NOFIRNO®
SEALING SYSTEM FOR MULTI-CABLE TRANSITS

TESTED TO IMO RESOLUTION A.754(18); FIRE CLASS A0-A60, H0-H120, JET FIRE
EC (MED) CERTIFICATE 09156/C0 ISSUED BY BUREAU VERITAS

WE CARE

BEELE ENGINEERING

CONTENTS

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BEELE ENGINEERING

WE CARE

BEELE ENGINEERING – SAFETY, RELIABILITY, INVOLVEMENT

Every moment of the day, in every business and every situation, the threat of fire is present. For over three decades, BEELE Engineering has specialized in passive fire safety in the form of systems which prevent the spread of fire, smoke, water and gases via cable and pipe penetrations. With our superior sealing technologies, we have become the undisputed Number One in this particular field.

It is BEELE Engineering's philosophy that R&D exists to respond to market demands. Only then can research and development activities be classed as functional. Only then are innovative solutions generated for problems that have current or near-term relevance. Our policy is one of continuous active response to customers' demands, or to modified or new functional requirements. We listen, we observe and we interpret, and so we arrive at new product developments and bold innovations.

BEELE Engineering has built up an enormous body of specialized expertise and knowledge. Our company is the world market leader in sealing systems for state-of-the-art shipbuilding applications as well as civil and industrial applications. We do not follow trends, we set them.

Development of new products and technologies, as well as pioneering know-how, are present in every fibre of our organization. We are driven by passion for our specialization, and our customer involvement drives us to exceed the boundaries of what is technically feasible.

BEELE Engineering operates world-wide. From our agencies in virtually every industrialized country, our support and services are always somewhere nearby. We are there for you – also for on-site advice or in-house demonstrations, instructions and support at your location.

Our development, test and production facilities are among the most advanced in the world. The factory is equipped with state of the art machines, which are tailor made to the requirements of our company. We work to a high-level ISO system, with unmatched involvement. Continuous investment in design technologies, combined with highest quality polymers, is our guarantee for the safety of lives and equipment. That is why BEELE Engineering is internationally recognized by all relevant certification institutes and classification societies.

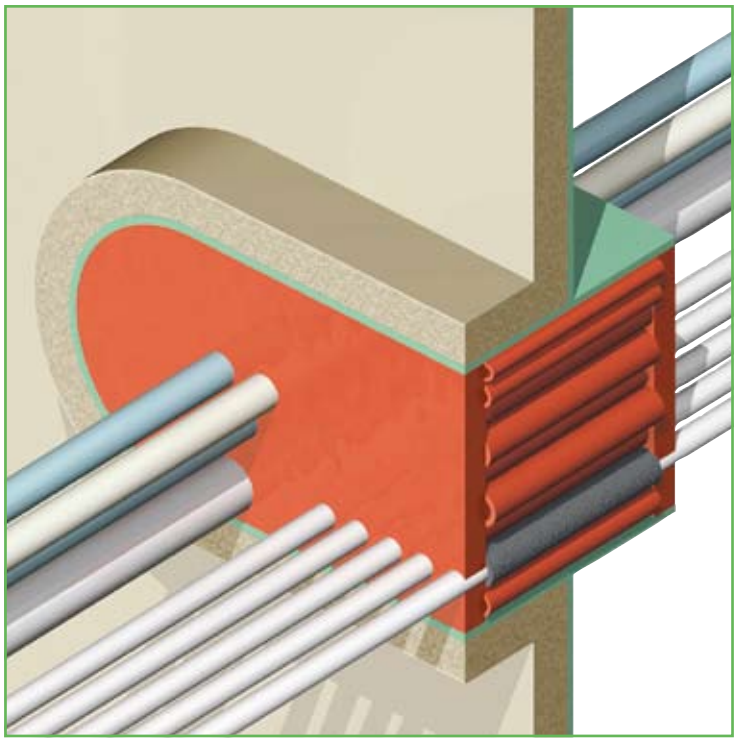
NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

BEELE Engineering is dedicated to fire safety. From the pictures below the text, it might be clear that fire prevention is not child´s play, nor can it just be disregarded. In a fire, the partitions can get so hot that even approaching them is impossible. Right then it is of utmost importance that the cable and pipe penetration seals stop the spread of fire and smoke to adjacent areas. To address this problem, BEELE Engineering has developed the NOFIRNO® technology. The cable and pipe penetrations, based on this technology, have been tested successfully for A- and H-class, A-0 and H-0 class and Jet Fires.

The NOFIRNO® rubber grade, which is compounded under strict conditions in our factory, is suitable for gas and water tight ducting and for fire rated applications as well.

We have been involved with fire resistant rubbers for decades. The drawbacks of certain fire resistant rubbers are halogen content, hardness of the highly filled rubbers, hardening during lifetime, and high permanent deformation sets. All these disadvantages will have an impact on performance in the long run. NOFIRNO® rubber does not have the above mentioned drawbacks. The processing conditions for optimized compounding in our factory assure highest performance of the rubber. NOFIRNO® rubber is traceable to prevent counterfeiting and to guarantee users the proven NOFIRNO® quality.

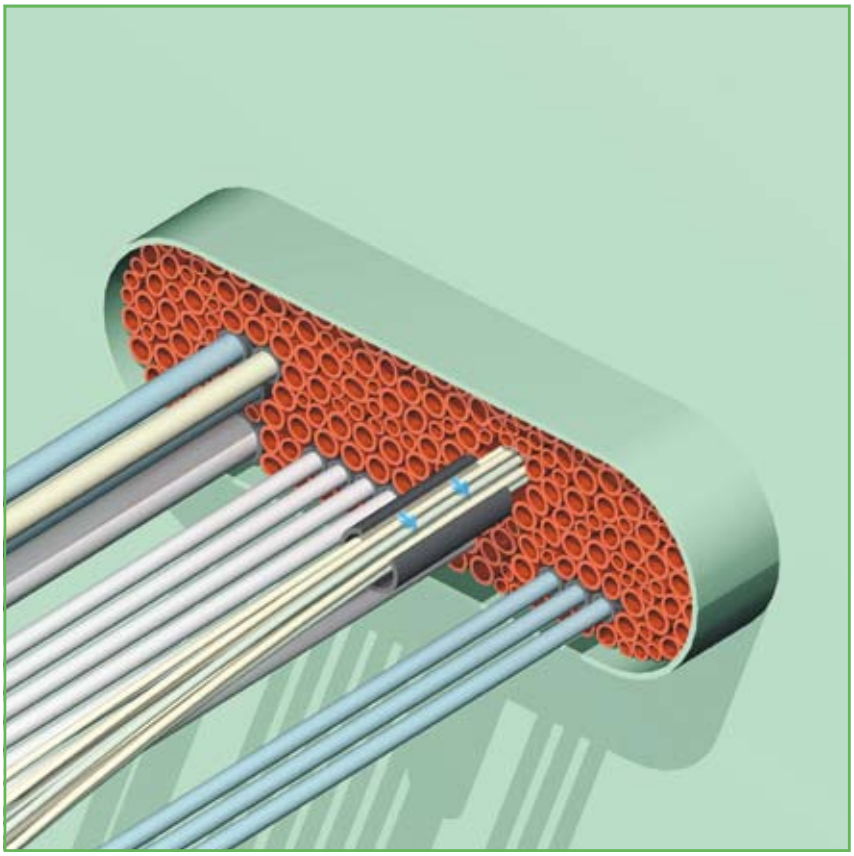
By way of surface charring and the rubber residues inside the product, it can easily be determined whether or not NOFIRNO® has been used (even after a fire).



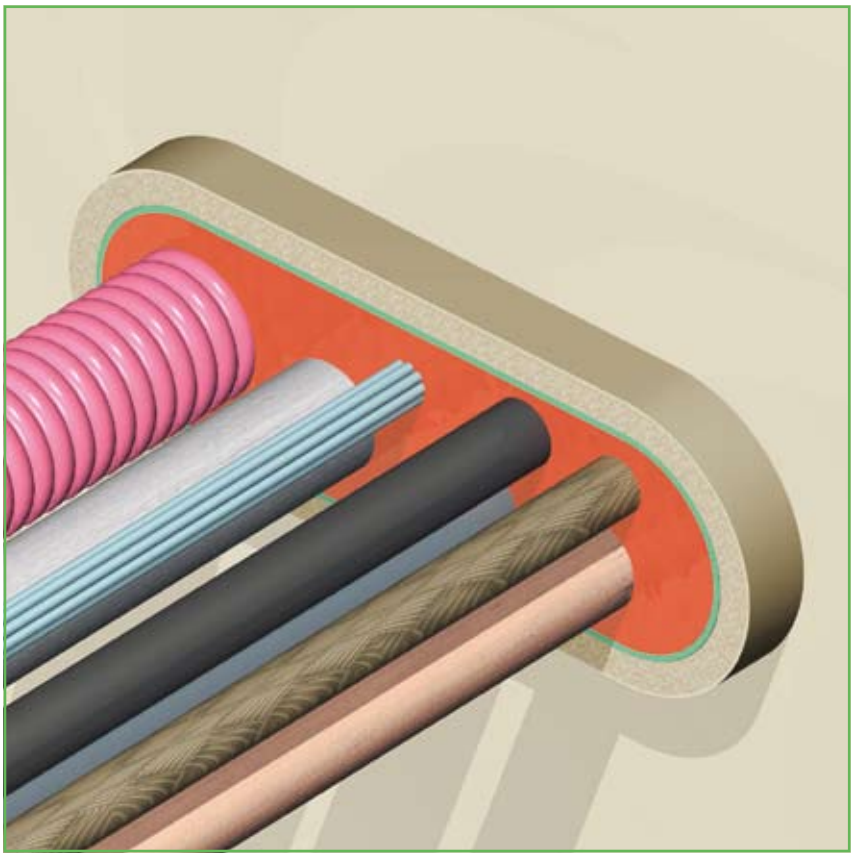
1) the NOFIRNO® rubber shows minimum permanent deformation and limited stress relaxation, guaranteeing mechanical stability in the long term.
2) the NOFIRNO® rubber can be exposed to high temperatures (up to 180 °C), making the NOFIRNO® sealing system suitable for steam lines.
3) NOFIRNO® stays flexible at temperatures of -50 °C, allowing application in arctic environments.
4) NOFIRNO® has optimum fire stopping properties:
   a) immediately creates a protective layer at the fire side
   b) will not be consumed sumed under fire exposure
   c) prevents smoke emission
5) higher thermal insulation values under fire load.
6) shorter conduit depths.
7) approved for A-0 and H-0 class without the use of any insulation. Certified up to A-60 and H-120 class.
8) successfully exposed to a 2 hour Jet Fire test.
9) can be combined with RISE® and RISE®/ULTRA.

NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

NOFIRNO® multi-cable penetrations are the best alternative to the casting compounds and block systems used in fire-rated/watertight bulkheads and decks. The RISE®/NOFIRNO® sealing system has been successfully tested according to IMO Resolution A.754(18) with sets of bundled cables. Especially in the case of ducting larger amounts of small diameter LAN cables a lot of time saving is obtained since not each and every cable has to be sleeved with a RISE® insert sleeve. Cable sets of max. 25 LAN cables with an OD of 5 - 6 mm tightly bundled to max. 35 mm can be passed through the penetration. A single RISE® insert sleeve is then placed around the cable set and inserted into the penetration. When applying the NOFIRNO® sealant, care has to be taken that sufficient sealant is injected in between the cables and partly into the RISE® insert sleeve.
This bundling is not allowed for gas and/or watertight penetrations.
See the specifications on pages 14 and 15.



The NOFIRNO® rubber grade has excellent properties and will not be consumed by the fire. The NOFIRNO® sealant immediately forms a protective layer and char when exposed to flames in this way protecting the filling of the penetration seal.
The thermal insulation is very high because of the air volume inside the penetration. The air is tightly enclosed by the sealant layer at both sides even when one side is exposed to the fire.
The NOFIRNO® system has been subjected to A-0, H-0 and even Jet Fires without being severely affected.
Due to the superb behavior of our various systems, the NOFIRNO® sealing system can be easily combined with RISE® and RISE®/ULTRA for the so-called MULTI-ALL-MIX® system for ducting all types of pipes and cables through a single conduit.
See also the NOFIRNO® pipe brochure for more information about the MULTI-ALL-MIX® applications.



NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

RISE® cable sleeves

Note: maximum continuous service temperature of the RISE® sleeves not to exceed 70 °C.
Consult our technical support department in case of higher operating temperatures.

cable sleeves are supplied split lengthwise

NOFIRNO® filler sleeves

Operating temperatures:
-50 °C up to +180 °C

filler sleeves are supplied non-split

NOFIRNO® multi-filler sleeves

filler sleeves are supplied in multi-sets of 10 sleeves

RISE® cable sleeve	cable diameter		sleeve length	article number
12/6	5 - 7		140	80.0051
14/8	7 - 9		140	80.0052
16/10	9 - 11		140	80.0053
18/12	11 - 13		140	80.0054
20/14	13 - 15		140	80.0055
22/16	15 - 17		140	80.0056
27/19	17 - 21		140	80.0057
31/23	21 - 25		140	80.0058
35/27	25 - 29		140	80.0059
39/31	29 - 33		140	80.0060
46/36	33 - 39		140	80.0061
52/42	39 - 45		140	80.0062
58/48	45 - 51		140	80.0063
64/54	51 - 57		140	80.0064
70/60	57 - 63		140	80.0065
12/6	5 - 7		160	80.0100
14/8	7 - 9		160	80.0101
16/10	9 - 11		160	80.0102
18/12	11 - 13		160	80.0103
20/14	13 - 15		160	80.0104
22/16	15 - 17		160	80.0105
27/19	17 - 21		160	80.0106
31/23	21 - 25		160	80.0107
35/27	25 - 29		160	80.0108
39/31	29 - 33		160	80.0109
46/36	33 - 39		160	80.0110
52/42	39 - 45		160	80.0111
58/48	45 - 51		160	80.0112
64/54	51 - 57		160	80.0113
70/60	57 - 63		160	80.0114
12/6	5 - 7		210	80.0200
14/8	7 - 9		210	80.0201
16/10	9 - 11		210	80.0202
18/12	11 - 13		210	80.0203
20/14	13 - 15		210	80.0204
22/16	15 - 17		210	80.0205
27/19	17 - 21		210	80.0206
31/23	21 - 25		210	80.0207
35/27	25 - 29		210	80.0208
39/31	29 - 33		210	80.0209
46/36	33 - 39		210	80.0210
52/42	39 - 45		210	80.0211
58/48	45 - 51		210	80.0212
64/54	51 - 57		210	80.0213
70/60	57 - 63		210	80.0214

all dimensions in mm

NOFIRNO® filler sleeve		sleeve length	article number
18/12 single		140	80.5002
18/12 multi		140	80.5052
18/12 single		160	80.5003
18/12 multi		160	80.5053
18/12 single		210	80.5004
18/12 multi		210	80.5054
27/19 single		140	80.5012
27/19 multi		140	80.5062
27/19 single		160	80.5013
27/19 multi		160	80.5063
27/19 single		210	80.5014
27/19 multi		210	80.5064

all dimensions in mm

NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

PRODUCT INFORMATION SEALANT

01)	colour	red brown
02)	specific gravity	1.40 ± 0.03 g/cm³
03)	curing of top layer	0.5 - 1 hour depending on temperature and air humidity
04)	service temperature	-50 °C up to +180 °C
05)	tensile strength	1.5 MPa
06)	elongation at break	200%
07)	hardness	45 Shore A
08)	elastic deformation	approx. 50%
09)	resistance	UV, Ozone, arctic conditions
10)	ageing	more than 20 years
11)	supplied in	310 ml cartridges
12)	storage	to be stored cool and dry min/max temperature = +5/+30° C
13)	storage life	guaranteed 6 months; when applied later than 6 months after date of manufacturing, curing and adhesive properties have to be checked before application

article number 50.0102

NOFIRNO® is a paste-like compound which is simple to use. NOFIRNO® has a balanced viscosity and can be applied overhead.
After applying the sealant, it can be smoothed by means of a wet cloth or by hand. Because the sealant adheres very tightly, the cloth and hands should be wetted with water before use to prevent sealant from sticking to them.

Shelf life is 12 months when stored properly. Since we have no control on storage, we can only guarantee for 6 months.

PRODUCT INFORMATION PUTTY

01)	colour	black
02)	specific gravity	1.30 ± 0.03 g/cm³
03)	curing of top layer	0.5 - 1 hour depending on temperature and air humidity
04)	service temperature	-50 °C up to +160 °C
05)	tensile strength	0.80 MPa
06)	elongation at break	40%
07)	hardness	35 Shore A
08)	elastic deformation	approx. 25%
09)	electrical resistance	< 100 Ω
10)	ageing	more than 20 years
11)	supplied in	310 ml cartridges
12)	storage	to be stored cool and dry min/max temperature = +5/+30° C
13)	storage life	guaranteed 6 months; when applied later than 6 months after date of manufacturing, curing and adhesive properties have to be checked before application

article number 80.0910

CONDUCTON® putty is an electrically conductive sealing putty based on a single component silicone compound.

CONDUCTON® has been developed for the NOFIRNO®/EMC multi-cable and pipe transits.

Shelf life is 12 months when stored properly. Since we have no control on storage, we can only guarantee for 6 months.

article number 80.0932

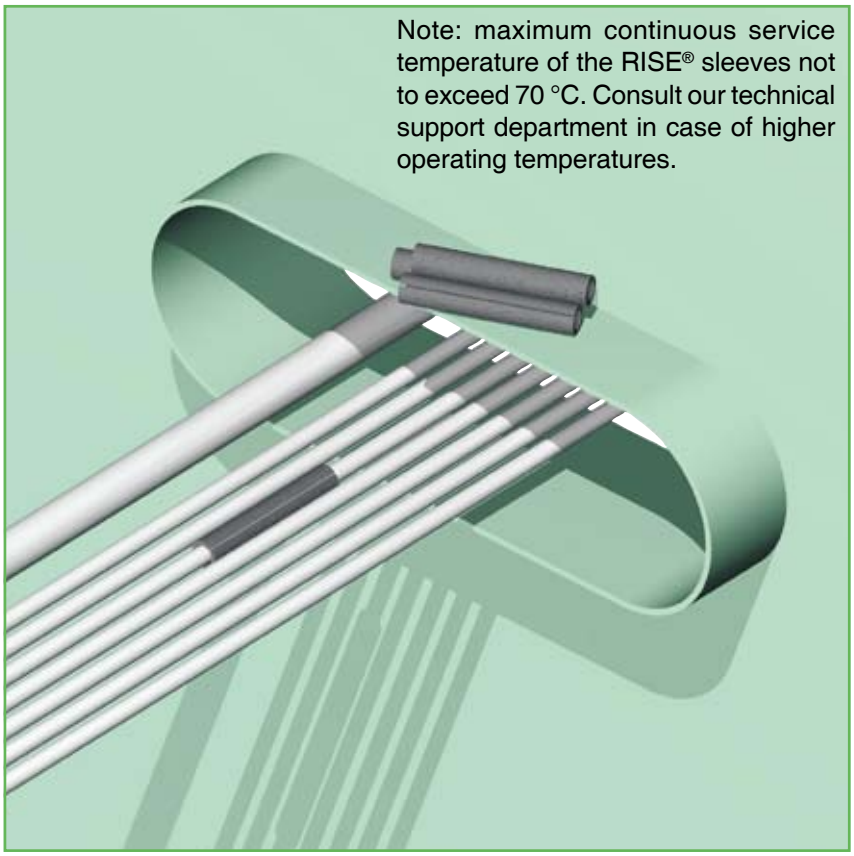
CONDUCTON® flexible rubber has been developed for the NOFIRNO®/EMC multi-cable transits and is used to fill the cavity around the ducted cables in the conduit sleeve, instead of making use of the putty. This rubber can be molded by hand and offers the highest attenuation.

