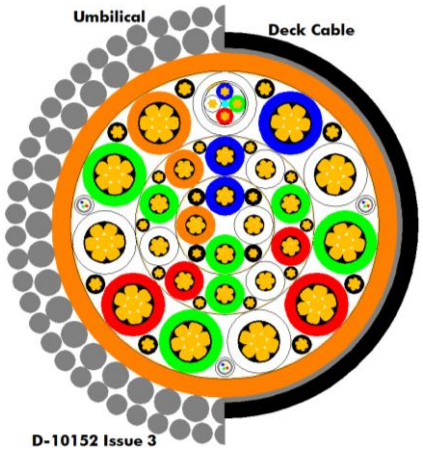
Technical Description

STEEL ARMOURED ROV UMBILICAL

Document no.: RS830

Unit content:

UNIT-P10	Power conductor, 10mm^2, 4.5kV	10 off
UNIT-P2	Power conductor, 2mm^2, 4.5kV	14 off
UNIT-FO	Fibre optic element, 4SM	3 off
UNIT-SQ	Screened quad, 0.5mm^2	1 off



Material description:

3xGs(4)+10x10mm^2+14x2mm^2+A2-0.5mm^2-FMV-RP2.6/2.0

3xGs(4)+10x10mm^2+14x2mm^2+A2-0.5mm^2 FMBP

Material no.:

10254515

10254516

Tender no.: KI010-14

Contract no.:

Issue no.	Date	Document status	Prepared by	Approved by	Released by
03E	04.07.14	Approved for Construction	JHH	JLU	LOM
02T	27.01.14	Issued for Tender	JHH	JLU	LOM
01T	16.01.14	Issued for Tender	JHH	JLU	LOM

Revision / Status coding:

Issued for Tender	XXT	Issued for Company Comment (Review)	XXR
Issued for DIC / IDC (Draft)	XXD	Approved for Construction	XXE
		As-Built	XXA

Nexans Norway AS, P.O. Box 6450 Etterstad, N-0605 Oslo, Norway

1. SCOPE

This document describes a torque balanced steel armoured umbilical and corresponding deck cable.

NOTES:
1. The design outlined in this document is in accordance to Nexans best practice for winch operated subsea cables. Nexans best practice is field proven with a long track record, and is thus qualified (ref. TR-027-14).
2. Order of precedence: In the event of conflict between the content of this document and other specifications, this document takes precedence.
3. The quality is verified through a control activity plan (ref. TR-055-12) and the corresponding control activity description (ref. TR-088-12).
4. Cable handling and installation shall be performed in accordance with latest revision of Nexans guidelines (re. TR-01-01).

2. REFERENCES

Document:	**Document title:**
TR-027-14	*Clarification of Nexans best practise for winch operated subsea cables*
TR-055-12	*Control activity plan for inline manufacturing of subsea cables.*
TR-088-12	*Control activity description for inline manufacturing of specialized subsea cables.*
TR-01-01	*Handling / Installation guidelines for dynamic cables.*

3. CABLE DESIGN

3.1 Element details

Process/ Material		Nom. thickness (mm)	Nom. outer diameter (mm)
UNIT-FO	**Fibre Optic element**		
Optical fibre	4SM (9/125µm)		0.25
Tube	Steel tube with filling compound	0.15	1.5
Sheath	Polypropylene, natural		1.9
UNIT-SQ	**Screened Quad, 0.5mm²**		
Conductor	Cu, 0.5mm²	7x0.3	0.9
Insulation	Polypropylene, colour coded		1.66
Filling	Solid filler and petroleum jelly		
Wrapping	Polyester tape		4.1
Screen	Drain wires + Al/polyester laminate	8x0.2	4.5
Sheath	Polypropylene, natural		6.2
UNIT-P2	**Power conductor, 2mm², 4.5kV**		
Conductor	Cu, 2mm²	7x0.6	1.8
Insulation	Semiconducting polypropylene Insulating polypropylene, colour coded		 3.8
UNIT-P10	**Power conductor, 10mm², 4.5kV**		
Conductor	Cu, 10mm²	7x1.39	3.9
Insulation	Semiconducting polypropylene Insulating polypropylene, colour coded		 6.2

3.2 Element lay-up

Process/ Material		**Nom. thickness (mm)**	**Nom. outer diameter (mm)**
1st-layer			
UNIT-P2	Power conductor, 2mm^2, 4 off	3.8	9.5
Interstices	Filling compound		
Screen	Screen wires (0.5mm^2), 4 off Screen tape	1.7	9.7
2nd-layer			
UNIT-P2	Power conductor, 2mm^2, 10 off	3.8	17.3
Interstices	Filling compound		
Screen	Screen wires (0.5mm^2), 10 off Screen tape	1.3	17.5
3rd-layer			
UNIT-P10	Power conductor, 10mm^2, 10 off	6.2	29.9
UNIT-SQ	Screened quad, 0.5mm^2, 1 off	6.2	29.9
UNIT-FO	Fibre optic element, 3 off	1.9	29.9
Interstices	Filling compound		
Screen	Screen wires (1mm^2), 8 off Screen tape	1.9	30.1
Inner sheath	Thermoplastic polyester, orange		33.7
UMBILICAL:			
Armouring			
1st layer	Galfan coated steel wires, 40 off w/ corrosion protective compound	2.6	38.9
2ndlayer	Galfan coated steel wires, 58 off w/ corrosion protective compound	2.0	42.9
DECK CABLE:			
Armouring	Galvanised steel tape, 2 layers		34.7
Outer sheath	PVC, flame retardant, black		37.7

