STOPAQ®

Self·healing corrosion prevention & sealant technology

SEALFORLIFE

APPLICATION MANUAL 2019

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 many standards like the KIWA BRL 911/02, TUV Nord ISO 12068, class C50 and ISO 21809-3. The systems 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 Wrappingband primary layers within a system consist of a fully amorphous, non-crosslinked, non-polar polymer composition. Once applied it is impermeable 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 substrate. This behaviour does not change with time, meaning that it has excellent long term corrosion preventative properties (i.e., no ageing). Stopaq provides superior adhesion to many types of substrates (steel pipe or existing coating) through a permanent molecular bonding. With a glass transition temperature of -65°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 protected 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 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 and, bacteria, combined with a very high electrical insulation resistance. 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-crosslinked 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 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, Januari 1, 2019

Bas Huizing
Training & Application Engineer Stopaq B.V.

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

INDEX

INDEX

Corrosion prevention products

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

Mechanical protection products

- Stopaq High Impact Shield
- Stopaq High Impact Shield HT
- Stopaq Outerwrap PVC
- Stopaq Outerwrap PE
- Stopaq Outerwrap HSPE
- Stopaq Outerwrap HSPEX
- Stopaq Outerwrap HTPP
- Stopaq Outerwrap PU
- Stopaq PE Repair Patch
- Stopaq EZ Topcoat
- Stopaq Flangebelt
- Subsea Intermediate Wrap PVC

Sealing products

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

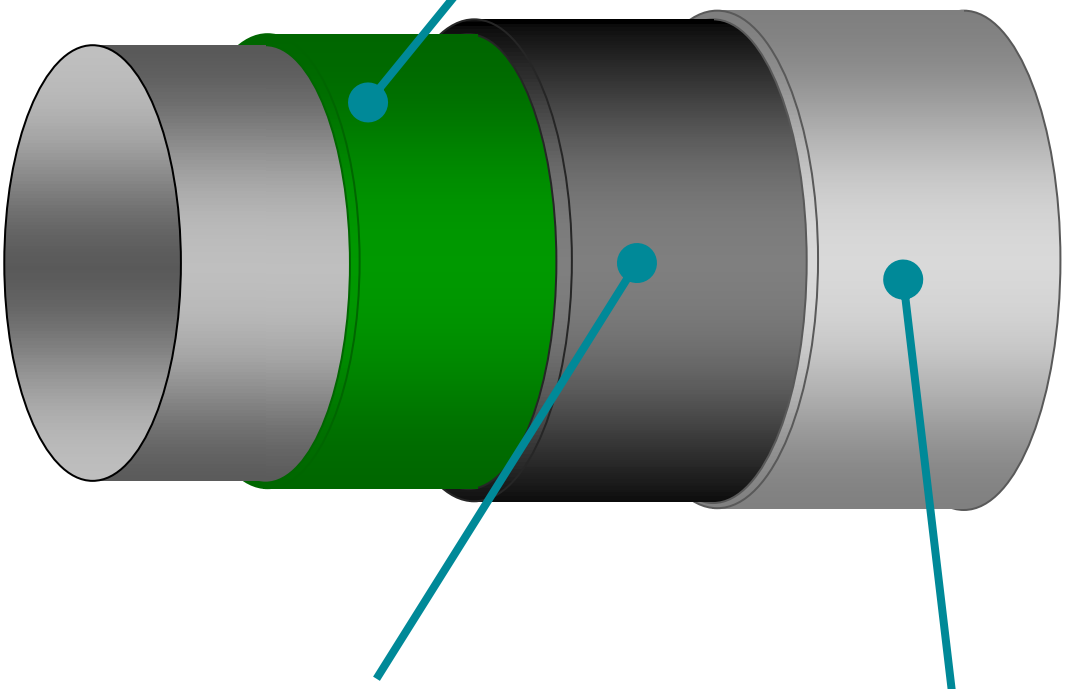
Additional Mechanical protection products

- Stopaq Outerglass Shield XT
- Stopaq Polyester
- Stopaq Gelcoat
- Stopaq Vinyl ester
- Protectamesh Rockshield
- Stopaq Soilstress Arrestor
- Stopaq Thermowrap
- Stopaq Geotextile

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

System build-up

Corrosion prevention
Wrappingband CZ, CZH, CZH-DS, CZHT
Paste CZ, CZH, CZHT, SZ
Wrappingband EZ, EZR, EZHT, Basecoat
4100 Putty
4200 Filler
Wrappingband CL, SZ



Mechanical protection
Outerwrap PVC, PE, HSPE, HSPEX, HTPP, PU
Subsea Intermediate Wrap
High Impact Shield (HT)
PE Repair Patch
Flangebelt

Additional Mechanical protection
Polyester
Vinyl ester
Outerglass Shield XT
Protectamesh Rockshield
Thermowrap
Soilstress Arrestor
Gelcoat
Geotextile

Stopaq® 4100 Putty ≤30˚C

Weight	Article number
0,53 kg	4110
2 kg	4125
20 kg	4000
Geotextile	1070

Stopaq® 4200 Filler ≤100˚C

Weight	Article number
0,53kg	4210
2kg	4225
20kg	4220

Stopaq® Basecoat (≤50˚C, Basecoat H≤70˚C)

Dimensions	Article number
100mm x 15m	6841-01500
200mm x 20m	6843-02000
150mm x 10m (H)	69062-01000
300mm x 10m (H)	69064-01000

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
CZH 50mm x 3m	69050-00300
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
200mm x 10m DS	69033-01000

Stopaq® Wrappingband CZH ≤70˚C

Dimension	Article number
50mm x 5m	6110
50mm x 10m	6120
100mm x 10m	6125
150mm x 10m	6136
150mm x 20m	6134
200mm x 10m	6130
200mm x 20m	6131
300mm x 10m	6248
50mm x 10m DS	6701
200mm x 20m DS	6704

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, EZR 70˚C, EZHT ≤95˚C

Dimension	Article number
50mm x 10m (EZ)	6400-01000
100mm x 10m (EZ)	6401
150mm x 10m (EZ)	6402
150mm x 20m (EZ)	6403
200mm x 10m (EZ)	6404
200mm x 20m (EZ)	6405
300mm x 10m (EZ)	6406
50mm x 10m (EZHT)	69020-01000
100mm x 10m (EZHT)	69021-01000
200mm x 10m (EZHT)	69022-01000
300mm x 10m (EZHT)	69023-01000
300mm x 10m (EZR)	6426

Stopaq® Wrappingband SZ ≤50˚C / Paste SZ

Product	Article number
100mm x 6m	4401
Paste SZ 2kg sheet	4400
Subsea Intermediate Wrap	1180

Stopaq® Casing Filler

Dimension	Article number
Stopaq Casing Filler – 20kg	69001-00024
Stopaq Casing Filler – 200ltr.	69001-00200
Stopaq Casing Filler – 1000ltr.	69001-01000

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
400mm x 40m (black)	1124
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
50mm x 30m	1230-03000
75mm x 30m	1231-03000
100mm x 30m	1232-03000
150mm x 30m	1233-03000

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
3” x 50’	1291-01524
4” x 50’	1292-01524

Stopaq® Outerwrap HTPP ≤95˚C

Dimension	Article number
2” x 100’	1249-03048
3” x 100’	1251-03048
4” x 100’	1250-03048

Stopaq® Outerwrap PU ≤135˚C

Dimension	Article number
4` x 108´	1282-03292

Stopaq® Thermowrap ≤175˚C continuous – Excursion temp 250˚C

Dimension	Article number
100mm x 30m	1262

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
660mm x 30m (HT)	1329
Other dimension	On request

Stopaq® Outerglass Shield XT Grey ≤121˚C

Dimension	Article number
4” x 30’	1471
6” x 60’	1472
8” x 60’	1473

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

Dimension	Article number
Polyester 1000mm x 10m	1144-01000
Compression Tape	1143-06600
Vinylester 600mm x 10m x 2mm	1150
Vinylester 180mm x 10m x 2mm	1153
Vinylester gelcoat CC 2,5kg - Grey	1151

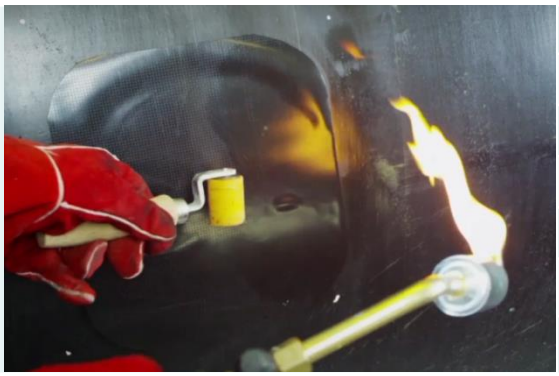
Stopaq® EZ Topcoat ≤100˚C

Dimension	Article number
4 litres – White	1090-04000
4 ltr. – Grey (Ral 7032)	1092-04000
Other colours on request	

Protecta-mesh™ Rockshield

Dimension	Article number
Strapping tool	1017-000
Strappingband roll carrier	1017-001
Strappingband 15,6mm x 1600m	1018
1,83m x 98m x 11mm	1510-09800

Stopaq® PE Repair patch ≤60˚C



Dimension	Article number
425mm x 10m	1360
URK Bitumen Patch 500x300mm	1102

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
Foam back plug Ø40mm x 1m	1103-00001
Foam Tape 20mm x 5m x 10m	1100

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

Quality Control	
Product	Article Number
SFL Holiday Detector	1011-000
SFL Holiday Detector Handle 0,50 – 30 kV	1011-001
SFL Holiday Detector Rechargeable Battery	1011-002
SFL Holiday Detector Extension 500mm	1011-003
SFL Holiday Detector Right Angles Rubber Probe 500mm	1011-004
SFL Holiday Detector Rubber Electrode 500mm	1011-005
SFL Barcol Hardness Tester	1024-00001

Stopaq® FAST	
Product	Article Number
SFL Fast Wrapping cart basic 220V	1080-000
SFL Fast Basecoat Wrapping device 220V	1080-001
SFL FAST GRE Wrapping device 220V	1080-002
SFL FAST Application Roller Bench 16T – Set	1080-0051
SFL FAST Application Roller Bench 24T – Set	1080-0052
SFL FAST Curing Roller Bench 16T – Set	1080-0061
SFL FAST Rail – 3m	1080-007
SFL FAST Skid Floor 20' – Used	1080-0081
SFL FAST Cable set 12m	1080-0091
SFL FAST Cable set 24m	1080-0092
SFL FAST Steel Support Beam (HEB280) – 5,5m	1080-010
SFL FAST Drum holder 200l.	1080-011
SFL FASTQ Roller Bench-PP 18T	1081-00001
SFL FASTQ Wrapping Cart – 9000	1081-00002
SFL FASTQ Tape Unit 68-260-200	1081-00003
SFL Graco Reactor – 2 H-XP2	1082-00001
STOPAQ FAST GRE Fabric 600 – 200mm	1600-020
STOPAQ FAST GRE Surface Veil – 100mm	1601-010
POWERCRETE FAST GRE Part A	5000-001
POWERCRETE FAST Air Releaser – 20lts.	50003-02000
POWERCRETE FAST GRE Part B	5001-001
POWERCRETE FAST GRE Part C	5001-002
POWERCRETE FAST Pigment Blue	5002-001
POWERCRETE FAST Pigment Green	5002-002
STOPAQ FAST Basecoat GRE 100mm x 15m	6501-01500
STOPAQ FAST Basecoat GRE 200mm x 35m	6505-03500
STOPAQ FAST Basecoat PE 100mm x 15m	6801-01500
STOPAQ FAST Basecoat PE 200mm x 30m	6803-03000
SYNERGYQ Ductile Iron Wrapping Tape 200mm x 20m	75003-02000

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 Injection set	500 ml Injector tool	1042
SFL Application 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
SFL Wrapster 1018-10041	Application	1021-21001
SFL Hot Air Blower	Surface preparation	1020
MBX Bristle Blaster Set Electric (220V)	Surface preparation	1007
SFL Propane Torches kit BN60	High Impact Shield	1014
Stopaq Pot magnet with hook (±100kg)	Subsea	1019
SFL Pyrometer	Surface preparation	1015
SFL Pyrometer Sensor	Surface preparation	1016
SFL Cleaning Wipes	Surface preparation	On request

System	
Product	**Used for**
4100 Putty	Corrosion Prevention Under ground flanges, Manhole covers, max 30°C
4200 Filler	Corrosion Prevention above ground flange and high temperature filler; max temp 100°C
Basecoat	Corrosion Prevention Structural steel; max temp 50°C
Paste CZ	Corrosion Prevention Under ground flanges, odd shapes etc.; max temp 50°C
Paste CZH	Corrosion Prevention Above ground flanges, odd shapes etc.; max temp 70°C
Paste CZHT	Corrosion Prevention Above ground flanges, odd shapes etc.; max temp 95°C
Wrappingband CL	Corrosion Prevention Condensating pipelines; max temp 50°C
Wrappingband CZ	Corrosion Prevention Pipelines, flanges, elbows etc.; max temp 50°C
Wrappingband CZH	Corrosion Prevention Pipelines, flanges, elbows etc.; max temp 70°C
Wrappingband CZH-DS	Corrosion Prevention Pipelines, flanges, elbows etc.; max temp 70°C
Wrappingband CZHT	Corrosion Prevention Pipelines, flanges, elbows etc.; max temp 95°C
Wrappingband EZ	Corrosion Prevention Chime area, coatable backing, max temp 70°C
Wrappingband SZ	Corrosion Prevention 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
Outerwrap PU	Mechanical protection, max temp 135°C
Thermowrap	Under insulation, max temp 175°C
PE Repair Patch	Mechanical ProtectionCoating 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
Flangebelt	Mechanical protection on flanges
Protectamesh Rockshield	Additional mechanical protection
Casing Filler	Casing pipes

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, SFL Cleaning Wipes or SFL Substrate Cleaner (NO thinner)	Isopropyl alcohol, SFL Cleaning Wipes or SFL Substrate Cleaner (NO thinner)	Isopropyl alcohol, SFL Cleaning Wipes 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 mill scale, rust paint coatings and foreign matter.

St 3 – Very thorough hand and power tool cleaning

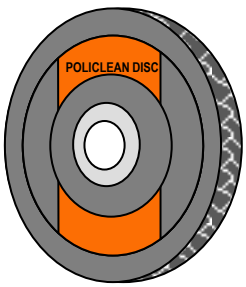
As for St2, the surface must be abraded to give a metallic sheen. A mechanical method of surface preparation widely used in the industry and involving the use of power sanders or wire brushes, power chipping hammers, abrasive grinding wheels, needle guns etc. Usually more effective than hand tool cleaning.

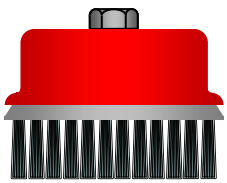
Surface preparation

1) Clean and degrease surface with SFL Substrate Cleaner, SFL Cleaning Wipes or Isopropanol. An abrasive cleaning pad can be used. Do not use any other solvents like thinner.

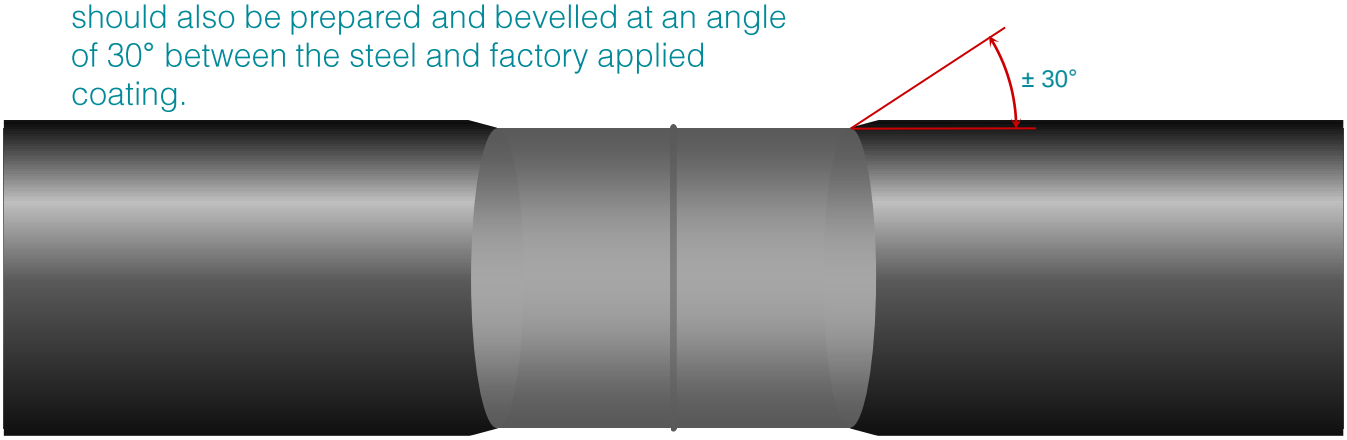
2)Surface should be prepared according to Stopaq's requirements minimum St2/St3 (ISO 8501-1). Wire brush, Monti Bristle Blaster, Grinding disc or similar tools are sufficient.

All mill scale must be removed.





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



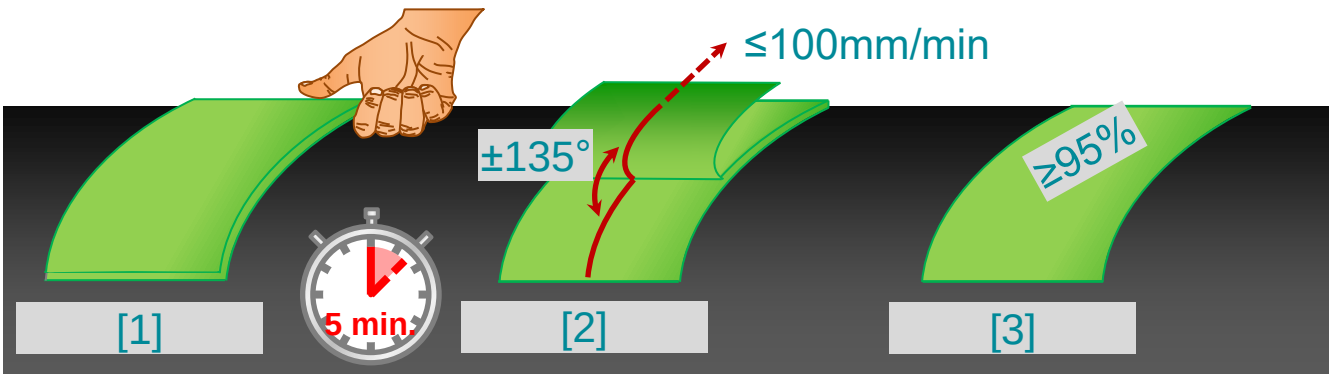
Surface cleanliness check.

[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

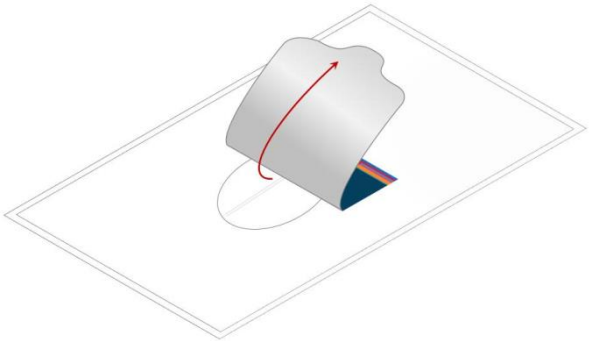
Use a calibrated dew point meter to measure the relative humidity, temperature of the atmosphere, temperature of the surface and the dew point.

1

Package of SFL Cleaning Wipes

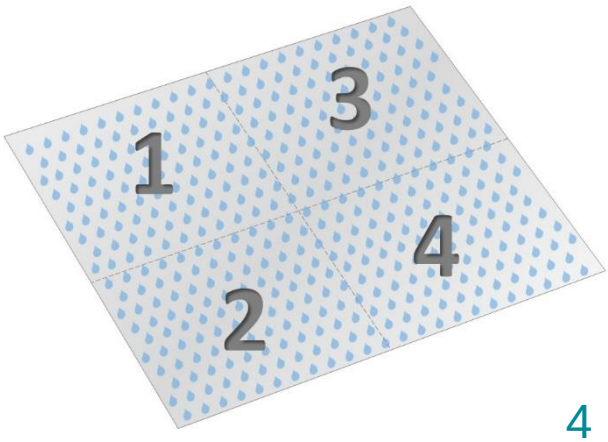
2

Open the pouch to take a SFL Cleaning Wipe



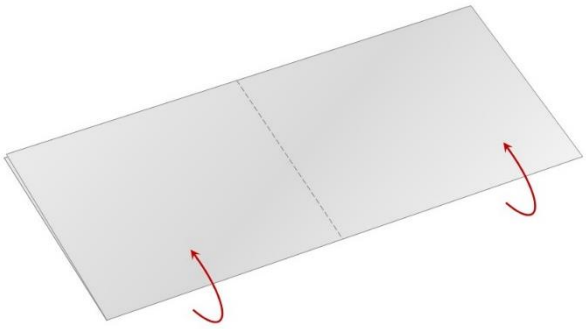
3

After taking a SFL Cleaning Wipe, close the package immediately to prevent the remaining Wipes from drying out



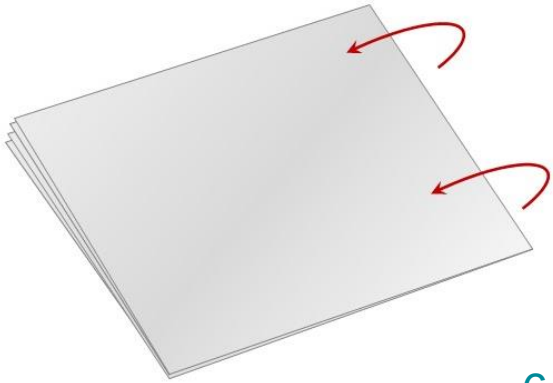
4

A SFL Cleaning Wipe as 4 areas that can be used to degrease the surface. Check if the wipe is moist. Dry wipes shall not be used.



5

Fold the SFL Cleaning Wipe at the middle, either through the length or width of the Wipe



6

Fold the Wipe again at the middle, so a quarter of the original size shall be used to clean the surface.

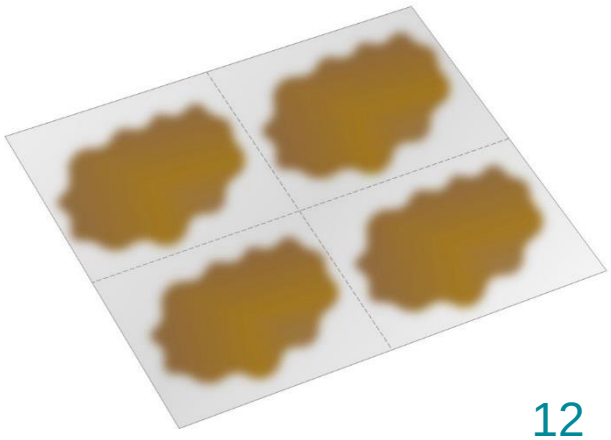
Surface to be cleaned with SFL Cleaning Wipe

After folding the SFL Cleaning Wipe the surface can be cleaned. Firmly rub the entire surface with the Wipe

If the Wipe has become too dirty, use an other clean side of the wipe

Continue until the surface is clean and all contaminations have been removed

Surface cleaned with SFL Cleaning Wipe.



If all 4 areas of the wipe have been used, take a new wipe to continue cleaning the surface.

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

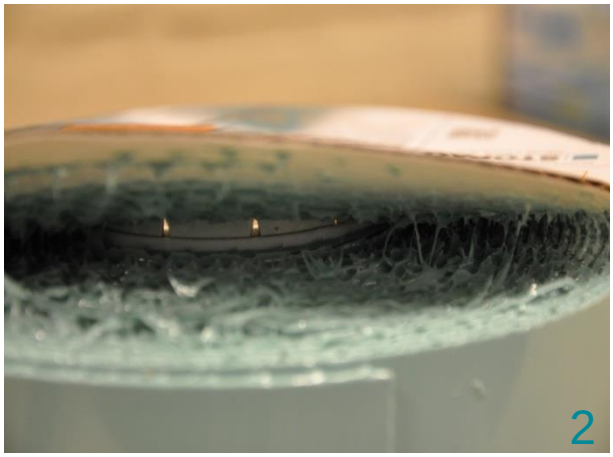
	Above ground	Below ground
Bare steel	**n/a**	**n/a**
Pipe with factory applied coating	**>100mm (not on bitumen coating)**	**>100mm (not on bitumen coating)**
Field joint (over coating) **Field joint (over weld)**	**±50mm** **≥30mm**	**±50mm** **≥30mm**

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.

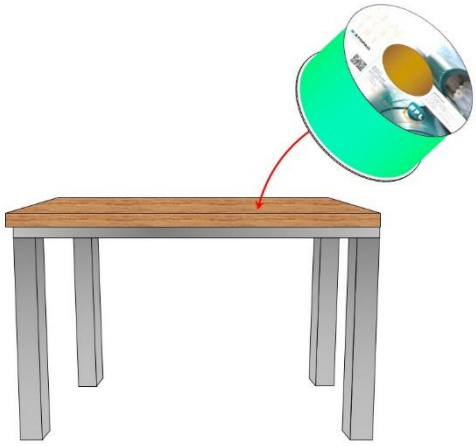


2

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

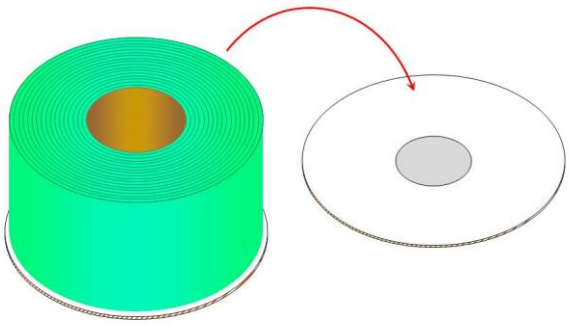
3

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.



4

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.

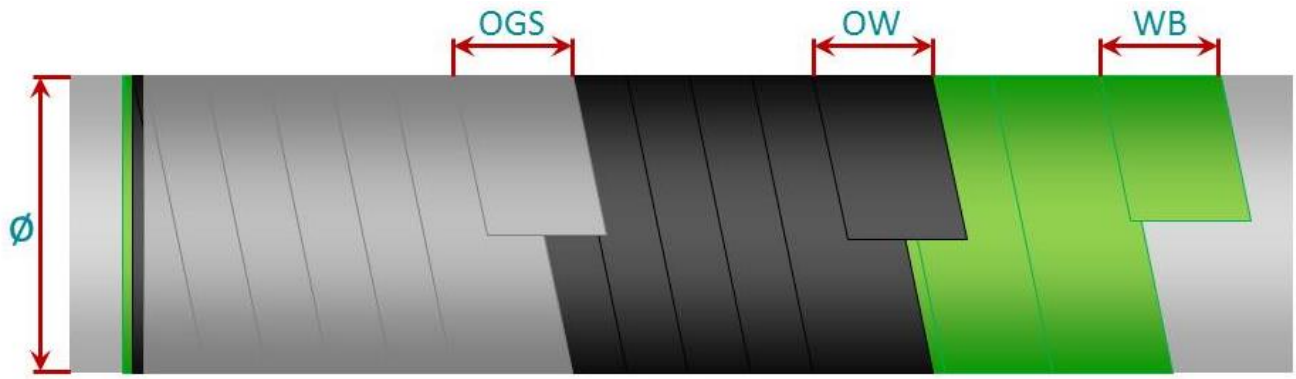
Spirally applied Wrappingband		
Pipe diameter	Width of Wrappingband to be used	Remark
< 6" (DN150)	50 mm	
≥ 6" (DN150)	100 mm	
≥ 36" (DN900)	200mm	

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

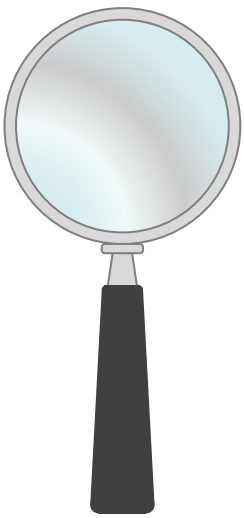


Holiday detection

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

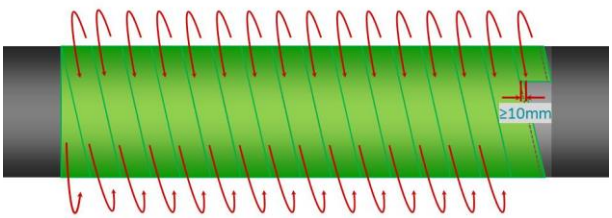
Backfill and compact with clean sand and filling material without sharp stones or hard lumps of soil, minimum 300mm around the object.

1

Ensure a proper surface preparation prior to the application of Wrappingband

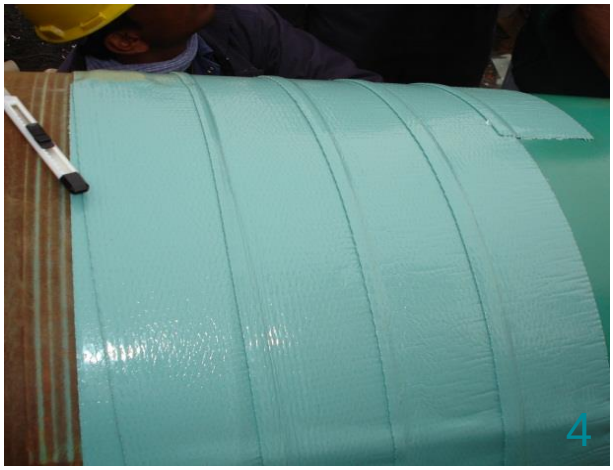
2

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



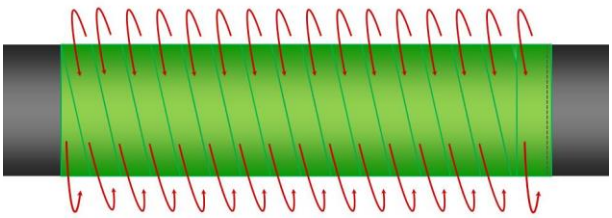
3

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



4

Always work in a clean environment.

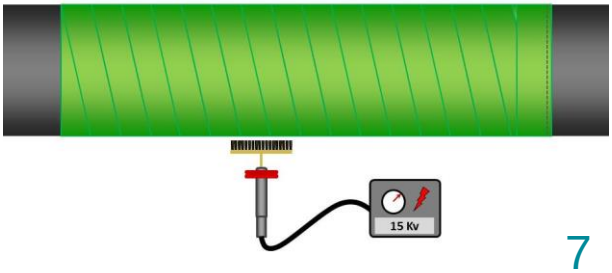


5

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.

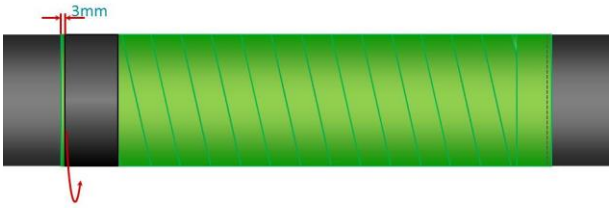


7

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.

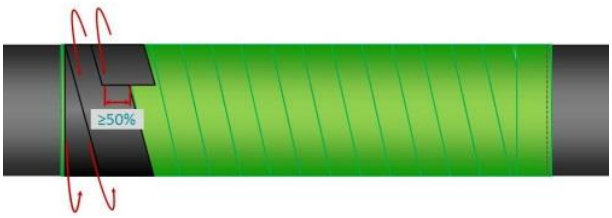


9

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.

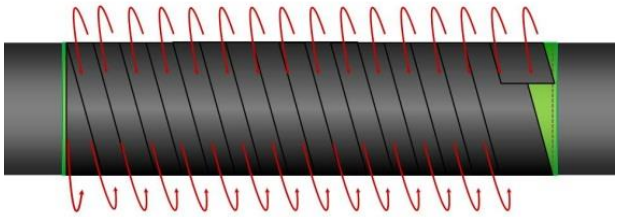


11

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.

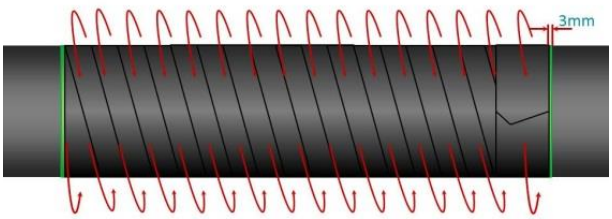


13

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

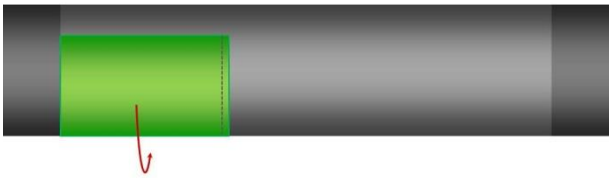
Finish with the Outerwrap facing downwards.

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.

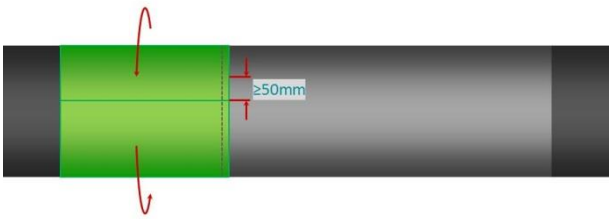


1

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.

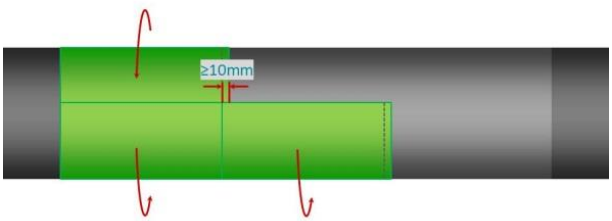


3

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.

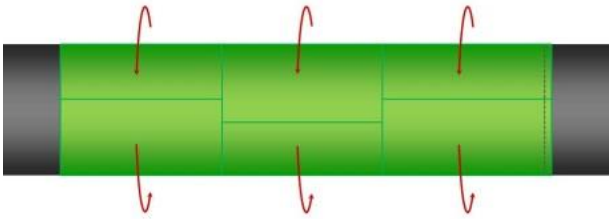


5

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

6

Check the adhesion of the Wrappingband regularly.

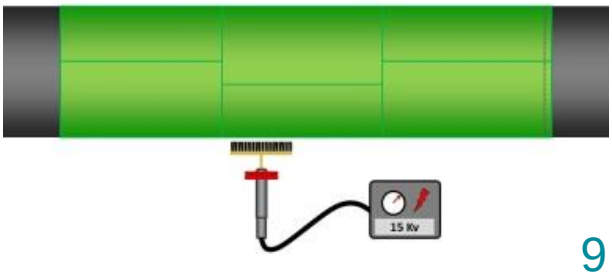


7

Continue until the entire area is covered with Wrappingband.

8

Do not walk on the applied Wrappingband.

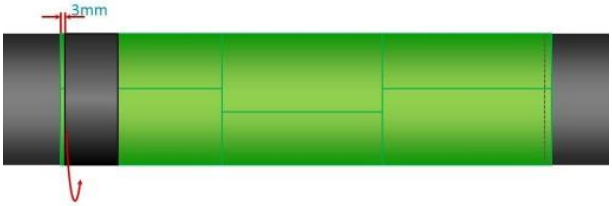


9

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.

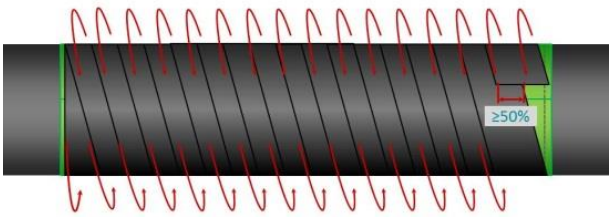


11

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.

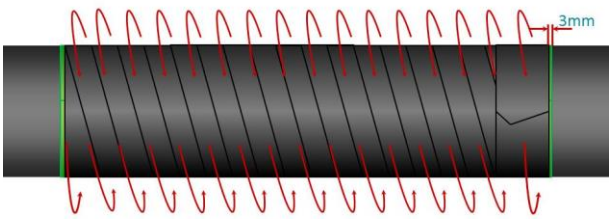


13

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

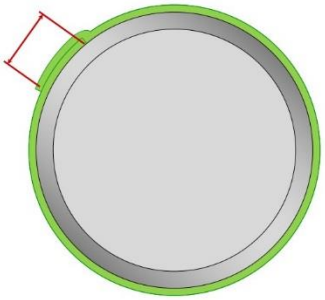
Outerwrap has to be applied with tension. An overlap of more than 50% does not affect the coating performance of the system. Finish with the Outerwrap facing downwards.

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.

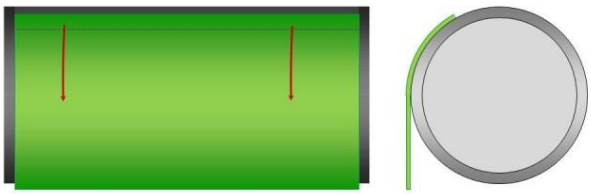


1

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.

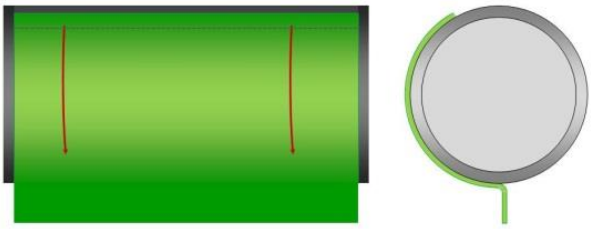


3

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.

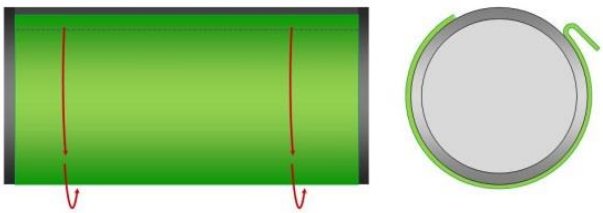


5

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.

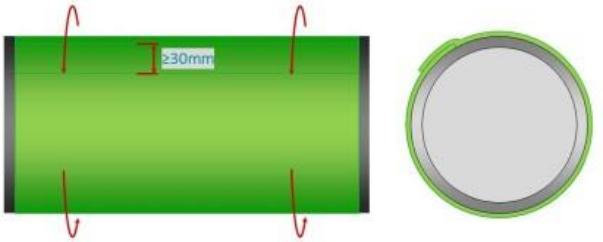


7

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.

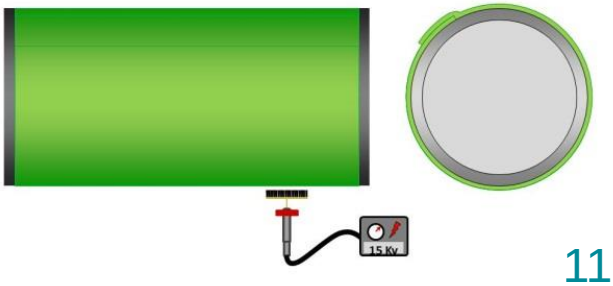


9

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.

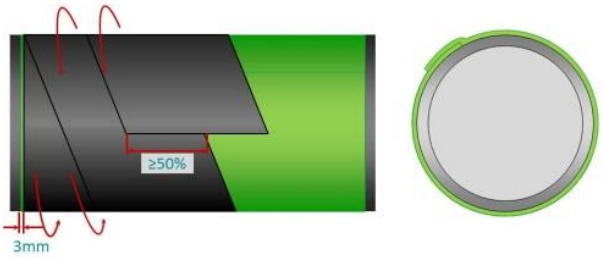


11

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.

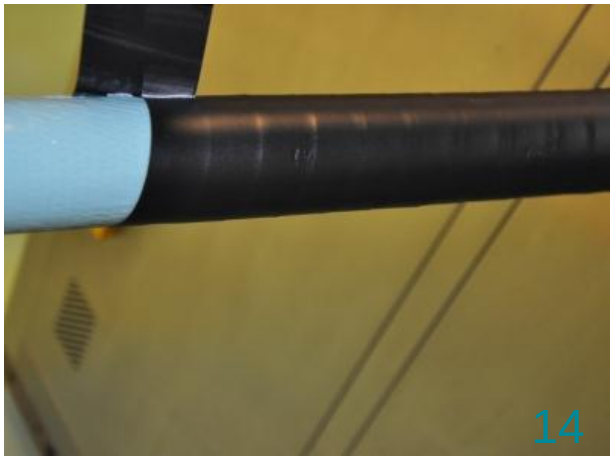
12

Always use approved and certified holiday test equipment.



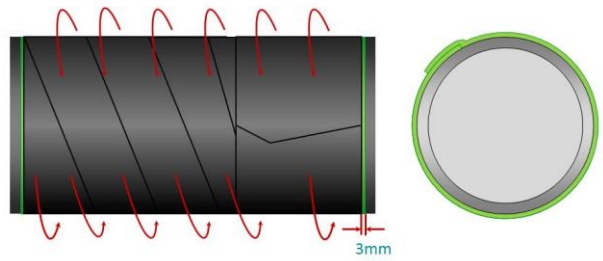
13

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.

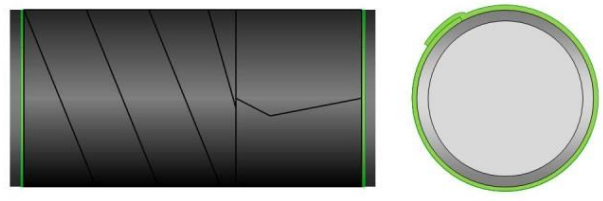


15

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

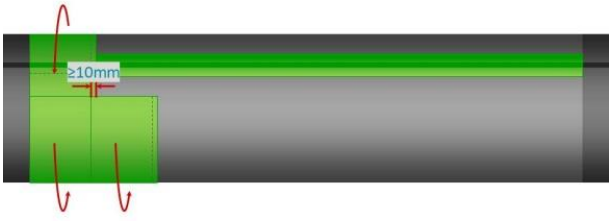
Check the adhesion of Wrappingband on a regular base during application.

3

Start with a circumferential wrap.

4

Wrappingband can be applied with straight wraps or spiral wraps.

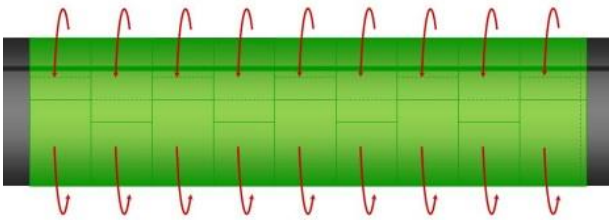


5

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

6

Apply Wrappingband with minimum tension and avoid air inclusions.

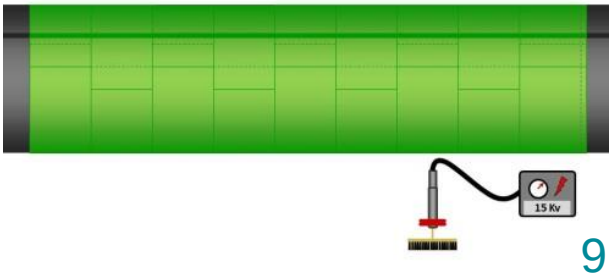


7

Continue application until the entire area is covered with Wrappingband.

8

Do not walk on the applied Wrappingband.

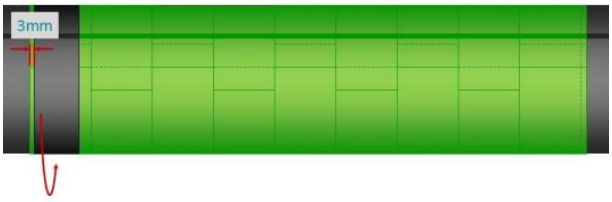


9

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.

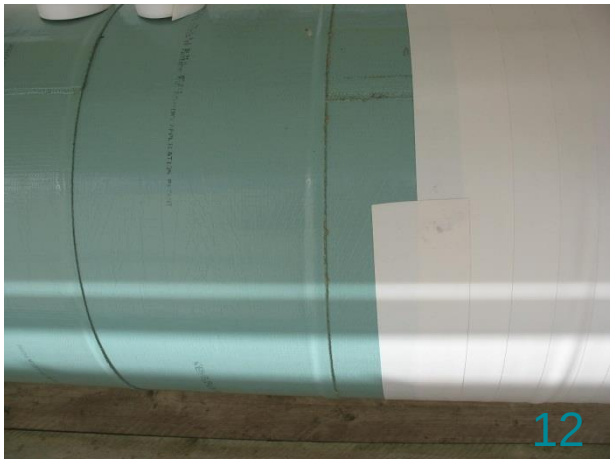
10

Always use approved and certified holiday test equipment.

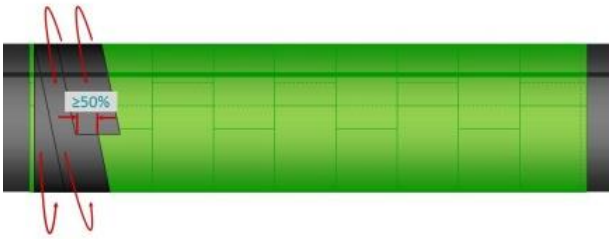


11

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



12

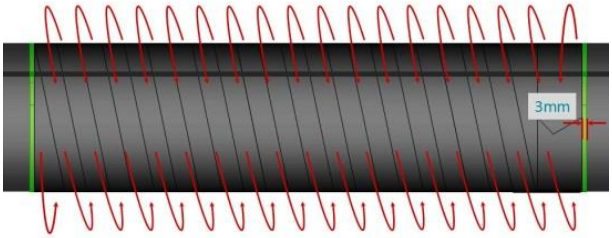


13

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

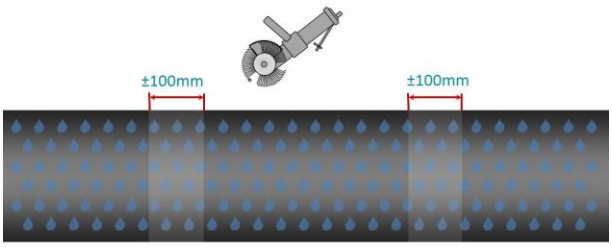
Outerwrap has to be applied with tension. An overlap of more than 50% does not affect the coating performance of the system. Finish with the Outerwrap facing downwards.

17

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

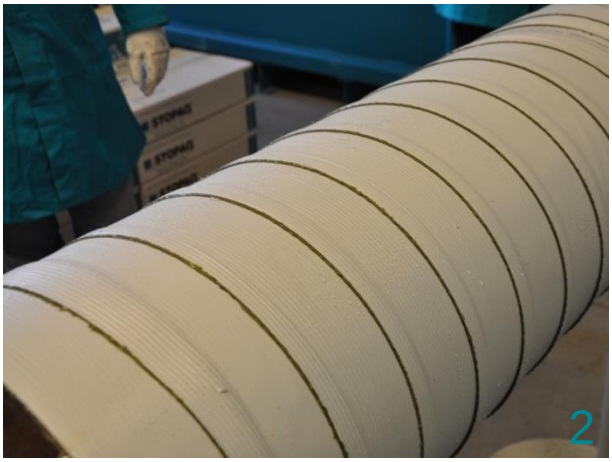
18

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



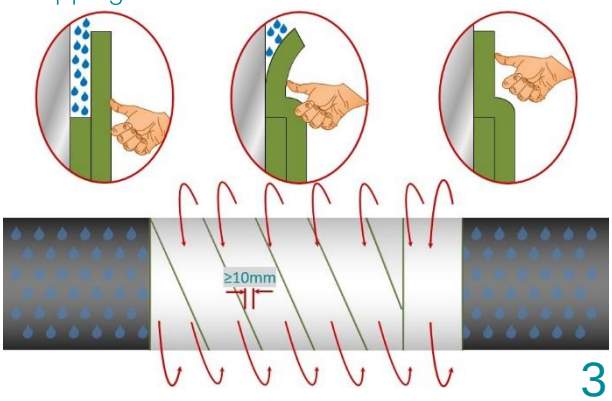
1

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.



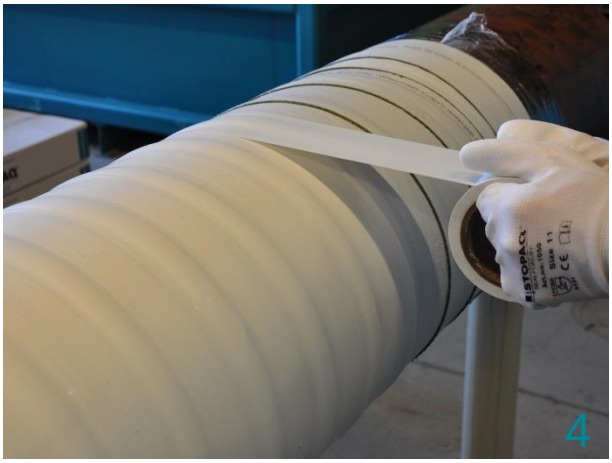
2

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



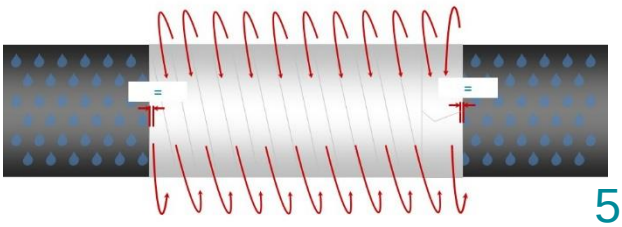
3

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.



4

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

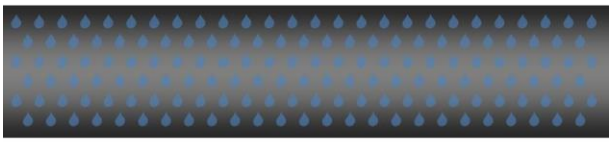


5

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 no Wrappingband CL visible on both sides.

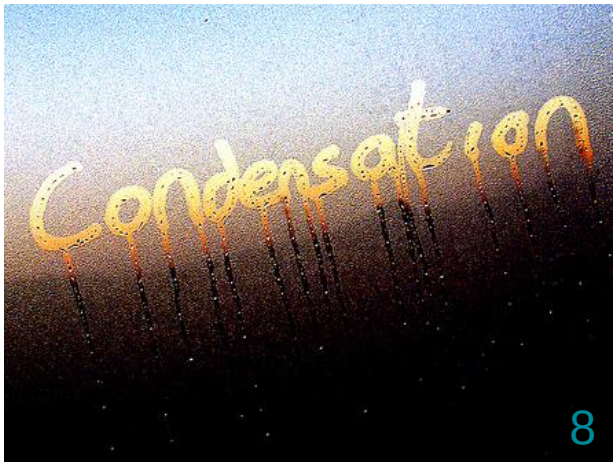
6

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

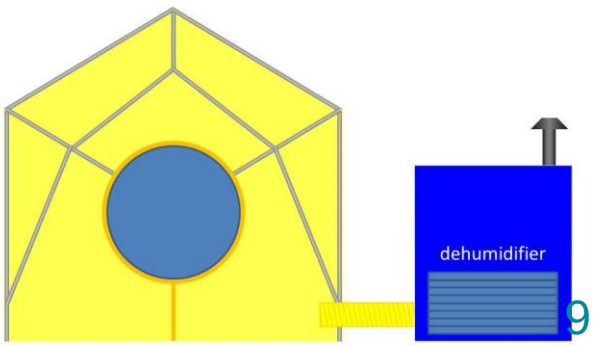


7

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

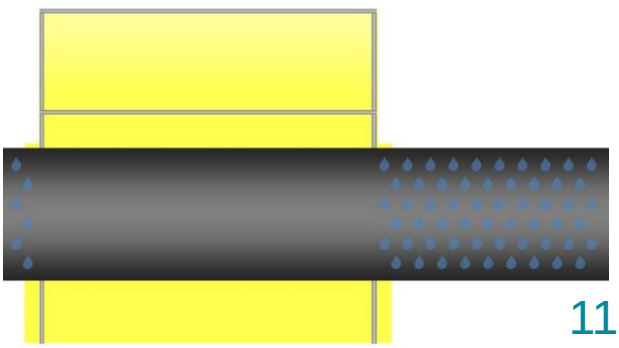


9

Install shelter with ground cloth around the pipe.

