MICROFLEX®

First in Flexibility

PRE-INSULATED FLEXIBLE PIPING SYSTEM

Heating

Sanitary

Cooling

Renewable energy

CATALOGUE 2009

WATTS® INDUSTRIES

A division of Watts Water Technologies Inc.

Watts Industries in Europe

MICROFLEX®
First in Flexibility

Watts Industries Europe B.V. is the European Holding and Division of Watts Water Technologies Inc., a leading multinational listed on the New York Stock Exchange. Watts develops and manufactures products that promote the comfort and safety of people, and the quality and protection of water in residential, commercial and industrial applications.

Over the past 15 years Watts Microflex has built up strong expertise in the development and manufacture of highly flexible pre-insulated PE-Xa pipes for hot and cold potable water, cooling water, wastewater and other fluids.

All our processes are ISO 9001-certified – every part of the Microflex system is designed with care. Only the best raw materials are selected for our uniquely high-tech production line. Efficient logistics management guarantees very short delivery terms. We have a team of professionals that are motivated to give you the best possible advice every time.

Microflex, your expert partner in highly flexible energy-saving piping systems!

Watts Microflex in Rotselaar (Belgium) – 17,000 m²

MICROFLEX®
First in Flexibility

Contents

Questions about our products or delivery terms?
Need help to calculate your material needs?

Other wishes?

Call **+44 (0)1386 446 997.**

Our staff will be delighted to help you.

Microflex is the ideal solution for the construction of a pre-insulated piping network. For hot and cold potable and cooling water pipes, heating pipes, discharge systems for wastewater, foodstuffs, chemicals or a range of other applications, flexibility is what distinguishes our system. As a result, Microflex is the benchmark not only for complicated utilities but also for connections with and between freestanding buildings.

By selecting only the best raw materials and techniques, we are able to offer you efficient future-proof solutions that optimise your workflow today and tomorrow.

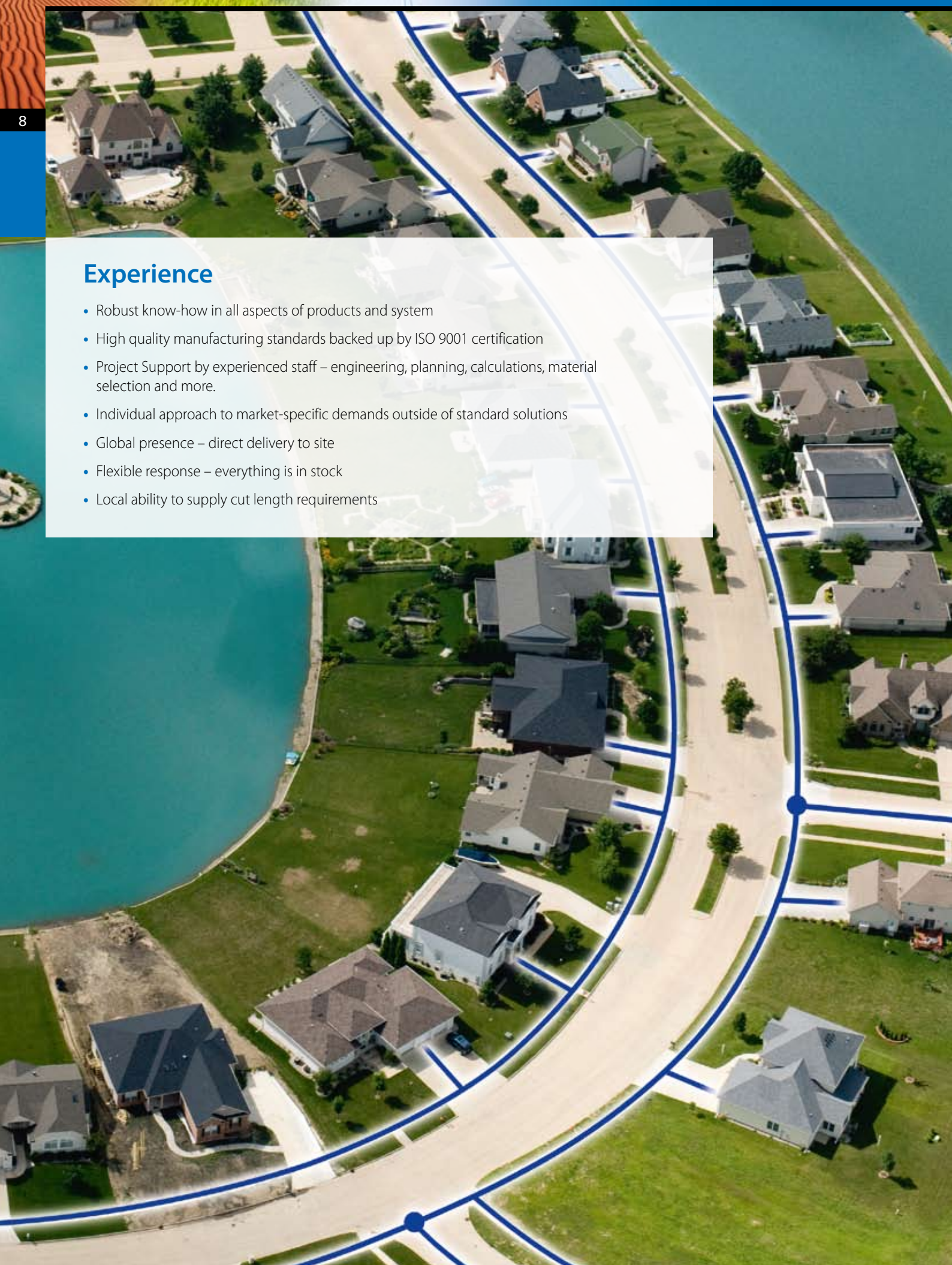
The unique assets of Microflex: flexibility, durability and expertise

Flexibility

- Very extensive range of pipes and accessories – complete system
- Available to order or on full coils up to 100 m for large networks – no pipe wastage
- Fast installation even in the event of bends, obstacles, wall feed-throughs and branches
- No compensators needed thanks to the piping system's self-compensatory behaviour
- No skilled welders needed for connections
- No special tools needed
- Limited weight facilitates easy installation
- Simple and safe to operate modular system of connections, including couplings and accessories
- Fast installation and accelerated assembly cut installation costs significantly

Durability

- High-grade raw materials ensure a very long product life
- Unique double wall outside casing in HDPE provides extra protection to the tube
- Sophisticated geometry of outside casing ensures unparalleled flexibility and high resistance to impacts and pressure
- Very elastic thermal foam insulation in PE-X with closed cell structure – excellent long-term insulation qualities and high μ factor
- Insulating centrepiece guarantees an effective separation of inlet and outlet pipes
- Corrosion-free transport pipe in PE-Xa (or PE), unique chemical resistance, very long life even under high pressures and temperatures, maximum resistance to cracks caused by ageing
- System pipes are highly resistant to external influences, such as stress, micro organisms and temperature swings



Experience

- Robust know-how in all aspects of products and system
- High quality manufacturing standards backed up by ISO 9001 certification
- Project Support by experienced staff – engineering, planning, calculations, material selection and more.
- Individual approach to market-specific demands outside of standard solutions
- Global presence – direct delivery to site
- Flexible response – everything is in stock
- Local ability to supply cut length requirements

Products by application

Application	Fluid	Pipe	T° max fluid	Pressure	Microflex solutions
	Heating water	PE-Xa	95°C	6 bar	M…C  MD…C  MQ… 
	Hot (potable) water	PE-Xa	95°C	10 bar	M…S  MD…S  MQ… 
	Cold (potable) water	HDPE	25°C	16 bar	M(V)…PE  MD…PE 
	Cooling water	HDPE	-10°C	16 bar	M(V)…PE  MD…PE 

Your guarantee of quality

BELGISCH CENTRUM VOOR CERTIFICATIE N.V.

CERTIFICATE

This is to certify that the Quality Management System of

WATTS MICROFLEX N.V.
Wingepark 59a, B-3110 Rotselaar

has been assessed and approved by the "Belgisch Centrum voor Certificatie" according to the following International Standard:

NBN EN ISO 9001:2000

The Quality Management System is applicable to the following activities:

" Design and manufacturing of flexible pre-insulated plastic pipes and components for district heating and cooling appliances. "

The validity of the certificate is subject to the company maintaining the quality system, which will be periodically verified by the "Belgisch Centrum voor Certificatie".

certificate number
80499707

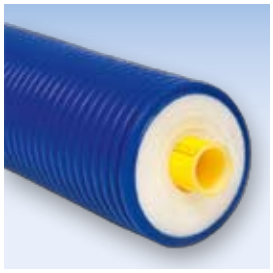
date of issue : 12th October 2007
expiry date : 14th July 2010

the "Belgisch Centrum voor Certificatie"

for the Certification Committee

for the Management

Other applications?
Please contact us.
+ 44 (0) 1386 446 997



MICROFLEX® UNO

Single flexible, pre-insulated, self-compensating, underground pipe. Especially suitable for heating water, but also for (hot) potable water, wastewater and other fluids.
Corrosion-resistant transport pipe in cross-linked PE-Xa in accordance with DIN 16892/16893, with yellow oxygen diffusion barrier in accordance with DIN 4726. Thermal, elastic, CFC-free foam insulation made from cross-linked PE-X with closed microcellular structure. Minimal water absorption capacity of < 1% in accordance with DIN 53428. Corrugated outside casing in HDPE, made in accordance with the closed chamber principle to provide high-grade protection to the piping system.

– Max operating pressure: 6 bar
– Max fluid temperature: + 95°C
– PE-Xa pipes: SDR 11
– Standard full coil length: 100 m

Specific combinations?
Please contact us.

PIPES

	PE-Xa d_{out} / s	PE-Xa d_{in}	Outside casing d_{out}	Weight	Bending radius (1)	Heat emission (2)
Art. No.	mm	DN	mm	kg/m	m	kW
M7525 C	25 / 2,3	20	75	0,68	0,20	~30
M9032 C	32 / 2,9	25	90	1,00	0,25	~60
M16040 C	40 / 3,7	32	160	2,32	0,35	~90
M16050 C	50 / 4,6	40	160	2,48	0,45	~140
M16063 C	63 / 5,8	50	160	2,78	0,55	~220
M20075 C	75 / 6,8	65	200	4,16	0,80	~330
M20090 C	90 / 8,2	75	200	4,73	1,10	~480
M200110 C	110 / 10,0	90	200	5,64	1,20	~700

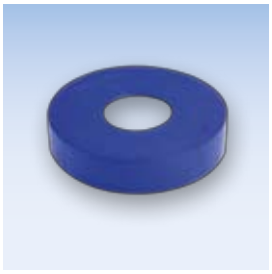
(1) Applicable practical values without risk of pipe distortion or damage.
(2) Average heat emission in kW at T_{water} of 80°C and ΔT of 20°C.

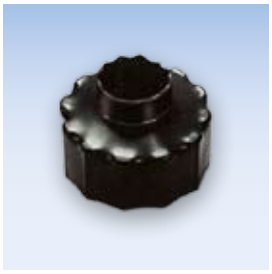
COUPLINGS

Microflex PE-X coupling	Thread
Art. No.	inch
MJ3413425/23 *(N)*	3/4" M
MJ3414432/29	1" M
MJ3415440/37	1 1/4" M
MJ3416450/46 *(N)*	1 1/2" M
MJ341263/58	2" M
MJ34121275/68 *(N)*	2 1/2" M
MJ341390/82	3" M
MJ3414110/10 *(N)*	4" M

(New) For availability, see p. 21.

ACCESSORIES





Fix points must be installed to absorb the possible effects of thermal expansion / shrinkage of the PE-Xa transport pipes.

Dust cap MS

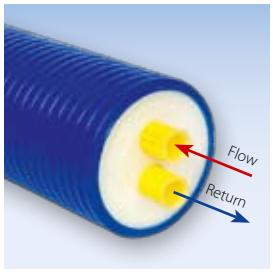
Art. No.
M7525 C
M9032 C
M16040 C
M16050 C
M16063 C
M20075 C
M20090 C
M200110 C

Shrink cap MK

MS
Art. No.
MS7525
MS9032
MS16040
MS16050
MS16063
MS20075
MS20090
MS200110

Fix point MFP

MK	MK	MFP	Thread
Art. No.	Art. No.	Art. No.	inch
MK2000	**MK2000**	**MFP34**	3/4" M
MK2100	**MK2100**	**MFP44**	1" M
MK2340	**MK2340**	**MFP54**	1 1/4" M
MK2340	**MK2340**	**MFP64**	1 1/2" M
MK2500	**MK2500**	**MFP2**	2" M
MK2600	**MK2600**	**MFP212**	2 1/2" M
MK2600	**MK2600**	**MFP3**	3" M
MK2600	**MK2600**	**MFP4**	4" M



MICROFLEX® DUO

Double flexible pre-insulated, self-compensating, underground pipe. Especially suitable for heating water, but also for (hot) potable water, wastewater and other fluids.
Corrosion-resistant transport pipe in cross-linked PE-Xa in accordance with DIN 16892/16893, with yellow oxygen diffusion barrier in accordance with DIN 4726. Thermal, elastic, CFC-free foam insulation made from cross-linked PE-X with closed microcellular structure. Minimal water absorption capacity of < 1% in accordance with DIN 53428. Insulating PE-X centrepiece guarantees an effective separation of flow and return pipes. Corrugated outside casing in HDPE, made in accordance with the closed chamber principle to provide high-grade protection to the piping system.

- Max operating pressure: 6 bar
- Max fluid temperature: + 95°C
- PE-Xa pipes: SDR 11
- Standard full coil length: 100 m
- Carrier pipes are individually identified

Specific combinations? Please contact us.

PIPES

	PE-Xa d_{out} / s	PE-Xa d_{in}	Outside casing d_{out}	Weight	Bending radius (1)	Heat emission (2)
Art. No.	mm	DN	mm	kg/m	m	kW
MD16025 C	2 x 25/2,3	20	160	2,21	0,50	~30
MD16032 C	2 x 32/2,9	25	160	2,41	0,50	~60
MD16040 C	2 x 40/3,7	32	160	2,63	0,60	~90
MD20050 C	2 x 50/4,6	40	200	4,03	0,80	~140
MD20063 C	2 x 63/5,8	50	200	4,64	1,20	~220

(1) Applicable practical values without risk of pipe distortion or damage.
(2) Average heat emission in kW at T_{water} of 80°C and ΔT of 20°C.