CONDUCTON® flexible rubber is absolutely HALOGEN FREE and has a toxicity index of 0,00 (tested according to Naval Engineering Standard NES 713: Issue 3). Furthermore CONDUCTON® has a low smoke index (NES 711: Issue 2: 1981), an oxygen index of 38,2% (ISO 4589-2: 1996), and a temperature index of 294 °C (ISO 4589-3: 1996).

CONDUCTON® flexible rubber fullfils the criteria for use on board of UK Navy vessels for EMP/EMI penetrations.

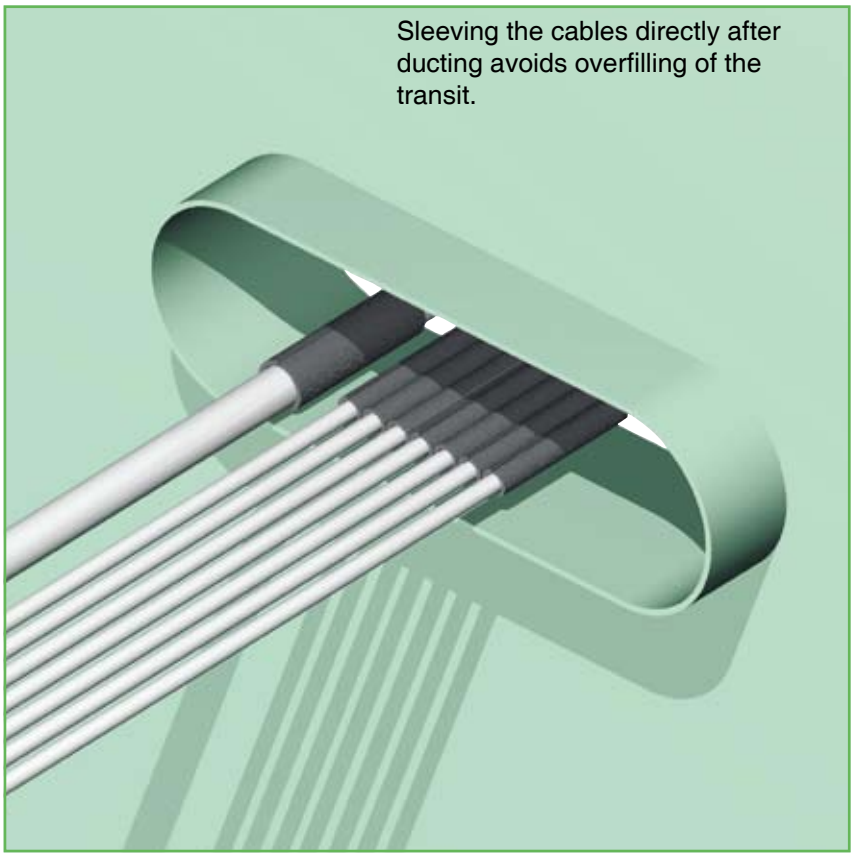
NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

1) The cables can be ducted through the conduit sleeve/ frame in random order.
It is most important that they are not pulled too tight so as not to hamper their separation when RISE® insert sleeves are inserted.



Note: maximum continuous service temperature of the RISE® sleeves not to exceed 70 °C. Consult our technical support department in case of higher operating temperatures.

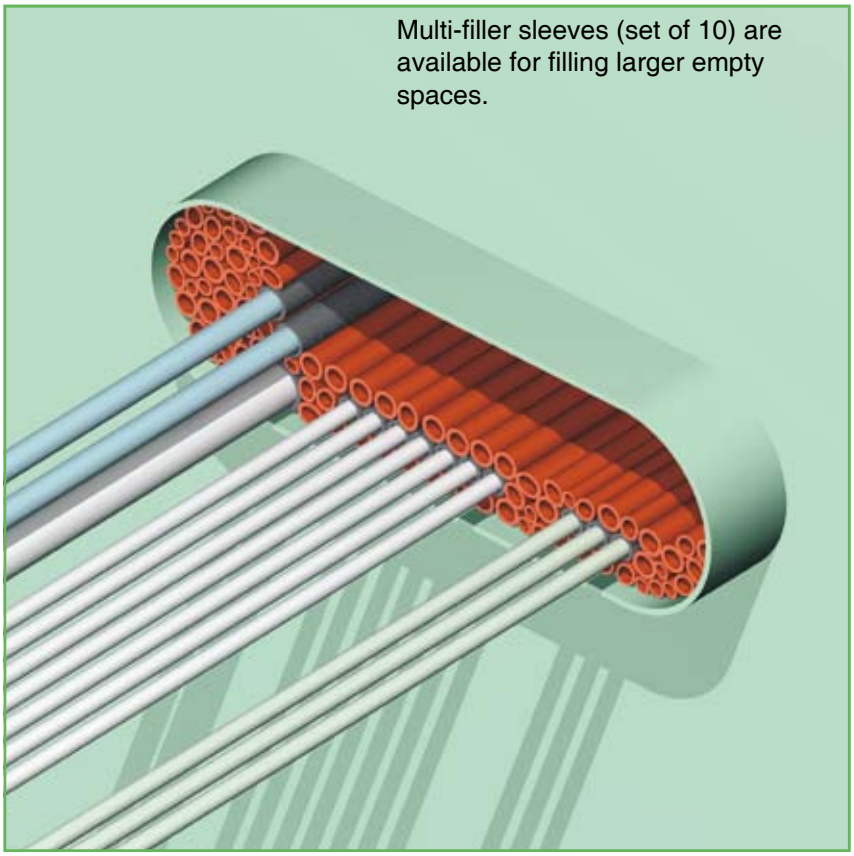
2) After the cables have been ducted, RISE® insert sleeves are applied around each cable.
The insert sleeves are split lengthwise and can therefore be placed around the cables in front of the conduit.



Sleeving the cables directly after ducting avoids overfilling of the transit.

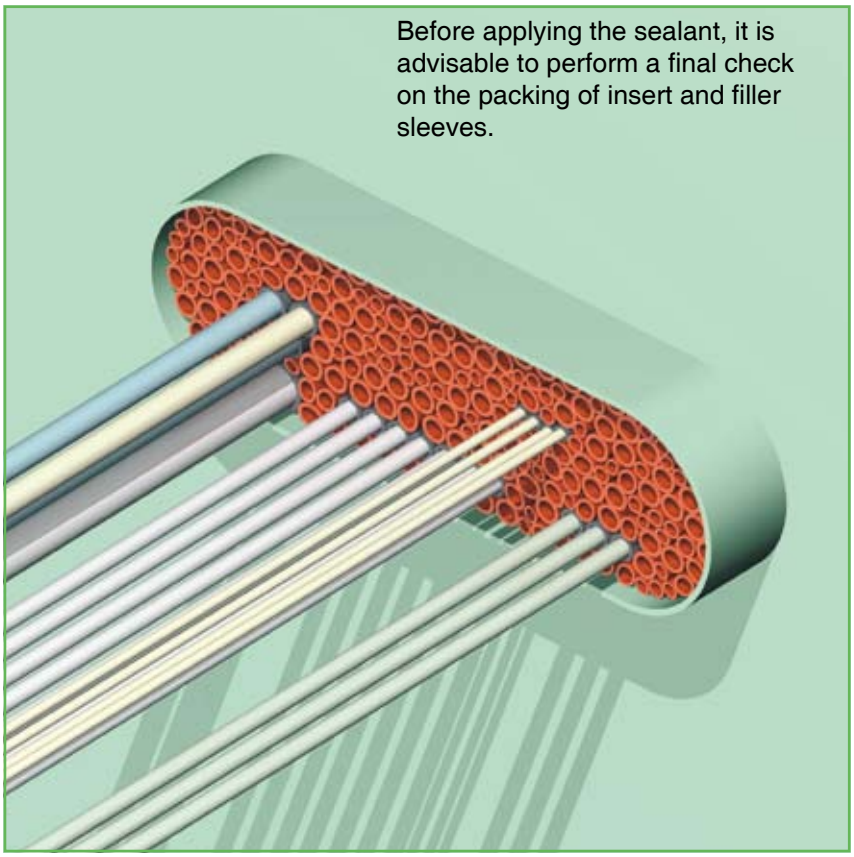
NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

3) The remaining free space in the conduit is filled with NOFIRNO® filler sleeves type 27/19 and 18/12.
For ease of filling, the NOFIRNO® filler sleeves are supplied non-split. The ratio 27/19 to 18/12 should be about 2:1.



Multi-filler sleeves (set of 10) are available for filling larger empty spaces.

4) Push the insert/filler sleeves into the conduit in such a way as to leave about 20 mm free space at the front and the back. The whole set of filler sleeves should fit tightly into the conduit to provide sufficient mechanical stability.



Before applying the sealant, it is advisable to perform a final check on the packing of insert and filler sleeves.

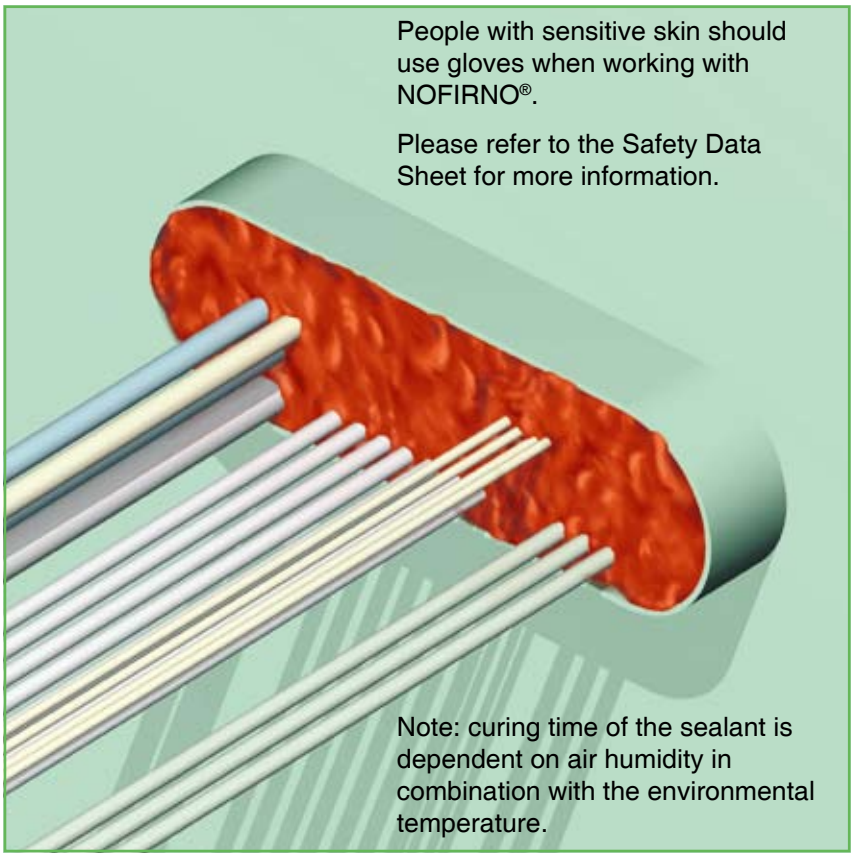
NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

5) A 20 mm thick layer of NOFIRNO® sealant is applied at each side of the conduit. Clean and dry the conduit opening and the cables thoroughly, and remove any dirt, rust or oil residues before applying the sealant.

Use our professional sealant guns. Hand fatigue is prevented and optimum flow of the sealant is obtained.

Note: due to the curing process, the sealant cannot be applied on hot surfaces. Maximum temperature is 60 °C (140 °F).

6) The conduit should be overfilled with NOFIRNO® sealant, because some sealant will be pushed between and into the empty filler sleeves during further finishing.
This will contribute to obtain higher tightness ratings.



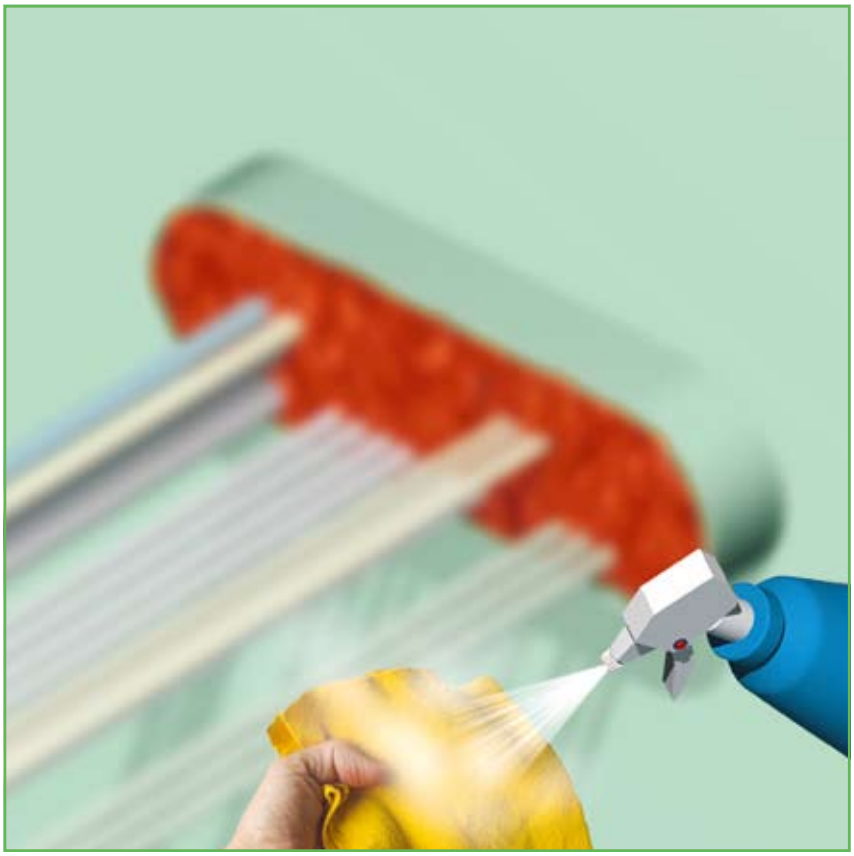
People with sensitive skin should use gloves when working with NOFIRNO®.

Please refer to the Safety Data Sheet for more information.

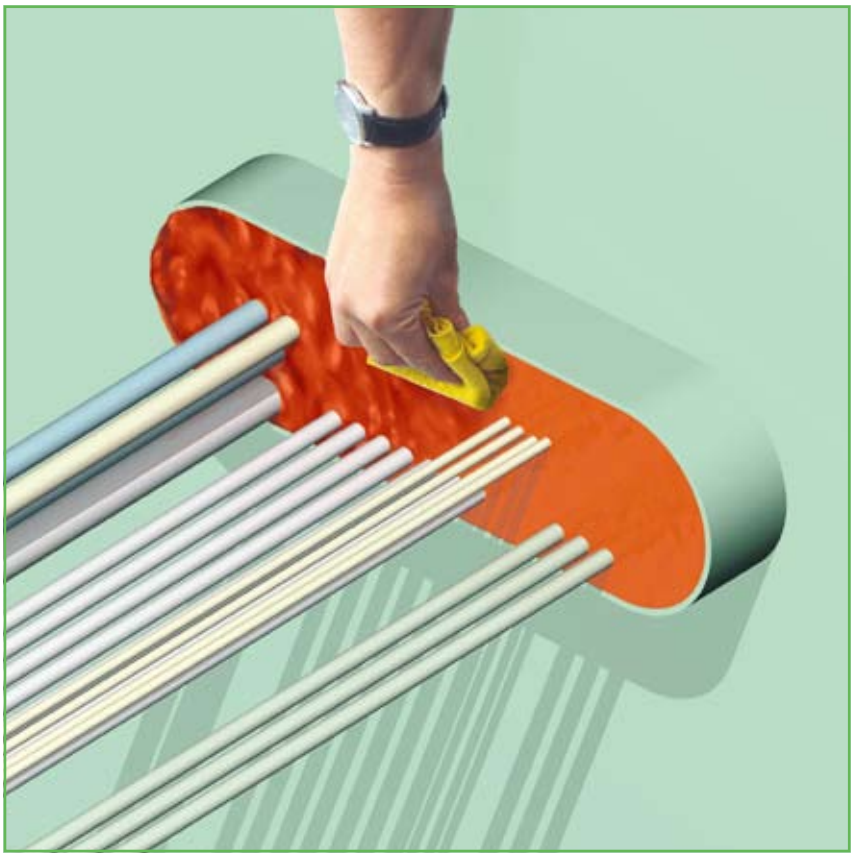
Note: curing time of the sealant is dependent on air humidity in combination with the environmental temperature.

NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

7) To smooth the surface of the NOFIRNO® sealant layer, a cloth is sprayed with water. This prevents the sealant from sticking to the cloth. Note: do not use soap water!

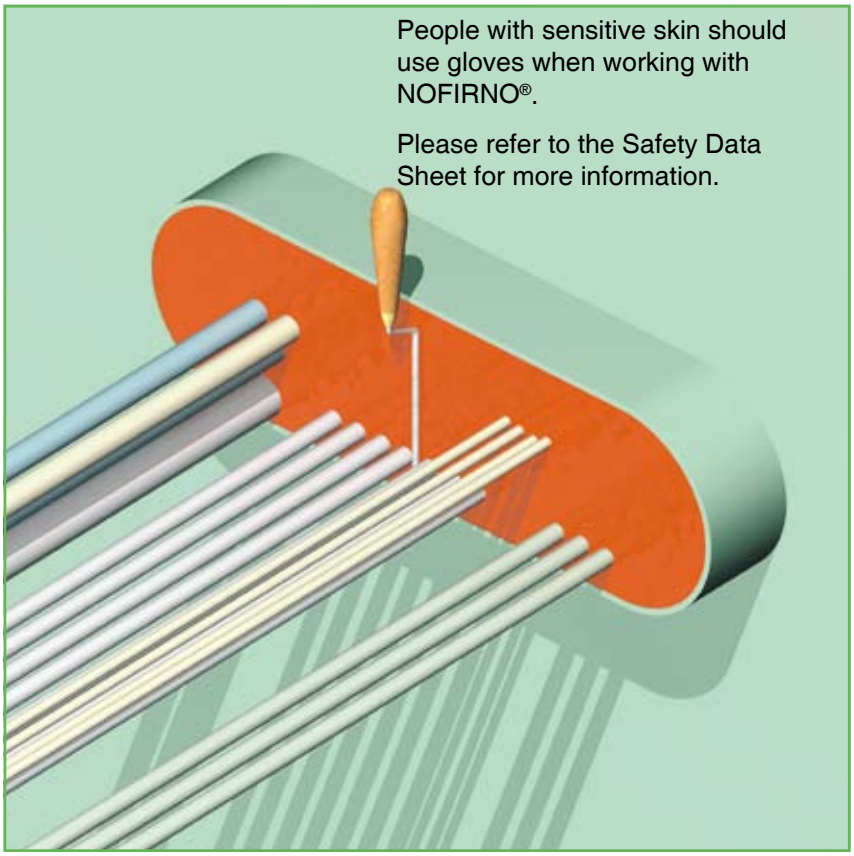


8) The cloth is then used to press down the sealant layer.
People with sensitive skin should use gloves when working with NOFIRNO®. Please refer to the Safety Data Sheet for more information.



NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

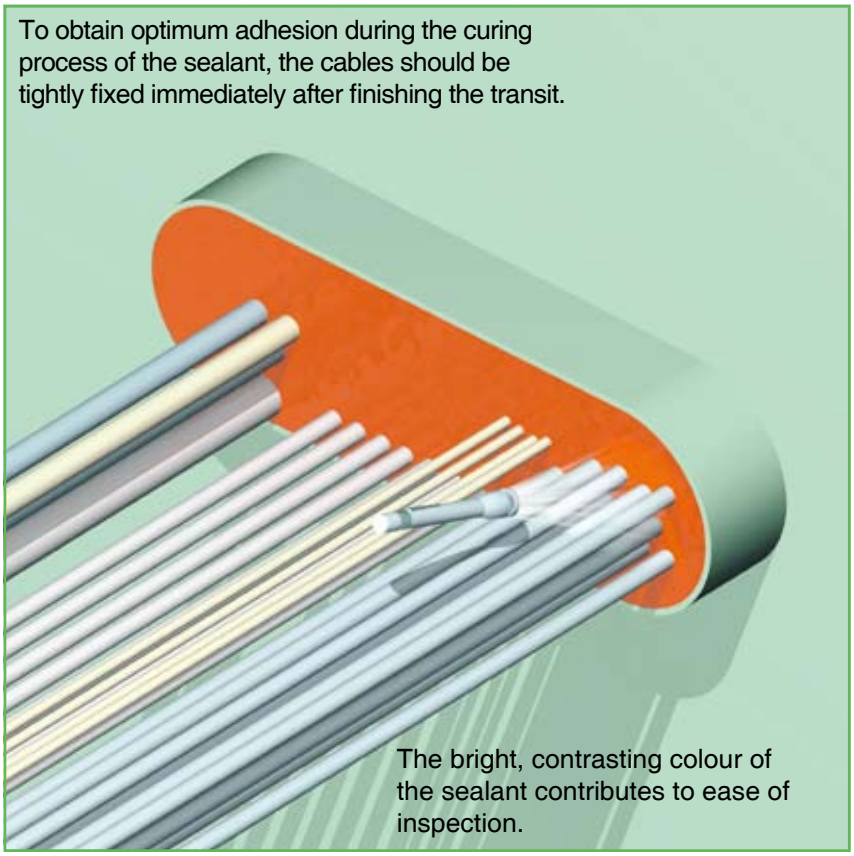
9) The NOFIRNO® sealant between the cables is pressed down and smoothed by hand or with a spatula or putty knife. This is essential to obtain optimum gas and water tightness.



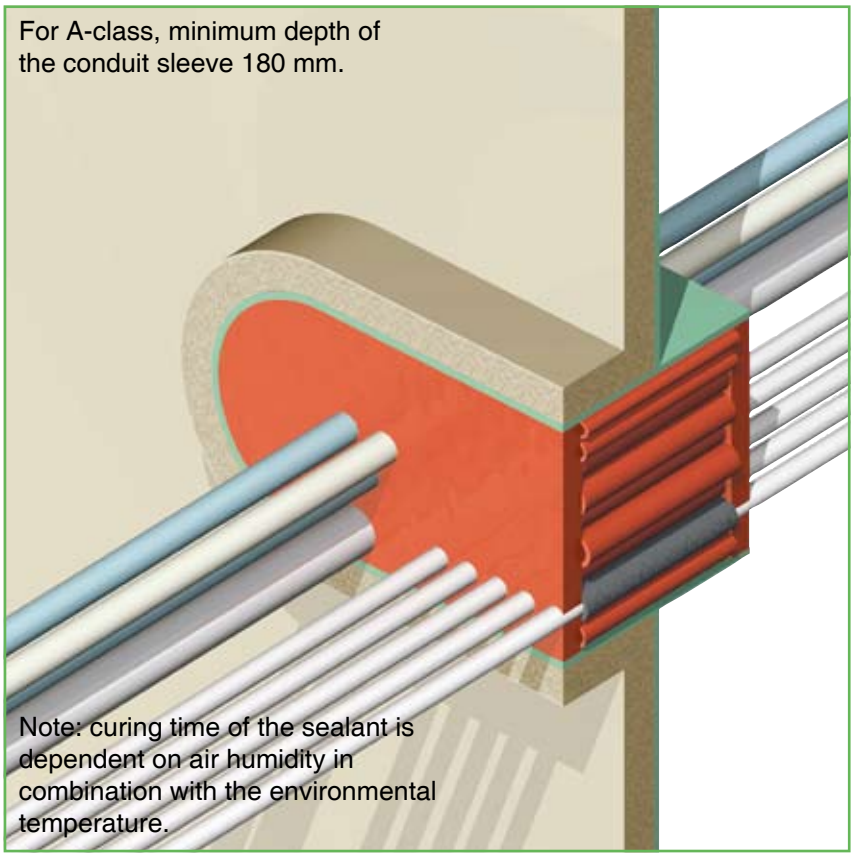
10) The surface can be smoothed by hand. Just wet the hands thoroughly with soap and water. No dirty hands when working with NOFIRNO® and a very neat surface is the result.

NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

11) After smoothing is finished, a last check should be performed to ensure sufficient sealant has been applied in between the cables (especially for transits with larger amounts of cables).
This is most important for water and gas tight penetrations.

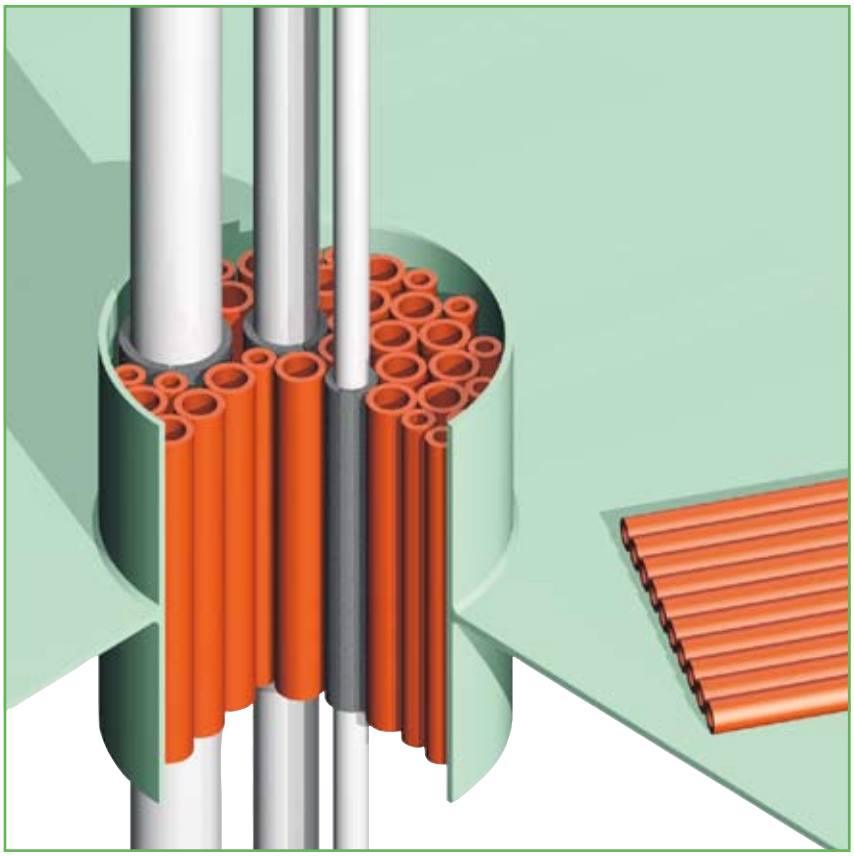


12) For A-class penetrations (which are insulated), the conduit sleeve/frame needs to be insulated only at the insulated side of the bulkhead or at the lower side of the deck.
No extra insulation needed in front of the penetration and/or in between the cables.

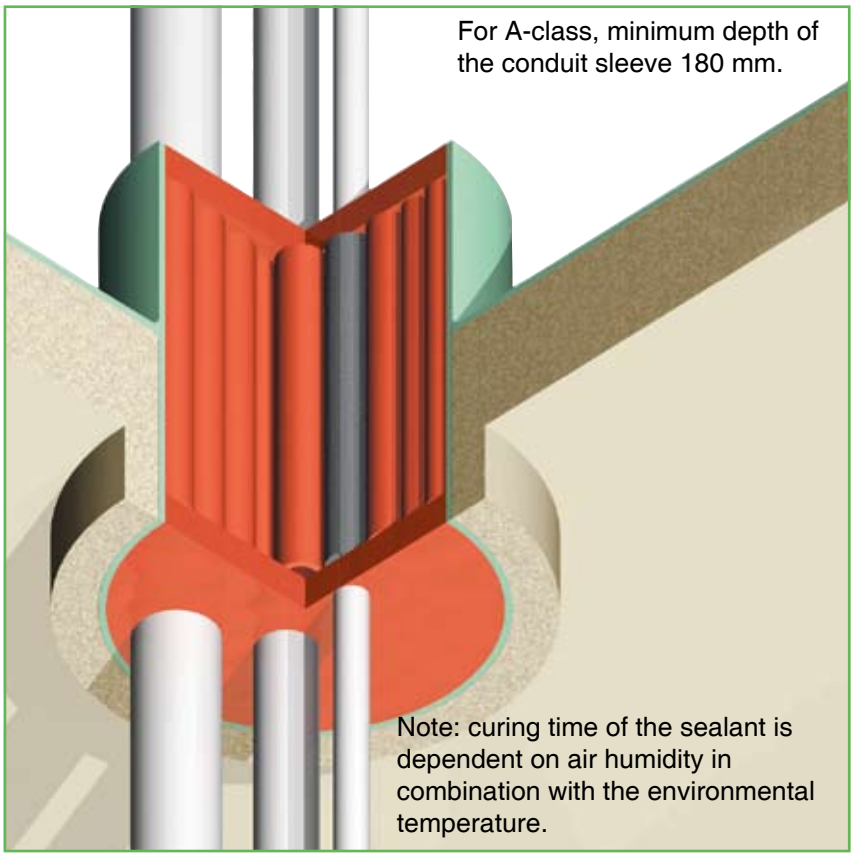


NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

13) To prevent the filler sleeves from falling out of the conduit sleeve/frame, they are squeezed together to form a compact bundle. They are available in bundles of ten pieces.

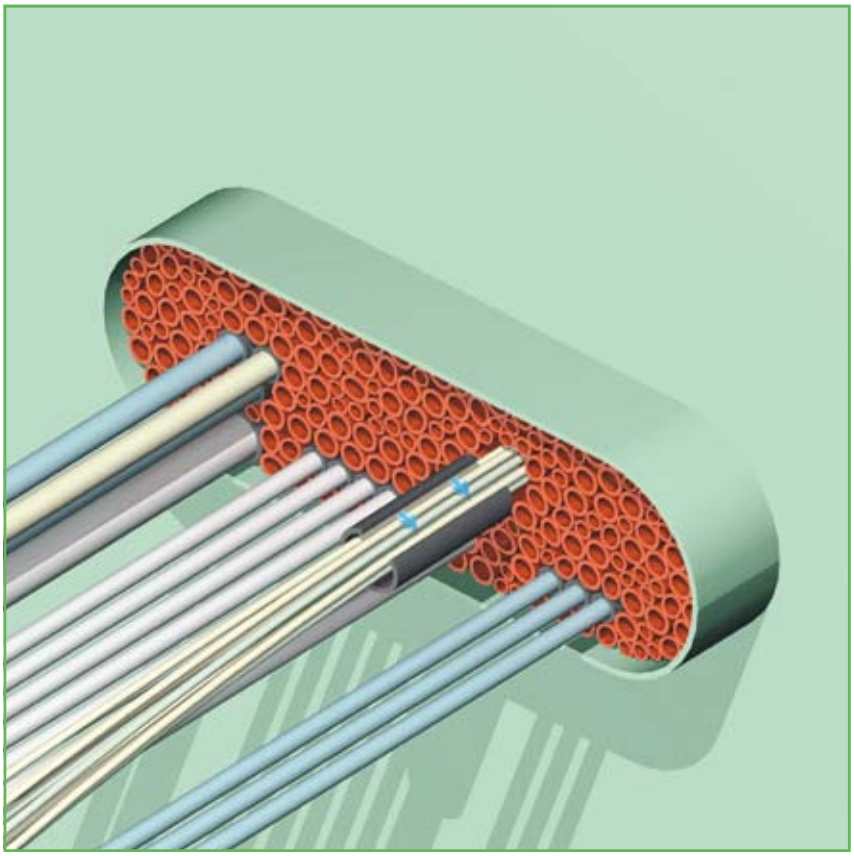


14) The optimized viscosity and the superb adhesion properties of the NOFIRNO® sealant make applying the sealant overhead an easy matter. NOFIRNO® sealant does not sag and will not drip off.



NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

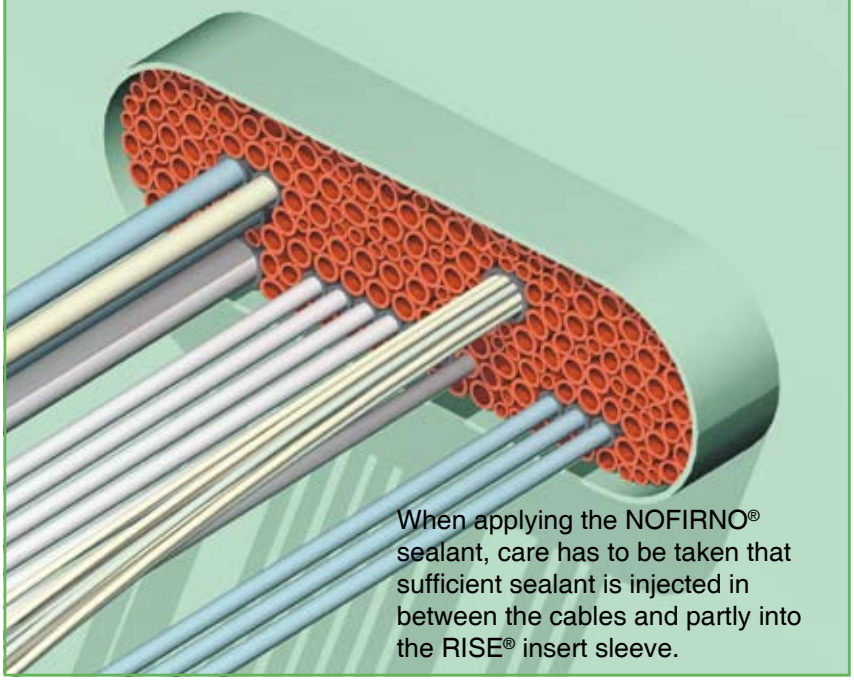
15) The NOFIRNO® cable penetrations are certified for ducting bundles of cables. Pull a set of bundled cables through the conduit and place a RISE® insert sleeve around the cable.
See the specifications on pages 14 and 15.



16) Push the insert/filler sleeves into the conduit in such a way as to leave about 20 mm free space at the front and the back. The whole set of filler sleeves should fit tightly into the conduit to provide sufficient mechanical stability.

The conduit to be finished as described on pages 8-11.

Before applying the sealant, it is advisable to perform a final check on the packing of insert and filler sleeves.



When applying the NOFIRNO® sealant, care has to be taken that sufficient sealant is injected in between the cables and partly into the RISE® insert sleeve.

NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

L1: A-60/H-120 approved bulkhead insulation.

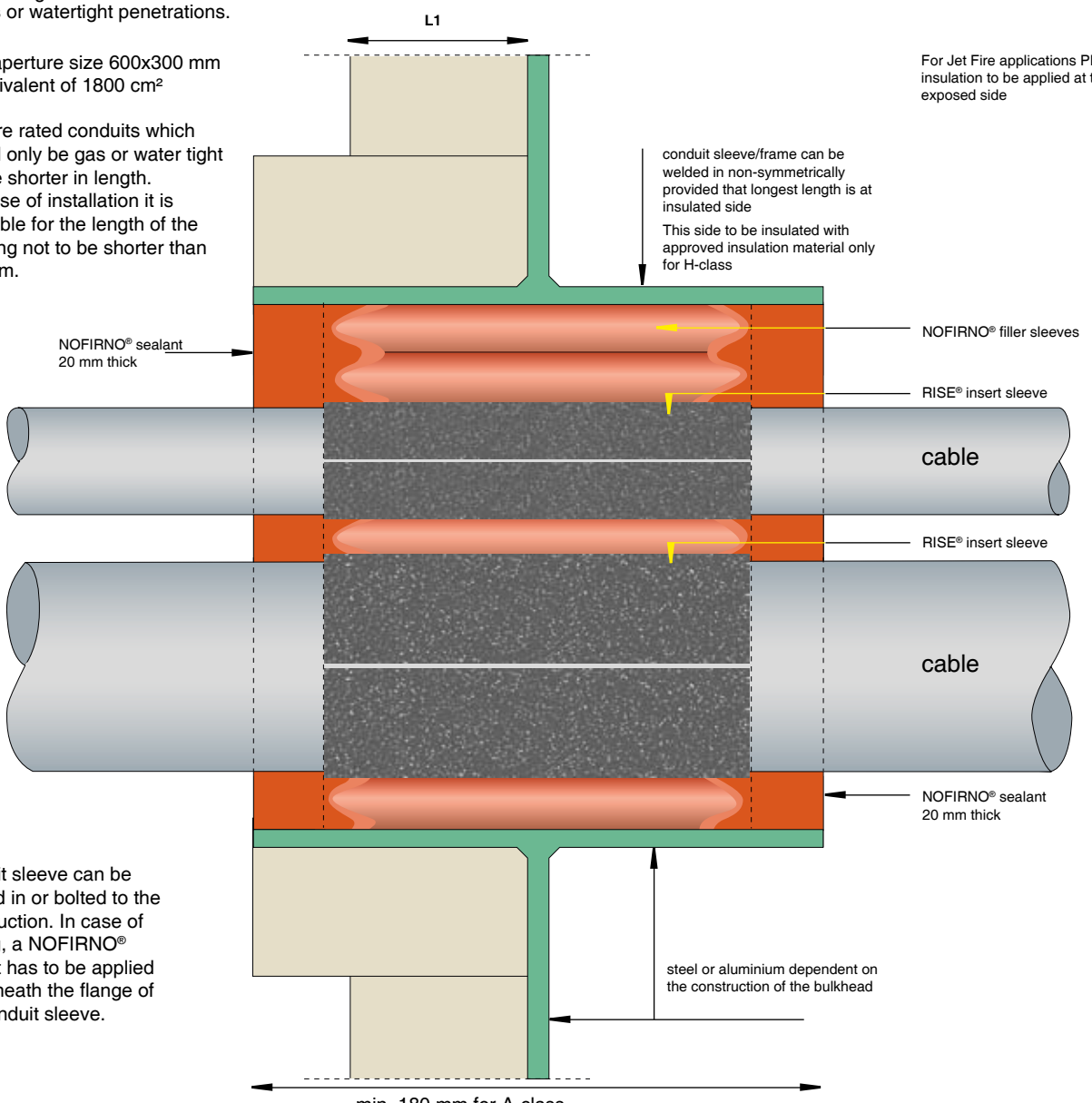
- APPROVED FOR ALL TYPES OF CABLES INCL. LAN AND CLX
- APPROVED FOR CABLE SIZES UP TO 105 MM OD AND UP TO 3x400 MM²
- APPROVED FOR BUNDLED LAN DATA CABLES
- MAX. BUNDLE SIZE 35 MM

Bundling of cables is not allowed for gas or watertight penetrations.