10

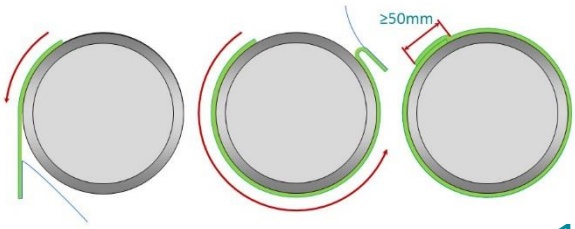
Dew point will decrease and therefore the pipe will become dry by supplying dehumidified air into the shelter.



11

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

12

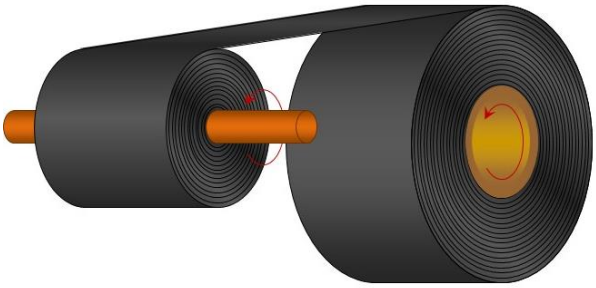


1

Due to the limited clearance between the pipes, Wrappingband shall be applied with straight wraps. For ease of application, remove the release liner during application. Circumferential overlap minimum 50mm.

2

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.

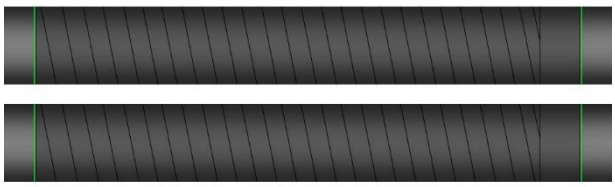


3

Due to the limited clearance between the pipes, Outerwrap can be wrapped on a tube or similar with a smaller core diameter. Therefore, the diameter of the Outerwrap roll to be applied on the pipe will be smaller and the Outerwrap could be applied by means of spiral wrap.

4

Start application of Outerwrap with 2 circumferential wraps. Keep approx. 3mm Wrappingband exposed. Apply Outerwrap with tension. Continue with spiral wrap, minimum 50% overlap.



5

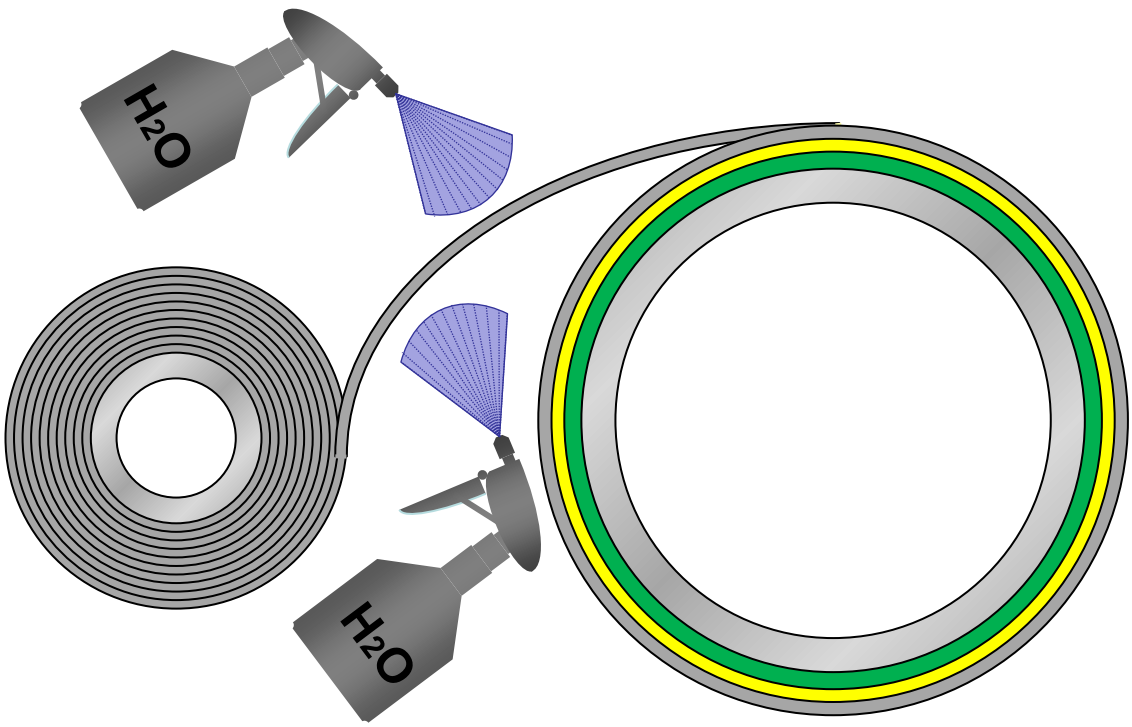
Finish with 2 circumferential wraps. Keep 3mm Stopaq Wrappingband visible. Apply the last 180° without tension. Cut the end as a tie.

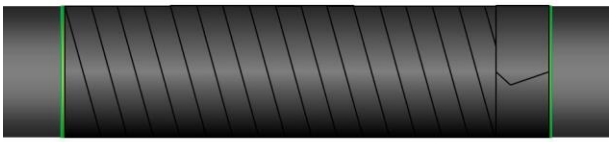
6

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

General information about the application of Outerglass Shield XT.

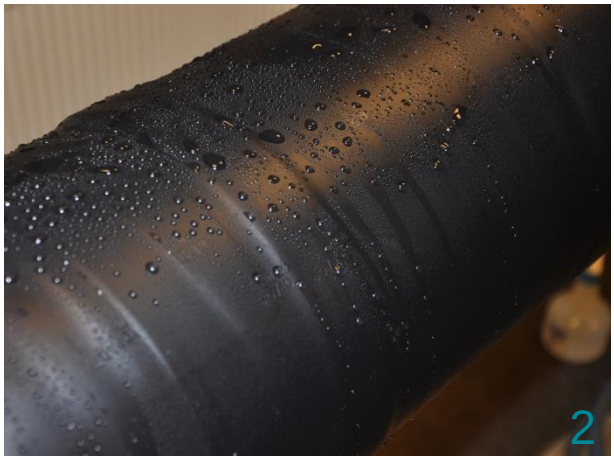
- The pouches of Outerglass Shield XT shall be opened one at a time and just prior to application. Once a pouch is opened, the curing reaction with moisture present in air or water will start immediately.
- The Outerglass Shield XT shall be applied within the working time indicated, including application 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.





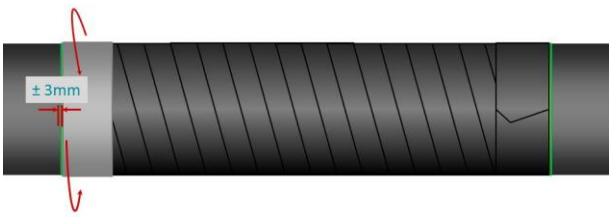
1

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



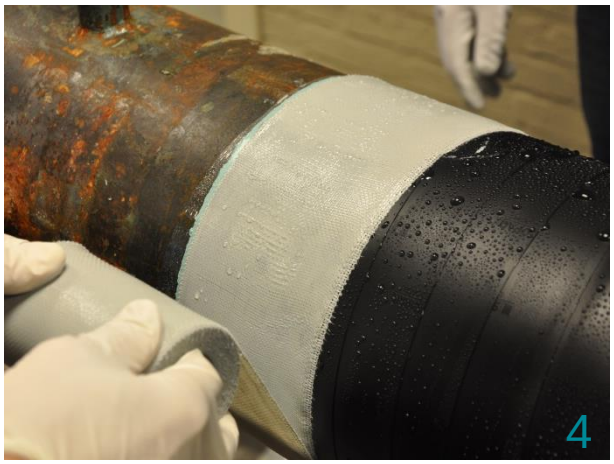
2

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



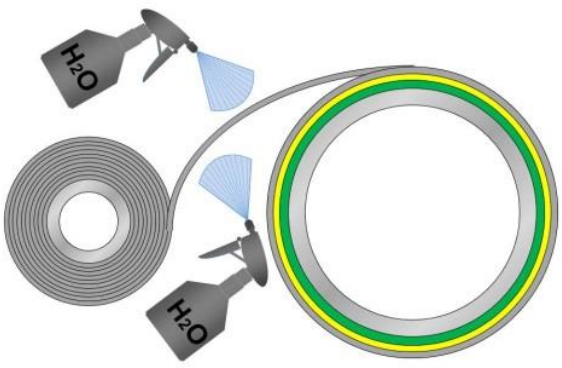
3

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.



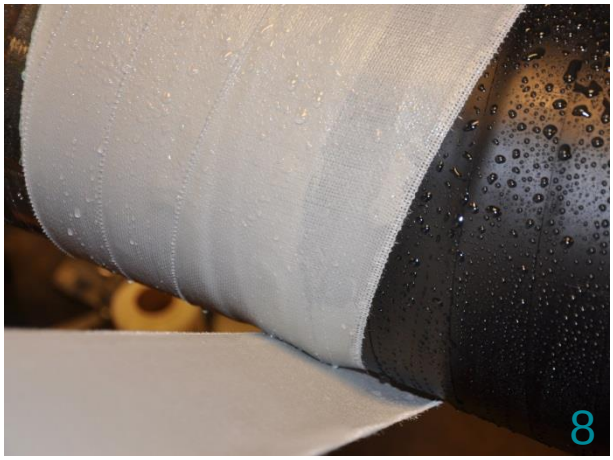
5

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

6

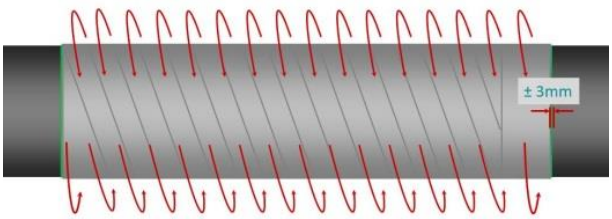
7

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



8

Use appropriate gloves during the application.

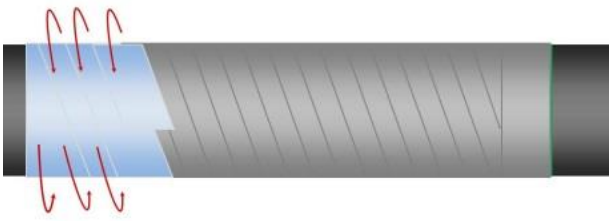


9

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

10

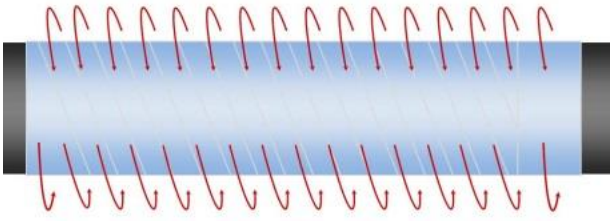
If necessary, extra layers or more overlap, for example minimum 66% to apply 3 layers Outerglass Shield XT can be wrapped in case additional mechanical strength is needed.



11

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

12

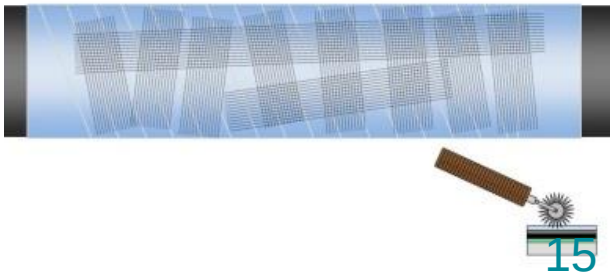


13

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

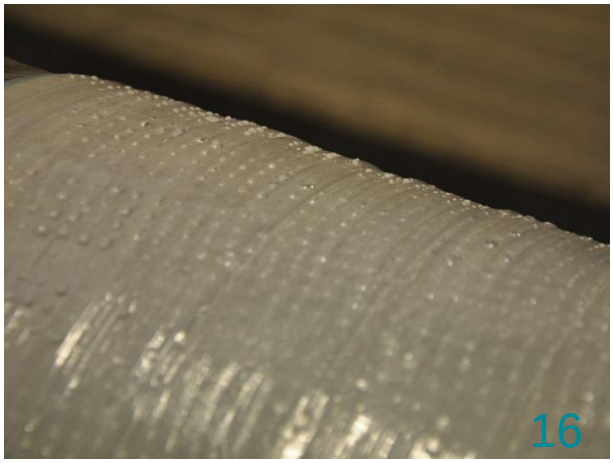
14

Finish beyond the extremity of Outerglass Shield XT.



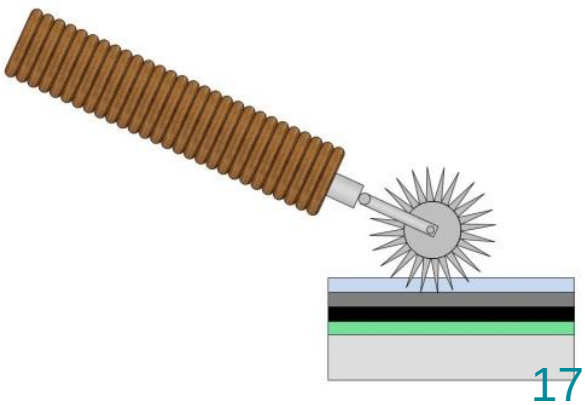
15

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.

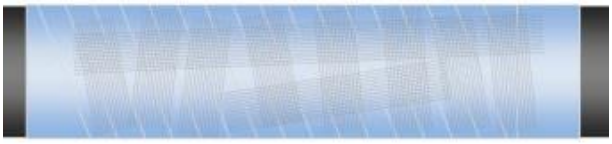


17

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.

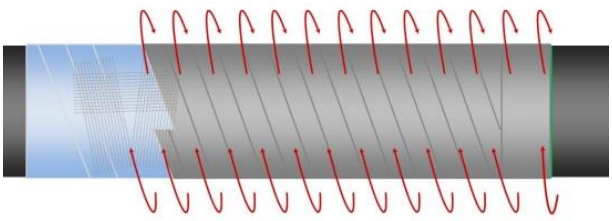


19

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.

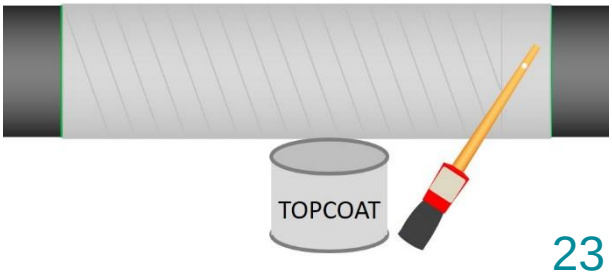


21

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

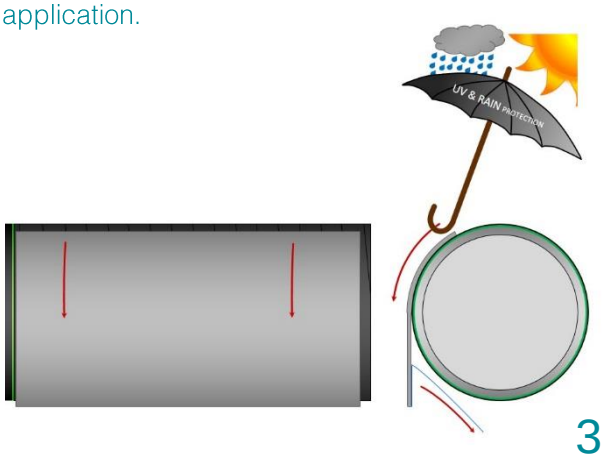
Backfill with clean sand. Backfill is possible immediately after the Outerglass Shield XT has cured.

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.

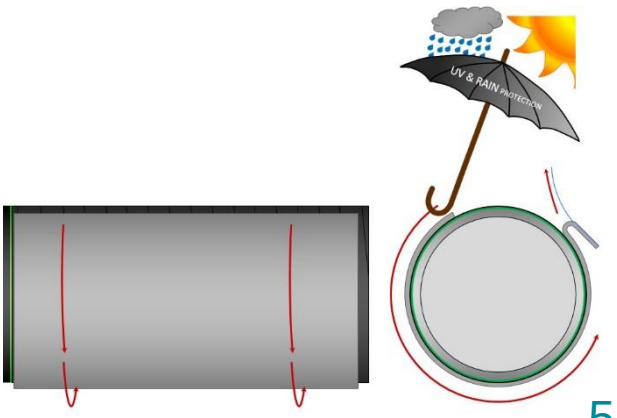
1

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.



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.



5

Continue with this procedure.

2

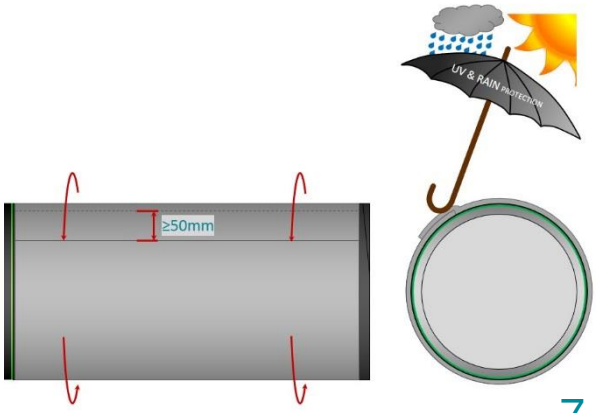
Always work in a work environment sheltered from direct sunlight and rain until the Compression Tape has been applied.

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.

6

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

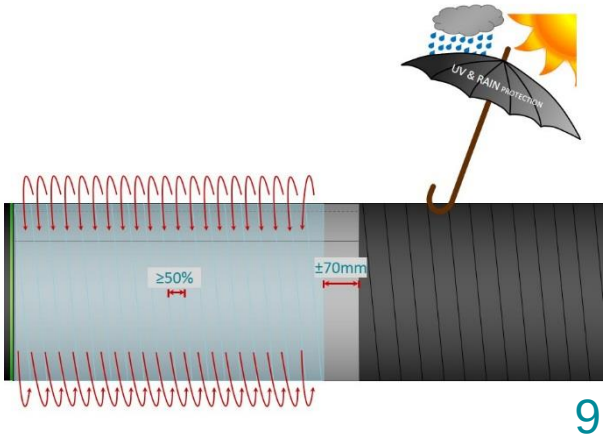


7

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.

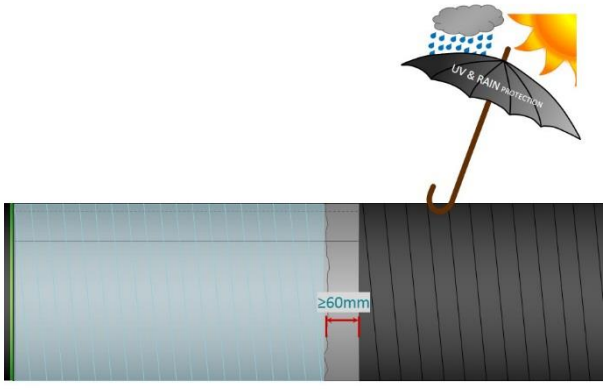


9

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.

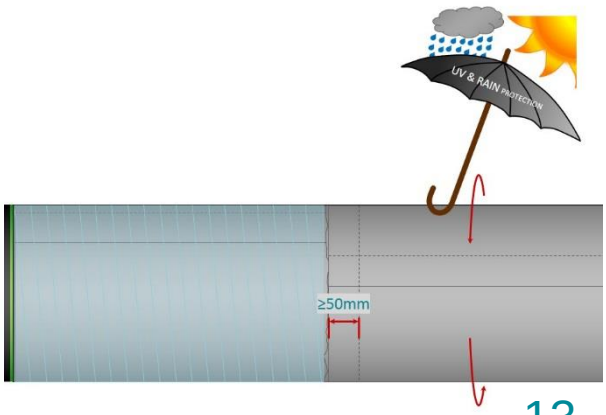


11

Remove minimum 60mm of the outer release liner.

12

…

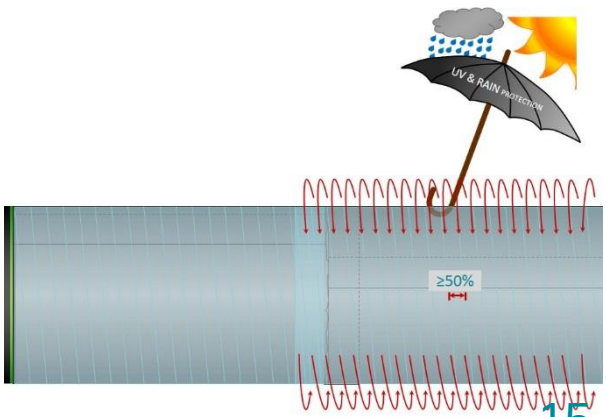


13

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

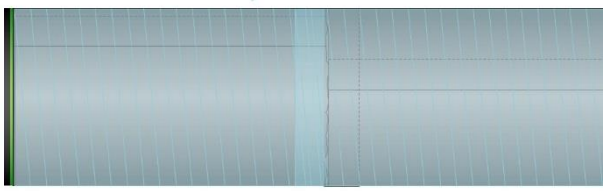


15

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

…

Installation

Protecta-mesh must wrapped around the circumference of the pipe. All pads must have sufficient dimensions to protect the entire pipe. The overlap of the Protecta-mesh should preferably be positioned at the 2 o'clock position, with the end facing downwards, for ease of application. Straps shall be used to fasten the Protecta-mesh to the pipe.

After installation of Protecta-mesh the backfill process can be started.

Strapping tool

[1] Wrap the strap loosely around the Protecta-mesh

[2] Place the strap in the strapping tool

[3] Press the red button. The strapping tool will beep when finished

[4] Squeeze the handle to cut the loose end of the strap and remove the tool

Follow the tool safety instruction.

[1]

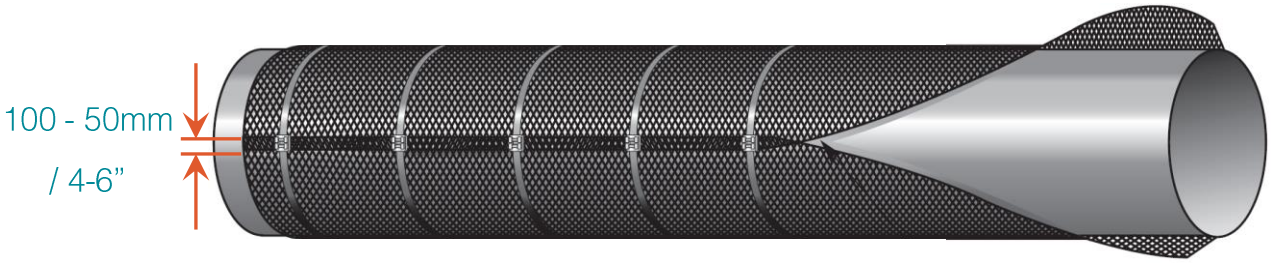
[2]

[3]

[4]

Protecta-mesh can be quick and easily installed in 3 different ways, depending on pipeline dimensions.

Longitudinal Wrap *(Pipe diameter ≤ DN150mm / 6")*



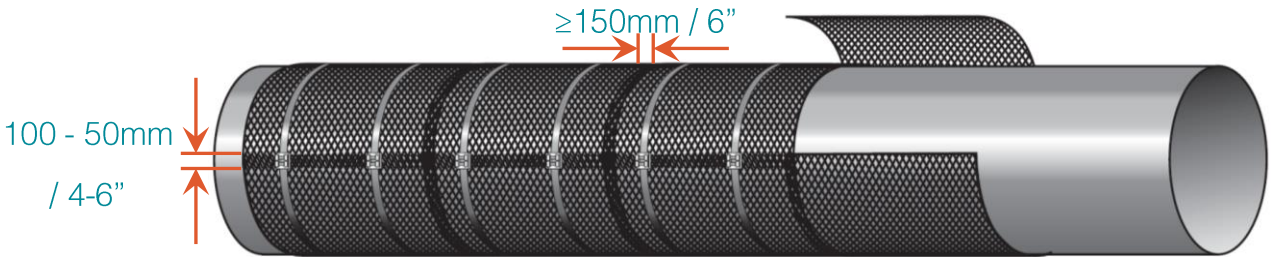
1) Unroll the mesh parallel to the pipe to be protected.

2) Place the mesh below the pipe.

3) Wrap the mesh around the pipe with a circumferential overlap of edges approx. 150mm / 6"

4) Secure the mesh with Protecta-mesh strappingband, which need to be installed approx. every 700mm / 2,3'

Circumferential Wrapping *(Pipe diameter ≥ DN150mm / 6")*

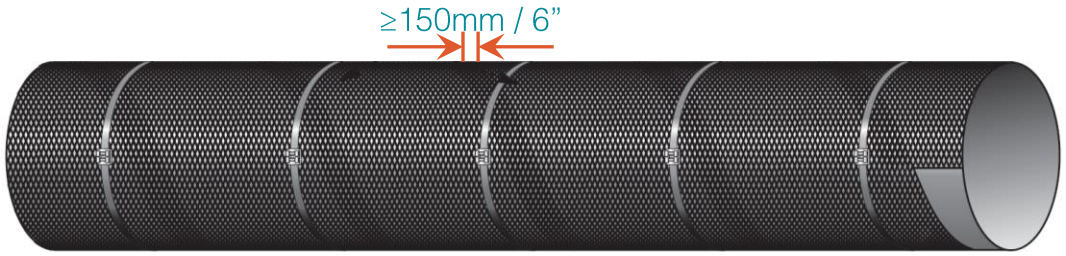


1) Cut the mesh into pieces 100-150mm / 4-6" longer as the circumference of the pipe. (See table)

2) Install the mesh with a side-by-side overlap of minimum 150mm / 6".

3) Fasten the mesh with Protecta-mesh strappingband. 3 straps shall be used per wrap.

Spiral Wrapping *(Pipe diameter ≤ DN800mm / 32")*



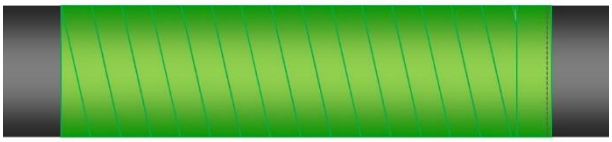
1) Install the mesh by means of spiral wrap with an overlap of 150mm / 6".

2) Secure the mesh with Protecta-mesh strappingband, which are to be installed approx. every 700mm / 2,3

Protecta-mesh dimensions						
Pipe diameter			Pipe circumference		Proteca-mesh length	
DN	inch	mm	inch	mm	inch	mm
50	2	60,3	7,5	189,4	12	300
100	4	114,3	14,1	359,1	20	500
150	6	168,3	20,8	528,7	26	650
200	8	219	27,1	688,0	32	800
250	10	273	33,8	857,7	38	1000
300	12	323,9	40,1	1017,6	46	1150
350	14	355,6	44,0	1117,2	48	1250
400	16	406,04	50,2	1275,6	56	1400
450	18	457,2	56,5	1436,3	62	1550
500	20	508	62,8	1595,9	68	1700
550	22	558,8	69,1	1755,5	74	1900
600	24	609,6	75,4	1915,1	80	2050
650	26	660	81,6	2073,5	86	2200
700	28	711	87,9	2233,7	92	2350
750	30	762	94,2	2393,9	100	2500
800	32	813	100,6	2554,1	106	2700
850	34	864	106,9	2714,3	112	2850
900	36	914	113,0	2871,4	118	3000
950	38	965	119,4	3031,6	124	3150
1000	40	1016	125,7	3191,9	130	3300
1050	42	1067	132,0	3352,1	136	3500
1100	44	1118	138,3	3512,3	144	3650
1150	46	1168	144,5	3669,4	150	3800
1200	48	1219	150,8	3829,6	156	3950
1300	52	1320	163,3	4146,9	168	4250
1400	56	1422	175,9	4467,3	180	4600
1500	60	1524	188,5	4787,8	194	4900

Installation tools

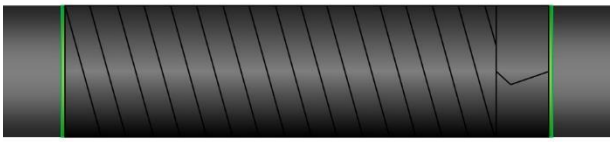
- Protecta-mesh strappingband
- Protecta-mesh roll carrier
- Protecta-mesh strappingtool (manual or battery)



1

Pipeline coated with Stopaq Wrappingband

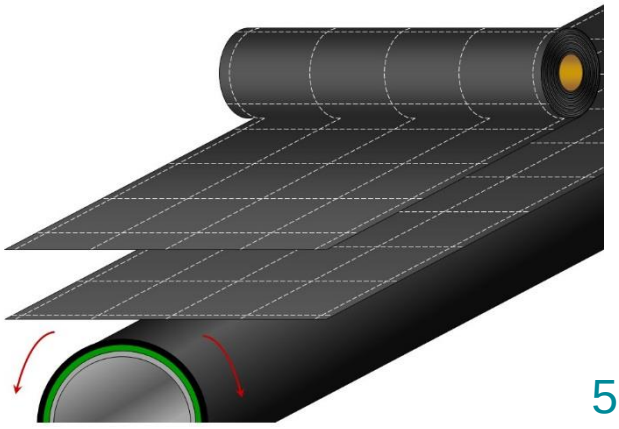
Wrappingband can be applied with straight wraps or by means of spiral wrap



3

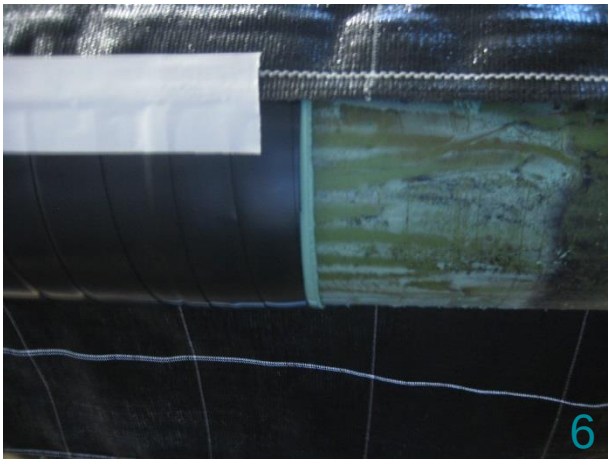
Pipeline coated with Stopaq Wrappingband and Outerwrap

Outerwrap shall always be applied by means of spiral wrap with a minimum side-by-side overlap of 50%



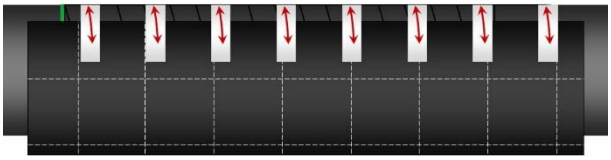
5

Both layers Soilstress Arrestor shall be installed in the longitudinal direction on the pipeline. This can be checked by sliding both layers over each other. If placed incorrect, the Soilstress Arrestor will not slide smooth.



6

Attach the first layer Soilstress Arrestor on the applied Stopaq system. This can be done with duct tape, Stopaq Outerwrap or similar.

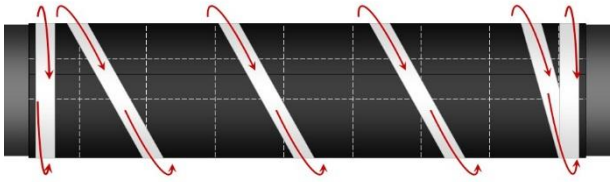


7

Install duct tape or similar on several locations to ensure that the Soilstress Arrestor will remain in the longitudinal direction of the pipeline during installation

8

Wrap the Soilstress Arrestor around the circumference of the pipe and fasten the Soilstress Arrestor with duct tape by means of spiral wrap.

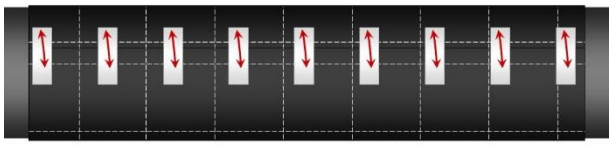


9

The first layer Soilstress Arrestor shall be installed tight around the pipeline

10

The second layer Soilstress Arrestor shall be installed over the first layer without securing the second layer to the first layer.

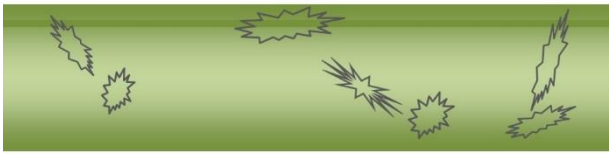


11

Attach the second layer Soilstress Arrestor only on the outside to itself. Ensure that both layers Soilstress Arrestor are installed longitudinal onto the pipeline.

12

In case several lengths of Soilstress Arrestor must be installed, the overlap of the first layer and second layer shall alternate.

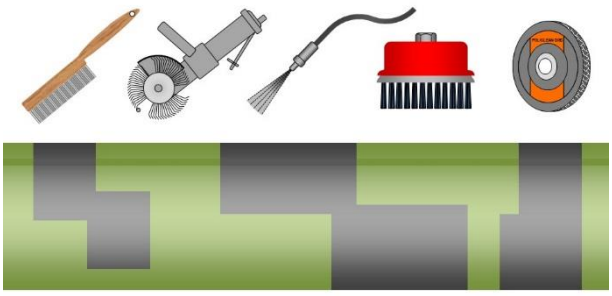


1

Damaged area to be coated with Wrappingband and Outerwrap.

2

All loose coatings must be removed.

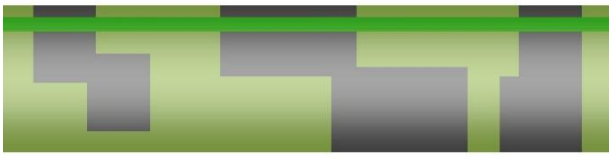


3

Prepare entire surface according to Stopaq or client specifications.

4

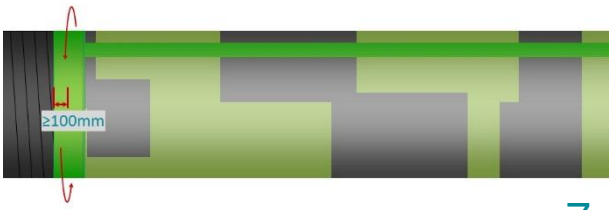
Ensure a clean work environment.



5

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

6

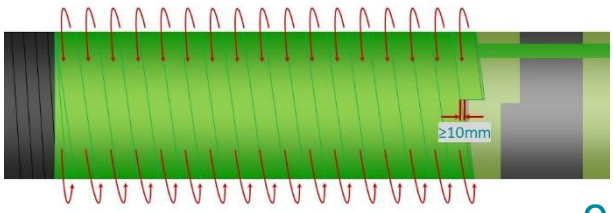


7

Start with a circumferential wrap overlapping the non damaged existing adherent coating minimum 100mm

8

Frequently check the adhesion of Wrappingband during application.

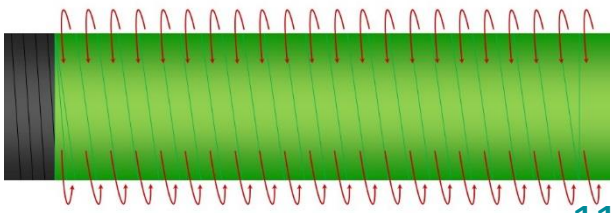


9

Continue spiral wrap application with a minimum side by side overlap of 10mm. Wrappingband shall be applied without tension and air enclosures shall be avoided.

10

Wrappingband can also be applied by means of straight wraps. Side-by-side overlap minimum 10mm, circumferential overlap minimum 100mm.

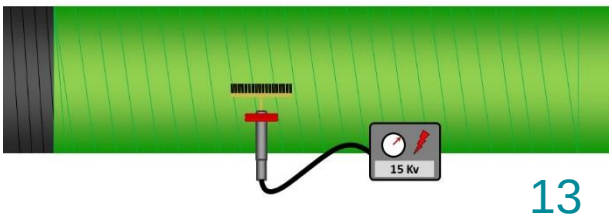


11

Continue until the entire area is covered with Wrappingband overlapping the adjacent coating approx. 100mm.

12

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

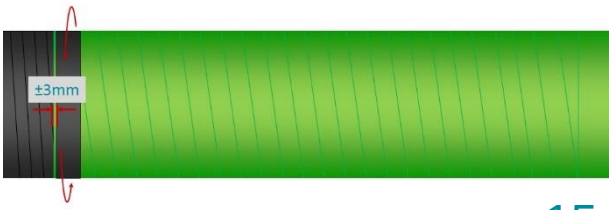


13

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.

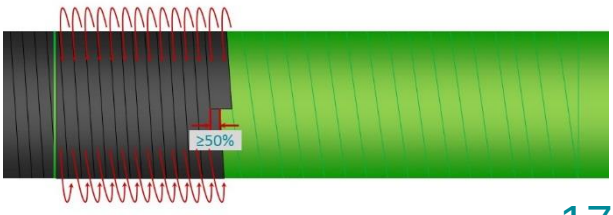


15

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

16

When applied on a pipeline with adjacent existing adherent coating, the Outerwrap shall overlap the adjacent existing coating with at least 100mm with respect to Wrappingband.

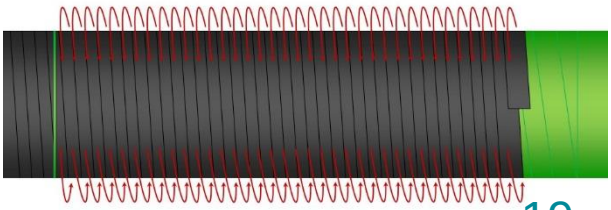


17

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

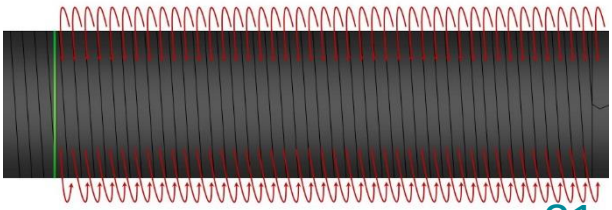
18

When a new roll has to be used, overlap the previous applied Outerwrap at least 100mm.



Continue wrapping until the entire area is covered with Outerwrap.

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

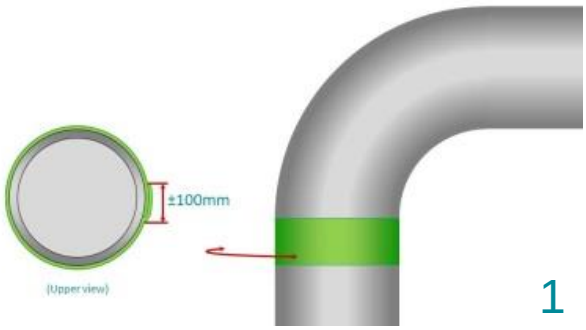


Finish with 2 straight circumferential wraps. The last 45 degrees of the Outerwrap should be applied without tension. Cut the end as a tie.

Finish with the Outerwrap facing downwards.

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

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

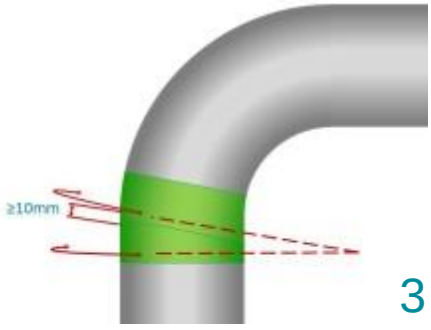


1

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.

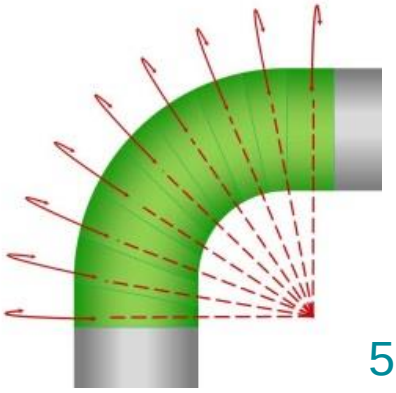


3

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.

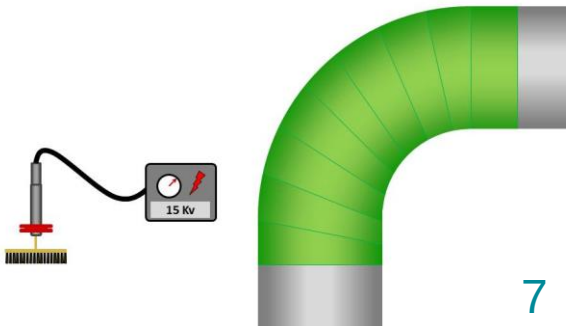


5

Continue until the entire area is covered.

6

…

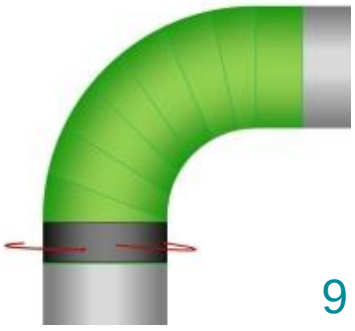


7

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.

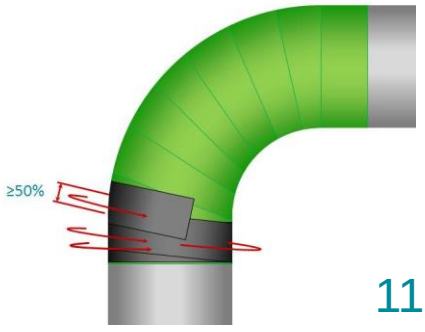


9

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

10

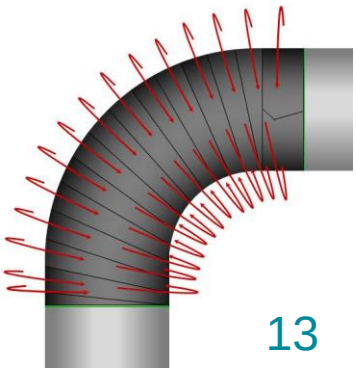
Apply Outerwrap with tension and avoid air inclusions.



11

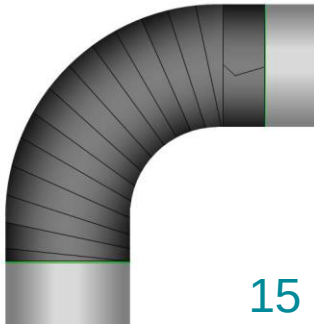
Continue with spiral wrap towards the centre of the elbow. The overlap must be 50% on the outer radius of the elbow. The overlap will increase towards the inside of the elbow.

12


13

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

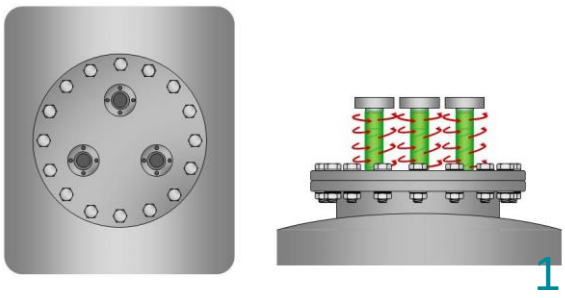

14


15

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

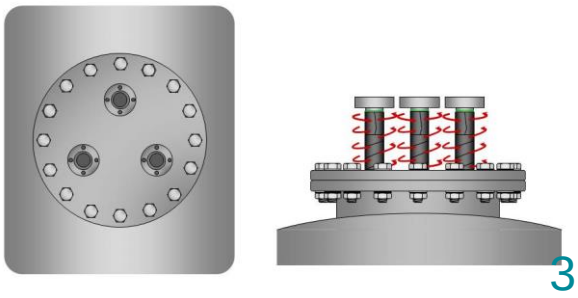

16


17



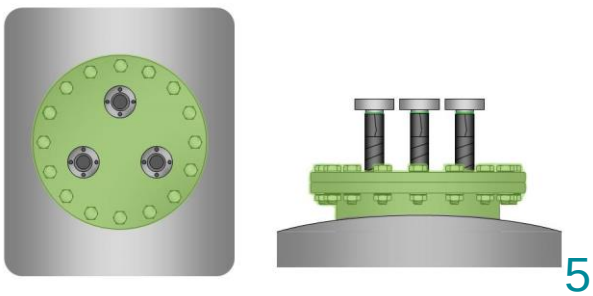
When present, small risers have to be coated with Wrappingband. This can be done with straight wraps, spiral wrap or cigarette wrap, see specific chapter for instructions.

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

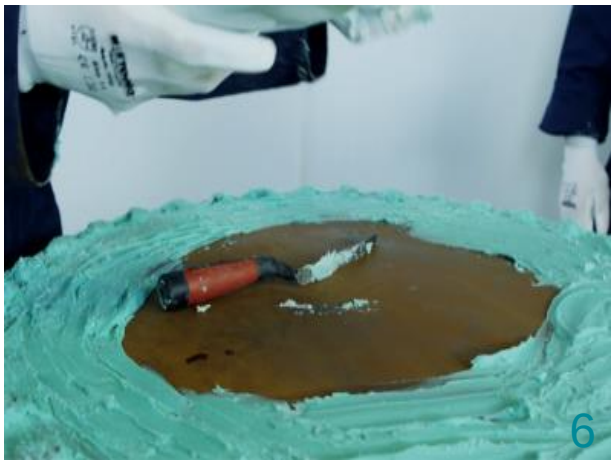


Apply Outerwrap according chapters 5, 6 or 7.

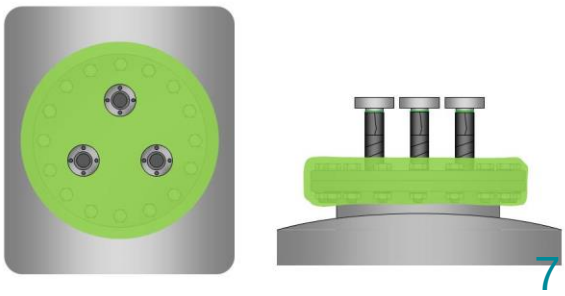
Apply a thin layer of 4100 Putty on the entire area around the bolts.



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

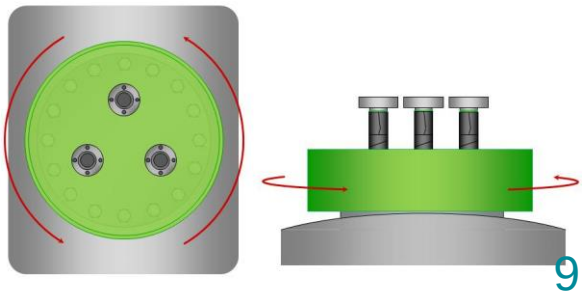


Continue until the entire area is covered with 4100 Putty.

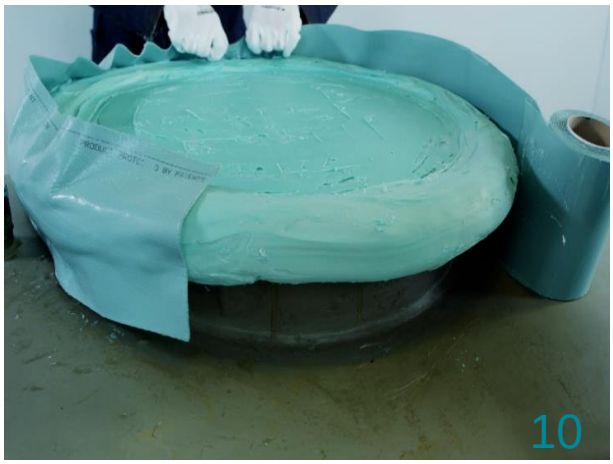


Fill the entire manhole cover with a thick layer of 4100 Putty.

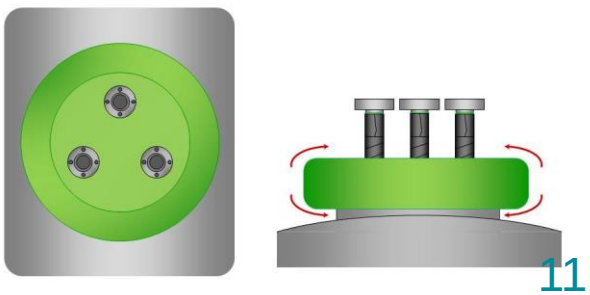
A putty knife can be used to smoothen the 4100 Putty.



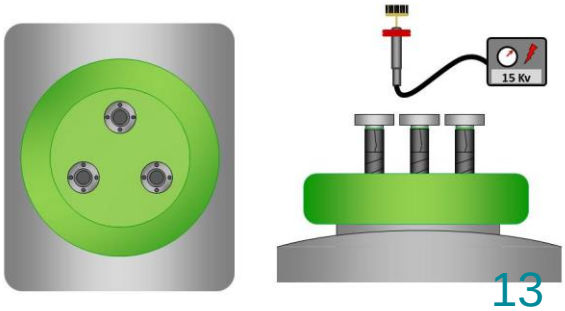
Apply a circumferential wrap of Wrappingband around the manhole cover. Circumferential overlap should be at least 150mm.



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.

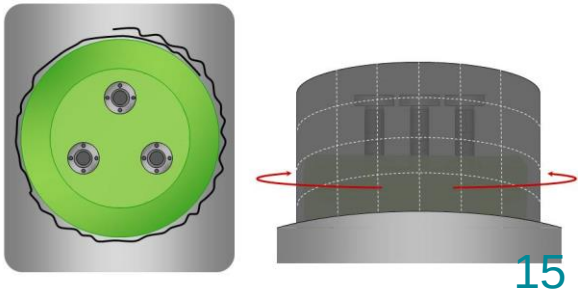


13

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

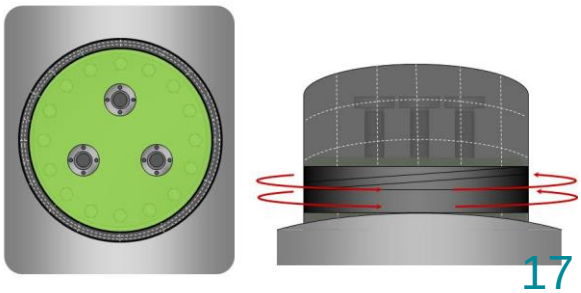
Always use approved and certified holiday test equipment.


15

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

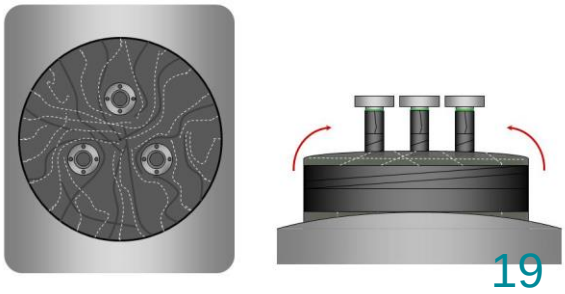

16

Put the geotextile around the manhole cover.


