ESST SYSTEM®

Expandable Sleeves with Sealant Type MCT (Multi-Cable Transit)

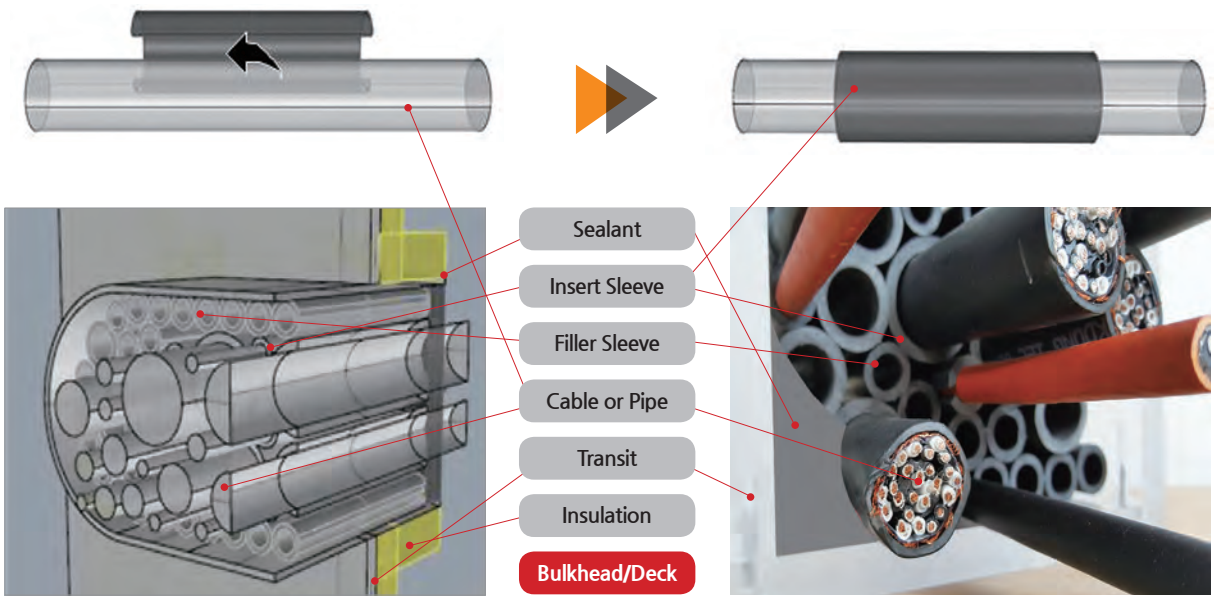
What' Expandable Sleeves with Sealant SYSTEM?

- Generally, fire in the ship is so fatal to lives and property even it is petty in early time.
- In case of fire, cable transit in the ship could role of a smoke pipe, it means not only fire spread rapidly but also cable transit be a passage of harmful gas.
- Even though, it is success to put out there might be some damage like equipment breakdown.

Fire Prevention System is essential to protect losses!

Cable Transit Fire & Sealing System ESST system

- Every Product Composition-Halogen Free Type / Low Smoke
- Fire-Resistance Test Passed (IMO Res. MSC. 307(88):2010 A-0, A-60 Class)
- Perfect Finishing with Sealant (Protect From water and harmful gas)



[Side View] [Front View]

Outstanding Properties

- **Sealant materials expand massively when exposed to high temperature**
  - In case of fire : Non Crack / -Toxicity / -Water leakage, Low Smoke Index
- **No special conduit frames**
  - It is possible to install on the existing tube
- **Having the properties of elastomer itself**
  - Preventing crack by vibration / impact suction
- **No exterior pollution**
  - No flow down in working because of high viscosity

- Install without difficulty in such kind of small space like ship
- Whoever can install easily without special skill
- Install without any retouching on the spot
- Light and convenient installing
- Save installation time
- Repair work are easy

Product Composition

AV-810 Sleeve®

- Product Type : NFRT (Non-halogen Fire Resistance Tube)
- Main Material : Olefin Resin
- It is possible to leave regular intervals as much as sleeve thickness between cables
- Fire-Resistance, Halogen Free, Low Smoke are excellent
- Supply variety sizes according to cable size.

