

VISCOTAQ



APPLICATION MANUAL



kleiss & co b.v.

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Chapter 1: Introduction

Introduction and general properties

This manual informs you on the application of VISCOTAQ products. This application manual is valid for all VISCOTAQ applications unless otherwise specified.

VISCOTAQ products have been developed for the protection against corrosion of underground and aboveground substrates. VISCOTAQ products have also been developed for sealing pipe and cable conduits, apertures, holes and tank chimes against the water infiltration.

VISCOTAQ products can be used for the

- Coating of pipes
- Coating of risers
- Coating of flanges
- Coating of manholes
- Coating of valves
- Coating of offshore risers and pillars
- Underwater coating of risers
- Coating of welded sockets
- Repair of all type of coatings
- Sealing of pipe and cable conduits
- Sealing of tank chimes
- Sealing of pipe casings

VISCOTAQ will adhere to virtually any existing coatings :

- VISCOTAQ coatings
- Bitumen coatings
- Bitumen coatings containing asbestos
- All type of polymeric coatings like PE, PP
- Polyurethane coatings
- Epoxy coatings
- Concrete coatings

In order to obtain the best performance of VISCOTAQ products it is important that there is no condensation present on the surface to be coated or on or between other coatings (layers). It is furthermore advised that the surface temperature of the substrate to be protected is a minimum 3 C/37.4 F above the dew point. Moreover it is advised to always blast the surface to a near white metal level SA 2-1/2. If blasting of the substrate cannot be accomplished a minimum surface preparation can be achieved by machine brush ST2 or SP3.



Chapter 2: Product Overview

VISCOSEALANT is a viscous-elastic paste type material for the sealing of pipe and cable conduits against the infiltration of moisture and gases. Moreover VISCOSEALANT can be used to seal flange apertures, tank chimes, transformer chambers, swimming pools, sewage treatment plants, air conditioning systems, etc. VISCOSEALANT is a 100% inert material and has an immediate adhesion to wet and dry surfaces of most all underground and aboveground substrates.

VISCOWRAP-HT is a viscous-elastic self healing coat wrap for the protection of underground and aboveground substrates against corrosion. VISCOWRAP-HT can be used in environments or on substrates with a surface temperature up to 71 C/160 F. The material is available in several width/length combinations.

VISCOWRAP-HD is a viscous-elastic coat wrap for the protection of underground and aboveground substrates against corrosion in situations where heavy horizontal and vertical shear loads are expected or where backfill material contains stones. The material can be used in environments or on substrates with a surface temperature up to 50 C. The material is available in several width/length combinations.

VISCOPASTE-HT is a viscous-elastic self healing paste for the protection of underground and aboveground substrates against corrosion. VISCOPASTE-HT is designed to protect voids and uneven surfaces against corrosion and is also used to prevent water infiltration at casing ends, pipe penetration, prefab joints, etc. The material can be used in environments or on substrates with a surface temperature up to 71 C/160 F. The material is delivered in roll form and can be cut to size.

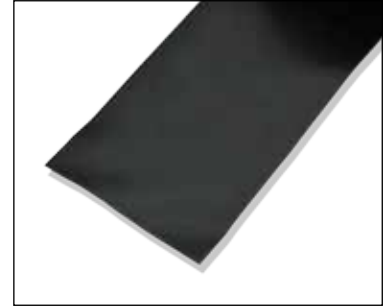
EZ-WRAP is a viscous-elastic self healing coat wrap for encapsulation of substrates and for the protection of underground and aboveground substrates against corrosion and water infiltration. Unlike VISCOWRAP, which has a polyethylene topcoat, EZ-WRAP has a polyester topcoat that can be painted. EZ-WRAP can be used in environments or on substrates with a surface temperature up to 65 C/159,8 F. The material is delivered in rolls of different width/length combinations.

VISCOSLEEVE is a viscous-elastic heat shrink sleeve for the protection of girth welds in pipeline systems. VISCOSLEEVE is applied without a primer. Pre-heating of the field joint is not necessary. VISCOSLEEVE is wrapped around the joint without leaving space underneath and shrinks by the application of a moderate flame.



Chapter 2: Product Overview

VISCOTAQ PVC OuterWrap is used for the mechanical protection of VISCOTAQ materials. The material is available in rolls of different width/length combinations. PVC Outerwrap is advised for bended pipelines < 4".



VISCOTAQ PE OuterWrap is used for the mechanical protection of VISCOTAQ materials. The material is available in rolls of different width/length combinations.



VISCOTAQ PE ShrinkWrap is used for the Heavy Duty mechanical protection of VISCOTAQ products. The material is available in rolls of different width/length combinations. The materials is wrapped hand tight around the VISCOTAQ product and shrinks by the application of a moderate flame.



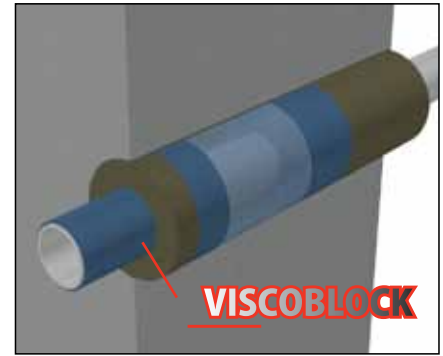
VISCOSHIELD is a UV curing polyester in roll form. When uncured the material is soft and pliable. When cured the material offers a RockShield protection against heavy mechanical impact. The material is available in rolls of different width/length combinations. The materials is wrapped hand tight around the VISCOTAQ product and is cured by the application of UV light. VISCOSHIELD is suitable for mechanical protection of VISCOWRAP during horizontal drilling (HDD).



Chapter 2: Product Overview

VISCOBLOCK is a special fire retardant mortar applied in combination with VISCOSEALANT in pipe and cable conduits. VISCOBLOCK enhances the pressure resistance of VISCOSEALANT against the infiltration of moisture and gases.

VISCOFOAM is delivered in roll form and acts as a barrier/backing when injecting VISCOSEALANT into a conduit.



Chapter 3: Application and testing specification

Read this chapter before using VISCOTAQ products.

This specification covers the application and field test requirements for VISCOTAQ Viscous Elastic Coating Products as an external corrosion barrier for above ground and buried piping, girth welds, fittings, bends, risers and flanges with service temperatures up to 71 C/160 F.

This specification applies to coating of new pipe or repairs to previously coated pipelines. The application procedures and product specifications for the use of the VISCOTAQ products shall be considered an integral part of this specification and the Contractor shall have a copy of this documentation on site prior to the commencement of construction.

3.0 - CONFLICT OF DOCUMENTS

3.0.1 This specification shall not eliminate consideration of the Contractor's standard practices, which may be approved by the Owner if found to be equivalent or superior to the following specified requirements.

3.1 - REFERENCE DOCUMENTS

3.1.1 The following documents or references can be referred to in conjunction with this specification:

Steel Structure Painting Council (SSPC)

| | |
|--------------|--|
| SSPC - SP1 | Solvent Clean |
| SSPC - SP2 | Hand Tool Clean |
| SSPC - SP3 | Power Tool Clean |
| SSPC - SP6 | Commercial Blast Clean |
| SSPC - SP10 | Near White Metal Blast |
| SSPC - VIS 1 | Visual Standard for Abrasive Blast Cleaned Steel |

NACE International (NACE)

NACE - RP0274 High Voltage Electrical Inspection of Pipeline Coatings Prior to Installation.

Canadian Standards Association (CSA)

| | |
|---------------|---|
| CSA - Z245.20 | External Fusion Bond Coating for Steel Pipe |
| CSA - Z245.21 | External Polyethylene Coating for Pipe |
| CSA - Z662 | Oil & Gas Pipeline Systems |

Chapter 3: Application and testing specification

3.2 - DEFINITIONS

Within the body of this specification, the following definitions shall apply:

- **Contractor:** The Contractor or Subcontractor responsible for the protective coating work including all surface preparation and application of the specified coating(s).
- **Cut Back:** End of pipe that is not coated to allow for jointing. Usually about 150 mm/6" to 175 mm/7" long on each end of the pipe to be jointed; can be up to 200 mm/8" long. Once the weld is completed, this area must be coated with the specified joint coating product(s).
- **Holiday:** (Also called a JEEP), a pinhole, scrape, gouge, or other damage to the protective coating that exposes the pipe or substrate to the environment.
- **Mainline Coating:** The plant-applied line pipe coating to which the coating materials must adhere to and be compatible with.
- **Manufacturer:** Kleiss & co b.v/Amcorr Products & Services.
- **NACE:** National Association of Corrosion Engineers.
- **Oil-Free Solvent:** A non-petroleum based cleaner that removes oil & grease, evaporates quickly and does not leave an oily residue.
- **Owner:** The Owner or Operator of the pipeline on which the work is being performed.
- **Owner Representative:** The Construction Coordinator or third party Inspector designated by appropriate Owner authority. This person is responsible to ensure that this specification is followed by the Contractor.
- **SSPC:** The Society for Protective Coatings.
- **Shall, Must, Will:** Mandatory requirements that must be followed unless a waiver is granted.
- **Should:** A preferred or recommended action.

3.3 - MATERIALS AND EQUIPMENT

VISCOTAQ is an amorphous a polar polyolefin in the form of a roll or paste. For additional mechanical protection and soil resistance, it should be over-wrapped with a tensioned PE or PVC outer wrap or VISCOSHIELD.

3.3.1 Materials to be supplied shall be as specified by the Owner.

3.3.2 Approved materials shall be used by the Contractor.

3.3.3 Contractor shall ensure that the crew is equipped with the required equipment and necessary expertise to complete the full scope of work:

- Abrasive blast equipment including a Compressor equipped with oil water traps and acceptable abrasive medium (sand or grit).
- Angle grinder and abrasive discs to achieve power tool clean where required.
- Files for removing weld spatter and other anomalies.
- 80 grit sandpaper for roughening adjoining plant-applied coatings.
- Oil-free Solvent and lint-free wiping rags.
- Knives and/or scissors for cutting and trimming
- Temperature and humidity monitor(s) for ambient conditions and a contact pyrometer for reading surface temperatures. (An infra-red pyrometer is not acceptable).
- Holiday detector

Chapter 3: Application and testing specification

3.4 - GENERAL REQUIREMENTS

3.4.1 A pre-job meeting shall be held prior to start of work. Required attendees shall be the Owner's Representative, including the Third Party Inspector and the Contractor's Job Superintendent.