17

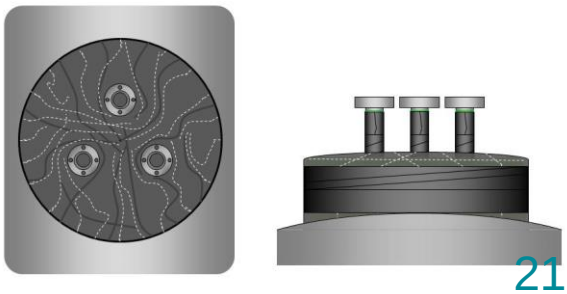
Wrap Outerwrap tightly around the manhole cover until the geotextile is tight in place.

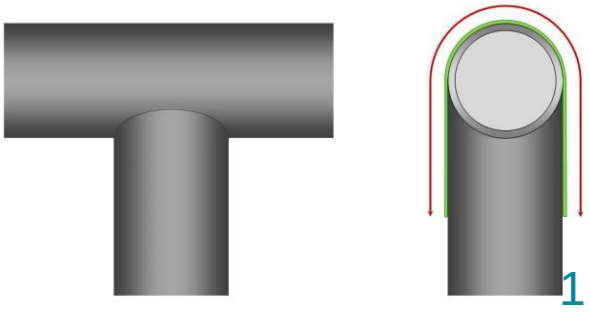

18



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

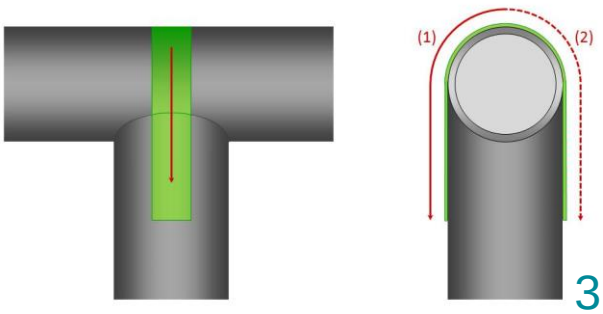
Strips of Outerwrap can be applied over the Geotextile.



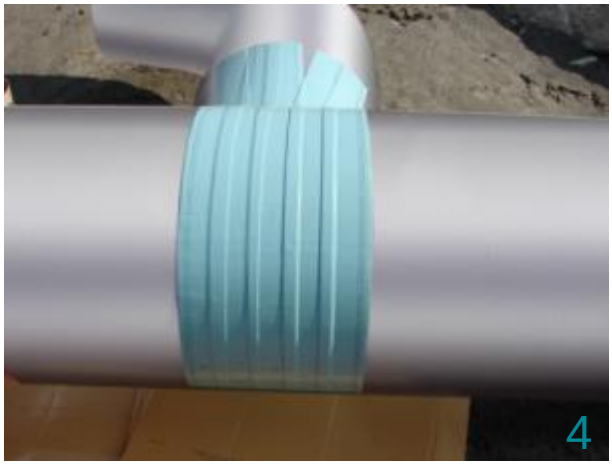


Ensure a proper surface preparation prior to the application of Wrappingband. Pre cut strips of Wrappingband with sufficient length as shown in the drawing above.

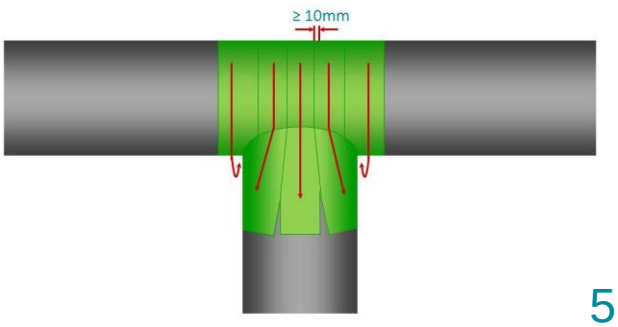
If a longitudinal weld is present it should be covered with a strip of Wrappingband.



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.

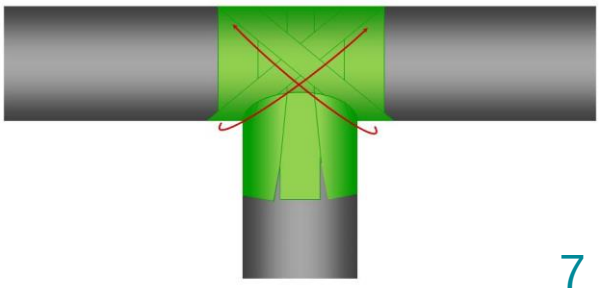


Remove the remaining piece of release foil and apply the Wrappingband without tension.



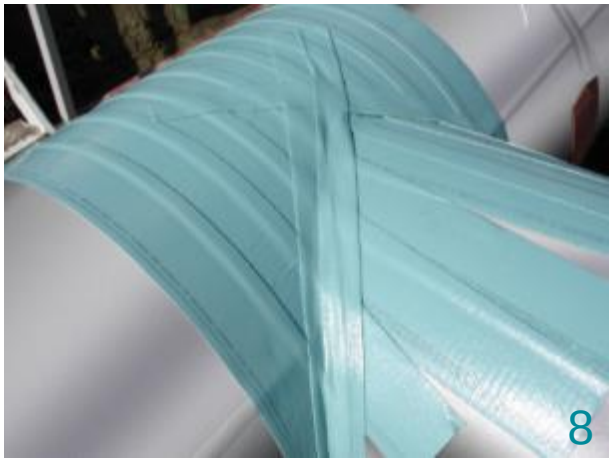
Apply adjacent strips of Wrappingband with a minimum overlap of 10mm on top of the T-Joint. The Wrappingband will diverge on the branch pipe section.

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



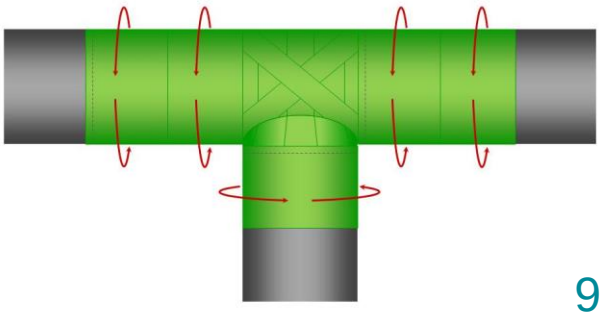
7

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



8

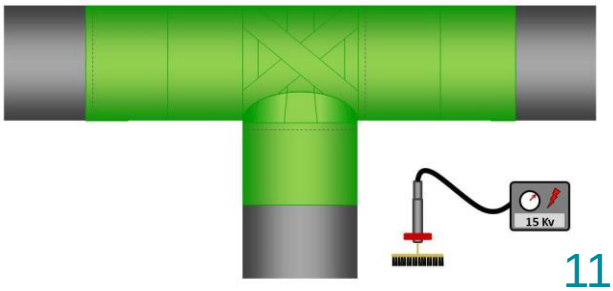
Several strips might be needed on larger diameter T-Joints.



9

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

10

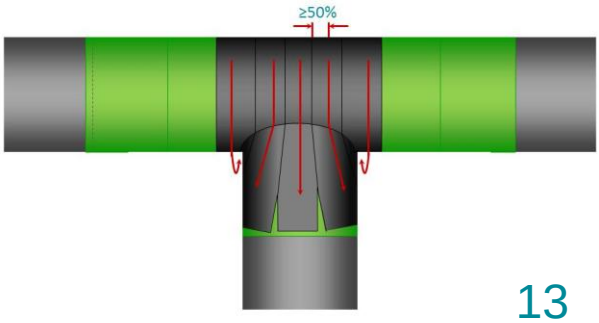


11

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

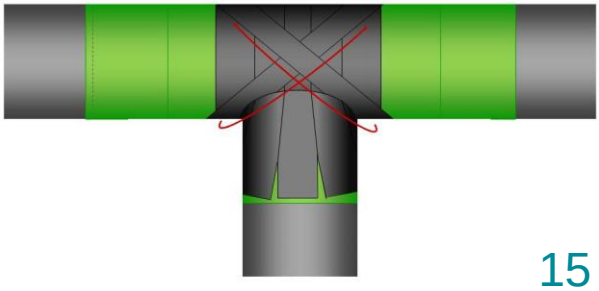
Always use approved and certified holiday test equipment.



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.

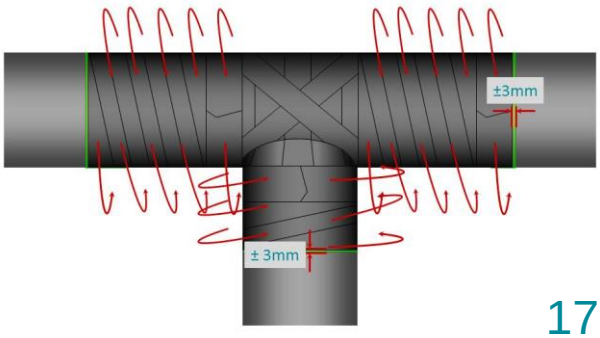
14



15

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

16

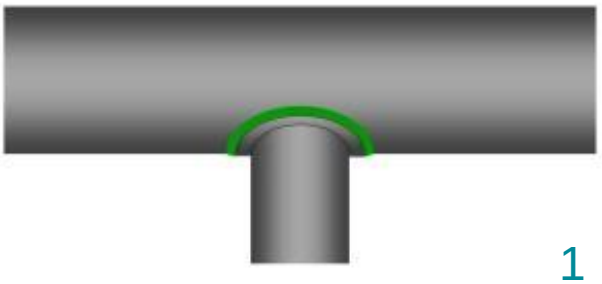


17

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

Keep 3mm Stopaq Wrappingband visible on all sides.

18

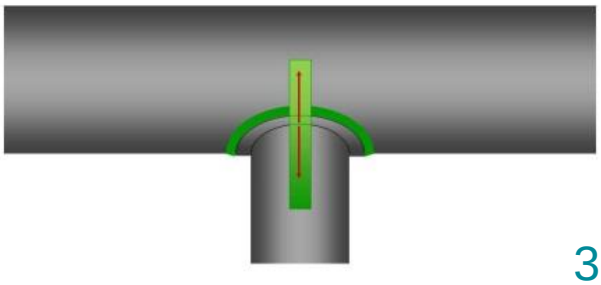


1

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.

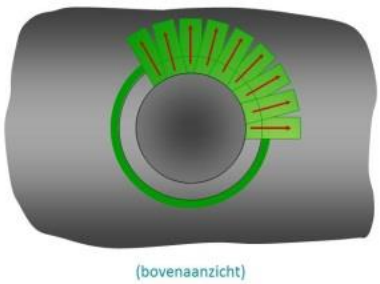


3

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

4

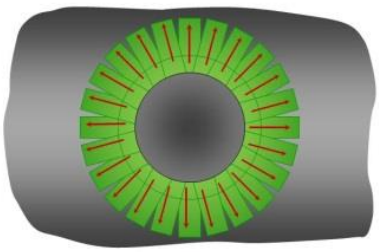
If there is no huge diameter difference, the T-Joint can be applied as a normal T-Joint, see specific chapter for instructions.



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

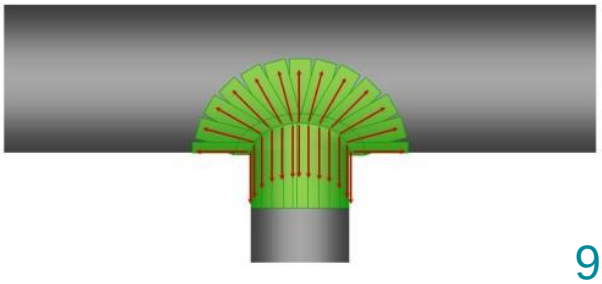


7

Continue until the entire circumference is covered with Wrappingband.

8

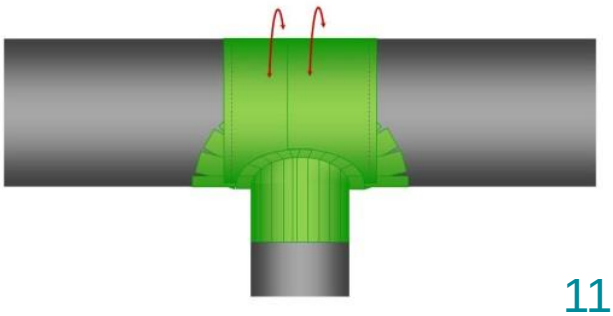
Wrappingband must be applied without air inclusions.



9

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

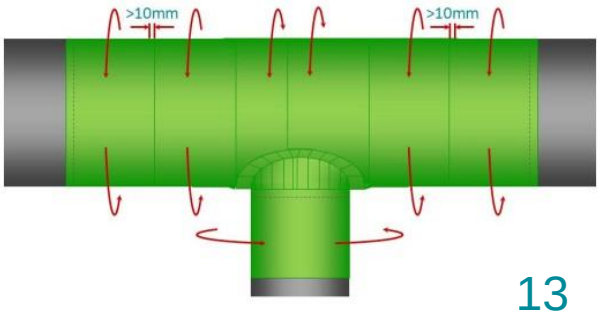
10



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

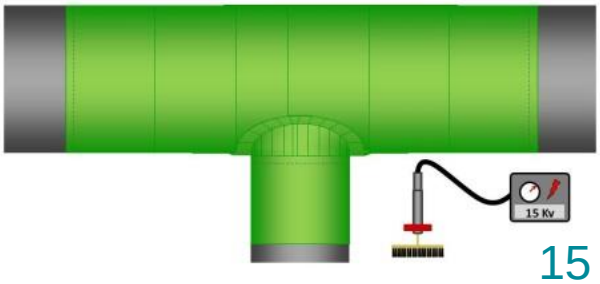


13

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.

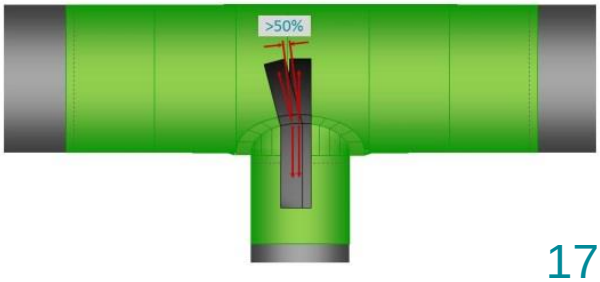


15

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.

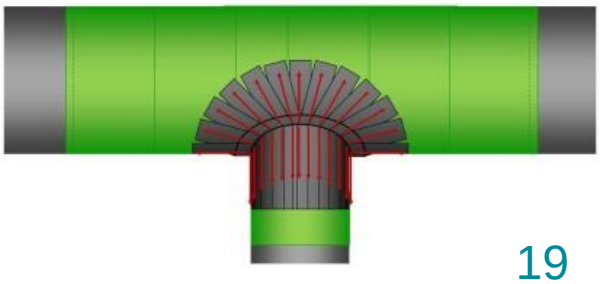
16

Always use approved and certified holiday test equipment.



17

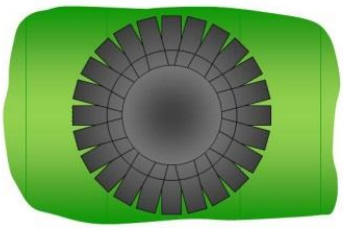
Outerwrap has to be applied following the same procedure as Wrappingband, but with a minimum overlap of 50% in the corner between the larger and smaller diameter pipeline. Apply without tension.



19

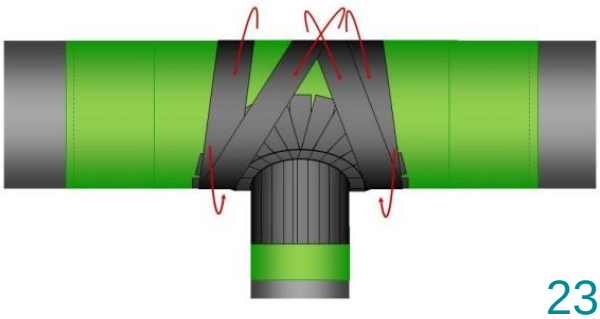
Continue until the entire circumference of the branch pipe is covered with Wrappingband.

Outerwrap must be applied without air inclusions.



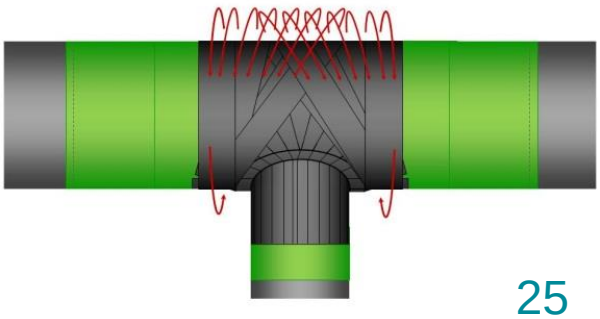
21

The overlap will decrease on the larger diameter pipeline.



23

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

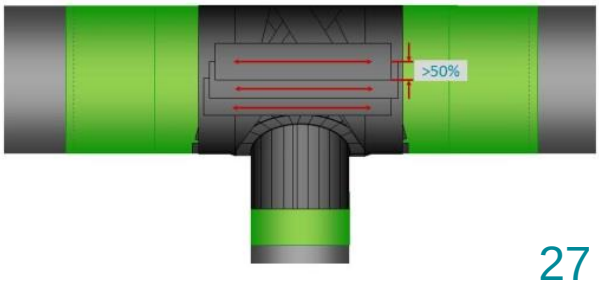


25

Continue until all the Wrappingband is covered with Outerwrap.

26

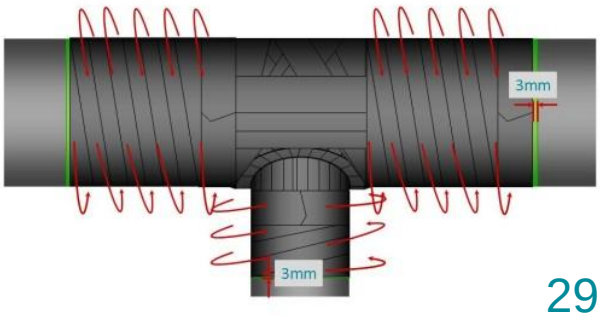
If there is no huge diameter difference, the T-Joint can be applied as a normal T-Joint.



27

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

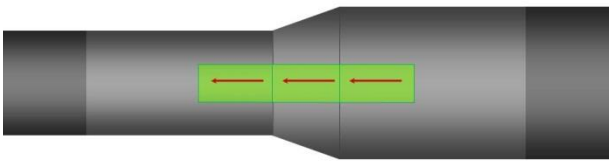
28



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

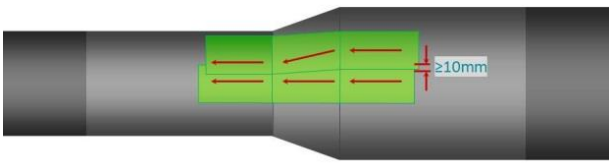


1

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.

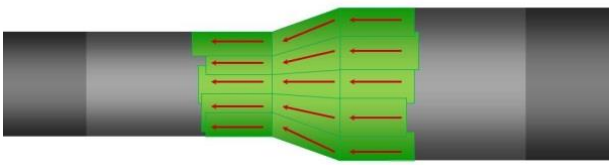


3

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

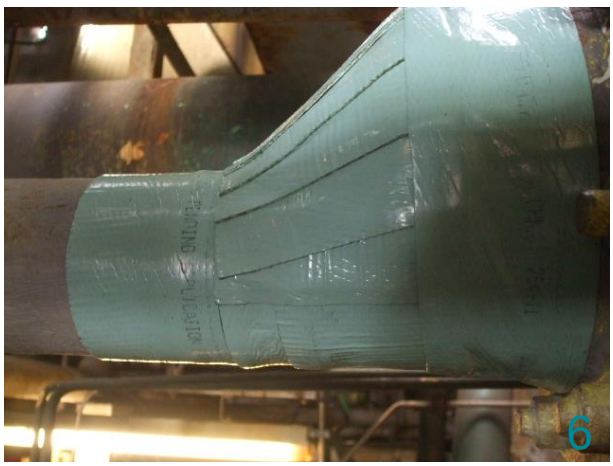
4

The overlap will increase during application on the reducer.



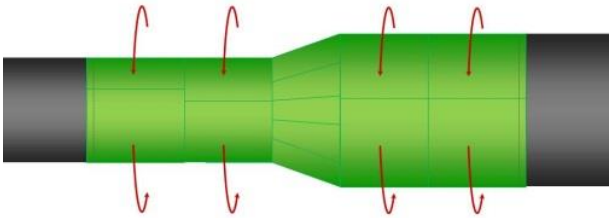
5

Continue until the entire area is covered with Wrappingband.



6

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

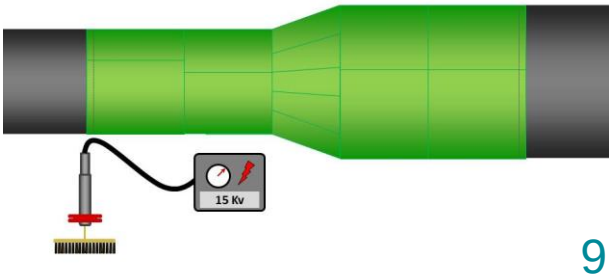


7

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.

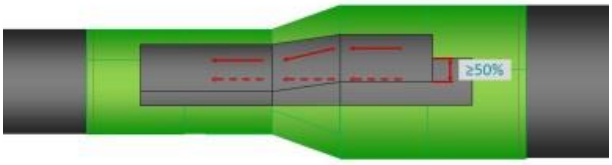


9

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.

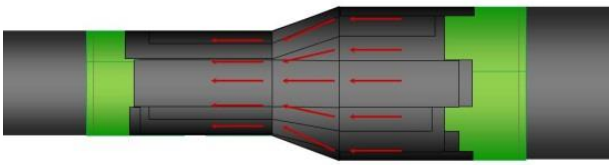


11

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.

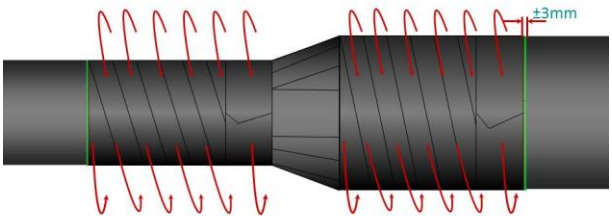


13

Continue until the entire circumference is covered with Outerwrap.

14

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

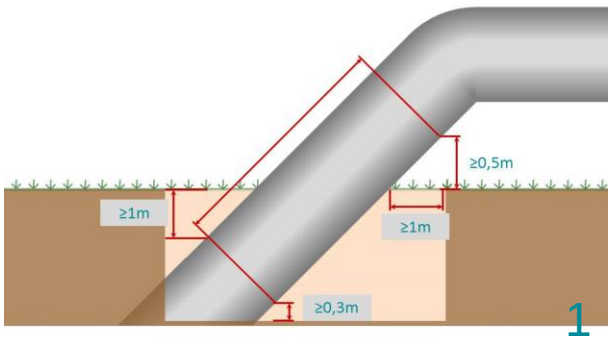


15

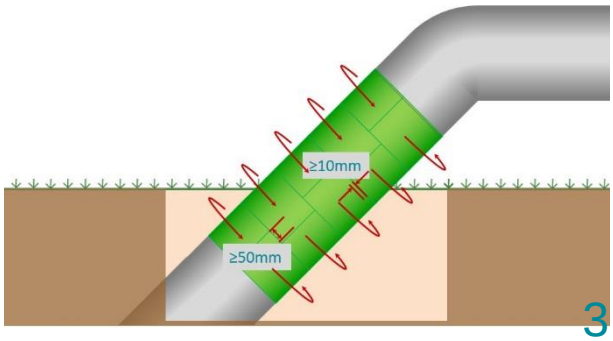
Finish the reducer with Outerwrap on the straight pipe sections. Apply with 50% overlap, with tension and without air inclusions. keep 3mm of Wrappingband visible.

16

17

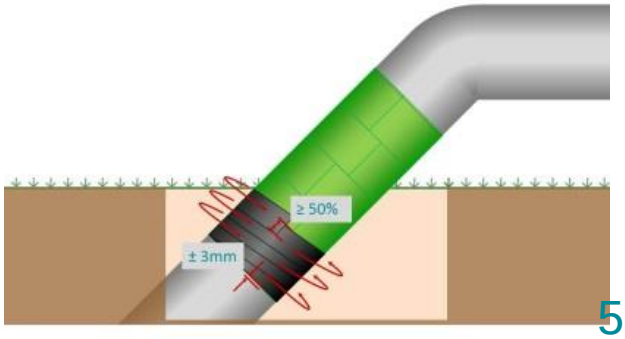


Ensure a proper surface preparation prior to the application of Wrappingband. Excavate area around the riser according to the drawing.

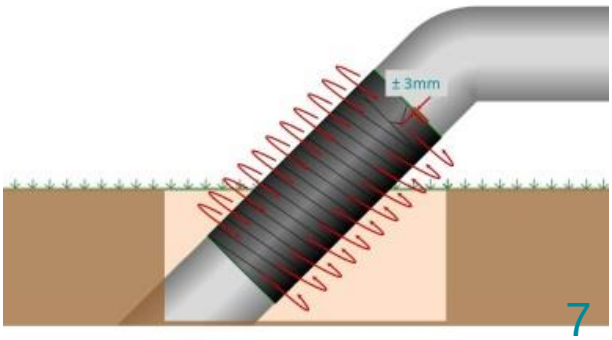


Apply Wrappingband on the entire surface according chapter 5 or 6. A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV.

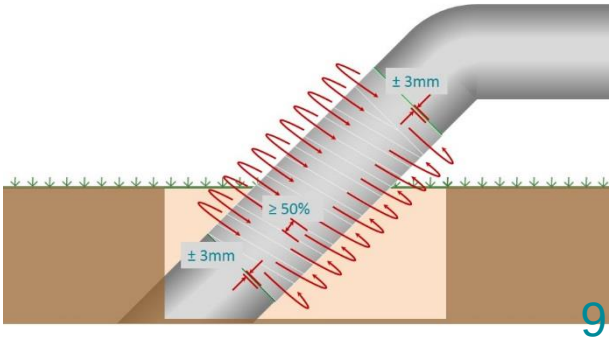
Always use approved and certified holiday test equipment.



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

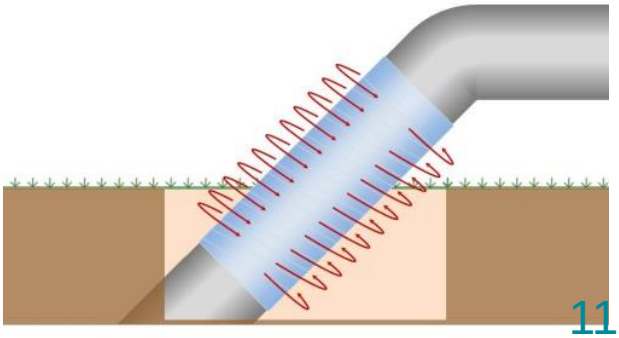


Continue until the entire area is covered. keep 3mm of Wrappingband visible.

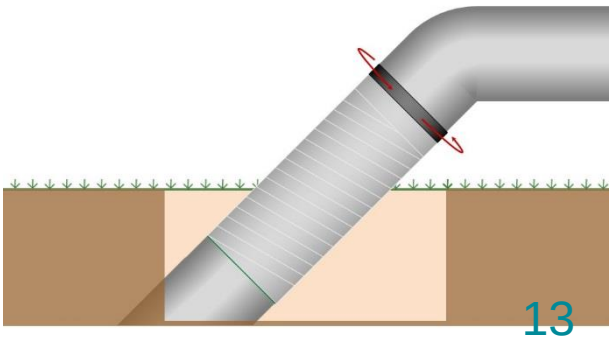


Apply Outerglass Shield XT with a minimum overlap of 50%. keep 3mm of Wrappingband visible, see specific chapter for instructions.

Work bottom to top.

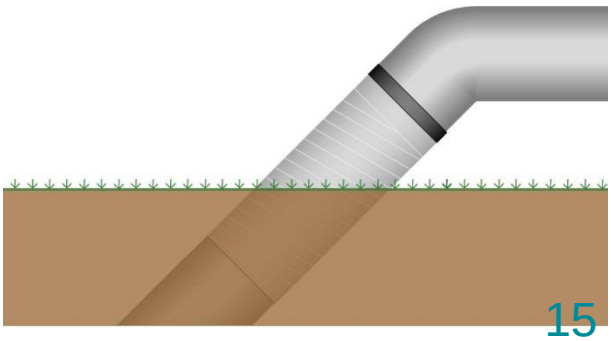


Wrap compression foil over the Outerglass Shield XT. Perforate with perforation roller and remove compression foil after initial curing time.

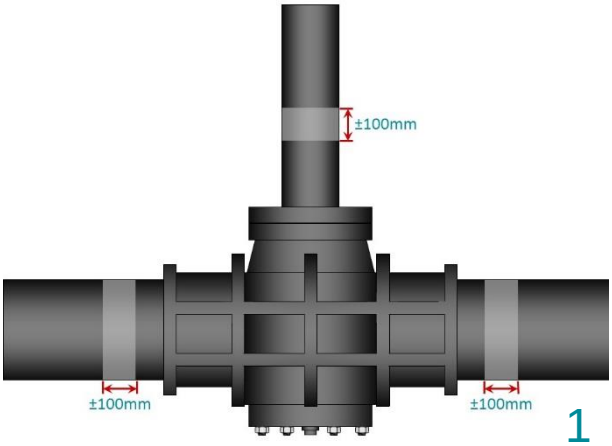


Wrap a circumferential wrap of Outerwrap HSPEX over the seam between the coating system and pipeline.

Paint the above ground part of the riser with a UV resistant topcoat to prevent discoloration of the Outerglass Shield XT.



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

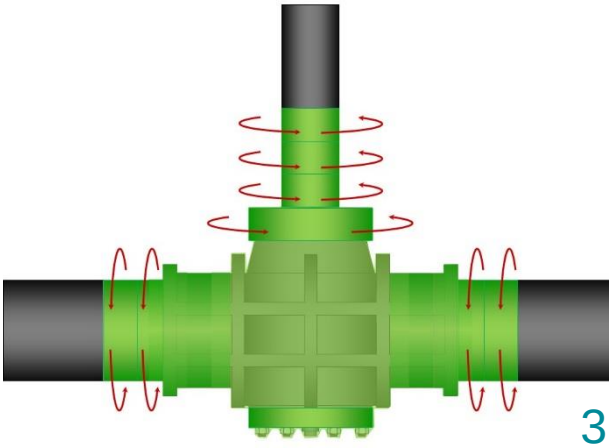


1

Ensure a proper surface preparation prior to the application of the Stopaq system

2

In case the existing coating cannot entirely be removed, bare metal rings of approx. 100m, wide shall be made at the boundaries of the area to be coated.

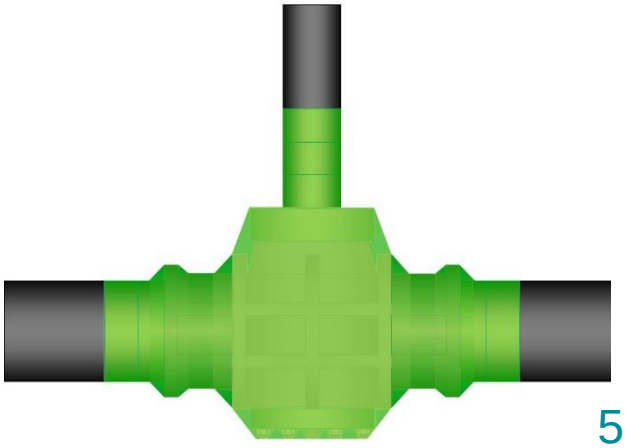


3

Apply Wrappingband on the straight pipe sections with a minimum circumferential overlap of 100mm and a minimum side-by-side overlap of 10mm. Apply without tension and avoid air enclosures

4

Smear a thin layer of 4100 Putty on the entire area of the valve and around the bolts etc.

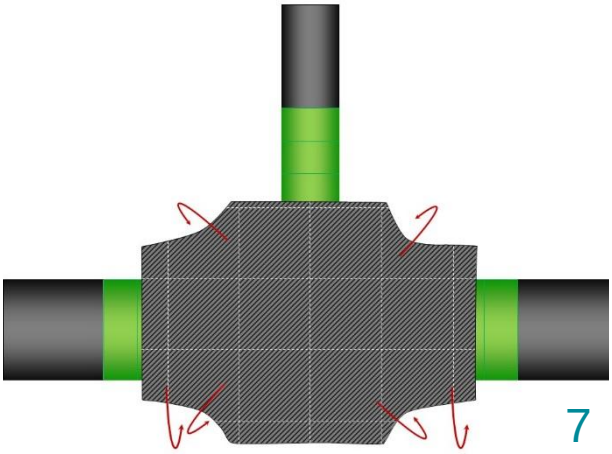


5

Fill all unevenly shaped surfaces of the valve with 4100 Putty. Create a smooth surface without any sharp edges.

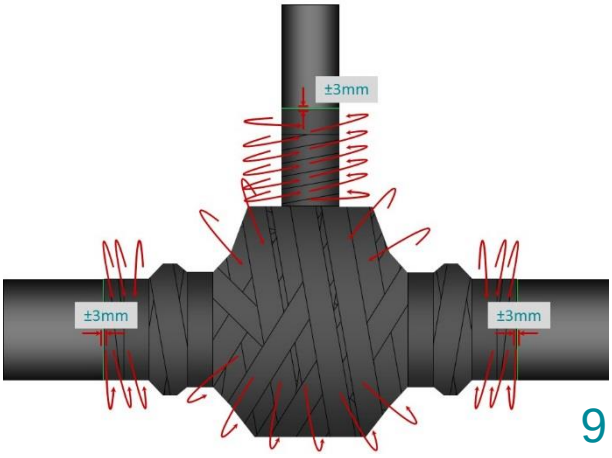
6

If the valve exceeds 30°C, Paste must be used in stead of 4100 Putty.



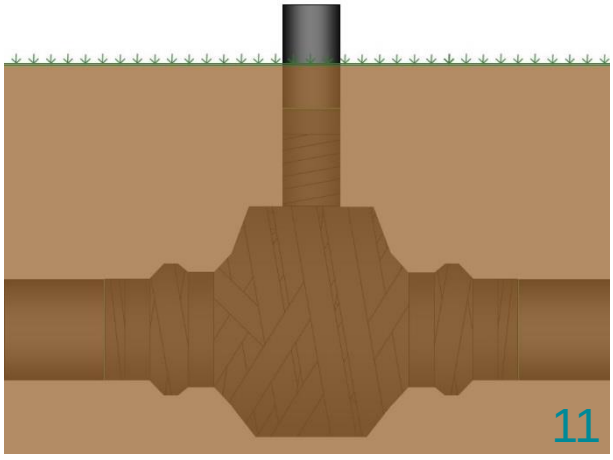
After holiday detection, install Geotextile over the applied 4100 Putty. Geotextile is not needed if Paste has been applied.

The Geotextile shall cover all the applied 4100 Putty.



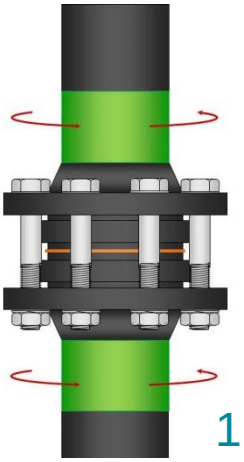
Apply Outerwrap criss-cross around the valve until all Geotextile has been covered.

Apply Outerwrap by means of spiral wrap over the adjacent pipes with a minimum overlap of 50%. Apply with tension, avoid air enclosures and keep approx. 3mm Wrappingband visible.



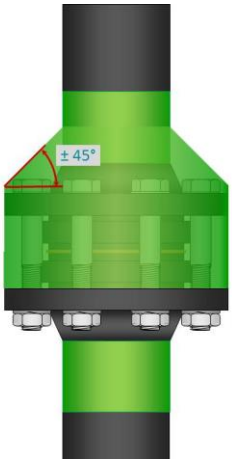
Backfill with clean sand. Backfill is possible immediately after application of Outerwrap.

If the Stopaq system has to be applied in soil-to-air transition areas, additional layers of Outerglass Shield XT shall be applied at the transition area.



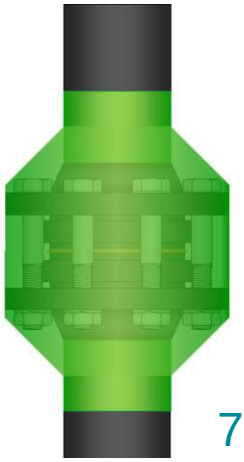
Ensure a proper surface preparation prior to the application of Wrappingband. Start with a circumferential wrap of Wrappingband on each pipe section connected to the flange.

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.



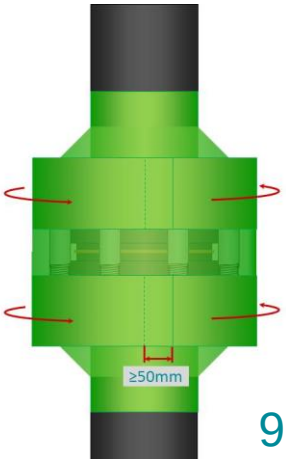
Apply Paste with an angle of 45° above the upper flange. Sequence of application of horizontal flanged connections does not matter.

Avoid air inclusions.


7

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

8

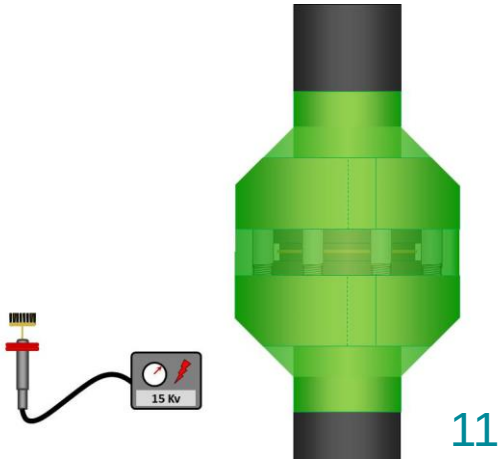


9

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

10

Fold the Wrappingband back into the Paste.

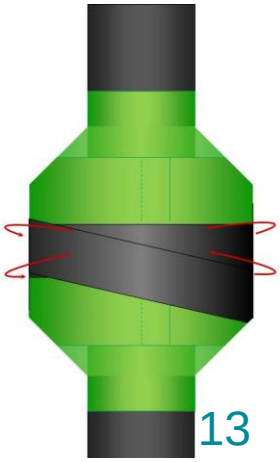


11

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.

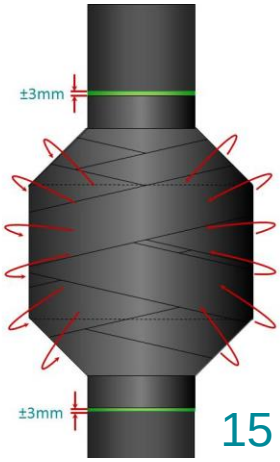

12

Always use approved and certified holiday test equipment.



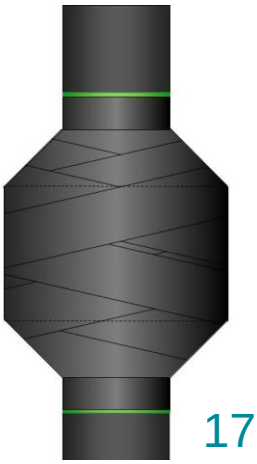
Start with a circumferential wrap of Outerwrap over the flanges. Apply with tension.

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

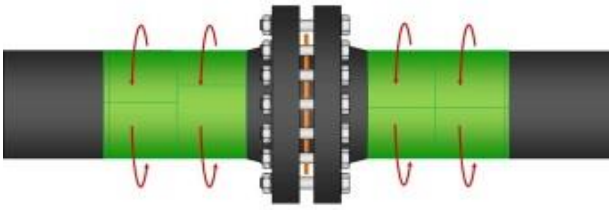


Apply Outerwrap criss-cross around the flanged connection until all Wrappingband is covered. keep 3mm of Wrappingband on both ends visible.

Apply with tension and without air inclusions.



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

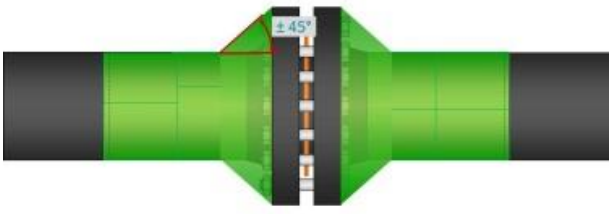


1

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.

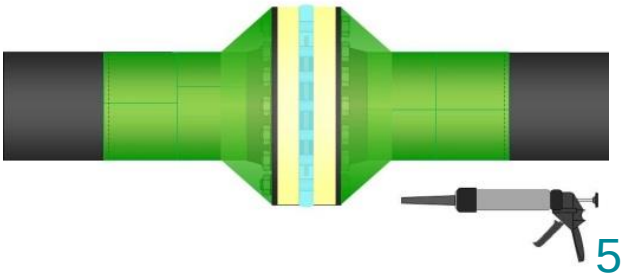


3

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

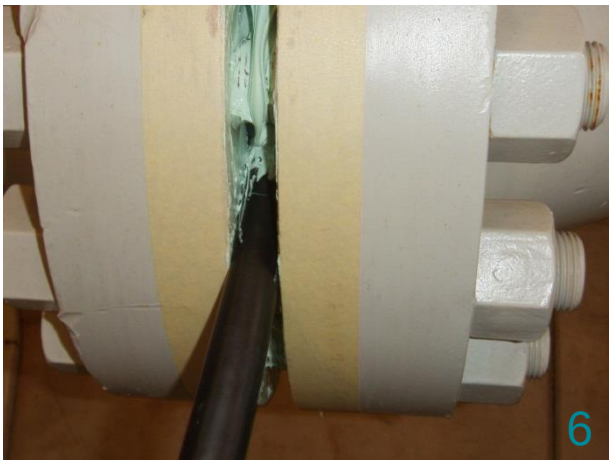
4

Paste has to be applied without air inclusions.



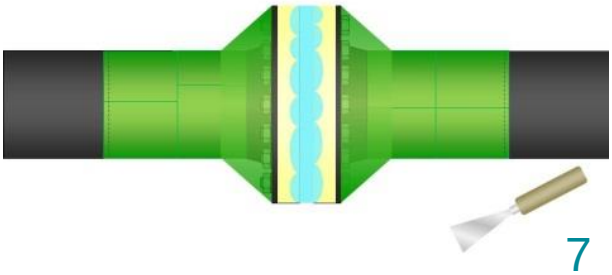
5

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.

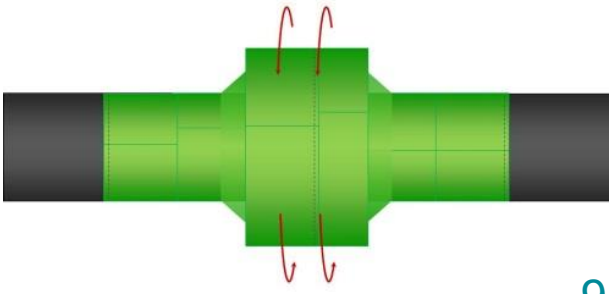


7

Use a putty knife to smoothen the 4200 Filler.

8

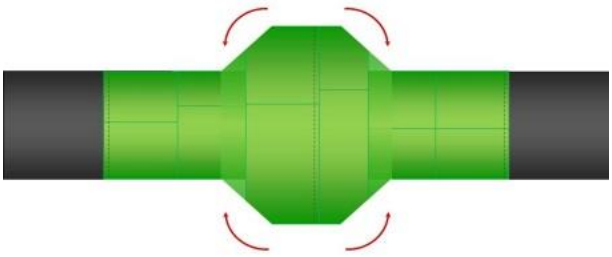
Prevent 4200 Filler from adhering to the surface of the flange.



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.

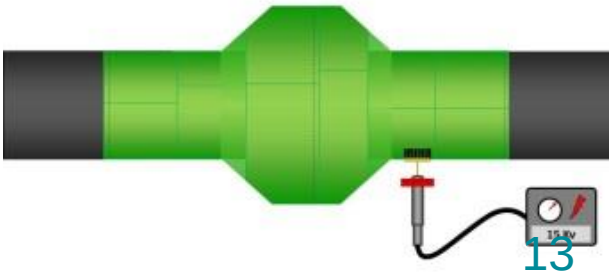
10



11

Fold the Wrappingband back into the Paste.

12

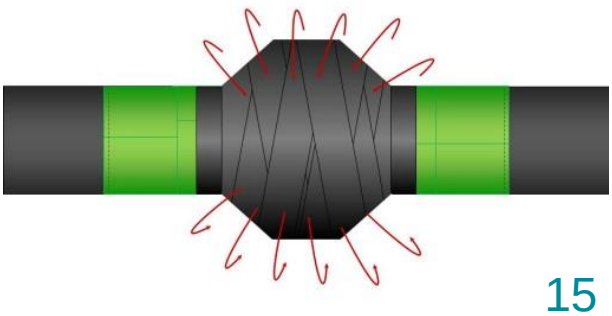


13

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

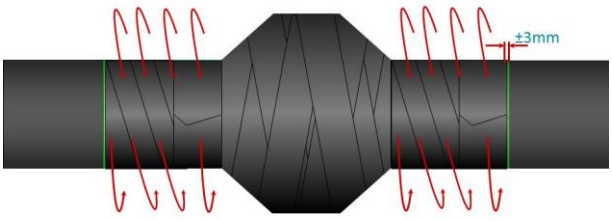
Always use approved and certified holiday test equipment.



15

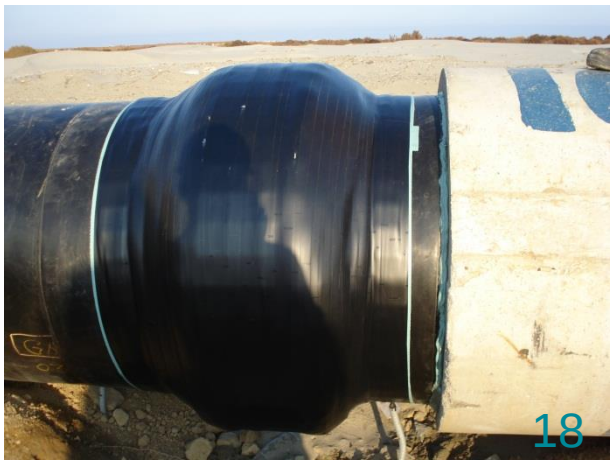
Start with a circumferential wrap of Outerwrap around the flanges. Continue application of Outerwrap criss-cross around the flange until all Wrappingband is covered.

16

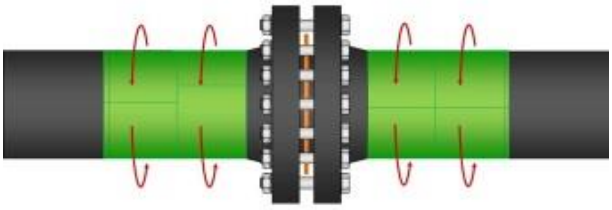


17

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

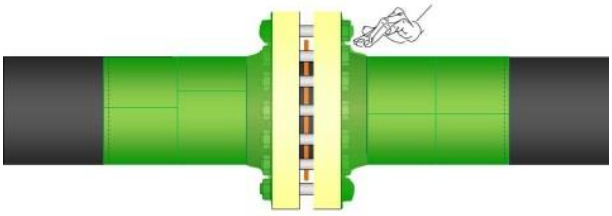


1

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.

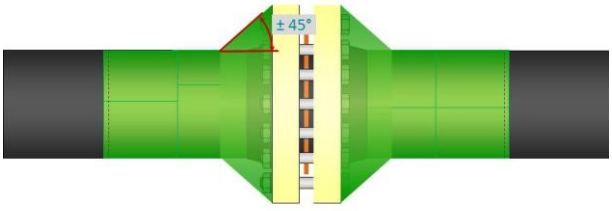


3

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

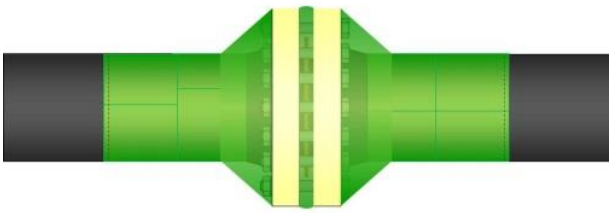
Smear a thin layer of 4100 Putty on the entire area of the flange around the bolts.



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

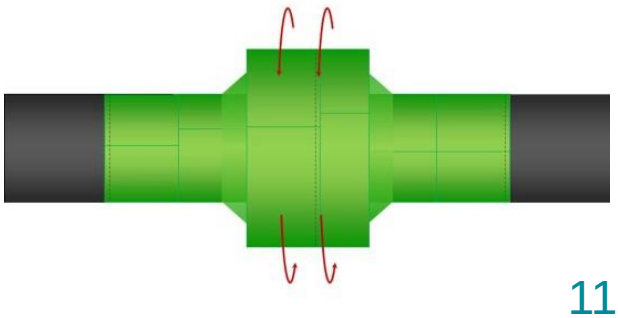
Application tools can be used during application.

9

Remove masking tape.

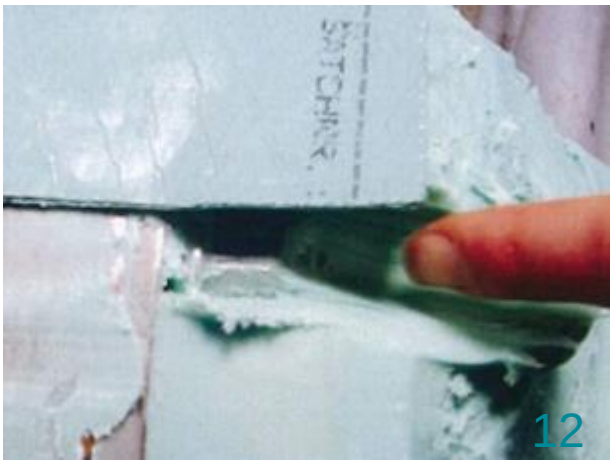
10

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.



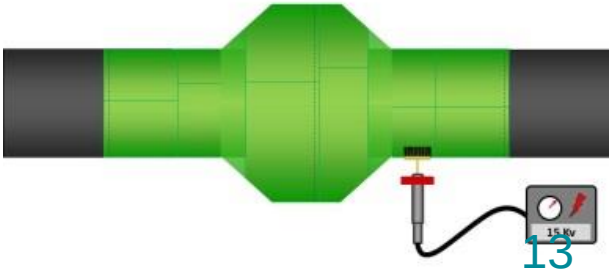
11

Apply straight wraps of Wrappingband and avoid air inclusions.



12

Fold the Wrappingband back into the 4100 Putty.

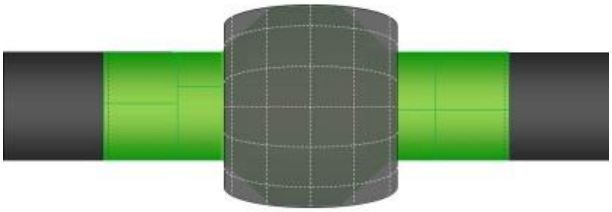


13

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.

