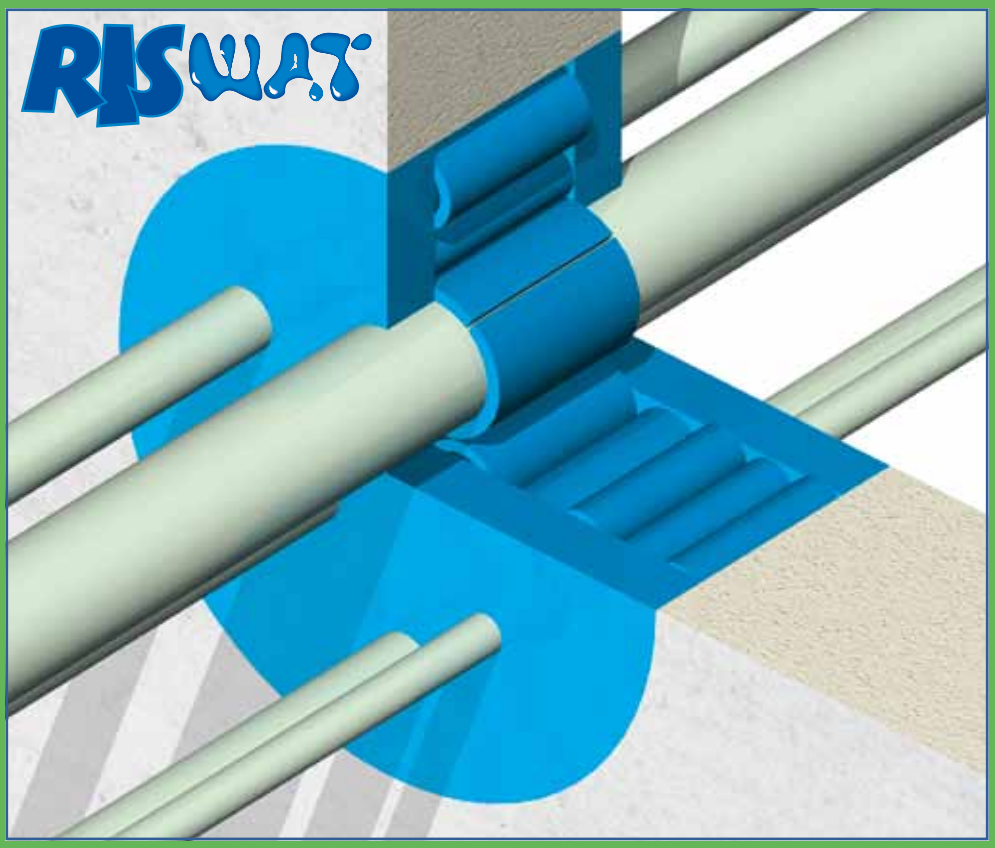
INSTALLATION INSTRUCTIONS RISWAT® SEALING SYSTEM FOR MULTI-CABLE TRANSITS



GAS & WATERTIGHT SEALING SYSTEM FOR CABLE ENTRIES IN NEW AND EXISTING INSTALLATIONS

WE CARE

BEELE ENGINEERING

Edition : September 2010

Research & Development : BEELE Engineering BV, Aalten, the Netherlands.

Note : The manufacturer reserves the right to make dimensional and design modifications without prior notification.

brochure code : riswat/installation/en/con

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RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS

RISWAT® cable sleeves

cable sleeves are supplied split lengthwise

RISWAT® sleeves are made from a specially developed extrudable thermoplastic which offers sufficient stiffness to enable ease of insertion. RISWAT® sleeves have a clearly recognizable blue colour to ensure that they are easily distinguishable from the NOFIRNO® sleeves which are used for fire-resistant conduits. RISWAT® sleeves are supplied in lengths of 60, 80, 110, 140 and 160 mm. They are also available in lengths of 500 and 1000 mm. They can be cut to length as required on the construction site. RISWAT® cable sleeves are split lengthwise to facilitate fitting them around cables which are already in place. The wall thickness of sleeves is so chosen to ensure sufficient separation of the cables to facilitate application of the DRIFIL®, FIWA® or NOFIRNO® sealant. RISWAT® filler sleeves are not split lengthwise.

The article numbers for the cable sleeves 500 mm long are 80.3200 and following; for the cable sleeves 1000 mm long 80.3220 and following.

RISWAT® cable sleeve	cable diameter	sleeve length	article number
12/6	5 - 7	160	80.3120
14/8	7 - 9	160	80.3121
16/10	9 - 11	160	80.3122
18/12	11 - 13	160	80.3133
20/14	13 - 15	160	80.3144
22/16	15 - 17	160	80.3155
27/19	17 - 21	160	80.3166
31/23	21 - 25	160	80.3167
35/27	25 - 29	160	80.3168
39/31	29 - 33	160	80.3169
46/36	33 - 39	160	80.3170
52/42	39 - 45	160	80.3171
58/48	45 - 51	160	80.3172
64/54	51 - 57	160	80.3173
70/60	57 - 63	160	80.3174

all dimensions in mm

RISWAT® cable sleeve	cable diameter	sleeve length	article number
12/6	5 - 7	60	80.3000
14/8	7 - 9	60	80.3001
16/10	9 - 11	60	80.3002
18/12	11 - 13	60	80.3003
20/14	13 - 15	60	80.3004
22/16	15 - 17	60	80.3005
27/19	17 - 21	60	803006
31/23	21 - 25	60	80.3007
35/27	25 - 29	60	80.3008
39/31	29 - 33	60	80.3009
46/36	33 - 39	60	80.3010
52/42	39 - 45	60	80.3011
58/48	45 - 51	60	80.3012
64/54	51 - 57	60	80.3013
70/60	57 - 63	60	80.3014
12/6	5 - 7	80	80.3020
14/8	7 - 9	80	80.3021
16/10	9 - 11	80	80.3022
18/12	11 - 13	80	80.3023
20/14	13 - 15	80	80.3024
22/16	15 - 17	80	80.3025
27/19	17 - 21	80	803026
31/23	21 - 25	80	80.3027
35/27	25 - 29	80	80.3028
39/31	29 - 33	80	80.3029
46/36	33 - 39	80	80.3030
52/42	39 - 45	80	80.3031
58/48	45 - 51	80	80.3032
64/54	51 - 57	80	80.3033
70/60	57 - 63	80	80.3034
12/6	5 - 7	110	80.3060
14/8	7 - 9	110	80.3061
16/10	9 - 11	110	80.3062
18/12	11 - 13	110	80.3063
20/14	13 - 15	110	80.3064
22/16	15 - 17	110	80.3065
27/19	17 - 21	110	80.3066
31/23	21 - 25	110	80.3067
35/27	25 - 29	110	80.3068
39/31	29 - 33	110	80.3069
46/36	33 - 39	110	80.3070
52/42	39 - 45	110	80.3071
58/48	45 - 51	110	80.3072
64/54	51 - 57	110	80.3073
70/60	57 - 63	110	80.3074
12/6	5 - 7	140	80.3100
14/8	7 - 9	140	80.3101
16/10	9 - 11	140	80.3102
18/12	11 - 13	140	80.3103
20/14	13 - 15	140	80.3104
22/16	15 - 17	140	80.3105
27/19	17 - 21	140	80.3106
31/23	21 - 25	140	80.3107
35/27	25 - 29	140	80.3108
39/31	29 - 33	140	80.3109
46/36	33 - 39	140	80.3110
52/42	39 - 45	140	80.3111
58/48	45 - 51	140	80.3112
64/54	51 - 57	140	80.3113
70/60	57 - 63	140	80.3114

