STOPAQ®

Self·healing corrosion prevention & sealant technology

SEALFORLIFE

APPLICATION MANUAL 2016

All it takes

is one idea

to solve an impossible problem.

Robert H. Schuller

Innovative Values

For more than 20 years, Stopaq has been the market leader in developing new applications for sealing and corrosion prevention meeting the most stringent safety and health requirements. Every day our people are developing and searching for new solutions using intelligent engineering from a total cost approach to ensure the end-user a safe and sound system. In many markets, from onshore pipelines, refineries to offshore platforms, subsea pipelines and civil structures, Stopaq solutions can be found making the impossible possible.

Certified and patented technology

Stopaq Corrosion Prevention & Sealant systems are certified according to the KIWA BRL k911/02, TUV Nord for the ISO 12068, class C50. The system are approved and tested from minus 45°C to 95°C according to ISO 21809-3. Stopaq is NSF/ANSI 61 approved with additional offshore approvals from the SouthWest Institute for smoke and toxicity.

What is Stopaq?

Stopaq's primary layers within a system consist of a fully amorphous, non-crosslinkable, non-polar polymer composition which is totally impermeable once applied. It is impenetrable to water, oxygen and bacteria, the elements that commonly cause corrosion. Unlike conventional coating types, the Stopaq compound features a liquid-like behaviour to flow across and ensure a full wetting of the entire surface of substrate. This behaviour does not change with time meaning that internal stresses to do arise in Stopaq ensures that it retains its corrosion preventative properties (i.e., no ageing). Stopaq provides superior adhesive strength to any surface (steel pipe or existing coating) through a permanent molecular bonding with the substrate. With a glass transition temperature of -67°C, Stopaq will flow and adhere even in the coldest working environments, and it will self-heal in case of minor damages.

Why Stopaq?

Stopaq manufactures and supplies worldwide a broad range of innovative patent defended corrosion prevention solutions. The corrosion prevention and sealant systems actively protect structural objects against the daily risk of corrosion. Due to its fluid-like nature and unique visco-elastic corrosion properties, the Stopaq system will protect your valuable assets for life. Stopaq systems seal, maintenance free, any substrate 100% from the ingress of water, oxygen, bacteria's or AC/DC current. Stopaq offers by far the most environmental friendly protection systems in the corrosion protective world. 100% stable, 100% self-healing and 100% adhesion guaranteed!

By offering unique non-crosslinkable anti-corrosion and sealant solutions that require only minimal surface preparation and perform for life, Stopaq ensures an environmentally-friendly, energy efficient and safe coating system application. Stopaq continuously develops new systems and applications by focussing its activity on the interaction between science, industry and the needs of the market. Our Research and Development is tasked to look for safer, healthier, risk-free, faster, easier and absolutely sustainable solutions from a total low cost of ownership perspective.

Stopaq Swellable Sealant

Stopaq Aquastop is a compound suited for sealing of wall, pipe or cable inlets and hollow spaces, against gases, moisture, standing water and running groundwater leaks.

Stopaq Casing Filler

Stopaq Casing Filler is an injected casing filler material, it is far superior to any other coating system currently in the market. This system combines the excellent corrosion prevention properties with the visco-elastic behavior of Stopaq.

This Application Manual is intended to serve as a primary reference document for clients technical supervisors and applicators. This Manual may be supplemented with further applications and systems as necessary.

Do it right, do it once.. Seal For Life!

Stadskanaal, 05 February 2016

For further information, please contact Stopaq B.V. or check General conditions of sale,

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Corrosion prevention products

- Stopaq 4100 Putty
- Stopaq 4200 Filler
- Stopaq Basecoat
- Stopaq Paste CZ
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- Stopaq Paste CZHT
- Stopaq Wrappingband CL
- Stopaq Wrappingband CZ
- Stopaq Wrappingband CZH
- Stopaq Wrappingband CZH-DS
- Stopaq Wrappingband CZHT
- Stopaq Wrappingband EZ
- Stopaq Wrappingband SZ

Mechanical protection products

- Stopaq High Impact Shield
- Stopaq High Impact Shield HT
- Stopaq Outerglass Shield XT
- Stopaq Outerwrap PVC
- Stopaq Outerwrap PE
- Stopaq Outerwrap HSPE
- Stopaq Outerwrap HSPEX
- Stopaq Outerwrap HTPE
- Stopaq Outerwrap HTPP
- Stopaq PE Repair Patch
- Stopaq Polyester
- Stopaq Vinyl ester
- Stopaq Gelcoat
- Stopaq EZ Topcoat

Sealing products

- Stopaq 2100 Aquastop
- SFL Mortar WR
- SFL Mortar FR

General:
See latest PDS as available on the website for detailed information.

Stopaq® 4100 Putty ≤30˚C

Weight	Article number
0,53 kg	4110
2 kg	4125

Stopaq® 4200 Filler ≤100˚C

Weight	Article number
0,53kg	4210
2kg	4225

Stopaq® Basecoat ≤50˚C

Dimensions	Article number
200mm x 20m	

Stopaq® Paste (CZ ≤50˚C, CZH ≤70˚C, CZHT ≤95˚C)

Product	Article number
CZ 2kg	6141
CZH 2kg	6140
CZH 100mm x 3m	69051-00300
CZHT 2kg	6142

Stopaq® Wrappingband CL ≤50˚C

Dimension	Article number
100mm x 10m	4501

Stopaq® Wrappingband CZ ≤50˚C

Dimension	Article number
50mm x 5m	4250
50mm x 10m	4235
100mm x 10m	4240
200mm x 10m	6127
300mm x 10m	4247

Stopaq® Wrappingband CZH ≤70˚C

Dimension	Article number
50mm x 5m	6110
50mm x 10m	6120
100mm x 10m	6125
150mm x 20m	6134
150mm x 20m	6134
200mm x 10m	6130
200mm x 20m	6131
200mm x 20m DS	6701
300mm x 10m	6248

Stopaq® Wrappingband CZHT ≤95˚C

Dimension	Article number
50mm x 10m	6301
100mm x 10m	6302
200mm x 10m	6303
200mm x 20m	6304
300mm x 10m	6305

Stopaq® Wrappingband EZ ≤70˚C

Dimension	Article number
100mm x 10m	6401
200mm x 10m	6404
300mm x 10m	6406

Stopaq® Wrappingband SZ ≤50˚C / Putty SZ

Product	Article number
100mm x 6m	4401
Paste SZ 2kg sheet	4400

Stopaq® High Impact Shield ≤65˚C (H.I.S. HT ≤95˚C onshore, ≤115˚C offshore)

Dimension	Article number
660mm x 30m	1330
Closure strip 100mm x 660mm	1331
Closure strip 150mm x 660mm	1332
HT 660mm x 30m	1329
Other dimension	On request

Stopaq® Outerglass Shield XT≤121˚C

4” x 30’ (XT) Grey	1471
6” x 60’ (XT) Grey	1472
8” x 60’ (XT) Grey	1473

Stopaq® Outerwrap PVC ≤70˚C

Dimension	Article number
50mm x 10m (black)	1120
50mm x 10m PVC-F	1123
35mm x 10m PVC-F	1128-01000
50mm x 30m (black)	1122
75mm x 30m (black)	1121
100mm x 30m (black)	1125
150mm x 30m (black)	1126
50mm x 30m (white)	1164
75mm x 30m (white)	1165
100mm x 30m (white)	1166
150mm x 30m (white)	1167

Stopaq® Outerwrap PE ≤70˚C

Dimension	Article number
75mm x 30m	1200
100mm x 30m	1201
150mm x 30m	1202

Stopaq® Outerwrap HSPE ≤50˚C

Dimension	Article number
2” x 50’	1270-01524
4” x 50’	1272-01524

Stopaq® Outerwrap HSPEX ≤50˚C

Dimension	Article number
2” x 50’	1290-01524
5” x 50’	1291-01524
4” x 50’	1292-01524

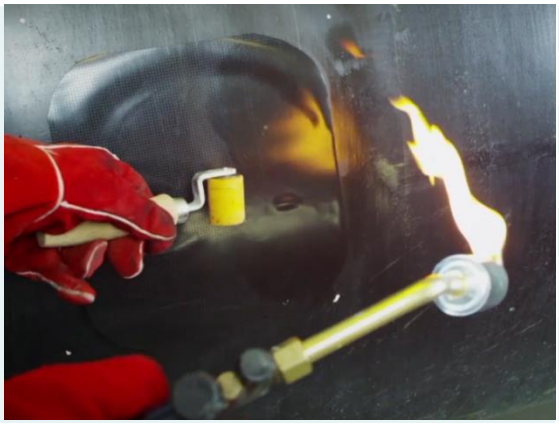
Stopaq® Outerwrap HTPE ≤95˚C

Dimension	Article number
75mm x 30m	1222
100mm x 30m	1223

Stopaq® Outerwrap HTPP ≤95˚C

Dimension	Article number
2” x 100’	1249
4” x 100’	1250

Stopaq® PE Repair patch ≤60˚C



Dimension	Article number
425mm x 10m	1360

Stopaq® Polyester ≤100˚C / Vinyl ester ≤150˚C

Dimension	Article number
1000mm x 10m (Polyester)	1144-01000
Compression Tape	1143-06600
Gelcoat CC 1 kg Grey	1140
Sealing Tape 100mm x 20m	1141
Sealing Tape 100mm x 20m	1142

Stopaq® EZ Topcoat ≤100˚C

Dimension	Article number
4 litres – White	1090-04000
4 ltr. – Goose Grey (BS 00.A.05)	1091-04000
4 ltr. – Grey (Ral 7032)	1092-04000

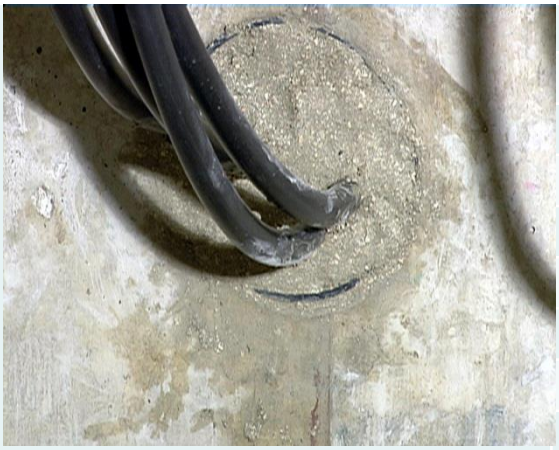
Stopaq® Flangebelt

Dimension	Article number
Client specific	On request

Stopaq® 2100 Aquastop Waterproofing Sealant <35˚C

Weight / Volume	Article number
310ml	2000
0,53kg	2002
1,25kg	2006
2kg	2005
20kg	2007

SFL® Mortar



Weight	Article number
WR 0,5kg	1109
WR 5kg	1112
WR 20kg	1114
FR 0,5kg	1105
FR 5kg	1113
FR 25kg	1115

Stopaq® Rockshield

Dimension	Article number
Project specific	On request

Stopaq® Casing Filler

Dimension	Article number
Project specific	On request

Tools and Equipment		
Product	**Used for**	**Article number**
SFL Injection tool 310 ml – Hand	310 ml tube	1002
SFL Injection tool 310 ml – Battery	310 ml tube	1003
SFL Injection tool 500 ml – Hand	0,53 kg tube	1000
SFL Injection tool 500 ml – Air	0,53 kg tube	1005
SFL Injection tool 500 ml – Battery	0,53 kg tube	1004
SFL Injection tool 1,25kg - hand	1,25 kg tube	1001
SFL Injection tool 2 l – Air	2 kg tubular bag	1012
SFL Injection tool 2 l – Hand	2 kg tubular bag	1013
SFL Flex. Nozzle for 310 ml	SFL Injection tool 310 ml	1048
SFL Flex. Nozzle for 500 ml	SFL Injection tool 500 ml	1047
SFL Flex. Nozzle for 1,25 kg	SFL Injection tool 1,25 kg	1046
SFL Substrate cleaner – 500 ml	Surface preparation	1023-00500
SFL Cleaning pad	Surface preparation	10048
SFL PU Flex Gloves	All	1050
SFL Latex Gloves	Outerglass Shield XT / Polyester	1051
SFL Application set	500 ml Injector tool	1042
SFL Scissor	All	1049
SFL Press Roller		1008
Puncture roller	Outerglass Shield	1009
Compression foil 250 mm x 170 m	Outerglass Shield XT / Polyester	1010
Compression foil 500 mm x 170 m	Outerglass Shield XT / Polyester	10053
Heating blanket 180 mm x 700 mm	Paste	6900
Stopaq Foam Tape 20 mm x 5 m x 10 m	2100 Aquastop system	1100
Stopaq Foam back plug Ø40 mm x 1 m	2100 Aquastop system	1103-0001

System	
Product	**Used for**
4100 Putty	Under ground flanges, Manhole covers, max 30°C
4200 Filler	Above ground flange and high temperature filler; max temp 100°C
Basecoat	Structural steel; max temp 50°C
Paste CZ	Under ground flanges, odd shapes etc.; max temp 50°C
Paste CZH	Above ground flanges, odd shapes etc.; max temp 70°C
Paste CZHT	Above ground flanges, odd shapes etc.; max temp 95°C
Wrappingband CL	Condensating pipelines; max temp 50°C
Wrappingband CZ	Pipelines, flanges, elbows etc.; max temp 50°C
Wrappingband CZH	Pipelines, flanges, elbows etc.; max temp 70°C
Wrappingband CZH-DS	Pipelines, flanges, elbows etc.; max temp 70°C
Wrappingband CZHT	Pipelines, flanges, elbows etc.; max temp 95°C
Wrappingband EZ	Chime area, coatable backing, max temp 70°C
Wrappingband SZ	Underwater applications, splash zone areas, max temp 50°C
High Impact Shield	Mechanical protection for Field Joints, max temp 65°C
High Impact Shield HT	Mechanical protection for Field Joints, max temp 95°C
Outerglass Shield XT	Additional mechanical protection, max temp 121°C
Outerwrap PVC	Mechanical protection, max temp 70°C
Outerwrap PE	Mechanical protection, max temp 70°C
Outerwrap HSPE	Mechanical protection, max temp 50°C
Outerwrap HSPEX	Mechanical protection above ground, max temp 50°C
Outerwrap HTPP	Mechanical protection, max temp 95°C
Outerwrap HTPE	Mechanical protection, max temp 95°C
PE Repair Patch	Coating repair; max temp 60°C
Polyester	Mechanical protection for Soil-to-air risers, max temp 100°C
Vinyl ester	Mechanical protection for Soil-to-air risers, max temp 150°C
Gelcoat	Topcoat over Polyester / Vinyl ester, max temp 100°C
EZ Topcoat	Topcoat over Wrappingband EZ, max temp 100°C
2100 Aquastop	Cable/duct sealing against water intrusion, max temp 35°C
Mortar WR	Barrier cable ducts, water resistant for use in basements etc.
Mortar FR	Barrier cable ducts, fire retardant

Material properties CZ, CZH, CZHT			
Characteristic	**CZ**	**CZH**	**CZHT**
Operating temperature	Max 50°C	Max 70°C	Max 95°C
Preferred temperatures of product and surface	Between 0°C and 20°C	Between 20°C and 40°C	Between 30°C and 50°C
Surface preparation (minimum)	St2	St2	St2
Surface degrease	Isopropyl alcohol or SFL Substrate Cleaner (NO thinner)	Isopropyl alcohol or SFL Substrate Cleaner (NO thinner)	Isopropyl alcohol or SFL Substrate Cleaner (NO thinner)
Holiday test @ 2mm thickness	15 kV	15 kV	15 kV
Toxity	None	None	None

SURFACE PREPARATION STANDARDS ISO 8501-1:2007(E)

Hand Tool Cleaning or Power Tool Cleaning is Required Prior to Stopaq Application

St 2 – Thorough hand and power tool cleaning

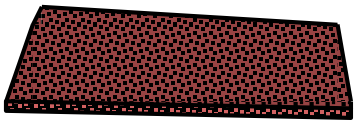
When viewed without magnification, the surface must be free from visible oil, grease and dirt, and from poorly adhering mill scale, rust paint coatings and foreign matter.

St 3 – Very thorough hand and power tool cleaning

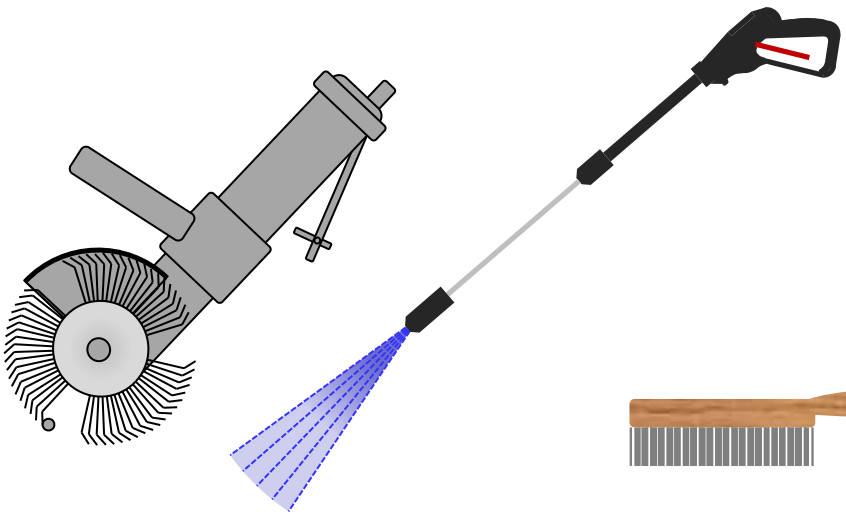
As for St2, the surface must be abraded to give a metallic sheen. A mechanical method of surface preparation widely used in the industry and involving the use of power sanders or wire brushes, power chipping hammers, abrasive grinding wheels, needle guns etc. Usually more effective than hand tool cleaning.

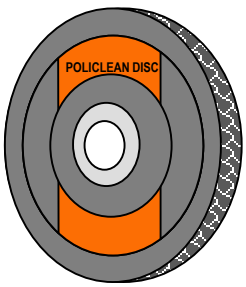
Surface preparation

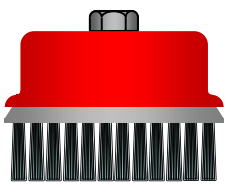
1) Degrease surface with SFL Substrate Cleaner or Isopropanol. A abrasive scotch-brite can be used. Do not use any thinner.



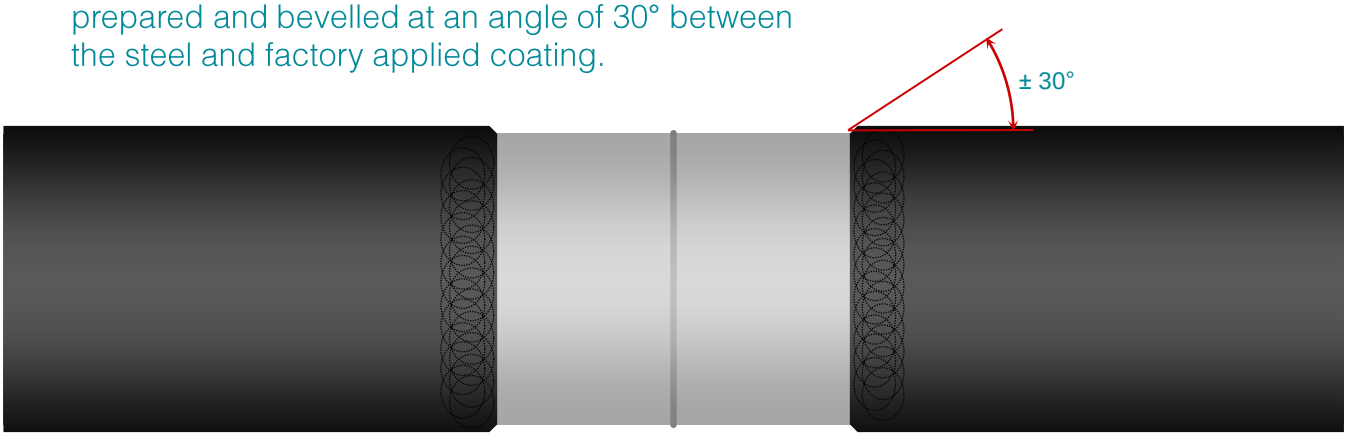
2)Surface should be prepared according Stopaq requirements minimum, St2, St3 (ISO 8504-3). Wire brush, Monti Bristle Blaster, Grinding disc or similar tools are sufficient.







3) Adjacent factory applied coating should also be prepared and bevelled at an angle of 30° between the steel and factory applied coating.



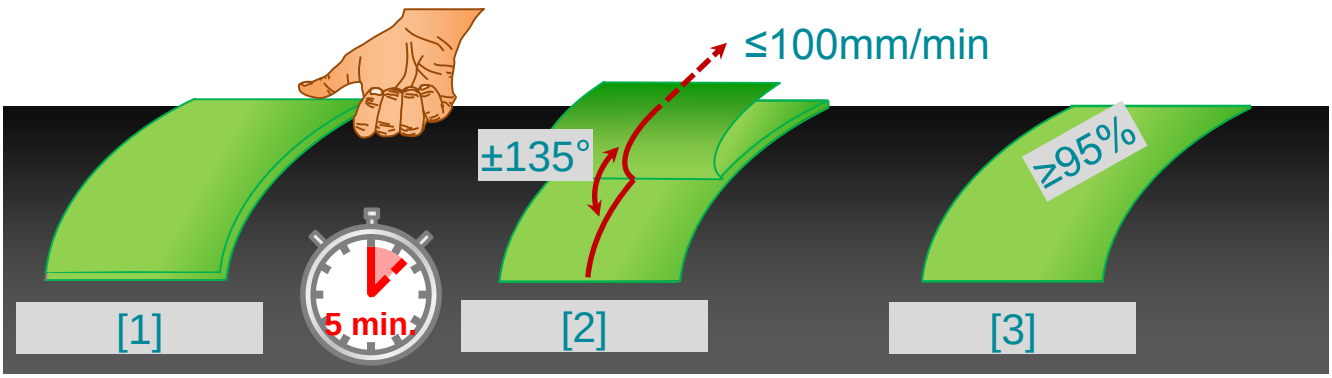
Surface cleanliness check.

[1] Apply ±150mm Stopaq Wrappingband onto the surfaces of the pipeline and any adjacent factory applied coating and press the material into the pores of the substrates.

[2] Remove the Stopaq after approx. 5 minutes in an angle of approx. 135° and a with a speed of 100mm/min.

[3] Cohesive failure should occur and the remaining Stopaq material should cover ≥95% of the surfaces

If this is less, further cleaning is required. Repeat cleaning and cleanliness check until ≥95% of the surface remains covered.



Dew point

The dew point a water-to-air saturation temperature. The dew point is associated with the relative humidity. At a certain relative humidity and air temperature, vapor can condensate on a surface if the temperature of the surface is lower than the dew point.

For an optimal application, the temperature of the surface should be at least 3°C above the dew point to prevent condensation of water onto the surface. The maximum amount of water vapor in the air at certain temperatures is shown in the table below.

Maximum amount of water vapour at a certain temperature										
Air temperature (°C)	0	5	10	15	20	25	30	35	40	45
Maximum amount of water vapour (g/m3)	4,8	6,8	9,5	12,8	17,3	23,0	30,4	39,6	51,5	65,0

The interaction between dew point, air temperature and relative air humidity can be calculated as shown in the table below:

Air temp. (°C)	Dew point (°C) with a relative humidity of								
	50%	55%	60%	65%	70%	75%	80%	85%	90%
5	-4,1	-2,9	-1,8	-0,9	0,0	0,9	1,8	2,7	3,6
6	-3,2	-2,1	-1,0	-0,1	0,9	1,8	2,8	3,7	4,5
7	-2,4	-1,3	-0,2	0,8	1,8	2,8	3,7	4,6	5,5
8	-1,6	-0,4	0,8	1,8	2,8	3,8	4,7	5,6	6,5
9	-0,8	0,4	1,7	2,7	3,8	4,7	5,7	6,6	7,5
10	0,1	1,3	2,6	3,7	4,7	5,7	6,7	7,6	8,4
11	1,0	2,3	3,5	4,6	5,6	6,7	7,6	8,6	9,4
12	1,9	3,2	4,5	5,6	6,6	7,7	8,6	9,6	10,4
13	2,9	4,2	5,4	6,6	7,6	8,6	9,6	10,6	11,4
14	3,7	5,1	6,4	7,5	8,6	9,6	10,6	11,5	12,4
15	4,7	6,1	7,3	8,5	9,5	10,6	11,5	12,5	13,4
16	5,6	7,0	8,3	9,5	10,5	11,6	12,5	13,5	14,4
17	6,5	7,9	9,2	10,4	11,5	12,5	13,5	14,5	15,3
18	7,4	8,8	10,2	11,4	12,4	13,5	14,5	15,4	16,3
19	8,3	9,7	11,1	12,3	13,4	14,5	15,5	16,4	17,3
20	9,3	10,7	12,0	13,3	14,4	15,4	16,4	17,4	18,3
21	10,2	11,6	12,9	14,2	15,3	16,4	17,4	18,4	19,3
22	11,1	12,5	13,8	15,2	16,3	17,4	18,4	19,4	20,3
23	12,0	13,5	14,8	16,1	17,2	18,4	19,4	20,3	21,3
24	12,9	14,4	15,7	17,0	18,2	19,3	20,3	21,3	22,3
25	13,8	15,3	16,7	17,9	19,1	20,3	21,3	22,3	23,2
26	14,8	16,2	17,6	18,8	20,1	21,2	22,3	23,3	24,2
27	15,7	17,2	18,6	19,8	21,1	22,2	23,2	24,3	25,2
28	16,6	18,1	19,5	20,8	22,0	23,2	24,2	25,2	26,2
29	17,5	19,1	20,5	21,7	22,9	24,1	25,2	26,2	27,2
30	18,4	20,0	21,4	22,7	23,9	25,1	26,2	27,2	28,2

Use a calibrated dew point meter to measure the relative humidity, temperature of the atmosphere, temperature of the surface and the dew point.

Material condition prior to and during application

Materials should be stored according to guidelines in Stopaq Product Data Sheets. Keep the rolls, tubes, tubular bags etc. clean and prevent sand, grease and other contaminations from contacting the materials. At a higher temperature, the visco-elastic material will adhere faster to the surface and is therefore easier to apply.

Surface condition prior to and during application

Before and during application the surface requirements should be checked frequently.

Things to remember during application

Stopaq visco elastic corrosion prevention materials should be applied with minimum tension. Some tension might be used when the circumstances require. Paste and Putty materials have their own application procedure. Press the applied material onto the surface to prevent air-inclusions. Adhesion must be checked frequently.

Overlap

In general, the side by side overlap of the Stopaq visco-Elastic corrosion prevention materials is minimum 10mm. Circumferential overlap minimum 50mm. More overlap does not badly influence the coating performance. Apply firm pressure onto overlap seams to prevent air inclusions.

Overlap of Stopaq Wrappingband

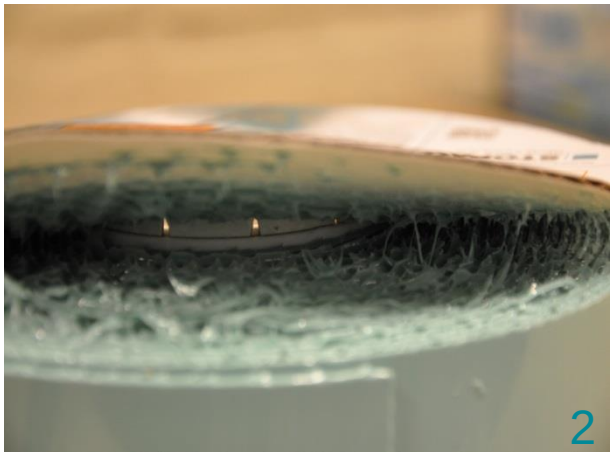
	Above ground	Below ground
Bare steel	**n/a**	**n/a**
Pipe with factory applied coating	**>100mm (not on bitumen coating)**	**>100mm (not on bitumen coating)**
Field joint	**±50mm**	**±50mm**

Quality control

The entire area coated with Visco elastic materials should be tested using a high voltage tester prior to application of any Mechanical Protection materials. The test must be carried out at a minimum of 5kV + 5 kV per mm thickness. A brush probe is recommended.

1

It might occur that the compound of Stopaq Wrappingband products sticks to the cardboard reel, which will be visible when the side disc of the reel is removed from the roll.

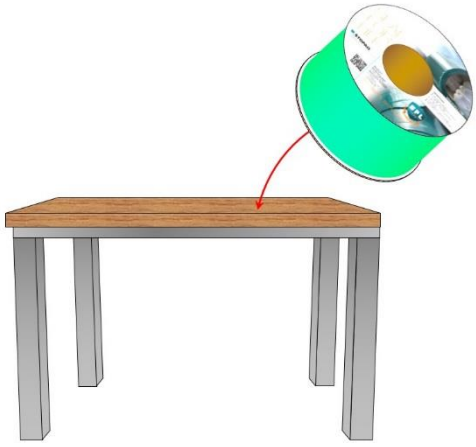


2

The surface of the Wrappingband is be rough and, therefore, the hands of the applicator might be smeared with Stopaq compound.

3

Press firmly on the entire surface of the reel to prevent the Stopaq compound from sticking to the reel. The compound will stick to the roll Wrappingband and the surface of the roll will be smooth.



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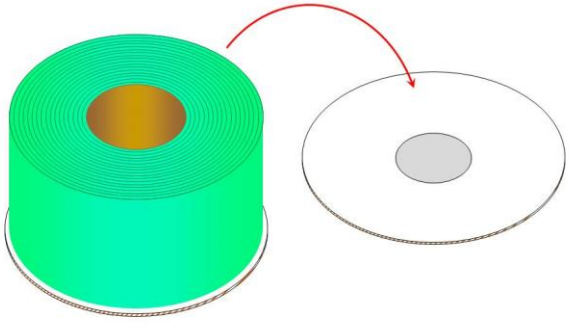
The roll Stopaq Wrappingband can also be tapped on a flat surface.



5

The disc of the reel will be clean now and the side of the roll Wrappingband will be smooth.

6

When the reel has been removed, do not place the Wrappingband flat on a surface. The material will adhere to the surface or get dirty.

Material condition prior to and during application

Materials should be stored according to Stopaq specifications. Keep the materials clean and prevent sand, grease and other contaminations from contacting the materials.

Surface condition prior to and during application

Stopaq visco elastic corrosion prevention materials should be applied and checked (holiday test) before the Mechanical Protection layer(s) are applied. If the mechanical protection layer must overlap a plant coating, the plant coating should also be prepared according to Stopaq specifications.

Things to remember during application

Mechanical protection layer(s) should be applied with tension and air inclusions should be avoided. These layers are for mechanical protection only and do not prevent corrosion. Therefore, these products might have a different application procedure compared to application without visco elastic coating materials.

Overlap

Mechanical protection layers have their own overlap requirements. When the system is applied on objects with a factory applied coating, the mechanical protection layer(s) could, if required by the client overlap onto the factory applied coating, see table below.

Overlap of Mechanical Protection over Stopaq Wrappingband

	Above ground	Below ground
Bare steel	**±3mm Wrappingband visible**	**±3mm Wrappingband visible**
Pipe with factory applied coating	**±3mm Wrappingband visible or according client specifications**	**±3mm Wrappingband visible or according client specifications**
Field joint High Impact Shield	**>50mm wider as Wrappingband**	**>50mm wider as Wrappingband**
Field joint Outerwrap / Outerglass Shield	**±3mm Wrappingband visible or according client specifications**	**±3mm Wrappingband visible or according client specifications**

Quality control

Visual inspection should be carried out after application of the Mechanical protection layer(s) to make sure that the specified overlap is respected, there are no air inclusions and uncovered areas.

Removal Mechanical Protection material

When mechanical protection layer(s) have to be removed, avoid damaging the Stopaq visco elastic material underneath.

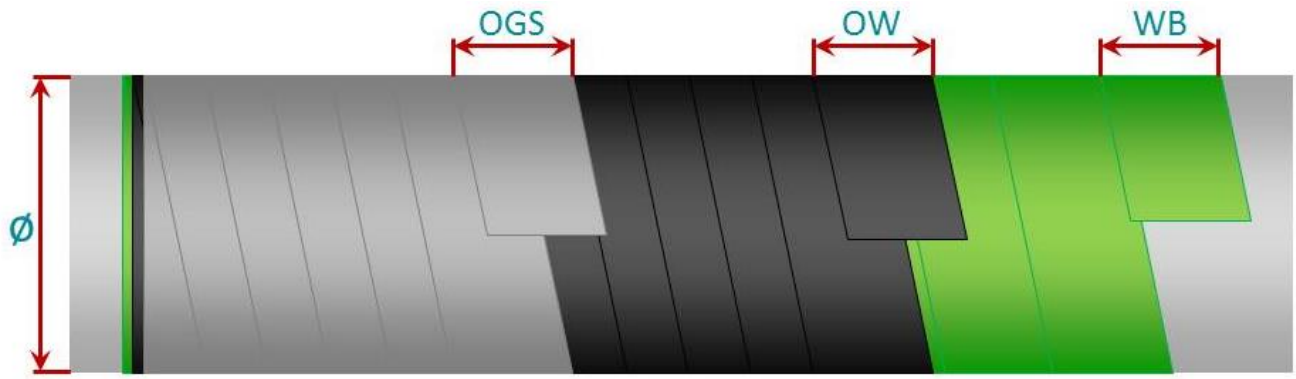
Spirally applied Wrappingband		
Pipe diameter	Width of Wrappingband to be used	Remark
< 6" (DN150)	50 mm	
≥ 6" (DN150)	100 mm	
≥ 36" (DN900)	200mm	With Wrappingmachine
Note: 200 and 300mm wide Wrappingband are too heavy to be manually spirally applied		

Straight applied Wrappingband		
Pipe diameter	Width of Wrappingband to be used	Remark
< 6" (DN150)	200 mm	
≥ 6" (DN150)	300 mm	
Note: For ease of application, use 200mm up to 6" (DN150) pipeline diameters		

Cigarette Wrap applied Wrappingband		
Pipe diameter	Width of Wrappingband to be used	Remark
½" (DN15)	100 mm	33 mm overlap
¾" (DN20)	100 mm	16 mm overlap
1" (DN25)	150 mm	45 mm overlap
1¼" (DN32)	150 mm	17 mm overlap
1½" (DN40)	200 mm	48 mm overlap

Outerwrap (Spirally applied only)		
Pipe diameter	Width of Outerwrap to be used	Remark
< 6" (DN150)	50 mm	
≥ 6" (DN150)	75 mm	
≥ 10" (DN250)	100 mm	
≥ 16" (DN400)	150 mm	
≥ 36" (DN900)	400 mm	With Wrappingmachine

Outerglass Shield XT (Spirally applied only)		
Pipe diameter	Width of Outerglass Shield to be used	Remark
< 10" (DN250)	4"	OGS applied with 50% overlap
≥ 10" (DN250)	6"	OGS applied with 50% overlap
≥ 16" (DN400)	8"	OGS applied with 50% overlap
< 8" (DN200)	4"	OGS applied with 66% overlap
≥ 8" (DN200)	6"	OGS applied with 66% overlap
≥ 12" (DN300)	8"	OGS applied with 66% overlap

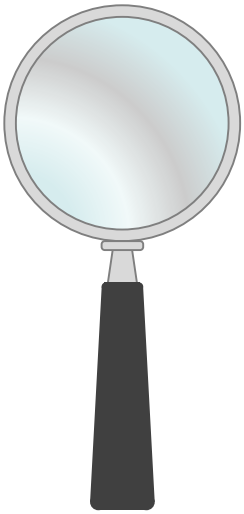


Holiday detection

On the “green” Stopaq materials with 15 kV (5kV + 5kV / mm).
A brush probe is recommended.

Visual Inspection

The appearance of the system must look smooth and tight and should be shaped around all details and into corners.



Exposure to loads

Objects coated with Stopaq materials should not be exposed to loads e.g. supports- or lifting equipment.

Immersion or burying

Immersion or burying is possible immediately after completion of the coating application if Outerwrap has been used.

Applications with High Impact Shield can be immersed or buried after the High Impact Shield has cooled down to ambient temperature.

When Outerglass Shield XT, Polyester, Vinyl ester and / or any topcoat have been used, Immersion or burying is possible after completion of curing.

Backfill

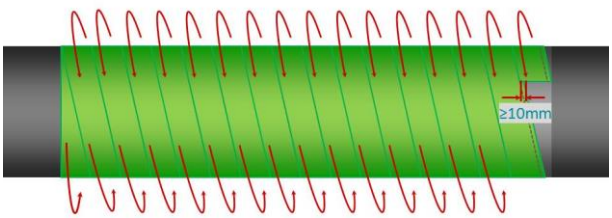
Backfill and compact with clean sand and filling material without sharp stones or hard lumps of soil, minimum 300mm around the object.

1

Ensure a proper surface preparation prior to the application of Wrappingband

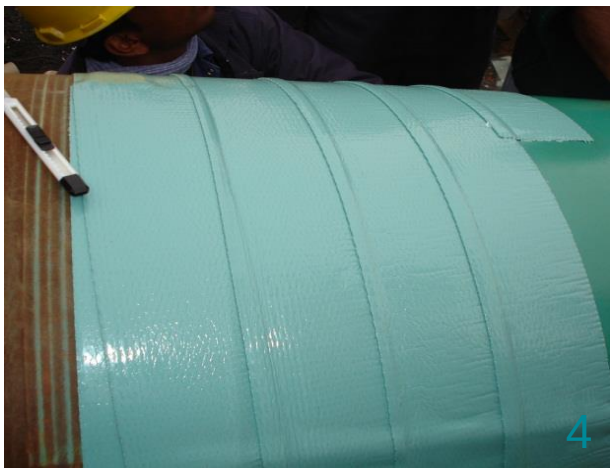
2

Start with one full straight circumferential wrap. Apply Wrappingband without air inclusions. Slight tension might be used.



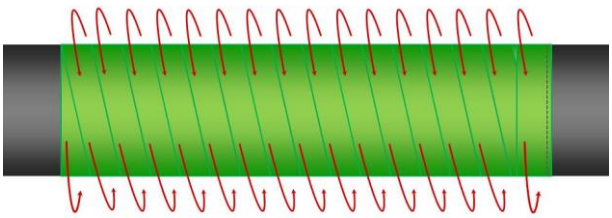
3

Continue spiral wrap application with a minimum side by side overlap of 10mm



4

Always work in a clean environment.

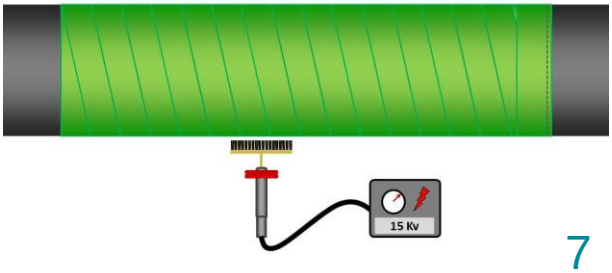


5

Continue until the entire area is covered with Wrappingband. When applied on a pipeline with factory applied coating, the Wrappingband should overlap the adjacent coating approx. 100mm.

6

Small folds can be repaired by moulding the Wrappingband firmly onto the surface pushing from centre to edge.

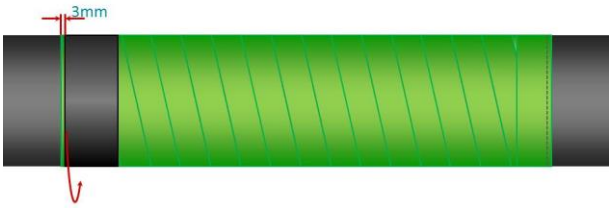


7

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

8

Always use approved and certified holiday test equipment.

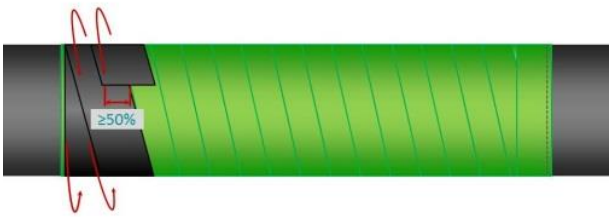


9

Start application of Outerwrap with 2 circumferential wraps. Apply Outerwrap with tension and avoid air inclusions. Work bottom to top on vertical pipelines.

10

When applied on a pipeline with adjacent factory applied coating, the Outerwrap may overlap the adjacent factory applied with at least 100mm in respect to Wrappingband.

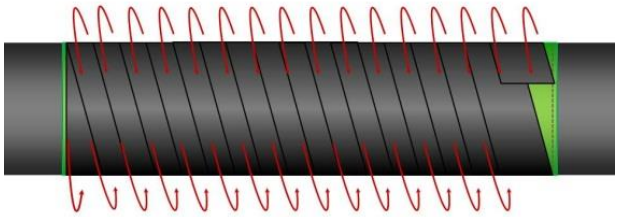


11

Continue spiral wrapping with a minimum overlap of minimum 50%.

12

When a new roll has to be used, overlap the previous applied Outerwrap at least 100mm. Continue application with minimum 50% overlap.

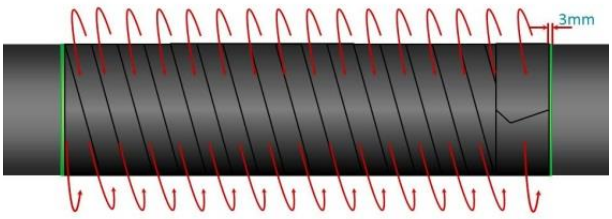


13

Continue until the entire area is covered with Outerwrap.

14

Outerwrap has to be applied with tension. An overlap more than 50% does not affect the coating performance of the system.



15

Finish with 2 straight circumferential wraps. The last 45 degrees of the Outerwrap should be applied without tension. Cut the end as a tie.

16

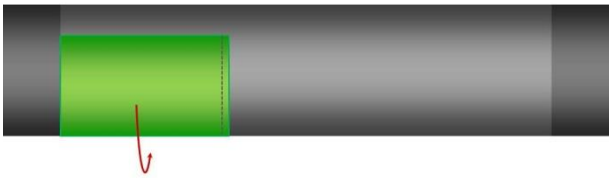
Finish with the Outerwrap facing downwards.

17

Conduct visual inspection to ensure that the entire area is covered with Outerwrap.

18

Backfill with clean sand. Backfill is possible immediately after application.

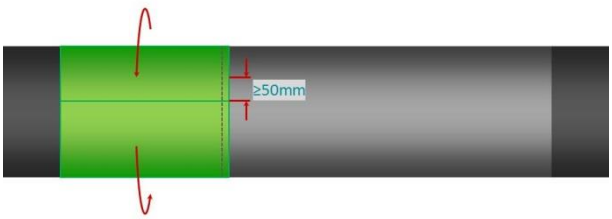


1

Ensure a proper surface preparation prior to the application of Wrappingband

2

Pre cut strips of Wrappingband with a length of the circumference of the pipe + an additional 50mm.

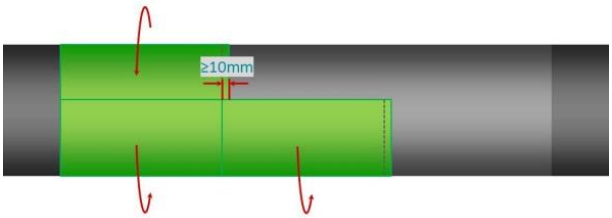


3

Apply the first straight wrap with minimum tension and avoid air inclusions.

4

The overlaps of the straight wraps must not be in line with the previous applied straight wrap, their position should alternate.

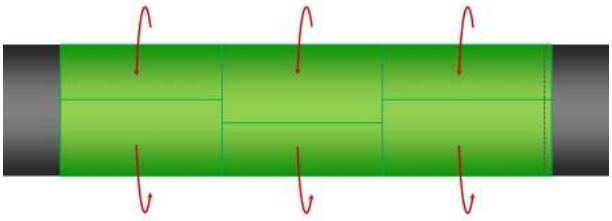


5

Apply the next wrap with a minimum side by side overlap of 10mm.

6

Check the adhesion of the Wrappingband regularly.

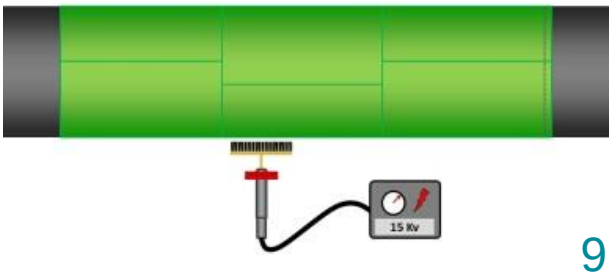


7

Continue until the entire area is covered with Wrappingband.

8

Do not walk on the applied Wrappingband.

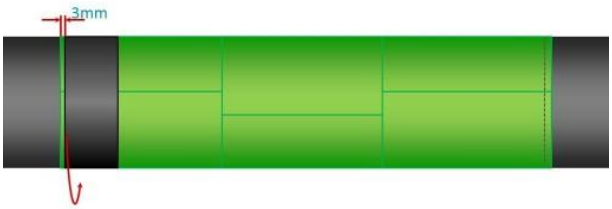


9

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

10

Always use approved and certified holiday test equipment.

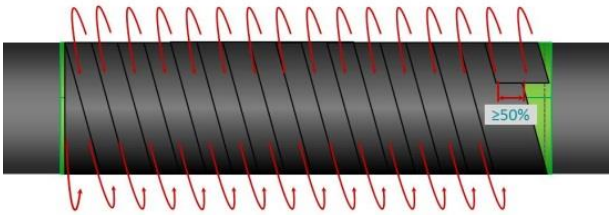


11

Start application of Outerwrap with 2 circumferential wraps. Apply Outerwrap with tension and avoid air inclusions. Work bottom to top on vertical pipelines.

12

When applied on a pipeline with a factory applied coating, the Outerwrap can overlap the adjacent factory applied coating minimum 100mm wider than the Wrappingband.

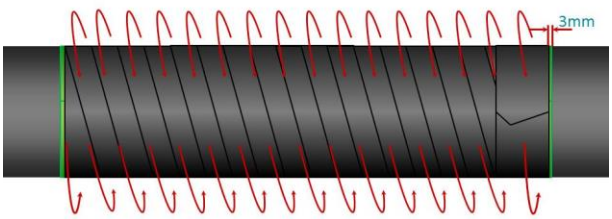


13

Continue spiral wrapping with a minimum overlap of 50%. Continue until the entire area is covered with Outerwrap.

14

When a new roll is used, overlap the previous applied Outerwrap at least 100mm. Continue application with minimum 50% overlap.



15

Finish with 2 straight circumferential wraps. The last 45 degrees of the Outerwrap should be applied without tension. Cut the end as a tie.

16

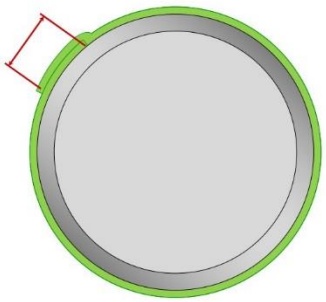
Outerwrap has to be applied with tension. An overlap of more than 50% does not affect the coating performance of the system. Finish with the Outerwrap facing downwards.

17

Conduct visual inspection to ensure that the entire area is covered with Outerwrap.

18

Backfill with clean sand. Backfill is possible immediately after application.

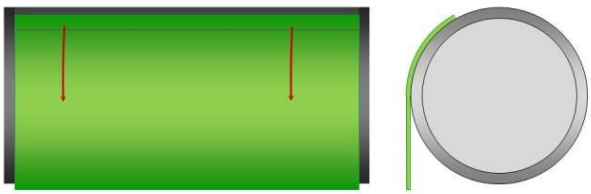


1

Ensure a proper surface preparation prior to the application of Wrappingband. The width of the Wrappingband according chapter “When to use which roll width”.

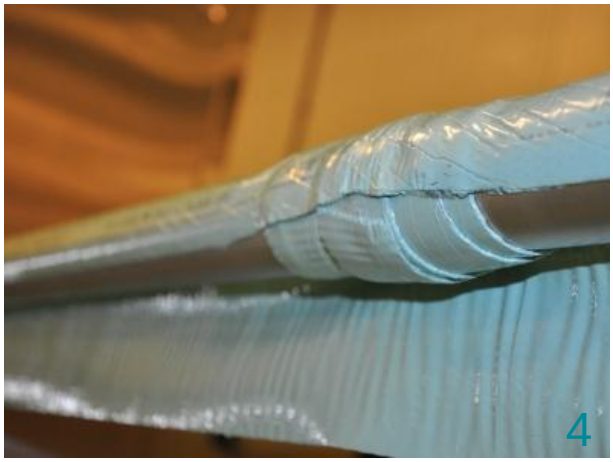
2

On the photo a joint in the pipeline is visible. Cigarette wrap can be applied on pipelines with and without joints.



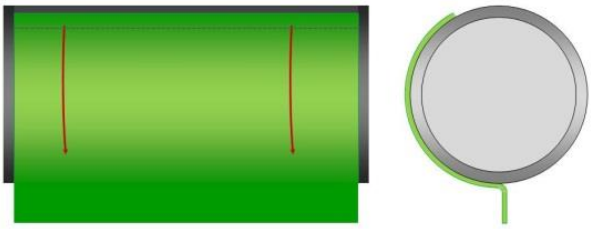
3

Apply a strip of Wrappingband on the pipe and press it firmly onto the surface over the first approx. 45 degrees. Be careful not to cut the strips too long because this may hamper ease of application.



4

Wrappingband has to be applied on the joint before the complete pipeline can be coated with Wrappingband.

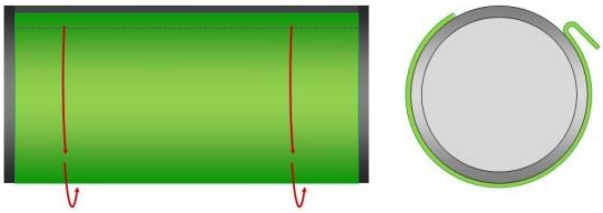


5

Press Wrappingband firmly on the surface without air inclusions. Work top to bottom.

6

Wrappingband can also be placed on top of the pipe. Prevent both sides of the Wrappingband from sticking to each other. Prevent air inclusions.

