



MARINE DIVISION

Certificate number: 10461/D0 BV

File number: ACI 4000/050/001

Product code: 5302H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

ESSVE Produkter AB

Sollentuna - SWEDEN

for the type of product

CABLE PENETRATIONS IN FIRE DIVISIONS

A-60 "FS-FLEX D cable penetration seal" for Bulkhead and Decks.

Requirements:

BV Rules - SOLAS 1974 Convention, as amended, Reg. II-2/9, IMO FTP Code Annex 1, Part 3, IMO MSC/Circ.1120

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 07 Jul 2016

For BUREAU VERITAS,

At BV GOTHENBURG, on 07 Jul 2011,

Magne MOLLER



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine Division available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

FS-FLEX D cable penetration seal for "A" Class Bulkheads and Decks

Made up of steel sleeve welded or bolted to the bulkhead / deck. "Blanket D-24B" is packed into the cavity between steel sleeve and cables. External surfaces are coated with a 15 mm thick (nominal) layer of "Fire Stop Sealant 3000".

A-60 Single cable penetrations type FS-Flex D:

Steel sleeve diameter (mm)	≤48	≤60	≤150	≤150
Orientation	bulkhead	bulkhead	bulkhead	deck
Minimum Steel sleeve thickness (mm)	2,6	3	3	3
Sleeve length (mm)	200	170 to 200	200	200
Steel sleeve location in bulkhead	only 25 mm on the uninsulated side of the division	equally distributed	only 25 mm on the uninsulated side of the division	equally distributed
Maximum Cable diameter(mm)	20	16	75	75
Additional Rock wool on insulated side (thickness / density)	50mm/ 125 kg/m ³ (along sleeve)	No	50mm/ 80 kg/m ³ (along sleeve and 200mm along cable)	50mm/ 80 kg/m ³ (200mm along cable)
Fire rating	A60	A60	A60	A60

Steel sleeves are continuously welded to the bulkhead.

A-60 Multi cable penetrations type FS-Flex D:

Steel sleeve dimensions (mm)	≤ 350 x 150	≤ 800 x 400	≤ 350 x 150	≤ 800 x 400	≤ 800 x 400
Orientation	bulkhead	bulkhead	deck	deck	deck
Fixation	bolted or continuously welded	continuously welded	bolted or continuously welded	continuously welded	continuously welded
Minimum Steel sleeve thickness (mm)	2	3	2	3	3
Sleeve length (mm)	200	200	200	170	200
Steel sleeve location in bulkhead	only 20 mm on the uninsulated side of the division	equally distributed	only 50 mm on the uninsulated side of the division	equally distributed	equally distributed
Maximum Cable diameter(mm)	49	85	49	34	85
Max. Cross-sectional area occupied by cables	39%	40%	39%	4 %	3 to 40%
Additional Rock wool on insulated side (thickness / density)	40mm/ 80 kg/m ³ (along sleeve)	50mm/ 120kg/m ³ (600mm around transit)	40mm/ 80 kg/m ³ (along sleeve)	50mm/ 120kg/m ³ (120mm around transit)	50mm/ 120kg/m ³ (120mm around transit)
Fire rating	A60	A60	A60	A60	A60

The transit has been tested with the cables evenly spread inside the coaming, as well as with the cables in bunch at the center of the transit.

2. DOCUMENTS AND DRAWINGS :

As per the manufacturer's drawings n°FSH-O-105-03 Rev. G, with limitations contained in §1.

3. TEST REPORTS :

3.1- A-60 cable transits type FS-Flex D in bulkheads:

- Test report N° 103070.54A dated November 23, 2010, N° 103070.43 dated October, 19 2007, N° 103070.40A dated July 03, 2006, 103070.30 dated March 17,2004 and N° SB/846007.04B dated 18th September 1997 as per IMO FTP Code, Annex 1, Part 3 [testing standard: IMO Resolution A754(18)] from SINTEF, Norway.
- Assessment report N° 103204.66 dated June 22, 2011 from SINTEF, Norway.

3.2- A-60 cable transits type FS-Flex D in decks:

- Test reports N° 103070.54B dated November 23, 2010, N° 103070.45B dated April 04, 2008, N° 103070.40B dated July 03, 2006 and 846007.04A dated September 18, 1997 as per IMO FTP Code, Annex 1, Part 3 [testing standard: IMO Resolution A754(18)] from SINTEF, Norway.