COUPLINGS

Microflex PE-X coupling (*)	Thread
Art. No.	inch
MJ3413425/23 *(N)*	3/4" M
MJ3414432/29	1" M
MJ3415440/37	1 1/4" M
MJ3416450/46 *(N)*	1 1/2" M
MJ341263/58	2" M

(*) For Duo pipes, provide for two couplings.
(New) For availability, see p. 21.

ACCESSORIES

Dust cap MS

Art. No.
MD16025 C
MD16032 C
MD16040 C
MD20050 C
MD20063 C

Shrink cap MK

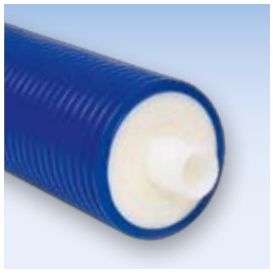
Art. No.
MSD16025
MSD16032
MSD16040
MSD20050
MSD20063

Fix point MFP

Art. No.	Thread
MK3350-01	3/4" M
MK3350-01	1" M
MK3350-02	1 1/4" M
MK3350-03	1 1/2" M
MK3350-05	2" M

(*) For Dup pipes, provide two fix points.

Fix points must be installed to absorb the possible effects of thermal expansion / shrinkage of the PE-Xa transport pipes.



MICROFLEX® UNO

Single flexible pre-insulated, self-compensating, underground pipe. Especially suitable for hot and cold potable water, but also for wastewater and other fluids.
Corrosion-resistant transport pipe in cross-linked PE-Xa in accordance with DIN 16892/16893. Thermal, elastic, CFC-free foam insulation made from cross-linked PE-X with closed microcellular structure. Minimal water absorption capacity of < 1% in accordance with DIN 53428. Corrugated outside casing in HDPE, made in accordance with the closed chamber principle to provide high-grade protection to the piping system.

– Max operating pressure: 10 bar
– Max fluid temperature: + 95°C
– PE-Xa pipes: SDR 7.4
– Standard full coil length: 100 m

Specific combinations?
Please contact us.

PIPES

	PE-Xa d_{out} / s	PE-Xa d_{in}	Outside casing d_{out}	Weight	Bending radius (1)
Art. No.	mm	DN	mm	kg/m	m
M7525 S	25 / 3,5	20	75	0,75	0,20
M9032 S	32 / 4,4	25	90	1,12	0,25
M12540 S	40 / 5,5	32	125	1,89	0,40
M12550 S	50 / 6,9	40	125	2,19	0,50
M12563 S	63 / 8,7	50	125	2,59	0,60

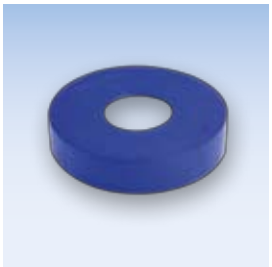
(1) Applicable practical values without risk of pipe distortion or damage.

COUPLINGS

Microflex PE-X coupling	Thread
Art. No.	inch
MJ3413425/35 *(N)*	3/4" M
MJ3414432/44	1" M
MJ3415440/55	1 1/4" M
MJ3416450/69 *(N)*	1 1/2" M
MJ341263/87	2" M

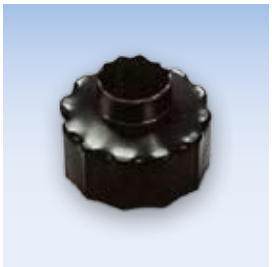
(New) For availability, see p. 23.

ACCESSORIES



Dust cap MS

Art. No.
M7525 S
M9032 S
M12540 S
M12550 S
M12563 S



Shrink cap MK

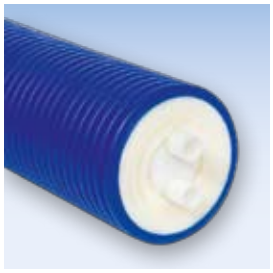
Art. No.
MS7525
MS9032
MS12540
MS12550
MS12563

Fix point MFP

Art. No.	Thread
MK2000	3/4" M
MK2100	1" M
MK2200	1 1/4" M
MK2200	1 1/2" M
MK2400	2" M

Art. No.	Thread
MFP34	3/4" M
MFP44	1" M
MFP54	1 1/4" M
MFP64	1 1/2" M
MFP2	2" M

Fix points must be installed to absorb the possible effects of thermal expansion / shrinkage of the PE-Xa transport pipes.



MICROFLEX® DUO

Double flexible, pre-insulated, self-compensating, underground pipe. Especially suitable for hot and cold potable water, but also for waste-water and other fluids.
Corrosion-resistant transport pipe in cross-linked PE-Xa in accordance with DIN 16892/16893. Thermal, elastic, CFC-free foam insulation made from cross-linked PE-X with closed microcellular structure. Minimal water absorption capacity of < 1% in accordance with DIN 53428. Insulating PE-X centrepiece guarantees an effective separation of sanitary hot water pipe and pipe for circulation loop. Corrugated outside casing in HDPE, made in accordance with the closed chamber principle to provide high-grade protection to the piping system.

– Max operating pressure: 10 bar
– Max fluid temperature: + 95°C
– PE-Xa pipes: SDR 7.4
– Standard full coil length: 100 m

Specific combinations?
Please contact us.

PIPES

	PE-Xa d_{out} / s	PE-Xa d_{in}	Outside casing d_{out}	Weight	Bending radius (1)
Art. No.	mm	DN	mm	kg/m	m
MD16025 S	2 x 25/3,5	20	160	2,35	0,50
MD1603225 S	1 x 32/4,4	25	160	2,50	0,50
	1 x 25/3,5	20			
MD1604025 S	1 x 40/5,5	32	160	2,71	0,60
	1 x 25/3,5	20			
MD1605025 S	1 x 50/6,9	40	160	2,89	0,60
	1 x 25/3,5	20			
MD1605032 S	1 x 50/6,9	40	160	3,04	0,60
	1 x 32/4,4	25			

(1) Applicable practical values without risk of pipe distortion or damage.

COUPLINGS

Microflex PE-X coupling	Thread
Art. No.	inch
MJ3413425/35(*) *(N)*	3/4" M
MJ3414432/44	1" M
MJ3413425/35 *(N)*	3/4" M
MJ3415440/55	1 1/4" M
MJ3413425/35 *(N)*	3/4" M
MJ3416450/69 *(N)*	1 1/2" M
MJ3413425/35 *(N)*	3/4" M
MJ3416450/69 *(N)*	1 1/2" M
MJ3414432/44	1" M

(*) Provide for this reference twice.
(New) For availability, see p. 23.

ACCESSORIES

Fix points must be installed to absorb the possible effects of thermal expansion / shrinkage of the PE-Xa transport pipes.

Dust cap MS

Art. No.
MD16025 S
MD1603225 S
MD1604025 S
MD1605025 S
MD1605032 S

Art. No.
MSD16025
MSD1603225
MSD1604025
MSD1605025
MSD1605032

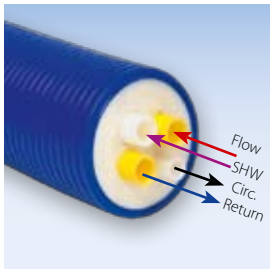
Shrink cap MK

Art. No.
MK3350-01
MK3350-01
MK3350-02
MK3360-01
MK3350-03

Fix point MFP

	Thread
Art. No.	inch
MFP34 (*)	3/4" M
MFP44	1" M
MFP34	3/4" M
MFP54	1 1/4" M
MFP34	3/4" M
MFP64	1 1/2" M
MFP34	3/4" M
MFP64	1 1/2" M
MFP44	1" M

(*) Provide for this reference twice.



MICROFLEX® QUADRO

Flexible pre-insulated, self-compensating underground pipe comprising two heating pipes and two sanitary pipes. Designed for heating water (flow and return), and equipped with a sanitary hot water pipe and a pipe for the circulation loop.
Corrosion-resistant transport pipe in cross-linked PE-Xa in accordance with DIN 16892/16893, with yellow oxygen diffusion barrier in accordance with DIN 4726 for the heating water pipes. Thermal, elastic, CFC-free foam insulation made from cross-linked PE-X with closed microcellular structure. Minimal water absorption capacity of < 1% in accordance with DIN 53428. Insulating PE-X centrepiece guarantees an effective separation of flow, return, hot water and circulation pipes. Corrugated outside casing in HDPE, made in accordance with the closed chamber principle to provide high-grade protection to the piping system.

Heating pipes
– Max operating pressure: 6 bar
– Max fluid temperature: + 95°C
– PE-Xa pipes: SDR 11

Sanitary pipes
– Max operating pressure: 10 bar
– Max fluid temperature: + 95°C
– PE-Xa pipes: SDR 7.4

– Standard full coil length: 100 m

Specific combinations?
Please contact us.

PIPES

	PE-Xa d_{out} / s	PE-Xa d_{in}	Outside casing d_{out}	Weight	Bending radius (1)
Art. No.	mm	DN	mm	kg/m	m
MQ16025C2520S	2 x 25/2,3	20	160	2,40	0,60
	1 x 25/3,5	20			
	1 x 20/2,8	15			
MQ16032C2520S	2 x 32/2,9	25	160	2,60	0,60
	1 x 25/3,5	20			
	1 x 20/2,8	15			
MQ16032C3225S	2 x 32/2,9	25	160	2,70	0,60
	1 x 32/4,4	25			
	1 x 25/3,5	20			

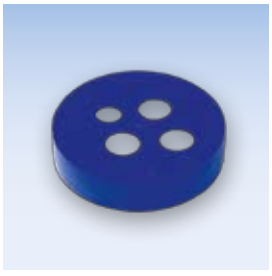
(1) Applicable practical values without risk of pipe distortion or damage.

COUPLINGS

Microflex PE-X coupling	Thread
Art. No.	inch
MJ3413425/23(*) *(N)*	3/4" M
MJ3413425/35 *(N)*	3/4" M
MJ3413420/28	3/4" M
MJ3414432/29 (*)	1" M
MJ3413425/35 *(N)*	3/4" M
MJ3413420/28	3/4" M
MJ3414432/29 (*)	1" M
MJ3414432/44	1" M
MJ3413425/35 *(N)*	3/4" M

(*) State this reference twice.
(New) For availability, see p. 21 and 23.

ACCESSORIES



Fix points must be installed to absorb the possible effects of thermal expansion / shrinkage of the PE-Xa transport pipes.

Dust cap MS

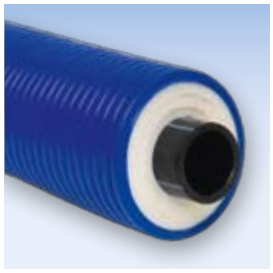
Art. No.
MQ16025C2520S
MQ16032C2520S
MQ16032C3225S

Art. No.
MSQ160252520
MSQ160322520
MSQ160323225

Fix point MFP

	Thread
Art. No.	inch
MFP34 (*)	3/4" M
MFP34	3/4" M
MFP34	3/4" M
MFP44 (*)	1" M
MFP34	3/4" M
MFP34	3/4" M
MFP44 (*)	1" M
MFP44	1" M
MFP34	3/4" M

(*) State this reference twice.



MICROFLEX® COOL

Single flexible pre-insulated, self-compensating, underground pipe. Suitable for cold potable water, cooling water and wastewater.
Corrosion-resistant transport pipe in PE 100 in accordance with EN 12201. Thermal, elastic, CFC-free foam insulation made from cross-linked PE-X with closed microcellular structure. Minimal water absorption capacity of < 1% in accordance with DIN 53428. Corrugated outside casing in HDPE, made in accordance with the closed chamber principle to provide high-grade protection to the piping system.

– Max operating pressure: 16 bar
– Max fluid temperature: -10°C … +25°C
– PE pipes: SDR 11
– Standard full coil length: 100 m

Specific combinations? Please contact us.

PIPES

	PE d_{out} / s	PE d_{in}	Outside casing d_{out}	Weight	Bending radius (1)
Art. No.	mm	DN	mm	kg/m	m
M9032 PE	32 / 2,9	25	90	1,00	0,25
M9040 PE	40 / 3,7	32	90	1,11	0,30
M12550 PE	50 / 4,6	40	125	1,92	0,40
M12563 PE	63 / 5,7	50	125	2,16	0,50
M16075 PE	75 / 6,8	65	160	3,20	0,75
M16090 PE	90 / 8,2	75	160	3,85	1,00
M200110 PE	110 / 10,0	90	200	5,74	1,20

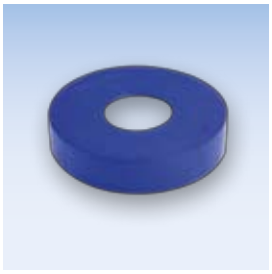
(1) Applicable practical values without risk of pipe distortion or damage.

COUPLINGS

Microflex PE-X coupling	Thread
Art. No.	inch
MJ3414432/29	1" M
MJ3415440/37	1 1/4" M
MJ3416450/46 *(N)*	1 1/2" M
MJ341263/58	2" M
MJ34121275/68 *(N)*	2 1/2" M
MJ341390/82	3" M
MJ3414110/10 *(N)*	4" M

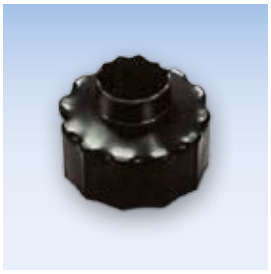
(New) For availability, see p. 21.