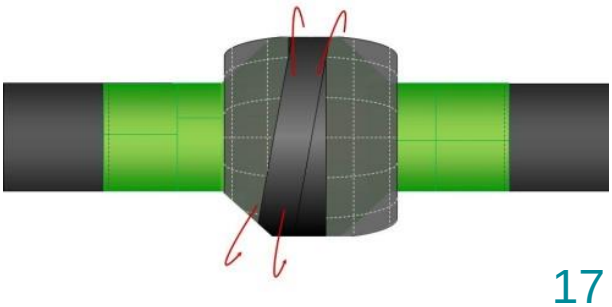


15

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

16

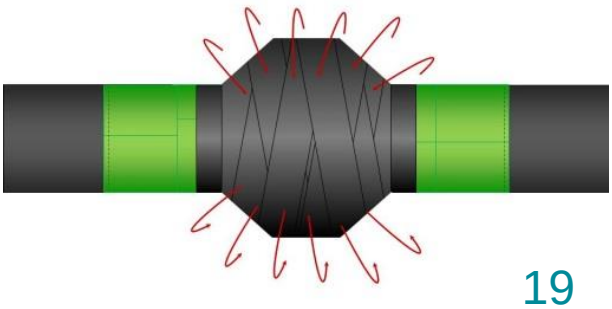
Width of the Geotextile should cover the complete area coated with 4100 Putty, but overlap on the Wrappingband should be avoided.



17

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

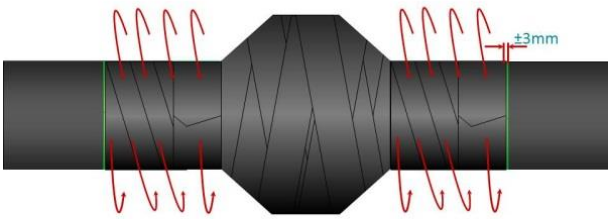
18



19

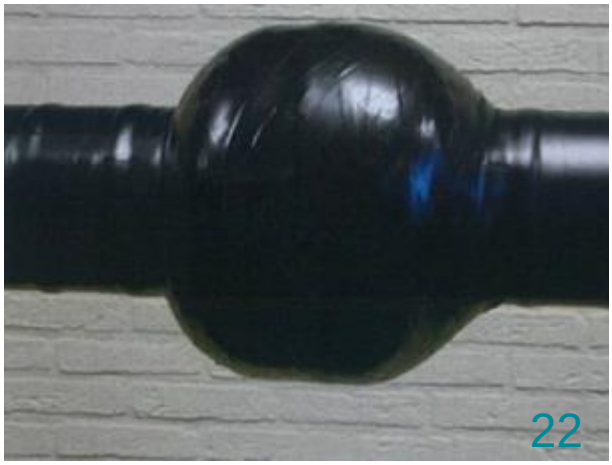
Apply Outerwrap criss-cross around the flanged connection until all Wrappingband is covered.

20

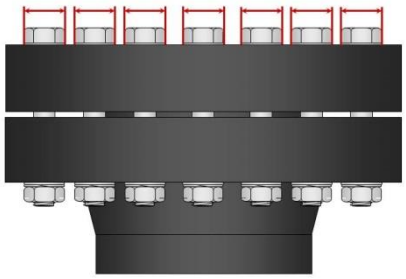


21

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.

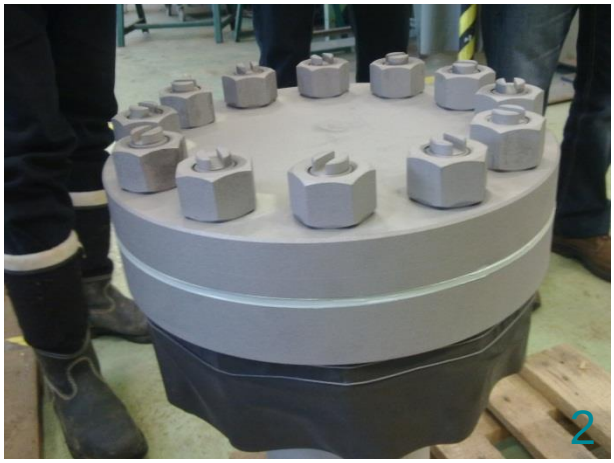


22



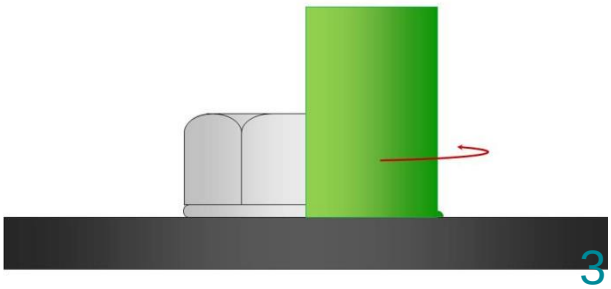
1

Ensure a proper surface preparation prior to the application of Wrappingband



2

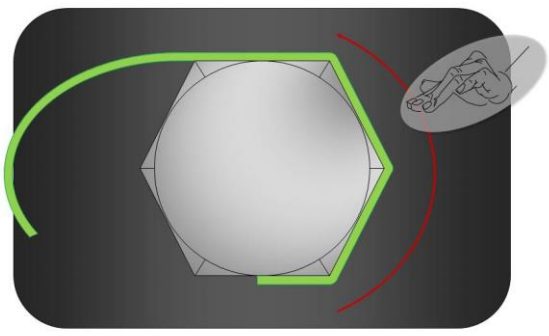
This chapter describes only bolt protection. Complete flange protection can be found in chapters 21 and 22.



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.

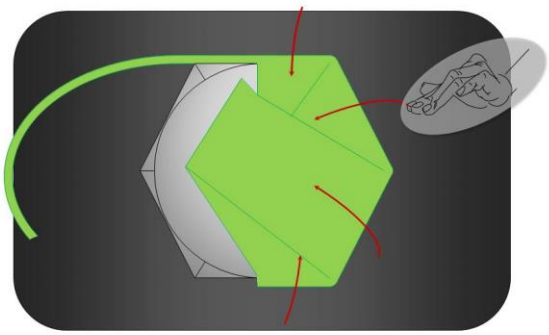
4



5

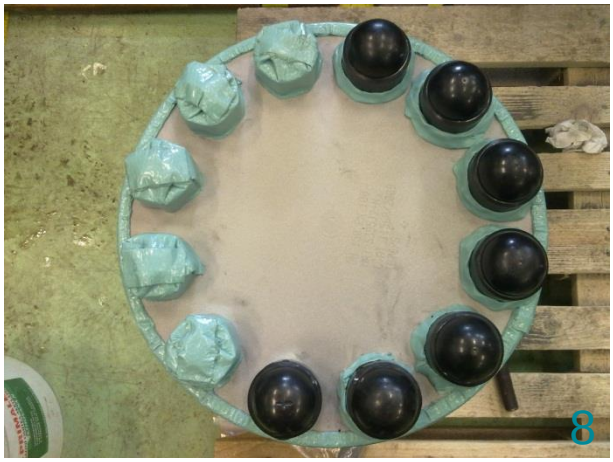
Press the Wrappingband tight around the bolt / nut without air inclusions. Some tension might be helpful during this application.

6



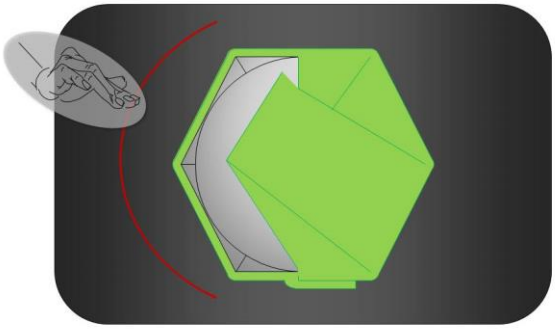
7

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



8

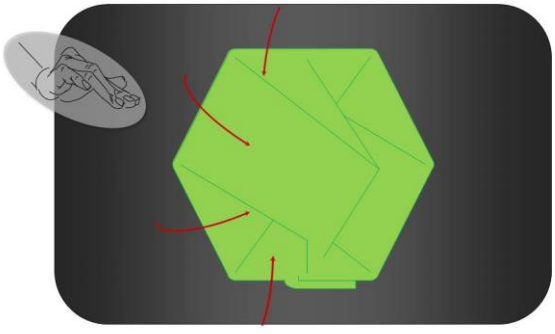
Bolt caps can be used for mechanical protection.



9

Press the remaining Wrappingband around the bolt / nut.

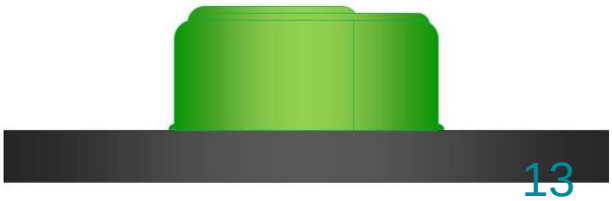
10



11

Fold the Wrappingband tight around the bolt.

12

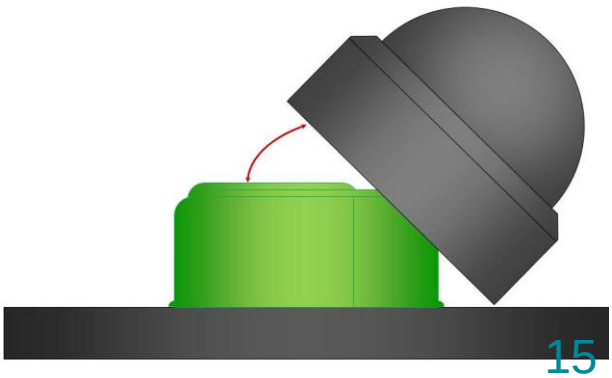


13

The complete bolt has to be covered with Wrappingband.

14

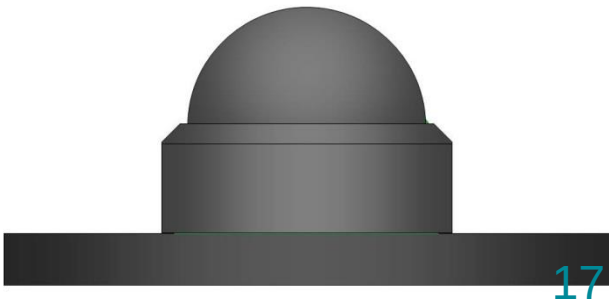
Wrappingband EZ can be painted with a topcoat.



15

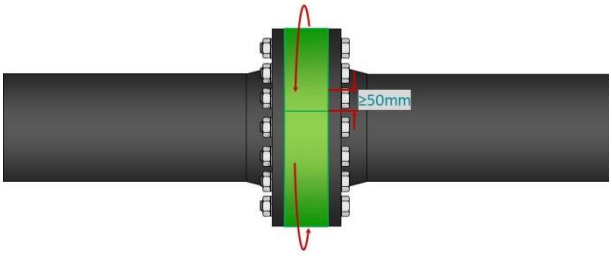
Optionally a bolt cap can be placed for mechanical protection over the bolt and applied Wrappingband.

16



17

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

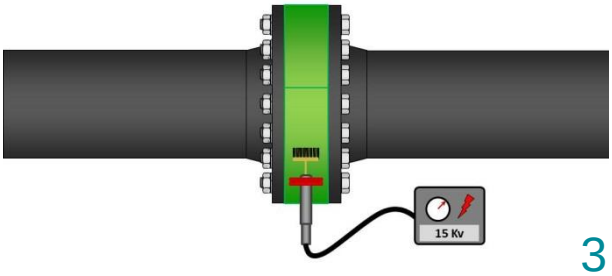


1

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.

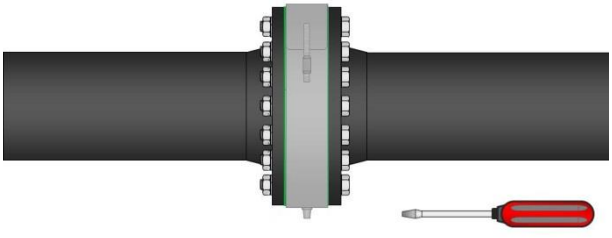


3

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.

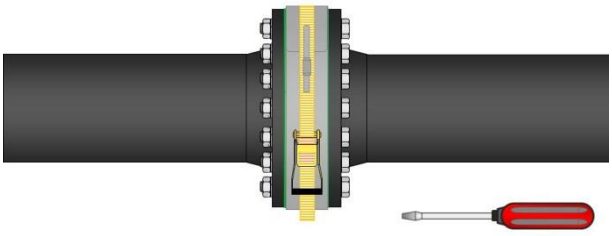


5

Place the Flangebelt centered over the Wrappingband.

6

Close the Flangebelt using a screwdriver.

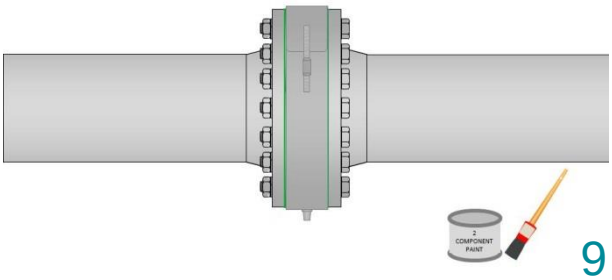


7

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

8

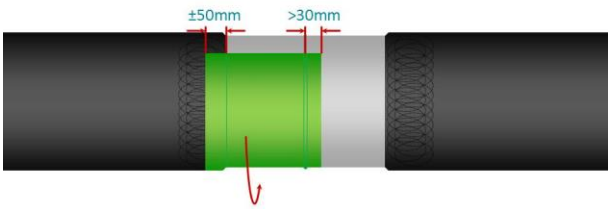
The rectangular cut in the ratchet strap enables tightening the clamp.



9

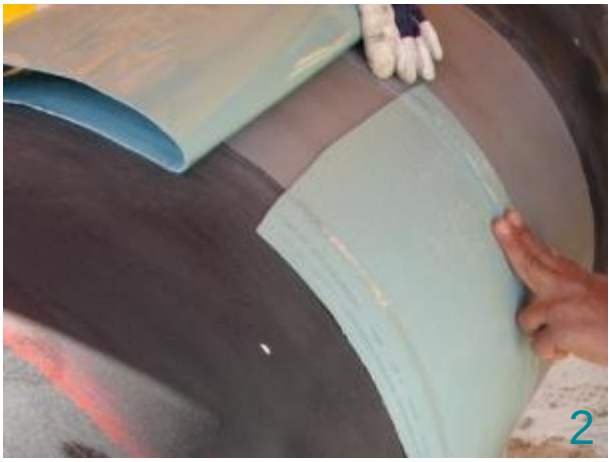
Paint the bolts and pipelines with a thick layer of an appropriate paint according client specification.

10



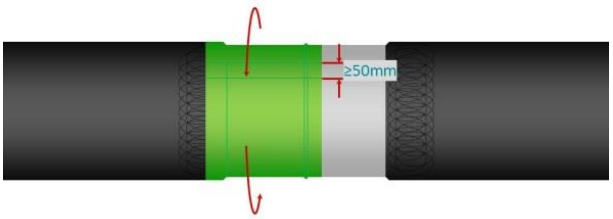
1

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.

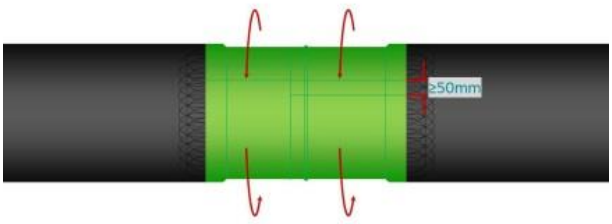


3

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.

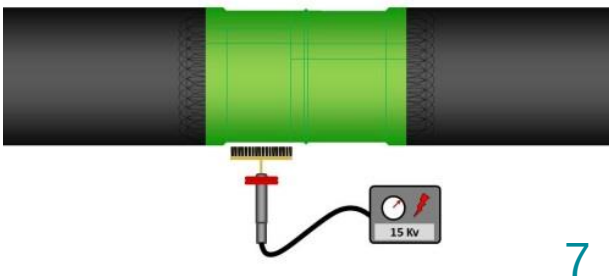


5

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.

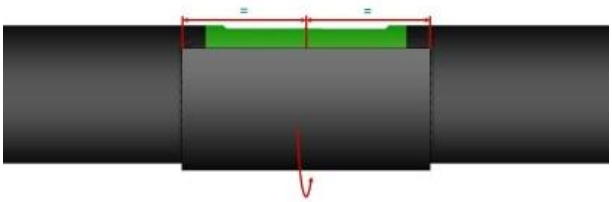


7

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.

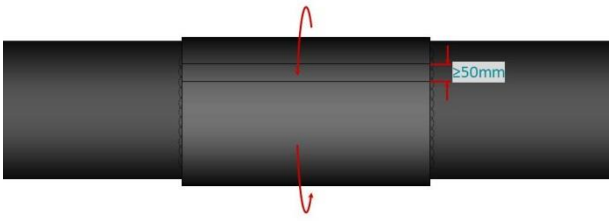


9

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.

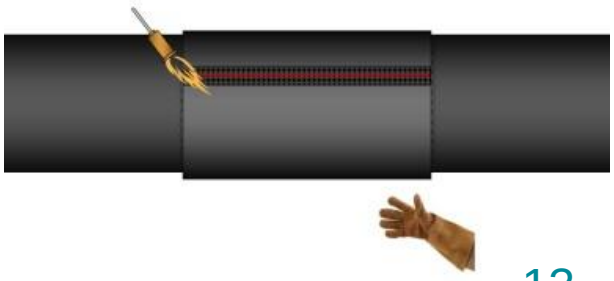


11

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.

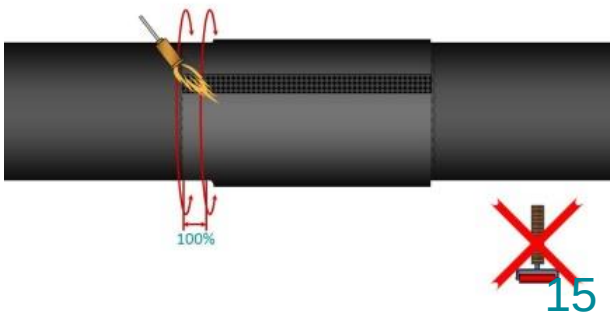


13

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.

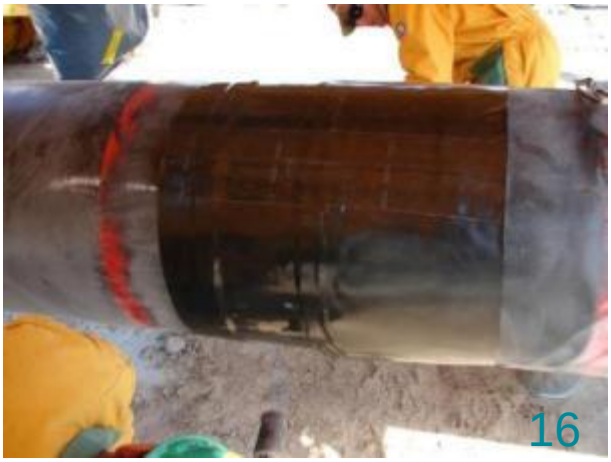
14

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.



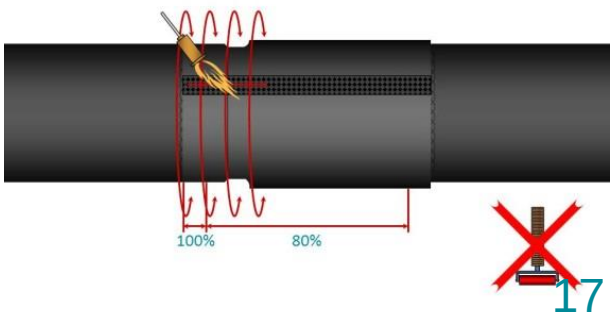
15

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.

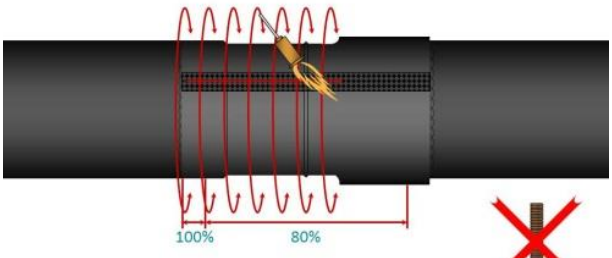


17

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.

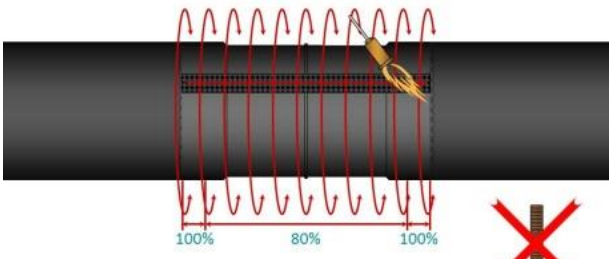


19

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

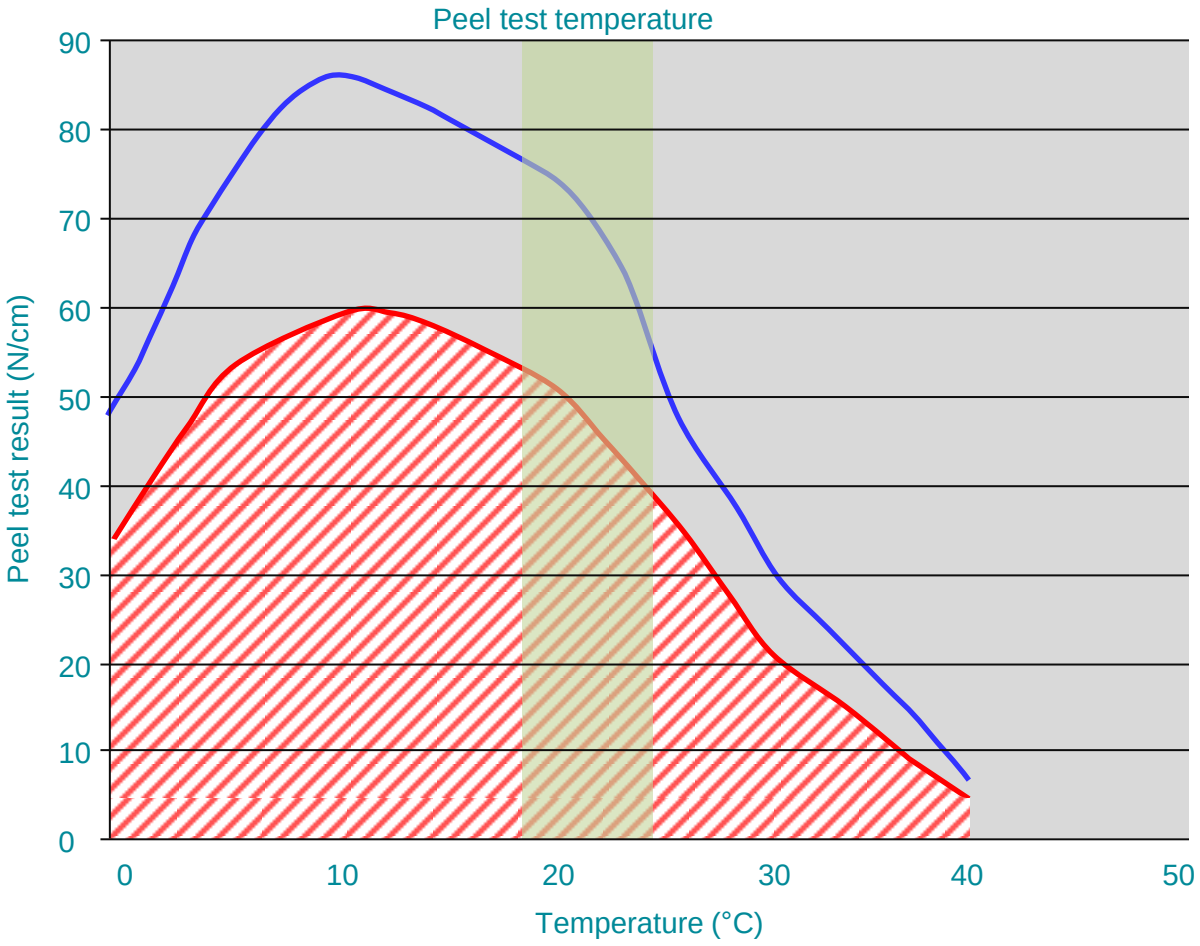
There is a difference between peel tests in a laboratory and in-field peel tests, because the peel tests in a laboratory will be carried out with special equipment at a peel rate of 10mm per minute, according to ISO 21809-3. This is not feasible in the field, so therefore the peel rate in field test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

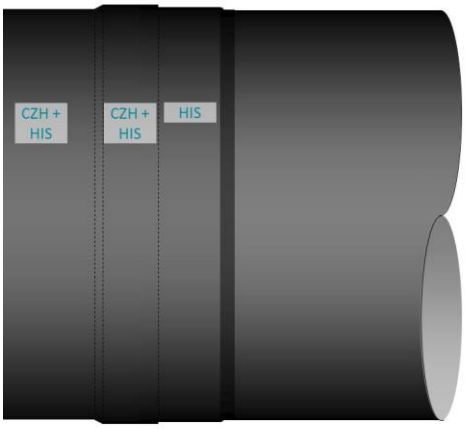
The peel value must have a minimum value according the table and graph below.

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



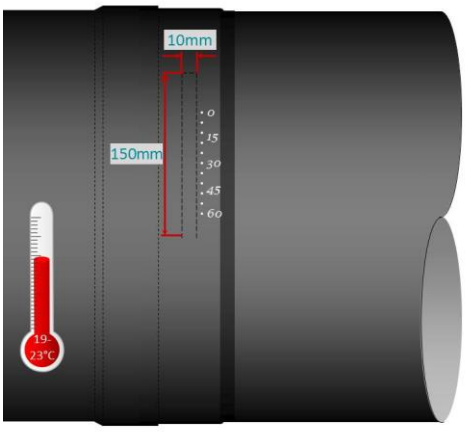


7

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.

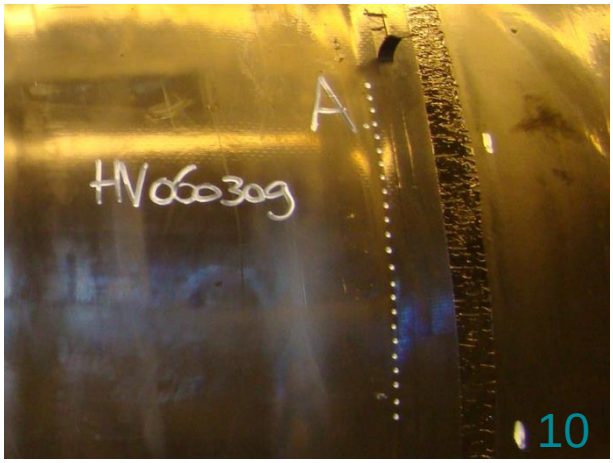
8

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



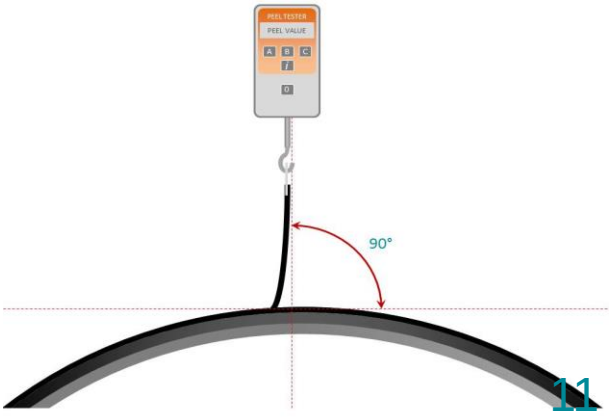
9

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.

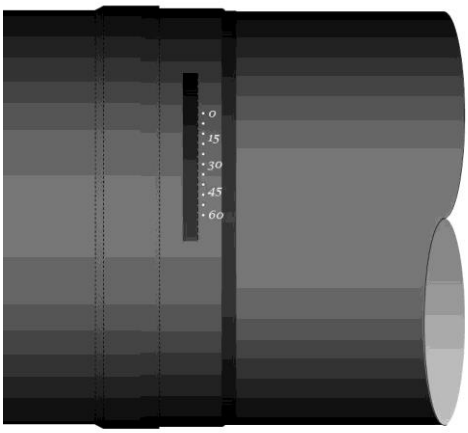


11

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.

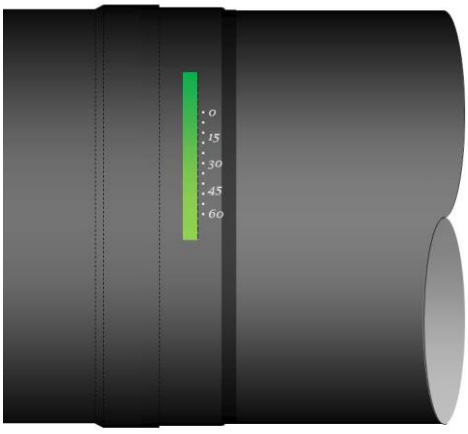


13

Remove the peeled strip completely after the peel test.

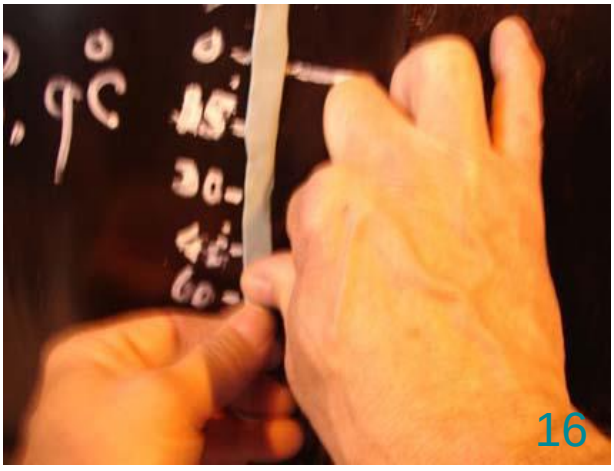
14

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



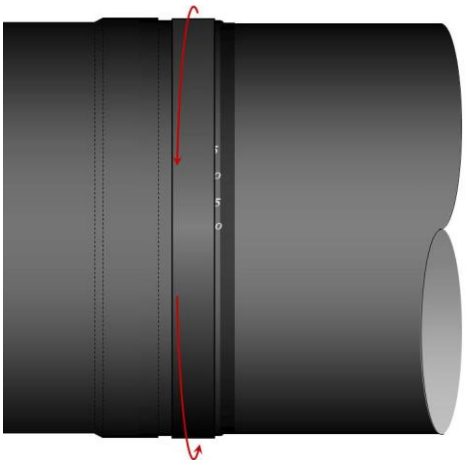
15

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



16

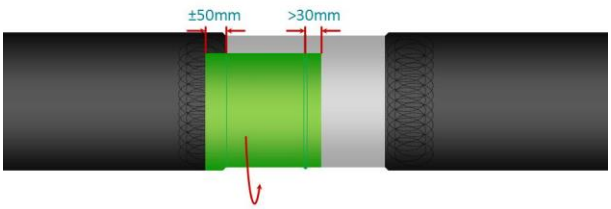
Apply Paste CZH without air inclusions and smoothen the surface.



17

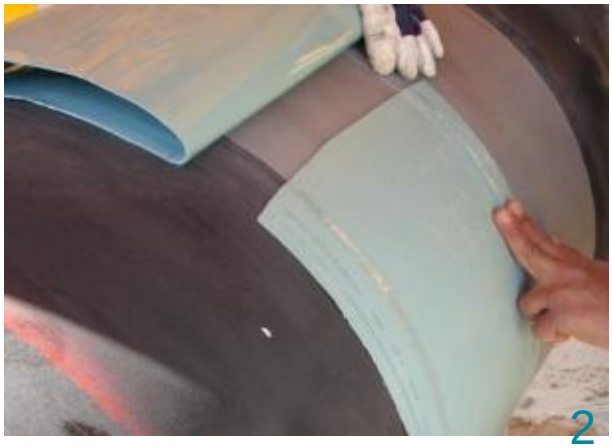
Apply Outerwrap over the damage. Start approx. 300mm above the damage and apply 2 straight wraps of Outerwrap. Apply Outerwrap with tension and without air inclusions.

18



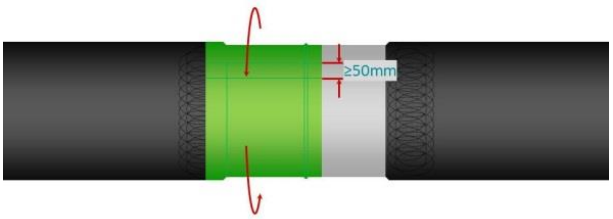
1

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.

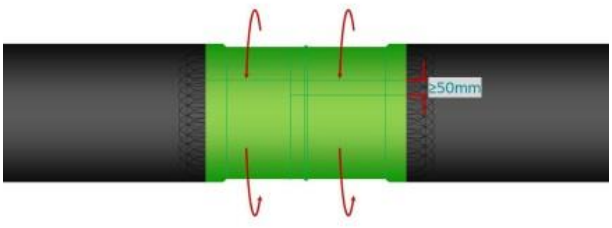


3

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.

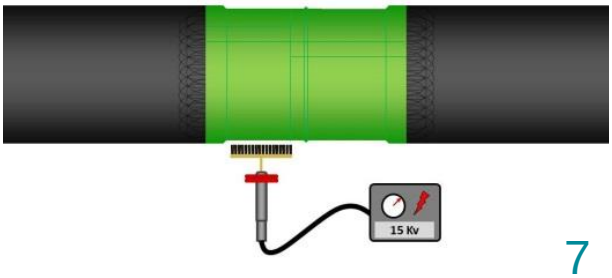


5

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.

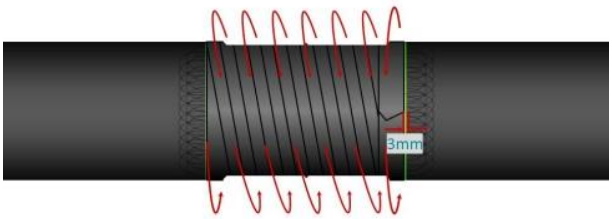


7

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.

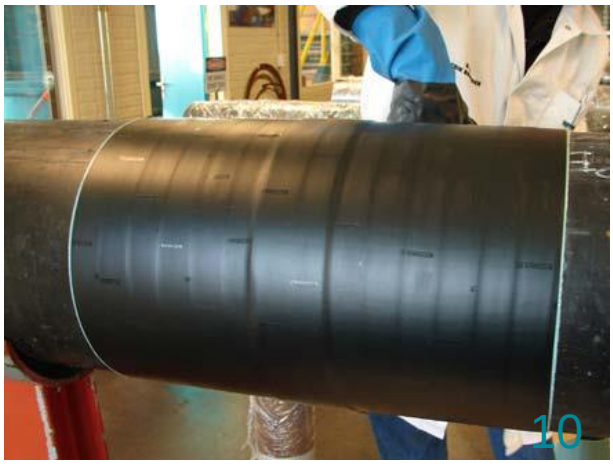
8

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.

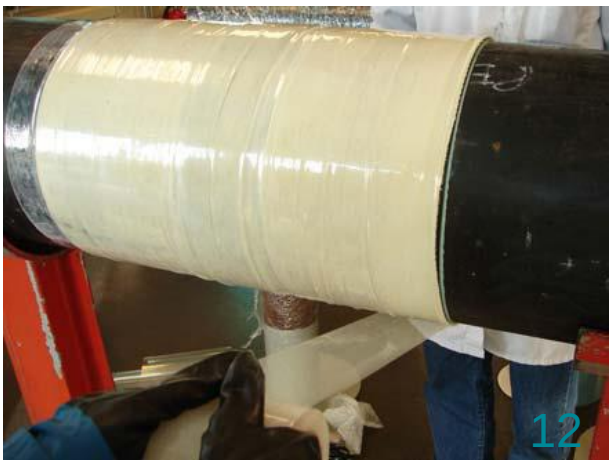


10

Apply Outerwrap with tension and avoid air inclusions.

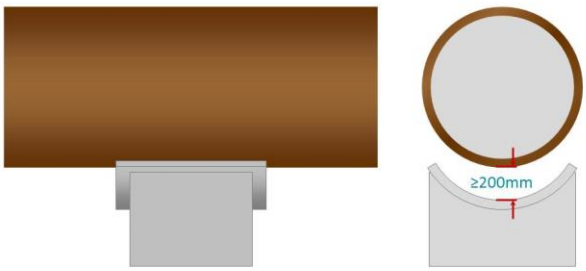
11

Apply Outerglass Shield XT according specific chapter for details.



12

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

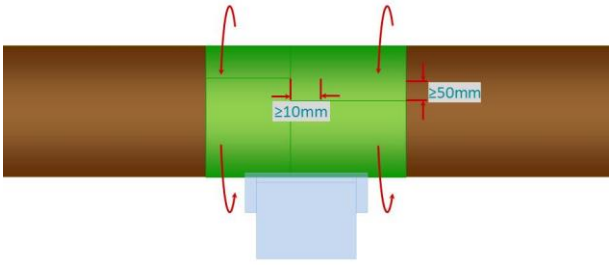


1

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.

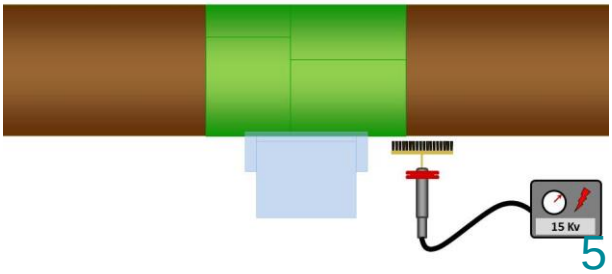


3

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.

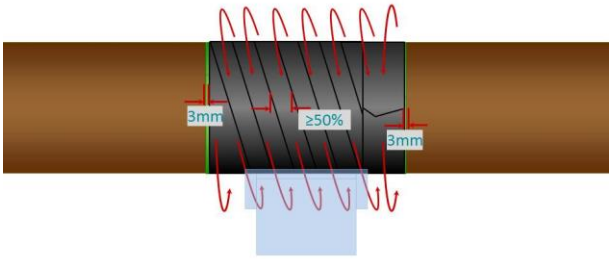


5

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

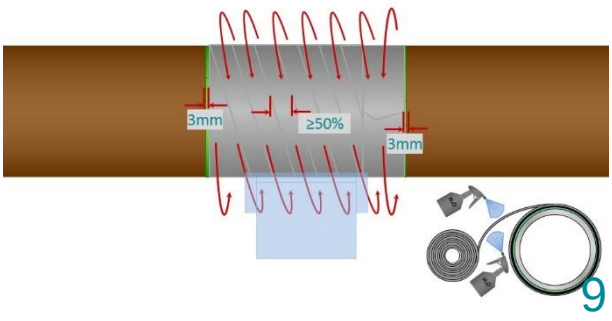
Always use approved and certified holiday test equipment.



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.

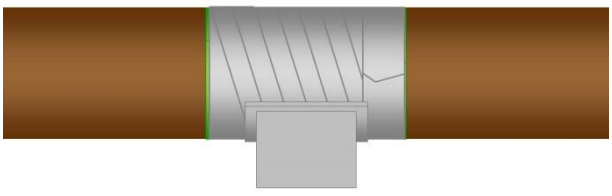
Keep 3mm of Wrappingband exposed at both ends.



9

Apply Outerglass Shield XT according the specific chapter.

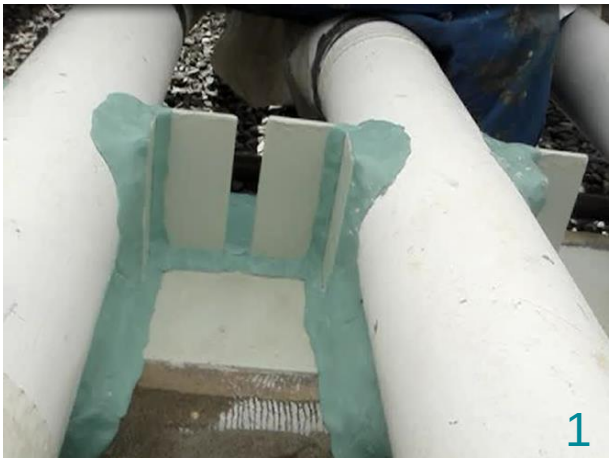
The coating performance will not be badly influenced when the compression foil remains on the Outerglass Shield XT.



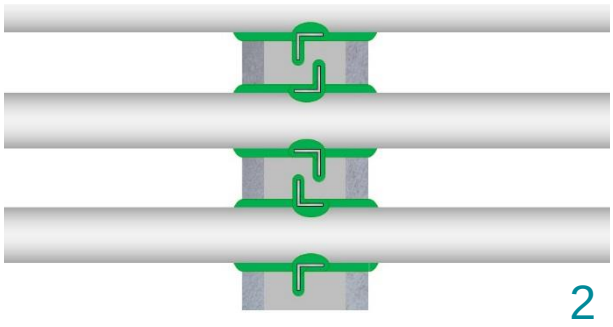
11

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.

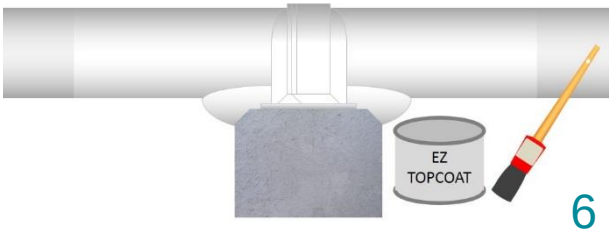


Apply without air enclosures and firmly press the materials in all corners, underneath and around the pipe into the pores of the substrates.

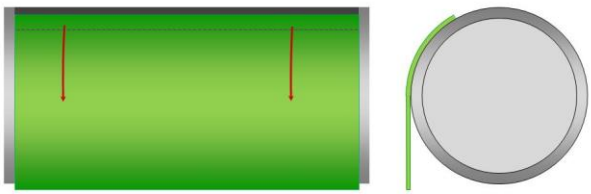
Apply Stopaq Basecoat over the entire support with a minimum overlap of 10mm on a previous applied strip Basecoat.

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

Apply EZ Topcoat over the entire area.



…

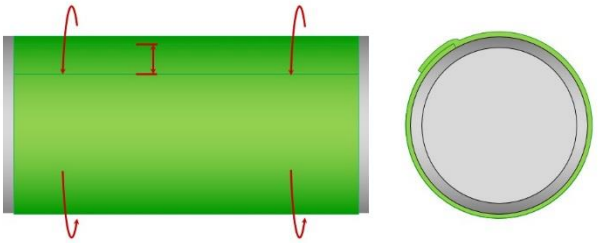


1

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

…

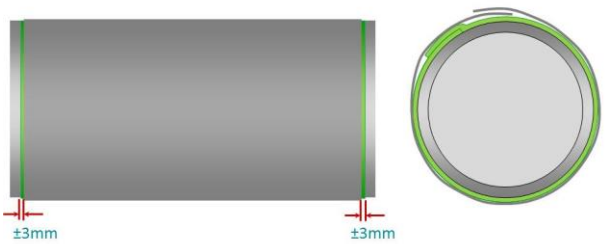


3

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

4

…

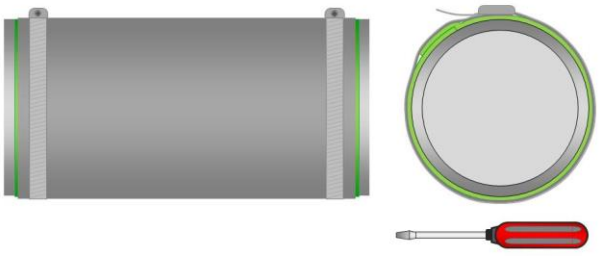


5

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

6

…

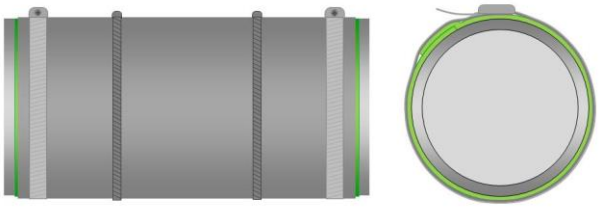


7

Tie the Aluminium sheet tight with stainless steel straps.

8

…

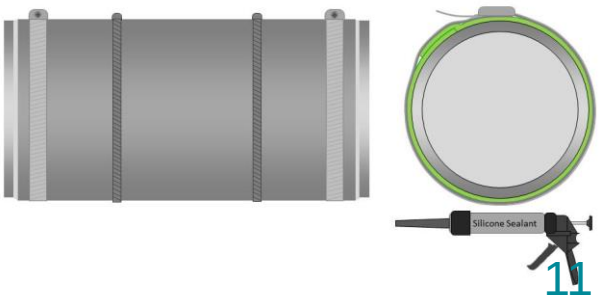


9

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

10

…

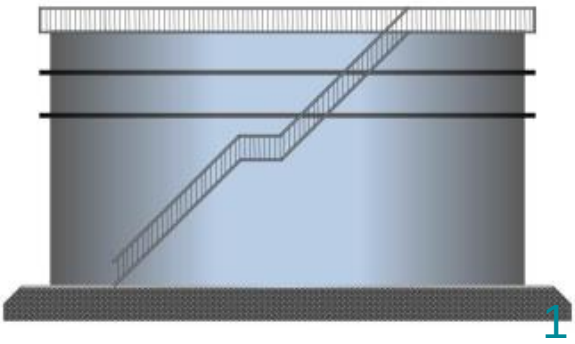


11

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

12

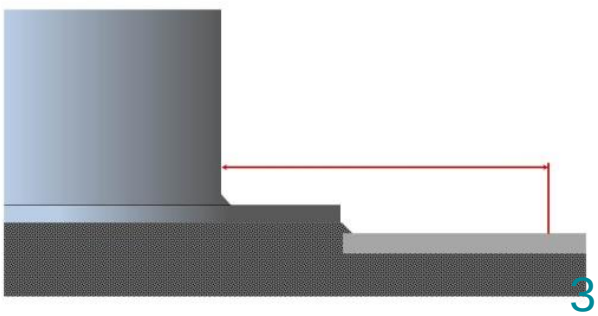
…



1

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

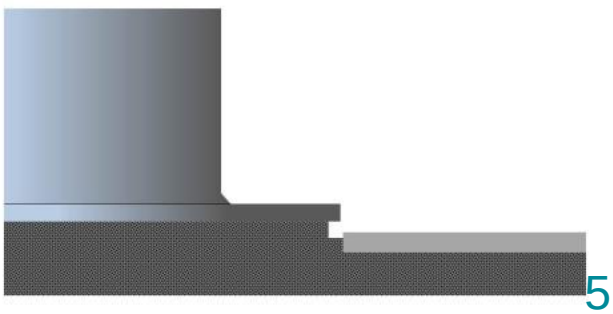
2



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.

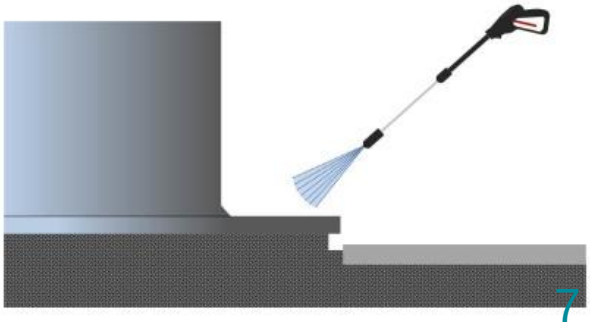
4



5

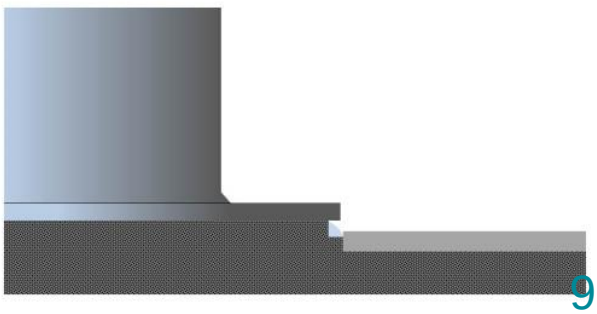
Ensure some space underneath the steel bottom flange adjacent to to the concrete. The steel ring has to be above the concrete.

6


7

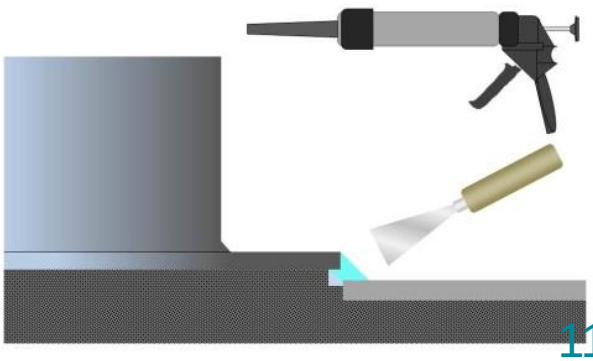
The entire area has to be cleaned prior to application. High pressure water jetting is recommended.


8


9

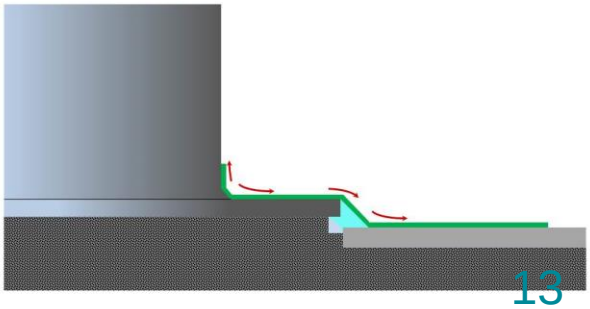
Area has to be completely dry prior to application. Apply a foam backing filler into the chime area void to avoid excess material use of 4200 Filler.


10


11

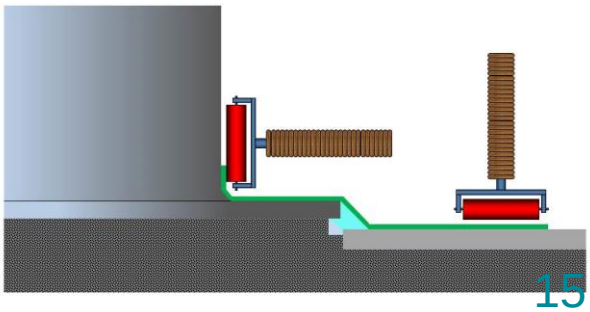
Apply 4200 Filler with the application tool and avoid air inclusions. A putty knife can be used to create a 45° angle between the concrete and metal bottom flange.


12


13

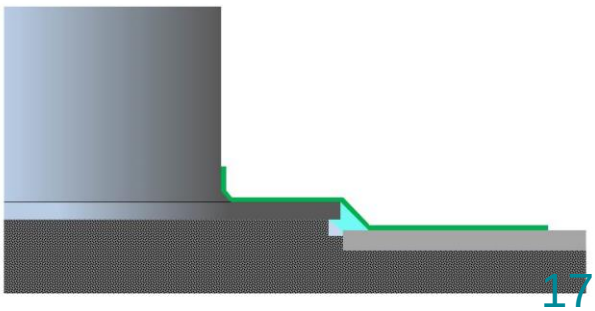
Apply Wrappingband EZ without tension and avoid air inclusions. Start on the tank wall and work towards the concrete. Dimensions according client specifications. Check adhesion on a regular base.


14


15

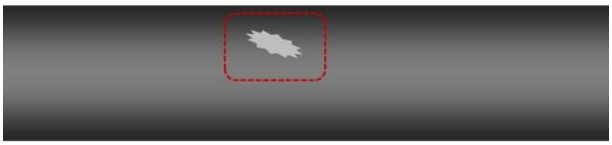
Use a roller to press the Wrappingband tight onto the surface.

