Corrosion Protection and Sealing

Raychem

Ultratec Division

Corrosion Protection and Sealing

Raychem

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General

International manufacturing locations

Raychem manufacturers a wide range of high performance products for the electronics, telecommunication and energy related industries. Our manufacturing plants are located in key economic regions of the world. The organisation has internationally recognised ISO 9001 approvals.

Kessel-Lo, Belgium

Tijuana, Mexico

Menlo Park, California

Tsukuba (Tokyo), Japan

Ultratec Division

Corrosion Protection, Sealing and Coupling

The Ultratec Division of Raychem offers unique solutions in the areas of corrosion protection, sealing and pipe coupling. The products, based on modern polymer technology, are specifically designed for use in gas and water distribution, pipeline construction and district heating. Ultratec products are manufactured at the Kessel-Lo plant in Belgium and in Tijuana, Mexico.

High performance corrosion protection for transmission pipelines.

Effective corrosion protection and sealing for fittings in gas-distribution networks.

Long-lasting sleeve joints and seals for district heating piping systems.

Raychem Divisions

In addition to Ultratec, Raychem has four other market-oriented divisions:

1. Electronics.

2. Energy Products.

3. Telecommunications.

4. Chemelex.

1

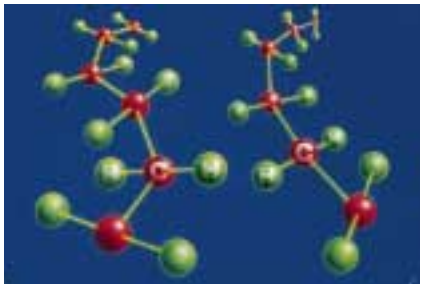
2

3

4

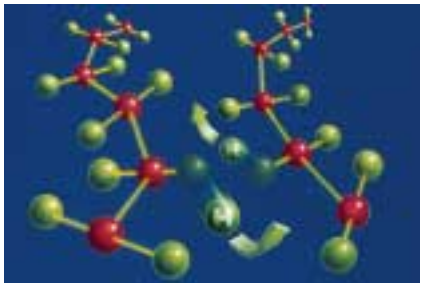
Over the last 35 years, Raychem has become a valued partner in the utilities and industrial markets. Supplying reliable and cost effective solutions to meet our customers needs.

Crosslinking through Radiation Chemistry

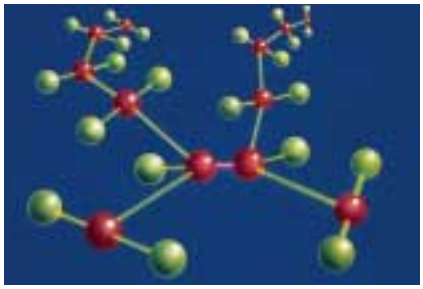


Thermoplastic materials are composed of extremely long, very thin molecules in a random arrangement. The strength of such materials depends upon the distance between its molecules, and the crystalline nature of its molecular structure. It is these crystals which provide most of the strength of the material.

As the material is heated over the "Chrystalline melting point" (120 °C), these crystals disappear. The molecules can then slip past each other easily and the material flows.

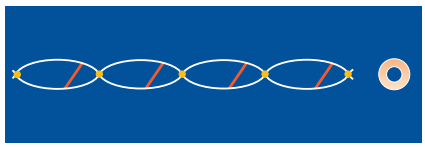


With the advent of atomic energy, the important discovery was made that the exposure of some plastic materials to high-energy penetrating radiation can cause the permanent crosslinking, or intermolecular joining, of adjacent molecules.



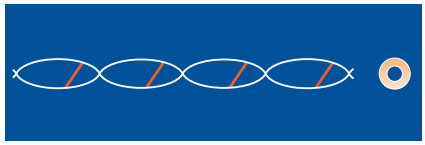
This linking results in the chemical bonding of the plastic structure into a new three-dimensional system.
Once the material has been crosslinked, it will not melt or flow at any temperature. When the material is heated, the crystals still disappear as before, but it will no longer flow or change shape because the crosslinks act as ties between the molecules. The crosslinked structure, however, is elastic. This when it is heated to a temperature where the crystals have melted, the material behaves like rubber.
Because of radiation crosslinking, crosslinked products have perfect elastic memory. These products are supplied in a deformed or expanded condition. When heated, they will shrink and tightly cover the object over which they have been placed. They are ideal for covering a variety of electrical and electronic components, as well as wires, lugs, terminals, connectors and pipe fittings.

Raychem fabricates its compounds into their final form and then subjects them to high energy radiation, thus permanently "freezing" them into the desired shape. The following illustrations demonstrate what happens to the molecular structure of crosslinked tubing during subsequent stages of manufacture and during application. Next to each illustration is an end view of a piece of heat-shrinkable tubing.



1

Figure 1 is an enlarged schematic view of a very small crosslinked section of extremely long molecules.

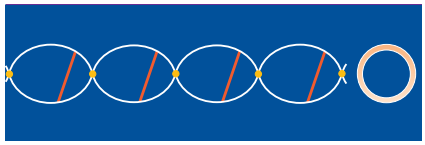


2

Once the tubing has been crosslinked, the next step in imparting elastic memory is to heat the compound above its crystalline melting point. The molecules are then tied together only by the crosslinks as shown in Figure 2.

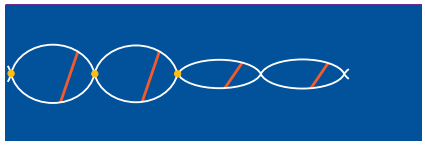
3

While hot, the tubing is deformed by applying pressure, thus stretching the crosslinked molecule, see Figure 3.



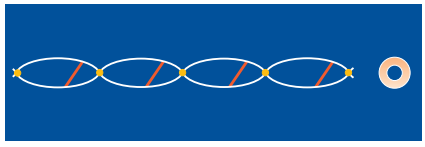
4

While in this deformed position, the tubing is cooled; the crystals then reappear, thereby locking the structure together in this deformed condition indefinitely. This is the form in which the material is supplied to customers (Figure 4).



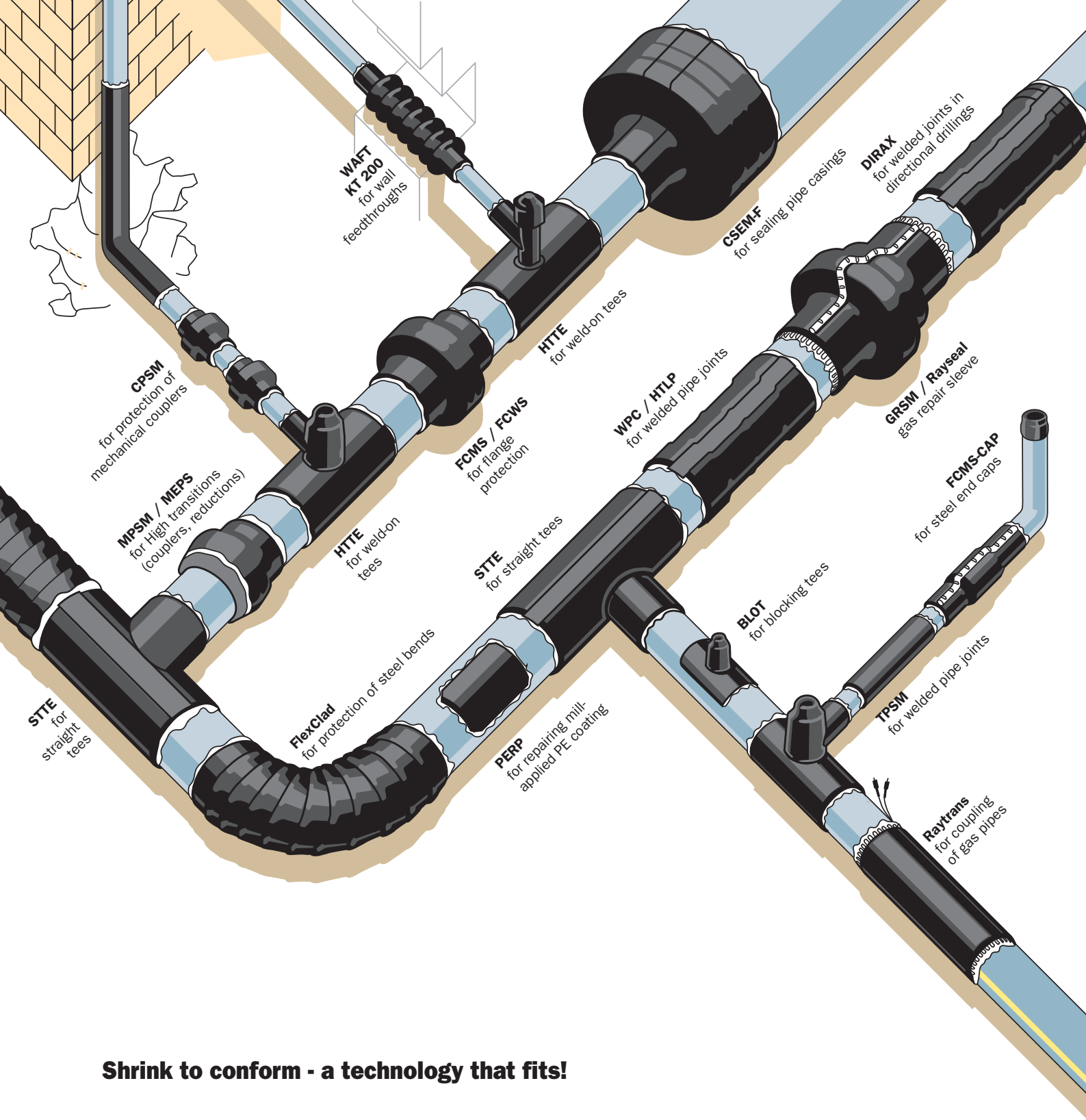
5

The customer then heats the product, melting the crystals. The crosslinks allow the material to return to its original shape as shown in figure 5. This is the perfect elastic memory of crosslinked material.



6

After cooling, the crystals reform and the tubing is locked in its recovered form, as shown in Figure 6. Upon subsequent reheating, no further change in shape will take place, unless mechanical force is applied.



Shrink to conform - a technology that fits!

Raychem pioneered the development of heatschrinkable technology.

By cross-linking polyethylene, our products shrink and automatically conform to a variety of difficult shapes and sizes - taking the guesswork out of site-work.

At Raychem, materials matter. That's why our quality program includes training of your field installers.

Cross-linked technology - it's smarter to shrink !

Functional properties / technical guidelines

Functional properties

Ultratec products are tested in accordance with the requirements and standards to meet specific application needs. Engineered to withstand temperature cycling, soil stresses, chemical and environmental attack (salt water, fungi, bacteria, ultra-violet radiation and soil alkhalis).

Standards

The Ultratec Division is ISO 9001 qualified.
Systematic quality-assurance procedures guarantee quality from product concept through development to manufacturing and installation, providing you with consistent products and service.

The products described in this catalogue have been developed pursuant to the country-specific standards, such as DIN 30672, Part 1 (09.1991), Austrian Standards (Ö-Norm 5250 and B 5252), and to the pan-European standards currently being drafted. On the basis of these and other standards, the products are tested and approved for use.

Raychem Ultratec products are qualified and used by owners and contractors in the oil, gas and water industries in countries all over the world.

Detailed technical product information is available on request.

In order to obtain correct performance, product installation must be carried out in accordance with the relevant installation instructions.

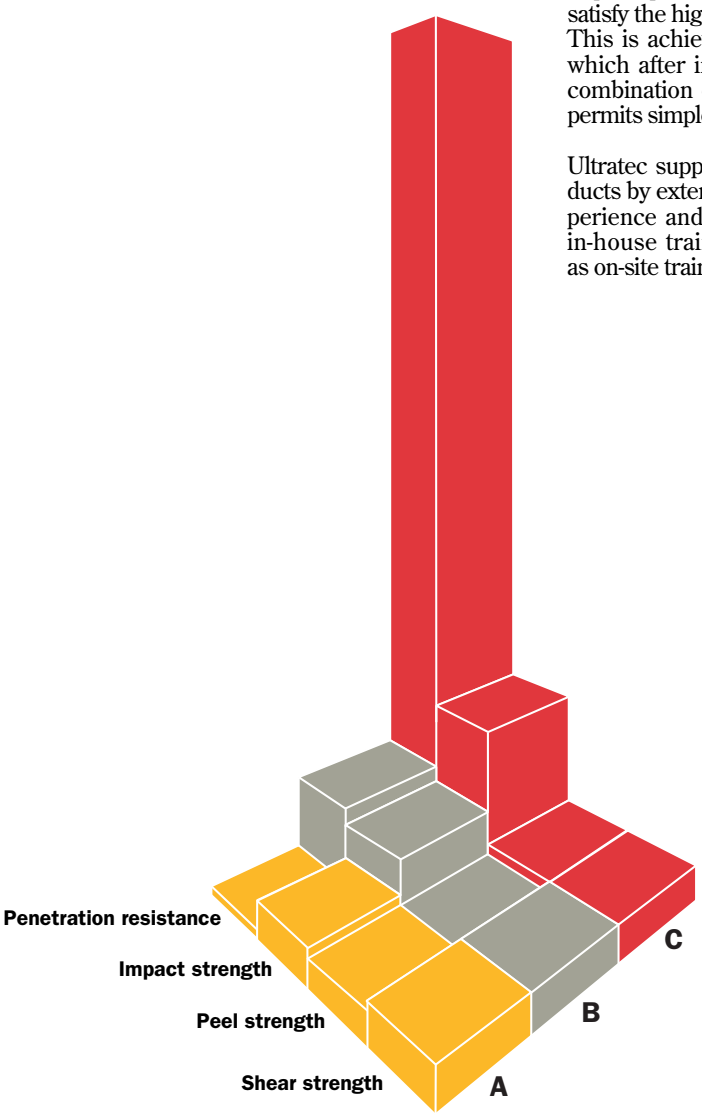
Packaging

Raychem has been using environmentally friendly packaging for quite some time. The guiding principle being: 'As much as is needed, as little as is possible'. Our objective here is to further optimize the packing of our products to bring environmental protection and practical handling very much to the forefront.

CEN Standard (draft)

The draft European standard for site applied coatings consist of three different ratings or classes: A, B and C.

In this system, Class A has the lowest requirements and Class C has the highest. The figure below represents the rise in demand for mechanical strength, from Class A to Class C. For example, penetration resistance increases by a factor of 100.



In principle, the heat-shrinkable products from Raychem are formulated to satisfy the high demands of Class C.
This is achieved by the use of a crosslinked heat-shrinkable backing, which after installation serves as a tough permanent outer layer. The combination of backing precoated with special anti-corrosion adhesives permits simple installation on site.

Ultratec supports the products by extended field experience and appropriate in-house training as well as on-site training.

Raychem: around your pipe,
around the world.

HTLP

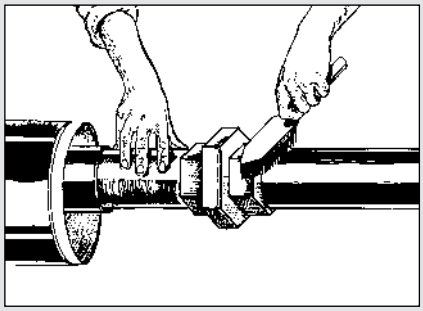
PERP

DIRAX

WPC-C50

Corrosion Protection

1. Pipes and pipe couplers

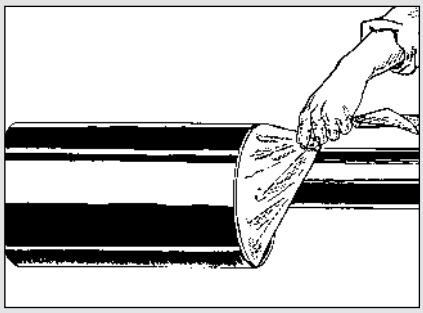


Installation procedure

1. Prepare the pipe surface to be coated, in accordance with SIS-055900-ST3 or SIS-055900-SA 2 1/2.

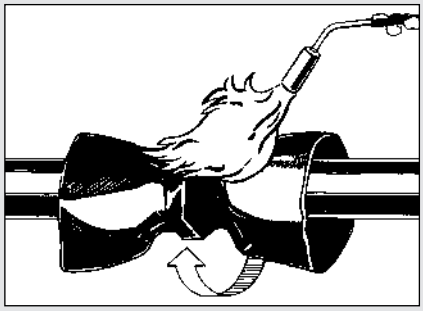
   No primer is required.

   Using a propane torch, pre-heat the surface to about +60°C.

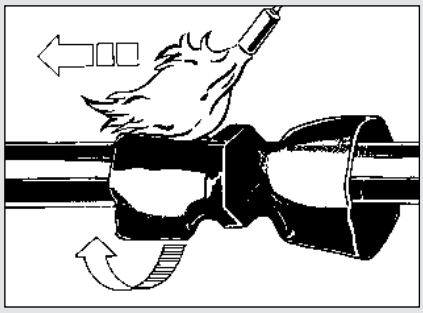


2. Position the sleeve above the component (e.g. couplings, etc.) so that it overlaps the mill-applied coating by at least 50 mm.

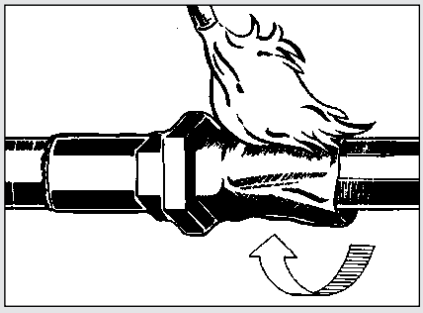
   Remove the release foil.



3. Working from the centre outwards, heat the sleeve with a soft yellow propane flame, keeping the torch in steady circumferential motion.



4. From the centre gradually shrink the sleeve onto the pipe on one side.



5. Then repeat on the other side.

Note

The sleeve is correctly installed when:
- the complete sleeve is in contact with the surface of the pipe, it is smooth and has no cold-spots or air enclosures.
- adhesive flow is evident at both sleeve edges along the circumference of the pipe.
- the overlap on the mill-applied coating is as specified.

Heat-shrinkable tubing

CPSM

Selection table - Ordering information - Dimensions

Pipe diameter	*Order description where applied on coupling*
DN-25	CPSM-C30-70/26-1000
DN-40	CPSM-C30-90/36-1000
DN-50	CPSM-C30-120/54-1000
DN-80	CPSM-C30-164/80-1000
DN-100	CPSM-C30-195/102-1000

Ordering example:

e.g. CPSM-C30-90/36-1000

- length (mm)
- max. recovered diameter (mm)
- diameter as delivered, expanded (mm)
- continuous operating temperature up to + 30°C
- mechanical resistance class

Ordering length 1000 mm

The 1000 mm long product should be cut on site to suit the application requirements; 300 mm is a commonly used length.

Special lengths are available upon request

Product description

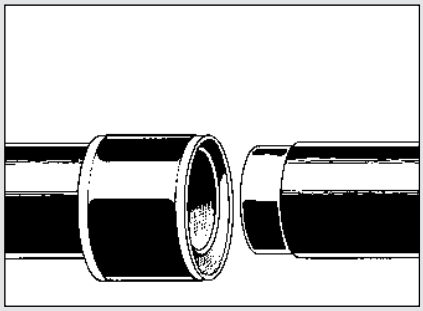
The CPSM heat-shrinkable sleeve is remarkable for its high shrink ratio which allows awkward, irregular shapes to be coated easily.