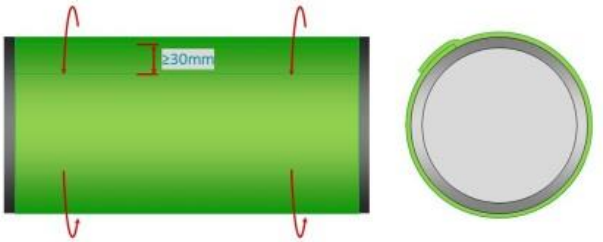


7

Press Wrappingband firmly onto the surface.

8

Make sure that the Wrappingband is pressed on the pipe equally over the full length of the strip to avoid air inclusions.

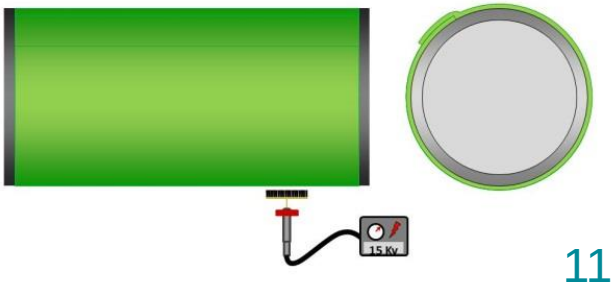


9

Continue application until the Wrappingband fully covers the pipe surface without air inclusion. Check the adhesion on both ends of the Wrappingband.

10

Cigarette wrap application can be used on small pipelines which are difficult to coat by spiral wrapping technique.

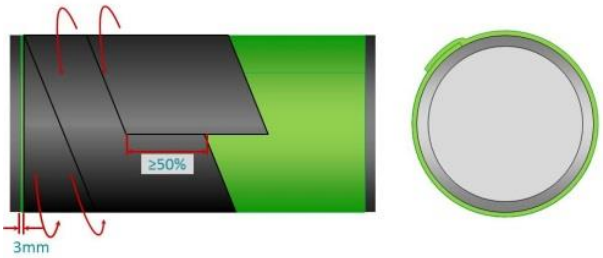


11

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

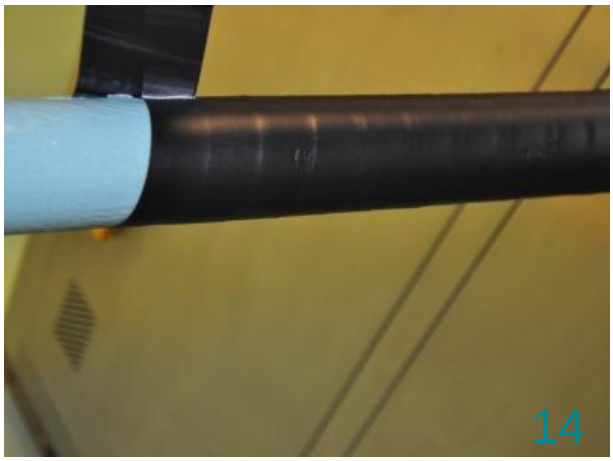
12

Always use approved and certified holiday test equipment.



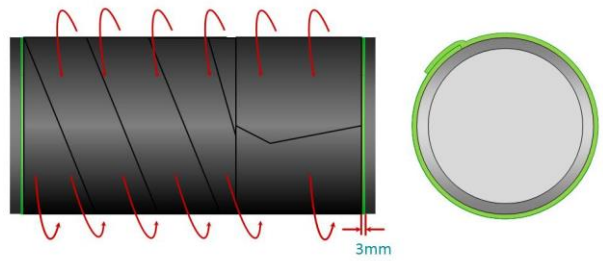
13

Start with 2 circumferential wraps and apply Outerwrap with tension and avoid air inclusions. Continue spiral wrap with an overlap of minimum 50%.



14

Do not use large width rolls of Outerwrap.

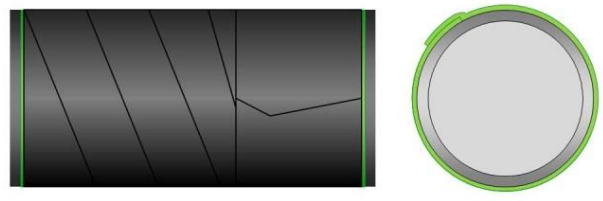


15

Finish with 2 straight circumferential wraps. The last 135 degrees of the Outerwrap should be applied without tension. Cut the end as a tie.

16

Outerwrap must be applied from bottom to top on diagonal or vertical pipelines.



17

Conduct visual inspection to ensure that the entire area is covered with Outerwrap.

1

Ensure a proper surface preparation prior to the application of Wrappingband. Start with a strip of Wrappingband over the longitudinal weld.

2

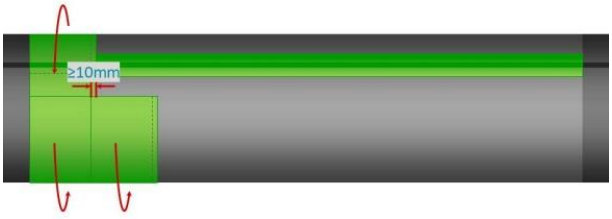
Check the adhesion of Wrappingband on a regular base during application.

3

Start with a circumferential wrap.

4

Wrappingband can be applied with straight wraps or spiral wraps.

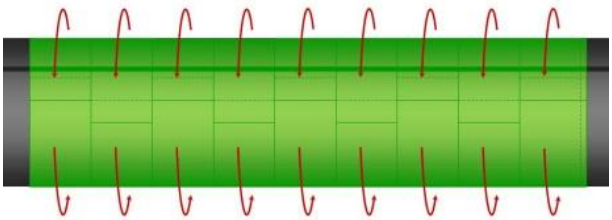


5

Continue application with a side by side overlap of at least 10mm.

6

Apply Wrappingband with minimum tension and avoid air inclusions.

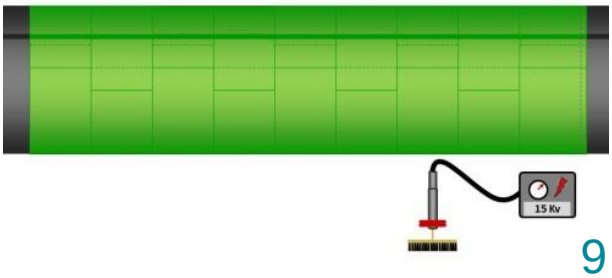


7

Continue application until the entire area is covered with Wrappingband.

8

Do not walk on the applied Wrappingband.

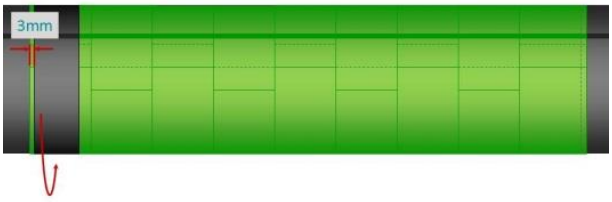


9

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

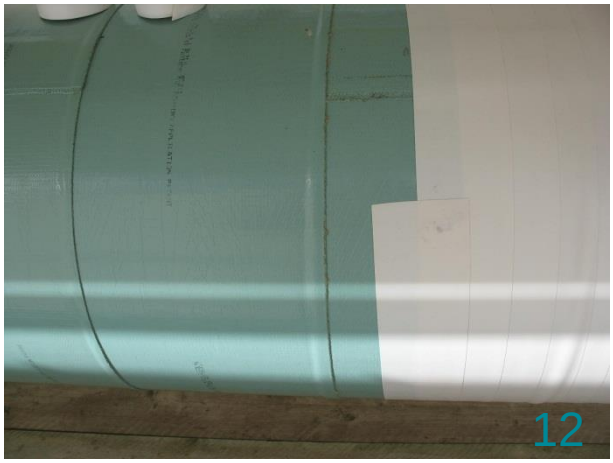
10

Always use approved and certified holiday test equipment.

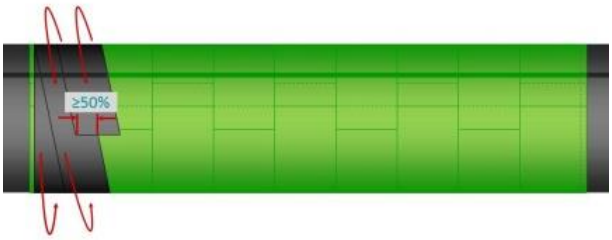


11

Start application of Outerwrap with 2 circumferential wraps. Apply Outerwrap with tension and avoid air inclusions. Work bottom to top on vertical pipelines.



12

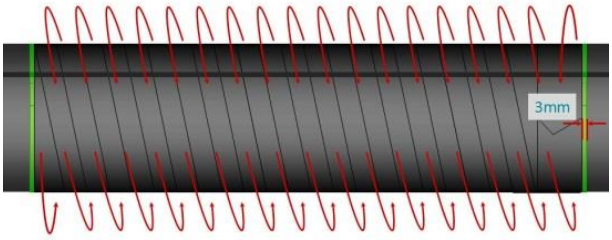


13

Continue spiral wrapping with a minimum overlap of at least 50%. Continue until the entire area is covered with Outerwrap.

14

When a new roll has to be used, overlap the previous applied Outerwrap at least 100mm. Continue application with minimum 50% overlap.



15

Finish with 2 straight circumferential wraps. The last 45 degrees of the Outerwrap should be applied without tension. Cut the end as a tie.

16

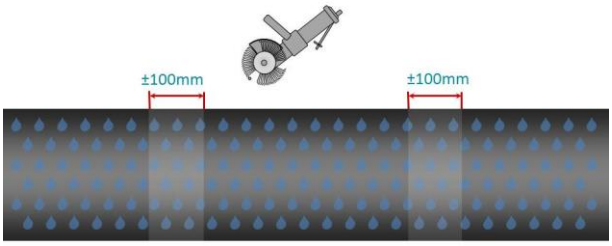
Outerwrap has to be applied with tension. An overlap of more than 50% does not affect the coating performance of the system. Finish with the Outerwrap facing downwards.

17

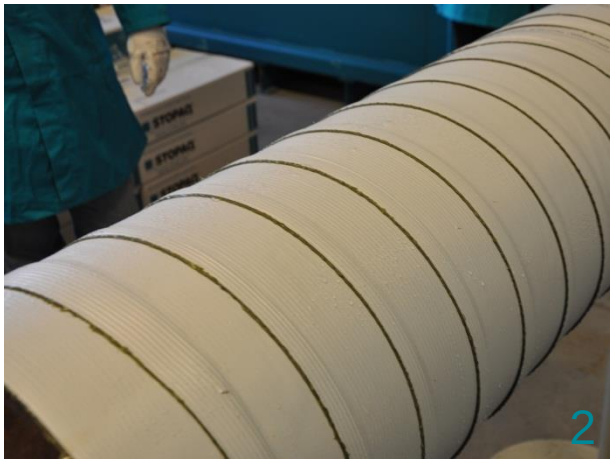
Conduct visual inspection to ensure that the entire area is covered with Outerwrap.

18

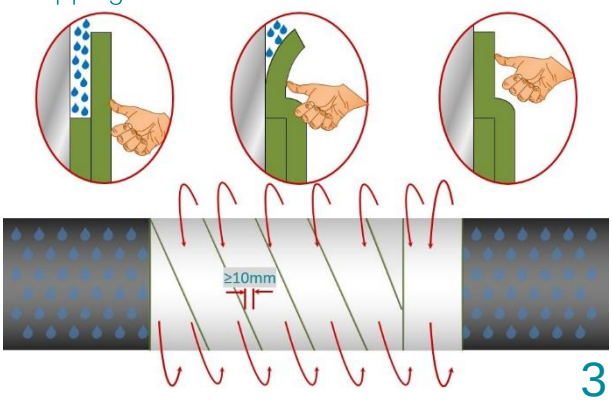
Backfill with clean sand. Backfill is possible immediately after application.



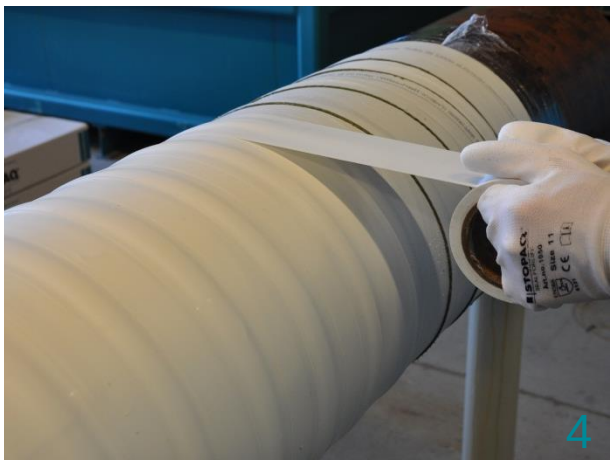
Clean 2 circumferential bare metal rings of 100mm wide at both extremities of the area to be coated with Wrappingband CL. Rinse the pipe with clean water. Ensure a proper surface preparation, minimum St2-St3, prior to the application of Wrappingband CL.



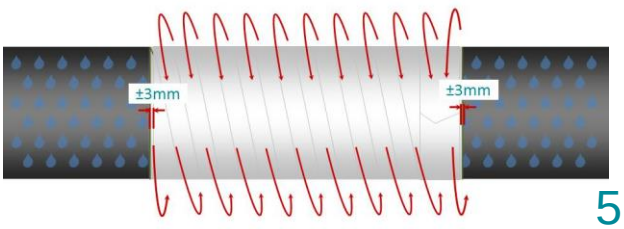
Start and finish with a straight circumferential wrap. Wrappingband CL shall be applied with tension.



Apply Wrappingband CL with a minimum overlap of 10mm. Avoid air and water inclusion by pressing the material firmly onto the surface and on the seam of the overlap. Do not remove the white backing foil, remove the transparent release foil only.

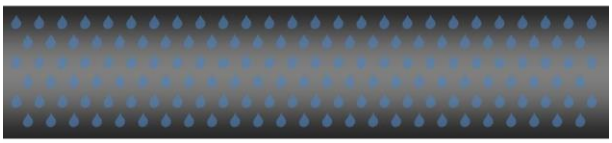


Conduct visual check to make sure that the entire area is covered with Wrappingband CL.



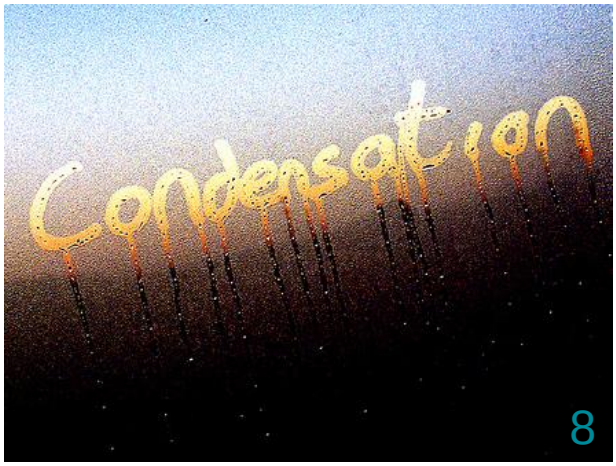
Start the application of Outerwrap with 2 straight circumferential wraps with tension. Continue with a minimum overlap of 50%. End with 2 circumferential wraps. keep 3mm of Wrappingband CL visible on both sides.

Outerglass Shield can be applied for extra mechanical protection, see specific chapter for instructions.

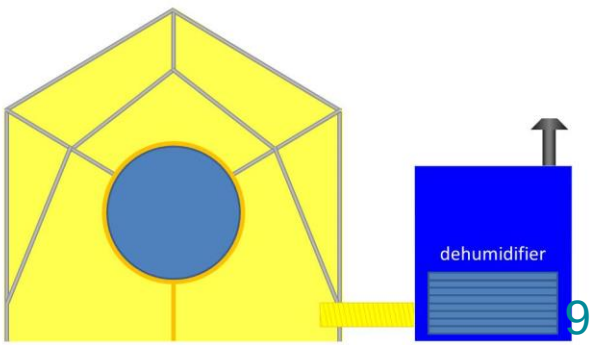


7

If the use of Wrappingband CL is not approved by the client, the condensing line can be dried by using an shelter with ground cloth and air supply by dehumidifier.



8

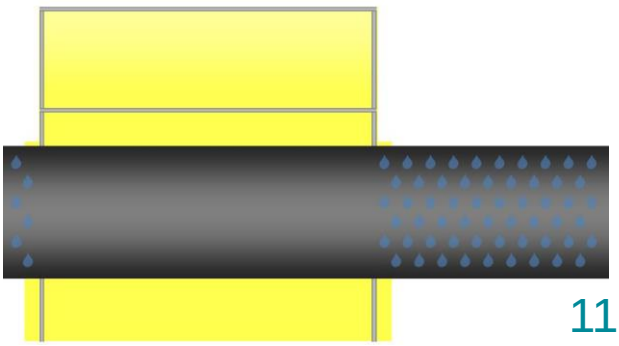


9

Install shelter with ground cloth around the pipe.

10

Dew point will decrease and therefore the pipe will become dry by supplying dehumidified air into the shelter.



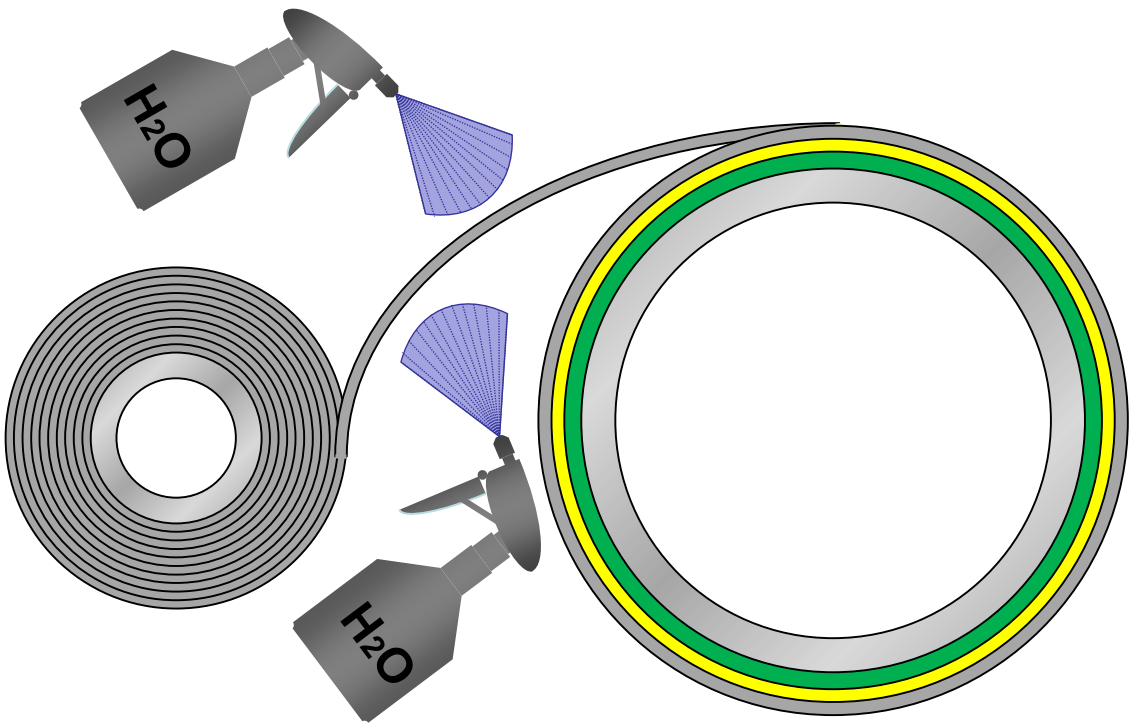
11

The pipe can be coated with Wrappingband CZ or CZH when the pipe surface is minimum 3°C above dew point.

12

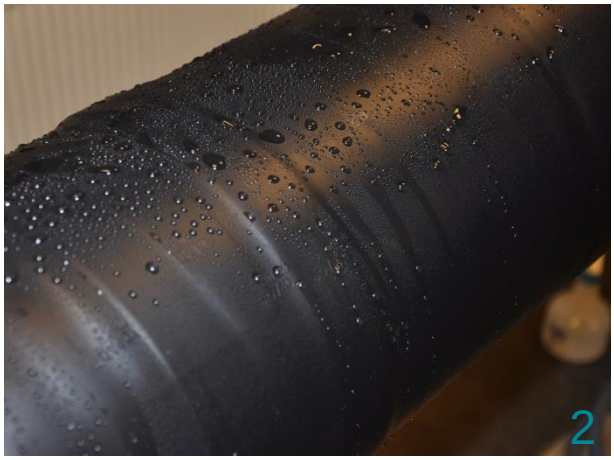
General information about the application of Outerglass Shield XT.

- The pouches of Outerglass Shield XT shall be opened one at a time and just prior to application. Once a pouch is opened, the curing reaction with moisture present in air or water will start immediately.
- The Outerglass Shield XT shall be applied within the working time indicated, including application of compression foil and perforation.
- Do not cover large surfaces at once, since Outerglass Shield XT needs to be compressed immediately after application with compression foil.
- Always apply and perforate compression foil well within the curing time of Outerglass Shield XT.
- In case overlapping existing Outerglass Shield XT, it shall only be applied on fully cured Outerglass Shield XT and after the compression foil has been removed and the surface has slightly been abraded.
- Continuous wetting of Outerglass Shield XT during application is required.
- Consult Safety Data Sheet and Product Data Sheet for appropriate personal safety measures, personal protective gear, application conditions etc.



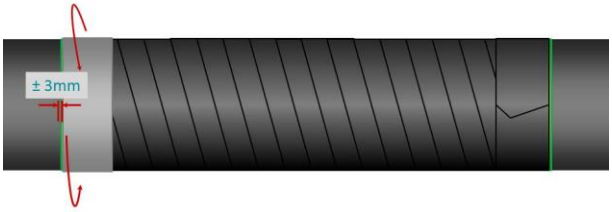
1

Prior to the application of Outerglass Shield XT the pipeline should be coated with Wrappingband and Outerwrap or High Impact Shield.



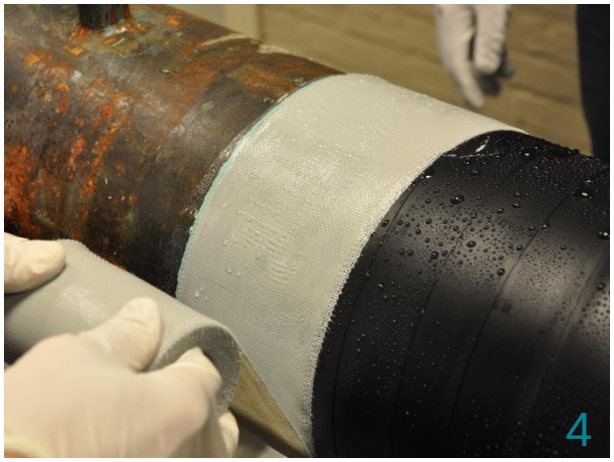
2

Clean and wet the surface. Open the pouches of Outerglass Shield XT just before application.



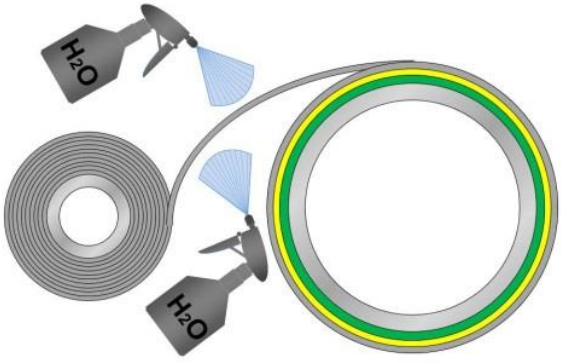
3

Start with 2 circumferential wraps. Overlap according to client specification. Outerglass Shield XT has a limited application time after the pouches are opened.



4

To increase the application time, the pouches with Outerglass Shield XT can be cooled down in iced water.



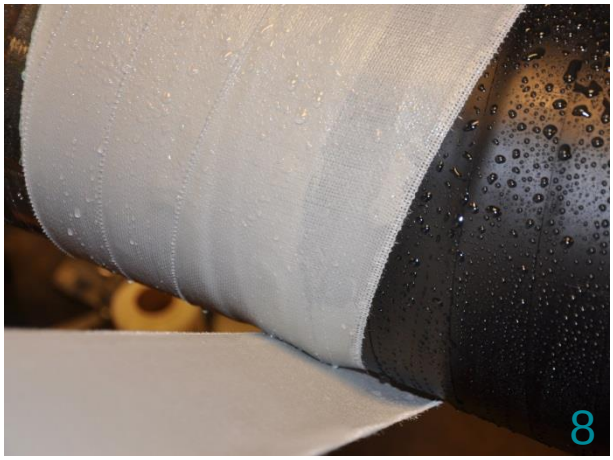
5

During application Outerglass Shield XT should be wetted by spraying with water.

6

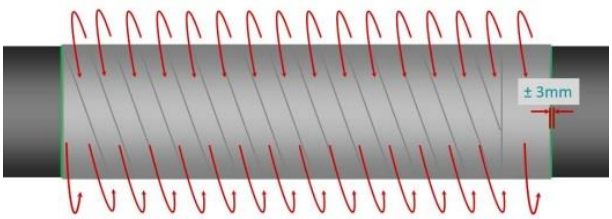
7

Apply Outerglass Shield XT with tension and a minimum overlap of 50%.



8

Use appropriate gloves during the application.

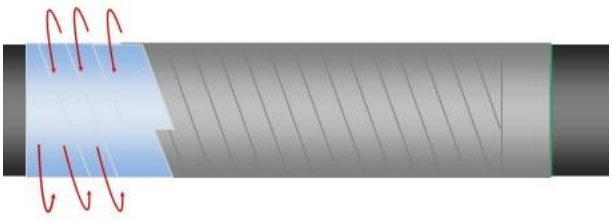


9

Continue application until the entire area is covered. Keep wetting the Outerglass Shield XT. Finish with 2 straight circumferential wraps.

10

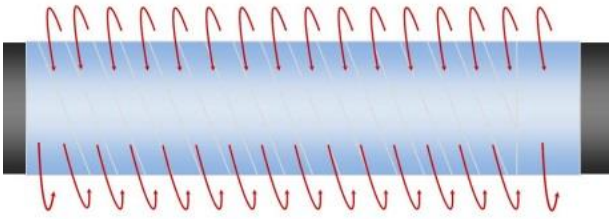
If necessary, extra layers or more overlap, for example minimum 66% to apply 3 layers Outerglass Shield XT can be wrapped in case additional mechanical strength is needed.



11

Wrap compression foil immediate after installation of Outerglass Shield XT. Start beyond the extremity of Outerglass Shield and wrap with tension.

12

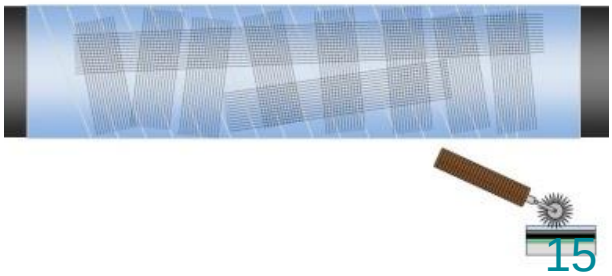


13

Wrap compression foil in the same wrapping direction as the Outerglass Shield XT.

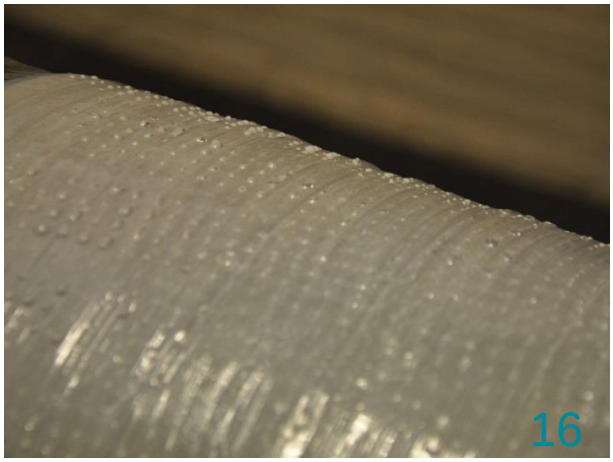
14

Finish beyond the extremity of Outerglass Shield XT.



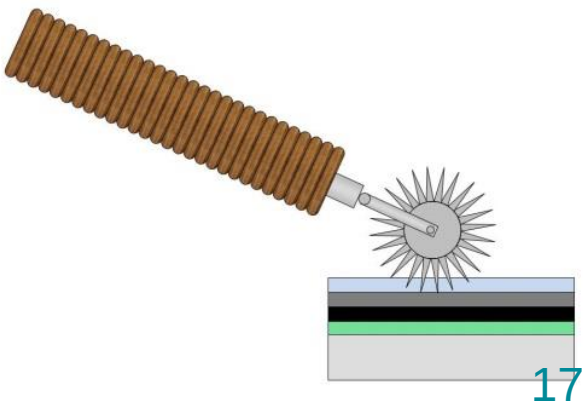
15

Compression foil has to be applied within the application time of Outerglass Shield XT.



16

Check if the Outerglass Shield XT is completely covered with compression foil.

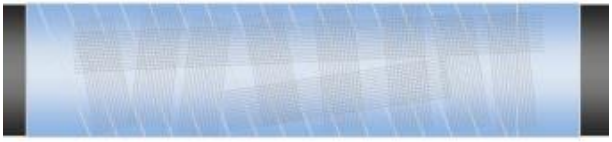


17

Use puncture roller to cautiously perforate the compression foil.

18

Only perforate the compression foil, do not perforate the Outerglass Shield XT, Outerwrap and Wrappingband.

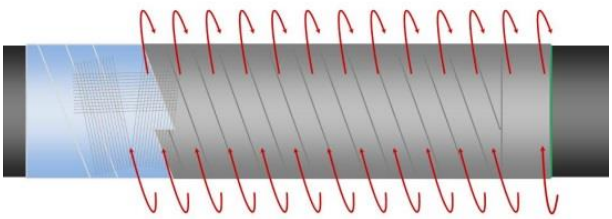


19

During the curing of the Outerglass Shield XT, some resin might be visible through the perforations.

20

Curing time is depending on temperature and amount of layers of Outerglass Shield XT.

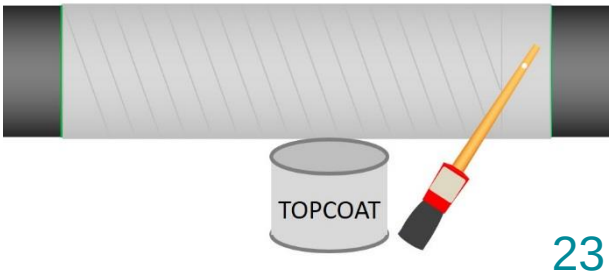


21

Remove compression foil after the Outerglass Shield XT is cured e.g. in order to enable application of additional top coatings.

22

The coating performance will not be influenced when the compression foil is not removed.



23

Outerglass Shield XT has to be painted with an UV resistant topcoat for above ground applications.

24

Backfill with clean sand. Backfill is possible immediately after the Outerglass Shield XT has cured.

General information about the application of Polyester.

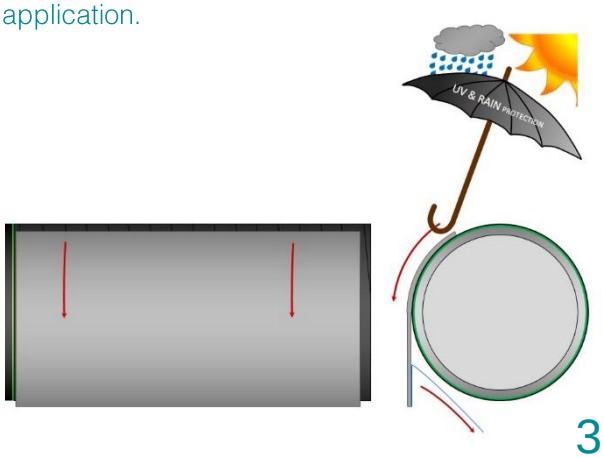
- Polyester cures with UV light. Therefore, ensure a work environment sheltered from direct sunlight and rain at all times, until the Compression Tape has been installed.
- Application of Polyester in direct sunlight will decrease the curing time.
- Polyester shall be taken out of the UV-resistant bags just prior to application.
- Cutting the Polyester to size shall NOT be done when directly exposed to UV light.
- Immediately after cutting, the pre-cut material and master roll shall be covered by the original black foil to avoid that the product starts curing.
- The light blue release liner is on the inside of the Polyester , the transparent release liner on the outside.
- Do not cover large surfaces at once, since Polyester needs to be covered well within curing time with Compression Tape.
- Polyester and the substrate must not get wet before and during the application and curing process.
- Overlapping over previous applied Polyester shall always be done on non-cured Polyester with the outer release liner being removed.
- Consult Safety Data Sheet and Product Data Sheet for appropriate personal safety measures, personal protective gear, application conditions etc.

1

Polyester and Compression Tape to be applied on a pipeline coated with Wrappingband and Outerwrap for extra mechanical protection. Ensure a proper surface preparation prior to the application.

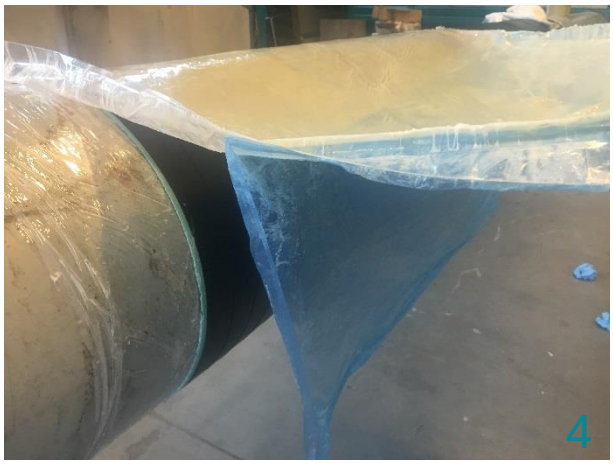
2

Always work in a work environment sheltered from direct sunlight and rain until the Compression Tape has been applied.



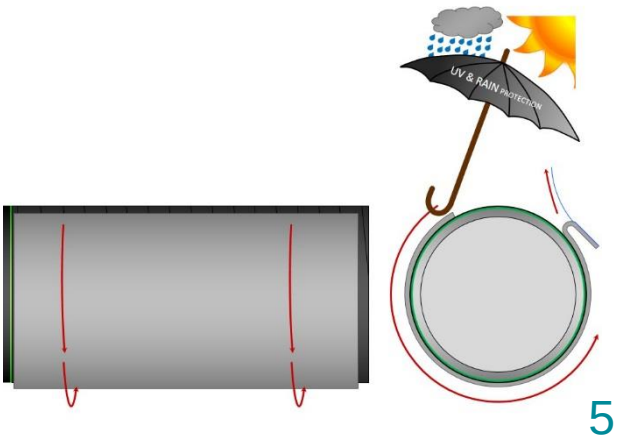
3

The length of the strip Polyester shall be minimum 50mm longer as the circumference of the pipe. Measure the length without removing any of the release liners.



4

Fold back approx. 50mm of the Polyester and remove 50mm. Of the blue release liner, which is on the inside. Stick the Polyester on the pipe and remove the release liner during the application.

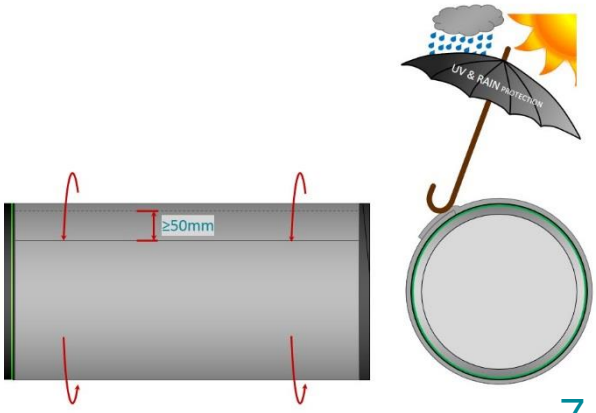


5

Continue with this procedure.

6

It is advised that the Polyester is being applied with minimum 2 applicators, 1 on each side of the pipe.

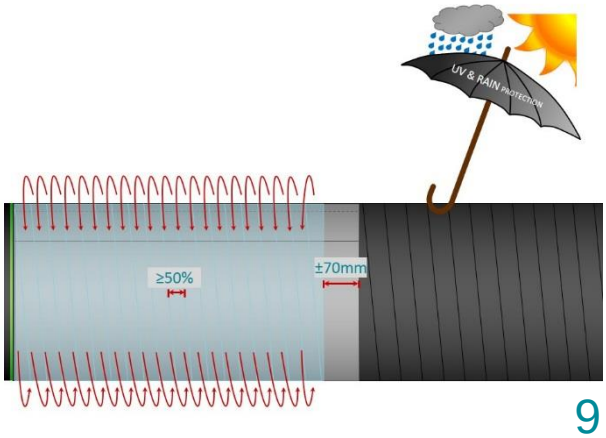


7

At the end of the wrap, pull back a sufficient length of the outer release liner and finish the straight wrap of Polyester.

8

Fold back the length of outer release liner.

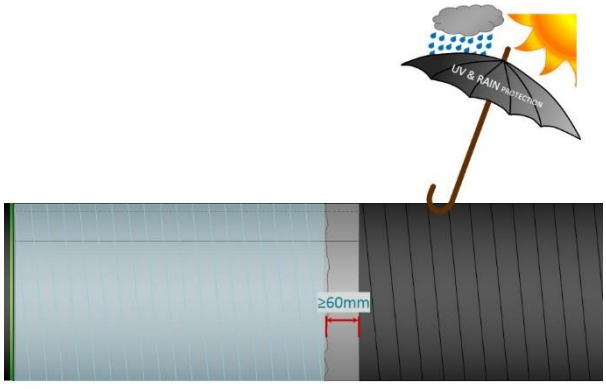


9

Apply Compression Tape immediate after completing the straight wrap. Keep approx. 70mm Polyester uncovered if more wraps of Polyester are needed.

10

Apply with tension and a minimum overlap of 50%. If there are no more wraps of Polyester needed, apply Compression Tape over the entire area.

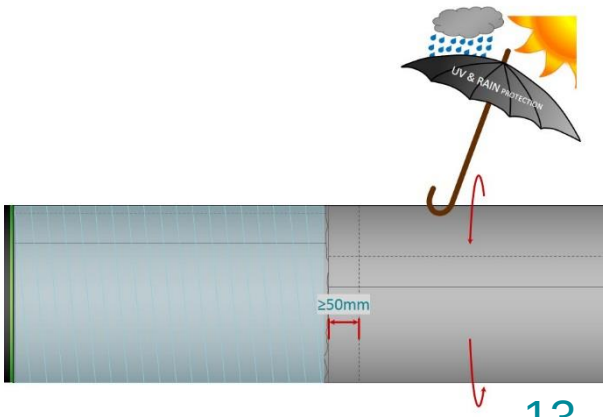


11

Remove minimum 60mm of the outer release liner.

12

…

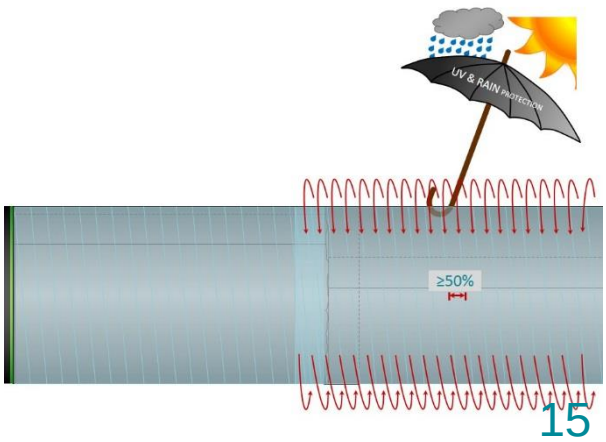


13

Apply the next wrap of Polyester with the same procedure, overlapping the previous applied wrap with minimum 50mm.

14

Do not apply Polyester over the outer release liner. Ensure that all the outer release liner of the previous applied wrap has been removed

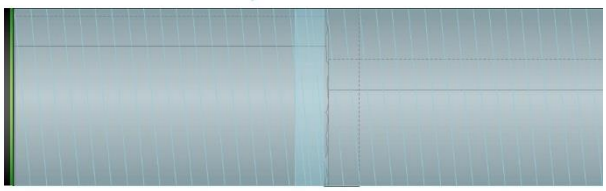


15

Apply Compression Tape immediate after completing the straight wrap. Keep approx. 70mm Polyester uncovered if more wraps of Polyester are needed.

16

Apply with tension and a minimum overlap of 50%. If there are no more wraps of Polyester needed, apply Compression Tape over the entire area.



17

Polyester will cure by sunlight. When natural light is not sufficient, UV/A lamps and reflective mirrors shall be used.

18

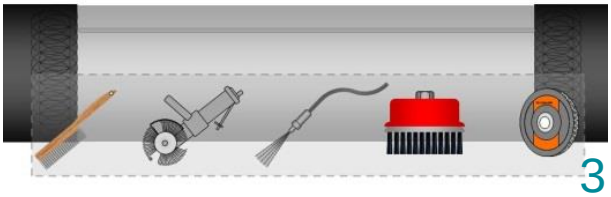
…

1

Damaged area to be coated with Wrappingband and Outerwrap.

2

All loose coatings must be removed.

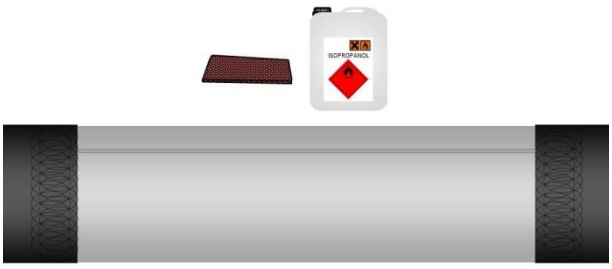


3

Prepare entire surface according to Stopaq or client specifications.

4

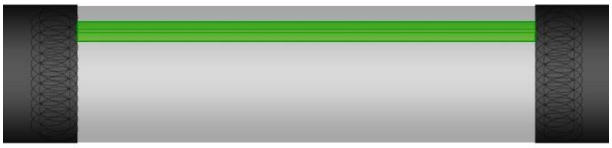
Ensure a clean work environment.



5

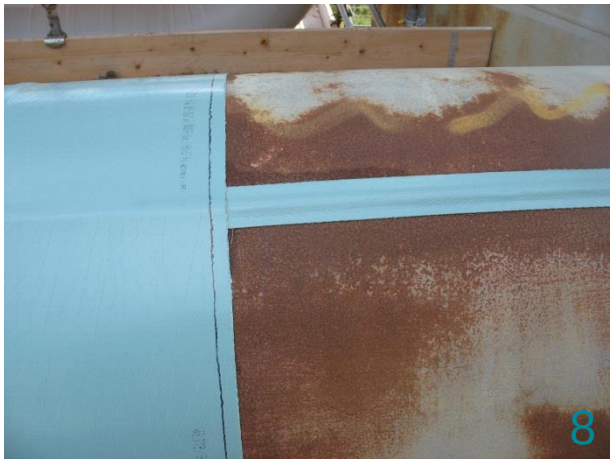
Degrease with Isopropyl Alcohol. Do not use any thinner.

6



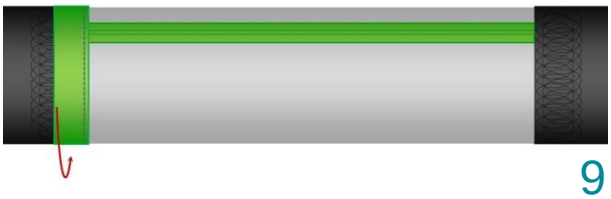
7

When a longitudinal or spiral weld is present, start with a strip of Wrappingband over the longitudinal or spiral weld.



8

Frequently check the adhesion of Wrappingband during application.



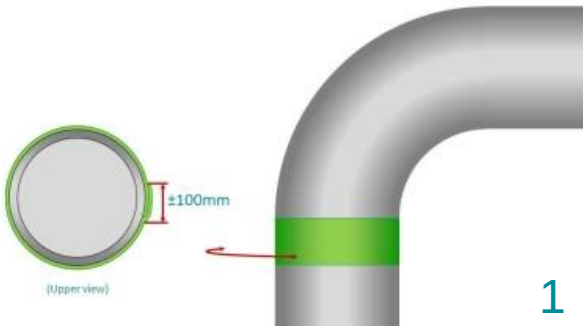
9

Start with a circumferential wrap overlapping the remaining factory applied coating with at least 100mm.

10

Wrappingband can be applied with straight wraps or by spiral wrapping, see specific chapter for instructions.

For the rest of the application, please check chapter 5 or 6.

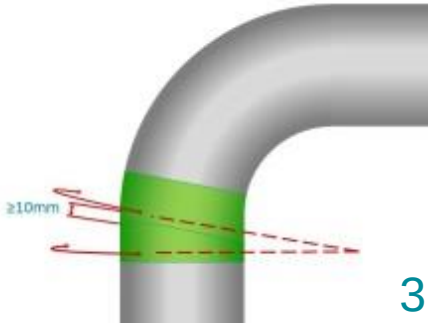


1

Ensure a proper surface preparation prior to the application of Wrappingband. Pre cut strips of Wrappingband corresponding to the pipeline circumference + approx. 100mm on larger diameter pipelines and approx. 50mm on smaller diameter pipelines.


2

Wrap the strips around the pipe with slight tension and avoid air inclusions. Work bottom to top on vertical pipes.

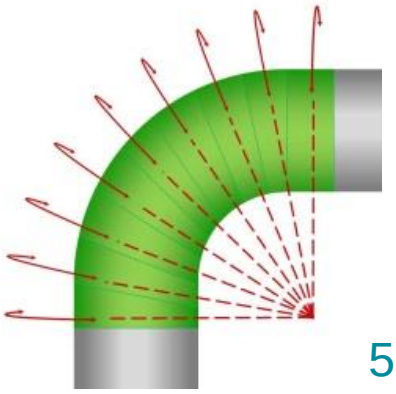


3

The overlap must be at least 10mm on the outer radius of the elbow. Apply the Wrappingband towards the centre of the elbow radius.


4

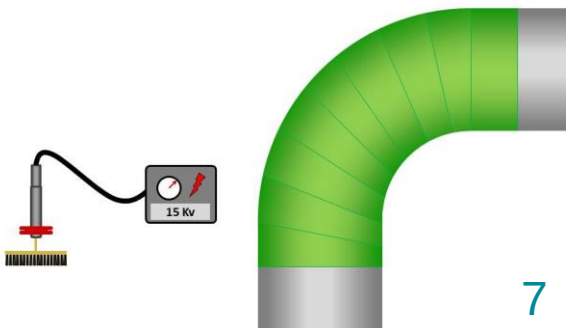
The overlap will increase on the inside of the elbow.


5

Continue until the entire area is covered.


6

…

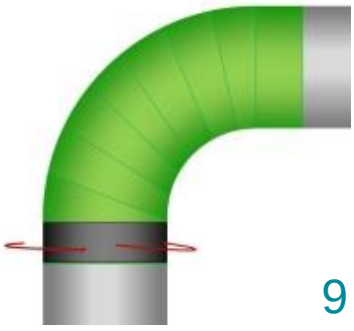


7

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

8

Always use approved and certified holiday test equipment.

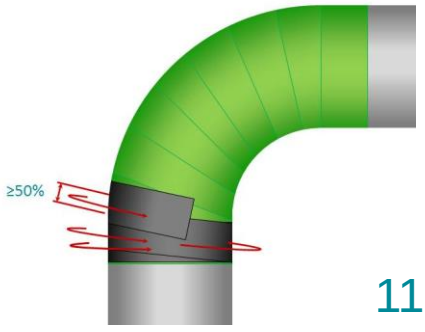


9

Start with 2 circumferential wraps of Outerwrap. Work bottom to top and keep 3mm of Wrappingband visible at the extremity.

10

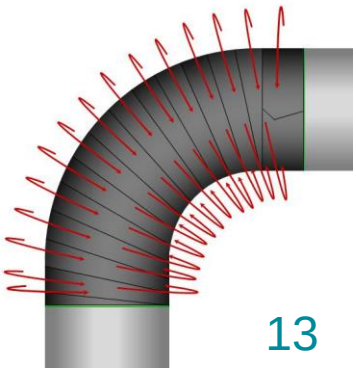
Apply Outerwrap with tension and avoid air inclusions.



11

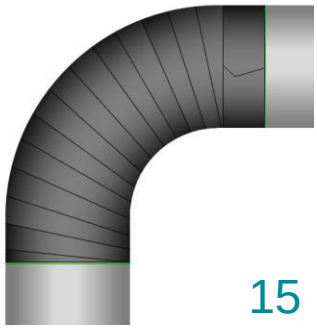
Continue with spiral wrap towards the centre of the elbow. The overlap must be 50% on the outer radius of the elbow. The overlap will increase towards the inside of the elbow.

12


13

Continue until the entire elbow is covered. keep 3mm of Wrappingband visible at the extremity.

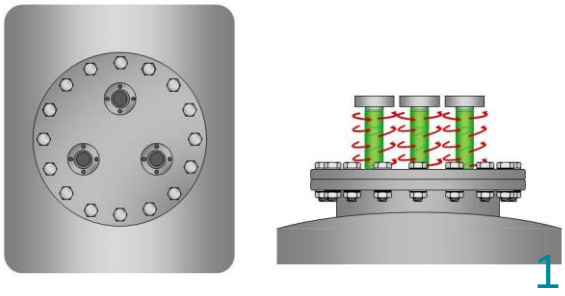

14


15

Conduct visual inspection to ensure that the entire area is covered with Outerwrap.

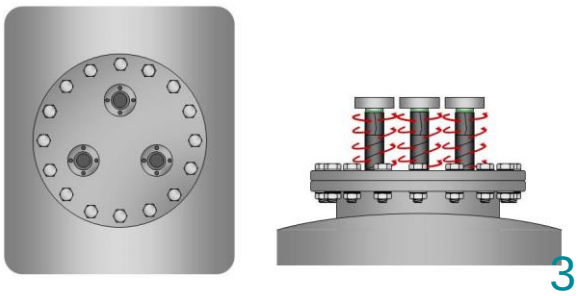

16


17



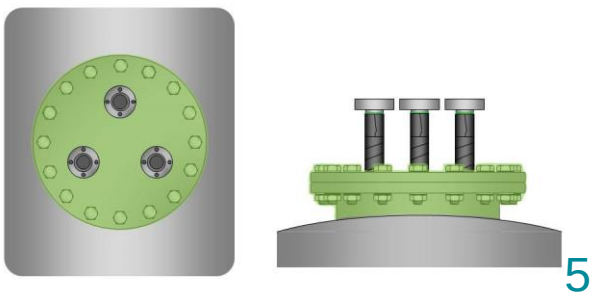
When present, small risers have to be coated with Wrappingband. This can be done with straight wraps, spiral wrap or cigarette wrap, see specific chapter for instructions.