Sleeve type	Cable Diameter(mm)		Sleeve (A) Length (mm)	Wall (mm) Thickness
	Min	Max		
6/12	5	7	140	3
8/14	7	9	140	3
10/16	9	11	140	3
12/18*	11	13	140	3
14/20	13	15	140	3
16/22	15	17	140	3
19/27*	17	21	140	4
23/31	21	25	140	4
27/35	25	29	140	4
31/39	28	33	140	4
36/46	33	39	140	5
42/52	39	45	140	5
48/58	45	51	140	5
54/64	51	57	140	5
60/70	57	63	140	5
68/78	63	71	140	5

* Filler sleeves are supplied non-split ease if filling

- Filler sleeve : 12/18*, 19/27*
  (sleeve don't cut in the direction of lengthwise)
- Sleeve length type is 140mm~(ex.160mm, 210mm)
- When able diameter size exceed 71mm,
  Mat type(ex.1000 x 5T[length * thickness
  * wide(140mm~)]
- AV-812 : A0 Class

AV-810 Sleeve® : non-toxic, halogen free components

- For the AV-810 insert and filler sleeves, a special rubber compound was developed known as FRR/LEHF(fire resistant rubber/low grade of expansion, halogen free). When this rubber is exposed to fire or temperatures in excess of 200℃ it expands five to ten times its original volume. During the expansion of the rubber a carbonized mass is formed, which has good properties of thermal insulation.
- The FRR/LEHF rubber is absolutely HALOGEN FREE. Furthermore the FRR/LEHF rubber has a low smoke index(NES 711: Issue 2: 2000) and a very high oxygen index(ISO 4589-2: 1996).
- The wall thickness of the sleeves is so chosen as to satisfy the requirements governing adequate separation of the cables.

AP-910 Sealant®

- Product Type : NFRT (Non-halogen Fire Resistance Sealant)
- Main Material : Room Temp. Curing Silicone Resin
- High viscosity doesn't make any pollution by reason of dropping down
- Be in safekeeping with sealed containers
- Finishing by filling at both exposed tube ends
- Fire-Resistance, Halogen Free, Low Smoke are excellent

Product Information

Color	Dark gray
Specific gravity	1.15 ±0.03 g/㎤
Curing of top Layer	1 ~ 2 hour
Service temperature	-60℃ up to + 70℃
Tensile strength	approx. 0.81 Mpa
Elongation at break	approx. 230%
Hardness	33 shore A
Elastic deformation	approx. 25%
Fire class	IMO Res. MSC. 307(88):2010
Ageing	Up to 50 years service life
Supplied in	Cartridges, containing 310㎖ 500㎖
Storage	To be stored cool and dry min/max temperature= +5/+30℃
Storage life	approx. 12months

AP-910 Sealant® : Water-repellent, High bonding strength, Weathering, UV and Ozone resistant

- AP-910 is a fire-resistant sealant based on a single component silicone compound.
- In the event of fire or at temperatures in excess of 200℃ the sealant expands to about five to ten times its original volume. During this process a porous mass is formed, which has excellent thermal insulation properties. In contrast to conventional materials that swell under severe heat exposure, the expansion of AP-910 sealant is not caused by intumescence, but by a chemical process (Intumescence means the occurrence of volume enlargement under the effect of heat, caused by the surface structure being inflated by fumes originating from the product). The advantage of this is that the expansion of AP-910 of not accompanied by formation of large amounts of fumes.

Fire Stop Mechanism

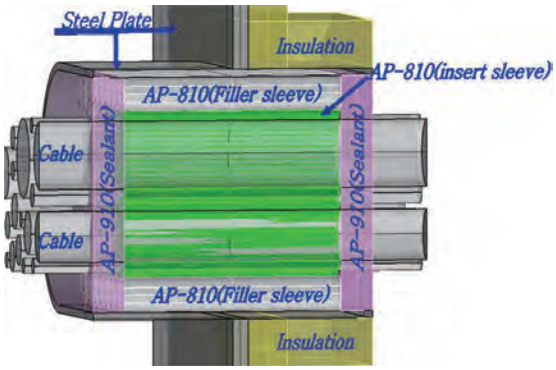
High temperature (200℃) or Flame contact