ACCESSORIES



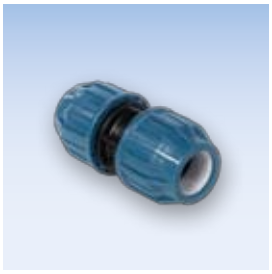
Dust cap MS

Art. No.
M9032 PE
M9040 PE
M12550 PE
M12563 PE
M16075 PE
M16090 PE
M200110 PE



Shrink cap MK

Art. No.
MS9032
MS9040
MS12550
MS12563
MS16075
MS16090
MS200110



Plastic couplings MPP

Art. No.	PE d_{out} / s	PE d_{out} x d_{out}
	mm	mm
MK2100		
MK2100		
MK2200		
MK2400		
MK2500		
MK2500		
MK2600		

Art. No.	PE d_{out} / s	PE d_{out} x d_{out}
	mm	mm
MPP27032/29	32 / 2,9	32 x 32
MPP27040/37	40 / 3,7	40 x 40
MPP27050/46	50 / 4,6	50 x 50
MPP27063/57	63 / 5,7	63 x 63
MPP27075/68	75 / 6,8	75 x 75
MPP27090/82	90 / 8,2	90 x 90
MPP270110/10	110 / 10,0	110 x 110

MICROFLEX® DUO COOL

Double flexible pre-insulated, self-compensating, underground pipe. Suitable for cold potable water, cooling water and wastewater.
Corrosion-resistant transport pipe in PE 100 in accordance with EN 12201. Thermal, elastic, CFC-free foam insulation made from cross-linked PE-X with closed microcellular structure. Minimal water absorption capacity of < 1% in accordance with DIN 53428. Insulating PE-X centrepiece guarantees an effective separation of flow and return pipes. Corrugated outside casing in HDPE, made in accordance with the closed chamber principle to provide high-grade protection to the piping system.

– Max operating pressure: 16 bar
– Max fluid temperature: -10°C … +25°C
– PE pipes: SDR 11
– Standard full coil length: 100 m

Specific combinations? Please contact us.

PIPES

	PE d_{out} / s	PE d_{in}	Outside casing d_{out}	Weight	Bending radius (1)
Art. No.	mm	DN	mm	kg/m	m
MD12532 PE	32 / 2,9	25	125	1,82	0,30
MD16040 PE	40 / 3,7	32	160	2,63	0,60
MD16050 PE	50 / 4,6	40	160	3,10	0,60
MD20063 PE	63 / 5,8	50	200	2,60	4,64

(1) Applicable practical values without risk of pipe distortion or damage.

COUPLINGS

Microflex PE-X coupling (*)	Thread
Art. No.	inch
MJ3414432/29	1" M
MJ3415440/37	1 1/4" M
MJ3416450/46 *(N)*	1 1/2" M
MJ341263/58	2" M

(*) Two couplings are provided for the Duo pipes.
(New) For availability, see p. 21.

ACCESSORIES

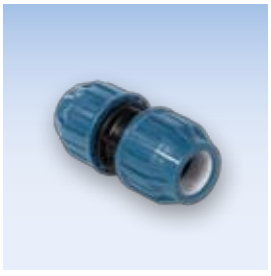
Dust cap MS

Art. No.
MD12532 PE
MD16040 PE
MD16050 PE
MD20063 PE

Art. No.
MSD12532
MSD16040
MSD16050
MSD20063

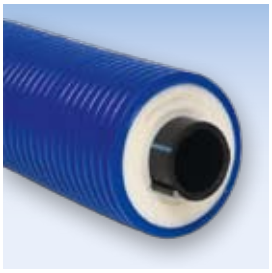
Shrink cap MK

Art. No.
MK3280
MK3350-02
MK3350-03
MK3350-05



Plastic couplings MPP

Art. No.	PE d_{out} / s	PE d_{out} x d_{out}
	mm	mm
MPP27032/29	32 / 2,9	32 x 32
MPP27040/37	40 / 3,7	40 x 40
MPP27050/46	50 / 4,6	50 x 50
MPP27063/57	63 / 5,7	63 x 63



MICROFLEX® COOL with self-regulating heating cable

Single flexible pre-insulated, self-compensating, underground pipe. Suitable for cold potable water, cooling water and wastewater.
Corrosion-resistant transport pipe in PE 100 in accordance with EN 12201. The transport pipe is in contact with a self-regulating heating cable. Thermal, elastic, CFC-free foam insulation made from cross-linked PE-X with closed microcellular structure. Minimal water absorption capacity of < 1% in accordance with DIN 53428. Corrugated outside casing in HDPE, made in accordance with the closed chamber principle to provide high-grade protection to the piping system.

- Max operating pressure: 16 bar
- Max fluid temperature: -10°C … +25°C
- PE pipes: SDR 11
- Heating cable power: 10 W/m
- Standard full coil length: 100 m

Specific combinations? Please contact us.

PIPES

	PE d_{out} / s	PE d_{in}	Outside casing d_{out}	Weight	Bending radius (1)
Art. No.	mm	DN	mm	kg/m	m
MV7532 PE	32 / 2,9	25	75	0,84	0,20
MV9040 PE	40 / 3,7	32	90	1,20	0,30
MV12550 PE	50 / 4,6	40	125	2,00	0,40
MV12563 PE	63 / 5,8	50	125	2,25	0,50
MV16075 PE	75 / 6,8	65	160	3,30	0,75
MV16090 PE	90 / 8,2	75	160	3,95	1,00
MV200110 PE	110 / 10,0	90	200	5,84	1,20

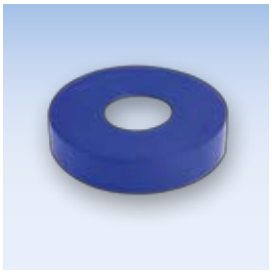
(1) Applicable practical values without risk of pipe distortion or damage.

COUPLINGS

Microflex PE-X coupling	Thread
Art. No.	inch
MJ3414432/29	1" M
MJ3415440/37	1 1/4" M
MJ3416450/46 *(N)*	1 1/2" M
MJ341263/58	2" M
MJ34121275/68 *(N)*	2 1/2" M
MJ341390/82	3" M
MJ3414110/10 *(N)*	4" M

(New) For availability, see p. 21.

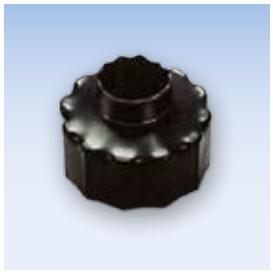
ACCESSORIES



Dust cap MS

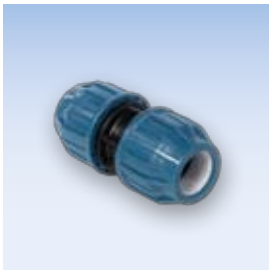
Art. No.
MV7532 PE
MV9040 PE
MV12550 PE
MV12563 PE
MV16075 PE
MV16090 PE
MV200110 PE

Art. No.
MS7532
MS9040
MS12550
MS12563
MS16075
MS16090
MS200110



Shrink cap MK

Art. No.
MK2100
MK2100
MK2200
MK2400
MK2500
MK2500
MK2600



Plastic couplings MPP

	PE d_{out} / s	PE d_{out} x d_{out}
Art. No.	mm	mm
MPP27032/29	32 / 2,9	32 x 32
MPP27040/37	40 / 3,7	40 x 40
MPP27050/46	50 / 4,6	50 x 50
MPP27063/57	63 / 5,7	63 x 63
MPP27075/68	75 / 6,8	75 x 75
MPP27090/82	90 / 8,2	90 x 90
MPP270110/10	110 / 10,0	110 x 110

MICROFLEX® Connection kit for heating cable

This connection kit is used to connect the heating cable to the Microflex Cool pipes. Contents:

MVTH

An ambient thermostat that interrupts the heating cable depending on changing temperature influences. The use of this thermostat is strongly recommended, because it prevents the heating cable from being live at all times and so cuts energy consumption.

– Operation: automatic / EN 60 730-1
– Protection level: IP 54 / EN 60529
– Regulating range: -10°C…+40°C
– Differential: 1 - 2 K
– Switch power: 16A / 230 VAC
– Voltage: 230 VAC

MVBOX

A PVC distribution box in which the heating cable is connected to the current feed.

– Protection level: IP 55

MVKITGR

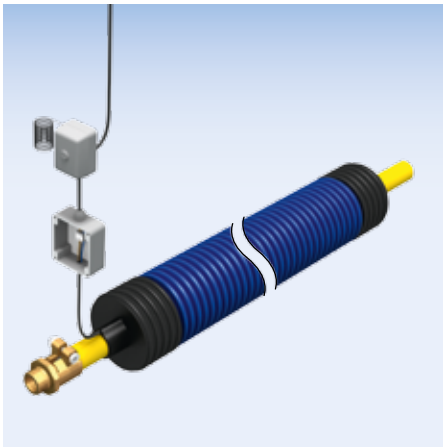
One kit comprising:
– 3 shrink sleeves to insulate the feed wire and the earthing of the heating cable
– 1 long shrink sleeve to insulate the heating cable at the connection
– 2 short shrink sleeves to insulate the end of the heating cable
– 1 swivel for lead-through in the MVBOX

Art. No.	Description
MVTH	Ambient thermostat
MVBOX	Distribution box
MVKITGR	Set of insulating shrink sleeves
MVKITM	1 x MVBOX + 2 x MVKITGR
MVKITT	1 x MVBOX + 3 x MVKITGR

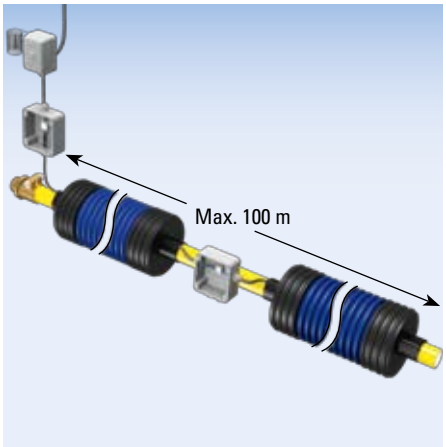
The heating cable must be connected to a 230V network. The circuit must be protected with a 16A fuse and a 30mA differential switch. We recommend that the trigger ambient temperature must be set to 2°C (by means of the thermostat).

NB: At a temperature of 0°C the heating cable must not be longer than 100 m. If this length is exceeded, the heating cables must be fed individually. Not available for the Cool Due Tube.

MVTH + MVBOX + MVKITGR



MVKITM

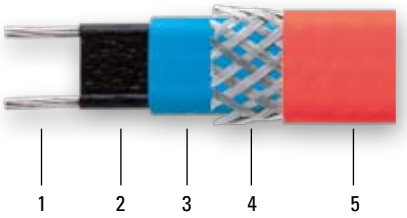


MVKITT

Heat loss table for MICROFLEX® COOL with self-regulating heating cable

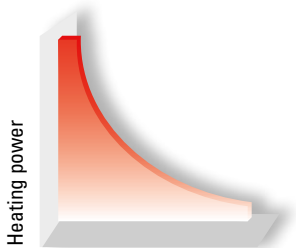
This table shows the heat losses at negative temperatures around the outside casing. If heat losses exceed 9 Watt/m the pipe is in danger of freezing.

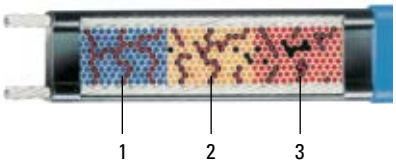
Casing d_{out} / Pipe d_{out}		75/25	125/25	75/32	90/32	125/32	90/40	125/40	160/40	125/50	160/50	125/63	160/63	160/75	200/75	160/90	200/90	200/110
Insulation thickness		19	41	16	22	37,5	18	33	50	28	46	22	40	34	52	26	44	34
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
temperature around the outside casing	-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	-2	1	1	1	1	1	1	1	1	1	1	2	1	2	1	2	1	2
	-3	1	1	1	1	1	2	1	1	2	1	2	1	2	1	3	2	2
	-4	2	1	2	2	1	2	2	1	2	1	3	2	2	2	3	2	2
	-5	2	1	2	2	1	2	2	1	2	2	3	2	3	2	4	3	3
	-6	2	1	2	2	2	3	2	2	3	2	3	2	3	2	4	3	3
	-7	2	2	2	3	2	3	2	2	3	2	4	2	3	3	5	3	4
	-8	3	2	3	3	2	4	3	2	3	2	4	3	4	3	5	4	4
	-9	3	2	3	3	2	4	3	2	4	3	5	3	4	3	6	4	5
	-10	3	2	3	3	3	4	3	2	4	3	5	4	5	3	6	4	5
	-11	4	2	4	4	3	5	3	3	4	3	6	4	5	4	7	5	6
	-12	4	3	4	4	3	5	4	3	5	3	6	4	5	4	7	5	6
	-13	4	3	4	4	3	5	4	3	5	4	7	4	6	4	8	5	7
	-14	4	3	5	5	3	6	4	3	5	4	7	5	6	5	8	6	7
	-15	5	3	5	5	4	6	4	3	6	4	7	5	6	5	9	6	7
	-16	5	3	5	5	4	6	5	4	6	4	8	5	7	5	9	6	8
	-17	5	3	5	6	4	7	5	4	6	5	8	6	7	5	10	7	8
	-18	5	4	6	6	4	7	5	4	6	5	9	6	8	6	10	7	9
	-19	6	4	6	6	4	8	5	4	7	5	9	6	8	6	10	7	9
	-20	6	4	6	6	5	8	6	4	7	5	9	7	8	6	11	8	10
	-21	6	4	7	7	5	8	6	5	7	6	10	7	9	7	11	8	10
	-22	6	4	7	7	5	9	6	5	8	6	10	7	9	7	12	8	10
	-23	7	4	7	7	5	9	6	5	8	6	11	7	9	7	12	9	11
	-24	7	5	8	7	6	9	7	5	8	6	11	8	10	7	13	9	11
	-25	7	5	8	8	6	10	7	5	9	6	12	8	10	8	13	9	12
	-26	7	5	8	8	6	10	7	6	9	7	12	8	10	8	14	10	12
	-27	8	5	8	8	6	10	7	6	9	7	12	8	11	8	14	10	13
	-28	8	5	9	9	6	11	7	6	10	7	13	9	11	9	15	10	13
	-29	8	5	9	9	7	11	8	6	10	7	13	9	12	9	15	11	14
	-30	8	6	9	9	7	11	8	6	10	8	14	9	12	9	16	11	14
	-31	9	6	10	9	7	12	8	6	10	8	14	10	12	9	16	11	15
	-32	9	6	10	10	7	12	8	7	11	8	14	10	13	10	17	12	15
	-33	9	6	10	10	7	12	9	7	11	8	15	10	13	10	17	12	15
	-34	9	6	10	10	8	13	9	7	11	8	15	10	13	10	18	12	16
	-35	10	6	11	10	8	13	9	7	12	9	16	11	14	10	18	13	16
	-36	10	7	11	11	8	13	9	7	12	9	16	11	14	11	18	13	17
	-37	10	7	11	11	8	14	10	8	12	9	16	11	14	11	19	13	17
	-38	10	7	12	11	8	14	10	8	13	9	17	11	15	11	19	14	18
	-39	11	7	12	12	8	14	10	8	13	10	17	12	15	11	20	14	18
	-40	11	7	12	12	9	15	10	8	13	10	18	12	15	12	20	14	18
non-recommended temperatures	-41	11	7	13	12	9	15	10	8	13	10	18	12	16	12	21	15	19
	-42	11	8	13	12	9	15	11	8	14	10	18	13	16	12	21	15	19
	-43	12	8	13	13	9	16	11	9	14	10	19	13	16	12	22	15	20
	-44	12	8	13	13	9	16	11	9	14	11	19	13	17	13	22	16	20
	-45	12	8	14	13	10	16	11	9	15	11	19	13	17	13	23	16	21
	-46	12	8	14	13	10	17	12	9	15	11	20	14	17	13	23	16	21
	-47	13	8	14	14	10	17	12	9	15	11	20	14	18	13	23	16	22
	-48	13	9	15	14	10	17	12	10	15	11	21	14	18	14	24	17	22
	-49	13	9	15	14	10	17	12	10	16	12	21	14	18	14	24	17	23
	-50	13	9	15	14	11	18	12	10	16	12	21	15	19	14	25	17	23



1. Tin-coated copper conductor
2. Self-regulating heating element
3. Electric insulation mantle
4. Safety plait in tin-coated copper
5. External safety cover

Schematic diagram





1. In the cold sections of the heating cable, the structure of the plastic will draw together, generating a large number of electrical currents through the carbon particles. The current is converted into heat in the heating element.
2. In the warmer sections, the structure of the plastic expands and progressively interrupts the currents in the carbon particles. This increases the resistance and reduces the current uptake and thus the heating capacity.
3. In the hot sections, the expansion of the plastic structure breaks the currents almost entirely. This creates a very high electrical resistance and the heating capacity falls to almost 0.

