

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plastic Pipes, Fibre Reinforced Thermosetting**with type designation(s)
DOUBLE O-RING JOINT

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 :****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.****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**DNV GL local station: **Singapore**Approval Engineer: **Gisle Hersvik**for **DNV GL**

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.

Product description

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

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

- 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.
- 2.
- 3.
- 4.
- 5.

Tests carried out

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

- Joint movement simulating temperature difference, 1,000 cycles under internal pressure.
- Joint movement simulating wave induced hull deformation, 10,000 and 100,000 cycles under internal pressure.
- Hydrostatic pressure testing.

Marking of product

The product is 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*.

Job Id: **262.1-013187-3**
Certificate No: **TAK00000F5**

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