Sleeve / Sealant E xpand

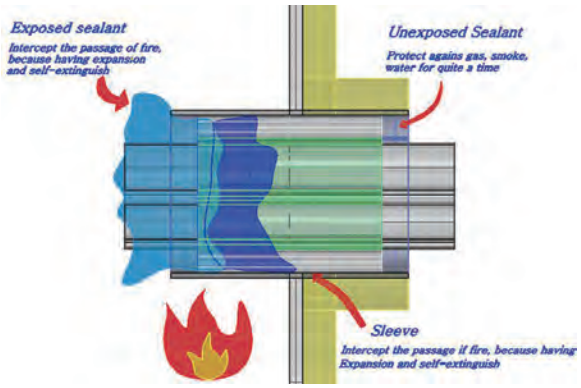
Cable transit interior flame interception

Self fire extinguishing feature it doesn't allow to expend fire to another section

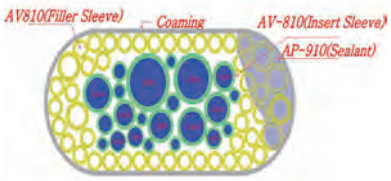
Ordinary



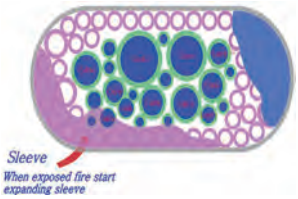
Fire



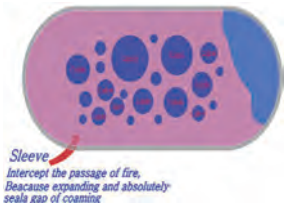
Ordinary



Fire Early Stage



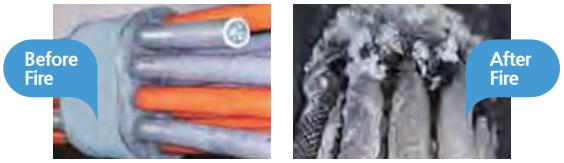
Fire After Stage



Exposed Sleeve

Sleeve
When exposed fire
Start expanding sleeve

Exposed Sealant



Exposed Sealant
ntercept the passage of fire, because having expansion and self-extinguish

Fire–Resistance Test

According to FTP Code(2010) Resolution MSC.307(88)

Bulkhead

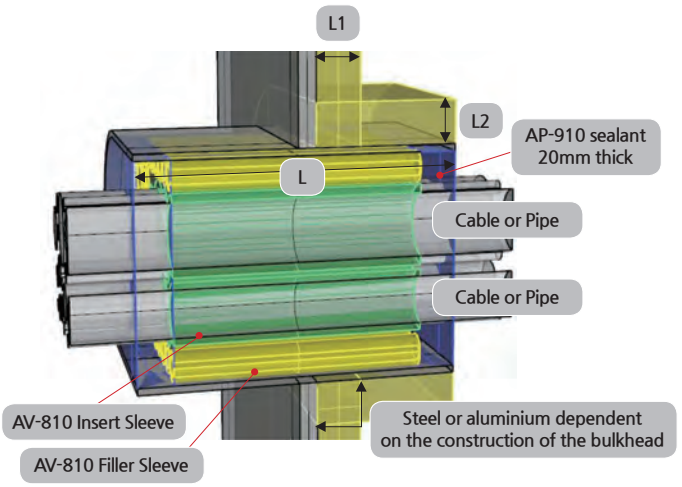
FTP Code(2010) Resolution MSC.307(88) “A bulkhead which includes the cable transit should be constructed in accordance whit 2.1.1 of the recommendation and should be insulated to class A-60 on the stiffened side, which should be the face which is exposed to the heating conditions of the test” Systems tested with insulation at the exposed side have a limitation in the application. The bulkhead must then be totally insulated at both sides.