Ensure a proper surface preparation prior to the application of 4100 Putty.

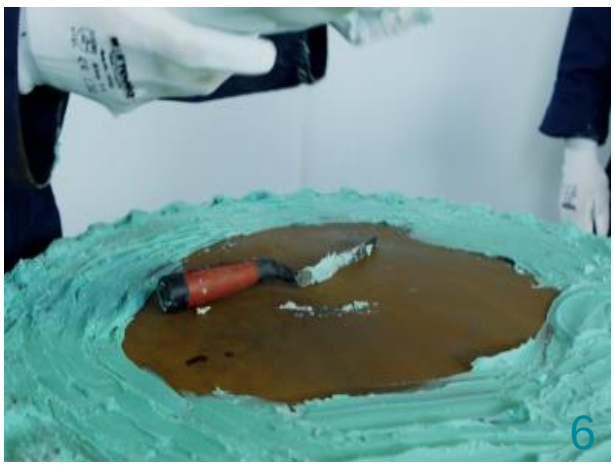


Apply Outerwrap according chapters 5, 6 or 7.

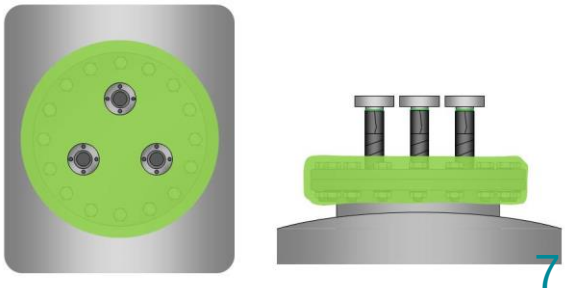
Apply a thin layer of 4100 Putty on the entire area around the bolts.



Also apply 4100 Putty on top of the manhole cover. Check the adhesion of the Putty frequently.

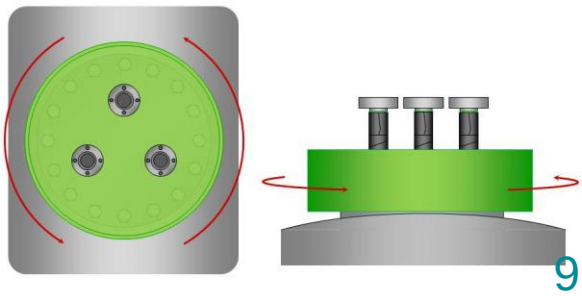


Continue until the entire area is covered with 4100 Putty.

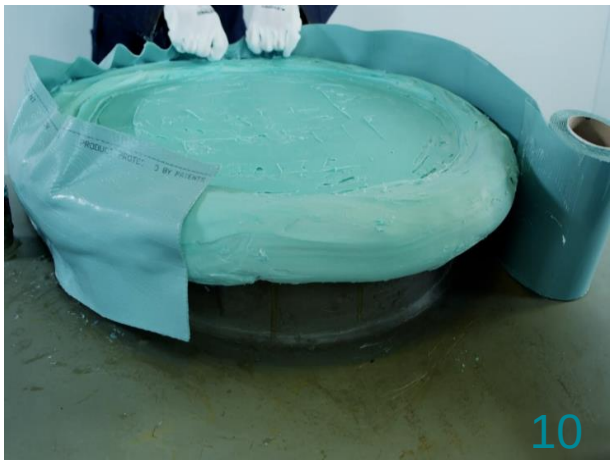


Fill the entire manhole cover with a thick layer of 4100 Putty.

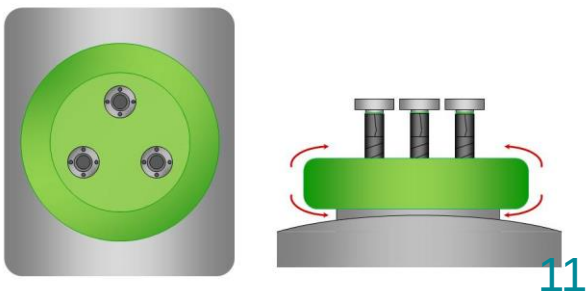
A putty knife can be used to smoothen the 4100 Putty.



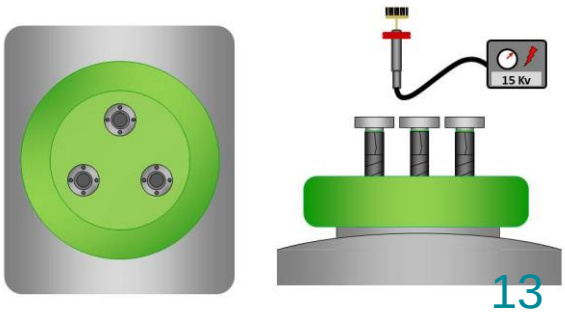
Apply a circumferential wrap of Wrappingband around the manhole cover. Circumferential overlap should be at least 150mm.



The Wrappingband will not adhere to the 4100 Putty. The width of the Wrappingband should be such that the bolts and nuts are covered.



Fold the Wrappingband tightly over the manhole cover.

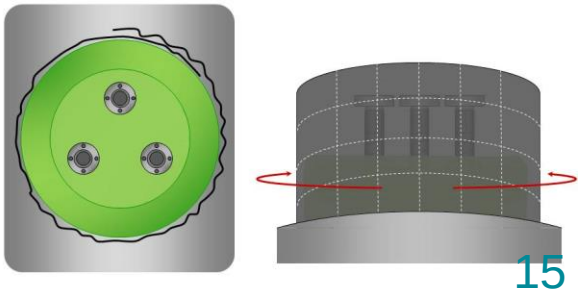


13

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband and 4100 putty prior to the application of any additional layers. The test must be carried out at a minimum of 15kV.


14

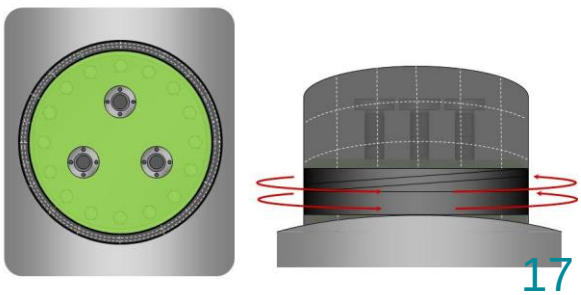
Always use approved and certified holiday test equipment.


15

Pre cut a strip of Geotextile with a length of the circumference of the manhole cover + minimum 200mm.

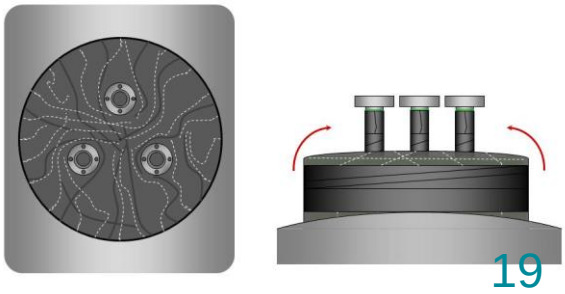

16

Put the geotextile around the manhole cover.


17

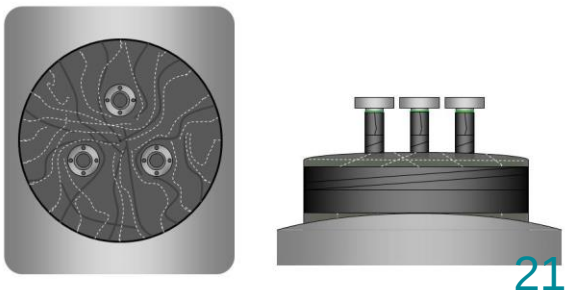
Wrap Outerwrap tightly around the manhole cover until the geotextile is tight in place.

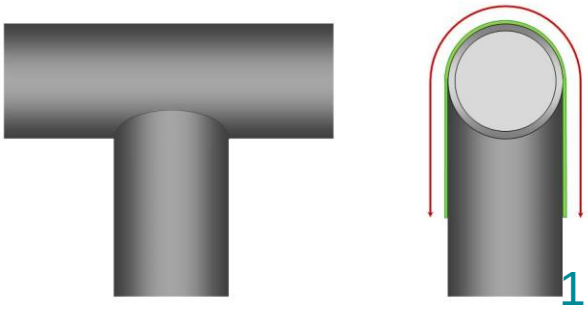

18



Fold the Geotextile over the manhole cover and push it gently into the 4100 Putty.

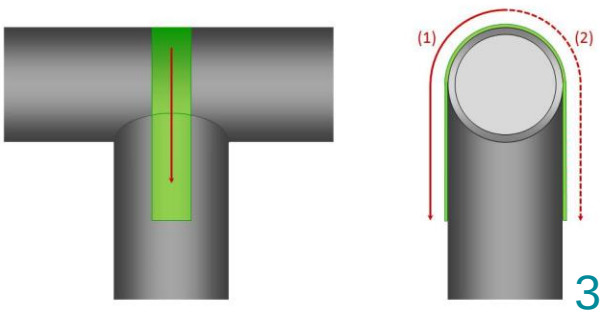
Strips of Outerwrap can be applied over the Geotextile.



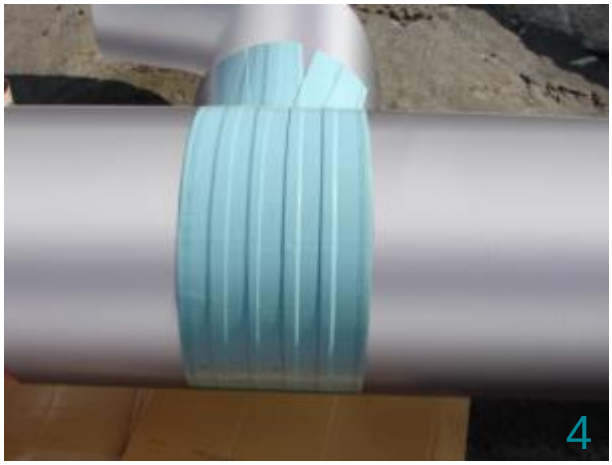


Ensure a proper surface preparation prior to the application of Wrappingband. Pre cut strips of Wrappingband with sufficient length as shown in the drawing above.

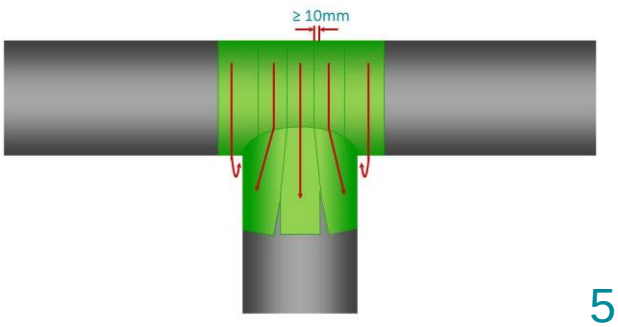
If a longitudinal weld is present it should be covered with a strip of Wrappingband.



Remove the release foil until halfway on the strip of Wrappingband, apply the Wrappingband on top of the T-Joint and apply the material without tension and avoid air inclusions onto the surface.

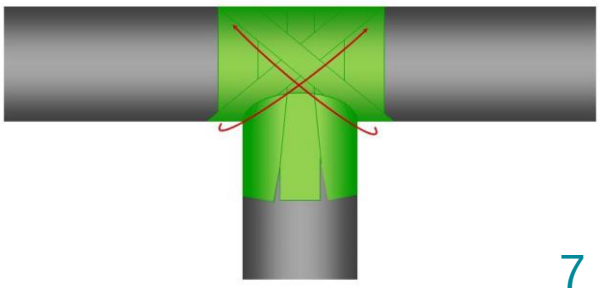


Remove the remaining piece of release foil and apply the Wrappingband without tension.



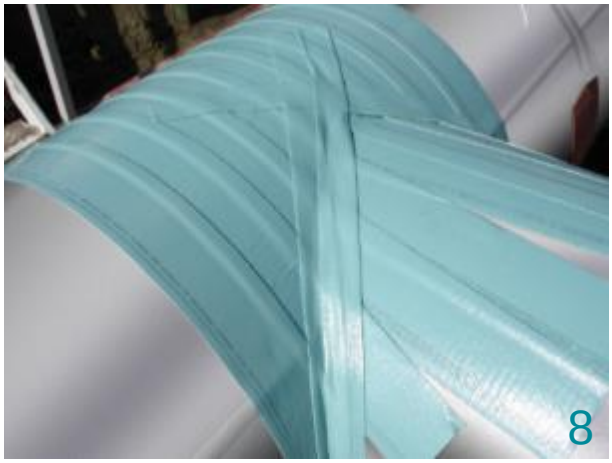
Apply adjacent strips of Wrappingband with a minimum overlap of 10mm on top of the T-Joint. The Wrappingband will diverge on the branch pipe section.

Continue until the total width of the applied Wrappingband is more than the diameter of the branched pipe.



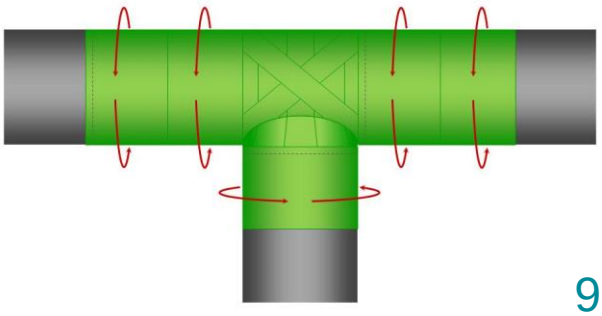
7

Apply 2 strips of Wrappingband through the corner of the T-Joint. These strips must be applied with tension.



8

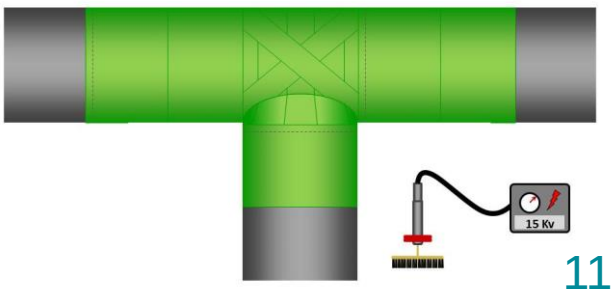
Several strips might be needed on larger diameter T-Joints.



9

Apply Wrappingband on all pipe sections. Start touching the T-Joint. Total area to be coated depends on customer specifications.

10

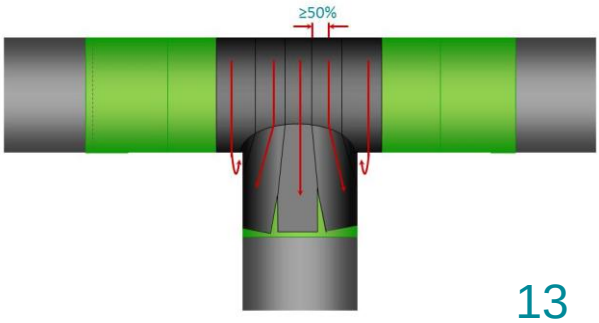


11

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

12

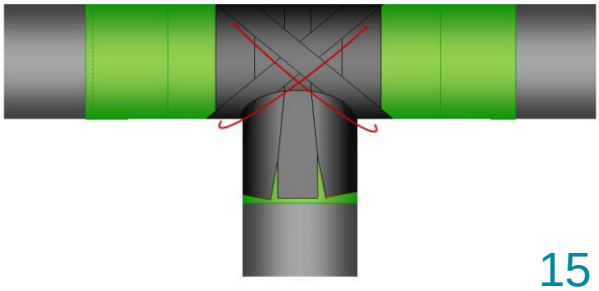
Always use approved and certified holiday test equipment.



13

Apply strips of Outerwrap on the T-Joint following the same procedure as with Wrappingband. Apply a minimum overlap of 50% on the top of the T-Joint. Apply without tension.

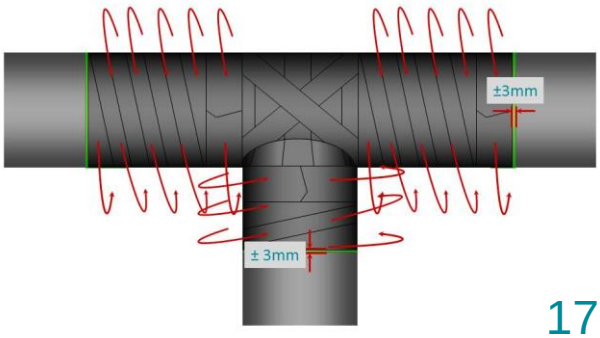
14



15

Apply 2 strips of Outerwrap with tension through the corner of the T-Joint.

16

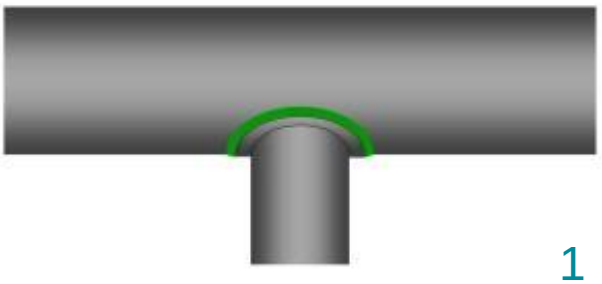


17

Apply Outerwrap on the pipes with tension, minimum 50% overlap and without air inclusions.

Keep 3mm Stopaq Wrappingband visible on all sides.

18

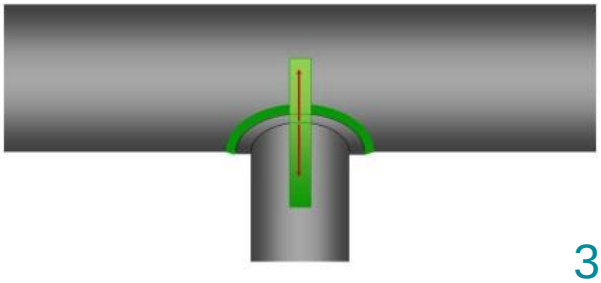


1

Ensure a proper surface preparation prior to the application of Wrappingband.

2

Eventual use Paste to bevel steps present and avoid air inclusions. Check the adhesion of Paste frequently.

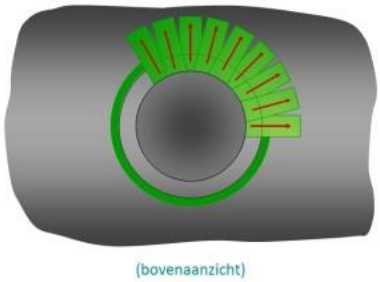


3

Apply strips of Wrappingband onto the surface. Start in the corner between the larger and smaller diameter pipeline and gradually apply without tension.

4

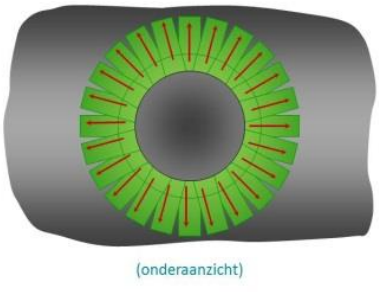
If there is no huge diameter difference, the T-Joint can be applied as a normal T-Joint, see specific chapter for instructions.



5

Continue the application with strips of Wrappingband with a minimum overlap of 10mm in the corner between the larger and smaller diameter pipeline.

6

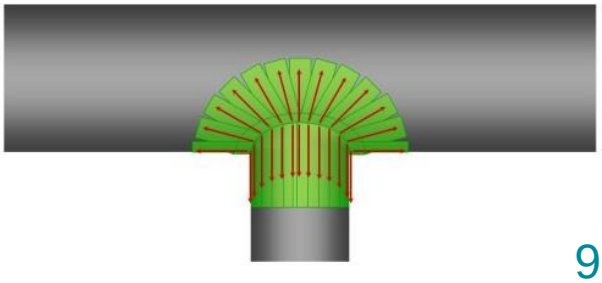


7

Continue until the entire circumference is covered with Wrappingband.

8

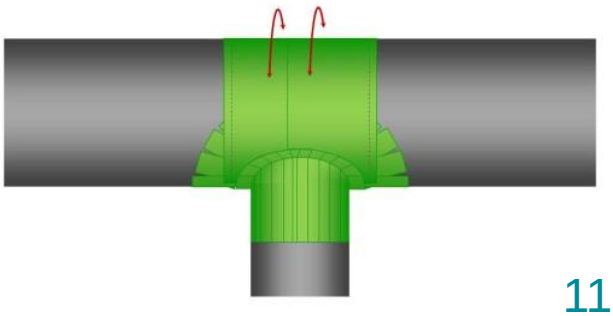
Wrappingband must be applied without air inclusions.



9

The 10mm overlap will decrease on the larger diameter pipeline.

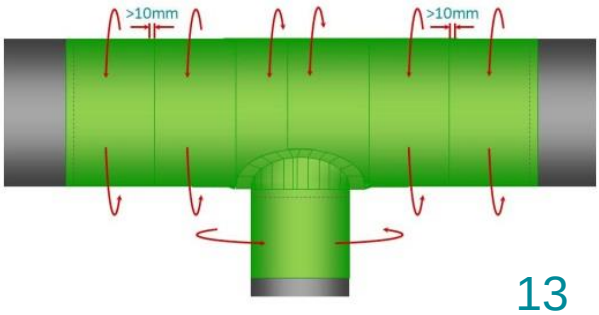
10



11

Apply straight wraps of Wrappingband over the larger diameter pipeline above the smaller diameter pipeline covering previously applied strips entirely. Cut the radius of the smaller diameter pipeline at the end of the strip.

12

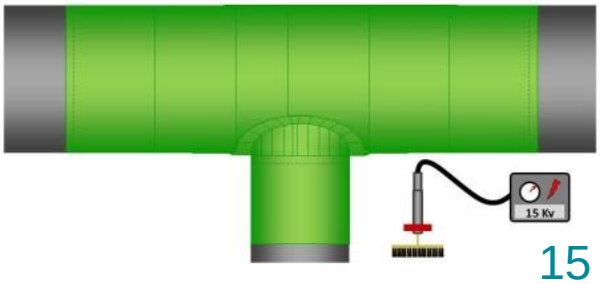


13

Apply straight wraps of Wrappingband to the T-Joint. Width according to client specification

14

For coating of main and branched pipe sections see specific chapter for instructions.

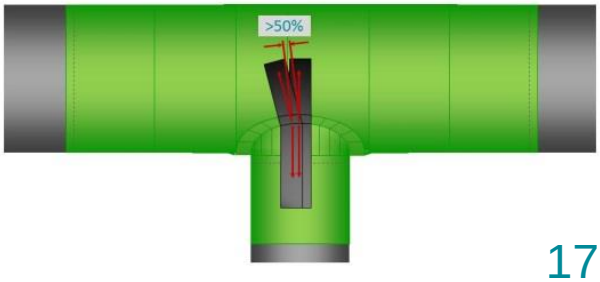


15

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

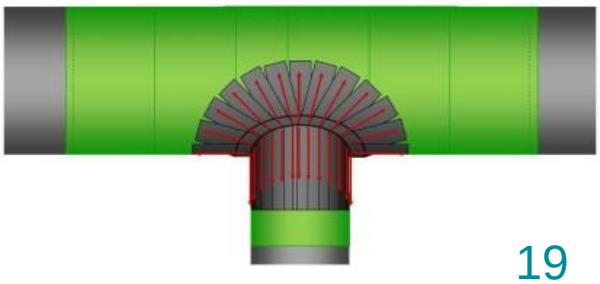
16

Always use approved and certified holiday test equipment.



17

Outerwrap has to be applied following the same procedure as Wrappingband, but with a minimum overlap of 50% in the corner between the larger and smaller diameter pipeline. Apply without tension.

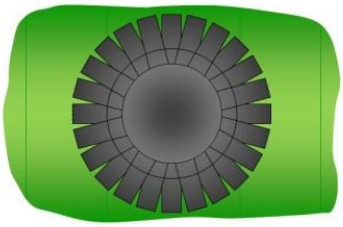


19

Continue until the entire circumference of the branch pipe is covered with Wrappingband.

20

Outerwrap must be applied without air inclusions.

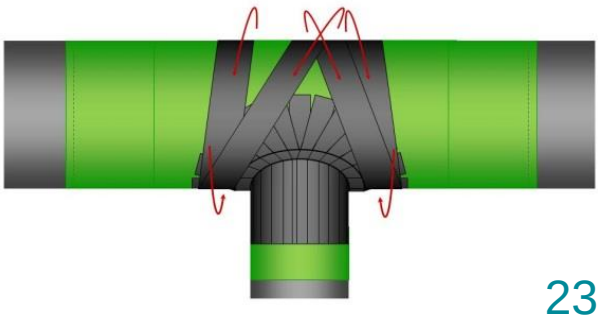


(onderaanzicht)

21

The overlap will decrease on the larger diameter pipeline.

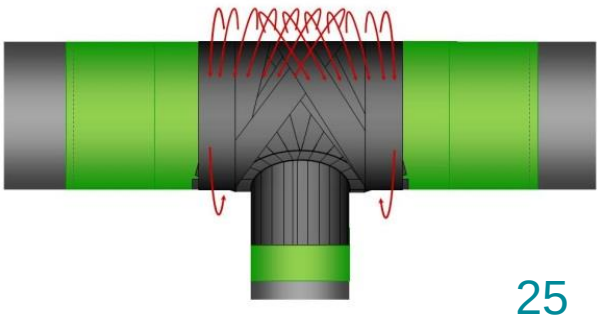
22



23

Apply Outerwrap with tension criss-cross around the T-Joint.

24

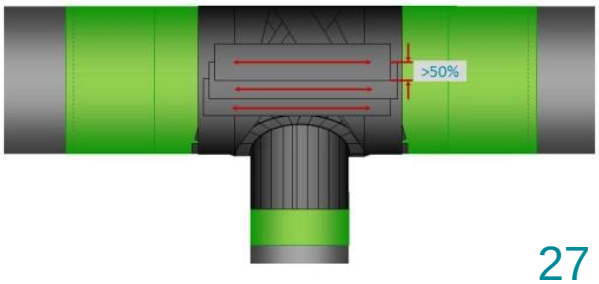


25

Continue until all the Wrappingband is covered with Outerwrap.

26

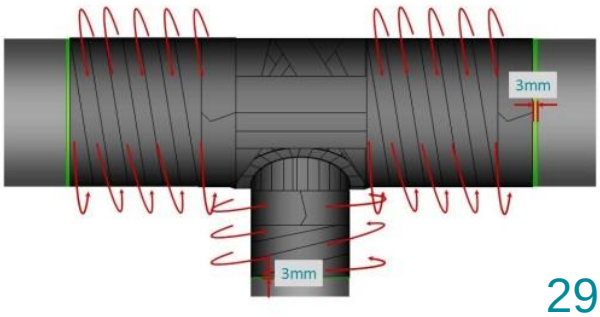
If there is no huge diameter difference, the T-Joint can be applied as a normal T-Joint.



27

Apply strips of Outerwrap according to drawing if Wrappingband has not completely been covered.

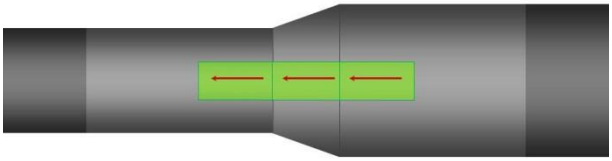
28



29

Finish the T-Joint with Outerwrap on the straight pipes. Apply with 50% overlap, with tension and without air inclusions. keep 3mm of Wrappingband visible.

30

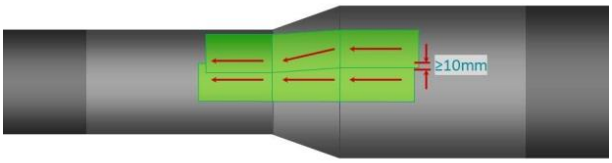


1

Ensure a proper surface preparation prior to the application of Wrappingband.

2

Apply strips of Wrappingband onto the reducer, starting on the larger diameter pipe. Press the Wrappingband without air inclusions onto the surface.

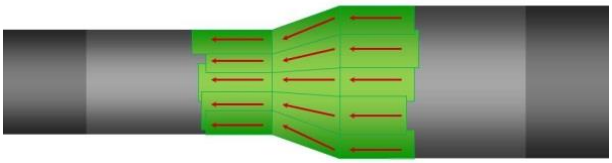


3

The next strips must be applied with an overlap of at least 10mm on the larger diameter pipeline.

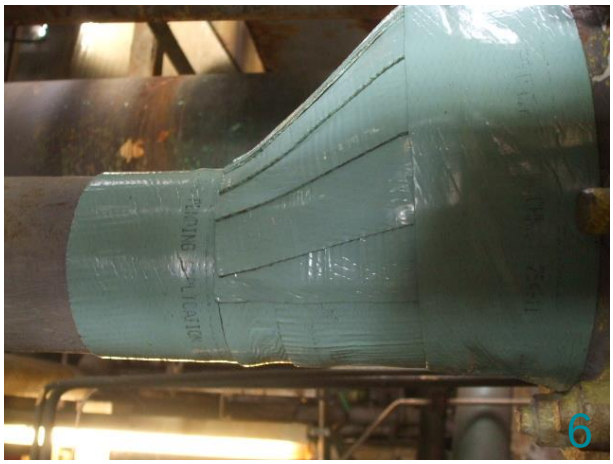
4

The overlap will increase during application on the reducer.



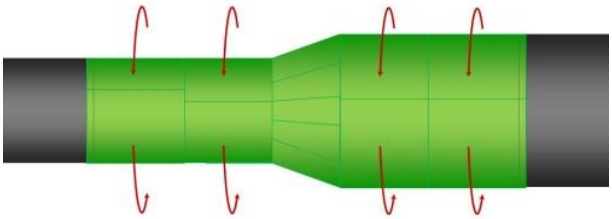
5

Continue until the entire area is covered with Wrappingband.



6

Asymmetric reducers can be coated using the same procedure as with a symmetric reducer.

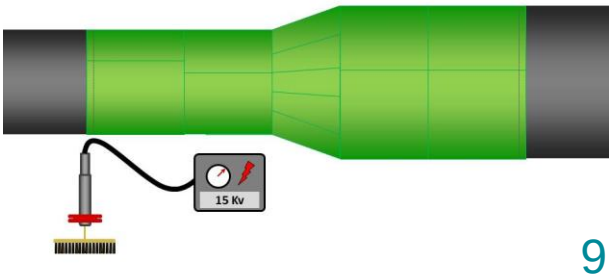


7

Apply Wrappingband onto the pipe sections according chapter 5 or 6. Start touching the reducer. Width according to client specification.

8

Wrappingband can also be applied with spiral wrap.

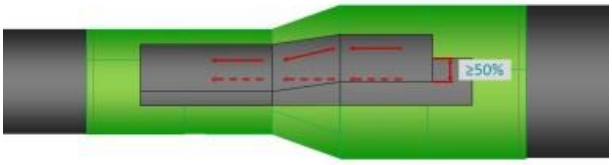


9

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

10

Always use approved and certified holiday test equipment.

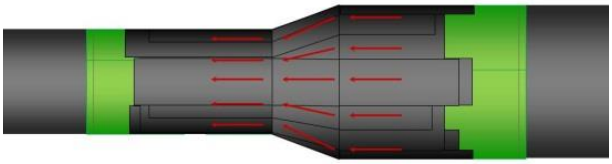


11

Outerwrap has to be applied following the same procedure as Wrappingband, but with a minimum overlap of 50% on the larger diameter pipeline. Apply without tension.

12

Outerwrap can be applied spirally on reducers with a small diameter difference. Apply with approx. 75% overlap over the reducer.

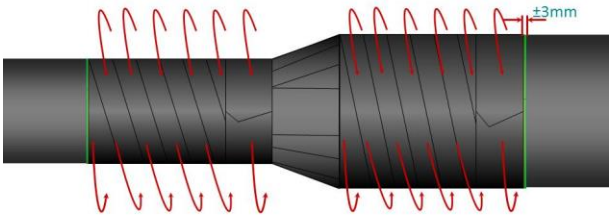


13

Continue until the entire circumference is covered with Outerwrap.

14

When spiral wrapped, the Outerwrap must be applied with tension and without air inclusions.

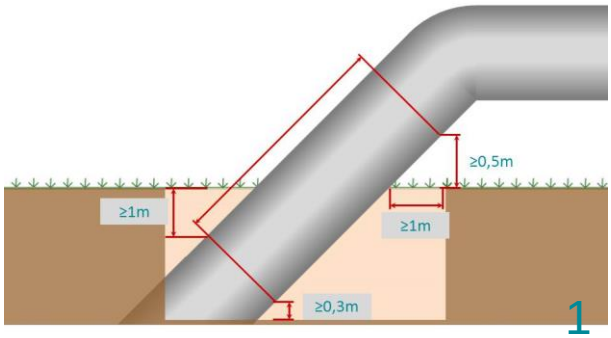


15

Finish the reducer with Outerwrap on the straight pipe sections. Apply with 50% overlap, with tension and without air inclusions. keep 3mm of Wrappingband visible.

16

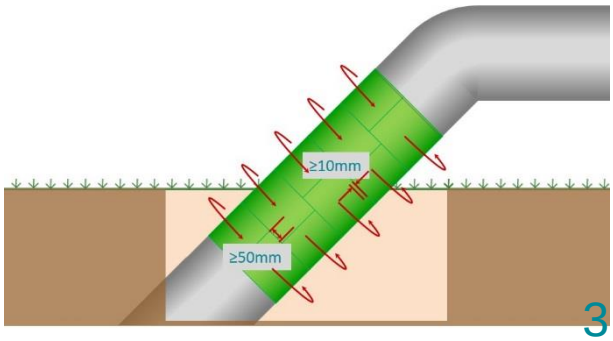
17



1

Ensure a proper surface preparation prior to the application of Wrappingband. Excavate area around the riser according to the drawing.


2

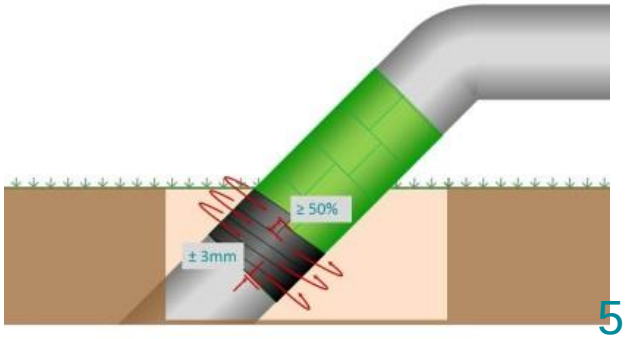


3

Apply Wrappingband on the entire surface according chapter 5 or 6. A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.


4

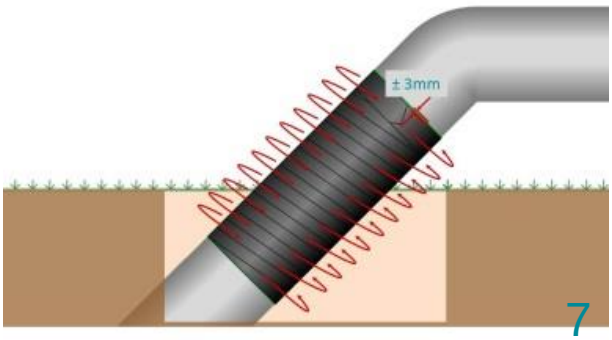
Always use approved and certified holiday test equipment.



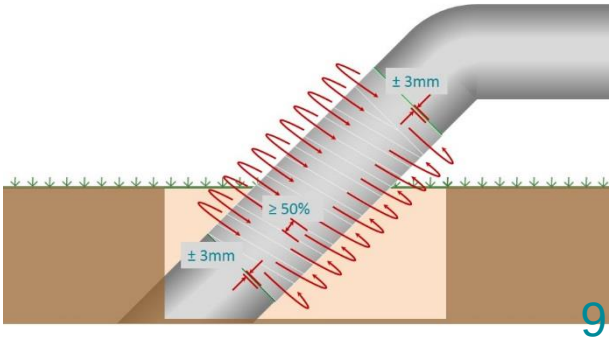
5

Apply Outerwrap bottom to top, without air inclusions and with tension. keep 3mm of Wrappingband visible.


6

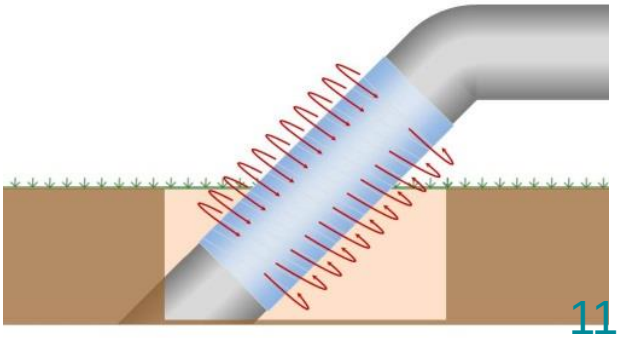


Continue until the entire area is covered. keep 3mm of Wrappingband visible.

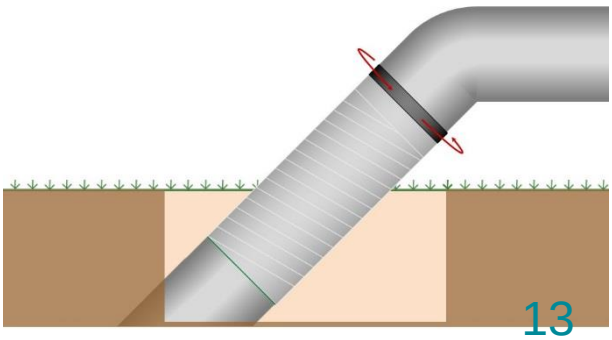


Apply Outerglass Shield XT with a minimum overlap of 50%. keep 3mm of Wrappingband visible, see specific chapter for instructions.

Work bottom to top.

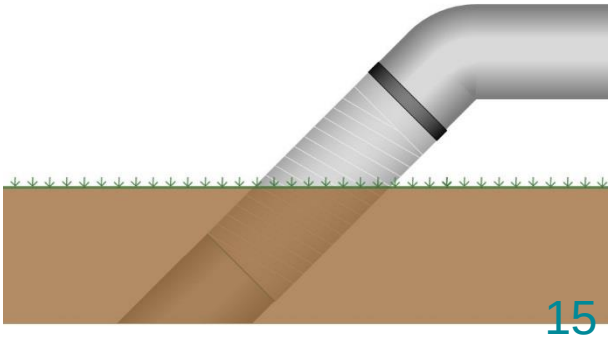


Wrap compression foil over the Outerglass Shield XT. Perforate with perforation roller and remove compression foil after initial curing time.

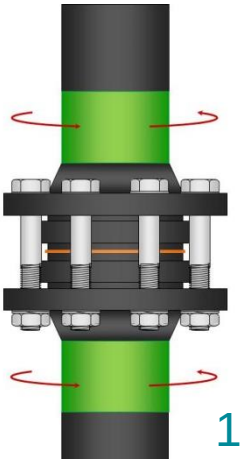


Wrap a circumferential wrap of Sealing tape over the seam between the coating system and pipeline.

Paint the above ground part of the riser with a UV resistant topcoat.

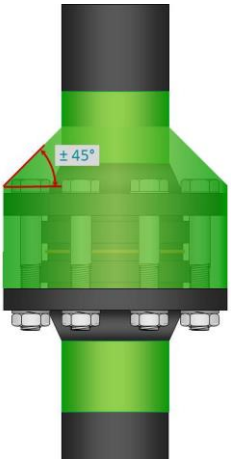


Backfill with clean sand. Backfill is possible after the topcoat has cured.



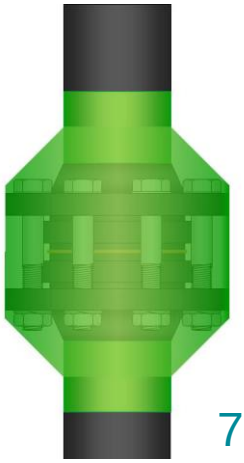
Ensure a proper surface preparation prior to the application of Wrappingband. Start with a circumferential wrap of Wrappingband on each pipe section connected to the flange.

Fill the area between the flanges with Paste. Area should be filled without air inclusions. Paste should be pre heated for the ease of application.

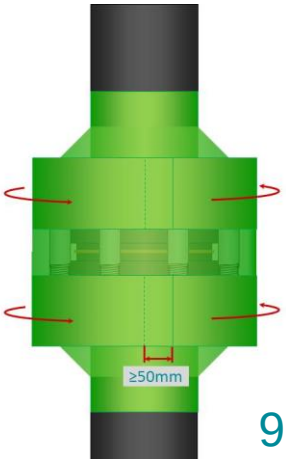


Apply Paste with an angle of 45° above the upper flange. Sequence of application of horizontal flanged connections does not matter.

Avoid air inclusions.

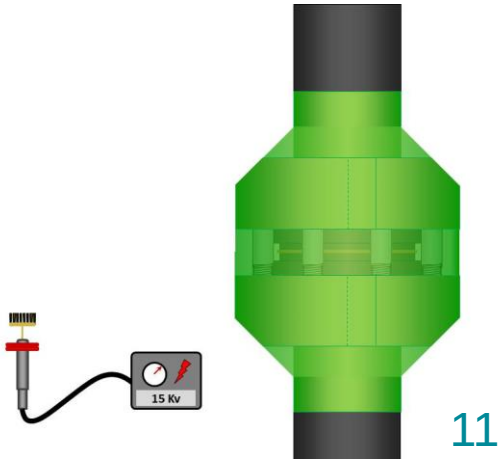


Apply Paste with an angle of 45° on the other side of the flanged connection.



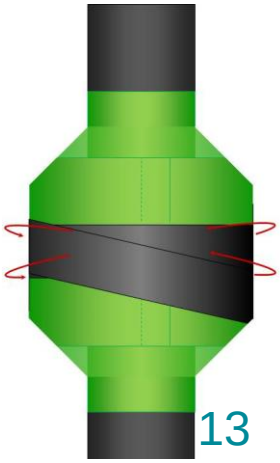
Apply a straight wrap of Wrappingband over the flanges. Width of the Wrappingband depends on flange size. Wrappingband should cover the bolts and nuts.

Fold the Wrappingband back into the Paste.



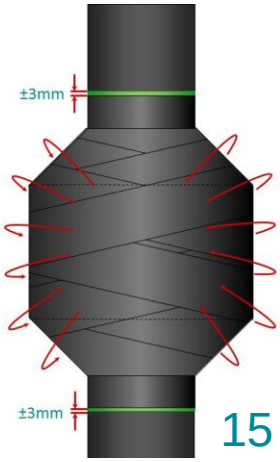
A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

Always use approved and certified holiday test equipment.



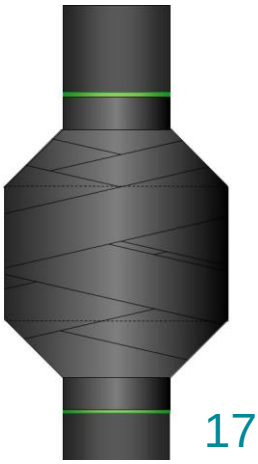
Start with a circumferential wrap of Outerwrap over the flanges. Apply with tension.

If a handle is present in the flanged connection / valve, the Outerwrap can be wrapped tightly around the handle.

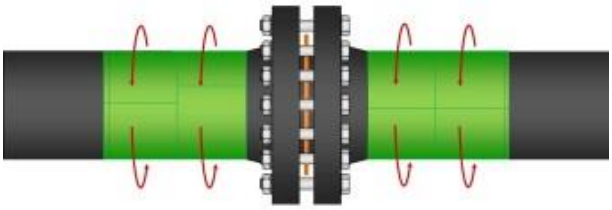


Apply Outerwrap criss-cross around the flanged connection until all Wrappingband is covered. keep 3mm of Wrappingband on both ends visible.

Apply with tension and without air inclusions.



Conduct visual inspection to ensure that the entire area is covered with Outerwrap.

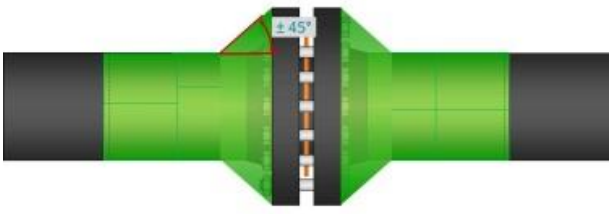


1

Ensure a proper surface preparation prior to the application of Wrappingband. Apply Wrappingband on the pipe with straight or spiral wraps on each pipe section connected to the flange. Start touching the flanges. Width according to client specification.

2

Apply Wrappingband without air inclusions.

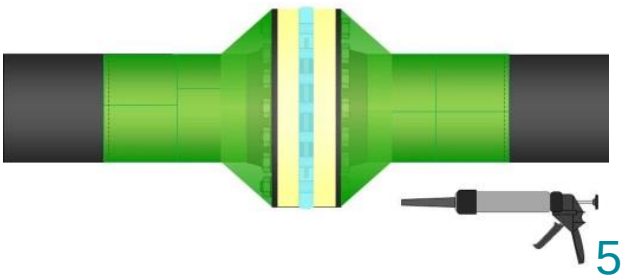


3

Apply Paste with an angle of 45° between the flange and pipe without air inclusions.

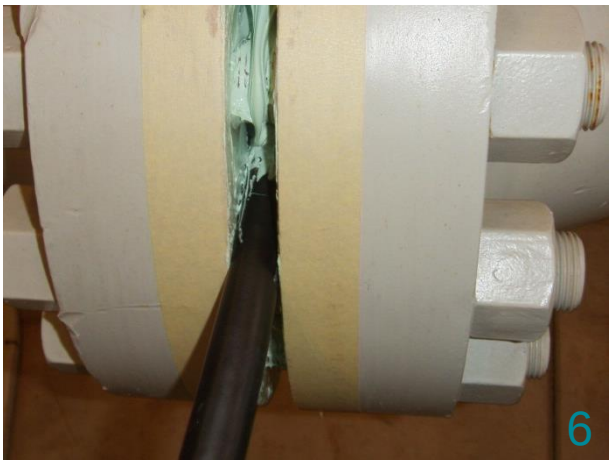
4

Paste has to be applied without air inclusions.



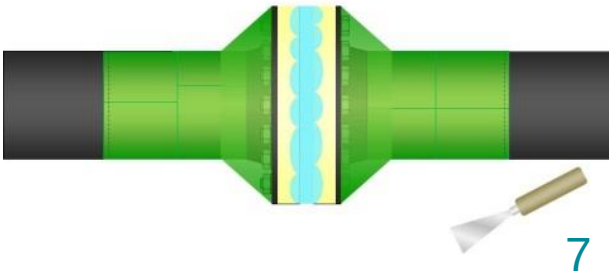
5

Use masking tape to protect the rims of the flange against contamination with 4200 Filler because Wrappingband will not adhere to a surface containing 4200 Filler.



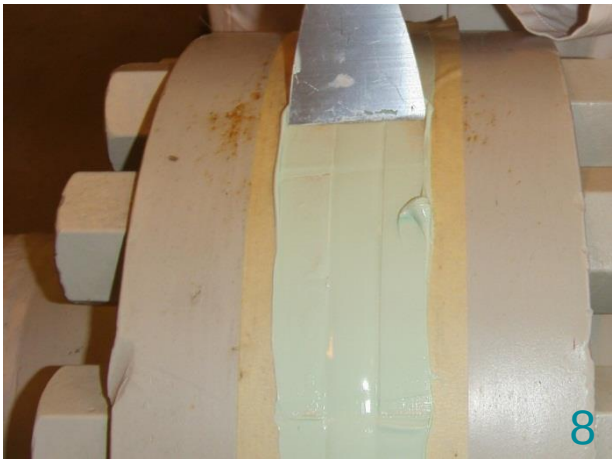
6

Fill the area between the flanges with the application tool and flexible nozzle. Work from inside out to prevent air inclusions.



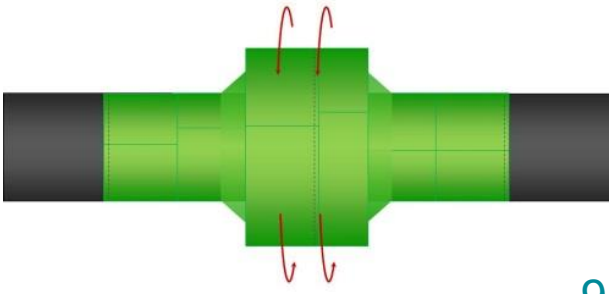
7

Use a putty knife to smoothen the 4200 Filler.



8

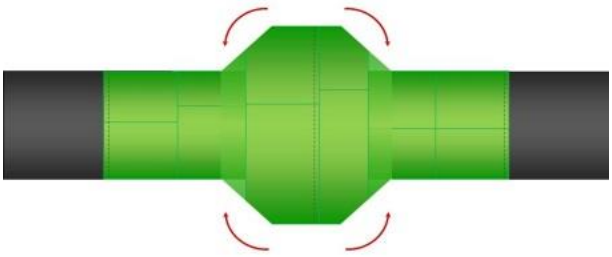
Prevent 4200 Filler from adhering to the surface of the flange.



9

Remove masking tape and apply 2 straight wraps of Wrappingband without air inclusions over the flange. Total width has to be sufficient to cover the length of the bolts / nuts.

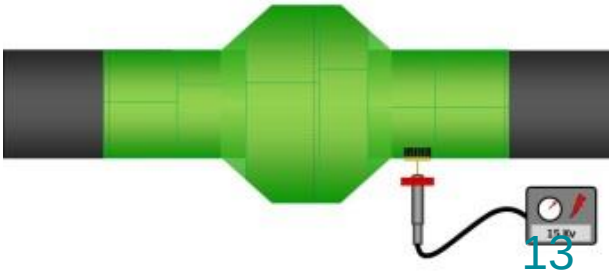
10



11

Fold the Wrappingband back into the Paste.