- NO EXTRA INSULATION REQUIRED AT THE FRONT OF THE PENETRATION AND/OR IN BETWEEN THE CABLES

max. aperture size 600x300 mm or equivalent of 1800 cm²

Non-fire rated conduits which should only be gas or water tight can be shorter in length. For ease of installation it is advisable for the length of the coaming not to be shorter than 100 mm.



conduit sleeve can be welded in or bolted to the construction. In case of bolting, a NOFIRNO® gasket has to be applied underneath the flange of the conduit sleeve.

ask for the MED certificate with the stamped and signed detailed installation drawings

Specifications for A-class according to EC (MED) certificate 09156/CO EC issued by Bureau Veritas. Drawings R0115E, R0116E, R0117E, R0170E, R0171E, R0172E, R0271E, R0272E and R0292E For H-class DNV certificate F-19295. Drawings R0293E, R0294E and R0295E.

A0-A60 / H0-H120 MULTI-CABLE TRANSIT

NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

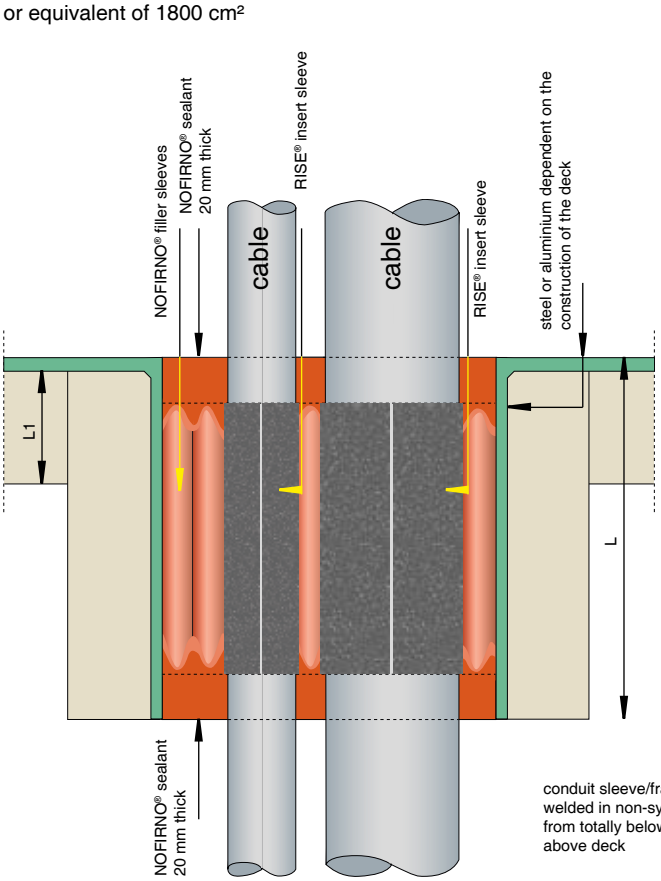
L1: A-60/H-120 approved deck insulation.

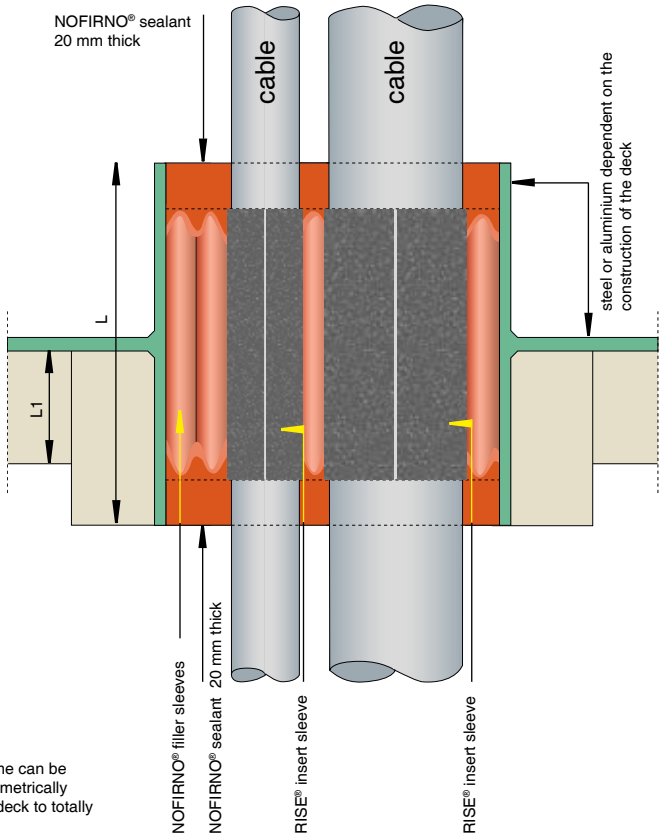
- APPROVED FOR ALL TYPES OF CABLES INCL. LAN AND CLX
- APPROVED FOR CABLE SIZES UP TO 105 MM OD AND UP TO 3x400 MM²
- APPROVED FOR BUNDLED LAN DATA CABLES
- MAX. BUNDLE SIZE 35 MM

Bundling of cables is not allowed for gas or watertight penetrations.

- NO EXTRA INSULATION REQUIRED AT THE FRONT OF THE PENETRATION AND/OR IN BETWEEN THE CABLES

max. aperture size 600x300 mm
or equivalent of 1800 cm²





conduit sleeve/frame can be welded in non-symmetrically from totally below deck to totally above deck

For Jet Fire applications PFP insulation to be applied at the exposed side

L= min. 180 mm for A-class,
L= min. 250 mm for A0/H0-H120 and Jet Fire

ask for the MED certificate with the stamped and signed detailed installation drawings

Non-fire rated conduits which should only be gas or water tight can be shorter in length.
For ease of installation it is advisable for the length of the coaming not to be shorter than 100 mm.

ask for the MED certificate with the stamped and signed detailed installation drawings

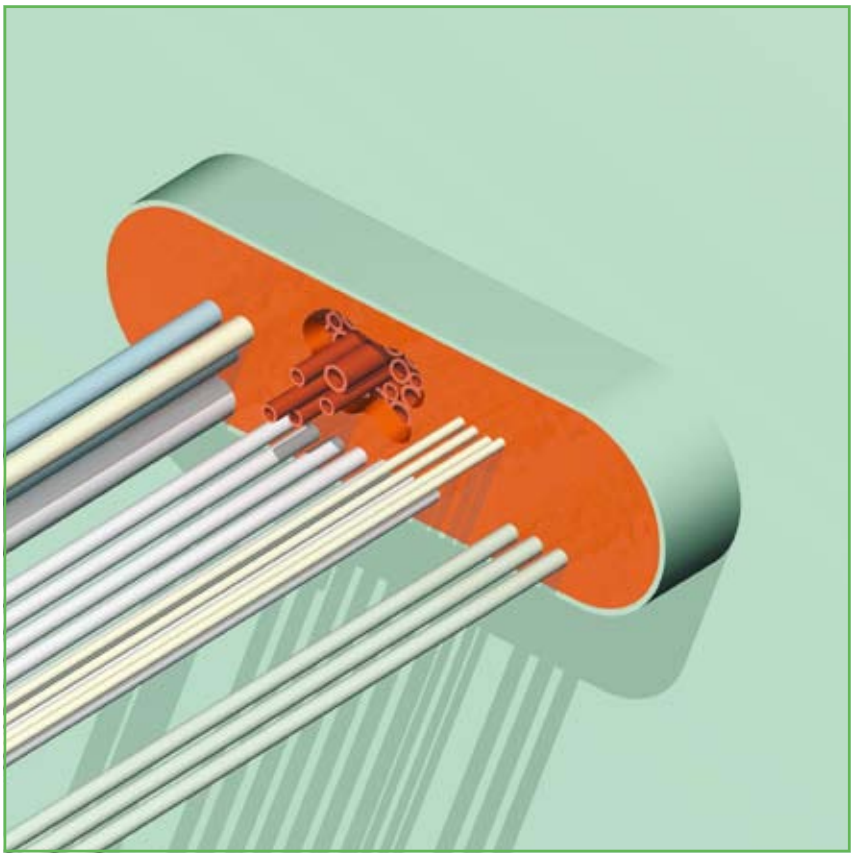
Specifications for A-class according to EC (MED) certificate 09156/CO EC issued by Bureau Veritas.
Drawings R0115E, R0116E, R0117E, R0170E, R0171E, R0172E, R0271E, R0272E and R0292E
For H-class DNV certificate F-19295.
Drawings R0293E, R0294E and R0295E.

A0-A60 / H0-H120 MULTI-CABLE TRANSIT

NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

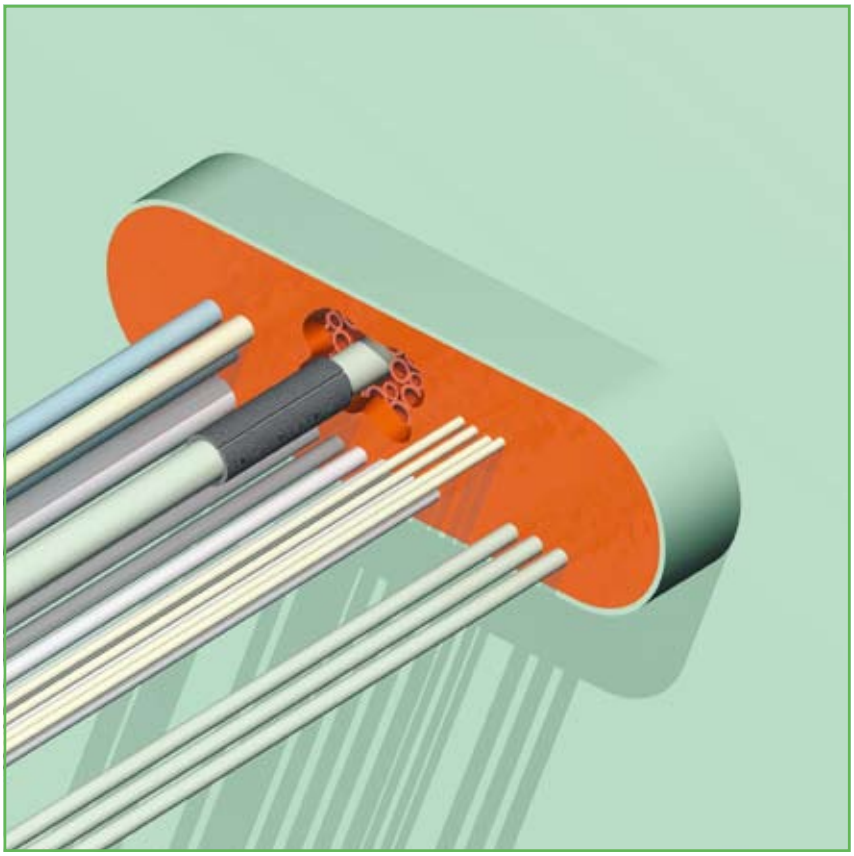
Adding extra cables is an easy job. Cut away the sealant layer at both sides of the penetration with a knife or a hollow punch in a tapering shape.
This creates a good foundation for the sealant mass to be applied later.

Remove one or more NOFIRNO® filler sleeves to create a fitting opening for the cable to be ducted.



NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

Pull the new cable through the created opening.
Place a RISE® sleeve around the ducted cable.
Push the insert sleeve into the conduit.
Fill open spaces with NOFIRNO® filler sleeves.



Refill the opening in the sealant layer at both sides of the penetration with sufficient NOFIRNO® sealant.
The NOFIRNO® sealant is pressed down firmly and smoothed with a damped cloth.
Note: do not use soap water!

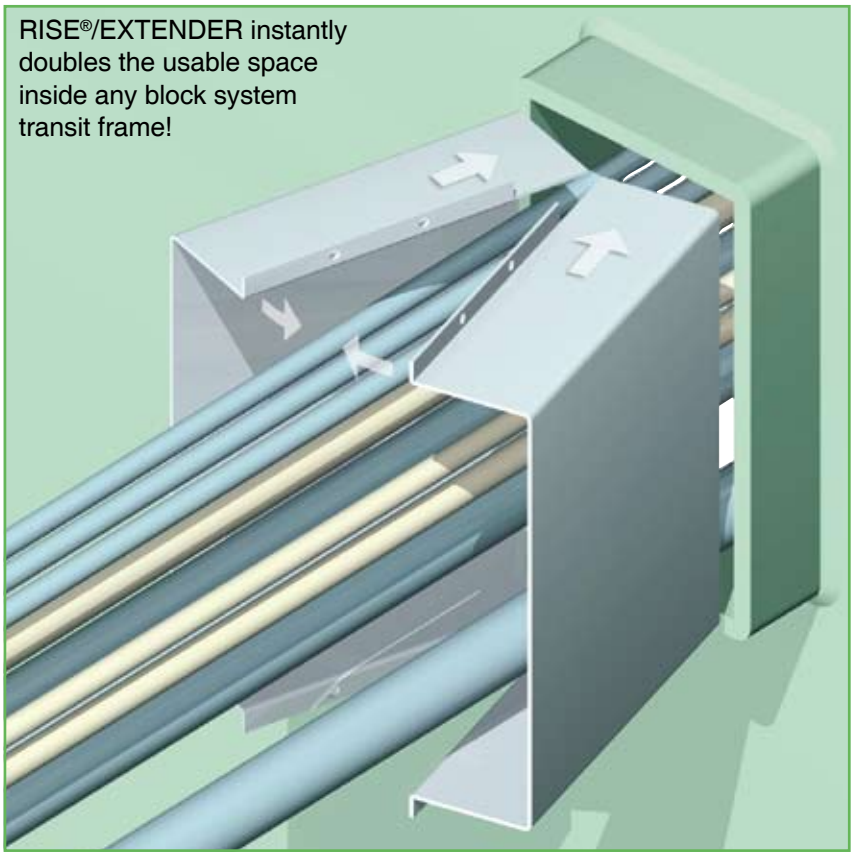
People with sensitive skin should use gloves when working with NOFIRNO®.

Please refer to the Safety Data Sheet for more information.

Note: curing time of the sealant is dependent on air humidity in combination with the environmental temperature.

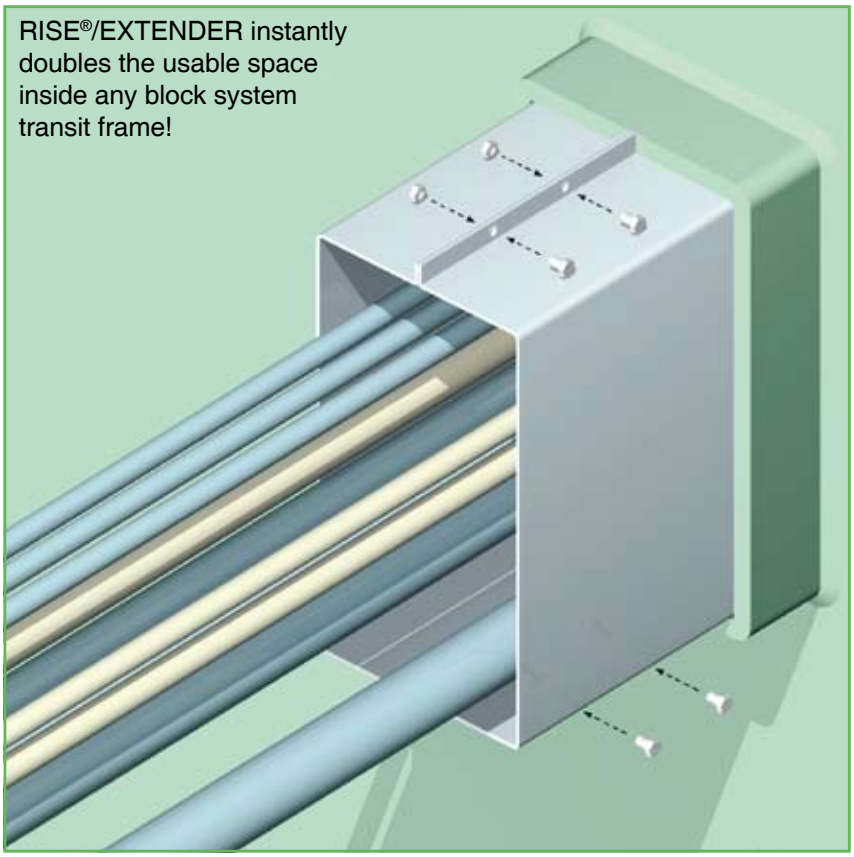
NOFIRNO® EXTEND-A-FRAMES FOR UPGRADING EXISTING BLOCK SYSTEM INSTALLATIONS

1) Remove all components from the transit frame, if any. Remove any dirt or grease from the inside of the frame and the cable jackets. Position the two halves of the EXTEND-A-FRAME around the bundle of cables, then push the EXTEND-A-FRAME into the transit frame. The fitting must be very tight for stability reasons.



NOFIRNO

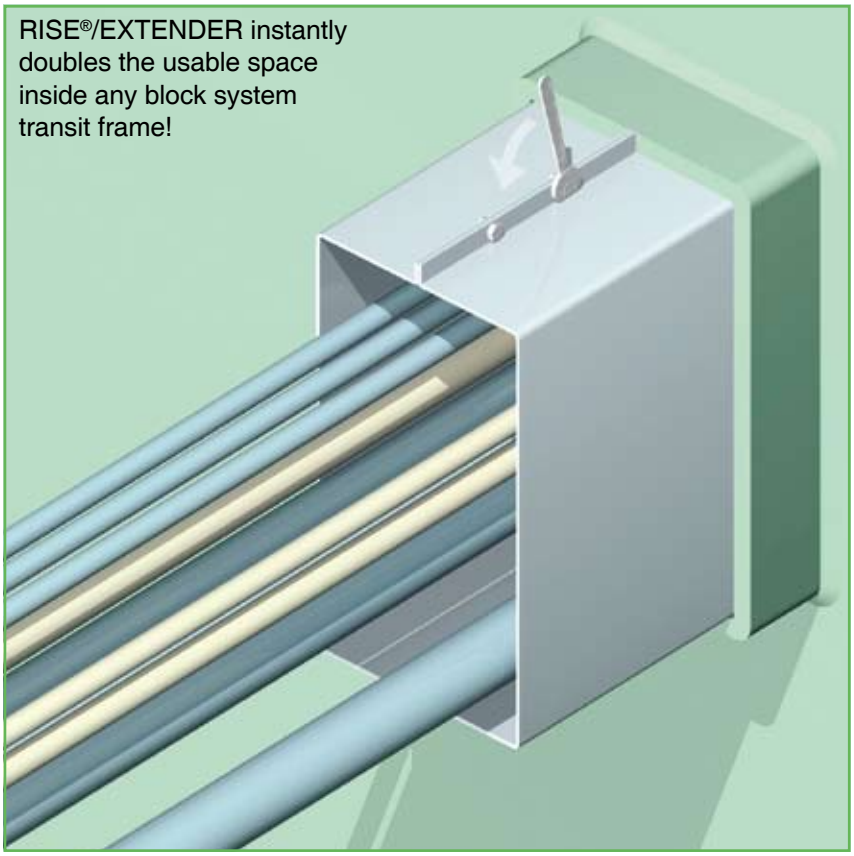
2) The flanges on the top and bottom of the EXTEND-A-FRAME must be firmly seated against the transit frame. Install the bolts and nuts on the top and bottom flanges. Tighten the bolts on top and bottom flanges.



