

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Flexible hoses of metallic material without permanently fitted couplings**with type designation(s)
UFBX 1 Single BraidIssued to
Amnitec Ltd.
Merthyr Tydfil, United Kingdomis found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV GL class programme DNVGL-CP-0184 – Type approval – Flexible hoses with permanently fitted couplings**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Temperature range: -55°C up to +550°C**
Max. working press.: up to 150bar. Refer to certificate.
Sizes: DN6 up to DN80Issued at **Hamburg** on **2021-03-05**for **DNV GL**This Certificate is valid until **2026-03-04.**DNV GL local station: **Manchester**Approval Engineer: **Hagen Markus****Olaf Drews**
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

"Single Braid Layer" corrugated hose up to nominal bore of 80mm (3") without end fittings.
Corrugated hose made of 321 and 316 stainless steel sheet material.
Braiding made of 304 and 316 stainless steel wires.
Design standard ISO 10380.

Application/Limitation

The UFBX1 corrugated metal hoses are type approved for the use in piping systems with static load included in pipe class I, II and III as follows:

Main class piping systems such as Lubricating, Fuel oil systems, Compressed air systems, Steam and condensate systems, Fresh cooling water.

Furthermore, in non-main class piping systems such as exhaust gas lines of combustion engines, sanitary piping systems and chilled water systems of air condition systems.

For application in piping systems with pressure pulsation additional pressure pulsation test is to be carried out.

Hose sizes and Maximum Allowable Working pressure (M.A.W.P)

Nominal Bore		Hose O/D	Min. Bend Radius		M.A.W.P
mm	inch	mm	Static	Dynamic	bar
6	¼"	11.4	25	110	167
8	5/16"	13.4	32	130	136
10	3/8"	16.3	38	150	100
12	½"	20.7	45	165	74
15	5/8"	23.3	50	195	70
20	¾"	27.4	70	200	65
25	1"	35.8	85	200	50
32	1 1/4"	43.2	105	250	39
40	1 1/2"	50	127	250	35
50	2"	64.2	160	350	30
65	2 1/2"	78.6	200	410	26
80	3"	91.9	230	450	22

Selection of materials

The stainless-steel materials AISI 321 and 316 are considered not suitable for application in sea water systems, especially in systems with longer periods of stagnant sea water.

AISI 316 may be used in marine atmospheric environment and in piping systems with permanent flow of sea water, but welding's needs to be special treated to ensure recovering of oxygen layer.

It shall further be noted that the selection of the materials considers the intended service condition and installation area of the piping system, in particular the resistance to corrosion, erosion, oxidation, and other deterioration which may occur during intended service life.

Reference is made to DNV GL Rules Pt.4 Ch.6 – Section 2 – Materials.

Type Approval documentation

Actual TAP00002A0

Drawings, Product specification

Reference	Title	Specification	Issue
DWG. No.TD 69298	Parametric Drawing UBX Braided Hose	UF Spec 179	25.09.2019
U.F Spec 179	United Flexible Product Specification 179	UBFX Flexible Hose	Rev. 5, 15 th June 1998

Type test reports

Pliability tests acc. to ISO 10380- para. 5.6 and reference to 6.5.2 Table 13

Test report	Hose	Size	Hose Material
Amnitec LTD, January 2020	UBFX1 Single Braid Type 1-10	DN6 up to DN80	316,321
Amnitec LTD, February 2017	UBFX1 Single Braid Type 1-10	DN6 up to DN80	316, 321

Fatigue tests acc. to ISO 10380 – 5.7.2.1 U-bend test and reference to 6.5.2 Table 13

Test report	Hose	Size	Hose/Braiding
Amnitec LTD, 2017	UBFX1 Single Braid Type 1-10	DN6 up to DN80	316/304 321/304

Burst and elongation test acc. to ISO 10380 – 5.5, 5.4 and reference to 6.5.2 Table 13

Test report	Hose	Size	Hose/Braiding
Amnitec LTD, 28.04.2020	UBFX1 Single Braid Type	DN8	316/316
	UBFX1 Single Braid Type	DN8	321/304
	UBFX1 Single Braid Type	DN065	316/316
	UBFX1 Single Braid Type	DN065	321/304

Burst test reports

All test specimen with reference AMNITEC F(QR) 91.001m

Test specimen	M.A.W.P.	Average burst pressure	Date
DN008 UFBX1 316/316, Method 1 – Three samples	136bar	605bar>544bar 8777psi>7892	24.11.2020
DN008 UFBX1 321/304, Method 1 – Three samples	136bar	681bar>544bar 9881psi>7892	22.10.2020
DN015 UFBX1 316/316, Method 1 – Three samples	70bar	302bar>280bar 4377psi>4060	24.11.2020
DN015 UFBX1 321/304, Method 1 – Three samples	70bar	297bar>280bar 4302psi>4060	24.11.2020
DN032 UFBX1 316/316, Method 1 – Three samples	39bar	204bar>156bar 2962psi>2264	22.10.2020
DN032 UFBX1 321/304, Method 1 – Three samples	39bar	204bar>156bar 2325psi>2264	22.10.2020
DN065 UFBX1 321/304, Method 1 – Three samples	26bar	111,0bar>104bar 1608 psi>1508	22.10.2020
DN065 UFBX1 316/316, Method 1 – Three samples	26bar	108bar>104bar 1562psi>1508	24.11.2020

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Hose assembly design details of test specimen

