POLYURETUB 130

Laying Manual

Inpal Energie

EUROHEAT & POWER

Sommaire

Prevention instructions

Wear personal protective equipment suitable for each site situation.

	For all work presenting risks for the hands (handling, use of hazardous products, welding, etc.)
	For all work with sound levels greater than 85 dBA (pneumatic drills, driving machinery, grinding, etc.
	For all work presenting risks of projection into the eyes (grinding, injection, etc.) or exposure to bright light sources (welding, etc.)
	For all work conducted in polluted environments (dust, toxic gases, etc.)

Risks	Preventions	Measures in case of accident
Projections on the skin BODY / ARMS HANDS / FACE		Wash immediately with plenty of soap and water
Projections in eye		Flush eye immediately with plenty of water or sterile ophthalmic solutions
Vapours		Rest, fresh air, medical emergency
Ingestion of dust	Wash hands before eating Do not eat at the workplace Do not eat with his work clothes	Immediately rinse mouth and drink plenty of water medical emergency
Cuts		 First aid kit / medical attention
Burns		 First aid kit / medical attention
Fire	Permis de Feu 	 First aid kit / medical attention

Rules of conduct

→ Follow the instructions, respect signs and collective protective systems set up.

→ Always have an ABC fire extinguisher nearby and know how to use it.

→ Use equipment suitable for the jobs to be performed, in good condition and in compliance with applicable regulations.

→ Check that your qualifications and vaccinations are up to date.

Site first-aid kit – Standard content

Matériel	Quantité
Dressings: large/medium/small	20
Disinfectant wipes	3
Cream for itching/dry skin	2
Anti-mosquito wipes	2
Soothing/bruise wipes	2
Antiseptic gel	1
Compresses 5 cm x 5 cm	5
Compression pad 5 cm	1
Stretch bandage 3 m x 5 cm	1
Stretch bandage 3 m x 7 cm	1
Adhesive tape	1
Pair of gloves	1
Refreedol	1
Mask for mouth to mouth resuscitation	1
Safety pins	1
Survival blanket	1
Pair of scissors	1
Tweezers	1

identification labels

IsoPMDI 92140 N° CAS : 9016-87-9

Contient des isocyanates . Observer les recommandations transmises par le fabricant.

F Nocif par inhalation et par ingestion. Irritant pour les yeux, les voies respiratoires et la peau. Peut entraîner une sensibilisation par inhalation et par contact avec la peau. Ne pas respirer les gaz/vapeurs/fumées/aérosols. Porter un vêtement de protection et des gants appropriés. En cas d'accident ou de malaise, consulter immédiatement un médecin (si possible lui montrer l'étiquette).

GB Harmful by inhalation and ingestion. Irritating to eyes, respiratory system and skin. May cause sensitization by inhalation and skin contact. Do not breathe gas/fumes/vapour/spray. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

D Schädlich durch Einatmung und durch Nahrungsaufnahme. Reizt für die Augen, die Atemwege und die Haut. Bewirken kann eine Sensibilisierung durch Einatmung und durch Kontakt mit der Haut. Atmen Sie nicht das Gas/Dämpfe/Rauch/Aerosole zu. Eine Kleidung des Schutzes und der angemessenen Handschuhe tragen. Bei Unfall oder Unbehagen sofort einen Arzt zu befragen (ihm die Etikette wenn möglich zu zeigen).

E Nocivo por inhalación y ingestión. Irrita los ojos, la piel y las vías respiratorias. Posibilidad de sensibilización por inhalación y en contacto con la piel. No respirar los gases/ humos/vapores/aerosoles. Úsense indumentaria y guantes de protección adecuados. En caso de accidente o malestar, acúdase inmediatamente al médico (si es posible, muéstresele la etiqueta).

I Nocivo per inalazione e ingestione. Irritante per gli occhi, le vie respiratorie e la pelle. Può provocare sensibilizzazione per inalazione e contacto con la pelle. Non respirai i gas/fum/vapori/aerosoli. Usare indumenti protettivi e guanti adatti. In caso di incidente o di malessere consultare immediatamente il medico (se possibile, mostrargli l'etichetta).

P Nocivo por inalação e consumo. Irritante para os olhos, vias respiratórias e pele. Pode causar sensibilização por inalação e contacto com a pele. Não respirar os gases/fumes/vapores/aerossóis. Usar vestuário de protecção e luvas adequadas. Em caso de acidenteou de indisposição, consultar imediatamente o médico (se possível mostrar-lhe o rótulo).

R20 R36/37/38 R42/43
S23.3 S36/37 S45

Inpal Industries 238 rue des frères Voisin - ZAC Chapotin - 69970 CHAPONNAY - Tél 04 78 69 63 20 - Fax 04 72 71 89 52

Safety data sheet

POLYOL

PERSONAL PROTECTIVE EQUIPMENT

Body protection :
Wearing of closed work clothing is required additionally to the stated personal protection equipment.

Hand protection:
Suitable chemical resistant safety gloves (EN 374) also with prolonged, direct contact

Eye protection:
Safety glasses with side-shields (frame goggles) (e.g. EN 166)

Respiratory protection :
Wear respiratory protection if ventilation is inadequate. Particle filter with medium efficiency for solid and liquid particles

STORAGE

Segregate from foods and animal feeds. Segregate from acids. Segregate from oxidants.
Further information on storage conditions: Containers should be stored tightly sealed in a dry place.
Store between **+15 °C and +35 °C.**

HYGIENE

Do not eat, drink or smoke near this product.
Wash hands and face before eating, drinking or smoking.
Remove contaminated clothing and protective equipment before entering eating areas.

ACCIDENTAL RELEASE

Do not empty into drains.
Do not discharge into the subsoil/soil

ELIMINATION

Incinerate in suitable incineration plant.
Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.
Dispose of contaminated material as prescribed.

DANGER

Hazard identification

- Harmful if swallowed

FIRST-AID MEASURES

General advice:
Remove contaminated clothing.

If inhaled:
If difficulties occur after vapour/aerosol has been inhaled, remove to fresh air and seek medical attention.

On skin contact:
Wash thoroughly with soap and water.

On contact with eyes:
Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:
Immediately rinse mouth and then drink plenty of water, do not induce vomiting, seek medical attention.

FIRE-FIGHTING MEASURES

Suitable extinguishing media:
water, dry extinguishing media, foam, carbon dioxide

Specific hazards:
carbon monoxide, carbon dioxide, nitrogen oxides

Specific hazards:
Wear a self-contained breathing apparatus

ACCIDENTAL SPILL MEASURES

Use respiratory protection and others protective equipments.

Pick up with suitable absorbent material (e.g. sand, sawdust, general-purpose binder, kieselguhr)

Safety data sheet

ISOCYANATE

PERSONAL PROTECTIVE EQUIPMENT

Body protection :
Wearing of closed work clothing is required additionally to the stated personal protection equipment.

Hand protection:
Suitable chemical resistant safety gloves (EN 374) also with prolonged, direct contact

Eye protection:
Safety eyewear complying with an approved standard (EN 166)

Respiratory protection :
Wear respiratory protection if ventilation is inadequate. Particle filter with medium efficiency for solid and liquid particles

STORAGE

Further information on storage conditions: Containers should be stored tightly sealed in a dry place.

Store between **+15 °C and +35 °C.**

HYGIENE

Do not eat, drink or smoke near this product.
Wash hands and face before eating, drinking or smoking.
Remove contaminated clothing and protective equipment before entering eating areas.

ACCIDENTAL RELEASE

Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers

ELIMINATION

The generation of waste should be avoided or minimised wherever possible.
Waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant in accordance with official regulations.

DANGER

DANGER

- Harmful if inhaled.
- Causes skin irritation.
- Causes serious eye irritation.
- May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- May cause an allergic skin reaction.
- Suspected of causing cancer.
- May cause respiratory irritation.
- May cause damage to organs through prolonged or repeated exposure if inhaled.

FIRST-AID MEASURES

If inhaled:
If difficulties occur after vapour/aerosol has been inhaled, remove to fresh air and seek medical attention.

On skin contact:
Wash thoroughly with soap and water.

On contact with eyes:
Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:
Immediately rinse mouth and then drink plenty of water, do not induce vomiting, seek medical attention.

FIRE-FIGHTING MEASURES

Suitable extinguishing media: Foam, CO2 or dry powder

Water may be used if no other available and then in copious quantities. Reaction between water and hot isocyanate may be vigorous. Prevent washings from entering water courses, keep fire exposed containers cool by spraying with water.

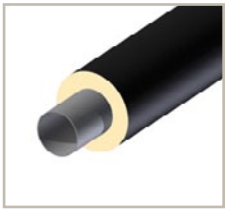
Decomposition products may include the following materials: carbon dioxide, carbon monoxide, nitrogen oxides

ACCIDENTAL SPILL MEASURES

Use respiratory protection and others protective equipments.

Absorb with an inert dry material (sanf, earth ..)

POLYURETUB 130



POLYURETUB 130 is a rigid, or bonded, system of pre-insulated pipes. The service pipe is usually made from black steel.

The insulation is injected polyurethane foam and the outer casing is a high density polyethylene sheath. All components of the POLYURETUB 130 product can be equipped with a leak detection system. The insulation and the outer casing are then remade at the welds.

Modification of the layout and warranty

Installation on site must comply with the drawings and instructions supplied by the network designer. The layout may not be modified without his prior approval.

⚠ No off the shelf parts can be accepted or insulated on site without the prior approval of Inpal Energie on the technique to be used.

Acceptance and inspection

⚠ In compliance with Inpal Energie general sales conditions:

→ The customer must make all necessary checks and issue all reserves during acceptance of the products.

→ No claim for missing parts, appearance faults or faults detectable by visual inspction can be considered by Inpal Energie if the faults are not indicated within 48 hours following delivery.

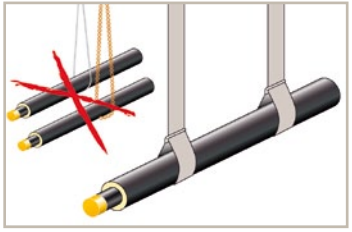
→ Consequently, it is the customer's responsibility to take all necessary action against the carrier within 48 hours following delivery. In addition, these reserves must be notified to Inpal Energie within the same delay by registered letter with acknowledgement of receipt.

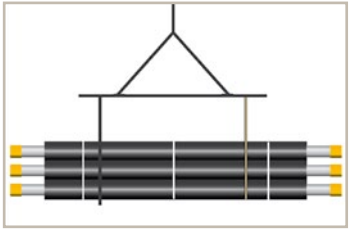
Unloading and storage

Unloading

The purchaser is responsible for reception and unloading of the equipment delivered.
The handling operations must be carried out by trained persons in compliance with applicable regulations.

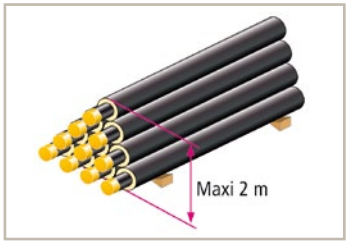
- Unloading must be carried out on a purpose-built, identified and dedicated area.
- Take the necessary precautions to avoid scratches, cuts or shocks.
- Use suitable lifting equipment.
- Handle the pipes using 2 lifting points.
- Handle only with textile straps at least 100 mm wide.





The pressure exerted on the outer casing must be less than 0.3 MPa.
To avoid significant bending of ND20-ND40 pipes, it is recommended to lift them in bundles, using a crossbar. The storage conditions must be sufficient to protect the components from any damage.

Storage of pipes



- **Store** the pipes on blocks parallel to each other on flat ground.
- **Sort** the pipes by diameter.
- **Do not exceed** a storage height of 2 m.
- **Check** that all plugs are fitted throughout the storage period.

Storage of parts

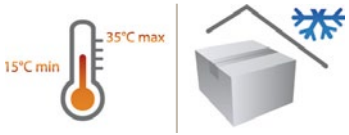
- Store the parts by category and by diameter.
- Store the T-branches and bends with the opening pointing downwards to avoid water ingress in case of bad weather.

Storage of junction kits

The kits must be stored in a dark place in a well ventilated room, heated in winter.

For correct conservation of the components, the kits must be stored at a **temperature of between +15 °C and +35 °C.**

Before use, check the use-by date shown on the product packaging.



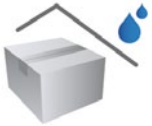
Storage of heat-shrinkable components

Store the parts at a **temperature of between +15 °C and +35 °C.** Direct, prolonged exposure to sunlight may make the heat-shrinkable products unfit for use (e.g. muffs, sleeves, etc.).

The packaging must be removed just before use.
In very hot weather, these products must therefore be stored under shelter.

Storage of pads and small accessories

Storage under shelter.



Prolonged storage (more than one month)

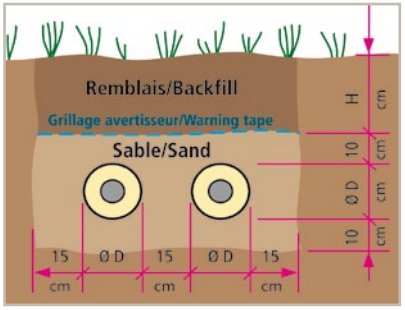
In case of prolonged storage, protect the components against the weather, frost and direct sunlight.

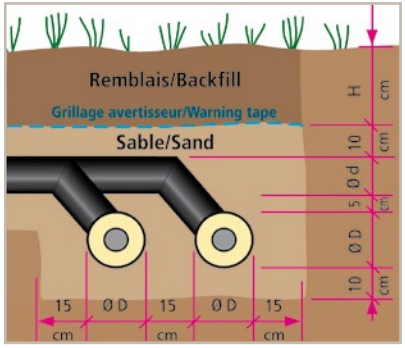
Digging the trench

Installation on site must comply with the drawings and instructions supplied by the network designer. The layout may not be modified without their prior approval.

Plan excavation depths and widths according to the minimum dimensions shown on the table opposite and in compliance with the designer's special requirements (high points, building entry points, vents, etc.)

Plan a work space large enough to allow correct execution of welds and junctions.





Remove all objects likely to damage the casing from the bottom of the trench.

Pay special attention to the depth at the tappings.

Minimum excavation depth

Casing	Height	Casing	Height	Casing	Height
ØD ou Ød	Excavation	ØD ou Ød	Excavation	ØD ou Ød	Excavation
mm	mm	mm	mm	mm	mm
90	790	250	950	630	1330
110	810	280	980	710	1410
125	825	315	1015	800	1500
140	840	355	1055	900	1600
160	860	400	1100	1000	1700
180	880	450	1150	1100	1800
200	900	500	1200	1200	1900
225	925	560	1260		

Anchors and concrete foundations

Make sure to install the anchors at the exact positions indicated on the layout plan provided.

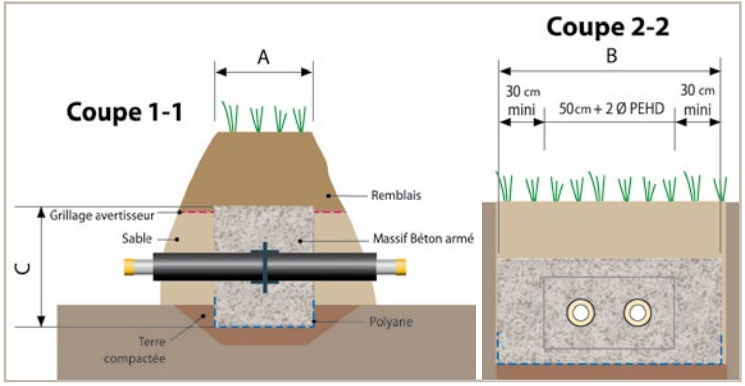
→ **Enlarge and deepen** the excavation to the dimensions of the concrete block.
→ In clayey ground, **allow extra depth** for drainage.

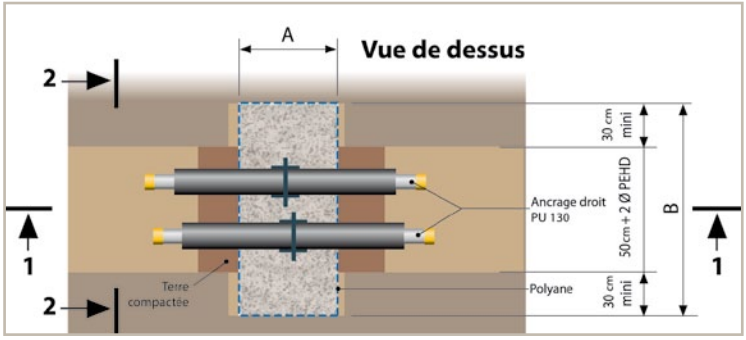
The anchor points of the outward and return networks will be positioned staggered, not opposite each other in the concrete block which will be reinforced and manufactured with a minimum content of 300 kg/m3.

If concrete is cast in the shuttering, make sure not to leave any gaps around the anchor discs.
It is recommended to vibrate the concrete.

If necessary, contact a structure design office for the block dimensions and reinforcement.

Do not forget that the heating cannot be started before the concrete is completely dry.





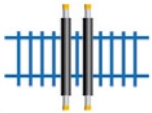
Special points

Network crossing

Respect the statutory and other applicable recommendations.

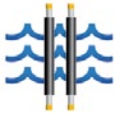
Under main roads

Minimum cover of 0.40 m on the upper generatrix of the pipes.
If this is impossible, run each pipe separately through a duct or install distribution slabs.



Under railways

Ask the operator for the special recommendations



Under waterways

Consult Inpal Energie.

Recommendations before laying

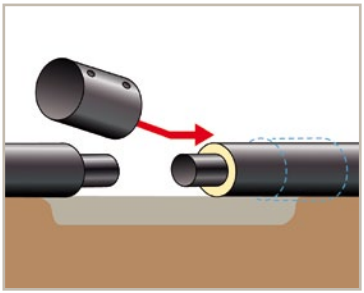
Before any operation, check that the pre-insulated components have not suffered any damage during storage.

Components which have been lying in water must be retreated.

Installation on site must comply with the drawing and instructions supplied by the network designer. The layout may not be modified without his prior approval.

Pipes will be laid in the trench using straps, taking care to avoid excessive bending.

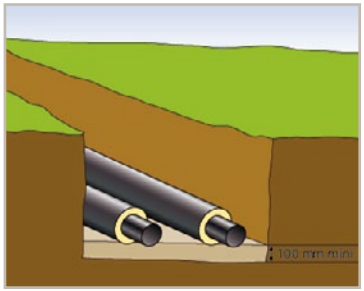
Before assembling the components, make sure there are no foreign bodies inside and do not forget to slide on the HDPE muff required to make the junction.



" Sand bed " laying technique

Cover the previously prepared and levelled trench bottom with a bed of **clean sand of minimum depth 100 mm**. Carefully compact the sand bed and level the surface so that the pipes are resting along their entire length. Clear extra space around the junction points for assembly.

Recommendation : round brittle sand, medium or large grain, 0-4 mm. Max 8% fine grains.
The internal friction angle of the sand will be about 32.5° to guarantee a friction angle of the sand/PE interface of between 20° and 22°.



The material must not contain residues of plants, humus, clay or pieces of silt. Avoid large sharp grains likely to damage the pipe and the junctions.

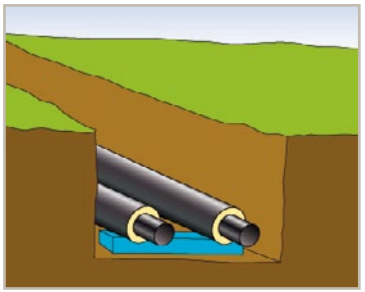
The material composition must allow the coefficients of friction indicated on the installation drawing, respecting the compacting (a coefficient of friction of 0.4 is generally chosen). Careful, regular compacting is required.

Installation on " blocks "

Lay the pipes on blocks*, taking care to leave a **minimum distance of 100 mm between the pipes and the trench bottom.**

Assemble.

The blocks can be sandbags or made from polyurethane, polystyrene or low-density PUR foam (StyroPUR foam™ block). **All other blocking systems must be removed before backfilling.*



Storage recommendations

It is recommended that the products are stored in a dry, ventilated room. Leave the sleeves in their delivery boxes and avoid exposure to sunlight, rain, snow, etc.

For correct conservation of the components, the junction kits must be stored at a **temperature of between +15 °C and +35 °C.**
Before use, check the use-by date shown on the product packaging.

Installation recommendations

The products must be installed in compliance with local safety rules.

⚠ **Special precautions must be taken during injection of polyurethane foam if the temperature is below 15 °C or above 35 °C.**

Equipment required

Tools
- Welding kit, angle grinder
- Blowtorch
- Electric drill, milling cutter, stapler
- Extruder, welding machine

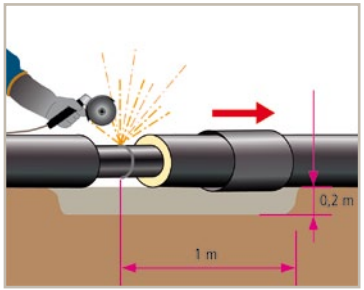
Cleaning
- Cloth, solvent (e.g.: ethanol min. 94%)
- Abrasive paper (grain 40/60)
- Wire brush
- Triangular scraper, Cutter

Heat-shrinkable components
- Thermometer, pressure gauge
- Rubber mallet
- Application roller

Humidity detection
- Stripping pliers
- Crimping pliers
- Cutting pliers
- Inpal Test or Ohmmeter

Cutting procedure

The cut must be perpendicular to the pipe axis. A bad cut tolerance < 2° is allowed in some cases. (See EN 13941)



The pipes can be cut to the required lengths, but make sure to keep at least 20 cm insulation to make the junctions.

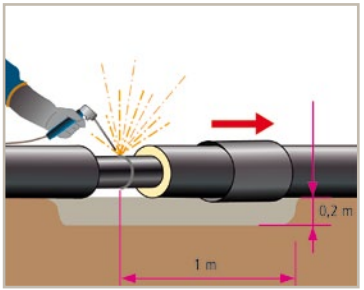
⚠ Only straight pipes must be cut. It is essential to contact us before cutting parts.

On steel pipes, strip the insulation over a length of 150 mm ± 10 mm to fill the junction correctly.

After stopping work, plug the pipe ends with the original plastic plugs to prevent entry of foreign bodies.

Welding the service pipes

When welding, make sure **to keep the muff far enough away.**



Work should always be carried out in compliance with professional standards.

If a cut is required, it must be perpendicular to the pipe axis. Always leave a minimum distance of 10 cm between two welds. Align the pipes with a tolerance of ± 20 cm per 6 m length.

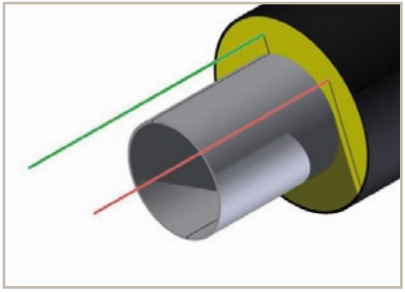
Respectez une distance de 10 cm minimum entre deux soudures.
Aligner les tubes avec une tolérance de ± 20 cm par longueur de 6 m.

Also make sure not to align the longitudinal weld beads of the service pipes (EN 13941: *Longitudinal or spiral beads must be separated by a distance of 10 times the wall thickness, with a minimum of 50 mm*).

Important : Leave at least 15 cm between the outward and return pipes.

Monitoring system > Ni-Cr wires

Type : BRANDES
Standard : EN 14419
Electrical resistance : 5.7 Ω /meter
Maximum wire length : 1000 m
Connection : loop
Boîtier : DELFIN 8000



The monitoring system is composed of:

→ 1 red insulated nickel chromium "**sensor**" wire, stripped every 1.5 cm

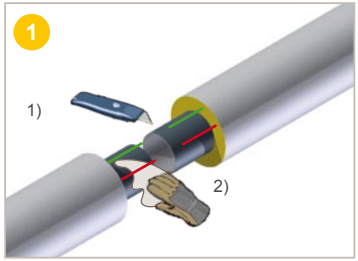
→ 1 green insulated copper "**ground**" wire

The system is based on the quantity of electricity conducted by the insulation which varies according to the amount of moisture.

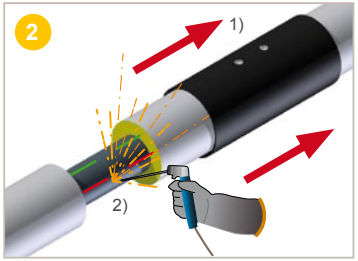
When the moisture in the polyurethane foam increases, the electrical resistance between the service pipe and the PUR foam decreases.

Humidity can be located by measuring the resistance.

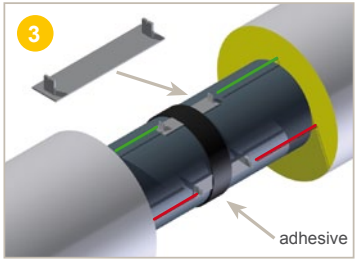
System composition			
1 Ni-Cr wire with Teflon casing (red)		1 copper wire with Teflon casing (green)	
Ø Inner	Ø Outer	Ø Inner	Ø Outer
mm	mm	mm	mm
0,6	1,1	0,9	1,4



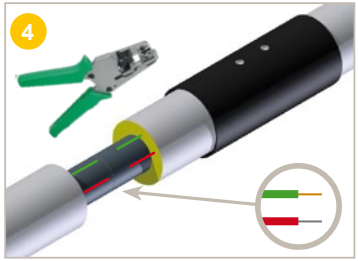
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



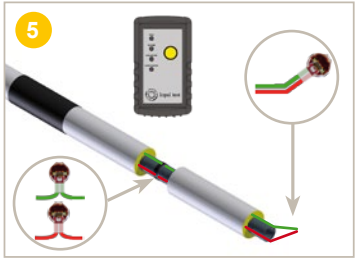
1) **Slide** along the HDPE muff.
⚠ Make sure not to remove the protective film, which prevents accidental shrinkage of the muff.
2) Align the pipes and **weld** the two steel pipes together according to professional standards.



