

TYPE APPROVAL CERTIFICATE

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

with type designation(s)

**Armada® Armoured Ethernet Cable Cat 5e 24AWG Solid S/FTP,
Armada® Armoured Ethernet Cable Cat 6 23AWG Solid U/FTP, F/UTP, S/FTP,
Armada® Armoured Ethernet Cable Cat 6a 23AWG Solid F/FTP, S/FTP,
Armada® Armoured Ethernet Cable Cat 7 23AWG Solid F/FTP, S/FTP**

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 :****Cable suitable for horizontal floor wiring. Armoured.****Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2020-10-14**for **DNV GL**This Certificate is valid until **2025-10-13**.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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

Armada® Armoured Ethernet cables.

Cable types	Design standards	Cross section	Conductor type ref IEC 60228	Shielding
Cat 5e	IEC 61156-5	24 AWG(0.204mm ²)	Solid class 1	S/FTP
Cat 6	IEC 61156-5	23 AWG(0.246mm ²)	Solid class 1	U/FTP, F/UTP, S/FTP
Cat 6a	IEC 61156-5	23 AWG(0.246mm ²)	Solid class 1	F/FTP, S/FTP
Cat 7	IEC 61156-5	23 AWG(0.246mm ²)	Solid class 1	F/FTP, S/FTP

Construction

Conductor	Bare or Tinned Solid Copper Class 1
Insulation	Polyolefin
Individual screen	*/FTP cables have individual Aluminium Foil screen
Common screen	S/*TP cables have a common braid screen F/*TP cables have a common Aluminium foil screen SF/*TP cables have a common Aluminium foil screen and a braid screen
Armour	Steel Wire Braid, Tinned Copper Wire Braid, Plain Copper Braid, Steel Wire Armour, Bronze Wire Braid.
Outer sheath	SHF1 or SHF2 (single layer) or SHF MUD resistant (double layer)

Electrical characteristics at 20°C

Frequency MHz	Cat 5e		Cat 6		Cat 6A		Cat 7	
	Att dB /100m	NEXT dB	Att dB /100m	NEXT dB	Att dB /100m	NEXT dB	Att dB /100m	NEXT dB
1	2,1	65	2,0	75,3	2,0	75,3	2,0	78,0
4	4,1	56	3,8	66,3	3,8	66,3	3,7	78,0
10	6,5	50	6,0	60,3	5,9	60,3	5,9	78,0
16	8,3	47	7,6	57,2	7,5	57,2	7,4	78,0
20	9,3	46	-	-	-	-	-	-
31.25	11,7	43	10,7	52,9	10,5	52,9	10,4	78,9
62.5	17,0	38	15,4	48,4	15,0	48,4	14,9	75,5
100	22,0	35	19,8	45,3	19,1	45,3	19,0	72,4
150			24,7	42,7	23,7	42,7	23,6	69,8
200			29,0	40,8	27,6	40,8	27,5	67,9
250			32,8	35,3	31,1	39,3	31,0	66,4
300					34,3	38,1	34,2	65,2
400					40,1	36,3	40,0	63,4
500					45,3	34,8	45,3	61,9
600							50,1	60,7
1000								

Manufactured by

DNV GL Id : 10096273

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

Datasheets Armada® Armoured Ethernet Cables, Belcom Technical Specification
 Type test DB1B04R2401 – 9DNV001108 cat 6 stranded
 DB2C04S2601 – 9DNV004108 cat 6_A stranded
 DB5D04s2601 – 9dnv002108 cat7 stranded
 Flame test report Category A dated 23.01.2014
 Mud resistance test NEK 606 dated 23.01.2014.

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	2018-07	Tests on electric cables under fire conditions - Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category A	Charred portion of sample does not exceed 2,5m above bottom edge of burner.

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IEC 60332-3-24	2018-07	Tests on electric cables under fire conditions - Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60754-1:2011 +AMD1:2019 CSV	2019-11	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content	Low Halogen: <0,5% Halogen
IEC 60754-2:2011 +AMD1:2019 CSV	2019-11	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1&2:2005 +AMD1:2013 +AMD2:2019 CSV	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%
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 * acc. to IEC 61156-5 - IEC60332-3-22 / IEC60332-3-24 - Armoured MUD Resistant - DNVGL Certified YR20** P*****

Family	Category type	Shield type	Conductor type	Conductor size	Armour material	Sheath material
AML	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)	24=24AWG 23=23AWG	WB = GSWB WA = SWA TW = TCWB CW = PCWB BW = PBWB	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