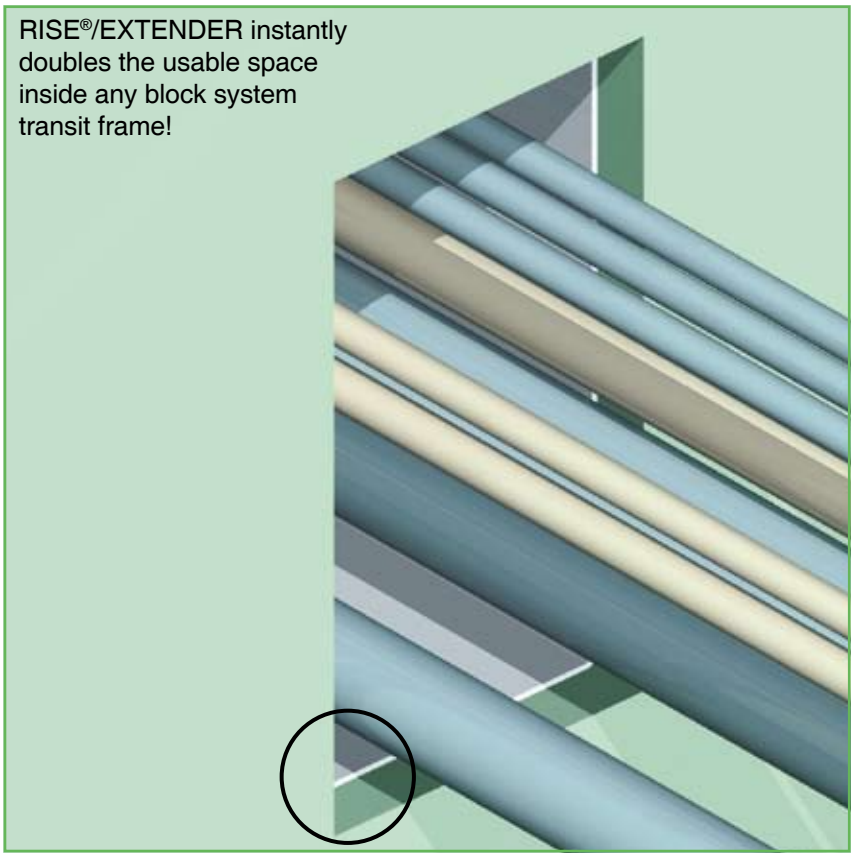
NOFIRNO

NOFIRNO® EXTEND-A-FRAMES FOR UPGRADING EXISTING BLOCK SYSTEM INSTALLATIONS

3) The flanges are 10 mm high, corresponding with the wall thickness of the block system transits.
This enables the EXTEND-A-FRAMES to fit in multi-window transit units without any problems.

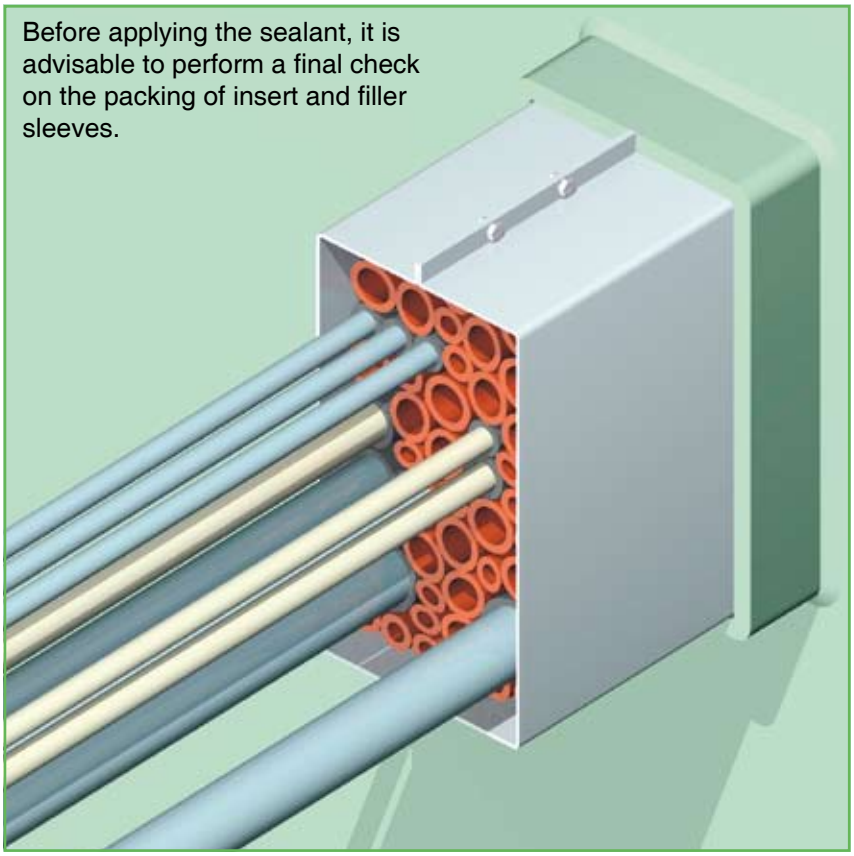


4) The EXTEND-A-FRAME, positioned in the transit frame, leaves 20 mm free at the back of the transit frame for the bonding of the NOFIRNO® sealant to the transit frame.
This is necessary to obtain a tight seal.



NOFIRNO® EXTEND-A-FRAMES FOR UPGRADING EXISTING BLOCK SYSTEM INSTALLATIONS

5) Place a RISE® insert sleeve around each cable. Any empty space is filled with NOFIRNO® filler sleeves.
Note: EXTEND-A-FRAMES can also be used with the RISE® system.



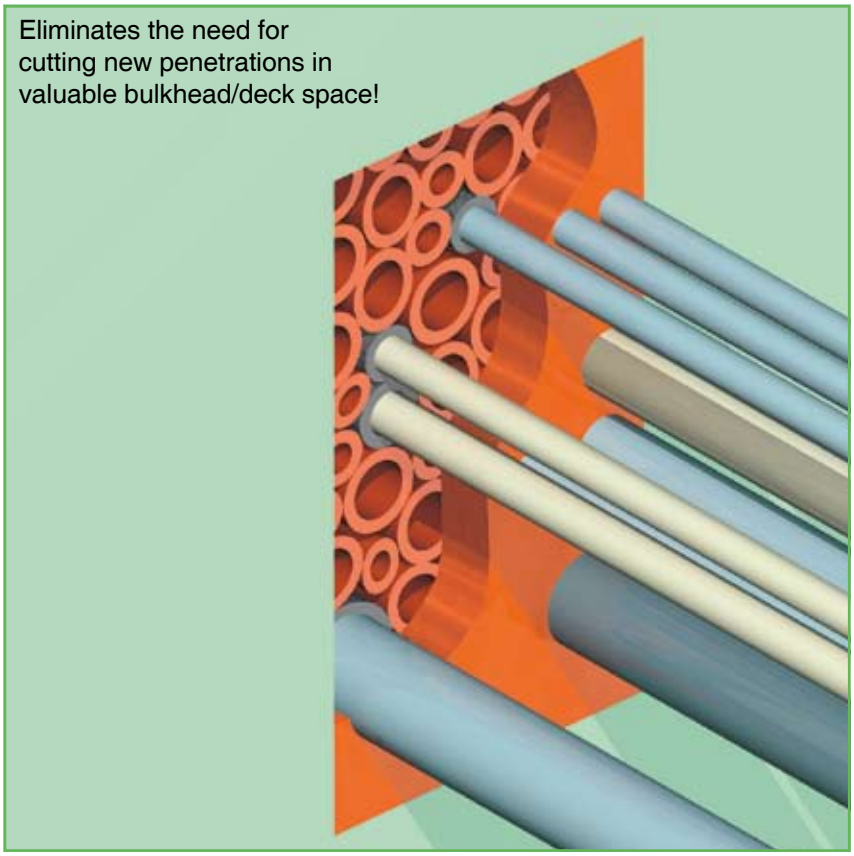
NOFIRNO

6) Center the RISE® insert and NOFIRNO® filler sleeves within the conduit so as to leave 20 mm free space at the front and the back of the transit.
A 20 mm layer of NOFIRNO® sealant is applied at both sides of the transit.

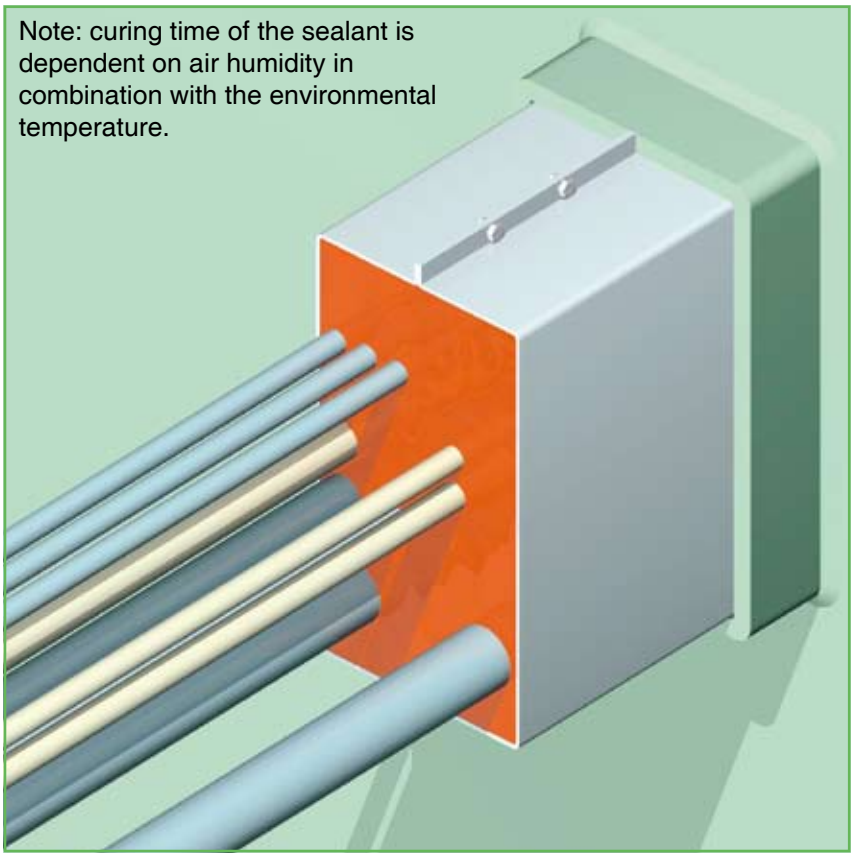
NOFIRNO

NOFIRNO® EXTEND-A-FRAMES FOR UPGRADING EXISTING BLOCK SYSTEM INSTALLATIONS

7) For final finishing of the transit, refer to the step by step installation instructions for NOFIRNO® multi-cable penetrations on pages 8-11. Note: EXTEND-A-FRAMES can also be used with the RISE® system.



8) For optimum stability, the EXTEND-A-FRAME can be spot welded or bolted to the existing frame. For larger frame configurations, an option is to install a frame around the existing transit frames, spot welded to the deck or bulkhead.

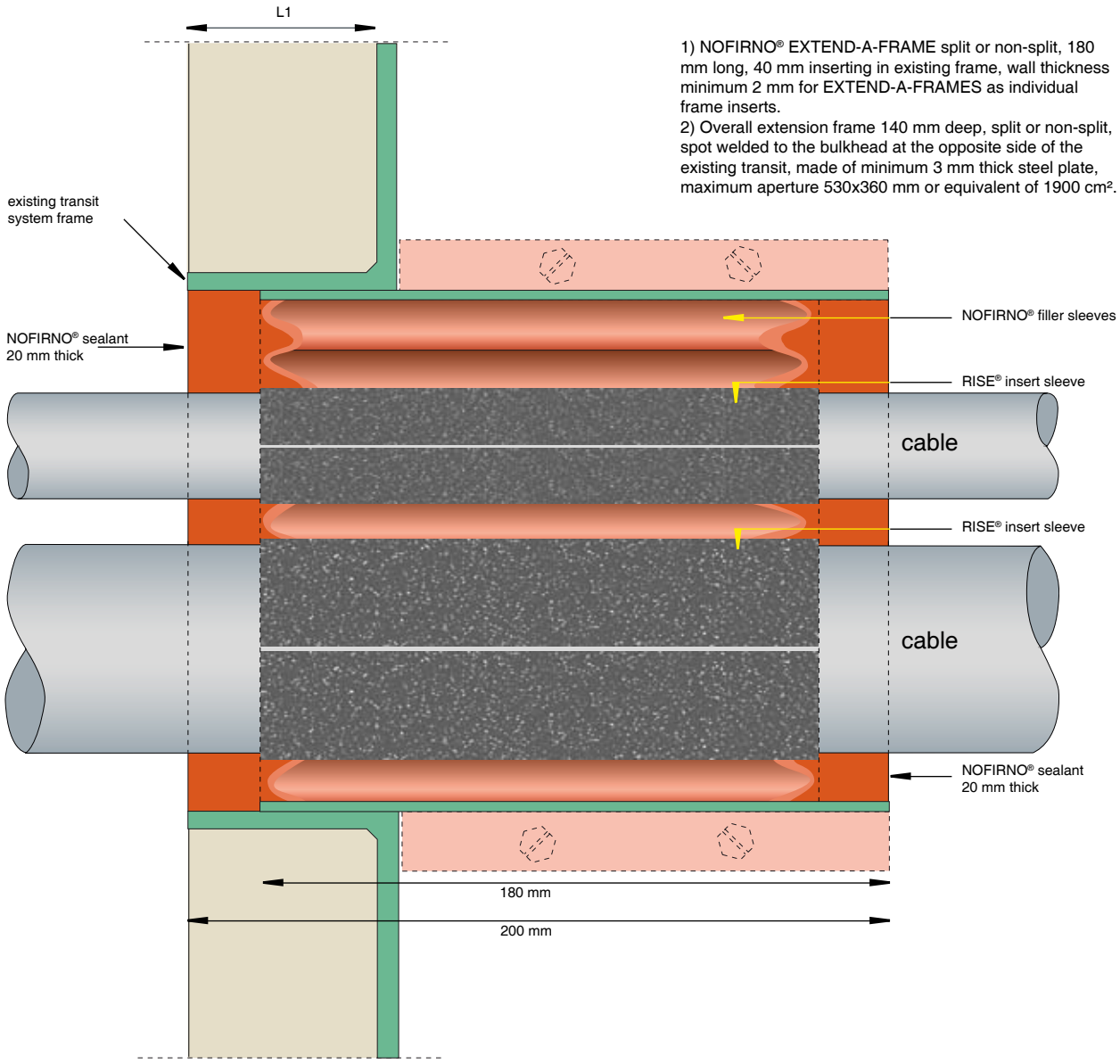


NOFIRNO® EXTEND-A-FRAMES FOR UPGRADING EXISTING BLOCK SYSTEM INSTALLATIONS

L1: A-60 approved bulkhead insulation.

NO EXTRA INSULATION REQUIRED AT THE FRONT OF THE PENETRATION AND/OR IN BETWEEN THE CABLES

1) NOFIRNO® EXTEND-A-FRAME split or non-split, 180 mm long, 40 mm inserting in existing frame, wall thickness minimum 2 mm for EXTEND-A-FRAMES as individual frame inserts.
2) Overall extension frame 140 mm deep, split or non-split, spot welded to the bulkhead at the opposite side of the existing transit, made of minimum 3 mm thick steel plate, maximum aperture 530x360 mm or equivalent of 1900 cm².



ask for the MED certificate with the stamped and signed detailed installation drawings

specifications for A-class according to EC (MED) certificate 09156/C0 EC issued by Bureau Veritas.
Drawings R0066E, R0067E, R0101E and R0102E

For optimum stability, the EXTEND-A-FRAME can be spot welded to the existing frame.
For larger frame configurations an option is to install a frame around the existing transit frames, spot welded to the bulkhead.

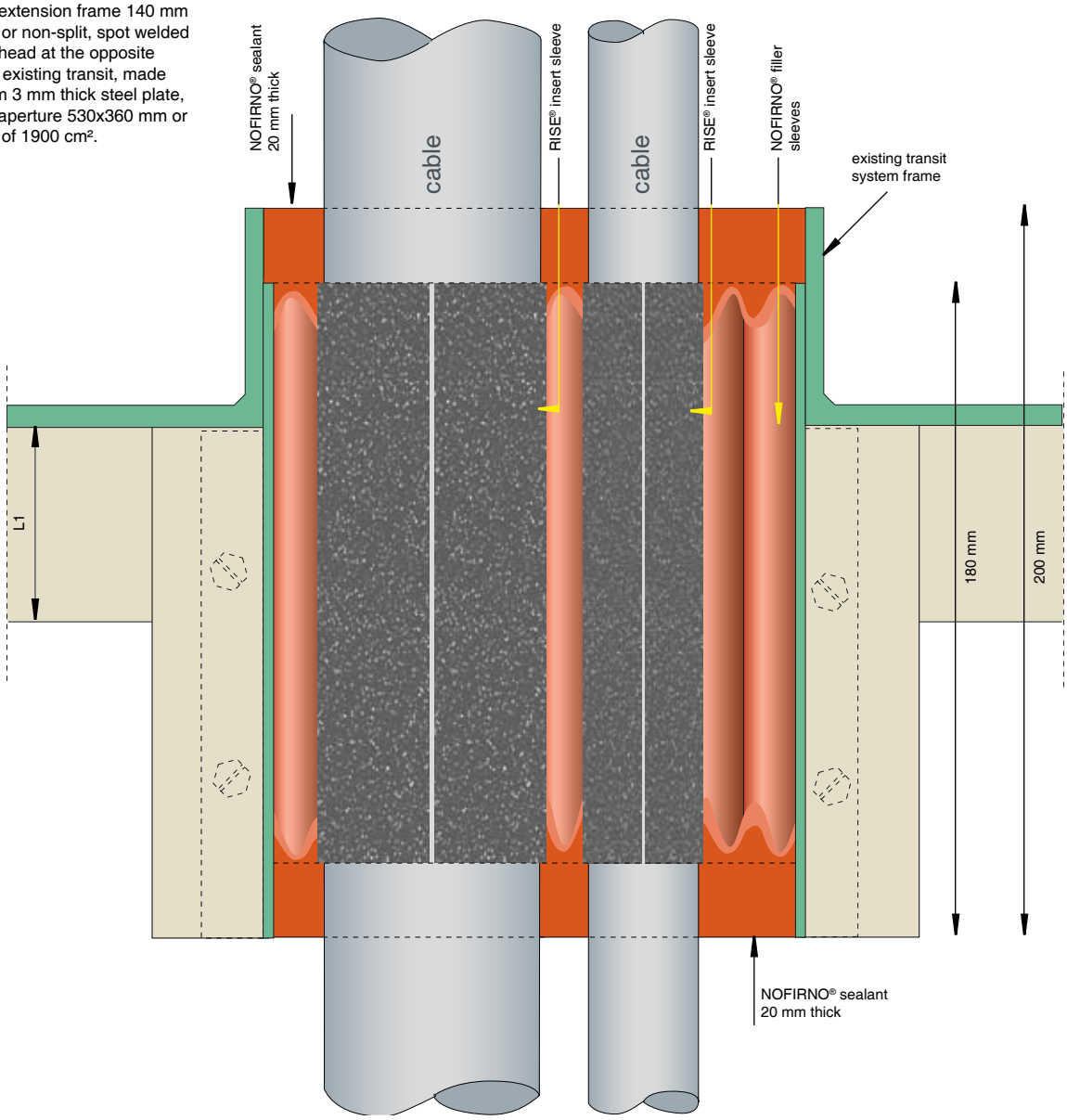
A0-A60 MULTI-CABLE TRANSIT

NOFIRNO® EXTEND-A-FRAMES FOR UPGRADING EXISTING BLOCK SYSTEM INSTALLATIONS

L1: A-60 approved deck insulation.