When heated, the CPSM sleeve shrinks and the sealant melts, encapsulating mechanical couplings and straight pipes with a strong impervious seal. While the sleeve conforms to the shape of the coupling or pipe, the melted sealant is forced into all surface irregularities providing a permanent environmental seal.

Special characteristics

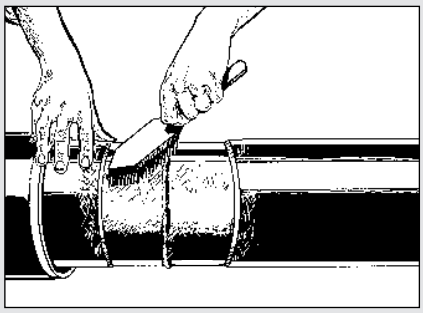
- Quick and simple installation.
- Outstanding adhesion to metals, plastics, etc.
- In the event of mechanical damage the sealing adhesive flows and seals off the damaged area (in other words, the damage is “self-healing”).
- Economical inventory keeping - thanks to the high shrink ratio only a few sizes need be kept in stock.

2.1 Coating of welded joints Heat-shrinkable tubing



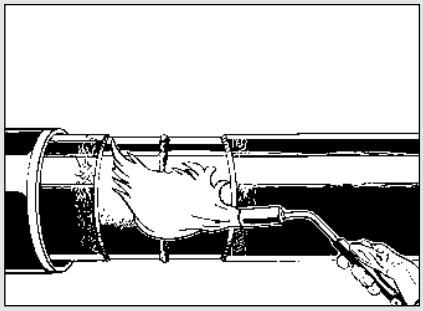
Installation procedure

1. Slide the heat-shrinkable sleeve, complete with its protective foil, onto the pipe before the joint is made.

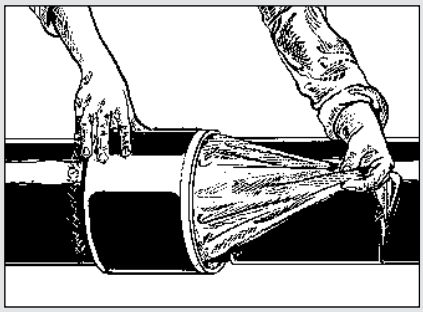


2. Prepare the pipe surface that is to be coated, according to SIS-055900-ST3 or SIS-055900-SA 2 1/2.

   No primer is required.

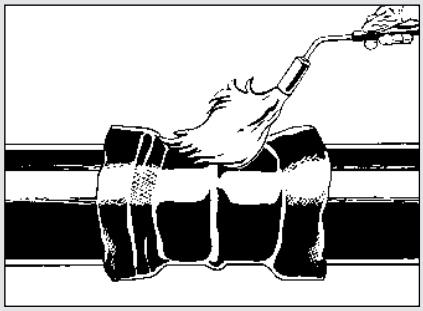


3. Using a propane torch, pre-heat the surface to about + 60°C.



4. Position the sleeve over the welded joint so that it overlaps the mill-applied coating by at least 50 mm.

   Remove the release foil.



5. Working from the centre outwards, heat the sleeve with a soft yellow propane flame, keeping the torch in steady circumferential motion.

Note

The sleeve is correctly installed when:
- the complete sleeve is in contact with the surface of the pipe, it is smooth and has no cold-spots or air enclosures.
- adhesive flow is evident at both sleeve edges along the circumference of the pipe.
- the overlap on the mill-applied coating is as specified.

Heat-shrinkable tubing

TPSM

Selection table - Ordering information - Dimensions

Pipe diameter	*Order description*
DN 25	TPSM-XXX-DN25-370
DN 40	TPSM-XXX-DN40-370
DN 50	TPSM-XXX-DN50-370
DN 80	TPSM-XXX-DN80-500
DN 100	TPSM-XXX-DN100-500
DN 150	TPSM-XXX-DN150-500
DN 200	TPSM-XXX-DN200-600

Available performance levels: TPSM-B30, TPSM-C30, TPSM-C50

Special: TPS (product with bitumen based adhesive and thermo indicator)

Ordering example

e.g. DN 150 - Class C30

TPSM-C30-DN150-500

- 500 — length in mm
- 150 — pipe diameter
- 30 — continuous operating temperature up to +30°C
- C — mechanical resistance rating class C

From nominal pipe size DN 100 and larger, we recommend the ready-to-fit heat-shrinkable wraparound sleeve WPC or HTLP.

Standard version suitable for commonly used cutbacks:
- up to 100 mm for each pipe end (DN 25-50);
- up to 150 mm for each pipe end (larger than DN50).

Product description

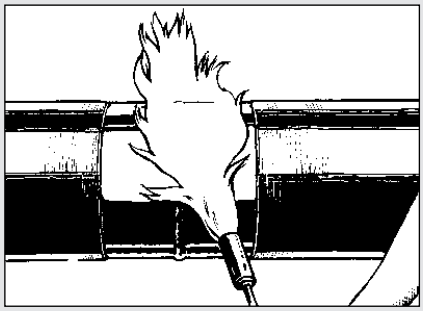
TPSM heat-shrinkable sleeves are compatible with standard pipe coatings including PE, FBE, tape and coaltar.

The comprehensive range of sizes allows all pipe diameters upto DN 200 mm to be covered.

Special characteristics

- The thick-walled structure of the cross-linked heat-shrinkable material gives it high impact strength and penetration resistance (class C).
- Installation is carried out directly on the cleaned and dried (pre-heated) pipe surface. No primer is required to promote adhesion.
- Compatible with standard commercial mill-applied coatings.
- In the event of mechanical damage the sealing adhesive flows and seals off the damaged area (self-healing effect).
- No special tools needed, leading to low installation costs.

2.2 Coating of weld joints
Heat-shrinkable wraparound sleeve

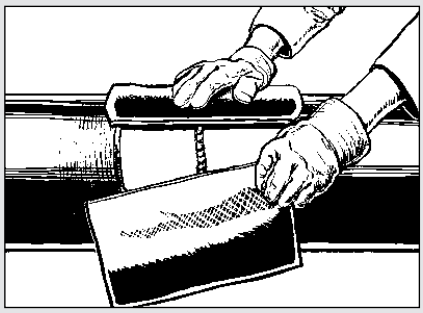


Installation procedure

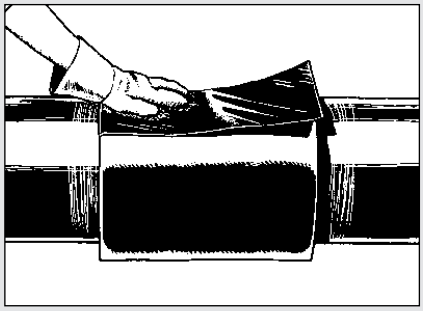
1. Prepare the pipe surface to be coated, according to SIS-055900-ST3 or SIS-055900-SA 2 1/2.

   No primer is required.

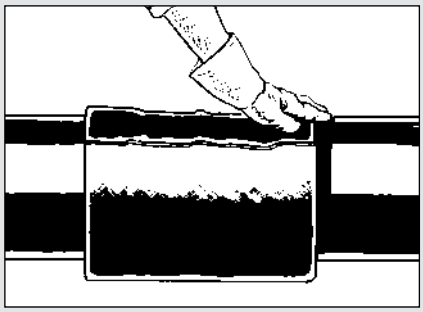
   Using a propane torch, pre-heat the surface to be coated to about +60°C.



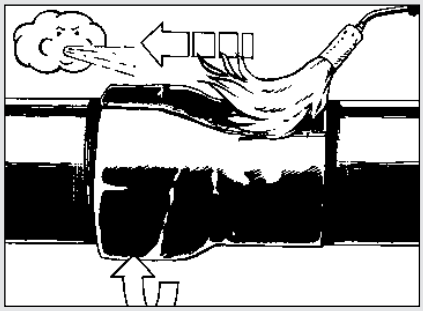
2. Take the ready-to-fit wraparound sleeve. Cut corners (15 mm x 50 mm) at one sleeve end. Remove the release foil about 150 mm at the end with the cut-off corners. Place the sleeve end centrally over the weld area at a right angle to the axis of the pipe. The WPC sleeve should overlap the mill-applied coating for at least 50 mm on both edges. Wrap the sleeve around the pipe so that it overlaps the sleeve edge with 50 mm, at the same time removing the rest of the release foil.



   The overlap should be in the upper third of the pipe, where it is readily accessible. In low ambient temperatures it is advisable to briefly warm the inside of the overlapping ends and also the closure flap.



3. Using a soft yellow flame and keeping it constantly on the move, uniformly heat the closure flap, until the fiberglass weave shows through. With a gloved hand, smooth the closure flap firmly down, eliminating wrinkles, to achieve the best possible contact with the sleeve.



4. Then shrink on the sleeve with a soft yellow propane flame, beginning at the one side opposite to the direction of the wind, moving the torch continuously in a paintbrush motion all around the sleeve.

Note

The sleeve is correctly installed when:
- the complete sleeve is in contact with the surface of the pipe, it is smooth and has no cold-spots or air enclosures.
- adhesive flow is evident at both sleeve edges along the circumference of the pipe.
- the overlap on the mill-applied coating is as specified.

Heat-shrinkable wraparound sleeve

WPC

Selection table - Ordering information - Dimensions

Pipe diameter DN	*Inches*	*Order description*	*WPC cut-length in mm*
DN 80	3	WPC-XXX-3500 x 18/UNI	380
DN 100	4	WPC-XXX-4500 x 18/UNI	460
DN 125	5	WPC-XXX-5625 x 18/UNI	550
DN 150	6	WPC-XXX-6625 x 18/UNI	640
DN 200	8	WPC-XXX-8625 x 18/UNI	800
DN 250	10	WPC-XXX-10750 x 18/UNI	980
DN 300	12	WPC-XXX-12750 x 18/UNI	1,150
DN 350	14	WPC-XXX-14000 x 18/UNI	1,260
DN 400	16	WPC-XXX-16000 x 18/UNI	1,420
DN 500	20	WPC-XXX-20000 x 18/UNI	1,770
DN 600	24	WPC-XXX-24000 x 18/UNI	2,110
DN 700	28	WPC-XXX-28000 x 18/UNI	2,430

Nominal sizes larger than DN 700 are available upon request
WPC type products are available in different performance levels: B30, C30, C50.
WPC type products are available in rolls (30M or 100 feet), or as Unisleeve.
WPC B30, WPC C30 and WPCT products should not be used in high soil stress environments or on pipe diameters above DN 500 mm (20").

Specials

- WPCT (product with bitumen based adhesive and thermo indicator)
- GAPS (Unisleeves with special features such as special size printing, cut corners and overlap indicators)

Ordering examples rolls:

WPC-C50-18 x 100

- 100 — rollenght: 100 feet or 30 M
- 18 — width as delivered: 18" or 450 mm
- C50 — continuous operating temperature up to +50°C
- C — mechanical resistance rating class C

Unisleeves:

WPC-C50-4500 x 18/UNI

- UNI — designates pre-attached closure for the UNISLEEVE construction
- 18 — width as delivered: 18" or 450 mm
- 4500 — pipe diameter (in mills)
- C50 — continuous operating temperature up to +50°C
- C — mechanical resistance rating class C

The standard width of 450 mm (18") is suitable for cutbacks of up to 150 mm (6") for each pipe end.
Other widths, e.g. 600 mm (24") and 900 mm (36") (roll length 20 m) on request

Closure flap WPCP IV (fiberglass-reinforced) for roll stock

Order description

WPCP IV 4x18 for pipe diameters ≤ DN 400 or 16"
WPCP IV 6x18 for pipe diameters > DN 400 or 16"

Product description

WPC is a heat-shrinkable ready-to-fit assembly for the corrosion protection of welded joints compatible with standard pipe coatings including PE, FPE, tape and coaltar. The closure patch consists of fiberglass reinforced, flexible plastic sheet and is coated with a high shear-strength quick-bonding adhesive.

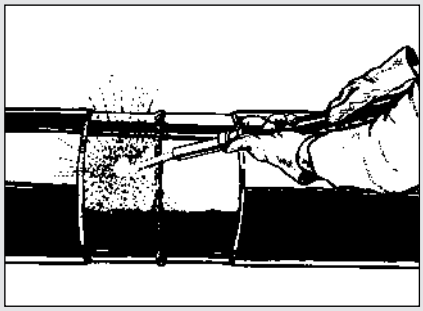
Special characteristics

- The available unisleeve is an all-in-one unit, which is easy to install.
- The thick-walled structure of the cross-linked heat-shrinkable sleeve gives the material high impact strength and high penetration resistance.
- Installation is carried out directly on the cleaned and dried (pre-heated) pipe surface. No primer is required.
- Compatible with standard mill-applied coatings.
- In the event of mechanical damage the sealing adhesive fills and immediately seals off the damaged area ("self-healing" effect).
- No special tools needed, leading to low installation costs.

Other available products

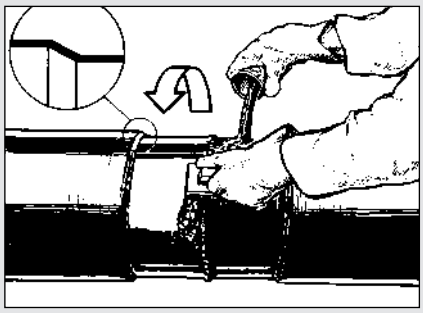
Ultratec supplies products for high temperature field joint coating, ambient and high temperature line coating both on- and off-shore. Also available are complete solutions for pipeline rehabiliation.

2.3 Coating of weld joints
Heat-shrinkable wraparound sleeve

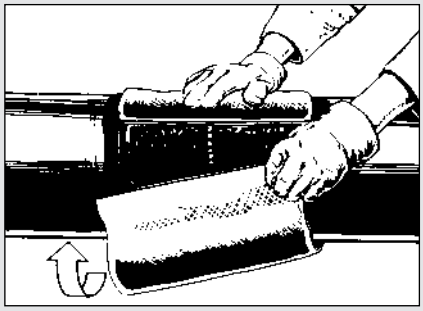


Installation procedure

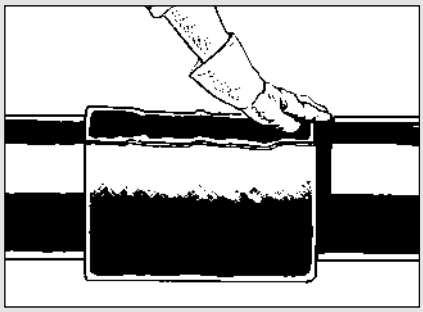
1. Recommended surface preparation is SIS-055900-SA 2 1/2 and PE abrading.



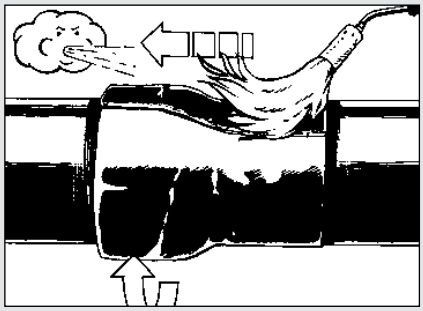
2. Pre-heat the surface to min. 70°C and apply the prepared and properly mixed two-component epoxy resin on the steel area and the adjacent line coating to be covered with the sleeve.



3. Place the sleeve end centrally over the weld area at a right angle to the axis of the pipe. The HTLP sleeve should overlap the mill-applied coating for at least 50 mm on both edges. Wrap the sleeve, with its closure flap, around the pipe ensuring the opposite sleeve edge overlaps the other edge by 50 mm.



4. Next, using a soft yellow flame, and keeping it constantly moving in a paintbrush motion, uniformly heat the closure patch, until the fiberglass weave shows through. With a gloved hand, smooth the closure patch firmly down, free from wrinkles. Roll out the closure area with a silicone roller.



5. Then shrink on the sleeve with a soft yellow propane flame, beginning at the one side opposite to the direction of the wind, moving the torch continuously in a paintbrush motion all around the sleeve.

Note

The sleeve is correctly installed when:
- the complete sleeve is in contact with the surface of the pipe, it is smooth and has no cold-spots or air enclosures,
- adhesive flow is evident at both sleeve edges along the circumference of the pipe,
- the overlap on the mill-applied coating is as specified.

Three-layer Field Joint Coating

HTLP 60

Ordering information - Dimensions

HTLP 60-36000-24/A/UNI

- Optional (designates pre-attached closure for the UNISLEEVE construction)
- Construction
- Sleeve Width (Standard sleeve widths are 11", 17", 24", 34")
- Pipe Diameter (in mills)

Epoxy primer

Primer is available in bulk packages and in small kits.

Small Epoxy primer kits

Kits include appropriate quantities of resin and hardener, a stirring stick and an applicator pad. Kits contain sufficient primer for up to 1 square meter (11 square feet) of surface coverage.

Bulk Epoxy primer kits

Bulk epoxy kits consist of 2-containers of Part **A** and 1-container of Part **B**, average coverage is 5.5 square meters per kg (27 square feet per pound).
When using Bulk epoxy kits, it is necessary to order dosing pumps and applicator pads seperately. Applicator Pad kits are available and these contain 150 pads, 100 mixing cups and sticks and 100 gloves.

		Unit Quantity
Small Kit:	S1301 primer epoxy kit 15 (USA)	320 g (0.73 lb)
	S1239 primer kit (Europe)	252 g (0.56 lb)
Bulk Kit:	S-1239-A epoxy resin	2 x 20.4 kg (2 x 45 lb)
	S-1239-B hardener	1 x 15.6 kg (1 x 34.5 lb)

Product description

The HTLP 60 is a 3-layer (epoxy, co-polymer, polyethylene) coating, similar to the structure of the three-layer mill-applied coating, designed to prevent corrosion of girthwelds on buried pipelines operating at temperatures up to 60°C (140F).

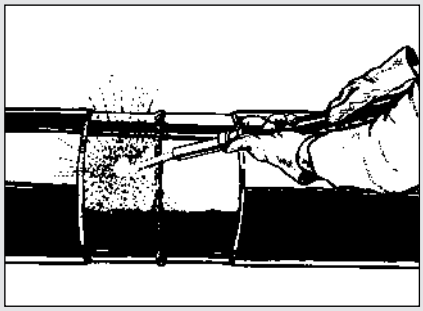
The HTLP system consists of a solvent-free, two-component liquid epoxy and a wraparound heat shrinkable sleeve. The HTLP 60 sleeves have a thick radiation-crosslinked polyolefin backing coated with a high shear strength copolymer hot-melt adhesive.

The flexible closure is normally kitted with the sleeve, however, it is available pre-attached to the sleeve in the UNISLEEVE construction. During installation the adhesive melts and flows, coming into intimate contact with the uncured liquid epoxy primer. The adhesive and primer fill all surface irregularities and, as the primer cures, powerful bonds are set-up to metal and adjacent coating surfaces.

Special characteristics

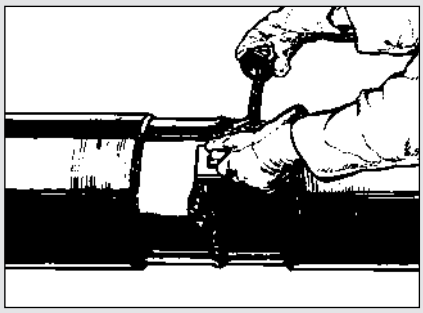
- Fully resistant to shear forces induced by soil and thermal movements.
- Fast curing times which means no drying or waiting times.
- Superior cathodic disbondment performance and hot water immersion resistance.
- Fully reconstructs 3-layer coating at all girth welds for continuous and homogeneous performance on pipelines coated with 3LPE.
- Simple installation without the need for special tools.