all dimensions in mm

all dimensions in mm

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RISWAT

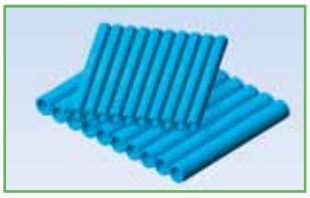
RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS

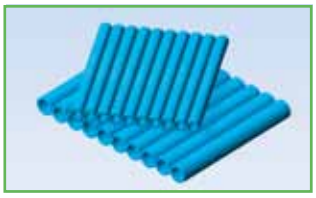
RISWAT® filler sleeve	sleeve length	article number
18/12 single	60	80.3018
18/12 multi	60	80.3016
18/12 single	80	80.3028
18/12 single	110	80.3078
18/12 single	140	80.3118
18/12 multi	140	80.3116
18/12 single	160	80.3178
18/12 multi	160	80.3176
18/12 single	500	80.3218
18/12 single	1000	80.3238

all dimensions in mm

RISWAT® filler sleeve	sleeve length	article number
27/19 single	60	80.3019
27/19 multi	60	80.3017
27/19 single	80	80.3029
27/19 single	110	80.3079
27/19 single	140	80.3119
27/19 multi	140	80.3117
27/19 single	160	80.3179
27/19 multi	160	80.3177
27/19 single	500	80.3219
27/19 single	1000	80.3239

all dimensions in mm





PRODUCT INFORMATION SEALANT

01)	colour	dark blue
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	0.95 MPa
06)	elongation at break	375%
07)	hardness	35 Shore A
08)	elastic deformation	approx. 75%
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 80.0920

DRIFIL® is a paste-like, halogen free compound which is simple to use. DRIFIL® 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 SEALANT

01)	colour	dark grey
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	1.15 MPa
06)	elongation at break	125%
07)	hardness	35 Shore A
08)	elastic deformation	approx. 25%
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

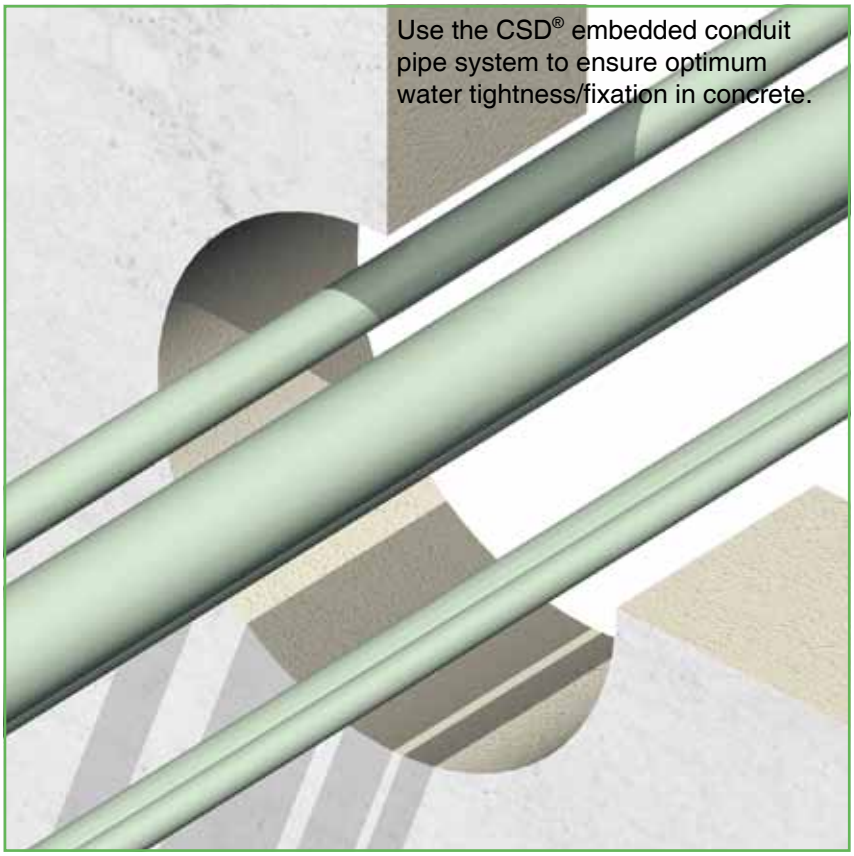
article number 80.0900

FIWA® is a paste-like, halogen free compound (tested according to Naval Engineering Standard NES 713: Issue 3). Furthermore FIWA® has a low smoke index (NES 711: Issue 2: 1981) and a high oxygen index (ISO 4589-2: 1996), and low flame spread characteristics according to IMO Resolution A.653(16).

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

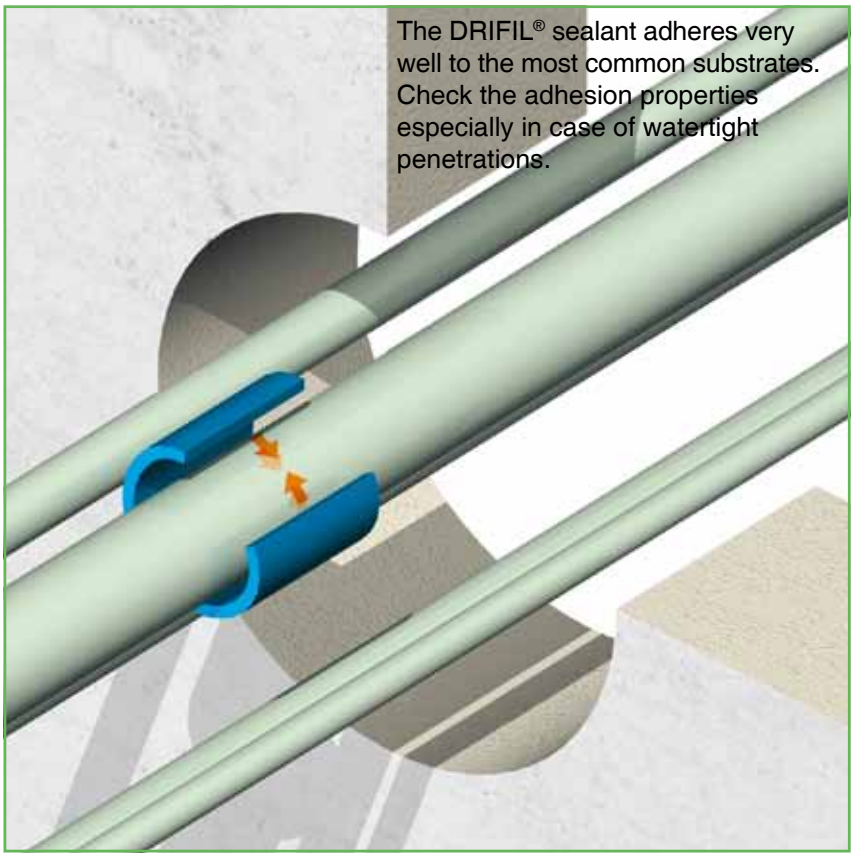
RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS

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



Use the CSD® embedded conduit pipe system to ensure optimum water tightness/fixation in concrete.

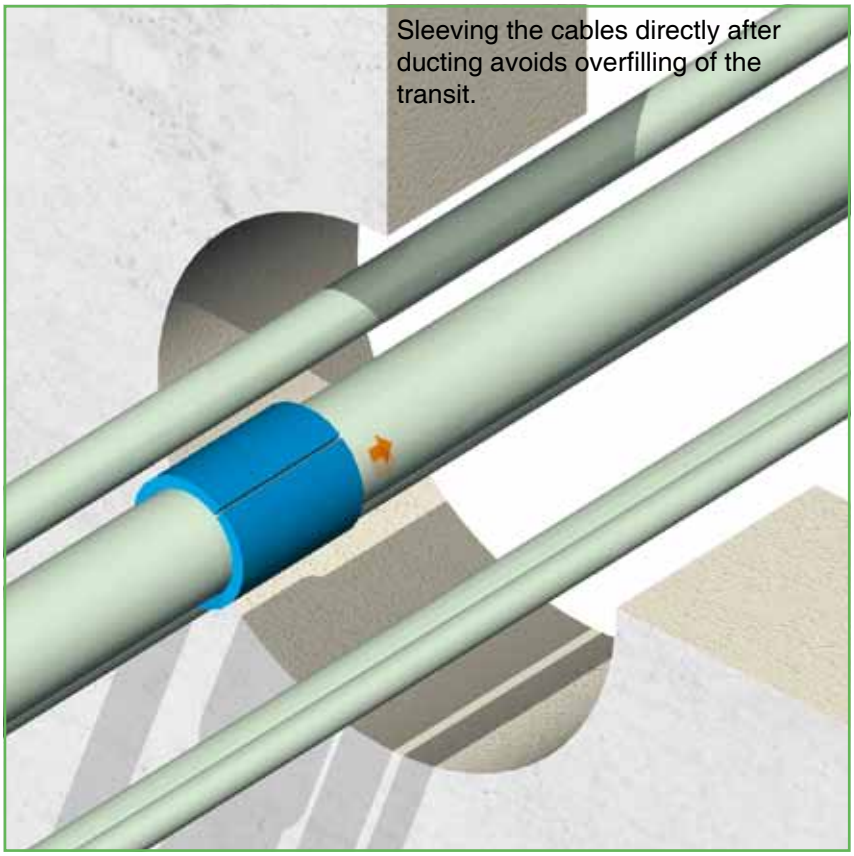
2) After the cables have been ducted, RISWAT® insert sleeves are applied around each cable.
The insert sleeves are split lengthwise and can therefore be placed around the cables in front of the conduit.



The DRIFIL® sealant adheres very well to the most common substrates. Check the adhesion properties especially in case of watertight penetrations.

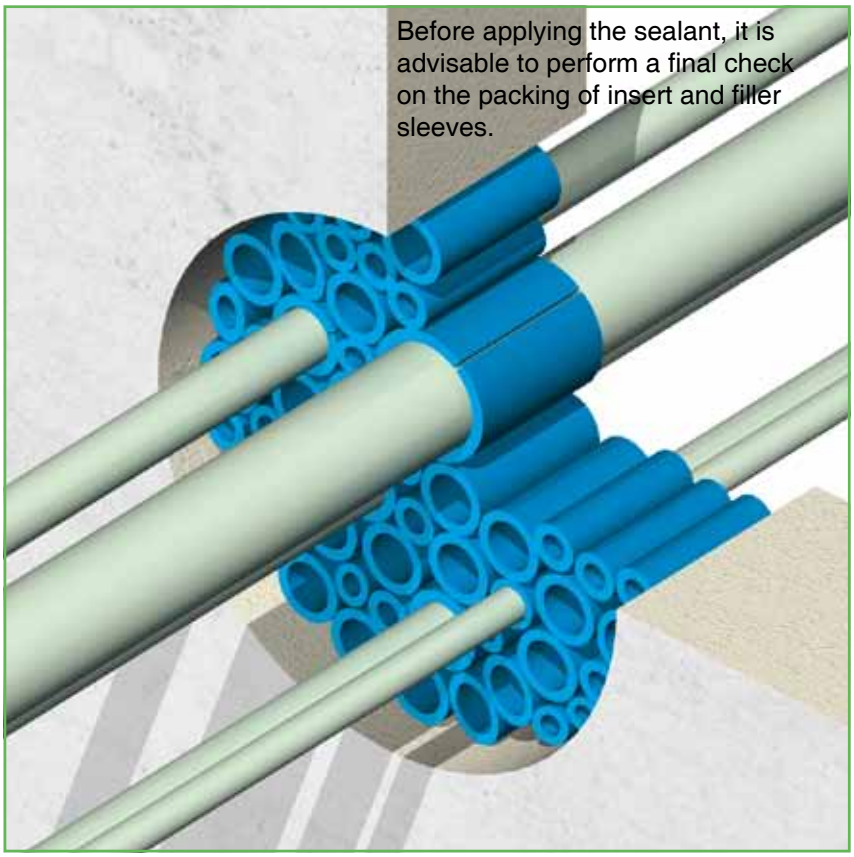
RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS

3) The insert sleeves are primarily used for separation of the cables to enable to apply the sealant.
An exact fit is for this reason not required. Push the sleeves into the conduit in such a way as to leave about 20 mm free space at the front and back.



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

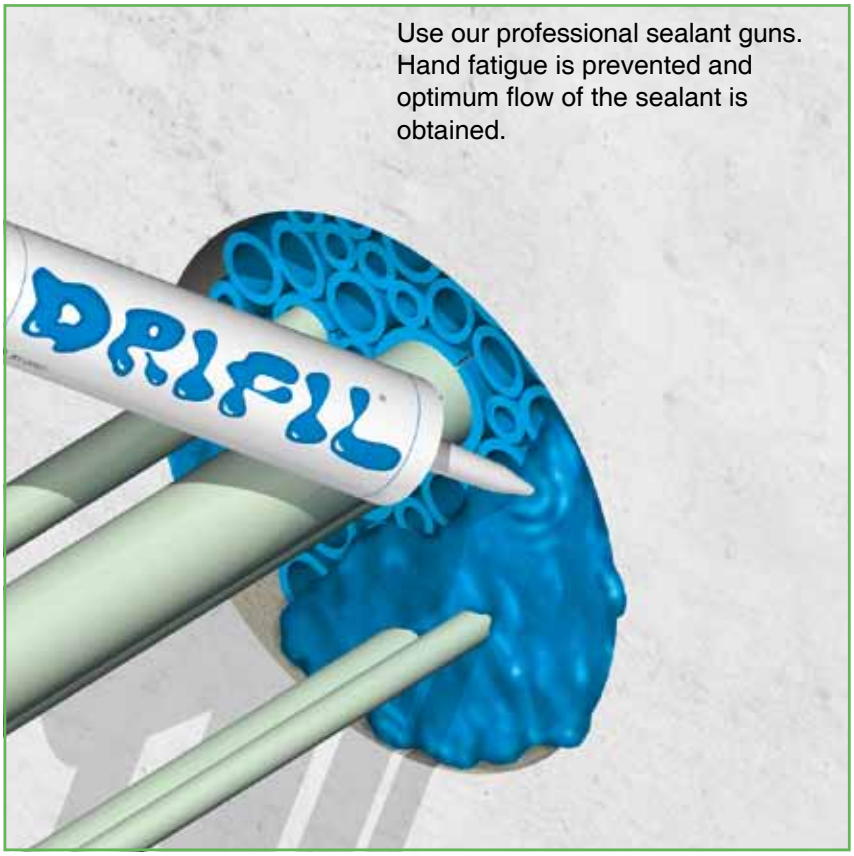
4) The remaining free space in the conduit is filled with RISWAT® filler sleeves type 27/19 and 18/12. The whole set of insert and filler sleeves should fit tightly into the conduit to provide sufficient mechanical stability.



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

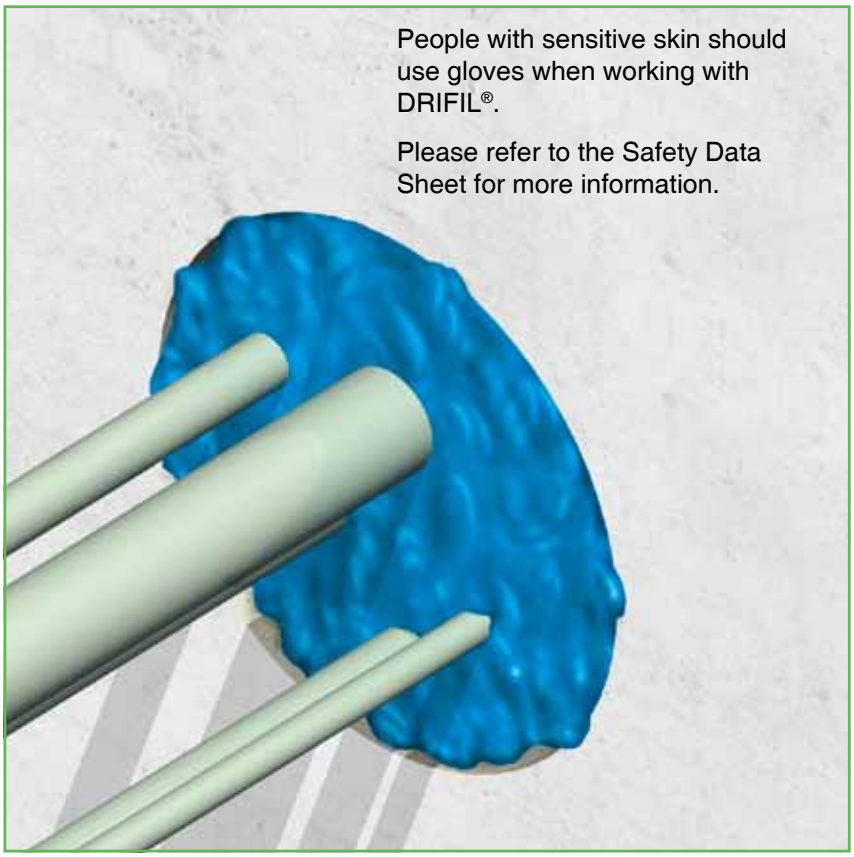
RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS

5) A 20 mm thick layer of DRIFIL® 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.

6) The conduit should be overfilled with DRIFIL® 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.



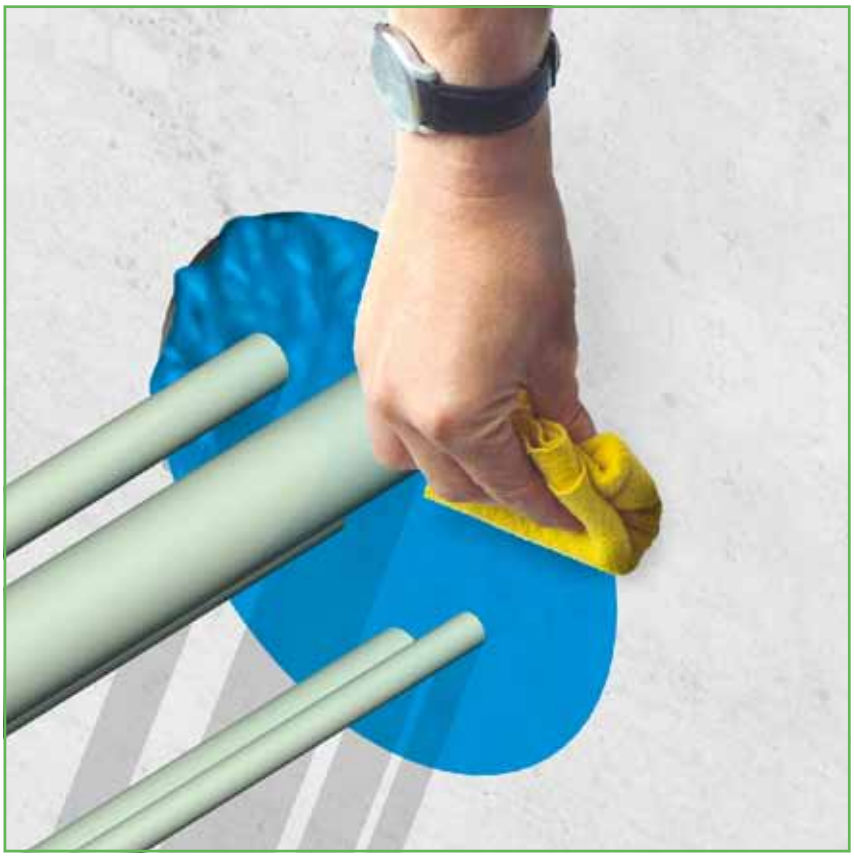
People with sensitive skin should use gloves when working with DRIFIL®.