Diagrammatic Overview of Shipbuilding/ Offshore Application

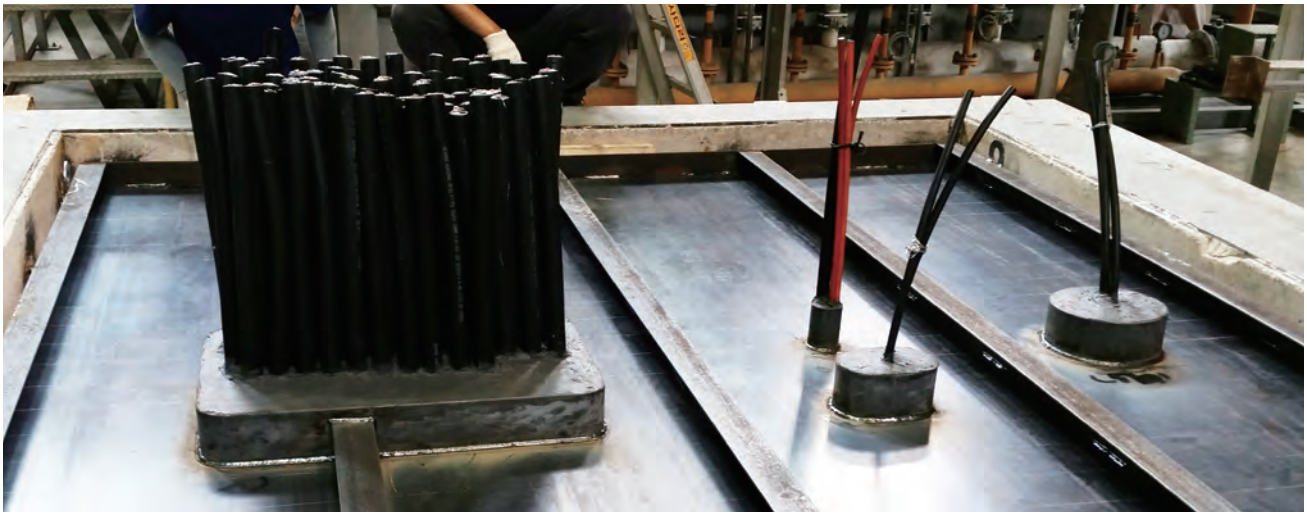
L1 : A-60 approved deck insulation
L2 : mineral wool minimum 25mm, density 110 kg/㎥
for A-class penetrations or equivalent
as used for the Bulkhead insulation.

[A0-A60 CABLE TRANSIT BULKHEADS]

Non-fire rated conduits which should only be gas or water tight can be shorter in length.
For ease of installation it is advisable the length of the coaming not to make shorter then 100 mm.
L = 180mm or 200mm for A-class
Length of the AP-910 insert and filler sleeve
140mm or 160mm for A-class



Deck



The easiest way to pass a deck test is to place the transit totally above deck.
Worst case for deck penetrations is to place the transits totally below deck. And that is exactly the way the penetrations generally are installed. Cable penetrations should be applied as tested. The means that penetrations tested only above deck should not be placed totally below deck.
ESST System are tested "worst case" and can be welded in above, below, midway.

- The average temperature of the furnace(℃)
  At the end of the first 5 min : 576℃
  At the end of the first 60 min : 945℃
- Time : 60min

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[A0-A60 CABLE TRANSIT DECKS]

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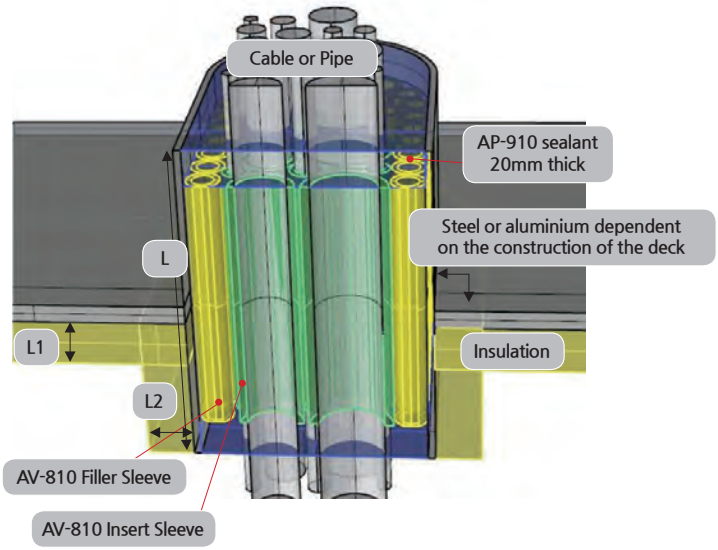


Water-/ Gas- Tightness Test

Water Tightness Test

- Pressure : 2.5 bar
- Time : 60 min

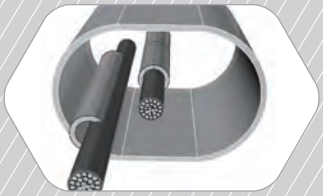
Sealcing system in type bulkhead, deck and tranks must be so constructed that they are capable of withstanding a hydraulic test pressure conforming to the condition specified below. And there should be no leakage during this test.

