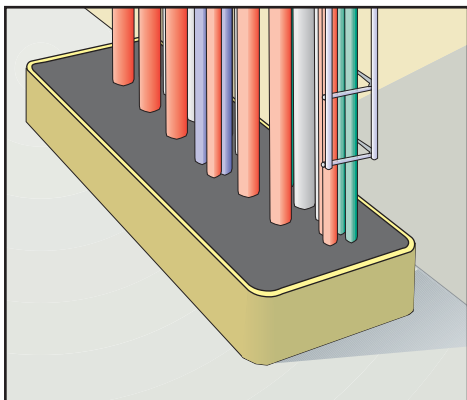


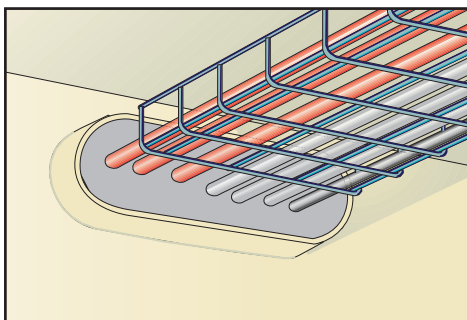


cable penetration seals for shipboard applications



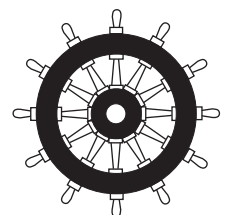
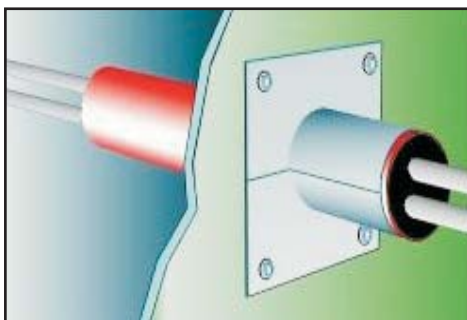
FS-Flex D Cable Penetration - Type CD

Easy-to-install flexible system for cables.
No special tools or equipment needed.
Intended also for watertight bulkheads and decks.



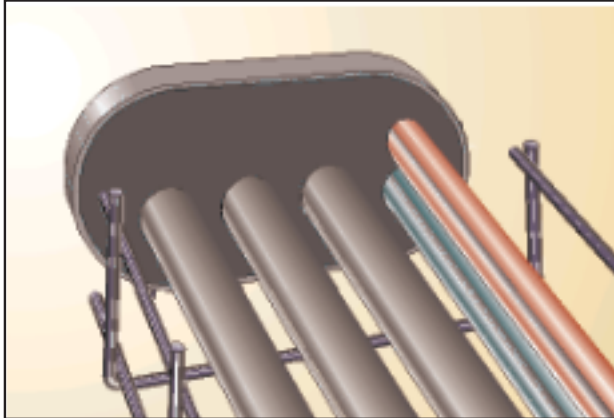
Kniparen Cable Penetration - Type KC

Easy-to-install with the prefabricated connector. Attached to barrier with self-tapping screws. Flexible system for cables easy to add and remove cables.



FS-Flex D

transit for shipboard cables



FS-Flex D Multi-Cable Transit

AREA OF USE

FS-Flex D is a cable penetration seal developed to meet the requirements set by the IMO Resolution A.754 (18).

The flexible seal is intended for use in both deck and bulkhead penetrations. It is suitable for use in welded-in sleeves or in connection with pre-fabricated, bolted/screwed designs.

FS-Flex D stops propagation of fire, smoke, gas, water, dust and sound. The elasticity and strength of the sealing material offers a flexible seal that resists large movements and strong vibration without cracking, deformation or loss of adhesion.

FS-Flex D is approved for use also below the waterline.

MATERIALS

The system utilizes non-combustible D-24B Calcium Silicate Blanket packed into the cavity between sleeve and cables. The external surfaces of the seal are then protected with a layer of FireStop Sealant 3000 fire retardant silicone elastomer which offers an air- and watertight bond to both cables and steel.

The seal is installed with ease and without special tools.



MAINTENANCE & REPAIRS

Maintenance of the seal is normally not required. Any repairs are made with ease by addition of new FireStop Sealant 3000.