Please refer to the Safety Data Sheet for more information.

RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS

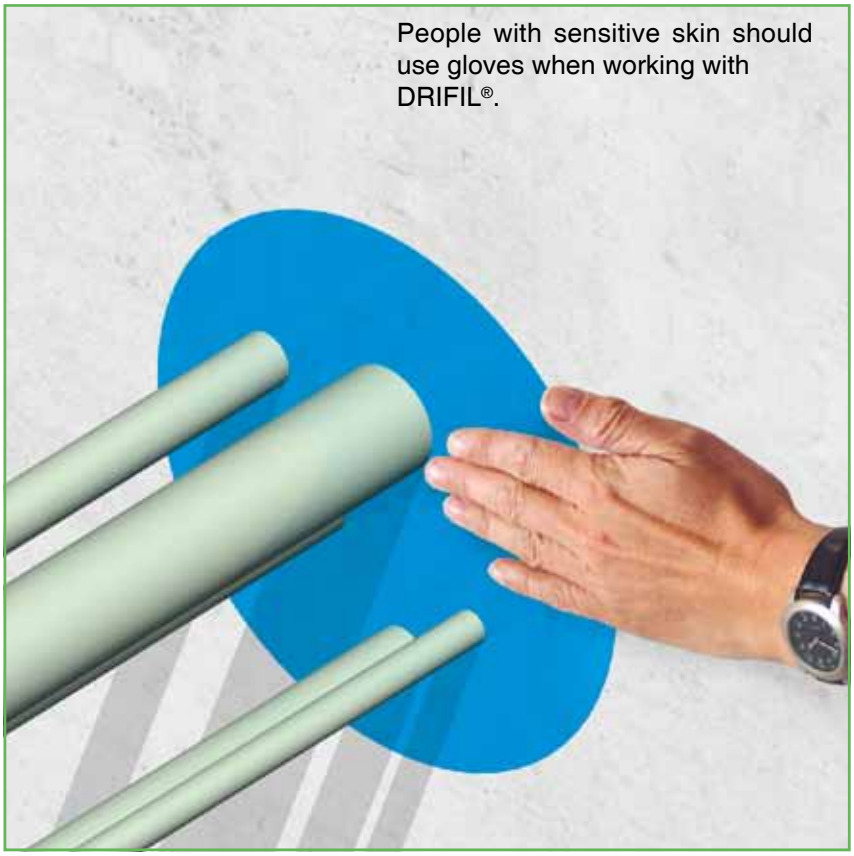
7) To smooth the surface of the DRIFIL® sealant layer, a cloth is sprayed with water. This prevents the sealant from sticking to the cloth. Note: do not use soap water!

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



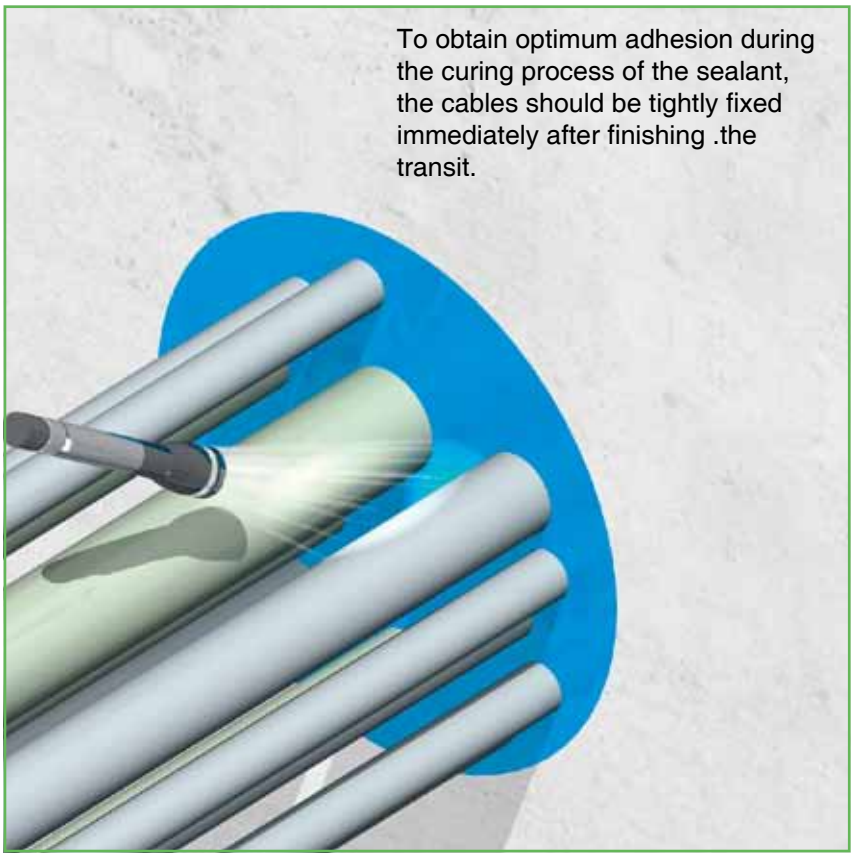
RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS

