

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Data transmission cables and systems**

with type designation(s)

**Armada® AMF Ethernet / LAN cable Cat 5, Cat 5e,
Armada® AMF Ethernet / LAN cable cat 6, Cat 6A,
Armada® AMF Ethernet / LAN cable cat 7, Cat 7A**

Issued to

**Belcom Cables Ltd.
Elsenham, Essex, United Kingdom**

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Cables suitable for work area cabling between work station and communication outlet.****Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2018-08-02**This Certificate is valid until **2023-08-01**.for **DNV GL**DNV GL local station: **Manchester**Approval Engineer: **Ivar Bull**

**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.



Product description

Armada® AMF Ethernet / LAN cables.

Stranded conductors suitable for work area cabling between work station and communication outlet.

Cable types	Design standards	Cross section	Conductor type ref IEC 60228	Shielding
Cat 5e	IEC 61156-6	26 AWG(0.138mm ²) 24 AWG(0.204mm ²) 23 AWG(0.246mm ²) 22 AWG(0.324mm ²)	Stranded class 2	F/UTP, S/FTP, SF/UTP
Cat 6	IEC 61156-6	26 AWG(0.138mm ²) 24 AWG(0.204mm ²) 23 AWG(0.246mm ²) 22 AWG(0.324mm ²)	Stranded class 2	F/UTP, S/FTP, SF/UTP
Cat 6A Cat 7 Cat 7A	IEC 61156-6	26 AWG(0.138mm ²) 24 AWG(0.204mm ²) 23 AWG(0.246mm ²) 22 AWG(0.324mm ²)	Stranded class 2	U/FTP, F/FTP, S/FTP

Construction

Conductor	Bare annealed or tinned copper class 2
Insulation	Solid or cellular polyolefin
Individual screen	*/FTP cables have individual foil screen
Common screen	S/*TP cables have a common braid screen F/*TP cables have a common foil screen SF/*TP cables have a common foil screen and a braid screen
Outer sheath	SHF1 or SHF2 or SHF MUD, single or double layer

Electrical characteristics at 20°C

	Cat 5e		Cat 6		Cat 6A		Cat 7		Cat 7A	
Frequency MHz	Att dB /100m	NEXT dB	Att dB /100m	NEXT dB	Att dB /100m	NEXT dB	Att dB /100m	NEXT dB	Att dB /100m	NEXT dB
1	3.2	65	3.1	75.3	3.1	75.3	3.0	78.0	3.0	78.0
4	6.0	56	5.8	66.3	5.8	66.3	5.6	78.0	5.6	78.0
10	9.5	50	5.9	60.4	5.9	60.3	8.8	78.0	8.7	78.0
16	12.1	47	11.4	57.2	11.4	57.2	11.1	78.0	10.9	78.0
31.25	13.5	46	16.0	52.9	16.0	52.9	15.6	78.9	15.5	78.0
62.5	17.1	43	22.8	48.4	22.8	48.4	22.3	75.5	21.9	78.0
100	24.8	38	29.9	45.3	29.9	45.3	28.5	72.4	27.8	78.0
150	32.0	35	37.4	42.7	37.4	42.7	35.3	69.8	34.2	76.0
200			43.8	40.8	43.8	40.8	41.2	67.9	39.7	74.0
250			49.7	39.3	49.7	39.3	46.5	66.4	44.5	72.5
300					55.1	38.1	51.3	65.2	49.0	71.2
400					65.1	36.3	60.0	63.4	57.0	69.4
500					74.0	34.8	67.9	61.9	64.2	67.9
600							75.1	60.7	70.6	66.7
1000									92.9	63.4

Application/Limitation

Temperature window

Installation: -15°C to +50°C

Operation/storage : -40°C to +85 °C

In order to achieve a transmission compliant with Category 7 and above, cables shall be installed with suitable termination equipment according to manufacturer's recommendations.

The requirements of SOLAS Amendments Chapter II-1, Part D, Reg. 45, 5.2 (provision to be taken to limit Fire Propagation along Bunches of Cables or Wires) are fulfilled without any additional measures.

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 61156-1	2007-06	Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification	
IEC 61156-3	2008-11	Multicore and symmetrical pair/quad cables for digital communications – Part 3: Work area cable - Sectional specification	
IEC 61156-6	2010-01	Multicore and symmetrical pair/quad cables for digital communications - Part 6: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz - Work area wiring - Sectional specification	Reference to requirement for category cable: 6 (250MHz), 6A (500 MHz), 7 (600MHz), 7A (1000 MHz)
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 60332-3-22	2009-02	Tests on electric and optical fibre cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A	Bunch test Category A
IEC 60332-3-24	2009-02	Tests on electric and optical fibre cables under fire conditions – Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category C	Bunch test
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:

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IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables – Determination of the degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke
NEK 606 Ed. 4	2009-05	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: IRM903 100°C 7d. Calc. Bromide 70°C 56d Carbo Sea 70°C 56d.

Marking of product

Armada® * Part number* Category Type – design standard – LSZH FireFighter® SHF1 – IEC 60332-3-22 / IEC 60332-3-24 – DNV GL Certified TAE***** - YoM - *Batch*

Family	Category type	Shield type	Conductor type	Conductor size	Sheath material
AMF	5e = CAT 5e 6 = CAT 6 6A = CAT 6A 7 = CAT 7	FU = F/ UTP FF = F/FTP SF = S/FTP SFU = SF/ UTP	BS = BC (Bare copper) TS = TC (Tinned copper)	26=26AWG 24=24AWG 23=23AWG 22=22AWG	ZF1 = SHF1 ZF2 = SHF2 ZFM = SHF2 MUD

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are 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 Routine tests (RT) and selected type tests (ref. to applicable class programs) checked (if not available these tests shall 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.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE