Benefits of Using Third Party Testing

Webinar 1: Conductors short-circuit tested according to IEC (AS/NZ) 61439-1

nVent ERIFLEX Team

2020-05-19

Agenda

Insight about AS/NZ 61439-1 (Section 8.6)

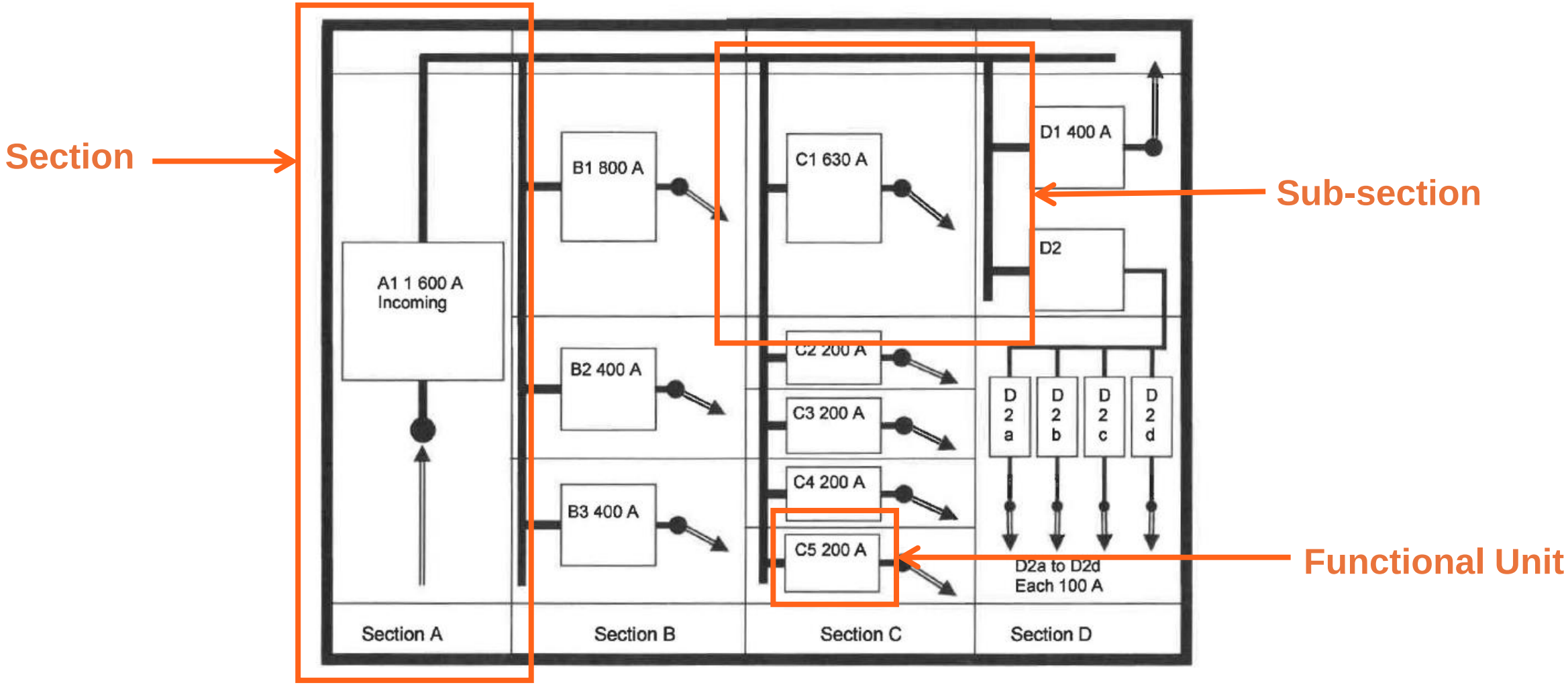
Example of short-circuit tested conductors

Other benefits of these conductors

Conclusion

Insight about AS/NZ 61439-1 (Section 8.6)

- From Figure E.1 of AS/NZ 61439-1: typical layout showing sections and functional units