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



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

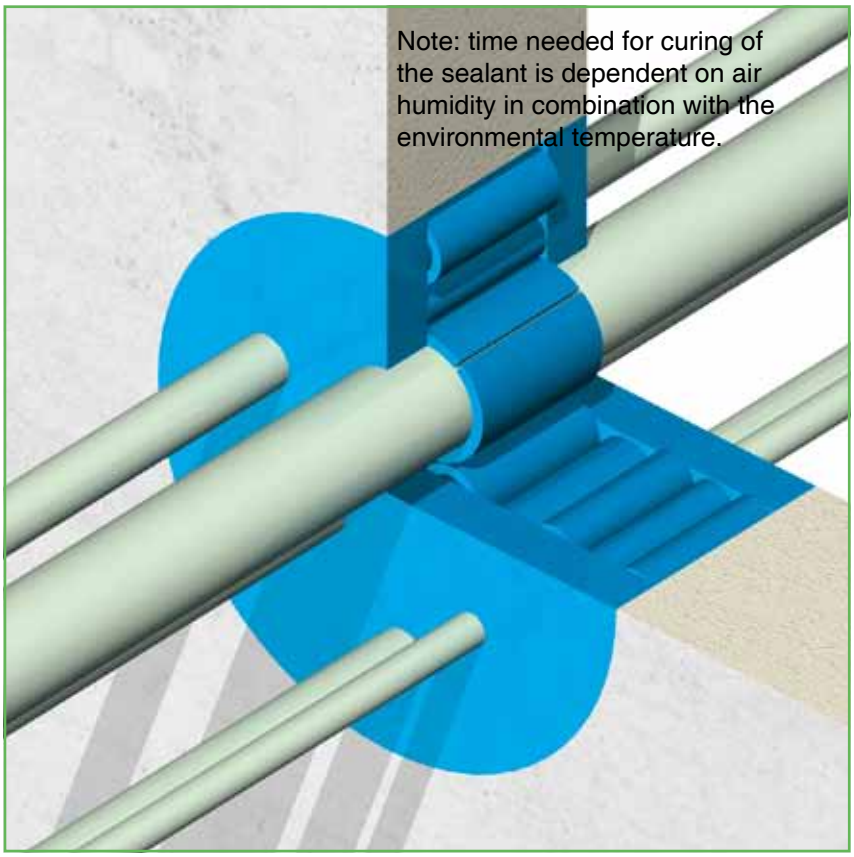
10) After smoothing is finished, a last check should be taken to ensure sealant is applied in between the cables, especially at penetrations with larger amounts of cables.



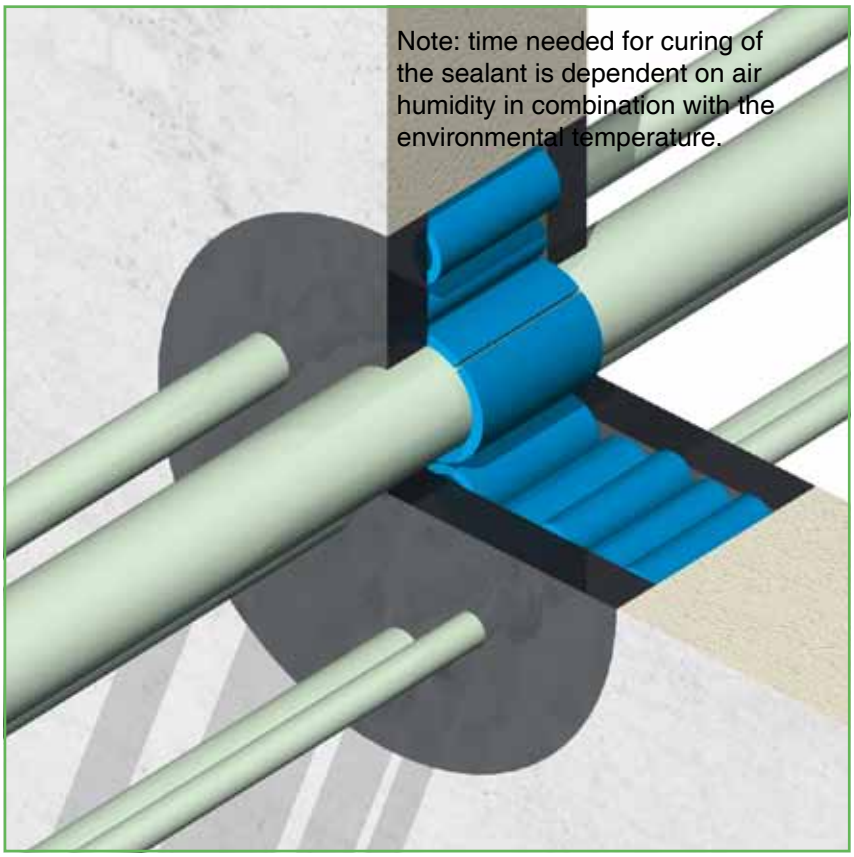
To obtain optimum adhesion during the curing process of the sealant, the cables should be tightly fixed immediately after finishing .the transit.

RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS

11) For optimum gas and water tightness it is advisable to apply at both sides of the penetration a 20 mm thick layer of the DRIFIL® sealant.



12) For optimized mechanical stability and to obtain higher pressure ratings, FIWA® or NOFIRNO® sealant can be used in place of DRIFIL® sealant. NOFIRNO® sealant has optimum mechanical properties.



RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS

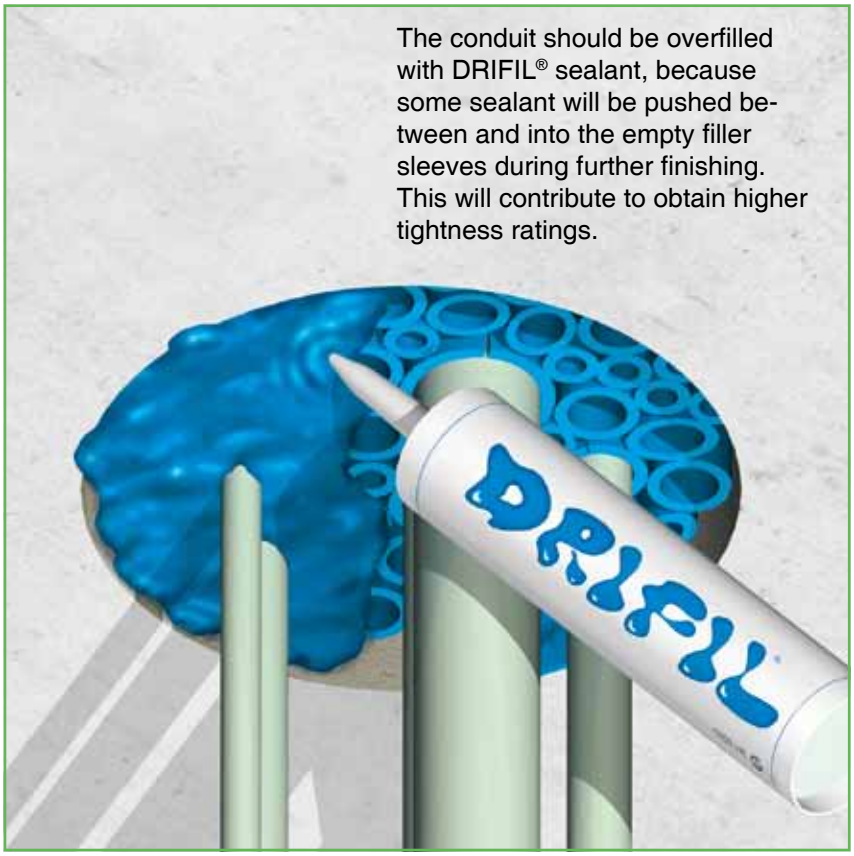
13) For vertical conduits it is advisable to select the insert sleeves a bit undersized. They will then cling to the ducted cables in such a way to prevent them from sliding down.

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

Please refer to the Safety Data Sheet for more information.