Self-regulating heating cable – structure and operation

Robust construction

The heating cable is a self-regulating cable with two parallel, multiwire tin-coated copper conductors and an intermediate semiconducting heating element.
This heating element is electrically insulated by means of a synthetic polyolefine or fluoropolymer cover. It is also covered by a plaited, tin-coated copper cord. This plaiting provides the earthing (safety conductor) for the heating cable, complies with prevailing safety standards (VDE 0100) and is fitted with an additional mechanical protection.

Proven lifespan

These self-regulating heating cables have been intensively tested in our laboratories using international standard tests and recognised scientific methods and procedures. These tests found that the self-regulating heating cable has a lifespan of over 40 years.

Licenses

All self-regulating heating cables are manufactured in accordance with the strictest quality norms and are subjected to ongoing quality controls. They are VDE-certified as well as with a variety of production, control and other licenses from many countries.

Parallel circuits

The current flows between two parallel copper conductors, regardless of where the heating cable is and right through the semiconducting, molecularly refined heating element. The electrical circuit diagram is similar to a parallel circuit in many temperature-dependent resistances.
The system's straightforward design and even simpler installation process will save you considerable expense. The heating cable is always connected to a 230 VAC output, regardless of its length.

Operation

The heating element consists of a specially formulated, molecularly refined plastic cover embedded with carbon particles which generate electrical currents between two parallel copper conductors. When the temperature rises, the plastic expands due to molecular expansion.
The carbon particles move further and further apart, resulting in the interruption of the electrical currents and a rise in the electrical resistance of the heating element. The current uptake and the heating capacity fall proportionally.
When the element cools, the process is reversed and the heating capacity rises in response to low temperatures. The molecular refinement of the heating element gives it duroplastic properties, making the expansion behaviour at molecular level exactly reproducable, even under fluctuating temperatures. The self-regulating properties of the heating cable are thus incorporated into the material itself.
Thanks to this self-regulation, the heating cable responds to temperature fluctuations along the entire length of the system.

Energy conservation

Because the heating capacity adjusts to local temperatures, energy consumption is always adapting to prevailing requirements. The heating cables therefore save energy and costs through self-regulation.

Safe and reliable

Due to these self-regulating properties, the system cannot overheat or burn through, even if the heating cable overlaps.

Straight coupling for use in piping systems equipped with transport pipes for heating, cold or cooling water applications.
The coupling has a long supporting pipe for optimal clamping, a cylindrical outside thread connection and a clamping ring with stainless steel bolt. The included remote plate makes it easier to fit the coupling.

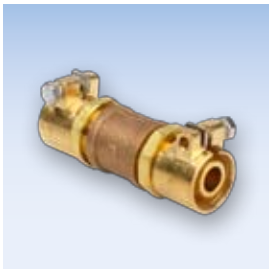
NB: PN6 Fittings are applicable to all tube with Suffix C and all "Cool" Tube

– Max operating pressure: 6 bar (16 bar)
– Max fluid temperature: +95°C (+25°C)
– PE-Xa and PE pipes: SDR 11
– Supporting pipe material: CW617N
– Clamping ring material: CW617N

Microflex PE-X coupling	PE-X d_{out} / s	Thread	Weight
Art. No.	mm	inch	kg
MJ3413425/23 *(N)*	25/2,3	3/4" M	0,22
MJ3414425/23	25/2,3	1" M	0,29
MJ3414432/29	32/2,9	1" M	0,35
MJ3415440/37	40/3,7	1 1/4" M	0,61
MJ3415450/46	50/4,6	1 1/4" M	0,87
MJ3416450/46 *(N)*	50/4,6	1 1/2" M	0,82
MJ341263/58	63/5,8	2" M	1,39
MJ341275/68	75/6,8	2" M	1,80
MJ34121275/68 *(N)*	75/6,8	2 1/2" M	1,80
MJ341390/82	90/8,2	3" M	2,98
MJ3413110/10	110/10,0	3" M	3,76
MJ3414110/10 *(N)*	110/10,0	4" M	3,77

(New) References will replace the MJ341... (grey) references in the course of this year. Please refer for more details.

PE-X x PE-X coupling



	PE-X d_{out} / s	Thread	PE-X d_{out} x d_{out}
Art. No.	mm	inch	mm
MJ27025/23	25/2,3	2 x 3/4"	25 x 25
MJ27032/29	32/2,9	2 x 1"	32 x 32
MJ27040/37	40/3,7	2 x 1 1/4"	40 x 40
MJ27050/46	50/4,6	2 x 1 1/2"	50 x 50
MJ27063/57	63/5,8	2 x 2"	63 x 63
MJ27075/68	75/6,8	2 x 2 1/2"	75 x 75
MJ27090/82	90/8,2	2 x 3"	90 x 90
MJ270110/10	110/10	2 x 4"	110 x 110

PE-X x PE-X elbow coupling

	PE-X d_{out} / s	Thread	PE-X d_{out} x d_{out}
Art. No.	mm	inch	mm
MJ9025/23	25/2,3	2 x 3/4"	25 x 25
MJ9032/29	32/2,9	2 x 1"	32 x 32
MJ9040/37	40/3,7	2 x 1 1/4"	40 x 40
MJ9050/46	50/4,6	2 x 1 1/2"	50 x 50
MJ9063/58	63/5,8	2 x 2"	63 x 63
MJ9075/68	75/6,8	2 x 2 1/2"	75 x 75
MJ9090/82	90/8,2	2 x 3"	90 x 90
MJ90110/10	110/10	2 x 4"	110 x 110

MICROFLEX® PE-X COUPLINGS - 6 BAR

3 x PE-X T-coupling

	PE-X d_{out} / s	Thread	PE-X d_{out} x d_{out} x d_{out}
Art. No.	mm	inch	mm
MJ13025/23	25/2,3	3 x 3/4"	25 x 25 x 25
MJ13032/29	32/2,9	3 x 1"	32 x 32 x 32
MJ1304032/37	40/3,7 + 32/2,9	2 x 1 1/4" + 1 x 1"	40 x 32 x 40
MJ13040/37	40/3,7	3 x 1 1/4"	40 x 40 x 40
MJ1305040/46	50/4,6 + 40/3,7	2 x 1 1/2 + 1 x 1 1/4"	50 x 40 x 50
MJ13050/46	50/4,6	3 x 1 1/2"	50 x 50 x 50
MJ1306350/58	63/5,8 + 50/4,6	2 x 2" + 1 x 1 1/2"	63 x 50 x 63
MJ13063/58	63/5,8	3 x 2"	63 x 63 x 63
MJ13075/68	75/6,8	3 x 2 1/2"	75 x 75 x 75
MJ13090/82	90/8,2	3 x 3"	90 x 90 x 90
MJ130110/10	110/10	3 x 4"	110 x 110 x 110

Straight coupling for use in piping systems equipped with transport pipes for sanitary, cold or hot water applications. The coupling has a long supporting pipe for optimal clamping, a cylindrical outside thread connection and a clamping ring with stainless steel bolt. The included remote plate makes it easier to fit the coupling.

NB: PNIO Fittings are applicable to all Tubes with Suffix S

– Max operating pressure: 10 bar
– Max fluid temperature: +95°C
– PE-Xa pipes: SDR 7.4
– Supporting pipe material: CW602N
– Clamping ring material: CW617N

Microflex PE-X coupling	PE-X d_{out} / s	Thread	Weight
Art. No.	mm	inch	kg
MJ3413420/28	20/2,8	3/4" M	0,17
MJ3413425/35 *(N)*	25/3,5	3/4" M	0,22
MJ3414425/35	25/3,5	1" M	0,29
MJ3414432/44	32/4,4	1" M	0,35
MJ3415440/55	40/5,5	1 1/4" M	0,59
MJ3415450/69	30/6,9	1 1/4" M	0,89
MJ3416450/69 *(N)*	50/6,9	1 1/2" M	0,90
MJ341263/87	63/8,7	2" M	1,47

(New) References will replace the MJ341... (grey) references in the course of this year.

PE-X x PE-X coupling

	PE-X d_{out} / s	Thread	PE-X d_{out} x d_{out}
Art. No.	mm	inch	mm
MJ27025/35	25/3,5	2 x 3/4"	25 x 25
MJ27032/44	32/4,4	2 x 1"	32 x 32
MJ27040/55	40/5,5	2 x 1 1/4"	40 x 40
MJ27050/69	50/6,9	2 x 1 1/2"	50 x 50
MJ27063/87	63/8,7	2 x 2"	63 x 63

PE-X x PE-X elbow coupling

	PE-X d_{out} / s	Thread	PE-X d_{out} x d_{out}
Art. No.	mm	inch	mm
MJ9025/35	25/3,5	2 x 3/4"	25 x 25
MJ9032/44	32/4,4	2 x 1"	32 x 32
MJ9040/55	40/5,5	2 x 1 1/4"	40 x 40
MJ9050/69	50/6,9	2 x 1 1/2"	50 x 50
MJ9063/87	63/8,7	2 x 2"	63 x 63

3 x PE-X T-coupling

	PE-X d_{out} / s	Thread	PE-X d_{out} x d_{out} x d_{out}
Art. No.	mm	inch	mm
MJ13025/35	25/3,5	3 x 3/4"	25 x 25 x 25
MJ13032/44	32/4,4	3 x 1"	32 x 32 x 32
MJ1304032/55	40/5,5 + 32/3,5	2 x 1 1/4" + 1 x 1"	40 x 32 x 40
MJ13040/55	40/5,5	3 x 1 1/4"	40 x 40 x 40
MJ1305040/69	50/6,9 + 40/5,5	2 x 1 1/2 + 1 x 1 1/4"	50 x 40 x 50
MJ13050/69	50/6,9	3 x 1 1/2"	50 x 50 x 50
MJ1306350/87	63/8,7 + 50/6,9	2 x 2" + 1 x 1 1/2"	63 x 50 x 63
MJ13063/87	63/8,7	3 x 2"	63 x 63 x 63

Fix point

Suitable for applications where the ends of pipes need to be anchored.
Fix points must be installed to absorb the possible effects of thermal expansion / shrinkage of the PE-Xa transport pipes. The non-application of fix points may result in serious damage.

NB: These fittings can be used in conjunction with PN60 and PN10 straight couplings/terminal connectors to produce Tee and 90° Elbow Assemblies.

	Thread
Art. No.	inch
MFP34	3/4" MF
MFP44	1" MF
MFP54	1 1/4" MF
MFP64	1 1/2" MF
MFP2	2" MF
MFP212	2 1/2" MF
MFP3	3" MF
MFP4	4" MF

Sleeve

	Thread
Art. No.	inch
VW27034	3/4" FF
VW27044	1" FF
VW27054	1 1/4" FF
VW27064	1 1/2" FF
VW2702	2" FF
VW270212	2 1/2" FF
VW2703	3" FF
VW2704	4" FF

Elbow piece

	Thread
Art. No.	inch
VW9034	3/4" FF
VW9044	1" FF
VW9054	1 1/4" FF
VW9064	1 1/2" FF
VW902	2" FF
VW90212	2 1/2" FF
VW903	3" FF
VW904	4" FF

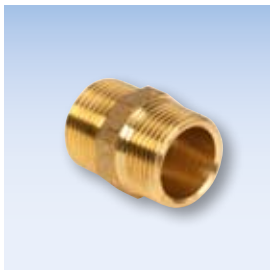
T-piece

	Thread
Art. No.	inch
VW13034	3/4" FFF
VW13044	1" FFF
VW13054	1 1/4" FFF
VW13064	1 1/2" FFF
VW1302	2" FFF
VW130212	2 1/2" FFF
VW1303	3" FFF
VW1304	4" FFF

Reduction MxF

	Thread
Art. No.	inch
VW2414434	1" M x 3/4" F
VW2415434	1 1/4" M x 3/4" F
VW2415444	1 1/4" M x 1" F
VW2416434	1 1/2" M x 3/4" F
VW2416444	1 1/2" M x 1" F
VW2416454	1 1/2" M x 1 1/4" F
VW241234	2" M x 3/4" F
VW241244	2" M x 1" F
VW241254	2" M x 1 1/4" F
VW241264	2" M x 1 1/2" F
VW24121254	2 1/2" M x 5/4" F
VW24121264	2 1/2" M x 6/4" F
VW2412122	2 1/2" M x 2" F
VW241344	3" M x 1" F
VW241354	3" M x 1 1/4" F
VW24132	3" M x 2" F
VW2413212	3" M x 2 1/2" F

Nipple



	Thread
Art. No.	inch
VW28034	3/4" M
VW28044	1" M
VW28054	1 1/4" M
VW28064	1 1/2" M
VW2802	2" M
VW280212	2 1/2" M
VW2803	3" M
VW2804	4" M

Stop

	Thread
Art. No.	inch
VW29034	3/4" M
VW29044	1" M
VW29054	1 1/4" M
VW29064	1 1/2" M
VW2902	2" M
VW290212	2 1/2" M
VW2903	3" M
VW2904	4" M

Ball valve

	Thread
Art. No.	inch
VW35034	3/4" M
VW35044	1" M
VW35054	1 1/4" M
VW35064	1 1/2" M
VW3502	2" M
VW350212	2 1/2" M
VW3503	3" M
VW3504	4" M

Flange

	Thread
Art. No.	inch
MDF34	3/4" F
MDF44	1" F
MDF54	1 1/4" F
MDF64	1 1/2" F
MDF2	2" F
MDF212	2 1/2" F
MDF3	3" F
MDF4	4" F

PE x PE pipe coupling

Polypropylene coupling for use in cold and cooling water systems. Suitable for connection to PE transport pipes.

