



CERTIFICATE NUMBER

DATE

98-QA3010-5-PDA

17 January 2012

ABS TECHNICAL OFFICE

London Engineering Department

CERTIFICATE OF DESIGN ASSESSMENT

This is to Certify that a representative of this Bureau did, at the request of
ESSVE PRODUKTER AB - SOLLENTUNA

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

PRODUCT: **Fire Stop System**

MODEL: **FS-Flex D Transit**

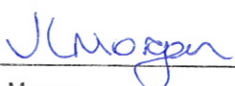
This Product Design Assessment (PDA) Certificate 98-QA3010-5-PDA, dated 17/Jan/2012 remains valid until 16/Jan/2017 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

AMERICAN BUREAU OF SHIPPING



John L. Morgan
Engineer

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by the terms and conditions as contained in ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010).

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MA Certificate No. 08-VS1096378-A

Product: Fire Stop System

Model: FS-Flex D Transit

Intended Service:

Fire rated flexible transit seal for use in shipboard deck and bulkhead penetrations

Description:

FS-Flex D Shipboard Cable Penetration: 200 mm mild steel sleeve (thickness 2 mm minimum), welded or bolted to the deck/bulkhead plating. The cavity between steel sleeve and cables is packed with a silicate blanket D-24-B and the external surfaces are protected by layer of "FireStop Sealant 3000" fire retardant silicone elastomer. Sleeve insulated with A-60 non-flammable mineral wool;

FS-Flex D Shipboard Pipe Penetration: 200 mm mild steel sleeve (thickness 2 mm minimum), welded or bolted to the deck/bulkhead plating. The cavity between steel sleeve and cables is packed with a silicate blanket D-24-B and the external surfaces are protected by layer of "FireStop Sealant 3000" fire retardant silicone elastomer. Sleeve insulated with A-60 non-flammable mineral wool.

Ratings:

Fire Rating A0 through A-60 Class.

Watertight Pressure Resistance: 2.0 Bar g.

Air tightness 30 mbar g.

Service Restrictions:

1. FS-Flex D Shipboard Cable Penetration: Maximum size of steel frame to be 800 x 400 mm; Minimum distance between cable and sleeve to be not less than 5 mm. Cable outside diameters up to 75 mm, insulation is to be provided as per the ABS approved drawings.
2. FS-Flex D Shipboard Pipe Penetration: Maximum size of steel pipe to be 273 mm outside diameter, maximum size of copper pipe to be 108 mm outside diameter. Bulkhead transits for pipes with outside diameters of 60.3 mm and above to be insulated as per ABS approved drawings.
3. Frames may be packed up to a maximum density of 40% fill ratio.
4. Not for use in tank boundaries.
5. Unit Certification is not required for this product. If the manufacturer or purchaser's request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

Comments:

Not Applicable

Notes / Drawings / Documentation:

- 1) FireSeal, Gas tightness test witnessed by DNV, Test report no. FSR-C-260-06 dated 03 May 2006.
- 2) Sintef Fire test report nos 103070.54 A dated 23 Nov 2010 and 103070.54B dated 23 Nov 2010.
- 3) SINTEF assessment report no. 103204.66-1 dated 09 Jan 2012.
- 4) This Product Design Assessment (PDA) is valid only for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

Term of Validity:

This Product Design Assessment (PDA) Certificate 98-QA3010-5-PDA, dated 17/Jan/2012 remains valid until 16/Jan/2017 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

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STANDARDS

ABS Rules:

2011 Steel Vessel Rules 1-1-4/7.7, 4-6-2/9.7 & 4-8-4/21.13

National:

NA

International:

IMO Resolution A.754(18)

Government Authority:

NA

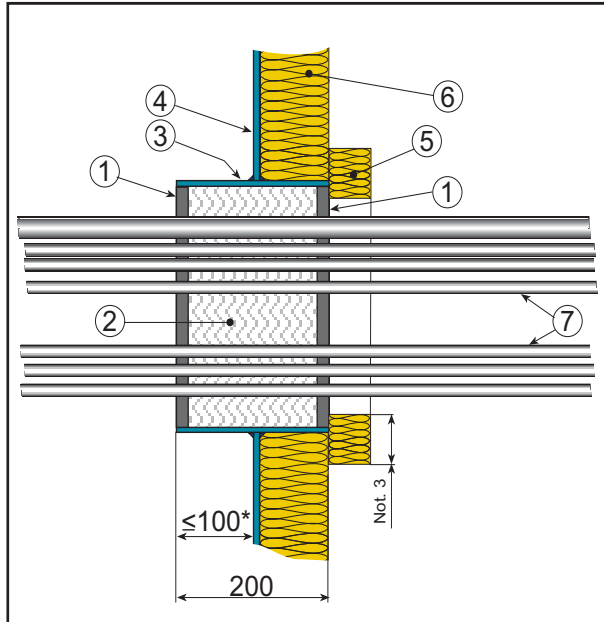
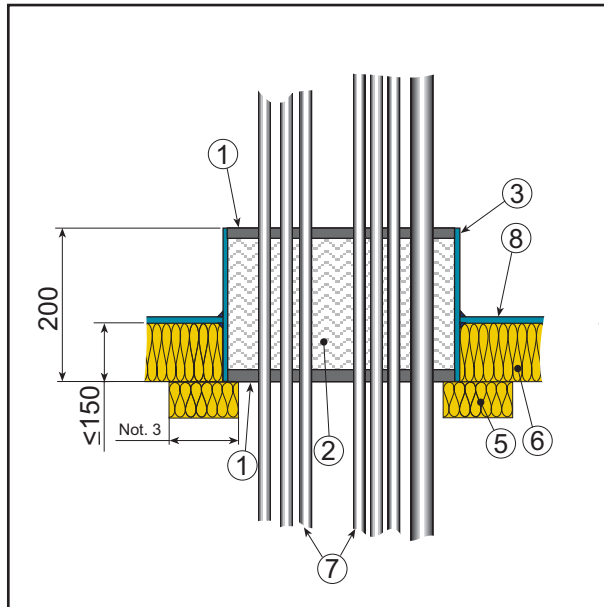
EUMED:

NA

Others:

NA



Bulkhead penetration -Type CD-B

Deck penetration -Type CD-D

Key:

1. FireStop Sealant 3000, 15 mm thk (nom.)
2. Blanket D-24B
3. Steel sleeve 200 mm long (min.), ≥ 2 mm thk, size from 48 mm O.D. up -to 800 x 400 mm**
4. Steel division plate**
5. Approved sleeve insulation RW 80, 40 mm thk.**
6. Division insulation to yard specification**
7. Penetrating cables**
8. Deck plate**

**Yard supply

FS-Flex D

Cable penetration with elastomer A0 - A60 Class

Area of use:

Specially suitable for small and large penetrations below or above the waterline.

Specially properties:

Movements or vibrations of the penetrating cables are accepted.

Simple installation - no special tools required.

Changes, repairs or retrofits are made with ease.

Filling holes not required.

Prefabricated sleeves with screws fixing optional.

FS-Flex D is tested to IMO Resolution A.754 (18).

Technical Data

Fire rating	A0 - A60 class
Watertightness	200 kPa (20 m W C) without reinforcement.
Gastightness	3 kPa
Sound Reduction	c. 50 dB
Resiliency	± 1 mm, 100 Hz
Moisture Protection	Not required.

Technical support

Contact FireSeal for specification, approval, certification or any further details.

* Equispaced sleeve accepted.

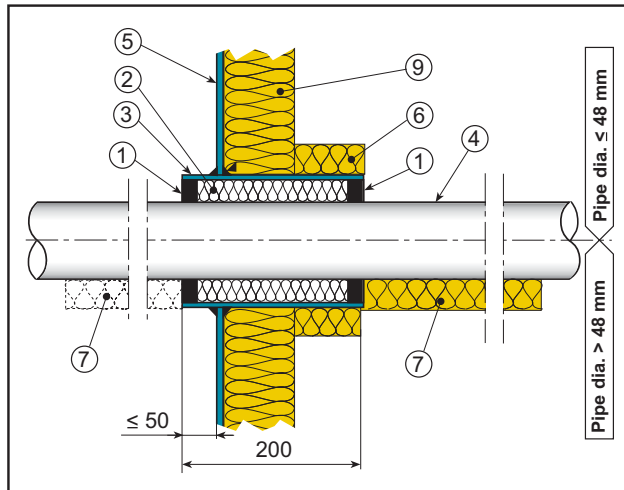
Note 1: Minimum distance between cable (s) and coaming ≥ 5 mm.
Well packed cable bundles accepted.
Max. 40 % cable fill.

