DNV·GL

Certificate No:
TAK00000F3

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Plastic Pipes, Fibre Reinforced Thermosetting

with type designation(s)
Bondstrand® S2000M Pipes and Fittings and QL16NC Fittings,
Bondstrand® S2000M FP Pipes and Fittings and QL16NC Fittings

Issued to
NOV FGS Malaysia Sdn. Bhd.
Senai Johor, Malaysia

is found to comply with
DNV GL class programme DNVGL-CP-0070 – Type approval – Fibre reinforced thermosetting plastic piping systems
DNV GL rules for classification – Ships
IMO Resolution A.753(18). Guidelines for the Application of Plastic Pipes on Ships

Application :

For installation according to DNV GL Rules and Manufacturer's Specification. The piping system is non-conductive, not for installations in gas hazardous areas. The piping system is approved to Fire Endurance L3 according to IMO Resolution A.753 (18), and Low Flame Spread according to ASTM D635-97.

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

This Certificate is valid until **2021-08-31**.

Issued at **Høvik** on **2016-09-01**

for **DNV GL**

DNV GL local station: **Singapore**

Approval Engineer: **Gisle Hersvik**

Martin Strande
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

Bondstrand® S2000M and Bondstrand® S2000M FP Fibreglass Pipes and Fittings and QL16NC Fittings, for marine and offshore service.

Internal pressure:
Maximum internal pressure at ambient temperature dependent on diameter is to be as follows:

Bondstrand® S2000M:

Nom. diameter	1" - 6"	8" - 16"	18" - 40"
Max. pressure, bar	16	16	16
Fitting name	QL16NC	QL16NC	S2000M-4.3

		S2000M-4.3	Minimum wall thickness in mm, incl. liner.								
	Ø:		25	40	50	80	100	150	200	250	
Int. PN [bar]	16		4.3	5.5	4.1	4.1	5.2	5.4	7.0	8.6	*
			-	-	-	-	-	-	-	-	**

		S2000M-4.3	Minimum wall thickness in mm, incl. liner.								
	Ø:	300	350	400	450	500	600	750	900	1000	
Int. PN [bar]	16	10.2	11.0	12.5	13.9	15.4	18.3	22.6	27.3	27.4	*
		-	11.6	13.1	14.5	16.0	19.2	23.5	28.2	-	**

* IPS = Iron Pipe Size
** MCI = Marine Cast Iron
Outside diameters of pipe in 250 and 300 mm sizes exceed IPS dimensions of ISO 559-1977 (273.0 and 323.9 mm, respectively) and MCI dimensions of ISO 13-1978 (274.0 and 326.0 mm, respectively).

External pressure:
Maximum external pressure is to be stipulated in accordance with the Bondstrand Engineering Guide.

Approved Fittings:
Typically elbows, tees, flanges, reducers.
Fittings to be tested prior to installation in classified objects.

Manufactured by

NOV FGS Malaysia Sdn. Bhd., PLO 202 Senai Industrial Park, Phase IV, 81400 Senai, Johor, Malaysia

NOV FGS Malaysia Sdn. Bhd., PLO 79, Jalan Rumbia 2, Kompleks Perindustrian Tanjung Langsat, Johor, Malaysia

DNV GL local station: Singapore

Responsibility

The Company (stated on the front page of this Certificate) 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

For installation according to DNV GL Rules/Standards and Manufacturer's Specification.

Piping system is approved as non-conductive, not for use in gas hazardous areas.

Piping system is approved to Fire Endurance L3 according to IMO Resolution A.753(18).

Piping system is approved to Low Flame Spread, according to ASTM D635-97 (accepted as an alternative to IMO Resolution A.653(16)).

Maximum material temperature: 100ºC. The maximum internal pressure at 100ºC is 75 % of that at ambient temperature. Maximum pressure between ambient temperature and 100ºC is to be determined by linear interpolation.

The piping system Bondstrand S2000M FP is successfully tested for jet fire resistance, using fire protection barrier as per NOV FGS Specification PF-12 "FIRE PROTECTION OF GLASSFIBER REINFORCED EPOXY PIPE AND FITTINGS IN JET FIRE APPLICATIONS".

Conductivity testing to be carried out on installed system.

Approved mounting/joining specification to be followed.

Type Approval documentation

1.
2.
3.
4.
5.
6.
7.

Tests carried out

Type Testing carried out according to **Type Approval documentation**.

Marking of product

The pipes and fittings are to be marked. The marking shall at least include the following information:

- *manufacturer's name*
- *manufacturing plant*
- *type designation*
- *pressure rating*
- *temperature rating*
- *nominal pressure*
- *dimensions*
- *production date.*

The marking is to be carried out in such a way that it is visible, legible and indelible. The marking of product is to enable traceability to the DNV GL Type Approval Certificate.

Periodical assessment

The scope of the Periodical Assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

Periodical Assessment to be performed after 2 years (Certificate Retention) and at renewal after 5 years (Certificate Renewal).

The main elements of the Periodical Assessment are to:

- Ensure that **Type Approval documentation** is available.
- Review design, materials, production process, and performance with respect to possible changes, in order to ensure compliance with **Type Approval documentation** and/or referenced material specifications.
- Ensure traceability between manufacturer's product marking and the DNV GL Type Approval Certificate.

END OF CERTIFICATE