– Max operating pressure at 20°C: 16 bar for 32-63 mm
– Max operating pressure at 20°C: 10 bar for 75-110 mm
– PE pipes: SDR 11
– Material: polypropylene

	PE d_{out} / s	PE d_{out} x d_{out}
Art. No.	mm	mm
MPP27032/29	32 / 2,9	32 x 32
MPP27040/37	40 / 3,7	40 x 40
MPP27050/46	50 / 4,6	50 x 50
MPP27063/57	63 / 5,7	63 x 63
MPP27075/68	75 / 6,8	75 x 75
MPP27090/82	90 / 8,2	90 x 90
MPP270110/10	110 / 10,0	110 x 110

PE x PE Elbow piece

	PE d_{out} / s	PE d_{out} x d_{out}
Art. No.	mm	mm
MPP9032/29	32 / 2,9	32 x 32
MPP9040/37	40 / 3,7	40 x 40
MPP9050/46	50 / 4,6	50 x 50
MPP9063/57	63 / 5,7	63 x 63
MPP9075/68	75 / 6,8	75 x 75
MPP9090/82	90 / 8,2	90 x 90
MPP90110/10	110 / 10,0	110 x 110

3 x PE T-piece

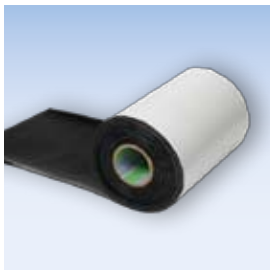
	PE d_{out} / s	PE d_{out} x d_{out}
Art. No.	mm	mm
MPP13032/29	32 / 2,9	32 x 32 x 32
MPP13040/37	40 / 3,7	40 x 40 x 40
MPP13050/46	50 / 4,6	50 x 50 x 50
MPP13063/57	63 / 5,7	63 x 63 x 63
MPP13075/68	75 / 6,8	75 x 75 x 75
MPP13090/82	90 / 8,2	90 x 90 x 90
MPP130110/10	110 / 10,0	110 x 110 x 110

Male-threaded coupling

	PE d_{out} / s	Thread
Art. No.	mm	inch
MPP3414432/29	32 / 2,9	1" M
MPP3415440/37	40 / 3,7	1 1/4" M
MPP3416450/46	50 / 4,6	1 1/2" M
MPP341263/57	63 / 5,7	2" M
MPP34121275/68	75 / 6,8	2 1/2" M
MPP341390/82	90 / 8,2	3" M
MPP3414110/10	110 / 10,0	4" M

ACCESSORIES OUTSIDE CASING

Repair tape



Used to repair incidental local damage to the outside casing.
MHB200: Heat-shrinkable wrapping tape
MHK150: Cold-applied wrapping tape.

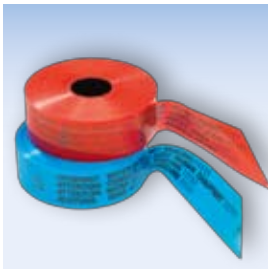
	Repair tape	L x W
Art. No.		m
MHB200	Heat-shrinkable tape	10 x 0,20
MHK150	Cold-applied tape	10 x 0,15

Shrink sleeve

Used to repair incidental local damage to the outside casing. Slide the sleeve over the damaged area, heat with hot air (be sure not to burn the outside casing) and apply gentle pressure wearing protective gloves.

	Outside casing d_{out}	Width
Art. No.	mm	mm
MHM75/90	75 - 90	220
MHM125	125	220
MHM160	160	220
MHM200	200	220

Warning tape



Used to show the location of underground pipes during excavation work. The tape is placed in the trenches above the pre-insulated pipe.

	Warning tape	L x W
Art. No.		m
MTRW	Attention: water pipe (red)	250 x 0,08
MTRB	Attention: water pipe with heating cable (blue)	250 x 0,08

MICRO SEAL (for pressurised water)

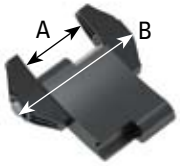
This pressurised water-impermeable wall seal can be applied directly in drilled holes and bricked-up, plastic and fibre cement wall feed-throughs.
The Micro Seal chain comprises a number of links that expand when tightened to produce a very tight seal.

Drill a hole according to minimum and maximum dimensions (see column wall opening).

Apply the Micro Seal chain around the outer jacket. Make sure that a straight line of at least 60 cm is maintained before and after the belt. Bends are not allowed.

Slide the pipe with Micro Seal chain into the wall opening.

By tightening the bolts of the evenly spaced links, the pressure plates are uniformly compressed, filling the annular space between the pipe and the wall opening.

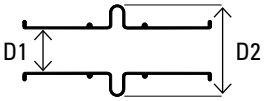


	Outside casing d_{out}	Micro Seal width		Wall opening	Moment Nm	
		Rubber A	Width bolts B		Min.	Max.
Art. No.	mm	mm	mm	mm		
9LS200 (1)	75	43	60	100 - 102	3,0	3,5
7LS300	75	62	83	110 - 115	9,0	11,0
8LS300 (1)	90	62	83	128 - 132	9,0	11,0
9LS315	90	62	85	134 - 136	10,0	12,0
7LS475 (1)	125	-	-	For MCS 8	26,0	32,5
6LS325	125	65	115	175 - 180	11,8	14,5
7LS325 (1)	160	65	115	209 - 212	11,8	14,5
7LS400	160	86	145	240 - 245	30,0	37,0
13LS300	160	62	83	200 - 202	9,0	11,0
9LS325	200	65	115	250 - 255	11,8	14,5
8LS400	200	86	145	275 - 282	30,0	37,0
10LS575 (1)	200	-	-	For MCS 12	47,0	61,0

(1) Can be used together with an MCS sleeve.

MCS sleeve

Designed to ensure durable water impermeability in combination with the Micro Seal chain. The MCS sleeve should preferably be bricked in.
Made from HDPE, the sleeve is resistant to changes in pressure and temperature as well as most chemicals.



	Outside casing d_{out}	Micro Seal	D1	D2	MCS thickness
Art. No.	mm	mm	mm	mm	mm
MCS 4	75	9LS200	102	212	4,8
MCS 5	90	8LS300	130	241	4,8
MCS 8	125	7LS475	209	321	4,8
MCS 8	160	7LS325	209	321	4,8
MCS 12	200	10LS575	311	422	4,8

MMDV Wall feed-through (for non-pressurised water)

The MMDV wall feed-through comprises a profiled HDPE pipe and shrink sleeve. After the pipe is bricked in (protruding 10 cm out of the wall), the Microflex pipe is fed through and sealed with the shrink sleeve.
The minimum wall thickness is 40 cm.

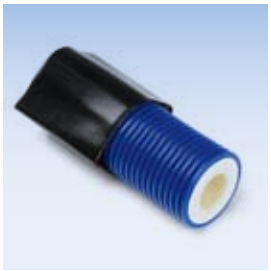
	Microflex pipe with casing d_{out}	Wall feed-through pipe d_{out}	Wall hole
Art. No.	mm	mm	mm
MMDV75	75	110	210
MMDV90	90	110	210
MMDV125	125	160	260
MMDV160	160	200	300
MMDV200	200	235	350

Insulated T-piece kit

Guarantees complete insulation and sealing of branch connections between Uno, Duo and Quadro pipes.
Kit comprises 2 halves in HDPE, rock wool insulation, sealer kit, stainless steel bolts and assembly instructions.

	Microflex pipe with casing d_{out}	L	W	H	Weight
Art. No.	mm	mm	mm	mm	kg
MT129075	125/90/75	960	590	200	5,5
MT201612	200/160/125	1170	750	270	8,0

Heat shrinkable caps to be ordered separately!



Reductions for insulated T-piece kit MT201612

Used where the difference in diameter at a transition is too big. Reductions comprise an outside casing with interior insulation and a shrink sleeve. The reduction is pressed into the insulated T-piece kit.

Art. No.	Description
MR24116075	160 to 75 reduction
MR24116090	160 to 90 reduction

Insulated I-piece kit

Guarantees complete insulation and sealing of straight extensions of Uno, Duo and Quadro pipes.
Kit comprises 2 halves in HDPE, rock wool insulation, sealer kit, stainless steel bolts and assembly instructions.

	Microflex pipe with casing d_{out}	L	W	H	Weight
Art. No.	mm	mm	mm	mm	kg
MM129075	125/90/75	960	290	200	4,5
MM201612	200/160/125	1170	345	270	5,5

Heat shrinkable caps to be ordered separately!

Insulation kit I variant

Guarantees complete insulation and sealing of straight extensions of Uno, Duo and Quadro pipes.
Kit comprises a smooth black HDPE pipe, rock wool insulation, 2 shrink sleeves, adhesive tape and assembly instructions.

	Microflex pipe with casing d_{out}	L	MM insulation kit d_{out}	Weight
Art. No.	mm	mm	mm	kg
MM75/90	75/90	700	110	1,8
MM125	125	850	140	2,5
MM160	160	1000	180	4,0
MM200	200	1000	225	6,0

Heat shrinkable caps to be ordered separately!

Insulated elbow 90° piece kit

Guarantees complete insulation and sealing of perpendicular connections between Uno, Duo and Quadro pipes.
Kit comprises 2 halves in HDPE, rock wool insulation, sealer kit, stainless steel bolts and assembly instructions.

	Microflex pipe with casing d_{out}	L	W	H	Weight
Art. No.	mm	mm	mm	mm	kg
MH201612	200/160/125	740	740	270	7,5

Heat shrinkable caps to be ordered separately!

Insulated trouser piece kit

Guarantees complete insulation and sealing of straight extensions between 1 Quadro and 2 Duo or 1 Duo to 2 Uno pipes.
Kit comprises 2 halves in HDPE, rock wool insulation, sealer kit, stainless steel bolts and assembly instructions.

	Microflex pipe with casing d_{out}	L	W	H	Weight
Art. No.	mm	mm	mm	mm	kg
MBR201612	200/160/125	1170	460	230	7,0

Heat shrinkable caps to be ordered separately!

Inspection chamber

Used to connect Uno, Duo and Quadro pipes. The HDPE inspection chamber has 6 connection points, enables connections of different pipes and integration of shut off valves.
Kit comprises inspection chamber, lid, stainless steel bolts, sealer kit and assembly instructions.

	Microflex pipe with casing d_{out}	Diameter MIS	H	Weight
Art. No.	mm	mm	mm	kg
MIS	200/160/125	810	770	35

Heat shrinkable caps to be ordered separately!

	Outside casing d_{out}	Length
Art. No.	mm	mm
MHM125	125	220
MHM160	160	220
MHM235	200	220

Installation time

The installation time is highly dependant on local conditions. Obstacles, use of tools and weather can have a significant impact on the installation.

Outside casing d_{out}	PE(X-a) d_{out}	Time	Number of workers
mm	mm	minutes *	
UNO (100 m)			
75	25	40	3
90	32	40	3
90 / 125 / 160	40	60	3
125 / 160	50	60	3
125 / 160	63	60	4
160 / 200	75	75	4
161 / 200	90	90	5
200	110	90	5
DUO (100 m)			
125 / 160	25	40	3
125 / 160	32	40	3
160	40	60	3
160 / 200	50	60	3
200	63	60	4
QUADRO (100 m)			
160	25	60	4

* All installation times are approximate. Transport and digging not included.

Accessories

	Time	Number of workers
	minutes *	
Terminal connections PE-X/PE-X up to DN 50	15 min.	1
Terminal connections PE-X/PE-X from DN 63 up to DN 90	20 min.	1
Tees PE-X up to DN 50	30 min.	1
Tees PE-X from DN 63 up to DN 90	40 min.	1
Insulation casings Ø 125 – 200 type MM/MH	20 min.	1
Insulation casings Ø 125 – 200 type MT/MBR	30 min.	1
Shrink caps Ø 125 – 200 mm	15 min.	1

* All installation times are approximate. Transport and digging not included.

