aquatherm®

Pre-insulated piping systems for buildings and industrial applications as well as heating and cooling networks“

aquatherm **energy**

Part of the Solution
www.aquatherm.de

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History

1973 Foundation of the aquatherm company by Gerhard Rosenberg
1981 Development of the first pipe system made of polypropylene, green becomes aquatherm's trademark
1991 Foundation of the Radeberg branch
1996 First certification of the quality management system according to ISO 9001
1997 Foundation of sales company in Italy
1999 Development of the fusiotherm® fibre composite pipe
2001 aquatherm is active in more than 50 export markets
2002 Market launch of aquatherm blue
2005 Market launch of aquatherm red and aquatherm black
2010 System extension of pipe dimensions up to max. ø 630 mm
2010 Handover of the management to Christof, Dirk and Maik Rosenberg
2012 First-time certification of the environmental management system in accordance with ISO 14001
2012 Market launch of fusiolen® PP-RP material
2013 First-time certification of the energy management system in accordance with ISO 50001
2017 Opening of the new pipe extrusion facility - one of the most modern of its kind in the world
2018 Opening of the new injection moulding
2018 Foundation of sales company in England
2019 Expansion of industrial prefabrication
2021 Participation in the sales company aquatherm ibérica s.l.
2022 Opening of the aquatherm campus
2023 aquatherm celebrates its 50th anniversary
2024 Jan Kriedel takes over the management with Maik Rosenberg

AQUATHERM ENERGY

Plastic pipework systems made of polypropylene

aquatherm is the world's leading manufacturer of plastic pipework systems made of polypropylene for plant construction and building services. Areas of application include drinking water applications, heating system construction, fire protection sprinkler systems, air conditioning and refrigeration technology, as well as surface heating and cooling systems. The range comprises more than 17,000 items in six product lines.

In order to guarantee the worldwide availability of products and offer local service, aquatherm works closely with long-standing partners in more than 70 countries around the globe. The company employs around 500 people in Germany, Italy and England.

Production takes place exclusively at the German sites in Attendorn (headquarters) and Ennest. This means that customers all over the world can rely on innovative and safe PP-R pipework systems of the highest quality "100% Made in Germany". Today, the family business is managed by Maik Rosenberg, son of aquatherm founder Gerhard Rosenberg, and Jan Kriedel.

AQUATHERM ENERGY

Future-proof in all application areas with customised solutions

aquatherm has the solution to your challenge. Benefit from the versatile application possibilities of our products. aquatherm products can be used in a wide range of applications.

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Here you will find an overview of the areas of application in which you can rely on aquatherm blue Yesterday. Today. Tomorrow.

Heating and
Cooling networks

Industrial and
Residential buildings

LEGEND

PIPE STRUCTURE LEGEND

S	single layer
M	multi-layered
MF	multilayer, fibre-reinforced
RP	increased compressive strength
UV	UV-resistant
OT	oxygen-tight
energy	thermally insulated
HI	flame retardant

MATERIAL LEGEND

PP	Polypropylene
PP-R	Polypropylene Random copolymer
PP-RCT	Polypropylene Random copolymer with increased pressure resistance
PP-RT	Polyethylene with increased temperature resistance

AREAS OF APPLICATION

- Heating and cooling networks
- Refrigeration technology
- Connection to heating / cooling
- Ceiling heating / cooling
- Surface heating / cooling
- Heating system construction
- Industrial underfloor heating
- Maritime applications
- Swimming pool technology
- Sports floor heating / cooling
- Drinking water

UNITS

Lengths	Units in mm (unless otherwise specified)
Weight	Weight in kg/m
Radii	All figures in inches
Contents	Water content litres/metre
SDR	Pressure stages
LE	Delivery unit
RG	Discount group

Pipe diameter

The location and intended use determine the diameter of the PP pipe, and the pipe diameter of the individual pipes and fittings must be compatible with each other so that you can lay a pipe from the connection to the outlet.

aquatherm energy green & blue

Diameter in mm	32	40	50	63	75	90	110	125	160	200	250	315	355
SDR 9 MF RP	○	○	○	○	○	○	○	○	○	-	-	-	-
SDR 9 MF RP	○	-	-	-	-	-	-	-	-	-	-	-	-
SDR 9 MF RP OT	○	-	-	-	-	-	-	-	-	-	-	-	-
SDR 11 MF RP	-	○	○	○	○	○	○	○	○	○	○	○	○
SDR 11 MF RP OT	-	○	○	○	○	○	○	○	○	○	○	-	-
SDR 17.6 MF RP	-	-	-	-	-	-	-	○	○	○	○	○	○

System advantages

Recommended system due to its technical advantages:

	aquatherm energy green	aquatherm energy blue	aquatherm energy blue OT
Low linear expansion	○	○	○
Odourless	○		
Corrosion resistant	○	○	○
Very good welding properties	○	○	○
Low pipe roughness	○	○	○
High impact strength	○	○	○
Heat stabilised		○	○
Recyclable	○	○	
Sound and heat insulating	○	○	○
Low weight	○	○	○
Self-compensating	○	○	○

Areas of application

aquatherm offers a comprehensive range of pre-insulated pipework systems for industrial applications and large building complexes such as hotel resorts. This enables the transport of hot or cold media with very low energy loss. In addition to building and industrial applications, aquatherm energy is particularly suitable for district heating/cooling and local heating/cooling. As underground versions, our pipework systems help to transport heating and cooling water safely and efficiently over long distances, supplying several buildings and even entire cities or conurbations with heat for heating and hot water or cold for air conditioning.

	Geothermal energy	Refrigeration technology	Heating and Cooling networks	Heating and Cooling technology	Technical Media*	Maritime Applications	Drinking water	Irrigation technology	Swimming pool technology
aquatherm energy green					○	○	○	○	○
aquatherm energy blue	○	○	○	○	○	○		○	○
aquatherm energy blue OT	○	○	○	○	○	○			○

*taking into account the resistance of the material

aquatherm energy
Product types

AQUATHERM PRODUCT TYPES

Polypropylene pipework systems

The history of aquatherm pipework systems begins in 1973 with the founding of a company for hot water underfloor heating systems by Gerhard Rosenberg. Initially, the owner's garage and cellar served as the company headquarters and production site. A lot has happened since then.

Over the past 50 years, aquatherm has developed into the world's leading manufacturer of plastic pipework systems made of polypropylene for plant construction and building services. Areas of application include heating and cooling networks, drinking water applications, heating system construction, air conditioning and refrigeration technology, as well as surface heating and cooling systems. The range comprises almost 17,000 items in six product lines.

Thanks to their special material properties, aquatherm pipework systems are characterised by their versatility of use.

The aquatherm pipework systems can be used in all areas of new installation, repair and refurbishment.

Features

aquatherm polypropylene pipework systems put an end to corrosion damage. All materials are corrosion-resistant and have reduced flow noise compared to metal pipework. aquatherm pipework is impermeable to light. This means there is no risk of algae formation.

Processing

aquatherm offers unrivalled joining technology: material unity through fusion. It impresses with the shortest connection times:
e.g. outer diameter 32 mm = 8 sec.

aquatherm connections can be pressurised or put into operation immediately after fusion. There are no waiting times.

Quality is a top priority at aquatherm. This is not only reflected in the national and international test marks, but above all in the satisfaction of aquatherm customers, installers and planners. You can find more information about quality and certificates here

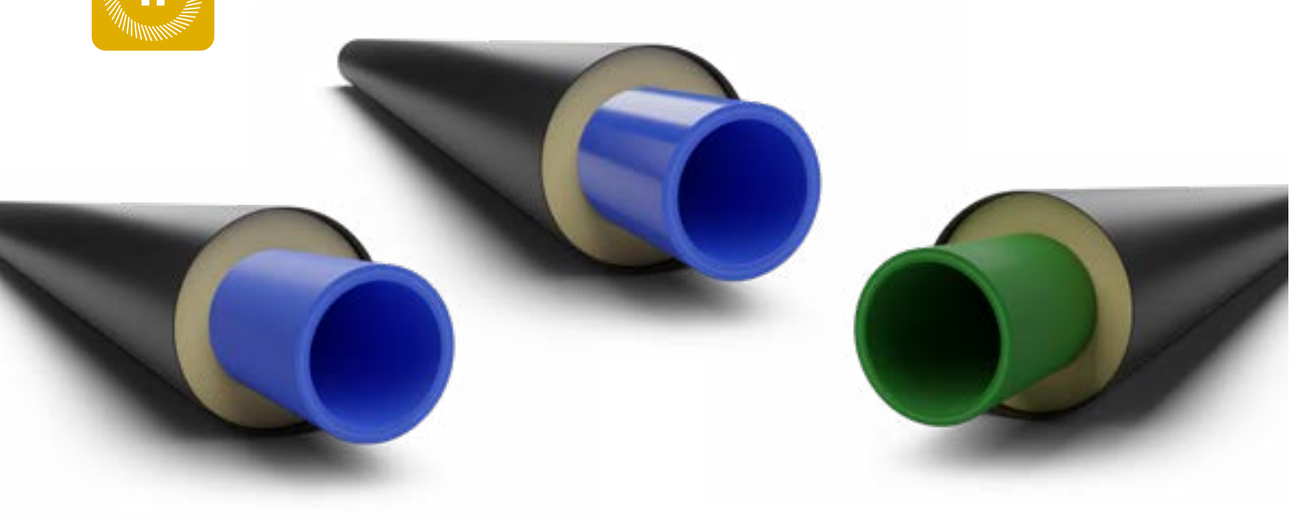
Certificates

Warranty

Due to the high product quality, aquatherm offers a 10-year warranty on all pipes and fittings instead of the 2 years applicable under German law. The extended warranty period is covered by a comprehensive insurance policy from a leading insurance company in our industry. Details can be found in the Warranty section of the catalogue.

Price advantage

aquatherm offers you sophisticated pipework systems with high-quality products at an attractive price/performance ratio.



AQUATHERM ENERGY

Product types

The aquatherm energy pipework system consists of pre-insulated polypropylene pipes, fittings and accessories. All service pipes and fittings used for aquatherm energy are made of the material fusiolen® PP-R/PP-RCT. These are insulated with PUR foam and enclosed in an HDPE casing pipe. The pre-insulated aquatherm energy pipe is particularly suitable for energy-efficient heat and cold transport. The system is the solution for many different applications for the distribution of heat and cold fluids, including in heating and cooling networks, water distribution, geothermal energy, swimming pool technology, open-air cooling, refrigeration systems, open-air heating and air conditioning systems. With our monitoring systems for aquatherm energy, we are setting new standards for the reliability of polypropylene pipework in heating and cooling networks. Two systems are available, each of which uses signals to localise leaks with pinpoint accuracy and automatically report them to the central monitoring unit. The system from Brandes GmbH is installed in the insulation of the pipework system. In the Wioniq system, the sensors are located directly on the pipe. Both systems enable the early detection of leaks before they lead to material or environmental damage, operational interruptions and high repair costs.

Areas of application

- Drinking water networks
- Air conditioning
- Cooling and refrigeration technology
- Swimming pool technology
- Rainwater utilisation
- Irrigation of green spaces
- Heating and cooling networks
- Maritime applications
- Technical media

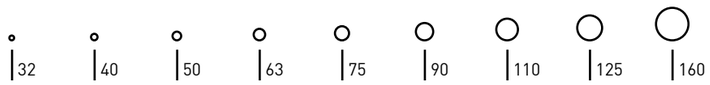
System components

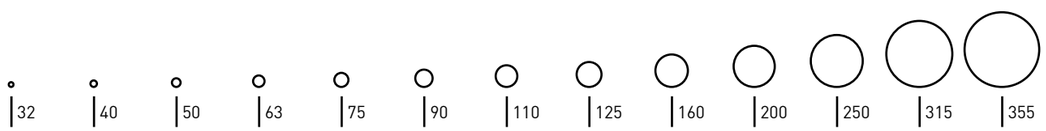
The following system components are available for all aquatherm energy pipework systems:

- Tubes (rods in 5.8 m and 11.6 m lengths)
- Bends 45° and 90° (other degrees on request)
- T-branches
- Reducing branches
- Skip branches
- Reducing-jump-over branches
- aquatherm energy sockets
- aquatherm energy reducing sockets
- aquatherm energy end collar
- Annular space seals
- Socket joints for casing pipes
- Special moulded parts available on request
- Leakage monitoring

Diameter

The location and intended use determine the diameter of the PP pipe. The pipe diameter of the individual pipes and fittings must be compatible so that you can lay a pipe from the connection to the outlet. aquatherm energy is available in the following diameters:

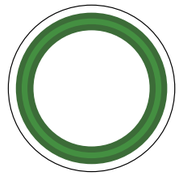




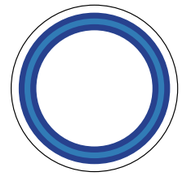
Pressure stages (SDR)

The SDR (Standard Dimension Ratio) is an indicator of pressure resistance. The following applies: the greater the wall thickness, the lower the SDR number and the more pressure-resistant the plastic pipe. The unit indicates the ratio between the outer diameter and wall thickness of a pipe.

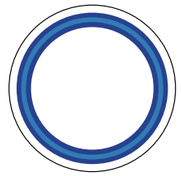
aquatherm energy is available in the following SDR sizes: aquatherm energy green: SDR 9, aquatherm energy blue: SDR 9, SDR 11, SDR 17.6



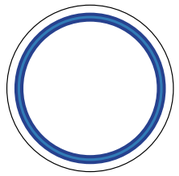
SDR 9



SDR 9



SDR 11



SDR 17,6

AQUATHERM ENERGY

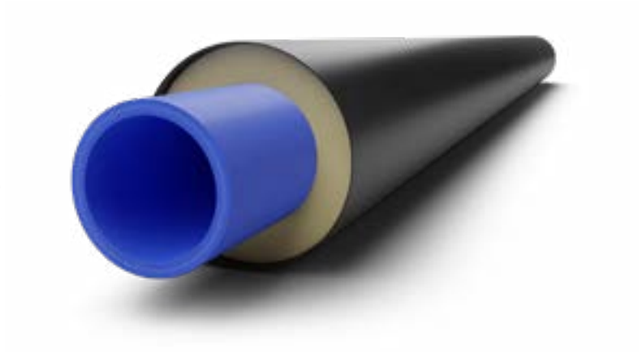
Pipe structure

We offer aquatherm energy in various pipe constructions.

	SDR 9	SDR 11	SDR 17.6
aquatherm energy blue MF RP MF RP = fibre composite pipe, multilayer, fibre-reinforced with increased compressive strength	○ ø: outer medium pipe: 32 mm ø: outer casing pipe: 90 mm	○ ø: outer medium pipe: 40-355 mm ø: outer casing pipe: 110-500 mm	○ ø: outer medium pipe: 125-355 mm ø outer casing pipe: 225-500 mm
aquatherm energy blue MF RP with leak detection MF RP = fibre composite pipe, multilayer, fibre-reinforced with increased compressive strength	○ ø: outer medium pipe: 32 mm ø outer casing pipe: 90 mm	○ ø: outer medium pipe: 40-355 mm ø outer casing pipe: 110-500 mm	○ ø: outer medium pipe: 125-355 mm ø outer casing pipe: 225-500 mm
aquatherm energy blue MF RP OT MF RP OT = fibre composite pipe, multilayer, fibre-reinforced with increased compressive strength and oxygen-tight	○ ø: outer medium pipe: 32 mm ø outer casing pipe: 90 mm	○ ø: outer medium pipe: 40-250 mm ø outer casing pipe: 110-400 mm	
aquatherm energy blue MF RP OT with leak detection MF RP OT = fibre composite pipe, multilayer, fibre-reinforced with increased compressive strength and oxygen-tight	○ ø: outer medium pipe: 32 mm ø outer casing pipe: 90 mm	○ ø: outer medium pipe: 40-250 mm ø outer casing pipe: 110-400 mm	
aquatherm energy green MF RP MF RP = fibre composite pipe, multilayer, fibre-reinforced with increased compressive strength	○ ø: external carrier pipe: 32 -160 mm ø outer casing pipe: 90 -250 mm		
aquatherm energy green MF RP with leak detection MF RP = fibre composite pipe, multilayer, fibre-reinforced with increased compressive strength	○ ø: external carrier pipe: 32 -160 mm ø: outer casing pipe: 90 -250 mm		

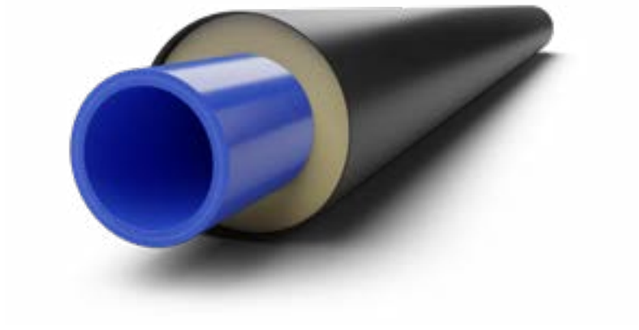
AQUATHERM ENERGY BLUE MF RP

The aquatherm blue pipework system has been specially developed for applications outside of drinking water installations. In addition to the general advantages of a PP-RCT pipework system, aquatherm energy blue offers higher flow rates compared to aquatherm energy green due to smaller pipe wall thicknesses.



AQUATHERM ENERGY BLUE MF RP OT

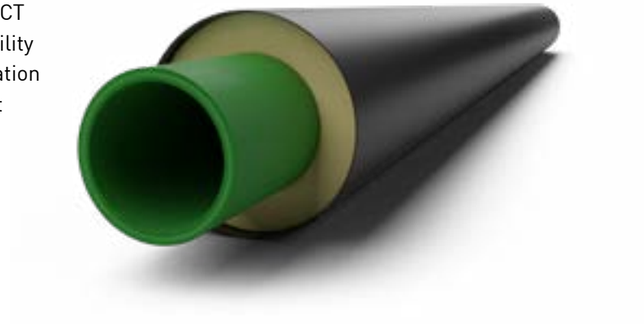
The aquatherm blue pipework system has been specially developed for applications outside of drinking water installations. In addition to the general advantages of a PP-RCT pipework system, aquatherm energy blue offers higher flow rates compared to aquatherm energy green due to smaller pipe wall thicknesses. In combination with our leakage monitoring systems, the pipework system helps to make heating and cooling networks even safer.



Leakage monitoring

AQUATHERM ENERGY GREEN MF RP

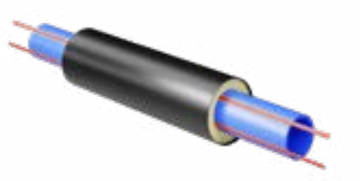
The innovative piping system made of fusiolen® PP-RCT with special fibre reinforcement offers maximum stability and durability. It is particularly suitable for the installation of drinking water pipe networks and fulfils the highest hygiene requirements.



AQUATHERM ENERGY BLUE MF RP OT
with Leak detection

More safety for heating and cooling networks. The aquatherm energy blue system is also available with integrated leakage detection. In combination with modern monitoring systems, it ensures even greater safety and efficiency in heating and cooling networks - a forward-looking solution for a sustainable and reliable energy supply.

System: Brandes

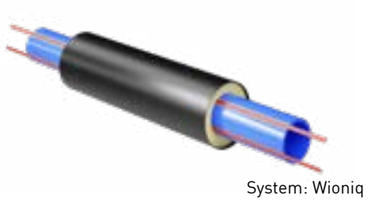


System: Wioniq

AQUATHERM ENERGY BLUE MF RP OT
with Leak detection

aquatherm energy blue MF RP OT offers decisive advantages, particularly in heating and cooling networks and in the geothermal energy sector. Thanks to the new leakage monitoring systems, it ensures maximum safety and reliability - a perfect solution for modern, sustainable pipework systems.

System: Brandes

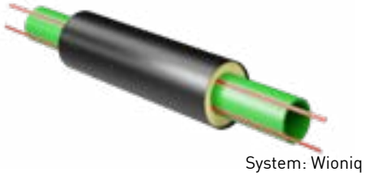


System: Wioniq

AQUATHERM ENERGY GREEN MF RP
with Leak detection

For maximum safety: In addition to the proven benefits of the AQUATHERM ENERGY GREEN MF RP, this variant offers this variant offers integrated leakage monitoring. This allows leaks to be detected at an early stage and-damage can be avoided - for a reliable and sustainable water supply.

