connections	10.7	NO	NO	YES
8	Terminals for external conductors	10.8	NO	NO	YES
9	Dielectric properties:	10.9			
	Power-frequency withstand voltage	10.9.2	YES	NO	NO
	Impulse withstand voltage	10.9.3	YES	NO	YES
10	Temperature -rise limits	10.1	YES	YES	YES
11	Short-circuit withstand strength	10.11	YES	YES	NO
12	Electromagnetic compatibility (EMC)	10.12	YES	NO	YES
13	Mechanical operation	10.13	YES	NO	NO

INTERNAL ARCING FAULT

Although not a compulsory item within AS/NZS 61439:2016, BE Switchcraft follows the guidelines provided in AS/NZS 61439.1:2016 APPENDIX ZC for assemblies intended to provide increased security against the occurrence or the effects of Internal Arcing Faults. We specifically offer means of achievement in accordance to **APPENDIX ZC, a, c & d** as below:

(a) By the provision of one or more insulation systems providing IPXXB degree of protection.

NOTE: For example, surrounding live conductors to include substantial insulation which alone is capable of withstanding the dielectric test voltage of the ASSEMBLY. Such provision is able to resist without damage all likely mechanical forces and temperatures that may occur in service and during maintenance by resin encapsulation or other insulation, in addition to clearance in air or other insulating media.

(c) By the use of devices (e.g. fuses or circuit breakers), designed to limit the magnitude and duration of the arcing current by interruption thereof, so as to limit the risk of injury to personnel or damage to the ASSEMBLY.

(d) By the use of devices sensitive to the energy radiated from an arc which are designed to reliably initiate the interruption of the arcing current (e.g. by means of a circuit breaker).

BE Switchcraft also recommend using arc flash detection systems as an appropriate form of preventing an internal arc fault. In most cases an internal arc fault would cause major damage to a switchboard thus rendering it unusable without repair or replacement. Subsequently implementing an arc flash detection system will prevent the fault from occurring and will allow the switchboard to be inspected and rectified without major internal damage.



BE SWITCHCRAFT TEST RESULTS

All detailed results are documented in the following Test Reports:

Test Report No. 50054963 001	Temperature Rise Test AS/NZS 61439.1:2016, clause 10.10.2.3.7c Test Item: Functional Units Test laboratory: TUV Rheinland Australia, High Power Laboratory Heidelberg Vic
Test Report No. 50063613 001	Temperature Rise Test AS/NZS 61439.1:2016, clause 10.10.2.3.7c Test Item: Complete Assembly Test laboratory: TUV Rheinland Australia, High Power Laboratory Heidelberg Vic
Test Report No. 50054963 002	Short Circuit Withstand Test AS/NZS 61439.1:2016, clause 10.11.5.3.2 & 10.11.5.3.3 Test Item: Incoming & Outgoing Units, 65kA-1 second Test laboratory: TUV Rheinland Australia, High Power Laboratory Heidelberg Vic
Test Report No. 50054963 003	Short Circuit Withstand Test Test Specification: AS/NZS 61439.1:2016, clause 10.11.5.3.2 Test Item: Main Busbars, 65kA-1 second Test laboratory: TUV Rheinland Australia, High Power Laboratory Heidelberg Vic
Test Report No. 50063613 001	Temperature Rise Test AS/NZS 61439.1:2016, clause 10.10.2.3.5 Test Item: Complete Assembly Test laboratory: TUV Rheinland Australia, High Power Laboratory Heidelberg Vic
Test Report No. 0321BESSEL529	IP54 Test AS/NZS 60529:2004; AS/NZS 61439.1:2016, clause 10.3 Test Item: Complete Assembly Test laboratory: Austest Laboratories, 12 Newfield Road, Para Hills West SA
Test Report No. 032BESSOL529	IP56 Test AS/NZS 60529:2004; AS/NZS 61439.1:2016, clause 10.3 Test Item: Complete Assembly Test laboratory: Austest Laboratories, 12 Newfield Road, Para Hills West SA
Test Report No. 0806BESSVCMIL	Vibration, Airborne Noise & Shock Test MIL-STD-167-1A; ISO 3746:2010; MIL-STD-810G W/Change 1. Test Item: Complete Assembly Test laboratory: Austest Laboratories, 2/9 Packard Avenue, Castle Hill NSW
Test Report No. QM F84	Lifting Test AS/NZS 61439.1:2016, clause 10.2.5 Test Item: Complete Assembly Test laboratory: Onsite test (1182 Old Port Road, Royal Park SA)
Test Report No. 0904BESSWI262	Mechanical Impact (IK07) & Resistance to Corrosion IEC 62262:2002; IEC 60068-2-75:2014; AS/NZS 61439.1:2016; IEC60068-2-30:2005; IEC60068-2-11:1981 Test Item: Complete Assembly Test laboratory: Austest Laboratories, 2/9 Packard Avenue, Castle Hill NSW
Test Report No. 1114BESSWITCH529	IP56 Test AS/NZS 60529:2013; AS/NZS 61439.1:2016, clause 10.3 Test Item: Complete Assembly Test laboratory: Austest Laboratories, 12 Newfield Road, Para Hills West SA
Test Report No. 0929BES20068	Sinusoidal Vibration with Resonance Test IEC 60068-2-6:2007; AS1170.4-2007 Test Item: Complete Assembly Test laboratory: Austest Laboratories, 2 Brex Court, Reservoir VIC 3073



BE Switchcraft switchboards can be found throughout Australia, from Parliament House in Canberra through to major hospitals, commercial buildings and sporting stadiums across the country. For over 5 decades we have built a reputation on trust, integrity, innovation and delivering on our commitments. Leading electrical contractors and engineers choose BE Switchcraft because of our ability to deliver a wide range of products and services that are renowned for their design, build quality and outstanding long-term support.

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