+GF+

HEAT-FIT
Planning Fundamentals

Plan, Build, Operate

Content

2062039
Planning Fundamentals HEAT-FIT (08/2024)

CH-8201 Schaffhausen/Switzerland

HEAT-FIT – Ultimate Fire Protection

The HEAT-FIT System is designed for applications in the maritime industry and makes the thermoplastic piping system ecoFIT resistant to temperatures up to 1.000°C or 1832°F for at least 30 minutes under pressure.

HEAT-FIT PE Fire Resistant test (IMO Res. A753 fire endurance L3 Code)

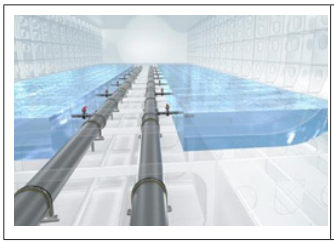
Features & Advantages

- Easy installation: No special skills required
- Up to 30% lighter than alternative materials (metal or Glass Reinforced Plastic)
- Fire Resistant code L3 according to IMO 753 – Meets the guidelines for applications of plastic pipes on ships
- Impact resistant, deformation can be absorbed
- Reliable, sustainable and long lasting solution
- 100% corrosion free

Most important market segments

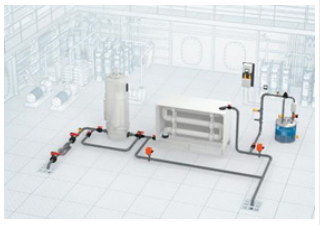
- Marine

Marine applications



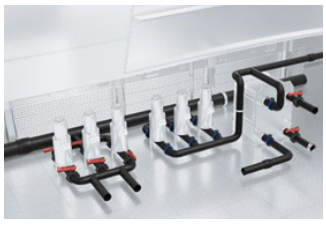
Ballast system
Ballast system ensures the stability of a vessels

- Media: Sea water
- Temperature: up to +35°C



Ballast water treatment Management
Regulates the discharge

- Media: Sea water
- Temperature: up to +35°C



Seawater and freshwater cooling
Provide cooling to engine or other equipment

- Media: Sea and fresh water
- Temperature: up to +60°C

Exhaust gas scrubber
Remove Sulphur oxides from ship's exhaust gas by scrubbing it with sea water or fresh water.

- Media: Sea water - low PH and very aggressive
- Temperature: up to +60°C

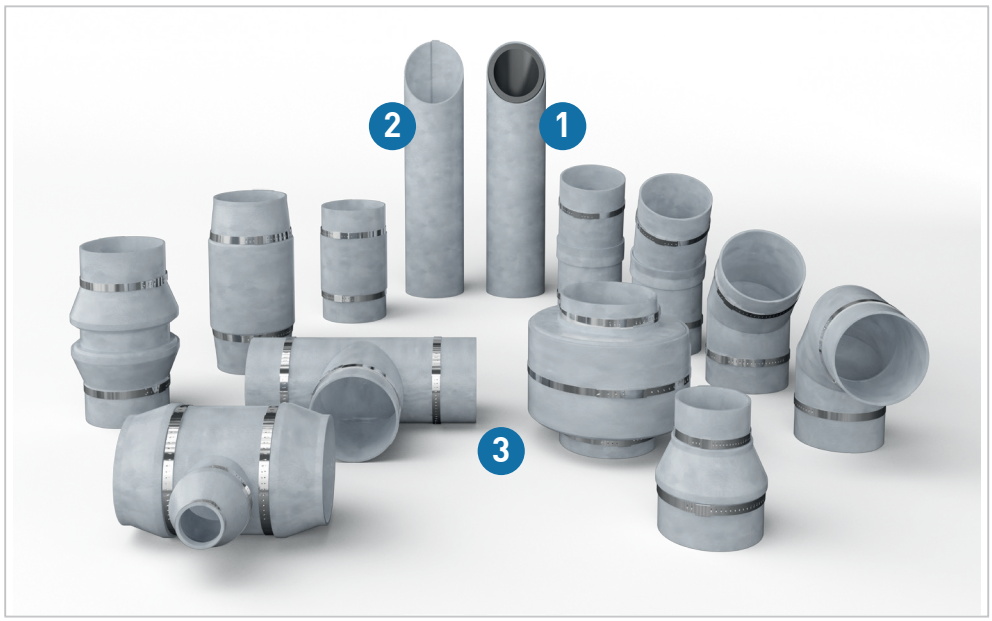
IMO 753 - Fire endurance requirements matrix