3.4.2 The Owner shall approve all coating materials, installation procedures, equipment and qualifications of application personnel.

3.4.3 The Contractor shall ensure and be prepared to demonstrate that all personnel applying external pipe coatings are knowledgeable and trained in the application of the coating(s) being used. The 40 years warranty is only applicable in cases where the material is applied by certified applicators, having certificates issued by KLEISS or AMCORR and is witnessed and inspected by a certified coating inspector.

3.4.4 The Contractor shall demonstrate that the proper equipment is used for safely handling coated line pipe to prevent damage to the coating. All personnel shall be knowledgeable in the safe installation of coated pipelines using techniques to minimize coating damage.

3.4.5 Prior to installation, the Contractor shall ensure that storage of all materials is maintained at a minimum of 10°C/50°F and protected from the elements.

Coating of Pipe and Fittings:

- The surfaces of pipe and fittings shall be cleaned in accordance with the specified requirements of VISCOTAQ-HT.
- The coating system shall be applied in accordance with the application procedures.
- For repairs to coated pipe or fittings, the damaged coating shall be removed.
- For buried flanges, the approved materials shall be applied in accordance with the Manufacturer's recommendations.
- Pipe risers and bends shall be coated to a minimum height of 500 mm /1-1/2 ft above the soil air transition.

3.5 - SURFACE PREPARATION

3.5.1 All surfaces shall be cleaned of mud, mill lacquer, wax, tar, oil, grease or other foreign contaminants to Solvent Clean SSPC-SP1 requirements, using an Oil Free Solvent (Acetone, Denatured Alcohol, and Isopropylalcohol). NOTE : Industrial grade citrus based (d'Limonene) products are not approved for use as an oil free solvent.

3.5.2 Existing damaged coating shall be removed before or as part of the surface preparation process.

3.5.3 New and repaired pipe, bends and risers, the pipe surface shall be abrasive blasted to SA 2,5/SSPC-SP10 (Near White Blast) to remove all mill scale, rust or foreign matter and/or dirt. A blast profile of 50 μ to 100 μ /2 to 4 mils shall be achieved. Burrs and weld splatter shall be removed.

3.5.4 For fittings, flanges and hard to reach areas, the surface shall be cleaned to a minimum of ST2/SSPC-SP2 (Hand Tool Clean), however where possible to ST3/SSPC-SP3 PowerTool Clean)

3.5.5 The overlap area on an existing mainline coating shall also be cleaned with an oil free solvent and abraded to minimum ST2/SSPC-SP2 (Hand Tool Clean), allowing for a minimum of 100 mm/4" overlap. The abrading should be accomplished by using 80 grit sandpaper.

3.5.6 Cleaned area shall be blown down with compressed air or brushed to remove remaining dust.

3.5.7 All cleaned areas shall have protective coating applied before end of shift. If a cleaned surface does not get coated, it shall be re-cleaned on the next shift.

Chapter 3: Application and testing specification

3.6 - APPLICATION OF VISCOTAQ-HT TO PIPE, BENDS & RISERS

3.6.1 The VISCOTAQ-HT shall be kept in a climate controlled warehouse to avoid freezing and shall be kept in a warm area, such as the cab of a truck while on the right-of-way to maintain a minimum temperature of 10°C/50°F.

3.6.2 Immediately prior to the application of VISCOTAQ-HT, ambient conditions and surface temperature shall be measured to ensure the surface to be coated is above +5°C/41° F, relative humidity is below 80% and ambient temperature is at least 3°C/37,4° F above the dew point.

3.6.3 While the VISCOTAQ-HT is rated as high as 71 C/160 F service temperature, the product shall not be applied to an operating line at temperatures above 71 C/160 F.

3.6.4 The VISCOTAQ-HT shall be spirally wrapped with tension, at the Manufacturer's recommended overlap of minimum 1 cm or ½ ". The wrapping process shall begin at least 150 mm/6" over the existing coating and extend at least 150 mm/6" onto the tail end of the other coated section.

3.6.5 The Tape shall be gently smoothed out by hand to ensure there are no wrinkles, folds, or entrapped air. Ensure that the tape has completely adhered to the substrate.

3.6.6 If specified, the VISCOTAQ-HT shall be over-wrapped with a Manufacture specified PE outer wrap, applied under tension at a 50% overlap.

3.6.7 The contractor shall use a UV resistant outer wrap approved in writing by KLEISS/AMCORR.

3.6.8 In all cases, the outer wrap shall be applied leaving a visible portion, approximately 6 mm/¼", of VISCOTAQ-HT exposed at both ends of the wrapped section.

3.6.9 For application to flanges or couplings, the Contractor shall follow the relevant application procedure in this manual.

3.7 - APPLICATION OF VISCOTAQ- HT AT ABOVE-GROUND TRANSITIONS

3.7.1 The application shall begin at least 500 mm/18" below soil/air transition and continuing to at least 500 mm/18" above soil/air transition.

3.7.2 The VISCOTAQ-HT shall be over wrapped with a UV Resistant PE Outer wrap, applied under tension with a minimum 50% overlap.

3.7.3 The UV outer wrap shall be applied leaving a visible portion, approximately 6 mm/¼", of the VISCOTAQ- ST/HT exposed at both ends of the wrapped section.

3.7.4 Refer to the application procedure in this manual for visual reference of this wrapping process.

Chapter 3: Application and testing specification

3.8 INSPECTION

3.8.1 The Contractor shall be responsible for quality assurance of the VISCOTAQ-HT Coating System.

3.8.2 The quality assurance program shall be approved and overseen by the Owner's Representative or a third party Inspector as appointed by the Owner.

3.8.3 Visual Inspection

- The Contractor shall provide a qualified individual as a lead hand or foreman to ensure that the correct coating materials and procedures are being used.
- The required minimum tools and equipment must be on site.
- The required surface preparation has been completed.
- The VISCOTAQ- ST/HT and Outer wrap have been applied at the recommended overlap, is wrinkle-free and is completely adhered to the substrate.
- If any of the above requirements are not met, the VISCOTAQ-HT shall be removed and re-applied.
- Each section of applied product that meets the specification shall be marked by the Inspector with a white paint marker visible from the work side of the ditch.

High Voltage Holiday Inspection (Jeeping)

- Prior to burial, all coated pipe and fittings shall be inspected for holidays using AC current holiday detector. Test voltage shall be minimum 15 kV 0,000 volts based on a coating thickness of 1,8 mm/ 70 mils. No holidays (jeeps) shall be accepted.
- The high voltage holiday detector shall come complete with trailing ground wire, correctly sized spring for the pipe diameter, ground spike, wire and clamps for rounding. Never use holiday detectors with DC current !
- On site verification of the correct operation and voltage setting of the holiday detector is required.
- Grounding both the pipe metal and the ground terminal of the detector is necessary to complete the circuit. This must be done through a direct wire connection or by connecting both to earth as a common ground (trailing ground wire). In arid, sandy, rocky or snow covered areas, where there is high electrical resistivity, a direct wire connection between the pipe metal and detector ground terminal shall be maintained. When a trailing wire is used to ground the detector, the wire shall not be coiled or knotted and shall be kept in contact with the earth.
- The wire spring electrode must maintain contact with the coated surface at all times when testing is underway. Any adhered materials such as ice, snow, dirt, etc. must be removed before testing.
- Speed of travel should not exceed a measured walk (1 m /3 ft. per second maximum). The electrode should always be in motion whenever the testing voltage is applied.
- Holiday detectors must be kept clean and free of moisture. Spare, fully charged batteries and test meter shall be available on site during test operations.
- Where jeeps are located in the coating system, the entire circumferential ring shall be cleaned and over-wrapped with VISCOTAQ-HT, overlapping the jeep on both sides by 100 mm/4".

Chapter 3: Application and testing specification

Field Peel Test

- After allowing a minimum of one hour for the VISCOTAQ-HT to set up, the Contractor shall perform random peel tests (and the Pipeline Owner shall request) to ensure proper bonding of the VISCOTAQ-HT.
- The procedure shall be to make two circumferential cuts, each at least 150 mm /6" long and 25 mm/1" wide, with a clean cut across the top. The two cut sections to be peeled shall be minimum 1 m apart.
- The top cut shall be peeled back with a sharp edge so that vise grip pliers may be attached to the tab. The tab shall be pulled at a 90° angle at a measured speed of 100 mm/4" per minute.
- The peel test is a subjective field test used to assess whether proper adhesion to the substrate has been achieved. The peel test is deemed acceptable if the adhesive fails cohesively, with the majority of the inner viscous-elastic layer remaining adhered to the pipe surface.
- The peel test is considered a failure if most of the adhesive easily breaks away from the pipe or plant applied coating surface. When most of the adhesive breaks away from the pipe surface, the VISCOTAQ-HT is deemed to be poorly bonded and defective. Defective VISCOTAQ-HT shall be removed and replaced. The peel test is successful if 70% of the substrate's surface remains covered with VISCOTAQ material after 1 hour.
- If the peel test fails, other peel tests shall be performed, moving backwards on the coated area until a peel test is accepted as a "pass".
- All peel test areas shall be repaired using a new wrap of VISCOTAQ-HT extending 100 mm/4" past both ends of the removed coating. After waiting a minimum of 72 hours but preferably more than 7 days, the peel test procedure shall be conducted whereby 90% of the substrate's surface shall remain covered after peeling.
- If the coating system does not meet the requirements of this specification, the VISCOTAQ-HT shall be removed and re-applied in accordance with this specification by the Contractor.

Chapter 4: Storage Conditions

VISCOTAQ products

- Store boxes in an upright position.
- By preference do not stack pallets.
- Do not store at temperatures below 10 C/50 F zero.
- Do not store at temperatures above 30 C/86 F.
- Store in a dry and by preference climate controlled place at room temperature.
- Never store the product in direct sunlight.