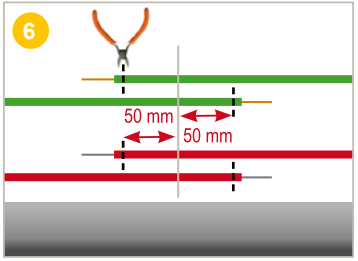
1) **Position** the spacers on the service pipe.
2) **Hold** the spacers in position with sellotape.



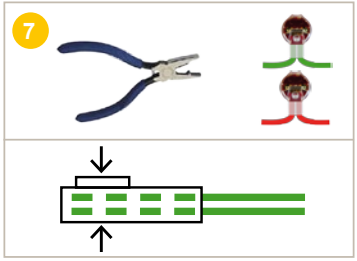
Strip the wires in order to check the connections.



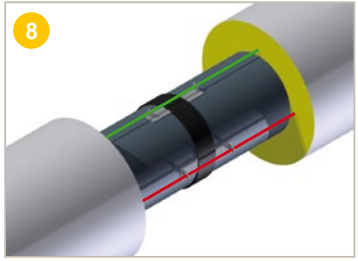
For each junction:
• **Check** that the detection wires are in good condition.
• **Check** that the detection wires are correctly connected using an INPAL TEST meter or an ohmmeter.
⚠ The wires are checked at each junction



After operation 5, **cut** the wires to length. Cut the wires to obtain an extra length of 50 mm and so that the cut ends can be inserted easily into the connectors.
⚠ The wires do not have to be stripped to be inserted into the connectors.



1) **Insert** the conductor wires fully into the connector (lug
⚠ Join the red wire to the red wire and the green wire to the green wire. Conductor length inside the connector: 10 mm
2) Crimp the connectors using the crimping pliers.



1) Test the connected wires by pulling them by hand.
2) Now **position** the wires on the spacers already fitted. After assembly, check the electrical continuity of the wires.

Monitoring system > copper wires

Type : NORDIQUE
Standard : EN 14419
Electrical resistance : 24 Ω /Km
Maximum wire length : in detection and 2500 m in fault localisation.
Connection : loop or single wire

The system is composed of:

→ 1 "**sensor**" bare tin-plated copper wire
→ 1 "**ground**" bare copper wire

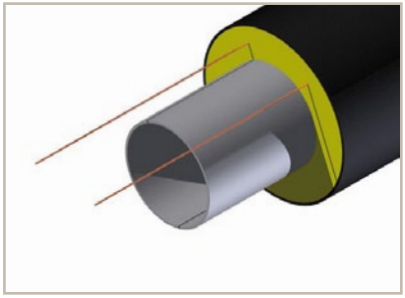
The system is based on the quantity of electricity conducted by the insulation.

Depending on the amount of moisture of the polyurethane foam, the electrical resistance between the steel service pipe and the PUR foam decreases.

Humidity can be detected by measuring the impedance.

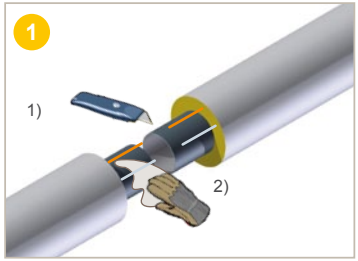
The units are available in several models:

→ Detectors indicate the presence of faults on the network.
→ The locator can detect faults on the network with a precise indication of the position to allow for targeted interventions.

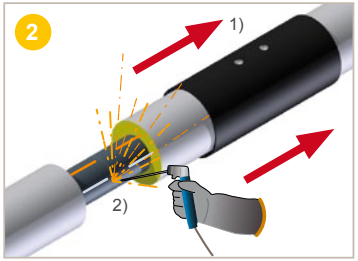


Detection units : 2020 / 3000
Localisation units : 4000

System composition	
1 "sensor" bare tin-plated copper	1 "ground" bare copper wire
Ø mm	Ø mm
1,39	1,39



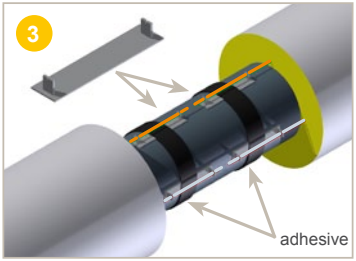
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



1) **Slide** along the HDPE muff.

⚠ Make sure not to remove the protective film, which prevents accidental shrinkage of the muff.

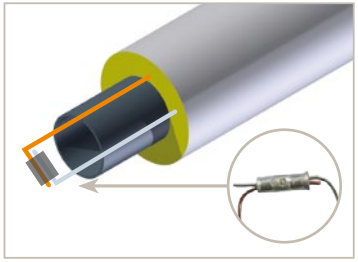
2) Align the pipes and weld the two steel pipes together according to professional standards.



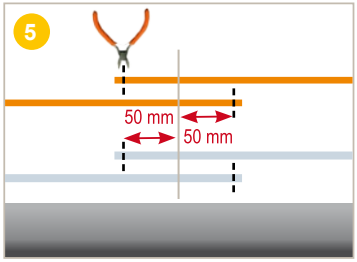
1) **Position** the spacers on the service pipe.
2) **Hold** the spacers in position with sellotape.

For each junction:
• **Check** that the detection wires are in good condition.
• **Check** that the detection wires are correctly connected using an INPAL TEST meter or an ohmmeter.

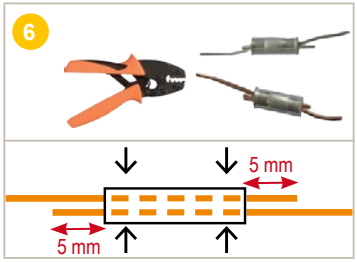
⚠ The wires are checked at each junction.



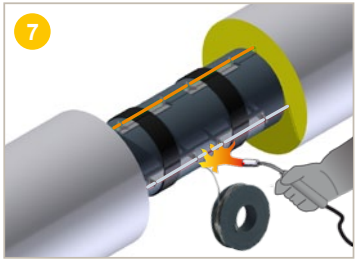
⚠ For operation ❹ the wires must be connected at one end.



Cut the wires to obtain an extra length of 50 mm and so that the cut ends stick out of the connector.



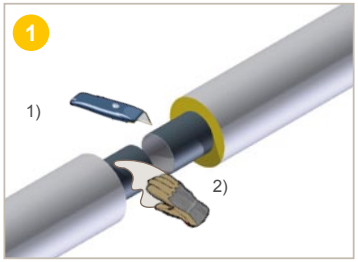
1) **Insert** the conductor wires of the same colour into the connector (lug) with the ends sticking out by about 5 mm.
2) **Crimp** the connectors at both ends using the crimping pliers.



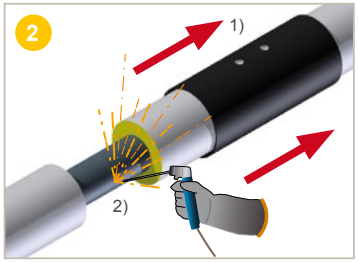
1) Weld the connector using a blow torch and tin wire. Test the connected conductors by pulling them by hand.
2) Now **position** the wires on the spacers already fitted. After assembly, check the electrical continuity of the wires.

Implementation of a

rigid muff

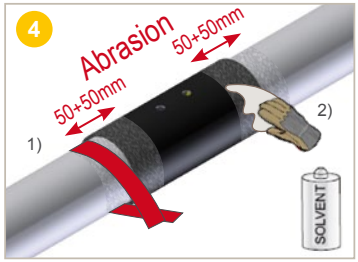


1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



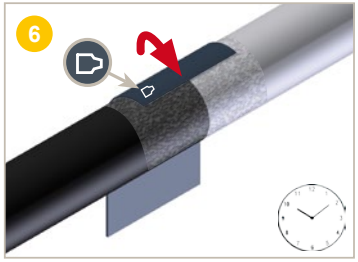
1) **Slide** the HDPE muff onto one of the pipes, pushing it along a sufficient distance.
2) **Align** the pipes and weld the two steel pipes together according to professional standards.

Slide the HDPE muff at the stripped area so that it covers the pipe casing by **10 cm on each end**.
⚠ Make sure that the steel weld has cooled down before sliding the muff.

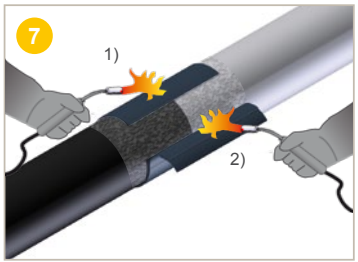


1) **Roughen** the surfaces (muff + casing 50 mm on each side) with abrasive paper (grain 40-60) or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).

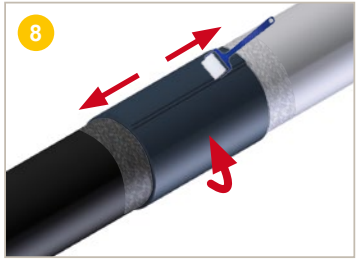
Use a blowtorch to **warm** the surfaces to be covered (muff + casing 50 mm on each end) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.



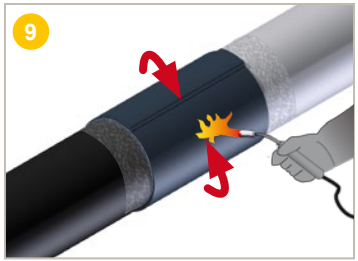
Fit the heat-shrinkable sleeve on the joint so that the overlap lies between the 10 o'clock and 2 o'clock positions
⚠ **Remember to remove its protective film**.
⚠ **Respect the implementation direction using the indicator:** large diameter muff side, small diameter pipe side.



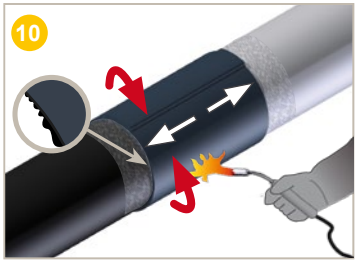
Leave 1 to 2 cm clearance to ensure correct shrinkage.
1) **Warm** the overlapping part of the heat-shrinkable sleeve slightly.
2) Then **warm** the adhesive of the other part of the sleeve called the "**adhesive patch**".



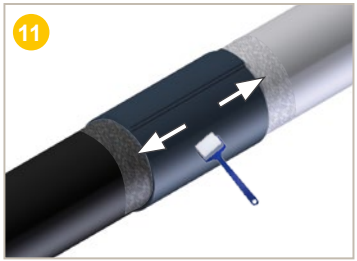
Press both ends of the heat-shrinkable sleeve firmly.
Remove the air bubbles with an application roller on the closure.



Shrink the heat-shrinkable sleeve around its circumference using large movements, starting at the centre.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.



Continue heating starting from the centre and going towards the ends until shrinking is complete. Finish with horizontal movements over the whole surface of the sleeve. Shrinking is complete when the adhesive projects out of each end of the sleeve.



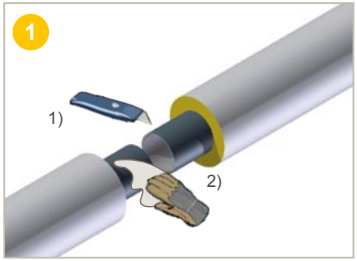
While the sleeve surface is still hot and malleable, use the application roller to **smooth and evacuate** the air bubbles. Use the same procedure on the closure.
Repeat operations 5 to 11 with the 2nd heat-shrinkable sleeve.

The system is correctly installed when:
• The sleeves are in contact with the surfaces to be protected and have no openings.
• The adhesive is visible on both ends of the sleeves.
• No holes or cracks are visible

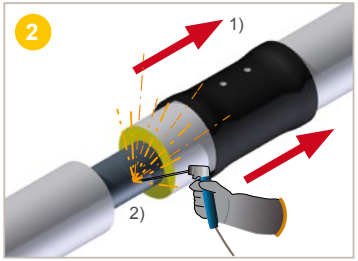
12 **Recommendations :**

It is recommended to perform an airtightness test at 0.2 bar with a hand pump and pressure gauge. If this is impossible, make a visual check. It is essential to allow the materials to cool down to ambient temperature before injecting polyurethane foam. In case of doubt or if a fault is observed, remake the junction completely.

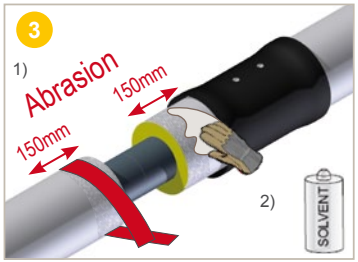
Implementation of an heat-shrinkable muff



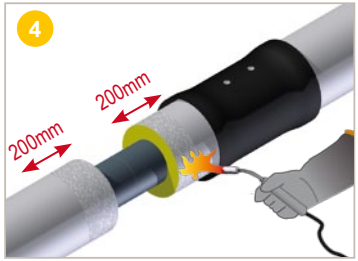
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



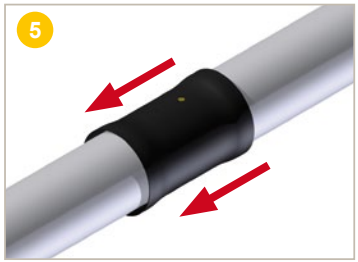
1) **Slide** the heat-shrinkable muff onto one of the pipes, **pushing it along a sufficient distance.**
2) **Align** the pipes and weld the two steel pipes together according to professional standards.



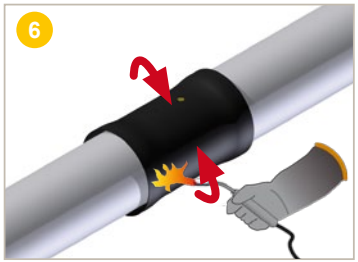
1) **Roughen** the surface (150 mm on each side) with abrasive paper or a wire brush.
2) **Clean** and degrease the roughened surfaces with a cloth dipped in ethanol (min. 94 %).
⚠ Do not remove the protective film, which prevents accidental shrinkage of the muff.



Use a blowtorch to **warm** the surfaces to be covered(200mmoneachend)uptoatleast65°C. **Check** the temperature on all surfaces with a thermometer.
⚠ From HDPE diameters >500, the sealant strips are supplied separately. Position the sleeves on the pipe using the mark made previously



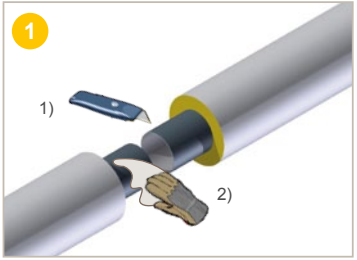
Slide the heat-shrinkable muff at the stripped area so that it covers the pipe casing by 5 to 10 cm on each end.
⚠Remember to remove the protective film before shrinking the heat-shrinkable muff.



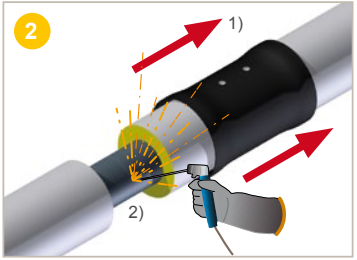
Shrink the ends of the heat-shrinkable muff with a blowtorch.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.

Allow to cool before injection.
After shrinking and return to ambient temperature, check that the muff and the casing are firmly bonded together.
⚠ It is recommended to perform an airtightness test at 0.2 bar with a hand pump and pressure gauge.

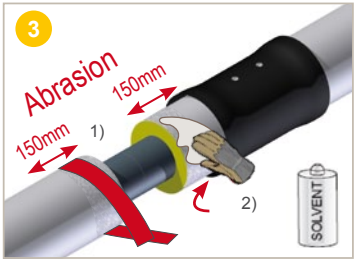
Implementation of an **electroweldable muff**



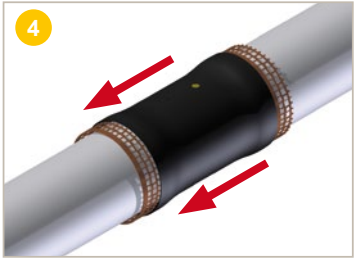
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



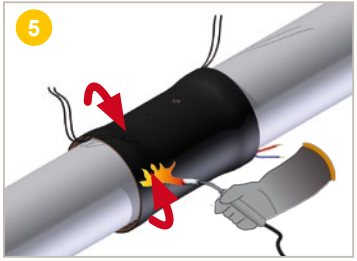
1) **Slide** the heat-shrinkable muff onto one of the pipes, pushing it along a sufficient distance.
2) **Align** the pipes and weld the two steel pipes together according to professional standards.



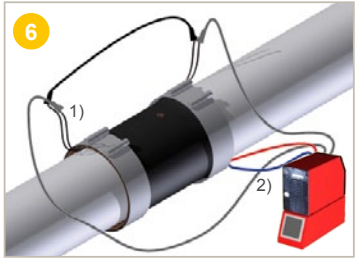
1) **Roughen** the surface (150 mm on each side) with abrasive paper or a wire brush.
2) **Clean and degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).
⚠ Do not remove the protective film, which prevents accidental shrinkage of the muff.



1) **Install the fusion grids** and staple them into position.
2) **Slide** the heat-shrinkable muff at the stripped area so that it covers the pipe casing by 5 to 10 cm on each end.
⚠ Remember to remove the protective film.



Shrink the ends of the heat-shrinkable muff with a blowtorch.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.
⚠ Allow the muff to cool before electrowelding.

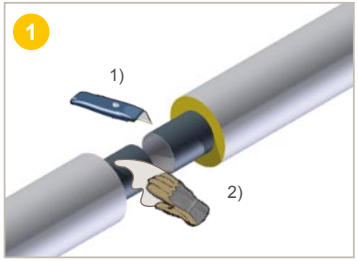


1) Fit the tightening straps on the muff and connect the branch wire to one of the welding wires at each end.
2) Connect the sensor and the two remaining welding wires to the welding machine.
⚠ **Fasten** the wires with adhesive tape to stop them coming off.
3) **Electroweld** the muff.

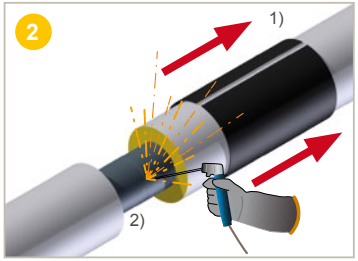
Allow to cool before injection. After shrinking and return to ambient temperature, check that the muff and the casing are firmly bonded together.

⚠ It is recommended to perform an airtightness test at 0.2 bar with a hand pump and pressure gauge.

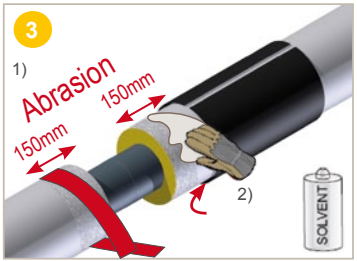
Implementation of an **non-drilled electroweldable muff**



1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.

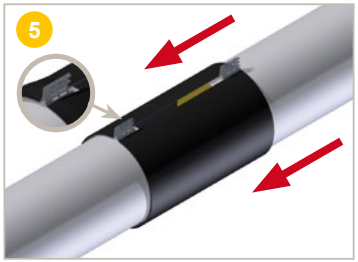


1) **Slide** the previously slit HDPE muff onto one of the pipes, **pushing** it along a sufficient distance.
2) Align the pipes and **weld** the two steel pipes together according to professional standards.

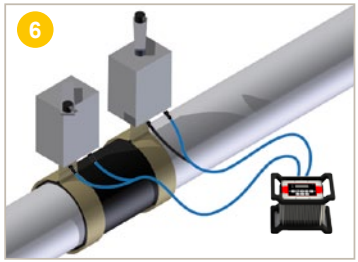


1) **Roughen** the surface of the casing (150 mm on each side) and the inside of the muff with abrasive paper or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).

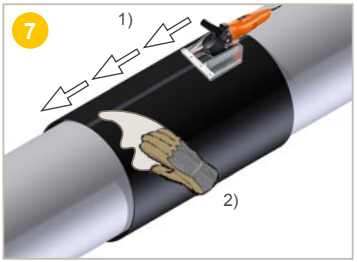
Position the fusion grids using the marking made previously and **staple** them in position.



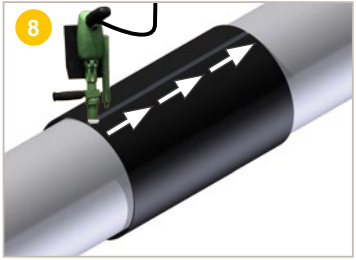
Slide the muff at the stripped area so that it covers the pipe casing by 5 to 10 cm on each end.
⚠ **Make sure to go past** the ends of the fusion grids of the muff slit.



Fit the Kevlar tightening system and **mount** the welding tools on the muff.
Weld the muff on the casing by electrowelding in compliance with the generator procedure.

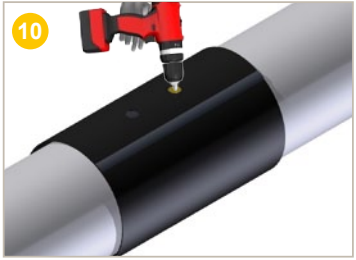


1) **Chamfer** the longitudinal cut in the muff to prepare for the PE extrusion operation.
2) Thoroughly **clean** the muff surface using a dry cloth to eliminate the PE residues produced during chamfering.



Weld the longitudinal cut of the muff using a PE extrusion gun.

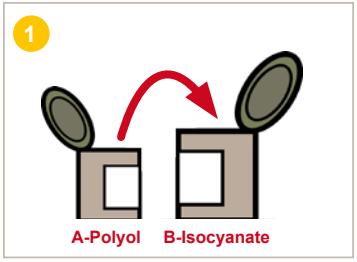
1) Drill a 1st hole in the muff with an electric drill, taking care not to drill the weld of the longitudinal cut.
⚠ Perform an airtightness test at 0.2 bar with a hand pump and pressure gauge.



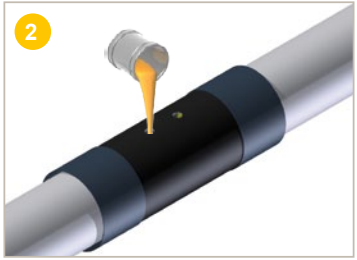
After conducting the airtightness test and demonstrating that the junction is airtight , **drill** the 2nd hole in the muff.

Injection of **polyurethane foam** on injected kit

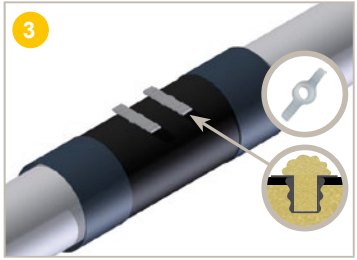
⚠ **Warning :** Depending on volume polyurethane foam necessary, some kits require 2 boxes for each component.
Each box componsant is then identified :
- 1/2 Component A
- 1/2 Component B



Take components **A** and **B** out of the kit boxes and check the diameters.
⚠ Check the kit use-by date. Pour component **A** into component **B**, **mix** together using the spatula supplied. The mixture is ready when it is homogeneous, with no signs of different colours.



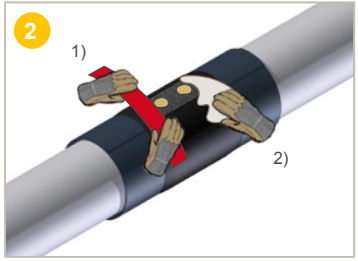
Pour the mixture into one of the 26 mm diameter HDPE muff injection holes.
Make sure to pour in all of the mixture, using the spatula supplied.



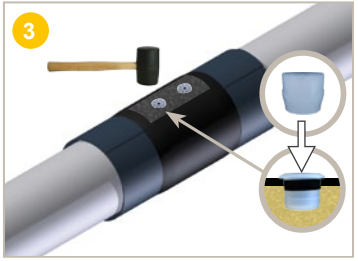
1) **Push** the 2 vent plugs fully into the 2 injection holes.
2) As soon as the expanded mixture has hardened, **remove** the plugs using the 2 tabs provided. **Clean off** any excess PUR foam.

Finalisation of a junction with **standard plugs**

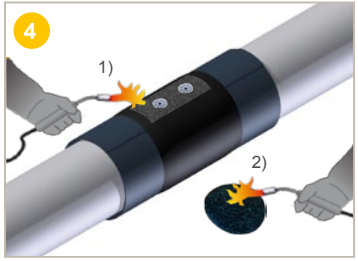
As soon as the expanded mixture has hardened, remove the plugs with 2 tabs provided. **Clean off** any excess PUR foam.



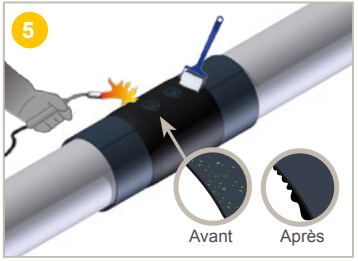
1) **Roughen** the surfaces to be covered (hole Ø + 50 mm on each side) with abrasive paper or a wire brush.
2) **Clean** the roughened surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).