Piping Systems	Location					
	A	B	C	D	J	K
	Machinery spaces of category A	Other machinery spaces and pump rooms	Cargo pump rooms	RO/RO cargo holds	Accomenda-tion service and control spaces	Open decks
Sea water						
Sprinkler system						
Ballast sea water (include BWT lines)	L3	L3	L3	L3	L2	L2
Cooling water, essential services	L3	L3				L2
Tank cleaning services fixed machines			L3			
Fresh water						
Cooling water, essential services	L3	L3			L3	L3
Condensate return	L3	L3	L3			
Exhaust gas cleaning effluent line	L3	L3			L3	

L2 : Fire Resistant code L2 according to IMO 753
L3 : Fire Resistant code L3 according to IMO 753
Source: IMO Publications and Documents

HEAT-FIT Product Range

Georg Fischer provides a HEAT-FIT JACKET and a HEAT-FIT PE system.



1 HEAT-FIT PE
2 HEAT-FIT Jacket Sleeve
3 HEAT-FIT Jacket

Technical data

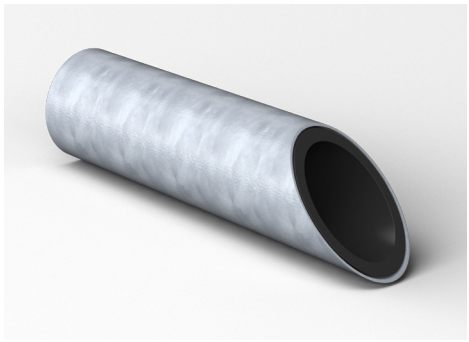
	HEAT-FIT PE		HEAT-FIT Jackets & Sleeves	
Dimensions	d110, d160, d225, d315		d110, d160, d225, d315	
SDR	11		Note: Combined with ecoFIT PE100 SDR 11 system	
PN (bar)	16		Note: Combined with ecoFIT PE100 PN 16 system	
Materials	Pipe	PE100	Base fabric	High Temp. Fiberglass
			Finished weight	3400 g/m2
			Thickness	3.5 mm
			Finishing	TPU film
	Coating	Fire Retardant (FR)	Coating	Fire Retardant (FR)
Fire resistant	At least 30 minutes up to 1.000°C / 1832° Fahrenheit		At least 30 minutes up to 1.000°C / 1832° Fahrenheit	
Density	~1.14 g/cm³ (Acc. EN ISO 1183-1)		~1.021 g/cm3 (Acc. EN ISO 1183-1)	
Impact resistance (90° RT & 0°C & RT)	No damage		No damage	
Vibration (5 Hz)	2'000'000 load cycles		2'000'000 load cycles	
Diesel Resistance (RT, 24h, immersion)	0.30%		15%	
Humidity (50 °C, 95 % r.h., 24h spray)	0.80%		20%	
NSS (35 °C, 24h immersion, 5 % NaCl, pH-value of 6.5-7.2)	0.40%		3.0%	
NaCl (23 °C, 24h immersion, 3.5 % NaCl, pH-value of 6.5-7.2)	0.20%		1.4%	
Color	Light grey		Light grey as RAL 7035	
Service life	tbd		tbd	

Approvals & Testing

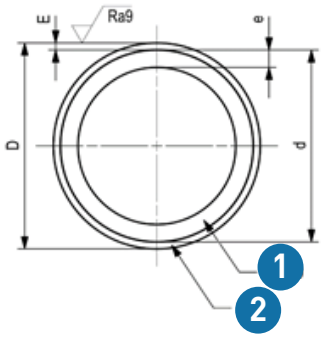
	Approval/Test	HEAT-FIT PE	HEAT-FIT Jackets & Sleeves
	ABS (20-1958414-1-PDA 20-4336831)	Expected Q4/2023	X
	LR (LR22277454TA)	Expected Q4/2023	X
	DNV (TAK00001B2)	Expected Q4/2023	X
	RINA (Q4/2022)	Expected Q4/2023	X
	BV (10132/F1)	Expected Q4/2023	X
	Fire Resistant plastic piping systems (IMO Res. A753 fire endurance L3 Code)	X	X
	Surface Flammability, Smoke and Toxicity (IMO A653 2010 FTP Code Part 5 and Part 2)	-	X
	ASTM D635-22 Standard test method for rate of burning and/ or extent and time of burning of plastics in a horizontal position	X	

