DNV·GL

Certificate No:
TAP00001R0

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Flexible Hoses of Metallic Material with permanently fitted couplings

with type designation(s)
TWINFLEX

Issued to
Fire Safe Fuel Hoses Pte Ltd
Singapore, Singapore

is found to comply with
DNV GL class programme DNVGL-CP-0184 – Type approval – Flexible hoses with permanently fitted couplings
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems

Application :

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

Temperature range:	**-55°C up to +150°C**
Max. working press.:	**16 bar**
Sizes:	**DN32/DN50, DN50/DN80, DN65/DN100**

Issued at **Hamburg** on **2019-05-16**

This Certificate is valid until **2024-05-15**.

for **DNV GL**

DNV GL local station: **Certification of Materials - Singapore**

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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Job Id: **262.1-030258-1**
Certificate No: **TAP00001R0**

PRODUCT DESCRIPTION

Stainless steel annular braided corrugated double walled hoses with a fixed flange on one side and a swivel flange on the other side. Ready for installation.

Properties	**DN32/DN50**	**DN50/DN80**	**DN65/DN100**
Nominal size	DN32	DN50	DN65
Internal flexible Hose (PARRAP Type 1-50)			
External flexible Hose (PARRAP Type 1-50)	DN50	DN80	DN100
Fixed Flange / Swivel Flange (EN 1092-1)	DN32	DN50	DN65
	PN16/PN40	PN16/PN40	PN16/PN40
Length	500 mm up to 700 mm		
Design Pressure	16 bar		
Design Temperature	- 55 °C to + 150 °C		
Media	Flammable liquid and other media suitable to internal flexible hose, excluding sea water.		
Materials[1]			
Internal flexible Hose (PARRAP Type 1-50)	AISI 316L / 1.4404		
External flexible Hose (PARRAP Type 1-50)			
Braid Type "A" - internal and external	AISI 304 / 1.4301		
Collar	AISI 304 / 1.4301		
Seamless Pipe	AISI 316 / 1.4401		
Stub End	AISI 316L / 1.4404		
Fixed Flange / Swivel Flange (EN 1092-1)	Carbon Steel		
Ring	AISI 316 / 1.4401		
Fixed Male	AISI 316 / 1.4401		
PYROJACKET sleeve	Woven high bulk fibre glass, with iron oxide silicone rubber		
Spacer Ring	PTFE		
Anti-Wearing Layer	Aramid "KEV5 PR"		

Notes:
[1] Pre-material composition and mechanical properties to be confirmed by material certificate type TR (test report, 2.2 certificate acc. to EN 10204). Refer to DNV GL Rules (RU-SHIP) Pt.1, Ch.3, Sec. 5.

Production place hose assemblies

Company Name	**Scope**	**DNVGL Station**
MATEC Group S.R.L. Via I Maggio 7 20068 Peschiera Borromeo MI	Manufacturing of hose assemblies, ready for installation	Milan

Responsibility

The company Fire Safe Fuel Hoses Pte Ltd, Singapore takes the responsibility that both design and production are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

APPLICATION/LIMITATION

The double walled hoses (Type TWINFLEX) are type approved for using in piping systems conveying flammable liquids and other media suitable to the inner hose material included in pipe class II and III. Application in sea water systems is excluded.

For selection, the instruction of manufacturer is to be observed.

Selection of materials

It shall be noted that the selection of the materials considers the applicable service condition with respect to type of media, flow velocity, media temperature etc. and installation area of the piping system. In particular, the resistance to corrosion, erosion, oxidation and other deterioration during projected service life are to be taken into account.

Reference is made to DNVGL Rules Pt.4, Ch.6, Section 2 – Materials.

Installation

For installation the valid FSFH "Installation manual Fire Safe Fuel Hoses"and DNVGL Rules Ship: RU-SHIP Pt.4, Ch.6, Section 9 are to be observed.

Production – welding according WPS

Welding process	Type	Kind of weld	WPS
141 - Gas Tungsten Arc Welding (GTAW)	Manual	DW-A	W010, W011
		DW-B	W02, W05, W06, W08
		DW-C	n.a.
		DW-D	W01, W03, W04, W07, W09

Production testing

Each metallic hose assembly is subject to a hydraulic pressure test according to purchase order but at least to 1.5 times the nominal pressure (PN).
Appropriate test report (TR) is to be issued by the manufacturer.
Refer to DNV GL Rules (RU-SHIP) - Pt.4, Ch.6, Section 9.

TYPE APPROVAL DOCUMENTATION

TESTS CARRIED OUT

MARKING OF PRODUCT

For traceability of products, marking shall be legible and indelible.
Products are to be marked at least as follows:

	Marking scope	Example
Marking on fixed flange	Manufacturer name	 *(M-Logo for Matec)*
	Nominal size/type	DN50/80
	Production lot	01/2018
	Design pressure	DP: 16 bar
	Design temperature	DT: 150°C
	Art no.	ART. 9600301

PERIODICAL ASSESSMENT

A condition for retention of the type approval certificate in its validity period is that periodical assessments are successfully carried out. The objective of the periodical assessment is to verify that the conditions for the type approval have not been altered. Regulations for the periodical assessment of the type approval certificate are to be find in the DNVGL Class Programme CP-0338.

It is further to be noted that the Society shall be informed of any:

- Modifications to the product which are liable to affect its characteristics and functions, as originally specified and tested;
- Shifting of the production site and additional production site.

If such notifications are not made, the validity of the type approval certificate terminates.

End of certificate