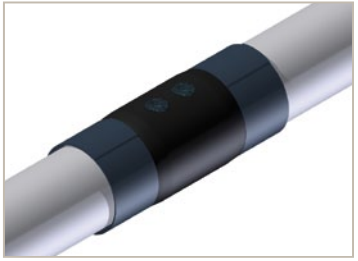
1) **Press the female** closure plugs by hand fully into the HDPE muff injection holes.
2) Then **knock the male** closure plugs into the female closure plugs with a mallet.



1) Use a blowtorch to **warm** the surfaces to be covered (hole Ø + 50 mm on each side) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.
2) **Heat** slightly (2 to 3 seconds) the 1st closure patch (FOPS) on the side opposite the coloured dots and then glue it onto the plug.



1) Finalise the bonding by **warming** until the coloured dots of the FOPS disappear.
2) While the closure patch (FOPS) is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.
Repeat the operation with the 2nd closure patch.

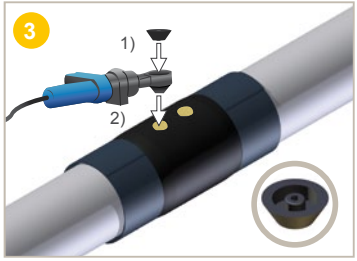


The system is correctly installed when:
• The closure patches (FOPS) are in contact with the surfaces to be protected.
• The adhesive is visible all around the closure patches.

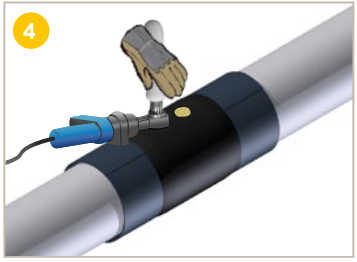
Finalisation of a junction with **weld-on plugs**

As soon as the expanded mixture has hardened, **remove** the plugs with 2 tabs provided. **Clean off** any excess PUR foam.

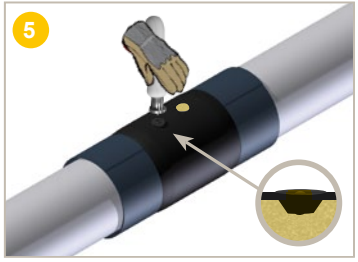
Clean the surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).



1) Use a suitable tool to **place** the 1st weld-on closure plug in the base of the welding machine to **heat it up**.
2) At the same time, **push** the end of the welding machine into the injection hole to **heat up** the edges.



Use a suitable tool to **remove** the weld-on closure plug previously heated in the welding machine.



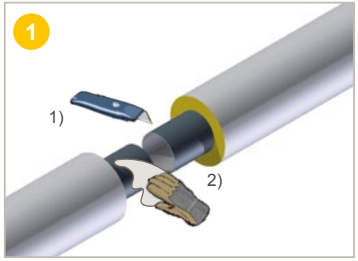
Position the weld-on closure plug in the injection hole and **press** gently for about 1 minute.

⚠ Do not remove the tool until the plug surface has become warm again.

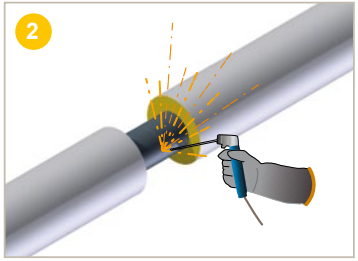
Repeat the operation with the 2nd weld-on closure plug.

The system is correctly installed when 2 homogeneous weld beads are visible around the entire circumference of the weld-on plugs.

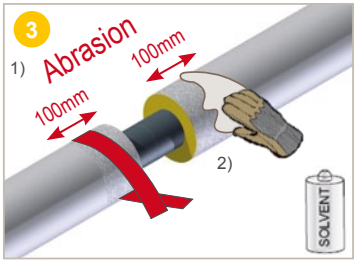
Implementation of heat-shrinkable sleeve half-shells



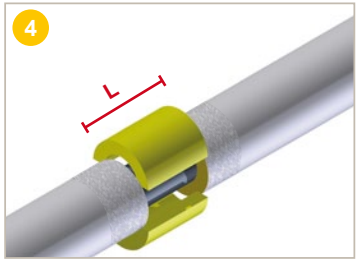
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



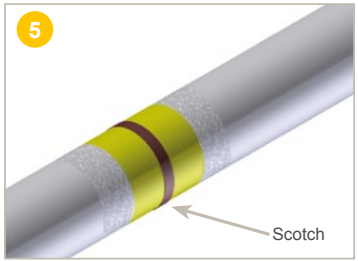
Align the pipes and **weld** the two steel pipes together according to professional standards.



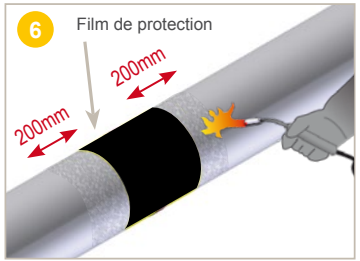
1) **Roughen** the surface (100 mm on each side) with abrasive paper or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).



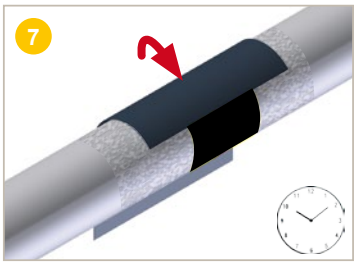
Measure the bare surface to be insulated then cut the half-shells to the required length (L).
Position the 2 half-shells, checking that they fill the space to be insulated perfectly.



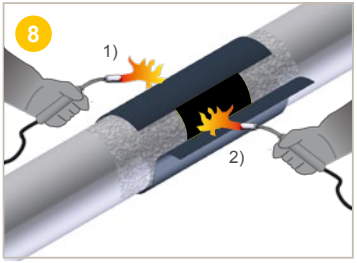
Hold the half-shells in position with sellotape.



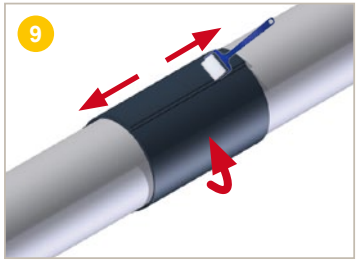
1) **Wrap** with the protective film supplied to avoid damaging the half-shells.
2) Use a blowtorch to **warm** the surfaces to be covered (200 mm on each side of the casing) up to at least **65 °C**. **Check** the temperature on all surfaces with a thermometer.



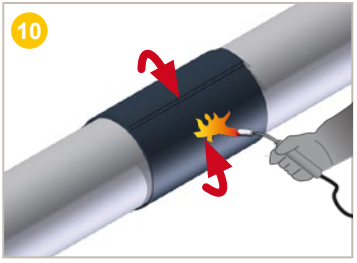
Fit the heat-shrinkable sleeve so that the overlap lies between the 10 o'clock and 2 o'clock positions.
⚠ Remember to remove the protective film from the sleeve.



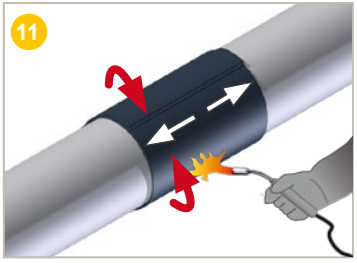
Leave 1 to 2 cm clearance to ensure correct shrinkage.
1) **Warm** the overlapping part of the heat-shrinkable sleeve slightly.
2) **Then warm** the adhesive of the other part of the sleeve called the "**adhesive patch**".



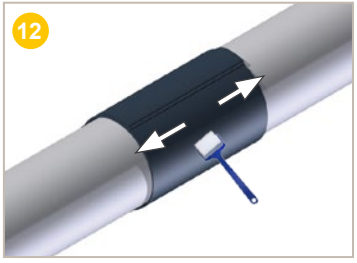
Press both ends of the heat-shrinkable sleeve firmly.
Remove the air bubbles with an application roller on the closure.



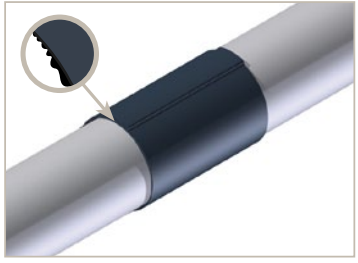
Shrink the heat-shrinkable sleeve around its circumference using large movements, starting at the centre.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.



Continue **heating** starting from the centre and going towards the ends until shrinking is complete. Finish with horizontal movements over the whole surface of the sleeve.
Shrinking is complete when the adhesive projects out of each end of the sleeve.

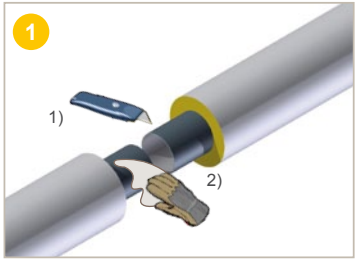


While the sleeve surface is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.
Use the same procedure on the closure.

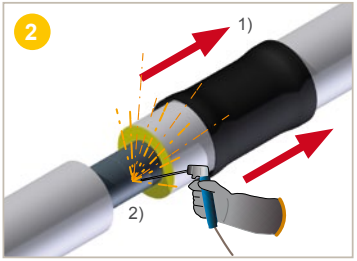


The system is correctly installed when:
• The whole sleeve is in contact with the surfaces to be protected and has no openings.
• The adhesive is visible on its ends
• No holes or cracks are visible.

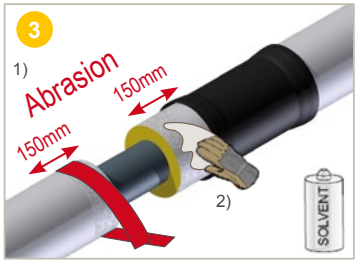
Implementation of heat-shrinkable muff half-shells



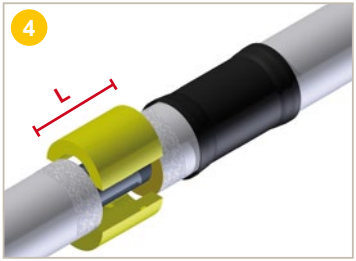
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



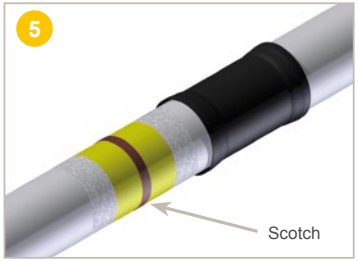
1) **Slide** along the non-drilled heat-shrinkable muff.
2) **Align** the pipes and weld the two steel pipes together according to professional standards.



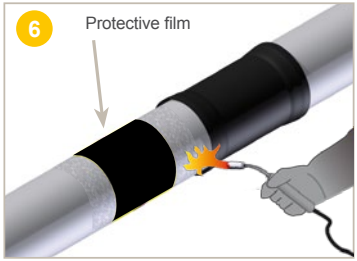
1) **Roughen** the surface (150 mm on each side + inside muff) with abrasive paper.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).
⚠ Do not remove the protective film, which prevents accidental shrinkage of the muff.



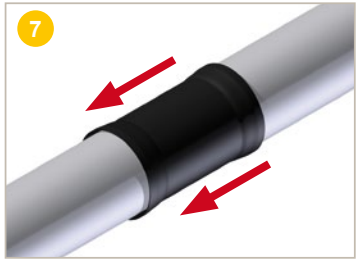
Measure the bare surface to be insulated then cut the half-shells to the required length (L).
Position the 2 half-shells, checking that they fill the space to be insulated perfectly.



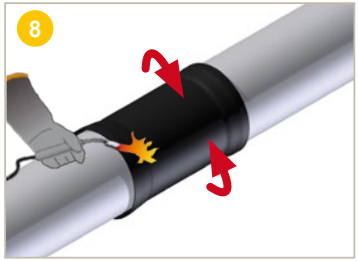
Hold the half-shells in position with sellotape.



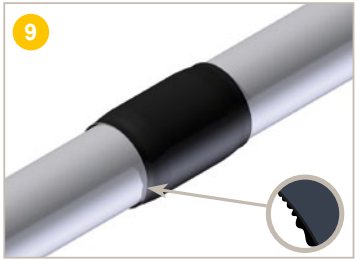
1) **Wrap** with the protective film supplied to avoid damaging the half-shells.
2) Use a blowtorch to warm the surfaces to be covered (width 200 mm on each side of the HDPE end) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.



Slide the non-drilled muff onto the part to be insulated so as to cover the HDPE sleeve by 5 to 10 mm on each end.
⚠ From HDPE diameters >500, the sealant strips are supplied separately. Position the sealant strips on the HDPE using the mark made previously.



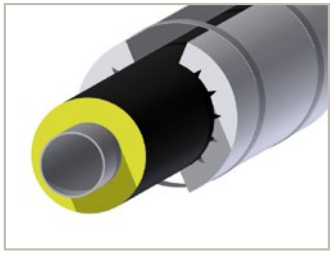
⚠ Remember to remove the protective film from the heat-shrinkable muff.
Shrink the entire surface of the heat-shrinkable muff with a blowtorch.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.



Shrinkage is complete when the adhesive projects each side of the sleeve and when the entire surface of the sleeve has no openings, holes or cracks.

Installation of expansion pads

The expansion pads must be installed before backfilling, at the positions indicated by the network designer.
Their role is to provide space in the earth, so that the pipe can expand without being damaged. Pads are generally installed at bends, T-branches, expansion loops, etc.



Two types of pad can be used:

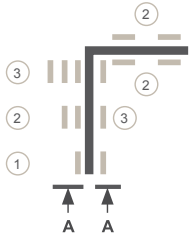
- polyurethane pads (plates)
- polyethylene pads (strips or plates)

The pads are positioned on the HDPE casing and must be held in place to prevent excessive penetration of sand between the casing and the pad(s).

If ties or a plastic film are used, the pads must be secured **at least three points across the width of the pad**. It is also recommended to go around **at least twice** to ensure that the pads are held securely in place.

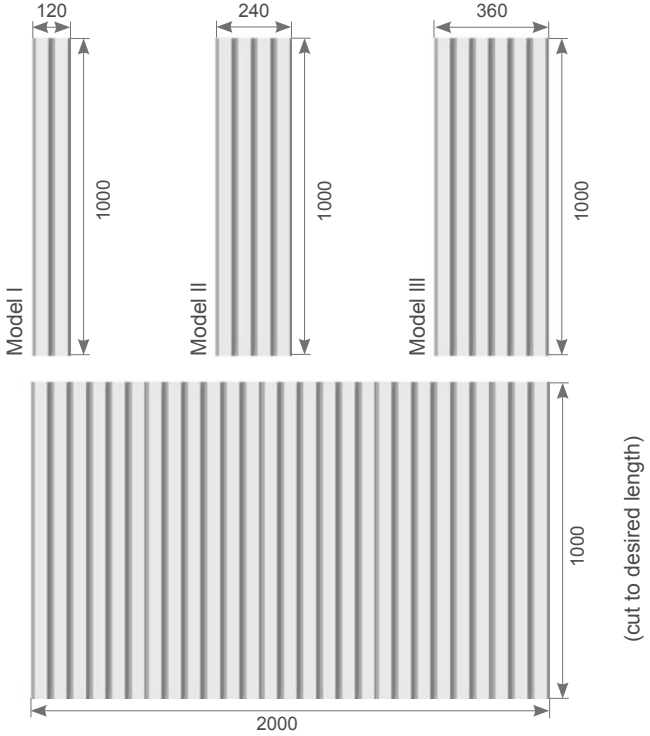
If there is too much expansion for the thickness of one pad, add one or more pad layers.

Number of pads depending on the expansion

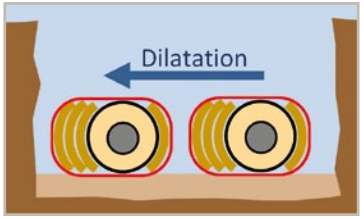


Deflection arm	Expansion	Expansion	Expansion
L	Δ L < 30 mm	Δ L 30 - 60 mm	Δ L 60 - 90 mm
M	Part	Part	Part
1,0 - 1,4	1	1 + 1	
1,5 - 2,4	2	2 + 1	
2,5 - 3,4	3	3 + 2	3 + 2 + 1
3,5 - 4,4	4	4 + 3	4 + 3 + 2
4,5 - 5,4	5	5 + 4	5 + 4 + 2
5,5 - 6,4	6	6 + 4	6 + 5 + 4
6,5 - 7,4	7	7 + 5	7 + 6 + 4
7,5 - 8,4	8	8 + 6	8 + 7 + 5
8,5 - 9,4		9 + 6	9 + 7 + 5
9,5 - 10,4		10 + 7	10 + 8 + 6
10,5 - 11,4			11 + 9 + 7

Dimensions of expansion pads



View A-A



Casing	Pads			
Ø Ext.	L	Ep.	H	Model
mm	mm	mm	mm	
90 à 160	1000	40	120	I
180 à 280	1000	40	240	II
315 à 355	1000	40	360	III
400 à 500	1000	40	480	II + II
560	1000	40	600	II + III
630	1000	40	720	III + III
710	1000	40	840	III + II + II
800	1000	40	960	III + III + II
900	1000	40	1080	III + III + III
1000	1000	40	1200	III + III + II + II
1200	1000	40	1440	III + III + III + III

Wall crossing

The wall crossing is a neoprene gasket inserted between the pipe HDPE casing and a concrete structure.

It is essential to use wall crossings whenever the network goes through a structure (valve chamber, entering buildings, etc.) to prevent water ingress and guarantee protection against possible perforation caused by the masonry structure.

They allow small expansion movements at this building entry point.

Crossing holes are usually made using a core drill or by reservation.

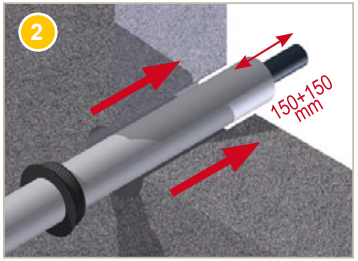
The wall crossings must be positioned before welding the pipes together

Casing	Reservation hole	Casing	Reservation hole	Casing	Reservation hole
Ø Ext.	Ø	Ø Ext.	Ø	Ø Ext.	Ø
mm	mm	mm	mm	mm	mm
90	112	200	225	450	500
110	132	225	250	500	550
125	142	250	300	560	600
140	162	315	350	630	650
160	182	355	400	710	800
180	200	400	450		

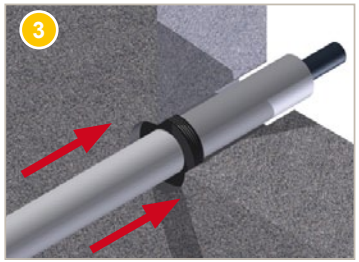
Neoprene wall crossing

Drill a reservation hole in the wall, of diameter 20 to 30 mm greater than the pipe outer diameter.

⚠ The wall crossings must be positioned before welding the pipes together.

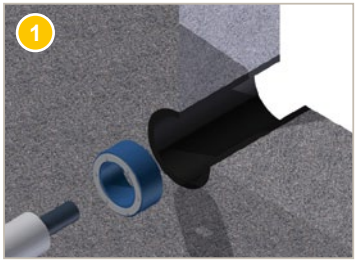


1) **Fit** the neoprene wall crossing on the pipe.
2) **Insert** the pipe into the reservation hole up to the wall crossing.
The pipe must project at least 300 mm (150 mm casing + 150 mm service pipe) inside the building.



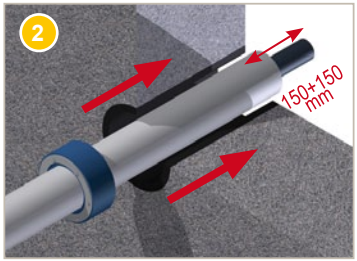
Slide the wall crossing.

Sealed wall crossing with tightening system

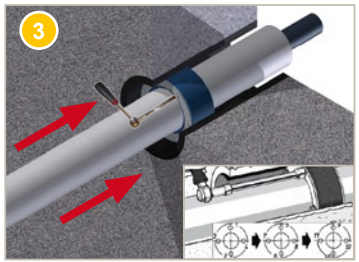


1) **Drill** a reservation hole in the wall, of diameter 20 to 30 mm greater than the pipe outer diameter.
2) **Place** the barrel in the wall reservation hole.

⚠ The wall crossings must be positioned before welding the pipes together.



1) **Fit** the sealed wall crossing on the pipe.
2) **Insert** the pipe into the reservation hole up to the wall crossing.
The pipe must project at least 300 mm (150 mm casing + 150 mm service pipe) inside the building.



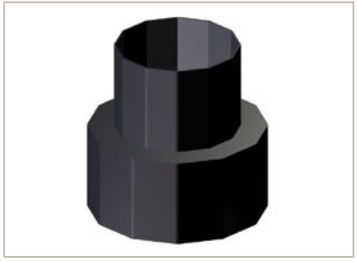
1) **Slide** the sealed wall crossing.
2) Tighten the nuts a few turns successively one after the other, proceeding diagonally.

District Heating Shrinkable End Cap (DHEC)

The district heating end cap (DHEC) is a heat-shrink part made from cross-linked polyolefins.
The DHEC was developed to seal the cut end of the polyurethane foam insulation between the main pipe and the outer casing, on pre-insulated pipe networks.
During installation, the DHEC shrinks onto the outer casing and the pipe; at the same time, the adhesive melts, forming a seal between the pipe and the outer casing.

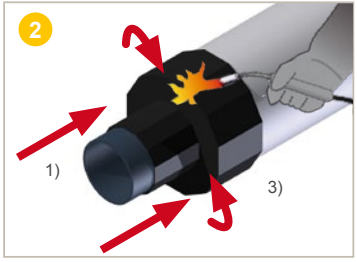
A DHEC must be used at each interruption in the insulated network (valve chamber, entering buildings, etc.) to prevent ingress of water inside the insulation.

⚠ The DHEC must be placed on the pipe casing before welding the pipes together.



Use a blowtorch to **warm** the surfaces to be covered (casing + pipe) up to at least **65 °C**.
Check the temperature on all surfaces with a thermometer.

⚠ The heat-shrinkable cap must be positioned before welding the pipes together



1) Position the heat-shrinkable cap on the end of the pipe.
2) Shrink the cap on the "casing" part by heating with circular movements.
Allow to cool for a few minutes then shrink the cap on the "pipe" side by heating with circular movements.

If necessary, press on the cap to evacuate any air bubbles.

Shrinkage is complete when the cap surface is completely smooth.

Hydraulic pressure tests before backfill

Hydraulic pressure tests are essential in order to check each weld or fitting before insulating the junctions.

To perform a 100 % inspection of the assemblies made on site, fill the pipes with cold water and subject them to a **pressure of 1.3 times the service pressure, with a minimum of 6 bars.**

Hammer the welds to check that they will not be damaged by the expansions generated when bringing the network to operating temperature and the resulting stresses.

Perform a general pressure test to check all welds simultaneously if the network is not too large.

On sections with compensators, check that the network test pressure remains less than the pressure test carried out on the compensators (**24 bars for standard compensators**).

The hydraulic pressure tests can be replaced by **air pressure tests at a pressure of 0.2 bar above or 0.65 bar below atmospheric pressure,** applying a suitable indicator fluid on the welds.

Inspecting the junctions

It is prohibited to backfill a network of **POLYURETUB 130** pipes without having at least inspected the junctions visually.

Proceed as follows :

- Check that the PUR foam fills the entire junction.
- The PUR foam must never come out of the heat-shrinkable components. If it does, the junction must be redone (incorrect implementation of the heat-shrinkable sleeves).
- The closure patch must never come off the HDPE muff. If it does, refit the closure patch and/or cover the closure patch with a heat-shrinkable sleeve.

Inspecting the excavation

Reminder :

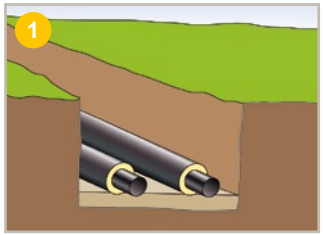
All blocks apart from those made from polyurethane, polystyrene or low-density PUR foam (StyroPUR foam™ block), must be removed.

Check that the pipes are supported along their entire length on the sand bed and adjust their spacing.

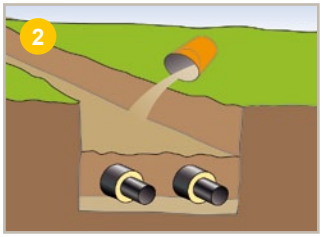
Thoroughly clean the excavation bottom to remove any objects (stone, metal, wood, etc.) or site waste that could damage the pipes.

Backfill

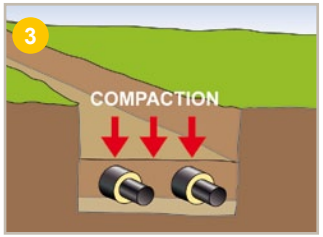
Thoroughly **clean** the excavation bottom to remove any objects (stone, metal, wood, etc.) or site waste that could damage the pipes.



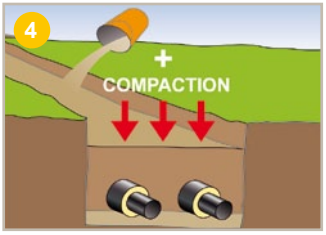
Spread a uniform layer of sand up to level with the top of the pipes.



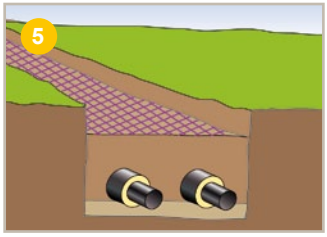
Pack the sand manually on the sides and between the pipes, avoiding any impacts to the HDPE casing. Spread a uniform layer of sand up to level with the top of the pipes.