HEAT-FIT PE

The HEAT-FIT PE piping system is a solution designed for the maritime industry. The co-extruded pipe basically consists of a media-carrying polyethylene pipe and a fire-retardant coating with a wall thickness e of 4mm.



HEAT-FIT PE



1 PE100 pipe
2 Flame-retardant coating

Technology

The halogen-free, high-performance intumescent coating, which is applied to the pipe by a co-extrusion process, withstands the most stringent requirements. The flame-retardant coating reacts with an intumescent reaction upon contact with flames. This intumescent reaction forms a protective layer that shields the underlying piping from flames and heat.

Product range

In the following table units of measurement are indicated according to the metric system.

Products	DN (mm)	110	125	140	160	180	200	225	280	315
PE100 pipe*	d (mm)	110			160			225		315
HEAT-FIT PE**	D (mm)	118			168			233		323

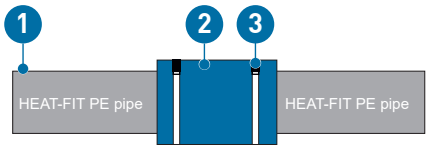
* d Outside diameter of the PE100 pipe

** D Outside diameter of the HEAT-FIT PE pipe

For further information see www.gfps.com/heat-fit

Connection technology

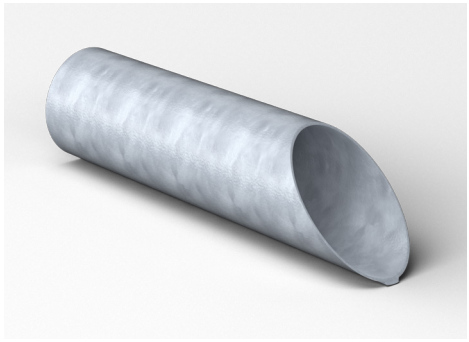
Pipe to pipe connections must be done via butt fusion. The weld bead must be covered after the succesfull pressure test with a HEAT-FIT Jacket Weld Bead Cover to ensure the flame retardant functionality.



1 HEAT-FIT PE pipe
2 HEAT-FIT Jacket Weld Bead Cover
3 Metal strap and closure coupler

HEAT-FIT Jacket Sleeves

HEAT-FIT Jacket is a flame-retardant system for ecoFIT PE100 pipes. All HEAT-FIT Jacket Sleeves are made of high temperature (HT) glass fiber fabric, intumescent coating, special adhesive and thermoplastic polyurethane (TPU).



HEAT-FIT Jacket Sleeves

ecoFIT PE100 pipes

Technology

The Halogen-free water-based high performing intumescent coating which is applied to a glass fiber fabric is more flexible, more elastic, smoother and capable of surpassing the most severe requirements. In order to protect the coating and the fiberglass fabric from external influences, they are laminated with a flame retardant thermoplastic Urethane. The coating reacts with an expanding reaction upon contact with flames. This intumescent reaction forms a protective layer that protects the underlying piping from flames and heat.

Product range

In the following table units of measurement are indicated according to the metric system.

Products	DN (mm)	110	125	140	160	180	200	225	280	315
ecoFIT PE100 pipe*	d (mm)	110			160			225		315
HEAT-FIT Jacket Sleeves**	D (mm)	122			172			237		327

* d Outside diameter of the ecoFIT PE100 pipe

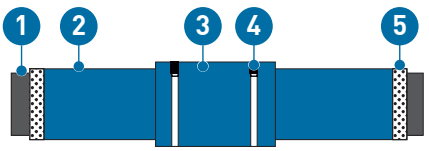
** D Outside diameter of the HEAT-FIT Jacket Sleeves

For further information see www.gfps.com/heat-fit

Connection technology

Pipe to pipe connections must be done via butt fusion or electrofusion.