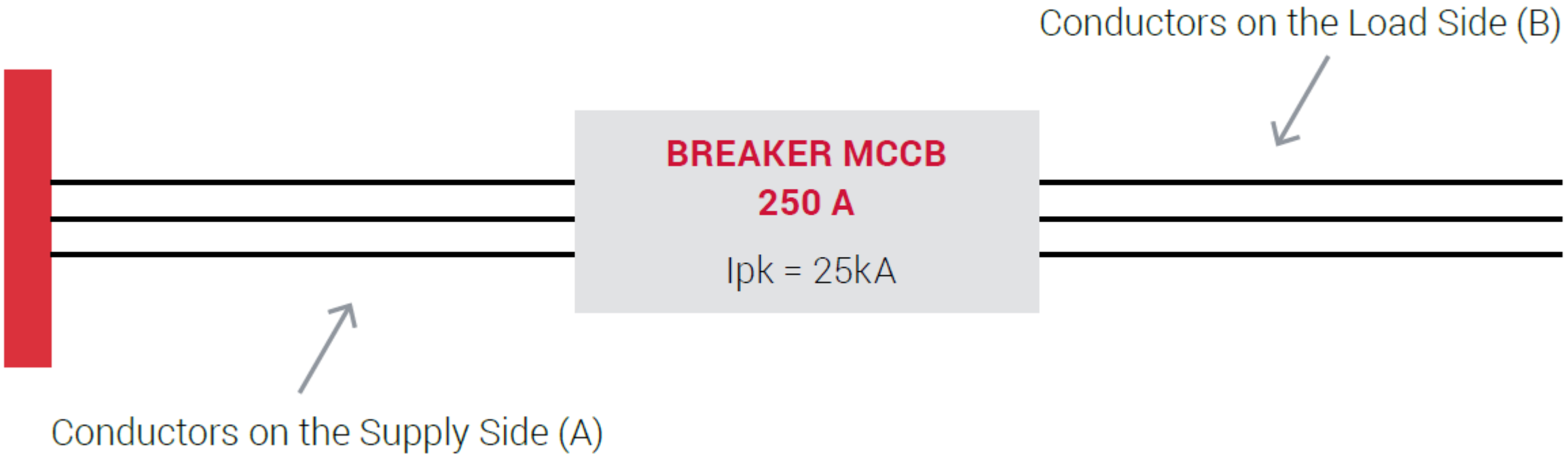
Insight about AS/NZ 61439-1 (Section 8.6)

- **Section 8.6 is titled *Internal electrical circuits and connections* but what does it say (from 8.6.1)?**

Within one section, **the conductors** (including distribution busbars) between the main busbars and the supply side of functional units as well as the components included in these units **may be rated on the basis of the reduced short-circuit stresses occurring on the load side of the respective short-circuit protective device within each unit**, provided that these conductors are arranged so that under normal operation an **internal short-circuit between phases and/or between phases and earth is not to be expected** (see 8.6.4).

Insight about AS/NZ 61439-1 (Section 8.6)

- **Practical example:**



What conductors can I use to meet these requirements and obtain my compliance to AS/NZ 61439-1?