12

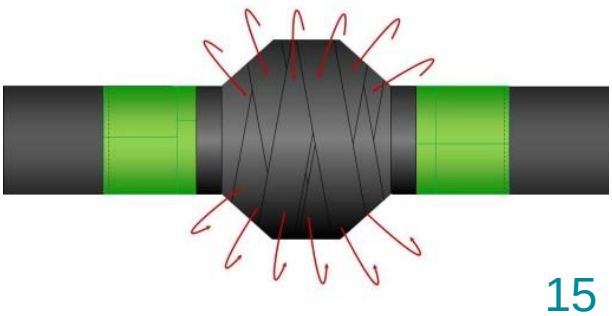


13

A holiday test using a high voltage tester must be carried out on the green Stopaq materials prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

14

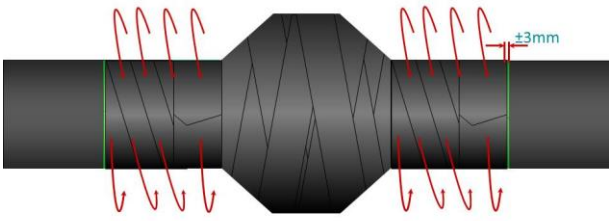
Always use approved and certified holiday test equipment.



15

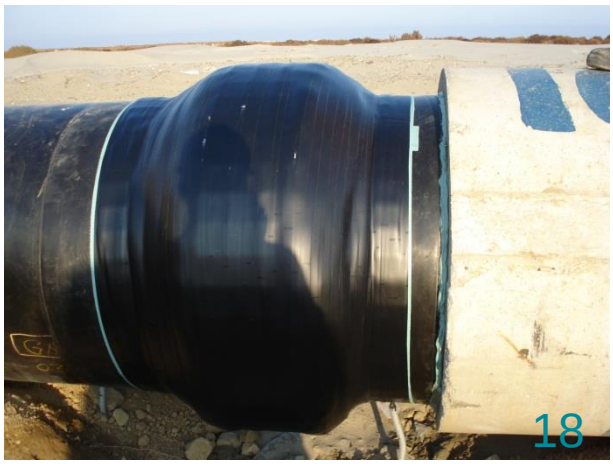
Start with a circumferential wrap of Outerwrap around the flanges. Continue application of Outerwrap criss-cross around the flange until all Wrappingband is covered.

16

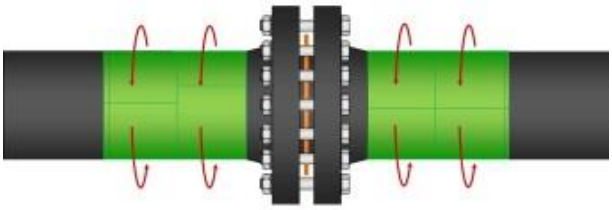


17

Finish the flange with Outerwrap on the straight pipes. Apply with 50% overlap, with tension and without air inclusions. Keep 3mm of Wrappingband on both ends visible.



18

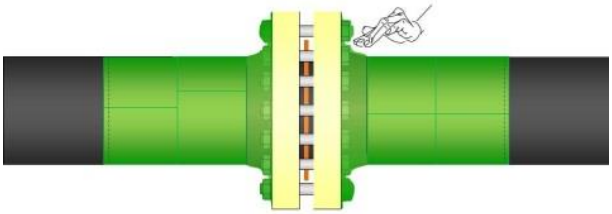


1

Ensure a proper surface preparation prior to the application of Wrappingband. Apply Wrappingband on the pipe with straight or spiral wraps on each pipe section connected to the flange. Start touching the flanges. Width according to client specification.

2

Apply Wrappingband without air inclusions.

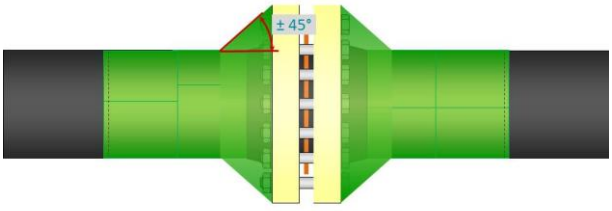


3

Use masking tape to protect the rims of the flange against contamination with 4100 Putty because Wrappingband will not adhere to a surface containing 4100 Putty.

4

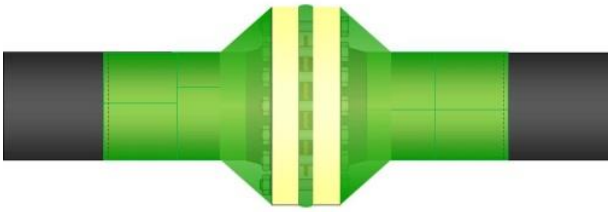
Smear a thin layer of 4100 Putty on the entire area of the flange around the bolts.



5

Apply 4100 Putty in an angle of 45° between the flange and pipe and avoid air inclusions.

6



7

Fill the area in between the flanges with 4100 Putty.

8

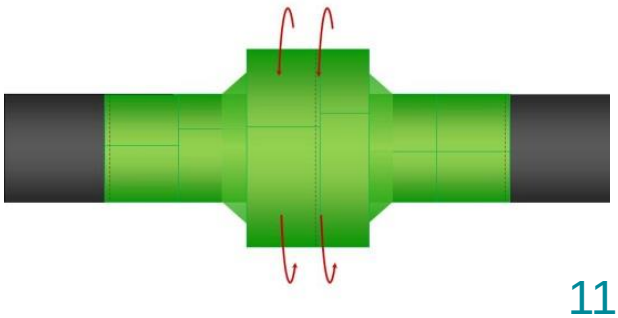
Application tools can be used during application.

9

Remove masking tape.

10

Wrappingband has to be applied over the rims of the flanges. Several wraps might be needed. Total width has to be sufficient to cover the total length of the bolts / nuts.

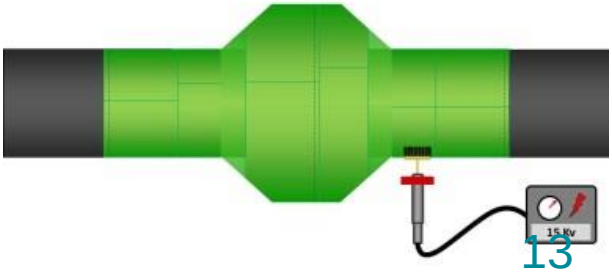


11

Apply straight wraps of Wrappingband and avoid air inclusions.

12

Fold the Wrappingband back into the 4100 Putty.

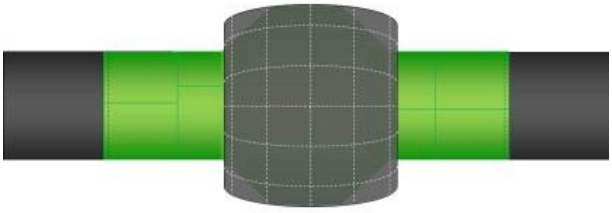


13

A holiday test using a high voltage tester must be carried out on the green Stopaq materials prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

14

Always use approved and certified holiday test equipment.

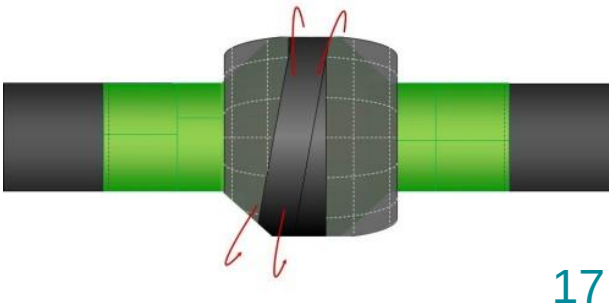


15

Pre cut a strip of Geotextile with a length of the circumference of the flange + approx. 50mm.

16

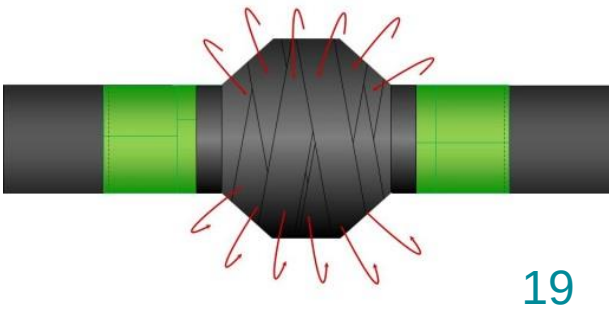
Width of the Geotextile should cover the complete area coated with 4100 Putty, but overlap on the Wrappingband should be avoided.



17

Start with a circumferential wrap of Outerwrap around the flanges. Apply with tension.

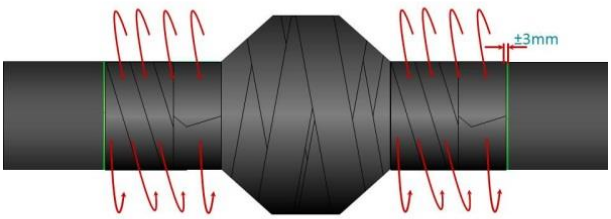
18



19

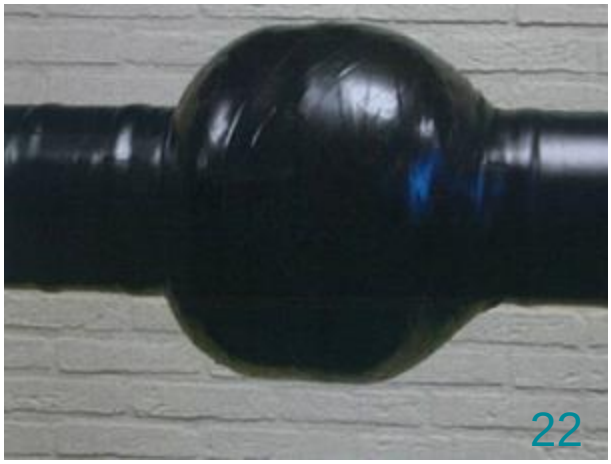
Apply Outerwrap criss-cross around the flanged connection until all Wrappingband is covered.

20

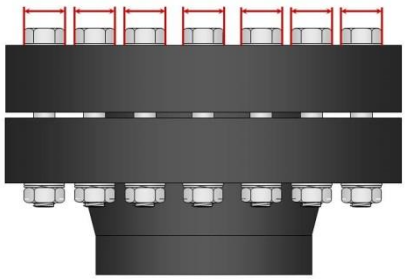


21

Finish the flange with Outerwrap on the straight pipes. Apply with 50% overlap, with tension and without air inclusions. keep 3mm of Wrappingband on both ends visible.

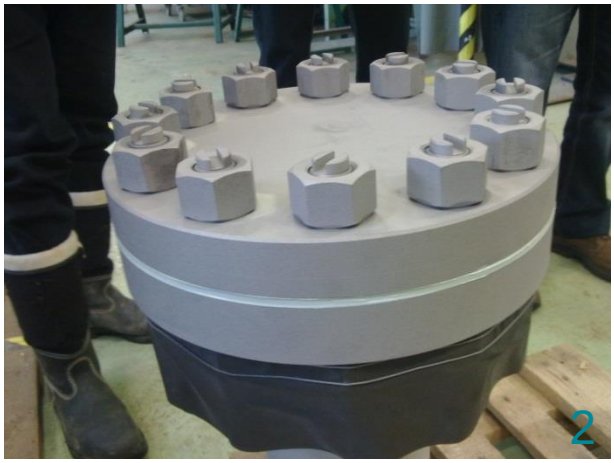


22



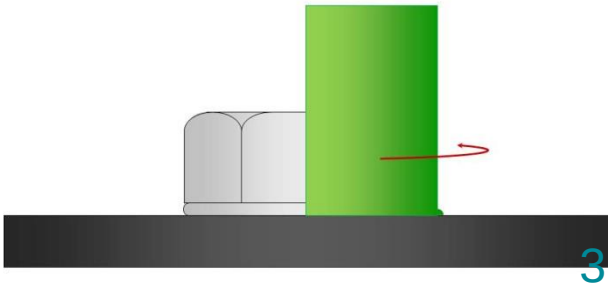
1

Ensure a proper surface preparation prior to the application of Wrappingband



2

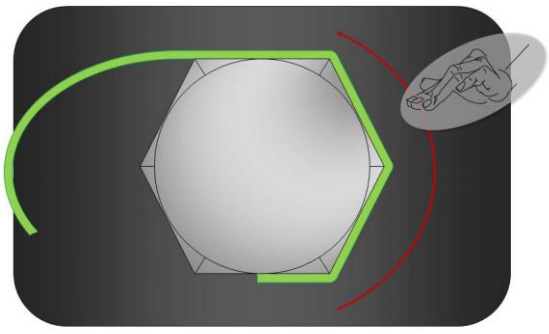
This chapter describes only bolt protection. Complete flange protection can be found in chapters 21 and 22.



3

Pre cut a strip of Wrappingband with a length of the complete circumference of the bolt + approx. 20mm. Width is depending on bolt / nut dimension.

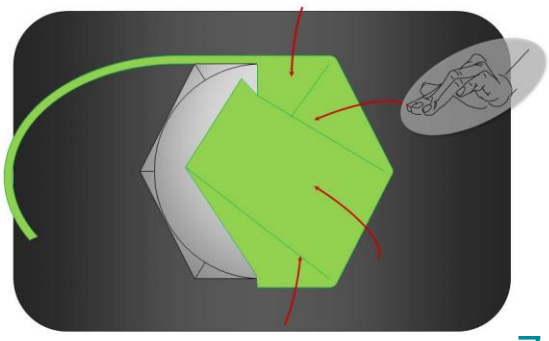
4



5

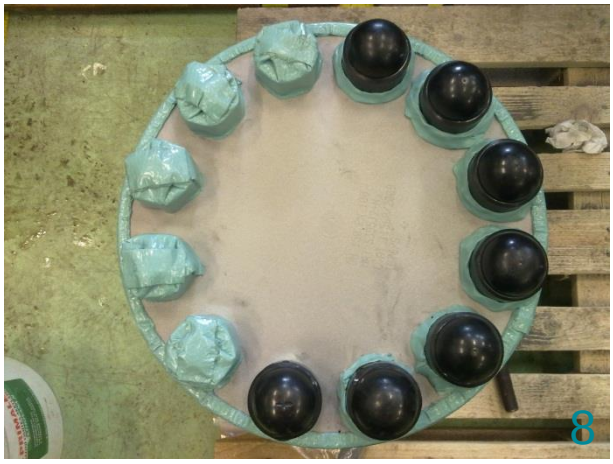
Press the Wrappingband tight around the bolt / nut without air inclusions. Some tension might be helpful during this application.

6



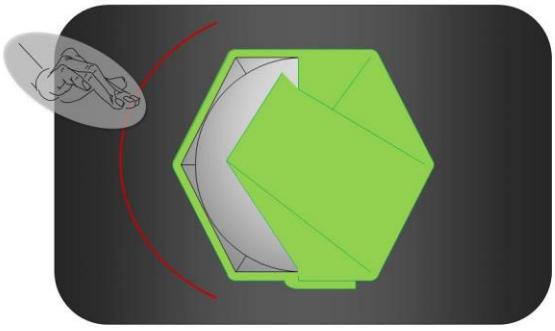
7

After covering half of the circumference, fold the Wrappingband down onto the bolt / nut.



8

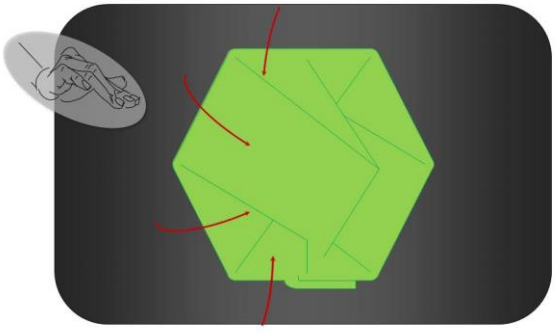
Bolt caps can be used for mechanical protection.



9

Press the remaining Wrappingband around the bolt / nut.

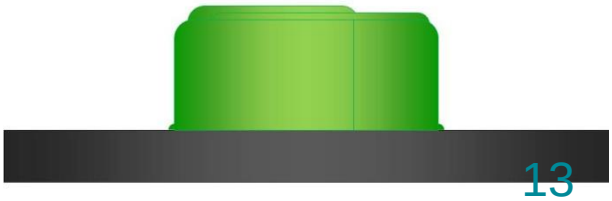
10



11

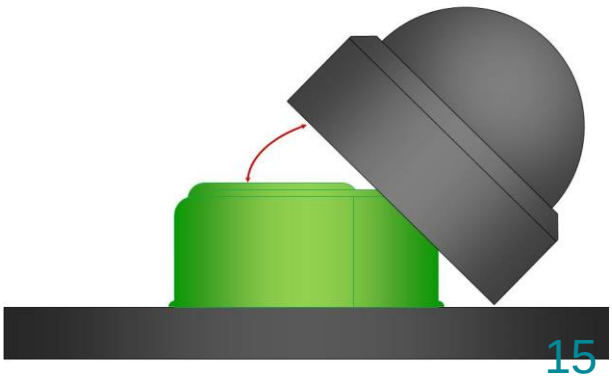
Fold the Wrappingband tight around the bolt.

12

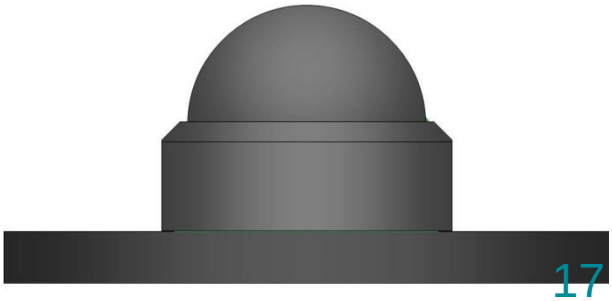


The complete bolt has to be covered with Wrappingband.

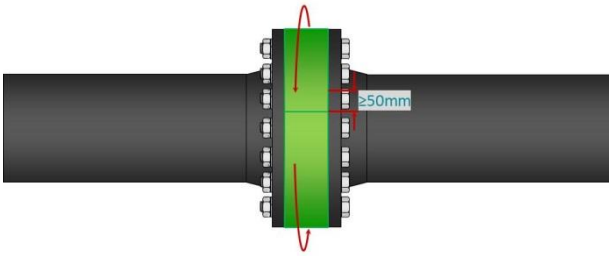
Wrappingband EZ can be painted with a topcoat.



Optionally a bolt cap can be placed for mechanical protection over the bolt and applied Wrappingband.



Bolt caps on horizontal flanges should be clamped with a bolt cap clamp.

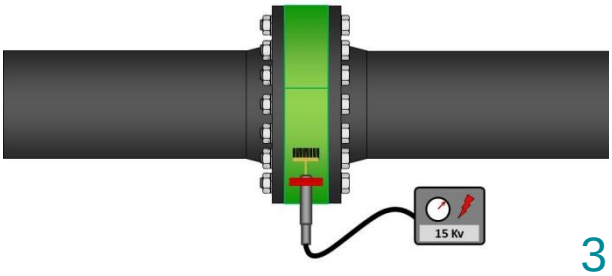


1

Ensure a proper surface preparation prior to the application of Wrappingband. Apply a straight wrap of Wrappingband over the flange.

2

4200 Filler will not be used with inspection flanges.

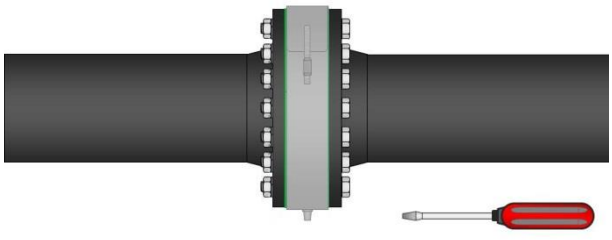


3

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

4

Always use approved and certified holiday test equipment.

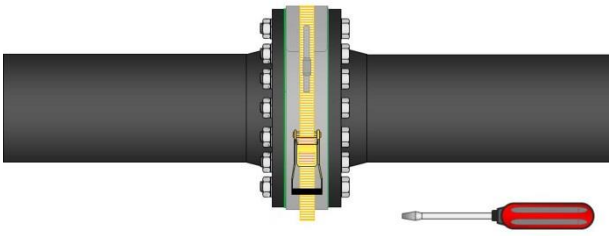


5

Place the Flangebelt centered over the Wrappingband.

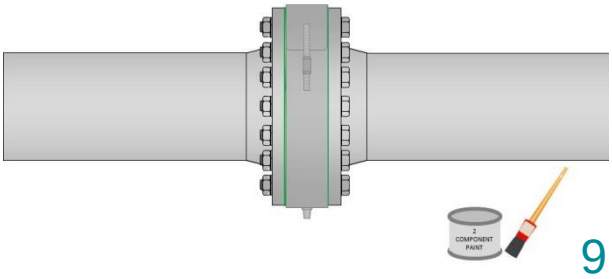
6

Close the Flangebelt using a screwdriver.

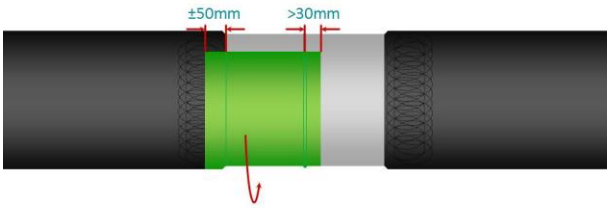


Tighten the Flangebelt with a ratchet strap. Tighten the clamp frequently during the strapping process.

The rectangular cut in the ratchet strap enables tightening the clamp.

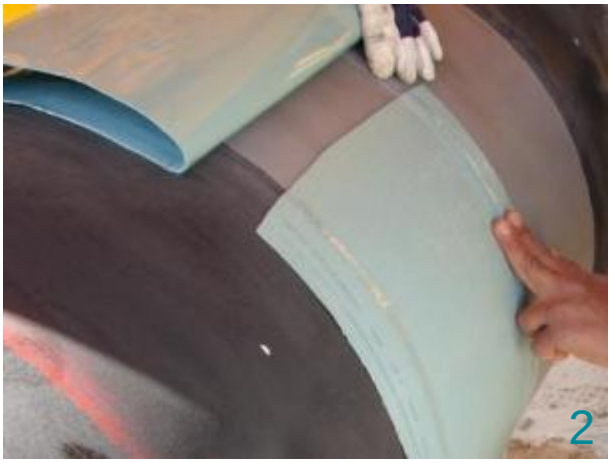


Paint the bolts and pipelines with a thick layer of an appropriate paint according client specification.



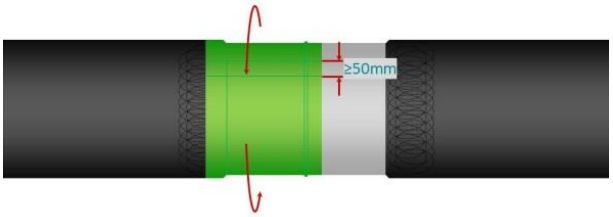
1

Ensure a proper surface preparation and preheating prior to the application of Wrappingband. Start the first straight wrap with a minimum overlap of 30mm over the weld and approx. 50mm on the adjacent factory applied coating.



2

Start application at the 10 o'clock position. Apply Wrappingband with minimum tension and avoid air inclusions.

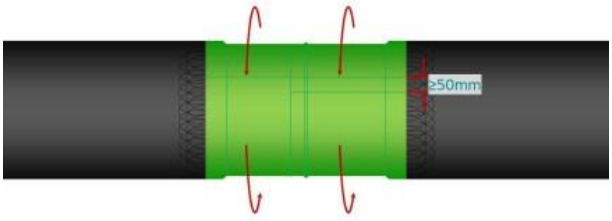


3

Circumferential overlap should be at least 50mm. On larger diameter pipelines it is recommended to remove approx. 200mm of release liner and fix this part to the pipe surface.

4

Next the remaining part should be positioned. Then the release liner removed and the Wrappingband must be fixed to the surface. Avoid air inclusions.

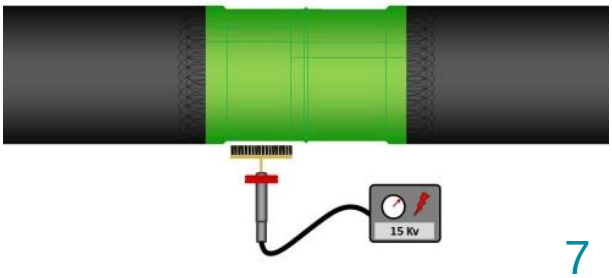


5

The second circumferential wrap must be applied with the same overlaps as the first; minimum 30mm over the weld and approx. 50mm on the adjacent factory applied coating.

6

The overlaps of the straight wraps must not be in line with the previous applied straight wrap, their position should alternate.

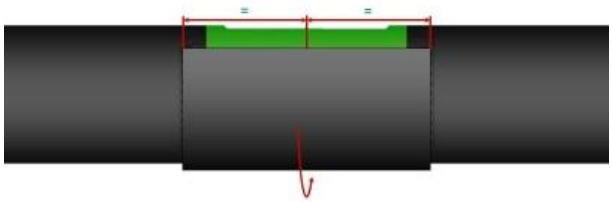


7

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of the High Impact Shield. The test must be carried out at a minimum of 15kV.

8

Always use approved and certified holiday test equipment.

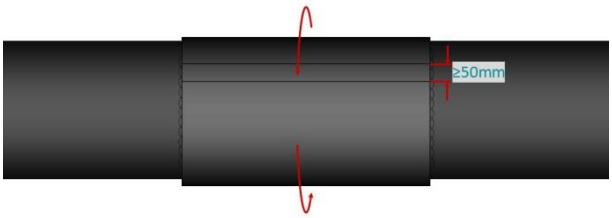


9

Cut the High Impact Shield to size according to table in PDS. Position the High Impact Shield centered over the field joint. The overlap should be positioned at on the 2 o'clock position, which is opposite of overlap of Wrappingband.

10

Remove approx. 300mm of the release foil and position the High Impact Shield over the Stopaq Wrappingband.

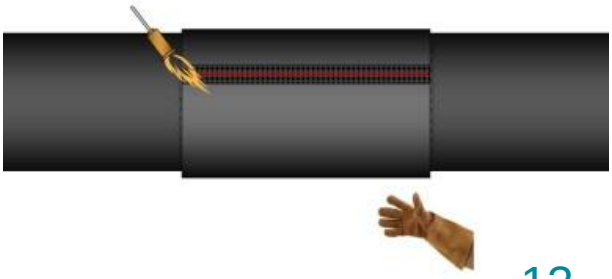


11

The High Impact Shield must not be put tight around the field joint. Some overlength is needed at the bottom of the joint.

12

Remove release foil and place the High Impact Shield over the Field Joint.

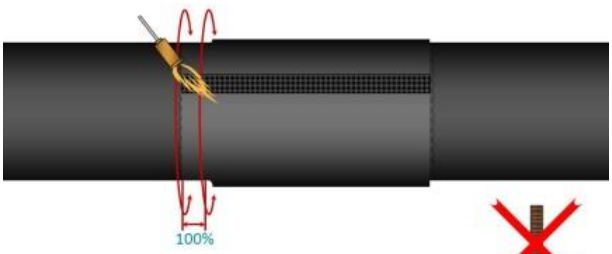


13

Pre-heat the closure strip and place it over the overlap-seam of the High Impact Shield. Heat the closure strip and patch the closure strip onto the High Impact Shield.

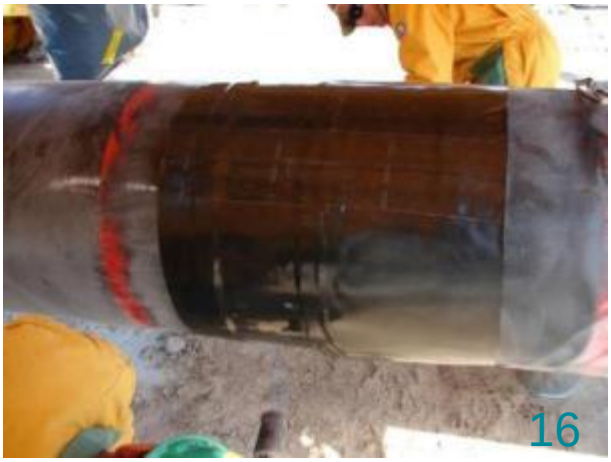
14

Small air inclusions will not affect the coating performance. With sufficient heat a dotted pattern in the closure strip will appear. Do not use a roller to improve adhesion. This will have negative effect.



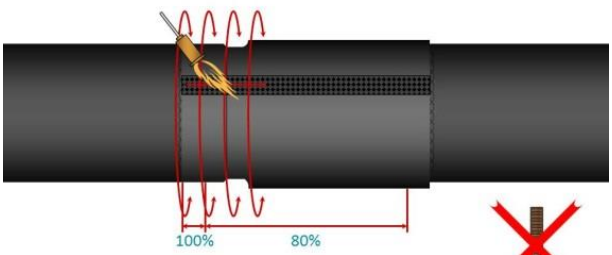
15

Heat the High Impact Shield from 1 side to the other side, against the wind.



16

Shrinking the High Impact Shield towards plant coating should be done using full torch power. Be careful not to damage the High Impact Shield by excessive heat.

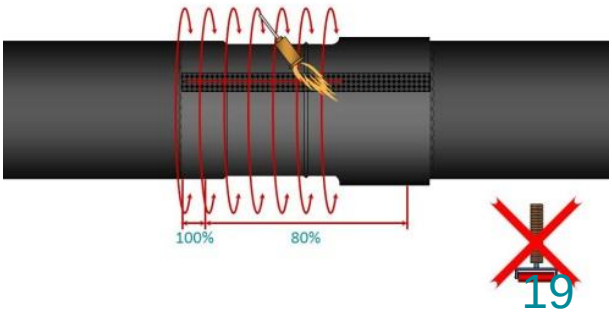


17

After shrinking, the dimples present in the High Impact Shield should disappear.

18

In areas where Wrappingband is present underneath the High Impact Shield, reduced torch power should be used to prevent overheating of the Wrappingband.

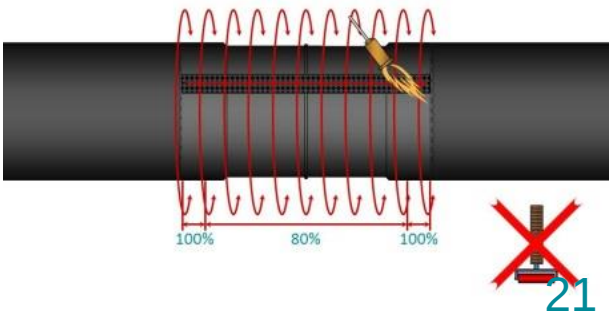


19

Continue to shrink the High Impact Shield.

20

High Impact Shield has to be shrinked down to the pipe by 2 workers, one on each side of the pipe. Both workers have to work with the same application speed.



21

Continue until the entire High Impact Shield has been shrinked to the pipe.

22

Adhesive will appear on both ends of the High Impact Shield.

23

The High Impact Shield will shrink during the heating process and when it is cooling down. Prevent the High Impact Shield from cooling down too quick.

24

Do not expose the coated field joint to heavy loads e.g. lifting / hoisting equipment.

Peel test

To check the adhesion of the High Impact Shield to the line pipe coating a peel test must be performed according to peel test equipment manufacturer specification / instruction.

Peel values

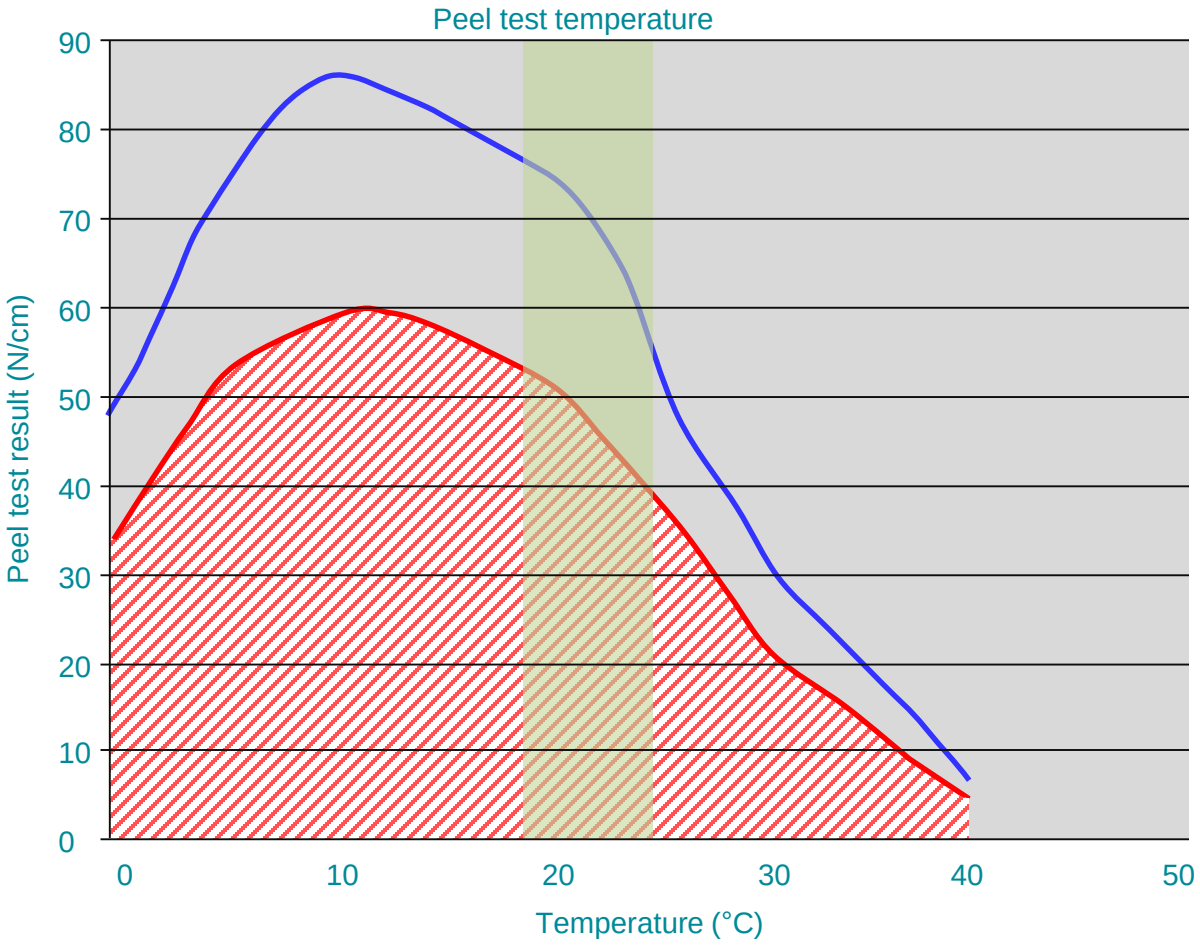
There is a difference between peel tests in a laboratory and in-field peel tests, because the peel tests in a laboratory will be carried out with special equipment at a peel rate of 10mm per minute, according to ISO 21809-3. This is not feasible in the field, so therefore the peel rate in field test will be carried out with 100mm per minute.

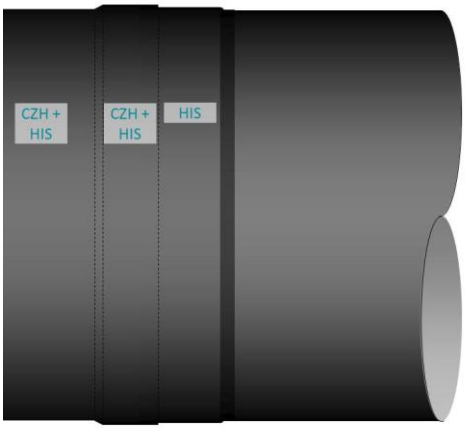
The peel value must have a minimum value according the table and graph below.

Peel test temperature

The peel test must be carried out at a temperature between 19°C and 23°C.

Peel values (N/cm)						
Temperature	0°C	10°C	20°C	23°C	30°C	40°C
Typical peel value (blue line)	45	85	74	60	31	7
Minimum peel value (red line)	33	59	51	42	21	5



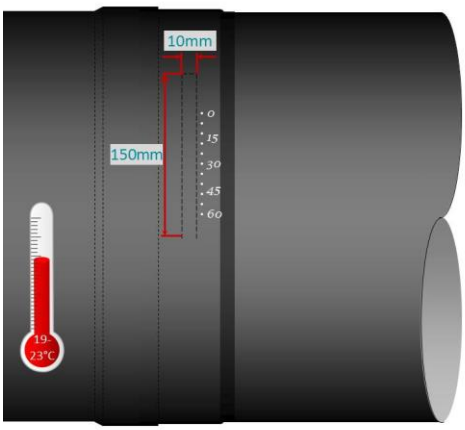


7

Peel test must be carried out on an area where the High Impact Shield has adhered to the line pipe coating. Stopaq Wrappingband should not be present underneath the High Impact Shield.

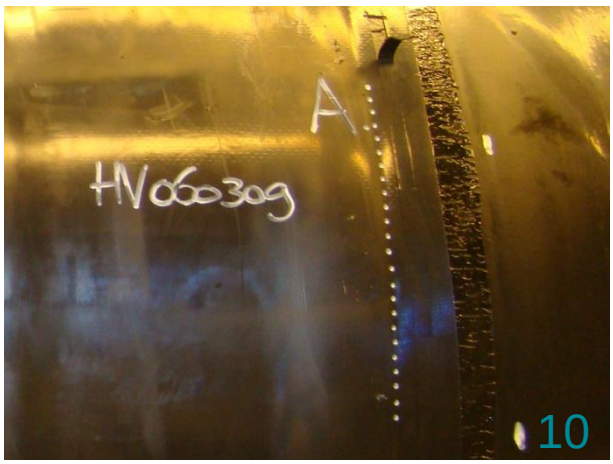
8

Cut a 10mm wide strip in the High Impact Shield with a length of 150mm. Be careful not to cut the line pipe coating.



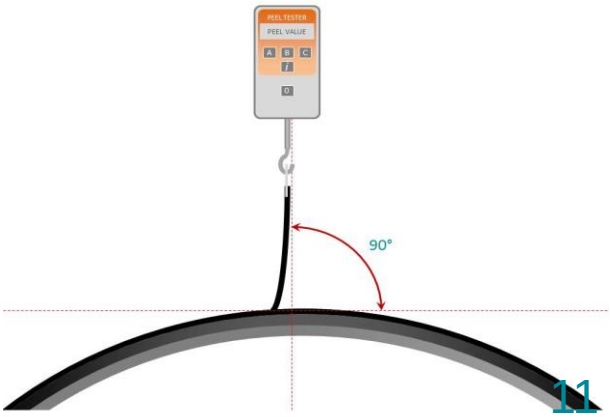
9

The temperature of the material must be between 19°C and 23°C (66,2 – 73,4°F)during the peel test. Mark a length of 100mm and note respectively “0” , “15”, “30” , “45” and “60” at the 0mm, 25mm, 50mm, 75mm and 100mm position.



10

The speed of the peel test is 100mm per minute, so 25mm per 15 seconds or 10mm per 6 seconds. The 100mm length can me marked every 10mm, which indicates the speed of 10mm per 6 seconds.

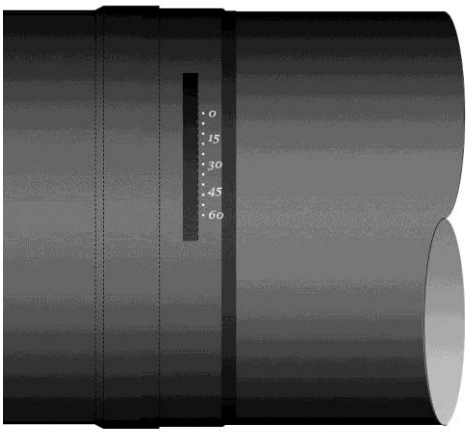


11

Pull a piece of the strip with pliers and attach it to the connection piece. Activate the peel tester and carry out the peel test with a 90° angle on the pipe.

12

The peel value has to correspond with the values in the table and graph on the previous page.

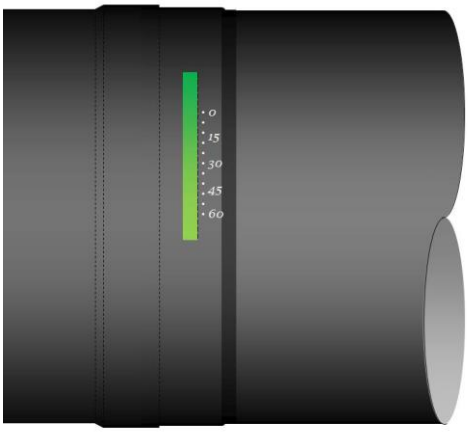


13

Remove the peeled strip completely after the peel test.

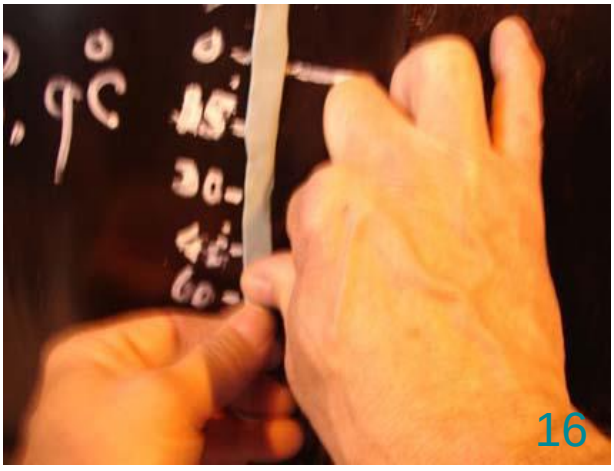
14

Pre heat some Paste CZH up to a temperature of approx. 35°C.



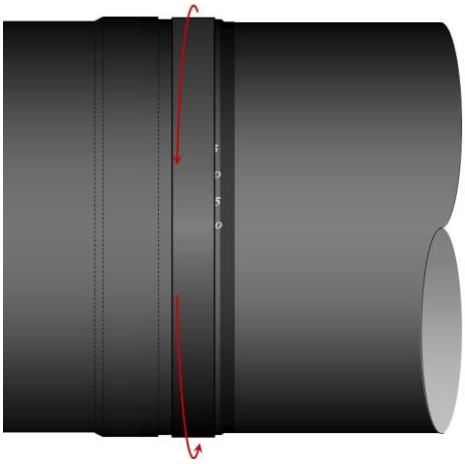
15

Press the Paste CZH in the damage caused by the peel test.



16

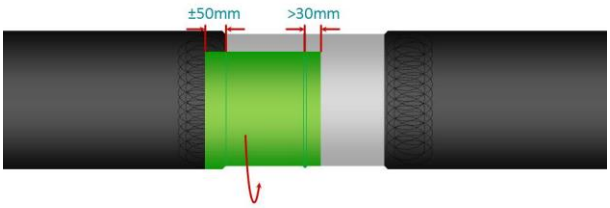
Apply Paste CZH without air inclusions and smoothen the surface.



17

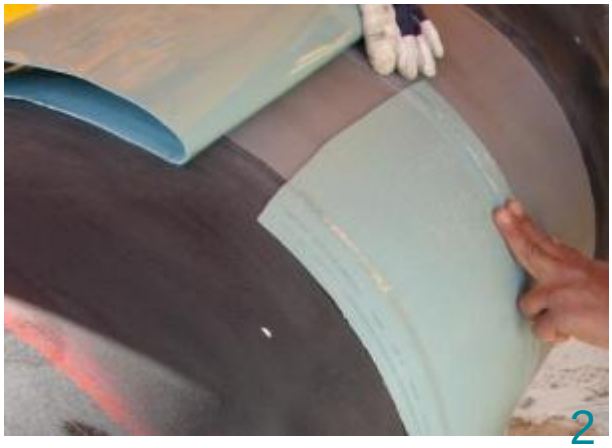
Apply Outerwrap over the damage. Start approx. 300mm above the damage and apply 2 straight wraps of Outerwrap. Apply Outerwrap with tension and without air inclusions.

18



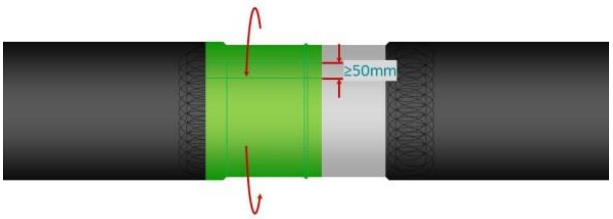
1

Ensure a proper surface preparation and preheating prior to the application of Wrappingband. Start the first straight wrap with a minimum overlap of 30mm over the weld and approx. 50mm on the adjacent factory applied coating.



2

Start application at the 10 o'clock position. Apply Wrappingband with minimum tension and avoid air inclusions.

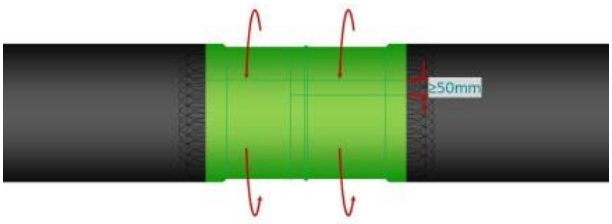


3

Circumferential overlap should be at least 50mm. On larger diameter pipelines it is recommended to remove approx. 200mm and fix this part to the pipe surface.

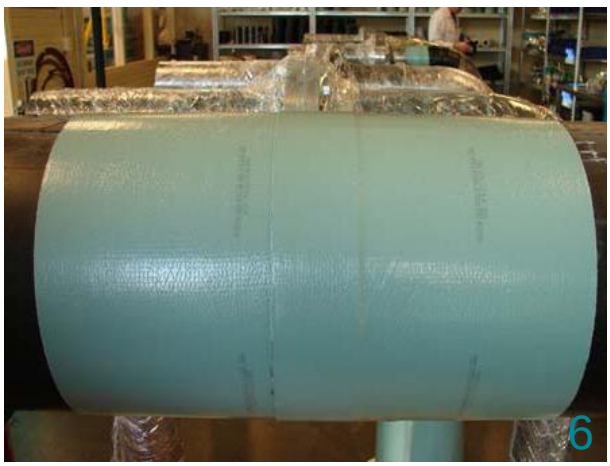
4

Next the remaining part should be positioned. Then remove the release liner and the Wrappingband has to be fixed to the surface. Avoid air inclusions.



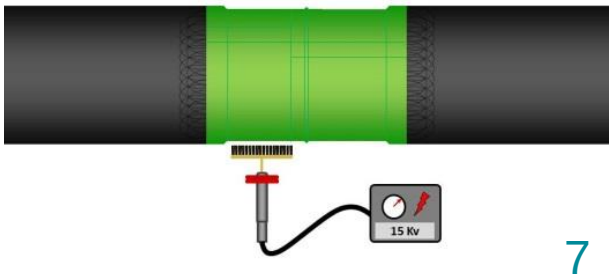
5

The second circumferential wrap must be applied with the same overlaps as the first; minimum 30mm over the weld and approx. 50mm on the adjacent factory applied coating.



6

The overlaps of the straight wraps must not be in line with the previously applied straight wrap, their position should alternate.

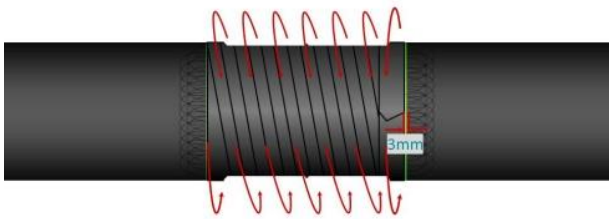


7

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

8

Always use approved and certified holiday test equipment.



9

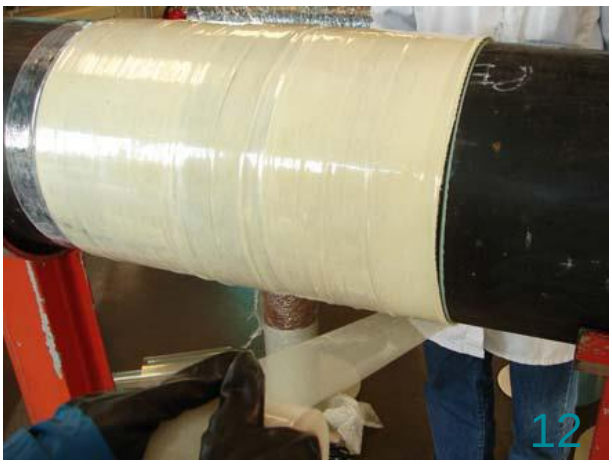
Apply Outerwrap with a minimum overlap of 50% over the Wrappingband. keep 3mm of Wrappingband exposed at both ends. see specific chapter for instructions.

10

Apply Outerwrap with tension and avoid air inclusions.

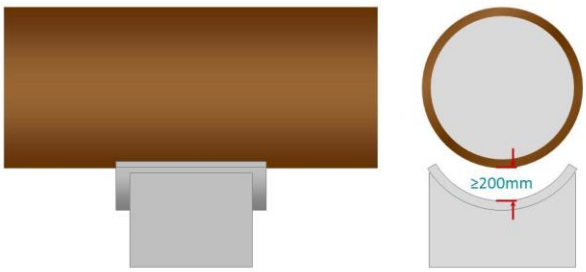
11

Apply Outerglass Shield XT according specific chapter for details.



12

Outerglass Shield should overlap the factory applied coating approx. 100mm.

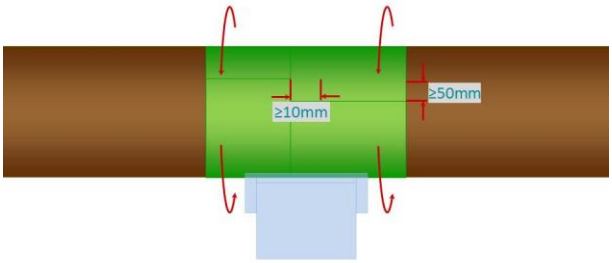


1

Ensure a proper surface preparation prior to the application of Wrappingband. Pre cut strips of Wrappingband corresponding to the pipeline circumference + approx. 100mm on larger diameter pipelines and approx. 50mm on smaller diameter pipelines.

2

For the ease of application, lift the pipe at least 200mm.

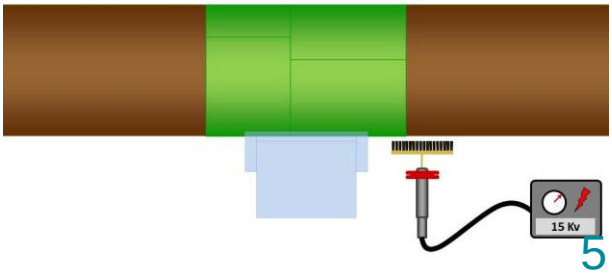


3

Apply Wrappingband with straight wraps. Side-by-side overlap minimum 10mm. Number of wraps depending on the size of the pipe support.