To ensure the flame retardant functionality after the succesfull pressure test, the weld bead must be covered with a HEAT-FIT Jacket Weld Bead Cover, the electrofusion coupler must be covered with HEAT-FIT Jacket Electrofusion coupler.



1 ecoFIT PE100 pipe
2 HEAT-FIT Jacket Sleeve
3 HEAT-FIT Jacket Weld Bead Cover / HEAT-FIT Jacket Electrofusion coupler
4 Metal Strap
5 TPU sealing tape

HEAT-FIT Jacket

HEAT-FIT Jacket Fittings is a flame-retardant system for ecoFIT PE100 fittings. All HEAT-FIT Jacket Fittings are made of high temperature (HT) glass fiber fabric, intumescent coating, special adhesive and thermoplastic polyurethane (TPU).

HEAT-FIT
Tee 90° Equal

ecoFIT
Tee 90° Equal

HEAT-FIT Jackets
combined with ecoFIT PE100 Fitting

Technology

The Halogen-free water-based high performing intumescent coating which is applied to a glass fiber fabric is more flexible, more elastic, smoother, and capable of surpassing the most severe requirements. In order to protect the coating and the fiberglass fabric from external influences, they are laminated with a flame retardant thermoplastic Urethane. The coating reacts with an expanding reaction upon contact with flames. This intumescent reaction forms a protective layer that protects the underlying piping from flames and heat.

Product range

The following table uses metric units of measure.

Products d (mm)	110	125	140	160	180	200	225	280	315
Jacket – 90° Bend	■			■			■		■
Jacket – 45° Elbow	■			■			■		■
Jacket – 30° Elbow Long Spigot	■			■			■		■
Jacket – 15° Elbow Long Spigot	■			■			■		■
Jacket – Tee 90° Equal	■			■			■		■
Jacket – Tee 90° Reduced	■			■			■		■
Jacket – Reducer	■			■			■		■
Jacket – Flange Connection	■			■			■		■
Jacket – Fix Point	■			■			■		■
Jacket – Branch Saddle (to d63)	■			■			■		■
Jacket – Electrofusion coupler	■			■			■		■
Jacket – Weld Bead Cover	■			■			■		■
Insert for pipe clamps	■			■			■		■

For further information see www.gfps.com/heat-fit

HEAT-FIT
15° Elbow Jacket

HEAT-FIT
30° Elbow Jacket

HEAT-FIT
45° Elbow Jacket

HEAT-FIT
90° Bend Jacket

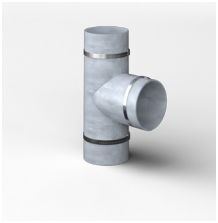
HEAT-FIT
Branch Saddle Jacket

HEAT-FIT
Electrofusion Coupler Jacket

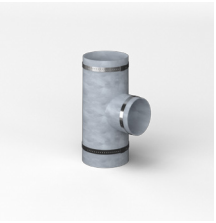
HEAT-FIT
Fix Point Jacket

HEAT-FIT
Flange Connection Jacket

HEAT-FIT
Reducer Jacket



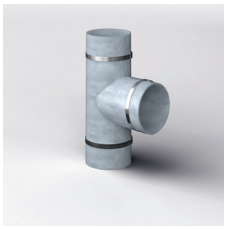
HEAT-FIT
Tee 90° Jacket



HEAT-FIT
Tee 90° Reduced Jacket

HEAT-FIT
Weld Bead Cover Jacket

HEAT-FIT Accessories

HEAT-FIT Jacket Tee 90°	HEAT-FIT Metal Strap	HEAT-FIT Metal Closure	ecoFIT Tee 90° PE100
			
756 200 114	756 170 302	756 170 303	753 208 614
1x	1x 165cm	3x	1x

Product range

The following table uses metric units of measure.