3. Coating weld seams for horizontal and directional drillings

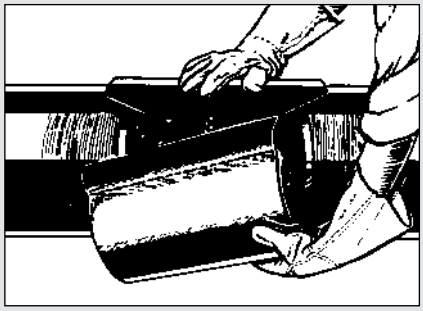


Installation procedure

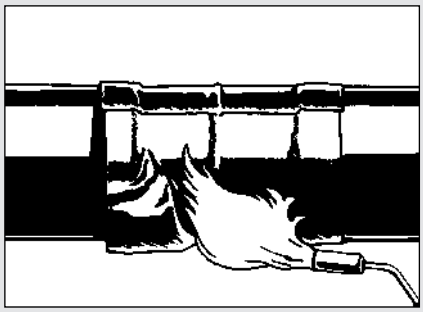
1. Recommended surface preparation is SIS-055900-SA 2 1/2 and PE abrading.



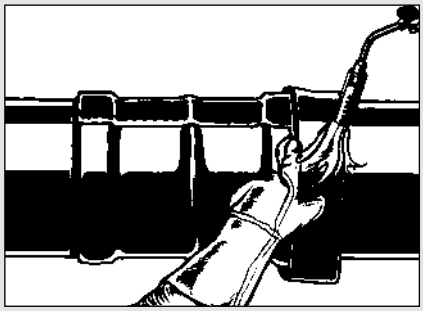
2. Pre-heat the surface to min. 70° C and apply the prepared and properly mixed two-component epoxy resin on the steel area.



3. Take the ready-to-fit wraparound sleeve and remove the release foil about 150 mm at the end with the cut-off corners. Place the sleeve end centrally over the weld area at a right angle to the axis of the pipe. The DIRAX sleeve should overlap the mill-applied coating for at least 50 mm on both edges. Wrap the sleeve, with its integrated closure flap, around the pipe ensuring the opposite sleeve edge overlaps the other edge by 50 mm, at the same time removing the rest of the release foil.



4. Next, using a soft yellow flame, and keeping it constantly moving in a paintbrush motion, uniformly heat the closure patch, until the fiberglass weave shows through. With a gloved hand, smooth the closure patch firmly down, free from wrinkles. Roll out the closure area with a silicone roller. Then shrink on the sleeve with a soft yellow propane flame, beginning at the leading edge, moving the torch continuously in a paintbrush motion all around the sleeve.



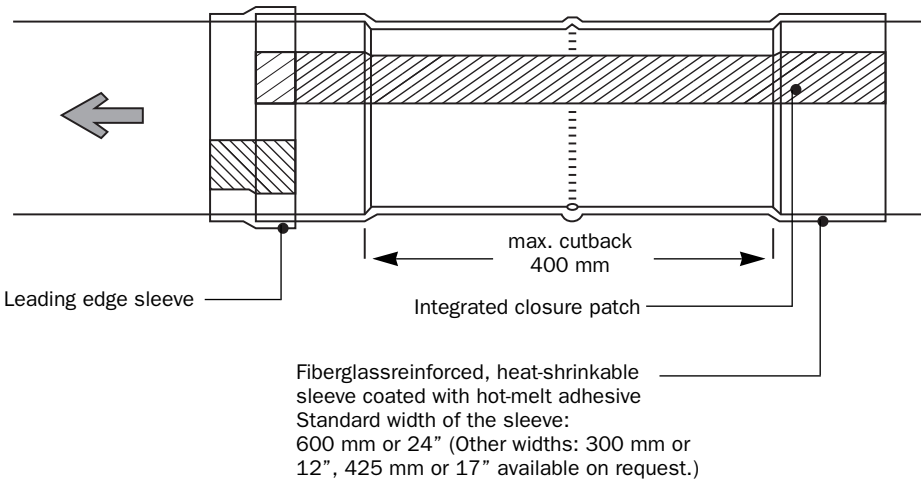
5. Position the narrow heatshrinkable strip centrally over the leading edge of the sleeve and shrink it on the same way as the sleeve. Check PE temperature prior to shrinking.

   Roll out the front-end sleeve all round using a silicone roller.

Note

The sleeve is correctly installed when:
- the complete sleeve is in contact with the surface of the pipe, it is smooth and has no cold-spots or air enclosures.
- adhesive flow is evident at both sleeve edges along the circumference of the pipe.
- the overlap on the mill-applied coating is as specified.

Ordering information - Dimensions



Order description

DIRAX-XXXXX-YY/zK

- z units of epoxy resin S1239-Primer-Kit-252 (separate ordering and delivery required by shipping regulations)
- sleeve width in inches (24 = 600 mm)
- Pipe diameter in inches (available from 3 1/2 in., DN 80)

Remark

From DN 600 up, 2 units of epoxy resin are required in the case of 600 mm wide sleeves,
e.g.: 1pc DIRAX-24000 - 24/2K
2pc S1239 Primer Kits 252

Product description

The DIRAX System is based on a high-performance heat-shrinkable sleeve and guarantees the corrosion protection of welded pipe joints in the case of horizontal or directional drillings.

The DIRAX System consists of:

a. a wraparound, fiberglass-reinforced, heat-shrinkable sleeve with a preattached closure and a coating of high-shear-strength thermoplastic hot-melt adhesive. The special glassfiber reinforced sleeve gives the material a high abrasion resistance while remaining flexible to follow bending radius.

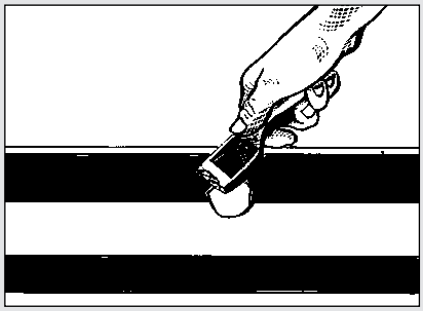
b. a solvent-free two-component epoxy resin.

c. a leading edge sleeve consisting of a narrow fiberglass-reinforced heat-shrinkable sleeve with a preattached closure and a coating of high-shear - strength hot-melt adhesive.

Special characteristics

- High shear strength and peel strength.
- Good abrasion resistance with adequate flexibility.
- Fast curing times.
- Superior cathodic disbondment performance.
- Compatible with standard commercial mill-applied PE coatings and FBE.
- Simple installation without special tools.

4. Repair system for damaged mill-applied PE coating

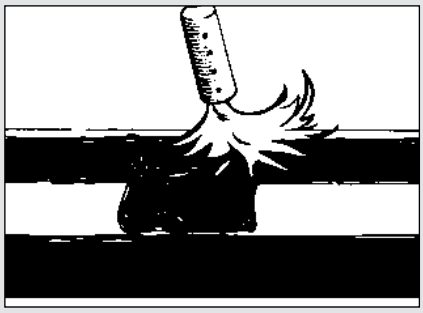


Installation procedure

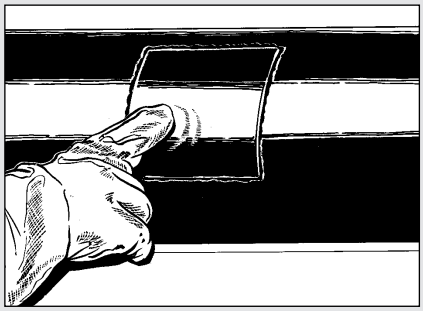
1. Clean damaged areas. Cut away loose parts of the mill-applied coating. Round out nicks and slits. Remove adhering rust and dirt, and roughen the mill-applied coating in the repair zone using abrasive paper. The surface must be free from oil, grease and moisture.

2 Cut a length of filler to fit the damage. Pre-heat the damaged zone to +60° C, apply the filler, heat it and smooth it down with a hot putty knife.
Important: do not spread the filler over the mill-applied PE coating.

3 Cut the repair patch for the damaged area so that there is an overlap of at least 50 mm all round. Then heat the patch on the adhesive side until the adhesive softens, shown by the surface turning glossy.



4. Using a soft yellow propane flame, warm the PERP repair patch until the thermo-indicating paint changes colour.



5. Smooth down with a gloved hand or with a hand roller.

   Once in place, the PERP repair system must be smooth and free from air enclosures. Adhesive flow is evident at all edges of the sleeve.

Repair system

Ordering information - Dimensions

For damaged area less than 40x70 mm : PERP-KIT

Kit components:
Carrier material 140x170 with rounded corners
Filler
Abrasion paper R60
Installation instructions

Order description
PERP-KIT

For extensive areas of damage: PERP roll.

(typically applied with larger projects)
Roll length 10 m. Widths 170 mm and 425 mm.

Order description
PERP 170-10000-TC
PERP 425-10000-TC

Filling adhesive: PERP Filler

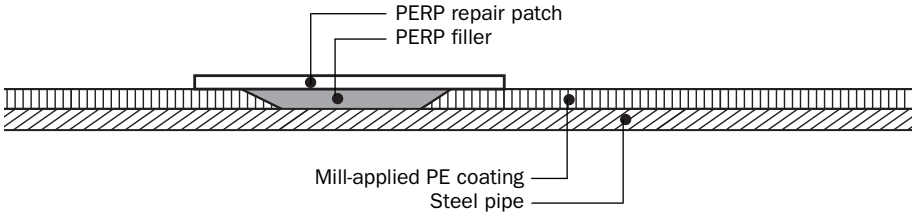
(necessary where rolls are used)

Strip: length 3 m, width 50 mm, thickness 3 mm

Order description
S1137 - 50 x 3 x 3000

Note: experience has shown that on average, 3 rolls of filler adhesive are used per roll of PERP.

System scheme



Filler material for the repair of damages that do not extend to the steel surface: PERP Melt Stick.

Size Ø 25 mm x 310 mm: PERP Melt Stick.

Order description
PERP-MELT-STICK

PERP

Product description

PERP is designed to repair damaged areas in mill-applied PE coating on steel pipes and ductile cast iron pipes.

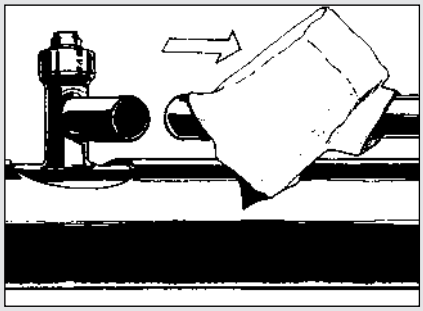
The system consists of two components:

- PERP Filler
- PERP Repair patch

Special characteristics

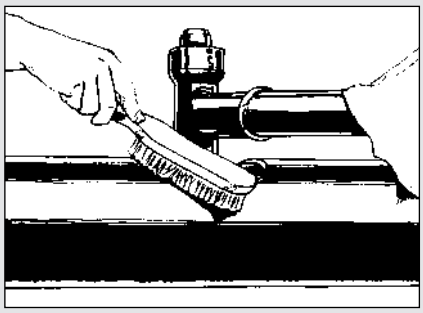
- The PERP Repair System resists high shear forces and shows excellent adhesion to commercial polyethylene-based mill-applied coatings.
- No primer required.
- Specific repair system, and therefore highly economic.

5.1 Weld-on tee



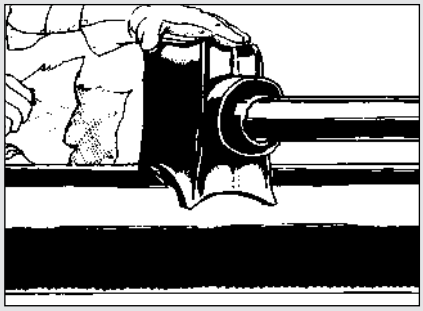
Installation procedure

1. Before making the joint between a tee and the house connection, slide the HTTE moulded part, with the protective foil, onto the house connection pipe.

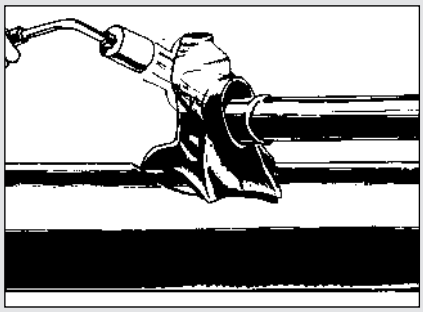


2. After making the joint, prepare the surface of the weld-on tee, the pipe and the adjacent mill-applied coating in accordance with SIS-055900-ST3. No primer is required.

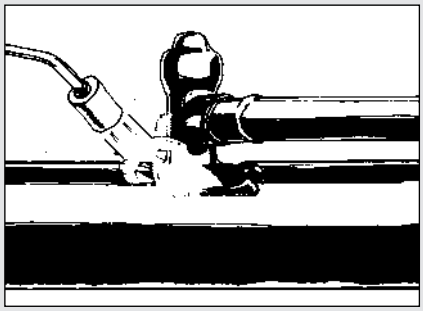
   Using a propane torch, pre-heat the area to be coated to about +70°C.



3. Then protect the welding zone between the tee and the house connection (see the accessory list). After pre-heating, fill the cut-out in the mill-applied coating with filler adhesive, remove the protective foil and fit the moulded part over the tee.



4. Beginning from the plug end, shrink the moulded part on with a soft yellow propane flame. The moulded part must initially be directed downwards and must be heated, keeping the source of heat in a paintbrush motion, until it is completely and smoothly in contact with the tee.



5. The flap on the underside should be firmly pressed down with a gloved hand in the transition zone between the tee and the pipe, and on the pipe.

Remarks

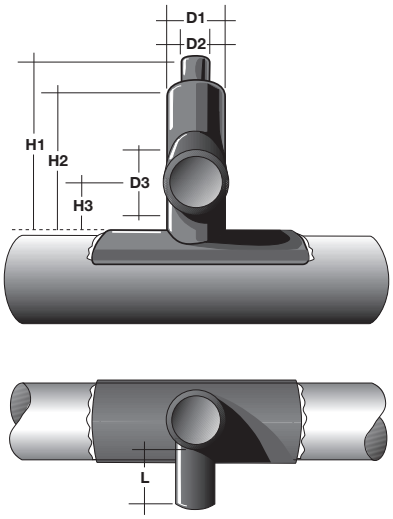
Kit with PERP
A PERP patch together with filler adhesive (see page 26) will be supplied with the moulded parts for covering the cut-out in the mill-applied PE coating.

Kit with GAPS or WPC
Alternatively, it is possible to have the moulded parts supplied with a GAPS/WPC sleeve. This is necessary when the mill-applied PE coating is removed over the whole circumference of the pipe (see page 27).

Moulded part

HTTE

Ordering information - Dimensions



Part number	D1 sup. min. mm	D1 rec. max. mm	D2 sup. min. mm	D2 rec. max. mm	D3 sup. min. mm	D3 rec. max. mm	H1 rec. min. mm	L rec. mm	H2 rec. mm	H3 rec. mm
HTTE-1500-02*	80	27	no cap		70	23	137	48	137	53
HTTE-1600**	110	37	110	27	70	32	90	45	78	40
HTTE-1700**	160	58	160	35	95	45	116	41	95	51
HTTE-1800**	160	58	160	35	95	45	135	41	113	70
HTTE-2000**	160	58	160	35	95	45	165	41	141	51
HTTE-4000**	160	58	160	35	85	33	187	47	155	61
HTTE-4500**	160	58	160	35	85	33	169	47	162	68
HTTE-5000-02*	160	58	no cap		95	45	214	41	185	92

* only available in 02-version
** 01 and 02 version available

sup.: as supplied
rec.: after full unrestricted recovery

Ordering information

Example

HTTE-1600-XX

- xx=01 with cap
- xx=02 without cap
- xx=04 without cap + CPSM
- size code

Product description

HTTE is a heat-shrinkable moulded part specially developed for weld-on tees.

The thick-walled, highly expanded moulded part is coated with a specially formulated hot-melt adhesive for this application, which, during installation, melts and under pressure from the shrinking sleeve is forced into any irregularities providing an excelent seal.
To prevent corrosion of the service pipe where the house connection is made, the use of a compatible WPC or GAPS heat-shrinkable wraparound sleeve or PERP patch is recommended.

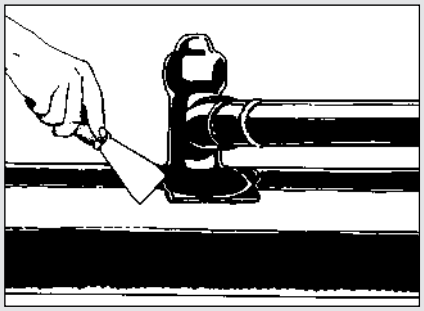
The PERP patches and the filling adhesive supplied with the moulded part are employed when no more than a window has been cut out of the original mill-applied coating to allow for the welding work; WPC or GAPS is used when the mill coating has been removed completely.

Alternatively, the HTTE corrosion protection moulded part can be supplied on request as a kit with the sleeve for the main pipe and the house connection pipe.

Special characteristics

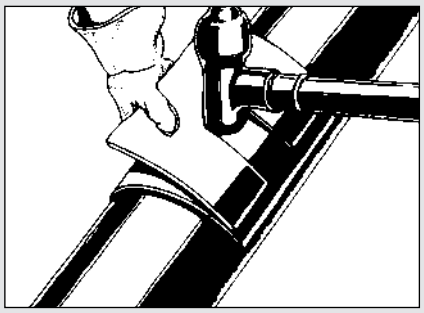
- No primer required.
- Installation can be carried out directly on the cleaned and pre-heated tee.
- Compatible with standard commercial mill-applied coatings.
- HTTE ensures reliable corrosion protection with high impact strength and penetration resistance and obviates the need of rock shielding as additional security for the pipes.
- No special tools needed, leading to low installation costs.

5.2 Weld-on tees

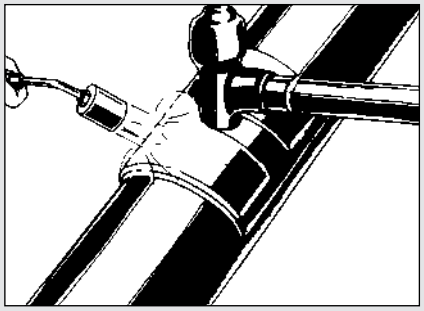


Installation procedure

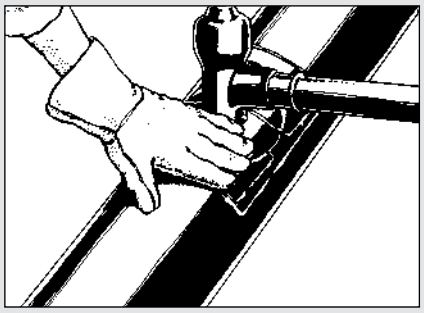
1. Before shrinking on the moulded part, use adhesive to fill the pre-heated cut-out on the pipe coating. To do this, cut adhesive strip into suitable pieces and apply them smoothly, with a propane flame and a hot putty knife.



2. After installing the moulded part, position the PERP patch, at the end of the weld-on tee, adequately overlapping it, so that the cut-out fits snugly around the tee.



