

Bondstrand® Series 2000M-FP and 7000M-FP Fire-Resistant Fiberglass Pipe and Fittings

Description

Bondstrand Series 2000M-FP is a fiberglass-reinforced epoxy resin piping system intended primarily for wet and dry deluge systems where excellent corrosion resistance as well as fire resistance are necessary and low weight is desired. Series 2000M-FP features a thick intumescent coating applied at the factory to the exterior of Series 2000M pipe and fittings. When exposed to fire, the coating expands to form an incombustible foam char that protects and insulates the piping. The intumescent coating is available in 5 mm and 8 mm thicknesses.

Series 7000M-FP pipe and fittings are electrically conductive.

Uses and Applications

- Offshore fire protection systems (wet and dry)
- Onshore above ground fire protection piping

Listings and Approvals for Bondstrand Series 2000M-FP and 7000M-FP Piping Systems

- American Bureau of Shipping (U.S.)
- Det Norske Veritas
- Germanischer Lloyd
- Lloyd's Register of Shipping (U.K.)
- National Sanitation Foundation (U.S.)
- United Kingdom Offshore Operators Association
- United States Coast Guard

Performance

Bondstrand Series 2000M-FP and 7000M-FP have been demonstrated to be capable of maintaining service pressure following exposure to a hydrocarbon fire (temp ~ 2000°F) no less than 5 minutes duration in the dry condition, and 25 minutes in the full-flow condition with expectation that service life would exceed 6 hours.

Pipe system design for pressure ratings up to: 17.2 bar (250 psi) for 1 - 16 inch and 16.0 bar (232 psi) for 18 - 40 inch, depending type of fittings. Refer to NOV Fiber Glass Systems.

Individual system components may not have the same ratings as the pipe. Refer to the detailed product information for the specific components to determine the pressure rating for the system as a whole.

Testing and Standards

Bondstrand products are manufactured to meet the highest standard of quality in accordance with ISO 9001. The products are designed to meet ANSI and ASTM standards. Bondstrand 2000M-FP and 7000M-FP piping meet all applicable requirements of ASTM F 1173 for fiberglass-reinforced resin pipe and fittings.

Bondstrand 2000M-FP and 7000M-FP products have been tested by Southwest Research Institute (SwRI) for performance in jet fire conditions in accordance with UKOOA guidelines. The 2000M-FP and 7000M-FP system meets the requirements for fire endurance in a hydrocarbon jet fire, certified by SwRI.

Characteristics

Pipe — Filament-wound fiberglass-reinforced epoxy pipe with nominal 0.020-inch (0.5 mm) integral resin-rich reinforced liner (2000M-FP) or with no liner, with comingled carbon fibers (7000M-FP) and 5 mm or 8 mm external intumescent coating. For typical physical and mechanical properties, refer to Bondstrand Product Data, Bondstrand Series 2000M and 7000M Fiberglass Pipe and Fittings for Shipboard and Offshore Platform Service.

Fittings — Wide range of lined filament-wound fiberglass-reinforced epoxy fittings.

Flanges — One-piece filament-wound fiberglass-reinforced epoxy resin flanges in heavy-duty hub-less configuration. Flange covers made with intumescent material is used to protect flanges.

Joining systems — Quick-Lock straight/taper adhesive-bonded joint featuring integral pipe stop in bell for predictable, precise laying lengths. Taper/taper bonded joints supplied in larger sizes.

Thermosetting adhesive for bonded joints — This includes both the Quick Lock and Taper/Taper joints - PSX™•34 or PSX™•60 two-part epoxy adhesive. PSX•60 adhesive is conductive and is to be used on all installations of Bondstrand 7000M pipe.

Typical joint lengths — All diameters are supplied in nominal 20 ft. (6.1m) lengths.

| Nominal Pipe Size | | Length | |
|-------------------|-----------|--------|-------|
| in | mm | ft | m |
| 1 - 1½ | 25 - 40 | 10 | 3.0 |
| 2 - 8 | 50 - 200 | 30 | 9.1 |
| 10 - 16 | 250 - 400 | 40 | 11.89 |

Fittings and Flanges

Fittings — See Bondstrand Product Data, Series 2000M-FP and 7000M-FP Fittings, for dimensions, shipping weights and pressure ratings.

| | |
|------------------------|---|
| 90° and 45° elbows | Deluge couplings sized to accept standard spray nozzles |
| Tees and reducing tees | Reducing saddles furnished with** |
| Couplings | * Quick-Lock® socket outlet |
| Nipples | * Flanged outlet |
| Reducers | |