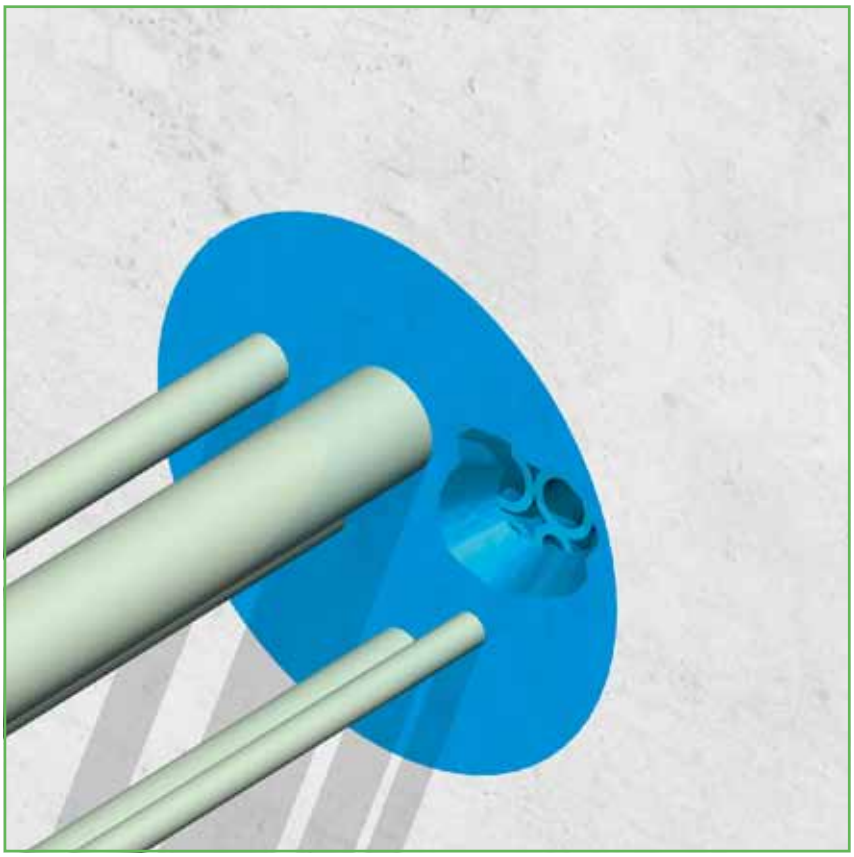
14) The optimized viscosity and the superb adhesion properties of the DRIFIL® sealant make applying the sealant overhead an easy matter. DRIFIL® sealant does not sag and will not drip off.

The conduit should be overfilled with DRIFIL® 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.

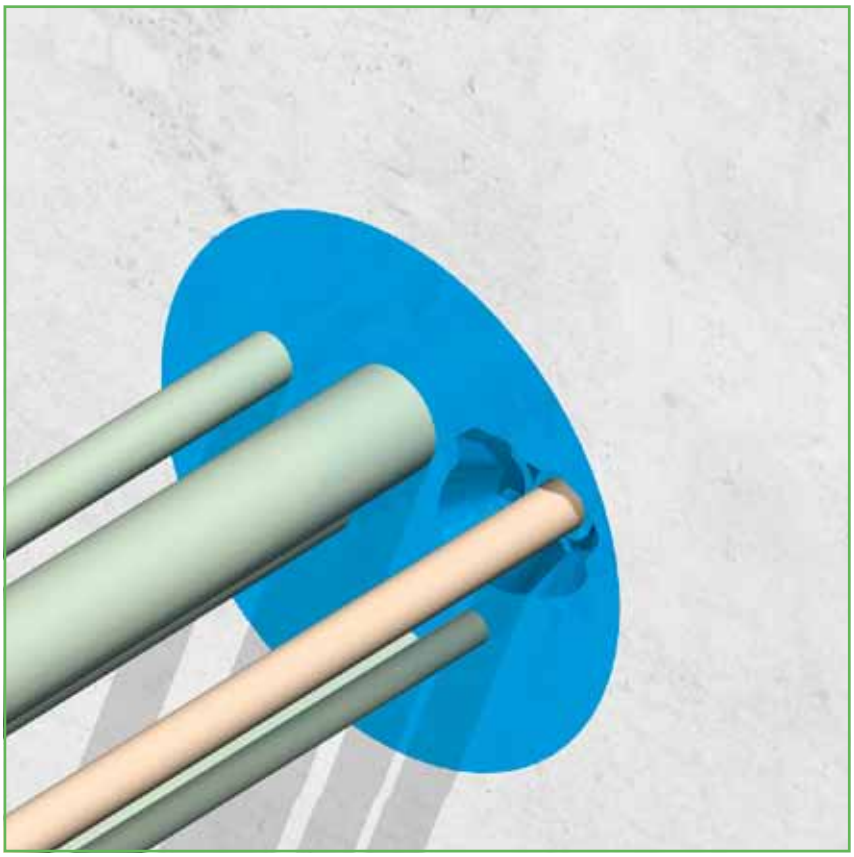


RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS

15) 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 as shown above. This creates a good foundation for the sealant to be applied later.

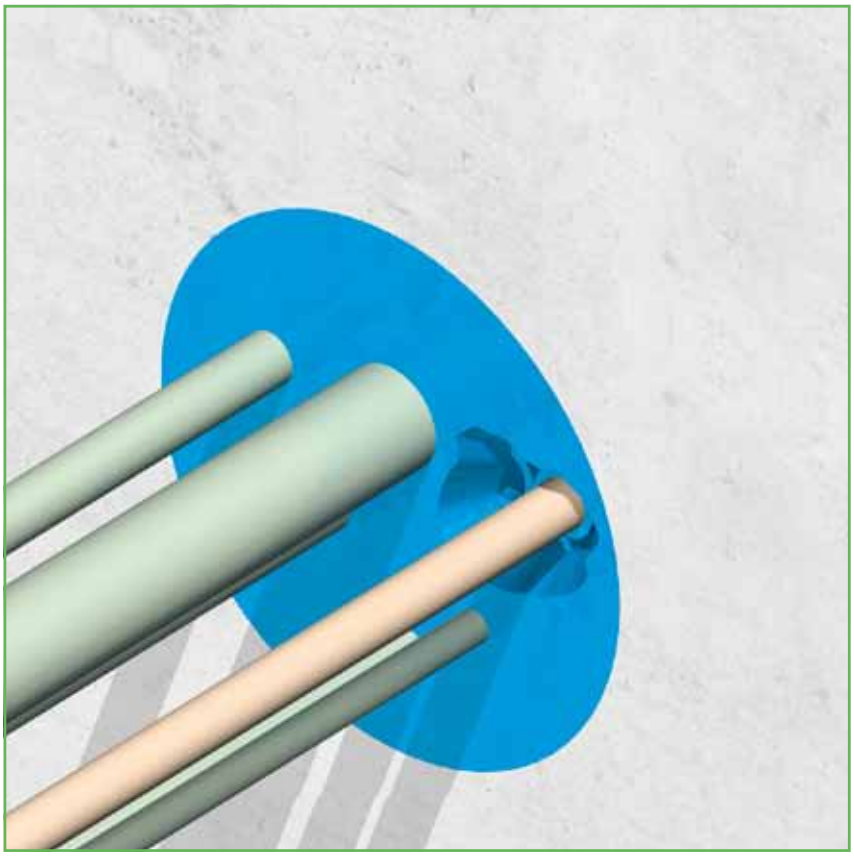


16) Pull the cable through one of the empty filler sleeves with an inner diameter more or less corresponding to the outer diameter of the cable.
Or remove one or more RISWAT® filler sleeves to create a fitting opening for the cable to be ducted.