VISCOSHIELD polyester products

- Store in a ventilated and dry place.
- Do not store at temperatures below 10 C/50 F.
- Store at a maximum temperature of 25 C/77 F.
- Avoid application after the shelf life date.

Chapter 5: VISCOTAQ PRODUCT COMBINATIONS

| APPLICATION | VISOWRAP ROLL/SIZE | VISCO PASTE ROLL | EZ-WRAP ROLL/SIZE | VISCO SEALANT CARTRIDGE | PE OUTERWRAP ROLL/SIZE | VISCOSHIELD ROLL/SIZE | VISCOSLEEVE SIZE WIDTH |
|--------------------|--------------------|------------------|-------------------|-------------------------|------------------------|-----------------------|------------------------|
| PIPELINES ≤ 6" | 50 mm/2" | | | | 50 mm/2" | 1000 mm/40" | |
| PIPELINES ≥ 8" | 100 mm/4" | | | | 75 mm/3" | 1000 mm/40" | |
| PIPELINES ≥ 24" | 200 mm/8" | | | | 400 mm/16" | 1000 mm/40" | |
| FLANGES | ANY | | | | | | |
| BALL VALVES | ANY | | | | | | |
| GATE VALVES | ANY | | | | | | |
| RISERS ≤ 6" | 50 mm/2" | | | | 50 mm/2" | 1000 mm/40" | |
| RISERS ≥ 8" | 100 mm/4" | | | | 75 mm/3" | 1000 mm/40" | |
| RISERS ≥ 24" | 200 mm/8" | | | | 100 mm/4" | 1000 mm/40" | |
| FIELD JOINTS ≤ 6" | 50 mm/2" | | | | 50 mm/2" | | 450 mm |
| FIELD JOINTS ≥ 8" | 100 mm/4" | | | | 75 mm/3" | | 450 mm |
| FIELD JOINTS ≥ 36" | 200 mm/8" | | | | 400 mm/16" | | 600 mm |
| TANK CHIMES | | | DEPENDS | | | | |
| RISERS OFFSHORE | DEPENDS | | | | | | |
| CASINGS- FILLER | | | | | | | |
| CASING END SEALS | | | | | | | |
| CONDUITS | | | | | | | |
| FLANGE APERTURES | | | | | | | |

Chapter 6: CERTIFICATION AND 40 YEARS WARRANTY

VISCOTAQ products are manufactured under ISO 9001 standards.

Audits to our factory are possible in cases where you are an approved and certified vendor or a VISCOTAQ end user.

VISCOTAQ products can be supplied with a 40 years warranty. This warranty ensures that once applied the material will remain in the same condition over a period of time of 40 years and will not show any deviations as from the time of application. The material properties will remain the same and not change. The material will for instance not deteriorate, not crack nor become brittle or show more or less moisture or gas permeability. The 40 years warranty is a warranty for continuous material performance. The warranty does not guarantee that no corrosion will occur, as corrosion may occur due to unforeseen circumstances like landslides, earth quakes, specific movements of the pipeline, unforeseen soil stress, unknown chemicals in the ground, terrorist attacks, changes in the pipelines, changes in pipeline operations, increased pipeline temperatures, et cetera. The warranty guarantees that if the coating performance decreases, new coating material will be supplied free of charge. The warranty does not cover consequential damages like labor costs, rental of equipment, inspection services, excavation works, et cetera.

The 40-years warranty is only applicable if VISCOTAQ materials have been applied according to the Kleiss's/Amcorr's instruction by trained and certified applicants. This means that all applicants should have received a VISCOTAQ training by a certified VISCOTAQ trainer and must have passed this training successfully and received a certificate by KLEISS or AMCORR. Moreover the application should be witnessed and inspected by a certified VISCOTAQ inspector and the relevant test reports must have been submitted to KLEISS or AMCORR and approved.

More details about the 40-years warranty you can find on the website www.viscotaq.com or by contacting Leo van Beugen at lvanbeugen@kleiss.nl or Edwin Welles at info@amcorrusa.com

Chapter 7: Repair of damaged pipeline coatings

Materials necessary

- VISCOWRAP
- PE Outer Wrap
- VISCOSHIELD (if necessary)
- PVC Foil (if necessary)
- UV LAMPS (if necessary)

General

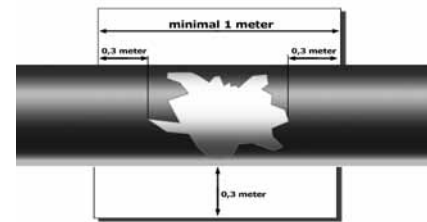
- Damaged coatings can be repaired with VISCOTAQ products. We call this coating rehabilitation.
- In most situations the old coating needs to be removed.

Preparation

- Collect the required amount of VISCOTAQ materials needed to perform the rehabilitation and store them at a location near the working area above 15C/59 F where no traffic or staff will disturb.
- Do not store or expose the VISCOTAQ materials in direct sunlight or moisture.
- VISCOTAQ products can best be applied at temperatures above 15 C/59 F.
- The pipeline to be re-coated should be sufficiently excavated and be easy accessible from all sides.
- The area from the trench bottom to the lower part of the pipeline should be minimal 30 cm/12".
- The working area should be dry and free of obstacles. Use drainage pumps wherever necessary.
- Check whether the surface to be coated is a minimum 3 C/37,4 F above the dew point.
- Protect the surface to be coated from rain and other moisture

Surface preparation

- Remove the old coating from the surface to be re-coated.
- The surface cleanliness must be minimum ST-2, by preference blasted to a level SA 2-1/2.
- The surface to be coated must be clean, dry and free of loose parts, oil and grease.
- The transition to the existing factory coating must be beveled to a 45° angle.
- Where the final layer is applied onto the existing factory coating, the spot must be dried with a burner with moderate flame.
- In case irregularities are found around the repair spot, the certified inspector or chief operations manager should be consulted.
- If the coating contains parts of asbestos bitumen, then the applicable regulations for removal must be followed.



Chapter 7: Repair of damaged pipeline coatings

Dew point measurement

- Make sure that during the application the temperature of the riser is at least 3C/37,4 F above the dew point.
- If necessary heat up the surface of the substrate to be coated.
- In order to reduce the risk of upcoming condensation, apply the material in one sequence without interruption.
- Apply VISCOTAQ material if possible above 15 C/34,7 F

Application of VISCOWRAP Inner Wrap

- The existing factory coating must be beveled to an angle of 45 degrees (if applicable). In case of thick coatings, like bitumen or coal tar enamel, a bridge should be made on the bare steel onto the coating transition with a first straight circumference wrap. This will facilitate to proper wrap over the 45 degrees angle.
- Start with a first straight on the existing factory coating on a 12 o'clock position. The overlap onto the existing factory coating should be minimal 15 cm/6".
- The first circumference wrap must be straight. Then start wrapping as a cigar wrap.
- Wrap the VISCOWRAP with tension with a minimum 1 cm overlap.
- End on the other coating side with a straight wrap. The overlap on the other coating side should also be minimal 15 cm/6".
- Eventual irregularities can be filled with VISCOPASTE.
- Test the coating with a holiday detector at minimum 15 kV.



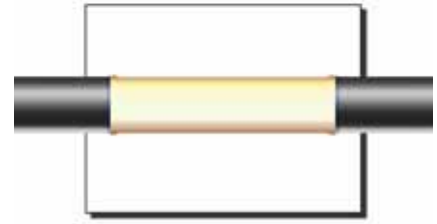
Application of the PE Outer Wrap

- PE Outer Wrap shall be wrapped with a 50% minimum overlap.
- The first wrap should be straight and then followed by a cigar wrap.
- The last section should end on a 4 o'clock position and be applied onto the pipe without tension.
- A 6 mm/ 1/4" section of VISCOWRAP material should still be visible after the PE Outer Wrap had been applied.
- In case the PE Outer Wrap is applied in above ground situations, the last section of the PE Outer Wrap should be applied without tension and at the spot where the last sections is applied the surface underneath should be lightly roughened with a sandpaper and cleaned with isopropyl alcohol.

Chapter 7: Repair of damaged pipeline coatings

Application of VISCOSHIELD

- VISCOSHIELD is applied in situations where heavy mechanical impacts can be expected.
- When not cured VISCOSHIELD is soft and pliable and can be cut to size. VISCOSHIELD must always be stored in a climate controlled and ventilated location under 25 C/77 F. The material must be stored dry conditions and kept out of UV sunlight.
- VISCOSHIELD cannot be applied at temperatures below 10 C/50 F.
- VISCOSHIELD rolls can be cut to the required circumference pipe size.
- The circumference overlap is minimum 10 cm/4" so a pre-cut section of VISCOSHIELD should be the circumference plus 10 cm/4".
- The overlap in linear direction should be minimum 5 cm/2".
- Remove the inner release liner of the VISCOSHIELD and wrap it onto the pipeline.
- Remove the top release liner wherever an overlap is created so that the bare material (without membrane) touch each other.
- After application, the VISCOSHIELD should be squeezed with a transparent PVC tape or foil that allows sunlight to pass through.
- Especially at both ends and on the overlap the PVC tape or foil should be wrapped with maximum tension.



Curing of VISCOSHIELD

- VISCOSHIELD will cure under UV light.
- The stronger the UV light the faster curing will happen.
- In case there is no sun or UV light, special UV lamps can be used and installed on different locations alongside the pipeline.
- When using artificial light always work with 2 or more lamps and install them on both sides of the pipeline at a distance of maximum 70 cm/2 ft.
- Use aluminum sheets under the pipeline for reflection.

Warning

- The UV light of the lamps is hazardous and can cause a person to become temporally blinded.
- Always wear special sunglasses in order to protect the eyes from the UV light.

Painting

After curing of the VISCOSHIELD the material can be painted if necessary. In order to paint VISCOSHIELD, the top membrane should be removed before curing.