Flanges — Series 2000M-FP and 7000M-FP flanges are offered in one configuration:

- One-piece hubless (heavy duty)

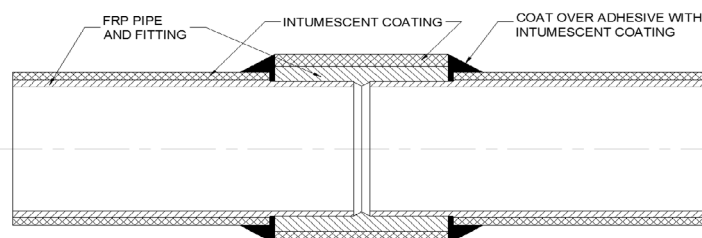
Bondstrand marine flanges are produced with the following drillings for easy connection to piping systems currently in common use; other drillings, as well as undrilled flanges, are available:

- | | | |
|------------------------------|-------------|-----------------------|
| • ANSI B16.5 Cl 150 & Cl 300 | • JIS B2211 | 5 kg/cm ² |
| • API 605 Cl 150 & Cl 300 | • JIS B2212 | 10 kg/cm ² |
| • ISO 2084 NP-10 & NP-16 | • JIS B2213 | 16 kg/cm ² |

See Bondstrand Product Data, Series 2000M-FP and 7000M-FP Flanges for dimensions and weights for the drillings given above. Flange covers made of the intumescent material used on the exterior of the pipe are available and required for complete system performance in a fire situation.

Installation

The installation procedures for Bondstrand Series 2000M-FP and 7000M-FP are described in Bondstrand Installation Guide. Standard pipe and fittings are joined using PSX™•34 or PSX™•60 adhesive. Electrically conductive systems are bonded with PSX•60 adhesive. Before adhesive cures, remove the excess adhesive from the joined pipe and fittings. The joint gaps in the intumescent coating between adjacent pipe and fittings are filled with a similar intumescent compound.



**Typical Pipe Dimensions and Weights with
8 mm Passive Fire Protection Coating**

| Nominal Pipe Size | | Pipe Inside Diameter | | Min. Pipe Wall Thickness | | Pipe Outside Diameter | | Pipe Weight (approx) | |
|-------------------|-----|----------------------|-----|--------------------------|------|-----------------------|-------|----------------------|------|
| in | mm | in | mm | in | mm | in | mm | lb/ft | kg/m |
| 1 | 25 | 1.07 | 27 | 0.14 | 3.5 | 2.03 | 51.6 | 1.3 | 1.9 |
| 1½ | 40 | 1.67 | 42 | 0.14 | 3.5 | 2.62 | 66.6 | 2.1 | 3.1 |
| 2 | 50 | 2.10 | 53 | 0.14 | 3.6 | 3.07 | 77.9 | 2.3 | 3.5 |
| 3 | 80 | 3.22 | 82 | 0.14 | 3.6 | 4.21 | 107.0 | 2.9 | 4.4 |
| 4 | 100 | 4.14 | 105 | 0.18 | 4.6 | 5.20 | 132.0 | 4.2 | 6.3 |
| 6 | 150 | 6.26 | 159 | 0.18 | 4.6 | 7.30 | 186.0 | 6.4 | 9.6 |
| 8 | 200 | 8.22 | 209 | 0.24 | 6.0 | 9.37 | 238.0 | 9.3 | 13.9 |
| 10 | 250 | 10.35 | 263 | 0.30 | 7.5 | 11.61 | 295.0 | 13.1 | 19.7 |
| 12 | 300 | 12.35 | 314 | 0.35 | 8.8 | 13.74 | 349.0 | 17.9 | 26.8 |
| 14 | 350 | 13.29 | 338 | 0.37 | 9.5 | 14.72 | 374.0 | 20.5 | 30.7 |
| 16 | 400 | 15.19 | 386 | 0.43 | 10.5 | 16.73 | 425.0 | 25.1 | 37.6 |