Leakage monitoring



System: Wioniq

Permissible operating pressures for general applications

For fittings made of butt-welded pipe segments, a weakening coefficient of 0.75 applies (reduction of the table values by 25 %).

	aquatherm blue				aquatherm green	
Years of operation	SDR 17.6 MF RP	SDR 11 MF RP	SDR 11 S	SDR 9 MF RP	SDR 7.4 MF	SDR 9 MF RP
At a temperature of up to 10 °C						
10	13.1 bar	25.3 bar	19.3 bar	27.5 bar	27.7 bar	27.5 bar
25	12.9 bar	24.7 bar	18.7 bar	27.1 bar	26.9 bar	27.1 bar
50	12.7 bar	24.1 bar	18.2 bar	26.7 bar	26.1 bar	26.7 bar
100	12.6 bar	23.5 bar	17.8 bar	26.3 bar	25.2 bar	26.3 bar
At a temperature of up to 15 °C						
10	12.3 bar	23.4 bar	17.8 bar	25.7 bar	26.9 bar	25.7 bar
25	12.1 bar	22.8 bar	17.2 bar	25.2 bar	26.1 bar	25.2 bar
50	11.9 bar	22.2 bar	16.8 bar	24.9 bar	25.3 bar	24.9 bar
100	11.7 bar	21.6 bar	16.3 bar	24.5 bar	24.5 bar	24.5 bar
At a temperature of up to 20 °C						
10	11.4 bar	21.4 bar	16.4 bar	23.9 bar	26.1 bar	23.9 bar
25	11.2 bar	21.0 bar	15.9 bar	23.5 bar	25.3 bar	23.5 bar
50	11.0 bar	20.4 bar	15.4 bar	23.1 bar	24.5 bar	23.1 bar
100	10.9 bar	19.9 bar	15.0 bar	22.8 bar	23.7 bar	22.8 bar
At a temperature of up to 30 °C						
10	9.8 bar	18.3 bar	13.9 bar	20.6 bar	22.0 bar	20.6 bar
25	9.6 bar	17.8 bar	13.4 bar	20.2 bar	21.3 bar	20.2 bar
50	9.5 bar	17.3 bar	13.0 bar	19.9 bar	20.7 bar	19.9 bar
100	9.4 bar	16.8 bar	12.7 bar	19.7 bar	20.0 bar	19.7 bar
At a temperature of up to 40 °C						
10	8.4 bar	15.5 bar	11.8 bar	17.7 bar	18.7 bar	17.7 bar
25	8.3 bar	15.0 bar	11.3 bar	17.3 bar	18.0 bar	17.3 bar
50	8.1 bar	14.6 bar	11.0 bar	17.1 bar	17.5 bar	17.1 bar
100	8.0 bar	14.1 bar	10.7 bar	16.8 bar	16.8 bar	16.8 bar
At a temperature of up to 50 °C						
10	7.2 bar	13.0 bar	9.9 bar	15.1 bar	15.7 bar	15.1 bar
25	7.0 bar	12.6 bar	9.5 bar	14.7 bar	15.2 bar	14.7 bar
50	6.9 bar	12.2 bar	9.2 bar	14.5 bar	14.7 bar	14.5 bar
100	6.8 bar	11.9 bar	9.0 bar	14.3 bar	14.1 bar	14.3 bar
At a temperature of up to 60 °C						
10	6.1 bar	10.9 bar	8.3 bar	12.7 bar	13.2 bar	12.7 bar
25	5.9 bar	10.6 bar	8.0 bar	12.4 bar	12.6 bar	12.4 bar
50	5.8 bar	10.3 bar	7.7 bar	12.2 bar	12.1 bar	12.2 bar
At a temperature of up to 70 °C						
10	5.1 bar	8.5 bar	7.0 bar	10.7 bar	11.1 bar	10.7 bar
25	5.0 bar	8.3 bar	6.0 bar	10.4 bar	9.6 bar	10.4 bar
50	4.9 bar	8.1 bar	5.1 bar	10.2 bar	8.1 bar	10.2 bar
At a temperature of up to 75 °C						
10	4.6 bar	7.7 bar	6.0 bar	9.7 bar	10.0 bar	9.7 bar
25	4.5 bar	7.6 bar	4.8 bar	9.5 bar	8.0 bar	9.5 bar
50	4.4 bar	7.3 bar	4.0 bar	9.3 bar	6.7 bar	9.3 bar
At a temperature of up to 80 °C						
5	4.3 bar	7.2 bar	5.7 bar	9.0 bar	9.2 bar	9.0 bar
10	4.2 bar	7.0 bar	4.8 bar	8.9 bar	7.8 bar	8.9 bar
25	4.1 bar	6.8 bar	3.9 bar	8.6 bar	6.2 bar	8.6 bar
At a temperature of up to 90 °C						
5	3.5 bar	5.9 bar	3.7 bar	7.4 bar	6.0 bar	7.4 bar
10	3.4 bar	5.8 bar	3.2 bar	7.3 bar	5.1 bar	7.3 bar

Permissible Operating pressures for drinking water systems

(Water flow medium according to DIN 2000)

The permissible pressures were determined with regard to the special conditions to which pipework components are exposed in domestic drinking water installations.

Limiting factors such as increased flow velocities, the use of disinfectants, increased oxygen content, etc. were taken into account by applying appropriate safety factors.

For fittings made of butt-welded pipe segments, a weakening coefficient of 0.75 applies (reduction of the table values by 25 %).

Years of operation	aquatherm green SDR 7.4 MF	aquatherm green SDR 9 MF RP
At a temperature of up to 20 °C		
1	28.6 bar	25.0 bar
5	26.8 bar	24.2 bar
10	26.1 bar	23.9 bar
25	25.3 bar	23.5 bar
50	24.5 bar	23.1 bar
At a temperature of up to 30 °C		
1	24.3 bar	21.7 bar
5	22.8 bar	21.0 bar
10	22.0 bar	20.6 bar
25	21.3 bar	20.2 bar
50	20.7 bar	19.9 bar
At a temperature of up to 40 °C		
1	20.5 bar	18.7 bar
5	19.2 bar	18.0 bar
10	18.7 bar	17.7 bar
25	18.0 bar	17.3 bar
50	17.5 bar	17.1 bar
At a temperature of up to 50 °C		
1	17.5 bar	15.9 bar
5	16.2 bar	15.3 bar
10	15.7 bar	15.1 bar
25	15.2 bar	14.7 bar
50	14.7 bar	14.5 bar
At a temperature of up to 60 °C		
1	14.7 bar	13.5 bar
5	13.7 bar	13.0 bar
10	13.2 bar	12.7 bar
25	12.6 bar	12.4 bar
50	12.1 bar	12.2 bar
At a temperature of up to 65 °C		
1	13.9 bar	12.4 bar
5	12.9 bar	11.9 bar
10	12.5 bar	11.7 bar
25	12.0 bar	11.4 bar
50	10.6 bar	11.2 bar
At a temperature of up to 70 °C		
1	12.4 bar	11.4 bar
5	11.4 bar	10.9 bar
10	11.1 bar	10.7 bar
25	9.6 bar	10.4 bar
30	9.3 bar	10.3 bar
50	8.1 bar	10.2 bar

Cold drinking water

Hot drinking water

aquatherm energy
Characteristics & Special features

AQUATHERM FEATURES AND SPECIALITIES

Material fusiolen®

aquatherm energy is made from corrosion-resistant material. This considerably extends the service life of the pipework, for example for an air conditioning system. The material fusiolen® from aquatherm is characterised by its special high heat and extraction stability, among other things. The physical and chemical properties are tailored to the special requirements of the drinking water and heating sector. Thanks to the exceptionally good welding properties, the pipe and fitting fuse together to form a homogeneous, cohesive unit; this has made the material fusiolen® known worldwide.

The advantages of aquatherm pipes and the material fusiolen® polypropylene in detail

- Corrosion resistant
- Resistant to many chemicals
- High environmental compatibility
- Low pipe roughness
- Heat/sound insulating properties
- High mechanical stability
- Very good welding properties
- Equipped for high thermal stability
- Lighter in weight than metallic systems
- Simple processing

Our material fusiolen® polypropylene

Decades of experience in producing and applying PP-R/-RCT piping systems, along with a continuous commitment to development, have resulted in significant advancements in aquatherm system technology.

Newly developed markets are placing ever greater demands on the pipe material. Versatile areas of application demand the greatest possible independence of the processed materials. Raw materials with novel properties that could not be achieved before are required. For this reason, aquatherm has been developing and producing its own innovative polypropylene materials for many years, which meet the global challenges in sanitary and heating technology, air conditioning and refrigeration technology, industry and agriculture, shipbuilding, and fire protection.

Successful results of this research are fusiolen® PP-R, fusiolen® PP-RCT and fusiolen® PP-R FS.

Environment

The environmentally friendly material polypropylene fusiolen® PP-R/-RCT is recyclable. It can be ground, melted, and reused for products such as engine encapsulations, wheel linings, laundry baskets, and other transport containers, all without any loss of quality. Additionally, no environmentally harmful substances are produced during processing or disposal.

Use of **metal deactivators**

The addition of suitable additives approved under food law demonstrably reduces the risk of material damage caused by metal ions under extreme conditions of use.

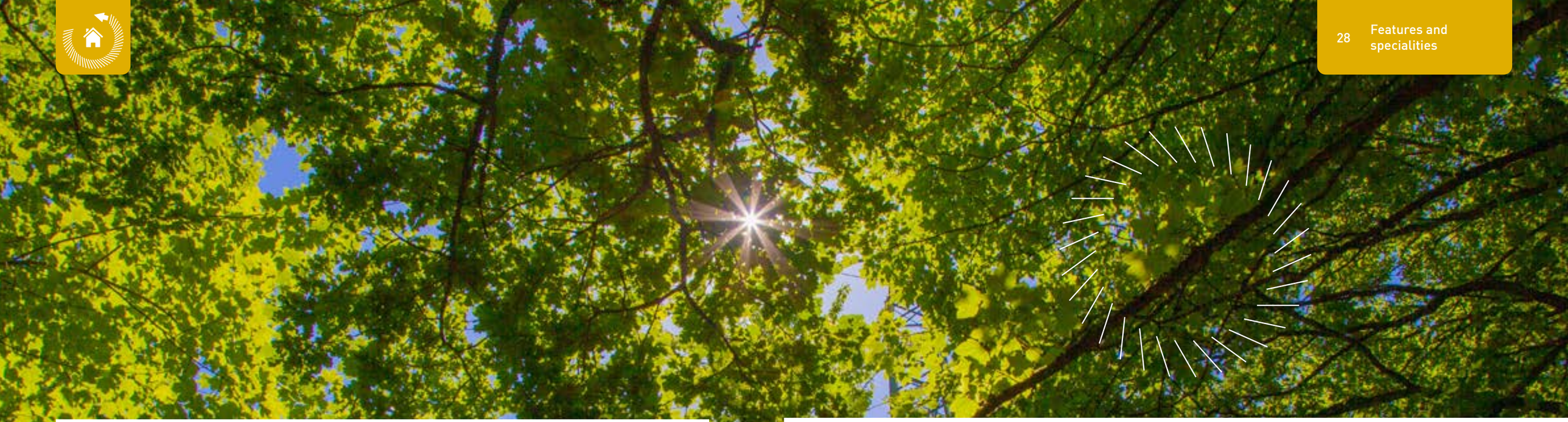
Higher long-term heat stabilisation

The long-term heat stabilisation has been increased in order to provide greater safety against the possible effects of the peak temperatures that occur during operation.

Material characteristics

Drinking water is one of the most extensively tested food products. The pipework system should have as little impact as possible on the water on its way to the tapping points. The selection of a sanitary pipework system made of an appropriate material is therefore of crucial importance. The aquatherm energy green pipework system is equally suitable for all drinking water qualities. The environmentally friendly and hygienically perfect drinking water pipework system made of fusiolen® PP-R/PP-RCT is physiologically and microbiologically harmless and has proven its technical suitability over decades of use worldwide. The extrapolated service life of aquatherm PPR/-RCT pipework is more than 50 years. Peak temperatures of 100 °C caused by short-term faults are unproblematic. Please refer to our tables for the possible temperature loads in continuous operation "Permissible operating pressures" depending on the media temperature.

Permissible operating pressures



AQUATHERM FEATURES AND SPECIALITIES

How aquatherm gets involved

17 goals to change the world: In 2015, the global community developed a roadmap for the future with the "Agenda 2030". This is intended to enable a decent life worldwide and preserve the natural foundations of life in the long term. We at aquatherm want to contribute to achieving these goals with everything we do. Our sustainable products, our comprehensive service and our leading expertise are part of the solution on the way to a climate-neutral life.

We are also a member of the German Sustainable Building Council (DGNB e.V.) and, together with this non-profit organisation, we are looking for ways and solutions to build for tomorrow today.

Climate change

Released CO_2 is the main problem of climate change: it enters the atmosphere and intensifies the greenhouse effect - the earth continues to heat up.

We are convinced that we humans will find solutions to meet this challenge and thus also significantly reduce CO_2 emissions in all sectors.

Construction industry

The construction industry is responsible for 36% of global energy consumption and 39% of energy and process-related CO_2 emissions.

The construction industry has already begun to face up to this responsibility. However, the steps are still too small to achieve the ultimate goal of a "net-zero building" over its entire life cycle.

We need more courageous and visionary pioneers who are determined to take the right path and set an example for the entire industry.

Exceptionally environmentally friendly

As part of its EPD project, the European Plastic Pipe Association TEPPFA analysed the impact of plastic pipe systems on the environment. The result: plastic pipe systems have excellent environmental behaviour in various areas of application and therefore leave a smaller ecological footprint than pipe systems made from other materials.

A pipe system made of polypropylene (25 mm, SDR 7.4), for example, has around seven times lower CO_2 emissions than a comparable steel pipe.

Success through consistent environmental protection

We live environmental protection - consistently. All company processes are geared towards conserving valuable resources, minimising energy consumption and avoiding or recycling waste.

We developed the first fibre composite pipe back in 1999. This required significantly less energy in the production process than the conventional aluminium composite pipe.

Technical data sheet

Technical properties	fusiolen® PP-R	fusiolen® PP-R/ PP-RCT fibre
Melt index 190 °C/5 kg	0.5 g/10 min.	0.5 g/10 min.
Melt index 230 °C/2.16 kg	0.3 g/10 min.	0.3 g/10 min.
Modulus of elasticity	800 $^{N/mm2}$	1200 $^{N/mm2}$
Yield stress	25 $^{N/mm2}$	30 $^{N/mm2}$
Density	0.9 $^{g/cm3}$	1.0 $^{g/cm3}$
Tensile strength	25 MPa	35 MPa
Ignition temperature	430-450 °C	490-500 °C
Linear expansion coefficient	1,5 $^{*10-4\ K-1}$	0.35 $^{*10-4\ K-1}$
Heat conduction coefficient	0.15 W/mK (measured at the pipe)	0.15 W/mK (measured at the pipe)
Pipe friction coefficient	0,007	0,007
(Pipe) bending radius	6 x d	
Water absorption	< 0,02 %	< 0,02 %

Electrical properties	fusiolen® PP-R	fusiolen® PP-R/ PP-RCT fibre
Dielectricity constant	2.3 (at 1 MHz)	2.3 (at 1 MHz)
Breakdown voltage	500 kV/cm	500 kV/cm
Volume resistance	> ^{1017} Ω cm	> ^{1017} Ω cm
Surfaces resistance	^{1014} Ω	^{1014} Ω
Dissipation coefficient	0.0002 (at 50 Hertz)	0.0002 (at 50 Hertz)

AQUATHERM FEATURES AND SPECIALITIES

aquatherm Environmental Product Declaration

Environmental Product declarations: The key to the green building industry

Climate change is one of the greatest challenges of our time. Released CO_2 is the main problem: it is released into the atmosphere and thus increases the greenhouse effect - the earth continues to heat up. Many organisations and companies have recognised the need for action. The idea of sustainability has also arrived in the construction industry, which is responsible for 36% of global energy consumption and 39% of energy and process-related CO_2 emissions. But how do you know how sustainable a product is? Environmental product declarations provide answers to this question.

What is an Environmental Product Declaration?

An Environmental Product Declaration (EPD) describes the impact of a product or service on the environment. It records the resource consumption and emissions over the entire life cycle of the product - from raw material extraction to disposal - and quantifies and evaluates these. An environmental product declaration therefore offers the opportunity to compare different products with one another.

In the Environmental Product Declaration, the characteristics of a product are identified neutrally and in accordance with internationally recognised standards. A precise methodology in accordance with ISO 14025 and EN 15804 is followed and all values are checked by independent third parties for completeness, plausibility and conformity with standards.

However, the EPD is not a certificate, i.e. requirements are placed on the quality and format of the data, but not on the product quality. For the construction sector, it forms an important basis for the ecological assessment of buildings.

What are Product Category Rules?

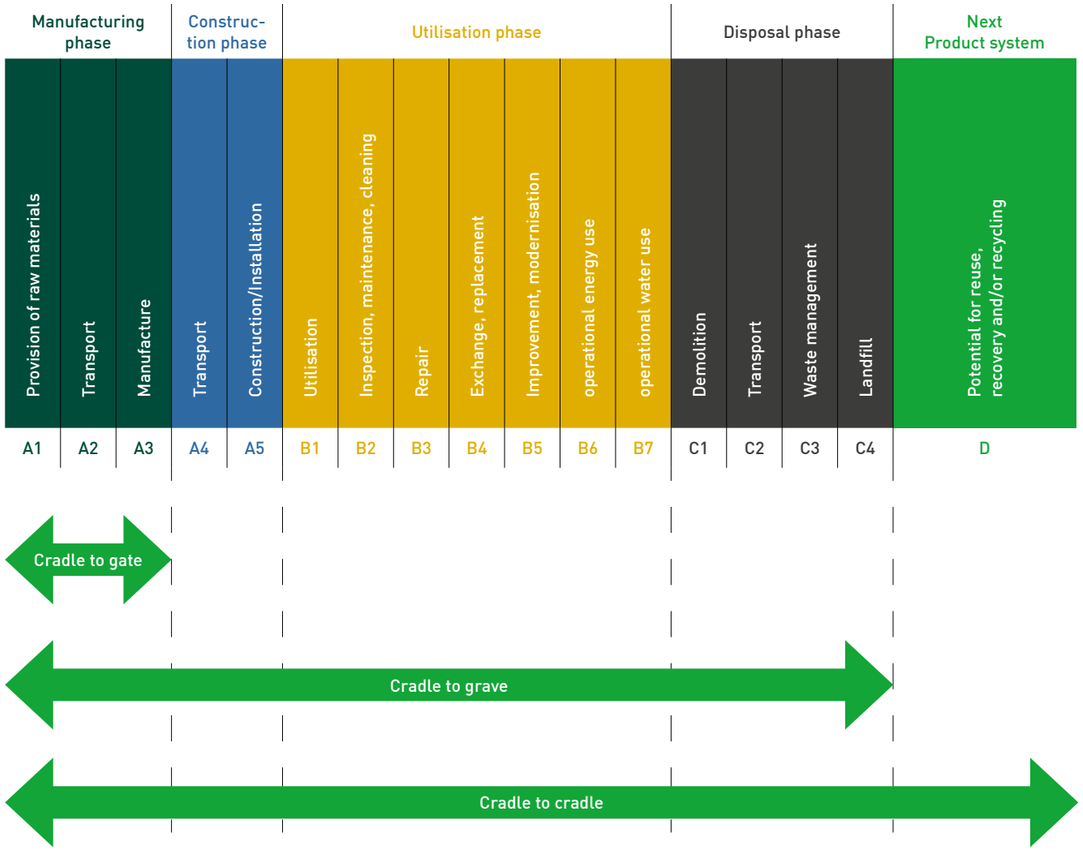
Product Category Rules (PCR) are used to assess functionally similar products in the same way as part of an Environmental Product Declaration. These are a compilation of specific rules, requirements or guidelines according to which products are categorised into groups. Product category rules are established for various items, such as thermal insulation materials, windows and doors, and building pipework systems.

What is a Life Cycle Assessment?

The aim of a life cycle assessment (LCA) is not only to provide environmentally relevant data on specific products, but also to estimate potential environmental impacts and therefore facilitate decisions in favour of or against a particular product. The basis of the LCA is the life cycle of a product. It consists of various phases: Raw material extraction, material production, use, waste treatment, and final disposal. All environmental inputs and outputs are listed. In other words, everything that flows into and out of the product is measured. This can be raw materials or resources, various types of energy, water or emissions to air, soil, or water.

What does the product life cycle include?

A life cycle assessment considers either the entire life cycle of a product or parts of it. A distinction is therefore made between three different approaches to assessing the product life cycle:



1) Cradle to grave / "from the cradle to the grave"
2) Cradle to gate / "from the cradle to the gate"
3) Cradle to cradle / "from the cradle to the cradle"

What environmental impact indicators are there?

Life cycle assessments provide information on the potential impact of a product (or service) on the environment. EN 15804+A2 prescribes 13 core indicators for environmental impacts to be reported for an environmental product declaration, as well as 6 additional, optional environmental impact indicators.

Core indicators according to EN 15804+A2:

Core indicator	Description of the	Unit
GWP-total	Global warming potential	$kgCO_{2-eq.}$
GWP fossil	Global warming potential of fossil fuels	$kgCO_{2-eq.}$
GWP-biogenic	Global warming potential biogenic	$kgCO_{2-eq.}$
GWP-luluc	Global warming potential Land use / change	$kgCO_{2-eq.}$
ODP	Depletion potential of the stratospheric ozone layer	kg CFC11- eq.
AP	Acidification potential of soil and water	mol $^{H+-eq.}$
EP-freshwater	Eutrophication potential Fresh water	kg $_{PO4-eq.}$
EP-marine	Eutrophication potential Sea water	kg N-eq.
EP-terrestrial	Eutrophication potential terrestrial	mol N-eq.
POCP	Formation potential for tropospheric ozone	kg NMVOC-eq.
ADPE	Potential for the depletion of abiotic resources - non-fossil resources (ADP substances)w	kg Sb-eq.
ADPF	Potential for the depletion of abiotic resources - fossil fuels (ADP - fossil fuels)	MJ
WDP	Water removal potential (user)	^{m3} world eq. withdrawn

Additional impact categories according to EN15804+A2 - optional:

Indicator	Description of the	Unit
PM	Potential occurrence of diseases due to particulate matter emissions	Cases of illness
IR	Potential effect of human exposure to U235	kBq U235-eq.
ETP-fw	Potential toxicity comparison unit for ecosystems	CTUe
HTP-c	Potential toxicity comparison unit for humans (carcinogenic effect)	CTUh
HTP-nc	Potential toxicity comparison unit for humans (non-carcinogenic effect)	CTUh
SQP	Potential soil quality index	-

How reliable is a Environmental Product declaration?

Neutral and in accordance with internationally recognised standards: This is how the characteristics of a product are recorded in an environmental product declaration. The precise methodology follows ISO 140253 and EN 158044, and all values are verified by independent third parties. The environmental product declaration is valid for a period of five years. If changes are made to the product's manufacturing process that are likely to cause significant deviations from previous values, a review must be performed.

What advantages does a Environmental Product Declaration offer?

nvironmental product declarations allow companies to take part in public tenders and enable investors to certify their buildings through sustainability systems like BREEAM, LEED, or DGNB. In addition, an environmental product declaration forms the basis for the development and optimisation of sustainable products.

Environmental Product Declarations from aquatherm

Environmental product declarations are vital for the construction industry, and consequently, for us and our customers. This is why we have assessed our products using the „cradle to gate" concept.

