

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Low Voltage Cable**with type designation(s)
Marine CAN Bus Cable,

Issued to

SAB Bröckskes GmbH & Co. KG
Viersen, Germany

is found to comply with

Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
IEC 60092-376 (2003-05)
IEC 60754-1 (2011-11)
IEC 60332-1-2 (2004-07)**Application :****Shipboard and offshore cables intended for control, instrumentation and telecommunication.**
Flame retardant, low halogen.

Type	Voltage class (V)	Temp. class (°C)
Marine CAN Bus Cable	250	90

This Certificate is valid until **2019-06-30**.Issued at **Høvik** on **2015-07-08**for **DNV GL**DNV GL local station: **Essen**Approval Engineer: **Ludovico Gullifa**

Marit Laumann
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.

Product description

Cable Type: Marine CAN Bus Cable 250V ($U_m = 300$ V peak operation voltage)

Construction:
Conductors: Fine stranded copper (Class 5 or Class 6)
Core insulation: XLPE
Screen: Tinned copper wire braid covering $\geq 80\%$
Outer sheath: TPU

No	No. of pairs x No. of cores x conductor cross-section
1	2x2x0,5 mm ²

Physical CAN BUS media parameters	
Impedance	$Z = 120 \Omega$ min=95 Ω ; max= 140 Ω
Length-related resistance	$R = 70 \text{ m}\Omega/\text{m}$
Specific line delay	5 ns/m

Application/Limitation

Control Apparatus Net (CAN) cable, flame (IEC 60332) retardant, low halogen (IEC 60754). Operating temperature: -40°C to 90°C.

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60092-376	2003-05	Cables for control and instrumentation circuits 150/250 V (300 V)	The outer sheath is deviating from the IEC 60092-376 design standard
IEC 60332-1-2	2004-07	Tests on electric and optical fibre cables under fire conditions – Part 1-1: Test for vertical flame propagation for a single insulated wire or cable – Apparatus	Flame retardant small scale
IEC 60754-1	2011-11	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content	Low Halogen: <0,5% Halogen
EN 50363-10-2	2005-11	Insulating, sheathing and covering materials for low voltage energy cables. Part 10-2: Miscellaneous sheathing compounds – Thermoplastic polyurethane	
ISO 11898-2	2003-11	Road vehicles -- Controller area network (CAN) -- Part 2: High-speed medium access unit	

Job Id: **262.1-016265-1**
Certificate No: **TAE0000003**

Marking of product

SAB BRÖCKSKES - Marine CAN Bus Cable - 2x2x0,5 mm² -250V -year

Periodical assessment

The scope of the periodical assessments to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Assessment to be performed at least every second year.

END OF CERTIFICATE