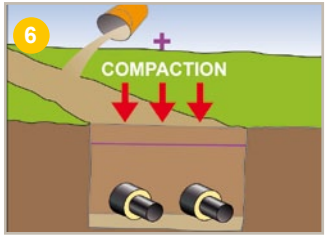
Spread a uniform layer of sand **at least 10 cm thick** on top of the pipes and pack carefully.



Purple underground warning mesh (colour coding of heating and air-conditioning networks according to EN 12613) must be laid about **20 to 50 cm** above the pipes.



Backfill in successive **30 cm deep layers** compacted one after the other.



Sand

⚠ The junctions must be protected against the weather if the trench is not backfilled within 48 hours.

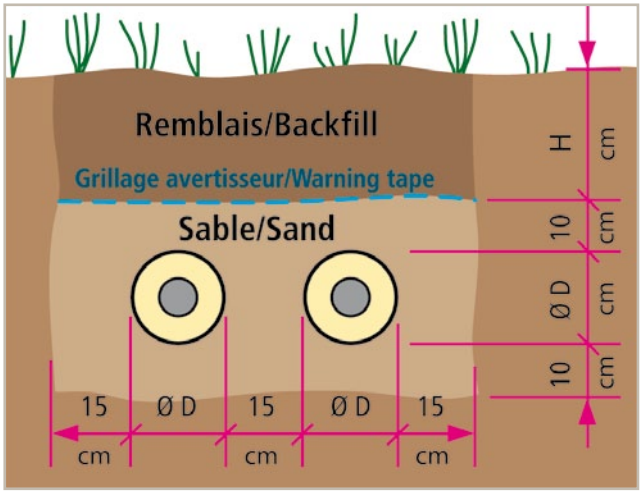
The sand to be used must have sufficient support capacity and the mechanical and hydraulic properties required in order to comply with the design base.

Recommendation: round brittle sand, medium or large grain, 0-4 mm. Max. 8 % fine grains.

The internal friction angle of the sand will be about 32.5° to guarantee a friction angle of the sand/PE interface of between 20° and 22°.

The material must not contain plant residue, humus, or clay or pieces of silt. Avoid large sharp grains likely to damage the pipe and the junctions.

The material composition must allow the coefficients of friction indicated on the installation drawing, respecting the compacting (a coefficient of friction of 0.4 is generally chosen). Careful, regular compacting is required.



Sorting waste

Cleanliness and waste recycling are essential for correct completion of the work site and it is therefore important to respect a few basic rules.

Recommendations:

- It is prohibited to burn waste on the site
- Do not bury waste in the trenches
- Provide designated waste skips on the site
- Sort waste correctly in the specified skips.
- Do not put hazardous waste in the household waste skips
- Remove the full skips regularly

Wood blocks

OIW (Ordinary Industrial Waste)

Pipe offcuts

Pallets

Boxes

Rubble

...

Implementation sheets

Injected junction kits

Half-shell junction kits

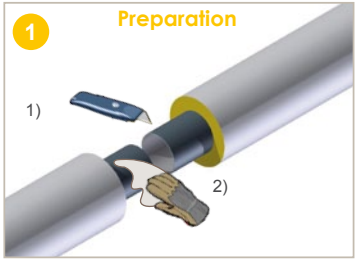
i1 Injected junction kit

Composition of the i1 kit:

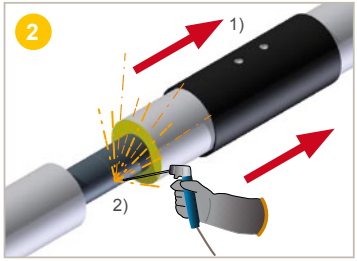
- 1 drilled rigid HDPE muff
- 2 heat-shrinkable sleeves

- 1 box of Polyol
- 1 box of Isocyanate
- 1 mixing spatula

- 2 vent plugs
- 2 female closure plugs
- 2 male closure plugs
- 2 closure patches (FOPS)

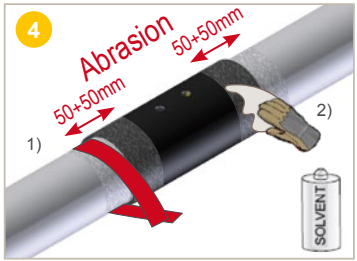


1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



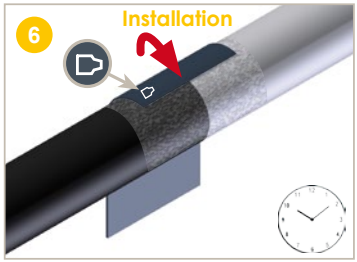
1) **Slide** the HDPE muff onto one of the pipes, pushing it along a sufficient distance.
2) **Align** the pipes and weld the two steel pipes together according to professional standards.

Slide the HDPE muff at the stripped area so that it covers the pipe casing by **10 cm on each end**.
⚠ Make sure that the steel weld has cooled down before sliding the muff.

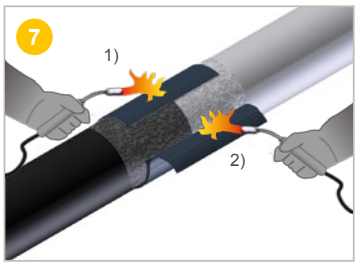


1) **Roughen** the surfaces (muff + casing 50 mm on each side) with abrasive paper (grain 40-60) or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).

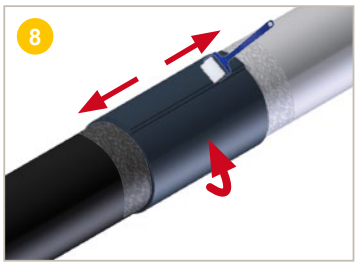
Use a blowtorch to **warm** the surfaces to be covered (muff + casing 50 mm on each end) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.



Fit the heat-shrinkable sleeve on the joint so that the overlap lies between the 10 o'clock and 2 o'clock positions
⚠ **Remember to remove its protective film.**
⚠ **Respect the implementation direction using the indicator:** large diameter muff side, small diameter pipe side.

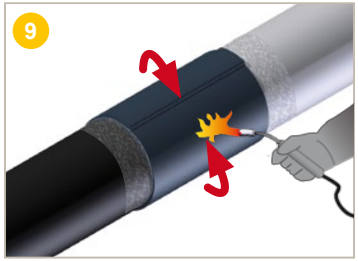


Leave 1 to 2 cm clearance to ensure correct shrinkage.
1) **Warm** the overlapping part of the heat-shrinkable sleeve slightly.
2) Then **warm** the adhesive of the other part of the sleeve called the "**adhesive patch**".

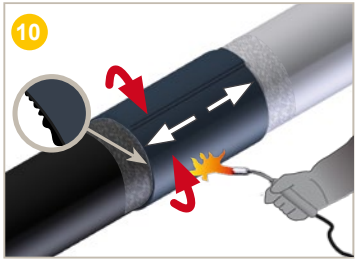


Press both ends of the heat-shrinkable sleeve firmly.
Remove the air bubbles with an application roller on the closure.

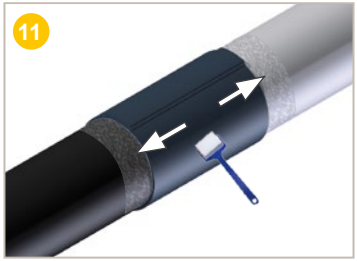
i1 Injected junction kit



Shrink the heat-shrinkable sleeve around its circumference using large movements, starting at the centre.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.

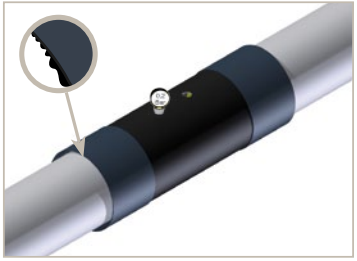


Continue heating starting from the centre and going towards the ends until shrinking is complete. Finish with horizontal movements over the whole surface of the sleeve. Shrinking is complete when the adhesive projects out of each end of the sleeve.



While the sleeve surface is still hot and malleable, use the application roller to **smooth and evacuate** the air bubbles. Use the same procedure on the closure.

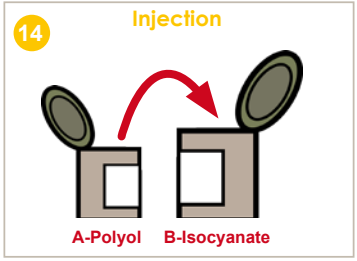
Repeat operations 5 to 11 with the 2nd heat-shrinkable sleeve.



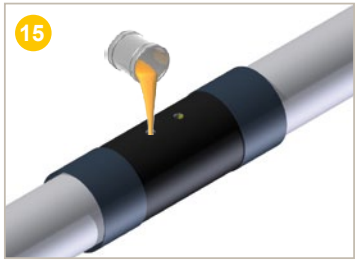
The system is correctly installed when:
- The sleeves are in contact with the surfaces to be protected and have no openings.
- The adhesive is visible on both ends of the sleeves.
- No holes or cracks are visible

13 **Recommendations :**

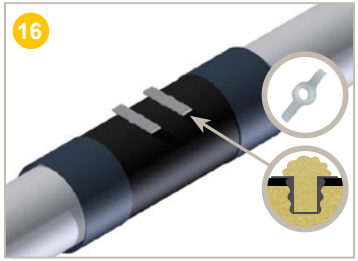
It is recommended to perform an airtightness test at 0.2 bar with a hand pump and pressure gauge. If this is impossible, make a visual check. It is essential to allow the materials to cool down to ambient temperature before injecting polyurethane foam. In case of doubt or if a fault is observed, remake the junction completely.



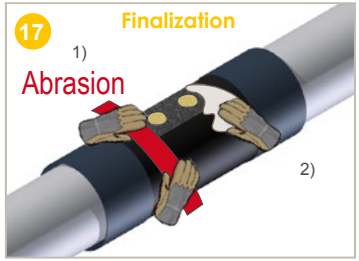
Take components **A** and **B** out of the kit boxes and check the diameters.
⚠ Check the kit use-by date. Pour component **A** into component **B**, **mix** together using the spatula supplied. The mixture is ready when it is homogeneous, with no signs of different colours.



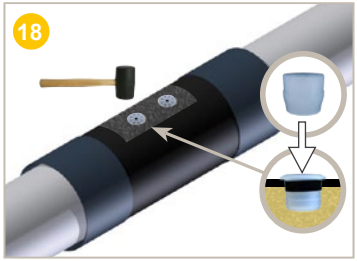
Pour the mixture into one of the 26 mm diameter HDPE muff injection holes.
Make sure to pour in all of the mixture, using the spatula supplied.



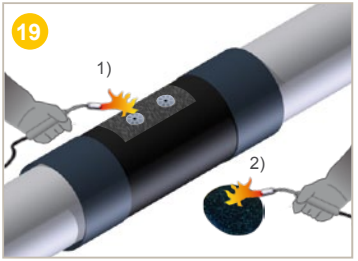
1) **Push** the 2 vent plugs fully into the 2 injection holes.
2) As soon as the expanded mixture has hardened, **remove** the plugs using the 2 tabs provided. **Clean off** any excess PUR foam.



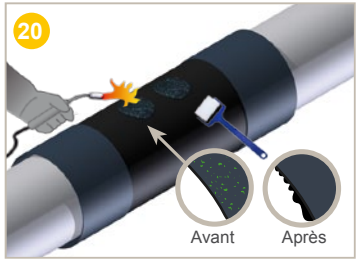
1) **Roughen** the surfaces to be covered (hole Ø + 50 mm on each side) with abrasive paper or a wire brush.
2) **Clean** the roughened surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).



1) **Press the female** closure plugs by hand fully into the HDPE muff injection holes.
2) Then **knock the male** closure plugs into the female closure plugs with a mallet.



1) Use a blowtorch to **warm** the surfaces to be covered (hole Ø + 50 mm on each side) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.
2) **Heat** slightly (2 to 3 seconds) the 1st closure patch (FOPS) on the side opposite the coloured dots and then glue it onto the plug.



1) Finalise the bonding by **warming** until the coloured dots of the FOPS disappear.
2) While the closure patch (FOPS) is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.
Repeat the operation with the 2nd closure patch.

The system is correctly installed when:

- The closure patches (FOPS) are in contact with the surfaces to be protected.

- The adhesive is visible all around the closure patches.

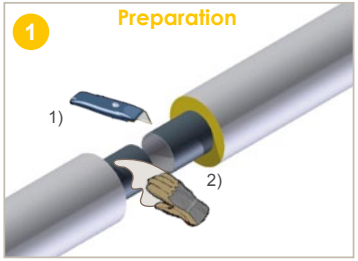
i2 injected heat-shrink junction kit

Composition of the i2 kit:

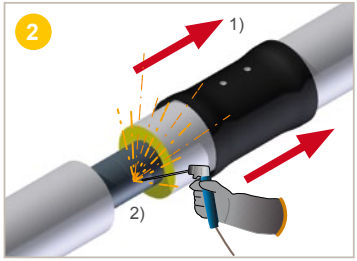
→ 1 drilled heat-shrinkable muff

→ 1 box of Polyol
→ 1 box of Isocyanate
→ 1 mixing spatula

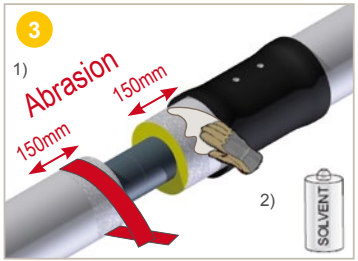
→ 2 vent plugs
→ 2 female closure plugs
→ 2 male closure plugs
→ 2 closure patches (FOPS)



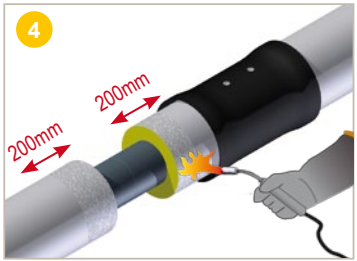
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



1) **Slide** the heat-shrinkable muff onto one of the pipes, **pushing it along a sufficient distance.**
2) **Align** the pipes and weld the two steel pipes together according to professional standards.



1) **Roughen** the surface (150 mm on each side) with abrasive paper or a wire brush.
2) **Clean** and degrease the roughened surfaces with a cloth dipped in ethanol (min. 94 %).
⚠ Do not remove the protective film, which prevents accidental shrinkage of the muff.



Use a blowtorch to **warm** the surfaces to be covered (200 mm on each end) up to at least 65 °C. **Check** the temperature on all surfaces with a thermometer.

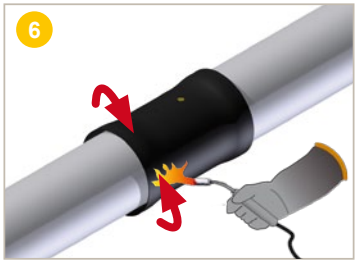
Slide the heat-shrinkable muff at the stripped area so that it covers the pipe casing by 5 to 10 cm on each end.

⚠Remember to remove the protective film before shrinking the heat-shrinkable muff.

WARNING :

⚠ Verify the presence of the sealant strips inside the muff before shrinking.

⚠ From HDPE diameters >500, the sealant strips are supplied separately. Position the sleeves on the pipe using the mark made previously

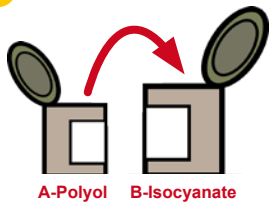


Shrink the ends of the heat-shrinkable muff with a blowtorch.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.

Allow to cool before injection.
After shrinking and return to ambient temperature, check that the muff and the casing are firmly bonded together.

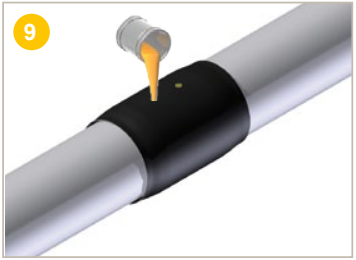
⚠ It is recommended to perform an airtightness test at 0.2 bar with a hand pump and pressure gauge.

8 Injection



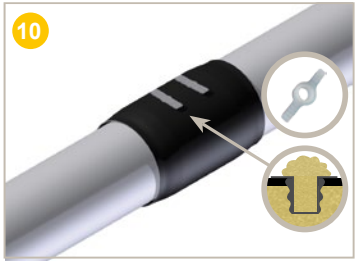
Take components **A** and **B** out of the kit boxes and check the diameters.
⚠ Check the kit use-by date. Pour component **A** into component **B**, **mix** together using the spatula supplied. The mixture is ready when it is homogeneous, with no signs of different colours.

9



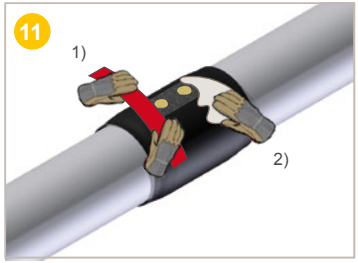
Pour the mixture into one of the 26 mm diameter HDPE muff injection holes.
Make sure to pour in all of the mixture, using the spatula supplied.

10



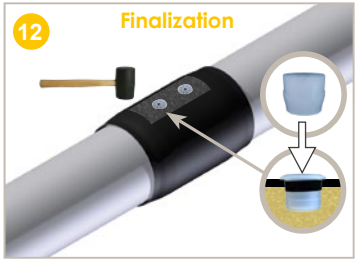
1) **Push** the 2 vent plugs fully into the 2 injection holes.
2) As soon as the expanded mixture has hardened, **remove** the plugs using the 2 tabs provided. **Clean off** any excess PUR foam.

11



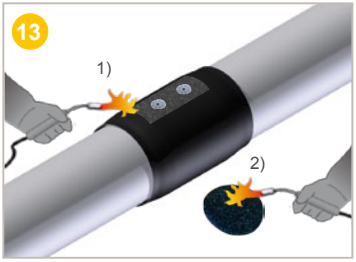
1) **Roughen** the surfaces to be covered (hole Ø + 50 mm on each side) with abrasive paper or a wire brush.
2) **Clean** the roughened surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).

12 Finalization



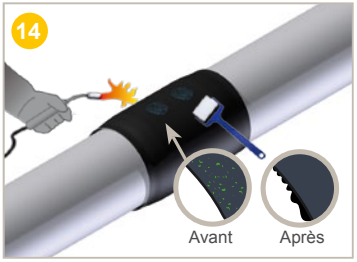
1) **Press the female** closure plugs by hand fully into the HDPE muff injection holes.
2) Then **knock the male** closure plugs into the female closure plugs with a mallet.

13



1) Use a blowtorch to **warm** the surfaces to be covered (hole Ø + 50 mm on each side) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.
2) **Heat** slightly (2 to 3 seconds) the 1st closure patch (FOPS) on the side opposite the coloured dots and then glue it onto the plug.

14



1) Finalise the bonding by **warming** until the coloured dots of the FOPS disappear.
2) While the closure patch (FOPS) is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.
Repeat the operation with the 2nd closure patch.

The system is correctly installed when:

- The closure patches (FOPS) are in contact with the surfaces to be protected.
- The adhesive is visible all around the closure patches.

Composition of the i3 kit :

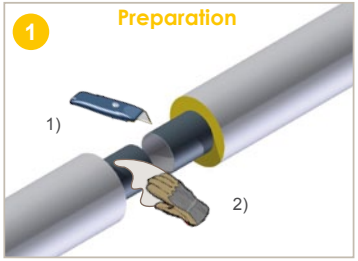
- 1 drilled heat-shrinkable muff
- 2 heat-shrinkable sleeves

- 1 box of Polyol
- 1 box of Isocyanate
- 1 mixing spatula

- 2 vent plugs
- 2 female closure plugs
- 2 male closure plugs
- 2 closure patches (FOPS)
- 2 weld-on plugs

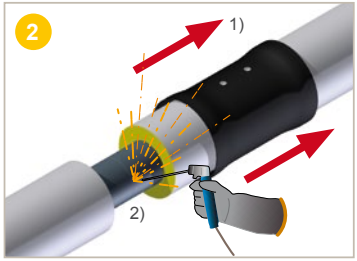
i3 injected heat-shrink junction kit

1 Preparation



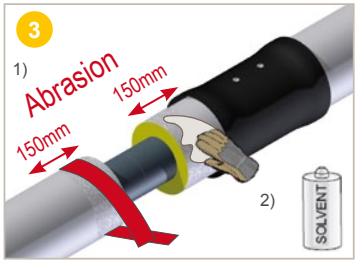
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.

2



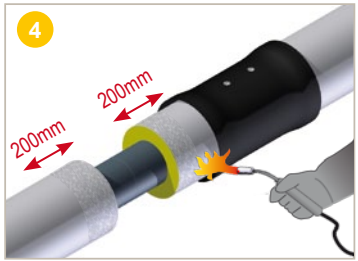
1) **Slide** the heat-shrinkable muff onto one of the pipes, **pushing it along a sufficient distance.**
2) **Align** the pipes and weld the two steel pipes together according to professional standards.

3



1) **Roughen** the surface (150 mm on each side) with abrasive paper or a wire brush.
2) **Clean** and degrease the roughened surfaces with a cloth dipped in ethanol (min. 94 %).
⚠ Do not remove the protective film, which prevents accidental shrinkage of the muff.

4



Use a blowtorch to **warm** the surfaces to be covered (200 mm on each end) up to at least 65 °C. **Check** the temperature on all surfaces with a thermometer.

5 Installation

Slide the heat-shrinkable muff at the stripped area so that it covers the pipe casing by 5 to 10 cm on each end.

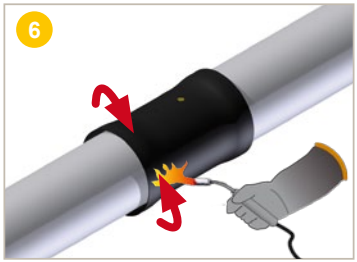
⚠ Remember to remove the protective film before shrinking the heat-shrinkable muff.

WARNING :

⚠ Verify the presence of the sealant strips inside the muff before shrinking.

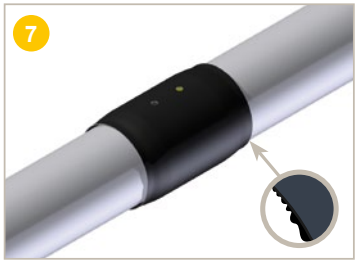
⚠ From HDPE diameters >500, the sealant strips are supplied separately. Position the sleeves on the pipe using the mark made previously

6



Shrink the ends of the heat-shrinkable muff with a blowtorch.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.

7

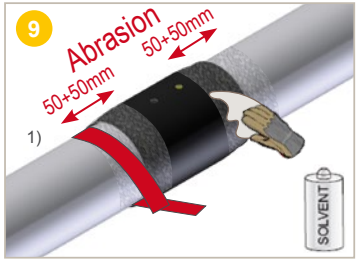


Allow to cool before injection.
After shrinking and return to ambient temperature, check that the muff and the casing are firmly bonded together.

8 **Recommendations :**

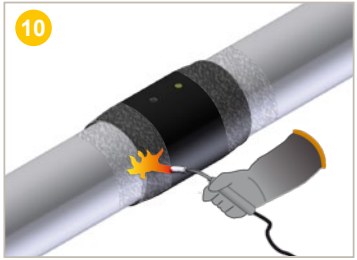
It is recommended to perform an airtightness test at 0.2 bar using a hand pump and pressure gauge. If this is impossible, make a visual check. It is essential to allow the materials to cool down to ambient temperature before injecting polyurethane foam. In case of doubt or if a fault is observed, remake the junction completely.

9



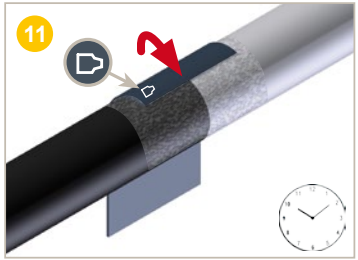
1) **Roughen** the surfaces (muff + casing 50 mm on each side) with abrasive paper (grain 40-60) or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).

10



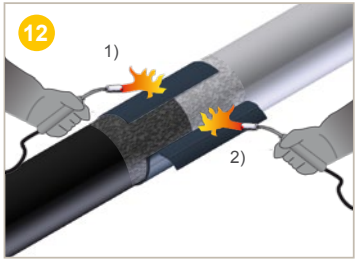
Use a blowtorch to **warm** the surfaces to be covered (muff + casing 50 mm on each end) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.

11



Fit the heat-shrinkable sleeve on the joint so that the overlap lies between the 10 o'clock and 2 o'clock positions
⚠ **Remember to remove its protective film**.
⚠ **Respect the implementation direction using the indicator:** large diameter muff side, small diameter pipe side.

12

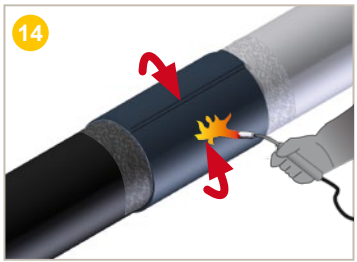


Leave 1 to 2 cm clearance to ensure correct shrinkage.
1) **Warm** the overlapping part of the heat-shrinkable sleeve slightly.
2) Then warm the adhesive of the other part of the sleeve called the "**adhesive patch**".

13

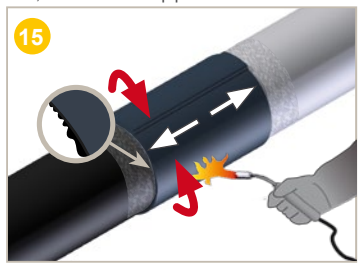
Press both ends of the heat-shrinkable sleeve firmly.
Remove the air bubbles with an application roller on the closure.