Our environmental product declarations are available Sustainability

for the following product groups:

- aquatherm green/blue S/MF pipe
- aquatherm red pipe S/MF
- aquatherm black system
- aquatherm green/blue S/MF pipe (OT)
- aquatherm green/blue S/MF pipe (UV)
- aquatherm green/blue S/MF pipe (TI/energy)

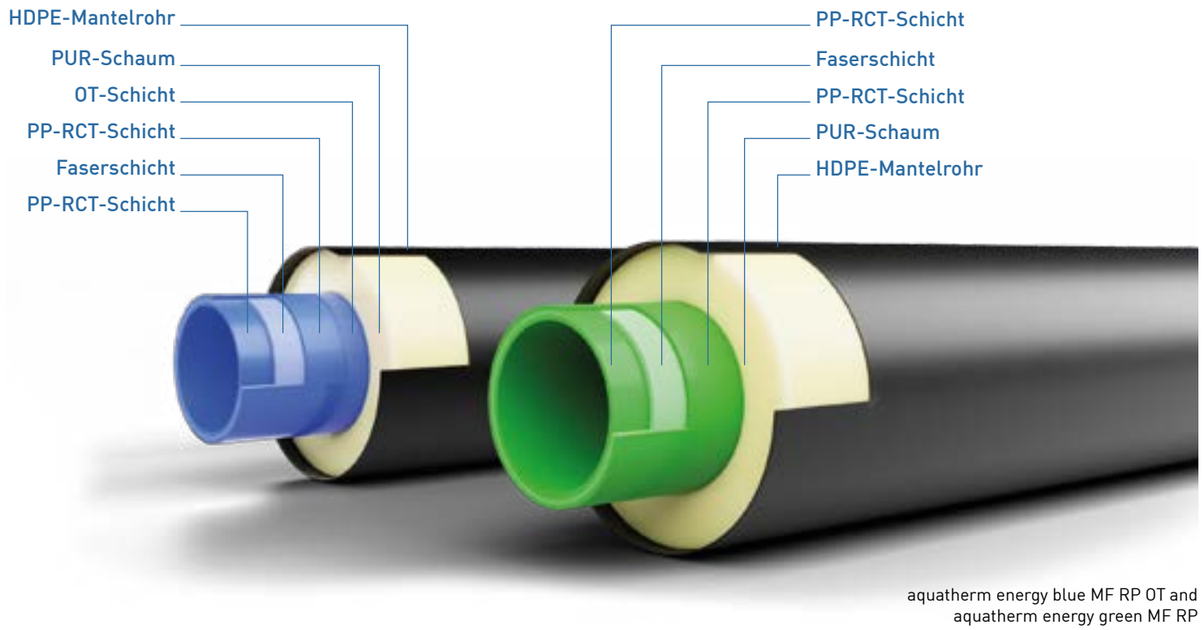
AQUATHERM FEATURES AND SPECIALITIES

aquatherm energy system label

aquatherm energy pipework consists of a carrier pipe, a casing pipe, and an insulating layer made of rigid PUR foam.

Medium pipes:

The carrier pipes used in the pre-insulated aquatherm energy piping systems are manufactured as fibre composite pipes made of polypropylene.



aquatherm energy blue MF RP OT and
aquatherm energy green MF RP

Fast processing technology:

The service pipes used with aquatherm energy also impress with their simple but effective installation and connection technology. By heating the pipe end and connecting part, the plastic melts into an inseparable connection after the elements have been joined. aquatherm energy blue OT pipes up to 125 mm must be prepped using the peeling devices with article numbers 9800050479 to 9800050488 before processing.

Spans:

aquatherm energy green / aquatherm energy blue
SDR 9 / 11 / 17.6

Table for determining the spans as a function of temperature difference and outside diameter.

Temperature difference ΔT[K]	Pipe diameter d (mm)												
	32	40	50	63	75	90	110	125	160	200	250	315	355
	Fastening distances in cm												
0	160	170	195	220	235	250	275	280	285	290	300	310	315
20	120	125	145	165	175	185	200	205	210	220	225	230	235
30	120	125	145	165	175	185	190	195	200	210	215	220	225
40	110	115	135	155	165	175	180	185	190	200	210	210	215
50	110	115	135	155	160	170	170	175	180	190	200	205	205
60	105	110	125	145	150	160	160	165	170	180	185	190	195
70	95	100	120	135	140	145	150	155	160	170	175	185	190

Pipe clamp spacings for vertical pipes can be increased by 20 % compared to the table values, i.e. multiply the table values by 1.2.

Dimensional overview

Medium pipe	aquatherm energy green Fibre composite pipe SDR 9	aquatherm energy blue Fibre composite pipe SDR 11	aquatherm energy blue ot Fibre composite pipe SDR 9* / 11	aquatherm energy blue Fibre composite pipe SDR 17.6	Jacket pipe	PUR rigid foam
Outer diameter	Dimension	Dimension	Dimension	Dimension	Outer diameter	Thickness
32 mm	DN 25	DN 25	DN 25 *	-	90 mm	26.00 mm
40 mm	DN 32	DN 32	DN 32	-	110 mm	32.00 mm
50 mm	DN 40	DN 40	DN 40	-	110 mm	27.00 mm
63 mm	DN 50	DN 50	DN 50	-	125 mm	28.00 mm
75 mm	DN 65	DN 65	DN 65	-	140 mm	29.50 mm
90 mm	DN 65	DN 80	DN 80	-	160 mm	32.00 mm
110 mm	DN 80	DN 80/100	DN 80/100	-	200 mm	41.80 mm
125 mm	DN 100	DN 100	DN 100	DN 100	225 mm	46.50 mm
160 mm	DN 125	DN 125	DN 125	DN 150	250 mm	41.10 mm
200 mm	DN 150	DN 150	DN 150	DN 200	315 mm	52.60 mm
250 mm	DN 200	DN 200	DN 200	DN 250	400 mm	68.70 mm
315 mm	DN 250	DN 250	-	DN 300	450 mm	60.50 mm
355 mm		DN 300	-	DN 350	500 mm	64.70 mm

larger dimensions on request

Material characteristics of carrier pipe

Would you like to find out more about the yield stress or tensile strength of our carrier pipes? The table provides you with information.

Technical data	PP
Melt index 230 °C/2.16 kg	0.3 g/10 min.
Modulus of elasticity	800 $^{N/mm2}$
Yield stress	25 $^{N/mm2}$
Tensile strength	25 MPa
Heat conduction coefficient	0.15 W/mK (measured on the pipe)
Pipe friction coefficient	0,007
Flammability, DIN 4102	B2
Oxygen-tight (OT pipe)	due to oxygen barrier layer, for PE only from -39 °C
Mean coefficient of linear thermal expansion, K-1, DIN 53752	0,7 - $^{10-4}$

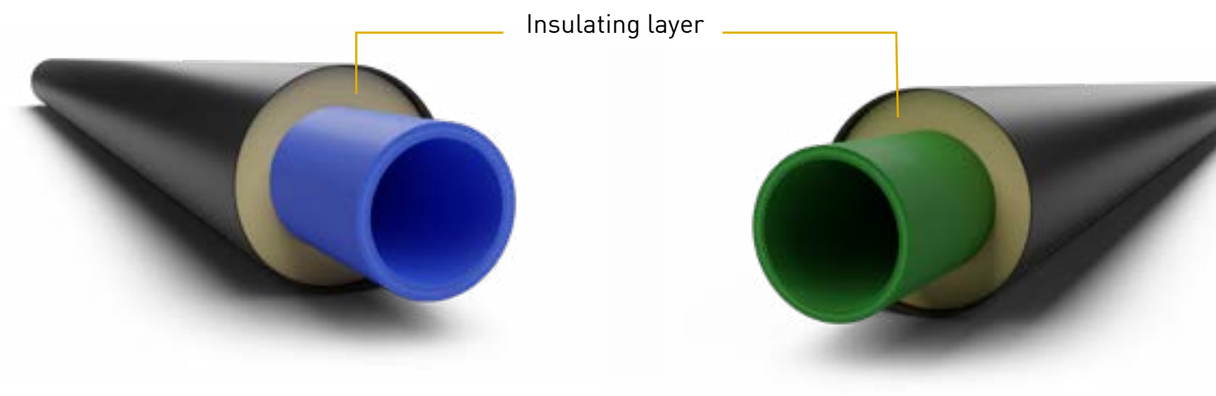
Insulation

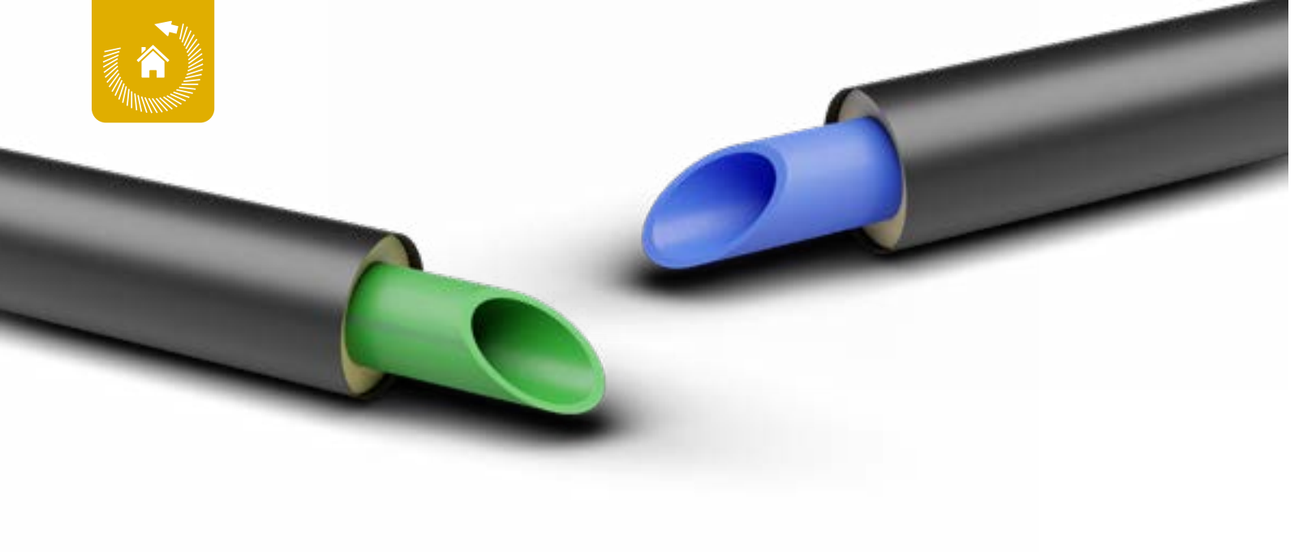
aquatherm energy pipework systems are insulated with PUR rigid foam. aquatherm energy is a rigid pipework system that is processed with various components (pipes and fittings) to form a complete system. As with all pre-insulated systems, it consists of pre-insulated pipes and pre-insulated moulded and connecting pieces. Insulating shells made of rigid PUR foam are available for the aquatherm energy pipework systems for the professional and appropriate sheathing of joints on pipes and fittings. These are encased with shrink sleeves and create an inseparable connection to the casing pipes. If required, joints can also be foamed on site.

Material characteristics Insulation

The high-quality insulation of our service pipes is essential for the smooth functioning of our pipework system. The following list provides details on characteristic values such as compressive strength and thermal conductivity.

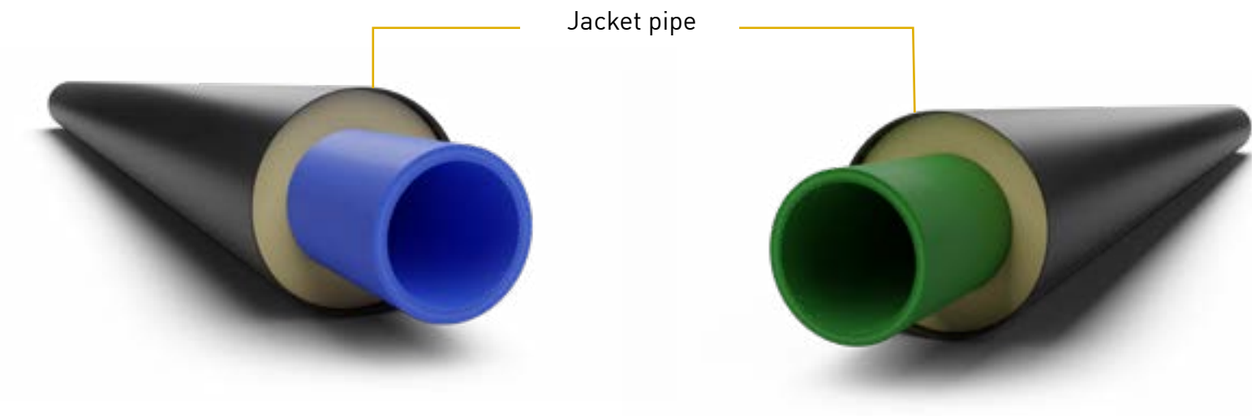
Technical data	PUR
Cyclopentane cell gas	> 8 %
Core density	> 60 $^{kg/m3}$
Closed cell	> 88 %
Water absorption	< 10 % (Vol)
Compressive strength 10 % deformation	> 0.3 $^{N/mm2}$
Shear strength	> 0.12 $^{N/mm2}$
Tangential shear strength	> 0.20 $^{N/mm2}$
Thermal conductivity at 50 °C	< 0.027 W/mK





HDPE casing pipes

The aquatherm energy blue and aquatherm energy green service pipes are encased in HDPE pipes. The quality meets the highest requirements, as this part of the pipe is exposed to the most wear during transport or installation. The jacket pipes are suitable for typical district heating applications as described in the standards mentioned. The casing pipes fulfil the requirements of DIN EN 8075, which describes how pipes made of HDPE material are manufactured and meet the technical functional requirements of DIN EN 253.



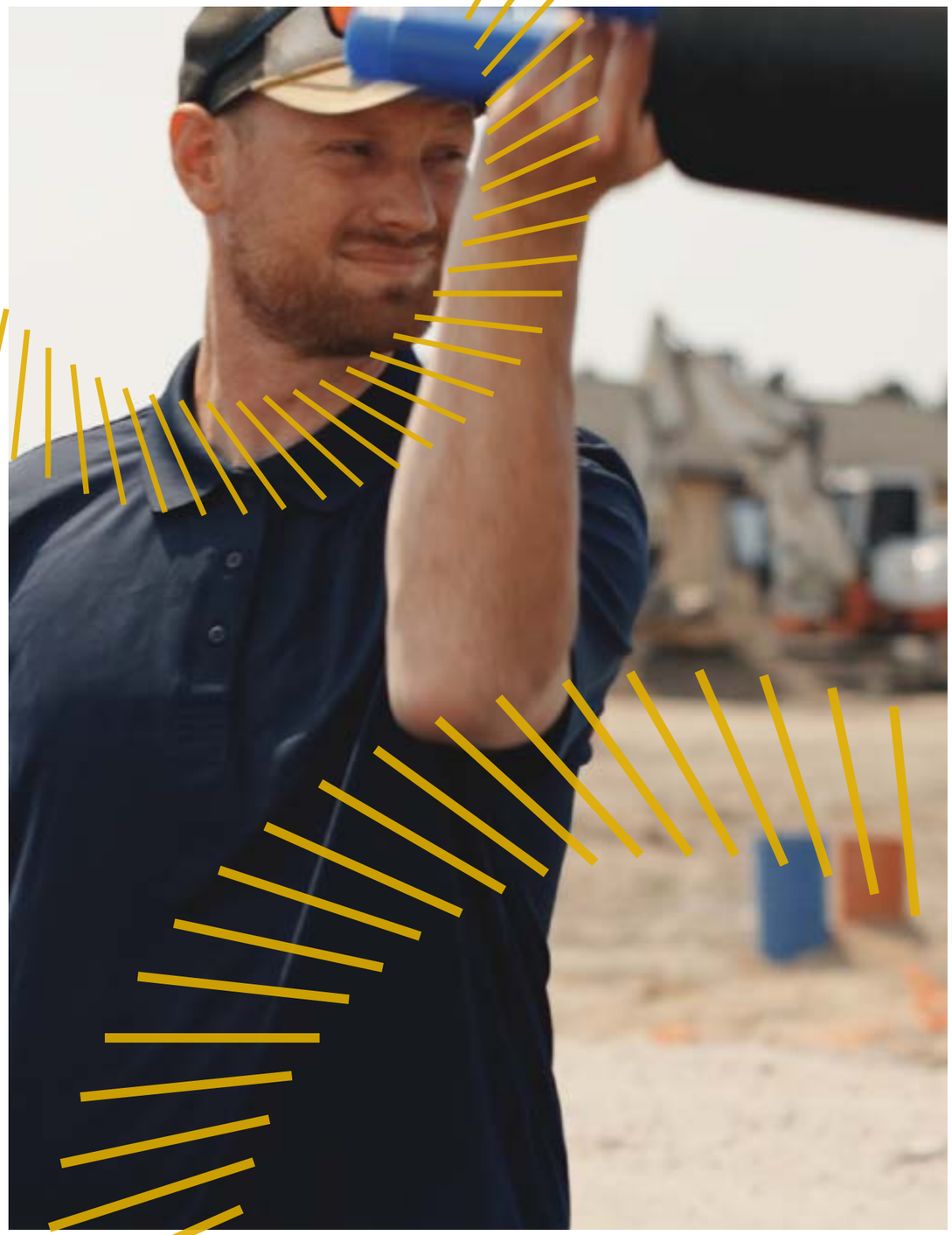
Material properties of casing pipe

In addition to the carrier pipe and the insulation, the casing pipe is also an important component of our aquatherm energy system. The table provides information on the most important technical data.

Technical data	PE 80
Density, g/cm3, ISO 1183	0,950
Yield stress, MPa, DIN EN ISO 527	22
Elongation at yield stress, %, DIN EN ISO 527	9
Elongation at break, %, DIN EN ISO 527	300
Tensile modulus of elasticity, MPa, DIN EN ISO 527	800
Impact strength, kJ/m2, DIN EN ISO 179	without breakage
Notched impact strength, kJ/m2, DIN EN ISO 179	12
Ball pressure hardness, MPa, DIN EN ISO 2039-1	40
Shore hardness, D, ISO 868	63
Mean thermal linear expansion coefficient, K-1, DIN 53752	1,8 - $^{10-4}$
Thermal conductivity, W/m - K, DIN 52612	0,38
Dielectric strength, kV/mm, VDE 0303-21	47
Surface resistance, Ohm, DIN IEC 167	^{1014}
Flammability, DIN 4102	B2
Physiological safety according to BgVV	yes
Chemical resistance according to DIN 8075 supplement	fulfilled
Temperature application range, °C	- 40 to + 80

Dimensional overview

Medium pipe	Jacket pipe
Outer diameter	Outer diameter
32 mm	90 mm
40 mm	110 mm
50 mm	110 mm
63 mm	125 mm
75 mm	140 mm
90 mm	160 mm
110 mm	200 mm
125 mm	225 mm
160 mm	250 mm
200 mm	315 mm
250 mm	400 mm
315 mm	450 mm
355 mm	500 mm



Pipe data

Weight/water content

The following table explains the effects of the pipe dimension on the weight and water content in the pipe.

Pipe dimension		Tare weight			Water content		
Medium pipe ($_{Da}$)	**Jacket pipe ($_{Da}$)**	**SDR 9**	**SDR 11**	**SDR 17.6**	**SDR 9**	**SDR 11**	**SDR 17.6**
32 mm	90 mm	1.6 kg/m	1.5 kg/m	-	0.483 l/m	0.539 l/m	-
40 mm	110 mm	2.1 kg/m	2.0 kg/m	-	0.754 l/m	0.834 l/m	-
50 mm	110 mm	2.3 kg/m	2.2 kg/m	-	1.182 l/m	1.307 l/m	-
63 mm	125 mm	3.0 kg/m	2.8 kg/m	-	1.869 l/m	2.074 l/m	-
75 mm	140 mm	3.8 kg/m	3.5 kg/m	-	2.659 l/m	2.959 l/m	-
90 mm	160 mm	5.0 kg/m	4.6 kg/m	-	3.825 l/m	4.252 l/m	-
110 mm	200 mm	7.2 kg/m	6.5 kg/m	-	5.725 l/m	6.359 l/m	-
125 mm	225 mm	9.1 kg/m	8.3 kg/m	6.8 kg/m	7.386 l/m	8.199 l/m	9.637 l/m
160 mm	250 mm	12.8 kg/m	11.5 kg/m	9.1 kg/m	12.109 l/m	13,430 l/m	15.784 l/m
200 mm	315 mm	-	18.3 kg/m	14.6 kg/m	-	21.010 l/m	24.649 l/m
250 mm	400 mm	-	29.0 kg/m	23.3 kg/m	-	32.861 l/m	38.549 l/m
315 mm	450 mm	-	40.6 kg/m	31.5 kg/m	-	52.172 l/m	61.193 l/m
355 mm	500 mm	-	50.8 kg/m	39.3 kg/m	-	66.290 l/m	77.793 l/m

aquatherm energy
Quality assurance

AQUATHERM QUALITY ASSURANCE

Quality "100 % Made in Germany"

Producing safe and innovative pipework systems - that is aquatherm's lived promise. It starts with the raw material: We develop and refine our polypropylene granulate under the fusiolen® brand. This enables us to always perfectly match the properties of our products to the requirements of the various areas of application.

Whether it's pipes or fittings, everything is „100% Made in Germany." This is because we produce exclusively at our German sites in Attendorn (headquarters) and Ennest using the latest manufacturing technology.
Only tested products then start their journey to our customers worldwide. In addition to our permanent in-house quality assurance, which includes monitoring test equipment, processing, production, and incoming goods inspections as well as final inspections, external monitoring is carried out by organisations such as the Süddeutsches Kunststoffzentrum (SKZ), NSF (National Sanitation Foundation, USA), IIP (Instituto Italiano di Plastici, Italy), CSTB (Centre Scientifique et Technique du Bâtiment, France), TGM (Technologisches Gewerbemuseum, Austria) and the Hygieneinstitut des Ruhrgebiets.

Numerous national and international quality seals and approval certificates, along with the repeated satisfaction of our customers, confirm the high quality standards of our products. aquatherm has implemented a quality management system in accordance with ISO 9001, which was certified by TÜV-Rheinland in 1996. This success represents a further step towards strengthening our competitive position and fulfilling our high standards and responsibility towards customers, partners and the environment.

See for yourself!

TÜVRheinland® ZERTIFIZIERT
Management System
ISO 9001:2015
ISO 14001:2015
ISO 50001:2018
www.tuv.com
ID 0091005348

Made in Germany

Fulfilment of system standards

Numerous national and international neutral authorities and institutions confirm the high aquatherm quality standard.

The product certificates are provided for reference purposes only. The certificates were issued in accordance with the laws, regulations and product standards applicable in the respective country. The certificates therefore cannot be used outside the respective jurisdiction. They do not contain any express or implied warranties of aquatherm GmbH or its affiliates.

You can find an overview of our international certificates here:

Certificates

aquatherm energy
Processing

PROCESSING

Tools & accessories

The following tools are available for the professional and proper processing of aquatherm energy green and aquatherm energy energy blue service pipes, with which the insulated pipes and moulded parts are joined together using the socket or butt welding process.

