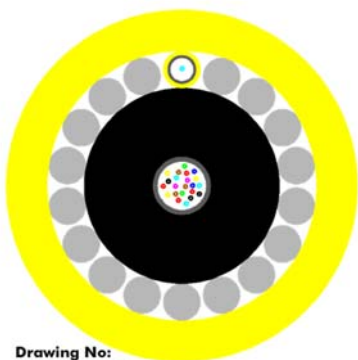


Nexans

Technical Description

Interstation Cable

Document no.: SB363-TD			 Drawing No: D-9970 Issue 2		
Unit content: G16 + G1 UNIT-FO2.3 FO element with 16 off G.652.D fibres 1 off UNIT-FO1.5 FO element with 1 off High NA fibre 1 off					
Material description : G16+G1 QERE -Ø2.3/Ø1.5- R1.9			Material No: 10544751		
Tender no.:			Contract no.:		
04E	2020-06-26	Issued for Construction	IJV	MCN	IJV
03E	2018-11-07	Issued for Construction	JAZ	MCN	IJV
02E	2018-01-23	Issued for Construction	JAZ	MCN	IJV
01T	2017-09-22	Issued for Tender	EAA	MCN	IJV
Issue no.	Date	Document status	Prepared by	Approved by	Released by
Revision / Status Coding: Issued for Tender XXT Approved for Construction XXE Issued for DIC / IDC (Draft) XXD As-Built XXA Issued for Company Comment (Review)XXR					
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1. SCOPE

This document presents the technical description and cross section drawing of an interstation cable based on URC-1 LW fibre optic submarine cable with 16 off single mode fibres in accordance with ITU-T G.652. 1 off High NA fibre is located in a stranded 1.5mm steel tube which is integrated in the armouring.

Fibre splices, if any, will be reported in the Manufacturing Record Book. Furthermore, fibre splices on stranded tube (FO1.5) shall be clearly marked at the location of the splice on both FO1.5 jacket and the outer jacket.

Cable handling and installation shall be performed in accordance with latest revision of Nexans guidelines (see section 2. REFERENCES).

2. REFERENCES

Document	Document title
TR1232	Subsea Umbilicals and Cables Rev. 5
TR3043	Telecommunication systems Rev. 5.01
NeNo – TR-48-99	Handling Guidelines for URC-1, ROC-1 and ROC-2 products
NeNo – TR-01-12	Outer marking of URC-1 and ROC-2 cables
IEC 60793	Generic Specification Optical Fibres
IEC 60794	Optical Fibre Cables
ITU-T G.652	Characteristics of a single-mode optical fibre and cable
TIA-598-D	Optical Fiber Cable Color Coding
ISO 13628 – 5	Petroleum and natural gas industries -- Design and operation of subsea production systems -- Part 5: Subsea Umbilicals Subsea Umbilicals.
ISO 9001	Quality management systems
ISO 14001	Environmental management systems
OHSAS 18001	Occupational Health and Safety Management Systems
QHSENO-1-1201	QHSE Management System Handbook
QHSENO-1-1205	ISO Certificates "The Quality Management System" according to ISO 9001:2008 "The Environmental Management System" according to ISO 14001:2004 "The Occupational Health and Safety Management Systems" according to OHSAS 18001:2007

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3. CABLE DESIGN

3.1 Element Details

Process/ Material		Nom. Thickness (mm)	Nom. Outer Diameter (mm)
UNIT FO1.5:			
Optical fibre	1 SM High NA 80µm core fibre*)		0.16
Tube	Steel tube with filling compound	0.15	1.5
Sheath	HDPE, Yellow		1.9
UNIT FO2.3:			
Optical fibre	16 SM ITU-T G652D		0.25
Tube	Steel tube with filling compound	0.20	2.3
Sheath	HDPE, Black		10

*) Company provided and free issued to Nexans.

Note: No copolymer between steel tube and the inner sheath to enhance the termination work for the client.

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3.2 Element Lay-up

Process/ Material		Nom. Thickness (mm)	Nom. Outer Diameter (mm)
Cable Core:			
UNIT FO2.3	1 off		10
Armouring:			
Galvanized steel wires	17 off	1.9	14.3
Unit FO1.5	1 off	1.9	
Interstices filled with bitumen + wrapping			
Outer sheath			
HDPE, yellow		2.3	19

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3.3 Characteristics

Physical Characteristics	Unit	Nominal value	±
Cable core diameter	mm	10	1
Cable outer diameter	mm	19	1
Weight in air, approx.	kg/m	0.65	-
Weight in seawater, approx.	kg/m	0.35	-
Minimum Breaking Load	kN	50	-
Nominal Transient Tensile Load, NTTS	kN	30	-
Nominal Operating Tensile Load, NOTS	kN	20	-
Nominal Permanent Tensile Load, NPTS	kN	15	-
Minimum Recommended Bending Radius, no Tension	m	0.50	-
Minimum Recommended Bending Radius, above NPTS	m	0.75	-
Hydrostatic Pressure Resistance	Bar	300	-
Operating Temperature Range	°C	-10 to +40	-
Storage Temperature Range	°C	-40 to +70	-
Handling Temperature Range	°C	-20 to +60	-
Fibre excess length in centre tube	%	0.1	-
Fibre excess length in stranded tube	%	Min 0.03	-
Axial Rigidity, fixed ends	MN	9.8	-
Load cancelling slack in centre tube, fixed ends	kN	10	-
Load cancelling slack in stranded tube, fixed ends	kN	20	-