3. Heat the PERP patch, using a soft yellow propane flame, until the thermo-inidicating paint changes colour completely.



4. At the same time, press the PERP patch into place with a gloved hand and ensure that the overlap is adequate.

Kit with PERP

Coating of the cut-out in the mill-applied PE coating by means of PERP

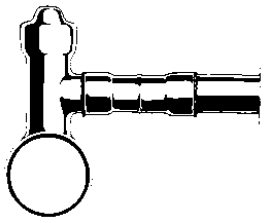
Order description

HTTE-XXXX-XX-P05
- P05 — kit with PERP
- XX — with or without cap
- XXXX — HTTE size

Accessory list

For the coating of welded joints in house connections we recommend our appropriate heat-shrinkable tubing:
(This area must be coated before installing the moulded part)

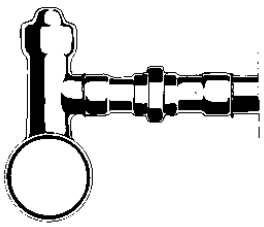
Size	*Order description*
DN 25	TPSM-C30-DN25-370
DN 40	TPSM-C30-DN40-370
DN 50	TPSM-C30-DN50-370

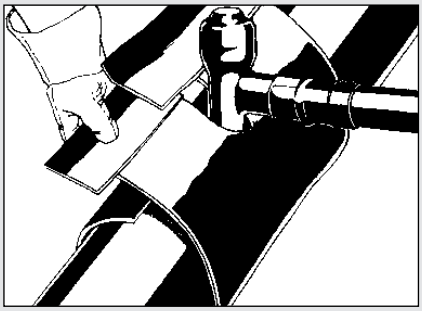


For steel/PE couplings we recommend our appropriate heat-shrinkable tubing:
(This area must be coated before installing the moulded part)

Size	*Order description*
DN 25	CPSM-C30-70/26-1000
DN 40	CPSM-C30-90/36-1000
DN 50	CPSM-C30-120/54-1000

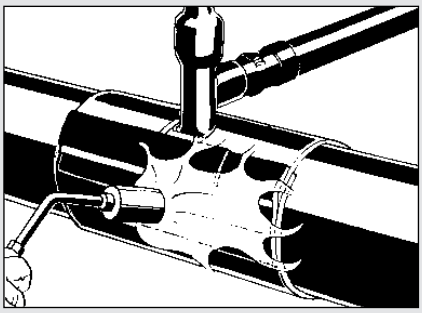
Cut the working length to size according to requirements.



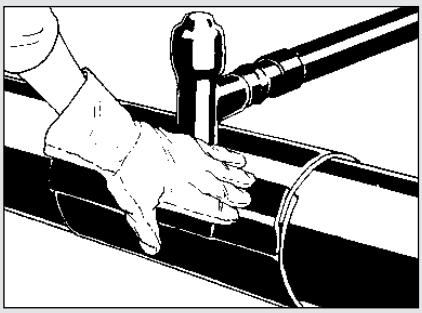


Installation procedure

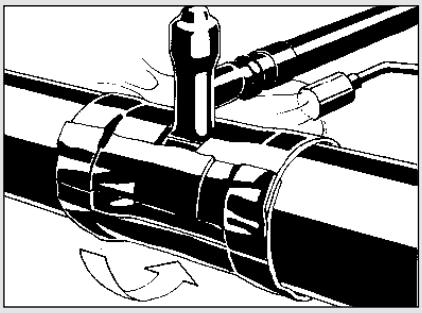
1. After pre-heating to about +60°C, draw the sleeve over the end of the already coated weld-on tee so that the closure is opposite the house connection line. Push the plain end of the sleeve under the other sleeve end until it pushes against the weld-on tee.



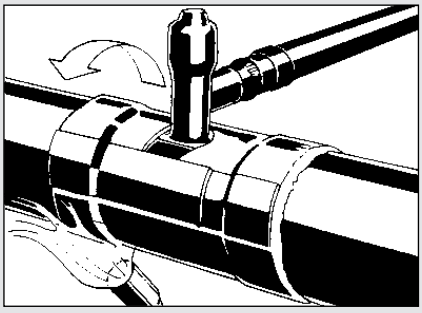
2. Heat the closure flap with a soft yellow propane flame, moving it in a paintbrush motion, until the fiberglass weave shows through.



3. With a gloved hand, firmly press the closure flap down so that it is smooth and free from wrinkles.



4. Working from the centre outwards, heat the sleeve with a soft yellow propane flame in a paintbrush motion.



5. When one side of the heat-shrinkable sleeve has been smoothly shrunk onto the entire circumference, continue the process along to the other end, until the whole sleeve is smooth and tight and the adhesive flow is evident at both edges over the whole circumference.

Coating of the cut-back in the mill-applied PE coating by means of a GAPS or WPC heat-shrinkable sleeve

Coating of the supply mains pipe with GAPS as a kit with HTTE moulded part:

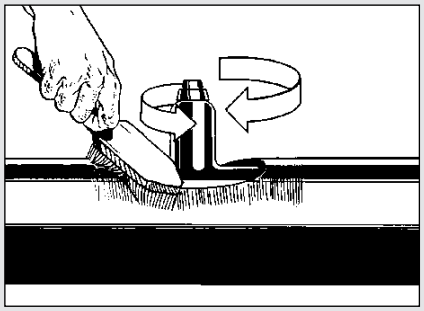
Nominal diameter of supply mains	*Order description*
DN 80	HTTE....-..-G05-DN80
DN 100	HTTE....-..-G05-DN100
DN 150	HTTE....-..-G05-DN150
DN 200	HTTE....-..-G05-DN200

The corresponding GAPS-05 sleeves can also be supplied separately (see page 29).

Ordering example

e.g. HTTE 4000-01-G05-DN 100
DN 100: diameter main pipe
G05: HTTE kit with GAPS
01: HTTE with cap
4000: HTTE size

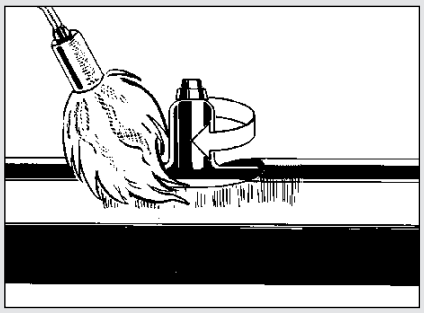
6. Blocking tees



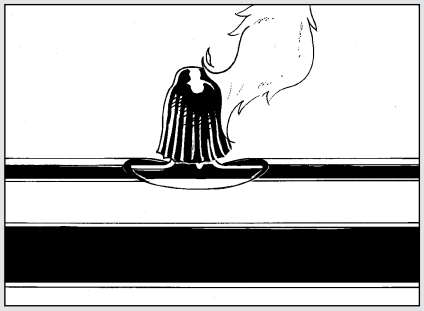
Installation procedure

1. Prepare the pipe surface to be coated, according to SIS-055900-ST3.

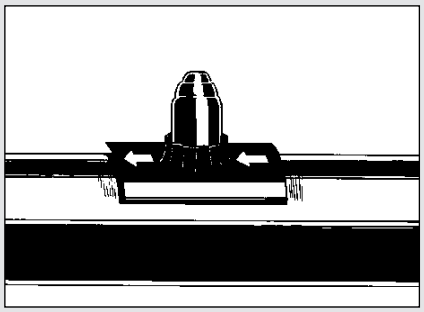
   No primer is required.



2. Using a propane torch, pre-heat the surface to be coated to about +70°C.

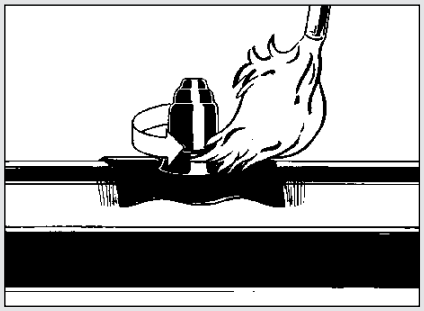


3. Put the cap onto the blocking tee and, beginning from the plug, shrink it on using a soft yellow propane flame. Avoid air enclosures.



4. Then fit the saddle piece, without its protective foil, over the sleeve.

   The embossed arrows must point in the direction of the pipe axis.



5. Starting at the weld area, shrink down the saddle piece.

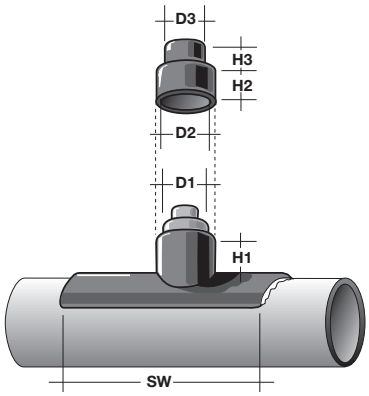
   Keeping the source of heat in a paintbrush motion, heat the moulded part until it is completely and smoothly tight on the blocking tee.

   Proceed by heating the flap area and pressing it down firmly and smoothly onto the main service pipe.

Moulded part

BLOT

Order information - Dimensions



Part number	*D1*		*H1*	*D2*		*H2*	*D3*	*H3*
	sup. mm	rec. mm	rec. mm	sup. mm	rec. mm	rec. mm	rec. mm	rec. mm
BLOT 100	70	40	30	80	40	37	24	12
BLOT 200	110	55	30	95	55	37	24	12
BLOT 300	125	70	32	135	70	42	40	28
BLOT 400	125	70	38	135	70	80	40	28

SW: 300 mm

Coating of the mains supply with GAPS

If complete coating of the mains supply is required, the BLOT moulded part can be combined with a correspondingly pre-cut GAPS-05 sleeve (compatible also with HTTE) (please order separately).

Nominal diameters of the mains supply	*Order description*
DN 80	GAPS-C30-DN80-450-05
DN 100	GAPS-C30-DN100-450-05
DN 150	GAPS-C30-DN150-450-05
DN 200	GAPS-C30-DN200-450-05

Product description

BLOT is a heat-shrinkable moulded part, specially developed for blocking tees, consisting of a saddle and a separate cap.

The saddle and cap are coated on the inside with a high shear adhesive specially formulated for this application.

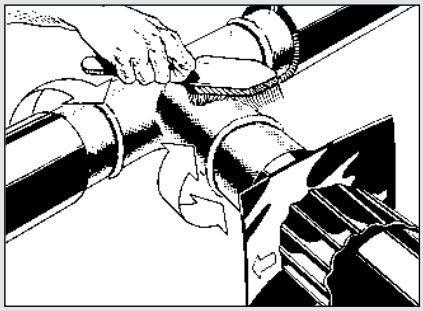
When no more than a window has been cut out of the original mill-applied coating, the BLOT moulded part is suitable for the purpose of complete coating.

When the mill-applied coating has been completely peeled off all round to allow for the welding work, GAPS (or WPC) sleeve is used in addition to BLOT.

Special characteristics

- No primer required.
- Installation can be carried out directly on the cleaned and pre-heated sleeve.
- Compatible with standard commercial mill-applied coatings.

7. Straight tees

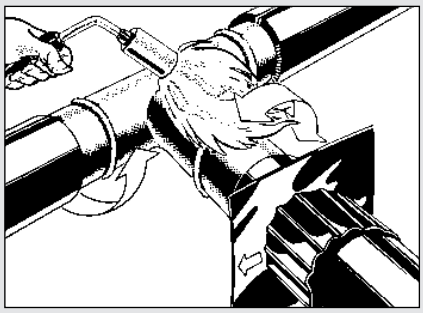


Installation procedure

1. Prepare the surface of the branch off fitting to be coated, according to SIS-055900-ST3.

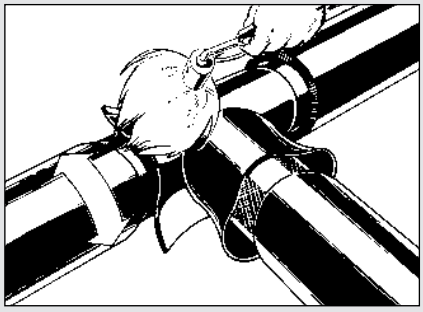
   Before welding the branch off fitting into place, slide the STTE moulded part onto the pipe, accompanied by the protective foil and, where applicable, by the heat-shrinkable tubing TPSM.

   No primer is required.

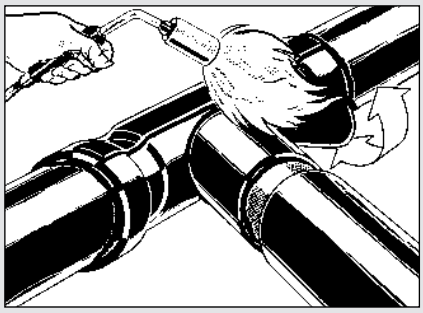


2. Using a propane torch, pre-heat the surface to be coated to about +70°C.

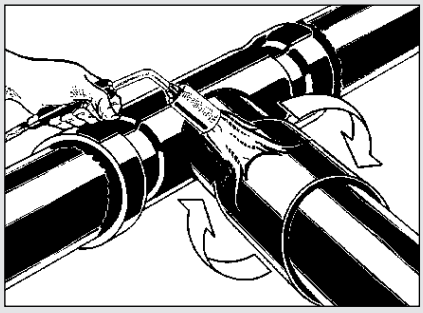
   Remove the release foil. Position the moulded part in the transitional zone between the main line and the branch so that the embossed arrows point in the direction of the pipe axis.



3. Starting at the weld area, shrink the moulded part and press it well down with a gloved hand in the transition between the branch and the main line. Press the flap firmly down onto the pipe.



4. Position the sleeve over the branch off pipe so that the closure is on the upper side of the main line. Push the plain end of the sleeve under the other sleeve end until it touches the branch off pipe. Using a soft yellow propane flame, and keeping it in a paintbrush motion, heat the closure flap until the fiberglass weave shows through. With a gloved hand, press the closure flap firmly down so that it is smooth and without wrinkles.



5. Working from the centre outwards, heat the sleeve with a soft yellow propane flame, moving the torch in a paintbrush motion all around the pipe. When one side of the heat-shrinkable sleeve has been smoothly shrunk onto the entire circumference, repeat the process on the other end, until the whole sleeve is smooth and tight and the adhesive flow is evident at both edges over the whole circumference.

Note

The remaining steel surface of the branch pipe can now be coated with TPSM or GAPS. Ensure the STTE moulded part and the mill-applied coating are overlapped by at least 50 mm.

Moulded part

STTE

Selection tables - Ordering Information- Dimensions

Selecting the STTE moulded part

Size of the branch pipe	*Order description*
DN 40	STTE DN 40-DN 50
DN 50	STTE DN 40-DN 50
DN 65	STTE DN 65-DN 80
DN 80	STTE DN 65-DN 80
DN 100	STTE DN 100-DN 150
DN 125	STTE DN 100-DN 150
DN 150	STTE DN 100-DN 150

Selecting the corresponding GAPS sleeve

Size of the main pipe	*Order description*
DN 80	GAPS-C30-DN 80-450-S
DN 100	GAPS-C30-DN 100-450-S
DN 150	GAPS-C30-DN 150-450-S
DN 200	GAPS-C30-DN 200-450-S
DN 250	GAPS-C30-DN 250-450-S
DN 300	GAPS-C30-DN 300-450-S

The GAPS sleeves can be used for all branch pipes of diameters DN 40 - DN 150.

Ordering example

Main pipe DN 100, branch DN 50:
- 1 STTE DN 40-DN 50
- 1 GAPS-C30 DN 100-450-S

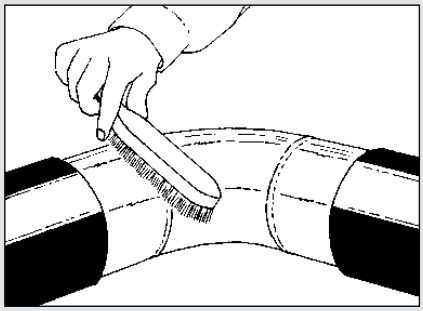
Product description

STTE combined with GAPS (or WPC) permits simple coating of straight pipe tees.

Special characteristics

- The thick-walled structure of the cross-linked heat-shrinkable material gives it high impact strength and penetration resistance.The high shrink ratio of the STTE moulded parts together with the cutting lines on the GAPS sleeves enable several pipe diameter combinations to be covered.
- Installation is carried out directly on the cleaned and dried (pre-heated) pipe surface, no primer is required.
- Compatible with standard commercial mill-applied coatings.
- No special tools needed, leading to low installation costs.

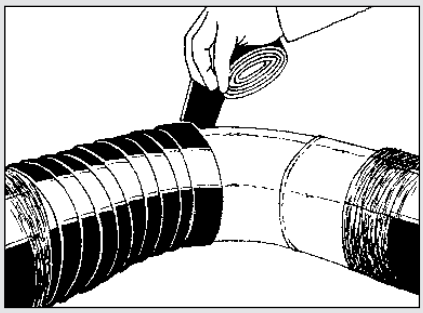
8. Pipe bends



Installation procedure

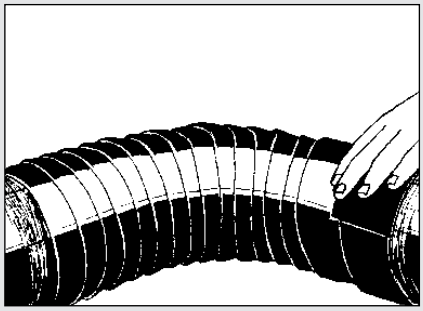
1. Prepare the surface of the pipe to be coated, according to SIS-055900-ST3 or SIS-055900-SA 2 1/2.

   No primer is required.

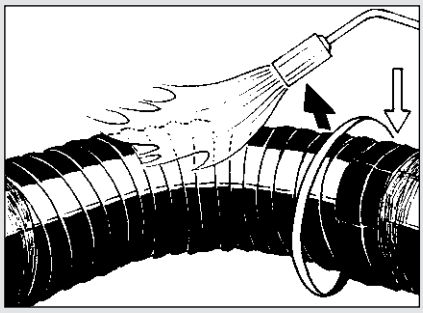


2. Using a propane torch, pre-heat the surface to be coated to about +70°C.

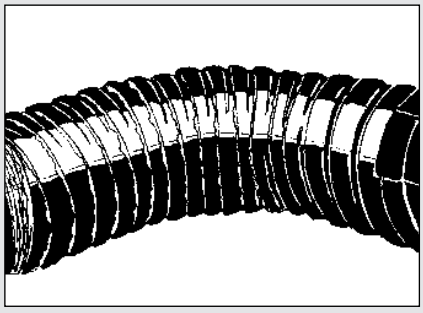
   Remove the protective foil and wind the Flexclad tape tightly around the pipe, beginning on the mill-applied coating. After the first complete turn, apply the tape spirally so as to give a 50% overlap each turn. If the bend is to be wrapped with Overflex as a second layer, an overlap of 10-15 mm is sufficient.



3. Wrap the entire bend in this manner, paying attention to the minimum overlap. The Flexclad tape should extend about 50 mm over the mill-applied coating. Secure the end of the tape using the supplied closure strips.



4. Heat the coated pipe bend with a soft yellow propane flame. Working against the wrapping of the Flexclad tape, advance the flame spirally around the pipe until the adhesive melts and is successively squeezed out along the edge of the tape.



5. The surface wrapped with Flexclad must be smooth and tight and without any air entrapments. Adhesive flow shall be evident at the overlaps around the whole circumference at the tape edges.

Note

If the higher temperature and mechanical resistance class C 50 is required, the shrinking of the Flexclad II C-30 must be immediately followed by a second layer, this time of **Overflex** tape, with a 50% overlap. Position the **Overflex** centrally over the previous layer of Flexclad II, work in the opposite direction to the Flexclad wrapping, and use closure strips for fixing. Heat-shrinking is carried out exactly as with Flexclad.