Note 2: For A0, A15 and A30 class, Flex D are to be insulated as A60 and addition the division is to be insulated with A60 insulation at least 200 mm around the penetration.

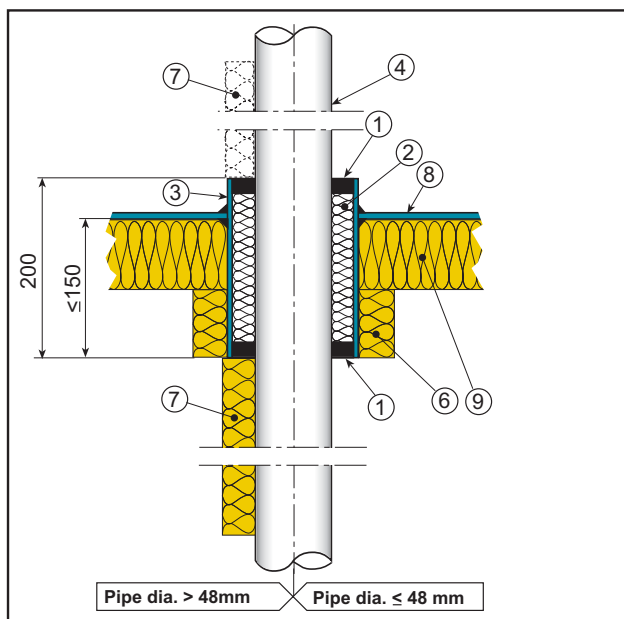
Note 3: Sleeve edge insulation on penetration 800x400 mm in bulkhead ≥ 400 mm in deck ≥ 120 mm.



Bulkhead Penetration -Type SPD-B



Deck Penetration -Type SPD-D



Key:

1. FireStop Sealant 3000, 15 mm thk (nom.).
 2. Blanket D-24B.
 3. Steel sleeve 200 mm long (min.), ≥ 4 mm wall thk, size from 60 O.D. up -to 375 O.D. or up-to 534 x 274 mm.*
 4. Steel pipe from 17 O.D. up-to 273 O.D. mm.*
 5. Bulkhead plate.*
 6. Approved sleeve insulation RW 80:
40 thk. for sleeve < 150 O.D. mm.*
50 thk. for sleeve ≥ 150 O.D. mm.*
 7. Approved pipe insulation RW 80:
Pipe > 48,3 ≤ 219 O.D. 50 thk. x 600 mm.*
Pipe > 219 ≤ 273 O.D. = 50 thk. x 450 mm each side.*
 8. Deck plate*.
 9. Division insulation to yard specification.*
- *Yard supply

FS-Flex D

Pipe penetration with elastomer

A0 - A60 Class

Area of use:

Intended for single pipe (SPD) and multiple (MPD) pipe penetrations below or above the waterline.

Specially properties:

Movements or vibrations of the penetrating pipes are accepted.

Simple installation - no special tools required.

Changes, repairs or retrofits are made with ease.

Filling holes not required.

FS-Flex D is tested to IMO Resolution A.754 (18).

Technical Data

Fire rating	A0 - A60 class
Watertightness	200 kpa (20 m W C) without reinforcement.
Gastightness	3 kpa
Sound Reduction	c. 50 dB
Resiliency	± 1 mm, 100 Hz
Movements	± 20% of annulus.
Moisture Protection	Not required.

Technical support

Contact FireSeal for specification, approval, certification or any further details.

Note: Distance between pipe(s) and coaming ≥ 10mm

Also accepted for copper pipes ranging from 15 up-to 108 mm O.D. Pipes to be insulated both sides with RW 100, 50 mm thk. and 600 mm length.