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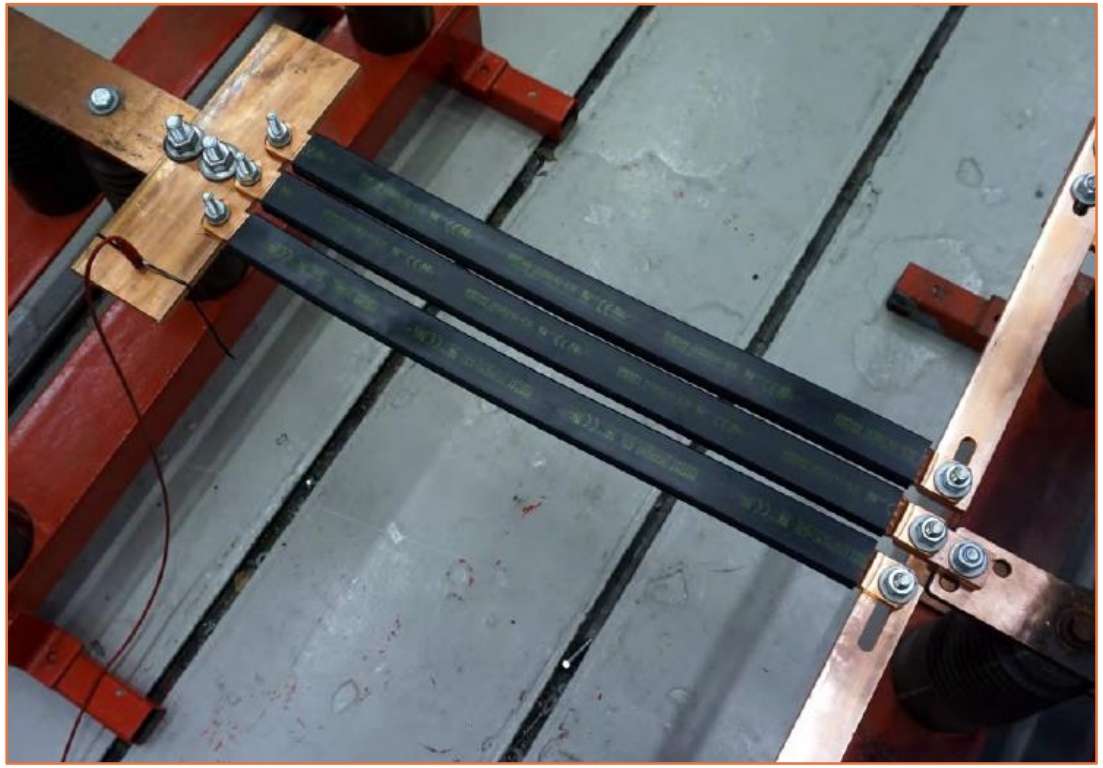
Example of short-circuit tested conductors

- The **nVent ERIFLEX IBSB Advanced** are an example of third-party tested conductors per IEC 61439-1.

Example of short-circuit tested conductors

- Testing took place in Norway in order to obtain **third-party DNV-GL approval**
- Certificate focus is on, but not limited to, the very stringent Marine applications (high-corrosion and vibration environment)



Example of short-circuit tested conductors

➢ **Online certification**

DNV·GL

Certificate No:
TAE00003B8

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Bus Bar

with type designation(s)
ERIFLEX insulated braided conductor IBSADV and IBSBADV

Issued to
ERICO Europe BV
Tilburg, Noord-Brabant, Netherlands

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

This Certificate is valid until **2024-01-07**.
Issued at **Høvik** on **2019-01-08**

DNV GL local station: **Rotterdam**

Approval Engineer: **Nicolay Horn**

for **DNV GL**
Digitally Signed By: Alonso Pontes, Marta
Location: DNV GL Høvik, Norway

Marta Alonso Pontes
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Job Id: **262.1-024834-1**
Certificate No: **TAE00003B8**

Name and Place of manufacturer
ERICO France SARL, Rue Charles Dalliére BP31,
42161 Andrézieux Bouthéon Cedex, France.

Product description

nVent ERIFLEX IBS and IBSB Advanced Flexible single-phase insulated braided conductor, insulation voltage 1000 VAC/1500 VDC, flammability in accordance to UL 94 V0. Insulation material: Low smoke and Halogen free Thermoplastic elastomer.

Type name	Description	Current* (A)	Joule-integrale*** (A^2s)	Rated short-circuit peak I_{pk}*** (kA)
IBSADV 25	IBS ADV 25-230 to IBS ADV 25-1030	125	$2.27x10^7$	14
IBSBADV 50	IBSB ADV 50-230 to IBSB ADV 50-1030	250	$8.17x10^7$	30
IBSBADV 70	IBSB ADV 70-230 to IBSB ADV 70-1030	300	$1.58x10^8$	30
IBSBADV 100	IBSB ADV 100-230 to IBSB ADV 100-1030	350	$3.31x10^8$	70
IBSBADV 120	IBSB ADV 120-230 to IBSB ADV 120-1030	400	$4.67x10^8$	70
IBSBADV 185	IBSB ADV 185-230 to IBSB ADV 185-1030	500	$8.81x10^8$	70
IBSADV 240	IBSB ADV 240-230 to IBSB ADV 240-1030	630	$1.52x10^9$	80

* Connection: Busbar to electrical component. Air temperature around bus-bar 45 °C.
** Joule-integrale is based on testing one conductor per phase with a 1 s duration.
*** Rated Short-Circuit Peak of the conductor from 1 s duration tests.