16


17

A topcoat should be applied immediately after application.

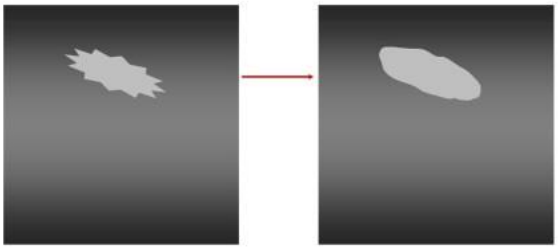

18



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.

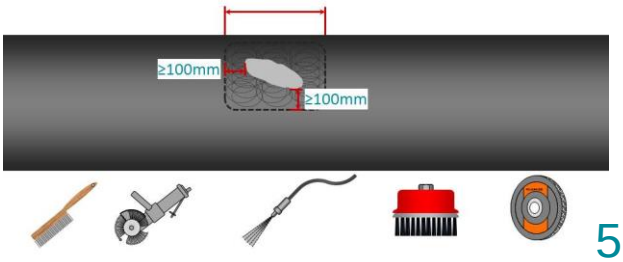
2



3

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

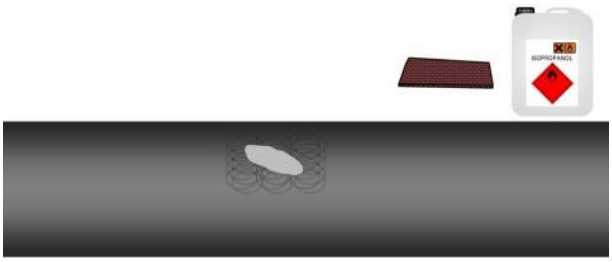
4



5

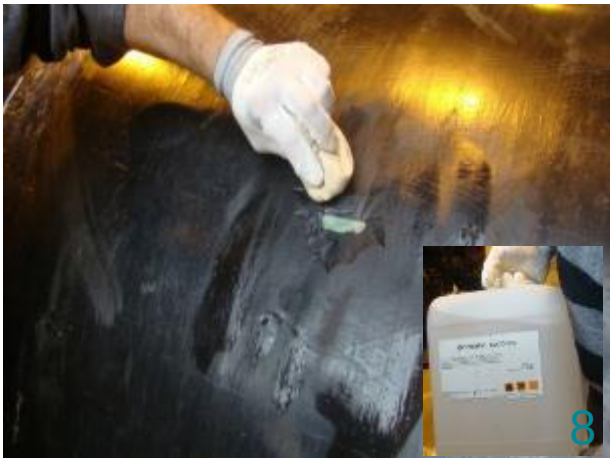
Roughen the surface of the plant coating around the damaged spot with an abrasive pad or sand paper. Remove all contaminations.

6



7

Degrease with isopropyl alcohol. Do not use a thinner.

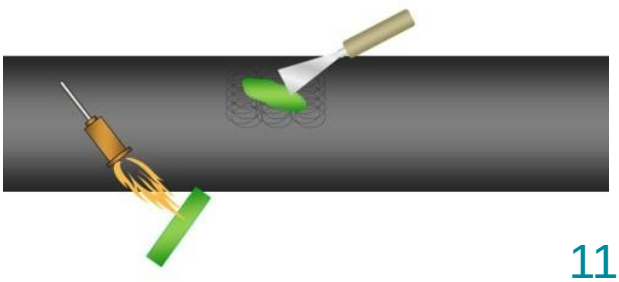


8

9

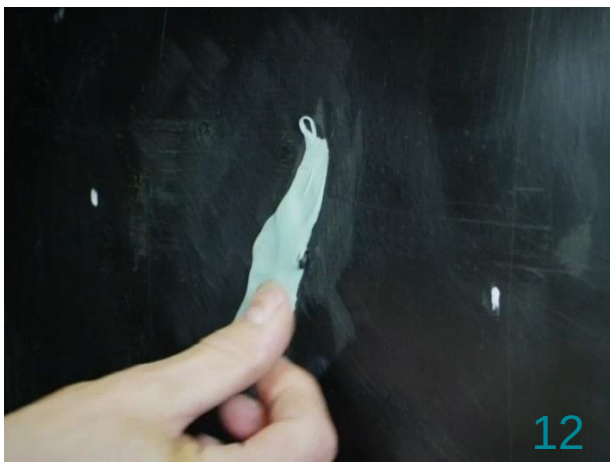
Preheat the area until approx. 70°C.

10

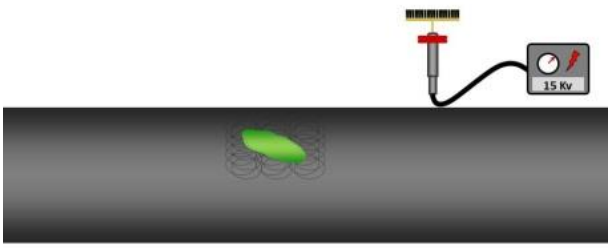


11

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



12

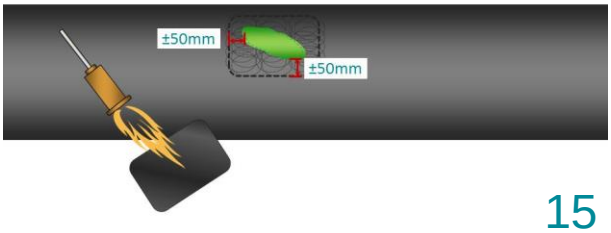


13

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.

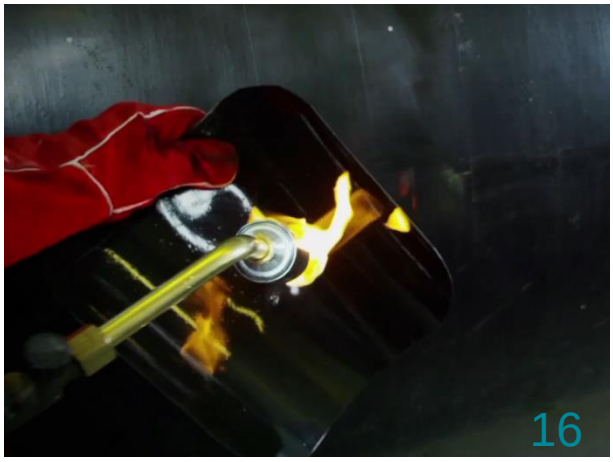
14

Always use approved and certified holiday test equipment.

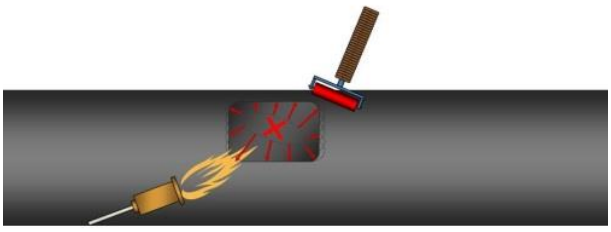


15

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

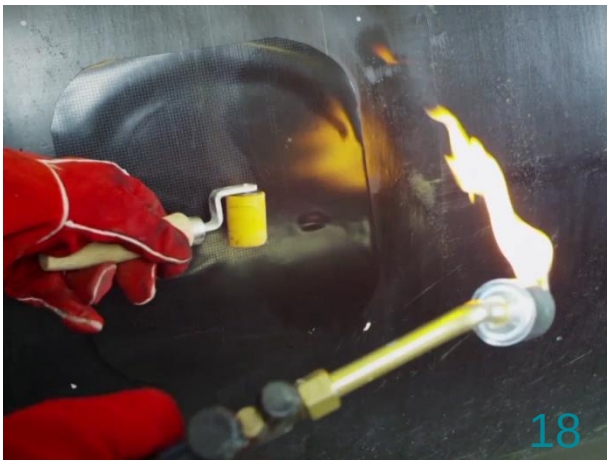


16

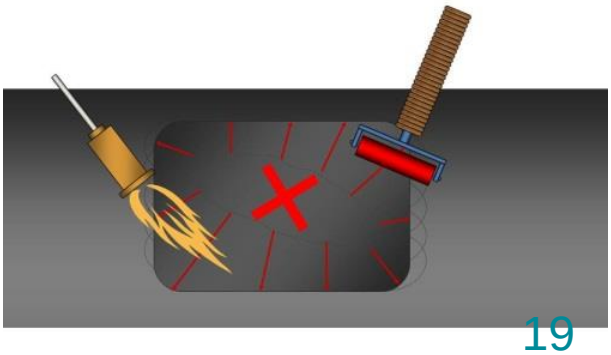


17

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



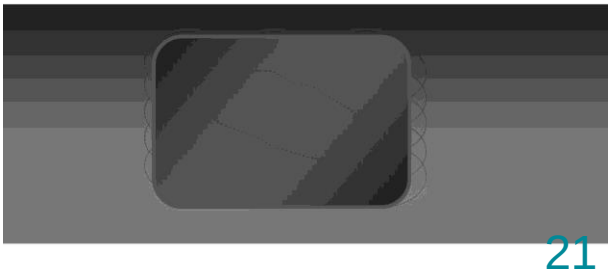
18



19

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

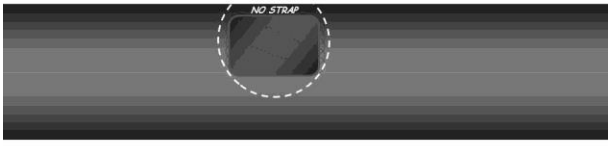
20



21

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

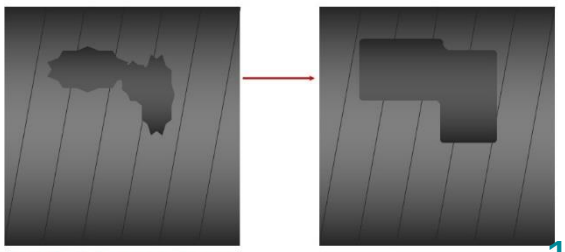
22



23

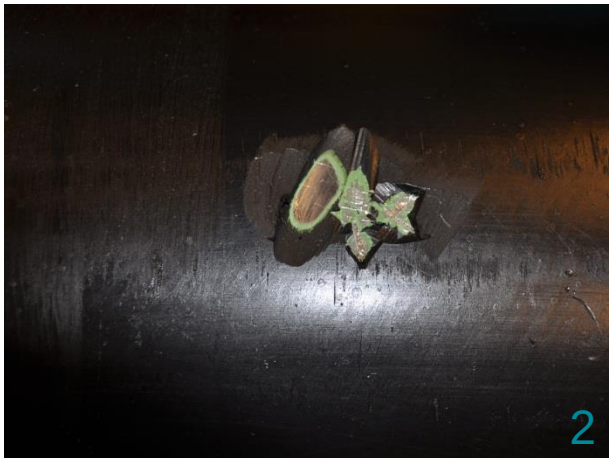
Mark the repaired area to indicate that straps must not be put around the repaired area.

24



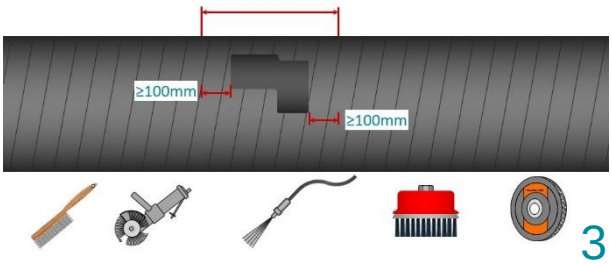
1

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.

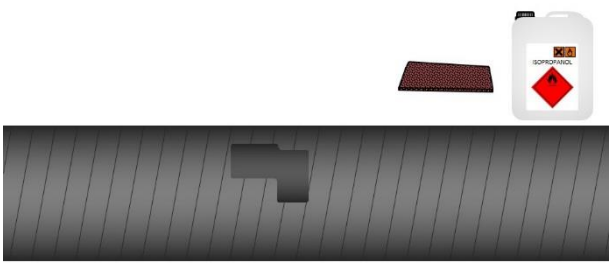


3

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

4

…

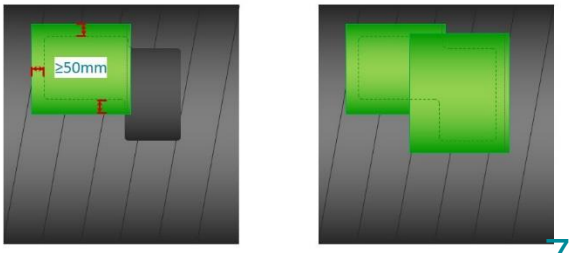


5

Degrease with isopropyl alcohol. Do not use a thinner.

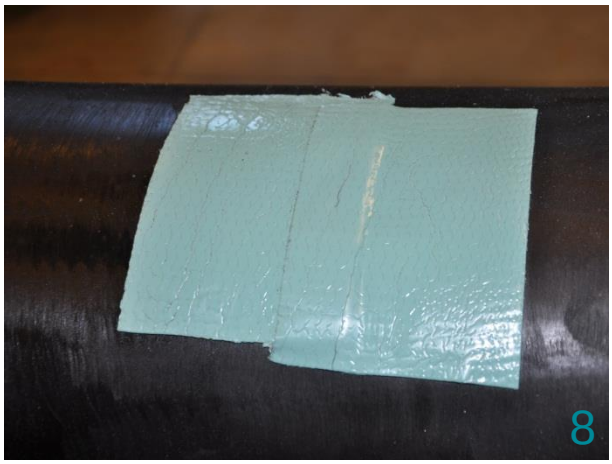
6

…

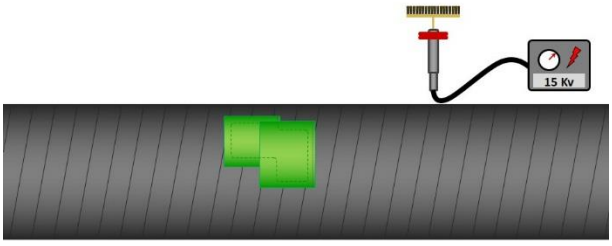


7

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

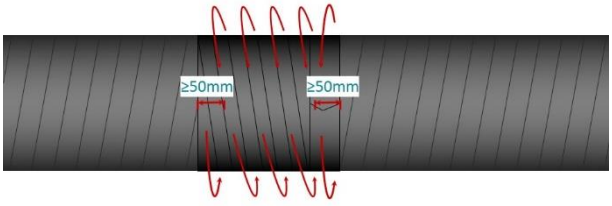


9

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

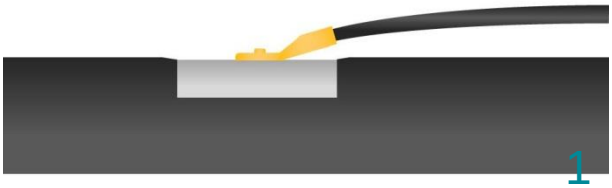
Always use approved and certified holiday test equipment.



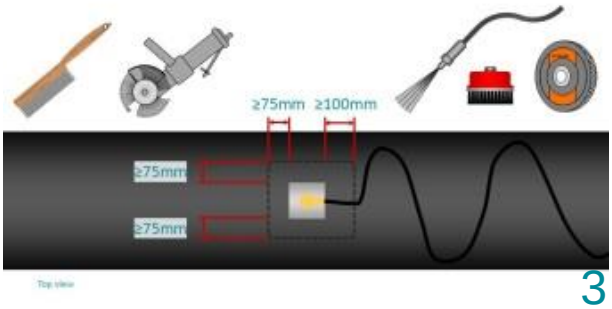
11

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.

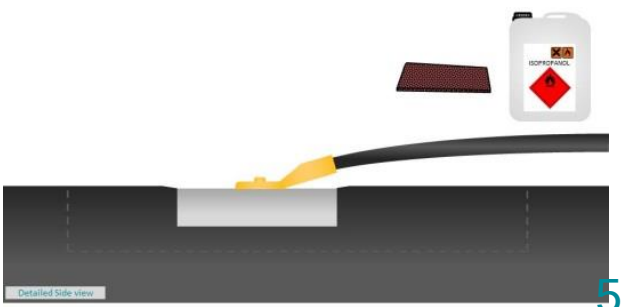
12



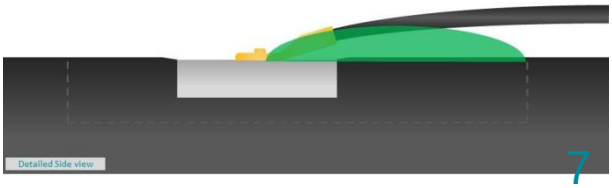
Bevel the edges of the plant coating surrounding the Pinbraze.



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



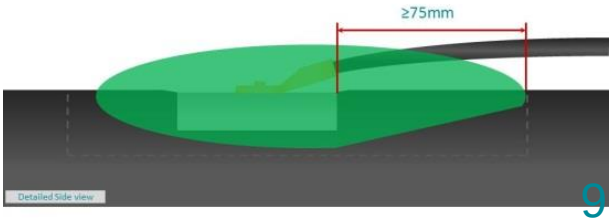
Degrease with isopropyl alcohol. Do not use a thinner.



7

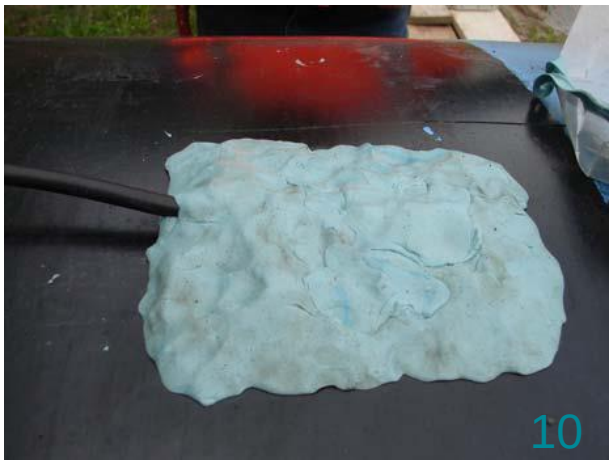
Apply preheated Paste around the Pinbraze and underneath the connecting wire. Check the adhesion of the paste

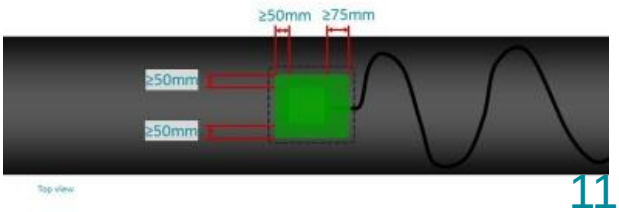

8



9

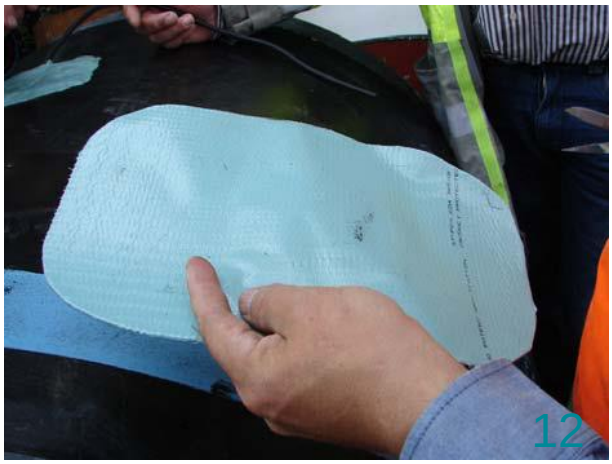
Fill the area around the Pinbraze with preheated Paste. Avoid air inclusions.

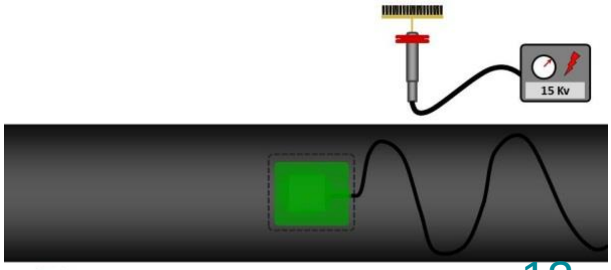

10



11

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


12

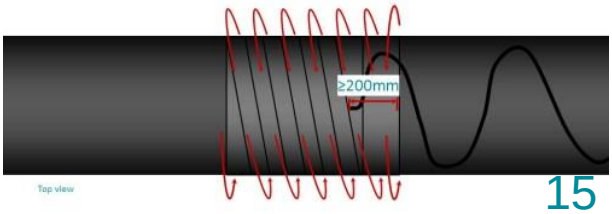


13

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

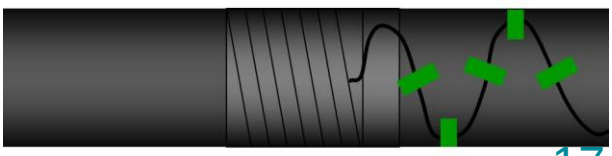
Always use approved and certified holiday test equipment.



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.

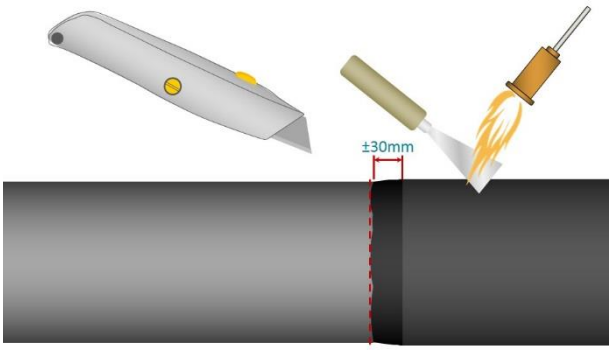
16



17

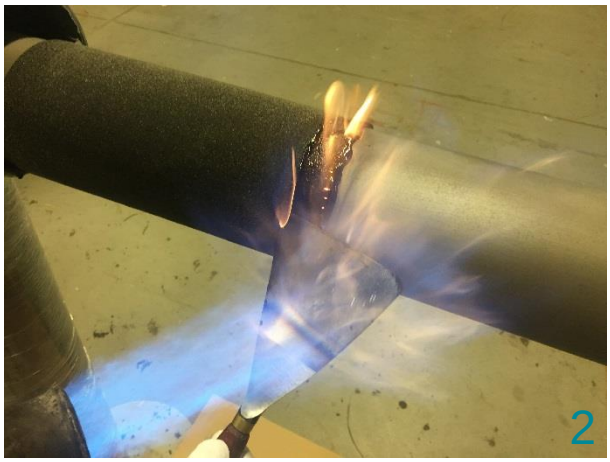
Use strips of Wrappingband to place the CP cable with loops on the surface.

18



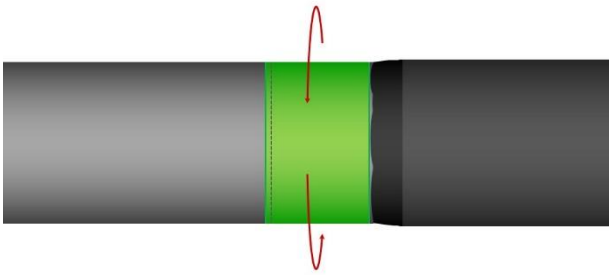
1

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



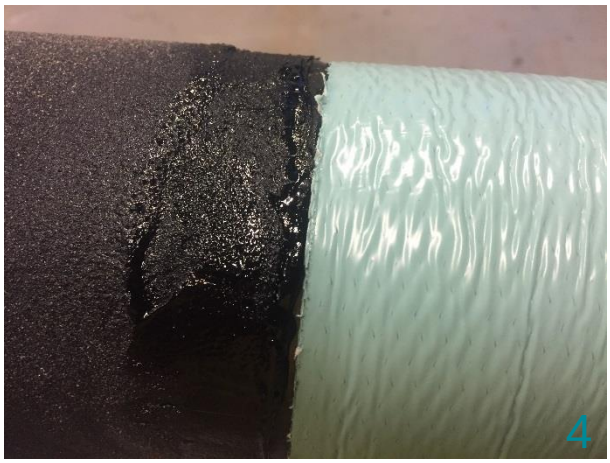
2

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



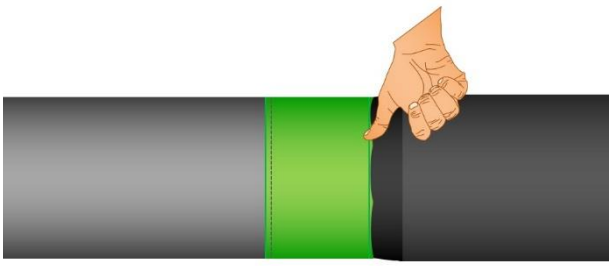
3

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.

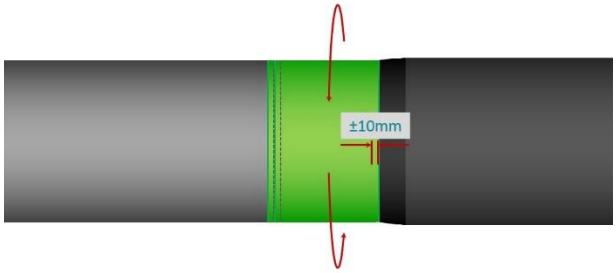


5

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.

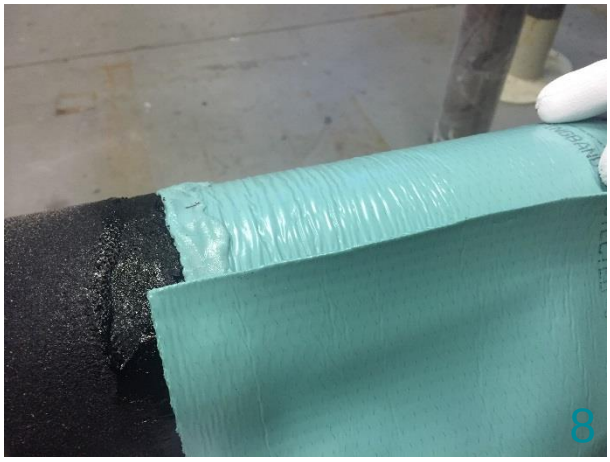
6

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



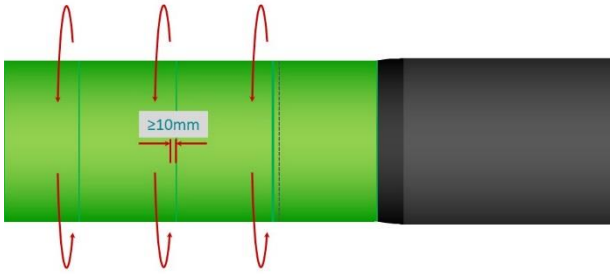
7

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.

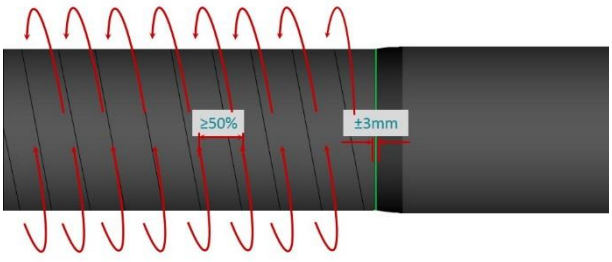


9

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.

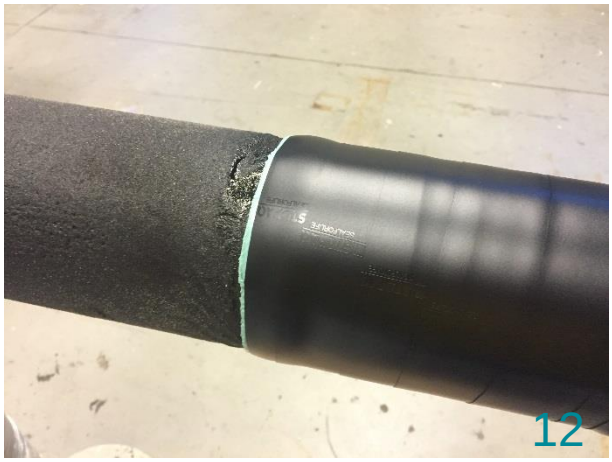
10

Always use approved and certified holiday test equipment.



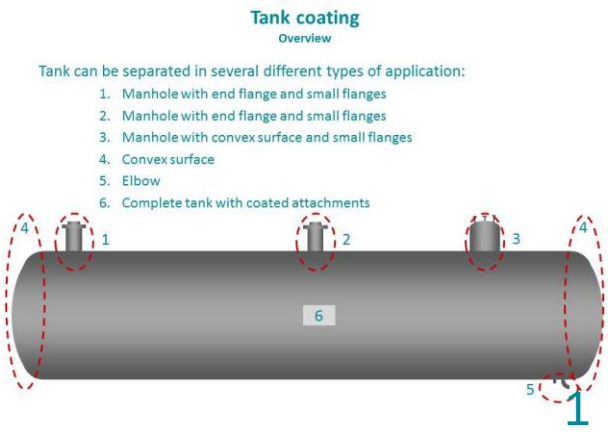
11

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



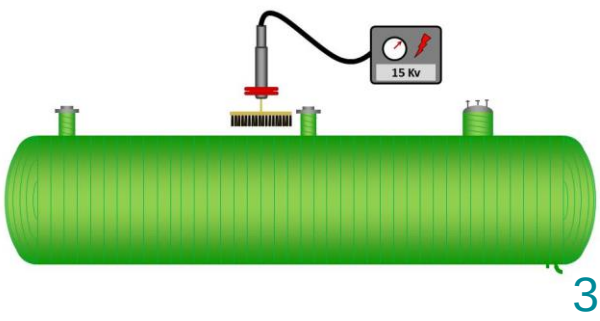
12

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



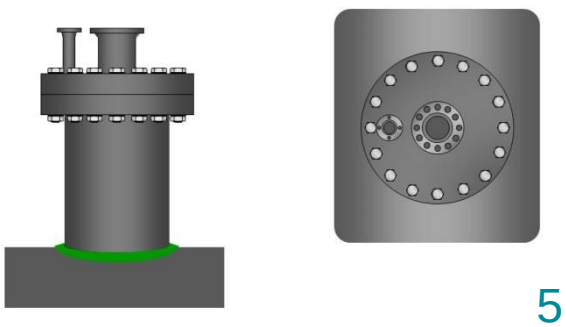
Tank to be coated with Stopaq Wrappingband, Outerwrap and Outerglass Shield. The tank can be separated in several sub-applications.

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



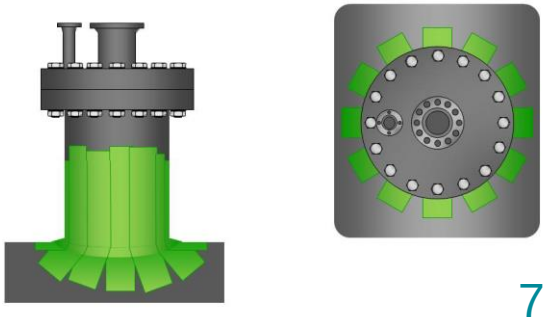
A holiday test using a high voltage tester must be carried out on the green Stopaq Wrappingband prior to the application of any Outerwrap. The test must be carried out at a minimum of 15kV. Holiday test can be carried out after each separate application.

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.

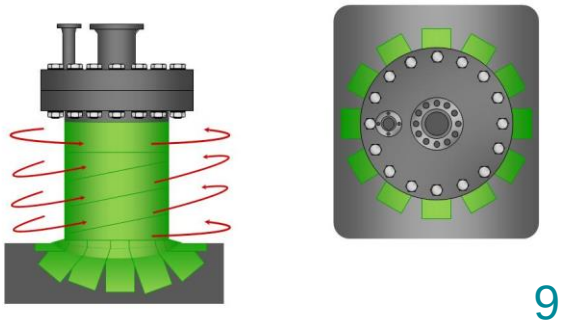
Apply Paste without air-inclusions.


7

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


8

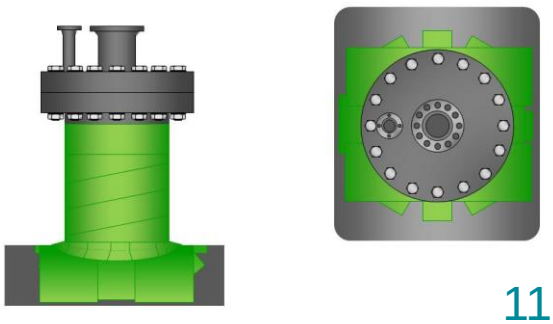
Press the Wrappingband into the pores of the substrate. Do not overlap the Wrappingband too much onto the tank.


9

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


10

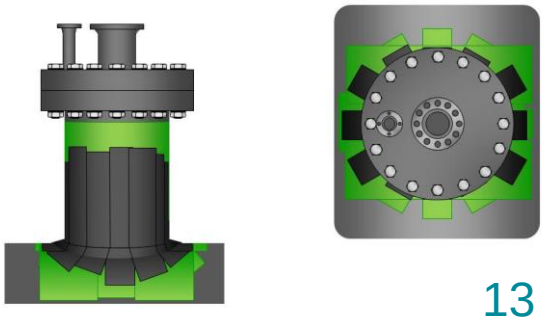
Wrappingband can be applied with spiral wrap or with straight wraps. Work bottom-to-top.


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.

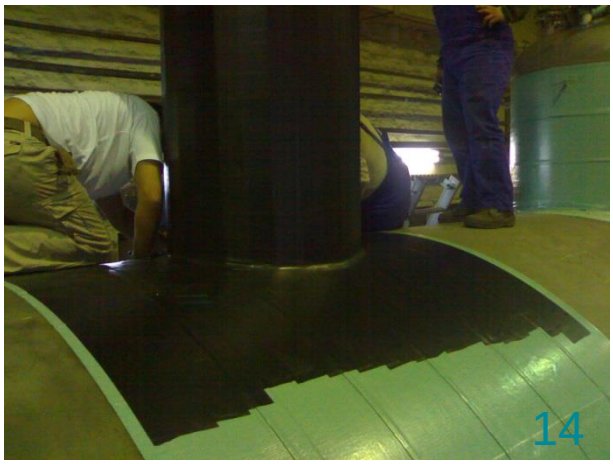

12

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



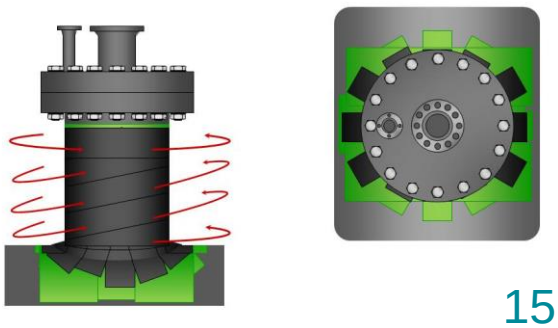
13

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.

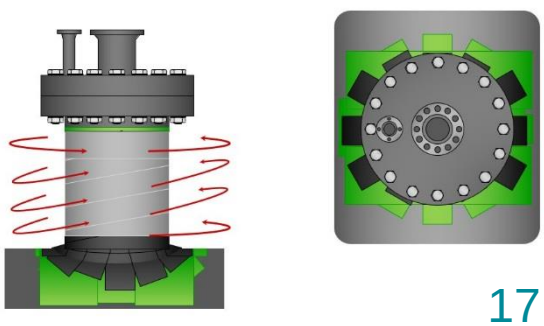


15

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.

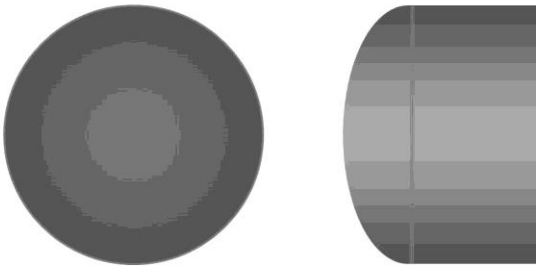


17

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.

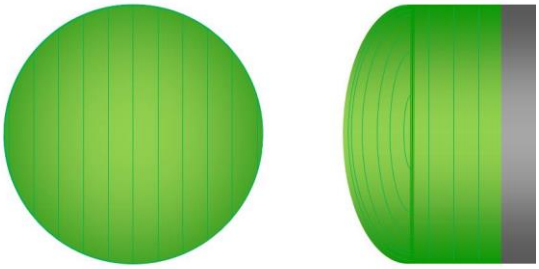


25

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.

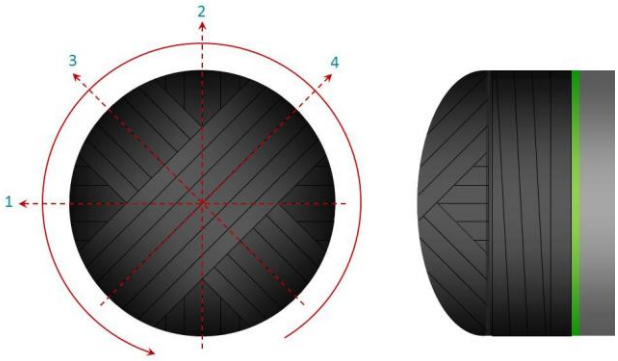


27

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

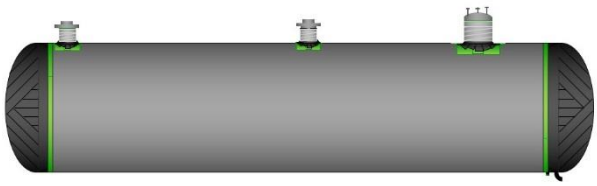
Finished convex surface. Perform holiday test prior to the application of Outerwrap.



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.

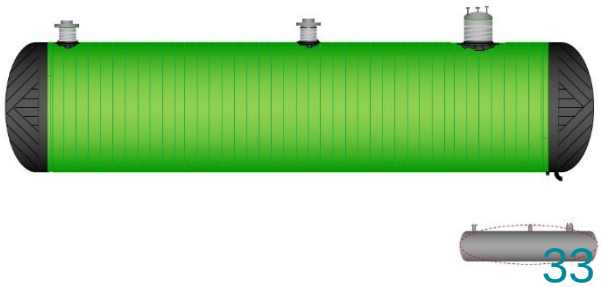


31

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

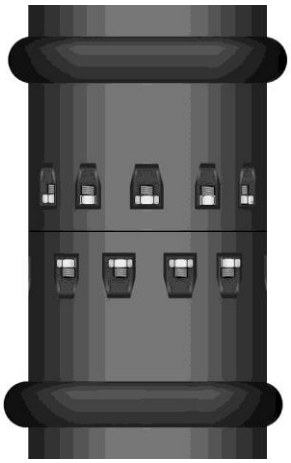
Perform holiday test prior to the application of Outerwrap.

35

Tank coated with Wrappingband, Outerwrap and Outerglass Shield.

36

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

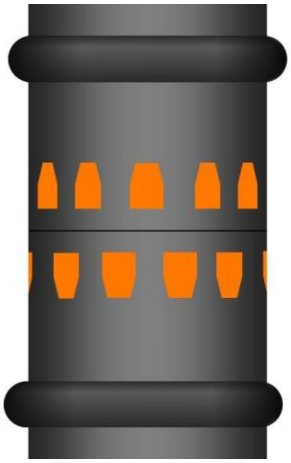


1

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

2

Ensure the bolts are installed according specification

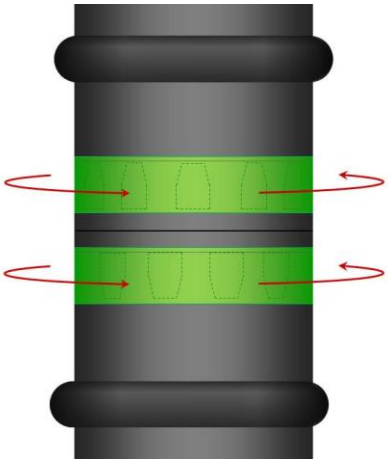


3

Install the blocks after the bolts have been installed

4

First place the rear blocks, then the front blocks

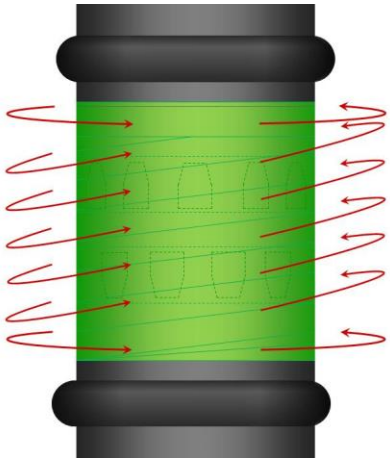


5

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

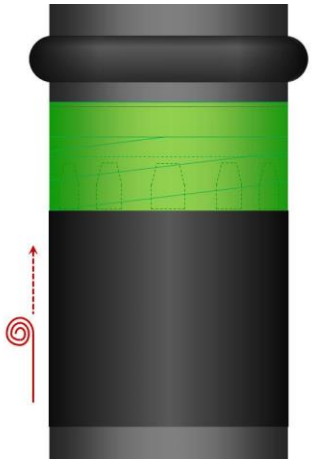


7

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

7

…

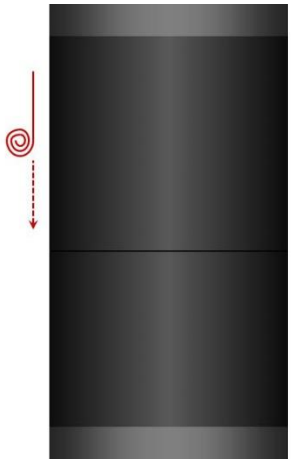


9

Close the bottom neoprene sleeve

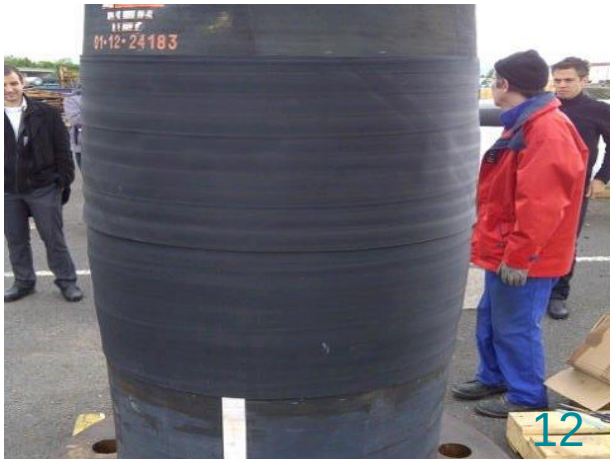
10

…



11

Close the top neoprene sleeve



12

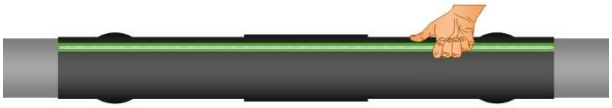
…

1

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

2

Prepare the entire casing incl. approx. 150mm of the high voltage cable.

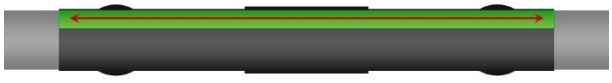


3

Use Paste to fill up the irregular shapes of the cable sleeve. Apply without air enclosures.

4

Minimum 95% coverage after surface cleanliness check



5

Apply a strip of Wrappingband over the zip of the sleeve

6

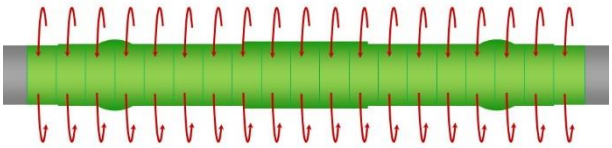
Apply Wrappingband without tension and avoid air enclosures. Press the Wrappingband in the pores of the substrate.

7

Apply Wrappingband by means of straight wraps over the high voltage cable. Circumferential overlap minimum 50nmm

8

Apply Wrappingband without tension and avoid air enclosures.

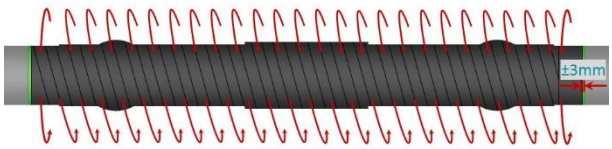


9

Apply Wrappingband over the entire sleeve. Firmly press the material in the pores of the substrate. Start and end minimum 100mm wider as the cable sleeve.

10

Conduct visual inspection prior to the application of Outerwrap.

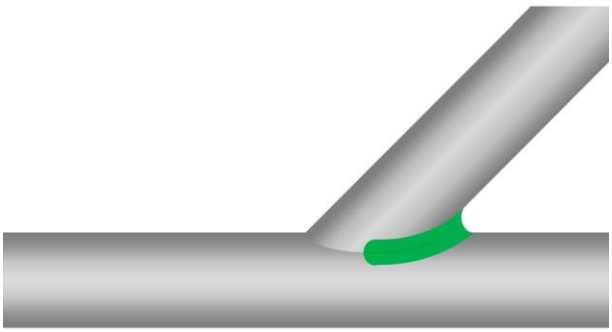


11

Apply Outerwrap over the Wrappingband. Start with 2 circumferential wraps, keeping approx. 3mm Wrappingband visible and continue application by means of spiral wrap over the sleeve.

12

Apply Outerwrap with tension and avoid air enclosures. Overlap minimum 50%. Finish with 2 circumferential wraps and keep approx. 3mm Wrappingband exposed.

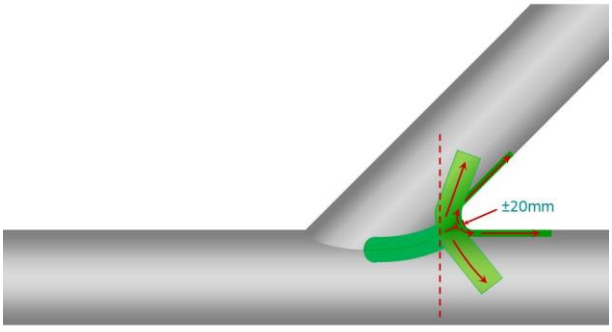


1

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.

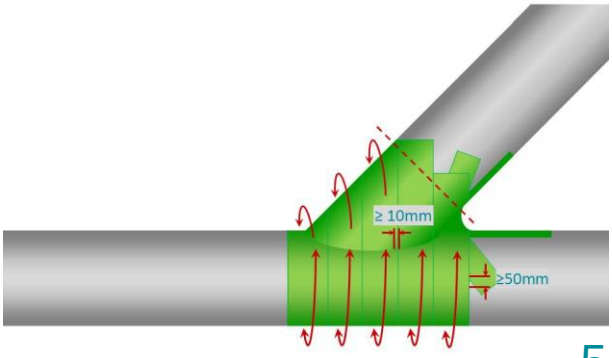


3

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.

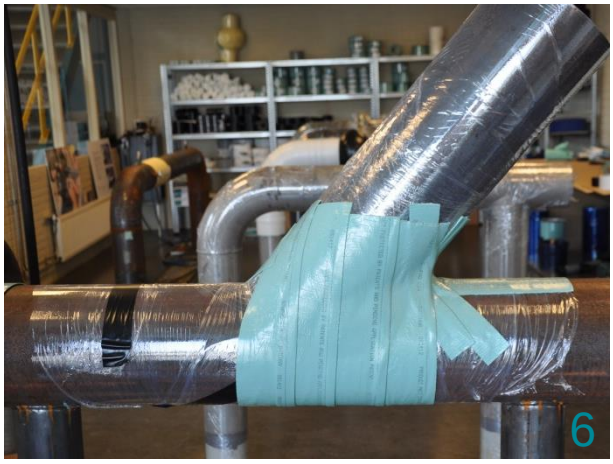
4

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.



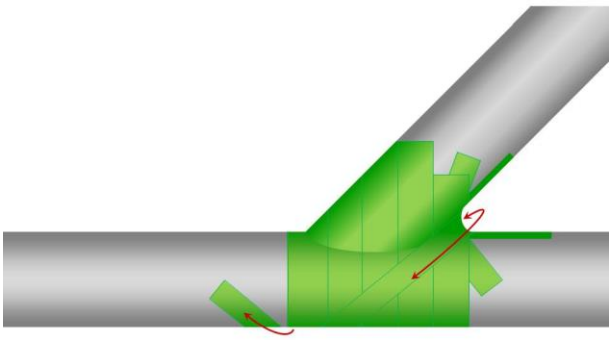
5

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.

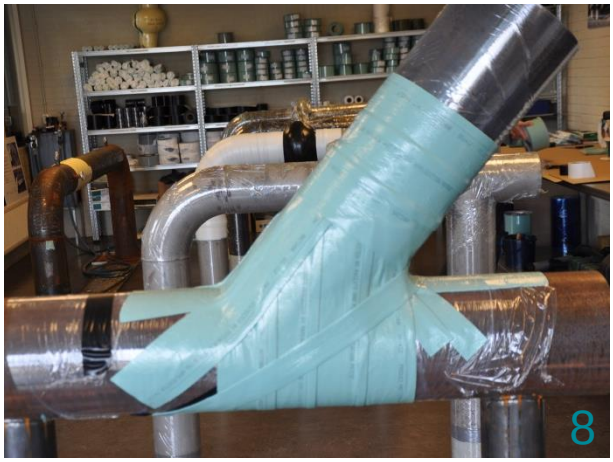


6

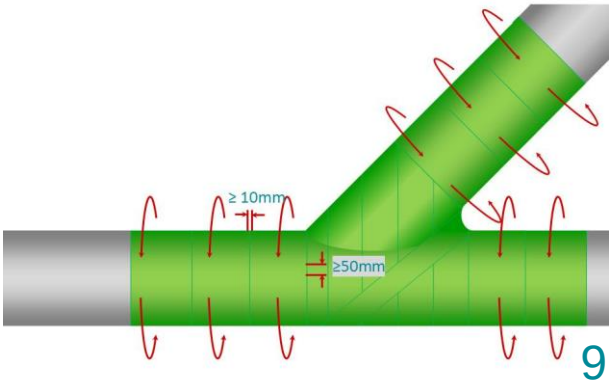
Side by side overlap minimum 10mm and consecutive overlap minimum 50mm.



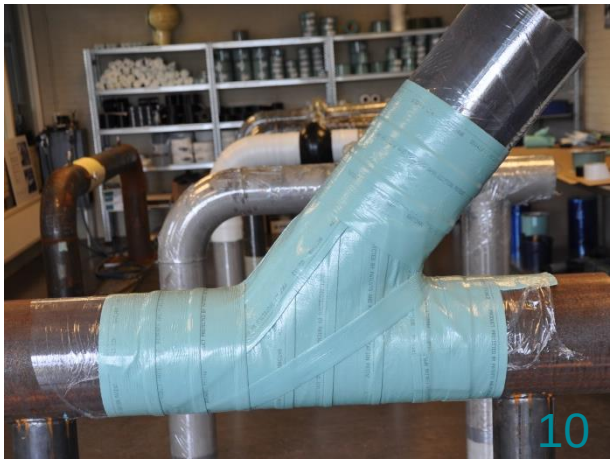
Apply a strip of Wrappingband through the corner of the Y-Connection.



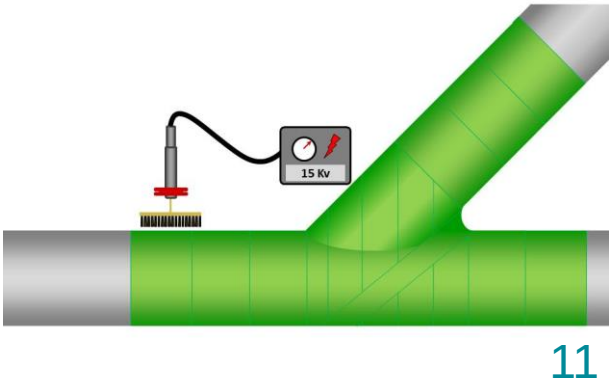
The strip must be applied with tension and extend the previous applied straight wraps of Wrappingband.