Chapter 8: Coating of risers

Materials Necessary

- VISCOWRAP
- PE Outer Wrap
- VISCOSHIELD (if necessary)
- PVC Foil (if necessary)
- UV LAMPS (if necessary)

General

- Risers are especially sensitive to corrosion due to a soil/air transition.
- Always start wrapping from the bottom to the top: the overlap is then on top of the previous wrap in the upper direction.

Preparation

- Collect the required amount of VISCOTAQ materials needed to perform the rehabilitation and store them at a location near the working area above 15C/34,7 F where no traffic or staff will disturb.
- Do not store or expose the VISCOTAQ materials in direct sunlight or moisture.

Surface preparation

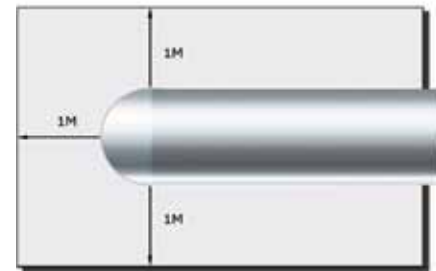
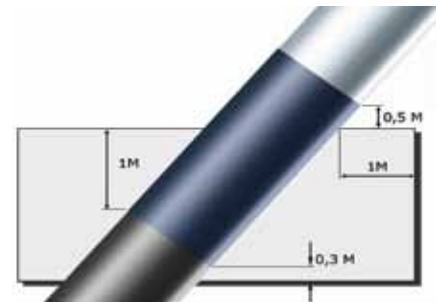
- In case of rehabilitation, remove the old coating from the surface to be re-coated. The surface cleanliness must be minimum ST-2, by preference blasted to a level SA 2-1/2.
- The surface to be coated must be clean, dry and free of loose parts, oil and grease.
- An eventual transition to an existing factory coating must be beveled to a 45° angle.
- Where the final layer is applied onto an existing factory coating, the spot must be dried with a burner with moderate flame.

Surface of the riser to be covered

- Protect the riser minimum 0,5 m/1-1/2 ft. below the soil/air transition.
- Protect the riser minimum 0,5 m/1-1/2 ft. above the soil/air transition.

Dew point measurement

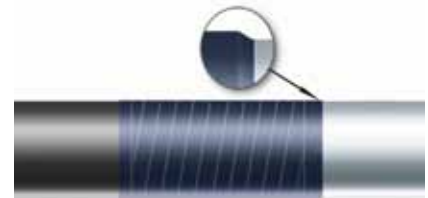
- Make sure that during the application the temperature of the riser is at least 3C/37,4 F above the dew point.
- If necessary heat up the surface of the riser a little bit.
- In order to reduce the risk of upcoming condensation, apply the material in one sequence without interruption.
- Apply VISCOTAQ material if possible above 15 C/34,7 F



Chapter 8: Coating of risers

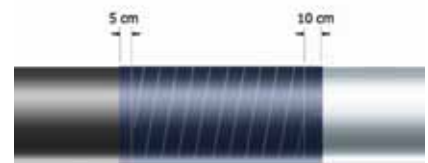
Application of VISCOWRAP material

- The existing factory coating must be beveled to an angle of 45 degrees (if applicable). In case of thick coatings, like bitumen or coal tar enamel, a bridge should be made on the bare steel onto the coating transition with a first straight circumference wrap. This will facilitate to proper wrap over the 45 degrees angle.
- Start with a first straight on the existing factory coating on a 12 o'clock position. The overlap onto the existing factory coating should be minimal 15 cm/6"
- The first circumference wrap must be straight. Then start wrapping as a cigar wrap.
- Wrap the VISCOWRAP with tension with a minimum 1 cm overlap.
- End on the other coating side with a straight wrap. The overlap on the other coating side should also be minimal 15 cm/6"
- Eventual irregularities can be filled with VISCOPASTE.
- Test the coating with a holiday detector at minimum 15 kV.



Application of the PE Outer Wrap

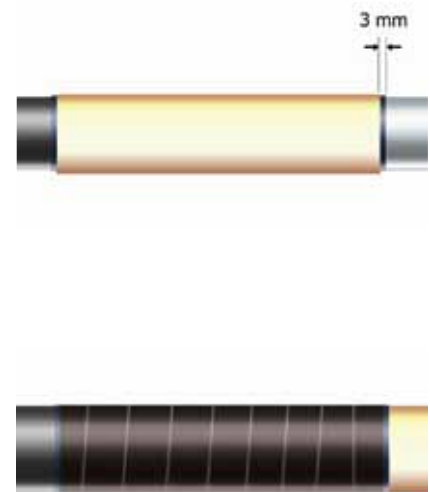
- PE Outer Wrap shall be wrapped with a 50% minimum overlap.
- The first wrap should be straight and then followed by a cigar wrap.
- The last section should end on a 4 o'clock position and be applied onto the pipe without tension.
- A 6 mm/ 1/4" section of VISCOWRAP material should still be visible after the PE Outer Wrap had been applied.
- In case the PE Outer Wrap is applied in above ground situations, the last section of the PE Outer Wrap should be applied without tension and at the spot where the last sections is applied the surface underneath should be lightly roughened with a sandpaper and cleaned with isopropyl alcohol.



Chapter 8: Coating of risers

Application of VISCOSHIELD

- VISCOSHIELD is applied in situations where heavy mechanical impacts can be expected.
- When not cured VISCOSHIELD is soft and pliable and can be cut to size. VISCOSHIELD must always be stored in a climate controlled and ventilated location under 25 C/77 F. The material must be stored dry conditions and kept out of UV sunlight.
- VISCOSHIELD cannot be applied at temperatures below 10 C/50 F.
- VISCOSHIELD rolls can be cut to the required circumference pipe size.
- The circumference overlap is minimum 10 cm/4" so a pre-cut section of VISCOSHIELD should be the circumference plus 10 cm/4".
- The overlap in linear direction should be minimum 5 cm/2".
- Remove the inner release liner of the VISCOSHIELD and wrap it onto the pipeline.
- Remove the top release liner wherever an overlap is created so that the bare material (without membrane) touch each other.
- After application, the VISCOSHIELD should be squeezed with a transparent PVC tape or foil that allows sunlight to pass through.
- Especially at both ends and on the overlap the PVC tape or foil should be wrapped with maximum tension.



Curing of VISCOSHIELD

- VISCOSHIELD will cure under UV light.
- The stronger the UV light the faster curing will happen.
- In case there is no sun or UV light, special UV lamps can be used and installed on different locations alongside the pipeline.
- When using artificial light always work with 2 or more lamps and install them on both sides of the pipeline at a distance of maximum 70 cm/2 ft.
- Use aluminum sheets under the pipeline for reflection.

Warning

- The UV light of the lamps is hazardous and can cause a person to become temporally blinded.
- Always wear special sunglasses in order to protect the eyes from the UV light.

Painting

After curing of the VISCOSHIELD the material can be painted if necessary. In order to paint VISCOSHIELD, the top membrane should be removed before curing.

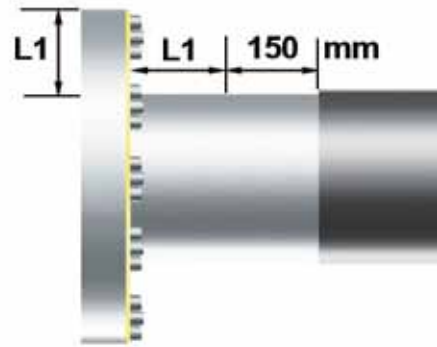
Chapter 9: Application of VISCOSHIELD

Materials necessary

- VISCOSHIELD
- PVC tape or foil
- Stanley knife

General

- VISCOSHIELD is applied in situations where excessive horizontal or vertical shear loads are expected or in the case of rocky soils.
- VISCOSHIELD is a UV curing polyester and is delivered as a roll. In non cured condition it is soft and pliable and it can be cut and paste to any form. Once cured it gives a RockShield protection against heavy impacts.



Storage

- Store VISCOSHIELD in a dry, dark and cool place.
- Do not store above 25 C/77 F.
- Store in a ventilated area and never expose the boxes to direct sunlight.

Application temperature

- Apply the material if possible between 10 C/50 F and 25 C/77 F.
- Do not apply under 10 C/50 F. If the temperature drops below 10 C/50 F, it is advised to create a shelter and to increase the temperature under the shelter above 10 C/50 F by means of a heat blower.

Preparation

- All necessary tools should be present and easily accessible so that no time is lost during cutting and application.
- Create an area where the boxes can be stored and the material can be cut without exposure to direct sunlight, like a shelter or a container.

Chapter 9: Application of VISCOSHIELD

Application

- The area where the material is applied should be sufficiently ventilated.
- The area where the material is applied should be protected from UV light.
- Never expose VISCOSHIELD to direct sunlight during application.
- Pre-cut the material in a dark place or a place in the shadow.
- Cut the material to size of the circumference of the pipe in such way that an overlap of 10 cm/4" is created in circumference direction.
- The overlap is a minimum of 5 cm/2" in linear direction.
- Remove the release liner/membrane on the spot where the overlap is created so that bare material adheres to bare material.
- Wrap the material around the pipeline with light tension. Avoid wrinkles.
- In case of more than one wrap in linear direction, the top membrane from the wrapped VISCOSHIELD should be removed over a width of 5 cm/2" so that VISCOSHIELD is applied on the previous wrap on bare material and not onto the membrane.
- After application of VISCOSHIELD the material should be wrapped under tension with a PVC tape or foil to assure good adhesion.

Curing of VISCOSHIELD

- VISCOSHIELD will cure under UV light.
- The stronger the UV light the faster curing will happen.
- In case there is no sun or UV light, special UV lamps can be used and installed on different locations alongside the pipeline
- Always work with 2 or more lamps and install them on both sides of the pipeline at a distance of maximum 70 cm/2 ft.
- Use aluminum sheets under the pipeline for reflection.

Warning

- The UV light of the lamps is hazardous and can cause temporary blindness.
- Always wear special sunglasses in order to protect the eyes from the UV light.