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Optical Characteristics, ITU-T G.652.D	Unit	Nominal value	±
Mode field diameter @ 1310 nm	μm	9.2	0.4
Mode field diameter @ 1550 nm	μm	10.4	0.5
Fibre cladding diameter	μm	125	0.7
Mode field/cladding concentricity error	μm	≤ 1	-
Non circularity of cladding	%	≤ 1	-
Cut-off-wavelength, λ _{cc}	nm	≤ 1260	-
Coating diameter, uncoloured fibre	μm	242	5
Effective group index of refraction, 1550 nm	-	1.468	-
Attenuation @ 1550 nm	dB/km	≤ 0.21	-
Attenuation @ 1310 nm	dB/km	≤ 0.35	-
Localised attenuation variation	dB	≤ 0.1	-
Chromatic dispersion @ 1550 nm	$\frac{ps}{nm \cdot km}$	≤ 18	-
Zero dispersion wavelength region	nm	1304-1324	-
Zero Dispersion slope	$\frac{ps}{nm^2 \cdot km}$	≤ 0.092	-
Polarization Mode Dispersion	$\frac{ps}{\sqrt{km}}$	≤ 0.1	-
Fibre proof test level	%	≥ 2 (1s)	-

Optical Characteristics, High NA 80μm core fiber	Unit	Nominal value	±
Characteristics dependant on supplied fibre. Nexans will measure the OTDR at 1550/1625 nm and provide the test results to the client. A 80 μm pigtail will be used for the OTDR measurements			

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3.4 Marking

3.4.1 Cable Marking

The outer sheath shall be marked every meter as follows:

<Cable ID > <Product Order No> <G16 + G1 QERE R1.9> <Nexans Norway>
<year>, <meter>

3.4.2 Fibre Coding

All fibres have unique fibre colour marking as shown in the table below for 16 fibres. The fibre colour marking is in accordance with TIA-598-D

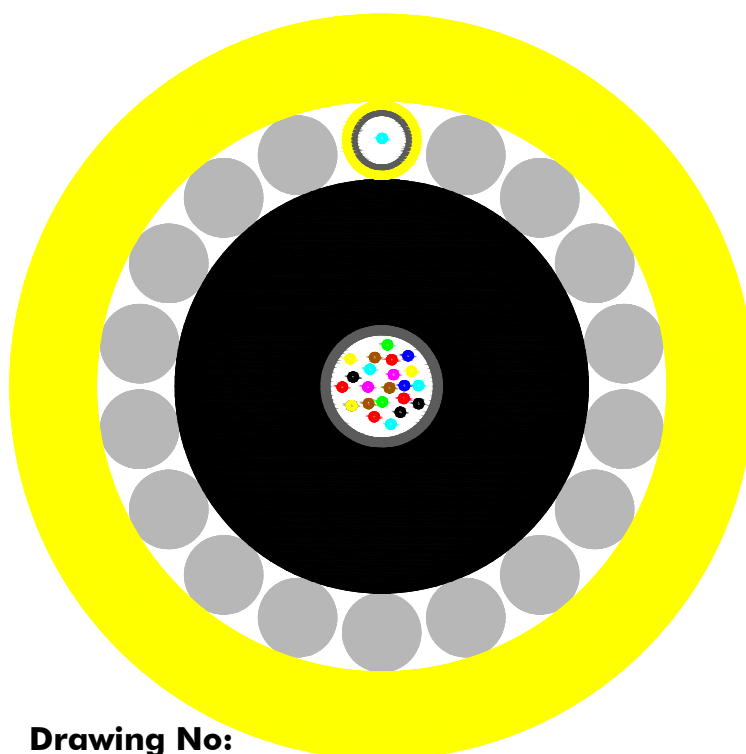
UNIT-FO	Fibre numbering code, 16 fibres ¹	
Fibre colour	0/0	1/50
Blue	1	13
Orange	2	14
Green	3	15
Brown	4	16
Grey	5	
White	6	
Red	7	
Natural	8	
Yellow	9	
Violet	10	
Pink	11	
Aqua	12	

¹ Ring markings A/B is defined as follows:

- A = number of rings at each marking point
- B = spacing between marking points in mm.

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4. CROSS-SECTIONAL DRAWING



**Drawing No:
D-9970 Issue 2**

5. AMENDMENT LIST

Issue No.	Date	Amendments
01T	2017-09-22	First edition
02E	2018-01-23	Added material number
03E	2018-11-07	Updated value for the Fibre excess length in stranded tube from 0.05% into the Min 0.03%(Clause 3.3) Added OTDR measurement at 1625nm
04E	2020-06-26	Removed magnetization of the steel armouring

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