Application/Limitation

To be used inside switchboards/enclosures onboard ships.

nVent ERIFLEX Advanced Insulated Braided Conductor used for one outgoing circuit may be rated on the basis of the reduced short-circuit stress occurring on the load side of the respective short-circuit productive device as stated in IEC 61439-1 item 8.6.1 part 1. nVent ERIFLEX Advanced Insulated Braided Conductor used as a connection from the main bus-bar to a dropper with several outgoing circuits shall be designed in accordance with the requirements 61439-1 item 8.6.1 part 2.

To be installed in accordance with the manufacturer's instruction. Max. 630 mm between the supports.

Type Approval documentation

Data sheet: Drawing "For types IBS ADV, IBSB ADV drawing no. PC-0160" dated 2018-06-26.

Test reports: RATP Report "Fire behaviour of product Isolated ERIFLEX ADVANCED / ERIFLEX ADVANCED No. 17.0501 dated 2017-04-20.
SGS Test Report no. SHIN1705029620PS dated 2017-06-08.

Tests carried out

Short-circuit test and voltage after IEC 61439-1. Flame retardance test after UL 94 V0.

Example of short-circuit tested conductors

- **Certificate details:**

Tests carried out

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Example of short-circuit tested conductors

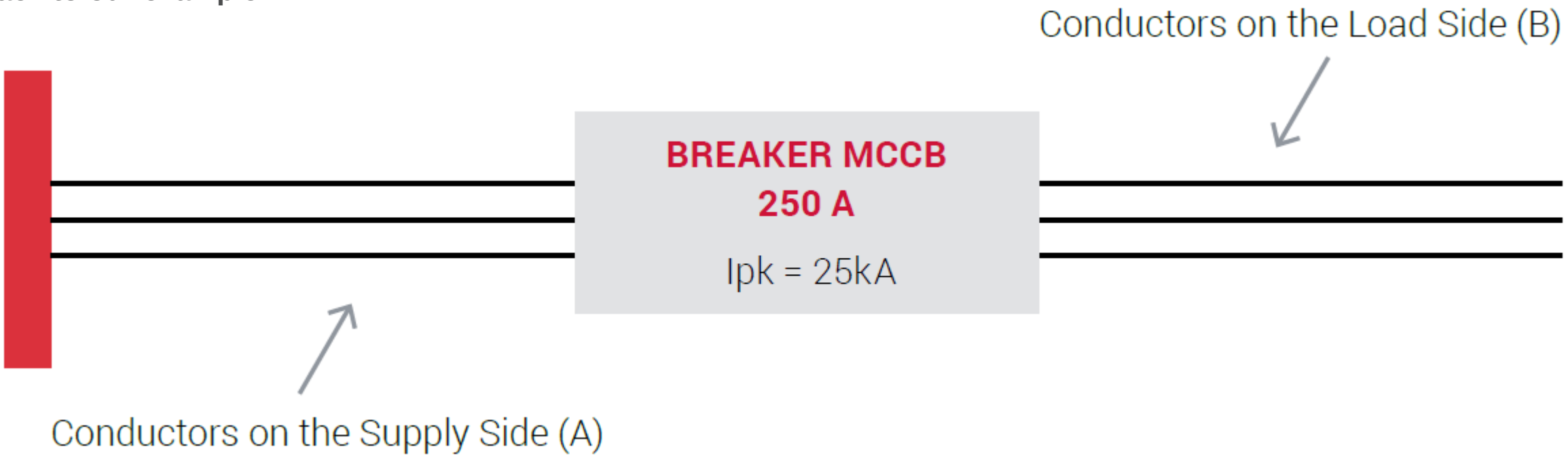
- **The most important part of the certificate:**