14

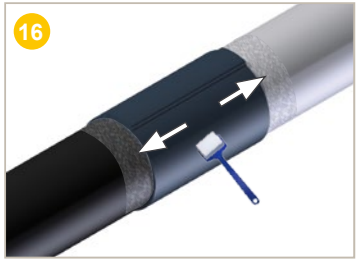


Shrink the heat-shrinkable sleeve around its circumference using large movements, starting at the centre.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.

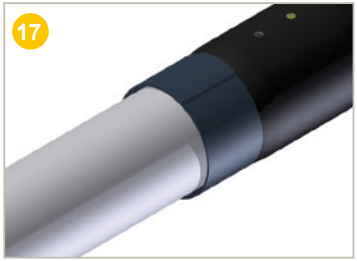
15



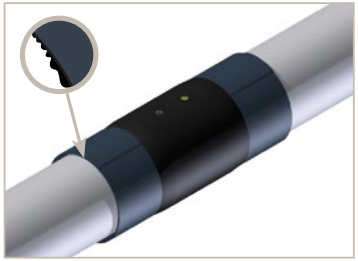
Continue heating starting from the centre and going towards the ends until shrinking is complete. Finish with horizontal movements over the whole surface of the sleeve. Shrinking is complete when the adhesive projects out of each end of the sleeve.



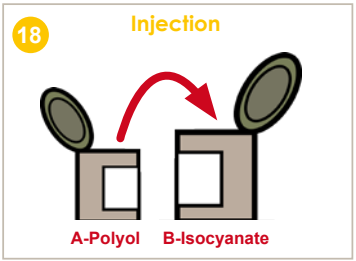
While the sleeve surface is still hot and malleable, use the application roller to **smooth and evacuate** the air bubbles.
Use the same procedure on the closure.



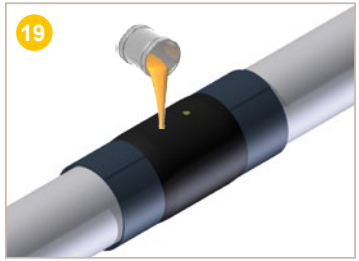
Repeat operations 10 to 16 with the 2nd heat-shrinkable sleeve.



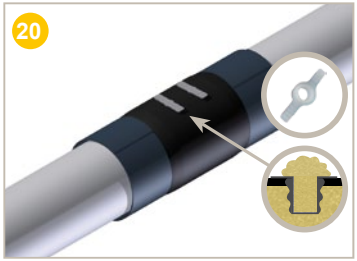
The system is correctly installed when:
• The sleeves are in contact with the surfaces to be protected and have no openings.
• The adhesive is visible on both ends of the sleeves.
• No holes or cracks are visible



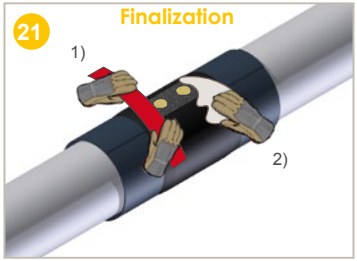
Take components **A** and **B** out of the kit boxes and check the diameters.
⚠ Check the kit use-by date. Pour component **A** into component **B**, **mix** together using the spatula supplied. The mixture is ready when it is homogeneous, with no signs of different colours.



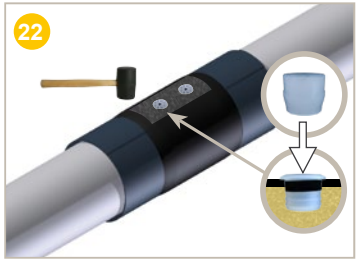
Pour the mixture into one of the 26 mm diameter HDPE muff injection holes.
Make sure to pour in all of the mixture, using the spatula supplied.



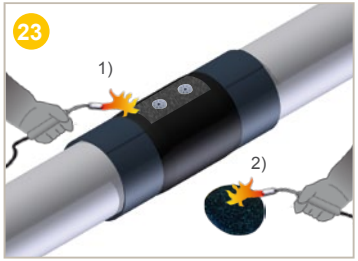
1) **Push** the 2 vent plugs fully into the 2 injection holes.
2) As soon as the expanded mixture has hardened, **remove** the plugs using the 2 tabs provided. **Clean off** any excess PUR foam.



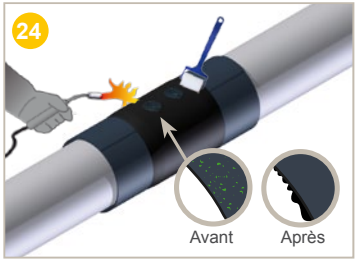
1) **Roughen** the surfaces to be covered (hole Ø + 50 mm on each side) with abrasive paper or a wire brush.
2) **Clean** the roughened surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).



1) **Press the female** closure plugs by hand fully into the HDPE muff injection holes.
2) Then **knock the male** closure plugs into the female closure plugs with a mallet.



1) Use a blowtorch to **warm** the surfaces to be covered (hole Ø + 50 mm on each side) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.
2) **Heat** slightly (2 to 3 seconds) the 1st closure patch (FOPS) on the side opposite the coloured dots and then glue it onto the plug.



1) Finalise the bonding by **warming** until the coloured dots of the FOPS disappear.
2) While the closure patch (FOPS) is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.
Repeat the operation with the 2nd closure patch.

The system is correctly installed when:

• The closure patches (FOPS) are in contact with the surfaces to be protected.

• The adhesive is visible all around the closure patches.

i4 Bend insulation kit

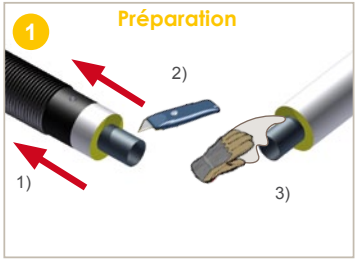
Composition of the i4 kit:

- 1 drilled flexible elbow muff
- 1 steel bend
- 1 centerring

- 1 box of Polyol
- 1 box of Isocyanate
- 1 mixing spatula

- 2 vent plugs
- 2 female closure plugs
- 2 male closure plugs
- 2 closure patches (FOPS)

1 Préparation



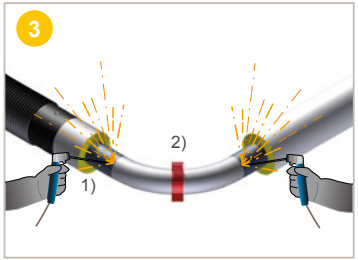
1) **Slide** along the flexible PE muff.
2) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
3) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.

2

Recommendations :

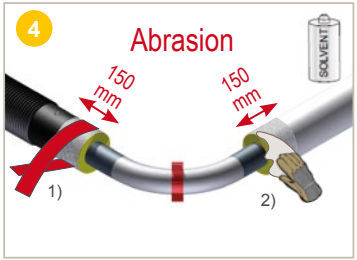
Before welding, make sure to keep the muff far enough away.
Do not remove the protective film too soon. It prevents accidental shrinkage of the flexible muff.

3



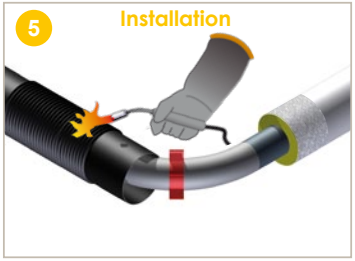
1) **Weld** the steel curve at the ends of the 2 pipes.
2) **Place** the centerring in the middle of the steel curve with an elastic and/or an adhesive tape, to stop the centerring from moving while assembling the flexible PE bend.

4 Abrasion



1) **Roughen** the surface (150 mm on each side) with abrasive paper or a wire brush.
2) **Clean** and degrease the roughened surfaces with a cloth dipped in ethanol (min. 94 %).

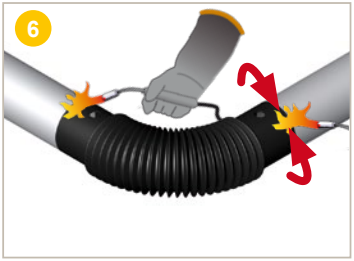
5 Installation



Warm the flexible part of the muff slightly and carefully slide the flexible bend onto the steel bend.

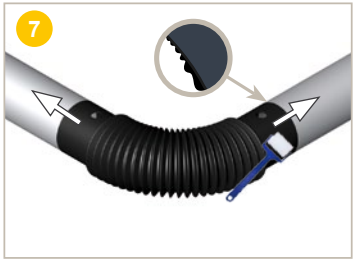
⚠ The injection holes must be at the top

6



⚠ The heat-shrinkable ends of the flexible bend must stick well out of the ends of the casings. Pull back the 2 heat-shrinkable ends of the flexible PE muff around its entire circumference.
⚠ Remember to remove the protective film before shrinking the heat-shrinkable muff.

7



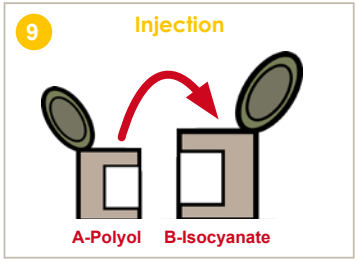
Smooth and **evacuate** the air bubbles with a roller.
After shrinking and return to ambient temperature, check that the muff and the casing are firmly bonded together.
Shrinking is complete when the adhesive projects out of each end of the muff.

8

Recommendations :

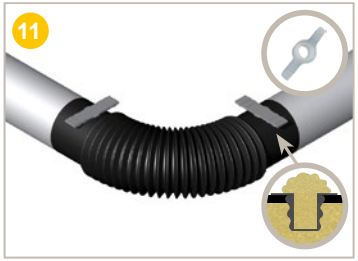
It is recommended to perform an airtightness test at 0.2 bar with a hand pump and pressure gauge. If this is impossible, make a visual check. It is essential to allow the materials to cool down to ambient temperature before injecting polyurethane foam. In case of doubt or if a fault is observed, remake the junction completely.

Bend insulation kit

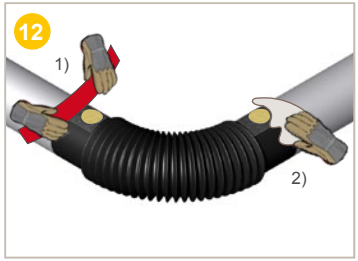


Take components **A** and **B** out of the kit boxes and check the diameters.
⚠ Check the kit use-by date. Pour component **A** into component **B**, **mix** together using the spatula supplied. The mixture is ready when it is homogeneous, with no signs of different colours.

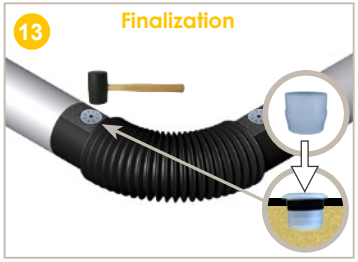
Pour the mixture into one of the 26 mm diameter HDPE muff injection holes.
Make sure to pour in all of the mixture, using the spatula supplied.



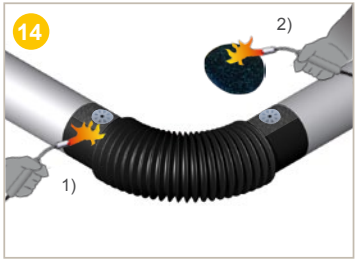
1) **Push** the 2 vent plugs fully into the 2 injection holes.
2) As soon as the expanded mixture has hardened, **remove** the plugs using the 2 tabs provided. **Clean off** any excess PUR foam.



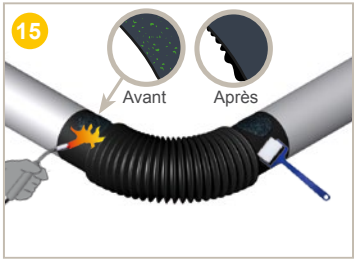
1) **Roughen** the surfaces to be covered (hole Ø + 50 mm on each side) with abrasive paper or a wire brush.
2) **Clean** the roughened surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).



1) **Press the female** closure plugs by hand fully into the HDPE muff injection holes.
2) Then **knock the male** closure plugs into the female closure plugs with a mallet.



1) Use a blowtorch to **warm** the surfaces to be covered (hole Ø + 50 mm on each side) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.
2) **Heat** slightly (2 to 3 seconds) the 1st closure patch (FOPS) on the side opposite the coloured dots and then glue it onto the plug.



1) Finalise the bonding by **warming** until the coloured dots of the FOPS disappear.
2) While the closure patch (FOPS) is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.
Repeat the operation with the 2nd closure patch.

The system is correctly installed when:

- The closure patches (FOPS) are in contact with the surfaces to be protected.
- The adhesive is visible all around the closure patches.

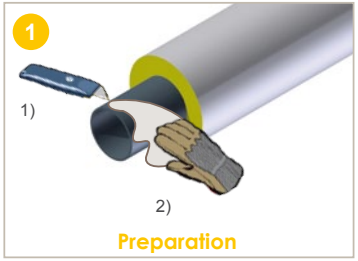
Composition of the i5 kit:

- 1 drilled end of line muff
- 1 steel cap
- 1 heat-shrinkable sleeve

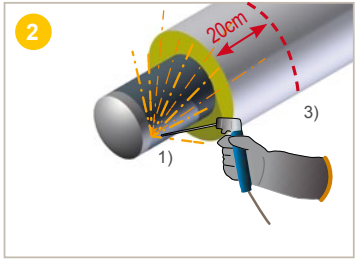
- 1 box of Polyol
- 1 box of Isocyanate
- 1 mixing spatula

- 1 vent plug
- 1 female closure plug
- 1 male closure plug
- 1 closure patch (FOPS)
- 1 weld-on plug

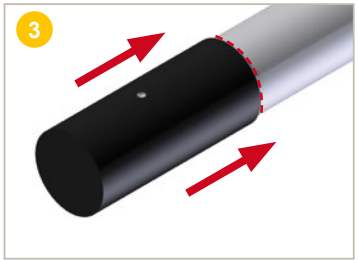
i5 Injected end of line kit



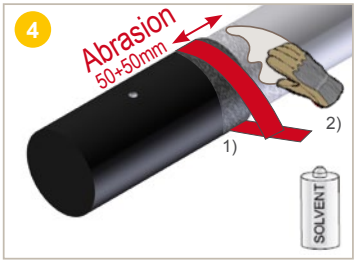
2) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
3) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



1) **Weld** the steel cap.
2) Now **perform** a hydraulic pressure test on the network before insulating the end of the network.
3) **Draw** a line on the casing 20 cm away.
⚠ You are recommended to insulate ends of line in dry weather.

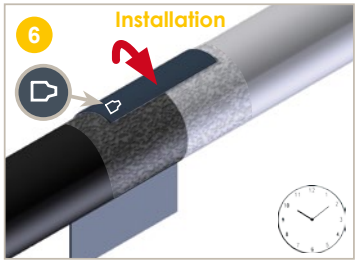


⚠ Make sure that the steel weld has cooled down before **sliding** the muff.
Slide the end of line muff at the stripped area so that it covers the pipe casing by **20 cm**.
⚠ The steel cap must not touch the muff.

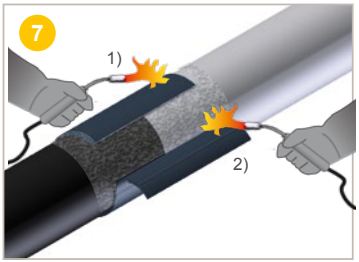


1) **Roughen** the surface (150 mm on each side) with abrasive paper or a wire brush.
2) **Clean** and degrease the roughened surfaces with a cloth dipped in ethanol (min. 94 %).

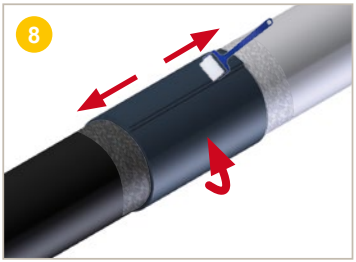
Use a blowtorch to **warm** the surfaces to be covered up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.



Fit the heat-shrinkable sleeve on the joint so that the overlap lies between the 10 o'clock and 2 o'clock positions
Remember to remove its protective film.
⚠ **Respect the implementation direction using the indicator:** large diameter muff side, small diameter pipe side.

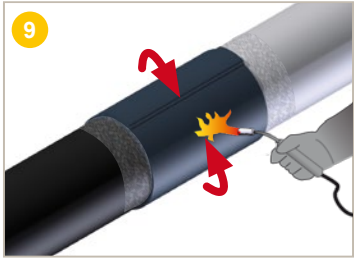


Leave 1 to 2 cm clearance to ensure correct shrinkage.
1) **Warm** the overlapping part of the heat-shrinkable sleeve slightly.
2) Then warm the adhesive of the other part of the sleeve called the "**adhesive patch**".



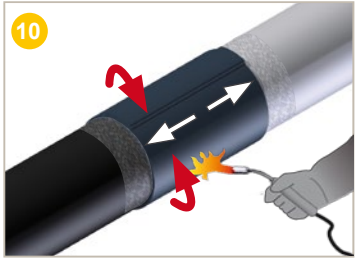
Press both ends of the heat-shrinkable sleeve firmly.
Remove the air bubbles with an application roller on the closure.

9



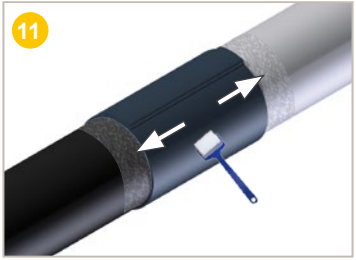
Shrink the heat-shrinkable sleeve around its circumference using large movements, starting at the centre.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.

10



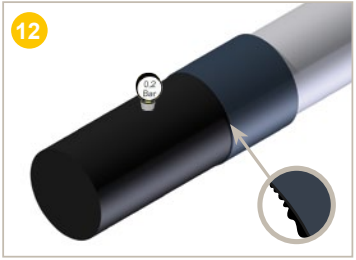
Continue heating starting from the centre and going towards the ends until shrinking is complete. Finish with horizontal movements over the whole surface of the sleeve.

11



While the sleeve surface is still hot and malleable, use the application roller to **smooth and evacuate** the air bubbles.
Use the same procedure on the closure.

12

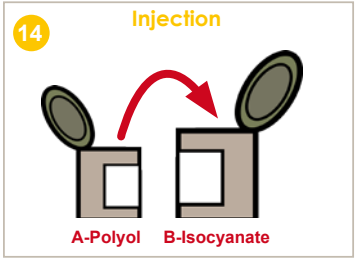


The system is correctly installed when:
• The sleeve is in contact with the surfaces to be protected and have no openings.
• The adhesive is visible on both ends of the sleeves.
• No holes or cracks are visible

13 **Recommendations :**

It is recommended to perform an airtightness test at 0.2 bar with a hand pump and pressure gauge. If this is impossible, make a visual check. It is essential to allow the materials to cool down to ambient temperature before injecting polyurethane foam. In case of doubt or if a fault is observed, remake the junction completely.

14

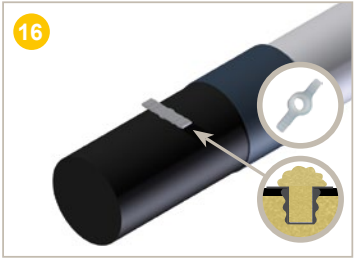


Take components **A** and **B** out of the kit boxes and check the diameters.
⚠ Check the kit use-by date. Pour component **A** into component **B**, **mix** together using the spatula supplied. The mixture is ready when it is homogeneous, with no signs of different colours.

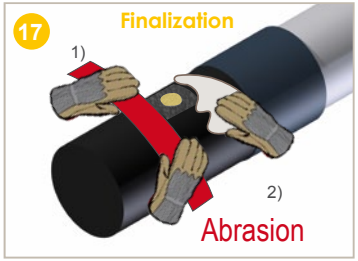
15

Pour the mixture into one of the 26 mm diameter HDPE end of line muff injection holes.
Make sure all of the mixture is removed, using the spatula supplied.

16



1) **Push** the vent plug fully into the injection hole.
2) As soon as the expanded mixture has hardened, remove the plug with the tab provided.
Clean off any excess PUR foam.

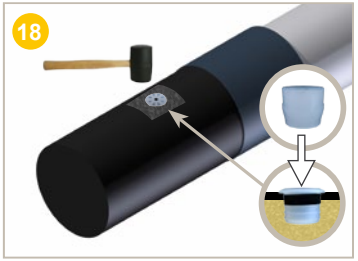


1) **Roughen** the surfaces to be covered (hole Ø + 50 mm on side) with abrasive paper or a wire brush.
2) **Clean** the roughened surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).

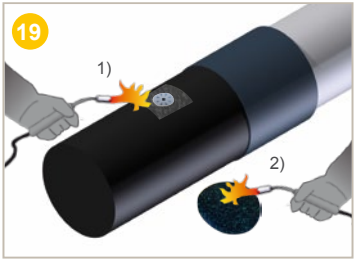
The system is correctly installed when:

• The entire closure patch (FOPS) is in contact with the surfaces to be protected.

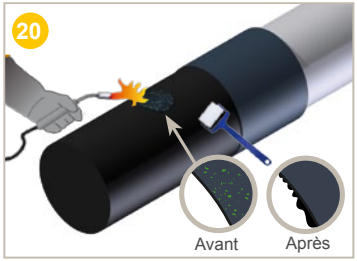
• The adhesive is visible all around the closure patch.



1) **Press** the female closure plug by hand fully into the HDPE muff injection hole.
2) Then knock the male closure **plug** into the female closure plug with a mallet.



1) Use a blowtorch to warm the surfaces to be covered (hole Ø + 50 mm on side) up to at least 65 °C. Check the temperature with a thermometer.
2) Heat slightly (2 to 3 seconds) the closure patch (FOPS) on the side opposite the coloured dots and then glue it onto the plug.



Finalise the bonding by warming until the coloured dots of the FOPS disappear
While the closure patch (FOPS) is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.

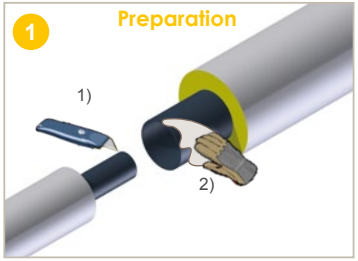
Composition of the i6 kit:

- 1 drilled HDPE reduced muff
- 2 heat-shrinkable sleeves

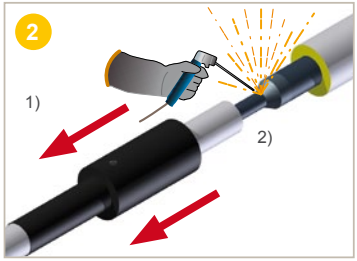
- 1 box of Polyol
- 1 box of Isocyanate
- 1 mixing spatula

- 1 vent plug
- 1 female closure plug
- 1 male closure plug
- 1 closure patch (FOPS)

i6 Injected reducing kit

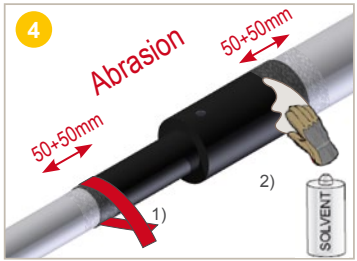


1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.

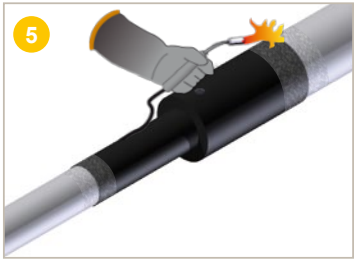


1) **Slide** the HDPE reduced muff onto the smallest pipe, pushing it along a sufficient distance.
2) **Align** the pipes and weld the two steel pipes together according to professional standards.

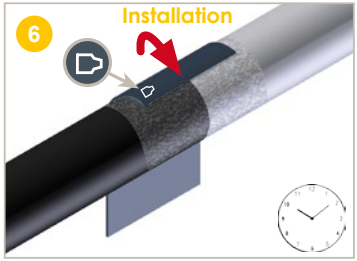
Slide the HDPE reduced muff at the stripped area so that it covers the pipe casing by 10 cm on each end.
⚠ Make sure that the steel weld has cooled down before sliding the muff.



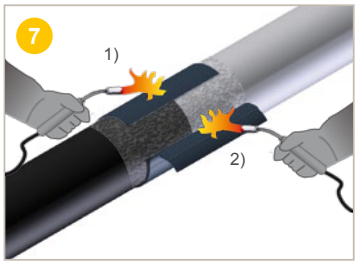
1) **Roughen** the surfaces (muff + casing 50 mm on each side) with abrasive paper (grain 40-60) or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).



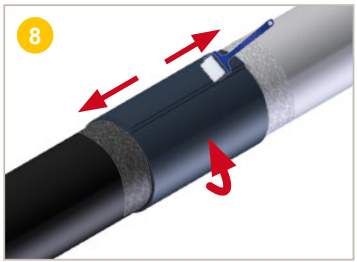
Use a blowtorch to **warm** the surfaces to be covered (muff + casing 50 mm on each side) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.



Fit the first heat-shrinkable sleeve on the joint so that the overlap lies between the 10 o'clock and 2 o'clock positions
⚠ **Remember to remove its protective film**.
⚠ **Respect the implementation direction using the indicator:** large diameter muff side, small diameter pipe side.