Heatshrinkable tape

Flexclad

Selection tables - Ordering information - Dimensions

Tape materials: Flexclad, Flexclad II and Overflex

Performance levels: B30 → Flexclad
C30 → Flexclad-II
C50 → Flexclad-II + Overflex

Roll length: 15 m. Widths: 35 mm, 50 mm, 75 mm and 100 mm

Calculated material usage

(including 50 mm overlap on the mill-applied coating)

		3 D-Bend				5 D-Bend			
		B 30/C 30	C 50			B 30/C 30	C 50		
Pipe diam.	Recommended tape width in mm	Tape length Flexclad in m	Tape length Flexclad II in m	+	Tape length Overflex in m	Tape length Flexclad in m	Tape length Flexclad II in m	+	Tape length Overflex in m
DN 25	35	3,1	2,7	+	3,1	3,4	3,0	+	3,4
DN 40	35	4,8	4,2	+	4,8	5,4	4,8	+	5,4
DN 50	35	6,3	5,5	+	6,3	7,3	6,4	+	7,3
DN 80	50	7,5	5,4	+	7,5	9,0	6,5	+	9,0
DN 100	50	10,6	7,7	+	10,6	13,2	9,5	+	13,2
DN 125	75	9,6	6,2	+	9,6	12,2	7,8	+	12,2
DN 150	75	12,7	8,1	+	12,7	16,4	10,5	+	16,4
DN 200	100	14,5	8,8	+	14,5	19,2	11,6	+	19,2
DN 250	100	20,6	12,5	+	20,6	28,0	16,8	+	28,0
DN 300	100	27,3	16,5	+	27,3	37,6	27,6	+	37,6

Note

For the coating of bends in the larger sizes, the WPC or HTLP product can also be used. If pipe bends are welded onto a pipe, the joints must subsequently be coated. This can be done with the products TPSM (for smaller diameters) or WPC or HTLP (for larger diameters).

Ordering example

e.g. Flexclad - XXX
└ tape width

Flexclad II - C30-XXX
└ tape width

Overflex-XXX
└ tape width

Product description

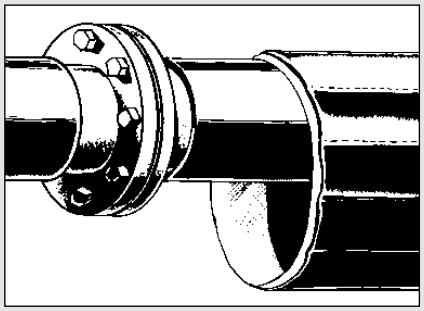
Flexclad is a heat-shrinkable tape used for corrosion protection, especially on pipe bends and also for straight pipes in distribution networks. On heating, the tape material shrinks; at the same time the sealing adhesive melts and is forced into all surface irregularities, forming a homogeneous coating. Flexclad is to be applied with a 50% overlap (B30 & C30).

Overflex is a thin-walled heat-shrinkable wrapping tape and serves as additional mechanical protection for Flexclad II (C50).

Special characteristics

- No primer is required.
- Installation is carried out directly on the cleaned and pre-heated pipe surface.
- Compatible with the standard commercial mill-applied forms of coating.
- Thanks to its high flexibility in the supplied condition the tape can be used equally well at low temperatures and on pipes of small diameter.
- Compatibility with varying pipe diameters minimises inventory.
- No special tools needed, leading to low installation costs.

9.1 Flange couplings
Closed moulded part

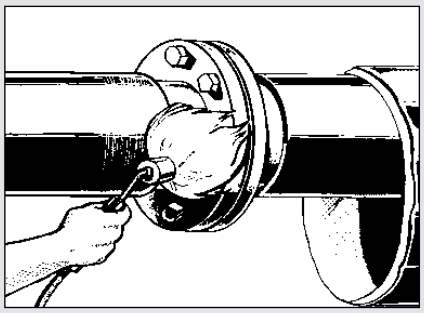


Installation procedure

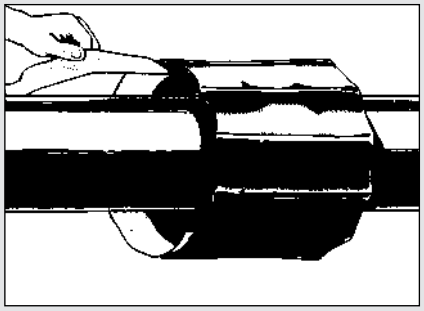
1. Before assembling the flanges, slide the FCMS heat-shrinkable sleeve, together with its release foil, onto the pipe.

   Prepare the surface to be coated according to SIS-055900-ST3.

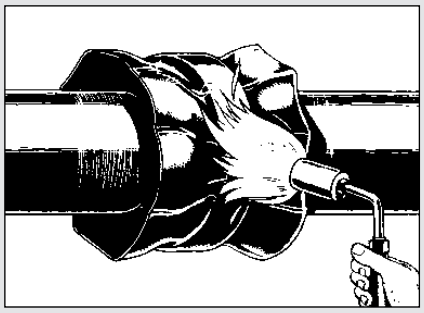
   No primer is required.



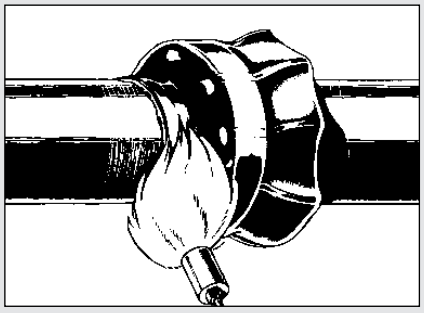
2. Using a propane torch, dry off the surface that is to be coated and pre-heat the two pipe ends to about +60°C.



3. Position the moulded sleeve centrally over the flange and remove the release foil.



4. Working from the centre outwards, heat the sleeve with a soft yellow propane flame, moving the torch in a paintbrush motion. Start by shrinking the sleeve onto the flange.



5. Then shrink one end of the sleeve onto the pipe.

   Finally, shrink the other end of the sleeve starting again in the middle to complete the operation.

Heat-shrinkable moulded part

FCMS

Selection tables - Ordering information - Dimensions

Pipe diameter	*Order description*
DN 40 DN 50	FCMS 170/40
DN 65 DN 100	FCMS 230/70
DN 125 DN 150 DN 200	FCMS 350/110

Ordering example

e.g. DN 100

FCMS 230/70

- 230 — maximum diameter (mm) after full unrestricted recovery
- 70 — min diameter (mm) as supplied

Product description

The FCMS heat-shrinkable moulded sleeve is capable of accommodating the large diameter difference between flanges and pipes.

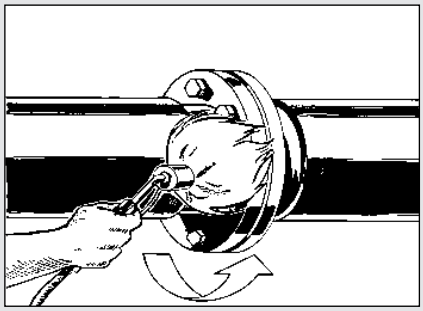
When heated, the moulded sleeve adapts itself to the shape of the flange. The viscoelastic sealing adhesive at both ends of the moulded part produces reliable sealing of the pipe coupling.

The moulded part is not coated in the flange zone, therefore should it become necessary to dismantle the joint, the flangebolts will be readily accessible without any further cleaning.

Special characteristics

- No primer is required.
- Installation is carried out directly on the cleaned, dried and prepared pipe surface.
- Compatible with standard commercial mill-applied coatings.
- The installed sleeve possesses high mechanical strength.
- Simple re-entry.

9.2 Flange couplings
Wraparound sleeve

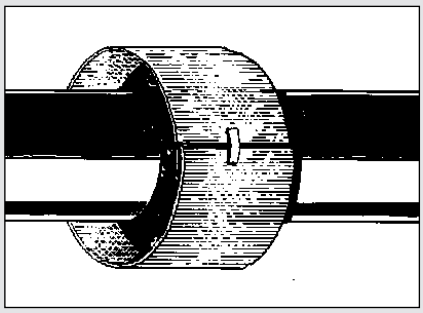


Installation procedure

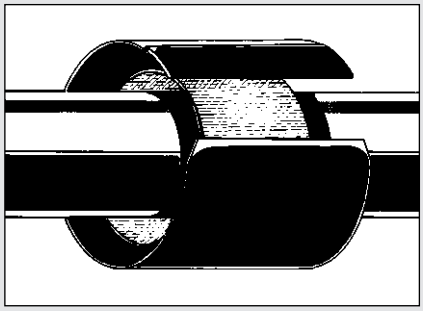
1. Prepare the surface to be coated, according to SIS-055900-ST3.

   No primer is required.

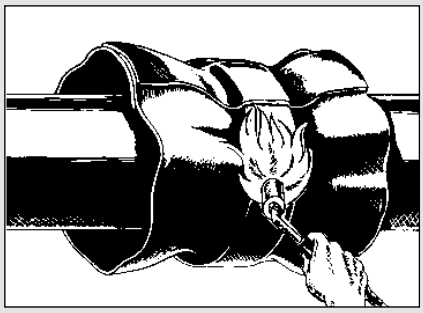
   Using a propane torch, dry off the surface to be coated and pre-heat the two pipe ends to about +60°C.



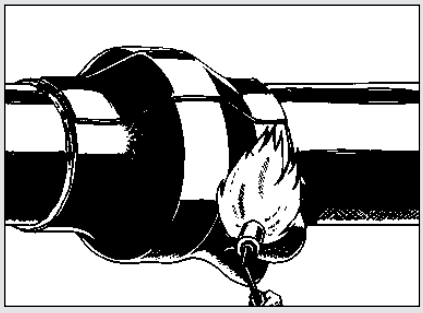
2. Wrap the corrugated paper - supplied with the sleeve - around the flange and fix with closure strips to keep the bolts free from adhesive. Then remove the release foil from the sleeve.



3. Position the heat-shrinkable sleeve centrally over the flange and close it using a closure flap or channel (FCWS) or a zipper closure (FCWS-F).



4. Next, using a soft yellow flame, and keeping it constantly moving in a paintbrush motion, uniformly heat the closure patch. With a gloved hand, smooth the closure patch firmly down, free from wrinkles. Then shrink on the sleeve, working from the center outwards, keeping the torch in a paintbrush motion, and begin by shrinking the sleeve onto the flange.



5. Next, shrink one end of the sleeve onto the pipe. Then shrink the other end of the sleeve, starting again in the middle, to finish the operation.

Wraparound heat-shrinkable sleeve

FCWS

Selection tables - Ordering information - Dimensions

Pipe diameter	*Order description* Rail & Channel	alternative (Fiberglass-reinforced sleeve)
DN 65	FCWS-DN65-450	FCWS-F-DN65-300
DN 80	FCWS-DN80-450	FCWS-F-DN80-300
DN 100	FCWS-DN100-450	FCWS-F-DN100-300
DN 125	FCWS-DN125-450	FCWS-F-DN125-300
DN 150	FCWS-DN150-450	FCWS-F-DN150-300

	Sheet & Patch
DN 200	FCWS-DN 200-450
DN 300	FCWS-DN 300-450
DN 400	FCWS-DN 400-600
DN 500	FCWS-DN 500-600
DN 600	FCWS-DN 600-600
DN 700	FCWS-DN 700-600
DN 800	FCWS-DN 800-600
DN 900	FCWS-DN 900-600

* As an alternative, fiberglass-reinforced sleeves are also available for DN 200 to DN 800 (see TISW-F).

Ordering example

e.g. DN 100

FCWS-F-DN100-300

- width (mm)
- pipe diameter
- fiberglass-reinforced, zipper closure

or

FCWS-DN100-450

- width (mm)
- pipe diameter
- patch or channel closure

Product description

FCWS heat-shrinkable wraparound sleeves have specially been developed to provide corrosion protection for flanges or mechanical couplings that are already in place.

The closure system used with this product allows quick and simple installation.

The use of fiberglass-reinforced plastic (FCWS-F) gives the sleeve a high degree of mechanical strength as well as a very hing shrink ratio.

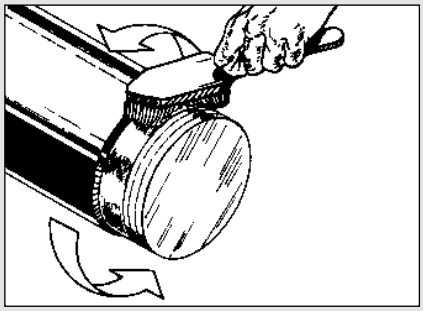
The FCWS or FCWS-F sleeves are capable of accommodating the large diameter difference between flanges and pipes.

The insertion of a piece of cardboard keeps the flange zone free from adhesive. Therefor should it become necessary to re-enter the joint, the flange bolts will be readily accessible without any cleaning work.

Special characteristics

- Mechanical strength, high impact strength and high penetration resistance render it unnecessary to employ rock shielding as additional protection for the pipe.
- No primer is required.
- Installation is carried out directly on the cleaned and prepared pipe surface.
- Compatible with standard commercial mill-applied coatings.
- No special tools needed, leading to low installation costs.
- Simple re-entry

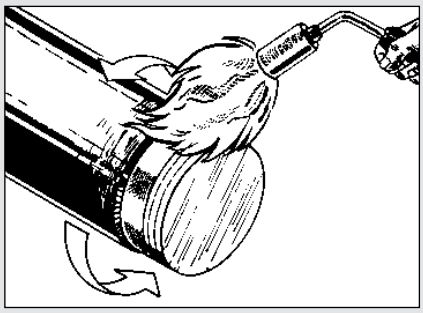
10. Steel end caps



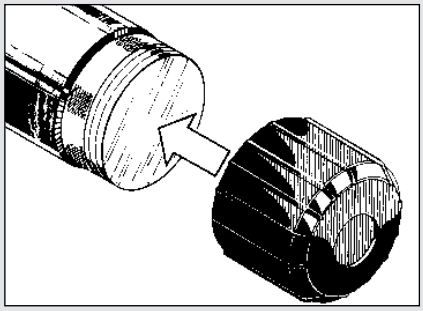
Installation procedure

1. Prepare the surface to be coated, according to SIS-055900-ST3.

   No primer is required.



2. Using a propane torch, pre-heat the surface to be coated to about +60°C.



3. Slide the moulded part onto the pipe so that it touches the steel end cap.

4. Using a soft yellow propane flame, heat the shrinkable moulding starting at the endcap. Ensure that it does not move by pressing a gloved hand against it if necessary. Complete the installation by heating by a continuous paintbrush motion around the pipe.

Note

Any remaining exposed steel can be coated with TPSM or WPC. In this operation, ensure an overlap of at least 50 mm with the FCMS-CAP moulded part and the mill-applied coating.

Moulded part

FCMS-CAP

Selection tables - Ordering information - Dimensions

Pipe diameter	*Order description*
DN 40-65	FCMS-CAP-DN40-DN65
DN 80-100	FCMS-CAP-DN80-DN100
DN 125-175	FCMS-CAP-DN125-DN175
DN 200-300	FCMS-CAP-DN200-DN300

Smaller diameters are available upon request.

Ordering example

e.g. DN 50

FCMS-CAP-DN 40-DN 65

Product description

FCMS-CAP heat-shrinkable moulded parts have been developed for the protection of pipe ends against corrosion.

Coated with a permanently elastic corrosion protection adhesive, the moulded part allows simple and safe coating.

Special characteristics

- High mechanical strength, high impact strength and penetration resistance.
- Installation is carried out directly on the cleaned and pre-heated pipe surface, no primer is required.
- Quick and simple disassembly.
- Compatible with standard commercial mill-applied coatings.
- High shrink ratio minimises inventory.

GRSM

FLEXCLAD

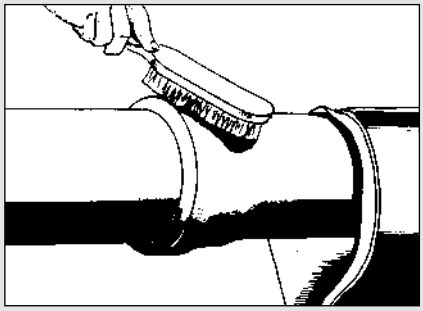
RAYTRANS

MEPS

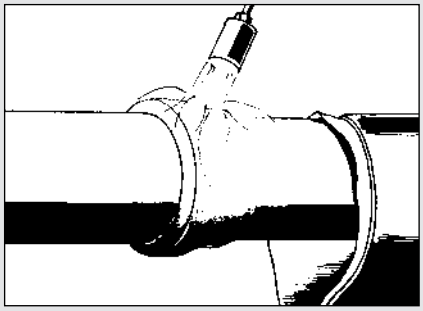
Corrosion Protection and Sealing

1. Bell and spigot joints

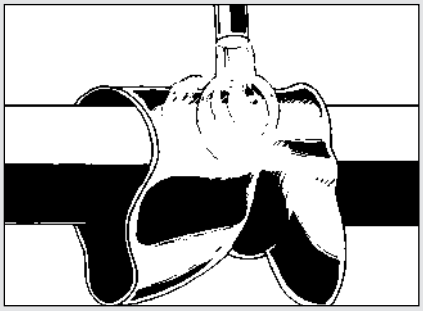
Installation procedure MPSM



1. Before making the joint, slide the heat-shrinkable sleeve, together with its release foil, onto the pipe. Prepare the surface to be coated, according to SIS-055900-ST3. No primer is required.

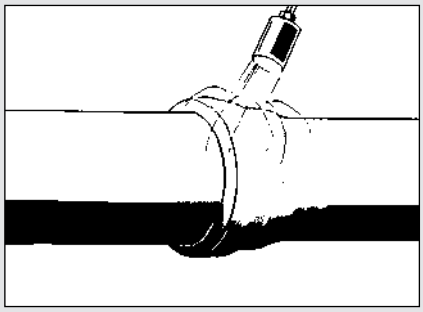


2. Using a propane torch, pre-heat the surface to be coated to about +60°C.

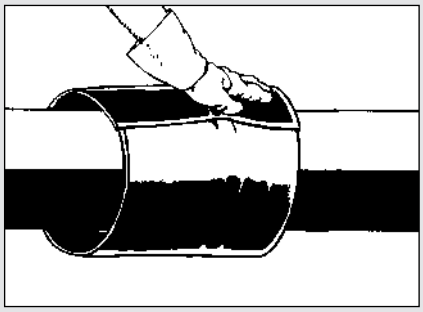


3. Position the heat-shrinkable sleeve centrally over the pipe joint. Remove the release foil. Using a soft yellow propane flame, and keeping the torch in circumferential paintbrush motion, shrink the sleeve first onto the bell and then in the same manner onto the spigot.

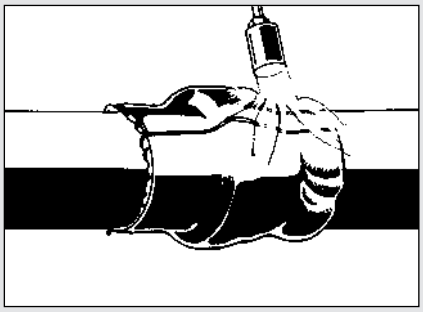
Installation procedure MEPS



1. Prepare the surface to be coated according to SIS-055900-ST3. No primer is required. Using a propane torch, pre-heat the surface to be coated to about +60°C.



2. Remove about 150 mm of the protective foil from the ready-to-fit sleeve. Position the free end of the sleeve over the pipe joint at right angles to the pipe axis and wrap the sleeve loosely round the pipe, removing the rest of the foil as you go. The overlap must be at least 80 mm and should be on the upper third of the pipe circumference to be readily accessible.



3. In low ambient temperatures it is advantageous to briefly heat the inside of the overlapping zones, along with the closure flap, and to press them firmly closed. Using a soft yellow flame, and keeping the torch in paintbrush motion, uniformly heat the closure flap until the fiberglass weave shows through. Then press firmly with a gloved hand. Maintaining uniform movement in a circumferential paintbrush motion, shrink the sleeve first onto the bell and then in the same way onto the spigot.