CROSS-SECTION	INSULATED BRAIDED CONDUCTOR	NOMINAL CURRENT RATING	RATED SHORT-CIRCUIT PEAK (Ipk)	THERMAL SHORT CIRCUIT STRENGTH (0.2sec)
25mm²	IBSBADV25 / IBSADV25	125A / 160A	14kA	10.7kA
50mm²	IBSB ADV 50	250A	30kA	20.2kA
70mm²	IBSB ADV 70	300A	30kA	22.4kA
100mm²	IBSB ADV 100	350A	70kA	40.6kA
120mm²	IBSB ADV 120	400A	70kA	40.6kA
185mm²	IBSB ADV 185	500A	70kA	66.3kA
240mm²	IBSB ADV 240	630A	80kA	87.2kA

Conductors short-circuit tested according to IEC (AS/NZ) 61439-1

Example of short-circuit tested conductors

- **Back to our example:**



Answer:

Since the short-circuit protective device has an Ipk rating of 25kA for a nominal current rating of 250A, an IBSB ADV 50(Ipk=30kA, In=250A) can be selected for both side of the Breaker (A) & (B).

Example of short-circuit tested conductors

- Keep in mind that this possible because the IBSB insulation is rated as a reinforced conductor (Class II/Double Insulated Equivalent).
- Going back to 8.6.1 “internal short-circuit between phases and/or between phases and earth is not to be expected (see 8.6.4)”

apave

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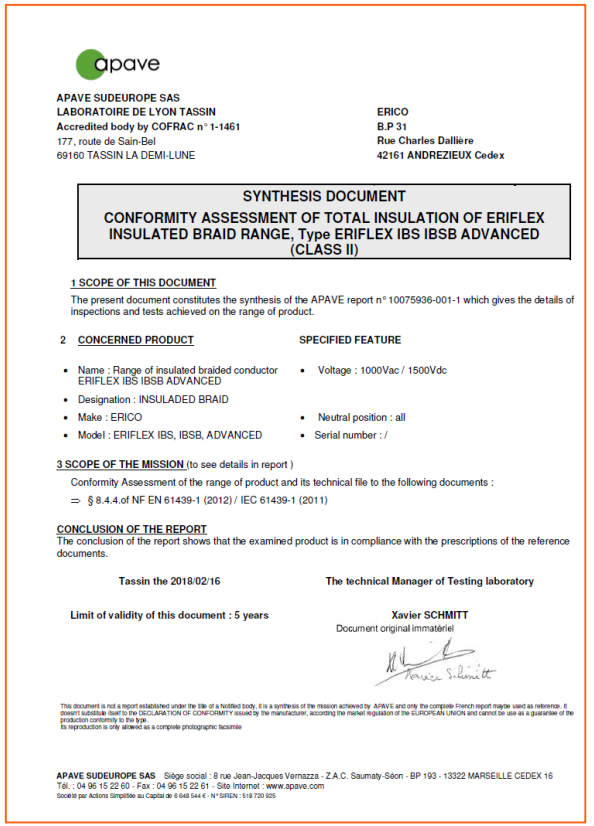
ERICO
B.P 31
Rue Charles Dallière
42161 ANDREZIEUX Cedex

SYNTHESIS DOCUMENT

CONFORMITY ASSESSMENT OF TOTAL INSULATION OF ERIFLEX INSULATED BRAID RANGE, Type ERIFLEX IBS IBSB ADVANCED (CLASS II)



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CONFORMITY ASSESSMENT OF TOTAL INSULATION OF ERIFLEX INSULATED BRAID RANGE, Type ERIFLEX IBS IBSB ADVANCED (CLASS II)

1 SCOPE OF THIS DOCUMENT
The present document constitutes the synthesis of the APAVE report n° 10075936-001-1 which gives the details of inspections and tests achieved on the range of product.