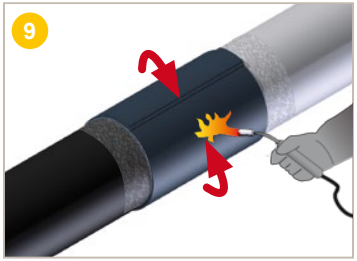


Leave 1 to 2 cm clearance to ensure correct shrinkage.
1) **Warm** the overlapping part of the heat-shrinkable sleeve slightly.
2) Then **warm** the adhesive of the other part of the sleeve called the "**adhesive patch**".



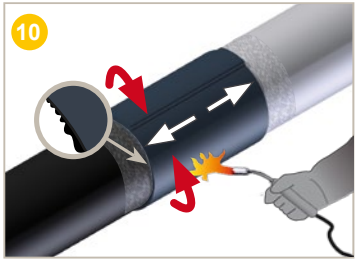
Press both ends of the heat-shrinkable sleeve firmly.
Remove the air bubbles with an application roller on the closure.

9



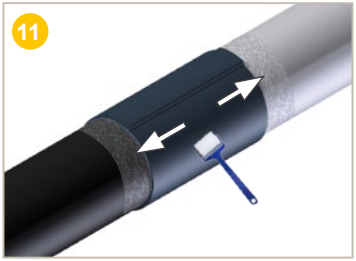
Shrink the heat-shrinkable sleeve around its circumference using large movements, starting at the centre.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.

10



Continue heating starting from the centre and going towards the ends until shrinking is complete. Finish with horizontal movements over the whole surface of the sleeve. Shrinking is complete when the adhesive projects out of each end of the sleeve.

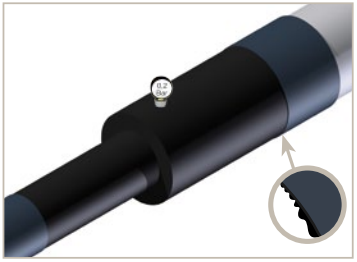
11



While the sleeve surface is still hot and malleable, use the application roller to **smooth and evacuate** the air bubbles. Use the same procedure on the closure.

12

Repeat operations 5 to 11 with the 2nd heat-shrinkable sleeve.

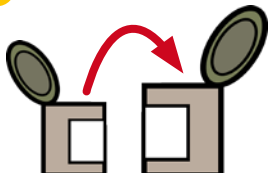


The system is correctly installed when:
• The sleeves are in contact with the surfaces to be protected and have no openings.
• The adhesive is visible on both ends of the sleeves.
• No holes or cracks are visible

13 **Recommendations :**

It is recommended to perform an airtightness test at 0.2 bar with a hand pump and pressure gauge. If this is impossible, make a visual check. It is essential to allow the materials to cool down to ambient temperature before injecting polyurethane foam. In case of doubt or if a fault is observed, remake the junction completely.

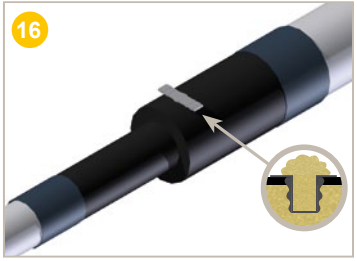
14 Injection



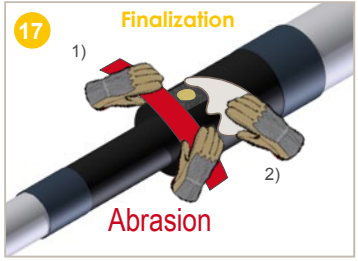
Take components **A** and **B** out of the kit boxes and check the diameters.
⚠ Check the kit use-by date. Pour component **A** into component **B**, **mix** together using the spatula supplied. The mixture is ready when it is homogeneous, with no signs of different colours.

15

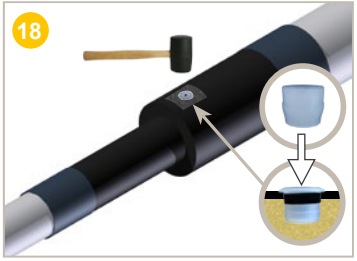
Pour the mixture into one of the 26 mm diameter HDPE end of line muff injection holes.
Make sure all of the mixture is removed, using the spatula supplied.



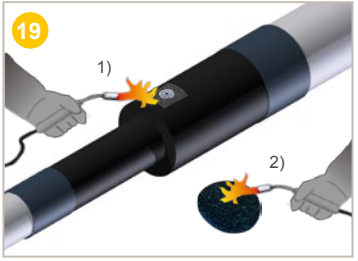
1) **Push** the vent plug fully into the injection hole.
2) As soon as the expanded mixture has hardened, remove the plug with the tab provided.
Clean off any excess PUR foam.



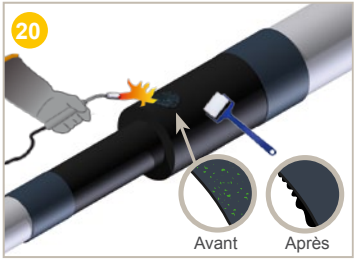
1) **Roughen** the surfaces to be covered (hole Ø + 50 mm on side) with abrasive paper or a wire brush.
2) **Clean** the roughened surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).



1) **Press** the female closure plug by hand fully into the HDPE muff injection hole.
2) Then knock the male closure **plug** into the female closure plug with a mallet.



1) Use a blowtorch to warm the surfaces to be covered (hole Ø + 50 mm on side) up to at least 65 °C. Check the temperature with a thermometer.
2) Heat slightly (2 to 3 seconds) the closure patch (FOPS) on the side opposite the coloured dots and then glue it onto the plug.



Finalise the bonding by warming until the coloured dots of the FOPS disappear
While the closure patch (FOPS) is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.

The system is correctly installed when:

- The entire closure patch (FOPS) is in contact with the surfaces to be protected.

- The adhesive is visible all around the closure patch.

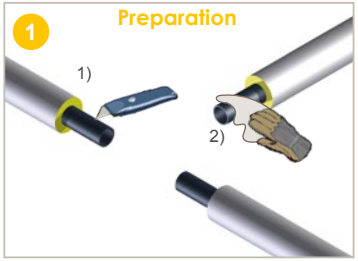
Composition of the i7 kit:

- 1 T-shaped, drilled HDPE muff
- 2 heat-shrinkable sleeves

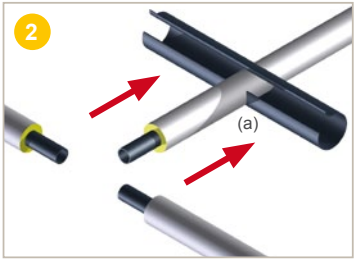
- 1 box of Polyol
- 1 box of Isocyanate
- 1 mixing spatula

- 1 vent plug
- 1 female closure plug
- 1 male closure plug
- 1 closure patch (FOPS)

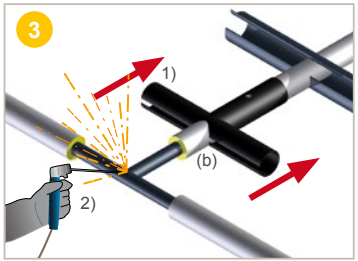
i7 Straight T-branch insultation kit



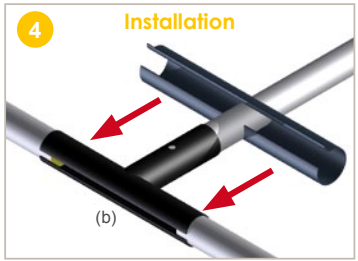
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the 3 ends).
2) **Clean** the 3 ends of the pipes or parts with a cloth to remove any water, mud or sand.



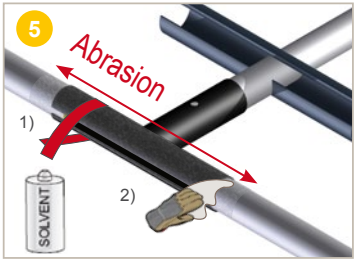
Slide the large heat-shrinkable sleeve (a) onto the branch pipe.



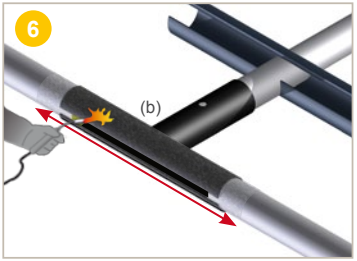
1) **Slide** the T-shaped HDPE muff (b) onto the branch pipe, pushing it along a sufficient distance.
2) **Align** the pipes and weld the 3 steel pipes together according to professional standards.



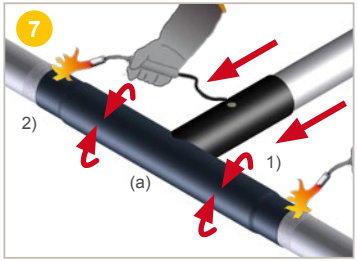
Slide the T-shaped HDPE muff (b) and fit it on the tapping.
⚠ Make sure that the steel weld has cooled down before sliding the muff.



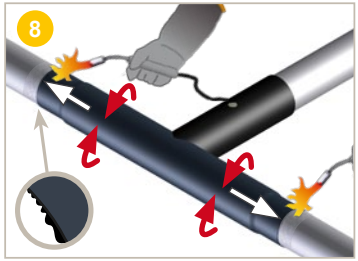
1) **Roughen** the surfaces (muff + casing 50 mm on each side) with abrasive paper (grain 40-60) or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).



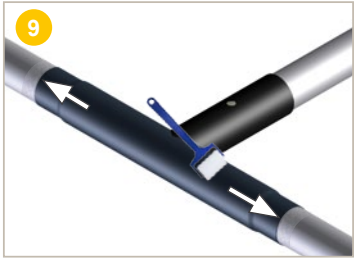
Use a blowtorch to **warm** the surfaces to be covered (muff + casing 50 mm on each side) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.



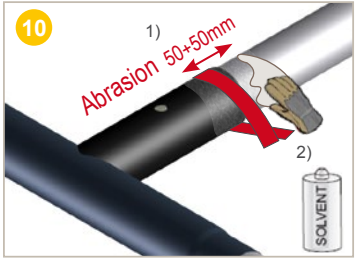
1) **Slide** the large heat-shrinkable sleeve (a) around the T-shaped HDPE muff (b).
Remember to remove the protective film.
2) **Shrink** the heat-shrinkable sleeve around its circumference using large movements, starting at the centre.



Continue **heating** starting from the centre and going towards the ends until shrinking is complete.
Finish with horizontal movements over the whole surface of the sleeve.
Shrinking is complete when the adhesive projects out of each end of the sleeve.

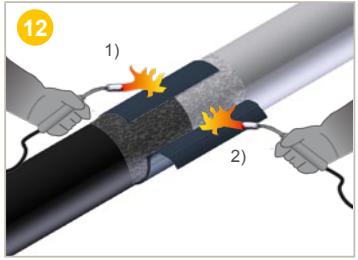


While the sleeve surface is still hot and malleable, use the application roller to smooth and evacuate the air bubbles.

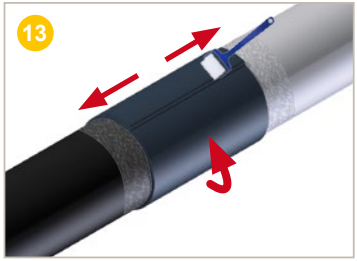


1) **Roughen** the surfaces (50 mm muff + 50 mm casing) with abrasive paper (grain 40-60) or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).

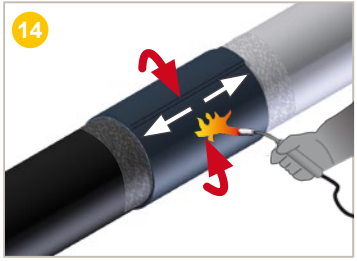
Fit the heat-shrinkable sleeve so that the overlap lies between the 10 o'clock and 2 o'clock positions.
⚠ Respect the implementation direction using the indicator. large diameter muff side, small diameter pipe side.
Remember to remove the protective film.



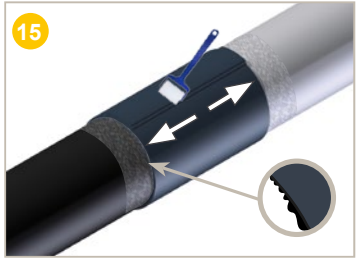
Leave 1 to 2 cm clearance to ensure correct shrinkage.
1) **Warm** the overlapping part of the heat-shrinkable sleeve slightly.
2) Then **warm** the adhesive of the other part of the sleeve called the "adhesive patch".



Press both ends of the heat-shrinkable sleeve firmly.
Remove the air bubbles with an application roller on the closure.



1) **Shrink** the sleeve around its circumference using large movements, starting at the centre.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm.
2) Continue **heating** starting from the centre and going towards the ends with horizontal movements.

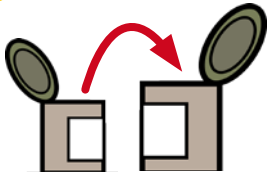


Use the application roller to smooth and evacuate the air bubbles. Use the same procedure on the closure.
Shrinking is complete when the adhesive projects each side of the sleeve and when the entire surface of the sleeve has no openings, holes or cracks.

⚠ It is recommended to perform an airtightness test at 0.2 bar using a hand pump and pressure gauge. If this is impossible, make a visual check. It is essential to allow the materials to cool down to ambient temperature before injecting polyurethane foam.

Straight T-branch insultation kit

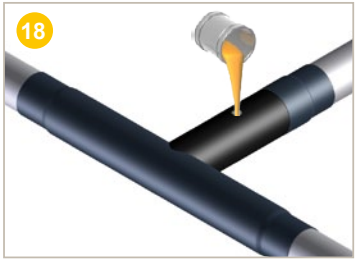
17 Injection



Take components **A** and **B** out of the kit boxes and check the diameters.

⚠ Check the kit use-by date. Pour component **A** into component **B**, **mix** together using the spatula supplied. The mixture is ready when it is homogeneous, with no signs of different colours.

18

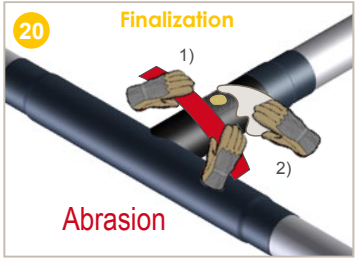


Pour the mixture into one of the 26 mm diameter HDPE end of line muff injection holes.
Make sure all of the mixture is removed, using the spatula supplied.

19

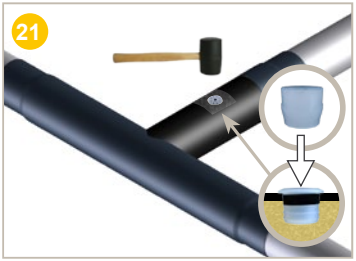
1) **Push** the vent plug fully into the injection hole.
2) As soon as the expanded mixture has hardened, remove the plug with the tab provided.
Clean off any excess PUR foam.

20 Finalization



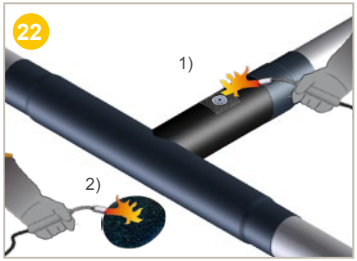
1) **Roughen** the surfaces to be covered (hole Ø + 50 mm on side) with abrasive paper or a wire brush.
2) **Clean** the roughened surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).

21



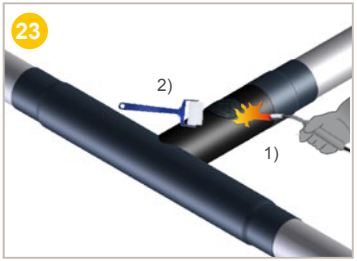
1) **Press** the female closure plug by hand fully into the HDPE muff injection hole.
2) Then knock the male closure **plug** into the female closure plug with a mallet.

22

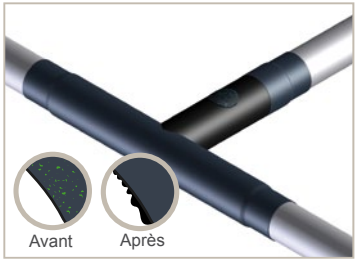


1) Use a blowtorch to warm the surfaces to be covered (hole Ø + 50 mm on side) up to at least 65 °C. Check the temperature with a thermometer.
2) Heat slightly (2 to 3 seconds) the closure patch (FOPS) on the side opposite the coloured dots and then glue it onto the plug.

23



Finalise the bonding by warming until the coloured dots of the FOPS disappear
While the closure patch (FOPS) is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.



The system is correctly installed when:

• The entire closure patch (FOPS) is in contact with the surfaces to be protected.

• The adhesive is visible all around the closure patch.

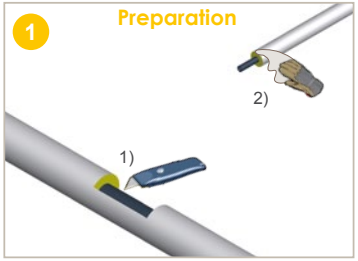
Composition of the i8 kit:

- 1 T-shaped, rigid HDPE muff
- 1 HDPE straight muff section
- 1 HDPE elbow muff section
- 1 drilled HDPE reduced muff
- 5 heat-shrinkable sleeves
- 1 centerring
- 1 steel pipe section
- 1 steel bend

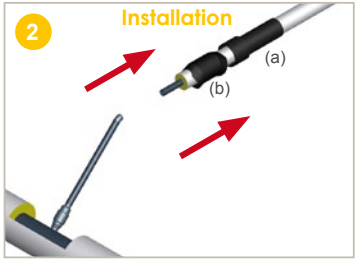
- 1 box of Polyol
- 1 box of Isocyanate
- 1 mixing spatula

- 1 vent plug
- 1 female closure plug
- 1 male closure plug
- 1 closure patch (FOPS)

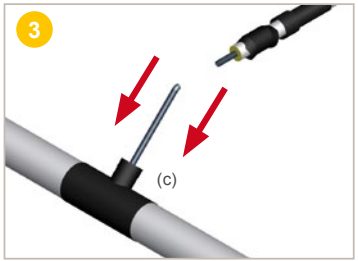
i8 Hot-tapping-valves insulation kit



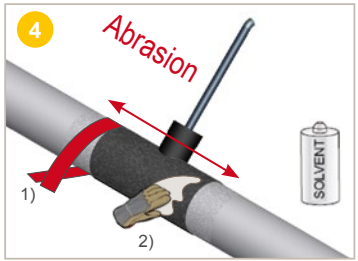
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes and stripped parts with a cloth to remove any water, mud or sand.



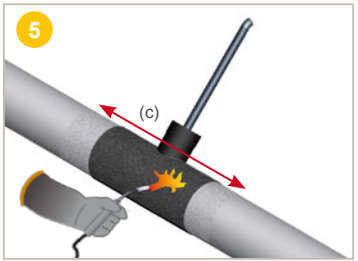
1) **Perform** the hot tapping operation. (See "Hot Tapping" procedure)
2) **Slide** the reduced drilled muff (a), then the elbow muff (b) onto the branch pipe.



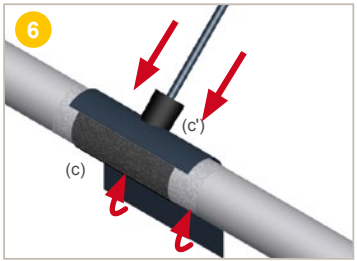
Fit the T-shaped rigid HDPE muff (c) onto the main pipe.
⚠ Make sure that the hot tapping has cooled down before sliding the muff.



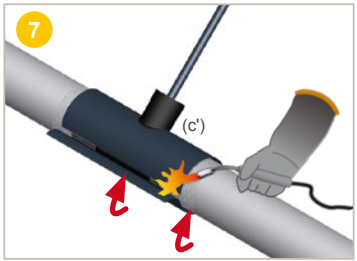
1) **Roughen** the surfaces (50 mm casing + muff width) with abrasive paper (grain 40-60) or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).



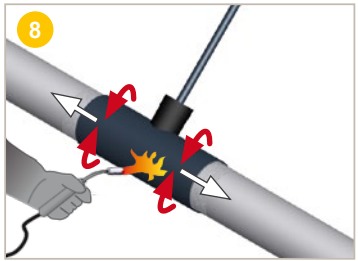
Use a blowtorch to **warm** the surfaces to be covered (50 mm casing + muff width) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.



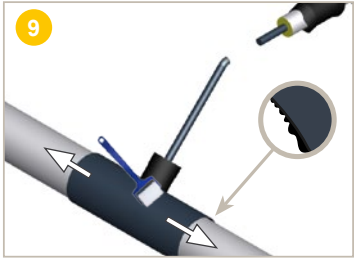
Fit the large heat-shrinkable sleeve (c') around the HDPE muff (c) so that the overlap lies between the 10 o'clock and 2 o'clock positions.
Remember to remove the protective film from the sleeve



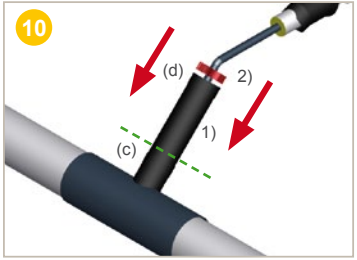
1) **Warm** the support of the overlapping part slightly.
2) Then **warm** the adhesive of the other part of the sleeve called the "adhesive patch".



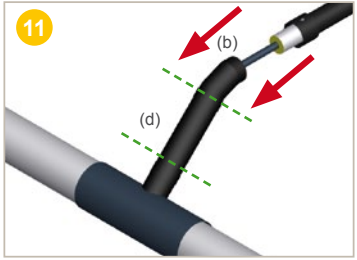
Continue **heating** starting from the centre and going towards the ends until shrinking is complete.
Finish with horizontal movements over the whole surface of the sleeve.



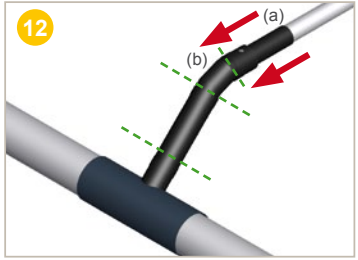
While the sleeve surface is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.
Shrinking is complete when the adhesive projects out of each end of the sleeve.



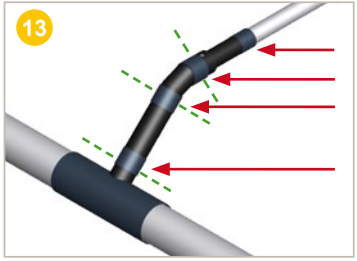
1) **Fit** the straight muff section (d) onto the T-shaped HDPE muff (c).
2) **Weld** the branch pipe onto the main pipe.
⚠ Remember to position a centerring on the main pipe to centre the casing.



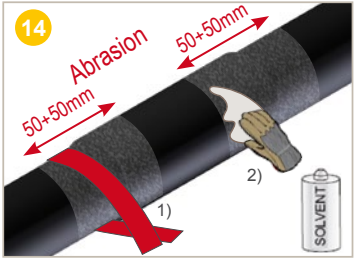
Slide the rigid elbow muff (b) and fit it on the rigid straight muff section (d).



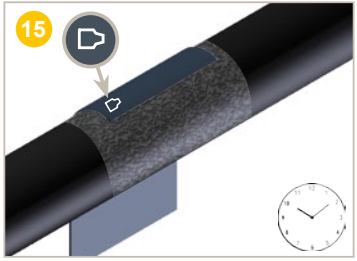
Slide the reduced drilled muff (a) and fit it on the rigid elbow muff (b).



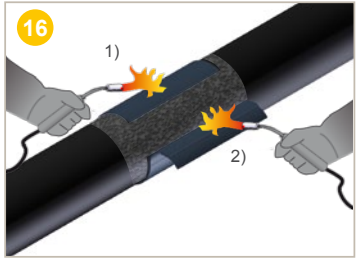
Fit the 4 small heat-shrinkable sleeves on the sockets and the end of the reduced drilled muff.
Use the following procedure for the 4 sleeves (see images 14 to 20).



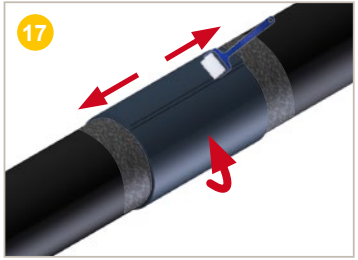
1) **Roughen** the surfaces (50 mm on each side) with abrasive paper (grain 40-60) or a wire brush.
2) **Clean** the roughened surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).



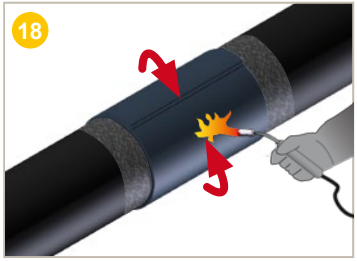
Fit the small heat-shrinkable sleeve so that the overlap lies between the 10 o'clock and 2 o'clock positions.
Remember to remove its protective film.
⚠ **Respect the implementation direction using the indicator:** large diameter muff side, small diameter pipe side.



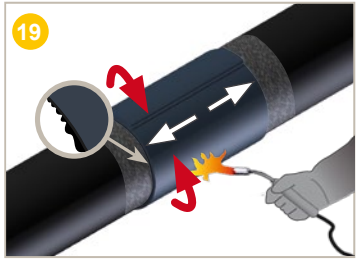
Leave 1 to 2 cm clearance to ensure correct shrinkage.
1) **Warm** the overlapping part of the heat-shrinkable sleeve slightly.
2) Then **warm** the adhesive of the other part of the sleeve called the "adhesive patch".