Painting

After curing of the VISCOSHIELD the material can be painted if necessary. Painting can only be performed after the top membrane is removed.

Chapter 10: Coating of new pipelines with welded seams

Materials necessary

- VISCOWRAP
- PE Outer Wrap
- VISCOSHIELD (if necessary)
- PVC Foil (if necessary)
- UV LAMPS (if necessary)

General

Longitudonal or spiral welds on a pipeline need to be protected with a single 5 mm strip of VISCOWRAP prior to wrapping of VISCOWRAP.

Preparation

- Collect the required amount of VISCOTAQ materials needed to perform the wrapping and store them at a location near the working area above 15 C/34,7 F where no traffic or staff will disturb.
- Do not store or expose the VISCOTAQ materials in direct sunlight or moisture.
- The pipeline to be coated should be sufficiently excavated and be easy accessible from all sides.
- The area from the trench bottom to the lower part of the pipeline should be minimal 30 cm/12".
- The working area should be dry and free of obstacles. Use drainage pumps wherever necessary.
- Check whether the surface to coated is minimum 3 C/37,4 F above the dew point.
- Protect the surface to be coated from rain and other moisture.

Surface preparation

- The surface cleanliness must be minimum ST-2, by preference blasted to a level SA 2-1/2.
- The surface to be coated must be clean, dry and free of loose parts, oil and grease.

Dew point measurement

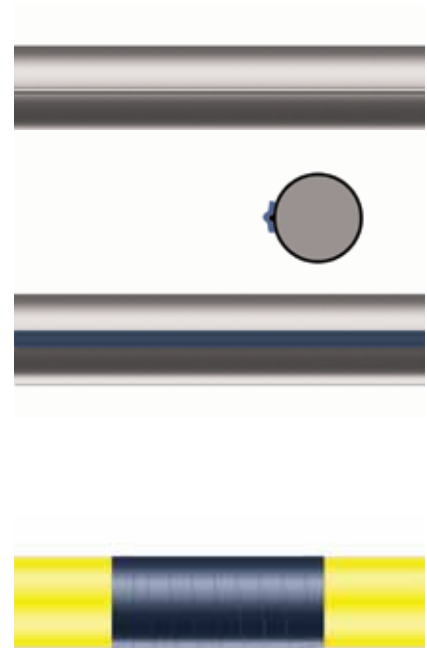
- Make sure that during the application the temperature of the substrate is at least 3 C/37,4 F above the dew point.
- If necessary heat the surface of the substrate.
- In order to reduce the risk of upcoming condensation, apply the material in one sequence without interruption.
- Apply VISCOTAQ material if possible above 15 C/59 F.



Chapter 10: Coating of new pipelines with welded seams

Application of VISCOWRAP Inner Wrap

- VISCOTAQ products can best be applied at temperatures above 15 C/59 F.
- In case of a longitudinal or spiral weld, apply a 50 mm wide strip of VISCOWRAP material over the weld and smooth with a roller.
- The existing factory coating must be beveled to an angle of 45 degrees (if applicable). In case of thick coatings, like bitumen or coal tar enamel, a bridge should be made on the bare steel onto the coating transition with a first straight circumference wrap. This will facilitate to proper wrap over the 45 degrees angle.
- Start with a first straight on the existing factory coating on a 12 o' clock position. The overlap onto the existing factory coating should be minimal 15 cm/6".
- The first circumference wrap must be straight . Than start wrapping as a cigar wrap.
- Wrap the VISCOWRAP with tension with a minimum 1 cm overlap.
- End on the other coating side with a straight wrap . The overlap on the other coating side should also be minimal 15 cm/6".
- Eventual irregularities can be filled with VISCOPASTE.
- Test the coating with a holiday detector at minimum 15 kV.



Application of the PE Outer Wrap

- PE Outer Wrap shall be wrapped with a 50% minimum overlap. Wrap the PE Outer Wrap by preference in reverse direction. So start where you ended with the VISCOWRAP
- The first wrap should be straight and then followed by a cigar wrap.
- The last section should end on a 4 o'clock position and be applied onto the pipe without tension.
- A 6 mm/ ¼" section of VISCOWRAP material should still be visible after the PE Outer Wrap had been applied.
- In case the PE Outer Wrap is applied in above ground situations, the last section of the PE Outer Wrap should be applied without tension and at the spot where the last sections is applied the surface underneath should be lightly roughened with a sandpaper and cleaned with isopropyl alcohol.

Chapter 10: Coating of new pipelines with welded seams

Application of VISCOSHIELD

- VISCOSHIELD is applied in situations where heavy mechanical impacts can be expected.
- When not cured VISCOSHIELD is soft and pliable and can be cut to size. VISCOSHIELD must always be stored in a climate controlled and ventilated location under 25 C/77 F. The material must be stored dry conditions and kept out of UV sunlight.
- VISCOSHIELD cannot be applied at temperatures below 10 C/50 F.
- VISCOSHIELD rolls can be cut to the required circumference pipe size.
- The circumference overlap is minimum 10 cm/4" so a pre-cut section of VISCOSHIELD should be the circumference plus 10 cm/4".
- The overlap in linear direction should be minimum 5 cm/2".
- Remove the inner release liner of the VISCOSHIELD and wrap it onto the pipeline.
- Remove the top release liner wherever an overlap is created so that the bare material (without membrane) touch each other.
- After application, the VISCOSHIELD should be squeezed with a transparent PVC tape or foil that allows sunlight to pass through.
- Especially at both ends and on the overlap the PVC tape or foil should be wrapped with maximum tension.



Curing of VISCOSHIELD

- VISCOSHIELD will cure under UV light.
- The stronger the UV light the faster curing will happen.
- In case there is no sun or UV light, special UV lamps can be used and installed on different locations alongside the pipeline.
- When using artificial light always work with 2 or more lamps and install them on both sides of the pipeline at a distance of maximum 70 cm/2 ft.
- Use aluminum sheets under the pipeline for reflection.

Warning

- The UV light of the lamps is hazardous and can cause a person to become temporally blinded.
- Always wear special sunglasses in order to protect the eyes from the UV light.

Painting

After curing of the VISCOSHIELD the material can be painted if necessary. In order to paint VISCOSHIELD, the top membrane should be removed before curing.

Chapter 11: Coating of girth welds

Materials necessary

- VISCOWRAP
- PE Outer Wrap
- VISCOSHIELD (if desirable)
- UV Lamps (if necessary)
- VISCOSLEEVE
- Burner

General

- Field welded joints, also called girth welds, can be coated with VISCOWRAP VISCOWRAP or VISCOSLEEVE.

Preparation

- Excavate the field welded joint in such way that it is freely accessible from all sides. Make sure that there is enough space under the pipeline. The minimum excavated space is 30 cm/12" from the bottom of the trench to the lower part of the pipeline.
- Keep the working area clean and dry at all times. Avoid the presence of water.
- Regularly check whether the surface of the pipeline is 3 C/37,4 F above the dew point.
- Protect the working area from rain and other moisture.

Surface preparation

- In case of rehabilitation the old coating should be removed. Remove loose parts, grease, debris and moisture.
- The minimum surface should be ST-2 but in order to obtain best values blast the pipe to a surface level near white metal SA 2-1/2.
- Remove sharp edges on the welds. Do this by means of a grinding machine.
- Bevel the factory/adjacent coating of the pipeline to which a connection must be made to an angle of 45 degrees.
- The adjacent coating must be roughened by means of sand paper or a grinding machine.

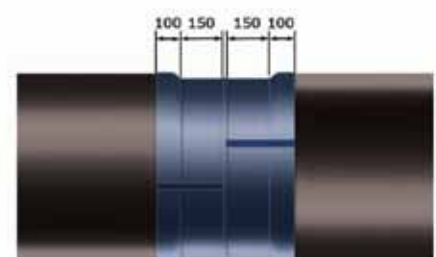
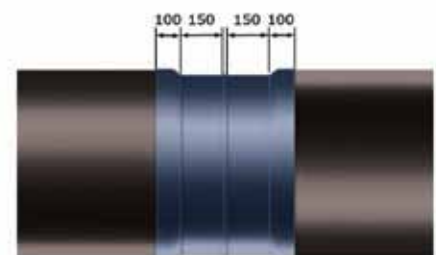
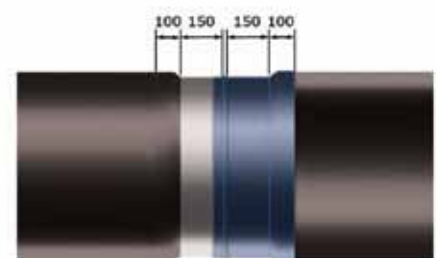
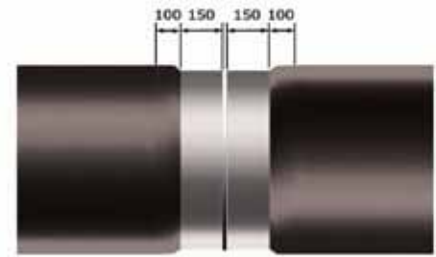
Overlap onto the existing pipe coating:

< 30" pipelines 10 cm/4"

> 30" pipelines 15 cm/6"

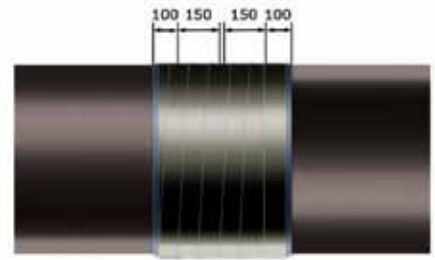
Application of the VISCOWRAP Inner Wrap

- The existing factory coating must be beveled to an angle of 45 degrees (if applicable). In case of thick coatings, like bitumen or coal tar enamel, a bridge should be made on the bare steel onto the coating transition with a first straight circumference wrap. This will facilitate to proper wrap over the 45 degrees angle.
- Start with a first straight on the existing factory coating on a 12 o' clock position. The overlap onto the existing factory coating should be minimal 15 cm/6"
- The first circumference wrap must be straight. Then start wrapping as a cigar wrap.