Products	d (mm)	110	125	140	160	180	200	225	280	315
Sealing Tape		■			■			■		■
Metal Strap		■			■			■		■
Metal Closure		■			■			■		■

Sealing Tape

The thermoplastic polyurethane (TPU) tape is delivered on a role with a total length of 25m and needed in case that the HEAT-FIT Jacket Sleeves must be shortened.

Metal Strap & Metal Closure

Stainless steel straps are delivered on a role with a total length of 30m. All metal straps must be closed via the metal closures to ensure the flame retardant functionality.

i For further information see www.gfps.com/heat-fit

Order information

All components must be ordered separately. The required information, such as the required length of metal straps, quantity of metal closures and corresponding ecoFIT inner pipe code numbers are listed in the HEAT-FIT datasheets.

Training

Planners and installer, involved with HEAT-FIT, ELGEF-Plus and ecoFIT planning and installation, must undergo training and certification from GF Piping Systems prior to performing any operations on site. For further information and training please contact GF support.

Installation HEAT-FIT

Installation HEAT-FIT PE

Connection technology HEAT-FIT PE

The system is installed analogously to the standard ecoFIT piping system by means of a conventional butt fusion. For more information, see chapter "Jointing technology – Welding".

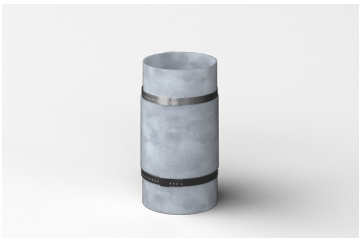
Welding parameters

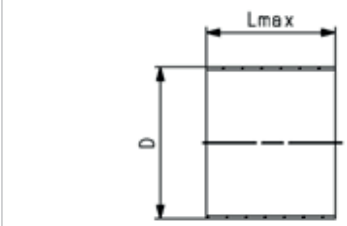
Standard welding parameters for ecoFIT PE100 / PN16 / SDR11 must be considered for all weldings.

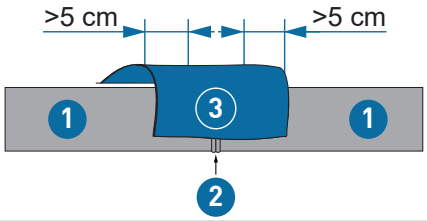
Pipe to pipe connections

Pipe-to-pipe butt-weld joints must be covered with a HEAT-FIT Jacket.

Dimension	Code
d110	756 170 334
d160	756 170 337
d225	756 170 330
d315	756 170 333

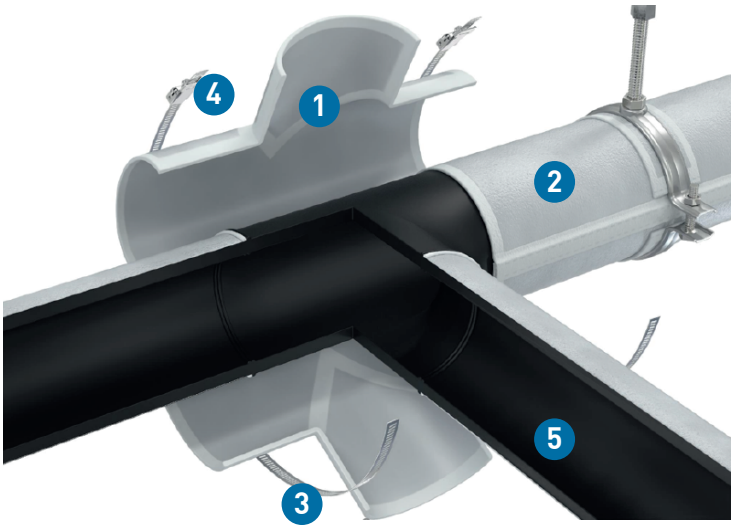






Pipe to fitting connections

Pipe to fitting connections must be covered with a HEAT-FIT Jacket. Care must be taken to ensure an overlap.