**Typical Weights for Coated Fittings with
8 mm Passive Fire Protection Coating**

| Nominal Pipe Size | | 90° Elbows | | 45° Elbows | | Tees | |
|-------------------|-----|------------|------|------------|------|-------|------|
| in | mm | lb | kg | lb | kg | lb | kg |
| 1 | 25 | 1.76 | 0.8 | 1.32 | 0.6 | 1.4 | 0.6 |
| 1½ | 40 | 2.90 | 1.3 | 1.76 | 0.8 | 2.0 | 0.9 |
| 2 | 50 | 4.00 | 1.8 | 2.9 | 1.3 | 5.3 | 2.4 |
| 3 | 80 | 6.60 | 3.0 | 4.6 | 2.1 | 8.4 | 3.8 |
| 4 | 100 | 9.90 | 4.5 | 7.3 | 3.3 | 11.9 | 5.4 |
| 6 | 150 | 20.7 | 9.4 | 14 | 6.4 | 20.7 | 9.4 |
| 8 | 200 | 35.7 | 11.6 | 23.8 | 10.8 | 42.9 | 19.5 |
| 10 | 250 | 57.2 | 26 | 38.7 | 17.6 | 61.6 | 28 |
| 12 | 300 | 88.0 | 40 | 57.9 | 26.3 | 82.5 | 37.5 |
| 14 | 350 | 96.8 | 44 | 61.6 | 28.0 | 105 | 47.7 |
| 16 | 400 | 127.6 | 52 | 73.9 | 33.6 | 131.1 | 59.6 |

**Concentric Reducers with 8 mm
Passive Fire Protection Coating**

| Nominal Pipe Size | | Concentric Reducers | |
|-------------------|-----------|---------------------|-----|
| in x in | mm x mm | lb | kg |
| 1½ x 1 | 40 x 25 | 1.3 | 0.6 |
| 2 x 1 | 50 x 25 | 2.2 | 1 |
| 2 x 1½ | 50 x 40 | 2.2 | 1 |
| 3 x 1½ | 80 x 40 | 3.3 | 1.5 |
| 4 x 2 | 100 x 50 | 5.3 | 2.4 |
| 4 x 3 | 100 x 80 | 5.7 | 2.6 |
| 6 x 3 | 150 x 80 | 8.8 | 4 |
| 6 x 4 | 150 x 100 | 9.5 | 4.3 |
| 8 x 4 | 200 x 100 | 15 | 6.8 |
| 8 x 6 | 200 x 150 | 14.7 | 6.7 |

Sizes above 16" are available upon request.

Support Spacing

| Nominal Pipe Size | | Support Spacing | |
|-------------------|-----|-----------------|-----|
| in | mm | ft | m |
| 1 | 25 | 7.0 | 2.1 |
| 1½ | 40 | 8.0 | 2.4 |
| 2 | 50 | 9.0 | 2.6 |
| 3 | 80 | 10.0 | 3.0 |
| 4 | 100 | 12.0 | 3.7 |
| 6 | 150 | 14.0 | 4.1 |

| Nominal Pipe Size | | Support Spacing | |
|-------------------|-----|-----------------|-----|
| in | mm | ft | m |
| 8 | 200 | 15.5 | 4.6 |
| 10 | 250 | 16.5 | 5.0 |
| 12 | 300 | 18.0 | 5.5 |
| 14 | 350 | 19.2 | 5.9 |
| 16 | 400 | 19.7 | 5.0 |
| — | — | — | — |

Note: Support spacing shown is based on pipe filled with water having a density of 1000 kg/m³ with no provision for weight of valves, flanges, etc.

Technical Support

Consult NOV Fiber Glass Systems for further recommendations concerning shore side or offshore use of Bondstrand piping systems. For particular questions regarding the installation and use of Bondstrand Series 2000M-FP and 7000M-FP pipe and fittings, refer to the NOV Fiber Glass Systems Marine Engineering Manual.

National Oilwell Varco has produced this brochure for general information only, and it is not intended for design purposes. Although every effort has been made to maintain the accuracy and reliability of its contents, National Oilwell Varco in no way assumes responsibility for liability for any loss, damage or injury resulting from the use of information and data herein nor is any warranty expressed or implied. Always cross-reference the bulletin date with the most current version listed at the web site noted in this literature.

North America
17115 San Pedro Ave. Suite 200
San Antonio, Texas 78232 USA
Phone: 210 477 7500

South America
Estrada de Acesso à Zona
Industrial Portuária da Suape, s/no.
Recife, PE, Brazil 55.590-000
Phone: 55 81 3501 0023

Europe
P.O. Box 6, 4190 CA
Geldermalsen, The Netherlands
Phone: 31 345 587 587

Asia Pacific
No. 7A, Tuas Avenue 3
Jurong, Singapore 639407
Phone: 65 6861 6118

Middle East
P.O. Box 17324
Dubai, UAE
Phone: 971 4881 3566