Chapter 11: Coating of girth welds

- Wrap the VISCOWRAP with tension with a minimum 1 cm overlap.
- End on the other coating side with a straight wrap . The overlap on the other coating side should also be minimal 15 cm/6".
- Eventual irregularities can be filled with VISCOPASTE.
- Test the coating with a holiday detector at minimum 15 kV.



Application of VISCOTAQ PE outer wrap

- PE Outer Wrap shall be wrapped with a 50% minimum overlap.
- The first wrap should be straight and then followed by a cigar wrap.
- The last section should end on a 4 o'clock position and be applied onto the pipe without tension.
- A 6 mm/ ¼" section of VISCOWRAP material should still be visible after the PE Outer Wrap had been applied.
- In case the PE Outer Wrap is applied in above ground situations, the last section of the PE Outer Wrap should be applied without tension and at the spot where the last sections is applied the surface underneath should be lightly roughened with a sandpaper and cleaned with isopropyl alcohol.

Application of VISCOSHIELD Outer Wrap

- VISCOSHIELD is applied in situations where heavy mechanical impacts can be expected.
- When not cured VISCOSHIELD is soft and pliable and can be cut to size. VISCOSHIELD must always be stored in a climate controlled and ventilated location under 25 C/77 F. The material must be stored dry conditions and kept out of UV sunlight.
- VISCOSHIELD cannot be applied at temperatures below 10 C/50 F.
- VISCOSHIELD rolls can be cut to the required circumference pipe size.
- The circumference overlap is minimum 10 cm/4" so a pre-cut section of VISCOSHIELD should be the circumference plus 10 cm/4".
- The overlap in linear direction should be minimum 5 cm/2".
- Remove the inner release liner of the VISCOSHIELD and wrap it onto the pipeline.
- Remove the top release liner wherever an overlap is created so that the bare material (without membrane) touch each other.
- After application, the VISCOSHIELD should be squeezed with a transparent PVC tape or foil that allows sunlight to pass through.
- Especially at both ends and on the overlap the PVC tape or foil should be wrapped with maximum tension.

Chapter 11: Coating of girth welds

Curing of VISCOSHIELD

- VISCOSHIELD will cure under UV light.
- The stronger the UV light the faster curing will happen.
- In case there is no sun or UV light, special UV lamps can be used and installed on different locations alongside the pipeline.
- When using artificial light always work with 2 or more lamps and install them on both sides of the pipeline at a distance of maximum 70 cm/2 ft.
- Use aluminum sheets under the pipeline for reflection.



Warning

- The UV light of the lamps is hazardous and can cause a person to become temporally blinded.
- Always wear special sunglasses in order to protect the eyes from the UV light.

Painting

- After curing of the VISCOSHIELD the material can be painted if necessary. In order to paint VISCOSHIELD, the top membrane should be removed before curing.

Application of VISCOSLEEVE

- VISCOSLEEVE material is supplied as pre-cut sleeves upon customer specification or as 30 m/100ft. rolls.
- Dry of the pipe by means of a moderate flame. This will create a hand warm surface.
- Wrap the sleeve around the weld. The circumference overlap to be made should be on a 1 o clock position.
- The linear overlap on both sides onto the factory coating should be minimal 5 cm/2".
- Unlike conventional sleeves the sleeves is wrapped hand tight around the weld but not too tight. Some space for shrinking should be left.
- The side of the sleeve that has a 45 cut on both corners is the section to be overlapped.
- Heat other side of the sleeve with a moderate flame and patch this side onto the side that has the cut corners.
- Heat the closure patch at one side and attach the patch to one side of the overlap.
- Heat the other side of the closure patch and attach the patch to the other side of the overlap.
- Use a roller to remove eventual air bubbles and smoothen the patch.
- Use a moderate flame and start heating the shrink sleeve from the middle to the left side in circumference direction.
- Do the same in the right direction.
- The sleeve is sufficiently heated if blue material escapes from both edges of the sleeve.
- Finish with a roller and remove air bubbles and smoothen irregular parts.

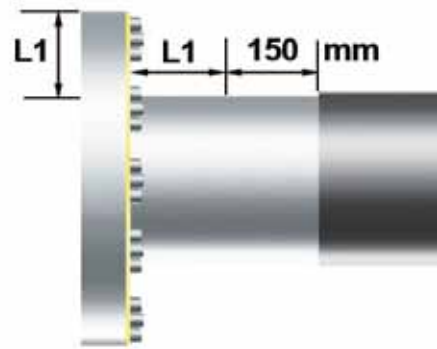
Chapter 12: Coating of underground flanges and exposed substrates

Materials Necessary

- VISCOWRAP
- VISCOPASTE
- VISCOSEALANT
- PE Outer Wrap
- VISCOSHIELD (if necessary)
- UV lamps (if necessary)
- PVC foil or tape (if necessary)

General

- Underground flanges and exposed substrates can be protected with, VISCOPASTE; often in conjunction with VISCOWRAP and VISCOSEALANT.
- VISCOPASTE is supplied as a mastic type material that can be molded around exposed objects.



Preparations

- Make sure that the substrate is freely accessible from all sides.
- The distance between the trench bottom and the object should be minimum 30 cm/12".
- The working area must be kept dry and clean. Use pumps to remove excessive water.
- Check whether the surface of the pipeline is 3 C/37,4 F above the dew point.
- Protect the working area against rain and other moisture.

Surface preparation

- Remove debris, oil, grease and loose coating parts from the substrate to be protected. The transition to the factory coating must be beveled (if applicable) at an angle of 45 degrees.
- The minimum surface preparation is ST-2. It is preferred to have a near white metal surface of SA-2-1/2.
- When grinding or blasting the flange, the insulation flange or gasket must be protected in order to avoid damaging.
- Roughen the factory or existing coating of the pipe with sand paper. This is the location where the VISCOWRAP will be applied.
- In case of the presence of asbestos materials, the local regulations for removal of this material must be taken into consideration.

Application of VISCOWRAP material.

- The existing factory coating must be beveled to an angle of 45 degrees (if applicable). In case of thick coatings, like bitumen or coal tar enamel, a bridge should be made on the bare steel onto the coating transition with a first straight circumference wrap. This will facilitate to proper wrap over the 45 degrees angle.
- Start wrapping the VISCOWRAP material as near to the flange as possible. The first wrap must be straight. The first wrap must be at least in a vertical position under the bolts.

Chapter 12: Coating of underground flanges and exposed substrates

- Wrap into the direction of the factory coating and end straight with an overlap of minimum 150 cm/64" onto the factory coating.
- Wrap with minimum 1 cm/1/2" overlap.
- Wrap by preference at temperatures > 15 C/59 F.



Application of VISCOPASTE material

- For optimum application of VISCOPASTE, the material should have a temperature by preference above 25 C/77 F.
- The material should not be too cold otherwise the material will be stiff and have too low of a viscosity for application in difficult to reach areas.
- Cut the VISCOPASTE material in smaller parts and push into the flange area to be protected.
- Use gloves and a putty knife and knead the VISCOPASTE to a 45 degrees angle from the flange rim toward the pipeline.
- All bolts and nuts or other exposed objects should be covered with VISCOPASTE.
- Avoid inclusion of air and moisture.



Application of VISCOSEALANT

- In cases where there is enough space, fill the flange aperture with VISCOSEALANT.
- Apply the VISCOSEALANT all the way around the flange.
- Smooth the surface with a putty knife, removing excessive material.



Application of VISCOWRAP material on the flange outer rim

- Wrap one layer of VISCOWRAP material in the circumference length of the flange.
- End with an circumference overlap of 5 cm/2".
- In case the flange is too wide for one wrap, make multiple single wraps, in such way that the circumference overlap is at least 1 cm/ 1/2".
- In cases of multiple circumference overlaps, they should be positioned in such way that they do not overlap each other.



Application of the PE Outer Wrap

- The VISCOPASTE material should have a smooth and uniform structure and by preference a 45 degrees angle from the flange top to the pipeline.
- Start wrapping the PE Outer Wrap on the flange rim to one side and wrap down with a 75% overlap. After finishing make the same wrap to the other side and end in the same way. Make sure that the last wrap is applied without tension and smoothly fix the PE end to the pipe.
- A 6 mm / 1/4 inch section of VISCOWRAP material should always be visible after the PE Outer Wrap had been applied.



Chapter 12: Coating of underground flanges and exposed substrates

Application of VISCOSHIELD

- In case of expected heavy mechanical forces it is advised to protect the flange construction with VISCOSHIELD.
- Do not apply VISCOSHIELD directly onto VISCOPASTE but first protect the body with VISCOWRAP.
- Cut the VISCOWRAP layers to the desired size and apply them from one side of the flange, over the flange, to the other side of the flange, hence in a linear direction, with a 3 cm/1" overlap.
- Calculate the required material of VISCOSHIELD to be cut out of a roll so that the whole circumference of the flange can be wrapped. Cut the sheet of VISCOSHIELD out of the roll (roll size = 10 m/30ft x 1 m/3ft). Cut the sheet in such way that when it is wrapped over the flange an overlap can be created in circumference direction of 10 cm/4" and minimum 10 cm onto the pipeline.
- Make cuts into both side of the VISCOSHIELD sheet in such way that the cuts extend to the pipeline face when the sheet is applied on the flange construction.
- Remove BOTH membranes of the sheet and fold the sheet over the flange.
- Close the separate legs of the sheet (that you have created by cutting the sheet) in such way that they overlap each other and form a closed surface and carefully smoothen the surface with a roller.
- Finish with the application by squeezing the body with a transparent PVC tape or PVC foil.

Curing of VISCOSHIELD

- VISCOSHIELD will cure under UV light.
- The stronger the UV light the faster curing will happen.
- In case there is no sun or UV light, special UV lamps can be used and installed on different locations alongside the pipeline
- When using artificial light always work with 2 or more lamps and install them on both sides of the pipeline at a distance of maximum 70 cm/2 ft.
- Use aluminum sheets under the pipeline for reflection.

Warning

- The UV light of the lamps is hazardous and can cause a person to become temporarily blinded.
- Always wear special sunglasses in order to protect the eyes from the UV light.