Important!
Only original aquatherm welding equipment and tools or equipment and tools approved by aquatherm may be used.

1. **aquatherm manual welder (800 W)**
   without welding tools (art. no. 9800050337)
   For medium pipes with dimensions 32-63 mm

2. aquatherm manual welder (1400 W)
   without welding tools (art. no. 9800050341)
   For medium pipes with dimensions of 50-125 mm

3. **aquatherm welding tools**
   for manual welders

   Art. no. 9800050212 32 mm
   Art. no. 9800050214 40 mm
   Art. no. 9800050216 50 mm
   Art. no. 9800050218 63 mm
   Art. no. 9800050220 75 mm
   Art. no. 9800050222 90 mm
   Art. no. 9800050224 110 mm
   Art. no. 9800050226 125 mm

4. aquatherm welding machine (1400 W)
   with welding tools 20-125 mm
   (art. no. 9800050148)
   For medium pipes with dimensions of 50-125 mm

5. aquatherm butt fusion machine
   For medium pipes with dimensions 160-630 mm

Hand welder 800 W and welding tools 32-63 mm

Hand welder 1400 W and welding tools 50-125 mm

Welding machine 1400 W with tools

Butt fusion machine type Light including accessories

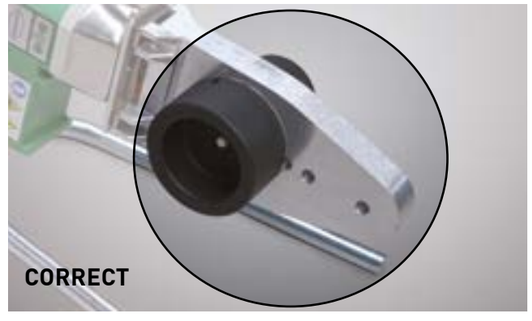
6. aquatherm electric pulling device
   Item no. 9800050151
   For service pipes with dimensions 63-125 mm

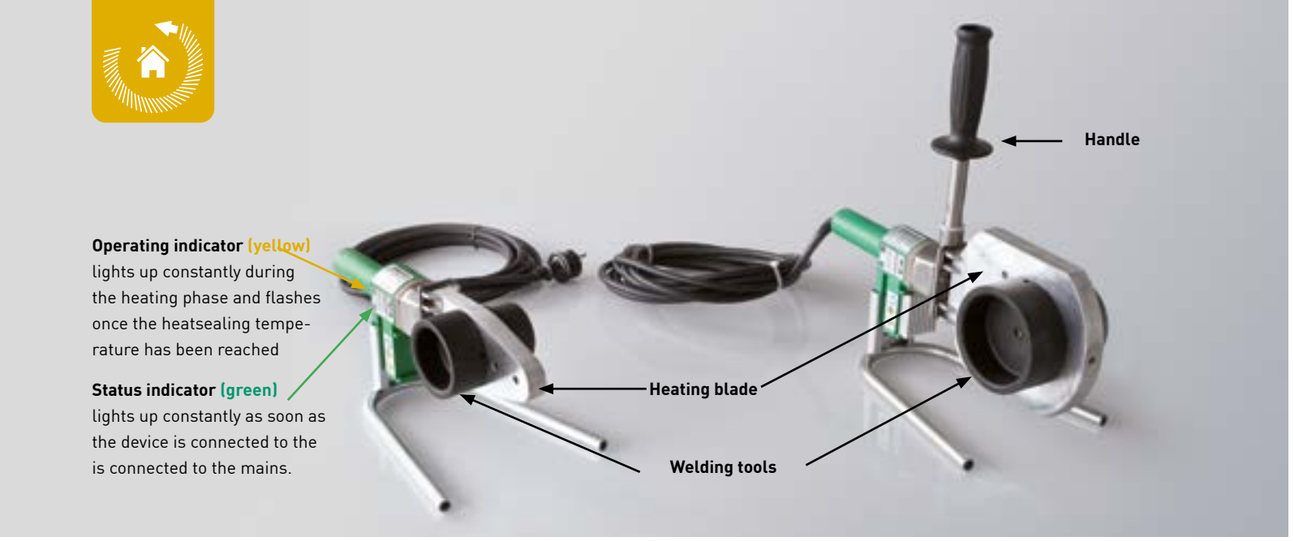
Note:
The following additional tools must only be used for processing aquatherm energy blue OT service pipes with dimensions of 32-125 mm, which are joined using the socket welding process. These must be used to remove the oxygen barrier layer from the pipe ends before the welding process, as described.

7. aquatherm universal peelers
   Art. no. 9800050481 32 mm
   Art. no. 9800050482 40 mm
   Art. no. 9800050483 50 mm
   Art. no. 9800050484 63 mm
   Art. no. 9800050485 75 mm
   Art. no. 9800050486 90 mm
   Art. no. 9800050487 110 mm
   Art. no. 980005048 125 mm

Instructions for fitting the welding tools!

- The heating blade of the welding device must be checked to ensure that it is in perfect condition.
- Damage to the heating blade, such as scratches, grooves, or dirt, must be removed.
- he welding tools, including the heating bush and heating mandrel, must be free from damage and checked for cleanliness before use.
- If needed, clean the heating bush and heating pin with a lint-free, coarse paper towel and, if necessary, use a spirit.
- Damaged tools must not be used and must be replaced.
- When the welding tools are cold, attach them by hand and then use the Allen key to tighten the screw securely.
- Welding tools must lie flat against the heating blade and must not protrude over the edge of the heating blade.





Heating phase

1. Connect the welding device to the power supply and check that the yellow operating indicator lights up.

2. Depending on the size of the welding tools and the ambient temperature, the tools take between 10 and 30 minutes to heat up.

3. During the heating phase, the welding tools must be tightened firmly by turning the screw with the Allen key. Ensure that the welding tools are in full contact with the heating blade.

Do not use pliers or other unsuitable tools to avoid damaging the coating of the welding tools.

4. The required welding temperature for processing aquatherm energy service pipes must be observed. In accordance with the DVS welding guidelines, the welding temperature must be checked on the tool before welding begins. The temperature is checked using a fast-indicating surface temperature measuring device.

Attention:
Start welding only 5 minutes after the welding temperature is reached!

Handling

5. When changing tools on a heated welding device, the welding temperature on the new welding tool must be checked again after the heating phase.

6. If the welding machine is switched off, e.g. during longer breaks, the heating process (from point 1) must be carried out again.

7. After completing the welding work, switch off the appliance and allow it to cool down.

Never cool the welding device with water or other liquids, otherwise the thermal resistors will be destroyed! Never open or repair welding equipment yourself. Send defective welding equipment to the factory for repair.

8. Welding equipment and welding tools must be protected from moisture and contamination. Burnt-on dirt particles can lead to faulty welding. The use of damaged and contaminated tools is not permitted.

9. Do not place the welding device on the welding tools before and after the welding process, as this could damage the Teflon coating of the tools. Always place the appliance in the stand supplied.

Guidelines and regulations

The general health and safety and accident prevention regulations must be observed when handling welding machines.

In particular, the guidelines of the Employer's Liability Insurance Association for the Chemical Industry apply to machines for working and processing plastics (chapter: "Welding machines and welding equipment").
The general guidelines of DVS 2208 Part 1 continue to apply to the handling of aquatherm manual welding equipment, machines and tools.

The manufacturer's instructions must be observed for the proper and professional handling of tools and accessories.

Relevant data for the merger

Pipe Outer Ø	Welding depth	Warm-up time		Processing time	Cooling time
mm	mm	sec. DVS	sec. AQT*	sec	Min.
32	18.0	8	12	6	4
40	20.5	12	18	6	4
50	23.5	18	27	6	4
63	27.5	24	36	8	6
75	30.0	30	45	8	8
90	33.0	40	60	8	8
110	37.0	50	75	10	8
125	40.0	60	90	10	8

* In accordance with DVS 2207, Part 11, the heating time should be increased by 50 % at ambient temperatures below +5 °C.

The general guidelines for hot plate welding in accordance with DVS 2207, Part 11 apply.

Note on the butt welding process for medium pipes with dimensions of 160-355 mm:
The relevant data for butt welding are dimension- and device-related and are listed in detail in the corresponding processing descriptions. These are enclosed with the machines or can be requested from aquatherm.

Dimension 160-355 mm:
These dimensions are butt-welded together.

Preparing the tools

Checking the welding temperature

The welding temperatures of all welding devices and machines must be measured using high-speed surface temperature measuring devices. The measurement is carried out on the welding tools.

The temperature is always measured before the welding process begins. Failure to reach the specified welding temperature may result in faulty welded joints.

Welding temperatures for aquatherm energy

Heating element socket welding: 260 °C
for medium pipes with dimensions 32-125 mm

Heating element butt welding: 210 °C
for medium pipes with dimensions 160-355 mm

Temperature measurement on the aquatherm hand welder (800 W)

Temperature measurement on aquatherm welding machine

Temperature measurement on the aquatherm hand welder (1400 W)

Temperature measurement on aquatherm butt fusion machine

Cutting and stripping pipe lengths*

Measure the pipe length and mark it on the casing pipe.

Cut through the entire circumference of the casing pipe with a pipe cutter up to the PUR insulation layer.

Mark the cutting line on the pipe circumference with adhesive tape.

Cut the jacket down to the PUR insulation layer using a standard tiger saw or foxtail equipped with a plastic saw blade.

Cut the pipe along the cutting line using a standard tiger saw or foxtail equipped with a plastic saw blade.

Cut off the end of the casing pipe and then mechanically remove the PUR insulation layer along the entire length of theinsulation.

Mark the stripping length of 22.5 cm from the pipe end on the casing pipe.

Clean the stripped carrier pipe and deburr the pipe end both internally and externally.

* This processing applies to aquatherm energy without leakage monitoring

Preparing the **tools**

Removal of the oxygen barrier layer for aquatherm energy blue OT in the dimensions 32-250 mm

Attention: Do not forget the shrink sleeve!

For pipe and/or fitting connections that are to be re-insulated with an aquatherm energy sleeve or reducing sleeve, it must be ensured that the shrink sleeve is pushed over the casing pipe on one side of the joint before the welding process.

However, the protective film surrounding the shrink sleeve must not yet be removed. Subsequent application of the shrink sleeve is not possible.

The end pieces of aquatherm OT (oxygen-tight) and UV (UV-resistant) can be peeled using the universal peeling devices. By evenly removing the outer layer of the pipe, the pipe system can be extended as required using a moulded part. The universal peeling devices are available in sizes Ø 20-125 mm (art no. 9800050479-9800050488). The peeling process is carried out either mechanically or by hand. For mechanical processing, two driver plates are available for pipe sizes Ø 20-63 mm (art. no. 9800050499) and Ø 75-125 mm (art. no. 9800050500). The drills or cordless screwdrivers should have a high torque.

1. Instructions for the mechanical peeling process

1.1. The driver plate is clamped into the cordless screwdriver with the hexagon bolt.

1.2. The peeler is fixed with its fitting screws in the groove of the driver plate that matches the diameter and turned clockwise so that the peeler is held on the driver plate.

1.3. The peeling tool clamped in the drill chuck is attached to the pipe end via the guide.

1.4 When the peeling device rotates, the peeling process begins in the axial direction under slight pressure (feed). The peeling process is complete when the driving plate strikes the end of the pipe.

1.**5** The pipe can now be socket welded.

2. Peeling instructions for hand peeling

2.1. Two toggles are fitted to the peeling device for manual peeling.

2.2. The peeler is pushed onto the untreated pipe as far as it will go.

2.3. Turn the peeler clockwise until the marked peeling depth (see table below) is reached.

2.4 Once the peeler has reached the specified/marked peeling depth (see table), the peeler is removed and socket welding can begin. If the e-socket is to be used as a sliding socket, the peeling depth for e-socket welding (see table) must be doubled.

Peel depth table for socket welding

Diameter Ø	Peeling depth mm
32	22
40	25
50	28
63	32
75	34
90	37
110	42
125	44

Heating element socket welding with manual welder

Welding process without mechanical aids

Remove dirt and impurities from the end of the pipe. (Attention: For aquatherm energy blue ot, see also the description S. <ÜS>.

Mark the welding depth with aquatherm welding depth gauge and graphite pencil.

Remove the aquatherm welding socket from the packaging. Unpacked moulded parts must be cleaned accordingly.

Press the aquatherm welding socket onto the heating mandrel and at the same time push the pipe end into the heating socket up to the marked welding depth mark.

After the heating time has elapsed, remove the aquatherm welding socket from the heating mandrel and the heating bush from the pipe end.

Push the sleeve onto the pipe end immediately after removing the welding device.

Press the welding socket onto the pipe end to the end of the welding depth within the processing time.

Align the aquatherm welding socket and fix for a short time. Further processing steps are only carried out after the specified cooling time has elapsed.

Heating element socket welding with manual welder AND PULL FEED

Welding process with mechanical aid

Push the pipe clamping slide into the rear slide rail until the arrow markings match and fix in place with the locking bracket.

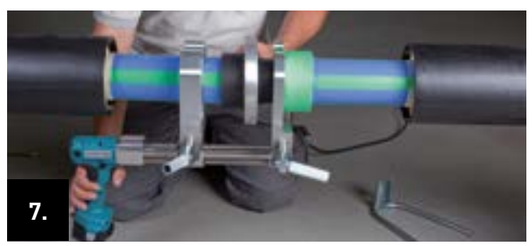
Insert the moulded part clamping slide into the front slide rail until the arrow markings match and fix in place.

Slide the clamping jaws against the face of the moulded part and tighten them against the stop using the fastening screw.

The welding depth and clamping distance are marked in a single operation using the aquatherm green clamping welding depth gauge.

Push the pipe end into the pulling tool up to the end of the clamping mark and tighten the clamping jaws with the fastening screw.

Remove dirt and impurities from the end of the pipe and the inside of the moulded part.



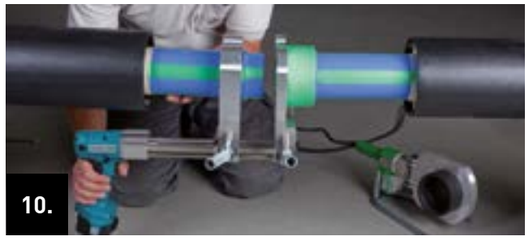
Position the manual welding device centred between the fitting and the pipe end and slowly move the pulling device forwards.

Use the pulling tool to press the heating mandrel into the welding socket and at the same time push the pipe end into the heating socket up to the marked welding depth mark.

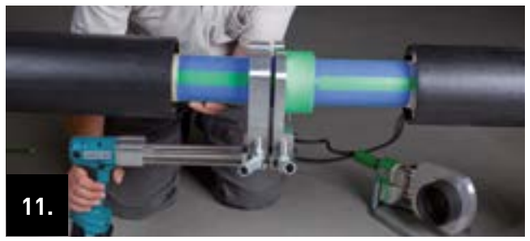
Heating element socket welding with manual welder and pulling device

Welding process with mechanical aid

After the heating time has elapsed, move the pulling tool apart and remove the welding device between the pipe end and the moulded part.



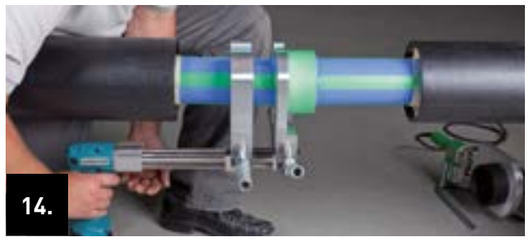
Immediately after removing the welding device, the pulling tool is slowly and evenly retracted.



Press the pipe end into the welding socket with the pulling tool to the end of the welding depth within the processing time.

Align the welded joint with the pulling device and fix for a short time. Further processing takes place after the specified cooling time has elapsed.

After the cooling time has elapsed, loosen the clamping jaws on the pipe side by unscrewing the fastening screw.



Move the pulling tool apart to be able to loosen the fastening screw of the moulded part clamping jaws.

Loosen the clamping jaws on the moulded part side by unscrewing the fastening screw.

Open the clamping jaws of the pulling tool until the pulling tool can be removed sideways or downwards from the joint.

Heating element socket welding with welding machine

Setup and welding process

Set up and align the welding machine. Take space requirements into account! (Please note that the machine must be removed from underneath the pipe after welding work has been completed)

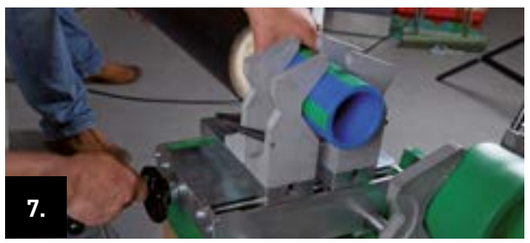
Connect the power supply and check whether the yellow operating indicator lights up.

The welding depth of the pipe dimension to be processed is set using the rotary knob (on the left front of the machine frame).

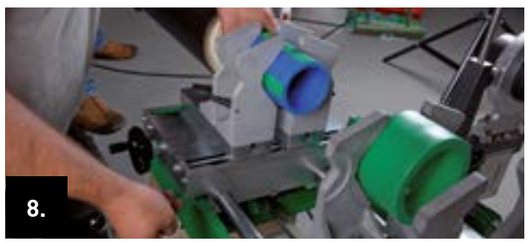
Slide the rear pair of clamping jaws for pipe fastening onto the front pair of clamping jaws and secure by tightening the fastening screws.

Hold the welding socket between the moulded part clamping jaws and press against the stops on the end face.

Fix the sleeve against the stop and tighten the clamping jaws firmly with the crank handle .



Push the pipe end between the clamping jaws and centre it by turning the crank handle, but do not tighten it.

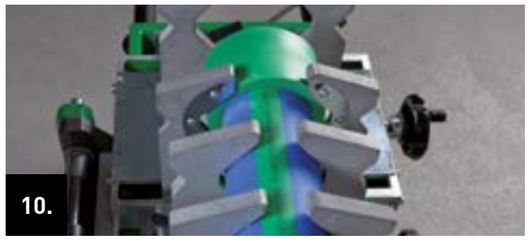


To preset the welding depth, press the calibration button located in the centre of the machine frame in as far as it will go.

Heating element socket welding with welding machine

Setup and welding process

Move the carriage of the welding machine together using the rotary crank and press the pipe end onto the welding socket.



Align the pipe end all the way round the welding socket and centre the position exactly.

Clamp the pipe end firmly with the clamping jaws by turning the crank handle.

Move the carriage of the welding machine apart using the rotary crank and pull out the calibration knob to preset the welding depth.

Fold down the welding machine and retract the carriage of the welding machine using the rotary crank.

After the heating time has elapsed, move the welding machine carriage apart using the rotary crank and fold up the welding machine.

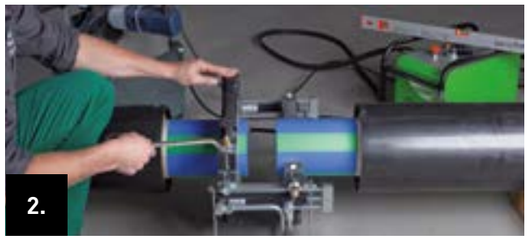
Move the carriage of the welding machine together as far as it will go using the rotary crank.

After the cooling time has elapsed, release the clamping jaws on the moulded part and pipe end and turn the welding machine 180°.

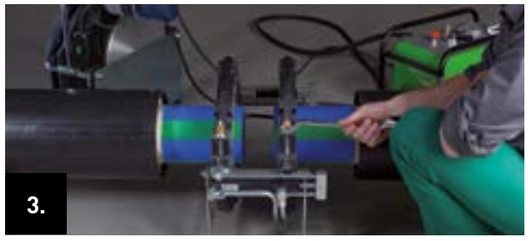
Heating element socket welding with two-ring butt welding machine

Prepare pipe ends and carry out welding process

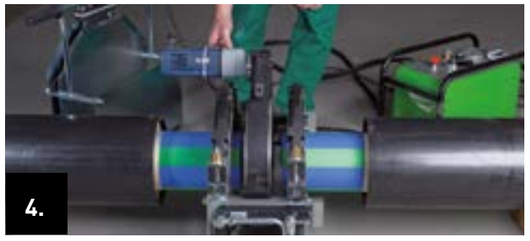
Set up and align the welding machine, plug in the hydraulic hoses and connect the welding machine and milling tool to the power supply.



Insert the first pipe end into the clamping device and align and fix it with the upper clamping element.



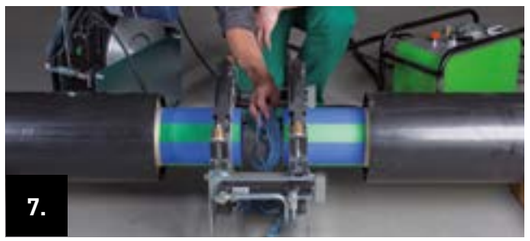
Insert the other pipe end into the clamping device in the same way and align and fix it with the clamping element.



Insert the milling tool between the pipe ends and secure it to the frame of the assembly slide with the locking mechanism. The tool can only be switched on if the locking mechanism is working properly.

Switch on the milling tool and slowly move the pipe ends in the assembly carriage towards the milling tool by actuating the hydraulics.

The pipe ends are slowly milled flat at the end faces by hydraulic actuation under slight contact pressure to the milling tool.



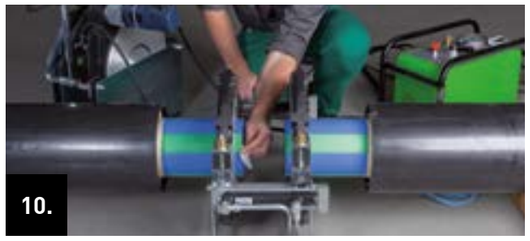
With chip removal running all round, move the assembly slide apart, remove the milling tool and remove the chips.

Attention! For aquatherm blue OT pipes, the side to be welded must be chamfered with the aquatherm chamfering tool before welding.

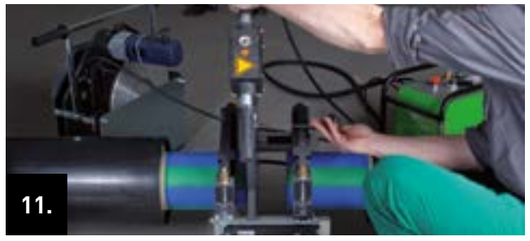
Heating element socket welding with two-ring butt welding machine

Prepare pipe ends and carry out welding process

Move the assembly slide back together until the pipe ends are flush. Check the gap and offset dimensions and then adjust the pressure on the hydraulics in accordance with the data sheet.

