



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **K-4901**

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

with type designation(s)
DOUBLE O-RING JOINT

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

To be used as joint on approved glass fibre reinforced epoxy pipes of size 2 - 24 inches. NOV FGS' installation procedure is to be followed. Applications/limitations as for the approved GRP pipes and fittings made by NOV FGS.

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-4901
File No.: 332.30
Job Id.: 262.1-013186-1

Product description

DOUBLE O-RING JOINT; Fitting for Glass Fibre Reinforced (FRP) Pipes.

Application/Limitation

- To be used as joint on approved glass fibre reinforced epoxy pipes of size 2 - 24 inches.
- NOV FGS' installation procedure is to be followed.
- Applications/limitations as for the approved FRP pipes and fittings made by NOV FGS.
- Materials and fabrication are to be as for the approved NOV FGS pipes and fittings.
- O-ring material and fabrication to be of same quality as originally tested, ref. **Type Approval documentation and Tests carried out**.
- Approved mounting/joining specification to be followed.

Type Approval documentation

1. Previous Type Approval Certificate No. K-3397.
2. Email from DNV Singapore of 2012-03-15, incl. Survey Report of 2012-03-01.
3. Testing of joint on 16 inch tubes by Veritec, Singapore. Ref. Test Report VT/SL/87350.

Tests carried out

Type Testing carried out according to **Type Approval documentation**, including:

- Joint movement simulating temperature difference, 1000 cycles under internal pressure.
- Joint movement simulating wave induced hull deformation, 10000 and 100000 cycles under internal pressure.
- Hydrostatic pressure testing.

Marking of product

Product shall be marked with *manufacturer's name*; **NOV FGS Singapore (Pte) Ltd., Singapore** and *type designation*.

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