Painting

After curing of the VISCOSHIELD the material can be painted if necessary. This can only be done if the top membrane is removed over its full length.

Chapter 13: Protection of seals, bolts and flange apertures

Materials necessary

- ViscoSealant
- ViscoWrap
- PE outerwrap

Preparation

- The working area must be accessible from all sides.
- Scaffolding should be secured if applicable.

Surface preparation

- Clean the surface between the flange and remove foreign material like dust, leaves, dead insects et cetera.
- An air tool can be used but be careful not to damage the gasket.
- Clean the flange neck to a minimum level ST-2 and by preference SA 2-1/2.
- When blasting the gasket should be protected.

Application of VISCOSEALANT

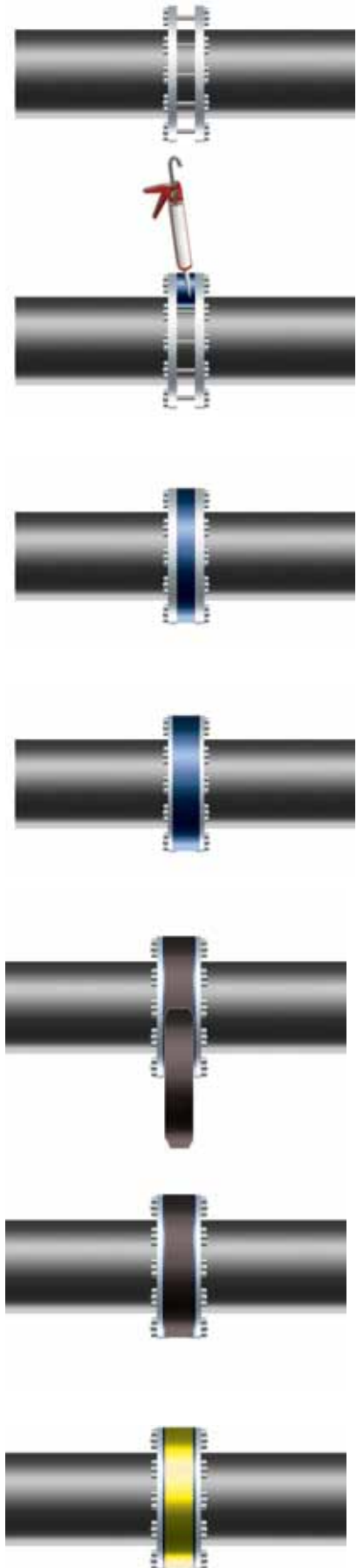
- Protect the flange neck with a removable tape in order not to pollute the neck with the VISCOSEALANT.
- Inject the VISCOSEALANT cartridge into a caulking gun and inject the VISCOSEALANT in the complete circumference of the flange.
- Remove excessive material with a putty knife. Dependable upon the flange class and flange type a flexible nozzle can be used in order to penetrate the flange aperture successfully.

Application of VISCOWRAP

- Remove the protective tape and apply one layer of VISCOWRAP over the complete circumference of the flange and make an overlap of at least 5 cm.
- In case the flange neck does not match the width of the VISCOWRAP, than make two separate wraps, in such way that the circumference overlap between the two wraps is always minimum 1 cm - 1/2". More is possible, less is not allowed.

Application of PE Outer Wrap

- Apply minimum one layer of PE outer wrap with tension over the complete circumference of the flange.
- Apply the end of the tape without tension. In case the flange neck does not match the width of the PE tape, wrap the tape with an overlap of 50% over the whole flange width.
- It is preferred to roughen the surface of the PE to which the last part is attached to with a sand paper and to adhere the end of the PE with a butyl primer to the surface in order to get a proper adhesion.



Chapter 13: Protection of seals, bolts and flange apertures

VISCOSHIELD

- In case extra mechanical protection is needed, it is advised to wrap one layer of VISCOSHIELD on the flange rim.
- We advise to use VISCOSHIELD reels, available in several widths.
- Cut the reel to the desired width and remove the release liner.
- Wrap the VISCOSHIELD over the entire circumference of the flange and finish by making an overlap of about 5 cm/2".
- When making an overlap, remove the upper membrane of the VISCOSHIELD to which the wrapped section will be attached to for a better adhesion and fold back once applied.
- Read the application instructions for VISCOSHIELD in this manual.

Chapter 14: Sealing of pipe and cable wall conduits

Materials necessary

- ViscoSealant
- Foam
- Caulking gun
- ViscoBlock

Product description

ViscoSealant is a non curing paste that can be used to seal conduits where single or multiple pipes or cables penetrate a wall against the infiltration of moisture or gasses

Characteristics

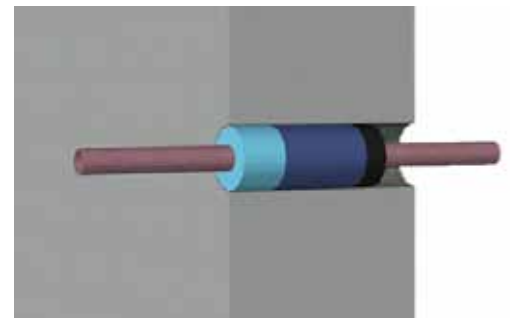
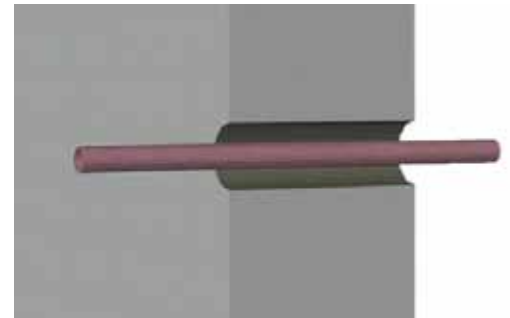
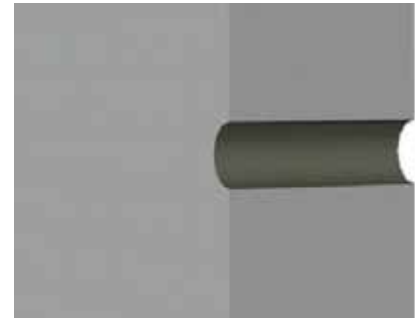
| | |
|--------------------------------|--|
| Maximum operating temperature: | 35C/95F without ViscoBlock 50C/122F with ViscoBlock |
| Surface | free from grease, oil, debris and loose parts |
| Application on wet surfaces | yes |
| Sandblasting | not necessary |
| Maximum pressure | 2bar/29 PSI with ViscoBlock |

Preparation

- Remove all debris, loose parts, oil and grease from the conduit and clean the cables.
- Clean the surface thoroughly with a wire brush and if possible with clean water. VISCOSEALANT bonds on a wet surface so it is not necessary to dry the surface.
- Do not use crossbars for pipe or cable supports as this will cause leaking.
- Place the ViscoSealant cartridges in a container with warm water of 25-30 C/86F so that the material obtains the right temperature for proper injection.

Positioning of pipes and cables.

- Apply a foam backing inside the conduit. The backing should be about 15 cm from the opening of the pipe. The backing is important otherwise the ViscoSealant is injected into a hollow space.
- It is important that the pipe and cable is centered as much as possible. In case of multiple pipes and cables, center and separate the pipes and cables in such way that a space exists between objects of a minimum 1 cm/1/2".
- Clean the pipe and cable again and make sure not loose parts are present.



Chapter 14: Sealing of pipe and cable wall conduits

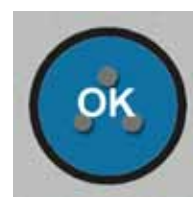
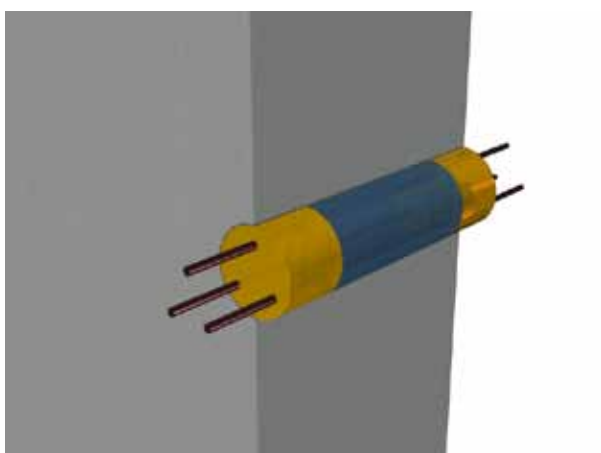
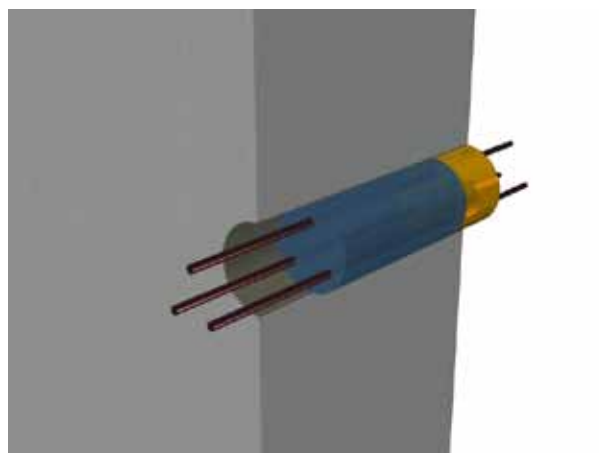
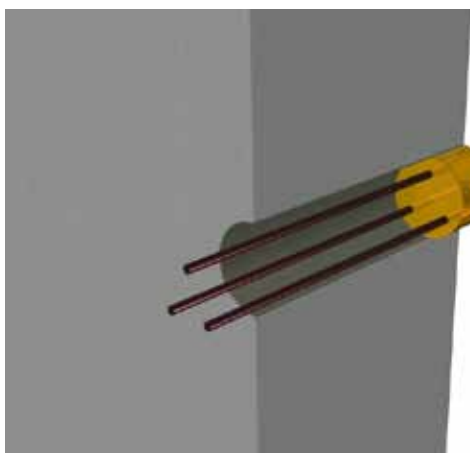
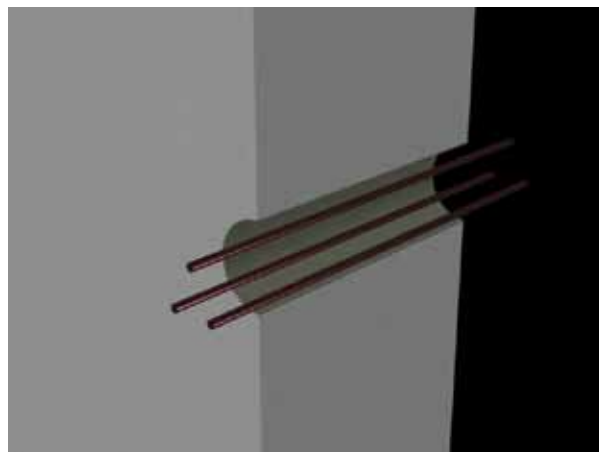
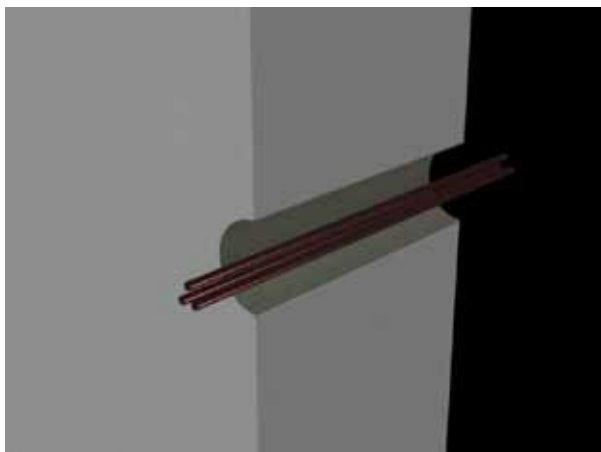
Injection of ViscoSealant