1) NOFIRNO® EXTEND-A-FRAME split or non-split, 180 mm long, 40 mm inserting in existing frame, wall thickness minimum 2 mm for EXTEND-A-FRAMES as individual frame inserts.
2) Overall extension frame 140 mm deep, split or non-split, spot welded to the bulkhead at the opposite side of the existing transit, made of minimum 3 mm thick steel plate, maximum aperture 530x360 mm or equivalent of 1900 cm².

NO EXTRA INSULATION REQUIRED AT THE FRONT OF THE PENETRATION AND/OR IN BETWEEN THE CABLES



ask for the MED certificate with the stamped and signed detailed installation drawings

specifications for A-class according to EC (MED) certificate 09156/C0 EC issued by Bureau Veritas.
Drawings R0066E, R0067E, R0101E and R0102E

For optimum stability, the EXTEND-A-FRAME can be spot welded to the existing frame.
For larger frame configurations an option is to install a frame around the existing transit frames, spot welded to the deck.

A0-A60 MULTI-CABLE TRANSIT

NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

Cutting Edge NOFIRNO® technology for optimum performance under harshest conditions:

- SYSTEM WILL NOT BE CONSUMED WHEN EXPOSED TO FIRE
- ALL COMPONENTS ARE MADE OF INERT SILICONE RUBBER
- IN CASE OF FIRE: NON-TOXIC, LOW SMOKE INDEX
- CE (MED) CERTIFICATES FOR A-0 UP TO A-60
- CERTIFIED FOR H-0 UP TO H-120 AND JET FIRE TESTED
- APPROVED WATERTIGHT UP TO 2.5 - 4 BAR
- APPROVED GAS TIGHT UP TO 1 BAR
- CAN BE USED IN ARCTIC CONDITIONS
- HIGH LEVEL OF SOUND DAMPING/EMC ATTENUATION
- SHOCK AND VIBRATION PROOF
- UP TO 50 YEARS SERVICE LIFE
- CAPABLE OF ABSORBING TEMPERATURE CHANGES
- WEATHERING, UV AND OZONE RESISTANT
- NO PRE-ENGINEERING NEEDED
- NO SPECIAL CONDUIT FRAMES
- MINIMIZED NUMBER OF STRUCTURAL COMPONENTS
- MOST COMPACT INSTALLATION
- EXTREMELY SIMPLE TO INSTALL
- NO INSULATION IN FRONT OF THE PENETRATION
- SHORTEST POSSIBLE CONDUIT LENGTH
- APPROVED FOR HEAVY CONDUCTOR CABLES
- APPROVED FOR BUNDLED LAN CABLES
- APPROVED FOR STEEL AND ALUMINIUM PARTITIONS
- MAINTENANCE FRIENDLY

NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM

Cutting Edge ACTIFIRE® and LEAXEAL® technology for optimum physical performance:

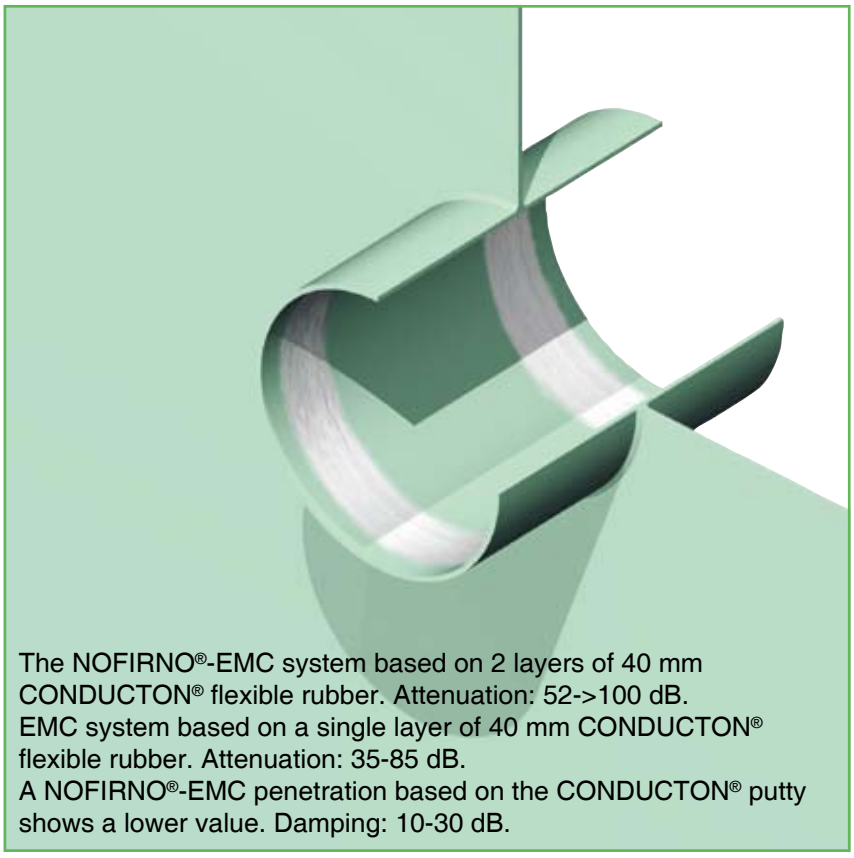
* Naval Engineering Standard 711: Issue 2: Determination of the smoke index	passed
* Naval Engineering Standard 713: Issue 3: Determination of the toxicity index	passed
* ISO 4589 - 2 : 1996 Determination of the oxygen index	passed
* ISO 4589 - 3 : 1996 Determination of the temperature index	passed
* IMO Resolution A.653(16) Determination of low flame spread characteristics	passed
* Artificial ageing test Determination of properties after 25-50 years	passed
* Thermal cycling test Determination of adhesion at +120 °C / ambient / -40 °C (+212 °F / ambient / -40°F)	passed
* Naval Engineering Standard 510: Issue 2, Draft B: Shock (100 g_n) and vibration test (5-350 Hz) combined with 1 bar leak test afterwards	passed
* Naval Engineering Standard 814: Shock test, acceleration level 8378/s/s in two directions combined with 6.9 bar leak test afterwards	passed
* Naval Engineering Standard 510: Issue 2, Draft B: Leak test after a one hour fire test	passed
* General classification Helium gas leak test up to 1 bar	passed
* Nordtest method NT ELEC 030, modified for conducted attenuation	20-100 dB
* Sound damping test According to EN ISO 717-1:1996	70 dB
* Rapid rise fire test, shock, vibration and water pressure According to Mil-P-24705 of the US Navy	passed
* Dynamic cycling test Displacement 10 mm, 100,000 cycles, frequency 0.5 Hz	passed
* Shock and vibration tests in 3 axis and pressure tests According to standards of the German Navy	passed

Initially some of these tests have been carried out with the regular RISE® system. The sealant is a determining factor for successful mechanical testing. NOFIRNO® sealant has improved mechanical properties so that NOFIRNO® can also be classed for these tests as well. TNO report TQS/RAP/07/335-idl.

To prove the outstanding quality and safety of the RISE® cable and pipe penetrations, the basic materials (FIWA® sealant and RISE® rubber) have been subjected to additional tests.
These tests have been carried out by official institutes: Warrington Fire Research and RAPRA Technologies in the United Kingdom, the Fire Technology Institute of the University of Ghent in Belgium and TNO Laboratories in The Netherlands.
The RISE® cable and pipe penetrations have also been subjected to additional tests at official institutes such as DELTA Danish Electronics, Light and Acoustics Testing in Denmark, QinetiQ in England, South West Research Institute in USA and in-house under survey of the classification societies. To name some: sound tests, shock and vibration tests, rapid temperature rise tests, leak tests after a one hour fire test, EMC tests, A-0 test without insulation, dynamic cycling test, several configurations on watertightness and a helium gas leak test.

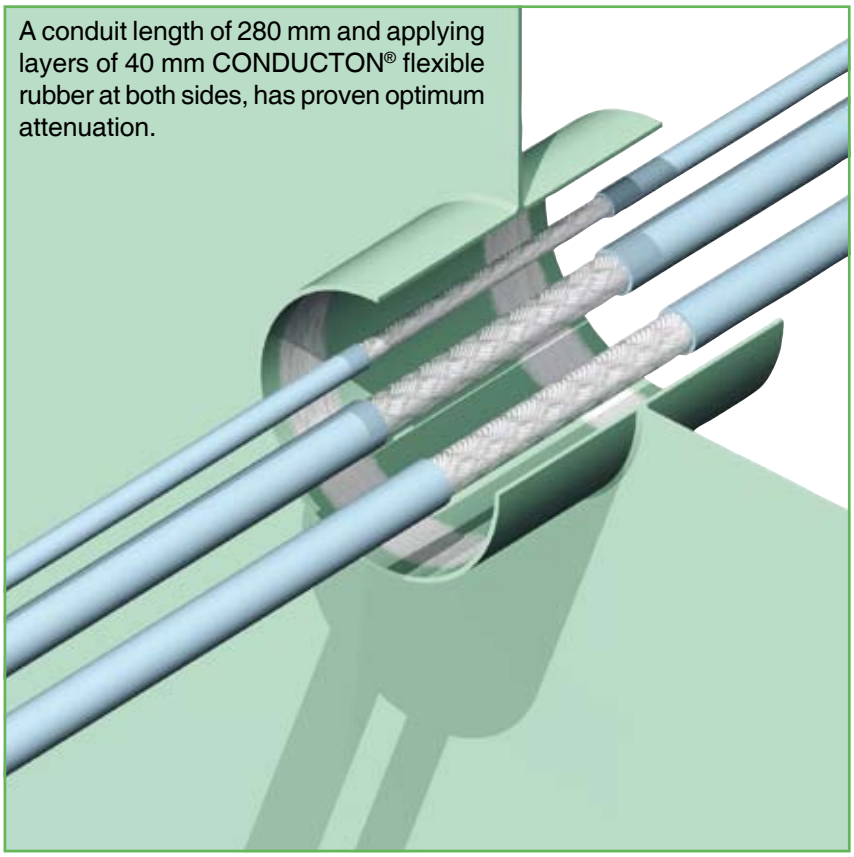
NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM TYPE EMC/EMI

1) At the place where the CONDUCTON® flexible compound is to be applied, the penetration should be bare steel without primer and thorougly cleaned to ensure effective connection to earth.



The NOFIRNO®-EMC system based on 2 layers of 40 mm CONDUCTON® flexible rubber. Attenuation: 52->100 dB.
EMC system based on a single layer of 40 mm CONDUCTON® flexible rubber. Attenuation: 35-85 dB.
A NOFIRNO®-EMC penetration based on the CONDUCTON® putty shows a lower value. Damping: 10-30 dB.

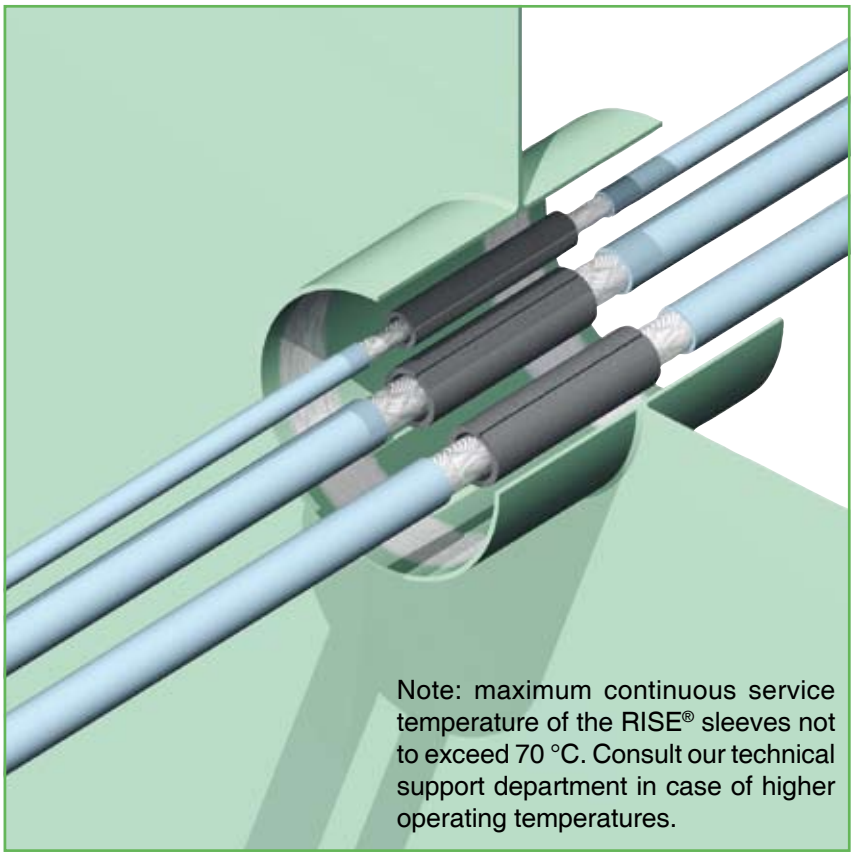
2) Remove the cable sheathing over a length that is 40 mm shorter than the length of the penetration, in such a way that the front face of the exposed braiding is situated about 20 mm inside the conduit at both sides.



A conduit length of 280 mm and applying layers of 40 mm CONDUCTON® flexible rubber at both sides, has proven optimum attenuation.

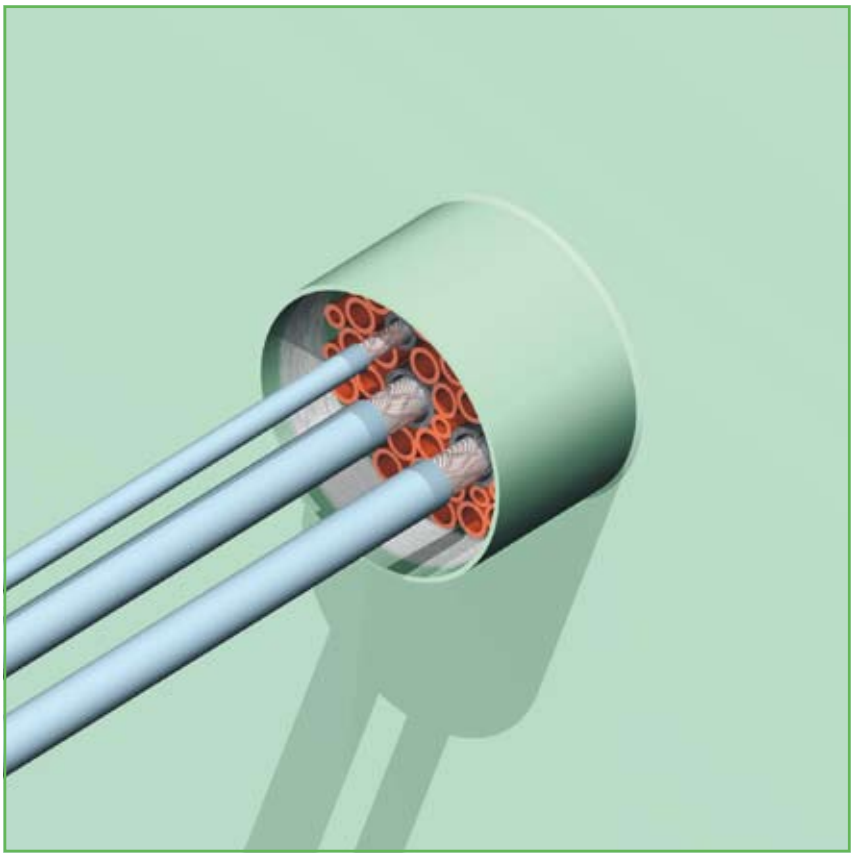
NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM TYPE EMC/EMI

3) RISE® sleeves 120 mm shorter in length than the penetration are then fitted around the ducted cables and pushed into the penetration. The exposed braiding should extend 40 mm outside the sleeves.



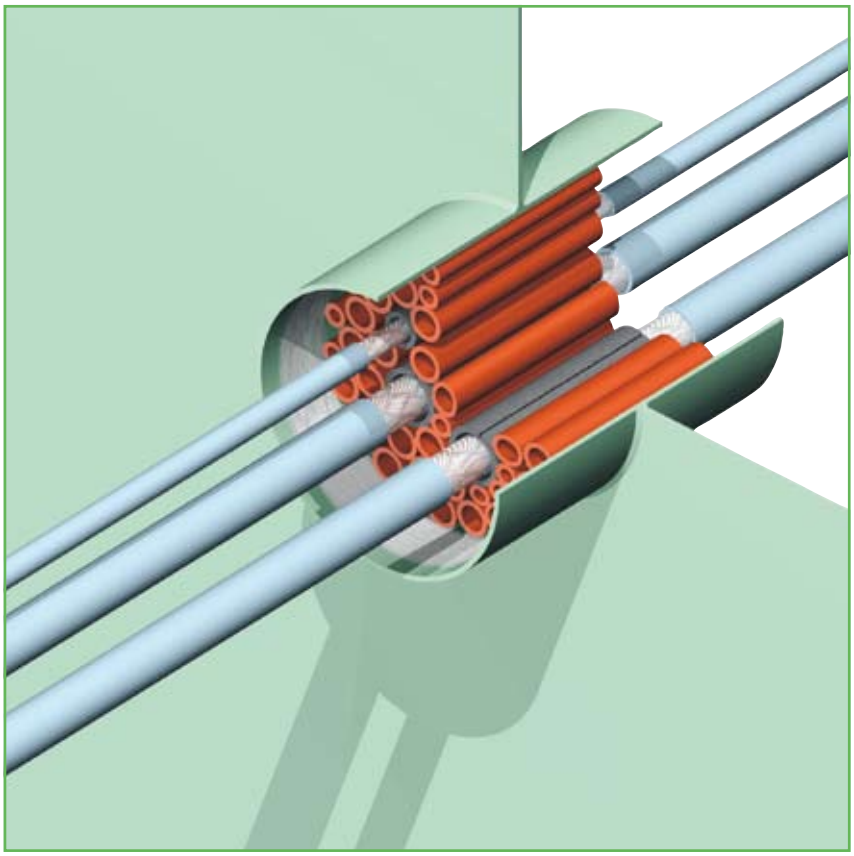
Note: maximum continuous service temperature of the RISE® sleeves not to exceed 70 °C. Consult our technical support department in case of higher operating temperatures.

4) The remaining space inside the penetration is then packed with NOFIRNO® filler sleeves. Push the filler sleeves into the penetration in the same way as the sleeves fitted around the cables. Make sure that the sleeves fit tightly.