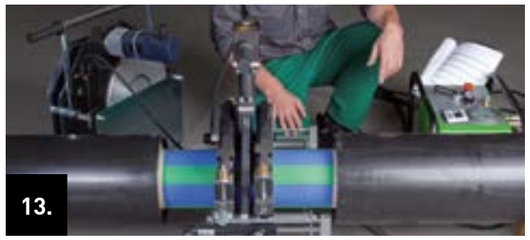


Remove dirt and impurities as well as milling residue from the ends of both pipe ends.

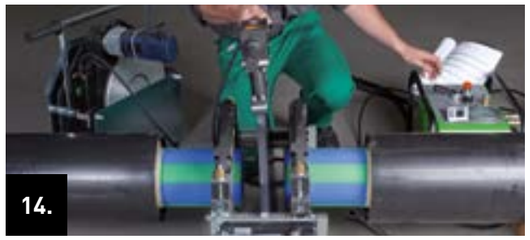


Insert the welding tool between the pipe ends, check that the welding sword is clean and measure the welding temperature.

Slowly move the assembly carriage towards the welding blade by actuating the hydraulics and press the pipe ends against the welding blade until the specified equalisation pressure is reached.



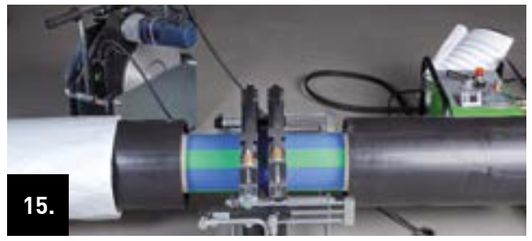
Once the specified bead height has been reached, the pressure on the hydraulics is reduced. The heating time then begins, during which the end faces of the pipe ends are brought to the required welding temperature.



After the heating time has elapsed, quickly move the assembly carriage apart by actuating the hydraulic and remove the welding tool.

Heating element socket welding with two-ring butt welding machine

Prepare pipe ends and carry out welding process



By actuating the hydraulics, the pipe ends are slowly joined together until the required welding pressure is reached.

The assembly carriage remains at the welding pressure set on the hydraulics until the end of the cooling time.

After the cooling time has elapsed, the pressure is released from the hydraulics. The clamping elements are then released and the clamping device removed.

MonoTop40 for rewrapping with and without wrapping machine

Corrosion protection tapes

Corrosion protection tapes are designed for the high-quality re-wrapping of pipework. They can be applied quickly and safely to weld seams, bends and moulded parts. The systems comply with the DIN 30672 and EN 12068 standards and are DVGW-approved (Reg. No.: NV-5180BQ0144).

MonoTop40 binding system
This system is used for recoating weld seams and entire pipe strings, especially for bends and moulded parts up to DN 600.

Thanks to its high flexibility, it is particularly suitable for manual processing without a winding machine.

MonoTop40 is a robust, self-welding corrosion protection tape with a flexible plastic outer layer.

The following material is required for re-wrapping the aquatherm energy insulating sleeve set with the MonoTop40 corrosion protection tape:

1. Adhesive tape for fixing the PUR half shells-elements
2. 40 or 60 grit emery cloth
3. Winding machine for MonoTop40 corrosion protection tape (not absolutely necessary)
4. MonoTop40 corrosion protection tape (can be seen on the winding machine)
5. Primer for dissolving the KM pipe
6. Cutter knife for cutting the MonoTop40 corrosion protection tape after the winding process has been completed
7. Flat curved brush (spreads the colour well and can be used "crosswise"; good for relatively narrow strokes and corners)

The winding machine shown here is not absolutely necessary for processing the MonoTop40 corrosion protection tape.

MonoTop40 requirement for aquatherm energy pipes

Pipe DN (SDR 11)	Outer casing DA in mm	Wrapping width in mm	Recommended width MonoTop40	running metre MonoTop40	Area for priming in square metres
DN 25	90	650	50	7,63	0,057
DN 32	110	650	50	9,33	0,069
DN 40	110	650	50	9,33	0,069
DN 50	125	650	50	10,60	0,079
DN 65	140	650	50	11,88	0,088
DN 80	160	650	50	13,57	0,101
DN 80/100	200	650	50	16,96	0,126
DN 100	225	650	50	19,09	0,141
DN 125	250	650	100	11,00	0,157
DN 150	315	650	100	13,85	0,198
DN 200	400	650	100	17,59	0,251
DN 250	450	650	100	19,79	0,283
DN 300	500	650	100	21,99	0,314

Technical data primer

Feature	Test method	Unit	Type PSI P27
Colour			Black
Density	ASTM 1298	g/cm3	0,83
Solvent content	ISO 1515	%	27
Viscosity	ASTM D 1200	Sec.	35
Flash point	ABEL IP 170	°C	- 12
Consumption		l/m2	Approx. 0.2
Processing temperature		°C	- 30 to 60

Technical data MonoTop 40

Feature	Test method	Value	Notes
Adhesive base		Butyl rubber compound	
Carrier belt base		Polyolefins	
Colour		black	
Total thickness		1.016 mm	
Adhesive thickness inside		0.610 mm	
Beam strength		0.406 mm	
Tensile strength	DIN EN 12068	7 N/mm	
Elongation at break	DIN EN 12068	400 %	
Core diameter	DIN EN 12068	76 mm	
Adhesion of primed steel at 23°C	DIN EN 12068	20 N / 10mm	
Adhesion of primed steel at 50°C	DIN EN 12068	3 N / 10 mm	
Liability to oneself	DIN EN 12068	20 N / 10 mm	
Wrapping resistance		40 KV / mm	
Water absorption		0,60 %	Measurement with tape adhering to steel
Processing temperature		-35 °C - 70 °C	Belt temperature min. 10 °C
Continuous operating temperature		-35 °C - 85 °C	

Preparation of the winding machine*

The MonoTop40 corrosion protection tape is pushed onto the centre roll. The release film is threaded into the slot of the outer roll. The wrapping machine is then adjusted.
The large adjustment screw in the centre regulates the tension pressure, while the small lower screw adjusts the winding radius, also known as the winding angle adjustment. This adjustment ensures that the corrosion protection tape is guided diagonally over the pipe to ensure the correct overlap.

Either the right-hand front or the right-hand rear wheel can be adjusted. Adjusting the front wheel changes the winding angle directly at the starting position, while the rear wheel influences the angle during winding.

To set the winding radius:

-Loosen the screw.
-All 4 wheels must touch the base evenly.
-Divide the diameter of the KM pipe by 20 (e.g. 160 mm KM pipe / 20 = 8 mm).
-The distance between the base surface and a wheel should be the determined value (here approx. 8 mm).
-Tighten the screw hand-tight.

*Winding machine is not included in the aquatherm range. Please contact another manufacturer.

Re-coating with MonoTop40
Preparing the carrier pipe

The PUR half shells are laid around the service pipe using a tongue and groove connection, aligned according to the numbering and fixed in place with suitable adhesive tape.

Mark the KM pipe with a white felt-tip pen. The starting point for winding the corrosion protection tape is between 50 and 100 mm from the end of the pipe.

Roughen the surface of the KM pipe with 40 - 60 grit emery cloth to optimise the adhesion of the corrosion protection tape. Repeat on the opposite end of the pipe.

Thoroughly clean both sides of the roughened KM pipe ends with Tangit cleaning cloths or ethanol/spirit (min. 99.9 %) and a white, dry, grease-free and lint-free cloth.

Apply a thin, even coat of primer to the entire surface of the dried area of the KM pipe. Use a flat brush or paint roller. Observe the processing guidelines on the packaging.

Apply a thin, even coat of primer to the entire surface of the dried PUR half-shells. Use a flat brush or paint roller. Observe the application guidelines on the packaging.

After application, the primer must flash off for at least 10 minutes. Then check by touch test whether the primer is dry. If the flash-off time exceeds 4 hours, the primer must be reapplied.

Re-coating with MonoTop40 **without** winding machine

Before attaching the anti-corrosion strap, remove the release film on the underside. Attach the strap to the marking at the 3 or 9 o'clock position.

The first winding of the corrosion protection tape is applied with an even tension around the KM pipe.

After the first winding of the corrosion protection tape, the tape is positioned so that the second winding can take place with at least 50% overlap around the KM pipe.

Several windings of the corrosion protection tape are applied. The overlap of at least 50 % is maintained while the release film is removed evenly.

The entire area to be wrapped is completely covered with the corrosion protection tape. The windings are applied evenly and without gaps.

Once the wrapping is complete, the corrosion protection tape is cut to length with a sharp knife and then pressed down firmly with the palm of your hand.

Re-coating with MonoTop40 **with** winding machine

Remove the release film from the anti-corrosion tape. Position the tape in the winding machine at the marking at the 3 or 9 o'clock position and start the first winding.

Use the winding machine to create the first winding with an even tension around the KM pipe. Make sure that the tape is guided tightly and evenly.

With the correct setting of the wrapping machine, the tape is spiralled around the KM pipe with at least 50% overlap. The release film is removed evenly to ensure optimum adhesion.

Continue the wrapping up to the mark on the opposite side and ensure that the overlap and pressure remain constant.

Once the winding is complete, the corrosion protection tape is cut to length. Press the end firmly with the palm of your hand to ensure good adhesion.

aquatherm energy sleeve*

Product description
The aquatherm energy sleeve is a cross-linked, self-sealing shrink sleeve for pre-insulated pipe systems. It can be shrunk over its entire length and is primarily used in conjunction with PUR half-shell technology.


aquatherm energy shrink sleeve SuperSeal (WTD)

The aquatherm energy shrink sleeve SuperSeal (WTD) consists of the following components, which are supplied as a set in a packaging unit:

- 1 pc. shrink sleeve SuperSeal (WTD)
- 2 PUR rigid foam element type 1
- 2 PUR rigid foam element type 2
- 1 PP-R welding socket (only for carrier pipes with dimensions 32-125 mm)

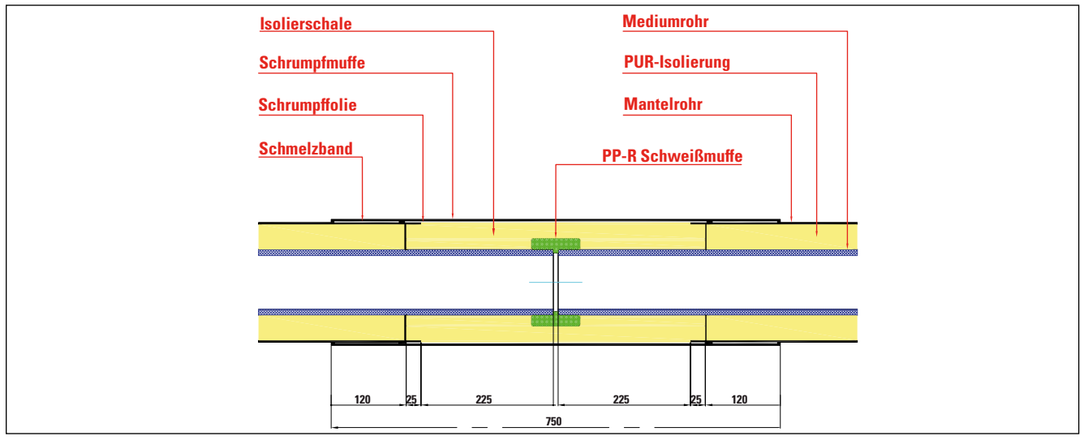
All components must be protected from dirt and moisture before and during processing.

Storage and safety
To ensure optimum and long-lasting functional quality, aquatherm energy sleeves that have not yet been processed should be stored in a dry, well-ventilated place. Avoid storage at temperatures above +80 °C and below -20 °C, in direct sunlight, rain, snow, dust or other unfavourable environmental influences. Processing must be carried out in compliance with the relevant regional health and safety regulations.

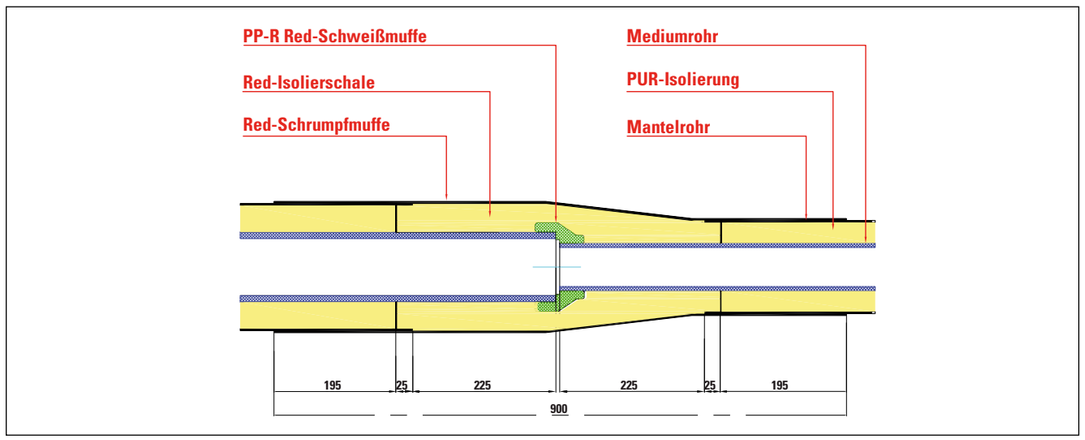
Equipment required for processing:
- Propane gas flame with hose, a suitable burner and an approved safety fitting
- Grease and lint-free cleaning cloths
- Greaseless marking pen
- Ethanol/spirit (min. 99.9 %)
- Emery cloth (grain 40 or 60)
- Tape measure, knife, scissors, triangular scraper, hollow rasp, pressure roller
- Temperature measuring device with contact sensor
- Wooden wedges
- Mounting roller blocks

* This processing applies to aquatherm energy without leakage monitoring

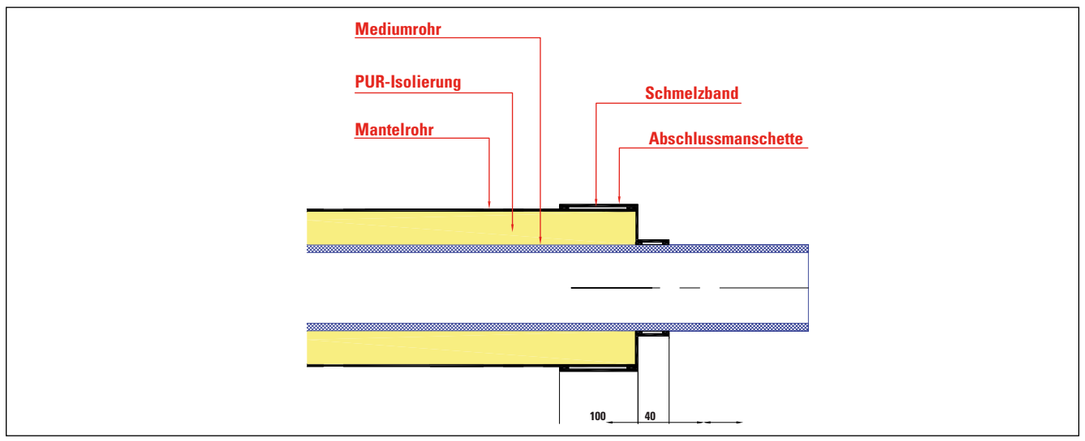
Shrink sleeve system



aquatherm energy sleeve



aquatherm energy reducing sleeve



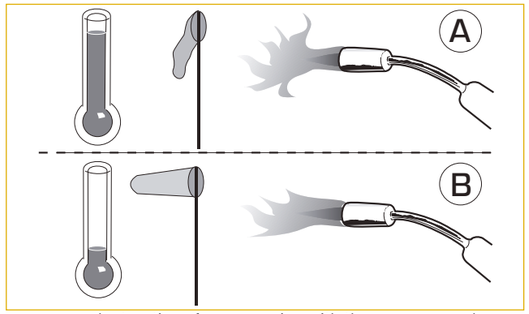
aquatherm energy end collar

Instructions for processing with the propane gas burner

The propane gas flame must be adapted to the respective construction site and weather conditions:

- A soft, yellow flame for thin-walled casing pipes and heat-shrinkable products, when there is no wind, at high outside temperatures and lack of space in the trench (A).

- A harder, blue flame for thick-walled casing pipes and shrink products, in windy conditions and at low outside temperatures (B).



Instructions for processing with the propane gas burner

Guide the propane gas flame only to the cross-linked shrink product. Constant movement in the circumferential direction minimises the risk of burning the PE casing pipes.

1. Preparatory work in the assembly area

1.1 Before the carrier pipes are connected with a socket using the heating element socket welding process or the heating element butt welding process, the shrink sleeve must be pushed over one of the two pipe ends. However, the white protective film is not yet removed! During the welding process, it is crucial to protect the shrink sleeve from burns to ensure its effectiveness.

Preparatory work in the assembly area

1.2 Dry and pre-clean the entire socket area and all sealing surfaces to remove loose dirt using a propane gas flame and a grease and lint-free cleaning cloth.

1.3 Removal of the capillary-bound moisture in the PUR end faces. The cut-back must be carried out with a suitable saw - preferably flat-vertical - to ensure it does not interfere with the fitting of the PUR insulating shell elements.

1.4 Remove plastic burrs and adhering dirt from all sealing surfaces using a triangular scraper or hollow rasp.

aquatherm energy shrink sleeve SuperSeal (WTD)

1. Preparation:
Dry and clean the entire sealing area with a grease and lint-free cloth.

4. Fix the PUR insulating shells in the centre with all-round adhesive tape.

2. Installation of the PUR insulating shells:
Push one of the PUR insulating shells labelled 1 and 2 into the cut-back cavities of the casing pipes on both sides, join them together and turn them onto the underside.

5. Marking of the shrink sleeve position:
To ensure that the shrink sleeve overlaps evenly, mark 30 cm on both sides starting from the centre of the sleeve area.

3. Insert the other PUR insulating shells labelled 1 and 2 as described. The tongue and groove profile of the shells ensures a gap-free and precise fit.

6. Preparation of the sealing area:
Roughen the casing pipe ends up to the marking with an abrasive belt or emery cloth (grain size 40 or 60) over the entire surface and all round.

aquatherm energy shrink sleeve SuperSeal (WTD)

7. Clean the grinding surfaces on both ends of the casing pipe with Tangit cleaning cloths or ethanol/spirit (min. 99.9%) and a dry, lint-free cloth.

8. Attach the shrink film:
Heat the cleaned casing pipe ends (with a soft flame when using a propane gas burner) to approx. 80 °C. Check the temperature before fitting the shrink film.

9. Check the shrink film for damage before installation and place it in the centre of the sealing area.

10. Wrap the sealing area evenly with the shrink film and remove the protective film on the underside.

11. Lay the shrink film tightly onto the PUR insulating shells and ensure an overlap of at least approx. 10 cm.

12. Place the sealing strip on the overlap (min. 100 mm) of the shrink film and press down firmly. Remove the protective film. Ensure good adhesion.

aquatherm energy shrink sleeve SuperSeal (WTD)

13. Shrinking process:
Check again for cleanliness and damage before starting the shrinking process. Start shrinking on one side of the film.

14. Shrink the film all round to the right and left using a controlled and "helical" forward movement of the hot air device or gas burner.

15. The shrinkage is complete when the film is in contact with the PUR insulating shells and the casing pipes over its entire length and circumference.

Control:
Use the "finger test" to check that there are no cold areas and that the hot melt adhesive has liquefied evenly. If not, reapply heat to these areas.

aquatherm energy half shells

The aquatherm energy half shells were developed to prevent energy loss at the joints and thus ensure complete insulation of the pipework system. The half-shells are made of PUR foam and polyurea and have similar insulation values to the pipe. They are also 100 % watertight. The new aquatherm energy half-shells are suitable for all applications in which the aquatherm energy pipework system is installed. They demonstrate their advantages in outdoor installation, in buildings, on the roof of buildings, or in underground installation.

With the new aquatherm energy half shells, laying the aquatherm energy pipework system is even easier and quicker. The half-shells are already foamed and encased in the factory and only need to be glued to the outer surfaces on site. This significantly saves time by minimising the need for time-consuming on-site shrinking.

Advantages:
- Quick and easy installation
- Already foamed and encased at the factory
- Significant time saving
- Quick on site installation due to stock availability
- Narrower pipe system design possible

Note:
The half shells do not have ISO approval and are NOT available in German-speaking countries

aquatherm energy half-shell installation instructions

1.

aquatherm energy Red. branch Half-shell

Tools and materials for assembly:

- Half shells in the corresponding dimension
- Adhesive S78 "glues & seals"
- Sealing gun
- Fine-toothed saw or insulating knife
- Spatula or putty knife
- Sealing tape (black)

Watch video

2.

Insert aquatherm energy Red. branch

3.

Applying the adhesive

Apply the adhesive generously to the half shell using a sealing gun.

4.

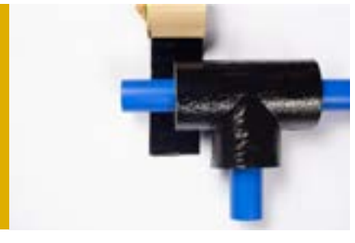
Assembling the half shells

After assembling the half-shells, we recommend using flexible black adhesive tape to hold the pair of half-shells firmly together. It is not necessary to remove the adhesive tape.

After the gluing process, remove the excess adhesive with a spatula or putty knife.

5.

Seal transitions with sealing tape



Apply the sealing tape in the centre of the transition between the two elements to be joined with an overlap of approx. 30 %. On the opposite side of the overlap, a distance of 2 cm must be maintained between the pipe and the shrink tape. This ensures that the tension of the shrink tape is evenly distributed during heating.

Heat the sealing tape evenly all round using a hot air gun or gas burner to seal the joint.

aquatherm energy
Planning & design

AQUATHERM PLANNING & DESIGN

Planning

Space required in the trench

In the case of underground pipelines, the proper condition of the trenches must be checked before installation begins.

The excavated material resulting from the excavation work must be deposited in such a way that it does not hinder the installation work.