4

Apply Wrappingband with minimum tension and avoid air inclusions.

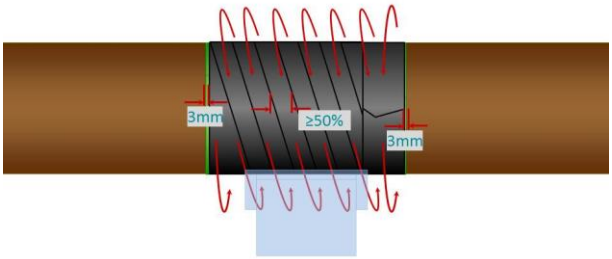


5

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

6

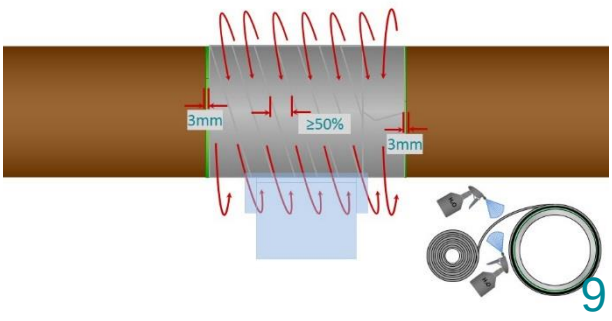
Always use approved and certified holiday test equipment.



7

Start application of Outerwrap with 2 straight circumferential wraps and continue by means of spiral wrap with a minimum overlap of 50%. Finish with 2 straight circumferential wraps.

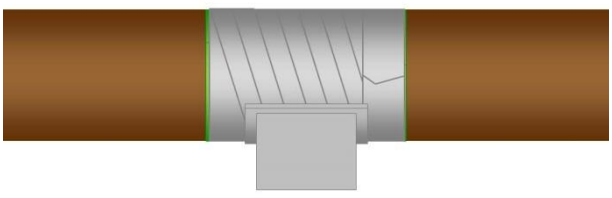
Keep 3mm of Wrappingband exposed at both ends.



9

Apply Outerglass Shield XT according the specific chapter.

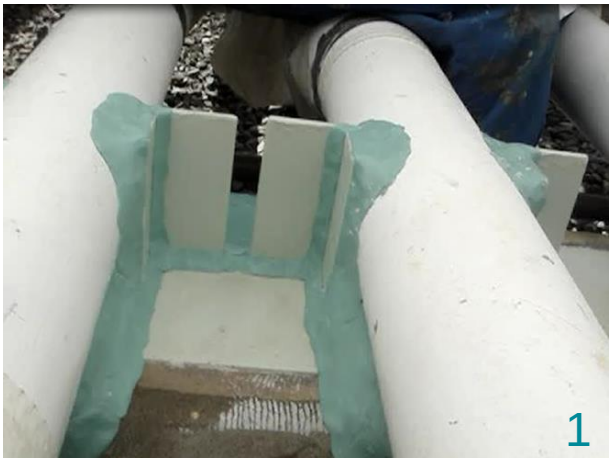
The coating performance will not be badly influenced when the compression foil remains on the Outerglass Shield XT.



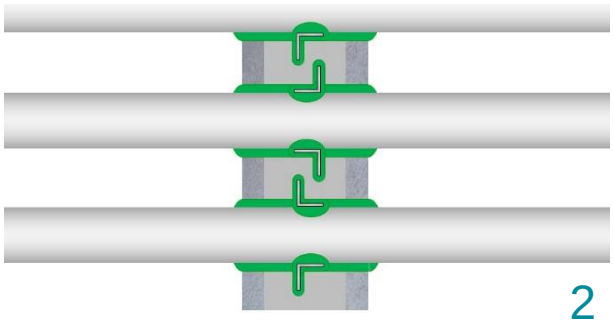
11

Outerglass Shield XT can be coated with a topcoat at above ground pipe supports.

Pipe can be placed in the support after initial curing time of the Outerglass Shield XT. Polyester can be used as an alternative extra mechanical protection layer.



Ensure a proper surface preparation prior to the application. Apply Paste CZ in the sharp edges, under and around the pipe at the contact on the support.

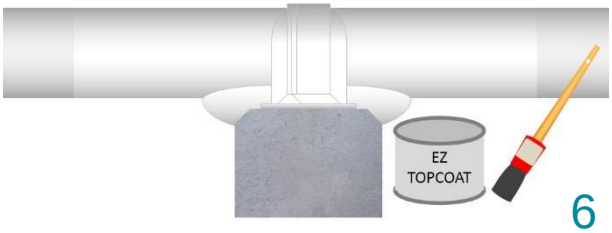


Apply without air enclosures and firmly press the materials in all corners, underneath and around the pipe into the pores of the substrates.

Apply Stopaq Basecoat over the entire support with a minimum overlap of 10mm on a previous applied strip Basecoat.

Apply without tension and avoid air enclosures. Check the adhesion on a regular base.

Apply EZ Topcoat over the entire area.



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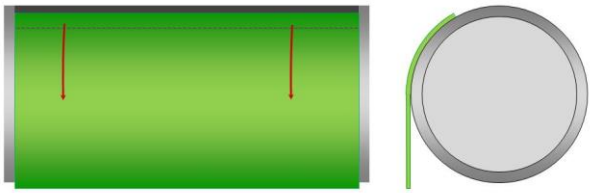
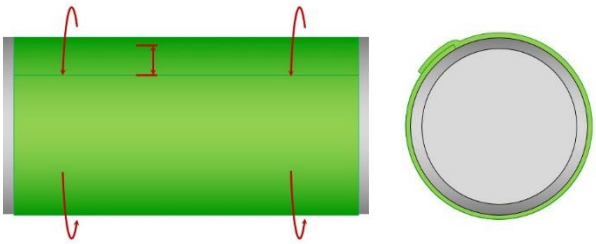


1

Ensure a proper surface preparation prior to the application of Wrappingband. The width of the Wrappingband according chapter “When to use which roll width”.

2

…

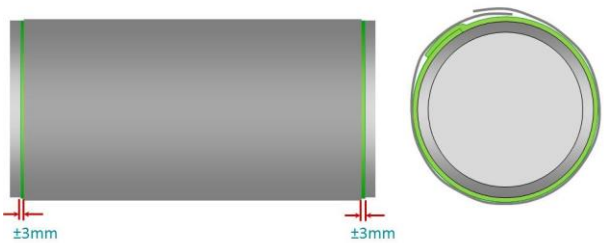


3

Apply Wrappingband without air inclusions as described in chapter “cigarette wrap”.

4

…

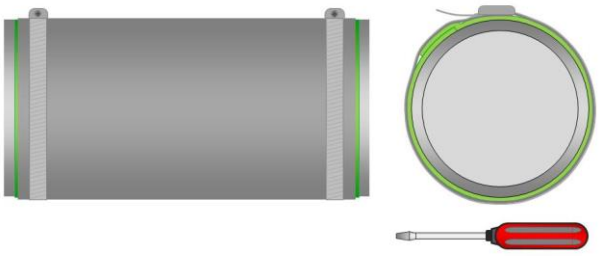


5

Install an Aluminium sheet with nearly the same length of the applied Wrappingband. Keep approx. 3mm Wrappingband exposed at both ends.

6

…

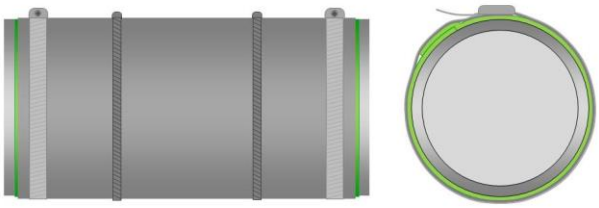


7

Tie the Aluminium sheet tight with stainless steel straps.

8

…

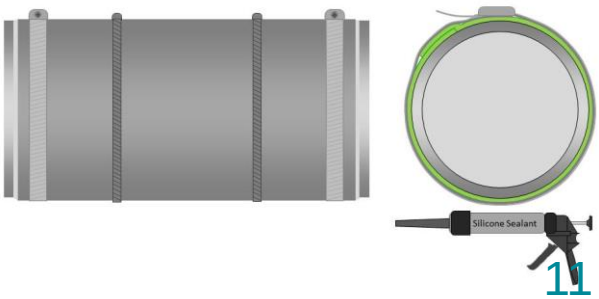


9

Extra plastic tie wraps can be used in between the stainless steel straps.

10

…

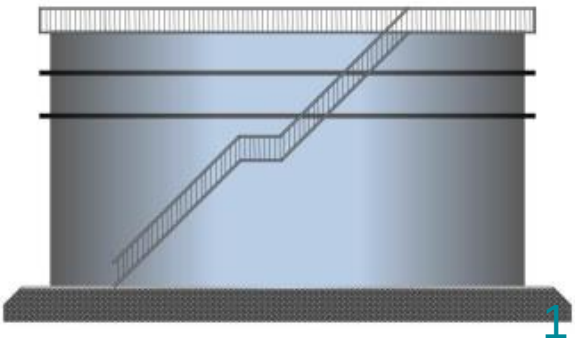


11

Apply Silicone Sealant in the edge between the Aluminium Sheet and the applied Wrappingband.

12

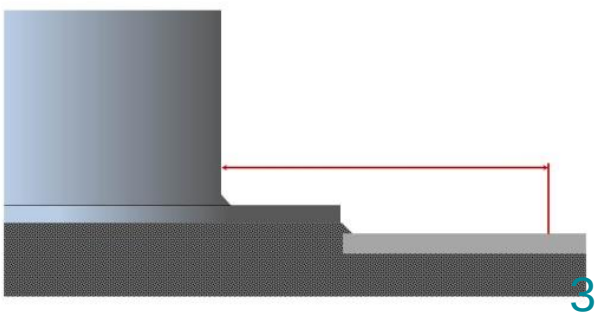
…



1

Chime area of a tank which has to be coated with Chime Area Coating System.

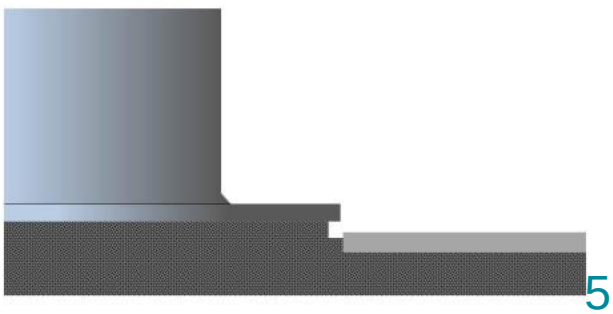
2



3

Ensure a proper surface preparation of steel and concrete prior to the application of the Stopaq materials. The concrete must be dry, free from any loose contaminations and/or dust.

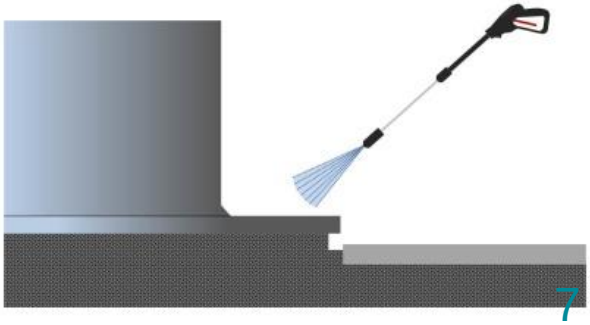
4



5

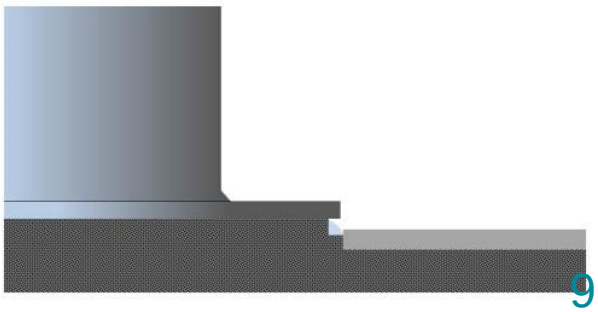
Ensure some space underneath the steel bottom flange adjacent to to the concrete. The steel ring has to be above the concrete.

6


7

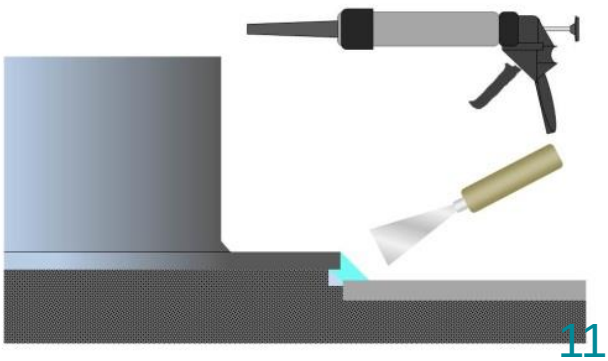
The entire area has to be cleaned prior to application. High pressure water jetting is recommended.


8


9

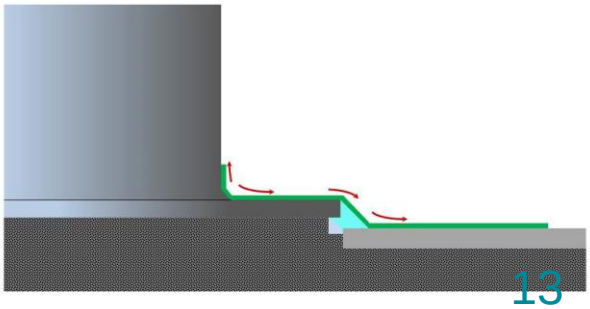
Area has to be completely dry prior to application. Apply a foam backing filler into the chime area void to avoid excess material use of 4200 Filler.


10


11

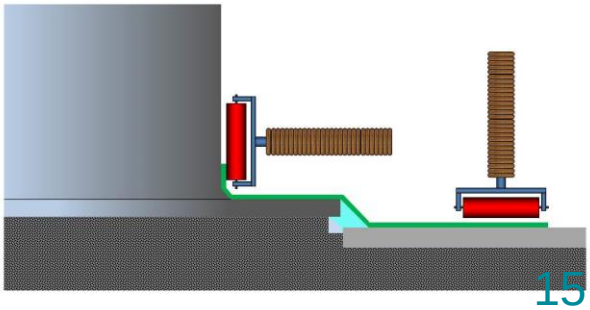
Apply 4200 Filler with the application tool and avoid air inclusions. A putty knife can be used to create a 45° angle between the concrete and metal bottom flange.


12


13

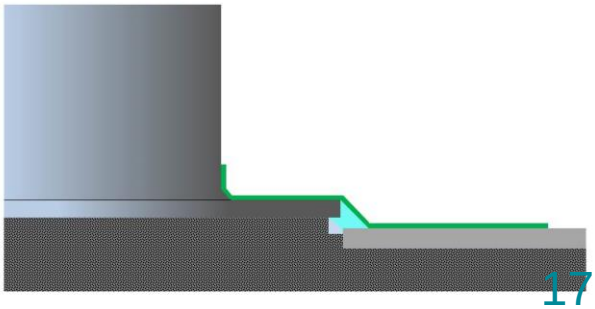
Apply Wrappingband EZ without tension and avoid air inclusions. Start on the tank wall and work towards the concrete. Dimensions according client specifications. Check adhesion on a regular base.


14


15

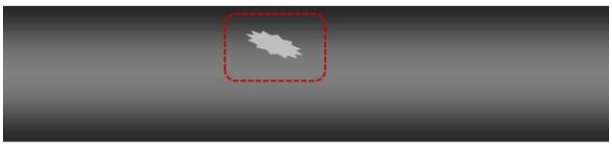
Use a roller to press the Wrappingband tight onto the surface.

16


17

A topcoat should be applied immediately after application.

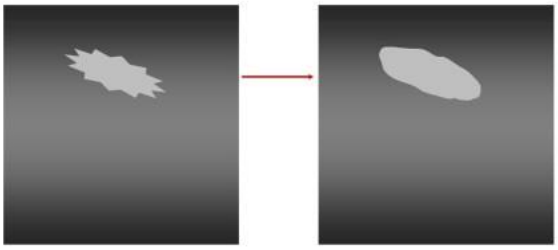

18



1

At the damaged spot, verify whether the steel substrate is also damaged. Do not repair the coating until supervisors have inspected the damaged steel surface and have approved coating repair.

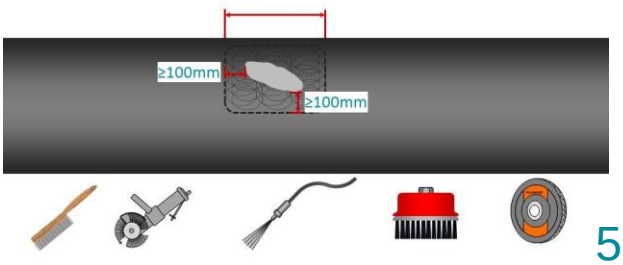
2



3

Remove loose coating and bevel all sharp edges of the coating damage.

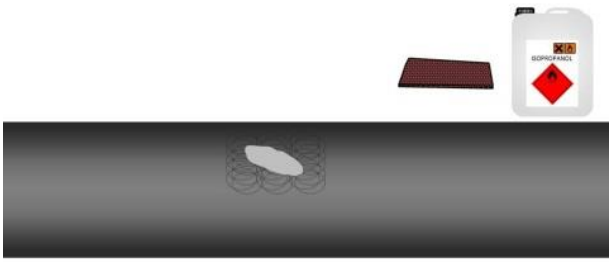
4



5

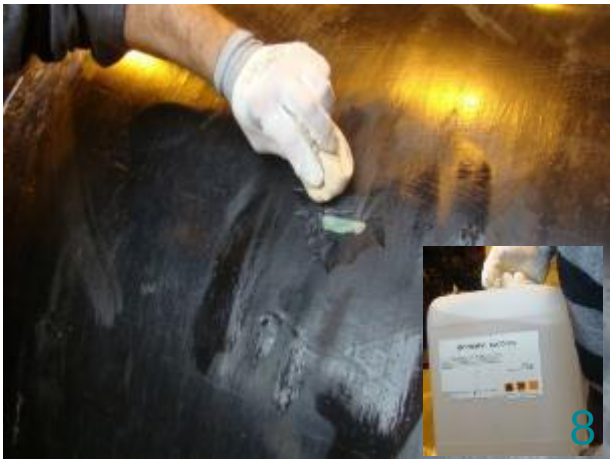
Roughen the surface of the plant coating around the damaged spot with an abrasive pad or sand paper. Remove all contaminations.

6

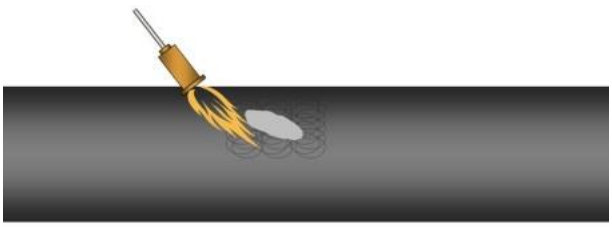


7

Degrease with isopropyl alcohol. Do not use a thinner.



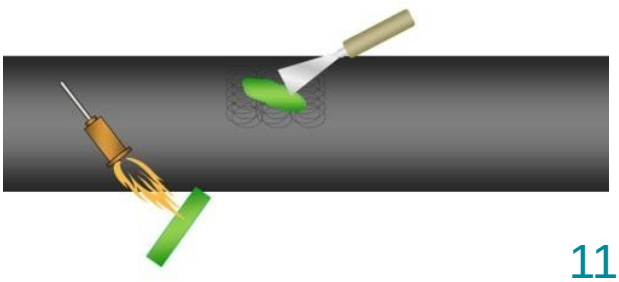
8



9

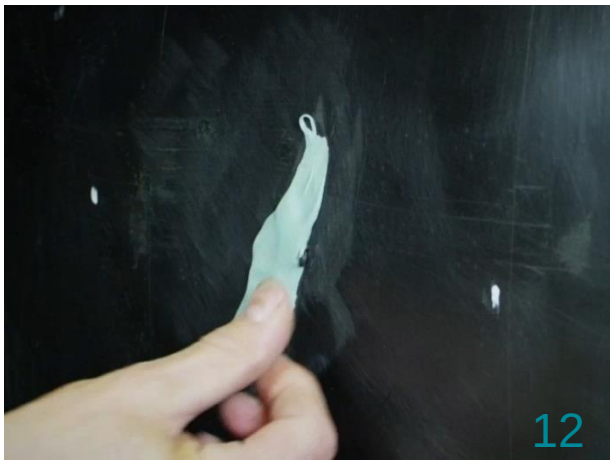
Preheat the area until approx. 70°C.

10

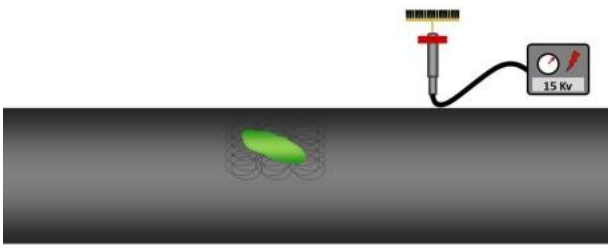


11

Preheat some Paste and mould it into the damaged area without air inclusions. Avoid smearing Paste beyond the damaged area.



12

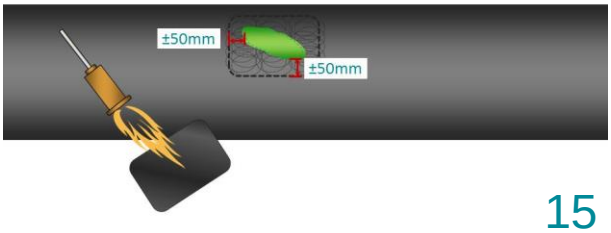


13

A holiday test using a high voltage tester must be carried out on the green Stopaq Paste prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

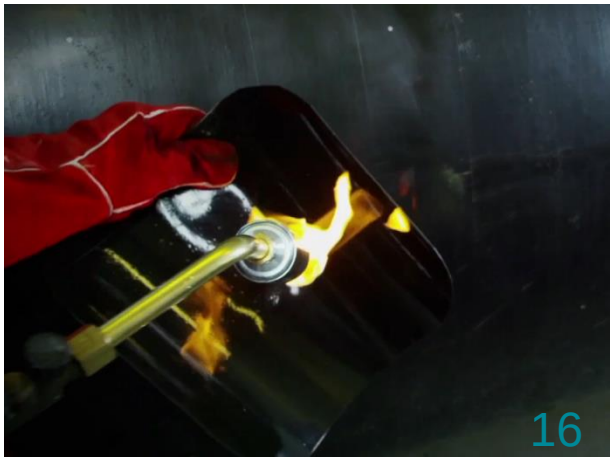
14

Always use approved and certified holiday test equipment.

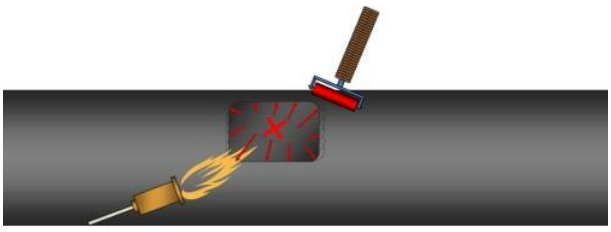


15

Cut a Repair Patch with dimensions of at least 50mm bigger than the damaged area. Preheat the patch and place it over the Paste.

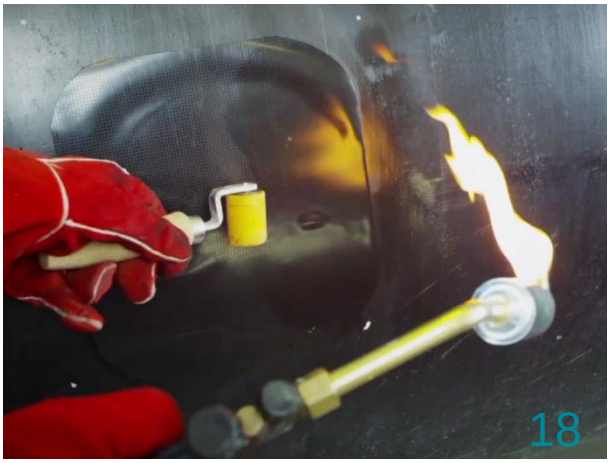


16

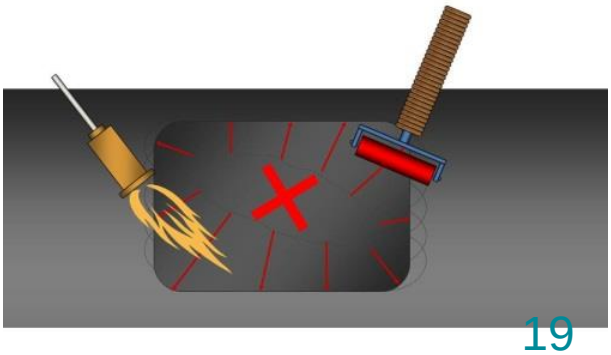


17

Heat the patch with a torch (moderate flame), use a siliconized roller to press the patch onto the surface and remove eventual air inclusions.



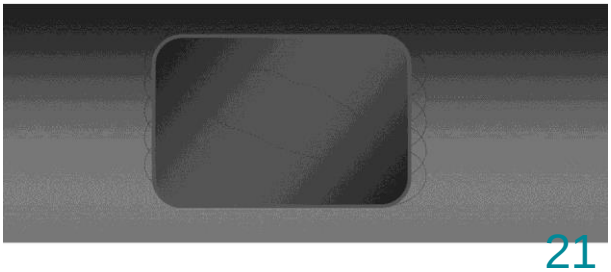
18



19

Do not roll over the area where the Paste has been applied.

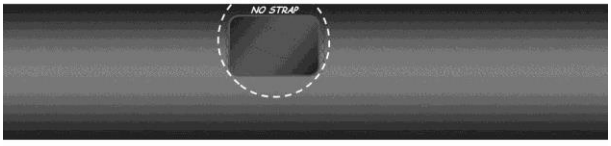
20



21

The dimpled pattern will disappear when sufficient heat has been applied and some hot melt will protrude from underneath the patch.

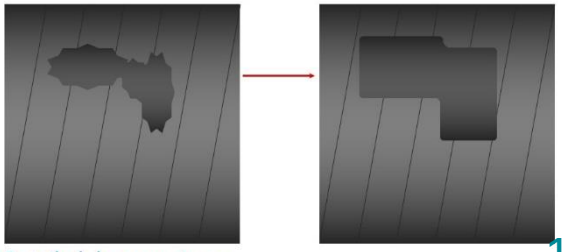
22



23

Mark the repaired area to indicate that straps must not be put around the repaired area.

24

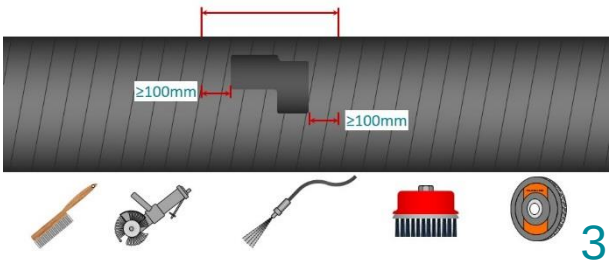


1

At the damaged spot, verify whether the steel substrate is also damaged. Do not repair the coating until supervisors have inspected the damaged steel surface and have approved coating repair.

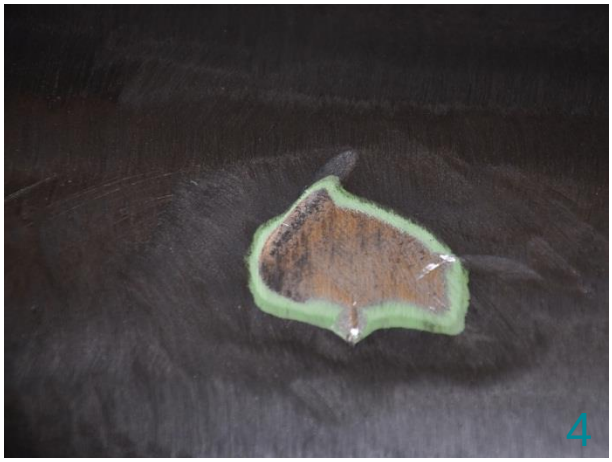
2

Remove loose coating and bevel all sharp edges of the coating damage.



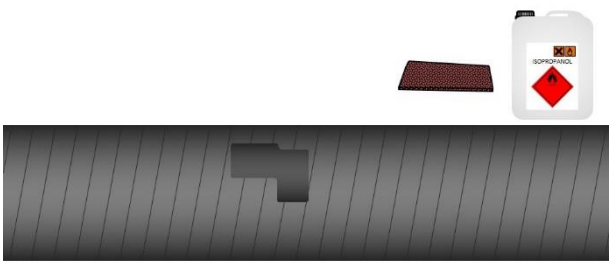
3

Roughen the surface of the plant coating around the damaged spot with an abrasive pad or sand paper. Remove all contaminations.



4

…

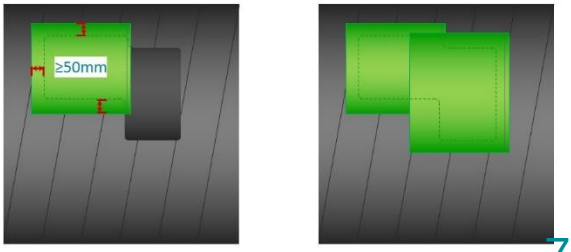


5

Degrease with isopropyl alcohol. Do not use a thinner.

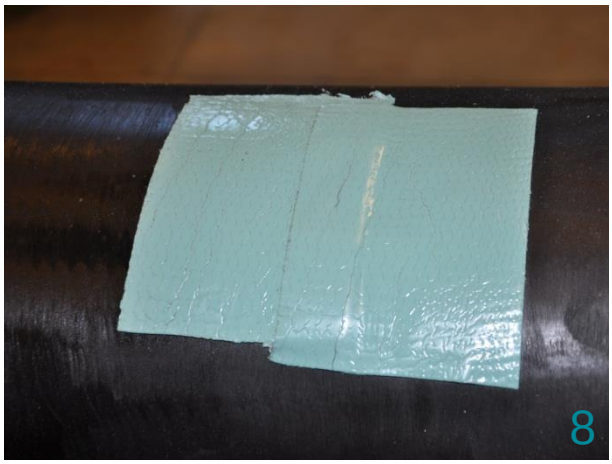
6

…

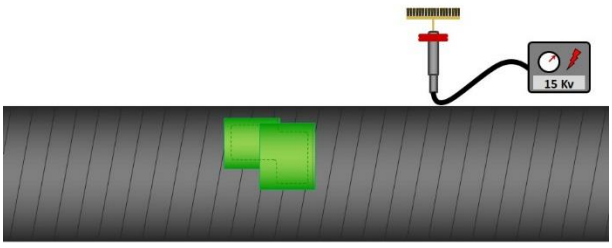


7

Depending on the size and depth of the damage, Paste might be necessary to fill the damage. Apply strips of Wrappingband over the damaged area with a minimum overlap of 50mm on the factory applied coating.



8

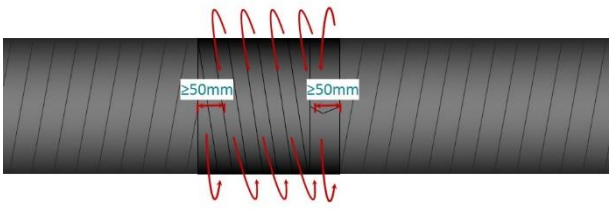


9

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

10

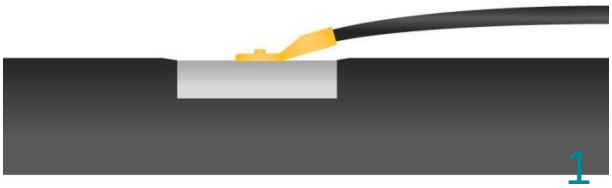
Always use approved and certified holiday test equipment.



11

Apply Outerwrap over the Wrappingband with tension and avoid air inclusions. Start and finish with an overlap of at least 50mm on plant coating adjacent to the 50mm outside the Wrappingband.

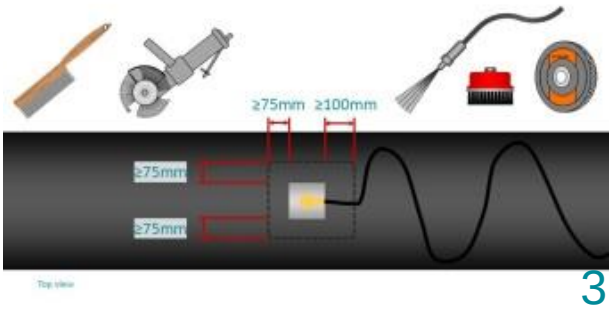
12



1

Bevel the edges of the plant coating surrounding the Pinbraze.

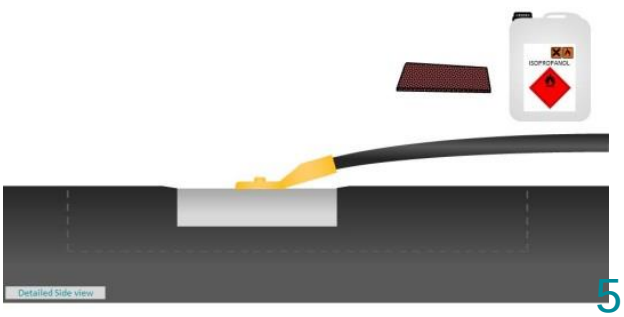
2



3

Roughen the surface of the plant coating surrounding the Pinbraze with an abrasive pad or sand paper. Remove all contaminations.

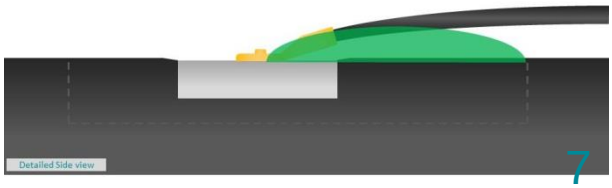
4



5

Degrease with isopropyl alcohol. Do not use a thinner.

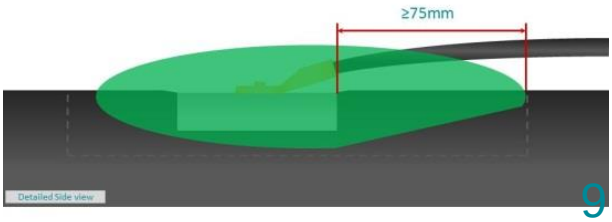
6



7

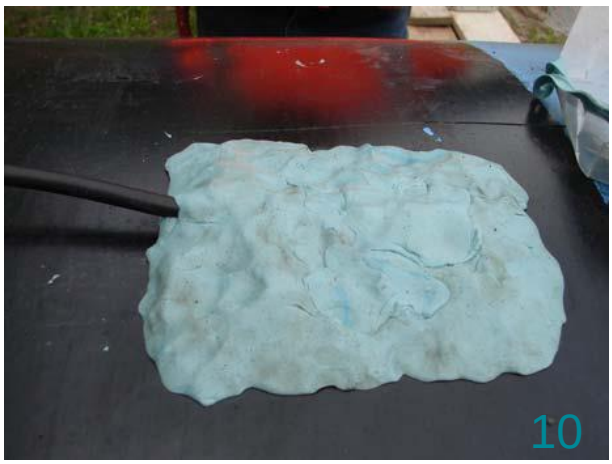
Apply preheated Paste around the Pinbraze and underneath the connecting wire. Check the adhesion of the paste

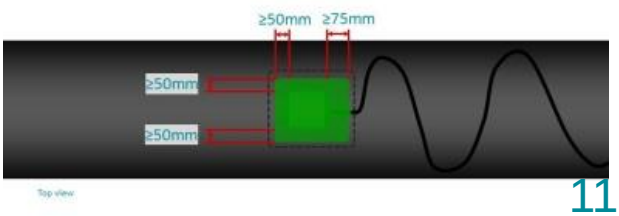

8



9

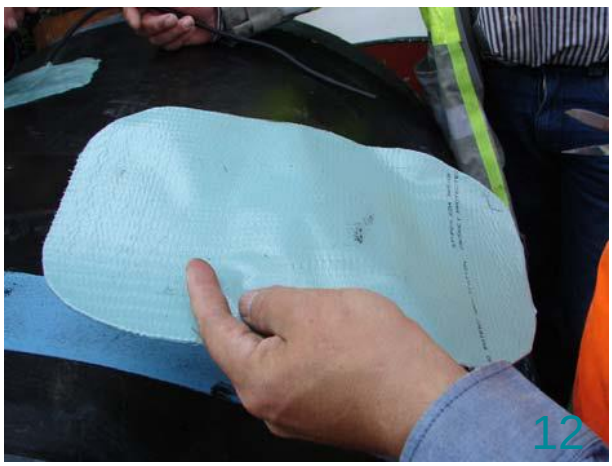
Fill the area around the Pinbraze with preheated Paste. Avoid air inclusions.

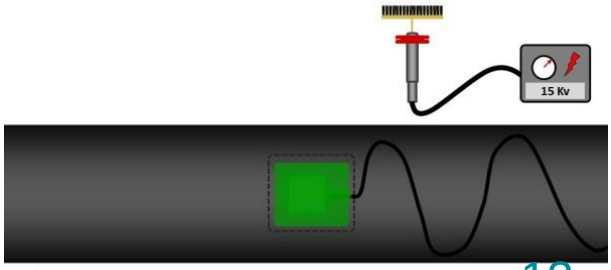

10



11

Pre cut a patch of Wrappingband according to the above drawing and place it over the Paste.


12

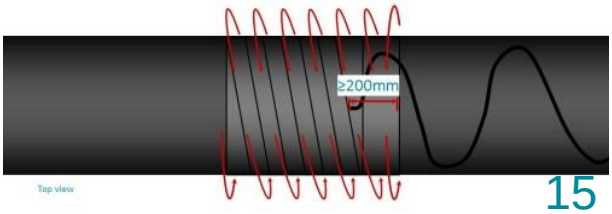


13

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

14

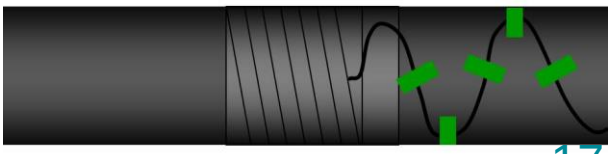
Always use approved and certified holiday test equipment.



15

Apply Outerwrap HTPP with tension over the Wrappingband and avoid air inclusions. Start and finish with an overlap of at least 50mm on plant coating adjacent to the Wrappingband.

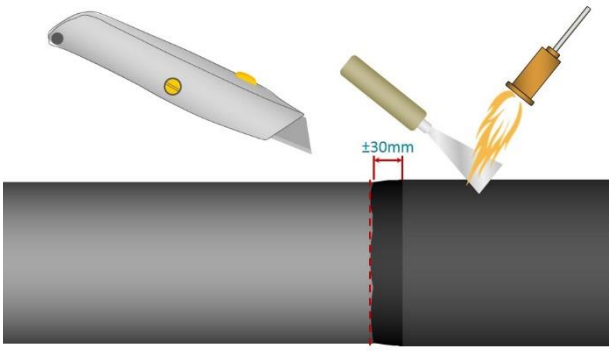
16



17

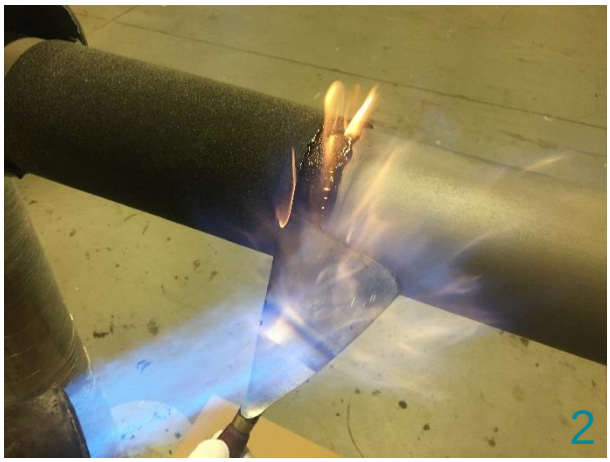
Use strips of Wrappingband to place the CP cable with loops on the surface.

18



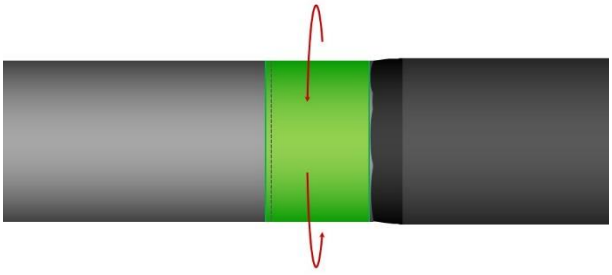
1

Make a straight, circumferential, cut in the bitumen up to the bare steel and remove the bitumen as straight as possible from the pipe.



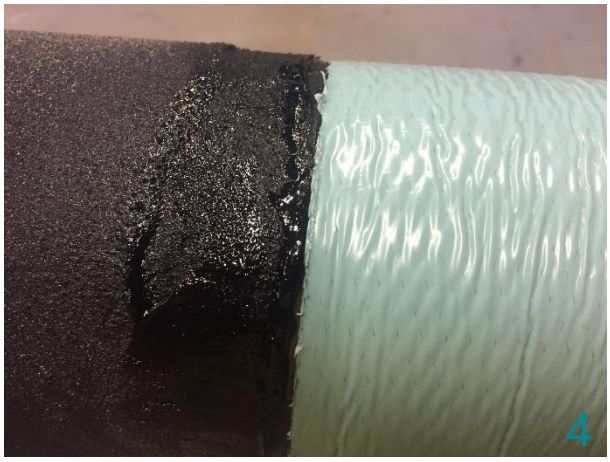
2

Use a hot putty knife to flatten approx. 30mm of the bitumen and remove all contaminations.



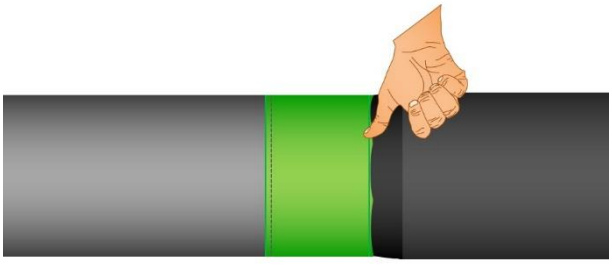
3

Apply a straight wrap Wrappingband on the steel surface, touching the bitumen. Any small uncovered areas between the Wrappingband and bitumen will be filled with Paste CZ.



4

Wrappingband shall be applied with minimum tension and without air enclosures. Apply with a minimum circumferential overlap of 50mm.

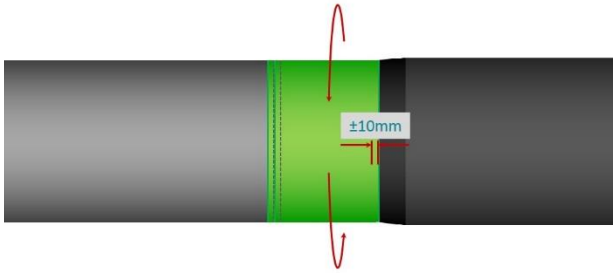


5

Apply Paste CZ into any uncovered areas between the Wrappingband and bitumen. Firmly press the Paste without and air enclosures into the pores of the substrate.

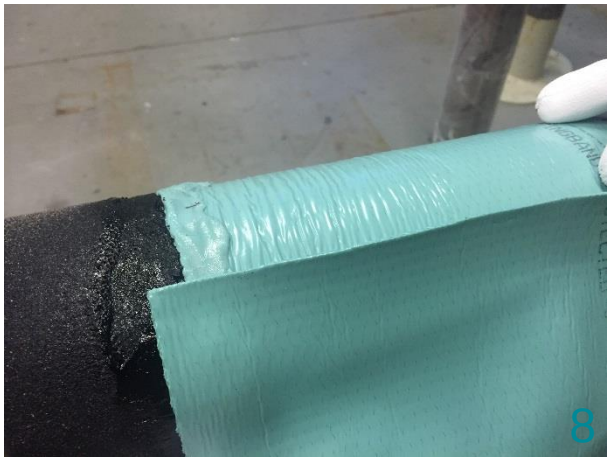
6

If necessary, bevel the edge between Paste and Wrappingband. Do not cover bitumen with Paste.



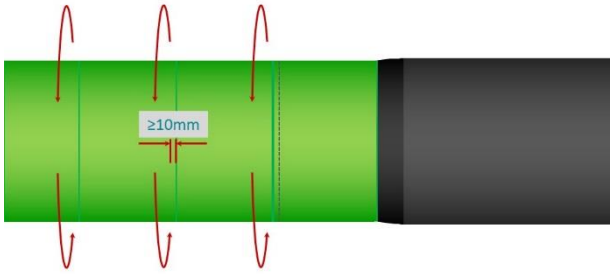
7

Apply a straight wrap Wrappingband, overlapping approx. 10mm over the bitumen.



8

Wrappingband shall be applied with minimum tension and without air enclosures. Apply with a minimum circumferential overlap of 50mm.

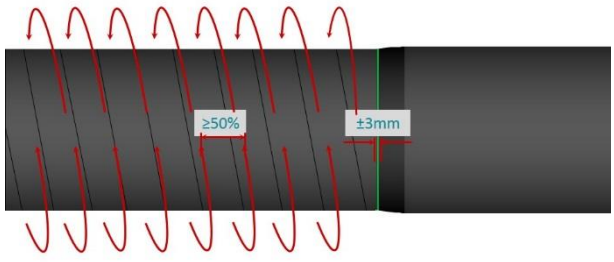


9

Apply Wrappingband on the rest of the pipeline by means of straight or spiral wrap. A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

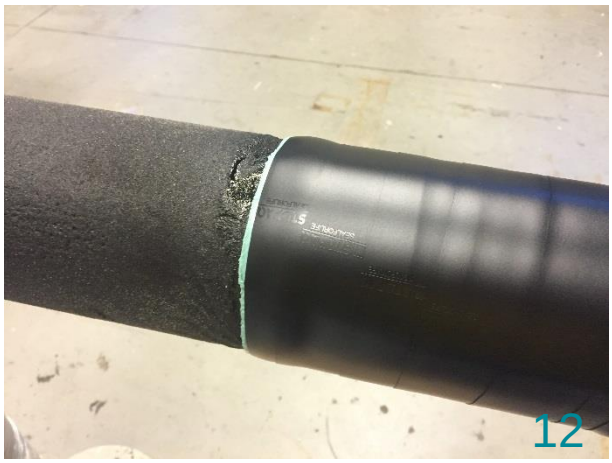
10

Always use approved and certified holiday test equipment.



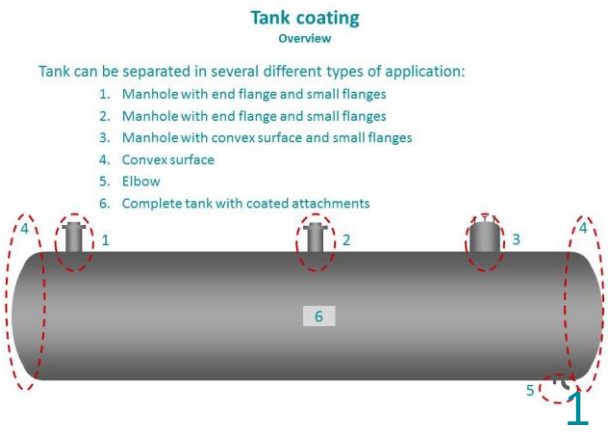
11

Apply Outerwrap over the applied Wrappingband. Start with 2 straight circumferential wraps and continue by means of spiral wrap. Keep approx. 3mm Wrappingband exposed.



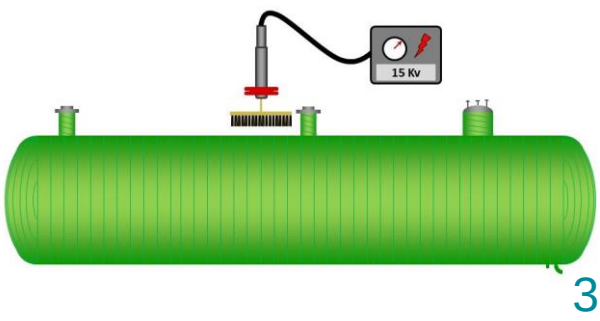
12

Outerwrap shall by applied with tension and a minimum overlap of 50%. Avoid air enclosures.



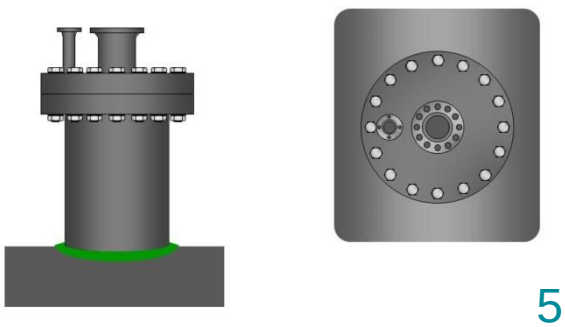
Tank to be coated with Stopaq Wrappingband, Outerwrap and Outerglass Shield. The tank can be separated in several sub-applications.

Final result of the coated tank coating, excl. the Outerglass Shield.



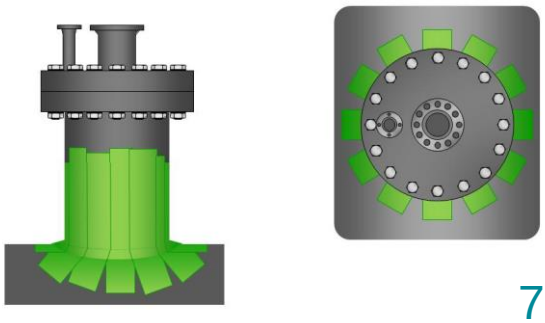
A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV. Holiday test can be carried out after each separate application.

Always use approved and certified holiday test equipment. Holiday test shall be performed after the application of Wrappingband on each sub-application.



Apply Paste in the transition area between the manhole/riser to smoothen the edge.