TECHNICAL PROPERTIES

Installed as FS-Flex D:

Fire Rating.....	A0 - A60 H0 - H60
Pressure Resistance.....	2.5 Bar(o)
Blast Impact.....	1.0 Bar(o)
Gas Tightness.....	0.02 Bar
Sound Deadening.....	ca. 55 dBA
Thickness of Silicone Sealant....	2 x 15 mm
Seal Thickness (total).....	200 mm for A0 - A60 250 mm for H0 - H60

Components:

FireStop Sealant 3000

Colour.....	Black, white or grey
Density.....	1400 kg/m ³
Application Temperature.....	5 - 35°C
Working Temperature.....	-65°C to 250°C
Curing Time (15mm thk).....	ca. 1 weeks
Working Time.....	20 - 30 minutes
Elongation.....	1300 %
Hardness Shore A.....	15 Points
Tensile Strength.....	0.7 MPa
Electrical Properties.....	Insulating
Shelf Life.....	12 months

D-24B Silicate Blanket

Colour.....	Off-white
Density.....	96 kg/m ³
Working Temperature.....	1200°C

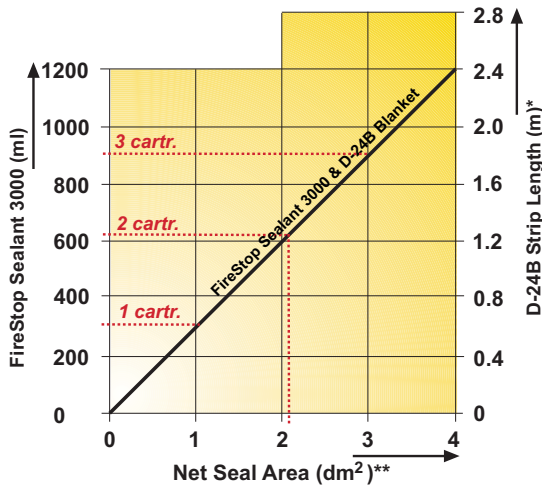
TECHNICAL ASSISTANCE

Contact FireSeal for any further details you may require.

FSI-O-014-08/1

MATERIALS CONSUMPTION

Figure 1:
Materials consumption for A Class Seal



* D-24B Calcium Silicate Blanket, 100 mm wide pre-cut strip

** Net Area = Sleeve Cross Sectional Area less Cable Cross Sectional Area.

Quick Guide - consumption per dm² net seal area:
FireStop Sealant 3000 - 1 cartridge for A and H Class;
D-24B Blanket - 6 dm² for A Class and 9 dm² for H Class.

PACKING

FS-Flex D is supplied as:

- FireStop Sealant 3000, 310 ml cartridge
- D-24B Calcium Silicate Blanket, strips measuring 7300 x 100 x 25 mm.

The components should be stored dry.

SLEEVE DESIGN

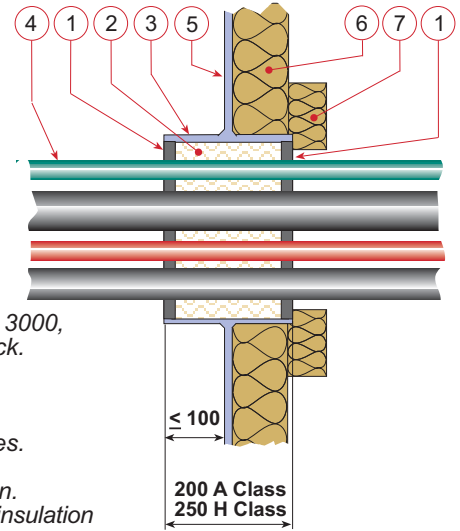
The sleeve, of 2 mm thickness minimum, can and be continuously welded or bolted to the division plate.

The distance between a cable and the sleeve should not be less than 5 mm.

SLEEVE INSULATION

The sleeve should be partially insulated with non-flammable mineral wool.

The division insulation should be installed to a snug fit around the sleeve and the sleeve insulation must be thoroughly fixed onto the division insulation and to the sleeve - see Figure 2.



