

Type Approval Certificate



This is to certify that the undemoted product(s) has/have been tested in accordance with the relevant requirements of the GL Type Approval System.

Certificate No. **60 055 - 13 HH**

Company **NOV FGS Singapore (Pte) Ltd.**

**7A Tuas Avenue 3
639407 Singapore, SINGAPORE**

Product Description **Bondstrand GRE Watertight Bulkhead Pipe Penetration**

Type **Bondstrand Glassfiber Reinforced Epoxy (GRE), single pipe bulkhead penetration, watertight**

Environmental Category **None**

Technical Data /
Range of Application **The GRE bulkhead pipe penetration consists of:
Steel pipe sleeve with doubler plate, Bondstrand Glassfiber Reinforced Epoxy (GRE) pipe, two rubber O rings (Buna-N), epoxy sealant and four GRE saddles.
Sealants: Chockfast Orange (Epoxy Chocking Resin), Phillybond Orange (Epoxy paste)**

**Sizes / Nominal diameter: 1 - 40 inch (25 - 1000 mm)
Maximum operating temperature*: 93°C
Design Internal Pressure*: 17.2 bar
Design External Pressure: 4 bar**

**Range of Application:
The GRE bulkhead penetration is type approved for "A" Class bulkheads as required by SOLAS 74 as amended, Regulation II-2/9 and for bulkheads for which water tightness is required.**

Test Standard **VI-7-4 – Test Requirements for Sealing Systems of Bulkhead and Deck Penetrations, Edition 2014**

Documents **Refer to pages 2 and 3**

Remarks ***) For pressure and temperature ratings – reference is made to Bondstrand GRE Pipe Series (GL Type Approval Cert. 7378894HH and 3298606HH) used for the Bulkhead Penetration (continuation on page 3)**

Valid until **2018-10-28**

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File No. **II.J.01**

Hamburg, 2013-11-13

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DOCUMENTS

Test Reports:

Fire tests:

Size 1 inch: no. 7191027418-MEC 12/1-IHN dated 14 Mar 2012, issued by PSB Singapore;
Size 24 inch: no. 7191013590-MEC 11/2-IHN dated 17 Aug 2011; issued by PSB Singapore;
Size 40 inch: no. 01.17787.01.405 [1] dated 2013-03-28, Rev.2013-06-25.

Water tightness tests:

For 1 inch GRE Bulkhead penetration: Doc.no.E051-11(S)(1) dated 3-Aug-2011;
For 24 inch GRE Bulkhead penetration: Doc.no.E051-11(S)(2) dated 3-Aug-2011;
For 40 inch GRE Bulkhead penetration: Doc.no.E065-11(M)(1) dated 3-Aug-2011;

Drawings:

| Drawing Title | Drawing No. |
|---|---------------------------|
| 1" penetration test assembly-fire test-9046425 | 9046425, Rev.5 |
| 1" bulkhead penetration- installation- 9047891 | 9047891, Rev.0 |
| 24" penetration test assembly-fire test-9046426 | 9046426, Rev.2 |
| 24" bulkhead penetration- installation- 9047892 | 9047892, Rev.0 |
| 9047898-40" Bulkhead penetration installation | 9047898, Rev.0 |
| 9047524-40" A60 fire test | 9047524 |
| Bulkhead plate with stiffeners for 40" GRE BHP (CLASS A-60 FIRE TEST) | CL-A60-TEST-40-B, Rev.0 |
| Bulkhead Test specimen-for 1" & 2" GRE BHP (CLASS A60 FIRE TEST) | CL-A60-TEST-1-12-B, Rev.1 |

Certificates for the sealants:

- Epoxy Chocking Resin – Chockfast Orange: ABS cert.no. 03-HS399240C/4-PDA, dated 17/Mar/2009;
- Epoxy paste - Phillybond Orange: ABS cert.no. 00-HS174530/1-PDA, dated 17/Mar/2009;

Manufacturer's procedures:

- Installation procedure: spec.no. INS-009B, Rev.1, dd. 23-May-12;
- Assembly Instruction for 1" – 40" GRE Bulkhead Penetration Spool, specification no. PF-32, Rev.0, dated 08-Feb-11;
- Testing procedure for Approval of 40" GRE Bulkhead Penetration: spec.no. TEST-40" BHD-2, Rev.1, dated 19-Jun-12;
- Testing procedure for Approval of class A60 GRE Bulkhead Penetration: spec.no. Class A60-02, Rev.2, dated 19-Jun-12;

ISO 9001:2008 Certificate: no. 30187-2008-AQ-SGP-RvA-Rev.1 dated 08.01.2012 by DNV.

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Audit reports dated 2013-08-01 Singapore, 2013-08-02 Malaysia

Supplier's Asbestos-free compliance document dated 2013-07-01.

GL Approval reference no. 12-077709

Remarks (continuation from page 1)

- The installation and insulation of the Bondstrand GRE Bulkhead Pipe Penetration is to be carried out in accordance with the specified drawings listed in this certificate.
- For penetrations with GRE pipe sizes less than 24 inch (600mm) a coating of minimum 5mm thickness PITT-CHAR LV and a wrap with a ceramic shielding tape have to be applied on the potentially fire exposed side.
- For the use at "A-0" Class (uninsulated) bulkheads the same insulation as tested for the "A-60" Class is required on the penetration itself plus additional insulation 200mm around.

Production places:

NOV FGS Singapore Pte Ltd.
No.7A Tuas Ave 3
Singapore

NOV FGS Malaysia SDN. BHD.
PLO 202, Senai Industrial Park, Phase IV
81400 Senai / Johor
Malaysia

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This certificate is issued on the basis of "Guidelines for the Performance of Type Approvals Part 1, Procedure".