DNV·GL

Certificate No:
TAE00001MZ

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Data transmission cables and systems

with type designation(s)
R&M Freenet Industry S/FTP C5e, R&M Freenet Industry S/FTP Cat7

Issued to
Reichle & De-Massari AG Hauptsitz
Wetzikon ZH, Switzerland

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

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

This Certificate is valid until **2020-06-30**.
Issued at **Hamburg** on **2017-01-10**

DNV GL local station: **Augsburg**

Approval Engineer: **Carsten Hunsalz**

Digitally Signed By: Rinkel, Marco
for **DNV GL**
Signing Date: 2017-01-17
Location: Hamburg - On behalf of

Duy Nam Le
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

Type(s):	**R&M Freenet Industry S/FTP C5e**
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

Number of cores x conductor cross-section mm^2	Overall diameter Mm
4 x 2 x 0,22	7,7±0,3

Electric data at 20 °C

Frequency	Attenuation, Nom	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

Characterictic impedance	100 Ohm
DC-loop resistance	158 Ohm/km

Type(s):	**R&M Freenet Industry S/FTP Cat7**
Standards	Category 7, Installation cable according to: EN 50173-1; EN 50288-4-1 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

Number of cores x conductor cross-section mm^2	Overall diameter mm
4 x 2 x 0,27	8,1±0,3

Electric data at 20 °C

Frequency	Attenuation, nom	NEXT
MHz	(db/100m)	(db)
1	2,0	90
4	3,6	90
10	5,5	90
16	7,5	90
20	7,7	90
31,25	9,8	90
62,5	14,0	86
100	17,9	83
155	22,4	81
200	25,6	78
250	28,7	77
300	31,6	73
600	45,7	71

Characterics tic impedance 100 Ohm
DC-loop resistance 138 Ohm/km

Manufactured by

DNV CIM: 10082991

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.

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 Approval documentation

Data sheet(s) DATA_SH B freenet Industry Cat.5e 200 B.pdf
DATA_SH A freenet Industry Cat.7 900 B.pdf
Test report : test report summary dated 2004-01-30

Tests carried out

Standard	Release	General description	Limitation
DNVGL-CP-0403	2015-12	DNV GL Type approval program for data communication cables – category cables	
IEC 61156-5	2009-05	Multicore and symmetrical pair/quad cables for digital communications - Part 5: Symmetrical pair/quad cables with	Reference to requirement for category cable:

Standard	Release	General description	Limitation
		transmission characteristics up to 1 000 MHz - Horizontal floor wiring - Sectional specification	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	Tests on electric cables under fire conditions - Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C	Bunch test Category C
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
IEC 60754-2	2011-11	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	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%

Marking of product

R&Mindustry S/FTP Cat.5e 200MHz 4PxAWG24 LSFRZH NVP= 75% ISO/IEC 11801 EIA/TIA 568B CERTIFIED BY DNV GL TYPE APPROVAL PROGRAMME NO. DNVGL-CP-0403 <R&M source code> <batch no.> <MC7> <DD/MM/YY/hh/mm> <meter> m

R&Mindustry S/FTP Cat.7 4PxAWG23 LSFRZH NVP= 76% ISO/IEC 11801 CERTIFIED BY DNV GL TYPE APPROVAL PROGRAMME NO. DNVGL-CP-0403 <R&M source code> <batch no.> <MC7> <DD/MM/YY/hh/mm> <meter> m

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) checked (if not available tests according to 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 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