4. APPLICATION / LIMITATION :

- 4.1- Approved for use cable transits in A-15, A-30 and A-60 class steel divisions, with limitations contained in §1.
- 4.2- Additional non-combustible mineral wool: The fire tests were conducted with different mineral wool types; any approved A-class insulation of similar type giving at least an equivalent insulation performance can be used.
- 4.4 - The fitting aboard to be the same as used for the test.
- 4.5- No more than 40% of the inside cross-sectional area of each transit should be occupied by cables
- 4.6- Where intended to be fitted into hull structural parts, welding procedures, welder's certification and material certification are to be submitted to Bureau Veritas

5. PRODUCTION SURVEY REQUIREMENTS :

The "FS-FLEX D" penetrations are to be manufactured, examined and tested by ESSVE Produkter AB in accordance with the type described in this certificate and Bureau Veritas Rules for the Classification of Steel Ships. Production sites are to be recognized by Bureau Veritas as per NR320 for HBV products. To this end ESSVE Produkter AB has to make the necessary arrangements for a Society's Surveyor to perform visits and product audits at the production sites. ESSVE Produkter AB has declared to Bureau Veritas that the type of product described in this certificate may be manufactured at the following production sites :

ESSVE Produkter AB
Sidensvansvägen 10
Box 770
192 55 Sollentuna
SWEDEN

6. MARKING OF PRODUCT :

The product or packing is to be marked with manufacturer name, type, designation and fire-technical rating.

7. OTHERS :

7.1 - This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the units at any time and that **ESSVE Produkter AB, Sollentuna - Sweden**, will accept full responsibility for informing shipbuilders, shipowners or their sub-contractors of the proper methods of use and general maintenance of the units and the conditions of this approval.

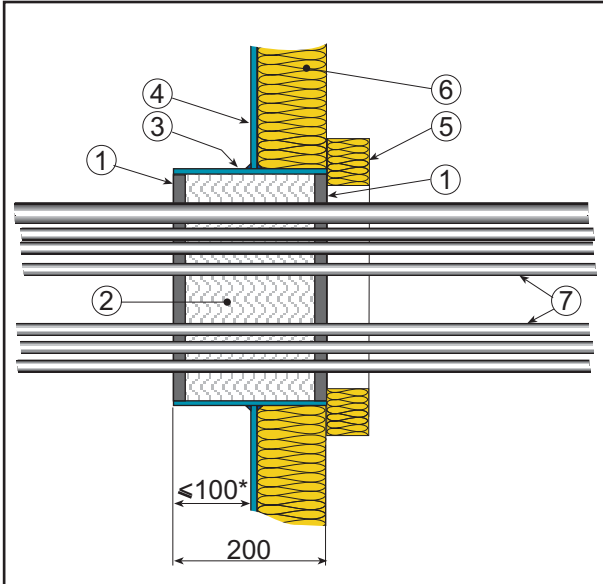
7.2- Watertightness and Gastightness:

- Tested watertightness (before fire exposure): 2,5 bar during 30 min.
- Tested gastightness (before fire exposure): 30 mbar during 30 min. (Test report FSR-C-260-06 dated 03-05-2006 from the manufacturer.)

7.3 This Certificate supersedes the Type Approval Certificate N° 10461/C0 BV issued on 13/12/2010 by the Society.

*** END OF CERTIFICATE ***

Bulkhead Penetration - Type CD-B



FS-Flex D

Cable penetration with elastomer A0 - A60 Class

Area of Use

Specially suitable for small and large penetrations.

Special Properties

Movements or vibrations of the penetrating cables are accepted.

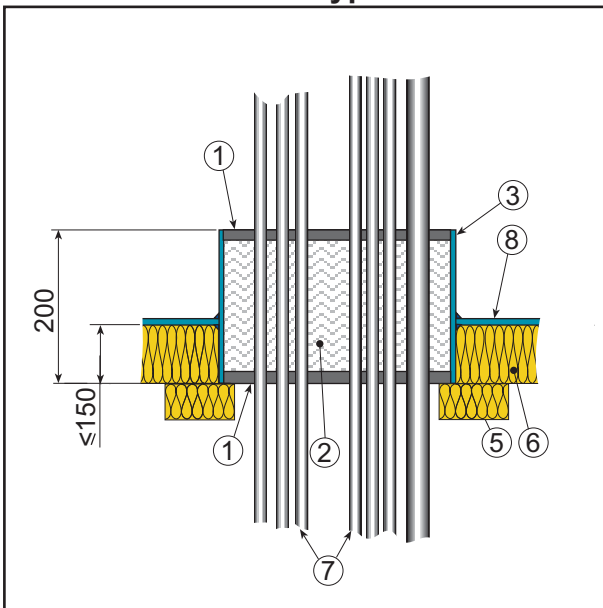
Simple installation - no special tools required.

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	167 kPa (16,7 mWC) without reinforcement
Gastightness	30 mBar
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.

For A-0, A-15 and A-30 class, Flex D are to be insulated as A-60 and in addition the division is to be insulated with A-60 insulation at least 200 mm around the penetration.

Key:

- 1 FireStop Sealant 3000, 15 thk (nom.)
- 2 D-24B alcium Silicate Blanket
- 3 Steel sleeve 200 long with 2 wall thk (min.), size from 48 O.D. up-to 800 x 400**
- 4 Division 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.
Max. cable fill 40 %.

**Yard Supply

