



# DET NORSKE VERITAS

## TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **K-4898**

This is to certify that the  
**Plastic Pipes, Fibre Reinforced Thermosetting**

with type designation(s)  
**Bondstrand Series 2020 Marine Pipes & Fittings and  
Bondstrand Series 2020C Marine Conductive Pipes & Fittings**

Manufactured by  
**NOV FGS Singapore (Pte) Ltd  
SINGAPORE, Singapore**

is found to comply with  
Det Norske Veritas' Type Approval Programme 1-501.1, 2011, Fibre Reinforced Thermosetting Plastic Pipes  
Det Norske Veritas' Rules for Classification of Ships  
IMO Resolution A.753(18). Guidelines for the Application of Plastic Pipes on Ships

Application  
**For installation according to DNV Rules and Manufacturer's Specification, non-conductive/conductive. 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.**

Høvik, 2012-03-21  
for Det Norske Veritas AS

**Rikard Törnqvist  
Head of Section**



DNV local office:  
**Singapore**

This Certificate is valid until  
**2016-06-30**

**Gisle Hersvik  
Surveyor**

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.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



Certificate No.: K-4898  
 File No.: 332.30  
 Job Id.: 262.1-013186-1

## Product description

**Bondstrand Series 2020 and Bondstrand Series 2020C**, Marine Pipes and Fittings, Non-Conductive / Conductive.

Pipes:

		<b>Bondstrand 2020, Minimum wall thickness in mm</b>								
<b>Non-conductive</b>	<b>Ø:</b>	<b>27</b>	<b>42</b>	<b>53</b>	<b>82</b>	<b>105</b>	<b>132</b>	<b>159</b>	<b>209</b>	<b>263</b>
<b>Int. PN [bar]</b>	<b>20</b>	3.5	3.5	3.6	3.6	4.6	4.6	4.6	5.8	7.2
<b>Conductive</b>	<b>Ø:</b>	<b>27</b>	<b>42</b>	<b>53</b>	<b>82</b>	<b>105</b>	<b>132</b>	<b>159</b>	<b>209</b>	<b>263</b>
<b>Int. PN [bar]</b>	<b>20</b>	3.5	3.5	3.6	3.6	4.6	4.6	4.1	5.3	6.7

Fittings:

Elbows, Equal Tees, Reducers, Reducing Tees, Couplings, Flanges.  
 Other fittings to be tested prior to installation in classified objects.

Joining Methods:

1" - 4" diameter pipe                      Quick-Lock Adhesive Joint  
 6" - 10" diameter pipe                    Taper-Taper Joint

## Application/Limitation

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

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

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

The piping system is approved as:

- Non-conductive, not for conveying conductive fluids in gas hazardous areas
- Conductive, for conveying conductive liquid fluids in gas hazardous areas dependent on clients' needs.

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 alternative to IMO Resolution A.653(16)).

Conductivity testing to be carried out on installed system.

Approved mounting/joining specification to be followed.

## Type Approval documentation

1. Previous Type Approval Certificate No. K-3395.
2. Email from DNV Singapore of 2012-03-15, incl. Survey Report of 2012-03-01.

## Tests carried out

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



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## Marking of product

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

- *Product name*
- *Manufacturers name*
- *Pressure rating*
- *Temperature rating*

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 Type Approval Certificate.

## Certificate Retention/Renewal Survey

The scope of the Retention/Renewal Survey 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.

Survey to be performed after two (2) years (Certificate Retention Survey) and at renewal after four (4) years (Certificate Renewal Survey).

The main elements of the survey are:

- 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 Type Approval Certificate.

END OF CERTIFICATE