2 CONCERNED PRODUCT

- Name : Range of insulated braided conductor ERIFLEX IBS IBSB ADVANCED
- Designation : INSULADED BRAID
- Make : ERICO
- Model : ERIFLEX IBS, IBSB, ADVANCED

SPECIFIED FEATURE

- Voltage : 1000Vac / 1500Vdc
- Neutral position : all
- Serial number : /

3 SCOPE OF THE MISSION (to see details in report)
Conformity Assessment of the range of product and its technical file to the following documents :
⇒ § 8.4.4.of NF EN 61439-1 (2012) / IEC 61439-1 (2011)

CONCLUSION OF THE REPORT
The conclusion of the report shows that the examined product is in compliance with the prescriptions of the reference documents.

Tassin the 2018/02/16 — The technical Manager of Testing laboratory

Limit of validity of this document : 5 years — Xavier SCHMITT
Document original immatériel

This document is not a report established under the title of a Notified body, it is a synthesis of the mission achieved by APAVE and only the complete French report maybe used as reference. It doesn't substitute itself to the DECLARATION OF CONFORMITY issued by the manufacturer, according the market regulation of the EUROPEAN UNION and cannot be use as a guarantee of the production conformity to the type.
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Example of short-circuit tested conductors

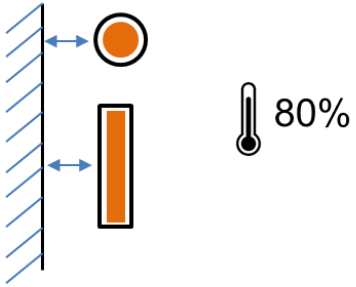
TABLE 4 – CONDUCTOR SELECTION AND INSTALLATION REQUIREMENTS (8.6.4) FROM IEC 61 439-1

Type of conductor	Requirements
Bare conductors or single-core conductors with basic insulation, for example cables according to IEC 60227-3	Mutual contact or contact with conductive parts shall be avoided, for example by use of spacers
Single-core conductors with basic insulation and a maximum permissible conductor operating temperature of at least 90 °C, for example cables according to IEC 60245-3, or heat-resistant thermo-plastic (PVC) insulated cables according to IEC 60227-3	Mutual contact or contact with conductive parts is permitted where there is no applied external pressure. Contact with sharp edges shall be avoided. These conductors may only be loaded such that an operating temperature of 80 % of the maximum permissible conductor operating temperature is not exceeded
Conductors with basic insulation, for example cables according to IEC 60227-3, having additional secondary insulation, for example individually covered cables with shrink sleeving or individually run cables in plastic conduits	No additional requirements
Conductors insulated with a very high mechanical additional requirements strength material, for example Ethylene Tetrafluoro Ethylene (ETFE) insulation, or double-insulated conductors with an enhanced outer sheath rated for use up to 3 kV, for example cables according to IEC 60502	
Single or multi-core sheathed cables, for example cables according to IEC 60245-4 or IEC 60227-4	

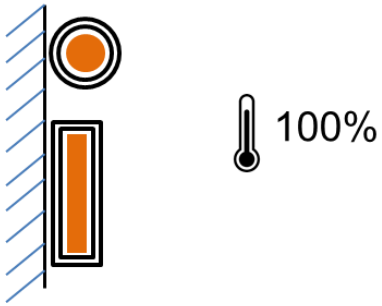
Insulation none Class II compliant are considered basic insulation. Additionnal requirements are mandatory.

IBS & IBSB Advanced are considered as a very high mechanical strength material insulation after test (class II). It gives the advantage of no additionnal requirements.