Coil sizes

Outside casing d_{out}	Microflex pipes							
	20 m		50 m		75 m		Full coil	
mm	w (m)	d (m)	w (m)	d (m)	w (m)	d (m)	w (m)	d (m)
75	0,20	1,55	0,20	1,85	0,25	1,90	0,30	1,90
90	0,20	1,55	0,30	1,85	0,35	1,90	0,45	2,00
125	0,25	1,75	0,40	2,10	0,55	2,10	0,70	2,10
160	0,30	1,90	0,55	2,20	0,70	2,30	0,85	2,30
200	0,40	2,00	0,80	2,30	1,10	2,30	1,40	2,30

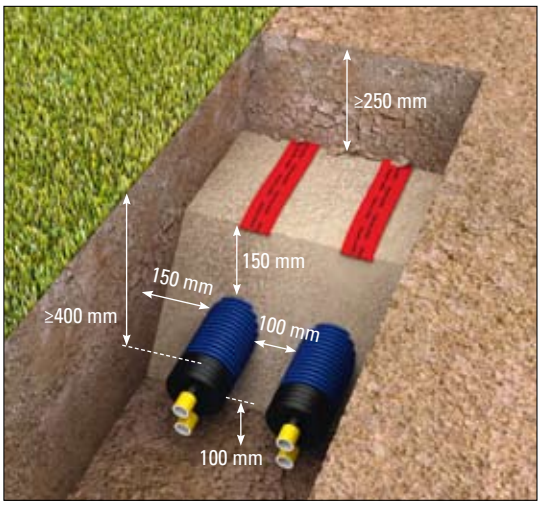
Groundwork

The Microflex pipes are laid in trenches in the ground. It is most practical to lay the excavated ground alongside the trench. The following steps can be performed from the other side:

- Position the role alongside the trench
- Remove the packaging foil
- Place the end of the pipe in position
- Cut the outermost straps
- Roll the pipe alongside or straight into the trench
- Cut the middle straps
- Roll out further
- Cut the innermost straps
- Roll out completely
- Apply the dust caps or shrink caps
- Connect your pipes with couplings
- Conduct the pressure test – fill in the report
- Fill the trench with a first layer
- Apply the warning tape
- Fill up the trench

The following guidelines should be followed during pipe installation:

- Lay the pipes in a bed of sand
- Avoid damaging the casing, remove sharp objects from the ground
- Always grasp the transport pipe and not the outer tube
- Keep to the stated bending radiuses
- Lay the line in a serpentine course
- The code of good craftsmanship for installing underground pipes must be observed. Read our installation instructions
- Sketch how and where the pipe network runs on a plan (including branches and connections), which you should keep

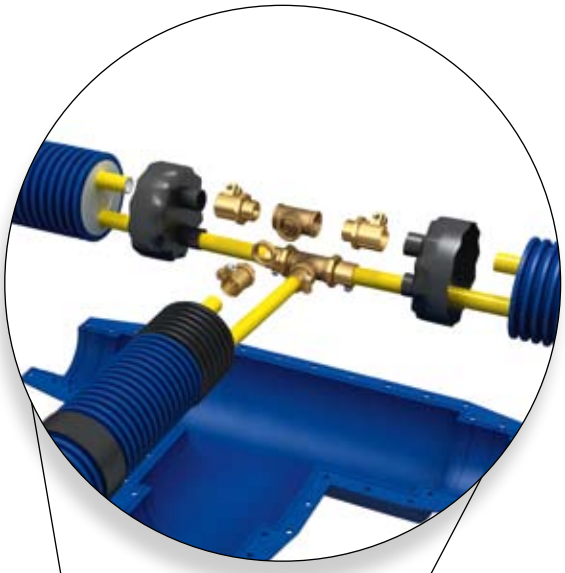


A Microflex pipe buried at a depth of no less than 50 cm and no more than 6 metres can bear a load of up to 60 tonnes. Placement must be performed in compliance with the prevailing ATV-DVWK-A127 guidelines for buried pipes.

NB: These guidelines are for illustrative purposes only and for specific applications please refer

Examples of connections

NB: Insultation casing kits for Tees, 90° elbow, PEX x PEX connector assemblies also include rock wool insulation, sealer kits, SS fixings abd assembly instructions, see pages 31-32



Heat loss tables

The use of PE-X pipes has proved successful for years in many installations worldwide. Data in the tables reflect principal standards and directives that have been established for cross-linked PE-X pipes by competent national and international authorities.
The values used in calculating the heat loss charge are:
λ Insulation: 0.0365 W/m.K
λ Ground: 1.2 W/m.K
λ PE-Xa pipe: 0.35 W/m.K
Depth of cover over top of pipe: 50 cm
With the ΔT being calculated, the heat loss per metre of piping can easily be read along the corresponding line of the table.

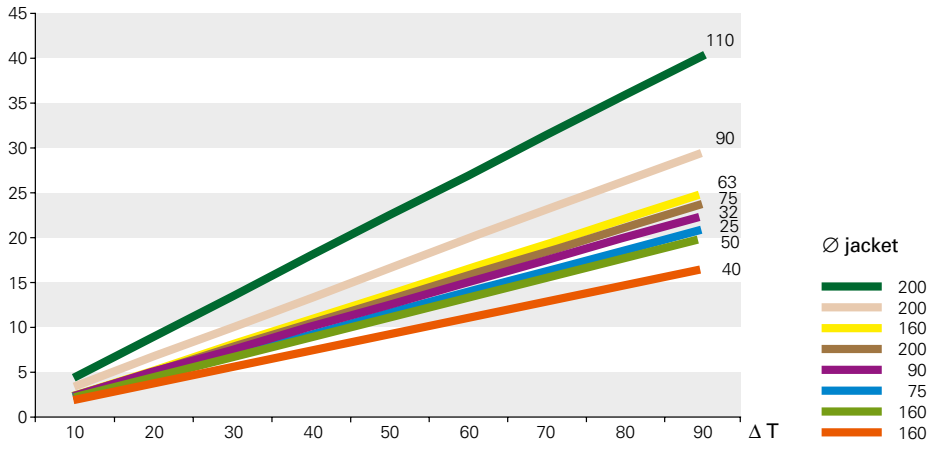
For UNO

$\Delta T = T_v - T_o$

T_v : Flow temperature
T_o : Ground temperature

MICROFLEX® UNO range

Heat losses in W/m



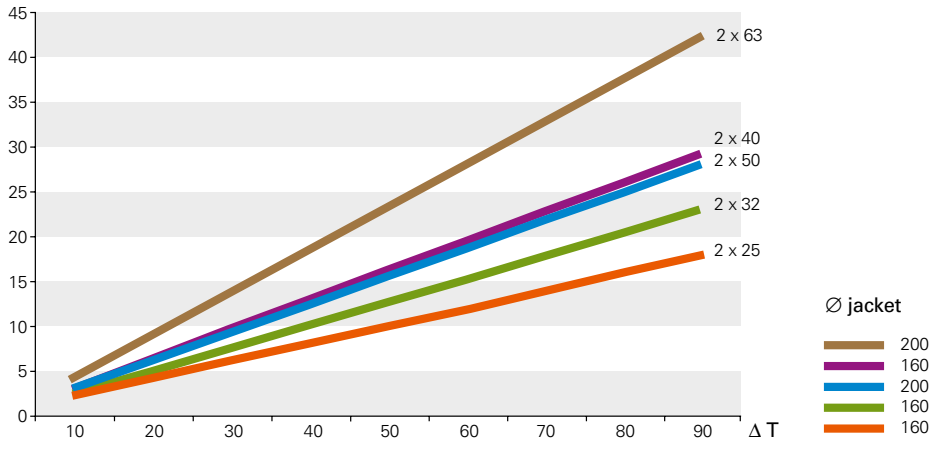
For DUO

$\Delta T = \frac{(T_v + T_r)}{2} - T_o$

T_v : Flow temperature
T_r : Return temperature
T_o : Ground temperature

MICROFLEX® DUO range

Heat losses in W/m



Pressure loss table

Heating capacity in Watts calculated at a ΔT of 20°C

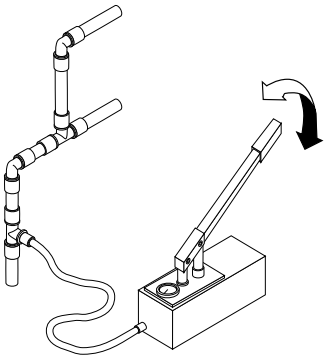
Pipe rugosity: 0,007 mm Water density: 0.97190 g/cm³ Water temperature: 80°C

		PE-Xa pipe					
		25 x 2,3		32 x 2,9		40 x 3,7	
l/s	Δt : 20°C Watts	v m/s	R Pa/m	v m/s	R Pa/m	v m/s	R Pa/m
1	2	5	6	7	8	9	10
0,030	2.512,0	**0,09**	**7,5**	-	-	-	-
0,035	2.930,7	**0,11**	**9,8**	-	-	-	-
0,040	3.349,4	**0,12**	**12,3**	-	-	-	-
0,045	3.768,1	**0,14**	**15,1**	-	-	-	-
0,050	4.186,8	**0,16**	**18,2**	0,09	5,5	-	-
0,055	4.605,5	**0,17**	**21,5**	0,10	6,5	-	-
0,060	5.024,1	**0,18**	**25,0**	0,11	7,6	-	-
0,065	5.442,8	**0,20**	**28,7**	0,12	8,7	-	-
0,070	5.861,5	**0,21**	**32,7**	0,13	9,9	-	-
0,075	6.280,2	**0,23**	**36,9**	0,14	11,2	0,09	4,0
0,080	6.698,9	**0,24**	**41,4**	0,15	12,5	0,10	4,4
0,085	7.117,5	**0,26**	**46,0**	0,16	13,9	0,10	4,9
0,090	7.536,2	**0,28**	**50,9**	0,17	15,4	0,11	5,4
0,095	7.954,0	**0,29**	**56,0**	0,18	16,9	0,11	6,0
0,100	8.373,6	**0,31**	**61,4**	0,19	18,5	0,12	6,5
0,120	10.048,3	**0,37**	**84,8**	0,22	25,6	0,14	9,0
0,140	11.723,0	**0,43**	**111,5**	0,26	33,6	0,17	11,8
0,160	13.397,7	**0,49**	**141,6**	0,30	42,5	0,19	14,9
0,180	15.072,4	**0,55**	**174,9**	0,33	52,4	0,22	18,4
0,200	16.747,0	**0,61**	**211,3**	0,37	63,2	0,24	22,1
0,220	18.421,9	**0,67**	**250,9**	0,41	74,9	0,26	26,2
0,240	20.096,6	**0,73**	**239,5**	0,45	87,5	0,29	30,6
0,260	21.771,3	**0,80**	**339,3**	**0,48**	**101,0**	0,31	35,3
0,280	23.446,0	**0,86**	**388,1**	**0,52**	**115,4**	0,34	40,3
0,300	25.120,8	**0,92**	**439,9**	**0,56**	**130,7**	0,36	45,5
0,320	26.795,5	**0,98**	**494,7**	**0,59**	**146,8**	0,38	51,1
0,340	28.470,2	**1,04**	**552,4**	**0,63**	**163,7**	0,41	57,0
0,360	30.144,9	**1,10**	**613,2**	**0,67**	**181,5**	0,43	63,1
0,380	31.819,6	1,16	676,9	**0,70**	**200,2**	0,46	69,5
0,400	33.494,4	1,22	743,5	**0,74**	**219,6**	0,48	76,3
0,420	35.169,1	1,28	813,1	**0,78**	**240,0**	0,50	83,2
0,440	36.843,8	1,35	885,6	**0,82**	**261,1**	0,53	90,5
0,460	38.518,5	1,41	961,0	**0,85**	**283,1**	0,55	98,1
0,480	40.193,2	1,47	1.039,3	**0,89**	**305,8**	**0,58**	**105,9**
0,500	41.868,0	1,53	1.120,5	**0,93**	**329,4**	**0,60**	**114,0**
0,550	46.054,8	1,68	1.336,0	**1,02**	**392,0**	**0,66**	**135,4**
0,600	50.241,6	1,84	1.569,5	**1,11**	**459,6**	**0,72**	**158,6**
0,650	54.428,4	1,99	1.820,8	**1,21**	**532,2**	**0,78**	**183,4**
0,700	58.615,2	-	-	**1,30**	**609,8**	**0,84**	**209,8**
0,750	62.802,0	-	-	**1,39**	**692,3**	**0,90**	**237,9**
0,800	66.988,8	-	-	1,48	779,8	**0,96**	**267,7**
0,850	71.175,6	-	-	1,58	872,2	**1,02**	**299,0**
0,900	75.362,4	-	-	1,67	969,4	**1,08**	**332,0**
0,950	79.549,2	-	-	1,76	1.071,5	**1,14**	**366,6**
1,000	83.736,0	-	-	1,85	1.178,5	**1,20**	**402,8**
1,050	87.922,8	-	-	1,95	1.290,3	1,26	440,6
1,100	92.109,6	-	-	2,04	1.406,9	1,32	480,0
1,150	96.296,4	-	-	-	-	1,38	521,0
1,200	100.483,2	-	-	-	-	1,44	563,5
1,250	104.670,0	-	-	-	-	1,50	607,6
1,300	108.856,8	-	-	-	-	1,56	653,3
1,350	113.043,6	-	-	-	-	1,62	700,6
1,400	117.230,4	-	-	-	-	1,68	749,4
1,450	121.417,2	-	-	-	-	1,74	799,8
1,500	125.604,0	-	-	-	-	1,80	851,7
1,550	129.790,8	-	-	-	-	1,86	905,2
1,600	133.977,6	-	-	-	-	1,92	960,3
1,650	138.164,4	-	-	-	-	1,98	1.016,9
1,700	142.351,2	-	-	-	-	2,04	1.075,0