Sufficient working space must be available around the application points to ensure that aquatherm energy sleeves can be properly and professionally installed in the trench. The base of the trench must be free of water and sludge. The pipe laying and pipe support must fulfil the requirements.

Civil engineering guidelines and dimensions

Earthworks must be carried out in accordance with the general guidelines and standards for civil engineering works. Pipe trenches must be constructed by qualified personnel in accordance with DIN 18300, DIN EN 805, DIN 4124 and backfilled in accordance with sections 3.09 and 3.11 of DIN 18300. DIN 4124 also specifies whether pipe trenches must be embanked or backfilled.

The guidelines in DIN EN 1610, Condition of the trench bottom, must be observed.

- The entire length of the base must be load-bearing and free of stones.
- The pipe layer is responsible for ensuring quality until completion. This includes drainage and keeping the pipe trenches clear.

Safety and accident prevention

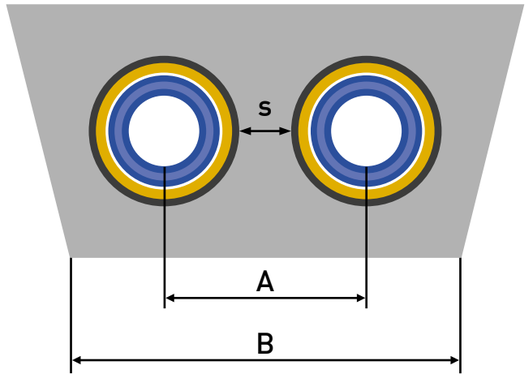
The activities in pits and trenches described in the accident prevention regulation "Construction work BGV C 22" are binding.

Section 28 (1) During earthwork, rock excavation and excavation work, earth and rock faces must be sloped or shored in such a way that employees cannot be endangered by slipping masses. All influences that could impair the stability of the ground must be taken into account.

Section 32 Working space widths

Excavations and pipe trenches in which work is carried out must have sufficient working space. The dimensions of the working space depend on the slope angle, shoring, pipe type and work sequence.

HDPE outer pipe D (mm)	Trench width B (m)	Pipe spacing s (m)
90	0,63	0,15
110	0,67	0,15
125	0,70	0,15
140	0,73	0,15
160	0,92	0,20
200	1,00	0,20
225	1,05	0,25
250	1,40	0,30
315	1,53	0,40
400	2,00	0,45
450	2,40	0,50
500	2,50	0,55



Underground installation

The trench depth is the sum of the depth of the frost line, the outside diameter of the pipe and the height of the bedding (A + Da + B). The frost limits must be observed; 0.5-9.0 m above the top of the pipe (E). If the pipes are installed outside the specified installation depths, a load distribution must be installed using steel or concrete plates.

Traffic loads

SLW 60, heavy-duty forklift (60 t maximum load).
SN classification = SN16 KN in accordance with ISO 9969.
Recommended calculation in accordance with ATV A 127 (basis for calculation). We recommend laying the pipes in a narrow trench that still provides sufficient working space.

Bedding layer (B)

For normal soil 100 mm sand with round grain size 0-8 mm.
For rock or rock-like soils 150 mm sand with round grain size 0-8 mm.
This layer is evenly compacted (≥ 97 % Proctor) with recesses in the socket area. Non-load-bearing soils are made load-bearing through the selection of the bedding layer. Observe the planning specifications.

Backfilling

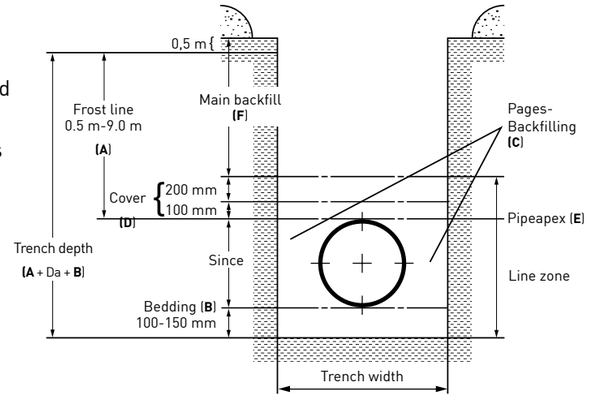
The 4/8 mm grain size construction material is placed in layers to create the side backfill (C) and the cover (D). The pipe crown (E) is covered with at least 100 mm. The main backfilling (F) can then be carried out with the excavation.
It must be ensured that the grain size does not exceed 300 mm and that sharp and coarse stones are removed. Planning specifications for the backfilling stages must always be observed. Each backfill is compacted individually.

Compaction

The side backfill (C) and cover (D) are compacted (≥ 97 % Proctor) by hand or with light equipment. Once at least 20 cm of the main backfill has been placed, the trench can be compacted with 95 % Proctor from this layer upwards using heavy equipment. The last 50 cm of the trench are compacted with 97-100 % Proctor.

Overlap

The overlap should be at least 0.8 m, measured from the top edge of the aquatherm energy pipe to ground level (Fig. 2) or 0.4 m to the road foundation (Fig. 3).
In the systems in which the overflow branches are installed, the above-mentioned widths should be measured from the top of the branches.
If the required covering layer cannot be applied, a reinforced concrete slab is laid over the pipes.



aquatherm energy
Areas of application

Areas of application

aquatherm has the solution for your challenge - Benefit from the versatile application possibilities of aquatherm energy pipework systems.
Here is an exemplary overview of the areas of application in which you can rely on aquatherm energy. Yesterday. Today. Tomorrow.

AQUATHERM ENERGY AREAS OF APPLICATION

Heating and cooling networks

District heating and cooling or local heating and cooling can be used to supply several buildings, blocks of flats or entire cities with cost-effective and sustainable heating and cooling. The distribution of tempered water via a pipe system is just as important as the generation of heating and cooling. Heat and cooling losses have a negative impact on efficiency and increase costs. The higher these losses are, the more energy has to be used to generate the heat and cold, which has a negative impact on the CO_2 footprint and costs.

aquatherm offers an innovative, modern PP pipework solution for fourth generation district heating and other projects with operating temperatures of up to 80 °C.
The factory pre-insulated polypropylene pipework system is an efficient and safe way of transporting heating and cooling water over long distances. The corrosion-free system also impresses with its lower weight compared to steel and time-saving installation.

One-stop shop solution
aquatherm offers a complete solution up to DN 355 from a single source:

- Transport lines
- Distribution lines
- All types of pre-insulated bends and outlets
- Shrink sleeves
- Fully PP-welded house connections with pre-insulated T-pieces
- Drilling house connections with open T-pieces, and foaming on site

Solutions
aquatherm offers pre-insulated pipework systems in various pressure ratings and sizes from 32 to 355 mm.

Prefabricated parts:
- Bend 45°
- 90° bend
- Branch
- Skip branch
- Reduced branch
- Reduced skip branch

Self-compensating
aquatherm energy is the self-compensating pipe system for underground installation. It can be installed without having to compensate for temperature-related changes in length. Plastics such as polypropylene have a greater linear expansion than steel, but a lower modulus of elasticity. This means that only low stresses are generated in the polymer pipes.

AQUATHERM ENERGY AREAS OF APPLICATION

Industrial and residential buildings

The aquatherm product portfolio includes a wide range of pre-insulated pipework systems that are suitable for industrial applications, residential buildings and large building complexes. The aquatherm energy product family enables the transport of hot or cold fluids with extremely low energy loss. In residential buildings, pre-insulated pipework is generally used when connecting to local or district heating or cooling sources. In industrial applications, aquatherm energy is mainly used as a supply pipe. Regardless of whether the application involves cooling with glycol or water or heating with a water-bearing pipe, corrosion can be ruled out thanks to the polypropylene material. This results in a high level of safety over the entire service life. In addition, aquatherm energy is characterised by flexible and fast installation, lower weight, better insulation values and more environmentally friendly production compared to steel.

Advantages

- Fast installation reduces installation costs
- Flexible installation thanks to polypropylene material
- Low weight facilitates handling and installation
- Better insulation values of polypropylene in PP plastic compared to steel
- No corrosion: high level of safety over the entire service life
- More environmentally friendly production compared to steel and good recycling options

aquatherm energy
References

aquatherm energy references

Heating & cooling networks

Project
Gateshead Energy Centre

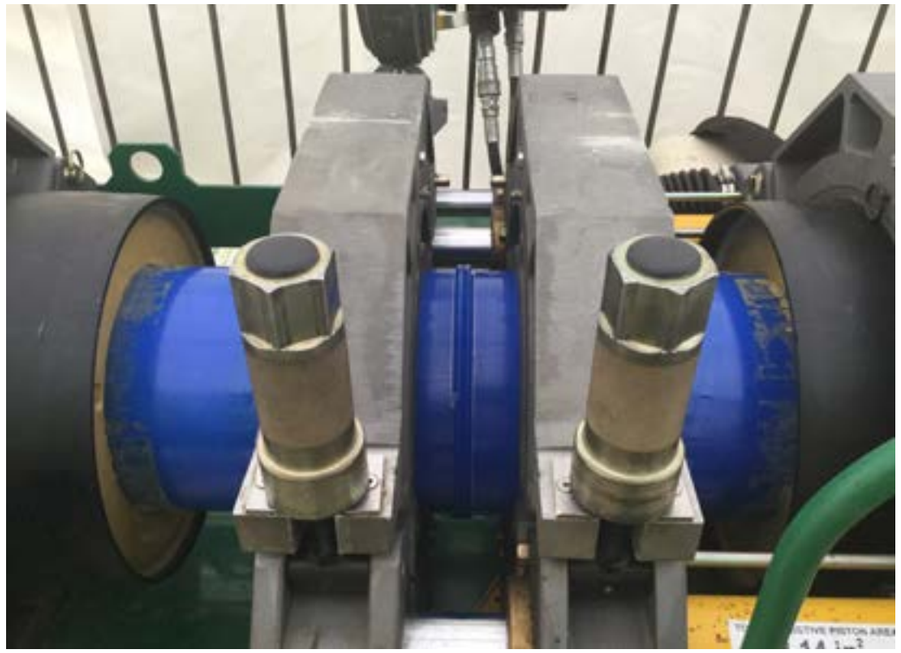
Location
Gateshead, England

Completion
2018

Area of application
District and local heating network

The challenge
The existing district heating network was to be expanded - with as little impact as possible on local residents and businesses.

The solution
Piping systems from aquatherm were laid in trenches of only 80 metres as a working step. This was a considerable relief for local residents and businesses as road closures and diversions were reduced, minimising the risk of congestion. Less trench protection equipment was required to protect the smaller trench, resulting in lower costs.



AQUATHERM ENERGY REFERENCES

Drinking water, HVAC

Project
Orsolina28

Location
Moncalvo, Italy

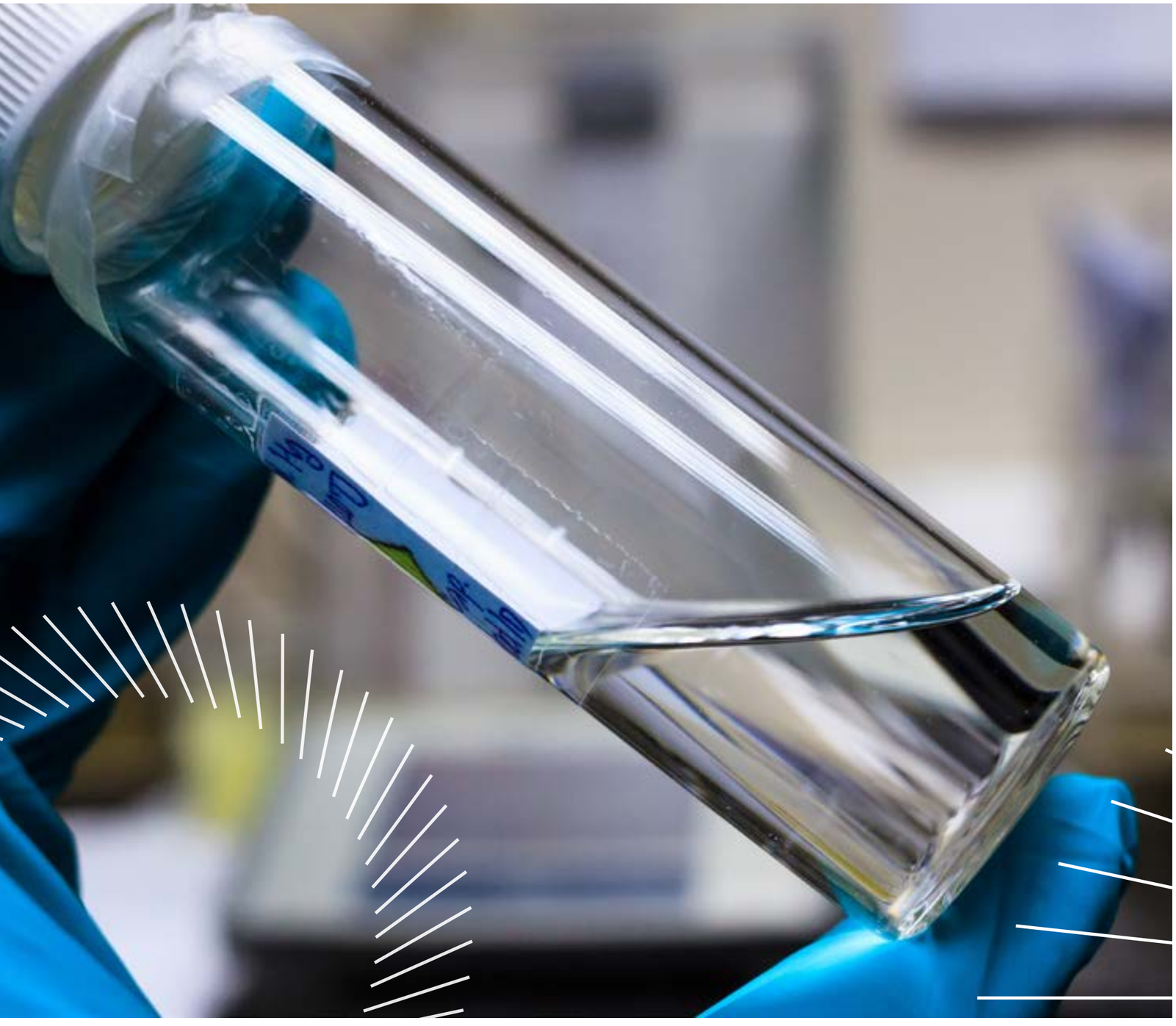
Completion
2021

Application
Drinking water
HVAC

The challenge
Connecting the tent domes to the hot and cold water supply as well as heating and cooling presented the planners of the "Orsolina28" construction project with challenges. At the same time, this had to be done using the most ecological materials possible.

The solution
aquatherm products made from polypropylene plastic impress with their significantly lower CO2 emissions compared to steel pipes. The underground aquatherm energy version with PUR rigid foam and a PE casing pipe is ideal for transporting water safely and efficiently over longer distances.

aquatherm energy
Chemical Resistance



AQUATHERM CHEMICAL RESISTANCE

Resistant

aquatherm products are characterised by their high resistance to numerous chemicals. This is made possible by the special polypropylene material from which aquatherm pipework systems are made.

The following tables serve as a guide for assessing whether and to what extent our products can be used in conjunction with chemicals. For detailed information on resistance in connection with the listed flow materials, please call +49 2722 950 0.

Downloads "Chemical resistance"

aquatherm energy
Warranty

Explanatory notes on the warranty of aquatherm GmbH

1. Foreword

Thank you for choosing a product from aquatherm GmbH, Germany. With almost 50 years of experience in the international plastics market and our trend-setting innovations, we have the necessary expertise to offer you customised system solutions "Made in Germany".

Our confidence in the quality of our products has motivated us toofferall pipes and fittings with a 10-year warranty instead of the2 years requiredunder German law .The extended warranty periodis covered by a comprehensive insurance policy from a leading insurance company in our industry. The warranty period begins on the date of delivery by aquatherm GmbH and takes effect on the date of the successfully performed and documented leak testin accordance with aquatherm specifications.

2. Scope of warranty

The aquatherm warranty protects you against financial losses that are demonstrably attributable to material defects, manufacturing errors and/or consulting/construction services provided by aquatherm. The warranty protection applies to the following product groups:

- aquatherm green pipe (fusiotherm and aquatherm ISO)
- aquatherm blue pipe (climatherm and aquatherm ISO)
- aquatherm red pipe (firestop)
- aquatherm black system (climasystem)
- aquatherm lilac pipe (aquatherm lilac)
- aquatherm orange system (aquatherm heating systems)
- aquatherm grey pipe (aquatherm SHT system)
- Installations carried out by aquatherm from these products

2.1. **What is covered by the aquatherm warranty ?**
The aquatherm warranty covers three aspects of damage: property damage, financial loss and personal injury.

2.1.1 **What is property damage?**
The damage or destruction of an item as a result of a defective product (e.g. classic water damage due to a leak). This impairs the usability of the item to fulfil its actual purpose. The term property damage is used when material assets are damaged or destroyed. Material damage can result in considerable costs, such as renovation, repair or replacement costs.

2.1.2 **What is meant by financial loss?**
Financial losses can be either additional expenses or a loss of business. Additional expenses are, for example, the costs for the removal and installation of replacement products following damage. Loss of business is the financial disadvantage suffered by the injured party as a result of damage (e.g. loss of income due to renovations following property damage).

2.1.3 **What is meant by personal injury?**
When a person suffers an injury, this is referred to as personal injury. For the purposes of this document, personal injury cover means the direct medical costs resulting from an injury.

3. What is not covered?

The costs incurred in connection with the claims, due to:

- Failure to comply with the operating parameters specified by aquatherm (see also aquatherm technical documentation). In case of doubt, please contact aquatherm GmbH or your local aquatherm representative. Exceptions must be made in writing by an aquatherm technician.
- Non-compliancewith theinstallation and laying guidelines specified in the aquatherm product documentation, in particular with regard to the use of aquatherm pipe clamps or other pipe fastenings compatible/usable with the aquatherm systems.
- Non-compliancewith the applicable national installation and laying regulations.
- Connections not made in accordance with aquatherm guidelines, including but not limited to: incorrect fusion technique, use of contaminated materials or tools, use of faulty or unsuitable tools, or any connection made by an installer without sufficient knowledge of aquatherm connection technology.
- Improperly established connections with other Piping systems and/or components (threads, flanges, brackets, mechanical connections that are not intended for use with aquatherm PP piping systems, etc.).
- All sealing elements usedin the product linesmanufactured by aquatherm.
- The tools and accessories sold by aquatherm GmbH are subject to the statutory warranty.
- Systems with faulty pipework parts or moulded parts that have not been subjected to an aquatherm leak test or another test approved by aquatherm before commissioning.
- Damage to our products after the transfer of risk.
- Damage caused oraggravated by copper in waterand resulting from erosion/corrosion or other degradation of copper components in a pipework system.
- delays caused by planning errors, delivery problems and/or or incorrect orders.
- Damage caused by entrained air, air pockets, high Pressure fluctuations or cavitation in the pipework system.

Note: This list contains only the best-known examples. Other events that affect the integrity of the products can also jeopardise the insurance cover.

4. How is the amount of compensation under the aquatherm warranty determined?

In the event of a material failure, aquatherm GmbH will be provided with samples of the damaged/defective product for inspection. In co-operation with the injured party, aquatherm will determine the cause of the damage and, if necessary, consult external bodies (testing institutes, laboratories, experts). If it is determined that the damage was caused by a material defect and/or manufacturing error or by consulting/construction services provided by aquatherm, the amount of the claim for damages will be examined and determined. In connection with the claim for damages, it is necessary to prove/document all expenses in a detailed and verifiable form.

5. What is the maximum insurance cover?

In the first 5 years of the warranty period, property damage, personal injury and financial losses are covered to the amount of € 20 million per insured event. The total cover for all cases in one year is a maximum of € 40 million. For years 6-10 of the warranty period, the sums insured are € 8.5 million and € 17 million respectively. Sublimit for damage to the planned objects/buildings (planning liability insurance) per insured event €2 million and €6 million for all insured events in the insurance year.

6. Why is the cover given in euros?

Both the insured manufacturer, aquatherm, and the insurer are based within the EU, so their agreements are issued in euros. As exchange rates fluctuate, the exchange rate valid at the time of the claim shall apply.

7. What is the communication channel for raising a warranty claim and related queries?
Warranty claims must be made directly to aquatherm GmbH or via their respective national representatives. Only the aquatherm partner or aquatherm GmbH will provide information on the processing status of the claim for damages.

8. Legal notice

If there is a discrepancy or contradiction between this document and the underlying insurance policy, the latter will always apply.

9. Notes on avoiding damage

I) **Production according to certified quality standards**
As a reliable manufacturer, aquatherm works according to certified quality standards (ISO 9001); constant internal quality controls are part of our daily routine. In addition, all employees are involved in quality assurance. As a result, products that do not meet our high standards are quickly recognised and removed from our range.

II) **Prevention of damage due to incorrect handling**
After delivery from our production plants, our products must be handled conscientiously and carefully. Experience has shown that most damage occurs during transport, storage and/or processing on site. We would like to take this opportunity to emphasise that correct handling helps to maintain product quality.

III) **Processing by trained installers**
Installation errors are easy to avoid! Our training courses teach the correct techniques for working with our products. Particular emphasis is placed on careful and meticulous installation. Installers who have been trained by us or a qualified aquatherm specialist work much more safely and the installation is much more efficient.

To ensure a secure connection between pipe and fitting, we recommend the exclusive use of aquatherm PP products. Mixing with non-system PP pipes and/or fittings must be avoided.

February 2023
aquatherm GmbH, Biggen 5, 57439 Attendorn, Germany

aquatherm energy
Transport & storage

AQUATHERM TRANSPORT & STORAGE

Careful storage

aquatherm pipes can be stored at any outside temperature. The storage location should generally be selected so that the entire length of the pipes is always in contact with the ground. Avoid bending the pipes during storage and transport.

At sub-zero temperatures, the pipes may be damaged by heavy impacts. The material must therefore be handled with care at these temperatures.

Despite their high resistance, aquatherm pipes should always be handled with care.

UV rays have an effect on all high-polymer plastics. Permanent unprotected storage outdoors is therefore not recommended.