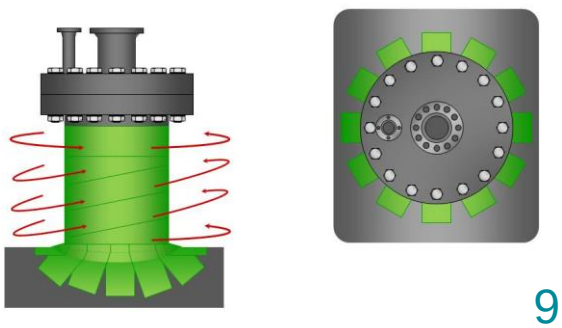
Apply Paste without air-inclusions.


7

Cover the Paste with strips of Wrappingband, overlapping the tank and onto the manhole.


8

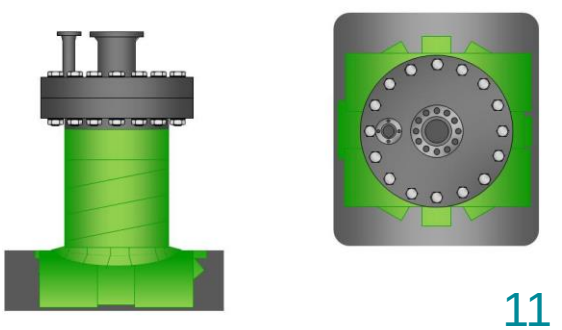
Press the Wrappingband into the pores of the substrate. Do not overlap the Wrappingband too much onto the tank.


9

Apply Wrappingband on the manhole. Apply without tension and a side-by-side overlap of at least 10mm.


10

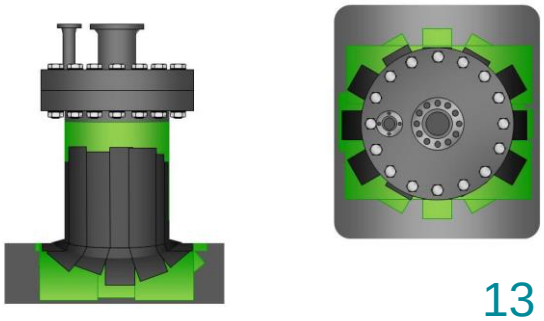
Wrappingband can be applied with spiral wrap or with straight wraps. Work bottom-to-top.


11

Straight wraps of Wrappingband must be applied on the tank touching the manhole. Cut an arc in the Wrappingband with the diameter of the manhole to ensure a tight application.

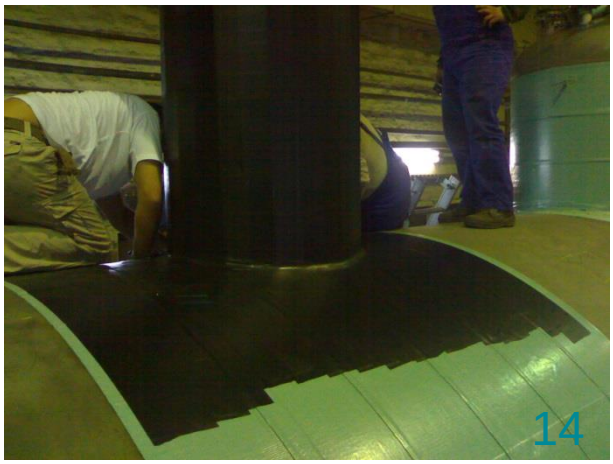

12

After holiday test, apply Outerwrap in the transition area between the manhole and tank.



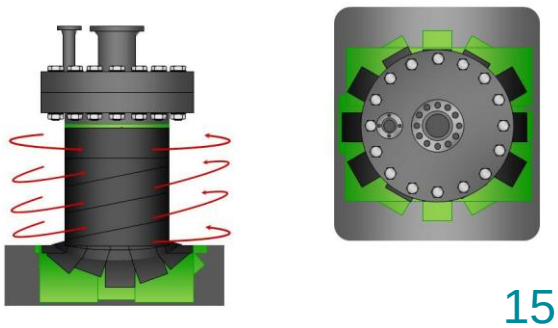
13

Apply strips of Outerwrap around the circumference of the manhole. Side-by-side overlap at least 50%.



14

Strips of Outerwrap must be applied on the tank, touching the manhole.

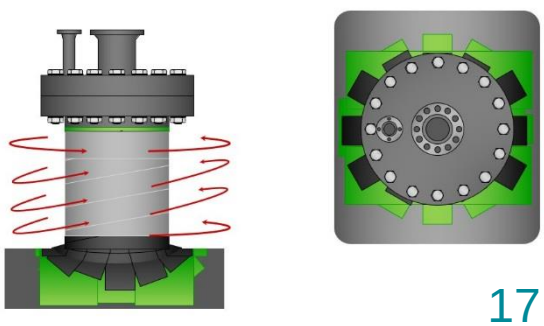


15

Apply Outerwrap on the manhole using spiral wraps with a minimum overlap of 50%.

16

Apply Outerwrap with tension and without air inclusions. keep 3mm of Wrappingband visible.

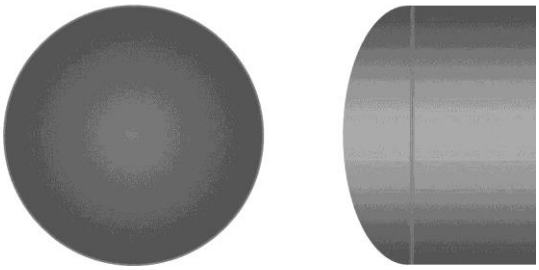


17

Outerglass Shield XT must be applied on the manhole as explained in specific chapter. All the manholes must be covered with this procedure.

18

The coating performance will not be impaired when the compression foil remains on the Outerglass Shield.

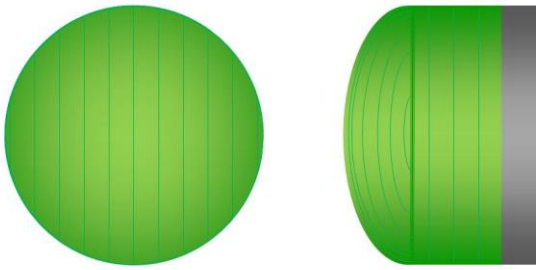


25

Convex surface to be coated with Stopaq Wrappingband and Outerwrap.

26

Apply Wrappingband with straight wraps on the convex surface. Side-by-side overlap minimum 10mm.

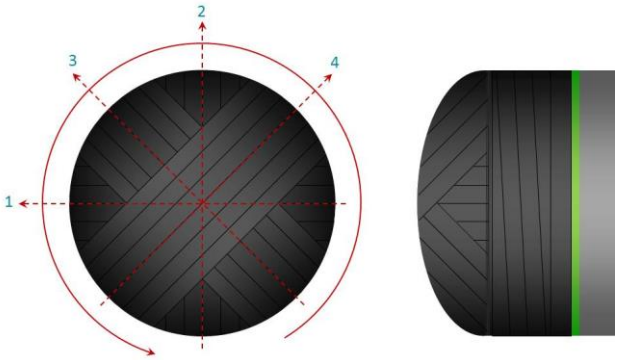


27

Continue until the entire convex is covered. Afterwards, apply Wrappingband on the tank to encapsulate the ends of the previous applied Wrappingband. Total length approx. 1 meter.

28

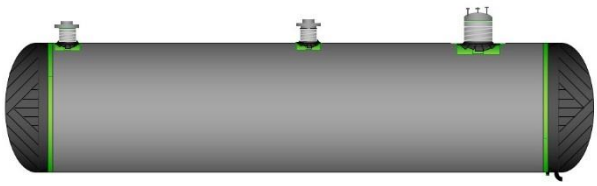
Finished convex surface. Perform holiday test prior to the application of Outerwrap.



Apply Outerwrap cross-wise on the convex surface as shown in the drawing. Start with several circumferential wraps on the tank to improve the adhesion of the Outerwrap. Apply without air inclusions.

30

Afterwards, apply Outerwrap on the tank to encapsulate the ends of the previous applied Outerwrap. Outerwrap might wrinkle. Keep 20mm Wrappingband exposed.

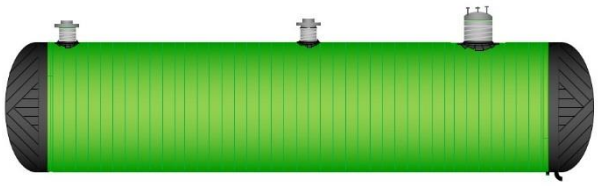


31

Tank to be coated with Wrappingband and Outerwrap, with the utilities previous coated.

32

..



33

Tank completed with Wrappingband. Avoid air inclusions underneath the Wrappingband during application. Avoid walking on the coating to prevent damages.

34

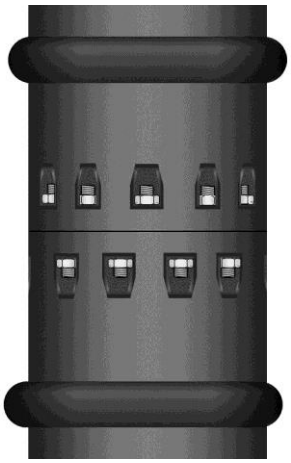
Perform holiday test prior to the application of Outerwrap.

35

Tank coated with Wrappingband, Outerwrap and Outerglass Shield.

36

Backfill with clean sand. Backfill is possible immediately after application.

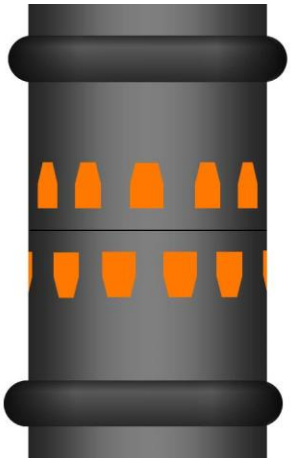


1

Neoprene hose connection to be bolted together and sealed with Wrappingband and Neoprene sleeve

2

Ensure the bolts are installed according specification

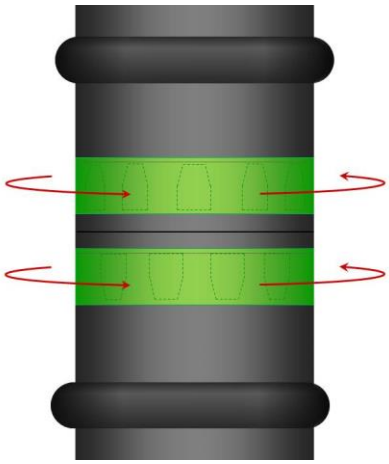


3

Install the blocks after the bolts have been installed

4

First place the rear blocks, then the front blocks

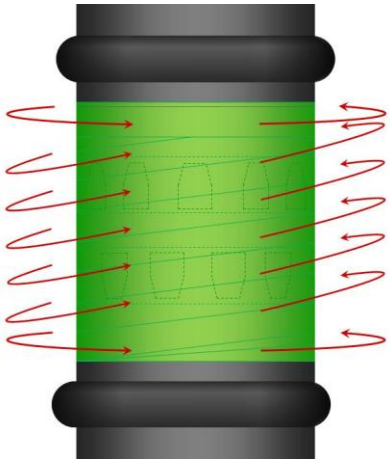


5

After sufficient surface preparation and a succesfull adhesion check, apply a straight wrap of Stopaq Wrappingband centrally over the blocks. Apply without tension and without air inclusions

6

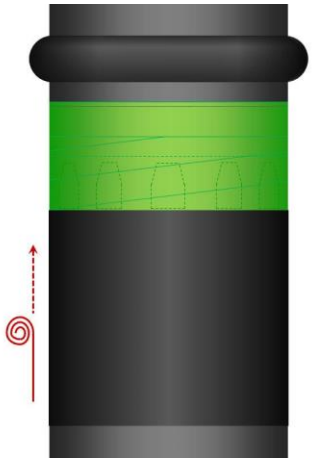
If several wraps of Wrappingband are needed, side-by-side overlap minimum 10mm. Circumferential overlap minimum 50mm



7

Apply Stopaq Wrappingband by means of straight or spiral wrap over the entire area

…



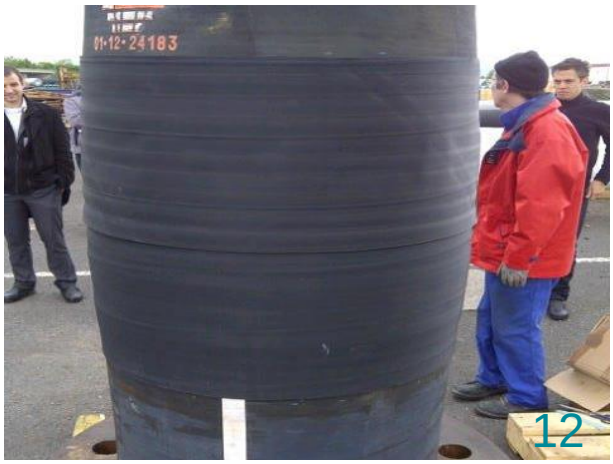
9

Close the bottom neoprene sleeve

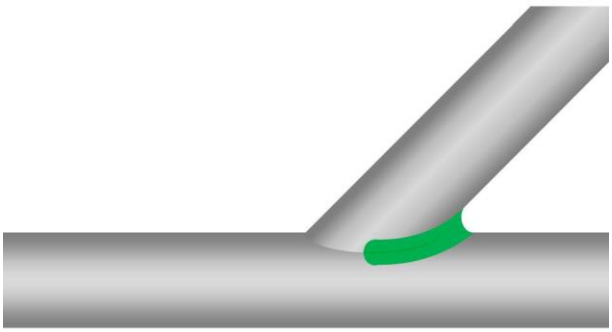
…

11

Close the top neoprene sleeve



…

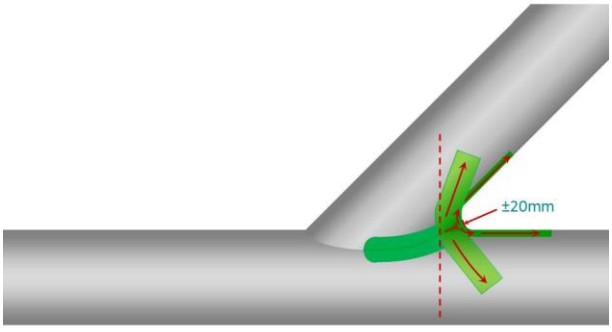


1

Ensure a proper surface preparation prior to the application of Paste and Wrappingband.

2

Apply a thick layer of Paste in the corner between both pipes to smoothen the edge.

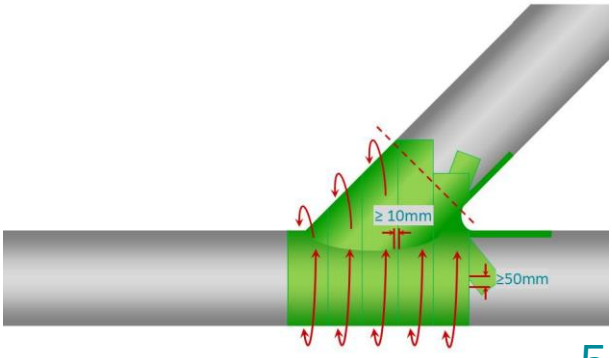


3

Apply strips of Wrappingband on the inside of the Y-connection from the corner on the diagonal and horizontal pipe. Apply without tension and without air inclusions. Overlap approx. 20mm in the edge.

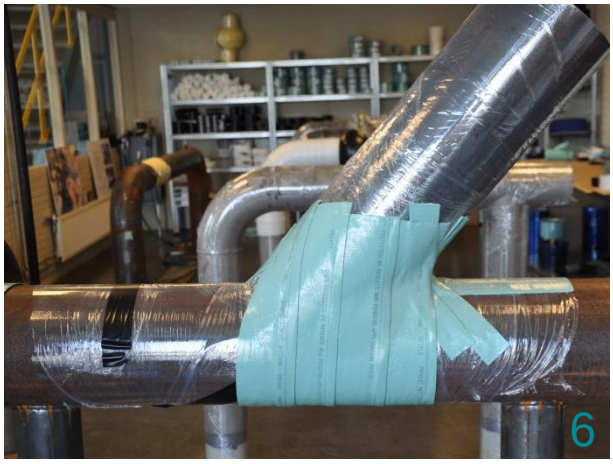
4

Do not use a wide strip of Wrappingband. Depending on the diameter, 50mm wide Wrappingband must be used. Press the Wrappingband firmly on the surface.



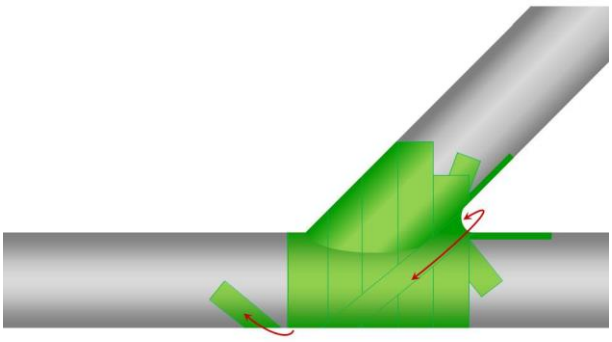
5

Continue with wider strips of Wrappingband, applied straight from the outside of the horizontal pipe up to over the diagonal pipe. Length of the strip is depending on the position. Wrappingband must be applied at least to the marked line.



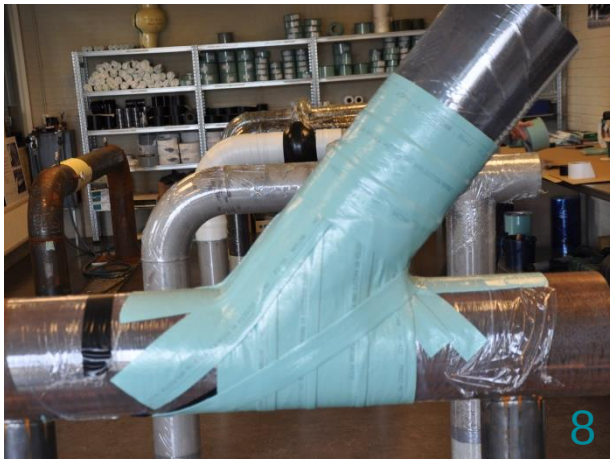
6

Side by side overlap minimum 10mm and consecutive overlap minimum 50mm.



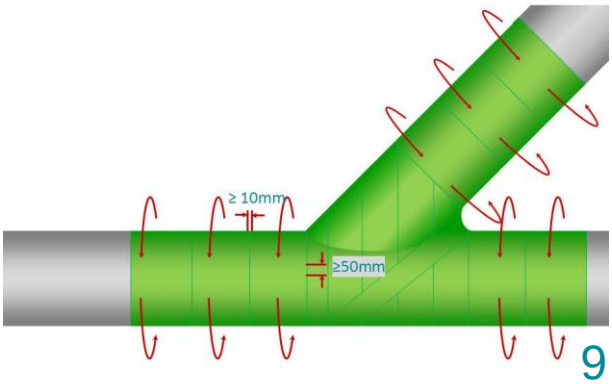
7

Apply a strip of Wrappingband through the corner of the Y-Connection.



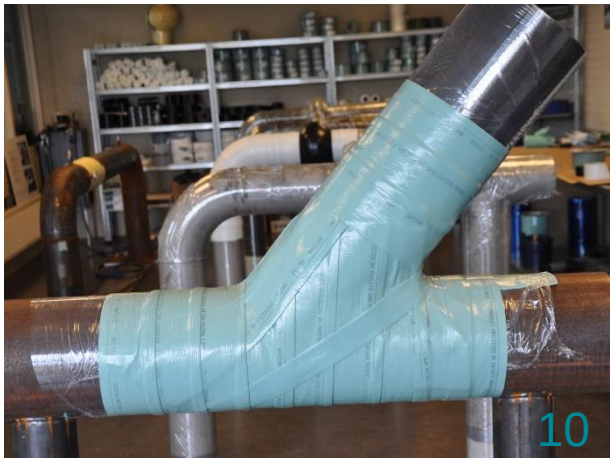
8

The strip must be applied with tension and extend the previous applied straight wraps of Wrappingband.



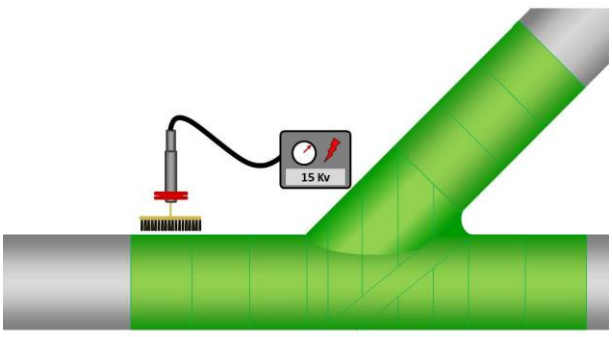
9

Apply Wrappingband on all pipe sections. Start touching the Y-Connection. Total area to be coated depends on customer specifications.



10

Side by side overlap minimum 10mm and consecutive overlap minimum 50mm. Check that there are no uncovered areas.

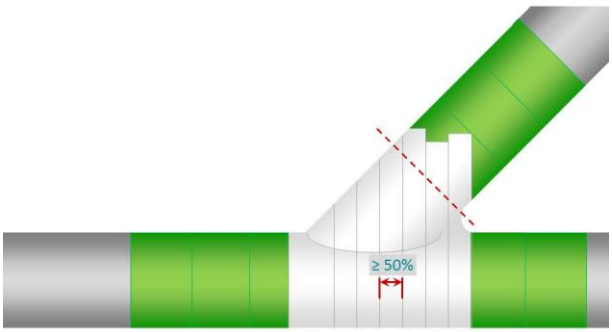


11

A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15 kV. Always use approved and certified holiday test equipment.

12

Apply strips of Outerwrap, applied straight from the edge of the horizontal pipe until the diagonal pipe is covered.

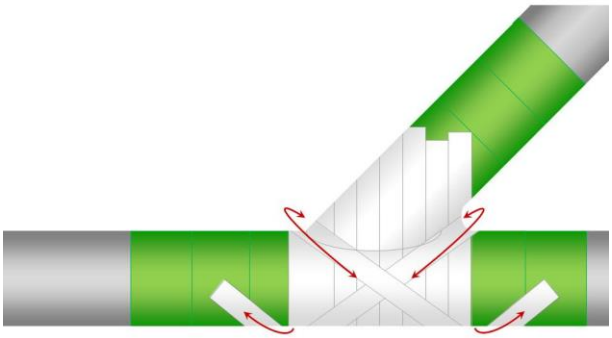


13

Length of the strips depending on the position. Outerwrap must be applied minimum up to the marked line.

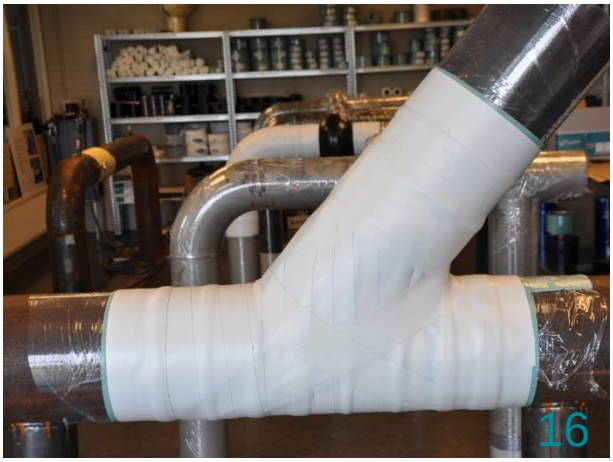
14

Side by side overlap of the Outerwrap minimum 50%. Outerwrap might divert and therefore the overlap will decrease.



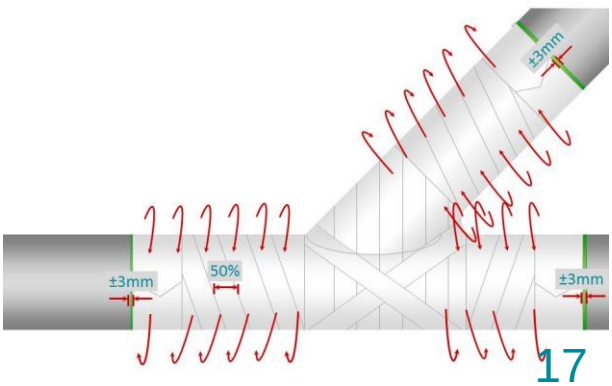
15

Apply 2 strips of Outerwrap with tension through the corners of the Y-Connection. The strips must extend the previous applied straight wraps of Outerwrap.



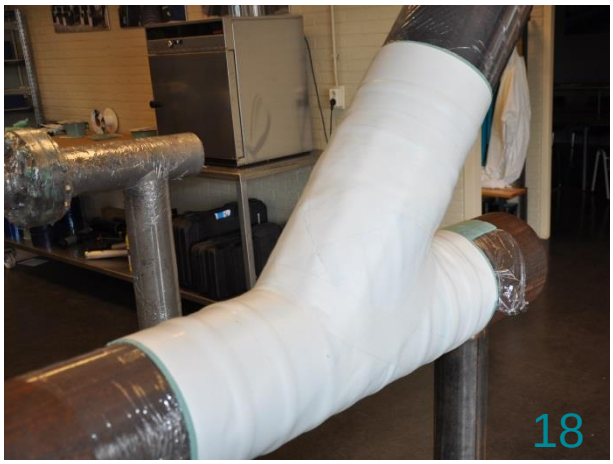
16

Apply Outerwrap with spiral wrap on the adjacent pipes. Start touching the Y-Connection.



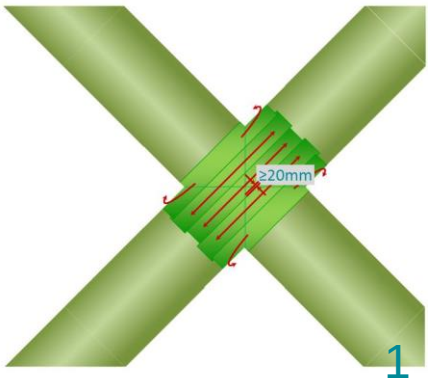
17

Outerwrap must be applied with tension and a minimum overlap of 50%. Keep approx. 3mm Wrappingband exposed.

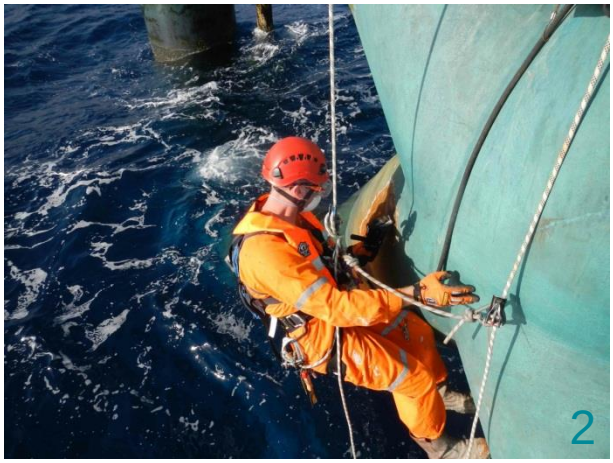


18

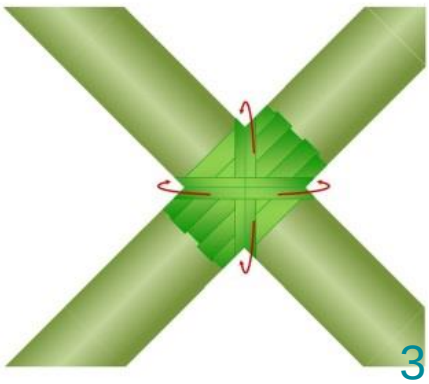
…



Ensure a proper surface preparation prior to the application of Wrappingband. Apply strips of Wrappingband over the center of the X-Knot until the area covered is wider than the pipe diameter. Wrappingband should be applied with an overlap of at least 20mm.

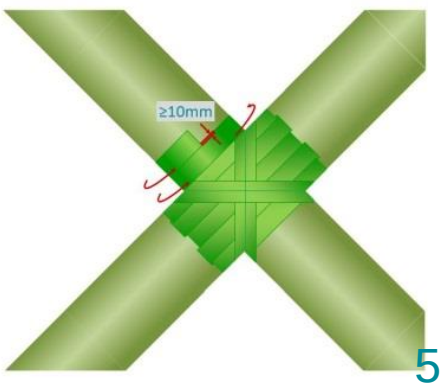


Wrappingband must be applied without air inclusions.

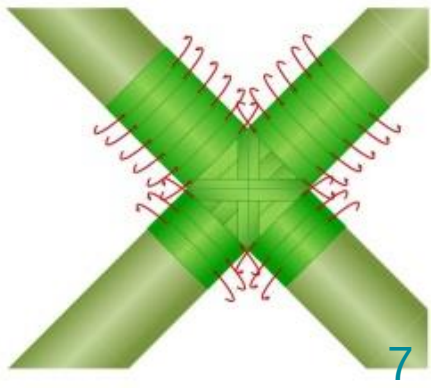


Apply strips of Wrappingband with tension through the corners of the X-Knot.

Wrappingband might diverge a bit resulting in reduction of the overlap.

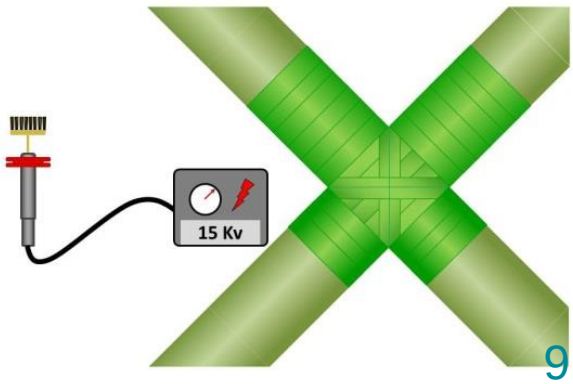


Start straight wrap application of Wrappingband adjacent to the previously applied Wrappingband on the X-Knot. Side by side overlap should be at least 10mm.



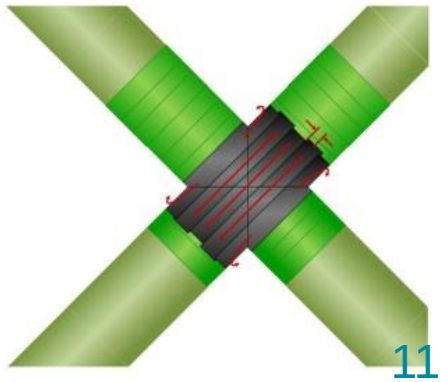
Continue application until the entire area is covered with Wrappingband. Dimensions according to client specification.

Wrappingband can be applied by straight or spiral wrap. Avoid air inclusions.



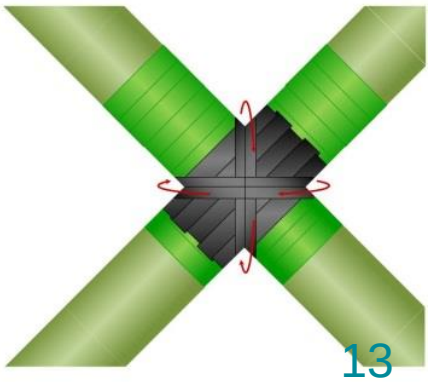
A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

Always use approved and certified holiday test equipment.

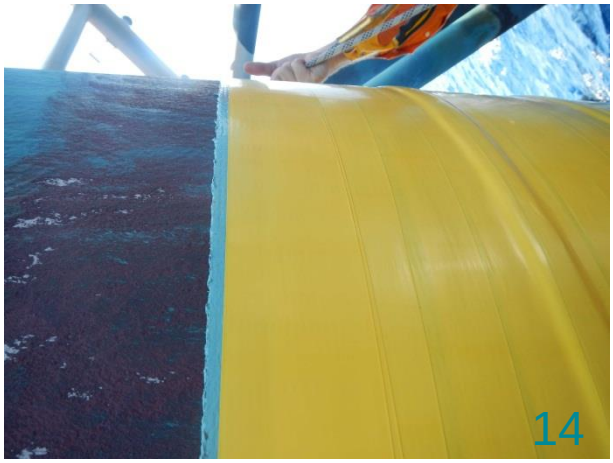


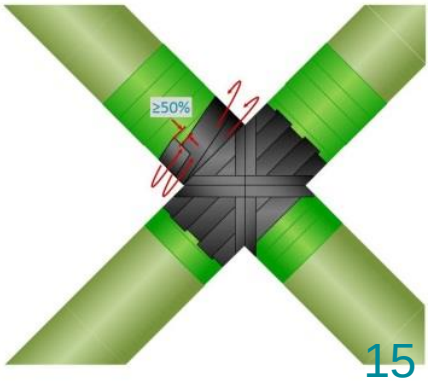
Apply strips of Outerwrap over the center of the X-Knot until the area covered is wider than the pipe diameter. Outerwrap should be applied with an overlap of at least 50%.

Outerwrap might diverge a bit resulting in reduction of the overlap.

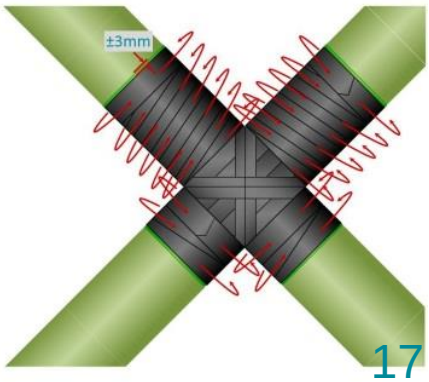


Apply strips of Outerwrap with tension through the corners of the X-Knot.

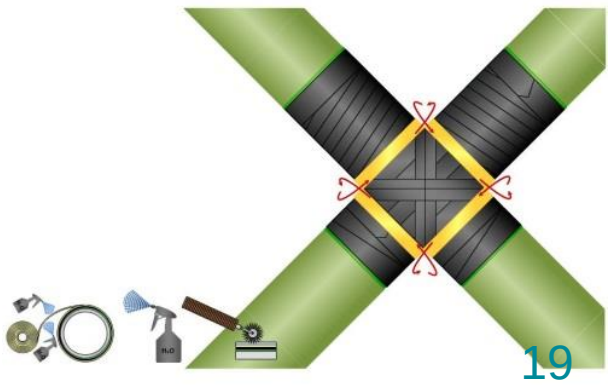




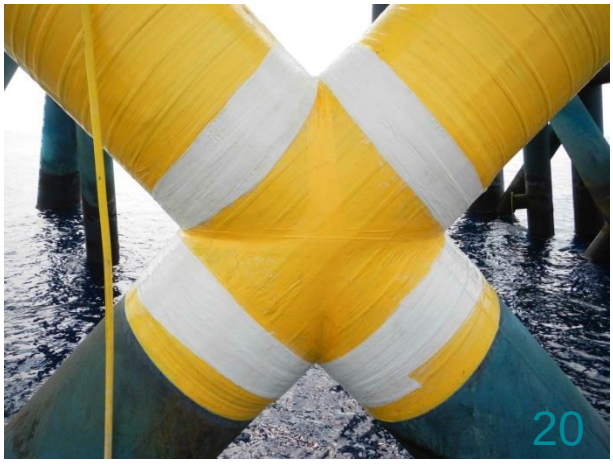
Start spiral wrap application of Outerwrap adjacent to the previously applied Outerwrap on the X-Knot. Side by side overlap should be at least 50%.



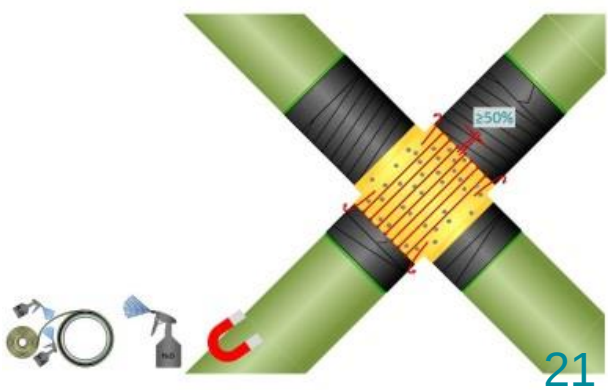
Continue application until the entire area is covered with Outerwrap. keep 3mm of Wrappingband visible.



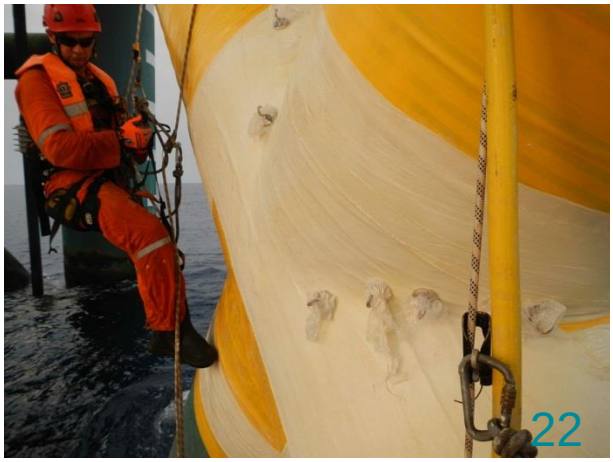
Apply 2 layers of Outerglass Shield through the corners of each diagonal pipe. Start touching the X-Knot. Continuous wetting of Outerglass Shield is required.



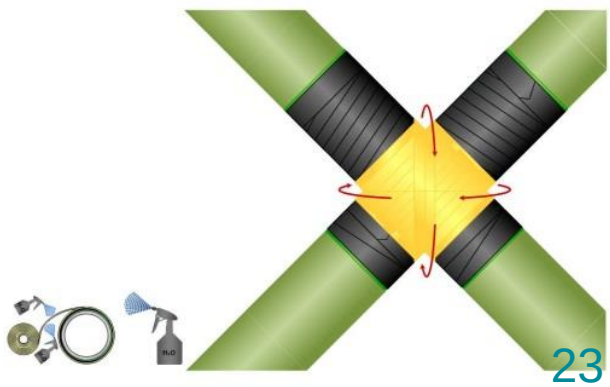
Wrap compression foil after every roll of Outerglass Shield. Perforate the foil and remove after initial curing has completed.



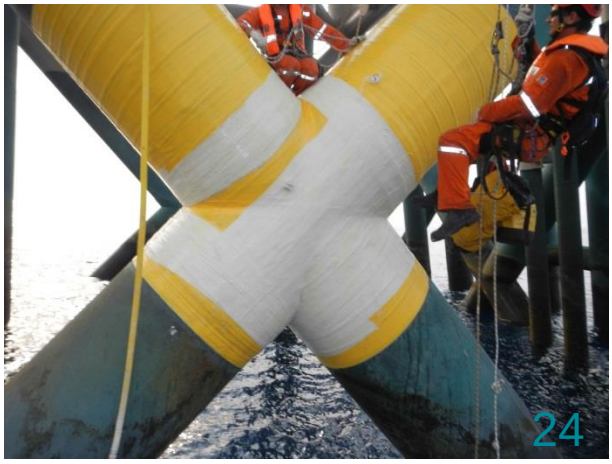
Apply strips of Outerglass Shield over the X-knot with a minimum overlap of 50%. Cover the entire area in-between the previous applied straight wraps of Outerglass Shield.

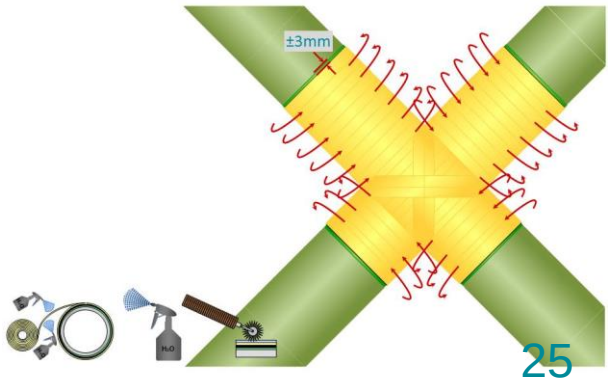


Magnets can be used to keep the Outerglass Shield in position. Apply compression foil using the same procedure as previously described.



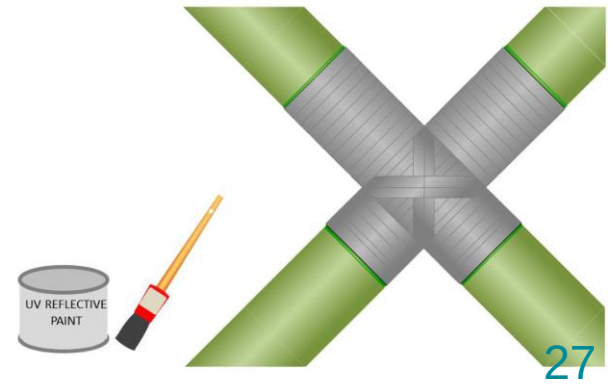
Apply strips of Outerwrap with tension through the corners of the X-Knot. Apply and perforate compression foil. Remove compression foil after initial curing time. Continuous wetting of Outerglass Shield is required.





Apply Outerglass Shield on the diagonal pipes. keep 3mm of Wrappingband exposed. Continuous wetting of Outerglass Shield must be done.

Apply compression foil after every roll Outerglass Shield. Perforate the compression foil and remove after initial curing time.



Paint the X-Knot with a UV resistant topcoat.

Introduction

Stopaq Casing Filler is the most effective solution for preventing corrosion of steel pipelines in steel, concrete and plastic casings. Water and oxygen that normally is expected to be present in a non-filled casing pipe, will cause corrosion of the operational steel pipeline and also will cause internal corrosion of a steel casing pipe.

By filling the annulus between the casing pipe and the operational pipe with Stopaq® Casing Filler, water and oxygen will be displaced, thereby ruling out corrosion.

Stopaq Casing Filler is delivered to the casing job site by truck in a heated tank and pumped down the casing vent as a hot liquid. As it cools down, it congeals to a pasty consistency. The product does not cure or become brittle, it stays flexible forever and maintains its optimum sealing properties.

Once applied, Stopaq Casing Filler will also prevent eventually present Cathodic Protection currents to cause internal corrosion of the steel casing pipe. The material has high specific electrical insulation resistance which prevents passing of electrical currents.

Superior end-sealing solutions are applied in combination with Stopaq® Casing Filler. This will prevent the ingress of water, oxygen and soil from the casing pipe ends.

The solution is by far superior to other casing filling solutions on the market. It combines excellent corrosion preventing properties and visco-elastic behaviour of Stopaq® materials.

The execution of the job will always be done by Seal For Life Technologies & Services B.V.

Features:

- Excellent corrosion prevention
- High specific electrical insulation resistance
- Adheres to various types of substrates
- Cathodic Protection systems are not affected
- No curing

Benefits:

- Maintenance-free solution
- Fast and easy to apply
- Environmentally friendly.
- No health and safety hazards to humans

Preparation work by contractor

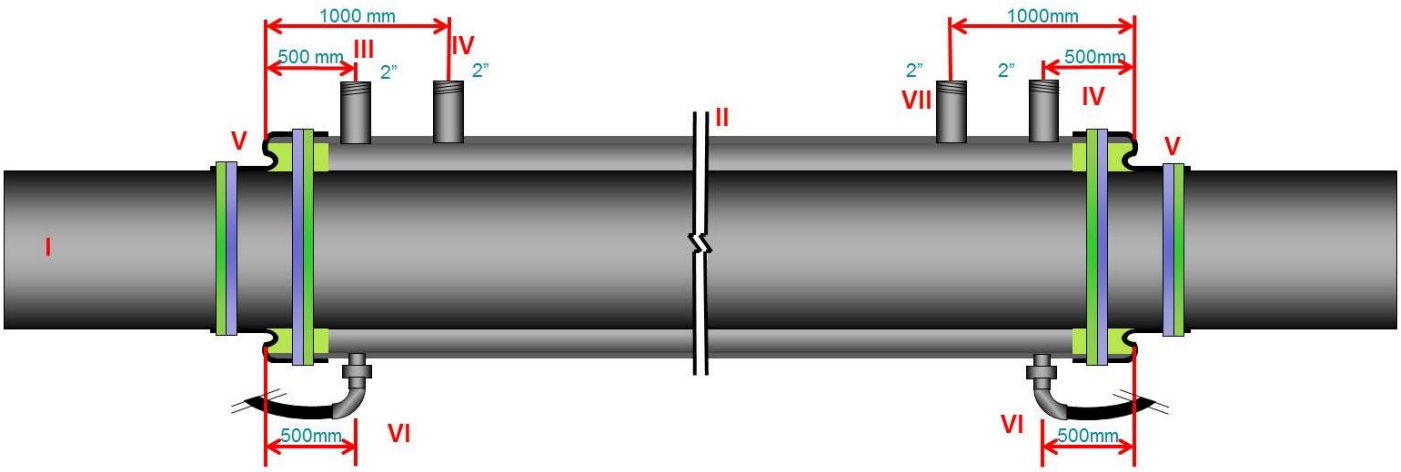
Jobsite accessibility

The casing must be filled from the highest end of the casing, but both ends of the casing have to have a perfect accessibility for the 40 tonnes, 18mtr long truck. Ramps might be needed. Maximum distance between the truck and 2" filling point is 35mtr. Always consult Seal For Life Technologies & Services B.V. for advice and instructions on the exact location and accessibility.

Preparation of the casing and carrier pipe

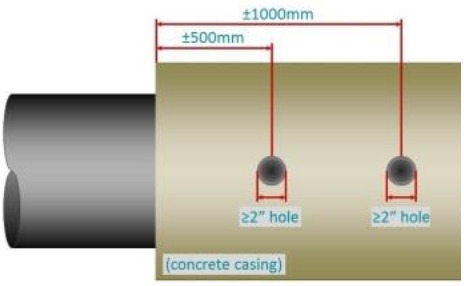
The casing must be completely clean and dry prior to the installation of the 4100 Putty and end seals. If some water remains in the casing, it has to be reported to Seal For Life Technologies & Services B.V. It might be necessary to install drains. The installation of the 4100 Putty and end seals has to be performed by Stopaq approved applicators. On the next pages the application instruction is shown.

Backfill at each end with sand and compact up to 1 metre above the casing pipe, in order to support and hold the end-seals in place during and after filling of the casing.



I	Carrier pipe
II	Casing pipe
III	2" tube, inlet Stopaq Casing Filler
IV	2" tube, air outlet
V	End seal in "S-shape" with approx. 300mm 4100 Putty
VI	1" drain, used when water has to be removed from casing
VII	2" tube, alternative inlet Stopaq Casing Filler

For more details, please consult Stopaq Casing Filler Scope of Work.



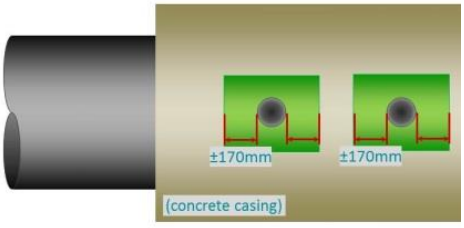
(upper view)

1

On each end of the casing pipe, drill 2 holes in the casing with a diameter which is slightly more than 2" at a distance of approx. 500mm and 1000mm from the extremities of the casing.

2

Surface can be pre-heated with a propane torch prior to the installation of the Wrappingband or Paste.



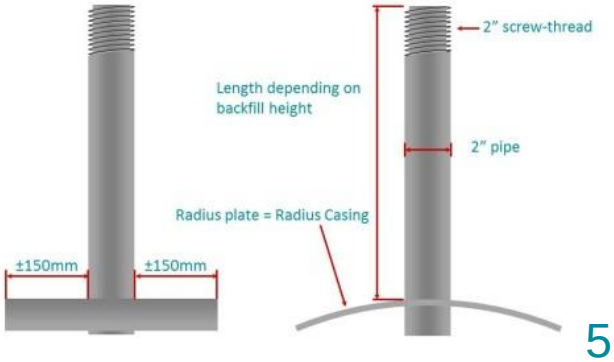
(upper view)

3

Apply strips of Wrappingband over the drilled holes and cut out the holes with the same diameter as the previously drilled holes.

4

Instead of Wrappingband, Paste can be used as well as a gasket between the concrete and installation pipe

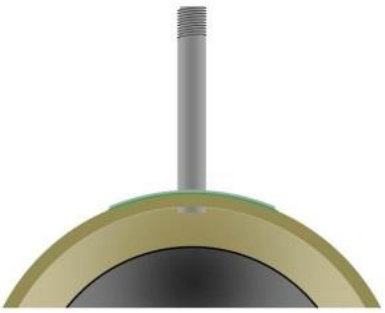


5

Construct 4 installation pipes according to the above sketch. 2 pipes are needed on each ends of the casing.

6

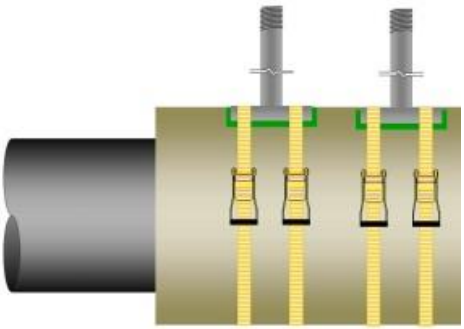
An installation plate with a 2" socket can also be used for the installation. A 2" pipe (length as shown in the drawing) shall be installed.



(front view) 7

Mount the installation pipes in the holes.

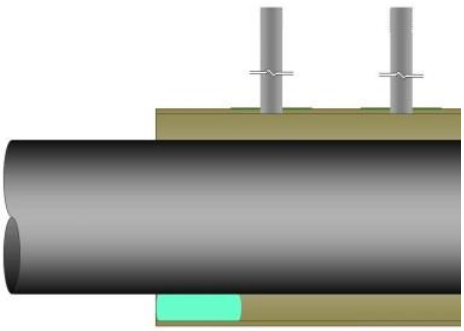
8



(side view) 9

Secure the installation pipes with a ratchet strap tightly around the casing. The strip of Wrappingband will seal the holes.

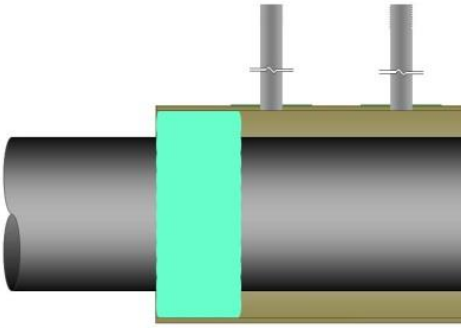
10



(side view, section casing) 11

The ends of the casing have to be clean and dry prior the installation of 4100 Putty. This has to be applied in the area between the casing and carrier pipe with a depth of approx. 300mm.