Press both ends of the heat-shrinkable sleeve firmly.
Remove the air bubbles with an application roller on the closure.

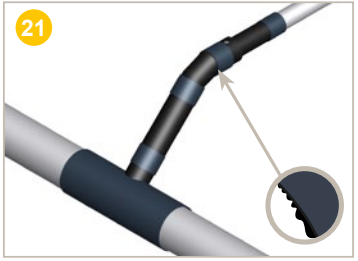


Shrink the heat-shrinkable sleeve around its circumference using large movements, starting at the centre.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.



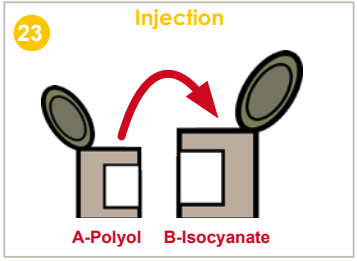
Continue **heating** starting from the centre and going towards the ends until shrinking is complete. Finish with horizontal movements over the whole surface of the sleeve.
Shrinking is complete when the adhesive projects out of each end of the sleeve.

While the sleeve surface is still hot and malleable, use the application roller to smooth and evacuate the air bubbles.
Use the same procedure on the closure.

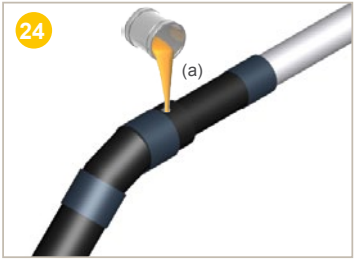


The system is correctly installed when:
• The sleeves are in contact with the surfaces to be protected and have no openings.
• The adhesive is visible on both ends of the sleeves.
• No holes or cracks are visible.

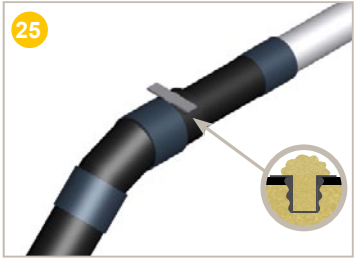
Recommendations : It is recommended to perform an airtightness test at 0.2 bar using a hand pump and pressure gauge.
If this is impossible, make a visual check. It is essential to allow the materials to cool down to ambient temperature before injecting polyurethane foam.



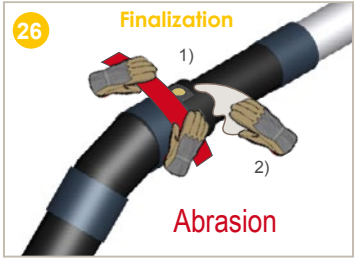
Take components **A** and **B** out of the kit boxes and check the diameters.
⚠ Check the kit use-by date. Pour component **A** into component **B**, **mix** together using the spatula supplied. The mixture is ready when it is homogeneous, with no signs of different colours.



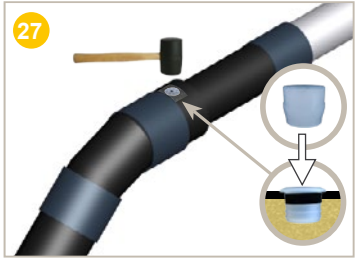
Pour the mixture into the 26 mm diameter HDPE reduced muff injection hole (a).
Make sure all of the mixture is removed, using the spatula supplied.



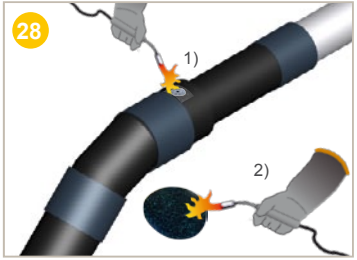
1) **Push** the vent plug fully into the injection hole.
2) As soon as the expanded mixture has hardened, remove the plug using the tabs provided.
Clean off any excess PUR foam.



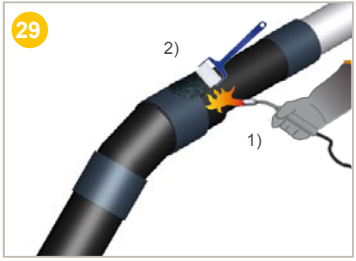
1) **Roughen** the surfaces to be covered (hole Ø + 50 mm on each side) with abrasive paper or a wire brush.
2) **Clean** the roughened surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).



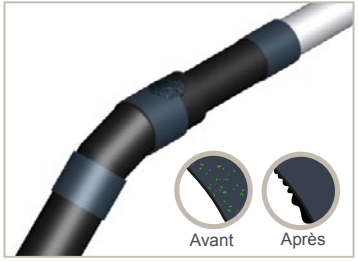
1) **Press** the female closure plugs fully into the HDPE muff injection holes.
2) Then **knock** the male closure plugs into the female closure plugs with a mallet.



1) Use a blowtorch to **warm** the surfaces to be covered (hole Ø + 50 mm on each side) up to at least 65 °C. Check the temperature with a thermometer.
2) **Heat** slightly (2 to 3 seconds) the 1st closure patch (FOPS) on the side opposite the coloured dots and then glue it onto the plug.



1) Finalise the bonding by **warming** until the coloured dots of the FOPS disappear
2) While the closure patch (FOPS) is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.



The system is correctly installed when:

- The closure patches (FOPS) are in contact with the surfaces to be protected.
- The adhesive is visible all around the closure patche.

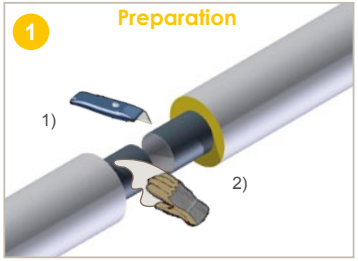
i10 injected electrowelding-junction kit

Composition of the i10 kit:

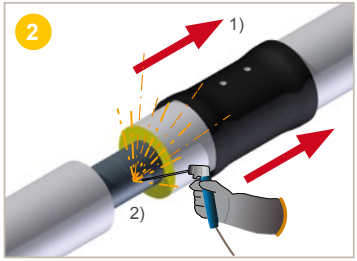
- 1 drilled heat-shrinkable muff
- fusion grids

- 1 box of Polyol
- 1 box of Isocyanate
- 1 mixing spatula

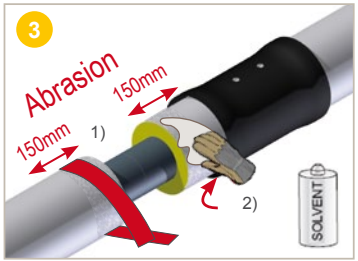
- 2 vent plugs
- 2 female closure plugs
- 2 male closure plugs
- 2 closure patches (FOPS)



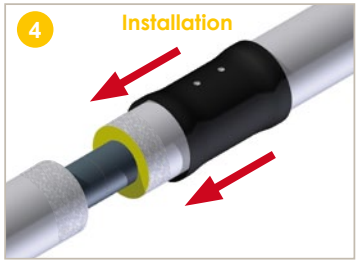
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



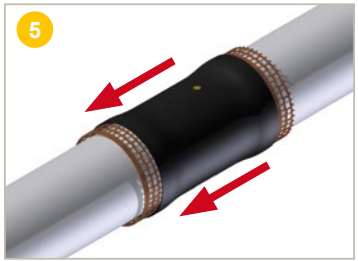
1) **Slide** the heat-shrinkable muff onto one of the pipes, pushing it along a sufficient distance.
2) **Align** the pipes and weld the two steel pipes together according to professional standards.



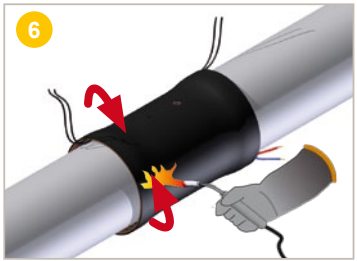
1) **Roughen** the surface of the casing (150 mm on each side) and the inside of the muff with abrasive paper or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).



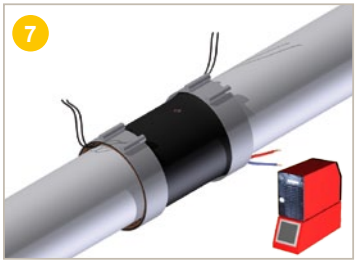
Slide the heat-shrinkable muff at the stripped area so that it covers the pipe casing by 5 to 10 cm on each end.
⚠ Remember to remove the protective film from the muff.



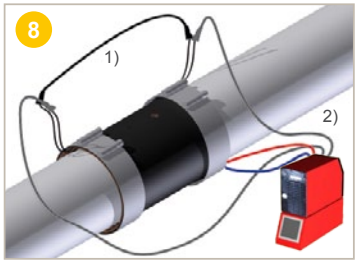
Install the fusion grids and staple them into position.



Shrink the two ends of the heat-shrinkable muff with a blowtorch. Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm.
If 2 blowtorches are used, use them on opposite sides of the pipe.



⚠ Allow the muff to cool before electrowelding.
After shrinking and cooling to ambient temperature, **fit** the tightening straps on the heat-shrinkable muff.

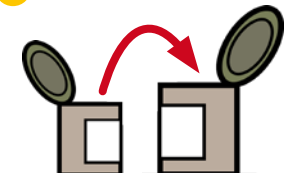


1) **Connect** the branch wire to one of the welding wires at each end.
2) **Connect** the sensor and the two remaining welding wires to the welding machine.
⚠ Fasten the wires with adhesive tape to stop them coming off.
3) **Perform** the electrowelding of the muff.

9

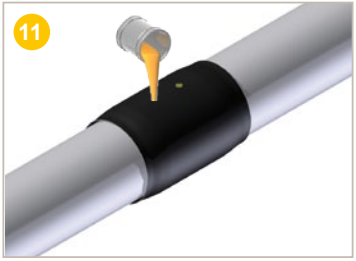
After shrinking and return to ambient temperature, check that the muff and the casing are firmly bonded together.
⚠ It is recommended to perform an airtightness test at 0.2 bar using a hand pump and pressure gauge.

10 Injection



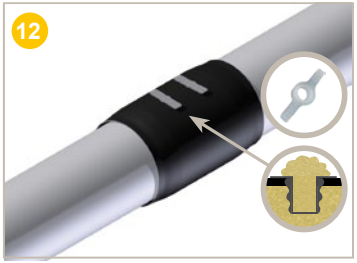
Take components **A** and **B** out of the kit boxes and check the diameters.
⚠ Check the kit use-by date. Pour component **A** into component **B**, **mix** together using the spatula supplied. The mixture is ready when it is homogeneous, with no signs of different colours.

11



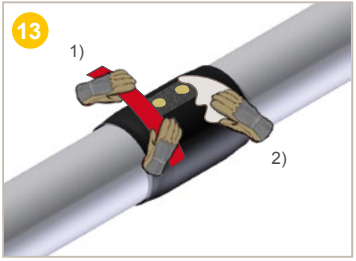
Pour the mixture into one of the 26 mm diameter HDPE muff injection holes.
Make sure to pour in all of the mixture, using the spatula supplied.

12



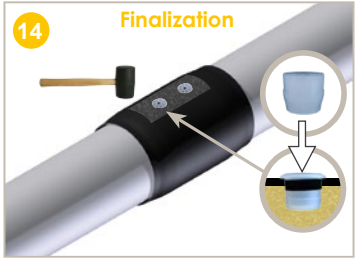
1) **Push** the 2 vent plugs fully into the 2 injection holes.
2) As soon as the expanded mixture has hardened, **remove** the plugs using the 2 tabs provided. **Clean off** any excess PUR foam.

13



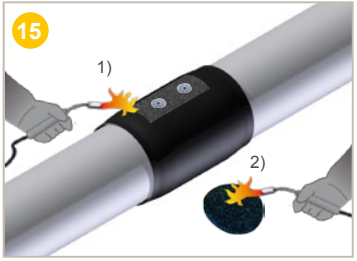
1) **Roughen** the surfaces to be covered (hole Ø + 50 mm on each side) with abrasive paper or a wire brush.
2) **Clean** the roughened surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).

14 Finalization



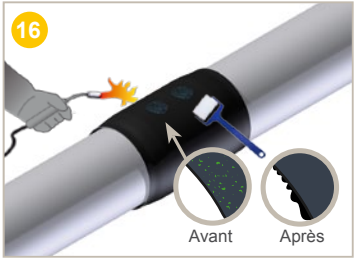
1) **Press the female** closure plugs by hand fully into the HDPE muff injection holes.
2) Then **knock the male** closure plugs into the female closure plugs with a mallet.

15



1) Use a blowtorch to **warm** the surfaces to be covered (hole Ø + 50 mm on each side) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.
2) **Heat** slightly (2 to 3 seconds) the 1st closure patch (FOPS) on the side opposite the coloured dots and then glue it onto the plug.

16



1) Finalise the bonding by **warming** until the coloured dots of the FOPS disappear.
2) While the closure patch (FOPS) is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.
Repeat the operation with the 2nd closure patch.

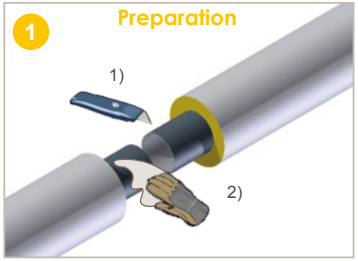
Composition of the i20 kit:

→ 1 HDPE muff to slit
→ fusion grids

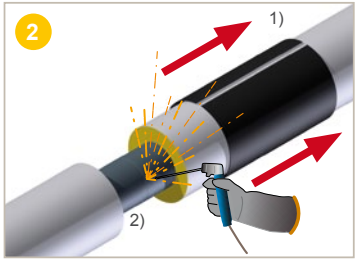
→ 1 box of Polyol
→ 1 box of Isocyanate
→ 1 mixing spatula

→ 2 vent plugs
→ 2 weld-on plugs

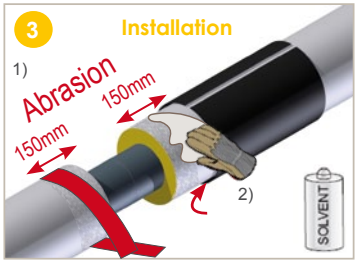
i20 Injected electrowelding-junction kit



1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.

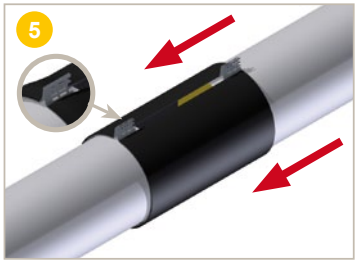


1) **Slide** the previously slit HDPE muff onto one of the pipes, pushing it along a sufficient distance.
2) **Align** the pipes and **weld** the two steel pipes together according to professional standards.

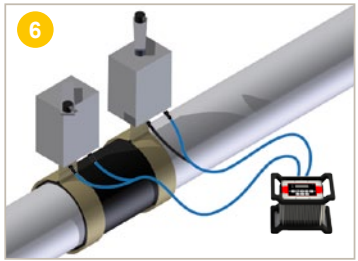


1) **Roughen** the surface of the casing (150 mm on each side) and the inside of the muff with abrasive paper or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).

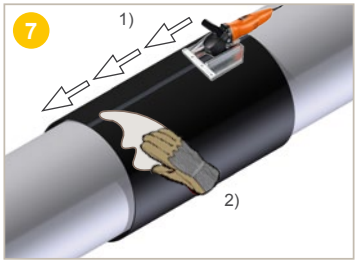
Position the fusion grids using the marking made previously and staple them into position.



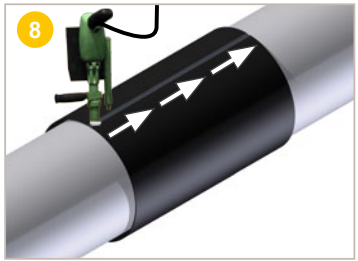
Slide the muff at the stripped area so that it covers the pipe casing by 5 to 10 cm on each end.
⚠ **Make sure to go past** the ends of the fusion grids of the muff slit.



Fit the Kevlar tightening system and mount the welding tools on the muff.
Weld the muff on the casing by electrowelding in compliance with the generator procedure.



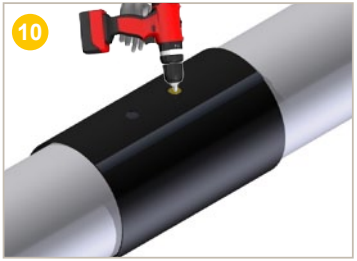
1) **Chamfer** the longitudinal cut in the muff to prepare for the PE extrusion operation.
2) Thoroughly clean the muff surface using a dry cloth to eliminate the PE residues produced during chamfering.



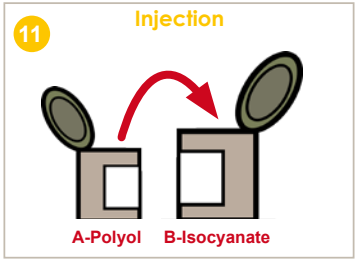
Weld the longitudinal cut of the muff using a PE extrusion gun.

Drill a 1st hole in the muff with an electric drill, taking care not to drill the weld of the longitudinal cut.

⚠ Perform an airtightness test at 0.2 bar with a hand pump and pressure gauge to check that the junction is perfectly airtight.



After conducting the airtightness test and demonstrating that the junction is airtight , **drill** the 2nd hole in the muff.



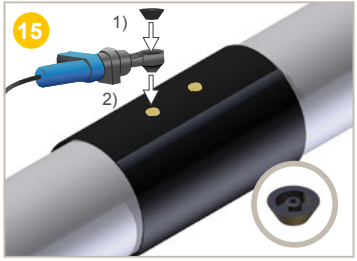
Take components **A** and **B** out of the kit boxes and check the diameters.

⚠ Check the kit use-by date. Pour component **A** into component **B**, **mix** together using the spatula supplied. The mixture is ready when it is homogeneous, with no signs of different colours.

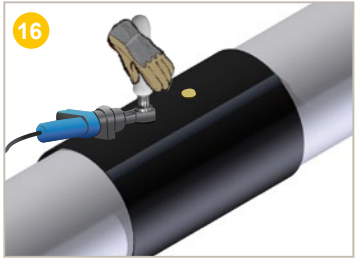
Pour the mixture into one of the 26 mm diameter HDPE muff injection holes.
Make sure all of the mixture is removed, using the spatula supplied.

1) **Push** the 2 vent plugs fully into the 2 injection holes.
2) As soon as the expanded mixture has hardened, remove the plugs using the 2 tabs provided.
Clean off any excess PUR foam.

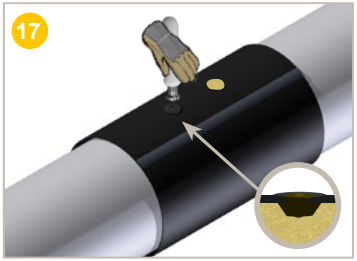
Clean the surface to remove any polyethylene or sand particles with a dry cloth (or blow off with the flame).



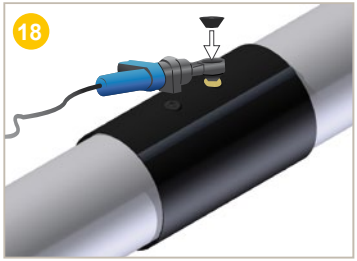
1) Use a suitable tool to place the 1st weld-on closure plug in the base of the welding machine to heat it up.
2) At the same time, push the end of the welding machine into the injection hole to heat up the edges.



Use a punch to remove the weld-on closure plug previously heated in the welding machine.



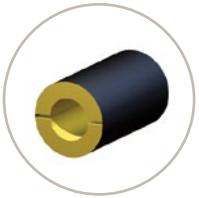
Position the weld-on closure plug in the injection hole and press gently for about 1 minute.
⚠ Do not remove the tool until the plug surface has become warm again.



Repeat operation 15 to 17 with the 2nd weld-on closure plug.

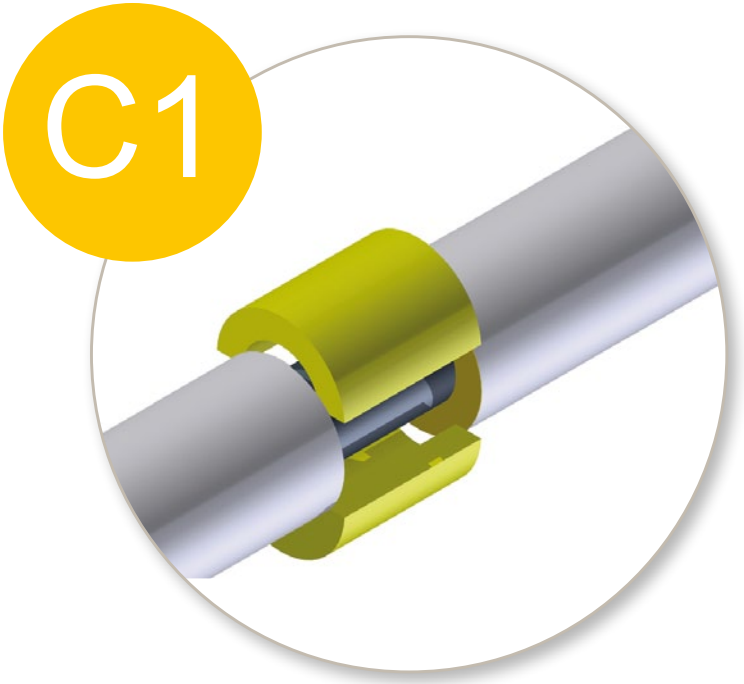
The system is correctly installed when 2 homogeneous weld beads are visible around the entire circumference of the weld-on plugs.

Composition of the C1 kit:

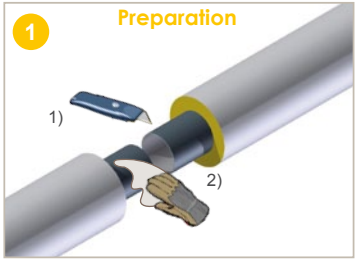


→ 2 PU half-shells
→ A protective film.

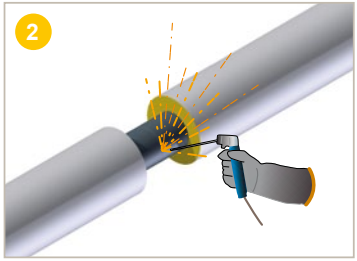
→ 1 heat-shrinkable sleeve



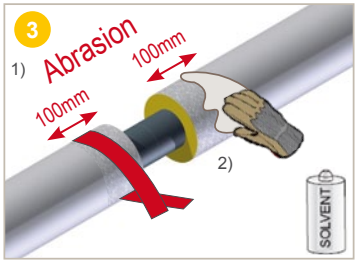
C1 Half-shell shrinkable sleeve kit



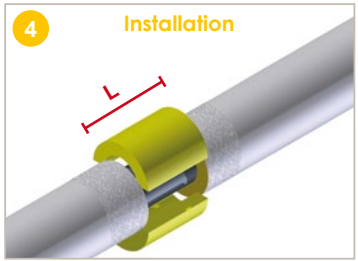
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



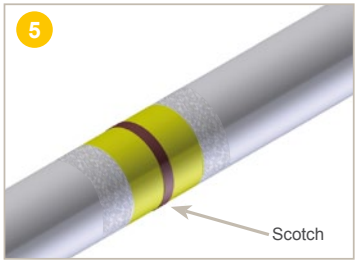
Align the pipes and weld the two steel pipes together according to professional standards.



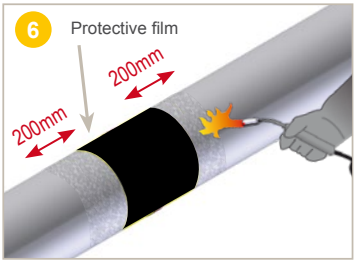
1) **Roughen** the surface (100 mm on each side) with abrasive paper or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).



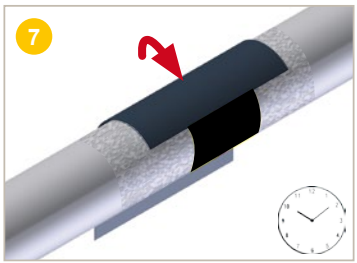
Measure the bare surface to be insulated then cut the half-shells to the required length (L).
Position the 2 half-shells, checking that they fill the space to be insulated perfectly.



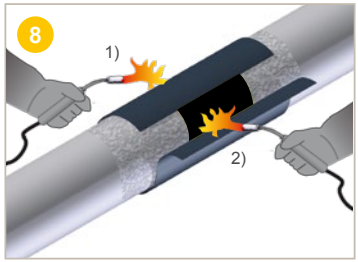
Hold the half-shells in position using sellotape.



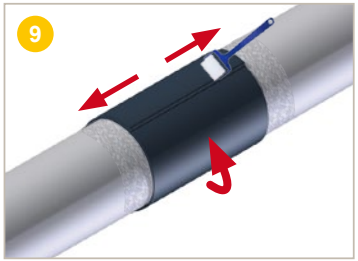
1) **Wrap** with the protective film supplied to avoid damaging the half-shells.
2) Use a blowtorch to **warm** the surfaces to be covered (200 mm on each side) up to at least **65 °C.**
Check the temperature on all surfaces with a thermometer.



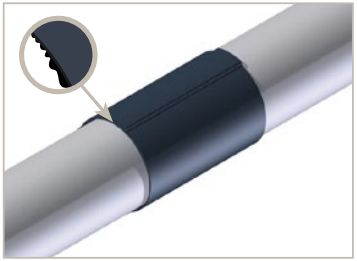
Fit the heat-shrinkable sleeve so that the overlap lies between the 10 o'clock and 2 o'clock positions.
⚠ Remember to remove the protective film from the sleeve.