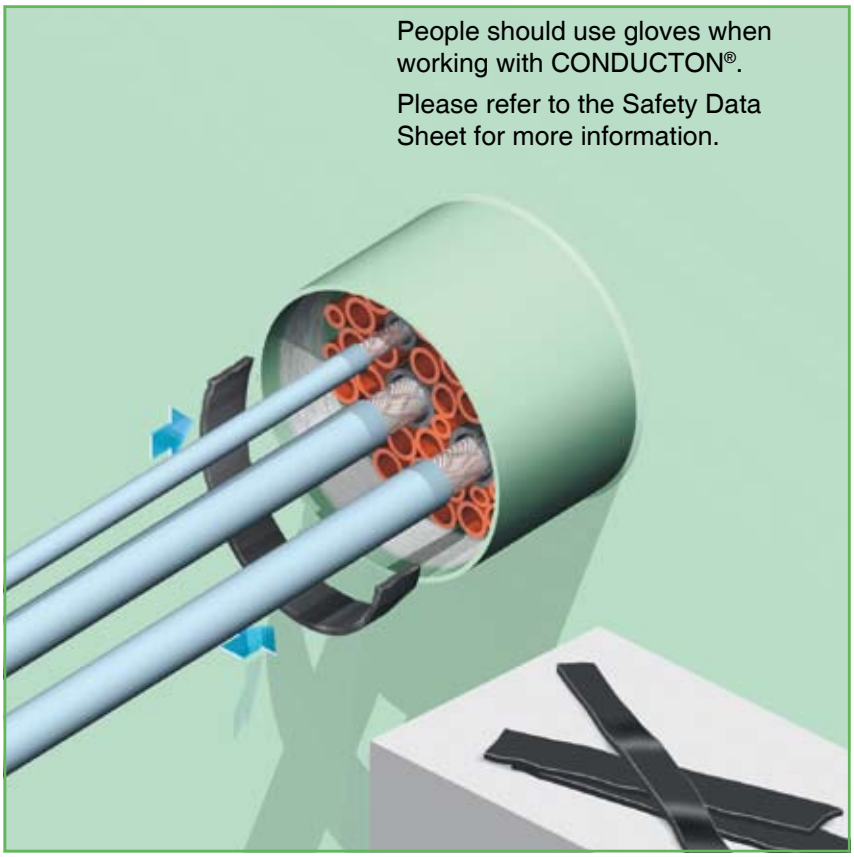


NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM TYPE EMC/EMI

5) Push the insert/filler sleeves into the penetration in such a way as to leave about 60 mm free space at both sides. Take care that the exposed braiding extends 40 mm outside the sleeves at each side.

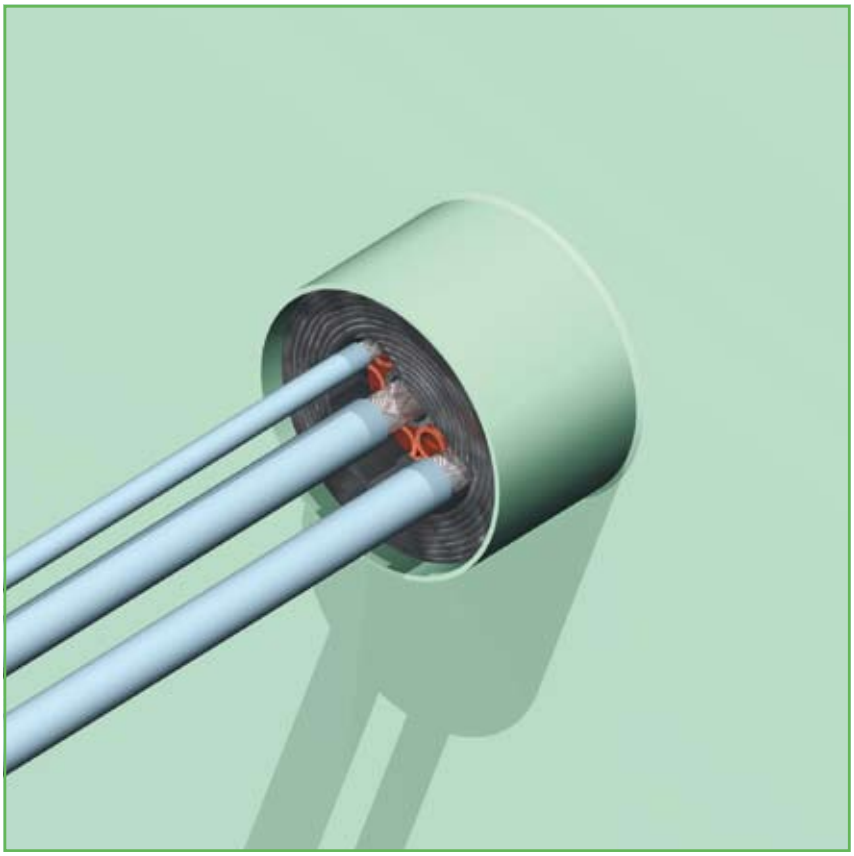


6) Then apply layers of CONDUCTON® flexible rubber strips 40 mm wide against the inside wall of the penetration.



NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM TYPE EMC/EMI

7) Pack the free space inside the penetration with lengths of strip. Compress the filling from time to time firmly to obtain a solid mass of flexible rubber and a good contact with the coaming/sleeve.



8) Pack the remaining small spaces around the cables with spare pieces of flexible rubber strip. Then press them down firmly with a piece of wood in order to obtain a good contact with the braiding.

NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM TYPE EMC/EMI

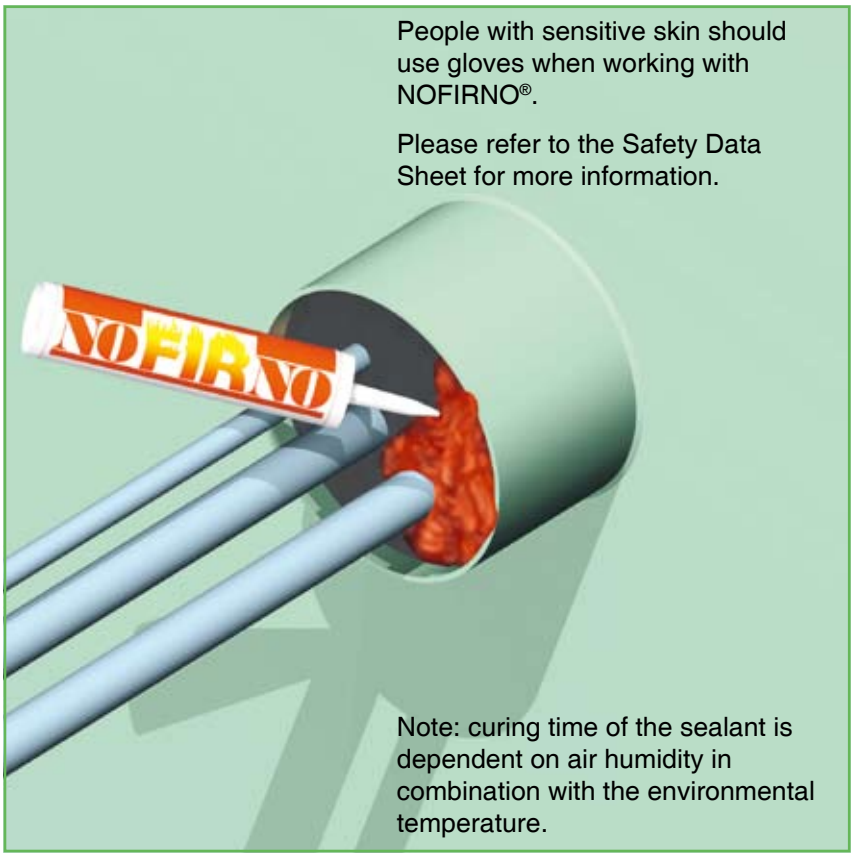
9) Firmly press down the mass once more by hand. This is extremely important to ensure effective conductivity. Then apply the CONDUCTON® flexible rubber at the other side of the penetration in a similar way.

People should use gloves when working with CONDUCTON®.

Please refer to the Safety Data Sheet for more information.

10) At both sides of the penetration about 20 mm free space should be present to enable the application of the NOFIRNO® fire safe, water tight sealing compound. First clean the inside wall of the penetration very thoroughly.

Refer to pages 8-11 for further finishing of the penetration.



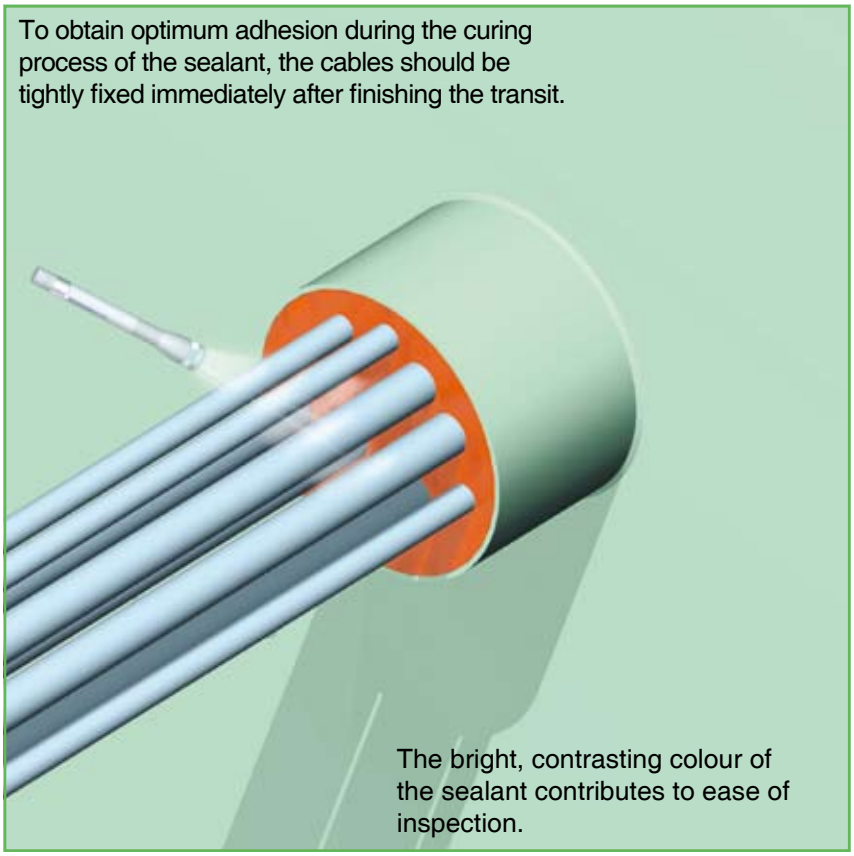
People with sensitive skin should use gloves when working with NOFIRNO®.

Please refer to the Safety Data Sheet for more information.

Note: curing time of the sealant is dependent on air humidity in combination with the environmental temperature.

NOFIRNO® MULTI-CABLE TRANSIT SEALING SYSTEM TYPE EMC/EMI

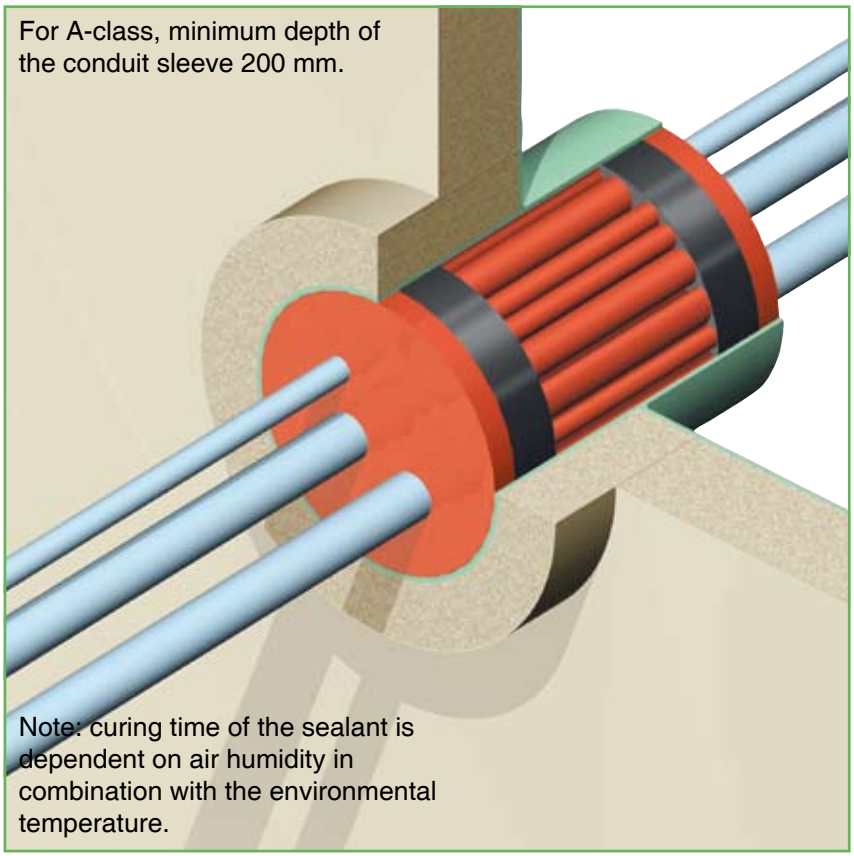
11) After smoothing is finished, a last check should be taken to ensure sufficient sealant has been applied in between the cables (especially for transits with larger amounts of cables). This is most important for water and gas tight penetrations.



To obtain optimum adhesion during the curing process of the sealant, the cables should be tightly fixed immediately after finishing the transit.

The bright, contrasting colour of the sealant contributes to ease of inspection.

12) For A-class penetrations (which are insulated), the conduit sleeve/frame needs to be insulated only at the insulated side of the bulkhead or at the lower side of the deck.
No extra insulation needed in front of the penetration and/or in between the cables.



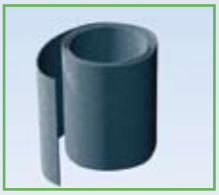
For A-class, minimum depth of the conduit sleeve 200 mm.

Note: curing time of the sealant is dependent on air humidity in combination with the environmental temperature.

NOFIRNO®/MULTI-ALL-MIX® CABLE/ PIPE TRANSIT SEALING SYSTEM

CRUSHER® type C-FIT

CRUSHER® type WRAP



plastic pipe OD	crusher® type	crusher® length	article number
16	30/16	140	80.2720
18	30/18	140	80.2721
20	40/20	140	80.2722
25	40/25	140	80.2723
32	50/32	140	80.2724
40	50/40	140	80.2725
50	70/50	140	80.2726
63	80/63	140	80.2727
75	100/75	140	80.2728
90	125/90	140	80.2729
110	150/110	140	80.2730
125	160/125	140	80.2731
140	180/140	140	80.2732
160	200/160	140	80.2733
wrap 1000x140x2.5 mm			80.2512

all dimensions in mm

RISE® cable sleeves

Note: maximum continuous service temperature of the RISE® sleeves and CRUSHERS® not to exceed 70 °C.
Consult our technical support department in case of higher operating temperatures.

cable sleeves are supplied split lengthwise

RISE® cable sleeve	cable diameter	sleeve length	article number
12/6	5 - 7	140	80.0051
14/8	7 - 9	140	80.0052
16/10	9 - 11	140	80.0053
18/12	11 - 13	140	80.0054
20/14	13 - 15	140	80.0055
22/16	15 - 17	140	80.0056
27/19	17 - 21	140	80.0057
31/23	21 - 25	140	80.0058
35/27	25 - 29	140	80.0059
39/31	29 - 33	140	80.0060
46/36	33 - 39	140	80.0061
52/42	39 - 45	140	80.0062
58/48	45 - 51	140	80.0063
64/54	51 - 57	140	80.0064
70/60	57 - 63	140	80.0065

all dimensions in mm

article number 50.0102

NOFIRNO® is a paste-like compound which is simple to use. NOFIRNO® has a balanced viscosity and can be applied overhead. After applying the sealant, it can be smoothed by means of a wet cloth or by hand. Because the sealant adheres very tightly, the cloth and hands should be wetted with water before use to prevent sealant from sticking to them.

Shelf life is 12 months when stored properly. Since we have no control on storage, we can only guarantee for 6 months.

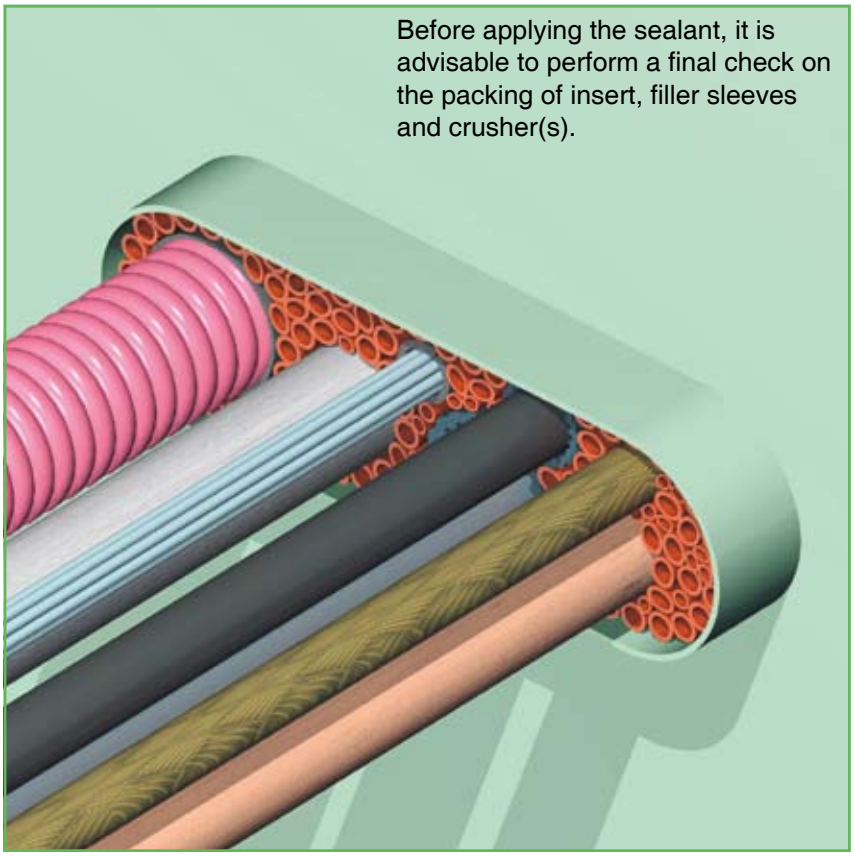
NOFIRNO® filler sleeve		sleeve length	article number
18/12 single		140	80.5002
18/12 multi		140	80.5052
27/19 single		140	80.5012
27/19 multi	all dimensions in mm	140	80.5062

NOFIRNO® filler sleeves

filler sleeves are supplied non-split, single and multi (set of 10)

NOFIRNO®/MULTI-ALL-MIX® CABLE/ PIPE TRANSIT SEALING SYSTEM

Cables up to 105 mm OD, bundled LAN cables, metallic, GRP and plastic pipes are allowed to be ducted through the same transit. Separation of the cables is provided by RISE® insert sleeves. The plastic pipes are sleeved with RISE®/ ULTRA crushers and the remaining open spaces in the transit are filled with NOFIRNO® single and multi-filler sleeves.



Before applying the sealant, it is advisable to perform a final check on the packing of insert, filler sleeves and crusher(s).

The whole set of crushers, insert and filler sleeves should tightly fit into the conduit.
Clean and dry the inside of the conduit sleeve and the cables/pipes thoroughly, removing any dirt, rust or oil/lubricant residues before applying the sealant.

Refer to the NOFIRNO® pipe brochure for further information.

People with sensitive skin should use gloves when working with NOFIRNO®.

Please refer to the Safety Data Sheet for more information.

Note: due to the curing process, the sealant cannot be applied on hot surfaces. Maximum temperature is 60 °C (140 °F).