Gas Tightness Test

- Pressure : 0.5 bar
- Time : 30 min

Bulkhead, deck cable transit shall be so constructed that they can withstand a pneumatic pressure with air conforming to the condition specified below. And there should be no leakage during this test.

Assembly Instructions



Put sleeves which is fitting on an external diameter inside laid cable.
Due to sleeve's splitting, it is easy to put into it from the front side by hand.

Put filler sleeves as 19/27 or 12/18 at the empty space after putting sleeve inside laid cable.

Arrange already stuffed sleeve to make 20mm space on both sides.
(Sealant should be filled in 20mm space with an error tolerance of 4mm)

Fill the sealant to 20mm empty space by sealant filler. Before fill the sealant, make sure that there is no oil or dust things and it is dry on the surface.
(Dust/moisture/corrosion or oil stain could disturb adhesion)

When finish sealant, it can be pushed to empty inside a little.
So make it thick than cross section.

Prepare a soapy water soaked cloth to make sealant treated surface smooth and looking good.
Press down sealant surface slightly.
(Soak cloth in soapy water is for preventing sealant stick to cloth) (But soapy water just should be used in finishing because of adhesive strength deterioration)

For the crack between cables, put and press down sealant with thin and flat tool.
It is for air and water proofing.

Certificate


TYPE APPROVAL CERTIFICATE

HS INC.

PIPE, CABLE, DUCT PENETRATIONS IN FIRE DIVISIONS

This certificate will expire on: 16 May 2021


Lloyd's Register

CERTIFICATE OF FIRE APPROVAL

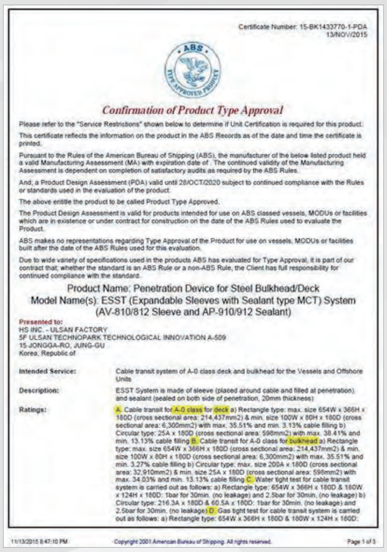
Manufacturer: HS INC.

Type: CABLE & PIPE PENETRATION (STANDARD FIRE TEST)


TYPE APPROVAL CERTIFICATE

THIS IS TO CERTIFY

KOREAN REGISTER OF SHIPPING


Confirmation of Product Type Approval

Product Name: Penetration Device for Steel Bulkhead/Deck

Model Name(s): ESST (Expandable Sleeves with Sealant type MCT) System (AV-810/812 Sleeve and AP-910/912 Sealant)


DNV·GL

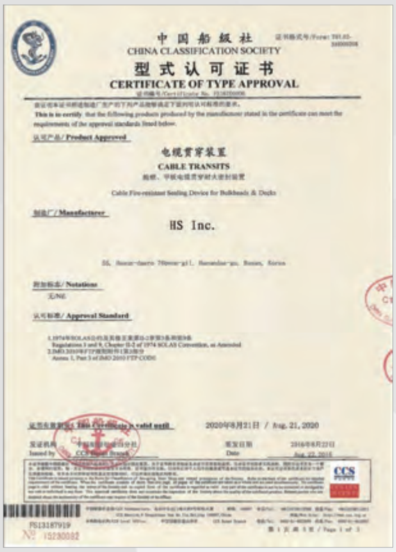
EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

This is to certify:

HS Inc.

Busan, Republic of Korea

This Certificate is valid until 2019-11-25.


中国船级社

CHINA CLASSIFICATION SOCIETY

型式认可证书

CERTIFICATE OF TYPE APPROVAL

CABLE TRANSITS

HS Inc.

KR KOREAN REGISTER · Lloyd's Register Careers · DNV·GL · ABS · CCS 中国船级社 CHINA CLASSIFICATION SOCIETY · BUREAU VERITAS