12

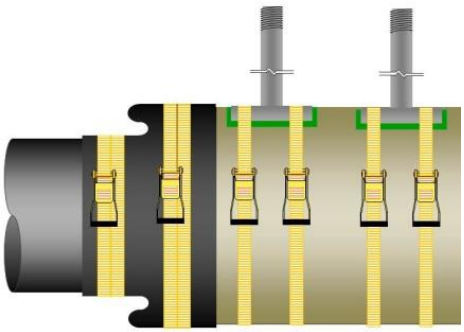


(side view, section casing)

13

Apply 4100 Putty without air inclusions. The entire annulus has to be sealed with 4100 Putty.

14

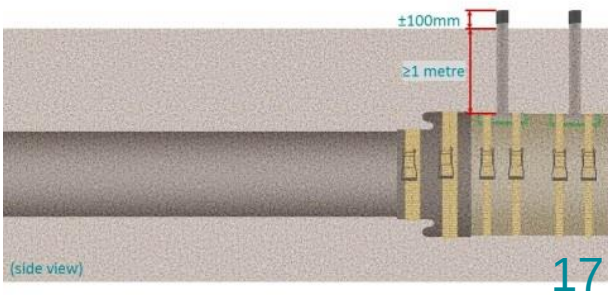


(side view)

15

Install end seal in an “S-shape” configuration and secure it with 4 ratchet straps per end seal (2 on casing and 2 on carrier pipe). The clamps have to be on the 3 and 9 o’clock position and need to be placed touching each other, with the clamp to be placed over the band of the adjacent ratchet strap.

16



17

Backfill at each end with sand and up to 1 metre above the casing pipe and compact it, in order to support and hold the link-seals in place during and after filling of the casing.

18

Casing Filler can then be pumped down into the annulus.

The filling process

The casing will be filled with Casing Filler by Seal For Life Technologies & Services B.V. after the preparations of the casing. If the casing is not placed horizontal, the pipe will be filled from the highest side of the casing. Both sides of the casing need to be accessible for the truck and tank trailer. Casing Filler has a temperature of approx. 70°C when the casing is filled. The material will be liquid like water and therefore flows into all irregularities in the casing. The filling process will continue until the trays are filled with Casing Filler, which is the indication that the casing has been filled completely. Additional Casing Filler will be added after the material has cooled down.

STOPAQ CASING FILLER B.V.
Bakboord 2
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Tel. +31 (0)599 655537
Fax +31 (0)599 650900
E-mail: info@stopac.com
www.casingfiller.com

STOPAQ CASING FILLER

STOPAQ Casing Filler — Completion

Date:	
Location:	
Client:	
Contractor:	
Project number:	
Batch number:	
Ø Medium pipe	
Ø Casing	
Length casing	
Temp. STOPAQ >50°	
Ambient temp.:	
Condition casing:	new / good / moderate / poor
Substrate casing:	
Endseal Type:	
Filling time:	start: end:

Volume	Measurement letter

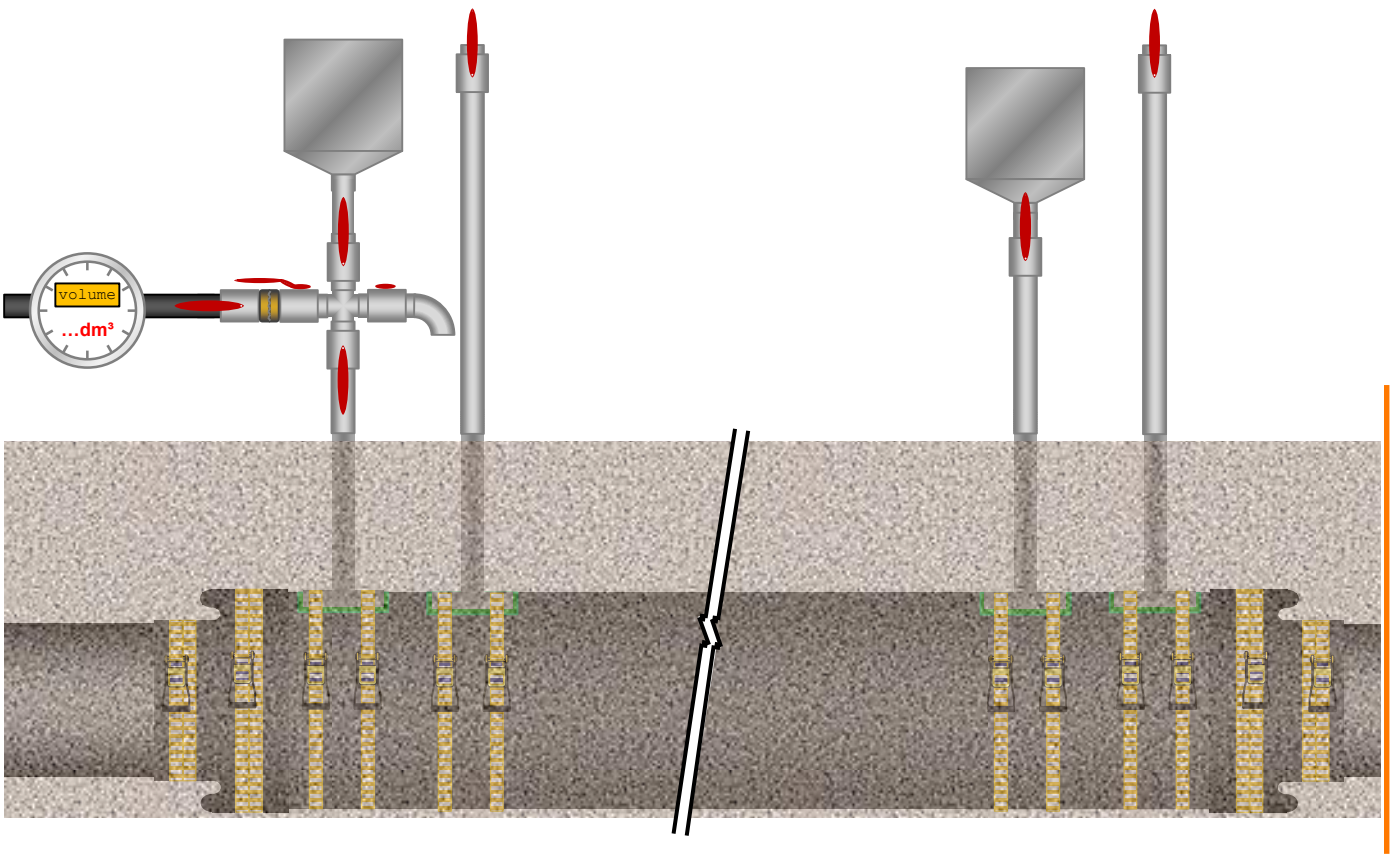
STOPAQ inspector:	Name:	
	Signature:	
Client:	Name:	
	Signature:	
Remarks:		

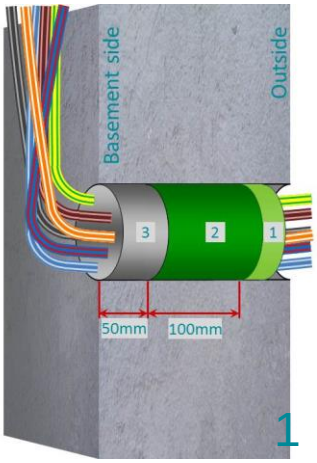
INSERT FORM AT THIS SIDE

Quality control

Seal For Life Technologies & Services B.V. will calculate the material use. The amount of materials that is pumped in the casing will be measured by a calibrated volume meter. The client will sign the material use form when the casing has been filled. If the casing needs a refill, the client has to sign an additional form.

If there is a big difference between the calculated volume and the actual volume pumped into the casing, Seal For Life Technologies & Services B.V. will inform the client.





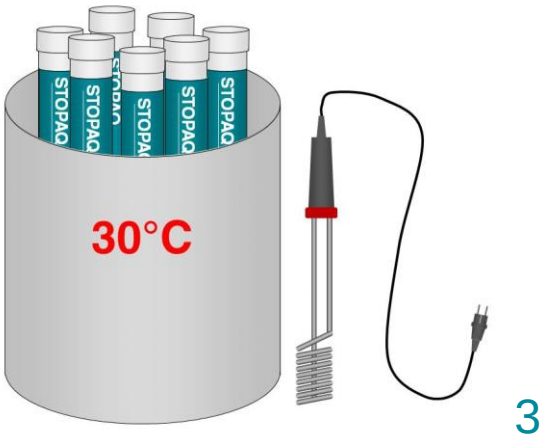
1

The complete system:

1. Barrier / 4100 Putty
2. Stopaq 2100 Aquastop, 100mm
3. Mortar, 50mm


2

The sealing system can be applied while the duct is leaking.

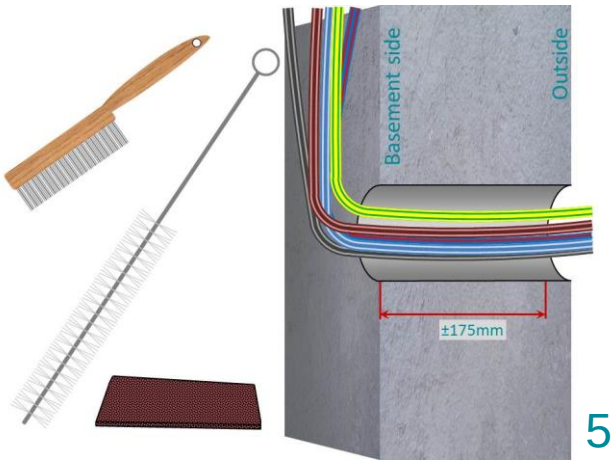


3

Preheat the 2100 Aquastop to a temperature 30°C. A bucket of water and a heating coil can be used.


4

…

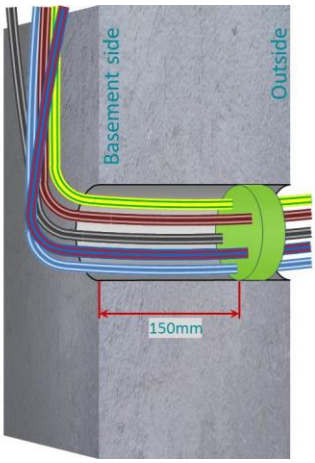


5

Clean the duct with a brush, cleaning pad or similar equipment. Total length approx. 175mm. Rinse with clean water is allowed as 2100 Aquastop can be applied on a wet surface.

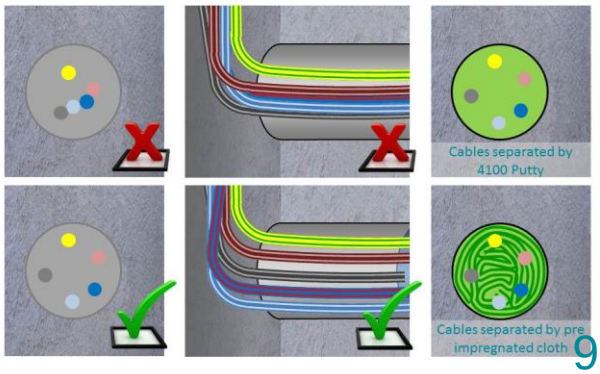

6

Adhesion can be improved when cables and duct are pre-applied with 2100 Aquastop.



Insert barrier, such as 4100 Putty, at a depth of 150mm into the duct.

…



Separate the cables from each other.

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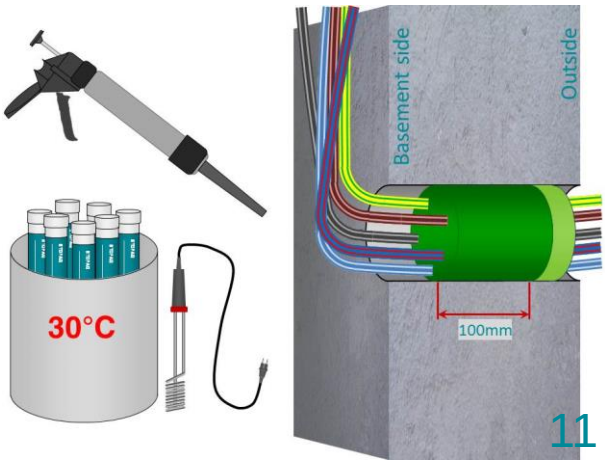
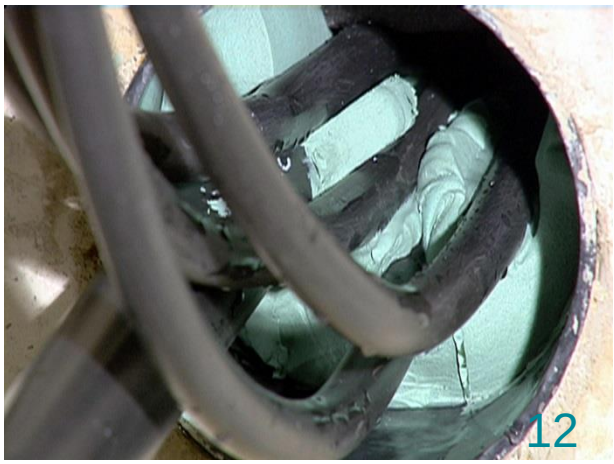
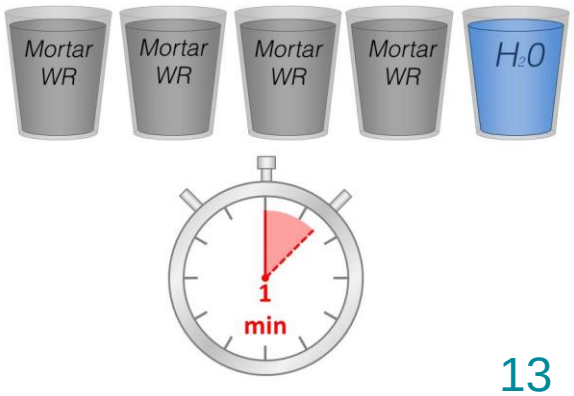


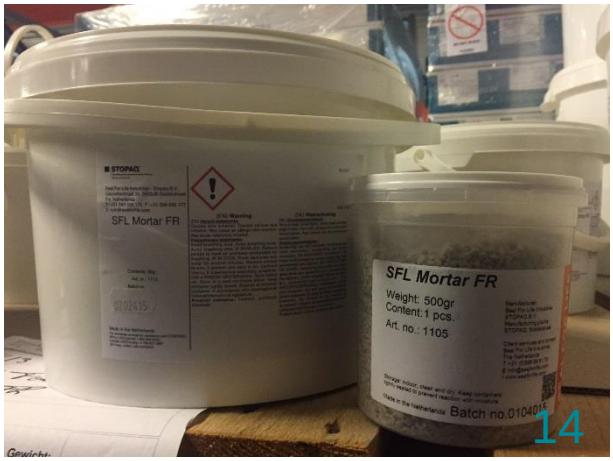
Apply 100mm of 2100 Aquastop and avoid air inclusions. Work from inside out to prevent air-inclusions.



Lift the cables and apply the 2100 Aquastop with a suitable injection tool around the cables.



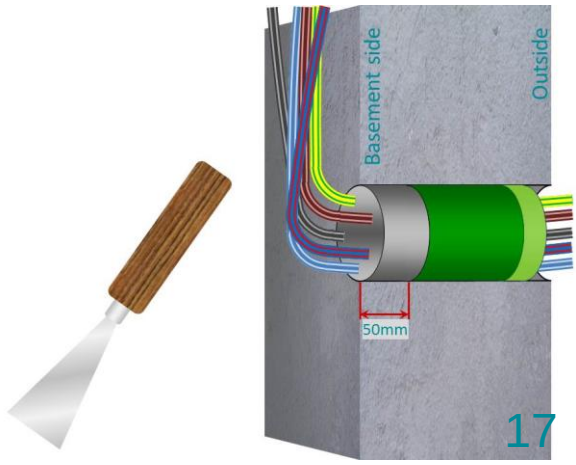
Prepare Mortar WR to a mouldable mass.
Mixing ratio by volume, mixing time 1 minute:
4 parts Mortar WR and 1 part of Water.



Mortar WR must be used as a waterproofing barrier in wall inlets that are frequently exposed to water, like basins, pools, etc.

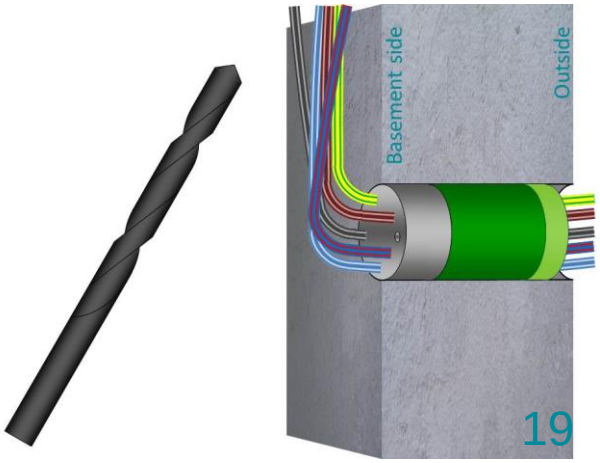
Mixing ratio by weight, mixing time 3-5 minutes:
1 kg Mortar FR and 0,6 – 0,8 litres of water
Mixing ratio by volume, mixing time 3-5 minutes:
2 – 4 parts Mortar FR and 1 part of Water.

Mortar FR must be used in fire rated walls and floors. Check the malleability of the Mortar FR-WR by moulding the Mortar to a ball shape without falling apart.



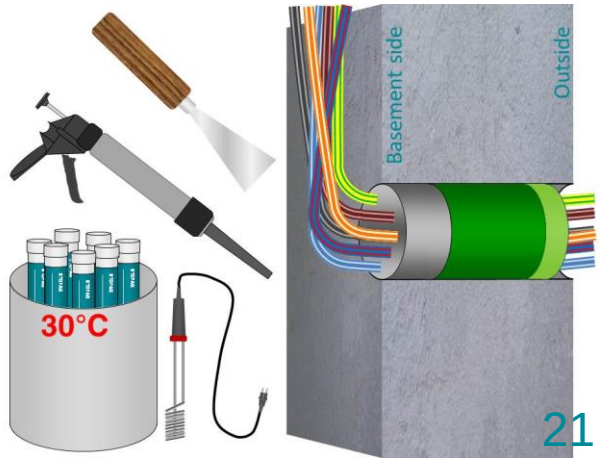
Clean the remaining 50mm of the duct from any 2100 Aquastop prior to the installation of Mortar FR or WR.
Apply Mortar in the remaining 50mm of the duct.

Start at the bottom between the cables.



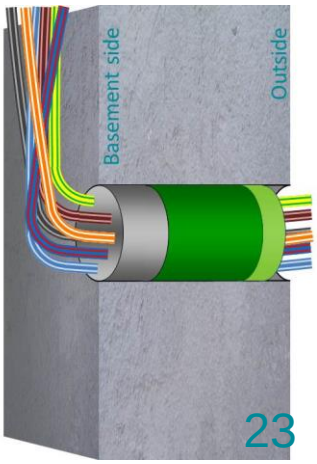
If an extra cable has to be fitted into the duct, drill a hole with a diameter that is larger than the cable.

…



Insert the cable and apply 2100 Aquastop, Mortar WR or FR and smoothen the surface with a putty knife.

A cable can be removed from the duct with the same procedure. Remove the cable → Apply 2100 Aquastop and Mortar WR or FR.



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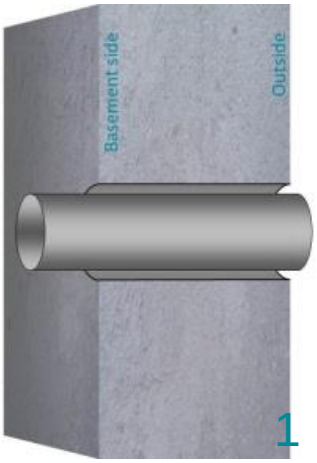
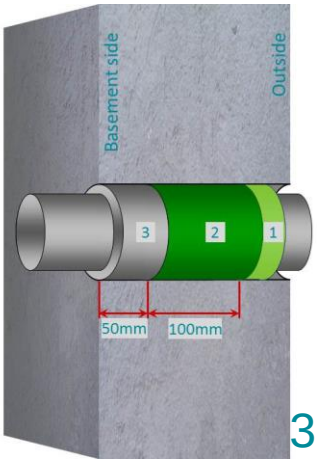


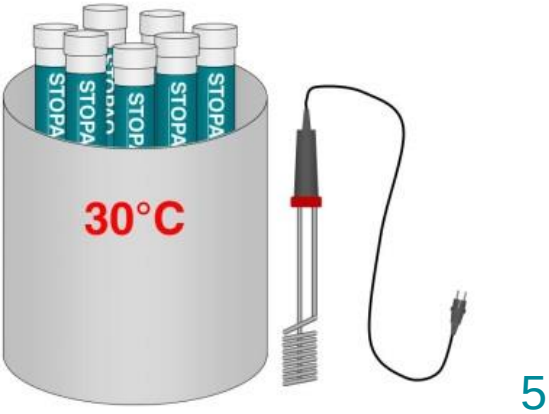
Duct to be sealed with a barrier, 2100 Aquastop and Stopaq Mortar FR or WR.

The sealing system can be applied while the duct is leaking.



The complete system:
1. Barrier / 4100 Putty
2. Stopaq 2100 Aquastop, 100mm
3. Mortar, 50mm

Mortar FR for ducts with Flame retardant properties
Mortar WR for ducts with Water resistant properties



Preheat the 2100 Aquastop up to a temperature 30°C. A bucket of water and a water heating coil can be used.

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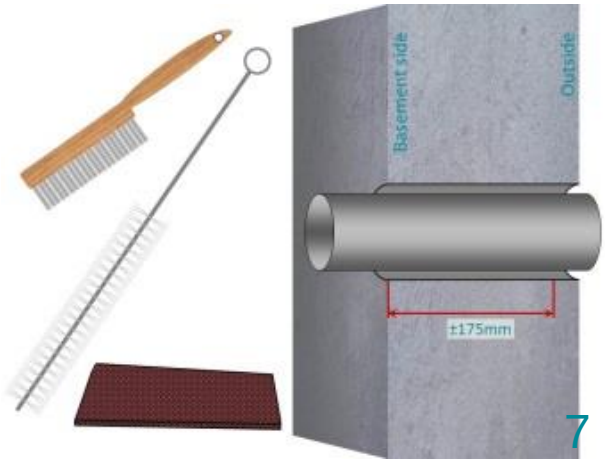
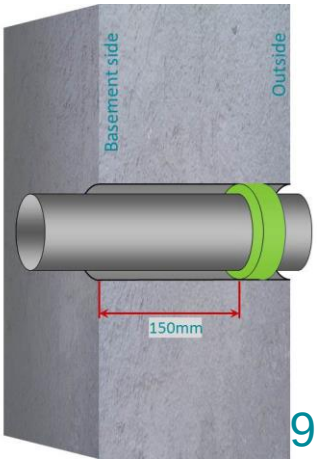


Clean the duct with a brush, cleaning pad or similar equipment. Total length approx. 175mm. Rinse with clean water is allowed as 2100 Aquastop can be applied on a wet surface.

Adhesion can be improved when pipe and duct are pre-applied with 2100 Aquastop.



Insert barrier, such as 4100 Putty, at a depth of 150mm into the duct.

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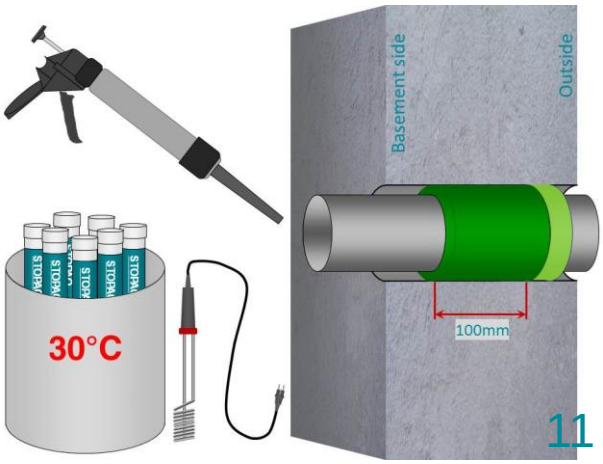

Apply 100mm of 2100 Aquastop and avoid air inclusions. Work from inside out to prevent air-inclusions.

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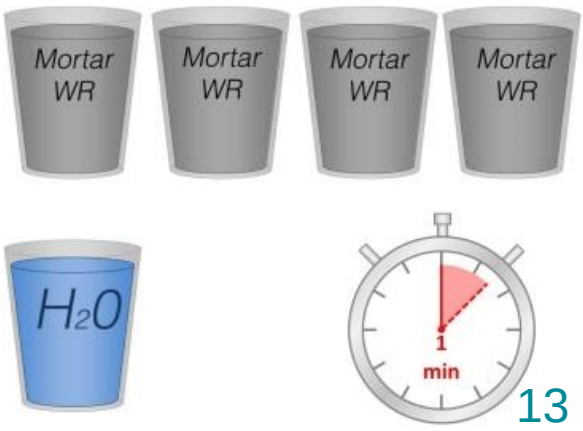
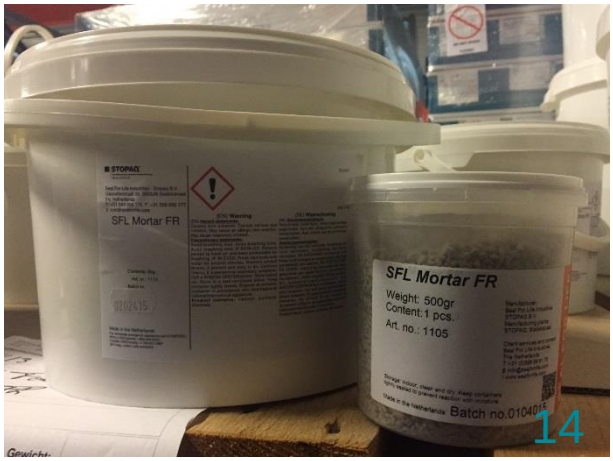


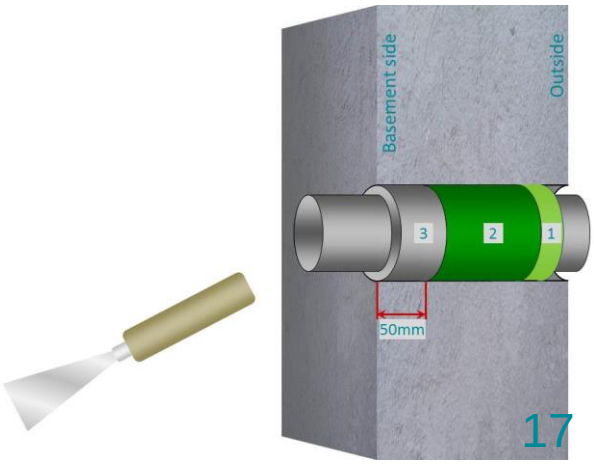
Prepare Mortar WR to a mouldable mass.
Mixing ratio by volume, mixing time 1 minute:
4 parts Mortar WR and 1 part of Water.



Mortar WR must be used as a waterproofing barrier in wall inlets that are frequently exposed to water, like basins, pools, etc.

Mixing ratio by weight, mixing time 3-5 minutes:
1 kg Mortar FR and 0,6 – 0,8 litres of water
Mixing ratio by volume, mixing time 3-5 minutes:
2 – 4 parts Mortar WR and 1 part of Water.

Mortar FR must be used in fire rated walls and floors. Check the malleability of the Mortar FR-WR by moulding the Mortar to a ball shape without it falling apart.



Clean the remaining 50mm of the duct from any 2100 Aquastop prior to the installation of Mortar FR or WR.
Apply Mortar in the remaining 50mm of the duct.

Smoothen the surface of the mortar by using a putty knife and a small amount of water.

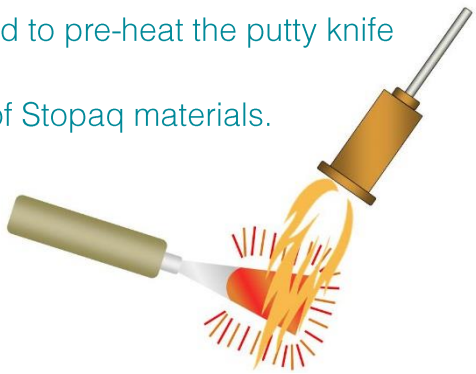
Removal of Stopaq materials with an oscillating tool

Stopaq can be difficult to remove from a surface. An oscillating tool can be used to remove the Stopaq materials. The flat knife must be mounted on the oscillating tool.

Removal of Stopaq materials with a hot putty knife

Stopaq can also be removed with a putty knife. It is advised to pre-heat the putty knife with a hot-air blower or flame torch.

The surface can also be pre-heated prior to the removal of Stopaq materials.



Removal of Stopaq materials using induction

Stopaq materials can also be removed using induction.

Material use on Stopaq Systems

This chapter has been made to explain the calculation of the theoretical material demand for several Stopaq applications.

- Straight pipes
- Elbows
- Reducers
- Tee-Joints
- Flanges
- Field Joints
- Tank Chime areas
- Polyester
- Pipe and cable ducts

All products are sold per box. Consult your distributor or Stopaq B.V. for the minimum order quantities.

The calculations provided herein are indicative values only and are based on the information used and provided by the user. Stopaq accepts no liability whatsoever for user's reliance on such values.
Final quantities might differ from the calculation due to box, pallet and/or container sizes. For questions and /or review of the calculations, please contact Stopaq B.V. at info@stopaq.com or +31 (0)599 696 170.

(Net) effective coverage area per Stopaq Wrappingband CZ, CZH, CZHT size			
Dimension	Surface	Overlap	Net effective coverage area
50mm x 5m	0,25 m²	≥10mm	0,187 m²
50mm x 10m	0,5 m²	≥10mm	0,375 m²
100mm x 10m	1 m²	≥10mm	0,85m²
150mm x 10m	1,5 m²	≥10mm	1,3 m²
150mm x 20m	3 m²	≥10mm	2,6 m²
200mm x 10m	2 m²	≥10mm	1,8 m²
200mm x 20m	4 m²	≥10mm	3,6 m²
300mm x 10m	3 m²	≥10mm	2,7 m²

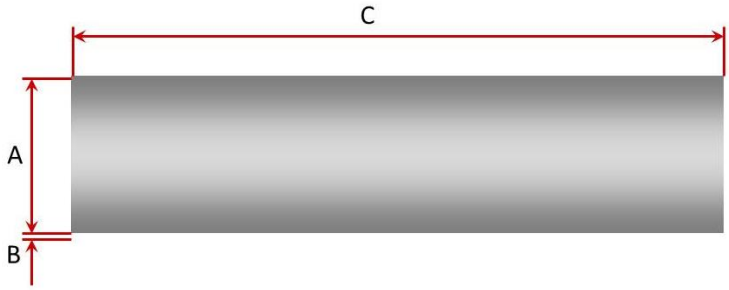
(Net) effective coverage area per Stopaq Outerwrap PVC, PE, HTPP, HTPE size			
Dimension	Surface	Overlap	Net effective coverage area
50mm x 10m	0,5 m²	≥50%	0,225 m²
50mm x 30m	1,5 m²	≥50%	0,675 m²
75mm x 30m	2,25 m²	≥50%	1,0125 m²
100mm x 30m	3 m²	≥50%	1,35 m²
150mm x 30m	4,5 m²	≥50%	2,025 m²
2 " x 50'	0,78 m²	≥50%	0,35 m²
2" x 100'	1,55 m²	≥50%	0,7 m²
4" x 50'	1,55 m²	≥50%	0,7 m²
4" x 100'	3,1 m²	≥50%	1,25 m²
		(2 Layers)	
Remark:	When Outerwrap will be applied over flanges, calculate 75% overlap (4 layers)		

(Net) effective coverage area per Outerglass Shield size			
Dimension	Surface	Overlap	Net effective coverage area
When applied with an overlap of minimum 50% (2 Layers)			
4" x 30'	0,93 m²	≥50%	0,42 m²
6" x 60'	2,8 m²	≥50%	1,26 m²
8" x 60'	3,7 m²	≥50%	1,67 m²
When applied with an overlap of minimum 66% (3 Layers)			
4" x 30'	0,93 m²	≥66%	0,27 m²
6" x 60'	2,8 m²	≥66%	0,81 m²
8" x 60'	3,7 m²	≥66%	1,07 m²

Remark: Besides the overlap (≥10mm and ≥50%) an extra 5% will be calculated for application tolerances. Any (first and last) straight wrap have not been included in the calculation.

Diameter INCH NPS	Diameter DN	Diameter mm	Surface per 10m
½	15	21,3	0,67 m^2
¾	20	26,7	0,84 m^2
1	25	33,4	1,05 m^2
1¼	32	42,2	1,33 m^2
1½	40	48,3	1,52 m^2
2	50	60,3	1,89 m^2
2½	65	73	2,29 m^2
3	80	88,9	2,79 m^2
3½	90	101,6	3,19 m^2
4	100	114,3	3,59 m^2
5	125	141,3	4,44 m^2
6	150	168,3	5,29 m^2
8	200	219	6,88 m^2
10	250	273	8,58 m^2
12	300	323,9	10,18 m^2
14	350	355,6	11,17 m^2
16	400	406,04	12,76 m^2
18	450	457,2	14,36 m^2
20	500	508	15,96 m^2
22	550	558,8	17,56 m^2
24	600	609,6	19,15 m^2
26	650	660	20,73 m^2
28	700	711	22,34 m^2
30	750	762	23,94 m^2
32	800	813	25,54 m^2
34	850	864	27,14 m^2
36	900	914	28,71 m^2
38	950	965	30,32 m^2
40	1000	1016	31,92 m^2
42	1050	1067	33,52 m^2
44	1100	1118	35,12 m^2
46	1150	1168	36,69 m^2
48	1200	1219	38,30 m^2
52	1300	1320	41,47 m^2
56	1400	1422	44,67 m^2
60	1500	1524	47,88 m^2
64	1600	1625	51,05 m^2

Material use on straight pipelines



Straight pipe	
Dimension	Description
A	Outer diameter of the pipe
B	Coating thickness
C	Pipeline length

Surface of a pipeline (m^2) = Pi x (A+B+B (m)) x C (m)

$$\text{Net needed materials (rolls)} = \frac{\text{Surface of the area to be coated } (m^2)}{\text{Surface per roll of material to be used } (m^2)}$$

Example 1

Pipeline DN500	A =	0,508m	(diameter)
Coating thickness	B =	0 mm	(bare pipe)
Length to be coated	C =	40 m	

Surface (m^2) = Pi x 0,508 (m) x 40 (m) = 63,84 m^2

$$\text{Net rolls Wrappingband 100mm x 10m} = \frac{63{,}84\ (m^2)}{0{,}85\ (m^2)} = 75{,}1 \text{ rolls} = 76 \text{ rolls}$$

Example 2

Pipeline 48”	A =	1,2 m	(diameter)
Coating thickness	B =	0,018 m	(rehab)
Length to be coated	C =	55 m	

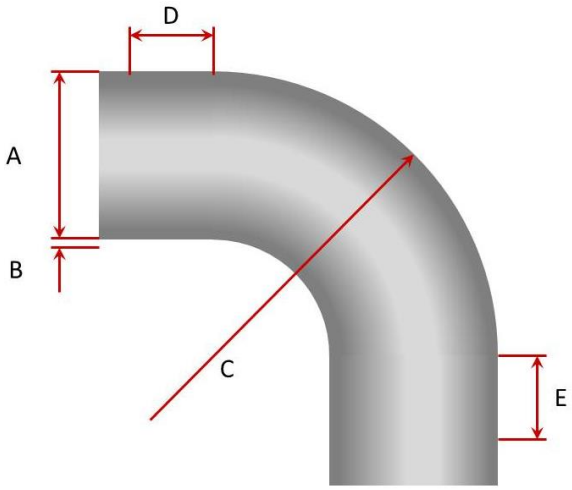
Surface (m^2) = Pi x 1,236 (m) x 55 (m) = 213,57 m^2

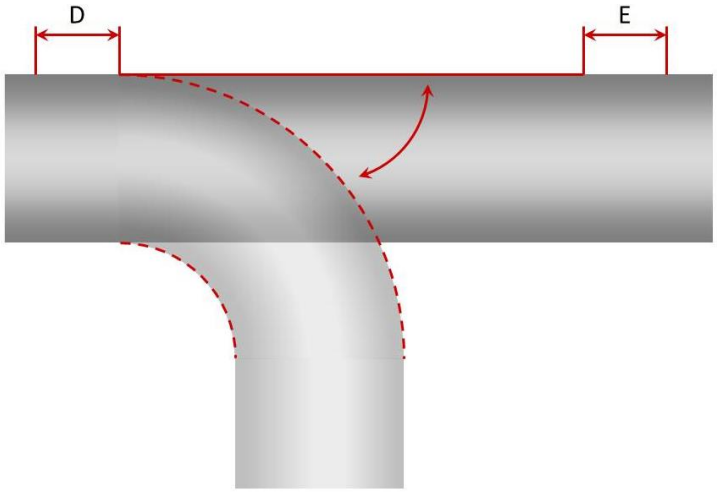
$$\text{Net rolls Wrappingband 200mmx20m} = \frac{213{,}57\ (m^2)}{3{,}6\ (m^2)} = 59{,}3 \text{ rolls} = 60 \text{ rolls}$$

Remark: The above calculation is for pipelines with straight or spirally applied Wrappingband. When Wrappingband is applied by means of cigarette wrap, see the table below. Material use will be calculated by dividing the pipeline length by the length of a roll Wrappingband.

Cigarette Wrap		
Pipe diameter	Width of Wrappingband to be used	Overlap
½”	100 mm	33 mm
¾”	100 mm	16 mm
1”	150 mm	45 mm
1¼”	150 mm	17 mm
1½”	200 mm	48 mm

Material use on Elbows





Material use on elbows can be calculated as a straight pipeline. The total length which has to be coated can be calculated with the outer radius perimeter of the elbow.

The circumference of the outer diameter of the elbow shall be divided by 4 if a 90° elbow must be coated. If a 45° elbow must be coated, the circumference will be divided by 8.

Elbow	
Dimension	Description
A	Outer diameter of the pipe
B	Coating thickness
C	Radius of the elbow
D	Adjacent length to be coated
E	Adjacent length to be coated

$$\text{Length to be coated (m)} = \frac{2 \times \text{Pi} \times \text{C (m)} \times \text{elbow angle}}{360} + \text{D} + \text{E}$$

Example:

Pipeline DN300	A =	0,3239m	(diameter)
Coating thickness	B =	0 m	(bare pipe)
Outer radius elbow	C =	0,75 m	
Adjacent lengths	D & E =	0,3 m	
# of elbows	=	18	

$$\text{Length to be coated (m)} = \frac{2 \times \text{Pi} \times 0{,}75\ \text{(m)} \times 90}{360} + 0{,}3 + 0{,}3 = 1{,}18 + 0{,}6 = 1{,}78\ \text{(m)}$$

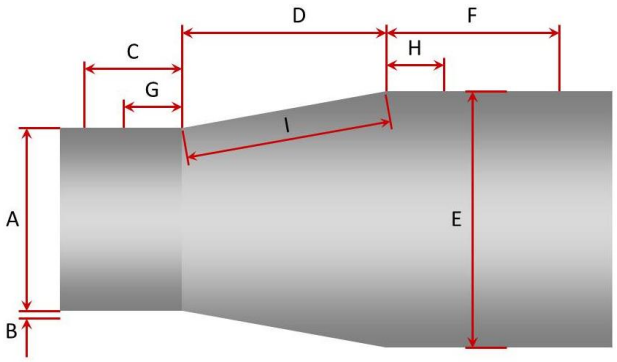
$$\text{Surface (m}^2\text{)} = \text{Pi} \times 0{,}3239\ \text{(m)} \times 1{,}78\ \text{(m)} = 1{,}81\ \text{m}^2$$

$$\text{Net rolls Wrappingband 100mm x 10m} = \frac{1{,}81\ \text{(m}^2\text{)}}{0{,}85\ \text{(m}^2\text{)}} = 2{,}13\ \text{rolls} = 3\ \text{rolls}$$

$$\text{Net rolls Outerwrap 75mm x 30m} = \frac{1{,}81\ \text{(m}^2\text{)}}{1{,}01\ \text{(m}^2\text{)}} = 1{,}8\ \text{rolls} = 2\ \text{rolls}$$

Total 18 elbows: = 18 x 2,13 = 38,36 = 39 rolls Wrappingband 100mm x 10m
= 18 x 1,80 = 32,28 = 33 rolls Outerwrap 75mm x 30m

Material use on Reducers



Reducer	
Dimension	Description
A	Outer diameter of smaller pipe
B	Coating thickness
C	Length to be coated on smaller pipe
D	Length of tapered part
E	Outer diameter of larger pipe
F	Length to be coated on larger pipe
G	Overlap strips over smaller pipe
H	Overlap strips over larger pipe
I	Actual strip length of tapered part

A reducer consists of 2 pipes with different diameter and a tapered pipe section in between the pipes. The tapered section has to be coated with longitudinal strips of material with sufficient overlap over the straight pipe sections. Then, the straight pipes adjacent to the tapered section have to be coated using circumferential wraps of material.

To calculate the length and amount of strips to be applied on the tapered section and adjacent pipes, the following equations can be used:

$$\text{Length of strip (m)} = I + G + H \text{ (m)}$$

$$\text{Length } I = \sqrt{D^2 + ((E-A) \times 0{,}5)^2}$$

(Pythagorean theorem)

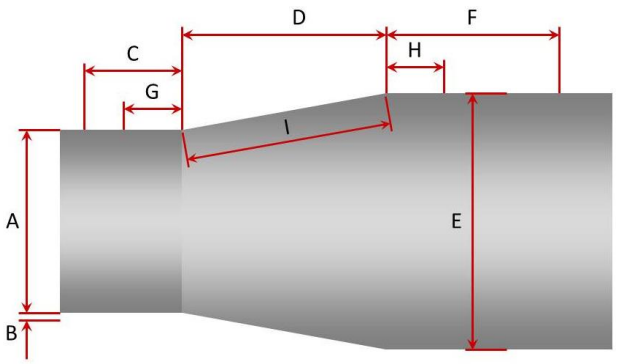
$$\text{\# of strips material} = \frac{\text{Pi} \times E \text{ (m)}}{\text{Width of material (m)} - \text{Overlap of material (m)}}$$

$$\text{\# of rolls material} = \frac{\text{\# strips of material} \times \text{length of strip (m)}}{\text{Total length of a roll of material (m)}}$$

The material demand for the adjacent lengths (C and F) will be calculated as straight pipe sections.

Total needed rolls = rolls of material (strips) + rolls of materials (straight pipes)

Example



Reducer		
Dimension	Remark	Size (m)
A	DN 500	0,508
B	Bare steel	0
C		0,5
D		0,5
E	DN 700	0,711
F		0,5
G		0,2
H		0,2
I		0,51

Length I = $\sqrt{0{,}5^2 + ((0{,}711-0{,}508) \times 0{,}5)^2} = 0{,}51$ (m)

Length of strip (m) = 0,51 + 0,2 + 0,2 (m) = 0,91 (m)

$$\#\text{ of strips Wrappingband 100mm} = \frac{\text{Pi x 0,711 (m)}}{\text{0,10 – 0,01 (m)}} = \frac{\text{2,23 (m)}}{\text{0,099 (m)}} = 22{,}56 = 23 \text{ strips}$$

$$\#\text{ of strips Outerwrap 100mm} = \frac{\text{Pi x 0,711 (m)}}{\text{0,1 – 0,05 (m)}} = \frac{\text{2,23 (m)}}{\text{0,05 (m)}} = 44{,}67 = 45 \text{ strips}$$

$$\#\text{ of rolls Wrappingband 100mm x 10m} = \frac{\text{23 x 0,91 (m)}}{\text{10 (m)}} = \frac{\text{20,93 (m)}}{\text{10 (m)}} = 2{,}1 \text{ rolls}$$

$$\#\text{ of rolls Outerwrap 100mm x 30m} = \frac{\text{45 x 0,91 (m)}}{\text{30 (m)}} = \frac{\text{40,95 (m)}}{\text{30 (m)}} = 1{,}4 \text{ rolls}$$

Material demand adjacent straight pipes:

Surface larger pipe (m^2) = Pi x 0,711 (m) x 0,5 (m) = 1,12 m^2
Surface smaller pipe (m^2) = Pi x 0,508 (m) x 0,5 (m) = 0,8 m^2

$$\text{Net rolls Wrappingband 100mm x 10m} = \frac{1{,}12 + 0{,}8\ (m^2)}{0{,}85\ (m^2)} = \frac{1{,}92\ (m^2)}{0{,}85\ (m^2)} = 2{,}26 \text{ rolls}$$

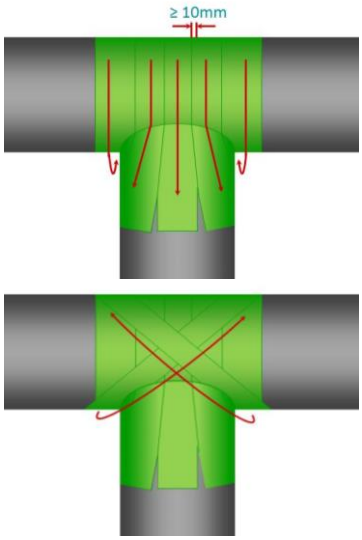
$$\text{Net rolls Outerwrap 100mm x 30m} = \frac{1{,}12 + 0{,}8\ (m^2)}{1{,}35\ (m^2)} = \frac{1{,}92\ (m^2)}{1{,}35\ (m^2)} = 1{,}43 \text{ rolls}$$

Total Wrappingband 100mm x 10m = 2,1 + 2,26 = 4,36 = 5 rolls
Total Outerwrap 100mmx 30m = 1,4 + 0,8 = 2,2 = 3 rolls

Material use on T-Joints

T-Joints will generally be coated with 2 different sizes of Stopaq Wrappingband and Outerwrap.

- Smaller size will be used for the strips over the center of the T-joint and the crosses. The materials use for this step will be calculated by length (meters).
- Wider size will be used for all the adjacent sections of the T-Joint. Material use will be calculated by surface, identical as a straight pipeline.



Length of the strips (m) = Pi x diameter pipe x 1,5

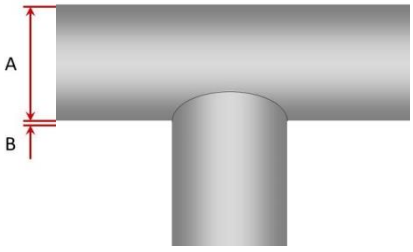
$$\#\text{ strips Wrappingband} = \frac{\text{diameter pipe (m)}}{\text{width of Wrappingband (m)} - 10\text{mm}}$$

$$\#\text{ strips Outerwrap} = \frac{\text{diameter pipe (m)}}{\text{width of Outerwrap (m) x 0,5}}$$

$$\text{Length cross} = \sqrt{2 \times (\text{Pi x diameter pipe (m)})^2} + 0{,}3\text{m}$$

Example:

Pipeline 6” = 168,3mm (diameter)
Coating thickness = 0 mm (bare pipe)
Material used: Wrappingband 50mm x 5m
Outerwrap PVC 50mm x 10m



Length of the strips (m) = Pi x 0,1683 (m) x 1,5 = 0,8 (m)

$$\#\text{ strips Wrappingband} = \frac{0{,}1683\text{ (m)}}{0{,}05\text{ (m)} - 0{,}01\text{ (m)}} = \frac{0{,}1683\text{ (m)}}{0{,}04\text{ (m)}} = 4{,}2 = 5\text{ strips}$$

$$\#\text{ strips Outerwrap} = \frac{0{,}1683\text{ (m)}}{0{,}05\text{ (m) x 0,5}} = \frac{0{,}1683\text{ (m)}}{0{,}025\text{ (m)}} = 6{,}8 = 7\text{ strips}$$

$$\text{Length cross} = \sqrt{2 \times (\text{Pi x } 0{,}1683\text{(m)})^2} + 0{,}3\text{m} = \sqrt{0{,}559\text{ (m)}} = 0{,}75\text{ (m)}$$

Net length (m) Wrappingband 50mm x 5m = 5 x 0,8 (m) + 2 x 0,75 (m) = 5,5 (m)

Net length (m) Outerwrap 50mm x 5m = 7 x 0,8 (m) + 2 x 0,75 (m) = 7,1 (m)

Lengths of rolls to be divided by net length needed for the application to calculate rolls for T-Joint. Adjacent sections to be calculated as straight pipes.

Material use on Flanges

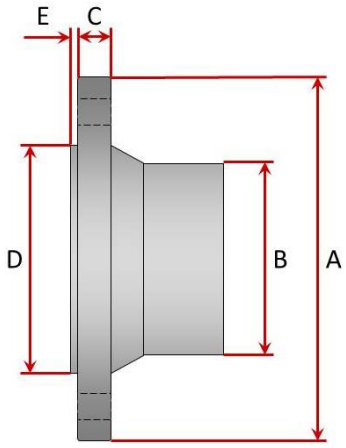
Dimensions of flanges are depending on the pipeline diameter and the pressure class of the flange e.g. a 10” flange with a 300 PSI pressure class has larger dimensions than a 10” flange with a 150 PSI pressure class.

Check the available standards and product documentation for exact dimensions e.g. ANSI B16.5, DIN2630 etc., or ask the client to measure the dimensions of the flange.

Example:

10” welding neck flange, class 150 and class 300 dimensions.

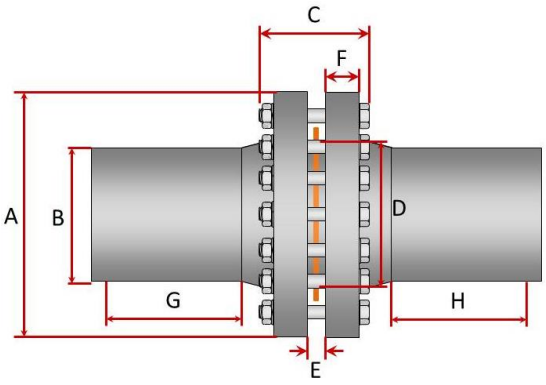
Important dimensions from flanges to calculate material use:



10” welding neck flange			
Dimension	Description	Class 150	Class 300
A	Outer diameter of the flange	405 mm	445 mm
B	Outer diameter of the pipe	273,1 mm	273,1 mm
C	Thickness of the flange	30,2 mm	47,7 mm
D	Diameter of raised face	323,9 mm	323,9 mm
E	Thickness of raised face	1,6 mm	1,6 mm

To calculate the material demand per flange, the following dimensions are needed:

Flange dimensions	
Dimension	Description
A	Outer diameter of the flange
B	Outer diameter of the pipe
C	Stud length
D	Diameter of raised face
E	Gap between the flanges
F	Thickness of the flange
G	Overlap over adjacent pipe section
H	Overlap over adjacent pipe section



Warm or above ground flanges will be applied with 3 corrosion prevention products.