1 HEAT-FIT Jacket Tee 90° Art. Code 756 200 114
2 HEAT-FIT Jacket Art. Code 756 170 114
3 Metal Strap Art. Code 756 170 302
4 Metal Closure Art. Code 756 170 303
5 HEAT-FIT PE Pipe Art. Code 756 017 114

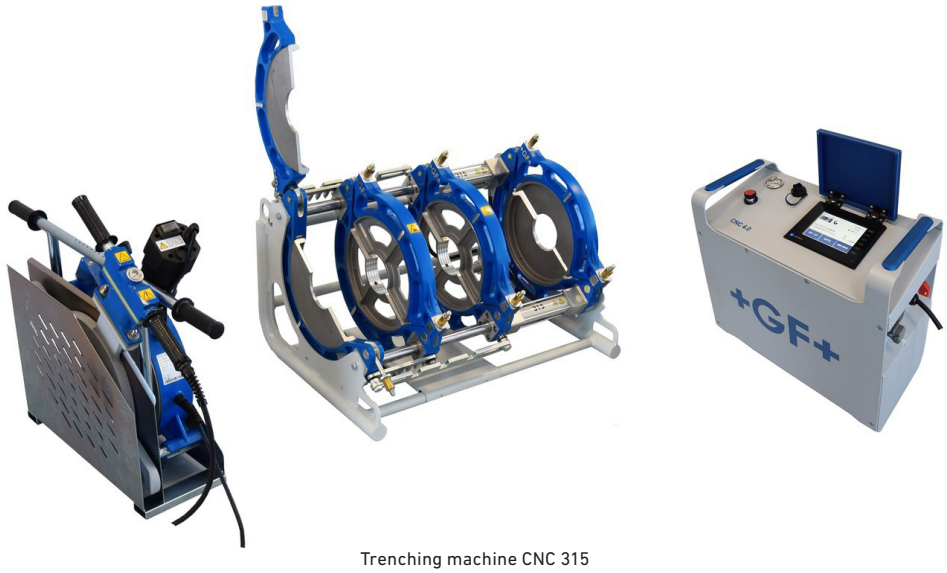
Important: Due to the larger outside diameter D (FR) of the HEAT-FIT PE pipe, special half-shells for the welding machines must be considered during installation. Please contact GF Piping Systems local sales company.

Due to the flame-retardant layer of 4mm on the outer pipe the pipe dimension is slightly bigger.

Therefore please keep an eye on the relevant welding machines.

Example:

- HEAT-FIT PE d160mm/D168mm
- Possible welding machine: TM 250 / TM 315



Trenching machine CNC 315

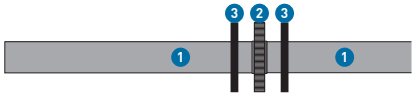
NOTE: Special half-shells are required!

Installation HEAT-FIT PE

HEAT-FIT Jackets are hand-fitted to the ecoFIT piping system components using HEAT-FIT metal straps and HEAT-FIT fasteners after welding the ecoFIT inner pipe.

1 Fusion process

1. Carry out the butt fusion process for ecoFIT piping system according to separate instructions.

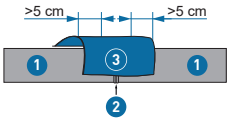


2. Observe the cool down time following the welding process.

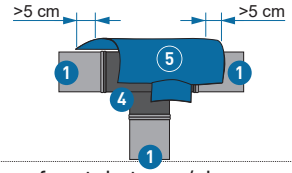
2 HEAT-FIT Jacket installation

1. Position HEAT-FIT Jacket on the fitting: Ensure >5cm overlap from HEAT-FIT Jacket to Pipe.

Pipe

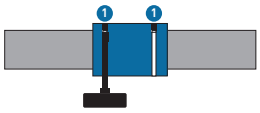


Fittings

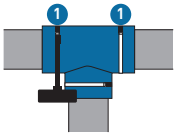


2. Refer to the product catalog for the number of metal straps/closures required and hand-tighten accordingly. It is mandatory to place the metal strap over each overlapping surface. Caution: Do not overtighten.