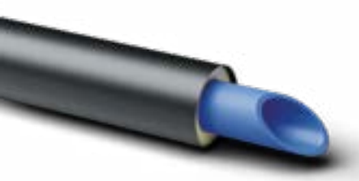
The maximum permissible outdoor storage time is 6 months.

aquatherm energy
Article list

aquatherm energy blue pipes/basic elements

aquatherm energy fibre composite pipe, Rod of 5.8 m aquatherm energy blue SDR 11 MF RP / *SDR 9 MF RP

Fibre composite pipe as single pipe in rods of 5.8 m each with PUR rigid foam insulation and PE casing pipe



Brandes Wioniq

without Leakage monitoring	with Leakage monitoring		Outer diameter Ø			
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	LE [m]	RG
Socket welding process						
2314032010 *	2314032011 *	2314032012 *	32	90	5,8	10
2314040012	2314040013	2314040014	40	110	5,8	10
2314050014	2314050015	2314050016	50	110	5,8	10
2314063016	2314063017	2314063018	63	125	5,8	10
2314075018	2314075019	2314075020	75	140	5,8	10
2314090020	2314090021	2314090022	90	160	5,8	10
2314110022	2314110023	2314110024	110	200	5,8	10
2314125024	2314125025	2314125026	125	225	5,8	10
Butt welding process						
2314160026	2314160027	2314160028	160	250	5,8	10
2314200028	2314200029	2314200030	200	315	5,8	10
2314250030	2314250031	2314250032	250	400	5,8	10
2314315032	2314315033	2314315034	315	450	5,8	10
2314355034	2314355035	2314355036	355	500	5,8	10

aquatherm energy fibre composite pipe OT, Rod of 5.8 m each aquatherm energy blue OT SDR 11 / *SDR 9 MF RP

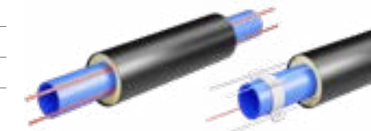
Fibre composite pipe as single pipe in rods of 5.8 m each with PUR rigid foam insulation and PE casing pipe

Brandes Wioniq

without Leakage monitoring	with Leakage monitoring		Outer diameter Ø			
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	LE [m]	RG
Socket welding process						
2414032010 *	2413032011 *	2413032012 *	32	90	5,8	10
2414040012	2414040013	2414040014	40	110	5,8	10
2414050014	2414050015	2414050016	50	110	5,8	10
2414063016	2414063017	2414063018	63	125	5,8	10
2414075018	2414075019	2414075020	75	140	5,8	10
2414090020	2414090021	2414090022	90	160	5,8	10
2414110022	2414110023	2414110024	110	200	5,8	10
2414125024	2414125025	2414125026	125	225	5,8	10
Butt welding process						
2414160026	2414160027	2414160028	160	250	5,8	10
2414200028	2414200029	2414200030	200	315	5,8	10
2414250030	2414250031	2414250032	250	400	5,8	10

aquatherm energy fibre composite pipe, Rod of 5.8 m aquatherm energy blue SDR 17.6 MF RP

Fibre composite pipe as single pipe in rods of 5.8 m each with PUR rigid foam insulation and PE casing pipe



Wioniq Brandes

without Leakage monitoring	with Leakage monitoring		Outer diameter Ø			
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	LE [m]	RG
Socket welding process						
2317125024	2317125025	2317125026	125	225	5,8	10
Butt welding process						
2317160026	2317160027	2317160028	160	250	5,8	10
2317200028	2317200029	2317200030	200	315	5,8	10
2317250030	2317250031	2317250032	250	400	5,8	10
2317315032	2317315033	2317315034	315	450	5,8	10
2317355034	2317355035	2317355036	355	500	5,8	10

aquatherm energy fibre composite pipe, Rod of 11.6 m aquatherm energy blue SDR 11 MF RP / *SDR 9 MF RP

Fibre composite pipe as single pipe in rods of 11.6 m each with PUR rigid foam insulation and PE casing pipe

Wioniq Brandes

without Leakage monitoring	with Leakage monitoring		Outer diameter Ø			
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	LE [m]	RG
Socket welding process						
2314032110 *	2314032111 *	2314032112 *	32	90	11,6	10
2314040112	2314040113	2314040114	40	110	11,6	10
2314050114	2314050115	2314050116	50	110	11,6	10
2314063116	2314063117	2314063118	63	125	11,6	10
2314075118	2314075119	2314075120	75	140	11,6	10
2314090120	2314090121	2314090122	90	160	11,6	10
2314110122	2314110123	2314110124	110	200	11,6	10
2314125124	2314125125	2314125126	125	225	11,6	10
Butt welding process						
2314160126	2314160127	2314160128	160	250	11,6	10
2314200128	2314200129	2314200130	200	315	11,6	10
2314250130	2314250131	2314250132	250	400	11,6	10
2314315132	2314315133	2314315134	315	450	11,6	10
2314355134	2314355135	2314355136	355	500	11,6	10

Legend Table abbreviations (units in mm unless otherwise stated)

d	Diameter in mm	**l/m**	Water content in litres per metre	**RG**	Discount group
D	Diameter in mm			**SDR**	Standard Dimension Ratio (diameter/wall thickness ratio)
s	Wall thickness in mm	**kg/m**	Weight in kg per metre		
di	Clear width in mm	**DN**	Nominal diameter		
		LE	Delivery unit in metres		

aquatherm energy blue pipes/basic elements

aquatherm energy fibre composite pipe OT, Rod of 11.6 m aquatherm energy blue OT SDR 11 / *SDR 9 MF RP

Fibre composite pipe as single pipe in rods of 11.6 m each with PUR rigid foam insulation and PE casing pipe

Brandes Wioniq

without Leakage monitoring	with Leakage monitoring		Outer diameter Ø			
	Brandes system	Wioniq system	Medium pipe	Jacket pipe		
Article no.	Article no.	Article no.	d	D	LE [m]	RG
Socket welding process						
2414032110 *	2414032111 *	2414032112 *	32	90	11,6	10
2414040112	2414040113	2414040114	40	110	11,6	10
2414050114	2414050115	2414050116	50	110	11,6	10
2414063116	2414063117	2414063118	63	125	11,6	10
2414075118	2414075119	2414075120	75	140	11,6	10
2414090120	2414090121	2414090122	90	160	11,6	10
2414110122	2414110123	2414110124	110	200	11,6	10
2414125124	2414125125	2414125126	125	225	11,6	10
Butt welding process						
2414160126	2414160127	2414160128	160	250	11,6	10
2414200128	2414200129	2414200130	200	315	11,6	10
2414250130	2414250131	2414250132	250	400	11,6	10

aquatherm energy fibre composite pipe, Rod of 11.6 m aquatherm energy blue SDR 17.6 MF RP

Fibre composite pipe as single pipe in rods of 11.6 m each with PUR rigid foam insulation and PE casing pipe

Brandes Wioniq

without Leakage monitoring	with Leakage monitoring		Outer diameter Ø			
	Brandes system	Wioniq system	Medium pipe	Jacket pipe		
Article no.	Article no.	Article no.	d	D	LE [m]	RG
Socket welding process						
2317125124	2317125125	2317125126	125	225	11,6	10
Butt welding process						
2317160126	2317160127	2317160128	160	250	11,6	10
2317200128	2317200129	2317200130	200	315	11,6	10
2317250130	2317250131	2317250132	250	400	11,6	10
2317315132	2317315133	2317315134	315	450	11,6	10
2317355134	2317355135	2317355136	355	500	11,6	10

Legend Table abbreviations (units in mm unless otherwise stated)

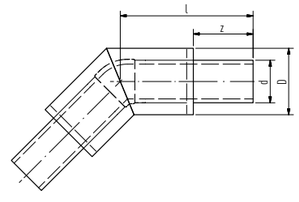
d	Diameter in mm	**l/m**	Water content in litres per metre	**RG**	Discount group
D	Diameter in mm	**kg/m**	Weight in kg per metre	**SDR**	Standard Dimension Ratio (diameter/wall thickness ratio)
s	Wall thickness in mm	**DN**	Nominal diameter		
di	Clear width in mm	**LE**	Delivery unit in metres		

aquatherm energy blue bends

aquatherm energy bend 45° SL 500

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue SDR 11 / *SDR 9 MF RP



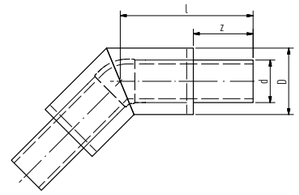
without Leakage monitoring	with Leakage monitoring Brandes system	Wioniq system	Outer diameter Ø Medium pipe	Jacket pipe					
Article no.	Article no.	Article no.	d	D	z	l	kg	LE	RG
Socket welding process									
2384032060 *	2384032760 *	2384032860 *	32	90	225	500	126	1	10
2384110061	2384110761	2384110861	40	110	225	500	1,496	1	10
2384050062	2384050762	2384050862	50	110	225	500	1,720	1	10
2384063063	2384063763	2384063863	63	125	225	500	2,340	1	10
2384075064	2384075764	2384075864	75	140	225	500	2,988	1	10
2384090065	2384090765	2384090865	90	160	225	500	4,150	1	10
2384110066	2384110766	2384110866	110	200	225	500	6,300	1	10
2384125067	2384125767	2384125867	125	225	225	500	7,850	1	10
Butt welding process									
2384160069	2384160769	2384160869	160	250	225	500	10,000	1	10
2384200071	2384200771	2384200871	200	315	225	500	14,806	1	10
2384250073	2384250773	2384250873	250	400	225	500	24,889	1	10
2384315075	2384315775	2384315875	315	450	225	500	38,788	1	10
2384355077	2384355777	2384355877	355	500	225	500	50,247	1	10

Also available in 15° and 30° versions.

aquatherm energy OT bend 45° SL 500

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue OT SDR 11 / *SDR 9 MF RP OT



without Leakage monitoring	with Leakage monitoring		Outer diameter Ø						
	Brandes system	Wioniq system	Medium pipe	Jacket pipe					
Article no.	Article no.	Article no.	d	D	z	l	kg	LE	RG
Socket welding process									
2480032001 *	2480032701 *	2480032801 *	32	90	225	500	1,237	1	10
2480040002	2480040702	2480040802	40	110	225	500	1,533	1	10
2480050003	2480050703	2480050803	50	110	225	500	1,812	1	10
2480063004	2480063704	2480063804	63	125	225	500	2,455	1	10
2480075005	2480075705	2480075805	75	140	225	500	3,035	1	10
2480090006	2480090706	2480090806	90	160	225	500	4,293	1	10
2480110007	2480110707	2480110807	110	200	225	500	6,389	1	10
2480125008	2480125708	2480125808	125	225	225	500	8,177	1	10
Butt welding process									
2484160009	2484160709	2484160809	160	250	225	500	10,156	1	10
2484200010	2484200710	2484200810	200	315	225	500	15,348	1	10
2484250011	2484250711	2484250811	250	400	225	500	25,853	1	10

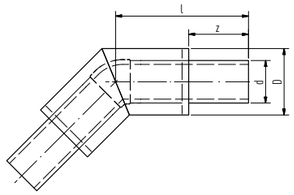
Also available in 15° and 30° versions.

aquatherm energy blue bends

aquatherm energy bend 45° SL 500

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue SDR 17.6 MF RP



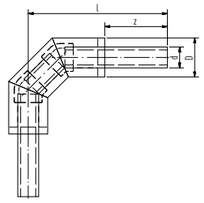
without Leakage monitoring	with Leakage monitoring		Outer diameter Ø						
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	z	l	kg	LE	RG
Socket welding process									
2387125068	2387125768	2387125868	125	225	225	500	6,310	1	10
Butt welding process									
2387160070	2387160770	2387160870	160	250	225	500	7,239	1	10
2387200072	2387200772	2387200872	200	315	225	500	11,163	1	10
2387250074	2387250774	2387250874	250	400	225	500	18,813	1	10
2387315076	2387315776	2387315876	315	450	225	500	28,521	1	10
2387355078	2387355778	2387355878	355	500	225	500	031	1	10

Also available in 15° and 30° versions.

aquatherm energy elbow 90° SL 500

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue SDR 11 / *SDR 9 MF RP



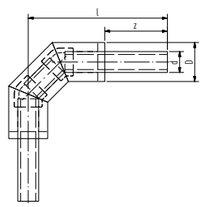
without Leakage monitoring	with Leakage monitoring		Outer diameter Ø						
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	z	l	kg	LE	RG
Socket welding process									
2384032081 *	2384032781 *	2384032881 *	32	90	225	500	1,000	1	10
2384040083	2384040783	2384040883	40	110	225	500	1,500	1	10
2384050085	2384050785	2384050885	50	110	225	500	1,660	1	10
2384063087	2384063787	2384063887	63	125	225	500	2,500	1	10
2384075089	2384075789	2384075889	75	140	225	500	3,000	1	10

Also available in 60° and 75° versions.

aquatherm energy OT elbow 90° SL 500

with PUR rigid foam insulation and PE casing pipe

for aquatherm blue energy blue SDR 11 / *SDR 9 MF RP OT



without Leakage monitoring	with Leakage monitoring		Outer diameter Ø						
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	z	l	kg	LE	RG
Socket welding process									
2480032021 *	2480032721 *	2480032821 *	32	90	225	500	1,264	1	10
2480040023	2480040723	2480040823	40	110	225	500	1,370	1	10
2480050025	2480050725	2480050825	50	110	225	500	1,670	1	10
2480063027	2480063727	2480063827	63	125	225	500	2,407	1	10
2480075029	2480075729	2480075829	75	140	225	500	3,500	1	10

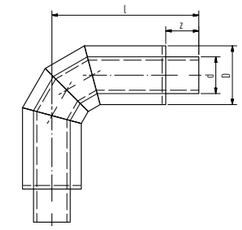
Also available in 60° and 75° versions.

aquatherm energy blue bends

aquatherm energy elbow 90° SL 1000

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue SDR 11 / *SDR 9 MF RP



without Leakage monitoring	with Leakage monitoring		Outer diameter Ø						
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	z	l	LE	RG	
Socket welding process									
2380032080 *	2380032780 *	2380032880 *	32	90	225	1000	1	10	
2380040082	2380040782	2380040882	40	110	225	1000	1	10	
2380050084	2380050784	2380050884	50	110	225	1000	1	10	
2380063086	2380063786	2380063886	63	125	225	1000	1	10	
2380075088	2380075788	2380075888	75	140	225	1000	1	10	
2380090090	2380090790	2380090890	90	160	225	1000	1	10	
2380110091	2380110791	2380110891	110	200	225	1000	1	10	
2380125092	2380125792	2380125892	125	225	225	1000	1	10	
Butt welding process									
2384160094	2384160794	2384160894	160	250	225	1000	1	10	
2384200096	2384200796	2384200896	200	315	225	1000	1	10	
2384250098	2384250798	2384250898	250	400	225	1000	1	10	
2384315100	2384315700	2384315800	315	450	225	1000	1	10	
2384355102	2384355702	2384355802	355	500	225	1000	1	10	

Also available in 60° and 75° versions.

aquatherm energy elbow 90° SL 1000

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue OT SDR 11 / *SDR 9 MF RP

without Leakage monitoring	with Leakage monitoring		Outer diameter Ø						
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	z	l	LE	RG	
Socket welding process									
2480032020 *	2480032720 *	2480032820 *	32	90	225	1000	1	10	
2480040022	2480040722	2480040822	40	110	225	1000	1	10	
2480050024	2480050724	2480050824	50	110	225	1000	1	10	
2480063026	2480063726	2480063826	63	125	225	1000	1	10	
2480075028	2480075728	2480075828	75	140	225	1000	1	10	
2480090030	2480090730	2480090830	90	160	225	1000	1	10	
2480110031	2480110731	2480110831	110	200	225	1000	1	10	
2480125032	2480125732	2480125832	125	225	225	1000	1	10	
Butt welding process									
2484160033	2484160733	2484160833	160	250	225	1000	1	10	
2484200034	2484200734	2484200834	200	315	225	1000	1	10	
2484250035	2484250735	2484250835	250	400	225	1000	1	10	

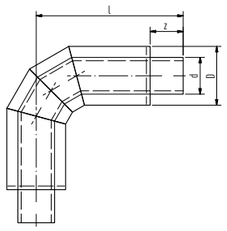
Also available in 60° and 75° versions.

aquatherm energy blue bends

aquatherm energy elbow 90° SL 1000

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue SDR 17.6 MF RP



without Leakage monitoring	with Leakage monitoring		Outer diameter Ø					
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	z	l	LE	RG
Socket welding process								
2387125093	2387125793	2387125893	125	225	225	1000	1	10
Butt welding process								
2387160095	2387160795	2387160895	160	250	225	1000	1	10
2387200097	2387200797	2387200897	200	315	225	1000	1	10
2387250099	2387250799	2387250899	250	400	225	1000	1	10
2387315101	2387315701	2387315801	315	450	225	1000	1	10
2387355103	2387355703	2387355803	355	500	225	1000	1	10

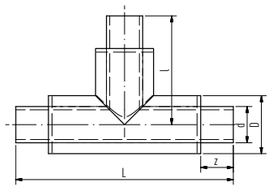
Also available in 60° and 75° versions.

aquatherm energy branches

aquatherm energy branch

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue SDR 17.6 MF RP



Brandes

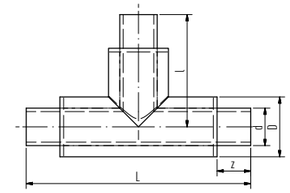
without Leakage monitoring	with Leakage monitoring		Outer diameter Ø						
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	z	l	L	LE	RG
Socket welding process									
2360032001 *	2360032701	2360032801	32	90	225	500	1.000	1	10
2360040002	2360040702	2360040802	40	110	225	500	1.000	1	10
2360050003	2360050703	2360050803	50	110	225	500	1.000	1	10
2360063004	2360063704	2360063804	63	125	225	500	1.000	1	10
2360075005	2360075705	2360075805	75	140	225	500	1.000	1	10
2360090006	2360090706	2360090806	90	160	225	500	1.000	1	10
2360110007	2360110707	2360110807	110	200	225	500	1.000	1	10
2360125008	2360125708	2360125808	125	225	225	500	1.000	1	10
Butt welding process									
2364160009	2364160709	2364160809	160	250	225	500	1.000	1	10
2364200010	2364200710	2364200810	200	315	225	750	1.500	1	10
2364250011	2364250704	2364250804	250	400	225	750	1.500	1	10
2364315012	2364315712	2364315812	315	450	225	750	1.500	1	10
2364355013	2364355713	2364355813	355	500	225	750	1.500	1	10

aquatherm energy branches

aquatherm energy branch

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue SDR 17.6 MF RP



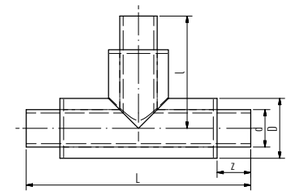
Brandes

without Leakage monitoring	with Leakage monitoring		Outer diameter Ø						
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	z	l	L	LE	RG
Socket welding process									
2367125040	2367125740	2367125840	125	225	225	500	1.000	1	10
Butt welding process									
2367160041	2367125739	2367160841	160	250	225	500	1.000	1	10
2367200042	2367200742	2367200842	200	315	225	750	1.500	1	10
2367250043	2367250743	2367250843	250	400	225	750	1.500	1	10
2367315044	2367315733	2367315833	315	450	225	750	1.500	1	10
2367355045	2367355743	2367355843	355	500	225	750	1.500	1	10

aquatherm energy branch

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue OT SDR 11 / *SDR 9 MF RP



Brandes

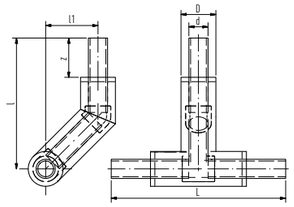
without Leakage monitoring	with Leakage monitoring		Outer diameter Ø						
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Jacket pipe D	z	l	L	LE	RG
Socket welding process									
2460032001 *	2460032701 *	2460032801 *	32	90	225	500	1.000	1	10
2460040002	2460040702	2460040802	40	110	225	500	1.000	1	10
2460050003	2460050703	2460050803	50	110	225	500	1.000	1	10
2460063004	2460063704	2460063804	63	125	225	500	1.000	1	10
2460075005	2460075705	2460075805	75	140	225	500	1.000	1	10
2460090006	2460090706	2460090806	90	160	225	500	1.000	1	10
2460110007	2460110707	2460110807	110	200	225	500	1.000	1	10
2460125008	2460125708	2460125808	125	225	225	500	1.000	1	10
Butt welding process									
2464160009	2464160707	2464160807	160	250	225	500	1.000	1	10
2464200010	2464200710	2464200810	200	315	225	750	1.500	1	10
2464250011	2464250711	2464250811	250	400	225	750	1.500	1	10

aquatherm energy branches

aquatherm energy skip branch

for aquatherm energy blue SDR 11 / *SDR 9 MF RP

with PUR rigid foam insulation and PE casing pipe

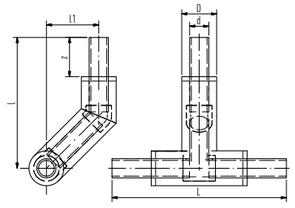


without Leakage monitoring	Outer diameter Ø							
Article no.	Medium pipe d	Jacket pipe D	z	l	l1	L	LE	RG
Socket welding process								
2360032020 *	32	90	225	750	190	1.000	1	10
2360040021	40	110	225	750	210	1.000	1	10
2360050022	50	110	225	750	210	1.000	1	10
2360063023	63	125	225	750	225	1.000	1	10
2360075024	75	140	225	750	240	1.000	1	10
2360090025	90	160	225	750	260	1.000	1	10
2360110026	110	200	225	750	300	1.000	1	10
2360125027	125	225	225	750	325	1.000	1	10
Butt welding process								
2364160028	160	250	225	1000	350	1.000	1	10
2364200029	200	315	225	1000	415	1.500	1	10
2364250030	250	400	225	1000	500	1.500	1	10
2364315031	315	450	225	1250	550	1.500	1	10
2364355032	355	500,0	225,0	1250	600	1.500	1	10