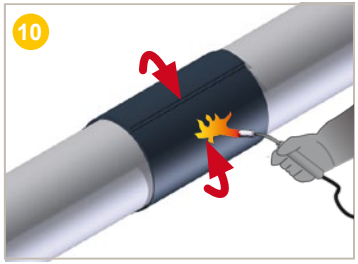
Leave 1 to 2 cm clearance to ensure correct shrinkage.
1) **Warm** the overlapping part of the heat-shrinkable sleeve slightly.
2) Then **warm** the adhesive of the other part of the sleeve called the "**adhesive patch**".



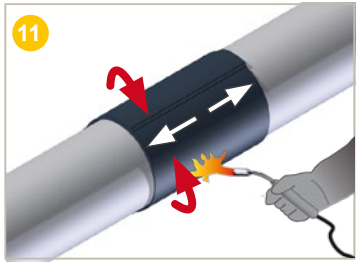
Press both ends of the heat-shrinkable sleeve firmly.
Remove the air bubbles with an application roller on the closure.



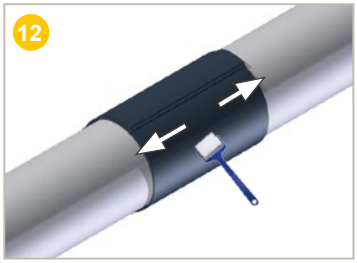
The system is correctly installed when:
• The whole sleeve is in contact with the surfaces to be protected and has no openings.
• The adhesive is visible on its ends
• No holes or cracks are visible.



Shrink the heat-shrinkable sleeve around its circumference using large movements, starting at the centre.
Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.



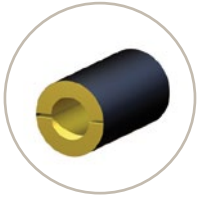
Continue **heating** starting from the centre and going towards the ends until shrinking is complete.
Finish with horizontal movements over the whole surface of the sleeve.
Shrinking is complete when the adhesive projects out of each end of the sleeve.



While the sleeve surface is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.
Use the same procedure on the closure.

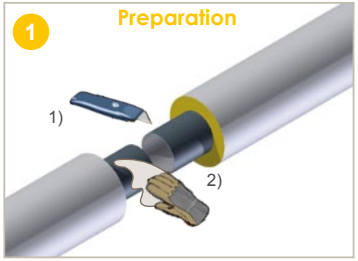
C2 Half-shell shrinkable junction kit

Composition of the C2 kit:

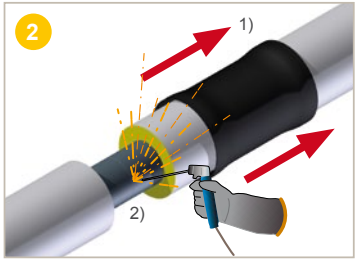


→ 2 PU half-shells
→ A protective film.

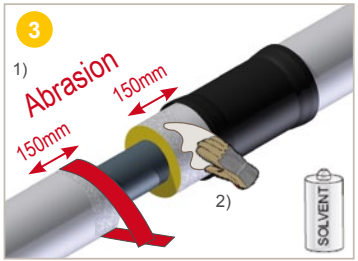
→ 1 non-drilled heat-shrinkable muff



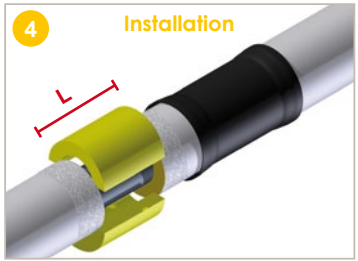
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



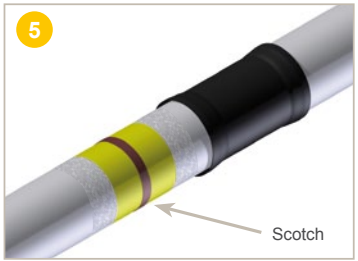
1) **Slide** along the non-drilled heat-shrinkable muff.
2) **Align** the pipes and weld the two steel pipes together according to professional standards.



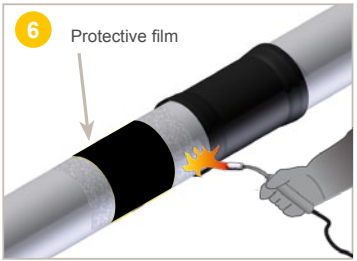
1) **Roughen** the surface (150 mm on each side) with abrasive paper or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).



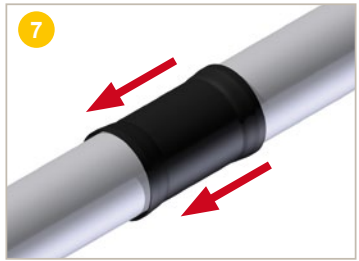
Measure the bare surface to be insulated then cut the half-shells to the required length (L).
Position the 2 half-shells, checking that they fill the space to be insulated perfectly.



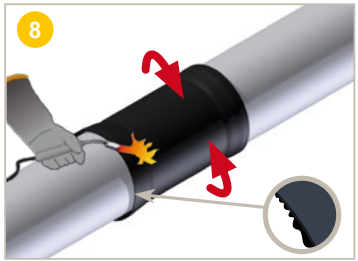
Hold the half-shells in position using sellotape.
⚠ Do not remove the protective film from the heat-shrinkable muff before preheating. It prevents accidental shrinkage of the muff.



1) **Wrap** with the protective film supplied to avoid damaging the half-shells.
2) Use a blowtorch to **warm** the surfaces to be covered (200 mm on each side of the HDPE end) up to at least 65 °C. Check the temperature on all surfaces with a thermometer.



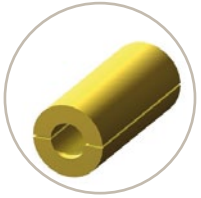
Slide the non-drilled muff onto the part to be insulated so as to cover the HDPE sleeve by 5 to 10 mm on each end.
⚠ From HDPE diameters >500, the sealant strips are supplied separately.
Position the sealant strips on the HDPE using the mark made previously.



⚠ Remember to remove the protective film from the heat-shrinkable muff.
Shrink the entire surface of the heat-shrinkable muff using a blowtorch.
Shrinking is complete when the adhesive projects each side of the sleeve and when the entire surface of the sleeve has no openings, holes or cracks.

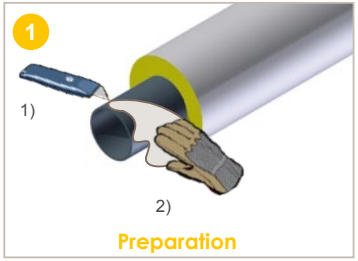
C5 Half-shell end of line kit

Composition of the C5 kit :

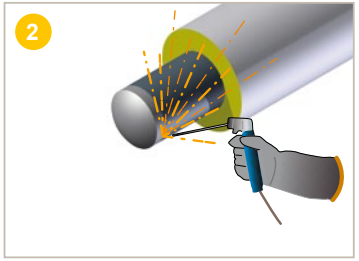


→ 2 PU half-shells
→ 1 steel cap

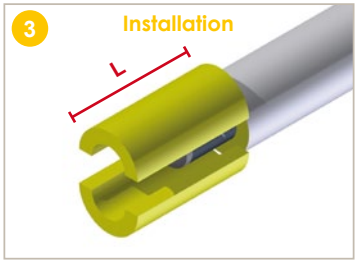
→ 1 non-drilled HDPE muff
→ 1 heat-shrinkable sleeve



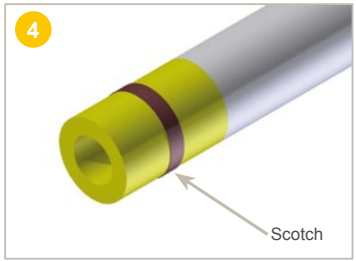
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the ends).
2) **Clean** the ends of the pipes or parts with a cloth to remove any water, mud or sand.



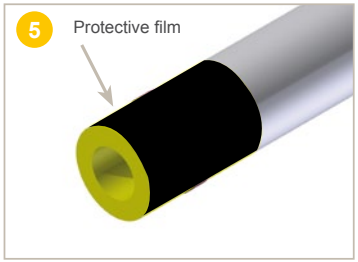
Weld the steel cap to the pipe.
Now **perform** a hydraulic pressure test on the network before insulating the end of the network.



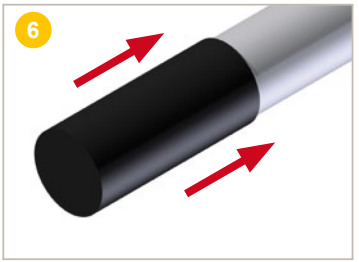
Measure the bare surface to be insulated then cut the half-shells to the required length (L).
Position the 2 half-shells, checking that they fill the space to be insulated perfectly.



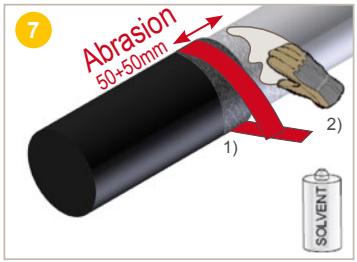
Hold the half-shells in position using sellotape.



Wrap with the protective film supplied to avoid damaging the half-shells.



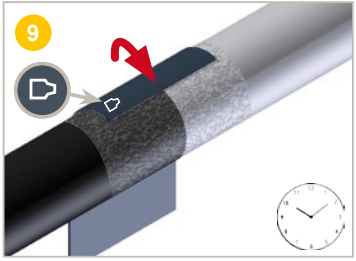
⚠ It is recommended that the ends of line are insulated in dry weather.
Slide the non-drilled end of line muff at the stripped area so that it covers the pipe casing by **20 cm**.



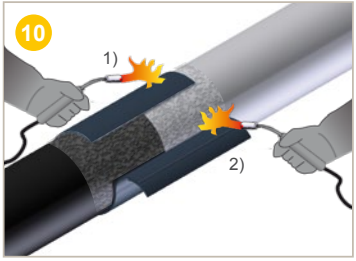
1) **Roughen** the surfaces (50 mm muff + casing 50 mm) with abrasive paper (grain 40-60) or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).

Use a blowtorch to warm the surfaces to be covered up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.

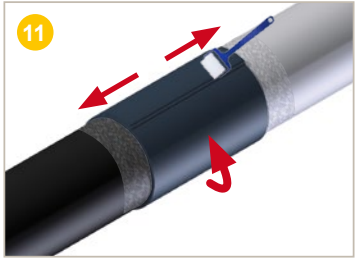
Half-shell end of line kit



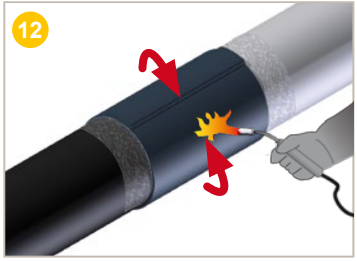
Fit the heat-shrinkable sleeve so that the overlap lies between the 10 o'clock and 2 o'clock positions.
Remember to remove its protective film.
⚠ **Respect the implementation direction using the indicator: large diameter muff side, small diameter pipe side.**



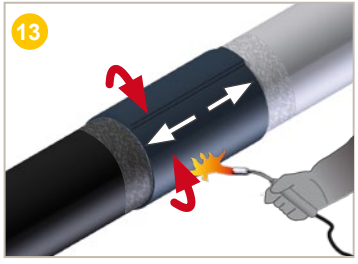
Leave 1 to 2 cm clearance to ensure correct shrinkage.
1) **Warm** the overlapping part of the heat-shrinkable sleeve slightly.
2) Then warm the adhesive of the other part of the sleeve called the "**adhesive patch**".



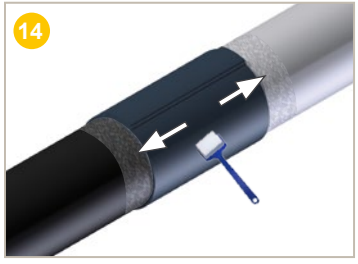
Press both ends of the heat-shrinkable sleeve firmly.
Remove the air bubbles with an application roller on the closure.



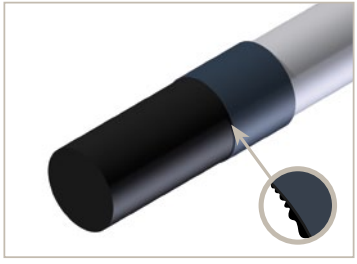
Shrink the heat-shrinkable sleeve around its circumference using large movements, starting at the centre. Depending on the diameter, use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm.
If 2 blowtorches are used, use them on opposite sides of the pipe.



Continue heating starting from the centre and going towards the ends until shrinking is complete.
Finish with horizontal movements over the whole surface of the sleeve.

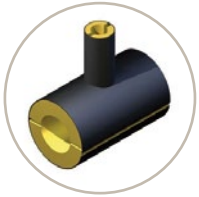


While the sleeve surface is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.
Use the same procedure on the closure.

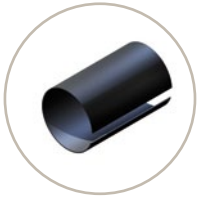


The system is correctly installed when:
• The whole sleeve is in contact with the surfaces to be protected and has no openings.
• The adhesive is visible on its ends
• No holes or cracks are visible.

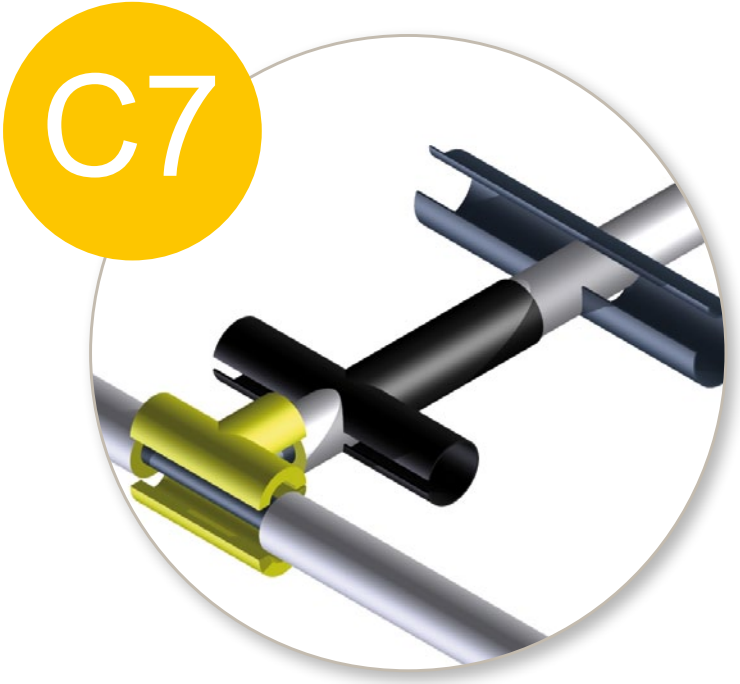
Composition of the C7 kit:



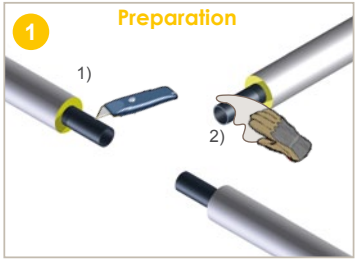
→ 1 T-shaped HDPE rigid muff
→ 4 PU half-shells



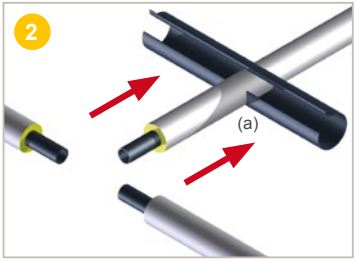
→ 2 heat-shrinkable sleeves



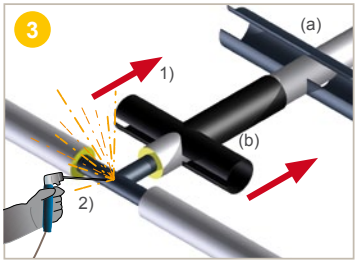
C7 Half-shell kit for straight T-branches



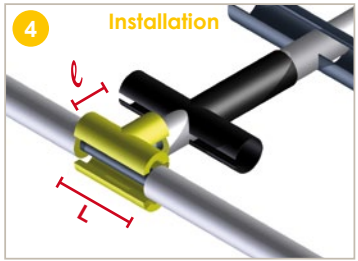
1) **Scrape** the PUR foam off the front (all signs of damp PUR foam must be removed from the 3 ends).
2) **Clean** the 3 ends of the pipes or parts with a cloth to remove any water, mud or sand.



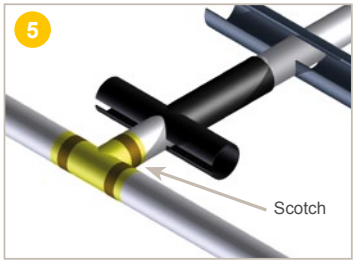
Slide the large heat-shrinkable sleeve (a) onto the branch pipe.



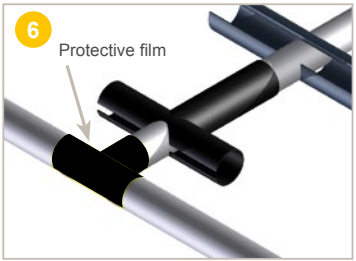
1) **Slide** the T-shaped non-drilled HDPE muff (b) onto the branch pipe.
2) **Align** the pipes and weld the 3 steel pipes together according to professional standards.



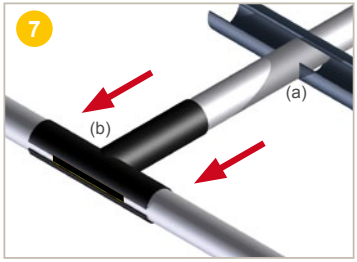
Measure the bare surface to be insulated then cut the half-shells to the required length (L and l).
Position the 2 half-shells, checking that they fill the space to be insulated perfectly.



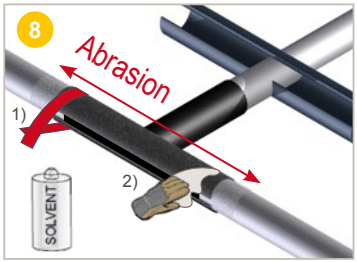
Hold the half-shells in position using sellotape.



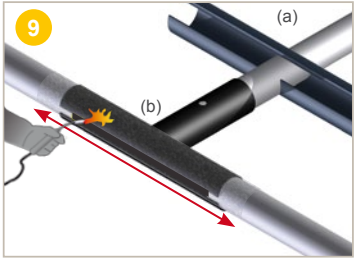
Wrap with the protective film supplied to avoid damaging the half-shells.



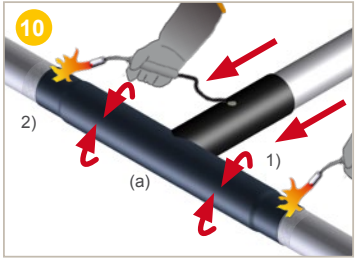
Slide the non-drilled HDPE muff (b) and fit it on the branch pipe.



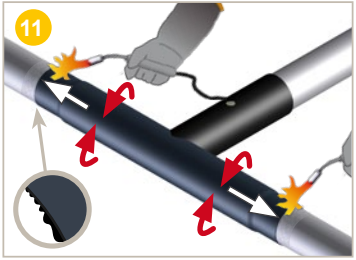
1) **Roughen** the surfaces (muff + casing 50 mm on each side) with abrasive paper (grain 40-60) or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).



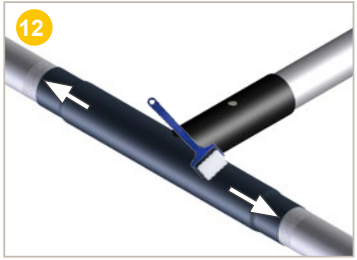
Use a blowtorch to **warm** the surfaces to be covered (50 mm casing + muff width) up to at least 65 °C.
Check the temperature on all surfaces with a thermometer.



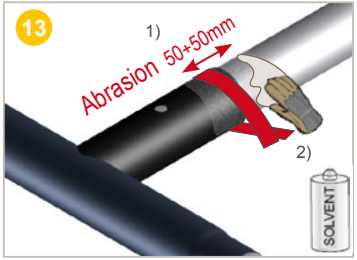
1) **Slide** the large heat-shrinkable sleeve (a) around the HDPE muff (b).
2) **Shrink** the heat-shrinkable sleeve around its circumference using large movements, starting at the centre.



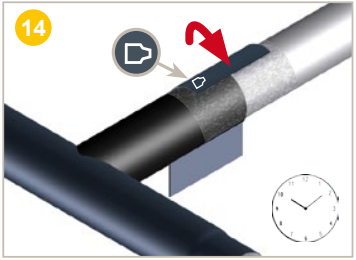
Continue heating starting from the centre and going towards the ends until shrinking is complete. Finish with horizontal movements over the whole surface of the sleeve.
Shrinking is complete when the adhesive projects out of each end of the sleeve.



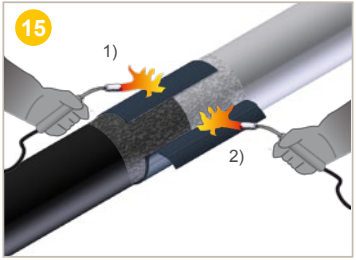
While the sleeve surface is still hot and malleable, use the application roller to **smooth** and **evacuate** the air bubbles.



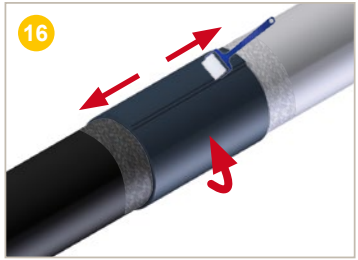
1) **Roughen** the surfaces (muff + casing 50 mm on each side) with abrasive paper (grain 40-60) or a wire brush.
2) **Clean** and **degrease** the roughened surfaces with a cloth dipped in ethanol (min. 94 %).



Fit the heat-shrinkable sleeve so that the overlap lies between the 10 o'clock and 2 o'clock positions.
Remember to remove its protective film.
⚠ **Respect the implementation direction using the indicator: large diameter muff side, small diameter pipe side.**

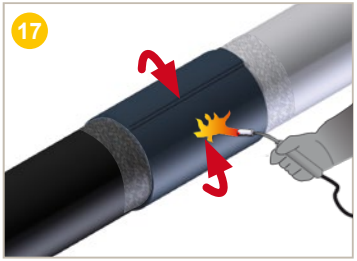


Leave 1 to 2 cm clearance to ensure correct shrinkage.
1) **Warm** the overlapping part of the heat-shrinkable sleeve slightly.
2) Then **warm** the adhesive of the other part of the sleeve called the "**adhesive patch**".

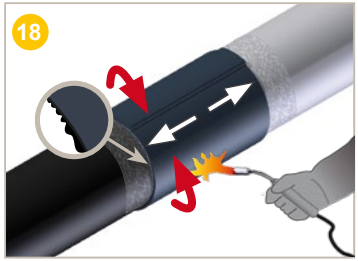


Press both ends of the heat-shrinkable sleeve firmly.
Remove the air bubbles with an application roller on the closure.

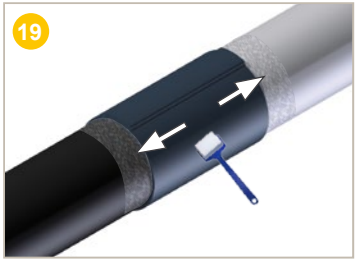
C7 Half-shell kit for straight T-branches



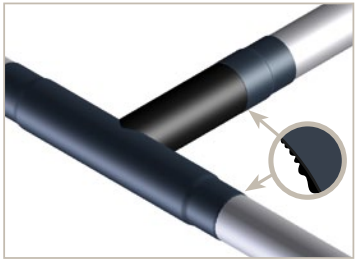
Shrink the heat-shrinkable sleeve around its circumference using large movements, starting at the centre. Use a single blowtorch for diameters <= 450 mm and 2 blowtorches for diameters > 450 mm. If 2 blowtorches are used, use them on opposite sides of the pipe.



Continue **heating** starting from the centre and going towards the ends until shrinking is complete. Finish with horizontal movements over the whole surface of the muff.
Shrinking is complete when the adhesive projects out of each end of the sleeve.

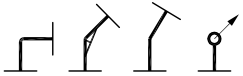


While the sleeve surface is still hot and malleable, use the application roller to smooth and evacuate the air bubbles.
Use the same procedure on the closure.



The system is correctly installed when:
• The sleeves are in contact with the surfaces to be protected and have no openings.
• The adhesive is visible on its ends
• No holes or cracks are visible.

Pipe length XX metres



Bend 90°, 45°, xx, extension

Straight and bent anchor (fixed point)

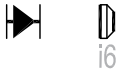
Jump T-branch and reinforced jump T-branch

Parallel T-branch and reinforced parallel T-branch

Straight T-branch and reinforced straight T-branch

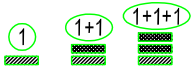
Pre-insulated valve
(without vent/ 1 vent/ 2 vents)

Pre-insulated valve with geared actuators
(without vent/ 1 vent/ 2 vents)



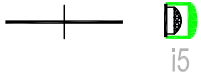
Reduction and reduced kit (i6)

Expansion compensator



Expansion Pads (1, 2, 3 thicknesses)

Wall crossing, DHEC, CCS-DHEC



Junction kit, end of line kit (i5)

Bend insulation kit (i4)

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