Note

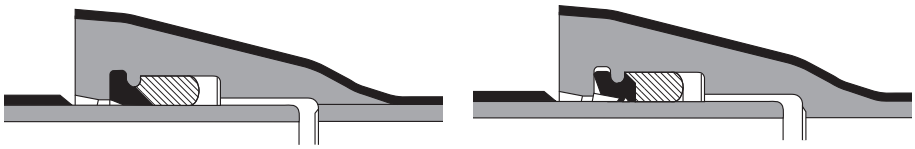
The product is correctly installed when:

- the tubing/sleeve has been completely shrunk onto the pipe joint, and is free from cold-spots and air enclosures,
- adhesive flow is evident at both sleeve edges along the circumference of the pipe,
- the overlap on the mill coating is min 50 mm.

Heat-shrinkable Sleeve

MPSM & MEPS

Selection tables - Ordering information - Dimensions



Bell and spigot joints

Heat-shrinkable sleeve MPSM			*Ready-to-fit*	
Pipe diameter	*Max. Bell Ø (mm)*	*Order description*	*Unit MEPS Order description*	*MEPS-300 Cutting length*
DN 80	151	MPSM-C30-DN80-350		
DN 100	171	MPSM-C30-DN100-300		
DN 150	217	MPSM-C30-DN150-300	MEPS-C30-DN150-300	845 mm
DN 200	278	MPSM-C30-DN200-300	MEPS-C30-DN200-300	1040 mm
DN 250	336	MPSM-C30-DN250-300	MEPS-C30-DN250-300	1220 mm
DN 300	393	MPSM-C30-DN300-300	MEPS-C30-DN300-300	1400 mm
DN 350	444	on request	MEPS-C30-DN350-300	1580 mm
DN 400	500		MEPS-C30-DN400-300	1740 mm
DN 500	607		MEPS-C30-DN500-300	2100 mm
DN 600	715		MEPS-C30-DN600-300	2450 mm
DN 700	824		MEPS-C30-DN700-300	2790 mm
DN 800	942		MEPS-C30-DN800-300	3160 mm

Ordering example

e.g. DN 100

MPSM-C30-DN100-300

- width as supplied
- pipe diameter
- performance classification

Note

Special width: 450 mm, 600 mm available on request.

Alternative

Rolls of MEPS
Roll length 30 m, width 300 mm

Order description

MEPS-C30-300

Closure patch WPCP IV for rolls

(fiberglass-reinforced)

Order description

WPCP IV-150x298
for all pipe diameters

Product description

MPSM tubing and Unisleeve MEPS are heat-shrinkable products designed for the effective coating of specific bell-and-spigot categories, such as:

- ductile cast-iron pipes with outer mill-applied PE coating,
- ductile cast-iron pipes with outer mill-applied fiber-cement coating,
- steel bell-and-spigotpipes with outer mill-applied PE coating.

The special visco-elastic adhesive coating ensures reliable sealing.

Due to their high shrink ratio the sleeves will shrink down tight and clean onto the bell and the spigot of the pipes.

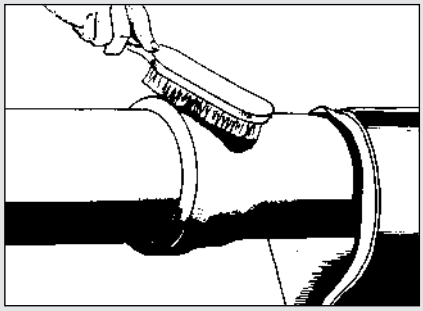
The structure and characteristics of MEPS is similar to WPC, the anti-corrosion sleeve for steel pipes.
Bell-and-spigot pipes can be coated with MEPS after they have been laid.

Special characteristics

- The angling tolerance and lengthwise play of the bell-and-spigot joint is fully retained.
- No primer is required.
- Installation is carried out directly on the cleaned and prepared pipe surface.
- Compatible with the usual commercial mill-applied coatings.
- The thick-walled structure of the cross-linked heat-shrinkable material gives it high impact strength and high penetration resistance.
- No special tools needed leading to low installation costs.
- Vacuum-tight sealing to exclude groundwater.

2. Special bell-and-spigot joints - TIS-K

Installation procedure TIS-K

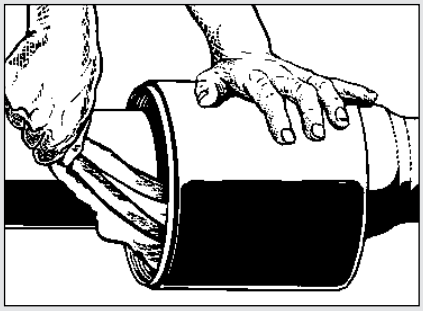


1. Before making the joint, slide the heat-shrinkable sleeve, together with its release foil, onto the pipe.

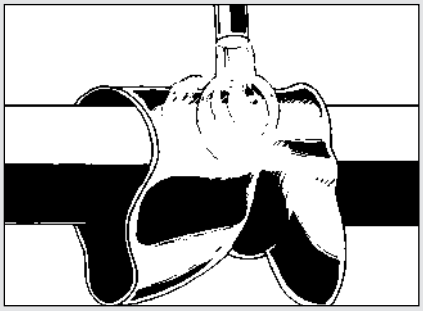
   Prepare the surface to be coated, according to SIS-055900-ST3.

   No primer is required.

   Using a propane torch, pre-heat the surface to be coated to about +60°C.

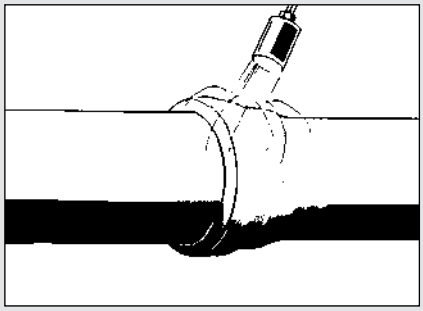


2. Position the sleeve over the pipe joint and remove the release foil.



3. Using a soft yellow propane flame, and keeping the torch in a paintbrush motion, first shrink the sleeve onto the pipe bell and then in the same way onto the spigot.

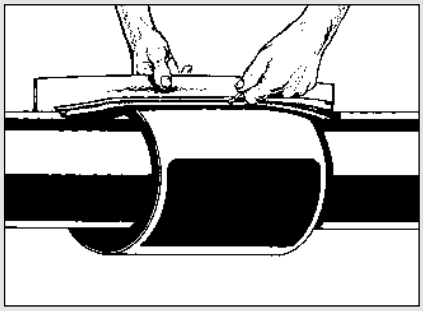
Installation procedure TISKW-F



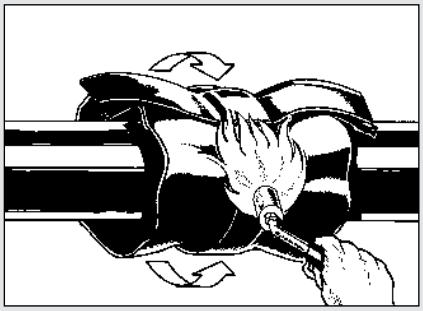
1. Prepare the surface to be coated, according to SIS-055900-ST3.

   No primer is required.

   Using a propane torch, pre-heat the surface to be coated to about +60°C.



2. Remove the release foil. Position the sleeve over the pipe joint. Close the sleeve.



3. Install the closure patch as a heat shield by heating over the zipper closure. Do not apply the flame directly on the zipper closure.

   Using a soft yellow propane flame, and keeping the torch in a paintbrush motion, first shrink the sleeve onto the pipe bell and then in the same way onto the spigot.

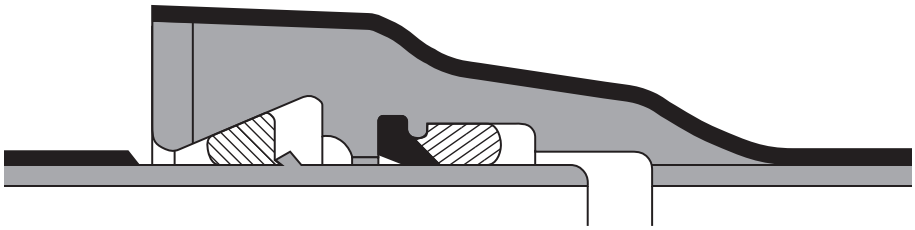
Note

The product is correctly installed when:

- the tubing/sleeve has been completely shrunk onto the pipe joint, and is free from cold-spots and air enclosures,
- adhesive flow is evident at both sleeve edges along the circumference of the pipe,
- the overlap on the mill coating is min. 50 mm.

TISKW-F

Selection tables - Ordering information - Dimensions



Pipe-diameter	*Max Bell Ø (mm)*	*Heat-shrinkable sleeve TIS-K Order description*	*Wraparound sleeve TISKW-F Order description*
DN 100	186	TISK - DN 100-300	TISKW-F DN 100-300
DN 150	241	TISK - DN 150-300	TISKW-F DN 150-300
DN 200	297	TISK - DN 200-300	TISKW-F DN 200-300
DN 250	357	TISK - DN 250-300	TISKW-F DN 250-300
DN 300	415	TISK - DN 300-300	TISKW-F DN 300-300
DN 350	480	TISK - DN 350-300	TISKW-F DN 350-300
DN 400	525	TISK - DN 400-300	TISKW-F DN 400-300
DN 500	637	on request	TISKW-F DN 500-300
DN 600	740	on request	TISKW-F DN 600-300
DN 700	855	on request	TISKW-F DN 700-300
DN 800	965	on request	TISKW-F DN 800-300

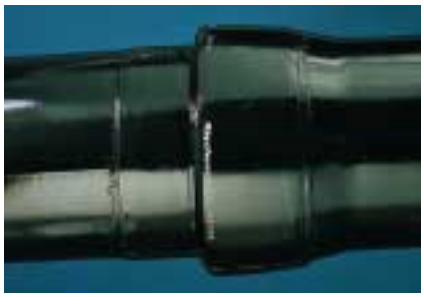
Ordering example

e.g. DN 100

TIS-K-DN100-300
- 300 — sleeve width (mm)
- 100 — pipe diameter

TISKW-F-DN100-300
- 300 — sleeve width (mm)
- 100 — pipe diameter
- F — fiberglass-reinforced

Product description



The heat-shrinkable tubing TIS-K and the wraparound heat-shrinkable sleeve TISKW-F are special anti-corrosion and sealing products for thrust-secured TIS-K bell-and-spigot joints.

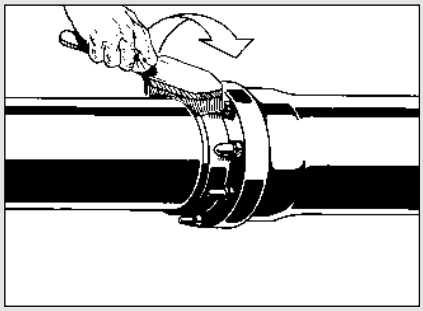
The closure system used with the TISKW-F permits quick and easy installation.

The use of a fiberglass-reinforced weave gives the sleeve high mechanical strength and a high shrink ratio.

Special characteristics

- The thick-walled structure of the cross-linked heat-shrinkable material gives it high impact strength and high penetration resistance.
- No primer is required.
- Installation is carried out directly on the cleaned and prepared pipe surface.
- Compatible with standard commercial mill-applied coatings.
- No special tools needed, leading to low installation costs.

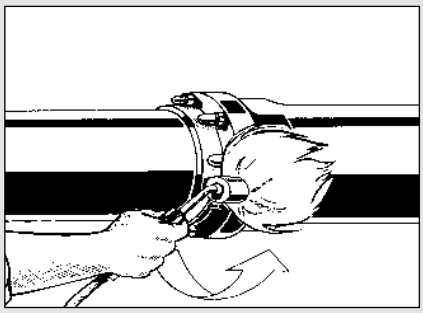
3. Special bell-and-spigot joints - TIS



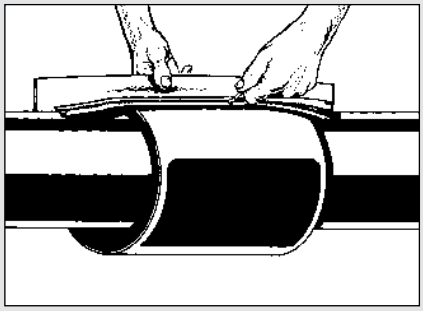
Installation procedure

1. Prepare the surface to be coated, according to SIS-055900-ST3.

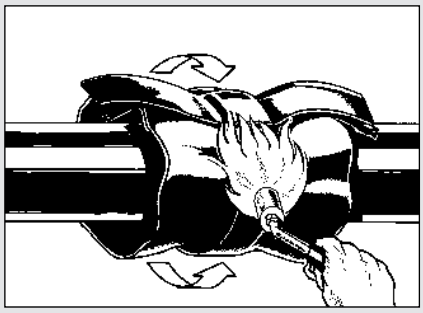
   No primer is required.



2. Using a propane torch pre-heat the surface to be coated to about +60°C.



3. Position the heat-shrinkable sleeve over the pipe joint. Remove the release foil. Close the sleeve.



4. Install the closure patch as a heat shield over the zipper closure. Do not apply the flame directly on the patch.

   Using a soft yellow propane flame, and keeping the torch in a continuous paintbrush motion, first shrink the sleeve onto the thrust stop and then onto the pipe bell and the spigot.

Note

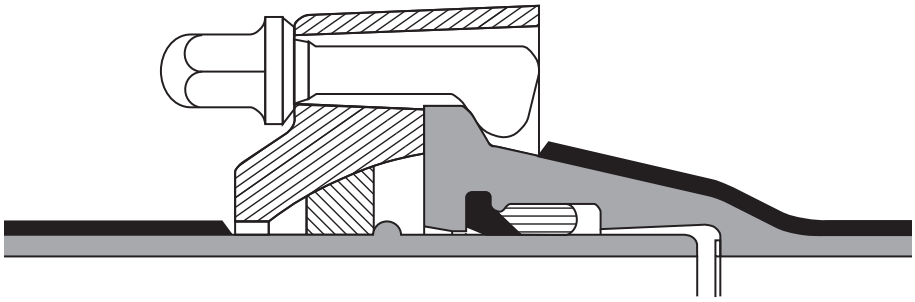
The product is correctly installed when:

- the tubing/sleeve has been completely shrunk onto the pipe joint, and is free from cold-spots and air enclosures,
- adhesive flow is evident at both sleeve edges along the circumference of the pipe,
- the overlap on the mill coating is min. 50 mm.

Wraparound heat-shrinkable sleeve

TISW-F

Selection tables - Ordering information - Dimensions



Wraparound sleeve TISW-F

Pipe diameter	*Max.bell Ø (mm)*	*Order description*
DN 100	255	TISW-F-DN100-425
DN 150-200	364	TISW-F-DN150/200-425
DN 250-300	516	TISW-F-DN250/300-425
DN 350	576	TISW-F-DN350-425
DN 400-500	733	TISW-F-DN400/500-600
DN 600	840	TISW-F-DN600-600
DN 700	958	TISW-F-DN700-600
DN 800	1069	TISW-F-DN800-600

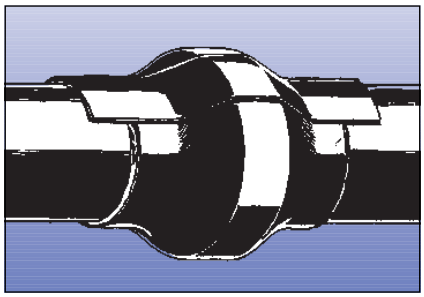
Ordering example

e.g. DN 100

TISW-F-DN100-425

- 425 — sleeve width (mm)
- 100 — pipe diameter
- TISW-F-DN — fiberglass-reinforced

Product description



TISW-F wraparound heat-shrinkable sleeve is a special anti-corrosion and sealing product for thrust-secured TIS bell-and-spigot joints.

The closure system used with this product permits quick and easy installation.

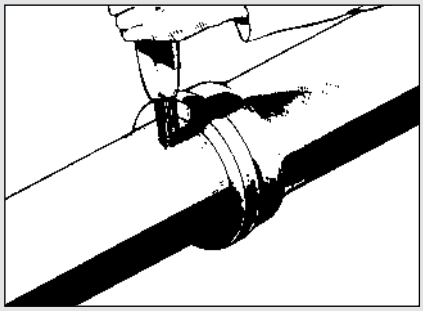
The use of a fiberglass-reinforced plastic gives the sleeve high mechanical strength and a very high shrink ratio.

Special characteristics

- The thick-walled structure of the cross-linked heat-shrinkable material gives it high impact strength and high penetration resistance.
- No primer is required.
- Installation is carried out directly on the cleaned and prepared pipe surface.
- Compatible with standard commercial mill-applied coatings.
- No special tools needed, leading to low installation costs.

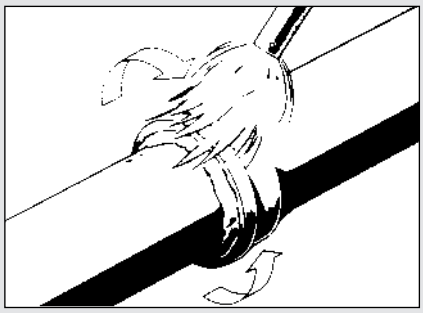
Sealing

1. Leak repair



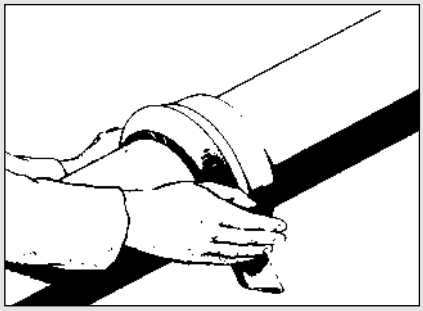
Installation procedure

1. The surface of the pipe in the installation area must be dry and free from foreign material (e.g. loosely adhering dirt, rust, oil, grease, etc.). The area can be cleaned with a needle descaling tool or a spark free steel-wire brush.

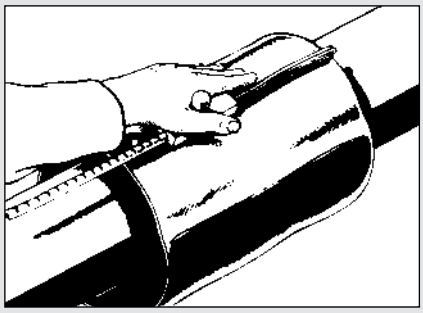


2. Any leaks should be temporarily sealed with Raychem mastic putty S 1057-2.

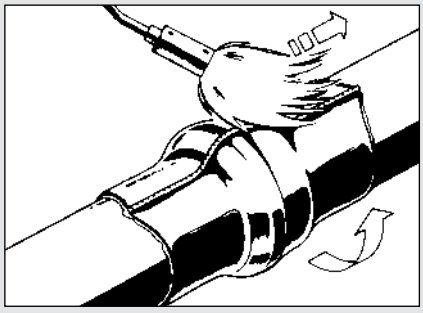
   Using a propane torch pre-heat the pipe in the installation area to about +60° C.



3. The mastic profile S 1052 contained in the GRSM Kit will completely fill the transitional zone between the bell and the pipe and should overtop the bell diameter by about 5 mm. Apply the mastic profile against the face of the bell as shown.