Single-Core conductor with basic insulation



Class II Conductor



Agenda

Insight about AS/NZ 61439-1 (Section 8.6)

Example of short-circuit tested conductors

Other benefits of these conductors

Conclusion

Other benefits of these conductors

- Unique Range of 79 Parts
- Safer Insulation
- Ready To Install
  No Additional Material

Unique – Safer – Ready to Install

Conductors short-circuit tested according to IEC (AS/NZ) 61439-1

Other benefits of these conductors

WHAT

➢ **Insulated Braided Conductor for Circuit Breakers:**

- ✓ Halogen-free
- ✓ Low Smoke
- ✓ Flame Retardant
- ✓ High Temperature
- ✓ Tinned

WHY

➢ **Why IBS & IBSB Advanced :**

- ✓ Ready-to-install
- ✓ Flexible conductor: wire replacement solution
- ✓ Unique designed for connections to all molded case circuit breakers, including the most compact breakers on the market

SPEC

Cross Sections	25 to 240 mm² (49.34 to 273.65 kcmil)
Lengths	230 to 1,030 mm (9.06" to 40.55")
Ampacity Range	80 to 700 A

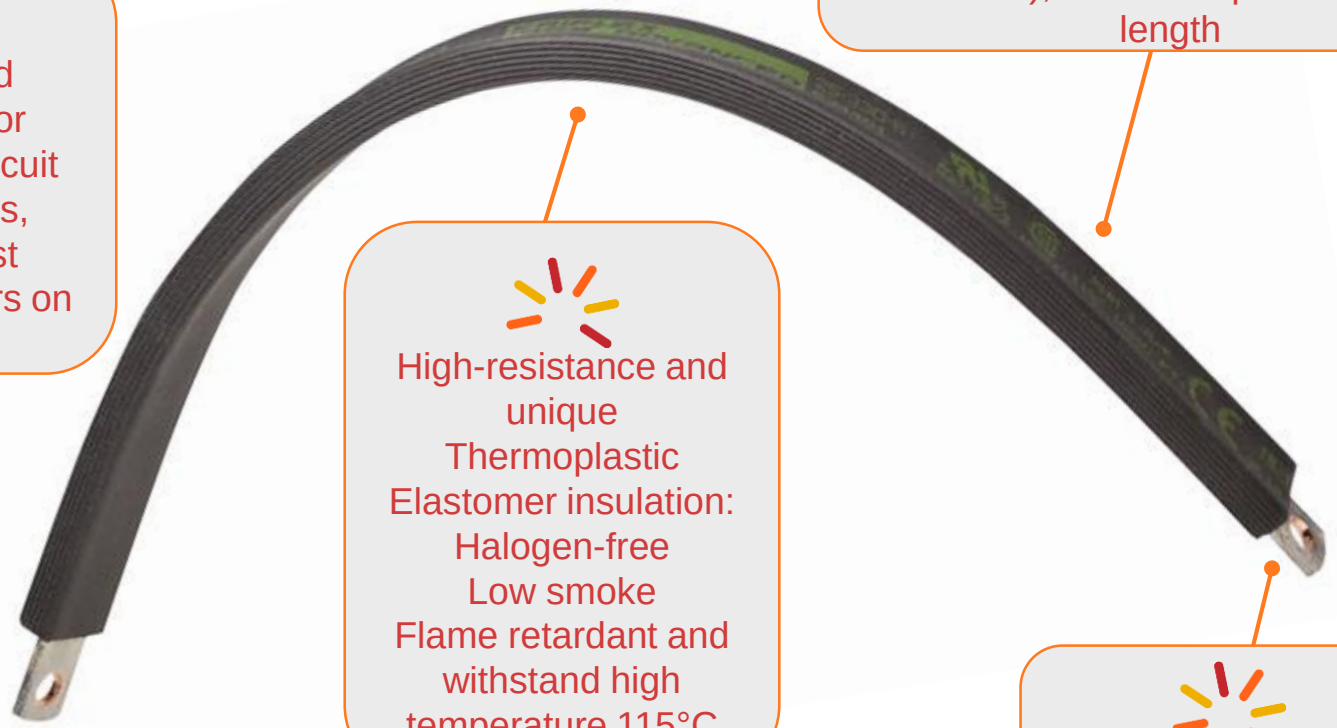
Unique – Safer – Ready to Install

Conductors short-circuit tested according to IEC (AS/NZ) 61439-1

Other benefits of these conductors

Full application range: 80 A to 630 A (section 25, 50, 70, 100, 120, 185 and 240 mm²), with 230 up to 1030 mm length