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

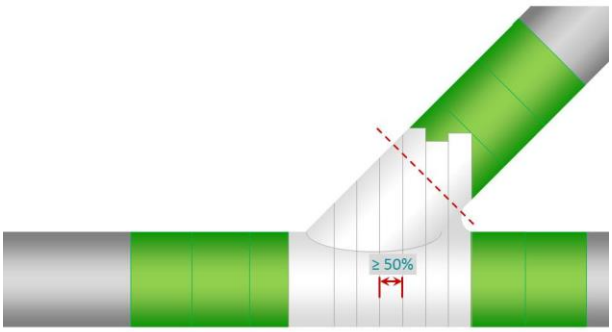


Side by side overlap minimum 10mm and consecutive overlap minimum 50mm. Check that there are no uncovered areas.



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.

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

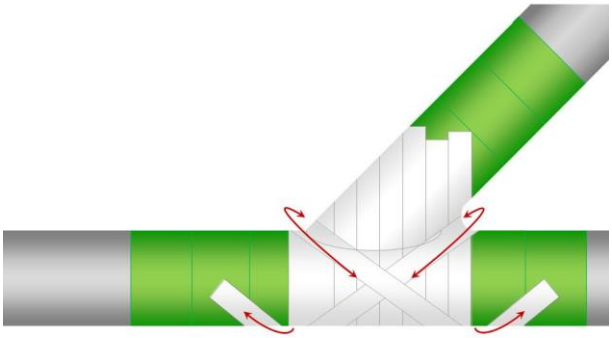


13

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

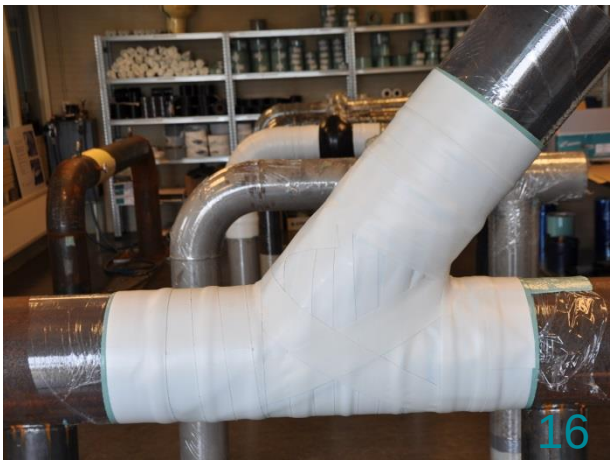
14

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



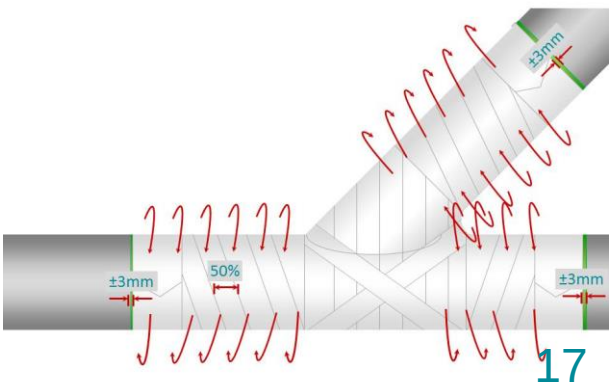
15

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.



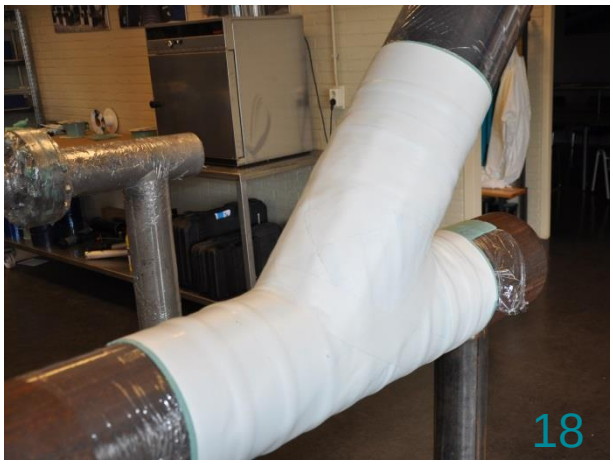
16

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



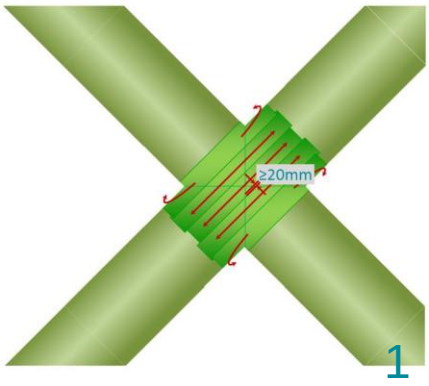
17

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



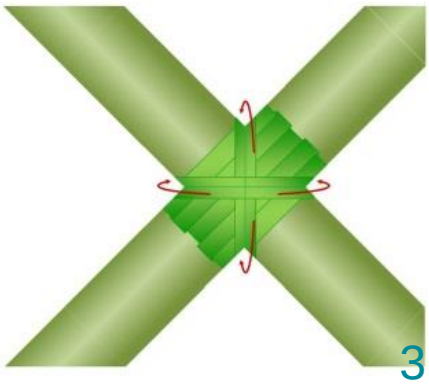
18

…



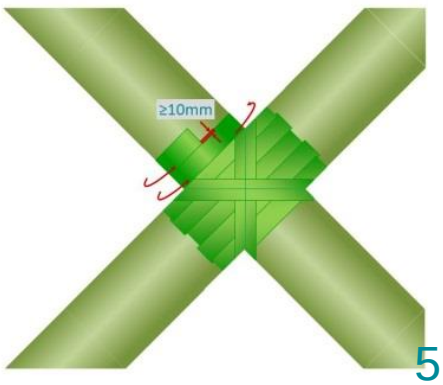
Ensure a proper surface preparation prior to the application of Wrappingband. Apply strips of Wrappingband over the center of the X-Knot until the area covered is wider than the pipe diameter. Wrappingband should be applied with an overlap of at least 20mm.

Wrappingband must be applied without air inclusions.

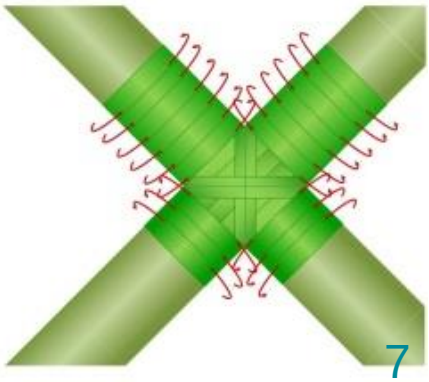


Apply strips of Wrappingband with tension through the corners of the X-Knot.

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



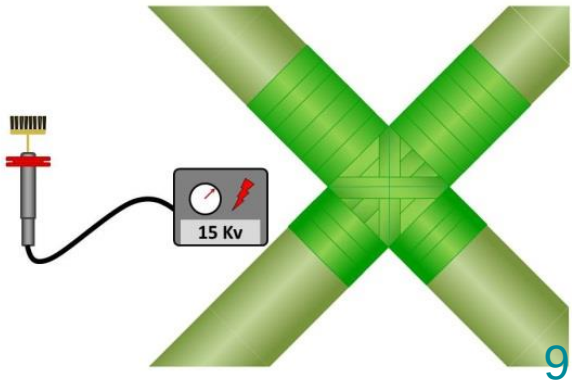
Start straight wrap application of Wrappingband adjacent to the previously applied Wrappingband on the X-Knot. Side by side overlap should be at least 10mm.


7

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


8

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

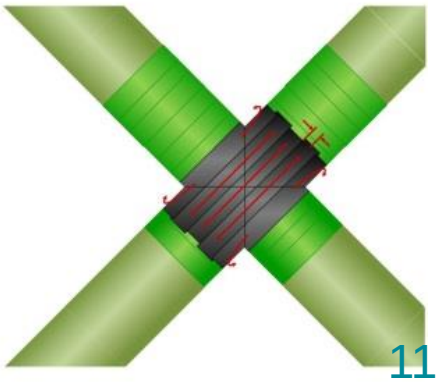


9

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

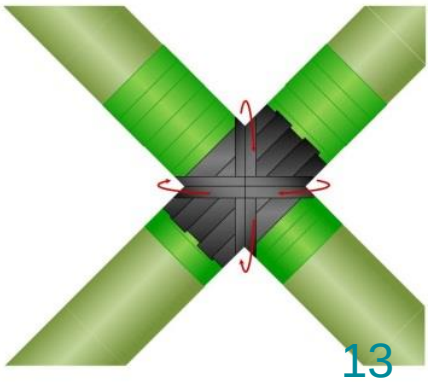
Always use approved and certified holiday test equipment.


11

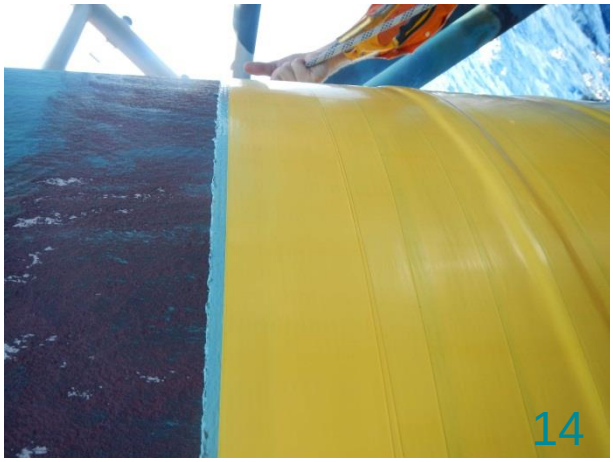
Apply strips of Outerwrap over the center of the X-Knot until the area covered is wider than the pipe diameter. Outerwrap should be applied with an overlap of at least 50%.

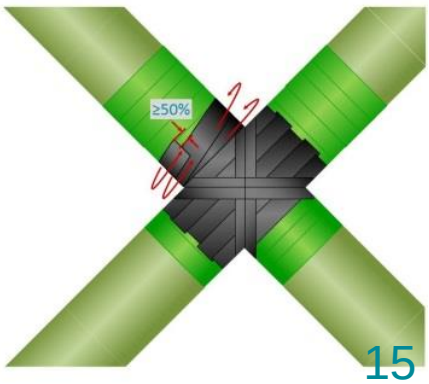

12

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

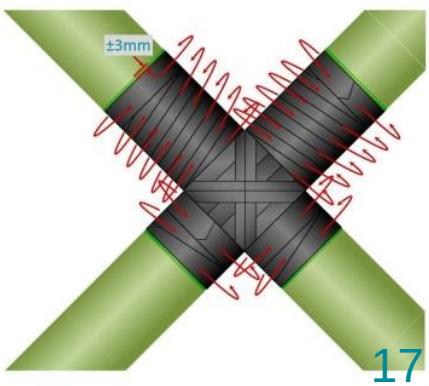


Apply strips of Outerwrap with tension through the corners of the X-Knot.

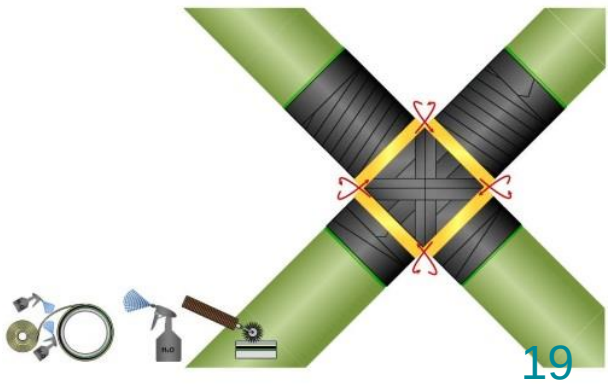




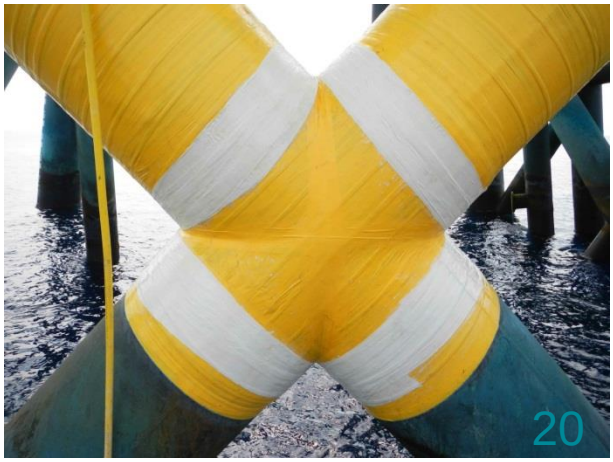
Start spiral wrap application of Outerwrap adjacent to the previously applied Outerwrap on the X-Knot. Side by side overlap should be at least 50%.



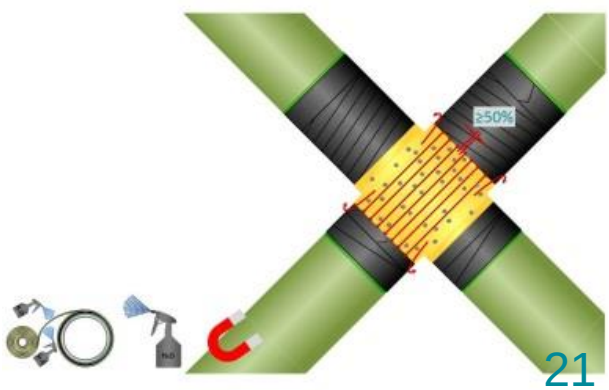
Continue application until the entire area is covered with Outerwrap. keep 3mm of Wrappingband visible.



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.

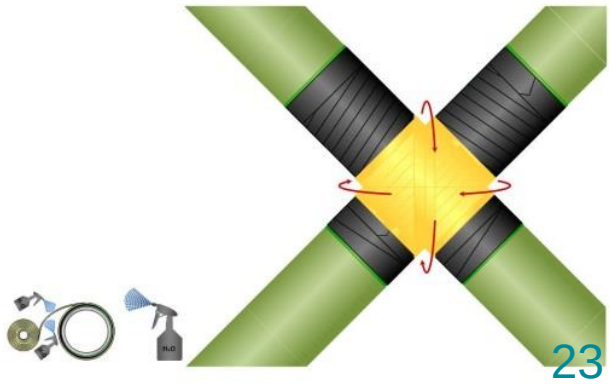


Wrap compression foil after every roll of Outerglass Shield. Perforate the foil and remove after initial curing has completed.

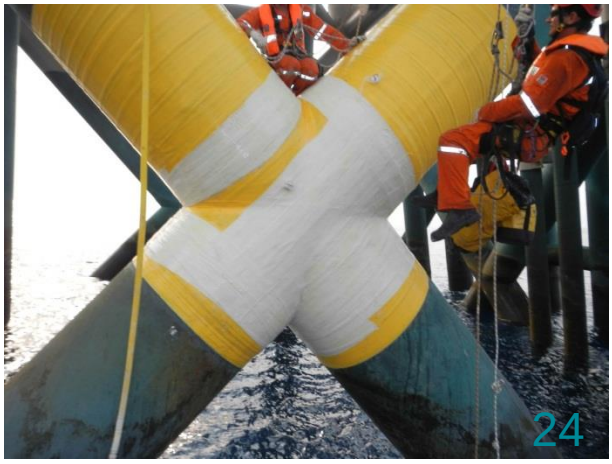


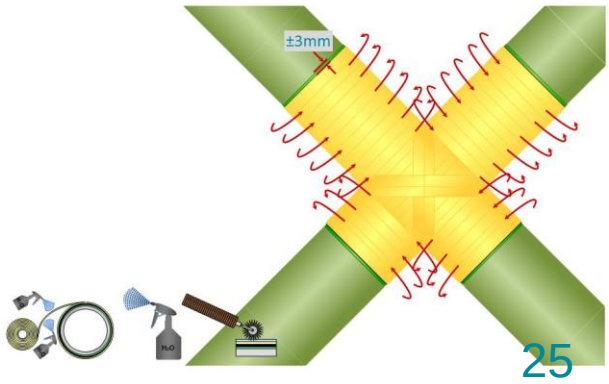
Apply strips of Outerglass Shield over the X-knot with a minimum overlap of 50%. Cover the entire area in-between the previous applied straight wraps of Outerglass Shield.

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



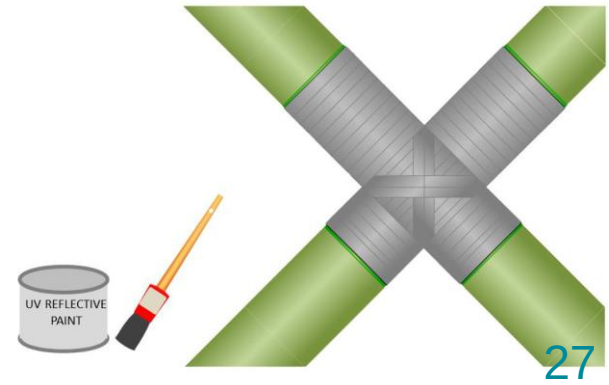
Apply strips of Outerwrap with tension through the corners of the X-Knot. Apply and perforate compression foil. Remove compression foil after initial curing time. Continuous wetting of Outerglass Shield is required.





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

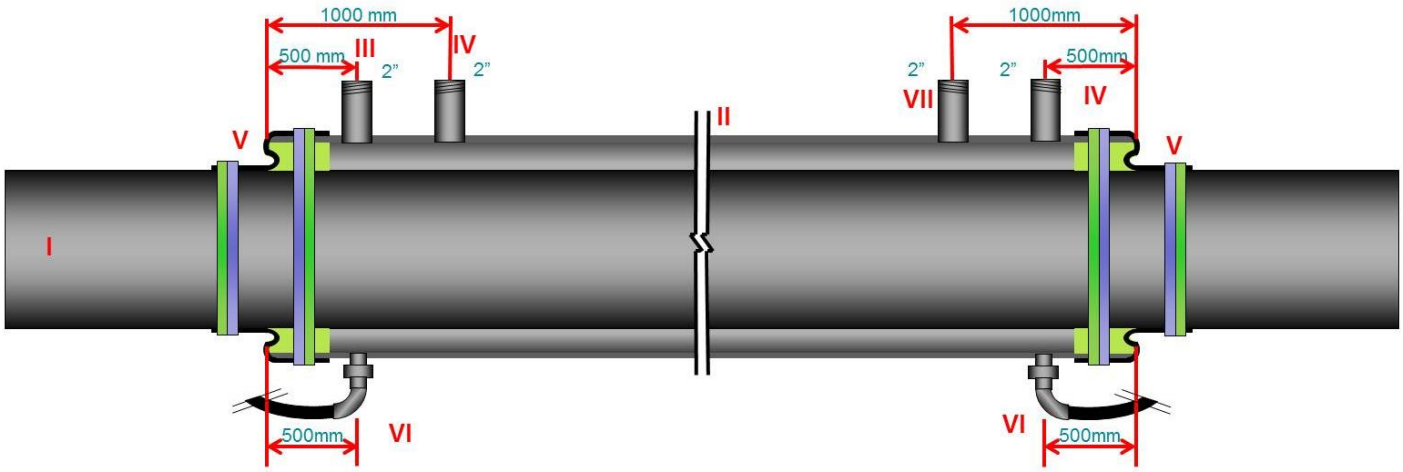
Jobsite accessibility

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

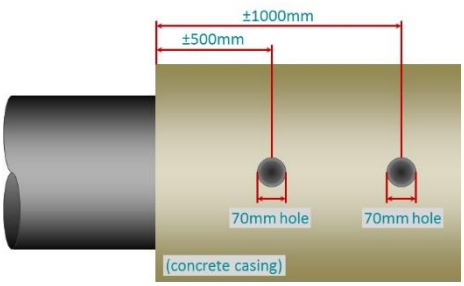
The casing must be completely clean and dry prior to the installation of the 4100 Putty and end seals. If some water remains in the casing, it has to be reported to Seal For Life Technologies & Services B.V. It might be necessary to install drains. The installation of the 4100 Putty and end seals has 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.



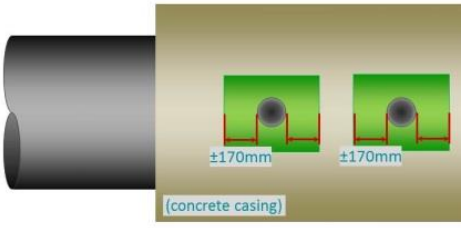
(upper view)

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.



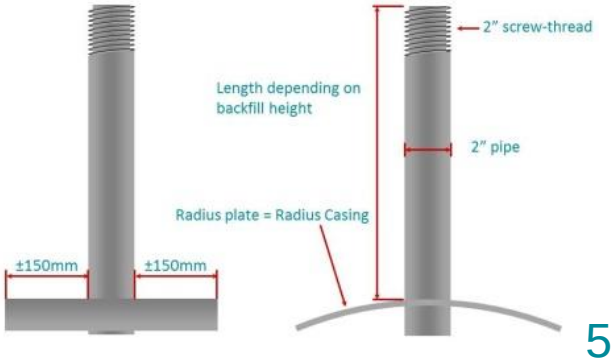
(upper view)

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

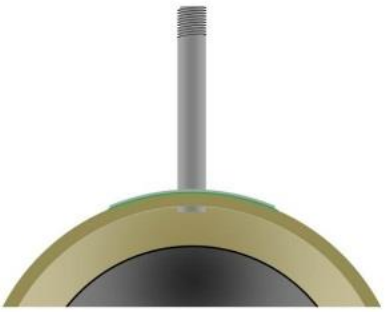


5

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.

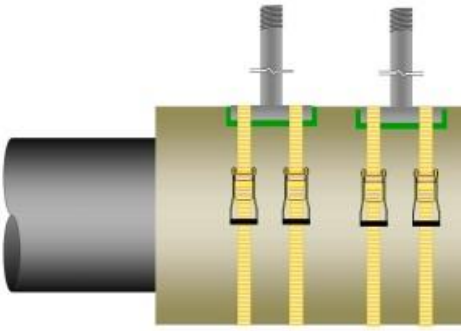


(front view)

7

Mount the installation pipes in the holes.

8

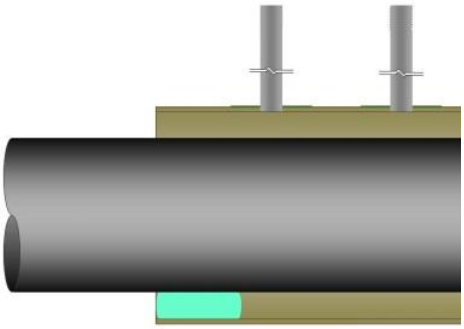


(side view)

9

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

10

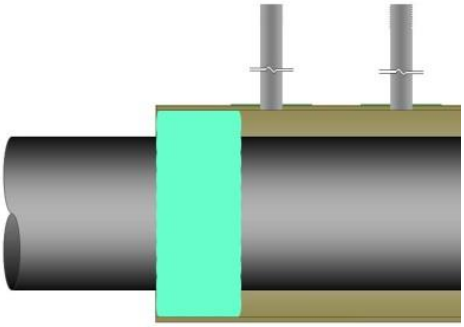


(side view, section casing)

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

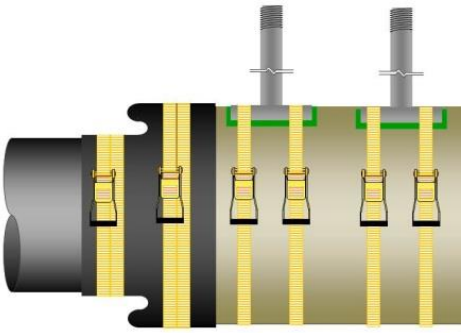


(side view, section casing)

13

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

14

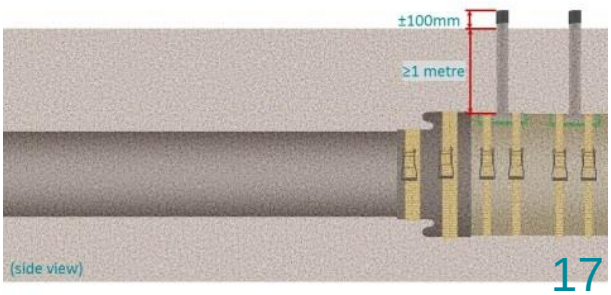


(side view)

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
9501 JX Stadskanaal, The Netherlands
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

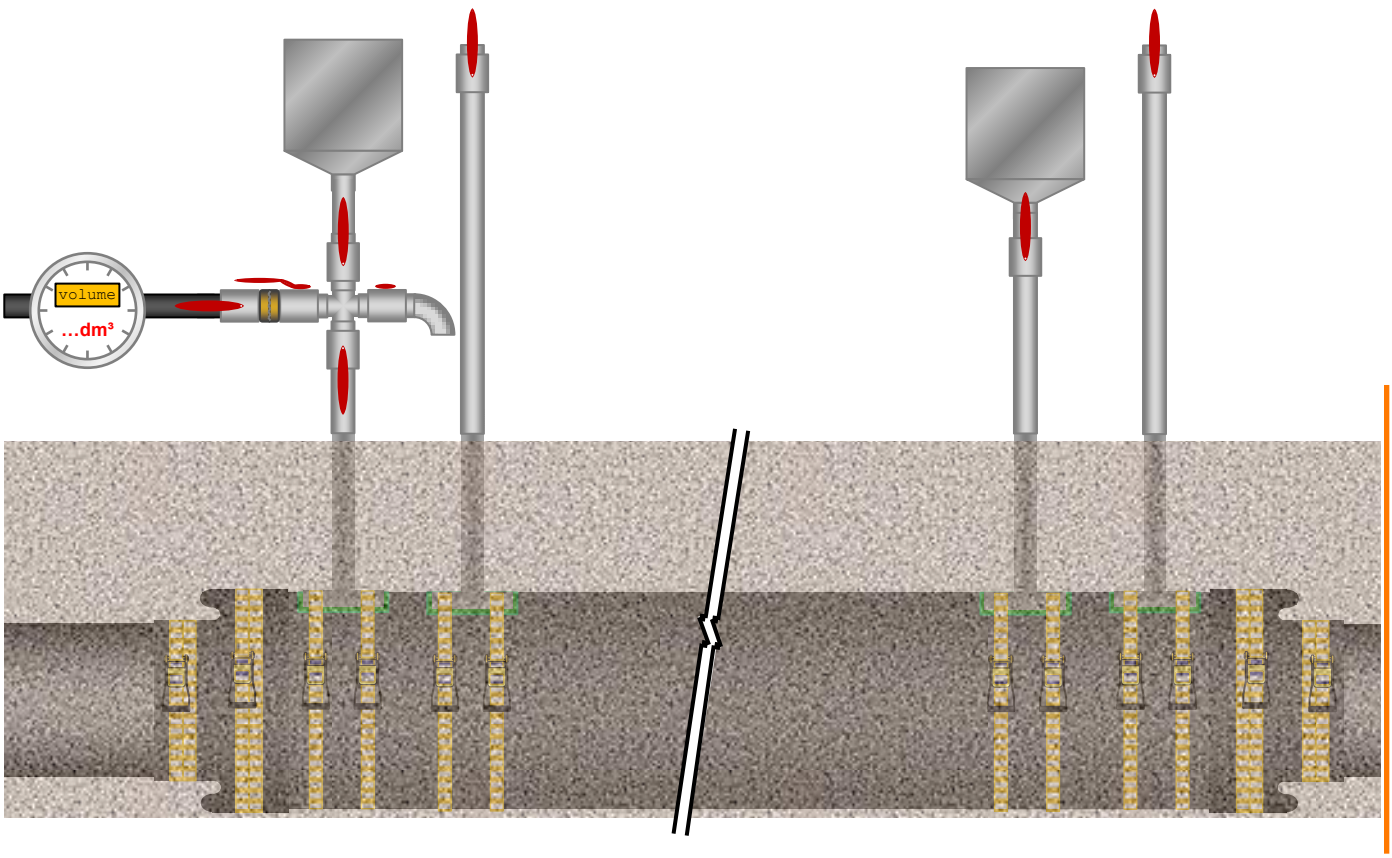
STOPAQ inspector:	Name:	
	Signature:	
Client:	Name:	
	Signature:	
Remarks:		

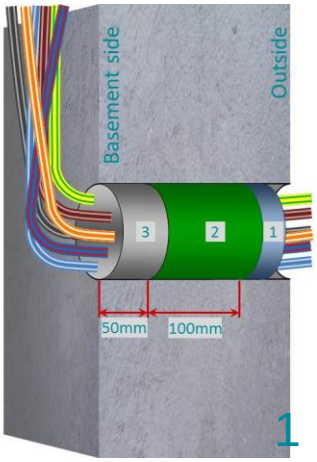
INSERT FORM AT THIS SIDE

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.





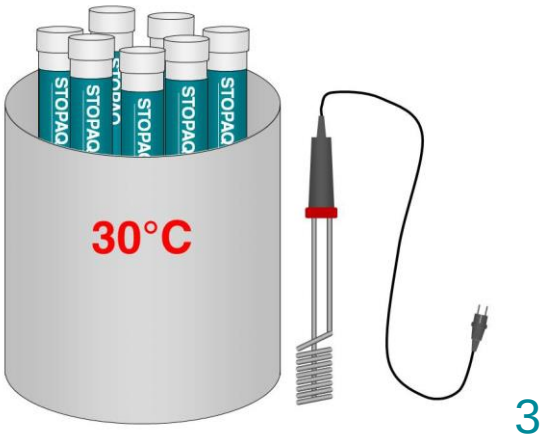
1

The complete system:

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


2

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

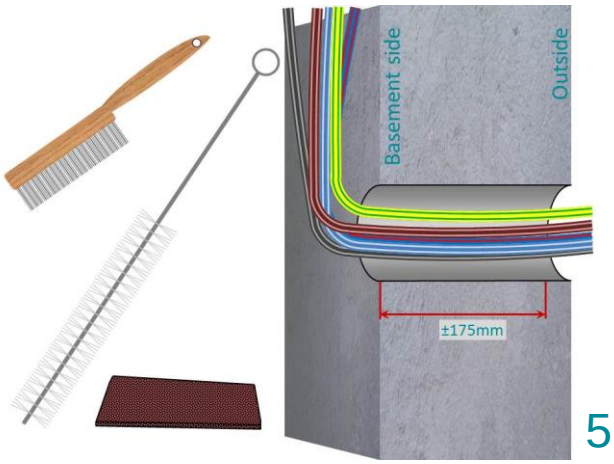


3

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


4

…

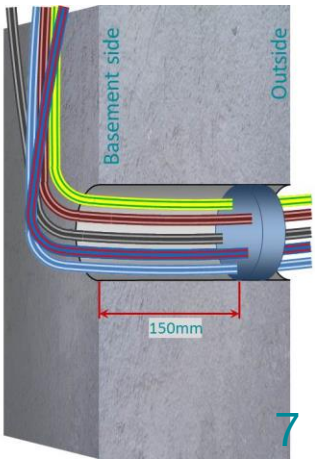


5

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.

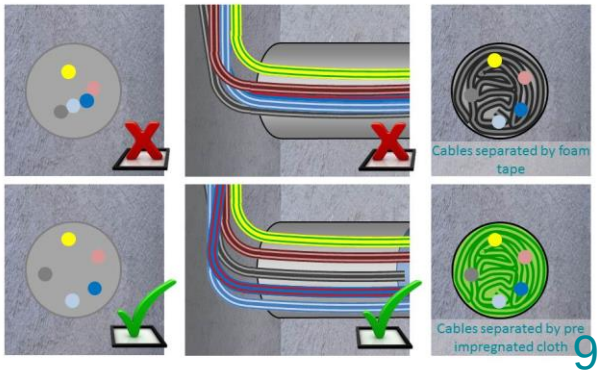

6

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



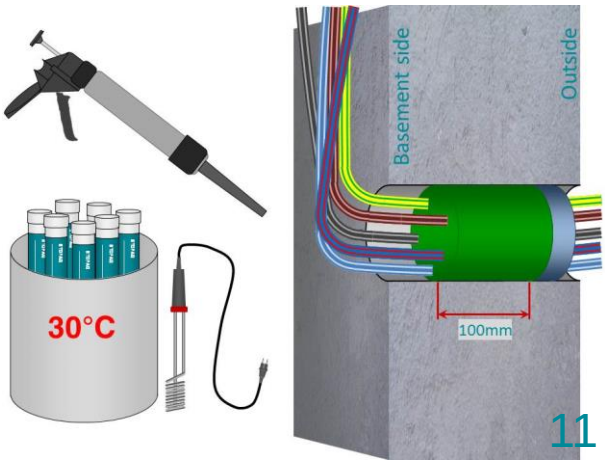
Insert barrier at a depth of 150mm into the duct.

…

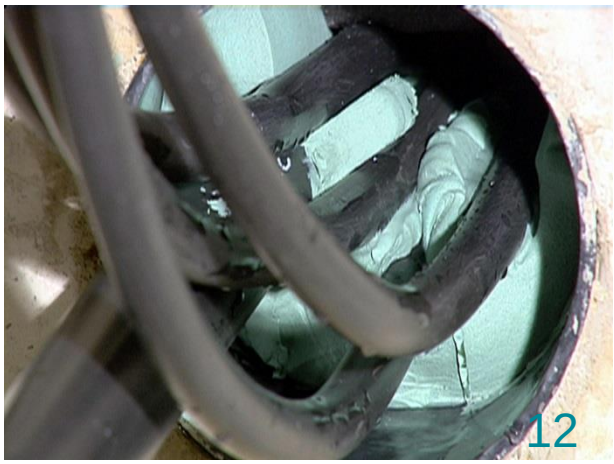


Separate the cables from each other.

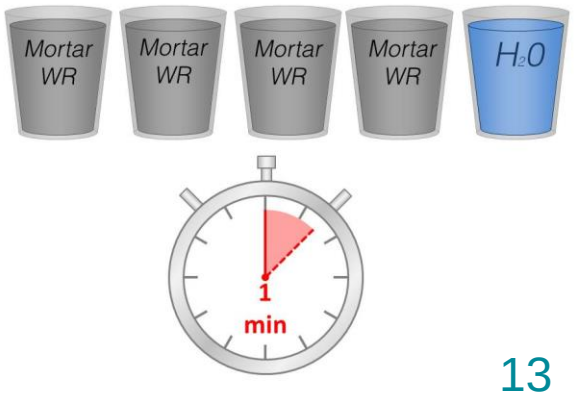
…



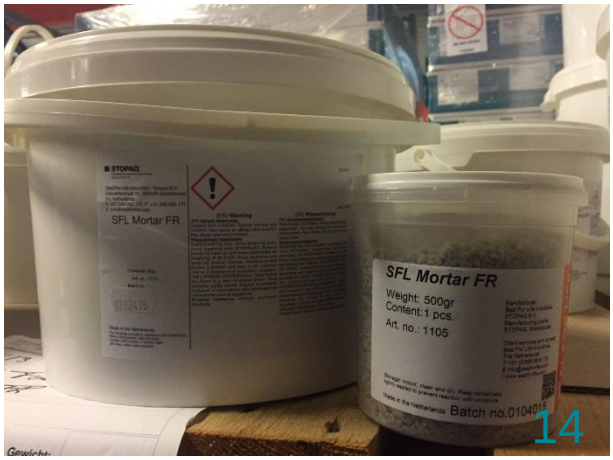
Apply 100mm of 2100 Aquastop and avoid air inclusions. Work from inside out to prevent air-inclusions.



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



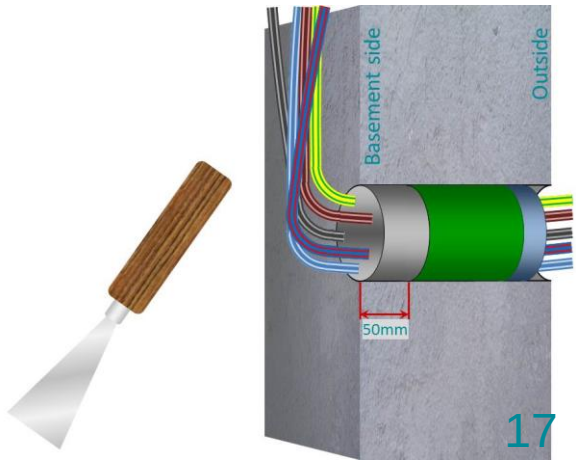
Prepare Mortar WR to a mouldable mass.
Mixing ratio by volume, mixing time 1 minute:
4 parts Mortar WR and 1 part of Water.



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

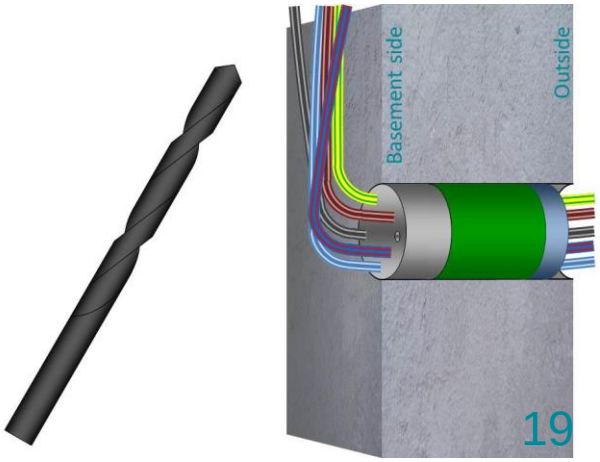
Mixing ratio by weight, mixing time 3-5 minutes:
1 kg Mortar FR and 0,6 – 0,8 litres of water
Mixing ratio by volume, mixing time 3-5 minutes:
2 – 4 parts Mortar FR and 1 part of Water.

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.



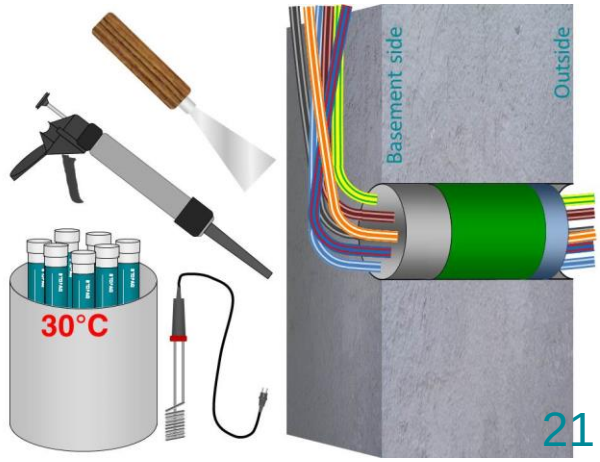
Clean the remaining 50mm of the duct from any 2100 Aquastop prior to the installation of Mortar FR or WR.
Apply Mortar in the remaining 50mm of the duct.

Start at the bottom between the cables.



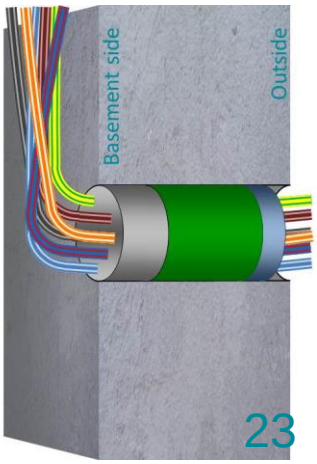
If an extra cable has to be fitted into the duct, drill a hole with a diameter that is larger than the cable.

…



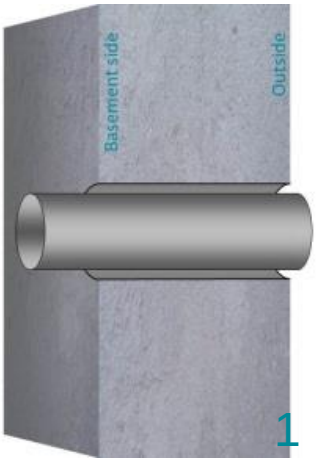
Insert the cable and apply 2100 Aquastop, Mortar WR or FR and smoothen the surface with a putty knife.

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



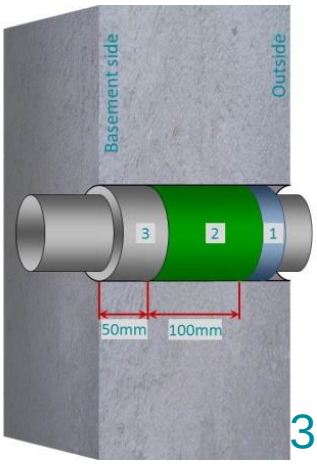
…

…



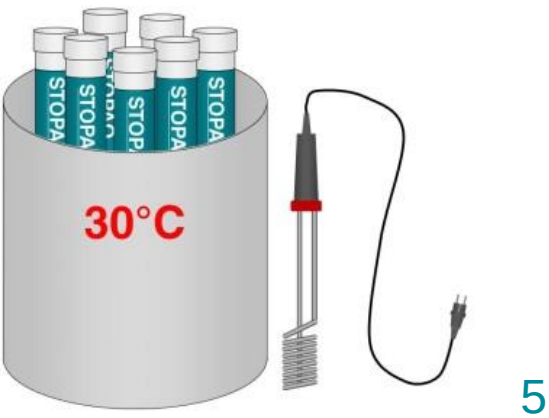
Duct to be sealed with a barrier, 2100 Aquastop and Stopaq Mortar FR or WR.

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



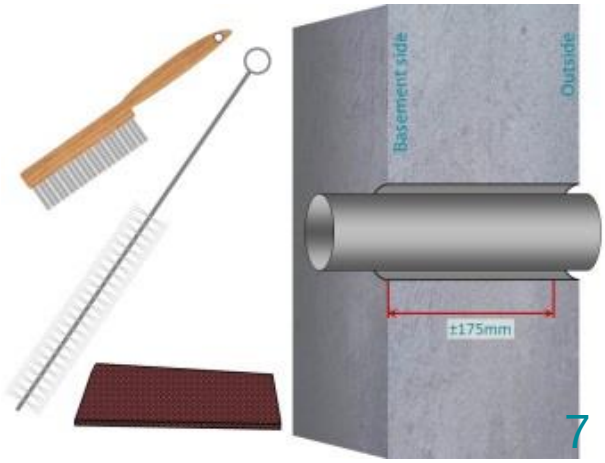
The complete system:
1. Barrier
2. Stopaq 2100 Aquastop, 100mm
3. Mortar, 50mm

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



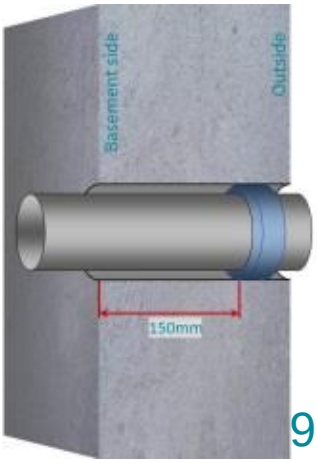
Preheat the 2100 Aquastop up to a temperature 30°C. A bucket of water and a water heating coil can be used.

…



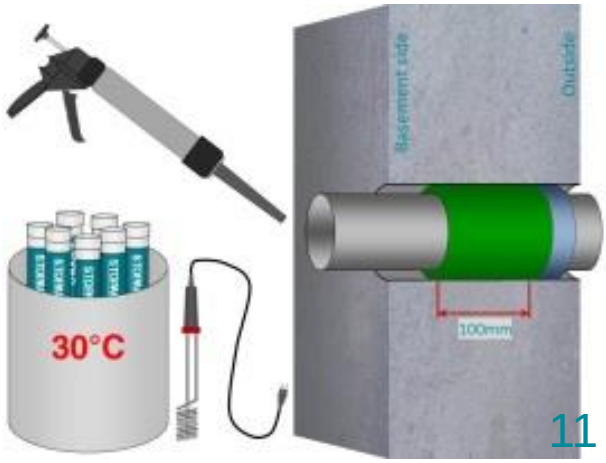
Clean the duct with a brush, cleaning pad or similar equipment. Total length approx. 175mm. Rinse with clean water is allowed as 2100 Aquastop can be applied on a wet surface.

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



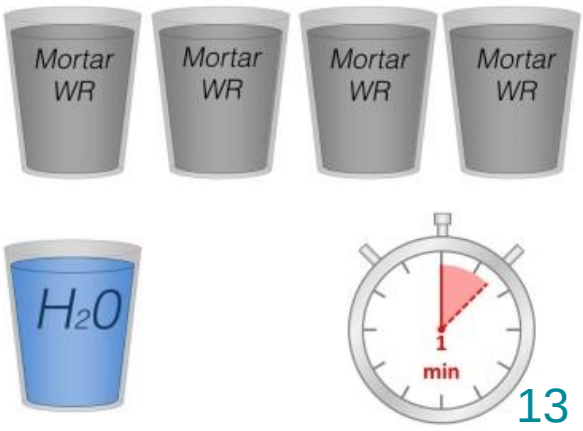
Insert barrier, at a depth of 150mm into the duct.

…

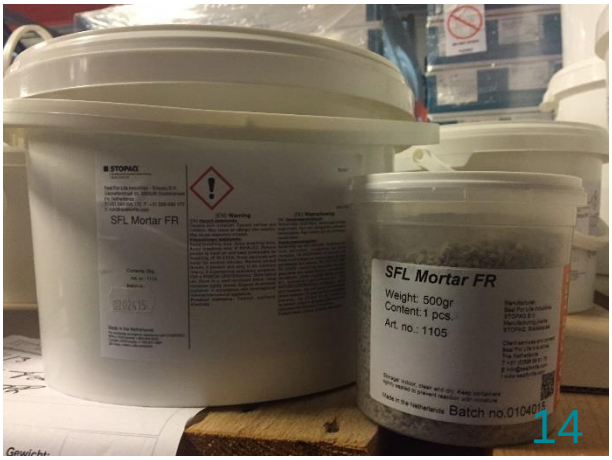


Apply 100mm of 2100 Aquastop and avoid air inclusions. Work from inside out to prevent air-inclusions.

…



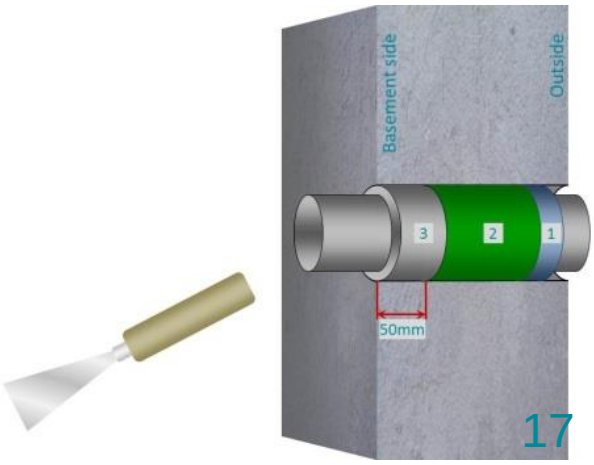
Prepare Mortar WR to a mouldable mass.
Mixing ratio by volume, mixing time 1 minute:
4 parts Mortar WR and 1 part of Water.



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.

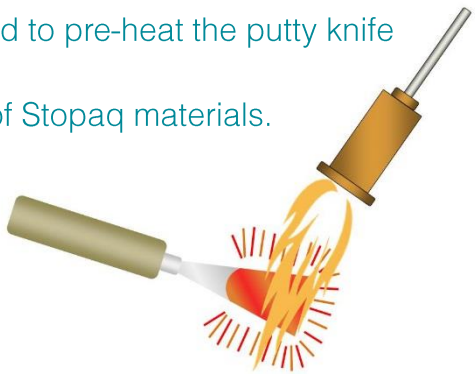
Removal of Stopaq materials with an oscillating tool

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.

Stopaq FAST GRE and SPE

Stopaq FAST GRE and FAST SPE are pipeline coating systems that are used in pipe coating mills (factory applied) or in mobile coating plants on the job-site (field applied). Stopaq FAST GRE and FAST SPE comprises two different layers:

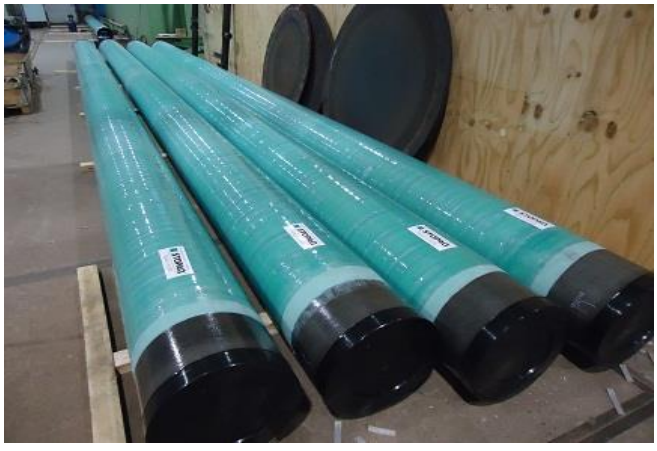
- Corrosion preventing polymer compound, consisting of a cold-applied, non-crosslinked, non-crystalline, monolithic viscous polymer based, prefabricated wrap coating with cold flow, self-healing properties.

- FAST GRE: Mechanical protective outer layer consisting of multiple layers of Glass fibre Reinforced Epoxy coating.

  The tough outer layer (GRE) protects pipelines during transportation and installation thereby reducing costly repairs. It also provides protection against shear forces, chemicals and abrasive soil conditions.

- FAST SPE: Mechanical protective outer layer comprising two layers of a thick-walled, radiation-cross-linked, high density polyethylene, with a high performance copolymer adhesive.

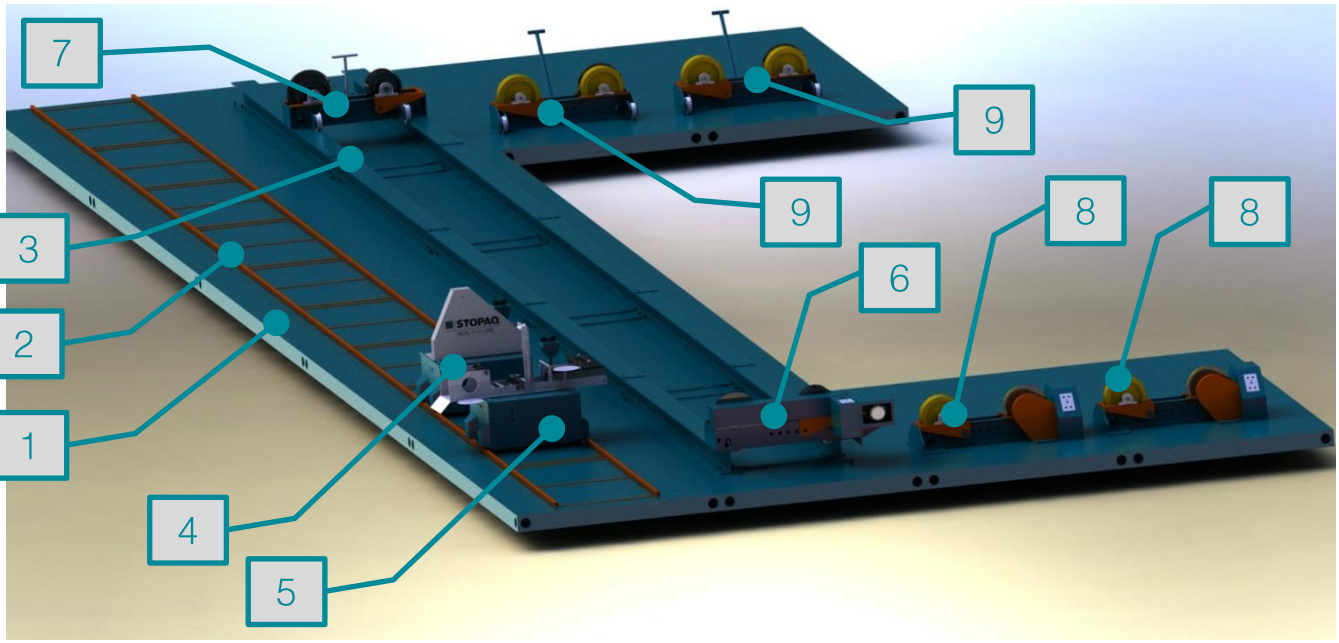
  The tough outer layer (HDPE) protects pipelines during transportation and installation thereby reducing costly repairs. . It also provides protection against shear forces, chemicals and abrasive soil conditions.