4. After removing the release foil from the inside, position the GRSM sleeve centrally over the lip of the bell and wrap round the pipe. The internal flap will face upwards. Using the Raychem channel pulling tool, and working from the straight end towards the bell, slide the channel onto the GRSM sleeve.
   In the case of the GRSM-F product, close the zipper closure. Avoid shifting the sleeve, to ensure that no displacement of the mastic profile occurs. In the case of GRSM-F, install the closure patch as a heat shield over the zipper closure by heating it. Do not apply the flame directly on the closure.



5. Beginning from the center of the sleeve, use a soft yellow flame to shrink the GRSM sleeve onto the pipe, keeping the torch in a steady paintbrush motion.

   Then, working outwards from the bell, install the sleeve with the same procedure on the other side. During the installation, use a blunt object such as the handle of a hammer to press the closure downward against the bell.

Note:

The product is correctly installed when

- the sleeve has been completely shrunk onto the pipe joint, and is free from cold-spots and air enclosures,
- adhesive flow is evident at both sleeve edges along the circumference of the pipe,
- Closure area shall be void of any damages, such as cuts, partial channel pull-out and the like, and shall conform to the contours of the joint.

Heat-shrinkable sealing sleeve

GRSM & GRSM-F

Selection tables - Ordering information - Dimensions

Pipe diameter	*Order description*
50/60	GRSM-60-450-AA
80	GRSM-80-600-AA*
100	GRSM-100-600-AB*
125/150	GRSM-150-600-AC*
200	GRSM-F-DN200/8
250	GRSM-F-DN250/10
300	GRSM-F-DN300/12
350	GRSM-F-DN350/14
400	GRSM-F-DN400/16
450	GRSM-F-DN450/18
500	GRSM-F-DN500/20
600	GRSM-F-DN600/24

*900 mm long sleeves for double bell & spigot joints.

Ordering example

e.g. DN 80

GRSM 80-600-AA
- code for mastic profile
- sleeve width (mm)
- pipe diameter

e.g. DN 200

GRSM-F-DN 200/8
- pipe diameter
- fiber-glass reinforced

Additional item: temporary sealing mastic S 1057-2

Note

Besides GRSM, electrically shrinkable sealing sleeve Rayseal (see further) is also available.

Product description

GRSM heat-shrinkable sealing sleeves are used in low-pressure gas systems for the sealing of leaking caulked / screwed bell-and-spigot joints. The wraparound sleeve is manufactured from modified crosslinked polyolefin coated with a thermoplastic sealing adhesive.

The F-version is reinforced with fiber-glass.

The mastic sealing profile supplied with the sleeve serves to fill out the transitional zone between the bell and the pipe. In the supplied condition the sleeve is expanded to allow it to be conveniently fitted onto the caulked/screwed bell-and-spigot joint. It is closed by means of a flexible chromium-nickel steel channel, or, in the case of the GRSM-F, with an integrated closure system.

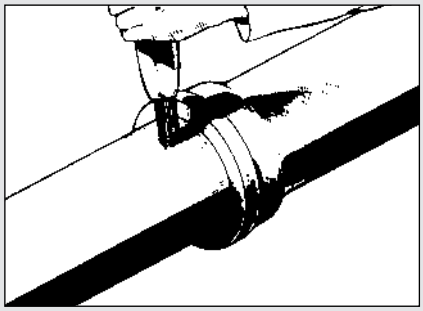
When heated with a gas flame, the sleeve shrinks tightly onto the caulked/ screwed bell-and-spigot joint, completely sealing it off, while the sealing adhesive and the sealing profile melt and are forced into any cavities or irregularities.

Special characteristics

- High mechanical strength.
- Excellent resistance to acidic and alkaline soils and likewise to soil bacteria and fungi.
- Withstands internal pressures up to 10 kPa (100 mbars) in the case of the GRSM and up to 5 kPa (50 mbars) in the case of the GRSM-F, even in the presence of strong soil vibration due to heavy traffic loads.
- Quick and easy installation under normal service pressure.

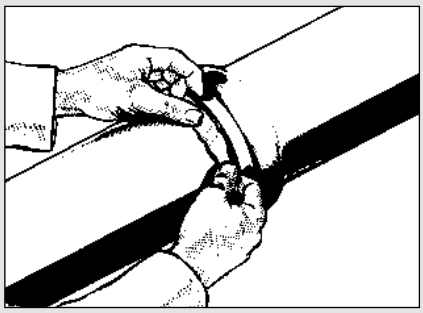
Rayseal

1. Leak repair

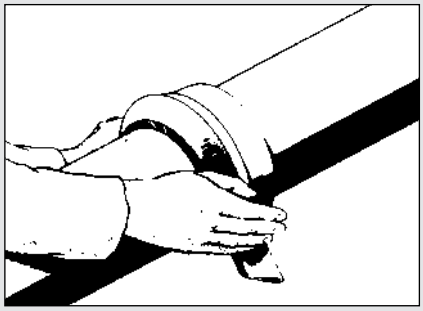


Installation procedure

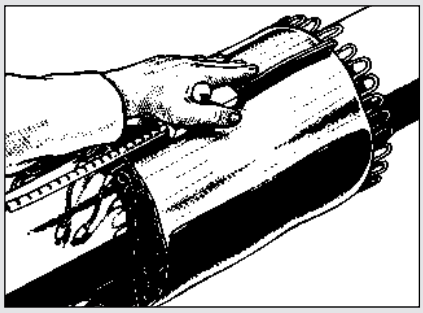
1. The surface of the pipe in the installation area must be dry and free from foreign material (e.g. loosely adhering dirt, rust, oil, grease, etc.). The area can be cleaned with a needle descaling tool or a spark free wire brush. Remove excess moisture with a dry cloth.



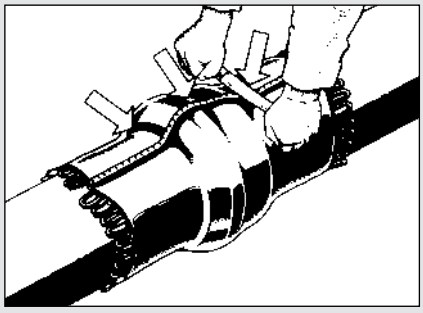
2. Any leaks should be temporarily sealed with Raychem mastic putty S 1057-2.



3. The mastic profile S 1052 contained in the Rayseal Kit will completely fill the transitional zone between the bell and the pipe and should overtop the bell diameter by about 5 mm. Apply the mastic profile against the face of the bell as shown.



4. After removing the release foil from the inside, position the Rayseal sleeve centrally over the lip of the bell and wrap round the pipe as shown in the diagram. The internal flap will face upwards. Using the Raychem channel pulling tool, and working from the straight end towards the bell, slide the channel onto the Rayseal sleeve. Do not damage the wires



5. Sleeve electrification. The control unit and splitter should be located outside the excavation.
Plug the lead wires of the sleeve into output terminal of a power control unit. Energize the unit manually or by the aid of the magnetic card or barcode which is supplied with each sleeve. After preset time has elapsed, disconnect power leads and use a blunt object such as the handle of a hammer to keep the closure pressed against the bell

Note

- When wind and/or temperature conditions require, the use of a Raychem insulation blanket is necessary.
- Effective power required from the generator is 3.5 to 3 kW.
- The product is correctly installed when

- the sleeve has been completely shrunk onto the pipe joint, and is free from cold-spots and air enclosures,
- adhesive flow is evident at both sleeve edges along the circumference of the pipe,
- Closure area shall be void of any damages, such as cuts, partial channel pull-out and the like, and shall conform to the contours of the joint.

Heat-shrinkable sealing sleeve, electrically activated Rayseal

Selection label - Ordering information - Dimensions

Pipe diameter	*Order description*
DN50/60	RAYSEAL-60-400-A
DN80	RAYSEAL-80-400-E *
DN100	RAYSEAL-100-400-F *
DN125/150	RAYSEAL-150-400-G *
DN200	RAYSEAL-80-600-E X2
DN250	RAYSEAL-80-600-E + RAYSEAL-100-600-F
DN300	RAYSEAL-100-600-F X2
DN350	RAYSEAL-100-600-F + RAYSEAL-150-600-G
DN400	RAYSEAL-150-600-G X2

* also available in 600 mm width

Ordering example

e.g. DN80

RAYSEAL-80-400-E
- E — code for mastic profile
- 400 — sleeve width (mm)
- 80 — pipe diameter

Additional item: temporary sealing tape S1057-2

Electrical equipment

(see page 59 for complete description.)

- EQ-RS-7-BOX-110/220 — or similar electrofusion unit f.e. Sauron, G. Fischer,...
- EQ-RS-BOX-CABLE-2.5M — output lead connection to the power box
- EQ-RS-OUTPUT-CABLE-1.5M — to connect box-cable to sleeve connectors
- EQ-RS-POWER-SPLITTER — used when installing a two Rayseal sleeve combination

Product Description

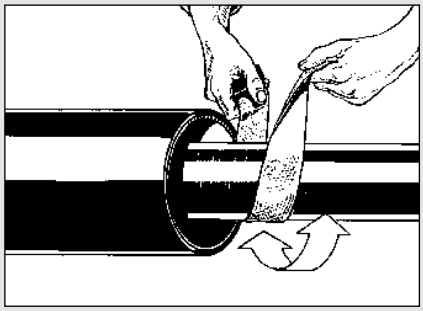
Rayseal - electrically shrinkable sealing sleeves are used in low pressure gas systems for the sealing of leaking caulked/screwed bell and spigot joints. The wrap-around sleeve is manufactured from modified crosslinked polyolefin coated with a thermoplastic sealing adhesive.
The mastic sealing profile supplied with the sleeve serves to fill out the transitional zone between the bell and the pipe.
In the supplied condition the sleeve is expanded to allow it to be conveniently fitted onto the caulked/screwed bell-and-spigot joint. It is closed by means of a flexible chromium-nickel steel channel.

When electrically heated, the sleeve shrinks tightly onto the leaking caulked/screwed bell-and-spigot joint, completely sealing it off, while the sealing adhesive and the sealing profile melt and are forced into any cavities or irregularities.
The electrical power can be provided through the Raychem power-box or a standard EF control unit in conjunction with a 4KVA-AC generator. Typical voltage range at sleeve: 39-40.5 volt.

Special characteristics

- High mechanical strenght
- Excellent resistance to acidic and alkaline soils and likewise to soil bacteria and fungi.
- Withstands internal pressures up to 10 kPa (100 mbar)
- Quick and easy installation under normal service pressure.
- Total operator independence results in reproducible, high-quality installations.
- No pre-heating or gritblasting is necessary.
- The product can be installed where clearance is restricted (less than 1/2" is sufficient) and in close proximity to electrical cables and plastic pipes.

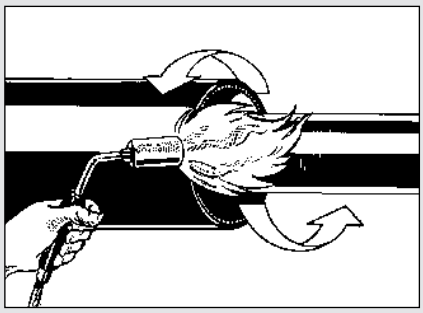
2. Sealing of pipe casings



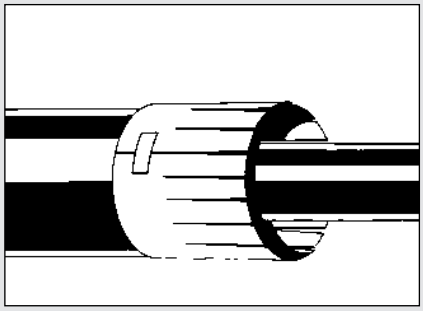
Installation procedure

1. Prepare the surface that is to be coated, according to SIS-055900-ST3.

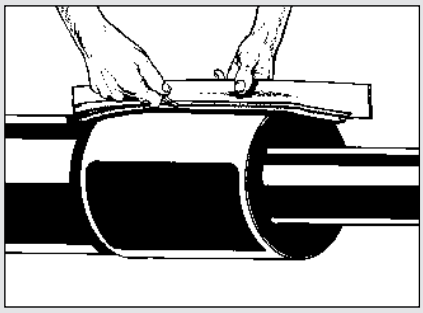
   No primer is required.



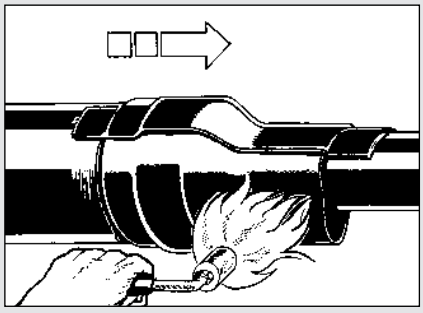
2. Using a propane torch, pre-heat the surface to be coated to about +60°C.



3. Wrap the cut-to-size supporting sleeve round the casing. Work the interlaced fingers down onto the service pipe and close off with adhesive tape.



4. Remove the release foil. Taking account of the difference in diameter, position the sleeve so that the contact surface when installed should be equally divided between the casing and the service pipe. Close the sleeve using a closure flap or a channel (CSEM), or a zipper closure (CSEM-F).



5. Using a soft yellow propane flame, and keeping the torch in a steady circumferential paintbrush motion, first shrink the sleeve onto the casing and then onto the transitional zone as far as the service pipe.

   Installation is complete when the sleeve fits snugly and smoothly around the pipe and the sealing adhesive has been squeezed out at the edges.

Wrap around heat-shrinkable sleeve

CSEM

Selection tables - Ordering information - Dimensions

Carrier pipe	*Casing pipe max. OD (mm)*	*CSEM*	*Casing pipe max OD (mm)*	*CSEM-F*
DN50	168	190/55-450		
DN80	200	240/68-450		
DN100	225	278/76-450		
DN125	280	329/93-450	250	280/110-425
DN150	355	380/110-450	355	380/140-425
DN200	406	452/200-450	508	540/180-425
DN300	406	452/200-450	712	760/270-600
DN350	508	530/340-600	812	880/320-600
DN400	609	620/400-600	1016	1050/370-600
DN450	660	690/445-600	1118	1150/410-600
DN500	762	790/490-600	1220	1300/470-600

Ordering example

e.g. service pipe DN 125, casing OD 280 mm

CSEM-329/93-450

- 450 — sleeve width (mm)
- 93 — Max. diameter after full unrestricted recovery (mm)
- 329 — Min. diameter as delivered (mm)

e.g. service pipe DN 125, casing DN 200 (OD 220 mm)

CSEM-F-280/110-425

- 425 — sleeve width (mm)
- 110 — Max. diameter after full unrestricted recovery (mm)
- 280 — Min. diameter as delivered (mm)
- F — glassfiber-reinforced

Note

The diameter combinations stated in the selection table can only be utilized to the maximum when the service pipe is concentric with the casing.

Product description

CSEM and CSEM-F are wraparound sleeves specially developed for casing/service-pipe sealing, and have an extremely high shrink ratio.

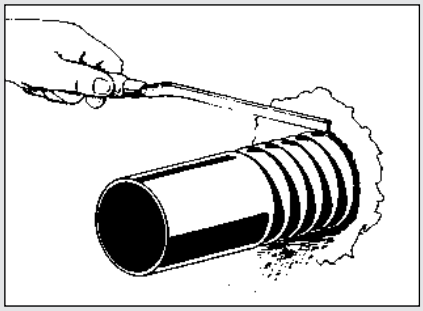
The closure system used with this product permits quick and easy installation.

A separate inner supporting sleeve, fingered at one end, provides additional mechanical support and permits a continuous transition.

Special characteristics

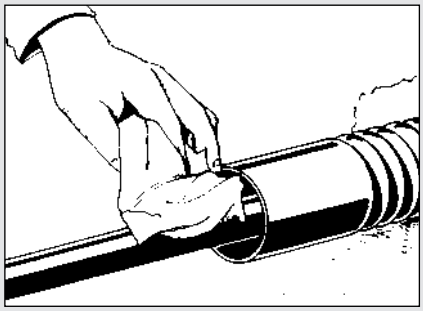
- Installation is carried out directly on the cleaned and prepared pipe surface; no primer is required.
- The system can also be used when the service pipe is not concentric with the casing.

3. Heat-shrinkable wall feedthroughs

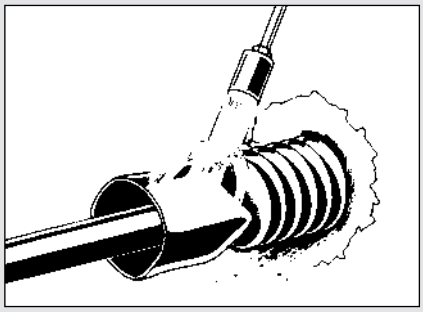


Installation procedure

1. Position the heat-shrinkable wall feedthroughs concentrically in the hole through the wall. Fill any gaps with cement mortar or a quick-curing mastic on both sides.



2. After allowing sufficient time for curing, remove the sealing caps. Clean the pipe or cable and pass it through.



3. Position the pipe or cable and shrink down the two ends of the feedthrough starting at the supporting helical spring. Allow ends of the feedthrough to cool to room temperature before subjecting them to mechanical load. Using a suitable sealant, coat the area surrounding the hole on the exterior wall.

WAFT-KT200

Selection tables - Ordering information - Dimensions

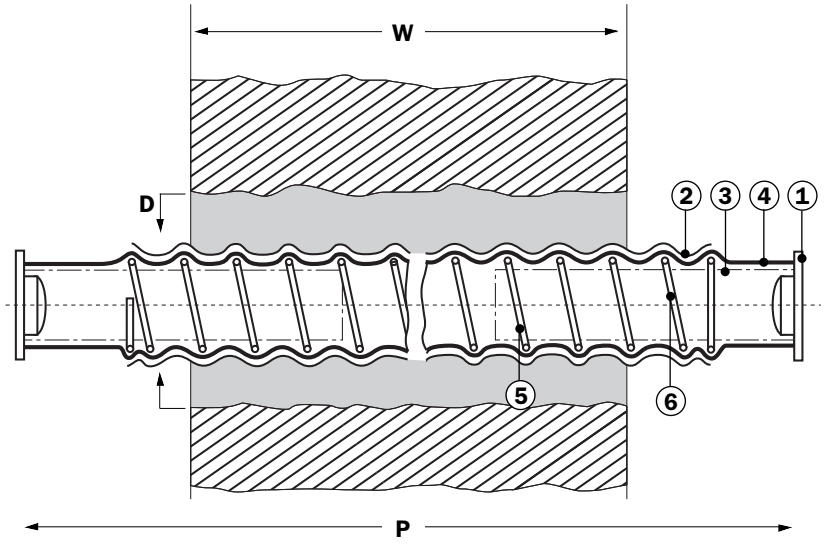
Cable/pipe Outside Ø from	*to*	*Wall thickness max.* mm*	*Dimensions*
8	14	320	WAFT-KT200-16/8
10	26	320	WAFT-KT200-28/10
16	38	420	WAFT-KT200-41/16
26	54	320	WAFT-KT200-59/26
54	95	370	WAFT-KT200-106/54

*For thicker walls, two feedthroughs can be joined together.

Ordering example

e.g. WAFT-KT200-16/8

- max. diameter shrinkage after full unrestricted recovery
- diameter size as supplied



1. **Closing cap**
2. **External sealant**
3. **Internal sealing compound**
4. **Heat-shrinkable tubing**
5. **Nominal cutting**
6. **Supporting helical spring St 34 galvanized**

W **Wall thickness**

D **Wall opening**

Product description

WAFT-KT200 heat-shrinkable wall feedthrough consists of a polyolefin tube lined with a metal stiffener. The corrugated exterior is coated with a sealant which forms a permanent compound that is impermeable to water when it comes into contact with wet concrete or mortar. The two ends are coated on the inside with sealing adhesive.

