DNV·GL

Certificate No:
E-14064
File No:
827.50
Job Id:
262.1-010044-2

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Data transmission cables and systems

with type designation(s)
ToughCat 5e S/FTP Class 2 stranded conductor, ToughCat 7 S/FTP Class 2 stranded conductor, ToughCat 7S S/FTP Class 1 solid conductor

Issued to
Draka Comteq Germany GmbH & Co. KG
Nürnberg, Germany

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
Type Approval Programme No. 6-827.50-2
IEC 61156-5 Ed. 2.0 (2009-02)
IEC 60332-3-24 (2009-02)
IEC 60754-1/2 (2011-11)
IEC 61034-1/2 (2013-07/2013-09)

Application :

Data communication cable
Installation / Horizontal cable
Halogen free, Low smoke

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

Type	Voltage (kV)	Temp. class (°C)
ToughCat 5e S/FTP Class 2 stranded conductor		
ToughCat 7 S/FTP Class 2 stranded conductor		
ToughCat 7S S/FTP Class 1 solid conductor		

This Certificate is valid until **2018-12-31**.
Issued at **Høvik** on **2015-02-26**

DNV GL local station: **Essen**

Approval Engineer: **Ivar Bull**

for **DNV GL**
Digitally Signed By: Laumann, Marit
Location: DNV GL Høvik, Norway
Signing Date: 2015-03-01

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.

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Product description

Type(s): **ToughCat 5e S/FTP 4x 2 x 0,22mm^2**
Standards: Category 5/5e Installation/Horizontal cable according to:
EN 50173-1; EN 50288-2-1, ISO/IEC 11801; IEC 61156-5
Conductors: Plain, stranded copper
Core insulation: Polyethylene
Screen: Al/polyester tape
Metal covering: Tinned, Copper wire braid
Outer sheath: SHF1

Electric data at 20 °C

Frequency	Attenuation, nominal	NEXT
MHz	(db/100m)	(db)
1	2,1	90
4	4,0	90
10	6,3	90
16	8,0	90
20	9,0	90
31,25	11,4	90
62,5	16,5	86
100	21,3	83

Characterics tic impedance 100 Ohm
DC-loop resistance $\leq$158 Ohm/km

Type(s): **ToughCat 7 S/FTP 4x2x 0,27mm^2 (stranded)**
ToughCat 7S S/FTP 4x2x 0,56mm (solid)
Standards Category 7, Installation cable according to:
EN 50173-1; EN 50288-4-1, ISO/IEC 11801; IEC 61156-5
Conductors: Plain solid copper or plain stranded copper
Core insulation: Polyethylene
Screen: Al/polyester tape
Metal covering: Tinned, Copper wire braid
Outer sheath: SHF1

Electric data at 20 °C

	Class 1 solid conductor		Class 2 stranded conductor	
Frequency	Attenuation, nominal	NEXT	Attenuation, Nominal	NEXT
MHz	(db/100m)	(db)	(db/100m)	(db)
1	1,8	100	2,0	90
4	3,4	100	3,6	90
10	5,4	100	5,5	90
16	6,8	100	7,5	90
20	7,7	100	7,7	90
31,25	9,6	100	9,8	90
62,5	13,7	100	14,0	86
100	17,4	100	17,9	83
155	21,9	94	22,4	81
200	25,0	92	25,6	78
250	28,1	90	28,7	77
300	30,9	89	31,6	73
600	44,8	85	45,7	71

	Class 1 solid conductor	Class 2 stranded conductor
Characteristic impedance	100 Ohm	100 Ohm
DC-loop resistance	≤ 150 Ω/km	≤138 Ohm/km

Application/Limitation

Temperature window
Operation: - 40°C to +85°C
Installation: - 15°C to +50°C

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

Data sheets: IE_ToughCat5_S_FTP_e, dated 14.11.2014
IE_ToughCat7_S_FTP_e, dated 14.11.2014
IE_ToughCat7S_S_FTP_e, dated 14.11.2014
Test report: Draka test report summary dated 2004-01-30

Tests carried out

Standard	Issued	General description	Limitation
	2001	DNV Type Approval Programme 6-827.50-2	
IEC 61156-5	2009-05	Multicore and symmetrical pair/quad cables for digital communications - Part 5: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz - Horizontal floor wiring - Sectional specification	Reference to requirement for category cable: Cat 5e (100MHz), Cat 7 (600MHz)
ISO/IEC 11801	2010-04	Information technology – Generic cabling for customer premises, inc Amd 1 and 2.	Reference to requirement for category cable: Cat 5e (100MHz), Cat 7 (600MHz)
IEC 60332-3-24	2009-02	Flame retardance in bunch, cat. C	
IEC 60754-1	1994-01	Test on gases evolved during combustion of materials from cables – Determination of the amount of halogen acid gas	Low Halogen
IEC 60754-2	1999-07	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 condctivity	Halogen free
IEC 61034-1/2	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke

Marking of product

DRAKA ToughCat Part No. 60011599 CERTIFIED BY DET NORSKE VERITAS TYPE APPROVAL PROGRAMME NO. 6-827.50-2 CATEGORY 5e S/FTP 4x2/0,22mm^2 - IEC 61156-5 EN 50288-2-1 IEC 60332-3-24 - LSHF-FR - Batch no.- Metermarking or

DRAKA ToughCat Part No. 60011617 CERTIFIED BY DET NORSKE VERITAS TYPE APPROVAL PROGRAMME NO. 6-827.50-2 CATEGORY 7 S/FTP 4x2/0,27mm^2 - IEC 61156-5 - EN 50288-4-1 IEC 60332-3-24 - LSHF-FR - Batch no. - Metermarking or

DRAKA ToughCat Part No. 60015280 CERTIFIED BY DET NORSKE VERITAS TYPE APPROVAL PROGRAMME NO. 6-827.50-2 CATEGORY 7S S/FTP 4x2/0,56mm - IEC 61156-5 - EN 50288-4-1 IEC 60332-3-24 - LSHF-FR - Batch no. - Metermarking

Periodical assessment

The scope of the Periodical assessmentis 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.

Periodical assessment to be performed at least every second year.

END OF CERTIFICATE