Conversion: 1 Watt = 0.860 kcal

		PE-Xa pipe						PE-Xa pipe						PE-Xa pipe	
		50 x 4,6		63 x 5,8				75 x 6,8		90 x 8,2				110 x 10	
l/s	Δt : 20°C Watts	v m/s	R Pa/m	v m/s	R Pa/m	l/s	Δt : 20°C Watts	v m/s	R Pa/m	v m/s	R Pa/m	l/s	Δt : 20°C Watts	v m/s	R Pa/m
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
0,100	8.373,6	0,08	2,3	0,05	0,7	0,30	25.116	0,10	2,2	0,07	0,9	0,40	33.488	0,06	0,6
0,150	12.560,4	0,11	4,6	0,07	1,5	0,35	29.302	0,12	2,9	0,08	1,2	0,50	41.860	0,08	0,9
0,200	16.747,2	0,15	7,6	0,10	2,5	0,40	33.488	0,14	3,7	0,09	1,5	0,60	50.233	0,09	1,2
0,250	20.934,0	0,19	11,2	0,12	3,7	0,45	37.674	0,15	4,5	0,11	1,9	0,70	58.605	0,11	1,6
0,300	25.120,8	0,23	15,5	0,14	5,0	0,50	41.860	0,17	5,4	0,12	2,3	0,80	66.977	0,13	2,0
0,350	29.307,6	0,27	20,4	0,17	6,6	0,55	46.047	0,19	6,4	0,13	2,7	0,90	75.349	0,14	2,5
0,400	33.494,4	0,31	25,9	0,19	8,4	0,60	50.233	0,20	7,5	0,14	3,1	1,00	83.721	0,16	3,0
0,450	37.681,2	0,34	31,9	0,22	10,3	0,65	54.419	0,22	8,6	0,15	3,6	1,20	100.465	0,19	4,1
0,500	41.868,0	0,38	38,6	0,24	12,5	0,70	58.605	0,24	9,9	0,16	4,1	1,40	117.209	0,22	5,4
0,550	46.054,8	**0,42**	**45,8**	0,26	14,8	0,75	62.791	0,25	11,2	0,18	4,7	1,60	133.953	0,25	6,9
0,600	50.241,6	**0,46**	**53,5**	0,29	17,3	0,80	66.977	0,27	12,5	0,19	5,2	1,80	150.698	0,28	8,5
0,650	54.428,4	**0,50**	**61,8**	0,31	19,9	0,85	71.163	0,29	14,0	0,20	5,8	2,00	167.442	0,31	10,3
0,700	58.615,2	**0,54**	**70,7**	0,33	22,8	0,90	75.349	0,30	15,5	0,21	6,5	2,40	200.930	0,38	14,3
0,750	62.802,0	**0,57**	**80,1**	0,36	25,8	0,95	79.535	0,32	17,0	0,22	7,1	2,80	234.419	0,44	18,9
0,800	66.988,8	**0,61**	**90,0**	0,38	28,9	1,00	83.721	0,34	18,7	0,24	7,8	3,20	267.907	**0,50**	**24,1**
0,850	71.175,6	**0,65**	**100,4**	0,41	32,3	1,05	87.907	0,35	20,4	0,25	8,5	3,60	301.395	**0,57**	**29,8**
0,900	75.362,4	**0,69**	**111,4**	0,43	35,8	1,10	92.093	0,37	22,2	0,26	9,3	4,00	334.884	**0,63**	**36,2**
0,950	79.549,2	**0,73**	**122,9**	0,45	39,4	1,15	96.279	0,39	24,0	0,27	10,0	4,40	368.372	**0,69**	**43,0**
1,000	83.736,0	**0,76**	**134,9**	**0,48**	**43,2**	1,20	100.465	0,41	25,9	0,28	10,8	4,80	401.860	**0,75**	**50,5**
1,050	87.922,8	**0,80**	**147,4**	**0,50**	**47,2**	1,30	108.837	**0,44**	**30,0**	0,31	12,5	5,20	435.349	**0,82**	**58,4**
1,100	92.109,6	**0,84**	**160,5**	**0,53**	**51,4**	1,40	117.209	**0,47**	**34,3**	0,33	14,3	5,60	468.837	**0,88**	**66,9**
1,150	96.296,4	**0,88**	**174,0**	**0,55**	**55,7**	1,50	125.581	**0,51**	**38,8**	0,35	16,2	6,00	502.326	**0,94**	**76,0**
1,200	100.483,2	**0,92**	**188,1**	**0,57**	**60,1**	1,60	133.953	**0,54**	**43,6**	0,38	18,2	6,40	535.814	**1,01**	**85,6**
1,250	104.670,0	**0,96**	**202,7**	**0,60**	**64,7**	1,70	142.326	**0,57**	**48,7**	0,40	20,3	6,80	569.302	**1,07**	**95,7**
1,300	108.856,8	**0,99**	**217,8**	**0,62**	**69,5**	1,80	150.698	**0,61**	**54,0**	0,42	22,5	7,20	602.791	**1,13**	**106,3**
1,350	113.043,6	**1,03**	**233,4**	**0,65**	**74,4**	1,90	159.070	**0,64**	**59,6**	0,45	24,8	7,50	627.907	**1,18**	**114,6**
1,400	117.230,4	**1,07**	**249,5**	**0,67**	**79,5**	2,00	167.442	**0,68**	**65,4**	**0,47**	**27,2**	8,00	669.767	**1,26**	**129,2**
1,450	121.417,2	**1,11**	**266,1**	**0,69**	**84,8**	2,10	175.814	**0,71**	**71,5**	**0,49**	**29,7**	8,40	703.256	**1,32**	**141,4**
1,500	125.604,0	**1,15**	**283,2**	**0,72**	**90,2**	2,20	184.186	**0,74**	**77,9**	**0,52**	**32,3**	8,80	736.744	**1,38**	**154,1**
1,550	129.790,8	**1,19**	**300,8**	**0,74**	**95,7**	2,30	192.558	**0,78**	**84,4**	**0,54**	**35,0**	9,20	770.233	**1,45**	**167,4**
1,600	133.977,6	**1,22**	**318,8**	**0,77**	**101,4**	2,40	200.930	**0,81**	**91,3**	**0,56**	**37,9**	9,40	786.977	1,48	174,2
1,650	138.164,4	**1,26**	**337,4**	**0,79**	**107,3**	2,50	209.302	**0,84**	**98,3**	**0,59**	**40,8**	9,60	803.721	1,51	181,1
1,700	142.351,2	**1,30**	**356,5**	**0,81**	**113,3**	2,60	217.674	**0,88**	**105,7**	**0,61**	**43,8**	9,80	820.465	1,54	188,2
1,750	146.538,0	1,34	376,1	**0,84**	**119,4**	2,70	226.047	**0,91**	**113,2**	**0,63**	**46,9**	10,00	837.209	1,57	195,4
1,800	150.724,8	1,38	396,2	**0,86**	**125,8**	2,80	234.419	**0,95**	**121,0**	**0,66**	**50,1**	10,50	879.070	1,65	214,0
1,900	159.098,4	1,45	437,8	**0,91**	**138,8**	2,90	242.791	**0,98**	**129,1**	**0,68**	**53,4**	11,00	920.930	1,73	233,4
2,000	167.472,0	1,53	481,3	**0,96**	**152,5**	3,00	251.163	**1,01**	**137,4**	**0,71**	**56,8**	11,50	962.791	1,81	253,5
2,100	175.845,6	1,61	526,9	**1,00**	**166,8**	3,20	267.907	**1,08**	**154,7**	**0,75**	**63,9**	12,00	1.004.651	1,89	274,5
2,200	184.219,2	1,68	574,3	**1,05**	**181,6**	3,40	284.651	**1,15**	**172,9**	**0,80**	**71,4**	12,50	1.046.512	1,96	296,3
2,300	192.592,8	1,76	623,8	**1,10**	**197,1**	3,60	301.395	**1,22**	**192,2**	**0,85**	**79,3**	13,00	1.088.372	2,04	318,8
2,400	200.966,4	1,84	675,1	**1,15**	**213,1**	3,80	318.140	**1,28**	**212,3**	**0,89**	**87,6**	13,50	1.130.233	2,12	342,2
2,500	209.340,0	1,91	728,4	**1,20**	**229,8**	4,00	334.884	**1,35**	**233,4**	**0,94**	**96,2**	14,00	1.172.093	2,20	366,3
2,600	217.713,6	1,99	783,6	**1,24**	**247,0**	4,20	351.628	1,42	255,5	**0,99**	**105,3**	14,50	1.213.953	2,28	391,2
2,700	226.087,2	-	-	**1,29**	**264,8**	4,40	368.372	1,49	278,5	**1,03**	**114,7**	15,00	1.255.814	2,36	416,9
2,800	234.460,8	-	-	**1,34**	**283,2**	4,60	385.116	1,55	302,4	**1,08**	**124,4**	15,50	1.297.674	2,44	443,4
2,900	242.834,4	-	-	1,39	302,2	4,80	401.860	1,62	327,3	**1,13**	**134,6**	16,00	1.339.535	2,52	470,7
3,000	251.208,0	-	-	1,43	321,8	5,00	418.605	1,69	353,1	**1,18**	**145,1**	16,50	1.381.395	2,59	498,8
3,100	259.581,6	-	-	1,48	341,9	5,20	435.349	1,76	379,8	**1,22**	**156,0**	17,00	1.423.256	2,67	527,6
3,200	267.955,2	-	-	1,53	362,6	5,40	452.093	1,82	407,5	**1,27**	**167,3**	17,50	1.465.116	2,75	557,2
3,300	276.328,8	-	-	1,58	383,9	5,60	468.837	1,89	436,1	**1,32**	**178,9**	18,00	1.506.977	2,83	587,7
3,400	284.702,4	-	-	1,63	405,8	5,80	485.581	1,96	465,6	**1,36**	**190,9**	18,50	1.548.838	2,91	618,8
3,500	293.076,0	-	-	1,67	428,2	6,00	502.326	2,03	496,0	1,41	203,3	19,00	1.590.698	2,99	650,8
3,600	301.449,6	-	-	1,72	451,2	6,20	519.070	2,09	527,4	1,46	216,0	19,50	1.632.558	3,07	683,6
3,700	309.823,2	-	-	1,77	474,8	6,40	535.814	2,16	559,6	1,50	229,1	20,00	1.674.419	3,14	717,1
3,800	318.196,8	-	-	1,82	498,9	6,60	552.558	2,23	592,8	1,55	242,6	20,50	1.716.279	3,22	751,4
3,900	326.570,4	-	-	1,86	523,7	6,80	569.302	2,30	626,9	1,60	256,5	21,00	1.758.140	3,30	786,5
4,000	334.944,0	-	-	1,91	549,0	7,00	586.047	2,36	661,9	1,65	270,7	21,50	1.800.000	3,38	822,3
4,100	343.317,6	-	-	1,96	574,8	7,20	602.791	2,43	697,9	1,69	285,2	22,00	1.841.860	3,46	858,9
4,200	351.691,2	-	-	2,01	601,3	7,40	619.535	2,50	734,7	1,74	300,2	22,50	1.883.721	3,54	896,3

Conversion: 1 Watt = 0.860 kcal

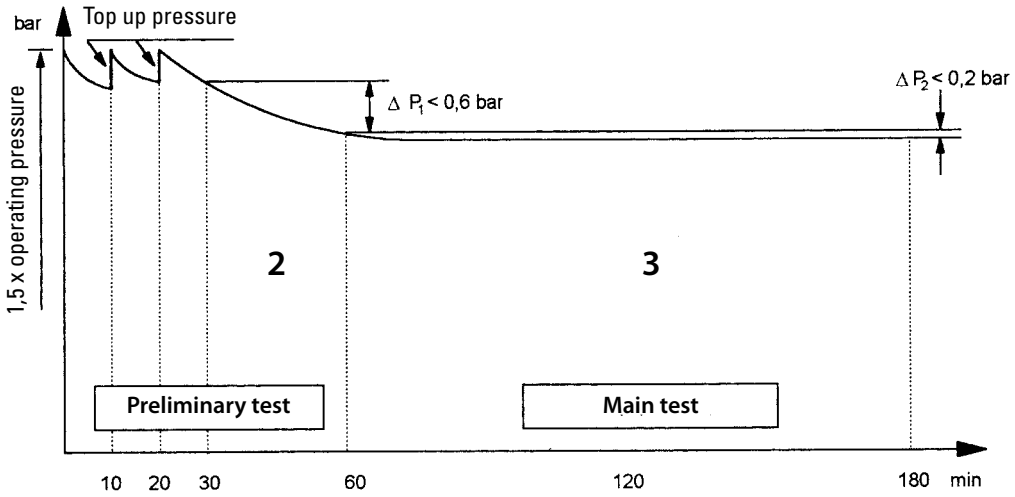


Pressure test according to DIN 1988 - 2

The pressure test procedure is obligatory before closing the trench!

1. **Pressure tests** constitute contractually agreed auxiliary work essential to the accomplishment of the contract and also form part of the contractor's performance without being stated in the performance specification. Prior to concealing, fill the finished pipework with water, taking care to avoid air locks. The pressure test must be conducted in two parts, starting with the preliminary test, followed by the main test.
2. **Preliminary test**
   The preliminary test involves applying a test pressure equal to 1.5 times the admissible operating pressure. This pressure must be regenerated twice within the space of 30 minutes at intervals of 10 minutes. Following a test period of another 30 minutes, the test pressure must not have fallen by more than 0,6 bar. Leakages must not occur at any points in the system being tested.
3. **Main test**
   The main test has to be conducted immediately after the preliminary test. The test takes 2 hours. At the end of this period, the test pressure recorded after the preliminary test must not have fallen by more than 0.2 bar. Leakages must not occur at any point in the system being tested.

Leakage testing - DIN 1988 - 2



Test the finished pipe-work before concealing! The state-of-the-art execution and documentation of the pressure test for the entire piping system is a warranty requirement!

		bar / psi
2	**Preliminary test**	
2.1	Operating pressure x 1,5	
2.2	After 10 min (restore 2,1)	
2.3	After 20 min (restore 2,1)	
2.4	After 30 min	
2.5	After 60 min admissible pressure drop < 0,6 bar	

		bar / psi
3	**Main test**	
3.1.1	Beginning	
3.1.2	End	
3.2	Test pressure	
3.3	After 120 min	
3.4	Remarks admissible pressure drop < 0,2 bar	

To ensure that the underground network is completely watertight, we advise you to heat the system at 85°C for one hour, regularly checking that the connections are secure. Let the system cool down to 20°C before conducting a final check of all pipe connections.

See the technical manual for more details.

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For more information,
call us on **+44 (0)1386 446997**

State application

APPLICATIONS		
	HEATING	❑
	SANITARY	❑
	COOLING	❑
	COLD POTABLE	❑

Number take off points *(fill out below):*	
Length / power cons. 1	..... m /..... kW
Length / power cons. 2	..... m /..... kW
Length / power cons. 3	..... m /..... kW
Length / power cons. 4	..... m /..... kW
Length / power cons. 5	..... m /..... kW

If you require more space to enter your requirements, please add list.

Flow temperature °C	.....
Return temperature °C	.....
Flow pressure bar	.....
Volumetric flow m^3/h or l/s	.....
Heating capacity kW	.....
Total length piping network m	.....
Wall feed-through?	YES / NO *
For pressurised water?	YES / NO *
Self-regulating heating cable?	YES / NO *
Installationplan? Non-scalable diagram? *If yes, please add.*	.....
Tender specifications? *If yes, please add.*	YES / NO *

** Delete as appropriate.*

Company name .....

Contact person .....