Pipe



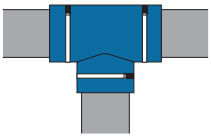
Fittings



3. Final inspection: The HEAT-FIT pipe must be completely covered with the HEAT-FIT Jackets.

Pipe

Fittings



1 HEAT-FIT PE pipe
2 Special half shells
3 Heating element

1 Weld bead

1 HEAT-FIT PE pipe
2 Weld bead
3 HEAT-FIT Jacket Weld Bead Cover
4 ecoFIT PE100 Tee 90°
5 HEAT-FIT Jacket Tee 90°

1 HEAT-FIT Metal Strap & Closures

Installation HEAT-FIT Jackets and Sleeves

HEAT-FIT Jacket Sleeves are installed on the straight pipe runs prior to welding the ecoFIT piping system components.

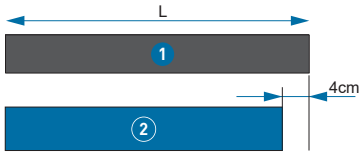
HEAT-FIT Jackets are hand-fitted to the ecoFIT piping system components using HEAT-FIT metal straps and HEAT-FIT fasteners after welding the ecoFIT inner pipe.

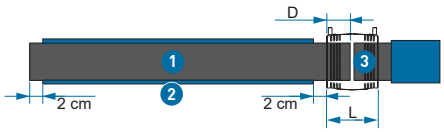
1 Cutting

Butt fusion
After cutting the ecoFIT pipe to the required length, cut the HEAT-FIT Jacket Sleeve 4 cm shorter than the ecoFIT pipe.

Electrofusion
(Pipe-pipe connections only!)
After cutting the ecoFIT pipe to the required length, cut the HEAT-FIT Jacket Sleeve according to the formula below.
Calculation HEAT-FIT Jacket Sleeve length
Jacket Sleeve Length = ecoFIT Pipe Length – (Insertion depth + 2cm). Insertion depth ELGEF Plus = L / 2

1 ecoFIT pipe
2 HEAT-FIT Jacket Sleeve
3 ELGEF Plus electrofusion coupler





2 Sealing

1. To prevent moisture penetration, apply TPU sealing tape around the cut edge of the HEAT-FIT material and press on by hand.

1 HEAT-FIT Jacket Sleeve
2 TPU sealing tape

2. Align HEAT-FIT Jacket Sleeve centered on the ecoFIT pipe.

1 HEAT-FIT Jacket Sleeve

3 Fusion process

1. Carry out the butt fusion process for ecoFIT piping system according to separate instructions. For free access to the welding point, the HEAT-FIT Jacket Sleeve must be pushed away from the welding site.

1 HEAT-FIT Jacket Sleeve
2 Half shells
3 Heating element

2. Following the welding process and after the cooling time has elapsed, the HEAT-FIT Pipel Sleeve is pushed into the center of the two welding beads.

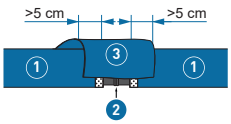
1 HEAT-FIT Jacket Sleeve

4

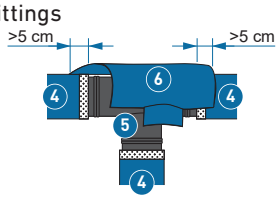
HEAT-FIT Jacket installation

1. Position HEAT-FIT Jacket on the fitting: Ensure >5cm overlap from HEAT-FIT Jacket to Jacket Sleeve according to illustration.

Pipe

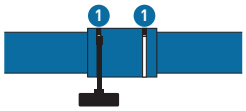


Fittings

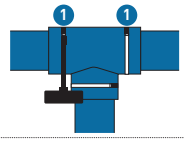


2. Refer to the product catalog for the number of metal straps/closures required and hand-tighten accordingly. It is mandatory to place the metal strap over each overlapping surface. Caution: Do not overtighten.

Pipe



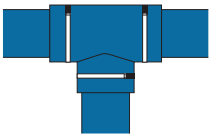
Fittings



3. Final inspection: The ecoFIT piping system must be completely covered with the HEAT-FIT.

Pipe

Fittings



1 HEAT-FIT Jacket Sleeve
2 Weld bead
3 HEAT-FIT Jacket Weld Bead Cover
4 ecoFIT PE100 pipe & HEAT-FIT Jacket Sleeve
5 ecoFIT PE100 Tee 90°
6 HEAT-FIT Jacket Tee 90° Equal

1 HEAT-FIT Metal Strap & Closures

GF Piping Systems

Local support around the world

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