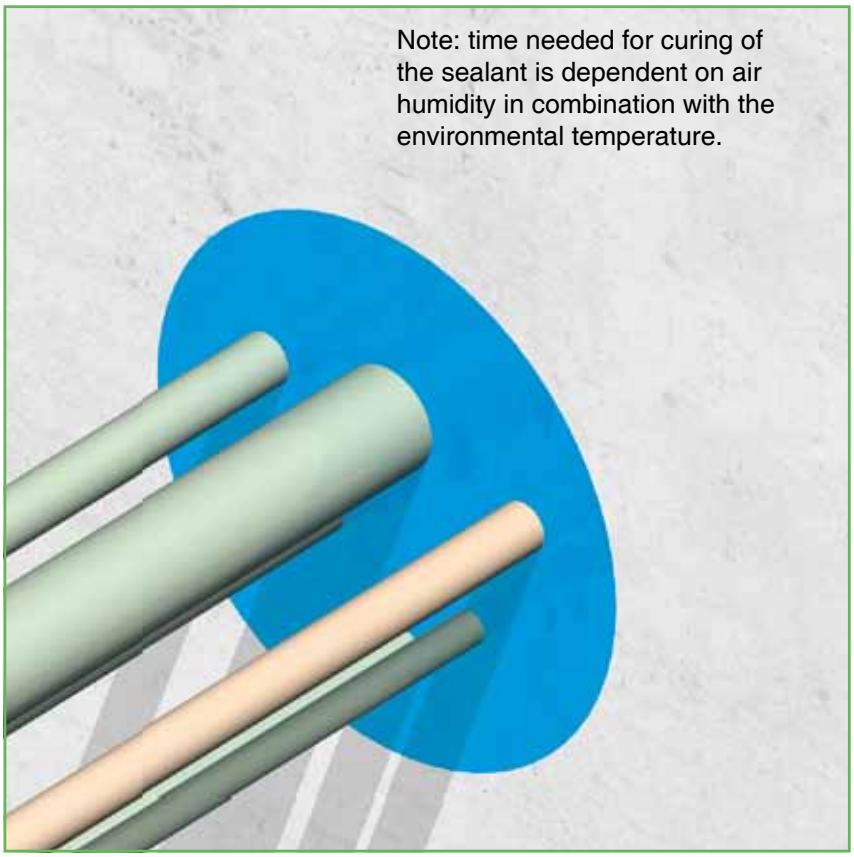


RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS

17) Place in this case a RISWAT® sleeve around the newly ducted cable. Push the insert sleeve into the conduit in such a way as to leave about 20 mm free space at the front and back and place, if necessary, RISWAT® filler sleeves back in the remaining open spaces.



18) Refill the opening in the sealant layer with sufficient DRIFIL® sealant at both sides of the penetration. Finish the sealant layer as described before.



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

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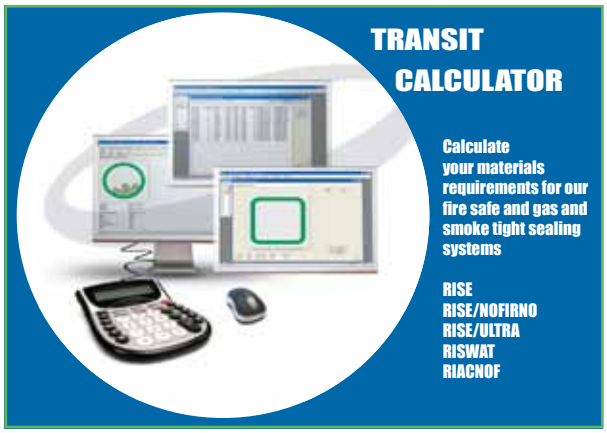
RISWAT® GAS & WATERTIGHT SEALING SYSTEM FOR NEW AND EXISTING MULTI-CABLE PENETRATIONS



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 NO-FIRNO® 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.

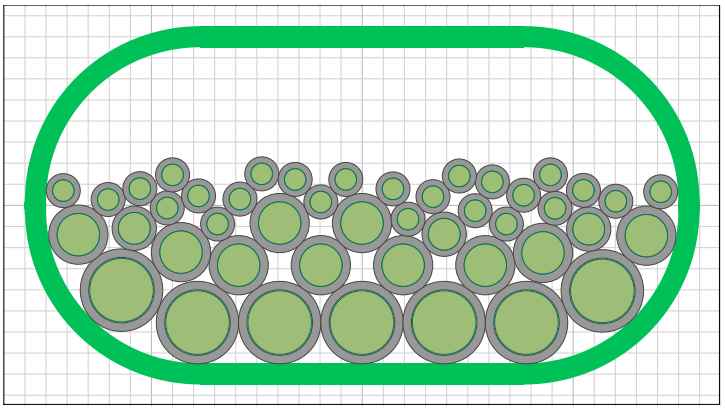
The material list of a transit shows the options which can be entered to make a calculation of the materials needed:

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 'transit E222CS'



Created on:	16-1-2010 11:37:17
Created by:	Smith
Last modified:	16-1-2010 11:40:00
Modified by:	Smith

Transit specifications:	**(All dimensions in mm)**
Width:	300,00
Height:	150,00
Corner radius:	73,50
Depth:	180,00
Transit type:	Cable
Transit used in this project:	1 time
Filling rate:	26,2%
Spare on cable set:	10,0%
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
FIWA sealant:	cartridges 310 ml

Cable specifications:

Cables (OD)	Amount
10,00	25
15,00	3
20,00	10
30,00	7

Total amount of cables: 45

RISE materials needed:

Insert sleeves	Amount	Length
16/10	25	140,00 mm
20/14	3	140,00 mm
27/19	10	140,00 mm
39/31	7	140,00 mm

Filler sleeves	Amount	Length
18/12	13	140,00 mm
27/19	26	140,00 mm

FIWA sealant
(incl. overfill) 1677 ml (6 cartridges)