Key:

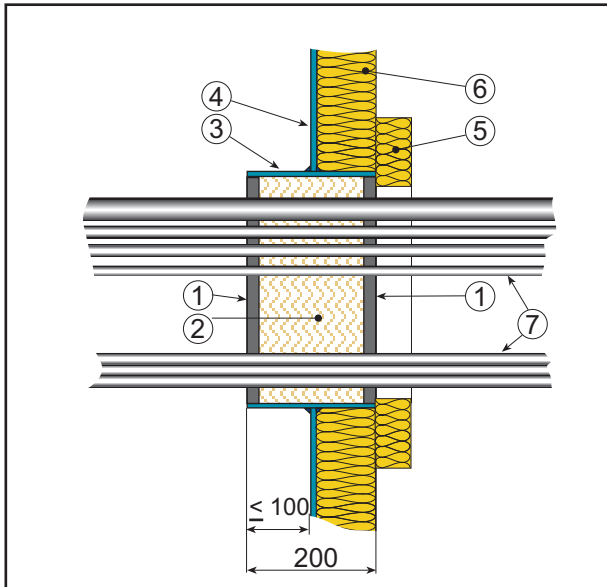
- 1 FireStop Sealant 3000, 15 mm (nom.) thick.
- 2 D-24B Calcium Silicate Blanket.
- 3 Steel sleeve.
- 4 Penetrating cables.
- 5 Division plate.
- 6 Division insulation.
- 7 Approved sleeve insulation

Figure 2:
Typical FS-Flex D Penetration

INSTALLATION DIRECTIVES

- 1 Remove all loose debris from the sleeve and make sure the sleeve is free from dust, oil and moisture.
- 2 Pack the sleeve including the space between cables and sleeve and between cables with D-24 B Calcium Silicate Blanket; a wooden slip may conveniently be used for packing down. Leave a recess of ca.15 mm depth at each end of the sleeve.
- 3 Apply FireStop Sealant 3000 directly from the cartridge into each recess at both faces.
- 4 Even out the sealant using a spatula or a finger wetted with soapy water.
- 5 Remove any spilled material with a cloth dipped in paraffin oil or white spirit.
- 6 Attach the control label onto or close to the penetration.
- 7 Insulate one side of the sleeve using approved insulating material.
- 8 Leave to cure for at least 24 hours.

Bulkhead Penetration - Type CD-B



FS-Flex D

Cable penetration with elastomer A0 - A60 Class

Area of Use

Specially suitable for cable penetrations.

Special Properties

Movements or vibrations of the penetrating cables are accepted.

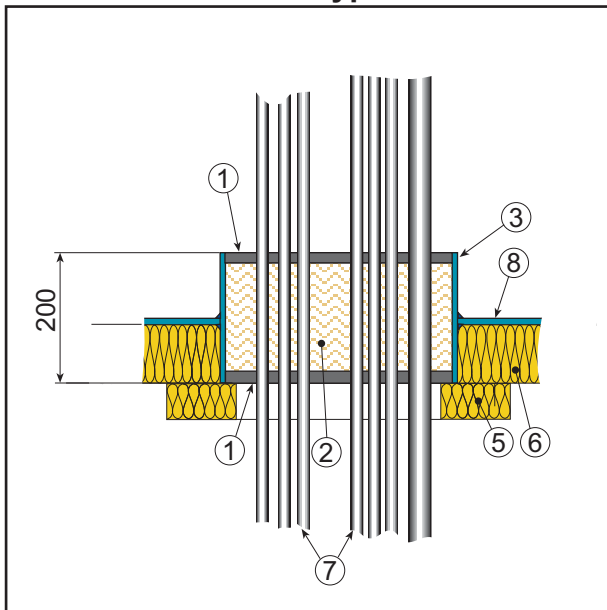
Simple installation - no special tools required.

Changes, repairs or retrofits are made with ease.

Lightweight coaming - no filling holes required.

Prefabricated sleeves with screw fixing optional.