3.3 Characteristics

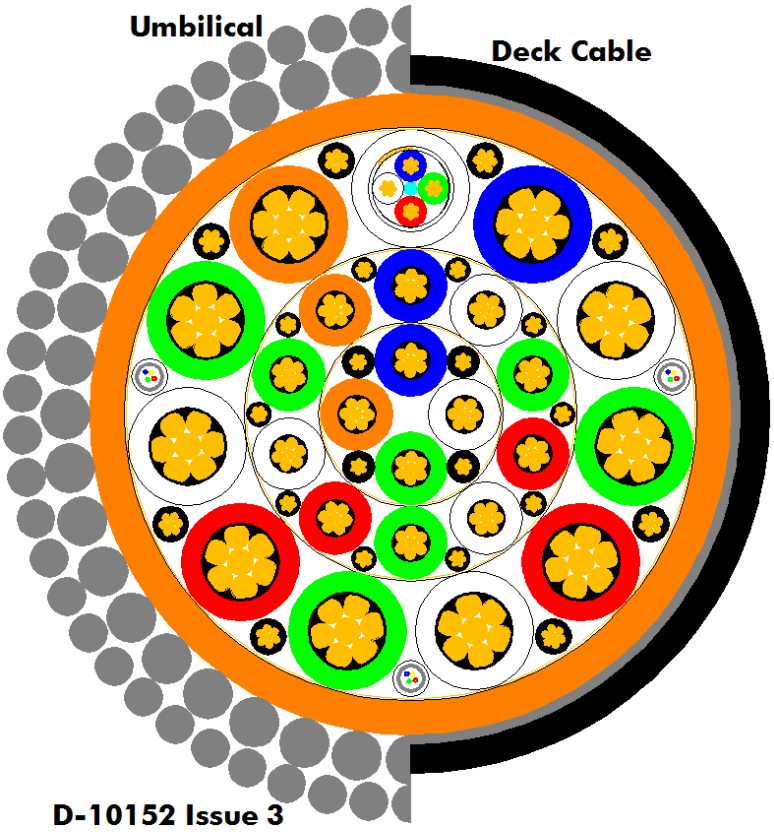
Physical characteristics	**Unit**	**Nominal value**	±
Cable outer diameter	mm	42.9	1
Weight in air, approx.	kg/m	5.6	
Weight in seawater, approx.	kg/m	4.1	
Minimum dynamic bending diameter	m	1.3	
Armouring breaking strength	kN	660	
Tension at conductor yield	kN	185	
DECK CABLE			
Cable outer diameter	mm	37.7	1
Weight in air, approx.	kg/m	2.7	
Minimum dynamic bending diameter	m	1.2	
Safe working load	kN	1	

Electrical / Optical Characteristics (target values)	**Unit**	**Nominal value**	±
UNIT-FO Fibre Optic element			
SINGLEMODE FIBRE:			
Attenuation @ 1310nm	dB/km	<0.6	
Attenuation @ 1550nm	dB/km	<0.4	
UNIT-SQ Screened Quad, 0.5mm²			
DC loop resistance, max	Ω/km	80	
UNIT-P2 Power conductor, 2mm², 4.5kV			
DC resistance, max	Ω/km	10.7	
Voltage rating, U_0/U (U_m)	kV	2.4/4.2(4.5)	
UNIT-P10 Power conductor, 10mm², 4.5kV			
DC resistance, max	Ω/km	2.0	
Voltage rating, U_0/U (U_m)	kV	2.4/4.2(4.5)	

3.4 Cable marking

Element	Marking
UNIT-P10	First conductor: Blue Alternating: White, green, red, white,… Last conductor: Orange
UNIT-P2	IN EACH LAYER: First conductor: Blue Alternating: White, green, red, white,… Last conductor: Orange
UNIT-SQ	Pair #1: Blue, red Pair #2: White, green
UNIT-FO	Fibre #1-#4: Red, green, blue, yellow
SHEATH(S)	<Production order no.> Nexans Norway High Voltage <year>, <meter>

4. CROSS-SECTIONAL DRAWING



5. AMENDMENT LIST

Issue no.	Date	Amendments
03E	04.07.14	Added deck cable. Approved for Construction.
02T	27.01.14	Updated design according to new client specifications.
01T	16.01.14	First edition.