STOPAQ FAST GRE

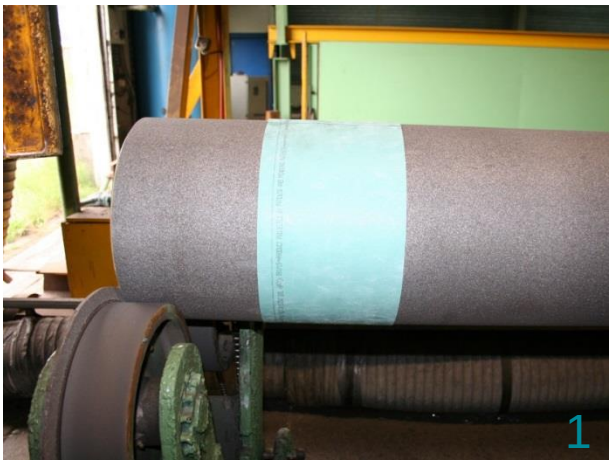
STOPAQ FAST SPE

The set-up



1) Skids
2) Rails
3) Beams
4) Stopaq Basecoat wrapping device
5) FAST GRE Wrapping device
6) Fixed application roller bench
7) Moveable application roller bench
8) Fixed curing station roller bench
9) Moveable curing station roller bench

Stopaq FAST GRE and SPE coating system manufacturing plants are available on various continents, but mobile coating equipment is also available for application at the job-site. For more information please contact Stopaq B.V.



After surface preparation, straight wraps of Stopaq FAST Basecoat GRE shall be applied at both sides of the pipe, minimum 200mm from the pipe end.

Depending on pipeline diameter, the angle of the FAST Basecoat Wrapping Device must be adjusted to ensure a minimum 10mm side-by-side overlap.

The overlap can be adjusted by changing the travel speed of the FAST Basecoat Wrapping Device. New rolls shall be installed with a minimum circumferential overlap of 50mm.

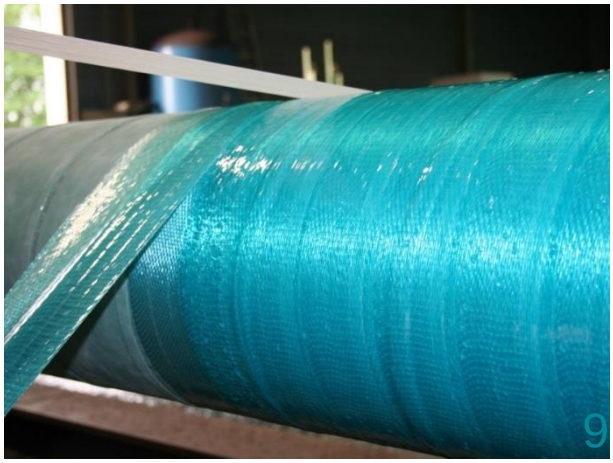
Continue until overlapping on the straight wrap FAST Basecoat and the entire area has been achieved. Conduct holiday test at 10kV with a brush probe.

Mix the POWERCRETE parts A, B and C with the pigments as per the mixing ratio's given in the PDS to ensure the best performance. Pour the mixed epoxy in the FAST GRE Wrapping Device.

Pull the impregnated GAST GRE Fabric through the GRE Wrapping Device and place it on the FAST Basecoat GRE.

Remove the non-impregnated part of the FAST GRE Fabric and start wrapping. Overlap according project requirements.

Depending on pipeline diameter, the angle of the FAST GRE Wrapping Device must be adjusted to ensure the needed overlap.



STOPAQ FAST GRE Surface Veil is the outer layer of the STOPAQ FAST GRE System.

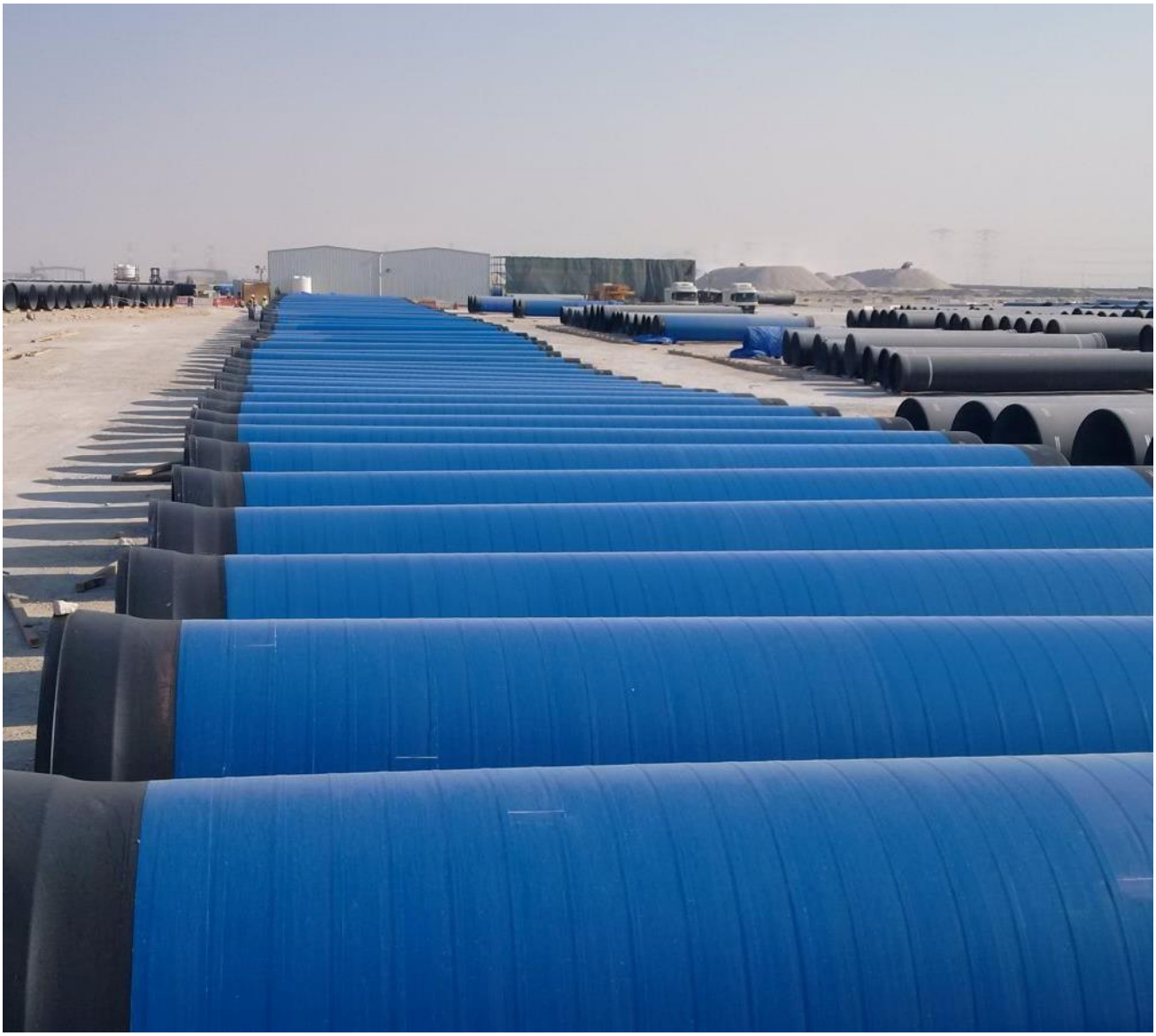
The FAST GRE Wrapping Device shall be placed perpendicular to the pipe before the final wraps are applied. Number of layers as per specification.

Immediately after finishing the physical application, start rotation of the pipe to avoid sagging of the un-cured epoxy.

To ensure a smooth finish of the surface flaming of the surface of the applied coating system might be considered. This can be carried out by means of a propane gas torch just before pipe handling to the curing station (force cure).

SYNERGYQ DUCTILE IRON WRAPPING TAPE 53

SynergyQ® Ductile Iron Wrapping Tape is a corrosion preventing wrapping tape comprising a flexible backing made of PE and a non-crosslinked, non-crystalline, low-viscosity polyolefin based corrosion preventing compound. SynergyQ® Ductile Iron Wrapping Tape is a primer-free, cold-applied, non-toxic wrapping tape adhering very well to Ductile Iron and Plant Coatings like PE and Epoxies. The corrosion preventing polymer compound is viscous within the indicated operating temperatures and, due to its liquid-like nature, flows into the finest pores of the substrate. Due to the sealing characteristics of the compound, tenting and bridging in application is avoided, and spiral corrosion will not occur. The compound does not cure and is unable to build up internal stress. SynergyQ® Ductile Iron Wrapping Tape is fully resistant to water and has a very low gas- and water vapour permeability, thereby also ruling out the risk of corrosion caused by osmotic phenomena e.g. as caused by salt residues present on the substrate. The application can be done manually, with the use of a wrapping tool or automated with the Wrappingmachine,



1

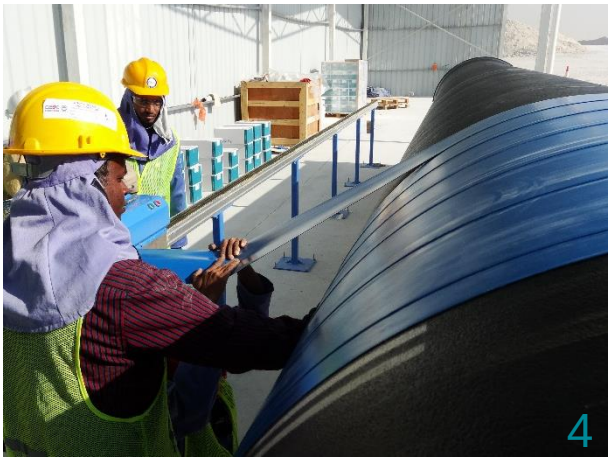
Ensure a proper surface preparation prior to the application of SynergyQ® Ductile Iron Wrapping Tape

2

Always work in a clean environment

3

Start with a straight circumferential wrap

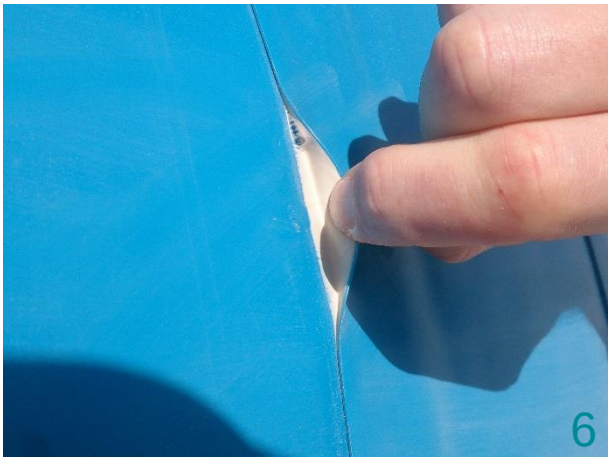


4

SynergyQ® Ductile Iron Wrapping Tape shall be applied with tension

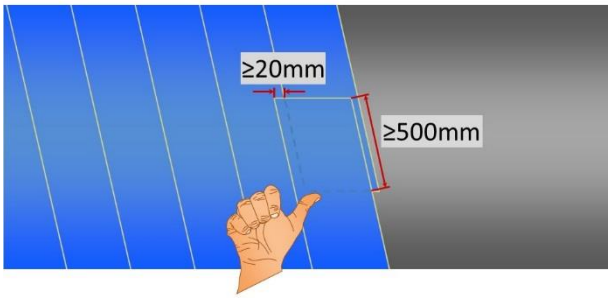
5

Continue application of SynergyQ® Ductile Iron Wrapping Tape by means of spiral wrap with a minimum overlap of 10mm



6

Check the overlap of SynergyQ® Ductile Iron Wrapping Tape at the overlap on a regular basis

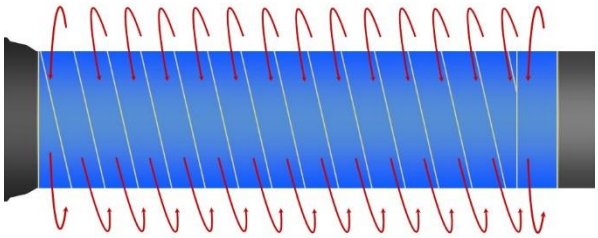


7

When applying a new roll, start minimum 20mm sideways outside the edge of the previous wrap. Consecutive overlap 500mm

8

Continue until the entire pipe is covered with SynergyQ® Ductile Iron Wrapping Tape



9

Finish with a straight circumferential wrap

10

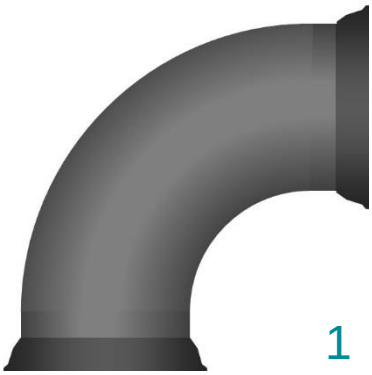
Apply the last approx. 500mm of the SynergyQ® Ductile Iron Wrapping Tape without tension and firmly press the material onto the substrate

11

Check quality according specific instructions after application of SynergyQ® Ductile Iron Wrapping Tape

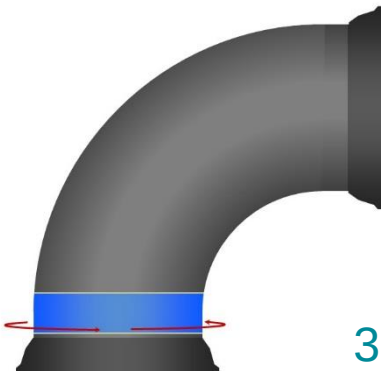
12

Backfill and compact with clean sand and filling material without sharp stones or hard lumps of soil.



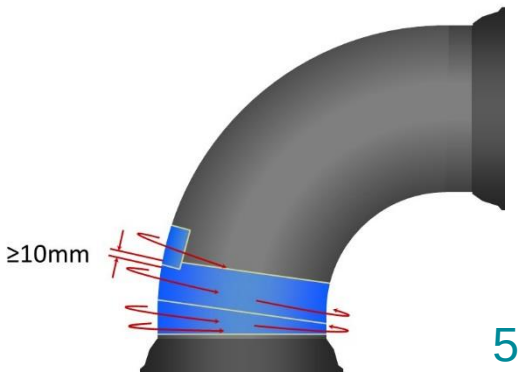
Ensure a proper surface preparation prior to the application of SynergyQ® Ductile Iron Wrapping Tape

Always work in a clean environment



Start with a straight circumferential wrap close to the Bell&Spigot socket

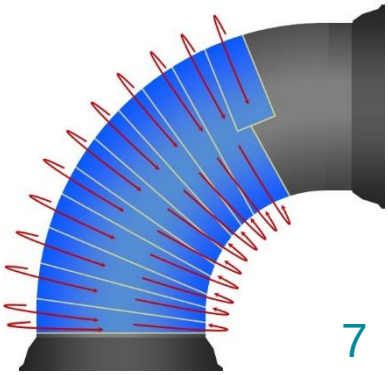
SynergyQ® Ductile Iron Wrapping Tape shall be applied with tension



Continue application of SynergyQ® Ductile Iron Wrapping Tape by means of spiral wrap with a minimum overlap of 10mm on the outside radius of the elbow and towards the centre of the elbow radius.

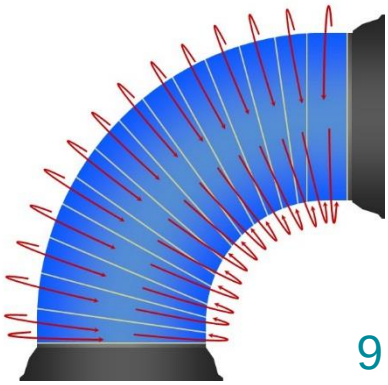
The overlap shall increase on the inside radius of the elbow.

Check the overlap of SynergyQ® Ductile Iron Wrapping Tape at the overlap on a regular basis



Continue until the entire elbow is covered with SynergyQ® Ductile Iron Wrapping Tape

Consecutive overlap when a new roll is used minimum 300mm

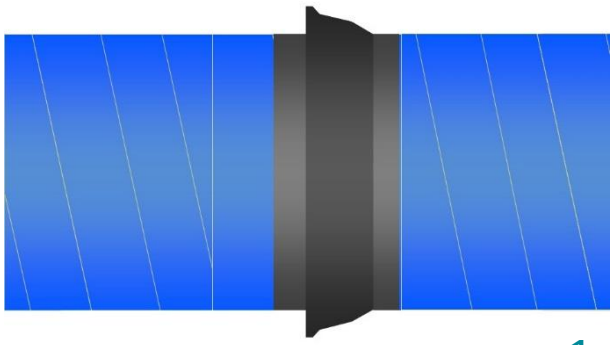


Finish with a straight circumferential wrap

Apply the last part of the SynergyQ® Ductile Iron Wrapping Tape without tension and firmly press the material in the pores of the substrate

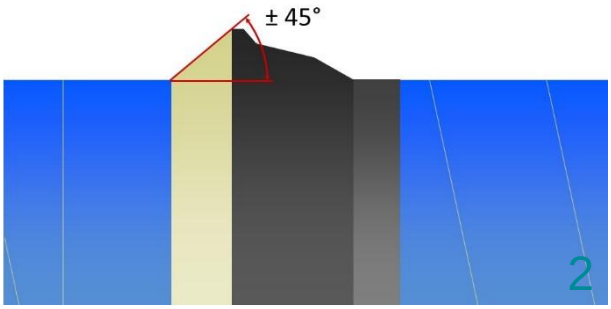
Check quality according specific instructions after application of SynergyQ® Ductile Iron Wrapping Tape

Backfill and compact with clean sand and filling material without sharp stones or hard lumps of soil.



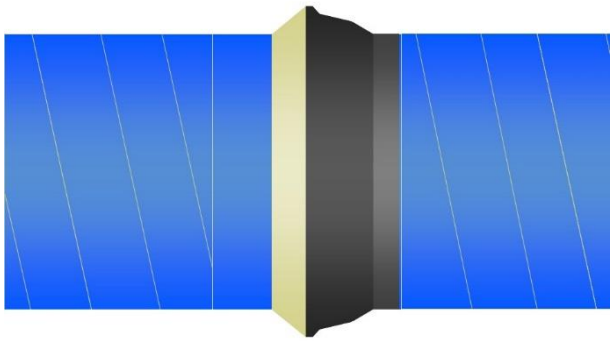
1

Ensure a proper surface preparation prior to the application of SynergyQ® Paste EPS and SynergyQ® Ductile Iron Wrapping Tape. Always work in a clean environment



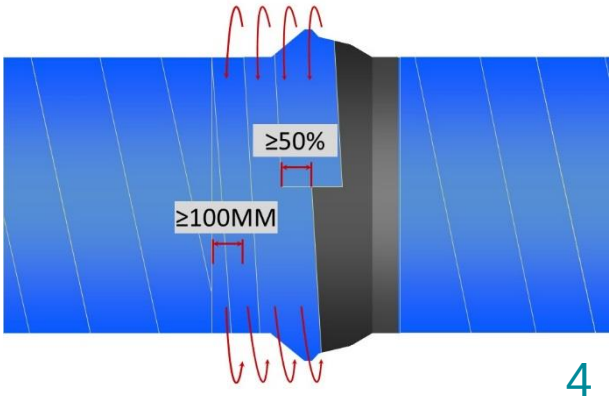
2

SynergyQ® Paste EPS shall be used to bevel the step-down in an angle of approx. 45°. SynergyQ® Paste EPS can be cut to size with a Paste cutter



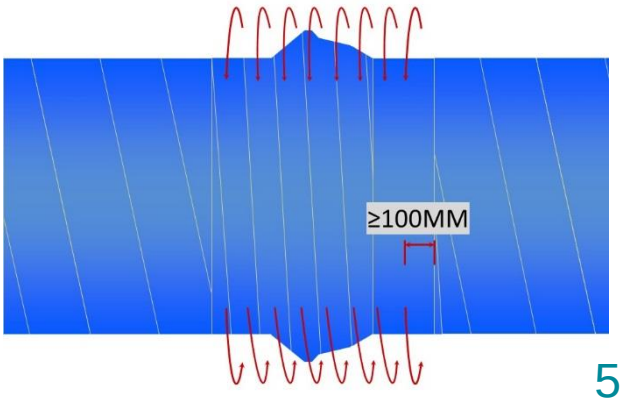
3

Firmly press the Paste in the crevices of the substrate and avoid air enclosures. Stepdown bevelled with SynergyQ® Paste EPS



4

SynergyQ® Ductile Iron Wrapping Tape shall be applied over the entire Bell&Spigot joint. Start minimum 100mm over the existing SynergyQ® Ductile Iron Wrapping Tape with a circumferential wrap and continue by means of spiral wrap with a minimum overlap of 50%. Apply with tension and avoid air enclosures.



5

Continue application until minimum 100m over the existing SynergyQ® Ductile Iron Wrapping Tape. Finish with a circumferential wrap.

6

Check Quality according specific instructions after application of SynergyQ® Paste EPS and SynergyQ® Ductile Iron Wrapping Tape.

WRAPPINGBAND CZ, CZH CZHT AND OUTERWRAP

STOPAQ COATING APPLICATION TEST REPORT	DOCUMENT NUMBER	DATE APPROVED	QR NUMBER	REFERENCE/REMARK
In-Process Inspection of STOPAQ Coating Systems				
PROJECT TITLE	CONTRACTOR / SUBCONTRACTOR			

GENERAL INFORMATION				LOCATION :
DAY	MONTH	YEAR	WEATHER CONDITIONS	OBJECT REFERENCE NO. :
				APPLICATION MANUAL REFERENCE NO. :
REMARKS				

SURFACE PREPARATION				SUPERVISOR : CERT. NO. :
REQUIREMENT	START TIME	END TIME	PASS / FAIL	QC INSPECTOR : CERT. NO. :
☐ Sa2½ ☐ St2-3				CLIENT INSPECTOR : CERT. NO. :
RELATIVE HUMIDITY	AMBIENT TEMP.	SURFACE TEMP.	DEW POINT	APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
REMARKS				

CORROSION PREVENTATIVE LAYER APPLICATION				SUPERVISOR : CERT. NO. :
START TIME	END TIME	DEGREASE ISOPROPANOL (YES / NO)		QC INSPECTOR : CERT. NO. :
		SURFACE CLEANLINESS CHECK (PASS / FAIL)		CLIENT INSPECTOR : CERT. NO. :
MATERIALS USED		MINIMUM 10MM OVERLAP CHECKED		APPLICATOR : CERT. NO. :
STOPAQ WRAPPINGBAND CZ - CZH - CZHT -		TIME	PASS / FAIL	APPLICATOR : CERT. NO. :
SIZE	BATCH NUMBER			APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
HOLIDAY TEST @ 15 KV	PASS / FAIL	ADHESION CHECKED AT (TIME)		
NO AIR INCLUSIONS	PASS / FAIL	RESULT (PASS / FAIL)		
REMARKS				

MECHANICAL PROTECTIVE LAYER APPLICATION				SUPERVISOR : CERT. NO. :
START TIME	END TIME	3MM STOPAQ EXPOSED (YES / NO)		QC INSPECTOR : CERT. NO. :
		APPLIED WITH TENSION (YES / NO)		CLIENT INSPECTOR : CERT. NO. :
MATERIALS USED		MINIMUM 50% OVERLAP CHECKED		APPLICATOR : CERT. NO. :
OUTERWRAP		TIME	PASS / FAIL	APPLICATOR : CERT. NO. :
SIZE	BATCH NUMBER			APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
REMARKS				

POST SERVICE VALIDATION				SYSTEM EXPOSED TO EXCESSIVE LOADS e.g. FROM SUPPORTS AND EQUIPMENT : (YES / NO)
DATE OF APPLICATION	DAY	MONTH	YEAR	BACKFILL WITH CLEAN SAND, WITHOUT AND STONES OR HARD LUMPS OF SOIL : (YES / NO)
				ANY OTHER DAMAGES ON THE SYSTEM BETWEEN APPLICATION AND BACKFILL : (YES / NO)
DATE OF BACKFILL	DAY	MONTH	YEAR	APPLICATOR
REMARKS				

Company :	Company :
Name :	Name :
Function :	Function :
Date :	Date :
Signature :	Signature :

STOPAQ®
Self-healing corrosion prevention & sealant technology
SEALFORLIFE

SEALFORLIFE Industries
A BERRY GLOBAL COMPANY

WRAPPINGBAND CZH, CZHT AND HIGH IMPACT SHIELD (HT)

STOPAQ COATING APPLICATION TEST REPORT	DOCUMENT NUMBER	DATE APPROVED	QR NUMBER	REFERENCE/REMARK
In-Process Inspection of STOPAQ Coating Systems				
PROJECT TITLE	CONTRACTOR / SUBCONTRACTOR			

GENERAL INFORMATION				LOCATION :
DAY	MONTH	YEAR	WEATHER CONDITIONS	OBJECT REFERENCE NO. :
				APPLICATION MANUAL REFERENCE NO. :
REMARKS				

SURFACE PREPARATION				SUPERVISOR : CERT. NO. :
REQUIREMENT ☐ Sa2½ ☐ St2-3	START TIME	END TIME	PASS / FAIL	QC INSPECTOR : CERT. NO. :
				CLIENT INSPECTOR : CERT. NO. :
RELATIVE HUMIDITY	AMBIENT TEMP.	SURFACE TEMP.	DEW POINT	APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
REMARKS				

CORROSION PREVENTATIVE LAYER APPLICATION				SUPERVISOR : CERT. NO. :
START TIME	END TIME	DEGREASE ISOPROPANOL	(YES / NO)	QC INSPECTOR : CERT. NO. :
		SURFACE CLEANLINESS CHECK	(PASS / FAIL)	CLIENT INSPECTOR : CERT. NO. :
MATERIALS USED		PREHEAT TEMPERATURE	°C	APPLICATOR : CERT. NO. :
STOPAQ WRAPPINGBAND		OVERLAP CZH(T) OVER WELD	MM	APPLICATOR : CERT. NO. :
SIZE	BATCH NUMBER	OVERLAP CZH(T) OVER PLANT COATING	MM	APPLICATOR : CERT. NO. :
		CIRCUMFERENTIAL OVERLAP	MM	APPLICATOR : CERT. NO. :
HOLIDAY TEST @ 15 KV	PASS / FAIL	ADHESION CHECKED AT (TIME)		
NO AIR INCLUSIONS	PASS / FAIL	RESULT (PASS / FAIL)		
REMARKS				

MECHANICAL PROTECTIVE LAYER APPLICATION				SUPERVISOR : CERT. NO. :
START TIME	END TIME	TYPE OF FACTORY APPLIED COATING		QC INSPECTOR : CERT. NO. :
		HIS (HT) CENTRAL OVER VELD	(YES / NO)	CLIENT INSPECTOR : CERT. NO. :
MATERIALS USED		HIS (HT) WITH OVER LENGTH WRAPPED	(YES / NO)	APPLICATOR : CERT. NO. :
HIGH IMPACT SHIELD		CLOSURE STRIP APPLIED CORRECT	(YES / NO)	APPLICATOR : CERT. NO. :
SIZE	BATCH NUMBER	HIS (HT) INSTALLED WITHOUT WRINKLES	(YES / NO)	APPLICATOR : CERT. NO. :
		AIR INCLUSIONS IN HIS (HT)	(YES / NO)	APPLICATOR : CERT. NO. :
CLOSURE STRIP		ADHESIVE VISIBLE AT BOTH EXTREMITIES	(YES / NO)	PATTERN IN HIS(HT) DISAPPEARED WHERE HIS DIRECT ON PLANT COATING (YES / NO)
		ANY VISUAL DAMAGES IN HIS (HT)	(YES / NO)	PATTERN IN HIS(HT) VISIBLE WHERE HIS IS COVERING WRAPPINGBAND CZH(T) (YES / NO)
REMARKS				

EXTRA MECHANICAL PROTECTIVE LAYER i.e. OUTERGLASS SHIELD XT / POLYESTER - SPECIFIC ITP SHALL BE USED

POST SERVICE VALIDATION (I.A.)				SYSTEM EXPOSED TO EXCESSIVE LOADS e.g. FROM SUPPORTS AND EQUIPMENT (YES / NO)
DATE OF APPLICATION	DAY	MONTH	YEAR	BACKFILL WITH CLEAN SAND, WITHOUT AND STONES OR HARD LUMPS OF SOIL (YES / NO)
				ANY OTHER DAMAGES ON THE SYSTEM BETWEEN APPLICATION AND BACKFILL (YES / NO)
DATE OF BACKFILL	DAY	MONTH	YEAR	APPLICATOR
REMARKS				

Company :	Company :
Name :	Name :
Function :	Function :
Date :	Date :
Signature :	Signature :

STOPAQ®
Self-healing corrosion prevention & sealant technology
SEALFORLIFE

SEALFORLIFE Industries
A BERRY GLOBAL COMPANY

WRAPPINGBAND CL AND OUTERWRAP

STOPAQ COATING APPLICATION TEST REPORT	DOCUMENT NUMBER	DATE APPROVED	QR NUMBER	REFERENCE/REMARK
In-Process Inspection of STOPAQ Coating Systems				
PROJECT TITLE	CONTRACTOR / SUBCONTRACTOR			

GENERAL INFORMATION				LOCATION :
DAY	MONTH	YEAR	WEATHER CONDITIONS	OBJECT REFERENCE NO. :
				APPLICATION MANUAL REFERENCE NO. :
REMARKS				

SURFACE PREPARATION				SUPERVISOR : CERT. NO. :
REQUIREMENT ☐ Sa2½ ☐ St2-3	START TIME	END TIME	PASS / FAIL	QC INSPECTOR : CERT. NO. :
				CLIENT INSPECTOR : CERT. NO. :
RELATIVE HUMIDITY	AMBIENT TEMP.	SURFACE TEMP.	DEW POINT	APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
REMARKS				

CORROSION PREVENTATIVE LAYER APPLICATION				SUPERVISOR : CERT. NO. :
START TIME	END TIME	MATERIAL TEMPERATURE °C		QC INSPECTOR : CERT. NO. :
		APPLIED WITH TENSION (YES / NO)		CLIENT INSPECTOR : CERT. NO. :
MATERIALS USED		MINIMUM 10MM OVERLAP CHECKED		APPLICATOR : CERT. NO. :
STOPAQ WRAPPINGBAND CL		TIME	PASS / FAIL	APPLICATOR : CERT. NO. :
SIZE	BATCH NUMBER			APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
VISUAL INSPECTION	PASS / FAIL	MIN. WATER INCLUSIONS	PASS / FAIL	APPLICATOR : CERT. NO. :
REMARKS				

MECHANICAL PROTECTIVE LAYER APPLICATION				SUPERVISOR : CERT. NO. :
START TIME	END TIME	CL ENCAPSULATED (YES / NO)		QC INSPECTOR : CERT. NO. :
		APPLIED WITH TENSION (YES / NO)		CLIENT INSPECTOR : CERT. NO. :
MATERIALS USED		MINIMUM 50% OVERLAP CHECKED		APPLICATOR : CERT. NO. :
OUTERWRAP		TIME	PASS / FAIL	APPLICATOR : CERT. NO. :
SIZE	BATCH NUMBER			APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
REMARKS				

EXTRA MECHANICAL PROTECTIVE LAYER i.e. OUTERGLASS SHIELD XT - SPECIFIC ITP SHALL BE USED

POST SERVICE VALIDATION (I.A.)				SYSTEM EXPOSED TO EXCESSIVE LOADS e.g. FROM SUPPORTS AND EQUIPMENT : (YES / NO)
DATE OF APPLICATION	DAY	MONTH	YEAR	BACKFILL WITH CLEAN SAND, WITHOUT AND STONES OR HARD LUMPS OF SOIL : (YES / NO)
				ANY OTHER DAMAGES ON THE SYSTEM BETWEEN APPLICATION AND BACKFILL : (YES / NO)
DATE OF BACKFILL	DAY	MONTH	YEAR	APPLICATOR
REMARKS				

Company	:	Company	:
Name	:	Name	:
Function	:	Function	:
Date	:	Date	:
Signature	:	Signature	:

WRAPPINGBAND SZ AND INTERMEDIATE / OUTERWRAP

STOPAQ COATING APPLICATION TEST REPORT	DOCUMENT NUMBER	DATE APPROVED	QR NUMBER	REFERENCE/REMARK
In-Process Inspection of STOPAQ Coating Systems				
PROJECT TITLE	CONTRACTOR / SUBCONTRACTOR			

GENERAL INFORMATION				LOCATION :
DAY	MONTH	YEAR	WEATHER CONDITIONS	OBJECT REFERENCE NO. :
				APPLICATION MANUAL REFERENCE NO. :
REMARKS				

SURFACE PREPARATION				SUPERVISOR : CERT. NO. :
REQUIREMENT ☐ Sa2½ ☐ St2-3	START TIME	END TIME	PASS / FAIL	QC INSPECTOR : CERT. NO. :
				CLIENT INSPECTOR : CERT. NO. :
BIOL. GROWTH REMOVED	WATER TEMP.	SALT OR STILL WATER	BARE METAL RINGS (I.A.)	APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
REMARKS				

CORROSION PREVENTATIVE LAYER APPLICATION				SUPERVISOR : CERT. NO. :
START TIME	END TIME	MATERIAL TEMPERATURE °C		QC INSPECTOR : CERT. NO. :
		APPLIED WITH TENSION (YES / NO)		CLIENT INSPECTOR : CERT. NO. :
MATERIALS USED		MINIMUM 50% OVERLAP CHECKED		APPLICATOR : CERT. NO. :
STOPAQ WRAPPINGBAND SZ		TIME	PASS / FAIL	APPLICATOR : CERT. NO. :
SIZE	BATCH NUMBER			APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
VISUAL INSPECTION	PASS / FAIL	MIN. WATER INCLUSIONS	PASS / FAIL	APPLICATOR : CERT. NO. :
REMARKS				

MECHANICAL PROTECTIVE LAYER APPLICATION				SUPERVISOR : CERT. NO. :
START TIME	END TIME	WRAPPINGBAND SZ INCAPSULATED (YES / NO)		QC INSPECTOR : CERT. NO. :
		APPLIED WITH TENSION (YES / NO)		CLIENT INSPECTOR : CERT. NO. :
MATERIALS USED		MINIMUM 50% OVERLAP CHECKED		APPLICATOR : CERT. NO. :
INTERMEDIATE/OUTER WRAP		TIME	PASS / FAIL	APPLICATOR : CERT. NO. :
SIZE	BATCH NUMBER			APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
				APPLICATOR : CERT. NO. :
REMARKS				

EXTRA MECHANICAL PROTECTIVE LAYER i.e. OUTERGLASS SHIELD XT - SPECIFIC ITP SHALL BE USED

POST SERVICE VALIDATION (I.A.)				SYSTEM EXPOSED TO EXCESSIVE LOADS e.g. FROM SUPPORTS AND EQUIPMENT : (YES / NO)
DATE OF APPLICATION	DAY	MONTH	YEAR	BACKFILL WITH CLEAN SAND, WITHOUT AND STONES OR HARD LUMPS OF SOIL : (YES / NO)
				ANY OTHER DAMAGES ON THE SYSTEM BETWEEN APPLICATION AND BACKFILL : (YES / NO)
DATE OF BACKFILL	DAY	MONTH	YEAR	APPLICATOR
REMARKS				

Company :	Company :
Name :	Name :
Function :	Function :
Date :	Date :
Signature :	Signature :

STOPAQ®
Self-healing corrosion prevention & sealant technology
SEALFORLIFE

SEALFORLIFE Industries
A BERRY GLOBAL COMPANY

OUTERGLASS SHIELD XT

STOPAQ COATING APPLICATION TEST REPORT	DOCUMENT NUMBER	DATE APPROVED	QR NUMBER	REFERENCE/REMARK
In-Process Inspection of STOPAQ Coating Systems				
PROJECT TITLE	CONTRACTOR / SUBCONTRACTOR			

GENERAL INFORMATION				LOCATION :
DAY	MONTH	YEAR	WEATHER CONDITIONS	OBJECT REFERENCE NO. :
				APPLICATION MANUAL REFERENCE NO. :
REMARKS				

CORROSION PREVENTATIVE LAYER APPLICATION				SUPERVISOR : CERT. NO. :
APPLICATION DATE	APPLICATION APPROVED?	DOCUMENT NUMBER	QR NUMBER	QC INSPECTOR : CERT. NO. :
				CLIENT INSPECTOR : CERT. NO. :
REMARKS				

MECHANICAL PROTECTIVE LAYER APPLICATION				SUPERVISOR : CERT. NO. :
APPLICATION DATE	APPLICATION APPROVED?	DOCUMENT NUMBER	QR NUMBER	QC INSPECTOR : CERT. NO. :
				CLIENT INSPECTOR : CERT. NO. :
REMARKS				

OUTERGLASS SHIELD XT APPLICATION				SUPERVISOR : CERT. NO. :	
START TIME	END TIME	Outerglass Shield XT, Compression foil and Perforation roller available	(YES / NO)	QC INSPECTOR : CERT. NO. :	
		SDS and PDS consulted for appropriate personal safety measures etc.	(YES / NO)	CLIENT INSPECTOR : CERT. NO. :	
MATERIALS USED		Pouches opened one at a time and just prior to application	(YES / NO)	APPLICATOR : CERT. NO. :	
OUTERGLASS SHIELD XT		Continuous wetting of Outerglass Shield XT during "dry" applications	(YES / NO)	APPLICATOR : CERT. NO. :	
BATCH NUMBER	SIZE + EXP. DATE	Compression foil applied well within curing time of Outerglass Shield XT	(YES / NO)	APPLICATOR : CERT. NO. :	
		Compression foil perforated well within curing time of OGS XT	(YES / NO)	APPLICATOR : CERT. NO. :	
		Overlapping over cured and slightly abraded OGS XT (I.A.)	(YES / NO)	APPLICATOR : CERT. NO. :	
		Overlap Outerglass Shield XT according specific application instruction	(YES / NO)	VISUAL INSPECTION PASS / FAIL	MIN. WATER INCLUSIONS PASS / FAIL
REMARKS					

POST SERVICE VALIDATION				SYSTEM EXPOSED TO EXCESSIVE LOADS e.g. FROM SUPPORTS AND EQUIPMENT (YES / NO)
DATE OF APPLICATION	DAY	MONTH	YEAR	BACKFILL WITH CLEAN SAND, WITHOUT AND STONES OR HARD LUMPS OF SOIL (YES / NO)
				ANY OTHER DAMAGES ON THE SYSTEM BETWEEN APPLICATION AND BACKFILL (YES / NO)
DATE OF BACKFILL	DAY	MONTH	YEAR	SYSTEM BACKFILLED AFTER CURING TIME OF OUTERGLASS SHIELD XT (YES / NO)
				APPLICATOR
REMARKS				

Company :	Company :
Name :	Name :
Function :	Function :
Date :	Date :
Signature :	Signature :

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

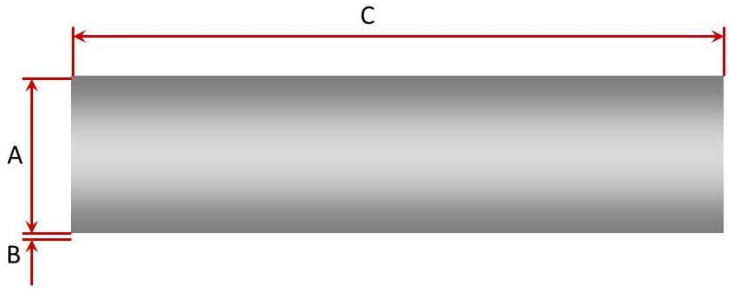
(Net) effective coverage area per Stopaq Outerwrap PVC, PE, HTPP, HTPE size			
Dimension	Surface	Overlap	Net effective coverage area
50mm x 10m	0,5 m²	≥50%	0,225 m²
50mm x 30m	1,5 m²	≥50%	0,675 m²
75mm x 30m	2,25 m²	≥50%	1,0125 m²
100mm x 30m	3 m²	≥50%	1,35 m²
150mm x 30m	4,5 m²	≥50%	2,025 m²
2 “ x 50’	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	

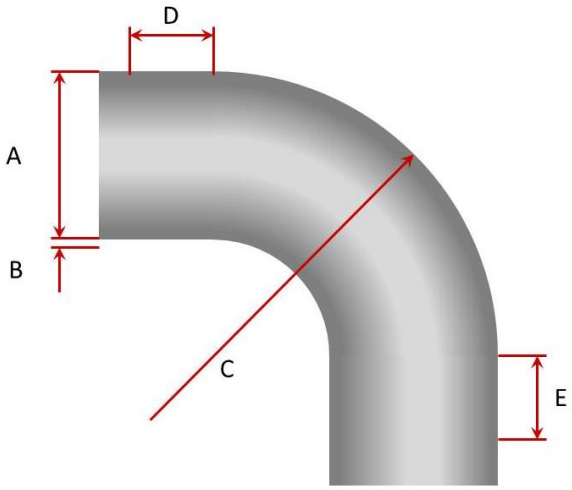
Surface (m^2) = Pi x 1,236 (m) x 55 (m) = 213,57 m^2

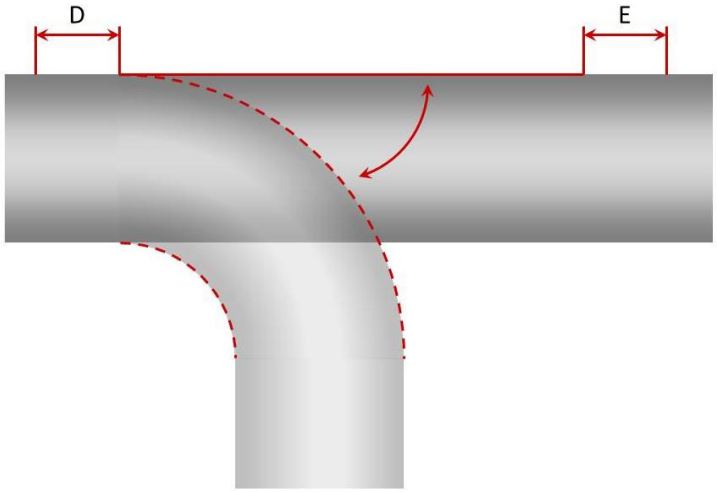
$$\text{Net rolls Wrappingband 200mmx20m} = \frac{213{,}57\ (m^2)}{3{,}6\ (m^2)} = 59{,}3 \text{ rolls} = 60 \text{ rolls}$$

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	

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

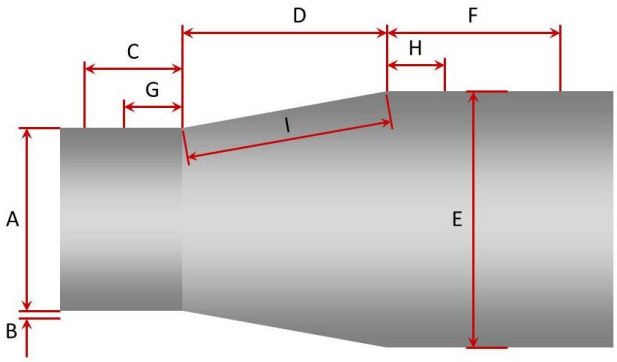
$$\text{Surface (m}^2\text{)} = \text{Pi} \times 0{,}3239\ \text{(m)} \times 1{,}78\ \text{(m)} = 1{,}81\ \text{m}^2$$

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

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

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)

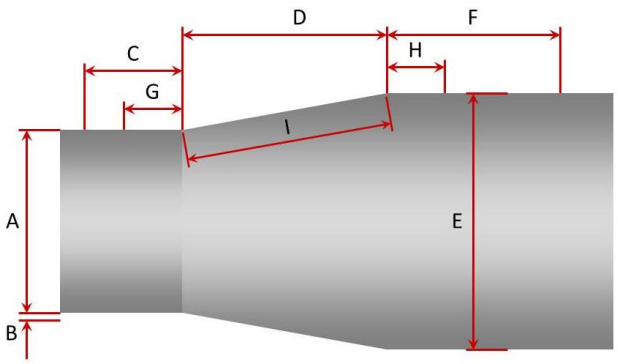
$$\text{\# of strips material} = \frac{\text{Pi} \times E \text{ (m)}}{\text{Width of material (m)} - \text{Overlap of material (m)}}$$

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

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

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

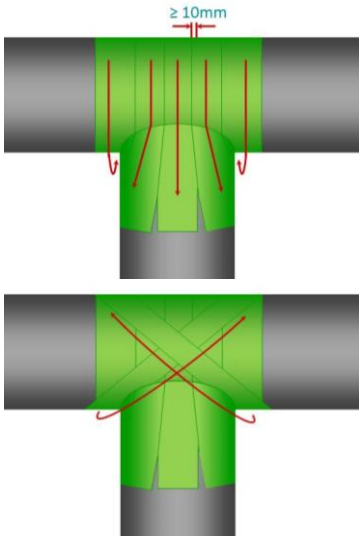
$$\text{Net rolls Outerwrap 100mm x 30m} = \frac{1{,}12 + 0{,}8\ (m^2)}{1{,}35\ (m^2)} = \frac{1{,}92\ (m^2)}{1{,}35\ (m^2)} = 1{,}43 \text{ rolls}$$

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

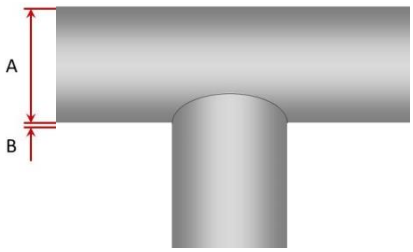
$$\text{\# strips Wrappingband} = \frac{\text{diameter pipe (m)}}{\text{width of Wrappingband (m)} - 10\text{mm}}$$

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

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

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)

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

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

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

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

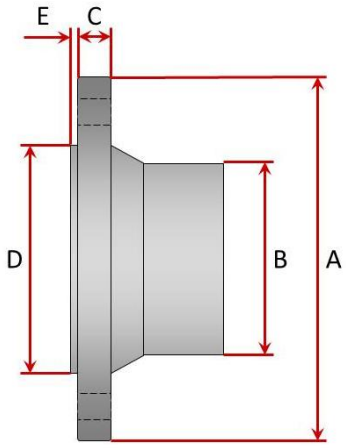
Dimensions of flanges are depending on the pipeline diameter and the pressure class of the flange e.g. a 10” flange with a 300 PSI pressure class has larger dimensions than a 10” flange with a 150 PSI pressure class.

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.

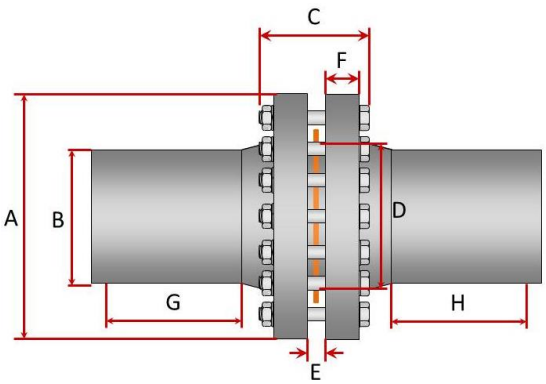
Important dimensions from flanges to calculate material use:



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.

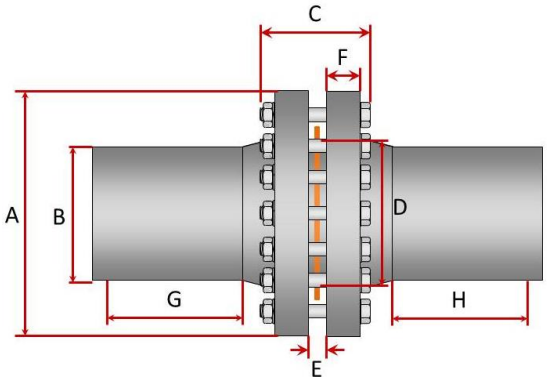
- Wrappingband CZ / CZH over the outer diameter of the flange and on the adjacent pipe sections
- 4100 Putty in between the flanges and to fill up the studs and create an approx. 45 angle between the pipe and flange.

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)

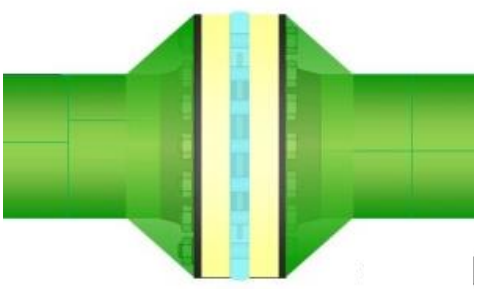
= 7,95 (dm^3) x 1,5 = 11,9 (kg)

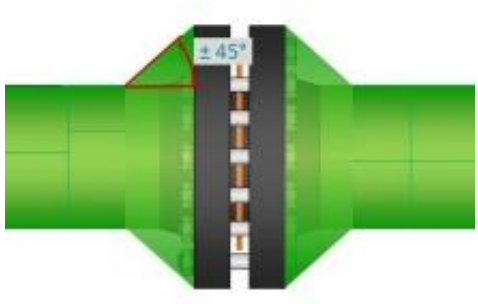
Volume of 4200 Filler (dm^3) = (0,25 x Pi x A^2 – 0,25 x Pi x B^2)x E (dm)

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

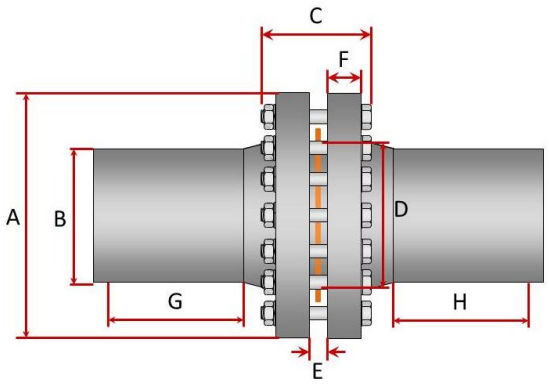
Weight of 4200 Filler (kg) = Volume of 4200 Filler x 1,35 (density 4200 Filler is 1,2-1,5)

= 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)

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

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

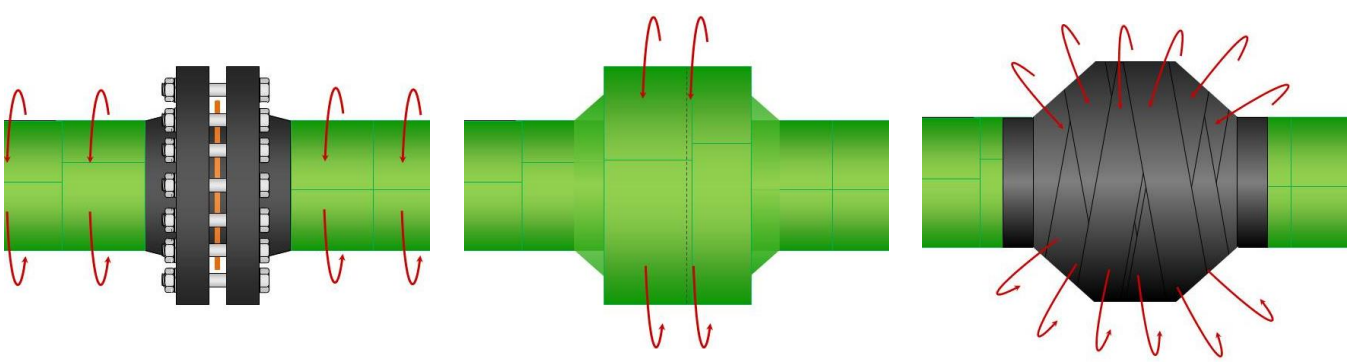
(2 straight wraps over the flange and 2 straight wrap on each side of the flange. More straight wraps on the pipes might be needed on larger diameter flanges.)