Designed and connectable for molded case circuit breaker ranges, including most compact breakers on the market



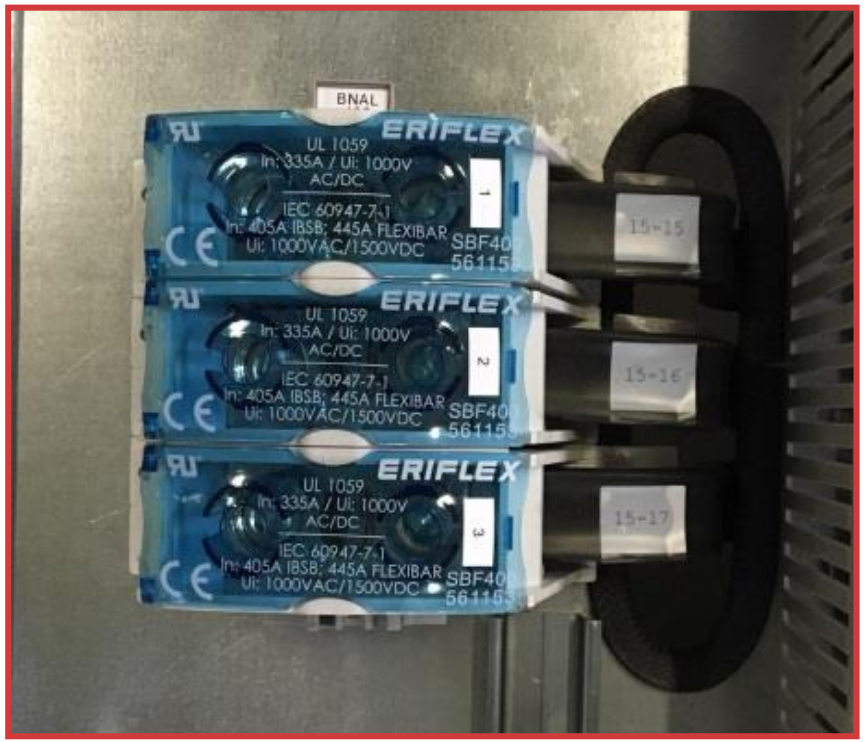
High-resistance and unique Thermoplastic Elastomer insulation:
Halogen-free
Low smoke
Flame retardant and withstand high temperature 115°C

Material savings: Tinned Integral palm without lugs or terminals

Conductors short-circuit tested according to IEC (AS/NZ) 61439-1

Other benefits of these conductors

- Can be used as part of a broader nVent ERIFLEX solution.
- More on that next week!



nVent ERIFLEX **Power Blocks** and four pole **Distribution Blocks** are **designed to be used with** IBS & IBSB Advanced

Our **Power** and **Distribution Blocks** are compact halogen-free & flame retardant, easy fasten to DIN rails or steel sheet, design for visual inspection, high fill-ratio ensures optimal electrical connectivity even in tight assemblies

Conductors short-circuit tested according to IEC (AS/NZ) 61439-1

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Insight about AS/NZ 61439-1 (Section 8.6)

Example of short-circuit tested conductors

Other benefits of these conductors

Conclusion

Conclusion

- **Short-circuit conductors tested according to IEC 61439-1 such as the nVent ERIFLEX IBSB Advanced power braids ease the selection of conductors and facilitate compliance to the new Australian standard from a short-circuit standpoint.**

Resources

- nVent ERIFLEX IBSB webpage: https://www.erico.com/category.asp?category=R3443
- nVent ERIFLEX DNV-GL certificate: https://approvalfinder.dnvgl.com/#approval/TAE00003B8
- nVent ERIFLEX “Reinforced/Class II” certificate: https://www.erico.com/catalog/certifications/IEC_61439_1_CLASS_II_IBSB_ADV.pdf
- nVent ERIFLEX IBSB Technical Guide: https://www.erico.com/catalog/literature/P8701-EN.pdf

ANY FURTHER QUESTIONS:

- Please ask your local COLTERLEC representative

- Chris Holst (Christopher.holst@nvent.com)

Thank you