Hose description	Hose R Number	Braid description	Braid R Number
UFBX1 321 Method 1	155916-01	64.9.0.42	151374-03
UFBX1 316 Method 1	153782-01	64.9.0.42	151741-05
UFBX1 321 Method 1	157731-01	48.6.0.42	158995-03
UFBX1 316 Method 1	146389-01	48.6.0.42	147624-06
UFBX1 321 Method 1	144386-01	24.6.0.28	159643-01
UFBX1 321 Method 1	146549-01	32.8.0.28	159643-01
UFBX1 316 Method 1	150059-01	24.6.0.28	159643-02

Guidance notes

- Braid description, for example, 64.9.0.42 = 64 Carriers, 9 Wires, 0.42mm Diameter.
- R Number is the Amnitech internal reference number for the material certificate. When the goods are booked in at "Goods In" the material is assigned and R number for traceability on that batch of material. The R number is recorded throughout Production and Sales.

Welding documentation

Welding Procedure Approval Test Certificates			
Reference	Standard	Welding process	Joint type
A004/09	ASME IX:2008	GTAW	Butt weld in strip

Welding Procedure Specification				
Reference	Standard	Welding process	Joint type	Welding position
WPS29/09, C	ASME IX:2008	Tungsten Inert Gas (GTAW)	Butt weld in strip	1G

Welder Operator Performance Qualification			
Name: Price Scott			
Reference	Standard	Welding process	Joint type
COV1627665/01	ASME IX:2008	GTAW	Plate - Groove

Quality control documents

Liquid Penetrant Inspection Certificate			
Reference	Scope	Size	Date
N127174LIQ3/B	12xPipe butt welds	2"	2018-08-09
N128270LIQ4/C	4x Circumferential welds	2"	2018-08-09
N145488LIQ1	Various RR Hoses	Various	2020-04-22

Product test instructions			
Reference	Standard	Scope	Type
WINS 90.023, 2019-06-07	AMNITEC	Work instruction Pressure Testing	Corrugated tube
WINS 90.016 2017-08-03	ISO 10380 - 5.5	Work instruction Burst Pressure Testing	Hose assemblies
WINS 90.058	AMNITEC	Hose Assembly Identification	

Product test report				
Reference	Standard	Scope	Type	Date
F(QR)96.002 Issue 3	AMNITEC	Vacuum Testing Daily Production Report	Corrugated tube	13-10-20, 9-10-20, 7-10-20

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Miscellaneous documents

- Material Test Certificate EN 10204-3.1 of DNV GL approved material manufacturers

Size and material designation	Manufacturer	DNV GL certificate
DN32, 316 Tube, 1.4404 (EN 10028:7, EN 10088:2)	Outokumpu, 58571 Schalksmühle and further production locations approved by DNV GL	AMMM00000XU, AMMM00001DN AMMM000022B and further approvals published.
DN32, 321 Tube, 1.4541 (EN 10028:7, EN 10088:2)		
DN8, 316L Tube, 1.4404 (EN 10028:7, EN 10088:2)		

Notes

Metal sheet material for making of tubes shall be from approved manufacturers.
Reference DNV GL approval finder.

Pressure test certificate

- Conformity/Pressure Test Certificate, Serial No: 267339/01, 2"NB UFBX1 IR Assembly (Ingersoll Rand Int.)

Previous certificate 20 188-04HH

- Type Approval Report dated 4th November 2003, Senior Flexonics facility in Merthyr Tydfil UK
Hose type UFBX, Senior product specification 179, Materials 1.4401, 1.4541
Type test scope: Sizes DN6, 12, 25, 50
Test standard ISO 10380, Sec 6.2 Pliable test, Sec. 6.3.2 U Bend Test, Sec. 6.4.2 – Burst Test, Sec. 6.4.3 Elongation test
- GL test certificate 10 635
- BRS. Investigation report 6mm UFBX single braid.
- Specification data sheet issue 02-2004

Tests carried out

Burst pressure test, Elongation test, Pliability (bending) test, Fatigue test (cycling loading, U-bend test).

Production testing

Each hose is to be hydraulically pressure tested to 1.5 times the maximum working pressure before installation/delivery. Appropriate works certificate (W) to be issued.

Depending on application material certificates (MC) including relevant material properties according to applicable DNV GL Rules are required for the metal sheet material.

Application Machinery piping systems – Rules Pt.4 Ch.6

Depending on pipe class material certificates for hose and hose end fitting to be provided as specified in DNV GL Rules Pt.4 Ch. 6 – Section 2 – Table 3 Material certificates.

For definition of material certificates refer to Pt.2 Ch.1 – Section 2 – [4.2].

Installation

Hose assemblies shall be accessible for inspection.


In fuel oil, lubricating oil and compressed air systems, means are to be provided for shut off from the system

Hose assemblies shall not be used in piping systems subject to high pressure pulsation or vibration load. Refer to DNV GL Rules Pt. 4 Ch.6 – Piping systems, Section 9.

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Marking of product

This type approval covers hose material normally spooled on a reel. Hoses shall be provided with a label or permanent marking as follows. Reference Amnitech instruction WINS 90.058.

Scope	Example
The name of the Manufacturer name or trademark	
The year of manufacture	2021
The hose designation	ISO 10380 – T1-50 a – X2CrNi19-11 – DN 25 – PS 16 – TS 30
Serial batch number	

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNVGL-CP-0338, Sec.4.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnvgl.com>

End of certificate