Deck Penetration - Type CD-D



Technical Data

Fire Rating	A0, A15, A30 & A60 class
Watertightness	250 kPa (25 mWC) without reinforcement
Gas tightness	30 mBar
Sound Reduction	c. 55 dB
Resiliency	±1 mm, 100 Hz
Moisture Protection	Not required

Technical Support

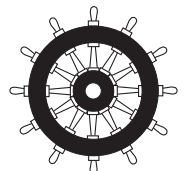
Contact FireSeal for specification, approval certification or any further details.

Key:

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

Minimum distance between cable(s) and sleeve \geq 5 mm.
Well packed cable bundles accepted.

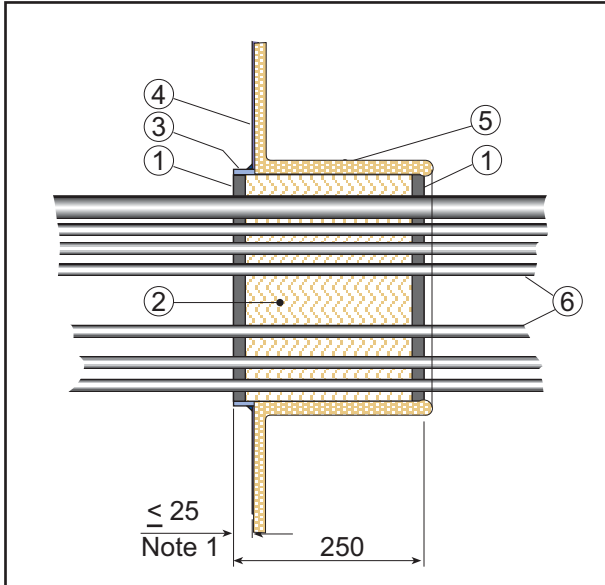
*Yard Supply



Recommendations for use of our products are based on tests and information we believe to be reliable. Manufacturer or seller are not responsible for results where the products are used under conditions beyond our control. Specifications are subject to change without notice.



Bulkhead Penetration - Type CDH-B



FS-Flex D

Cable penetration with elastomer H0 & H60 Class

Area of Use

Specially suitable for cable penetrations.

Special 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.

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

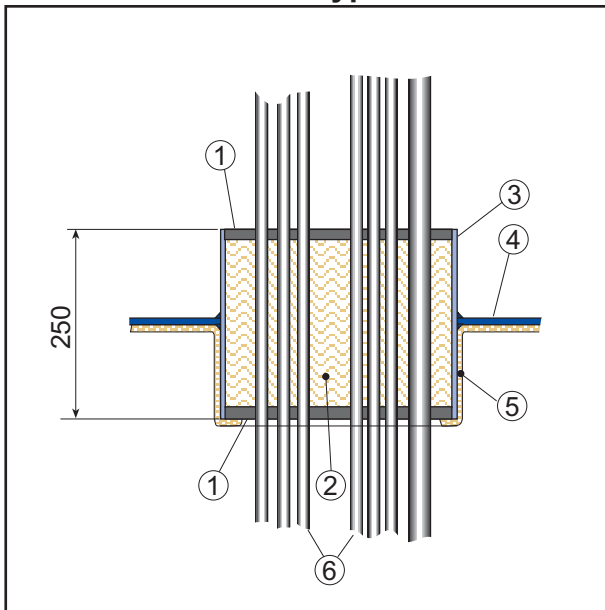
Technical Data

Fire Rating	H0 & H60 class
Watertightness	250 kPa (25 mWC) without reinforcement
Sound Reduction	c. 55 dB
Resiliency	± 1 mm, 100 Hz
Moisture Protection	Not required

Technical support

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

Deck Penetration - Type CDH-D



Key:

- 1 FireStop Sealant 3000, 15 thk (nom.)
- 2 D-24B Blanket
- 3 Steel coaming 250 mm long and minimum 2 mm thk, size from 60 mm O.D. up-to 356 x 256 mm*
- 4 Steel division plate*
- 5 Approved S.F.P. or equal H class insulation - Note 1*
- 6 Penetrating cables - Note 2*

*Yard Supply

Note 1: Deck sleeve to be partly insulated.
Fire side protrusion of uninsulated sleeve 25 mm maximum.

Note 2: Minimum distance between cable(s) and and coaming ≥ 5 mm.
Well packed cable bundles accepted.
Max.40 % cable fill.

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