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

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

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

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

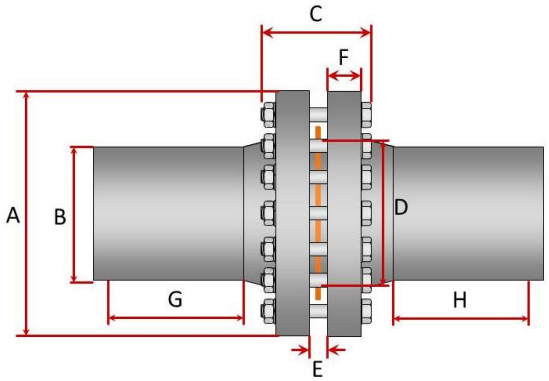


Example

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



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

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

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

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

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

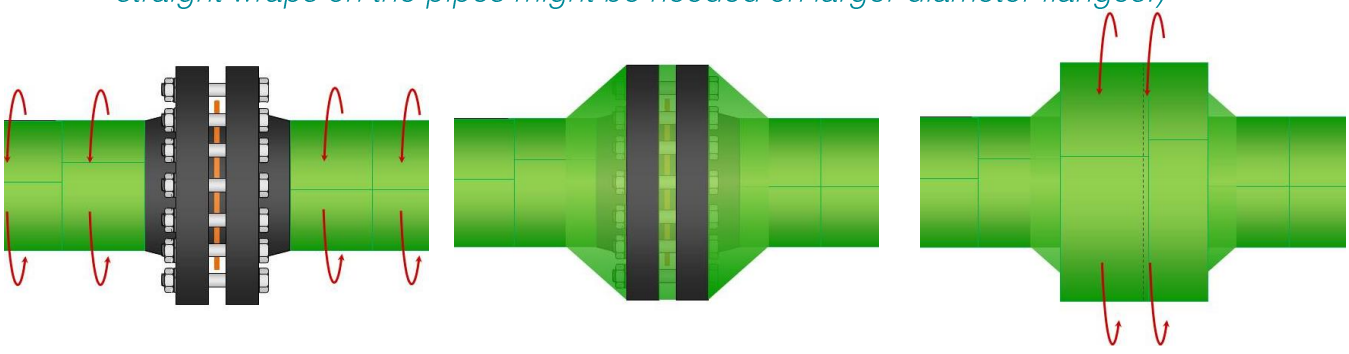
$$= 2 \times ((\text{Pi} \times 0{,}405) + 0{,}1) + 4 \times ((\text{Pi} \times 2{,}731) + 1)$$

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

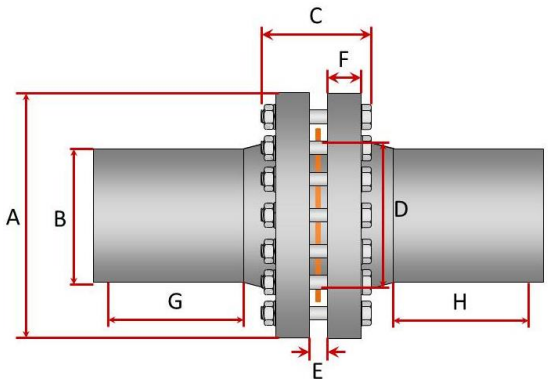
$$\text{Rolls of Wrappingband} = \frac{\text{Length of Wrappingband needed (m)}}{\text{Length of roll Wrappingband (m)}}$$

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

(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)

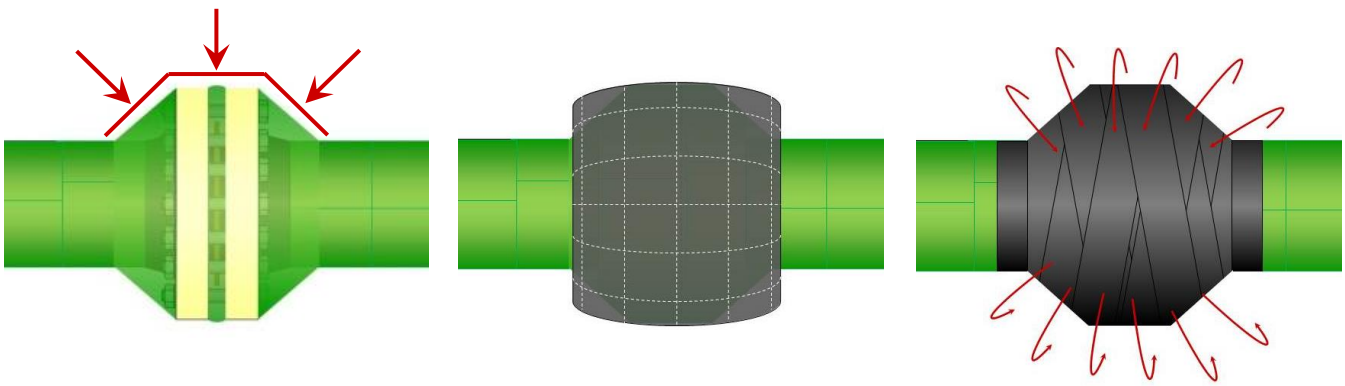
Width of Geotextile (m) = 0,16 (m) + 2 x $\sqrt{2}$ x ((0,445 – 0,2731) x 0,5)
= 0,16 (m) + 0,25 (m) = 0,41 (m)

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

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

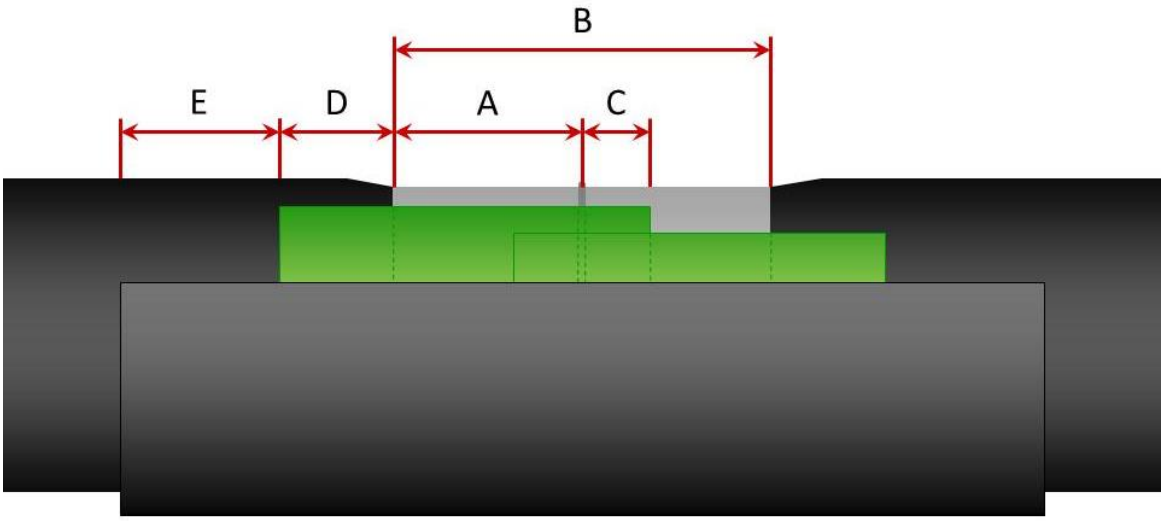
$$\text{Rolls of Outerwrap (0,4 x 50mm x 10m} = \frac{0,62 - 2 \text{ x } 0,059}{0,125\text{m}^2} = \frac{0,502\text{m}^2}{0,125\text{m}^2} = 4,02 \text{ rolls}$$

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

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

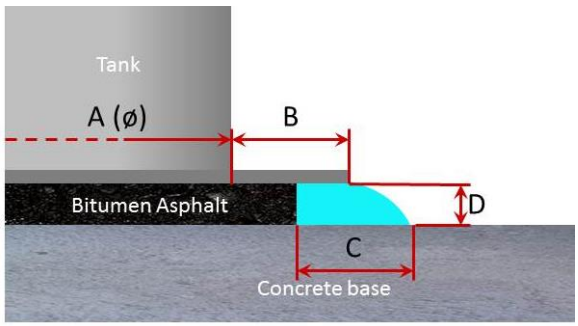
$$\text{Strips per roll High Impact Shield 660mm x 30m} = \frac{30\ (m)}{1{,}950\ (m)} = 15{,}4 = 15 \text{ strips}$$

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

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)

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

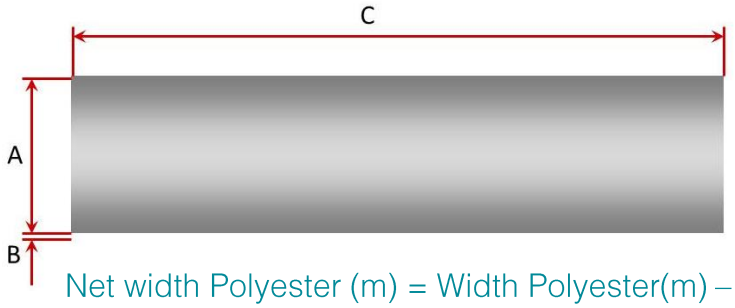
Volume 4200 Filler (dm^3) = Pi x 262 (dm) x 0,4 (dm) x 0,3 (dm) = 98,8 dm^3

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

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

(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)

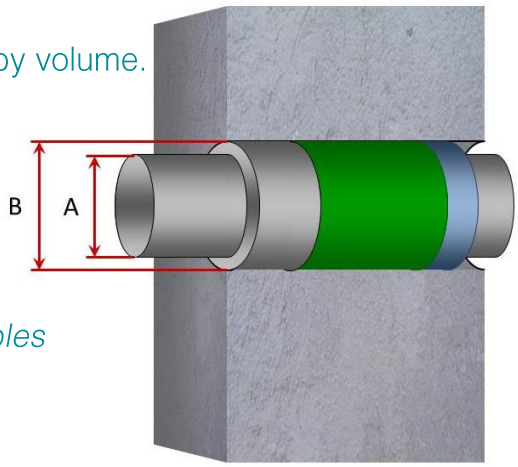
$$\text{Net needed Compression tape (rolls)} = \frac{40 \times Pi \times (0,508 + 0,0094)(m^2)}{2,97\ (m^2)} = 21,9 \text{ rolls}$$

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)

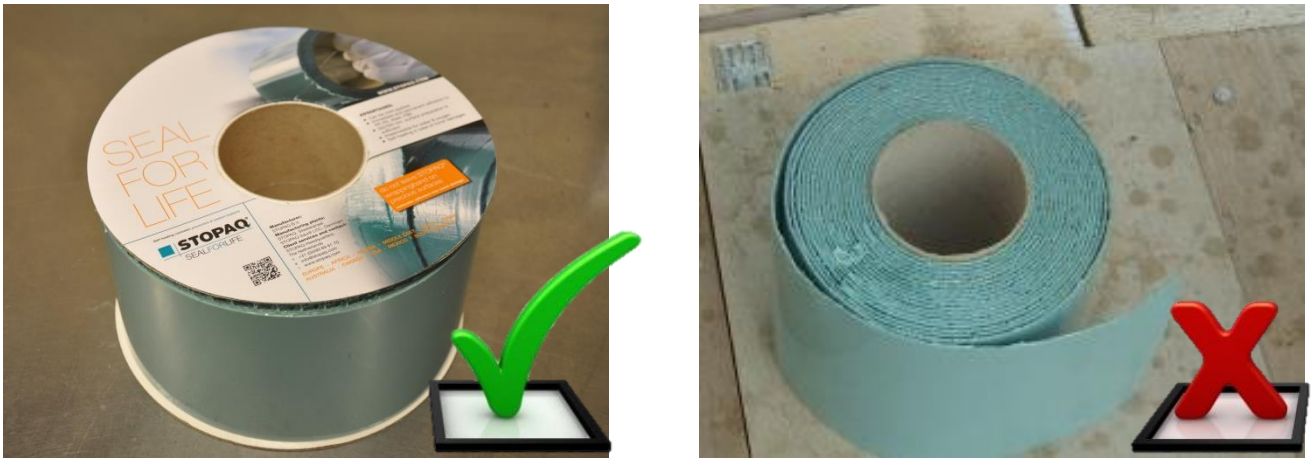
Weight 2100 Aquastop (kg) = 0,5 x 1,35 = 0,675 (kg)

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)

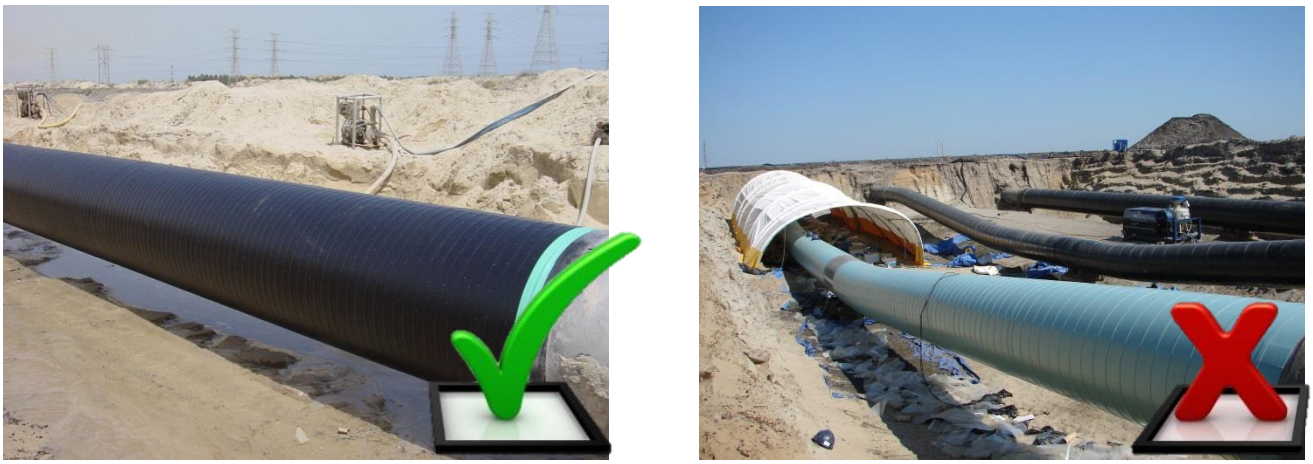
Weight Mortar WR (kg) = 0,25 x 1,6 = 0,4 kg

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.

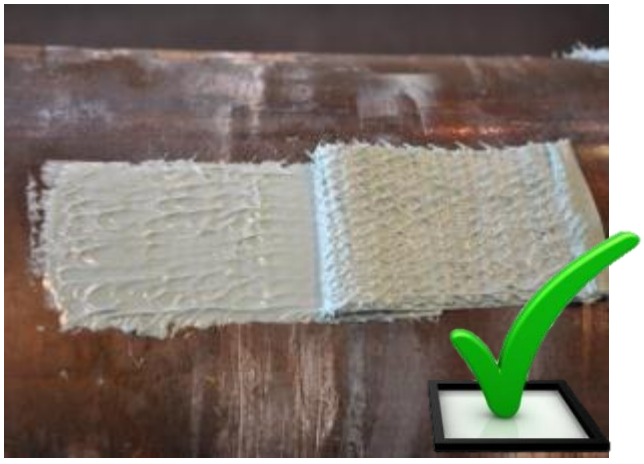


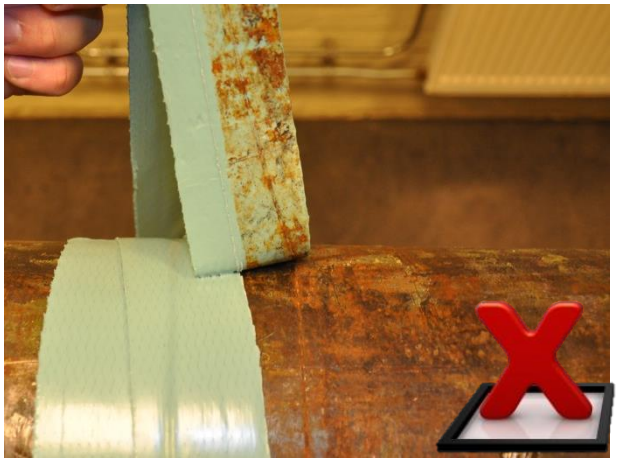
Always work in a clean environment and remove all the garbage, such as release liners, cardboard reels, empty boxes etc. after the application.

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.

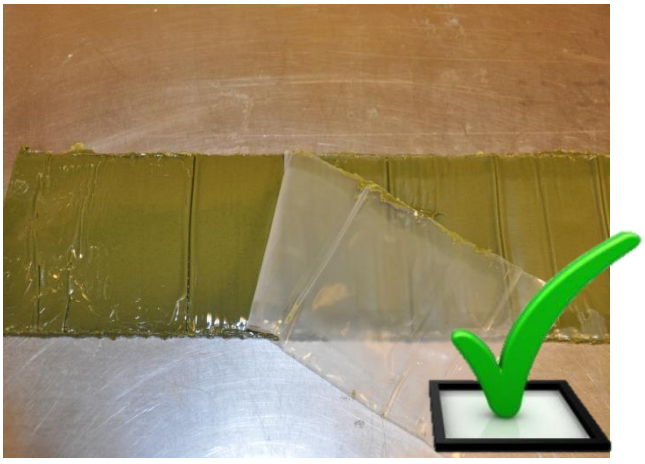
If necessary, degrease with Isopropanol of SFL Substrate Cleaner. Do not use any thinner.

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.



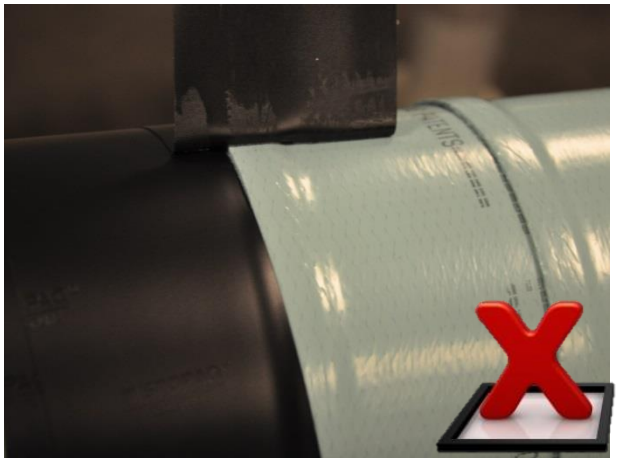
Only remove the release liner. The backing foil or non-woven cloth which is attached to the Wrappingband must not be removed.

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.

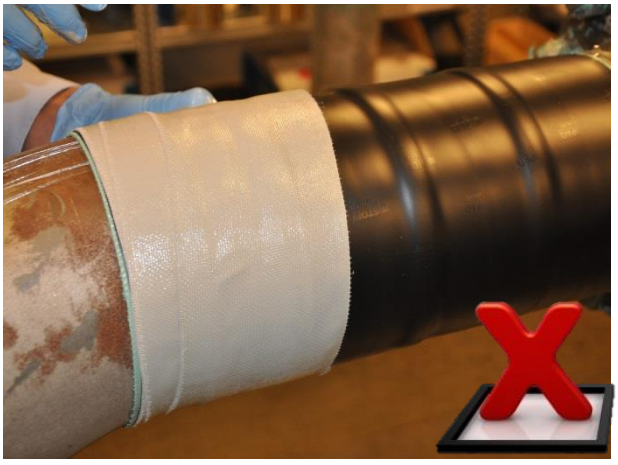
Do not apply Outerwrap on bare steel. Stopaq Visco-elastic materials will provide the corrosion preventive properties of the system, Outerwrap is just for mechanical protection only. Keep approx. 3mm Wrappingband exposed at both ends.



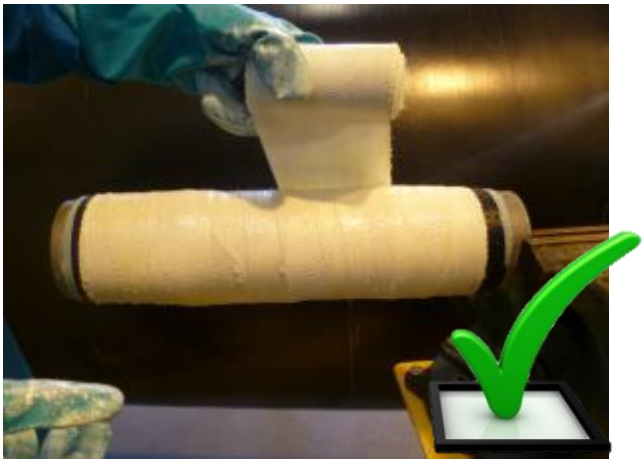
Apply Outerwrap with tension. Apply Outerwrap with a minimum overlap of 50%.

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

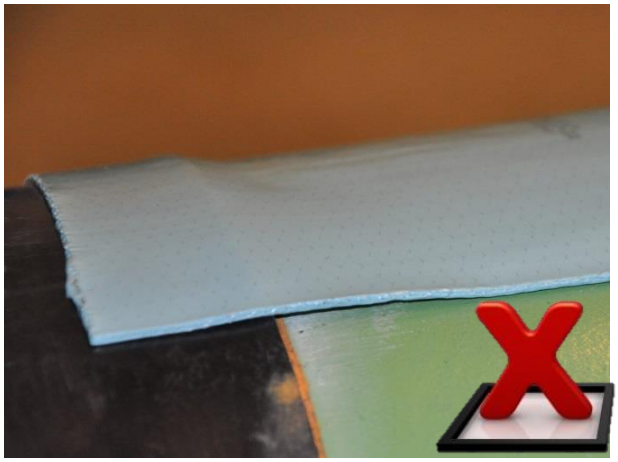
Open the pouch of Outerglass Shield just prior to the application. Outerglass Shield will start curing when the pouch is opened.



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

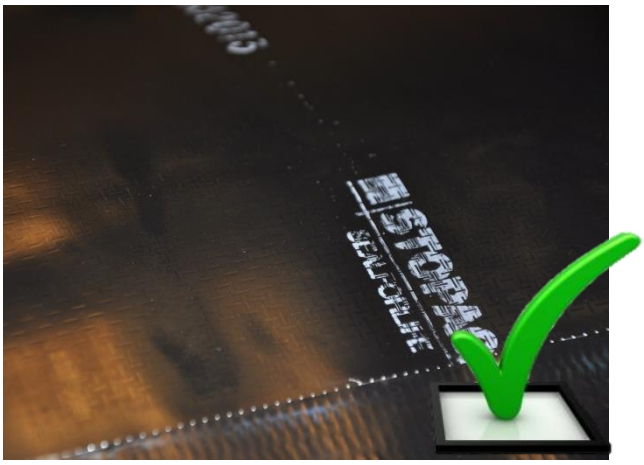


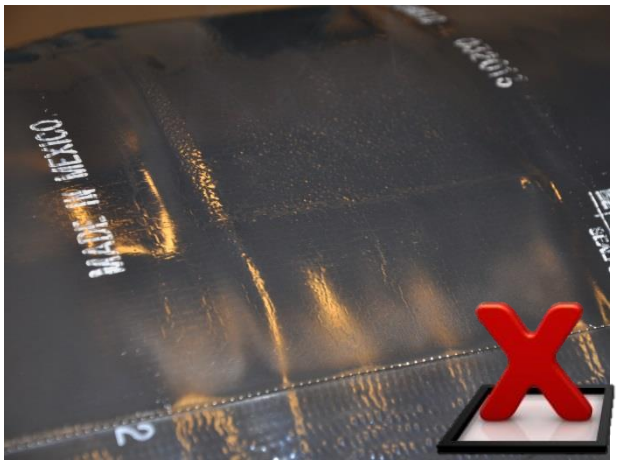
Wear proper gloves and PPE during the application of Outerglass Shield.



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

FGSZ ZRT.
FÖLDGÁZSZÁLLÍTÓ
A MOL-CSOPORT TAGJA

SAPREF

ГипроНИИгаз

DVGW

TÜV NORD

ÖVGW
ÖSTERREICHISCHE VEREINIGUNG
FÜR DAS GAS- UND WASSERFACH

FSB

ofi
FORTSCHRITT IN GUTEN HÄNDEN

POLYMER
SERVICE
CENTRE

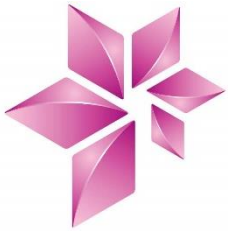
NSF®

INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
ज्ञानम् परमम् ध्येयम्

TSUS

TÜV
SÜD

SwRI®

COT
onafhankelijk


PolyVation
INITIATE • INNOVATE • CREATE

Ú
P
V

Statoil
kiwa

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

Project reference list

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.

Some larger projects are summed up on the following pages with the year of the project, client, project description and used Stopaq system.

Year	Country	Client	Project description	Used system
2000	USA	Valero refinery	24” Field Joints	Wrappingband CZH Outerwrap PVC
2001	Saudi Arabia	Saudi Aramco	Rehabilitation of 16"-56" pipelines, 40 km/year	Wrappingband CZH Outerwrap PVC Polyester
2001	The Netherlands	Gasunie	Ravenstein, 36” Field Joints	Wrappingband CZH Outerwrap PVC
2001 - 2004	The Netherlands	Shell/Total/ BP	Several small diameter pipelines, risers, fittings at fuel stations	Wrappingband CZH Outerwrap PVC
2002	Belgium	Exxon	12" pipeline sections	Wrappingband CZH Outerwrap PVC
2002	USA	City of Houston	Wrapping of underground installations, pipes, fittings, valves	Wrappingband CZH Outerwrap PVC 4100 Putty
2002 - 2004	Saudi Arabia	Saudi Aramco	Qurayya Seawater injection 56" pipeline	Wrappingband CZH Outerwrap PVC
2002 - ongoing	The Netherlands	Essent	New pipelines & general maintenance of pipes, bends, valves, fittings etc.	Wrappingband CZH Outerwrap PVC 4100 Putty
2002 - 2004	Saudi Arabia	Saudi Aramco	Qurayah - Northern Area Producing, Rehabilitation of 56" main waterline >206Km	Wrappingband CZH Outerwrap PVC
2003 - ongoing	Saudi Arabia	Saudi Aramco	QU1 & QU2 Sabkha, 40" pipeline rehabilitation, 30Km/yr	Wrappingband CZH Outerwrap PVC
2003	USA	Shell	32" pipeline sections and 32” field joints	Wrappingband CZH Outerwrap PVC
2003 - 2007	Belgium	BASF	Chemical plant ,Wrapping of underground installations, pipes, fittings, valves	Wrappingband CZH Outerwrap PVC 4100 Putty Polyester
2003	USA	Boston City	Big Dig Tunnel Project, Wrapping of underground installations, pipes, fittings, valves, sealing of pipe inlets	Wrappingband CZH Paste CZH Outerwrap PVC 2100 Aquastop
2003	Saudi Arabia	Saudi Aramco	Khurasanya, Wrapping of new plant piping and off-plot piping >500Km	Wrappingband CZH Outerwrap PVC
2003	France	Gaz de France	Road crossing	Stopaq Casing Filler
2003	Gulf of Mexico	Shell	Protection of flanges at the flange faces	Stopaq FN4200 Wrappingband CZH Outerwrap
2003	The Netherlands	Akzo Nobel	Pipelines, roadcrossings	Wrappingband CZH Outerwrap PVC

Year	Country	Client	Project description	Used system
2004	Canada	Exxon Mobil	Risers, offshore platforms	Wrappingband EZ composite system
2004	The Netherlands	Nerefco refinery	Wrapping of 24" pipeline section and fieldjoints	Wrappingband CZH Outerwrap PVC
2004	Belgium	Fluxys	Flanges	Stopaq 4100 Putty Stopaq Paste CZ
2005	The Netherlands	Gasunie	40" Field Joints and bends And 3 compressor stations Gasunie	Wrappingband CZH Outerwrap PVC 4100 Putty
2005	Russia	Sakhalin Energy	Sak.2, Coating of Field joints & tie-in's of 34" pipeline	Wrappingband CZH Outerwrap PVC Casing Filler
2005	Saudi Arabia	Royal commission Jubail & Yanbu	Coating of parallel pipelines 16-46"	Wrappingband CZH Outerwrap PVC
2005	The Netherlands	Eneco Electrical company	Pipelines, roadcrossings, wall inlets	Wrappingband CZH Outerwrap PVC 2100 Aquastop
2005	Oman	PDO Oman	Murayrat Wadi Jizzi Gas Pipeline, Rehabilitation of 16" gas pipeline	Wrappingband CZH Outerwrap Vinylester
2005	Thailand	Chevron	Flange preservation	4200 Filler Wrappingband CZH Outerwrap PVC
2005	Saudi Arabia	Saudi Aramco	Khurais, Wrapping of new plant piping and off-plot piping >500Km	Wrappingband CZH Outerwrap PVC
2005	USA	Shell	Rehabilitate existing buried coating in California	Wrappingband CZH Outerwrap PVC
2005	The Netherlands	Gasunie	Bacton-Balgzand, Coating of underground piping of compressor station	Wrappingband CZH Outerwrap PVC
2006	Belgium	Wintershall	Coating of field joints of 24" pipeline	Wrappingband CZH Outerwrap PVC Polyester
2006	The Netherlands	Gasunie	Julianadorp-Callantsoog, Coating of fieldjoints of 48" -80bar- PU insulated pipeline	Wrappingband CZH Outerwrap PVC
2006	The Netherlands	Nuon nv	Gas storage EPE, Coating of underground objects, risers, fittings, pipes & fieldjoints	Wrappingband CZH Outerwrap PVC 4100 Putty 4200 Filler
2006	Oman	PDO Oman	Birba 9 gas flowline, Linepipecoating & fieldjoints	Wrappingband CZH Outerwrap PVC
2006	USA	ARC-Chevron Shell	32" jetty piles. Splash zone	Subsea system

Year	Country	Client	Project description	Used system
2006	Thailand	PTT Thailand	8km of 22" pipeline - Field Joints	Wrappingband CZH Outerwrap PVC
2006	Russia	Shell	Molikpaq, 25.000 liter filling of J-tube	Casing Filler
2006	Italy	ATC	All transmission lines, Field Joints	
2006	Oman	PDO Oman	Budour pipeline, 10 6" full wrap	Wrappingband CZH Outerwrap PVC
2006	Malaysia	Fuel Pipeline Company	14“ underground pipeline. Pipe sections and field joints	Wrappingband CZH Outerwrap PVC
2007	Brunei	Brunei LNG	Entire pipeline protection	Wrappingband CZH Outerwrap PVC
2007	Brunei	Brunei LNG	Various Ground to air interfaces & above ground flanges	Wrappingband CZH Outerwrap PVC Polyester 4200 Filler
2007	Sudan	GNPOC	Replacement of HSS after failure	Wrappingband CZHT Outerwrap Vinylester
2007	Thailand	JST Thailand	Laem Chabang Terminal 30"jetty piles	Wrappingband CZH Outerwrap PVC
2007	Thailand	RAPP Pulp and paper Mill	Various small pipelines in highly concentrated sulphuric acidic environment	Wrappingband CZH Outerwrap PVC
2007	Norway	Exxon Mobil	Ringhorne, Drilling module, valves and flanges	
2007	Norway	StatoilHydro	Statfjord B, Platform legs, tank top	Subsea
2007	Norway	StatoilHydro	Sleipner, Process module, valves and flanges	
2007	Norway	Total	Frigg, Platform legs	Subsea
2008	Libya	Wintershall	Coating of wellheads	Wrappingband CZH Outerwrap PVC
2008	The Netherlands	MOT	Pilot project Jetty Pile protection, Case stude Jetty Pile rehab system	Wrappingband SZ Intermediate Wrap Outerglass Shield XT
2008	France	Gaz de France	60 meter casing, 56"	Casing Filler
2008	Sudan	GNPOC	Field Joint	
2008	Azerbeidzjan	BP	WREP, Rehabilitation of 24" pipeline	Wrappingband CZH Outerwrap PVC
2008	Nigeria	TOTAL	AKPO project, Coating of Risers	Wrappingband CZHT Paste CZHT Outerwrap HTPP Outerglass Shield XT

Year	Country	Client	Project description	Used system
2008	Thailand	HESS	Underground 16" pipeline repair. Tank - chime and wall protection	4200 Filler Wrappingband EZ polyester
2008	Norway	Exxon Mobil	100 flanges	4200 Filler Wrappingband Outerwrap
2009	China	Petrochina	Moda Pipeline, Fieldjoint coating and insulation on 900km, 30", 80833 fieldjoints of insulated gas pipeline	Wrappingband CZH High Impact Shield Insulation
2009	Saudi Arabia	SWCC	100 km 60" pipeline rehabilitation	Wrappingband CZH Outerwrap PVC
2009	The Netherlands	MOT	Jetty pile project Rotterdam harbour, Rehabilitation of 132, 36" Jetty piles	Stopaq Subsea System
2009	Croatia	Janaf	T-jonts elbows	Wrappingband CZH OuterwrapPVC
2009 - 2010	The Netherlands	Gasunie	North-South gaspipeline, 22.500 field joints 48"	Wrappingband CZH High Impact Shield
2009	Australia		Jemena Waterpipeline, 2009 - 2010 Rehabilitation of waterpipeline	Wrappingband CZH Outerwrap PVC
2009	Sudan	PetroEnergy	Fieldjoint coating on 10,000 field joints of gas pipeline	
2010	Saudi Arabia	Saudi Aramco	Karan project, Protection of 10.000 field joints	Wrappingband CZH Outerwrap PVC High Impact Shield
2010	Sudan	GNPOC	Replacement of HSS after failure	Outerglass shield HT Wrappingband CZH Outerglass shield XT
2010	Kroatia	Crodux	LNG storage tank coating (4,5*37mtr)	Wrappingband CZH Outerwrap PVC
2010	The Netherlands	Wintershall	K13 Offshore platform, Coating of braces of K13 platform	Subsea System Wrappingband CZH OuterwrapPVC Outerglass Shield XT
2010	Saudi Arabia	Saudi Aramco	Manifa, Field Joint Coating system	Wrappingband CZH Outerwrap PVC High impact Shield
2010	Saudi Arabia	Saudi Aramco	Safaniyah, Field Joint Coating system 2500 offshore fieldjoints	Wrappingband CZH Outerwrap PVC High impact Shield
2010	Saudi Arabia	SWCC	Qatif Junction, Complete rehabilitation of 48" pipeline, 70Km	Wrappingband CZH Outerwrap PVC
2010	Sudan	SPPC	Field joint	

Year	Country	Client	Project description	Used system
2010	Saudi Arabia	SWCC	Qatif Junction, Complete rehabilitation of 42" pipeline, 70Km	Wrappingband CZH Outerwrap PVC
2010	Saudi Arabia	KJO	Al- Kafji Y2B platform, Coating platfor Jackets 48-62"	STOPAQ Subsea System
2010	The Netherlands	BP Shell MOT	Rehabilitation of 5, 36" Jetty piles	Stopaq Subsea System
2010	Mexico	PEMEX	Rehabiltation of 250Km 24" pipeline in Swamp area	Wrappingband CZH Outerwrap PVC
2010	Brasil	Petrobras	Started in 2010 and ongoing, Repair Subsea pipelines (flexible)	Stopaq Subsea
2010	Trinidad	-	Coating off plot 50" pipeline	Wrappingband CZH Outerwrap PVC Outerglass shield XT
2011	The Netherlands	VOPAK	VOPAK Terminal II, Rehabilitation of 125 Jetty Piles, >40"	Stopaq Subsea System
2011	Saudi Arabia	SWCC	Qatif , Complete rehabilitation of 60" pipeline, 60Km	Wrappingband CZH Outerwrap PVC
2011	The Netherlands	DOW Chemicals	Remmingwerk I, Rehabilitation of Jettty piles, >40	Stopaq Subsea Wrappingband CZ Outerwrap PVC Outerglass shield XT
2011	Mexico	PEMEX	SIGMA, 38,000m2 rehabilitation 20-24"pipeline	Wrappingband CZH Outerwrap PVC
2011	Sudan	GNPOC	Rehabilitation & reinforcing of 25,000 fieldjoints	Wrappingband CZHT Outerwrap HTPP Outerglass shield XT
2011	UK	Shell UK	Mossmorran, Rehabilitation LNG Plant	Wrappingband CZH Outerwrap PVC White
2011	Kroatia	Janaf	Fieldjoint T-joint Coating 36"	Wrappingband CZH Outerwrap PVC Outerglass shield XT
2011	Mexico	Pemex	3150 Rehabilitation of 20-24"pipeline	Wrappingband CZH Outerwrap PVC
2011	Antartica	Kaefer	Neumayer research station, Sealing of the seams	Wrappingband CZ Outerwrap PVC White
2011	The Netherlands	Shell	New 4“ Plantpiping	Stopaq FAST GRE
2011	Mexico	Pemex	Rehabilitation riser coating	Stopaq Subsea system
2011	China	PetroChina	West-East Gas pipeline, Rehabilitation fieldjoint coating	Wrappingband CZH GRE

Year	Country	Client	Project description	Used system
2011	Nigeria	Shell	Two 8" replacement pipeline with risers tie-in to the existing 8" line at Sego manifold (19.07m pipe) and Belema flow station (15m pipe) in the swamp.	Wrappingband CZH Outerwrap PVC Outerglass Shield XT
2012 - 2014	UAE	Dolphin Energy	Rehabilitation of a 30“, 105km, bitumen coated pipeline.	Wrappingband CZH Outerwrap PVC
2012	Sudan	SPPC	Rehabilitation project	Wrappingband CZHT Outerwrap HTPP
2012	Pakistan	SNGPL	Sui Northern Gas pipelines Ltd, New pipeline, field joints	Wrappingband CZH Outerwrap PVC
2012	Pakistan	Mari Gas Company Limited	Rehabilitation of pipeline, risers & canal crossings	Wrappingband CZH Outerwrap PVC
2012	Slovakia	Areko	Field joint coating on a new 16,4km pipeline DN300	Wrappingband CZH Outerwrap PVC High Impact Shield Paste CZH
2012	Italy	SIOT trieste	Rehabilitation of jetty piles	Wrappingband SZ Wrappingband CZH Intermediate Wrap PVC Sealing Tape OuterglassShield XT
2012	Russia	Shell	Sakhalin, 48" PPL repair and 24" tie-in	Wrappingband CZH Outerwrap PVC Paste CZH
2012	The Netherlands	Akzo Nobel	Rehabilitation of high quality stainless steel	Stopaq Wrappingband and Stopaq Paste
2012	Nigeria	Shell Nigeria	Rehabilitation of swamp pipeline, risers	Wrappingband SZ Wrappingband CZH Intermediate Wrap PVC Sealing Tape OuterglassShield XT
2012	United Kingdom	BP	BP Forties pipeline Cruden Bay, Below ground Flanges and 2" pipe work	Wrappingband CZ Paste CZ Outerwrap PVC
2013	Saudi Arabia	KJO	KJO Hout offshore gas facilities, Field joint coating on 16 onshore fieldjoints and on 3500 offshore fieldjoints	Wrappingband CZH High Impact Shield
2013	UAE	Saudi Aramco	4000 of 16" en 1100 24" offshore fieldjoints	Wrappingband CZHT Outerwrap HTPE High Impact Shield HT Rockshield

Year	Country	Client	Project description	Used system
2013	Brunei	SHELL BLNG	Rehabilitation of jetty piles	Wrappingband SZ Wrappingband CZH Intermediate Wrap PVC Outerglass Shield XT
2013	Saudi Arabia	Saudi Aramco	15km of rehabilitation of water pipelines	Wrappingband CZH Stopaq Outerwrap PVC
2013	UAE	GASCO	5500 4" to 24" field joints	Wrappingband CZH Stopaq Outerwrap PVC
2013	Colombia	Repsol	Cartagena Refinery expansion project, New structures, pipelines	Wrappingband CZH Stopaq Outerwrap PVC
2013	Mexico	PEMEX	Factory Applied Stopaq Technology on 10 km of new pipeline	STOPAQ FAST
2013 - 2014	Sudan	PDOC	IP of the 1400Km 32" pipeline from PDOC has shown defects on more than 100.000 points	Wrappingband CZH Outerwrap PE
2013	Saudi Arabia	Saudi Aramco	Wasit, New offshore pipeline structures. 42500 field joints	Wrappingband CZHT Outerwrap HTPE High Impact Shield HT Rockshield
2013	Saudi Arabia	Saudi Aramco	Safaniya Phase II, New offshore pipeline structures. 7200 field joints	Wrappingband CZHT High Impact Shield HT
2013	The Netherlands	Gasunie	Beverwijk, Field joint coating on a 50km, 48 inch pipeline	Wrappingband CZH High Impact Shield
2013	United Kingdom	Exxon Mobil	Mossmorran Fife , 33m diameter liquid ethylene tank chime area	Paste CZ Wrappingband EZ 4200 Filler
2013	Saudi Arabia	Saudi Aramco	Karan K-45 project, Field joint coating a new 20" pipeline	Wrappingband CZHT High Impact Shield HT
2013	Ireland	Shell	Corrib, Field joint coating on the new offshore to onshore pipeline	Wrappingband CZH High Impact Shield
2013	The Netherlands	Nuon	IJmeer project, Subsea coating repair work on a 28" pipeline	Wrappingband SZ Intermediate Wrap Outerwrap PVC Outerglass Shield XT

Year	Country	Client	Project description	Used system
2013	United Kingdom	Shell	Riser leg in UKCS North Sea, 8" riser leg in 100m water depth	Wrappingband SZ Paste SZ Intermediate Wrap PVC Outerglass Shield XT
2013	Saudi Arabia	SWCC	Rehabilitation of 39000 field joints on a 60" pipeline	Wrappingband CZH Stopaq Outerwrap PVC
2013	Mexico	Comision Estatal de Aguas	Water pipeline, Factory Applied Stopaq on 2.5 km of new pipeline	Stopaq FAST
2013	United Kingdom	Shell	Coating reinstatement pipeline spool UKCS North Sea,	Wrappingband SZ Intermediate Wrap Outerwrap PVC Outerglass Shield XT
2013	United Kingdom	TAQA	UKCS North Sea, 16" riser leg coating repair work	Wrappingband CZH Paste CZH Outerwrap
2013	The Netherlands	Shell	Norgron, 48“ Field joint coating of a 70km pipeline	Wrappingband CZH High Impact Shield
2014	Saudi Arabia	Saudi Aramco	Manifa Phase II, Offshore laybarge field joint application	Wrappingband CZH High Impact Shield
2014	Saudi Arabia	Saudi Aramco	KJO Hout offshore gas facilities, Offshore laybarge field joint application	Wrappingband CZHT Outerwrap HTPE PU infill
2014	The Netherlands	Gasunie	Westerschelde West - Cambron, New 14km x 48" pipeline	Wrappingband CZH High Impact Shield
2014	Saudi Arabia	Saudi Aramco	Karan 45 project, Offshore laybarge field joint application	Wrappingband CZH High Impact Shield
2014	The Netherlands	VOPAK	Jetty pile repair, Rehabilitation of 60 x 16 inch jetty piles	Wrappingband SZ Wrappingband CZH Intermediate Wrap PVC Sealing Tape Outer glass Shield XT
2014	Saudi Arabia	Saudi Aramco	Stopaq FAST factory applied for horizontal drilling	Stopaq basecoat + Stopaq GRE
2014	Saudi Arabia	Saudi Aramco	LTA Phase II, Offshore laybarge field joint application	Wrappingband CZH High Impact Shield
2014	The Netherlands	Gasunie	Starkeborgkanaal, Subsea coating repair work	Wrappingband SZ Intermediate Wrap Outerwrap PVC Outerglass Shield XT

Year	Country	Client	Project description	Used system
2014	Indonesia	Bluewater	Yokohama floating hose. Repair of 60 flanges on 20 inch hose connected to FPSO in Timor Sea	Wrappingband SZ Wrappingband CZ Paste CZ Outerwrap HSPE Outerglass Shield XT
2014	Algeria	Sonelgaz	Rehabilitation of a 20 inch sweating pipeline	Wrappingband CL Stopaq Outerwrap
2014	Slovakia	Transpetrol	9,2 kilometres of 18 inch pipeline	Wrappingband Outerwrap
2015	Norway	Statoil	1 km rehabilitation	Wrappingband Outerwrap
2015	Norway	ConocoPhilips	3 km rehabilitation	Wrappingband Outerwrap
2015	Pakistan	SNGPL	SND1709, Supply of rehabilitation works - 150.000 rolls	Wrappingband Outerwrap
2015	Algeria	Sonatrach	Application of flanges and risers	Wrappingband Outerwrap Paste Vinylester
2014 - ongoing	United Arab Emirats	GASCO	Supply of material for ongoing rehabilitation of pipelines and infrastructure	Wrappingband Outerwrap PVC
2015	Gabon	Shell	Gamba Expor sealine replacement, Field joint coating	Wrappingband Outerwrap PVC
2015	Ghana	Vulcan	FAST	Stopaq FAST
2015	Australia	Woodside	Stopaq corrosion prevention solution for offshore and partly onshore applications	Wrappingband Outerwrap Outerglass Shield XT
2015	Mexico	PEMEX	Ongoing rehabilitation works	Wrappingband Outerwrap
2015	United Kingdom	Shell UK	Mossmorran Phase II, Ongoing rehabilitation works	Wrappingband Outerwrap
2016	Sudan	PDOC	Rehabilition of 6000 points on a 32inch pipeline	Wrappingband Outerwrap
2016	Dominican Republic	Punta Catalina	Central Termoelectrica - Proyecto Punta Catalina, New power plant - all pipe work coated with Stopaq	Wrappingband Outerwrap

Year	Country	Client	Project description	Used system
2016	The Netherlands	VOPAK	Rehabilition of jetty piles	Wrappingband SZ Wrappingband CZH Intermediate Wrap PVC Outerglass Shield XT
2016	Russia	Yuzhno-Sakhalinsk	Coating under Insulation	Wrappingband Outerwrap
2016	Saudi Arabia	Saudi Aramco	Zuluf & Marjan field development, Offshore laybarge field joint application	Wrappingband CZH High Impact Shield
2016	South Africa	Saldahana	Bullet tank application	Easy-Qote (Basecoat VE + PU topcoat)
2016	Saudi Arabia	Saudi Aramco	Al- Khafji, Offshore laybarge field joint application	Wrappingband CZH High Impact Shield
2016	South Africa	Eskom	Kusile power plant application	Easy-Qote Basecoat VE + High performance UV & Chemically resistant topcoat
2016	Slovakia	Areko	Pipeline coating	
2016	Lithuania	Amber Grid	Pipeline coating rehabilitation	Wrappingband CZH Outerwrap PVC
2016	The Netherlands	Shell	Pernis, Various pipeline coating rehab works at the Pernis refinery	Wrappingband Outerwrap
2016	Canada		Pipeline coating rehabilitation	Wrappingband Outerwrap
2016	Iran	SZOGPC	Maintenance project on their pipelines	Wrappingband Outerwrap
2016	Mexico	PEMEX	Various pipeline coating rehab works and flange and valve applications	Wrappingband CZH Outerwrap PVC 4100 Putty
2016	Chile	Electrogas	Pipelines wall inlets	Stopaq 2100
2016	Australia	INPEX	Ichthys onshore refinery, Various pipeline coating (rehab) works and flange, valve applications and H-Beam	Wrappingband CZH Paste CZH 4200 Filler Outerwrap PVC
2016	Pakistan	SNGPL	New and rehabiliation works on gas network	Wrappingband Outerwrap
2016	Pakistan	SSGC	New and rehabiliation works on gas network	Wrappingband Outerwrap
2016	Australia	Jemena	Pipeline field joint coating + various rehab works on pipe work	Wrappingband Outerwrap

Year	Country	Client	Project description	Used system
2016	The Netherlands	DOW Chemicals Terneuzen	Rehabiliation of 250 jetty piles and structures	Wrappingband CZ Wrappingband SZ Outerwrap HSPEX Outerglass Shield XT
2016	Oman	PDO Oman	Full rehabilition works on 26km of a 36inch pipeline	Wrappingband CZH Outerwrap PVC
2017	Chile	COPEC	Oleoducto Arica, Coating of fieldjoints on 10" pipe	Wrappingband Outerwrap
2017	Singapore	Shell	Maintenance project	Wrappingband Outerwrap
2017	UAE	Saudi Aramco	Berri Field, Field joint coating 16" & 12"	Wrappingband High Impact Shield
2017	Indonesia	Conoco Philips Indonesia	Full rehabilition works and CUI applications	Wrappingband Outerwrap
2017	Malaysia	Petronas	Offshore Riser Repairs	Wrappingband Outerwrap Outerglass Shield XT
2017	Oman	PDO	Maintenance project 30" x 12.1km	Wrappingband Outerwrap
2017	Chile	Electrogas	Rehabilitation FBE Coating	Wrappingband Outerwrap
2017	Iran	SZOGPC	30inch Gas gathering pipeline maintenance project	Wrappingband Outerwrap
2017	Egypt	BP	Atoll, Field joint coating 20"	Wrappingband Outerwrap
2017	Peru	PetroPeru	Rehabilitation isolation joints	Wrappingband Outerwrap
2017	Qatar	QP	repair of damaged field joints, 12" & 36" CWC pipeline	Wrappingband Outerwrap Outerglass Shield XT
2017	Lithuania	Amber Grid	Maintenance project	Wrappingband Outerwrap Rockshield
2017	The Netherlands	Gasunie	New pipeline project Scheemda	Wrappingband Outerwrap
2017	Singapore	Exxon Mobil	Maintenance project	Wrappingband Outerwrap
2017	Sudan	Petrodar	Petrodar maintenance project 32inch x 6000 repair points of 1m length each	Wrappingband Outerwrap
2017	Singapore	FGE Control	Factory Applied Stopaq Technology	Stopaq FAST GRE
2018	Chile	United	Mineroducto, Fieldjoint coating 10"	Wrappingband Outerwrap

Year	Country	Client	Project description	Used system
2018	Peru	Antamina	Underground objects	Wrappingband Outerwrap
2018	Malaysia	Shell	E6 project, Field joint coating	Wrappingband CZH Outerwrap PVC High Impact Shield Rockshield
2018	Malaysia	Shell	E6 project, Field joint coating	Wrappingband CZH Outerwrap PVC High Impact Shield Rockshield
2018	India	Indian Oil	Filling of annulus with Casing Filler	Casing Filler
2018	Saudi Arabia	Sabic	Splash zone application	Wrappingband SZ Intermediate Wrap Outerwrap PVC Outerglass Shield XT
2018	The Netherlands	Shell Moerdijk	Under Insulation	Wrappingband CZ Outerwrap PVC
2018	The Netherlands	Gasunie	Bemmel project	Wrappingband CZH High Impact Shield

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.

STOPAQ B.V. * GASSELTERSTRAAT 20 * 9503JB STADSKANAAL * THE NETHERLANDS
TEL: (+31)599 696 170 * FAX: (+31)599 696 177 * WWW.SEALFORLIFE.COM * INFO@STOPAQ.COM