- Cut the top of the cartridge above the thread.
- Install the flexible nozzle onto the cartridge and install the cartridge into the gun.
- Push the throttle downwards and insert the nozzle towards the backing and start injecting the ViscoSealant while making a circular movement around all the pipes and/or cable(s).
- Sensing resistance indicates that the area is filled with sealant and the cartridge can be moved to the front of the conduit all while continuing to fill.

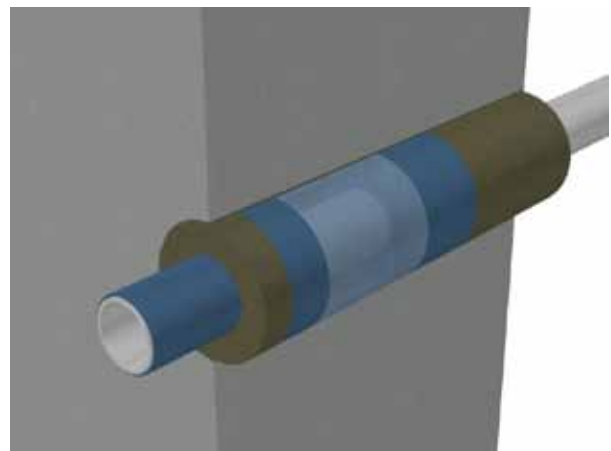
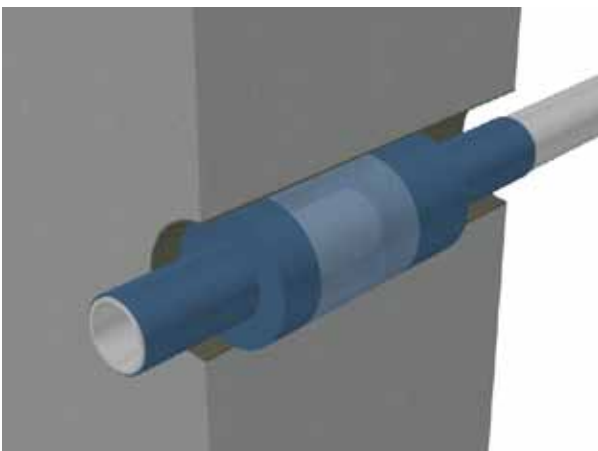
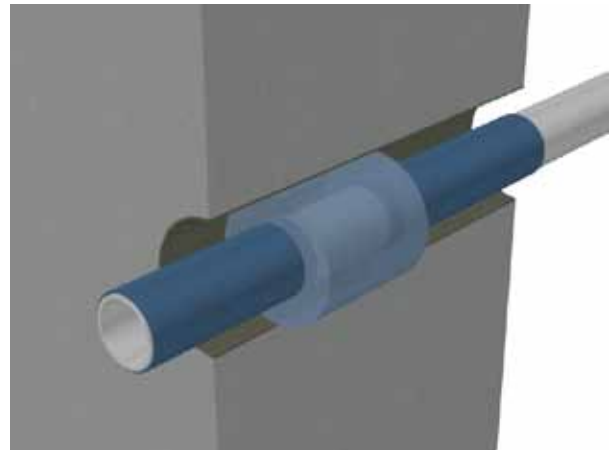
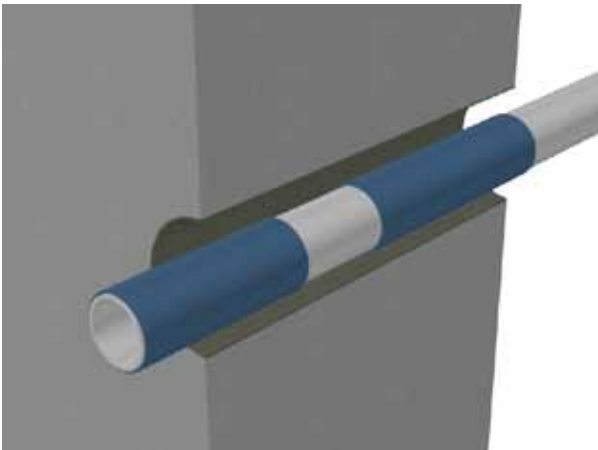
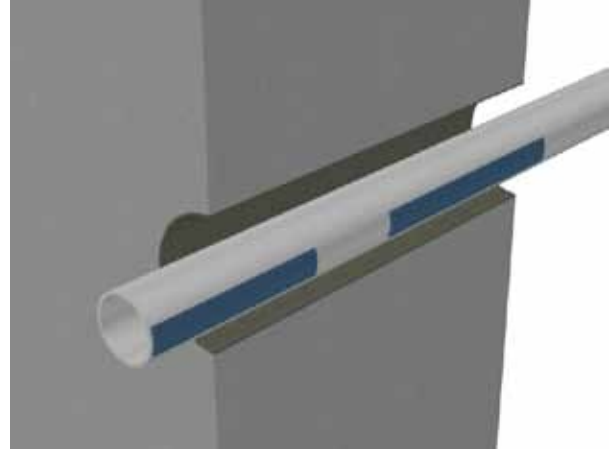
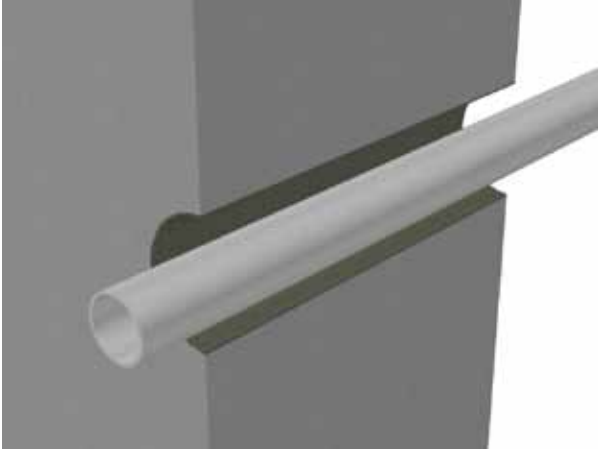
Finishing

- It is advised to always use ViscoBlock in order to obtain a proper sealing against the pressure of water.
- In case no ViscoBlock is used, the injection can be ended by making a smooth finish with a putty knife at the beginning of the conduit.
- In case ViscoBlock is used, leave a depth of 5 cm/2" at the beginning of the conduit free.
- Mix ViscoBlock mortar according to the instructions and finish the mortar smoothly with a putty knife.

Chapter 14: Sealing of pipe and cable wall conduits



Chapter 14: Sealing of pipe and cable wall conduits



Chapter 15: Protection of offshore risers

Materials necessary

- VISCOWRAP
- VISCOTAQ POLYCURE

General

- VISCOWRAP shows an adhesion under water, provided the surface is clean and free from loose parts, shell and alga.
- The surface should be blasted under water to a level minimum ST-2.

Preparation

- Depending upon the infrastructure, constructions, maritime conditions and the risers to be coated, scaffolding could be necessary to apply the VISCOTAQ material.
- All VISCOWRAP material should be properly stored in a diver bag.
- All VISCOCURE material should be stored in a watertight plastic bag. The bag should not be opened or accessible to moisture prior to application.

Surface preparation

- The surface to be coated should be free from shell, alga, loose parts and debris.
- Blast the surface with underwater jetting equipment to a cleanliness of minimum ST-2.

Application of VISCOWRAP

- Depending upon the riser and the maritime conditions, start wrapping the VISCOWRAP from the bottom to the top with an overlap of 1 cm/1/2".
- Do not wrap the material as if it was an overland pipeline, but apply the material to the riser using a sweeping motion with slight pressure of your hand. In this way the water is removed from the area where the surface of the substrate touches the VISCOWRAP.
- Press out all folds and air pockets that may occur.
- Avoid as much as possible inclusion of water.

Application of VISCOCURE

- Unpack the POLYCURE from the plastic back.
- Apply the POLYCURE over the VISCOWRAP and wrap it around the riser with tension (as far as possible) and with a 50% overlap.
- Make the first wrap straight.
- End straight.
- Let the POLYCURE cure under the influence of water.