Function .....

Direct tel .....

Fax .....

E-Mail .....

Address .....

.....

.....

❑ Would you like us to contact you?

❑ Would you like one of our representatives to visit you?

❑ Would you like to receive our technical manual?

❑ Would you like to receive documentation on our products?

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1. DEFINITIONS

In these conditions "We" means Watts Industries UK Limited and "you" means any company, firm or individual from whom we receive an order which we have accepted in writing. "The Goods" means the products, materials and /or services to be supplied by us.

2. APPLICABILITY OF CONDITIONS

2.1 We accept orders for the supply of Goods subject only to these conditions. You accept that these conditions shall govern relations between us to the exclusion of any other terms including, without limitation, conditions and warranties (written or oral, express or implied) even if contained in any of your documents which purport to provide that your own terms shall prevail. No variation or qualification of these conditions or of any quotation or order arising there from shall be valid unless agreed in writing by one of our directors.

2.2 Any quotation or tender of ours does not constitute an offer by us and no order shall result in a binding contract until we have issued a written acceptance of your order, on or before delivery. We will only consider acceptance of orders placed against quotations if received by us within the period stated in the quotation or within 30 days of the date of the quotation if no other period is stated.

3. PURCHASER'S INFORMATION

3.1 Your order must be accompanied by sufficient information to enable us to proceed forth-with otherwise we shall be at liberty to amend the prices quoted to cover any increase in costs which has taken place after the issue of our acceptance of order.

3.2 You warrant that all information and data supplied to us by you, or your agents or representatives is accurate and fully comprehensive for the purpose of fulfilling the contract and you hereby indemnify us in respect of any and all losses, expenses, damages or costs howsoever arising as a result of any failure to comply with this warrant.

4. PRICE

4.1 We reserve the right to amend prices without notice to take account of variations in labour, material and other costs, including without limitation any variations in the prices which we are called upon to pay our suppliers or sub-contractors; any variations to the contract; any extra costs and expenses incurred as a result of site conditions, site agreement, delays, interruptions or any other factors outside our control; and any difference between the Goods and those items specified in the quotation. (Notwithstanding any quotation, tender price or price list) Goods will be invoiced at prices ruling at the date of despatch.

4.2 All prices unless otherwise stated are quoted exclusive of Value Added Tax ("VAT") and VAT will be added to all invoices at the rate applicable on the tax point date which date shall be the date of the invoice. Where before delivery or the date of the invoice, whichever is the earlier, the Goods become subject to any additional duty, VAT, or any other tax or surcharge ("Taxes"), in excess of the sum specified for such liabilities our quotation or invoice, you will be charged and will pay such Taxes.

4.3 If you wish to alter or specify requirements after the issue by us of our acceptance of order, such variation shall be effective only if accepted by us in writing, provided always that you will be liable for any and all additional charges in respect thereof.

5. TECHNICAL DATA

5.1 All drawings, illustrations, designs, plans, computations, descriptions, weights and measures included in our quotation or other literature are, unless otherwise indicated, approximations only and shall not form part of the contract.

5.2 Any performance figures given by us are based on experience and are such as would be expected to be obtained on test. We will not accept liability if such performance figures are not obtained unless we have specifically guaranteed such figures in the contract in writing.

6. DELIVERY

6.1 The Goods will be at your risk as soon as they have been delivered or, if earlier, when you are notified that they are available for delivery.

6.2 You will be responsible for unloading and accepting delivery and for the safe custody of the Goods.

6.3 We reserve the right to deliver Goods by instalments and in such event each instalment shall be treated as a separate contract provided that the deliveries of further instalments may be withheld until the Goods or materials comprised in earlier instalments have been paid for in full.

6.4 Any periods of time quoted or accepted by us for despatch, delivery or completion of the order are to be treated as estimates only, not involving us in any liability to you in respect of loss suffered as a result of failure to despatch, deliver or complete within such a period of time. Estimated time for despatch, delivery and completion of the contract will run from the date of receipt by us of your order and all information required pursuant to clause 3, together with any payment due with such order.

6.5 In circumstances where the Goods have been produced or modified to a specification supplied by you, then if we do not receive forwarding instructions sufficient to enable despatch to be made within 14 days after notification that the Goods are ready for despatch, you will be deemed to have taken delivery and we may (without prejudice to any of our other rights) dispose of the Goods ordered at the best price reasonably available and recover from you any shortfall between the contract price and price actually obtained, or may arrange for storage of the Goods at our premises or elsewhere as we may so determine at your cost.

7. PACKING

7.1 Unless otherwise agreed packing cases and the like are not included in the contract price and will be charged extra.

7.2 The manner of packing shall be at our discretion. No liability shall be accepted for failure to pack to any particular standard or against any particular risk unless the requirement for such packing is specifically brought to our attention in writing, accepted by us and paid for by you.

8. CLAIMS

8.1 Notice of any claim relating to shortage of or damage to the Goods must be made to us and to the carrier in writing within 3 days of receipt of the Goods. In the event of loss or non-delivery of the Goods you must notify us and the carrier in writing within 3 days of receiving the advice note.

8.2 We will consider claims only if the above conditions are met and the claim is signed by you and accompanied by full particulars giving your invoice and order number and, a copy of the delivery note in respect of the Goods which, in the case of shortage or damage to the Goods, must bear an appropriately qualified signature, for example, "material received damaged. (signed)"

8.3 Our liability hereunder in respect of any shortage loss or damage to the Goods shall be limited to repair or replacement free of charge or refund of the proportion of the price attributable to the Goods undelivered lost or damaged, at our option.

9 PAYMENT TERMS

9.1 Payments will be due as specified on the quotation and/or invoice. Payment is to be made in pounds sterling, by cheque or banker's draft drawn on a British clearing bank, by transfer into such an account as we may notify to you, or as we may otherwise agree in writing.

9.2 Where only part of the Goods are despatched, payment shall be made of the contract price attributable to that part.

9.3 In the event of any delay or delays in despatch, delivery, installation and/or completion which are attributable to your actions or failure to act, you must make payment to us in accordance with the above as if the Goods had been delivered, installed, and/or completed at the times at which but for such delay or delays such delivery, installation and/or completion would have taken place. Any extra costs incurred as a result of such delay or delays will be added to the contract price and will be payable by you.

9.4 We reserve the right to charge interest on late payment of four per cent per annum above the base rate quoted by Barclays Bank plc from time to time on the daily balance from the due date until payment in full is made, and to recover from you any and all costs incurred in connection with the recovery of overdue sums.

9.5 If any payment falls into arrears, we will have the right to cancel or postpone performance of the contract, wholly or in part, and to be paid immediately for performance of the contract to date (if any).

9.6 No claim by you under warranty or otherwise shall entitle you to any deduction, retention or withholding of any part of any sums due for payment hereunder. You will not be entitled to any setoff of obligations within or between contracts with us.

10. RISK AND TITLE

10.1 Risk passes to you on delivery of the Goods or, if earlier, when you are notified that they are available for delivery.

10.2. Whilst risk in Goods supplied to you will pass on delivery, legal and beneficial ownership of the Goods will remain with us until such time as we have received payment in full for all Goods supplied to you and until such time you keep such Goods separate from your property and clearly identified as our property.

10.3 Notwithstanding terms of payment specified herein or elsewhere, payment for all Goods supplied to you shall become due immediately if you fail to pay for the Goods on the due date (or fail to pay any instalment in which case the whole outstanding balance shall immediately become due) or if you are declared bankrupt or compound with your creditors or, being a company, go into voluntary, or compulsory liquidation, or enter into a composition with your creditors or have an administrator or an administrative receiver or manager appointed over all or part of your assets or if otherwise declared insolvent or prohibited from trading, and you must immediately notify us thereof and in such circumstances you will not be entitled to resell or otherwise deal with the Goods; you must not part with possession of any Goods; and will have the right, without prejudice to any other remedies, to withhold delivery of any undelivered Goods, to stop any Goods in transit, to cease installation of Goods, and to otherwise suspend performance of the contract.

10.4 If payment for any Goods is overdue, whether in whole or in part, and Goods have been delivered to you, we may (without prejudice to any of our other rights) enter upon your premises to recover and/or resell the Goods or such of them as we may in our absolute discretion designate as necessary to recover the amount of payment overdue and our reasonable costs incurred in giving effect to our rights hereunder and for these purposes you hereby irrevocably authorise us to enter and take all necessary and reasonable steps upon your premises.

11. INTELLECTUAL PROPERTY RIGHTS

11.1 All drawings, specifications, technical descriptions and other documents supplied to you under the contract are supplied for your use only and solely in connection with this contract and no licence whatsoever is granted for their use by you and you must not disclose, publish, release, transfer or otherwise make available any such documents to any third party other than its employees and then strictly on a need-to-know basis only. All such documents must be forthwith returned to us in the event that you fail to place an order with us, the contract is terminated for whatsoever reason, or upon our written request.

11.2 You warrant that any design or instruction furnished or given by you shall not be such as shall cause us to infringe any intellectual or industrial property rights owned or enjoyed by a third party in the execution of the contract and shall indemnify us against and all liabilities, claims, damages, costs and losses arising as a result of any such infringement or alleged infringement.

12. INSURANCE

12.1 All materials, plant, machinery and equipment supplied under or provided in connection with the contract shall from the time of delivery to the site installation or other place indicated by you be your sole responsibility and you shall indemnify us in respect of and hold suitable insurance to cover all loss, damage or destruction howsoever caused thereto.

13. TERMINATION BY THE COMPANY

13.1 We will (without prejudice to any other rights hereunder) be entitled to terminate any contract with you forthwith, by written notice to you, if you shall:

13.1.1 fail to pay any amounts falling due (whether under these conditions or otherwise) to us within 30 days of the date payment is due; or

13.1.2 be declared bankrupt or compound with your creditors, or

13.1.3 suffer the appointment of a receiver; or

13.1.4 go into voluntary or compulsory liquidation (other than for purposes of bona fide amalgamation or bona fide reconstruction); or

13.1.5 enter into a composition with your creditors or have an administrator or an administrative receiver or manager appointed over the whole or part of your assets; or

13.1.6 be otherwise declared insolvent or prohibited from trading; or

13.1.7 commit a breach of any terms of the contract or of any other contract with us.

13.2 Upon termination all unpaid invoices rendered by us to you shall become immediately payable.

14. CANCELLATION BY THE PUCHASER

14.1 You may cancel or suspend the contract only with our written consent following agreement by you to reimburse us in an amount to be determined by us having regard to all work carried out and materials acquired up to the time it may be reasonable and practicable to cease manufacture, loss of profit, and costs arising as a result of cancellation.

15. LIMITATIONS OF LIABILITY

15.1 We shall not be liable in contract, tort or otherwise for any expenditure, loss, damage or injury (other than personal injury or death arising out of our negligence for which we must accept liability in accordance with the Unfair Contract Terms Act, 1977, where you are a United Kingdom customer for supply within the United Kingdom) arising out of any use or dealing with the Goods, howsoever such expenditure, loss, damages or injury shall arise, and whether from any defect in the Goods or otherwise.

15.2 You will indemnify us against all and any claims, costs, action or demands whatsoever (including without limitation, in respect of personal injury and death, and damage to Goods) and howsoever arising (whether by virtue of our negligence, our employees, agents, or subcontractors, or otherwise) made by any third party (including your employees) whether direct or indirect, in connection with the contract, including without limitation those relating to the supply, delivery, installation, operation or use of the Goods.

15.3 Without prejudice to foregoing, in the event that we are held liable for any loss, expenditure or damage sustained by you (or any third party), whether directly or indirectly, such liability shall be limited to the aggregate of the sums received by us from you hereunder.

15.4 Without prejudice to the generality of clause 15.1 and notwithstanding clause 15.3, we will not be liable for any consequential losses of any nature, (including without limitation, pure economic loss, indirect loss, los of use, production, profit or contracts) in any circumstances whatsoever.

16. FORCE MAJEURE

16.1 If we are delayed in or prevented from performing our obligations hereunder owing to any cause whatsoever beyond our control, including without limitation act of God, war, strikes, lockouts, trade disputes, or any other cause ("Force Majeure"), we will not be liable for any loss, damage or expense incurred and shall be at liberty to cancel or suspend the contract without incurring any liability arising there from, and you will not in such circumstances be entitled to terminate the contract.

16.2 If the contract shall become impossible to perform by reason of any Force Majeure continuing for a period of 30 days or shall be frustrated, then we may at our sole option forthwith terminate the contract by written notice to you in which case you will be liable to pay to us all costs which we and our sub-contractors and suppliers have incurred or for which they are liable directly or indirectly in connection with the contract, provided that we shall not require payment for any standard parts or materials which we are able to use in any other contract then current. Any payments, which may have been made to us under the contract, will be applied to the aggregate of these sums, which may become due to us hereunder and the excess (if any) will be refunded to us.

17. GENERAL, LAW AND JURISDICTION

17.1 This contract represents the entire agreement between the parties and supersedes all earlier warranties, representation or statements made by the parties (whether oral or in writing) and may only be varied or amended by agreement between the parties signed by one of our directors

17.2 Our liability under the contract is strictly subject to the complete and proper performance by you of all your obligations hereunder.

17.3 It is agreed between us both that these terms and conditions are fully understood by us both and that the price for the Goods sold hereunder and that all other terms and conditions set out herein are accepted in consideration of our express warranties hereunder and your benefits and remedies for breach thereof, as provided in these conditions, to the exclusion of or limitation of other remedies.

17.4 You may not assign, transfer or part with any of your duties or obligations to be performed hereunder without our prior written consent.

17.5 The failure of either party to this contract to exercise or enforce any rights conferred hereunder shall not be deemed to be a waiver of any such right or operate so as to bar the exercise or enforcement thereof at any time or times thereafter.

17.6 The headings of each provision are intended to be for convenience only and do not affect the interpretation thereof.

17.7 The contract shall be deemed to be a contract made in England and shall be construed according to English Law and the parties hereby irrevocably submit to the exclusive jurisdiction of the English Courts

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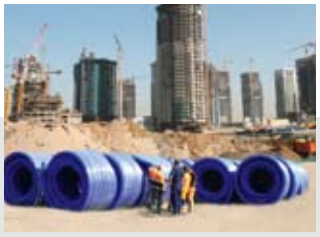

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