- Wrappingband CZ / CZH / CZHT over the outer diameter of the flange and on the adjacent pipe sections
- 4200 Filler in between the flanges.
- Paste CZ / CZH / CZHT to fill up the studs and create an approx. 45 angle between the pipe and flange.

Cold below ground flanges will be applied with 2 corrosion prevention products.

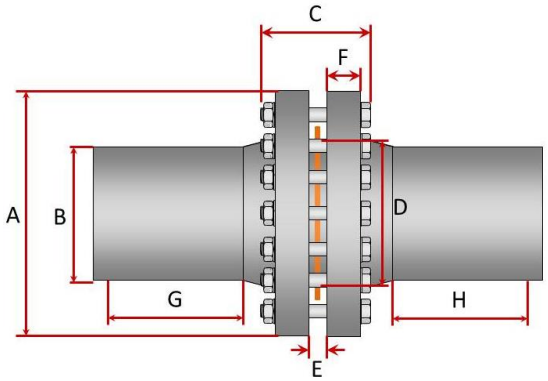
- Wrappingband CZ / CZH over the outer diameter of the flange and on the adjacent pipe sections
- 4100 Putty in between the flanges and to fill up the studs and create an approx. 45 angle between the pipe and flange.

Example

A 10” welding neck flange class 150 has to be coated with the following system:

- 4200 Filler
- Paste
- Wrappingband
- Outerwrap PVC (0,4) x 50mm x 10m

10” Flange Pressure class 150		
Dimension	Remark	Size (m)
A		0,405
B		0,2731
C		0,115
D		0,3239
E	1,6+1,6+4 mm	0,0072
F		0,0302
G		0,3
H		0,3



$$\text{Volume of Paste } (dm^3) = 0{,}25 \times Pi \times A^2 - 0{,}25 \times Pi \times B^2 \ (dm^2) \times \left(C - F - F - E + \frac{A-B\ (dm)}{2}\right)$$

$$\text{Volume of Paste } (dm^3) = 0{,}25 \times Pi \times 4{,}05^2 - 0{,}25 \times Pi \times 2{,}731^2\ (dm^2) \times 1{,}13 = 7{,}95\ (dm^3)$$

Weight of Paste (kg) = Volume of Paste (dm^3) x 1,5 (density Paste is 1,4-1,6)

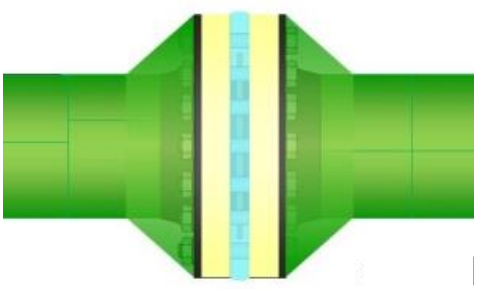
= 7,95 (dm^3) x 1,5 = 11,9 (kg)

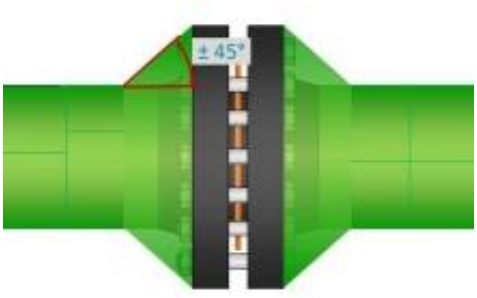
Volume of 4200 Filler (dm^3) = (0,25 x Pi x A^2 – 0,25 x Pi x B^2)x E (dm)

= (0,25 x Pi x $4{,}05^2$ - 0,25 x Pi x $3{,}239^2$) x 0,072 = 0,34 dm^3

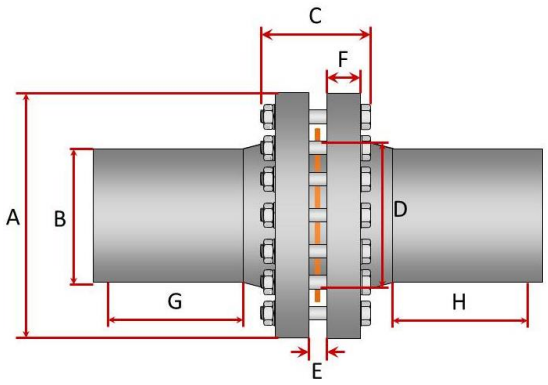
Weight of 4200 Filler (kg) = Volume of 4200 Filler x 1,35 (density 4200 Filler is 1,2-1,5)

= 0,34 x 1,35 = 0,46 (kg)





10” Flange Pressure class 150		
Dimension	Remark	Size (m)
A		0,405
B		0,2731
C		0,115
D		0,3239
E	1,6+1,6+4 mm	0,0072
F		0,0302
G		0,3
H		0,3



Length of Wrappingband (m) = All straight wraps over flange and pipe added up
= 2 x ((Pi x 0,405) + 0,1) + 4 x ((Pi x 2,731) + 1)
= 2,75 (m) + 3,83 (m) = 6,58 (m)

$$\text{Rolls of Wrappingband} = \frac{\text{Length of Wrappingband needed (m)}}{\text{Length of roll Wrappingband (m)}}$$

$$\text{Rolls of Wrappingband 100mm x 10m} = \frac{6{,}58\ (m)}{10\ (m)} = 0{,}66 \text{ rolls}$$

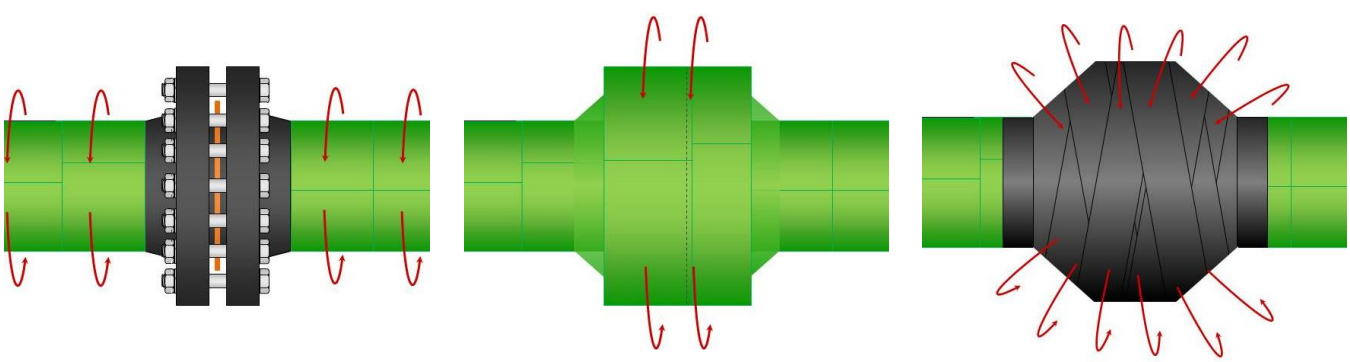
(2 straight wraps over the flange and 2 straight wrap on each side of the flange. More straight wraps on the pipes might be needed on larger diameter flanges.)

$$\text{Rolls of Outerwrap} = \frac{4 \times Pi \times (A\ (m) \times 0{,}5)^2 - 2 \times 0{,}25 \times Pi \times B^2}{\text{Surface of roll Outerwrap, calculated with 75\% overlap}}$$

$$= \frac{4 \times Pi \times (0{,}405\ (m) \times 0{,}5)^2 - 2 \times 0{,}25 \times Pi \times 0{,}2731^2}{0{,}125 m^2\ (PVC\ 50x10x0{,}4)}$$

$$\text{Rolls of Outerwrap (0,4 x 50mm x 10m} = \frac{0{,}515 - 2 \times 0{,}059}{0{,}125 m^2} = \frac{0{,}397 m^2}{0{,}125 m^2} = 3{,}2 \text{ rolls}$$

Outerwrap on adjacent lengths to be calculated as on straight pipes.

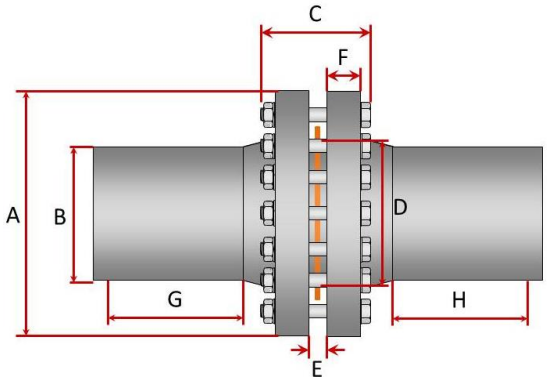


Example

A 10” welding neck flange class 300 has to be coated with the following system:

- 4100 Filler
- Wrappingband
- Geotextile
- Outerwrap PVC (0,4) x 50mm x 10m

10” Flange Pressure class 300		
Dimension	Remark	Size (m)
A		0,445
B		0,2731
C		0,160
D		0,3239
E	1,6+1,6+4 mm	0,0072
F		0,0447
G		0,3
H		0,3



$$\text{Volume of 4100 (dm}^3\text{)} = 0{,}25 \times \text{Pi} \times A^2 - 0{,}25 \times \text{Pi} \times B^2 \ \text{(dm}^2\text{)} \times \left(C - F - F + \frac{\text{A-B (dm)}}{2}\right)$$

$$= 0{,}25 \times \text{Pi} \times 4{,}45^2 - 0{,}25 \times \text{Pi} \times 2{,}731^2 \ \text{(dm}^2\text{)} \times 1{,}57 = 15{,}18 \ \text{(dm}^3\text{)}$$

$$\text{Weight of 4100 Putty (kg)} = \text{Volume of 4100 (dm}^3\text{)} \times 1{,}35 \ \text{(density 4100 is 1,2 – 1,5)}$$

$$= 15{,}18 \ \text{(dm}^3\text{)} \times 1{,}35 = 20{,}5 \ \text{(kg)}$$

$$\text{Length of Wrappingband (m)} = \text{All straight wraps over flange and pipe added up}$$

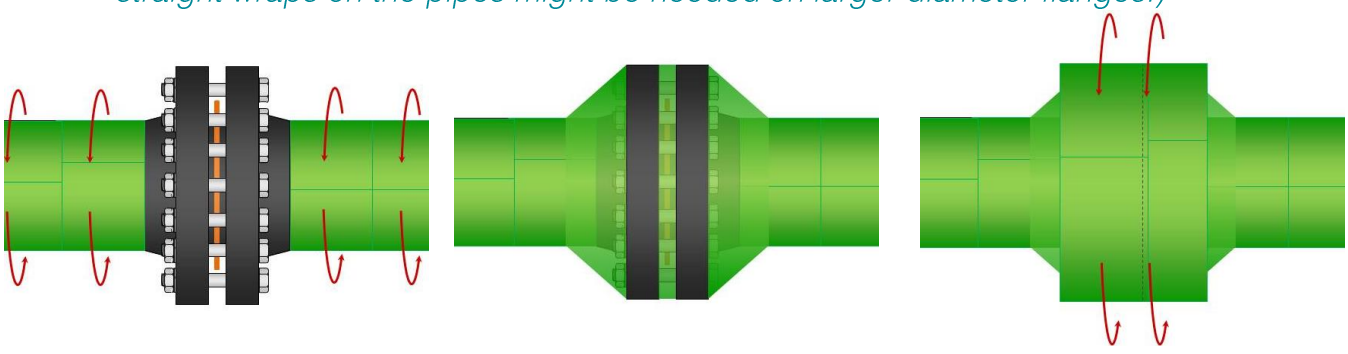
$$= 2 \times ((\text{Pi} \times 0{,}405) + 0{,}1) + 4 \times ((\text{Pi} \times 2{,}731) + 1)$$

$$= 2{,}75 \ \text{(m)} + 3{,}83 \ \text{(m)} = 6{,}58 \ \text{(m)}$$

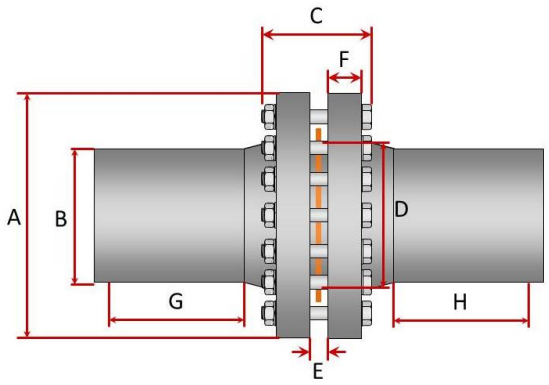
$$\text{Rolls of Wrappingband} = \frac{\text{Length of Wrappingband needed (m)}}{\text{Length of roll Wrappingband (m)}}$$

$$\text{Rolls of Wrappingband 100mm x 10m} = \frac{6{,}58 \ \text{(m)}}{10 \ \text{(m)}} = 0{,}66 \ \text{rolls}$$

(2 straight wraps over the flange and 2 straight wrap on each side of the flange. More straight wraps on the pipes might be needed on larger diameter flanges.)



10” Flange Pressure class 300		
Dimension	Remark	Size (m)
A		0,445
B		0,2731
C		0,160
D		0,3239
E	1,6+1,6+4 mm	0,0072
F		0,0447
G		0,3
H		0,3



Length of Geotextile (m) = Circumference flange (m) + 0,4 (m)
= Pi x 0,445 (m) + 0,4 (m) = 1,8 (m)

Width of Geotextile (m) = Length studs (m) + 2 x hypotenuse of the 4100 Putty.

Hypotenuse of the 4100 Putty = $\sqrt{2 \text{ x (radius flange – radius pipe)}^2}$
= $\sqrt{2}$ x (radius flange – radius pipe)
= $\sqrt{2}$ x ((diameter flange – diameter pipe) x 0,5)

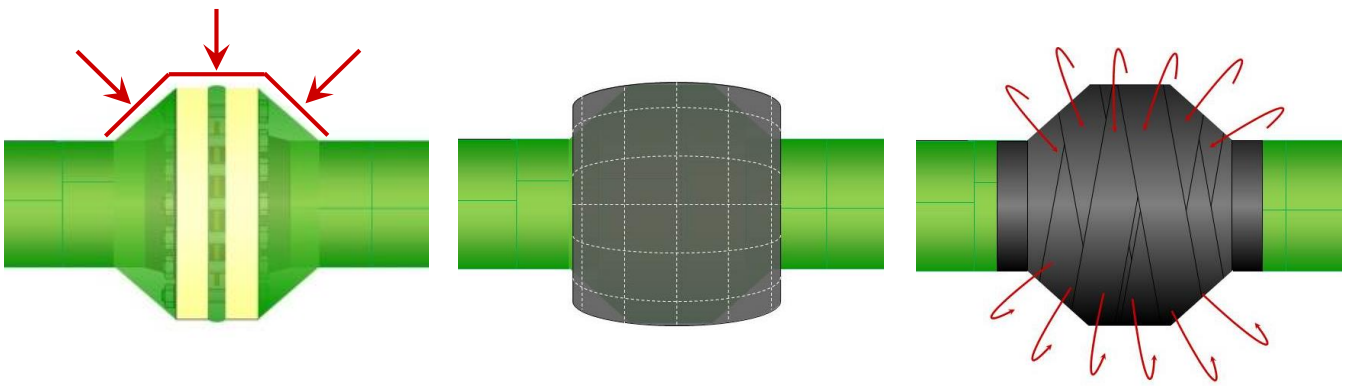
Width of Geotextile (m) = 0,16 (m) + 2 x $\sqrt{2}$ x ((0,445 – 0,2731) x 0,5)
= 0,16 (m) + 0,25 (m) = 0,41 (m)

$$\text{Rolls of Outerwrap} = \frac{4 \text{ x Pi x (A (m) x 0,5)}^2 - 2 \text{ x } 0,25 \text{ x Pi x B}^2}{\text{Surface of roll Outerwrap, calculated with 75\% overlap}}$$

$$\text{Rolls of Outerwrap} = \frac{4 \text{ x Pi x (0,445 (m) x 0,5)}^2 - 2 \text{ x } 0,25 \text{ x Pi x } 0,2731^2}{0,125\text{m}^2 \text{ (PVC 50x10x0,4)}}$$

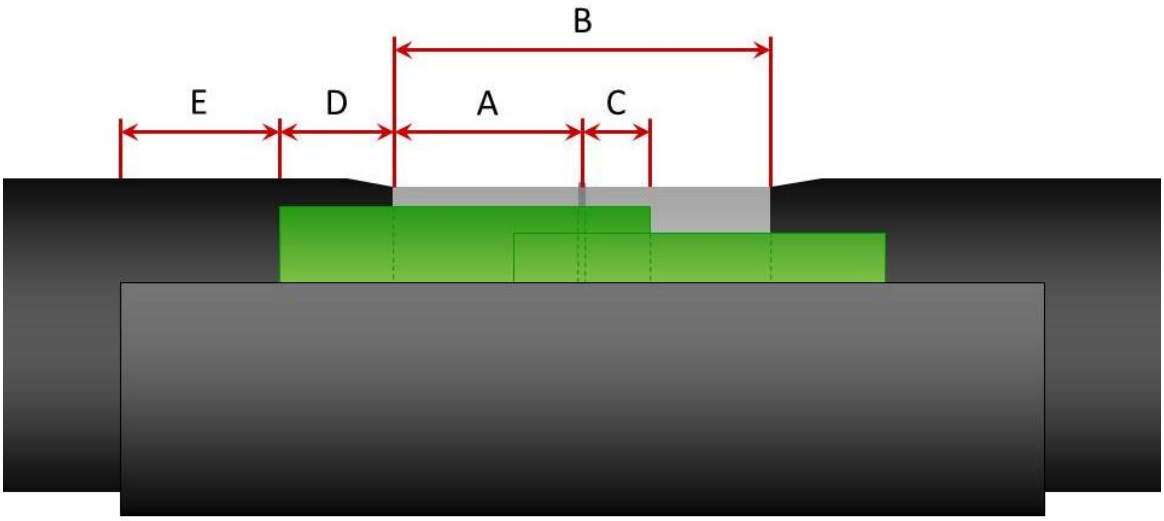
$$\text{Rolls of Outerwrap (0,4 x 50mm x 10m} = \frac{0,62 - 2 \text{ x } 0,059}{0,125\text{m}^2} = \frac{0,502\text{m}^2}{0,125\text{m}^2} = 4,02 \text{ rolls}$$

Outerwrap on adjacent lengths to be calculated as on straight pipes.



Material use on Field Joints

Field Joints will generally be coated with Wrappingband CZH(T) and High Impact Shield. The weld has to be covered with minimum 2 layers of Wrappingband CZH(T) at all times.



Field Joints		
Dimension	Desctiption	Size (mm)
A	Cut back of the pipeline	Client specific
B	Total cut back of the Field Joint	Client specific
C	Overlap Wrappingband CZH(T) over the weld	Minimum 30mm
D	Overlap Wrappingband CZH(T) over plant coating	Approx. 50mm
E	High Impact Shield wider as Wrappingband CZH(T)	Minimum 75mm

The width of Wrappingband CZH(T) that shall be used is depending on the total cut back of the Field Joint [B]

See table below:

Wrappingband dimensions	
Total Cutback [B]	Wrappingband CZH(T)
Max. 240mm	2 x 200mm wide
Max. 440mm	2 x 300mm wide
More than 440mm	Consult Stopaq B.V.

Cutting lengths of Wrappingband CZH(T) and High Impact Shield on the next page.

Material use on Field Joints

Cutting length of High Impact Shield and Wrappingband per pipeline size

Diameter INCH	Diameter DN	Circumference mm	Length CZH mm	Length HIS mm
2	50	189	239	305
2,5	65	229	279	330
3	80	279	329	380
3,5	90	319	369	430
4	100	359	409	460
5	125	444	494	550
6	150	529	579	640
8	200	688	738	800
10	250	858	908	980
12	300	1018	1118	1150
14	350	1117	1217	1260
16	400	1276	1376	1420
18	450	1436	1536	1590
20	500	1596	1696	1770
22	550	1756	1856	1950
24	600	1915	2015	2110
26	650	2073	2173	2270
28	700	2234	2334	2430
30	750	2394	2494	2600
32	800	2554	2654	2760
34	850	2714	2814	2930
36	900	2871	2971	3100
38	950	3032	3132	3260
40	1000	3192	3292	3430
42	1050	3352	3452	3590
44	1100	3512	3612	3750
46	1050	3669	3769	3910
48	1200	3830	3930	4065
52	1300	4147	4247	4420
56	1400	4467	4567	4750
60	1500	4788	4888	5080

EXAMPLE

22" Field Joint

Cut back per pipe = 200mm (total cut back is 400mm)

# of Field Joints: = 60 pcs.

System that shall be used:

1. Wrappingband CZH, 2 straight wraps (Roll Wrappingband CZH(T) 300mm x 10m)
2. High Impact Shield (Roll High Impact Shield 660mm x 30m)
3. Closure strip

Cutting length Wrappingband CZH = 1856 (mm) = 1,856 (m)

Cutting length High Impact Shield = 1950 (mm) = 1,950 (m)

Material use per Field Joint

Wrappingband CZH = 2 x 1,856 (m)

High Impact Shield = 1 x 1,950 (m)

Closure strip = 1 pc.

$$\text{Strips per roll Wrappingband CZH 300mm x 10m} = \frac{10\ (m)}{1{,}856\ (m)} = 5{,}3 = 5 \text{ strips}$$

Strips Wrappingband CZH 300mm = 60 x 2 = 120 strips total

$$\text{Rolls Wrappingband CZH 300mm x 10m} = \frac{120\ (\text{strips})}{5\ (\text{strips per roll})} = 24 \text{ rolls}$$

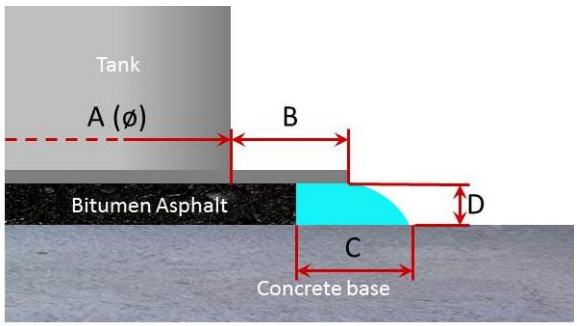
$$\text{Strips per roll High Impact Shield 660mm x 30m} = \frac{30\ (m)}{1{,}950\ (m)} = 15{,}4 = 15 \text{ strips}$$

$$\text{Rolls High Impact Shield 660mm x 30m} = \frac{60\ (\text{strips})}{15\ (\text{strips per roll})} = 4 \text{ rolls}$$

Closure strips = 60 pcs.

Material use on Tank chime areas

Tank chime area	
Dimension	Description
A	Tank diameter (dm)
B	Rim width (dm)
C	Chime width (dm)
D	Chime height (dm)



$$\text{Rolls Wrappingband EZ ***mm x 10m} = \frac{\text{Pi x (A + 2 x B) (dm)}}{\text{98 (dm) (100dm length – 2dm overlap)}}$$

Volume 4200 Filler (dm^3) = Pi x (A + 2 x B) (dm) x C (dm) x D (dm)

Weight of 4200 Filler (kg) = Volume of 4200 Filler x 1,35 (density 4200 Filler is 1,2-1,5)

$$\text{\# 4200 Filler 2kg Tubular bags} = \frac{\text{Weight of 4200 Filler (kg)}}{2}$$

EXAMPLE

Tank chime area	
Dimension	Dimension
A	260 (dm)
B	1 (dm)
C	0,4 (dm)
D	0,3 (dm)

$$\text{Rolls Wrappingband EZ ***mm x 10m} = \frac{\text{Pi x 262 (dm)}}{\text{98 (dm)}} = \frac{\text{823,1(dm)}}{\text{98 (dm)}} = 8,6 = 9 \text{ rolls}$$

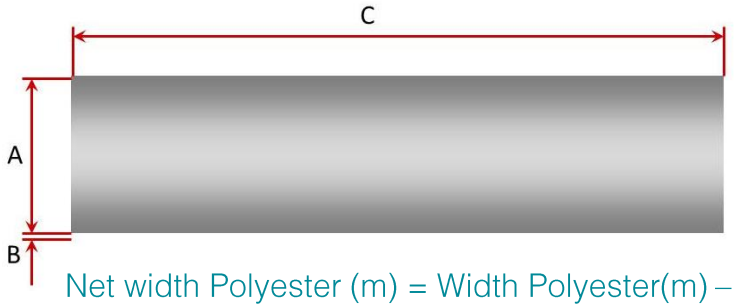
Volume 4200 Filler (dm^3) = Pi x 262 (dm) x 0,4 (dm) x 0,3 (dm) = 98,8 dm^3

Weight of 4200 Filler (kg) = 98,8 dm^3 x 1,35 = 133,4 (kg)

$$\text{\# 4200 Filler 2kg Tubular bags} = \frac{\text{133,4 (kg)}}{2} = 66,7 = 67 \text{ tubular bags}$$

(If the width of the chime (dimension C) is more than 0,5 dm, a backing foam barrier shall be used.)

Material use of Polyester on pipelines



Straight pipe	
Dimension	Description
A	Outer diameter of the pipe
B	Coating thickness
C	Pipeline length

Net width Polyester (m) = Width Polyester(m) – 0,05(m) (overlap 50mm)

Length Wrap Polyester (m) = Pi x (A+B+B (m)) + 0,05 (m)

$$\text{Net needed Polyester (rolls)} = \frac{\text{Pipeline length (m)}}{\text{Net width Polyester(m)}} \times \frac{\text{Length wrap (m)}}{10}$$

$$\text{Net needed Compression tape (rolls)} = \frac{\text{Surface to be coated (m}^2\text{)}}{\text{Net surface roll (m}^2\text{)}}$$

Surface to be coated (m^2) = Length pipe (m) x (A + B + B + 2 x thickness Polyester)

Net surface roll Compression tape (m^2) = Surface area roll(m^2) x 0,45 (50% overlap)

Example

Pipeline DN500	A =	0,508m	(diameter)
Coating thickness	B =	3 mm	(Stopaq System)
Length to be coated	C =	40 m	

Net width Polyester (m) = 1(m) – 0,05(m) = 0,95(m)

Length Wrap Polyester (m) = Pi x (0,508+0,003+0,003) + 0,05 = 1,67 (m)

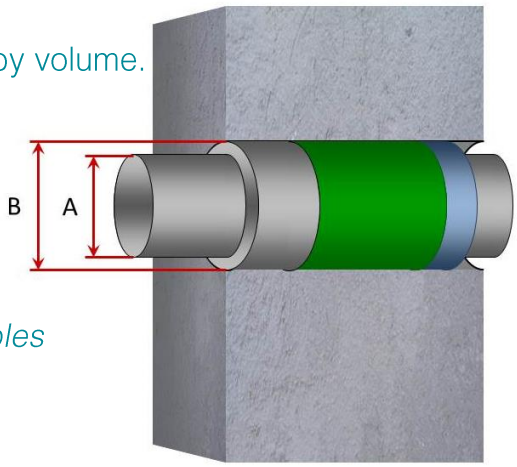
$$\text{Net needed materials (rolls)} = \frac{40(m)}{0,95(m)} \times \frac{1,65(m)}{10(m)} = 43 \times 0,167(m) = 7,2 \text{ rolls}$$

Net surface roll Compression tape (m^2) = 6,6(m^2) x 0,45 = 2,97(m^2)

$$\text{Net needed Compression tape (rolls)} = \frac{40 \times Pi \times (0,508 + 0,0094)(m^2)}{2,97\ (m^2)} = 21,9 \text{ rolls}$$

Note: Thickness Polyester is 1,7mm.

Material use in Pipe / Cable ducts



2100 Aquastop and Mortar WR or FR will be calculated by volume.
System build/up is as follow:

Barrier
100mm 2100 Aquastop
50mm Mortar

Note: At cable duct no volume compensation for the cables will be calculated.

Volume 2100 Aquastop (dm^3) = (Surface duct (dm^2) – Surface pipe (dm^2)) * 1 (dm)

Weight 2100 Aquastop (kg) = Volume of 2100 Aquastop x 1,35 (density is 1,35±0,05)

Volume Mortar WR/FR (dm^3) = (Surface duct (dm^2) – Surface pipe (dm^2)) * 0,5 (dm)

Weight Mortar WR (kg) = Volume of Mortar x 1,6 (density Mortar WR is 1,6±0,2 @ 20°C)

Weight Mortar FR (kg) = Volume of Mortar x 0,85 (density Mortar WR is 0,8 – 0,85)

EXAMPLE

Duct diameter = 100mm
Pipe diameter = 60mm
# of ducts = 50
System = 2100 Aquastop + Mortar WR

Volume 2100 Aquastop (dm^3) = (Pi x 0,25 x 1^2 (dm) – Pi x 0,25 x $0,6^2$ (dm)) * 1 (dm)
= 0,5 (dm^3)

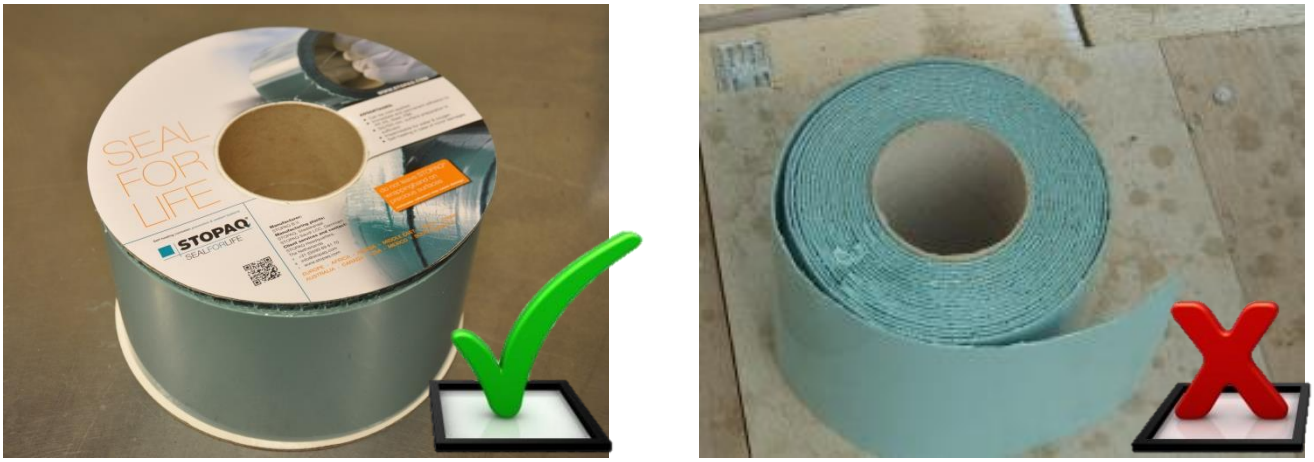
Weight 2100 Aquastop (kg) = 0,5 x 1,35 = 0,675 (kg)

Volume Mortar WR (dm^3) = (Pi x 0,25 x 1^2 (dm) – Pi x 0,25 x $0,6^2$ (dm)) * 0,5 (dm)
= 0,25 (dm^3)

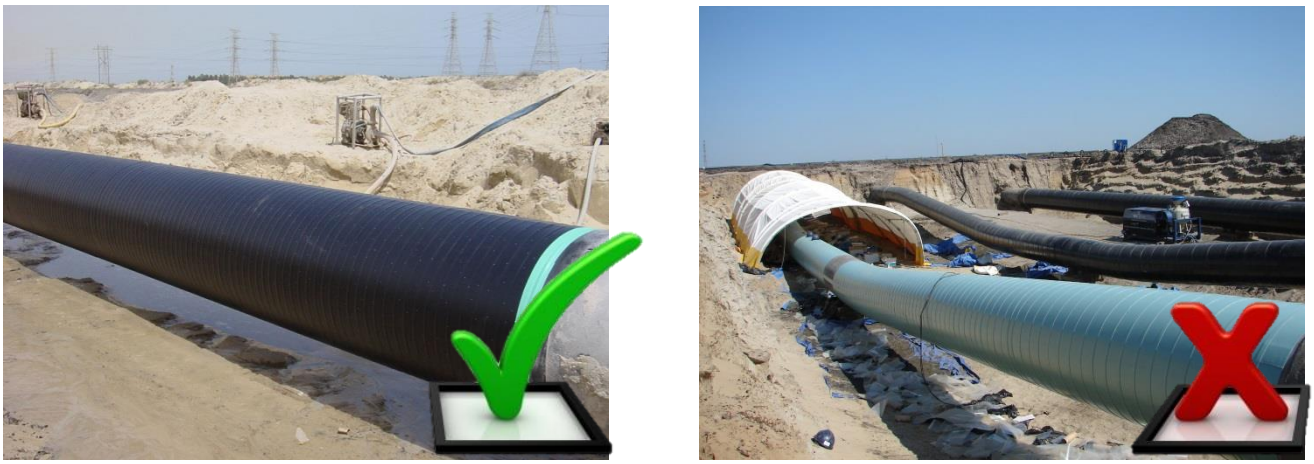
Weight Mortar WR (kg) = 0,25 x 1,6 = 0,4 kg

Total 50 ducts: = 50 x 0,5 = 25 (kg) 2100 Aquastop
= 50 x 0,25 = 12,5 (kg) Mortar WR

In case of any doubt always check specifications and procedures or consult a Stopaq Engineer.



Do not place Stopaq materials without the cardboard reel or siliconized foil on any surface or onto itself. Stopaq materials will immediate stick to almost any surface and will be difficult to remove.

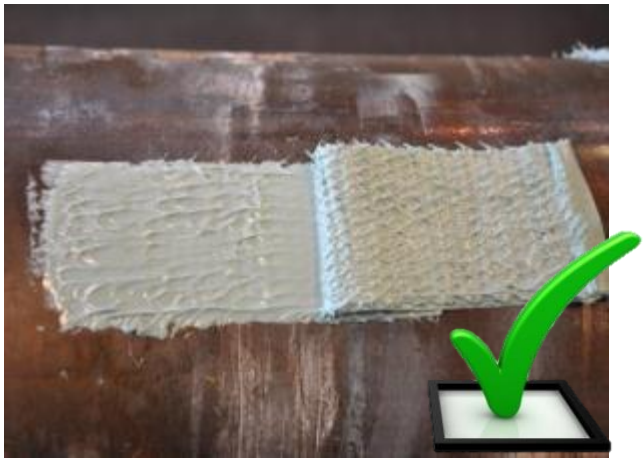


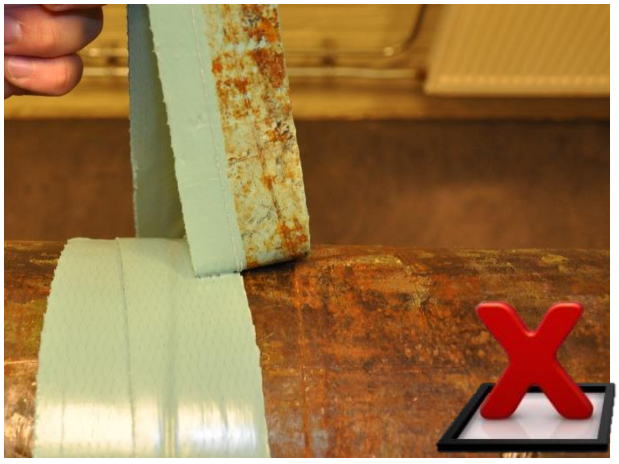
Always work in a clean environment and remove all the garbage, such as release liners, cardboard reels, empty boxes etc. after the application.

Always respect manufacturers storage instructions. Do not stack pallets. Restriction to stacking is clearly mentioned on the outside of the packed boxes. Stacking can lead to severe damage of the packing and its content. Materials that are not stacked upright might change shape due to its visco elastic behaviour.

Place boxes with Stopaq materials upright. Due to the visco-elastic properties of the materials, the shape of a roll Wrappingband might change.

Respect manufacturer or client specification regarding Surface preparation. Minimum St2-St3, minimum 3 degrees above dew point, no mill scale, no loose contaminations etc.





Cohesive fracture shall occur when peel off test is conducted. If no 95% remaining coverage is achieved the surface needs further cleaning.

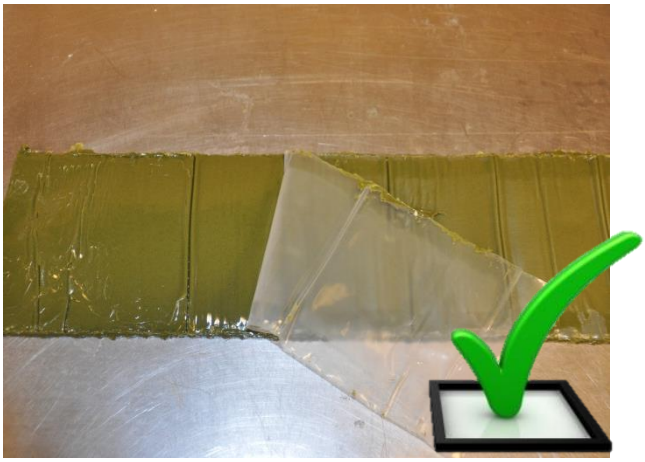
If necessary, degrease with Isopropanol of SFL Substrate Cleaner. Do not use any thinner.

Apply Wrappingband without tension.

Start and end with a straight circumferential wrap.

Minimum side by side overlap shall be 10mm. Respect the printed indication line on the Wrappingband, present on the Wrappingband wider than 50mm.

Do not apply any Wrappingband, except Wrappingband CL and Wrappingband SZ, on a wet surface.



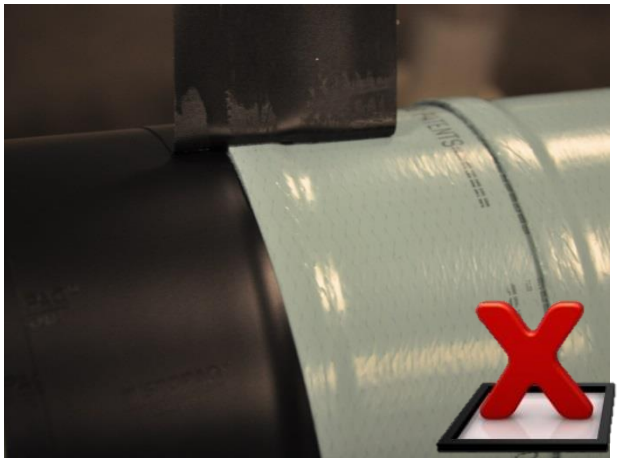
Only remove the release liner. The backing foil or non-woven cloth which is attached to the Wrappingband must not be removed.

Do not unwind Wrappingband and place it on a flat surface or wrap it in the other wrapping direction. Wrinkles might appear. Respect the wrapping direction on the cardboard reel.

Always smear a thin layer of 4100 Putty on the surface/object before big lumps of 4100 Putty will be used.

Use Geotextile as an intermediate layer between 4100 Putty and Outerwrap.

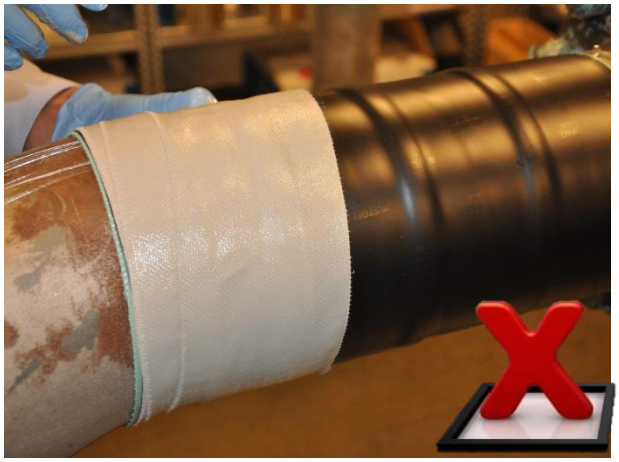
Do not apply Outerwrap on bare steel. Stopaq Visco-elastic materials will provide the corrosion preventive properties of the system, Outerwrap is just for mechanical protection only. Keep approx. 3mm Wrappingband exposed at both ends.



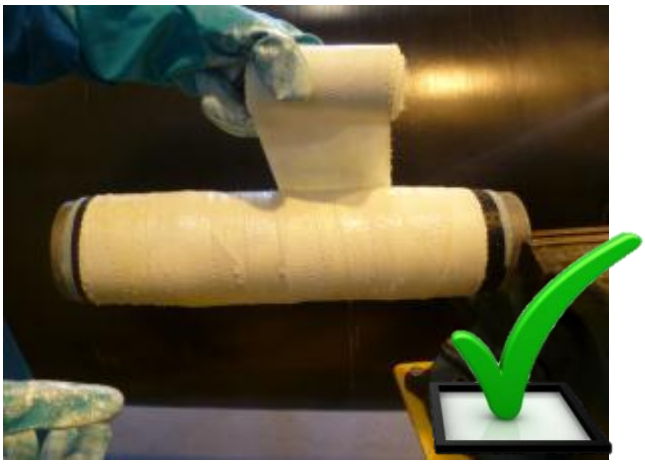
Apply Outerwrap with tension. Apply Outerwrap with a minimum overlap of 50%.

Do not apply Outerwrap without the visco elastic corrosion prevention material on any object.

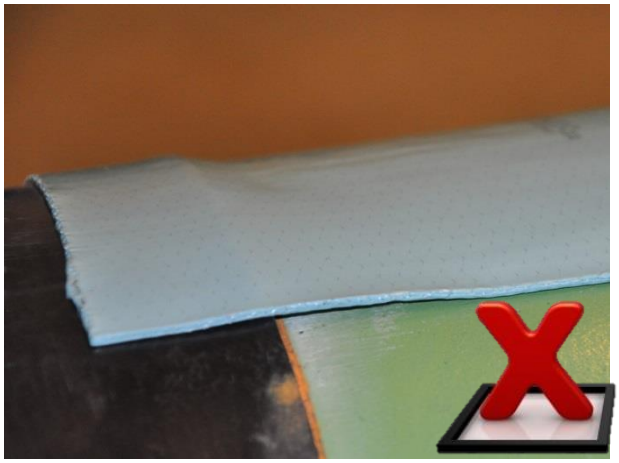
Open the pouch of Outerglass Shield just prior to the application. Outerglass Shield will start curing when the pouch is opened.



Continuous wetting of Outerglass Shield during the application for a faster and better curing time and coating performance.

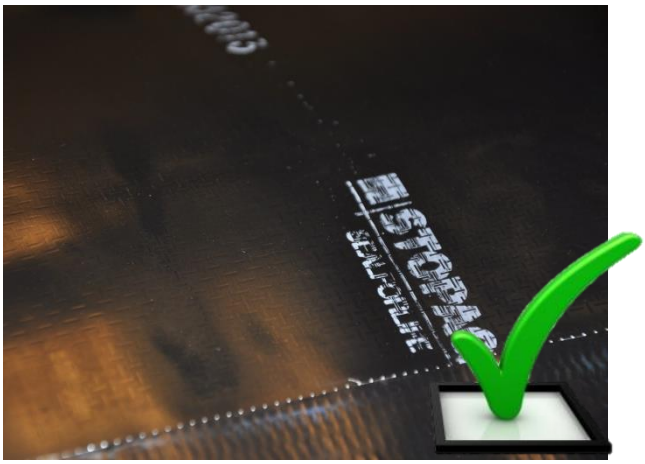


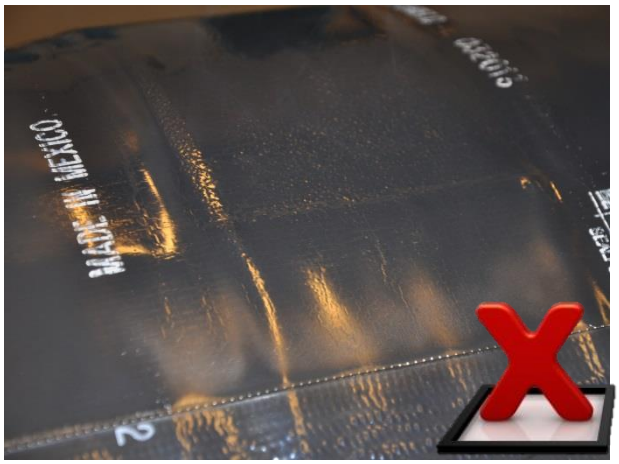
Wear proper gloves and PPE during the application of Outerglass Shield.



Press Wrappingband tight in the bevelled edge with the line pipe coating. Avoid air inclusions.

Do not use a siliconized roller. Due to the Visco-elastic behaviour of Stopaq materials, the siliconized rolled could displace some materials and therefore material thickness could be reduced.





Do not overheat the High Impact Shield. Where the Wrappingband is underneath the High Impact Shield, the pattern in the surface of the High Impact Shield must remain. Slight discolouration is allowed.


Shell Global Solutions

ارامكو السعودية
Saudi Aramco

BASF
The Chemical Company

المملكة العربية السعودية
المؤسسة العامة لتحلية المياه المالحة
Saline Water Conversion Corporation

جاسكو
GASCO

WRAPPINGBAND CZ

Independently tested, approved and qualified by:

- DVGW
- Kiwa BRL K911-02
- OVGW QM Wasser
- TUV Nord Baltik
- Polyvation
- OFI Technologie & Innovation GmbH
- Polymer Service Centre

In combination with:	Max. temp of combination	UV resistant?	Independently tested, approved and qualified by:
Outerwrap PVC	50°C	YES	Giproniigaz
Outerwrap PE	50°C		
Outerwrap PU	50°C	YES	
Outerwrap HSPE	50°C		
Outerwrap HSPEX	50°C	YES	
Outerwrap HTPE	50°C		
Outerwrap HTPP	50°C	YES	

WRAPPINGBAND CZH

Independently tested, approved and qualified by:

- NSF
- TUV Nord Baltik
- Polyvation
- Polymer Service Centre
- BASF
- TUV Sud
- OFI Technologie & Innovation GmbH

In combination with:	Max. temp of combination	UV resistant?	Independently tested, approved and qualified by:
Outerwrap PVC	65°C	YES	Shell Global Solutions Giproniigaz FSB University of Zagreb SWCC Foldgazszallito FGSZ Zrt. Gasco Sapref Saudi Aramco
Outerwrap PE	50°C		
Outerwrap PE	70°C		
Outerwrap PU	70°C	YES	
Outerwrap HSPE	50°C		
Outerwrap HSPEX	50°C	YES	
Outerwrap HTPE	70°C		
Outerwrap HTPP	70°C	YES	
High Impact Shield	65°C		Shell Global Solutions TSUS Sapref
H.I.S. HT	70°C		

WRAPPINGBAND CZHT

Independently tested, approved and qualified by:

- OVGW QM Wasser
- SWRI

In combination with:	Max. temp of combination	UV resistant?	Independently tested, approved and qualified by:
Outerwrap PE	70°C		
Outerwrap PU	95°C	YES	
Outerwrap HSPE	50°C		
Outerwrap HSPEX	50°C	YES	
Outerwrap HTPE	95°C		
Outerwrap HTPP	95°C 120°C	YES	Shell Global Solutions Sapref COT Haarlem Shell Global Solutions (for CUI and atmospheric)
High Impact Shield	65°C		
H.I.S. HT	95°C		

Shell Global Solutions

SAPREF

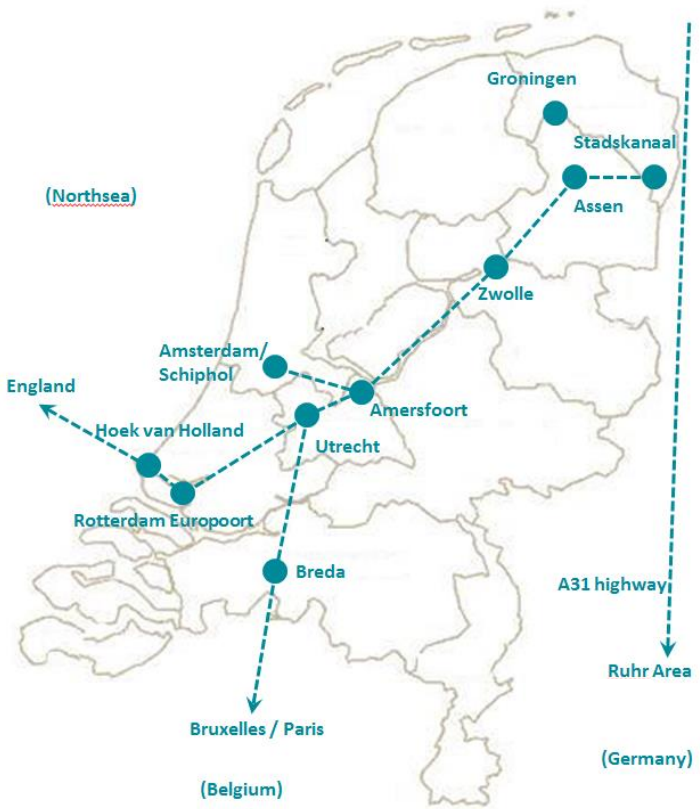
WRAPPINGBAND EZ			
In combination with:	Max. temp of combination	UV resistant?	Independently tested, approved and qualified by:
High Impact Shield HSR	65°C		IIT Mumbai

WRAPPINGBAND CL			
In combination with:	Max. temp of combination	UV resistant?	Independently tested, approved and qualified by:
Outerwrap PVC	50°C	YES	UVP Protikorozni

CONTACT DETAILS

Directions
From Amsterdam Airport Schiphol: A4 towards Amsterdam, Exit A10 towards Amersfoort, Exit A1 towards Amersfoort, Exit A28 towards Zwolle, Exit A28 towards Assen, Exit N33 Assen Zuid towards Veendam, Exit N33 towards Veendam, Roundabout N34 towards Gasselte/Emmen, Exit N378 Gasselte/Stadskanaal. Approx. 11 km straight ahead and until arrival at Stopaq.

From Groningen: A28 towards Assen, Exit N34 Emmen, Roundabout N34 towards Gasselte/Emmen, Exit N378 Gasselte/Stadskanaal. Approx. 11 km straight ahead and until arrival at Stopaq.



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