NOFIRNO®/MULTI-ALL-MIX® CABLE/ PIPE TRANSIT SEALING SYSTEM

L1: A-60 approved bulkhead insulation

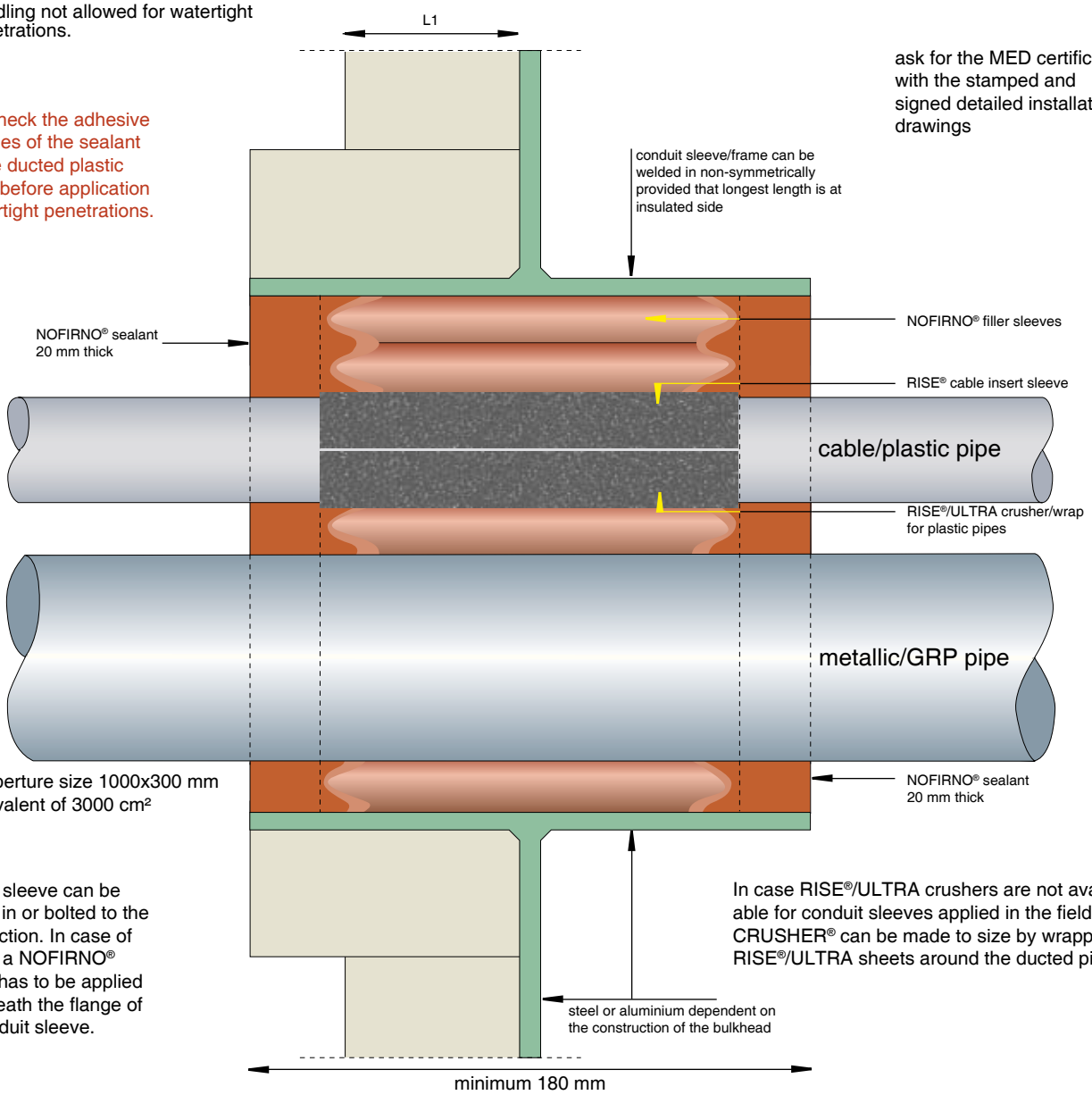
- APPROVED FOR STEEL/SS PIPES UP TO 168 MM OD
- APPROVED FOR COPPER/CuNi PIPES UP TO 108 MM OD
- APPROVED FOR PLASTIC PIPES UP TO 160 MM OD
- APPROVED FOR ALL TYPES OF CABLES INCL. LAN AND CLX
- APPROVED FOR CABLE SIZES UP TO 105 MM OD
- APPROVED FOR CABLE SETS OF MAX. 25 LAN CABLES 5-6 MM - MAX BUNDLE SIZE 35 MM

Bundling not allowed for watertight penetrations.

NO EXTRA INSULATION REQUIRED AT THE FRONT OF THE PENETRATION AND/OR IN BETWEEN THE CABLES OR PLASTIC PIPES

ask for the MED certificate with the stamped and signed detailed installation drawings

Note: check the adhesive properties of the sealant with the ducted plastic pipe(s) before application in watertight penetrations.



max. aperture size 1000x300 mm or equivalent of 3000 cm²

conduit sleeve can be welded in or bolted to the construction. In case of bolting, a NOFIRNO® gasket has to be applied underneath the flange of the conduit sleeve.

In case RISE®/ULTRA crushers are not available for conduit sleeves applied in the field, a CRUSHER® can be made to size by wrapping RISE®/ULTRA sheets around the ducted pipe.

Specifications for A-class according to EC (MED) certificate MED-B-4908 issued by Det Norske Veritas. Drawings N0015E, N0016E and N0017E

A0-A60 MULTI-ALL-MIX® PIPE/ CABLE TRANSIT

RISE®/ULTRA - MULTI-PLASTIC/METALLIC PIPE TRANSIT SEALING SYSTEM

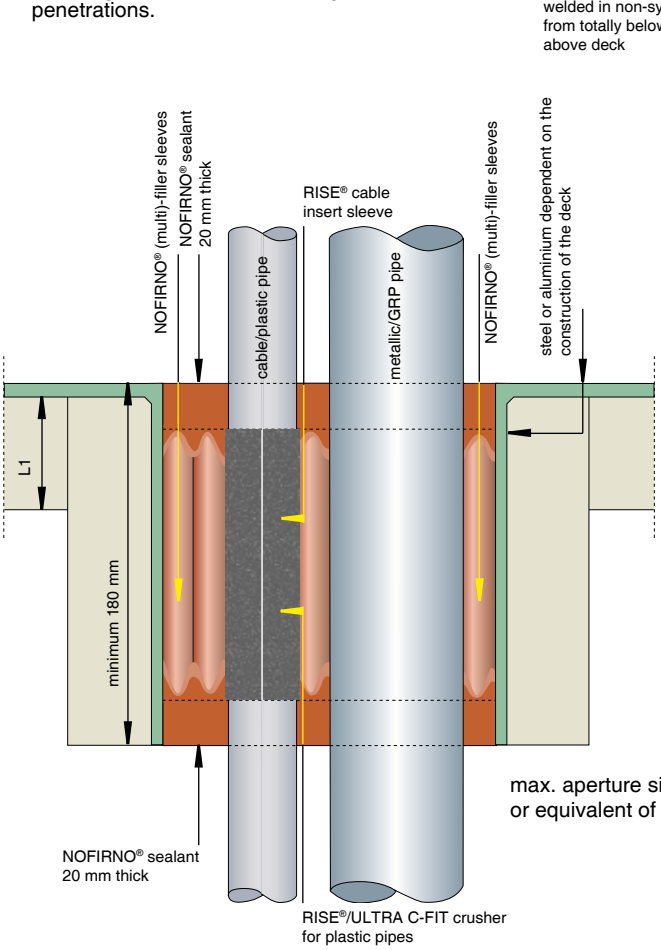
L1: A-60 approved deck insulation.

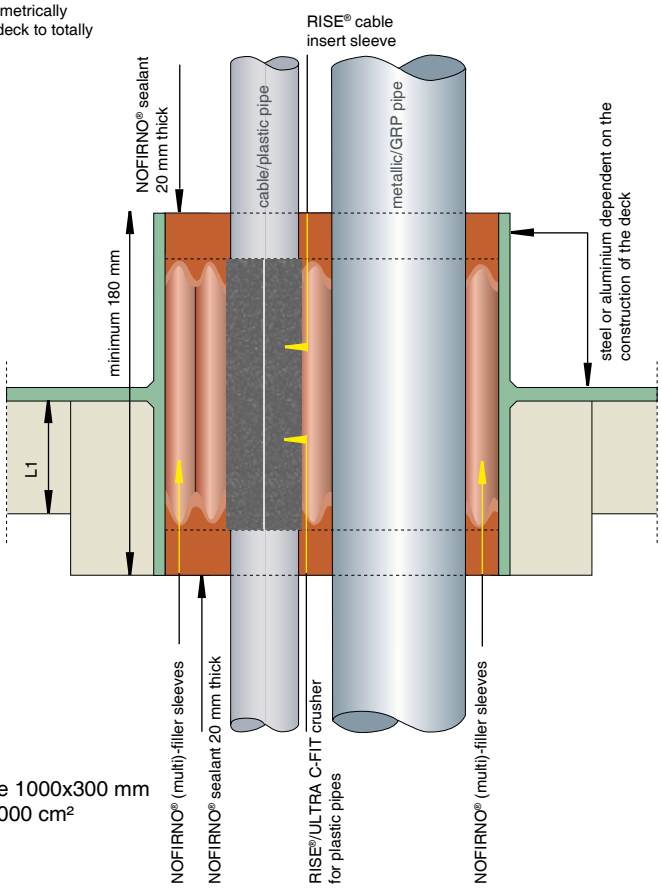
- APPROVED FOR STEEL/SS PIPES UP TO 168 MM OD
- APPROVED FOR COPPER/CuNi PIPES UP TO 108 MM OD
- APPROVED FOR PLASTIC PIPES UP TO 160 MM OD
- APPROVED FOR ALL TYPES OF CABLES INCL. LAN AND CLX
- APPROVED FOR CABLE SIZES UP TO 105 MM OD
- APPROVED FOR CABLE SETS OF MAX. 25 LAN CABLES 5-6 MM - MAX BUNDLE SIZE 35 MM

Bundling not allowed for watertight penetrations.

NO EXTRA INSULATION REQUIRED AT THE FRONT OF THE PENETRATION AND/OR IN BETWEEN THE CABLES OR PLASTIC PIPES

conduit sleeve/frame can be welded in non-symmetrically from totally below deck to totally above deck





max. aperture size 1000x300 mm or equivalent of 3000 cm²

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ask for the MED certificate with the stamped and signed detailed installation drawings

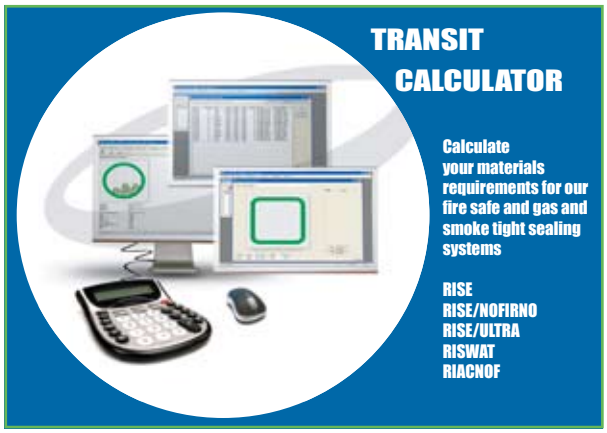
In case RISE®/ULTRA crushers are not available for conduit sleeves applied in the field, a CRUSHER® can be made to size by wrapping RISE®/ULTRA sheets around the ducted pipe.

Note: check the adhesive properties of the sealant with the ducted plastic pipe(s) before application in watertight penetrations.

Specifications for A-class according to EC (MED) certificate MED-B-5068 issued by Det Norske Veritas. Drawings N0015E, N0016E and N0017E

A0-A60 MULTI-ALL-MIX® PIPE/ CABLE TRANSIT

NOFIRNO®, RIACNOF®, RISE® AND RISE®/ULTRA CABLE/PIPE TRANSIT SEALING SYSTEM



Free material calculation software. Download at our web-site http://www.beele.com.
After entering the dimensions of the conduit opening and the amount and outer diameters of the ducted cables or pipes, the software calculates the amount of RISE® or RISWAT® insert sleeves, the RISE® , RISWAT® or NOFIRNO® filler sleeves, the ACTIFOAM® spare filling sheets, the RISE® or RISE®/ULTRA crushers and the DRIFIL®, FIWA® or NOFIRNO® sealant. It is easy to switch between the several systems and also between A-class, H-class, EMC and watertight penetrations. After entering the dimensions and amount and sizes of cables/pipes, a drawing appears on the screen showing also the remaining free space in the conduit opening. Furthermore, the filling rate of the cable penetrations is shown. Warnings appear for deviations of the certified configurations and for overfilling the transits or exceeding filling rates.
For a created project, all calculated transits can be stored in a database. Order/calculation forms can be shown on screen for project totals and single transits. The material lists can be printed and/or exported to MS Word.

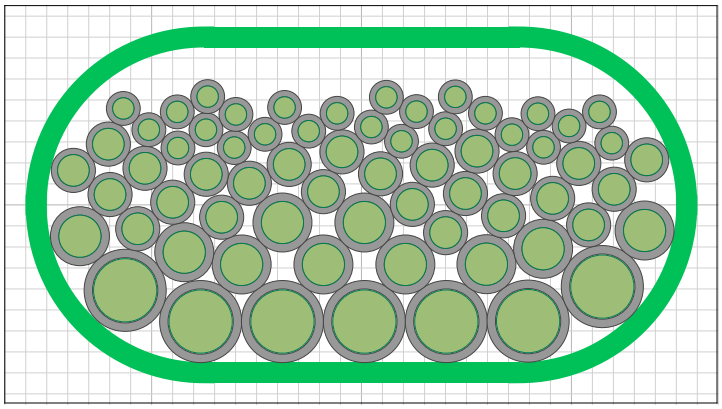
The material list of a transit shows the options which can be entered to make a calculation of the materials needed:

1) transit dimensions.
2) the depth of a transit is automatically selected based on the entered data at class (A, B, H-class or watertight) but can be changed. In this case, a warning appears that this is a deviation of the certification.
3) selection of the sealing system (cable, pipe).
4) the quantity of duplicate transits in the project.
5) the filling rate is calculated on the basis of the entered cable amounts and dimensions
6) percentage of spare for later extensions
7) where appropriate, a selection can be made for EMC rated penetrations
8) type of sealant can be selected (FIWA® or NOFIRNO® for fire rated transits and DRIFIL®, FIWA® or NOFIRNO® for watertight transits)

The material list displays the selected system, cable (or pipe) specifications, and the sealing material requirements. All transits in a project can be selected to create a similar list for all materials for the whole project.

Program-version of Transit-calculator: 3.9.2 (10 Dec 2009)
Always use the most recent version when creating a new material-list!

Material list for transit 'NOFIRNO multi-cable transit'



Created on:	20-1-2010 13:55:32
Created by:	Jansen
Last modified:	24-2-2010 10:40:34
Modified by:	Dickson

Transit specifications:	**(All dimensions in mm)**
Width:	300,00
Height:	150,00
Corner radius:	75,00
Depth:	180,00
Transit type:	Cable
Transit used in this project:	1 time
Filling rate:	36%
Spare on cable set:	0%
Class:	A-class
EMC:	None
Sealant:	20mm (both sides)

Check the Type Approval Certificates for limitations in sizes !

Material specifications:

Type of filler sleeves:	standard
NOFIRNO sealant:	cartridges 310 ml

Cable specifications:

Cables (OD)	Amount
10,00	25
15,00	25
20,00	10
30,00	7

Total amount of cables: 67

NOFIRNO materials needed:

Filler sleeves	Amount	Length
18/12	7	140,00 mm
27/19	16	140,00 mm

NOFIRNO sealant
(incl. overfill) 1354 ml (5 cartridges)

RISE materials needed:

Insert sleeves	Amount	Length
16/10	25	140,00 mm
20/14	25	140,00 mm
27/19	10	140,00 mm
39/31	7	140,00 mm

BEELE - RESEARCH & DEVELOPMENT
PRODUCTS FOR SPECIAL APPLICATIONS

NOFIRNO®

NEW TECHNOLOGY

- Approved for harshest fire ratings for pipe penetrations (A, H and Jet Fire class).
- Allows substantial movement of the ducted pipe within the conduit.
- High pressure ratings - designed for gas and/or watertight penetrations.
- Prevents corrosion inside the penetration.
- Longest service life and best Total Cost of Ownership on the market.
- NOFIRNO® rubber sleeves and sealant will remain stable and not be consumed by fire.
- Breakthrough - MULTI-ALL-MIX SYSTEM®
- Approved for any combination of cable and/or metallic, GRP or plastic pipes!

MULTI-ALL-MIX®
(left to right):
CLX cable, steel pipe, bundled LAN cables, plastic pipe, thermally insulated metallic pipe, copper and GRP pipe

NOFIRNO®

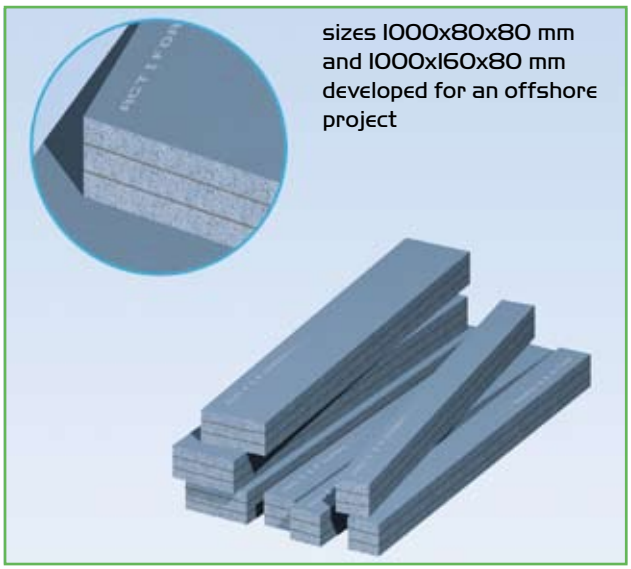
NEW TECHNOLOGY

- Gaskets and rubber sheets for applications in which the transits, coamings or conduit sleeves are bolted to the partition.
- Successfully tested for A-class RISE®, RIACNOF® and NOFIRNO® sealing systems for multi-cable and pipe transits bolted to the partitions.
- NOFIRNO® rubber will remain stable and not be consumed by fire.
- NOFIRNO® rubber has excellent resistance against UV, Ozone and weathering.
- Wide temperature range: -50 °C up to +180 °C.
- Proven - harshest fire exposure
- Special sizes of gaskets upon request.
- Products made of NOFIRNO® rubber upon request.

ACTIFOAM®/ULTRA

NEWEST TECHNOLOGY

- Sealing of gaps and openings in constructions against the ingress of moisture and to avoid flame spread.
- ACTIFOAM® has high thermal insulation values due to the close cellular structure.
- RISE®/ULTRA - adhesive properties under fire load.
- Breakthrough - ACTIFOAM® sheets can be layered with RISE/ULTRA sheets.
- The sandwich construction acts as a “bridge bearing” enabling the carrying of very high loads.
- Highest fire ratings achievable due to the unique combination of the two rubber grades.
- Successfully subjected to two hour hydrocarbon fire.



sizes 1000x80x80 mm and 1000x160x80 mm developed for an offshore project

WE CARE

BEELE ENGINEERING:
A COMPANY DEDICATED TO SAFETY FOR OVER 35 YEARS

BEELE ENGINEERING

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