When heated with a gas flame, the two ends shrink onto the cable or pipe, and the sealing adhesive melts and is forced into any cavities or irregularities, providing a gas- and watertight seal.

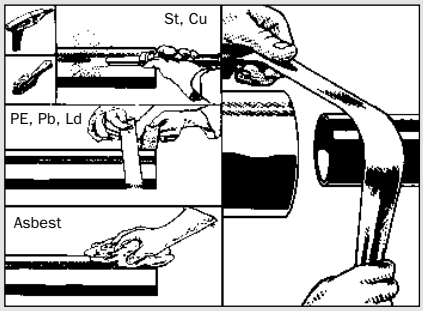
As delivered, the two openings of the feedthrough are sealed by caps, so that it can be positioned in advance. Furthermore, the special pattern of the design makes it possible for the pipe or cable to be replaced at a later date without requiring new drilling work.

Special characteristics

- Flexible - can bend up to 30°.
- Quick and simple installation - the wall lead-in consists of one single piece.
- High shrink ratio which means a range of only six sizes will accomodate pipe/cable diameters of 8 to 140 mm.

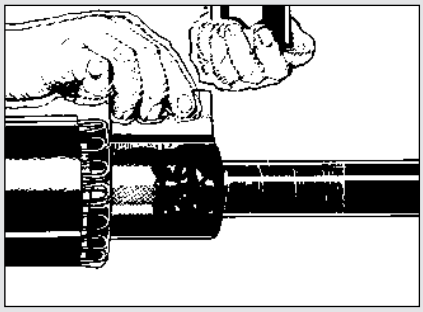
Coupling

1. Coupling of dissimilar low pressure gas pipes

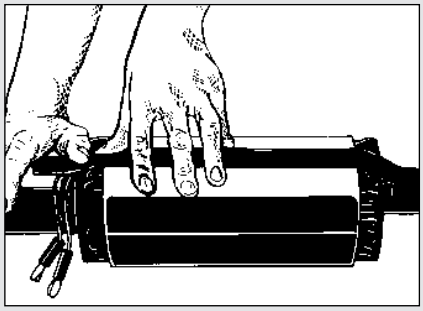


Installation instruction

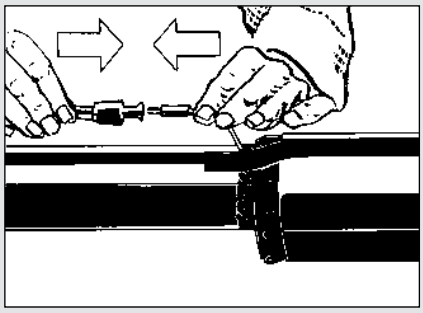
1. Put Raytrans sleeve onto one of the pipes to be joined. The surface of the pipe in the installation area must be dry and free from foreign materials such as scale, dirt, dust, rust, moisture, oil, grease, etc.
   Clean metal pipe surface in accordance with SIS-055900-SA 1/2 or SIS-055900-ST3. PE, lead and copper pipe surface should be abraded (P60).
   Align and support the pipes. The maximum gap allowed between the pipes is 5 mm. max. pipe diameter difference allowed is 25 mm.



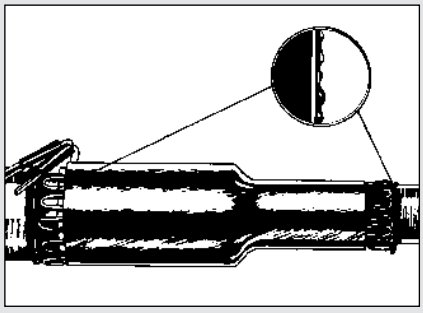
2. Apply the prepared and properly mixed two-component epoxy resin on the metal pipe.
   Snugly wrap the dented transition smoothing tape around the larger pipe section at the junction of the pipe ends.



3. Carefully move Raytrans in position and affix the sleeve to the pipes by applying the fixation tape which is supplied with the kit.



4. Ensure the power control unit is not energized. Plug both connectors into the outlet terminals of the power control unit. Energize the control unit manually or by the aid of the magnetic card or barcode which is supplied with each sleeve.



5. After the preset time has elapsed, carefully disconnect the power leads.

Note

- The Raytrans sleeve can be reheated to correct possible installation problems once the sleeve has substantially cooled down.
- Effective power required from the generator is 3.5 to 3 kW.
- Check the installed Raytrans sleeve for following points:

- adhesive flow shall be evident at both sleeve edges along the circumference of the pipe;
- sleeve surface shall be smooth without dimples, bubbles, signs of air entrapment, punctures, pinholes, burn marks etc ...

Electro-shrinkable coupling for dissimilar low pressure gas pipes

Raytrans

Selection table - Ordering information

Size	polyethylene mm	steel mm	copper mm	lead mm	Raychem Part number
1"-1/2"	25,32,40	27,33,42	22,28,35	26,33,42	RAYTRANS-KIT- 25- 40

Size	polyethylene mm	steel mm	cast iron mm	asbest mm	Raychem Part number
2"	63	60.3	76	67-72	RAYTRANS-KIT- 63- 90
		88.9		78-82	RAYTRANS-KIT- 63- 90
3"	90	88.9	98	98-102	RAYTRANS-KIT- 63- 90
	90	114.3			RAYTRANS-KIT- 90-125
4"	110	88.9-114.3	98-124	124-130	RAYTRANS-KIT- 90-125
5"	125	114.3	118-124	124-130	RAYTRANS-KIT- 90-125
	125	141.3	144	144-150	RAYTRANS-KIT-125-180
6"	160/180	168.3	176-180	176-182	RAYTRANS-KIT-125-180
8"	200	219.1	197-222		RAYTRANS-KIT-200-225
	225	219.1	197-248	232-248	RAYTRANS-KIT-200-225

Ordering information

Sleeve

RAYTRANS-KIT-63-90

- 90 — Max PE size
- 63 — Min PE size
- KIT — Kit containing a sleeve, a primer kit, abrasive paper, a transition gap filler, a sleeve fixation tape, installation parameters (barcode and magnetic card) and an installation brochure.

Equipment

Support rings for PE-pipes

PE size	SDR	Support ring
25		EQ-RT-INSERT-25/1
32		EQ-RT-INSERT-32/1-1/4*
40		EQ-RT-INSERT-40/1-1/2
63	11 &17	EQ-RT-INSERT-63/11-17*
90	17	EQ-RT-INSERT-90/17
110	17	EQ-RT-INSERT-110/17
125	17	EQ-RT-INSERT-125/17
160	17	EQ-RT-INSERT-160/17
200	17	EQ-RT-INSERT-200/17

* included in the kit

Electrofusion control unit

EQ-RS-7-BOX-110/220 (and similar electrofusion control units, f.e. Sauron)

Product description

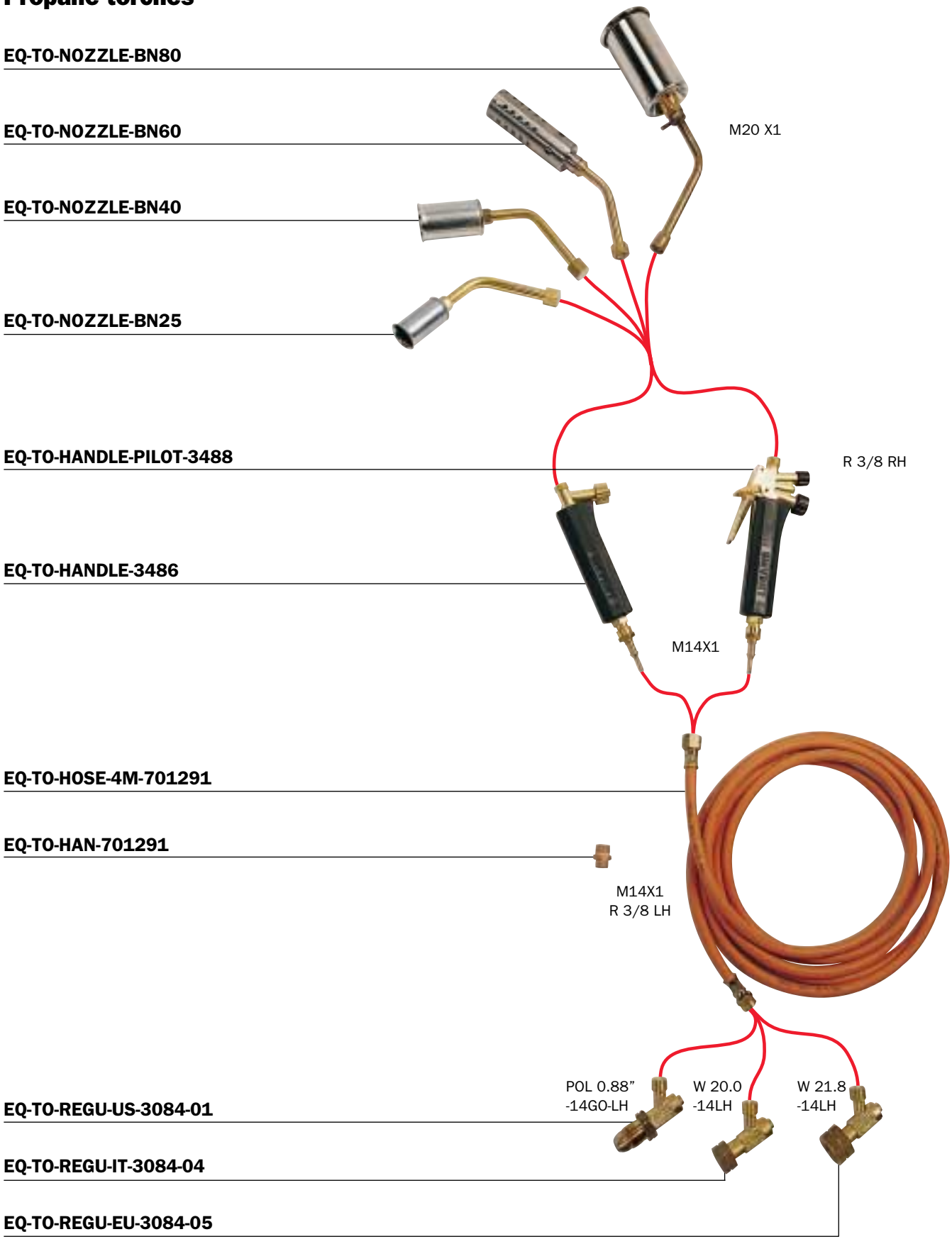
Raytrans electrically activated, heat-shrinkable sleeves provide a reliable way to join and repair any combination of steel, cast iron, ductile iron, copper, lead, plumb, asbestos cement on PE-gas pipes in low pressure distribution networks. Raytrans sleeves permit easy, fast and repeatable installations (typically 5-10 minutes). No welding, threading or special pipe configuations are required. The specialised adhesive in the Raytrans sleeve ensures a long-lasting seal over a wide temperature range. Adhesion to bare metal and asbestos cement pipe surfaces is enhanced by application of a two component solvent free epoxy primer.

Special characteristics

- High mechanical strenght.
- The sleeve is inert to acidic and basic soil environments, and resists vibration, pressure soil stress, and fungal and bacterial attack.
- Quick and easy installation (no preheating).
- Total operator independence results in reproducible, high quality installations.
- Withstands internal pressures up to 300 mbar (200 mbar for pipe diameters of 125-225 mm).
- The sleeves accept pipes with OD variations, ovality, minor deformation, and minor angular and axial misalignments.

Installation Accessories

Propane torches



Rayseal electrical equipment

- **EQ-RS-7-BOX-110/220**
  (or similar electrofusion unit f.e. Sauron, G. Fischer,...)

- **EQ-RS-BOX-CABLE-2.5M**
  output lead connection to the power box

- **EQ-RS-OUTPUT-CABLE-1.5M**
  to connect box-cable to sleeve connectors

- **EQ-RS-OUTPUT-CABLE-5M**
  Optional

- **EQ-RS-POWER-SPLITTER**
  used in double Rayseal sleeve combination (daisy chaining)

- **EQ-RS-COMBO-5kW**
  electrical power unit in 110V or 220V version

- **EQ-RS-COMBO-CABLE-7,5M**
  cable to connect the COMBO unit to the output cable or to the power splitter

- **EQ-RS-OUTPUT-CABLE-1.5M**
  to connect box-cable to sleeve connectors

- **EQ-RS-OUTPUT-CABLE-5M**
  Optional

	Installation equipment	Order description
	• Channel puller, for sliding closure channels onto GRSM wraparound heat-shrinkable sleeves	IT-1000-014
	• Working gloves	EQ-Gloves-Pair
	• Silicone roller	EQ-Roller-Silicone-Rubber
	• Plastic scraper for bevelling and rounding of the mill-applied coating	EQ-PE-SCRAPER
	• Replacement blade for plastic scraper	EQ-PE-BLADE
	• Temperature indicating stick	RM-TEMP-IN-STICK-60C/70C

Raychem

Product Innovations and New Technologies

Anodeflex 1500-01

Continuous cathodic protection system

Anodeflex 1500-01 is a cable-like anode designed to deliver well distributed cathodic protection current. The heart of the product is the electrically conductive flexible polymer, which is extruded onto a copper conductor. The robust, flexible polymer protects the copper conductor from chemical attack and at the same time permits current to flow from the copper to the surroundings over the whole length of the cable.

The anode cable is packed in highly conductive coke breeze within a porous textile coat and is also braided. Installing the ready-to-fit unit is simple and can be carried out in the immediate proximity of the item to be protected.
Existing pipelines with damaged coatings can be safely protected using Anodeflex, without the need for digging-up and recoating. Many users worldwide have installed Anodeflex alongside their poorly coated pipelines and have solved a difficult problem at a fraction of the cost of recoating.
A complete system (CASS) including a rectifier, mains leads and splice kits is also available, and is intended for use on tank installations.
Anodeflex is notable for its wide range of applications, even and homogeneous distribution of protective current and high efficiency. Anodeflex is especially used on old pipes in high resistivity soil or in soil with many different resistivity values.

Ultrafuse-C

Welding sleeve for PE pipes

Wraparound welding sleeve with an integrated welding and heating element of electrically conductive ultra-high molecular weigth polyethylene. Also well suited for repair work and large-gauge pipes.

T-DUX

Sealing elements for annular spaces

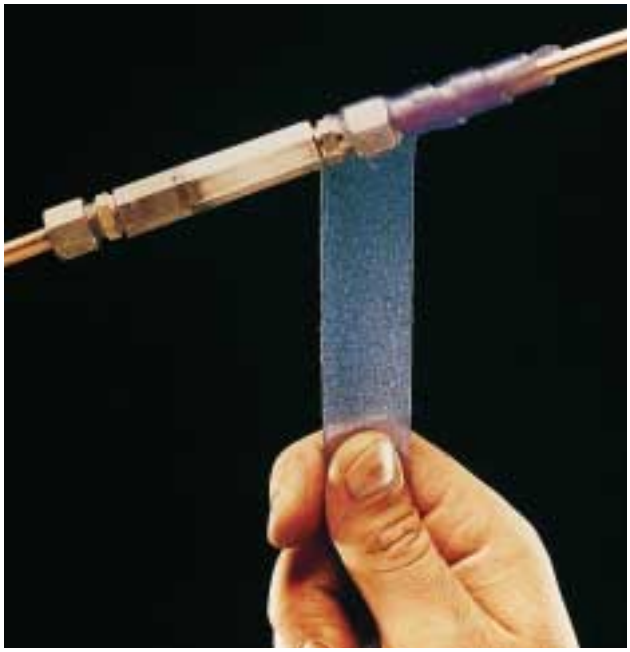
T-DUX consists of a plastic laminate with metal inserts which is formed into a sealing item. T-DUX is used for immediate and post-installation sealing of annular spaces. The seal is both gas and water-tight.

To make a seal, T-DUX is pushed into the annular space and then, using a compressed-gas filling device, raised to an internal pressure of about 300 kPa. The installation can be carried out even when water is leaking from the pipe casing. The system is easy and clean to both install, and remove.

Geltek

Moisture-proof encapsulation and corrosion protection

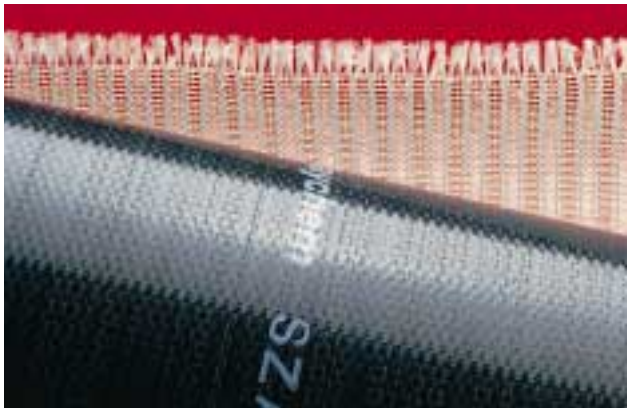
Geltek is a pre-cured engineering material consisting of solid and liquid components. It is flexible, can be worked cold, and will stick even to moist surfaces. The gel possesses a range of oustanding properties. It is particularly remarkable for its excellent thermal and chemical resistance. Besides being available as tape, Geltek is supplied in a wide variety of forms and combinations.



Fiberglass reinforced engineering materials

The use of fiberglass reinforced materials enables installation to be achieved under extreme conditions, e.g. in horizontal drillings or offshore service.

The special structure gives this kind of coating great resistance to mechanical stresses, while the penetation resistance is several times higher than that of unreinforced carrier materials.



Raychem

Ultratec Division
Corrosion Protection, Sealing and Coupling

Customer service

B **Fax (32) 16 / 351 202** • **UK** **Fax (44) 1743 572 549** • **US** **Fax 800 540 1009**

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Telephone: ..... Fax: .....

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☐ Raychem Specification
☐ Technical Information

for the following Products

☐ CPSM	☐ PERP	☐ FCMS/FCWS-F	☐ GRSM/GRSM-F	☐ Anodeflex/CASS
☐ TPSM	☐ HTTE	☐ FCMS-CAP	☐ RAYSEAL	☐ Ultrafuse-C
☐ WPC/GAPS	☐ BLOT	☐ MPSM/MEPS	☐ CSEM-F	☐ Geltek
☐ HTLP 60	☐ STTE	☐ TISKW-F	☐ WAFT	☐ T-DUX
☐ DIRAX	☐ FLEXCLAD	☐ TISW-F	☐ RAYTRANS	

☐ Corrosion Protection and Sealing-catalogue
☐ Information on district heating products
☐ Information on products for transmission pipelines (new construction and rehabilitation)
☐ Information on products for cathodic corrosion protection

Other information requirement

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Remark

All of the above information, including illustrations, is believed to be reliable. Users however, should independently evaluate the suitability of each product for their application. Raychem makes no warranties as to the accuracy of completeness of the information and disclaims any liability regarding its use. Raychem's only obligations are those in the Standard Terms and Conditions of Sale for this product and in no case will Raychem be liable for any incidental, indirect or consequential damages arising from the sale, resale, use or misuse of the product. Raychem Specifications are subject to change without notice. In addition Raychem reserves the right to make changes in materials or processing, without notification to the Buyer, which do not affect compliance with any applicable specification.

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Summit (NJ)

BENELUX
NV Raychem SA
Ultratec Division
Diestsesteenweg 692
3010 Kessel-Lo
Belgium
Tel. 32 16.351 221
Fax. 32 16.351 694

UNITED STATES
Raychem Corporation
Ultratec Division
1669-A Brandywine Avenue
Chula Vista, CA 91911-6020
USA
Tel. 800 540 0004
Fax. 800 540 1009

PCN: 081965-000