aquatherm energy skip branch

for aquatherm energy blue OT SDR 11 / *SDR 9 MF RP

with PUR rigid foam insulation and PE casing pipe



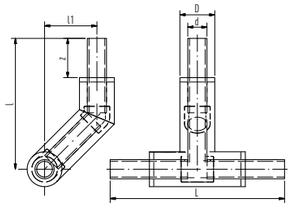
without Leakage monitoring	Outer diameter Ø							
Article no.	Medium pipe d	Jacket pipe D	z	l	l1	L	LE	RG
Socket welding process								
2460032020 *	32	90	225	750	190	1.000	1	10
2460040021	40	110	225	750	210	1.000	1	10
2460050022	50	110	225	750	210	1.000	1	10
2460063023	63	125	225	750	225	1.000	1	10
2460075024	75	140	225	750	240	1.000	1	10
2460090025	90	160	225	750	260	1.000	1	10
2460110026	110	200	225	750	300	1.000	1	10
2460125027	125	225	225	750	325	1.000	1	10
Butt welding process								
2464160028	160	250	225	1000	350	1.000	1	10
2464200029	200	315	225	1000	415	1.500	1	10
2464250030	250	400	225	1000	500	1.500	1	10

aquatherm energy branches

aquatherm energy skip branch

for aquatherm energy blue SDR 17.6 MF RP

with PUR rigid foam insulation and PE casing pipe

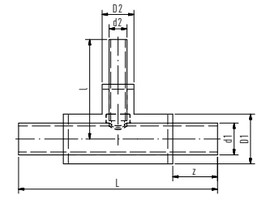


without Leakage monitoring	Outer diameter Ø							
Article no.	Medium pipe d	Jacket pipe D	z	l	l1	L	LE	RG
Socket welding process								
2367125050	125	225	225	750	325	1.000	1	10
Butt welding process								
2367160051	160	250	225	1000	350	1.000	1	10
2367200052	200	315	225	1000	415	1.500	1	10
2367250053	250	400	225	1000	500	1.500	1	10
2367315054	315	450	225	1250	550	1.500	1	10
2367355055	355	500	225	1250	600	1.500	1	10

aquatherm energy reducing branch

for aquatherm energy blue SDR 11 / *SDR 9 MF RP

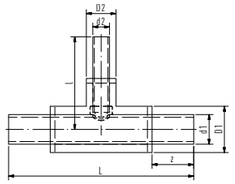
with PUR rigid foam insulation and PE casing pipe



without Leakage monitoring	with Leakage monitoring		Outer diameter Ø							
Article no.	Brandes system Article no.	Wioniq system Article no.	Ø outside d1	Ø outside d2	Ø outside D1	Ø outside D2	z	l	L	LE	RG
Socket welding process											
2360040060 *	2360040760 *	2360040860 *	40	32	110	90	225	500	1.000	1	10
2360050061 *	2360050761 *	2360050861 *	50	32	110	90	225	500	1.000	1	10
2360050062	2360050762	2360050862	50	40	110	110	225	500	1.000	1	10
2360063063 *	2360063763 *	2360063863 *	63	32	125	90	225	500	1.000	1	10
2360063064	2360063764	2360063864	63	40	125	110	225	500	1.000	1	10
2360063065	2360063765	2360063865	63	50	125	110	225	500	1.000	1	10
2360075066 *	2360075766 *	2360075866 *	75	32	140	90	225	500	1.000	1	10
2360075067	2360075767	2360075867	75	40	140	110	225	500	1.000	1	10
2360075068	2360075768	2360075868	75	50	140	110	225	500	1.000	1	10
2360075069	2360075769	2360075869	75	63	140	125	225	500	1.000	1	10
2360090070 *	2360090770 *	2360090870 *	90	32	160	90	225	500	1.000	1	10
2360090071	2360090771	2360090871	90	40	160	110	225	500	1.000	1	10
2360090072	2360090772	2360090872	90	50	160	110	225	500	1.000	1	10
2360090073	2360090773	2360090873	90	63	160	125	225	500	1.000	1	10
2360090074	2360090774	2360090874	90	75	160	140	225	500	1.000	1	10
2360110075 *	2360110775 *	2360110875 *	110	32	200	90	225	500	1.000	1	10
2360110076	2360110776	2360110876	110	40	200	110	225	500	1.000	1	10
2360110077	2360110777	2360110877	110	50	200	110	225	500	1.000	1	10
2360110078	2360110778	2360110878	110	63	200	125	225	500	1.000	1	10
2360110079	2360110779	2360110879	110	75	200	140	225	500	1.000	1	10
2360110080	2360110780	2360110880	110	90	200	160	225	500	1.000	1	10
2360125081 *	2360125781 *	2360125881 *	125	32	225	90	225	500	1.000	1	10
2360125082	2360125782	2360125882	125	40	225	110	225	500	1.000	1	10
2360125083	2360125783	2360125883	125	50	225	110	225	500	1.000	1	10

*Branch d2 SDR 9

Continued on the next page ...



aquatherm energy reducing branch

with PUR rigid foam insulation and PE casing pipe

(continued) for aquatherm energy blue SDR 11 / *SDR 9 MF RP

without Leakage monitoring	with Leakage monitoring		Outer diameter Ø								
Article no.	Brandes system Article no.	Wioniq system Article no.	Ø outside d1	Ø outside d2	Ø outside D1	Ø outside D2	z	l	L	LE	RG
2360125084	2360125784	2360125884	125	63	225	125	225	500	1.000	1	10
2360125085	2360125785	2360125885	125	75	225	140	225	500	1.000	1	10
2360125086	2360125786	2360125886	125	90	225	160	225	500	1.000	1	10
2360125087	2360125787	2360125887	125	110	225	200	225	500	1.000	1	10
Butt welding process											
2364160088 *	2364160788 *	2364160888 *	160	32	250	90	225	500	1.000	1	10
2364160089	2364160789	2364160889	160	40	250	110	225	500	1.000	1	10
2364160090	2364160790	2364160890	160	50	250	110	225	500	1.000	1	10
2364160091	2364160791	2364160891	160	63	250	125	225	500	1.000	1	10
2360160092	2360160792	2360160892	160	75	250	140	225	500	1.000	1	10
2364160093	2364160793	2364160893	160	90	250	160	225	500	1.000	1	10
2364160094	2364160794	2364160894	160	110	200	200	225	750	1.500	1	10
2364160095	2364160795	2364160895	160	125	250	225	225	750	1.500	1	10
2364200096 *	2364200796 *	2364200896 *	200	32	315	90	225	750	1.500	1	10
2364200097	2364200797	2364200897	200	40	315	110	225	750	1.500	1	10
2364200098	2364200798	2364200898	200	50	315	110	225	750	1.500	1	10
2364200099	2364200799	2364200899	200	63	315	125	225	750	1.500	1	10
2364200100	2364200700	2364200800	200	75	315	140	225	750	1.500	1	10
2364200101	2364200701	2364200801	200,0	90,0	315	160	225,0	750	1.500	1	10
2364200102	2364200702	2364200802	200,0	110,0	315	200	225,0	750	1.500	1	10
2364200103	2364200703	2364200803	200	125	315	225	225	750	1.500	1	10
2364200104	2364200704	2364200804	200	160	315	250	225	750	1.500	1	10
2364250105 *	2364250705 *	2364250805 *	250	32	400	90	225	750	1.500	1	10
2364250106	2364250706	2364250806	250	40	400	110	225	750	1.500	1	10
2364250107	2364250707	2364250807	250	50	400	110	225	750	1.500	1	10
2364250108	2364250708	2364250808	250	63	400	125	225	750	1.500	1	10
2364250109	2364250709	2364250809	250	75	400	140	225	750	1.500	1	10
2364250110	2364250710	2364250810	250	90	400	160	225	750	1.500	1	10
2364250111	2364250711	2364250811	250	110	400	200	225	750	1.500	1	10
2364250112	2364250712	2364250812	250	125	400	225	225	750	1.500	1	10
2364250113	2364250713	2364250813	250	160	400	250	225	750	1.500	1	10
2364250114	2364250714	2364250814	250	200	400	315	225	750	1.500	1	10
2364315115 *	2364315715 *	2364315815 *	315	32	450	90	225	750	1.500	1	10
2364315116	2364315716	2364315816	315	40	450	110	225	750	1.500	1	10
2364315117	2364315717	2364315817	315	50	450	110	225	750	1.500	1	10
2364315118	2364315718	2364315818	315	63	450	125	225	750	1.500	1	10
2364315119	2364315719	2364315819	315	75	450	140	225	750	1.500	1	10
2364315120	2364315720	2364315820	315	90	450	160	225	750	1.500	1	10
2364315121	2364315721	2364315821	315	110	450	200	225	750	1.500	1	10
2364315122	2364315722	2364315822	315	125	450	225	225	750	1.500	1	10
2364315123	2364315723	2364315823	315	160	450	250	225	750	1.500	1	10

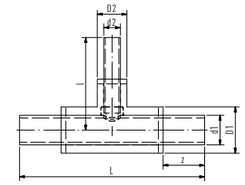
*Branch d2 SDR 9

aquatherm energy branches

aquatherm energy reducing branch

with PUR rigid foam insulation and PE casing pipe

(continued) for aquatherm energy blue SDR 11 / *SDR 9 MF RP



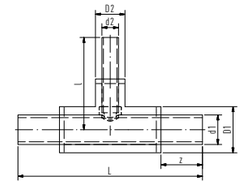
without Leakage monitoring	with Leakage monitoring		Outer diameter Ø								
Article no.	Brandes system Article no.	Wioniq system Article no.	Ø outside d1	Ø outside d2	Ø outside D1	Ø outside D2	z	l	L	LE	RG
2364315124	2364315724	2364315824	315	200	450	315	225	750	1.500	1	10
2364315125	2364315725	2364315825	315	250	450	400	225	750	1.500	1	10
2364355126 *	2364355726 *	2364355826 *	355	32	500	90	225	750	1.500	1	10
2364355127	2364355727	2364355827	355	40	500	110	225	750	1.500	1	10
2364355128	2364355728	2364355828	355	50	500	110	225	750	1.500	1	10
2364355129	2364355729	2364355829	355	63	500	125	225	750	1.500	1	10
2364355130	2364355730	2364355830	355	75	500	140	225	750	1.500	1	10
2364355131	2364355731	2364355831	355	90	500	160	225	750	1.500	1	10
2364355132	2364355732	2364355832	355	110	500	200	225	750	1.500	1	10
2364355133	2364355733	2364355833	355	125	500	225	225	750	1.500	1	10
2364355134	2364355734	2364355834	355	160	500	250	225	750	1.500	1	10
2364355135	2364355735	2364355835	355	200	500	315	225	750	1.500	1	10
2364355136	2364355736	2364355836	355	250	500	400	225	750	1.500	1	10
2364355137	2364355737	2364355837	355	315	500	450	225	750	1.500	1	10

*Branch d2 SDR 9

aquatherm energy OT reducing branch

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue OT SDR 11 / *SDR 9 MF RP



without Leakage monitoring	with Leakage monitoring		Outer diameter Ø								
Article no.	Brandes system Article no.	Wioniq system Article no.	Ø outside d1	Ø outside d2	Ø outside D1	Ø outside D2	z	l	L	LE	RG
Socket welding process											
2460040220 *	2460040720 *	2460040820 *	40	32	110	90	225	500	1.000	1	10
2460050221 *	2460050721 *	2460050821 *	50	32	110	90	225	500	1.000	1	10
2460050222	2460050722	2460050822	50	40	110	110	225	500	1.000	1	10
2460063223 *	2460063723 *	2460063823 *	63	32	125	90	225	500	1.000	1	10
2460063224	2460063724	2460063824	63	40	125	110	225	500	1.000	1	10
2460063225	2460063725	2460063825	63	50	125	110	225	500	1.000	1	10
2460075226 *	2460075726 *	2460075826 *	75	32	140	90	225	500	1.000	1	10
2460075227	2460075727	2460075827	75	40	140	110	225	500	1.000	1	10
2460075228	2460075728	2460075828	75	50	140	110	225	500	1.000	1	10
2460075229	2460075729	2460075829	75	63	140	125	225	500	1.000	1	10
2460090230 *	2460090730 *	2460090830 *	90	32	160	90	225	500	1.000	1	10
2460090231	2460090731	2460090831	90	40	160	110	225	500	1.000	1	10
2460090232	2460090732	2460090832	90	50	160	110	225	500	1.000	1	10
2460090233	2460090733	2460090833	90	63	160	125	225	500	1.000	1	10
2460090234	2460090734	2460090834	90	75	160	140	225	500	1.000	1	10
2460110235 *	2460110735 *	2460110835 *	110	32	200	90	225	500	1.000	1	10
2460110236	2460110736	2460110836	110	40	200	110	225	500	1.000	1	10
2460110237	2460110737	2460110837	110	50	200	110	225	500	1.000	1	10
2460110238	2460110738	2460110838	110	63	200	125	225	500	1.000	1	10

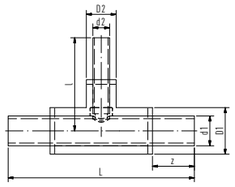
*Branch d2 SDR 9

Continued on the next page ...

aquatherm energy OT reducing branch

with PUR rigid foam insulation and PE casing pipe

(continued) for aquatherm energy blue OT SDR 11 / *SDR 9 MF RP



without Leakage monitoring	with Leakage monitoring		Outer diameter Ø								
Article no.	Brandes system Article no.	Wioniq system Article no.	Ø outside d1	Ø outside d2	Ø outside D1	Ø outside D2	z	l	L	LE	RG
2460110239	2460110739	2460110839	110	75	200	140	225	500	1.000	1	10
2460110240	2460110740 *	2460110840 *	110	90	200	160	225	500	1.000	1	10
2460125241 *	2460125741	2460125841	125	32	225	90	225	500	1.000	1	10
2460125242	2460125742	2460125842	125	40	225	110	225	500	1.000	1	10
2460125243	2460125743	2460125843	125	50	225	110	225	500	1.000	1	10
2460125244	2460125744	2460125844	125	63	225	125	225	500	1.000	1	10
2460125245	2460125745	2460125845	125	75	225	140	225	500	1.000	1	10
2460125246	2460125746	2460125846	125	90	225	160	225	500	1.000	1	10
2460125247	2460125747	2460125847	125	110	225	200	225	500	1.000	1	10
Butt welding process											
2464160248 *	2464160748 *	2464160848 *	160	32	250	90	225	500	1.000	1	10
2464160249	2464160749	2464160849	160	40	250	110	225	500	1.000	1	10
2464160250	2464160750	2464160850	160	50	250	110	225	500	1.000	1	10
2464160251	2464160751	2464160851	160	63	250	125	225	500	1.000	1	10
2464160252	2464160752	2464160852	160	75	250	140	225	500	1.000	1	10
2464160253	2464160753	2464160853	160	90	250	160	225	500	1.000	1	10
2464160254	2464160754	2464160854	160	110	250	200	225	750	1.500	1	10
2464160255	2464160755	2464160855	160	125	250	225	225	750	1.500	1	10
2464200256 *	2464200756 *	2464200856 *	200	32	315	90	225	750	1.500	1	10
2464200257	2464200757	2464200857	200	40	315	110	225	750	1.500	1	10
2464200258	2464200758	2464200858	200	50	315	110	225	750	1.500	1	10
2464200259	2464200759	2464200859	200	63	315	125	225	750	1.500	1	10
2464200260	2464200760	2464200860	200	75	315	140	225	750	1.500	1	10
2464200261	2464200761	2464200861	200	90	315	160	225	750	1.500	1	10
2464200262	2464200762	2464200862	200	110	315	200	225	750	1.500	1	10
2464200263	2464200763	2464200863	200	125	315	225	225	750	1.500	1	10
2464200264	2464200764	2464200864	200	160	315	250	225	750	1.500	1	10
2464250265 *	2464250765 *	2464250865 *	250	32	400	90	225	750	1.500	1	10
2464250266	2464250766	2464250866	250	40	400	110	225	750	1.500	1	10
2464250267	2464250767	2464250867	250	50	400	110	225	750	1.500	1	10
2464250268	2464250768	2464250868	250	63	400	125	225	750	1.500	1	10
2464250269	2464250769	2464250869	250	75	400	140	225	750	1.500	1	10
2464250270	2464250770	2464250870	250	90	400	160	225	750	1.500	1	10
2464250271	2464250771	2464250871	250	110	400	200	225	750	1.500	1	10
2464250272	2464250772	2464250872	250	125	400	225	225	750	1.500	1	10
2464250273	2464250773	2464250873	250	160	400	250	225	750	1.500	1	10
2464250274	2464250774	2464250874	250	200	400	315	225	750	1.500	1	10

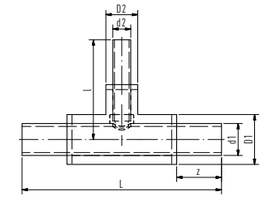
*Branch d2 SDR 9

aquatherm energy branches

aquatherm energy reducing branch

with PUR rigid foam insulation and PE casing pipe

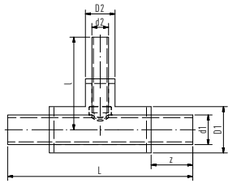
for aquatherm energy blue SDR 17.6 / SDR 11 MF RP



without Leakage monitoring	with Leakage monitoring		Outer diameter Ø								
Article no.	Brandes system Article no.	Wioniq system Article no.	Ø outside d1	Ø outside d2	Ø outside D1	Ø outside D2	z	l	L	LE	RG
Socket welding process											
2367125335 *	2367125735 *	2367125835 *	125	32	225	90	225	500	1.000	1	10
2367125336 *	2367125736 *	2367125836 *	125	40	225	110	225	500	1.000	1	10
2367125337 *	2367125737 *	2367125837 *	125	50	225	110	225	500	1.000	1	10
2367125338 *	2367125738 *	2367125838 *	125	63	225	125	225	500	1.000	1	10
2360125339 *	2360125739 *	2367125839 *	125	75	225	140	225	500	1.000	1	10
2367125340 *	2367125739 *	2367160841 *	125	90	225	160	225	500	1.000	1	10
2360125341 *	2360125741 *	2360125841 *	125	110	225	200	225	500	1.000	1	10
Butt welding process											
2367160342 *	2367160742 *	2367160842 *	160	32	250	90	225	500	1.000	1	10
2367160343 *	2367160743 *	2367160843 *	160	40	250	110	225	500	1.000	1	10
2367160344 *	2367160744 *	2367160844 *	160	50	250	110	225	500	1.000	1	10
2367160345 *	2367160745 *	2367160845 *	160	63	250	125	225	500	1.000	1	10
2367160346 *	2367160746 *	2367160846 *	160	75	250	140	225	500	1.000	1	10
2367160347 *	2367160747 *	2367160847 *	160	90	250	160	225	500	1.000	1	10
2367160348 *	2367160748 *	2367160848 *	160	110	250	200	225	750	1.500	1	10
2367160349	2367160749	2367160849 *	160	125	250	225	225	750	1.500	1	10
2367200350 *	2367200750 *	2367200850 *	200	32	315	90	225	750	1.500	1	10
2367200351 *	2367200751 *	2367200851 *	200	40	315	110	225	750	1.500	1	10
2367200352 *	2367200752 *	2367200852 *	200	50	315	110	225	750	1.500	1	10
2367200353 *	2367200753 *	2367200853 *	200	63	315	125	225	750	1.500	1	10
2367200354 *	2367200754 *	2367200854 *	200	75	315	140	225	750	1.500	1	10
2367200355 *	2367200755 *	2367200855 *	200	90	315	160	225	750	1.500	1	10
2367200356 *	2367200756 *	2367200856 *	200	110	315	200	225	750	1.500	1	10
2367200357	2367200757	2367200857	200	125	315	225	225	750	1.500	1	10
2367200358	2367200758	2367200858	200	160	315	250	225	750	1.500	1	10
2367250359 *	2367250759 *	2367250859 *	250	32	400	90	225	750	1.500	1	10
2367250360 *	2367250760	2367250860	250	40	400	110	225	750	1.500	1	10
2367250361 *	2367250761	2367250861	250	50	400	110	225	750	1.500	1	10

*Branch d2 SDR 11

Continued on the next page ...



aquatherm energy reducing branch

with PUR rigid foam insulation and PE casing pipe

(continued) for aquatherm energy blue SDR 17.6 / SDR 11 MF RP

without leakage monitoring	with leakage monitoring		Outer diameter Ø								
Article no.	Brandes system Article no.	Wioniq system Article no.	outside d1	Ø outside d2	Ø outside D1	Ø outside D2	z	l	L	LE	RG
2367250362 *	2367250762 *	2367250862 *	250	63	400	125	225	750	1.500	1	10
2367250363 *	2367250763 *	2367250863 *	250	75	400	140	225	750	1.500	1	10
2367250364 *	2367250764 *	2367250864 *	250	90	400	160	225	750	1.500	1	10
2367250365 *	2367250765 *	2367250865 *	250	110	400	200	225	750	1.500	1	10
2367250366	2367250766	2367250866 *	250	125	400	225	225	750	1.500	1	10
2367250367	2367250767	2367250867 *	250	160	400	250	225	750	1.500	1	10
2367250368	2367250768	2367250868 *	250	200	400	315	225	750	1.500	1	10
2367315369 *	2367315769 *	2367315869 *	315	32	450	90	225	750	1.500	1	10
2367315370 *	2367315770 *	2367315870 *	315	40	450	110	225	750	1.500	1	10
2367315371 *	2367315771 *	2367315871 *	315	50	450	110	225	750	1.500	1	10
2367315372 *	2367315772 *	2367315872 *	315	63	450	125	225	750	1.500	1	10
2367315373 *	2367315773 *	2367315873 *	315	75	450	140	225	750	1.500	1	10
2367315374 *	2367315774 *	2367315874 *	315	90	450	160	225	750	1.500	1	10
2367315375 *	2367315775 *	2367315875 *	315	110	450	200	225	750	1.500	1	10
2367315376	2367315776	2367315876	315	125	450	225	225	750	1.500	1	10
2367315377	2367315777	2367315877	315	160	450	250	225	750	1.500	1	10
2367315378	2367315778	2367315878	315	200	450	315	225	750	1.500	1	10
2367315379	2367315779	2367315879	315	250	450	400	225	750	1.500	1	10
2367355380 *	2367355780 *	2367355880 *	355	32	500	90	225	750	1.500	1	10
2367355381 *	2367355781 *	2367355881 *	355	40	500	110	225	750	1.500	1	10
2367355382 *	2367355782 *	2367355882 *	355	50	500	110	225	750	1.500	1	10
2367355383 *	2367355783 *	2367355883 *	355	63	500	125	225	750	1.500	1	10
2367355384 *	2367355784 *	2367355884 *	355	75	500	140	225	750	1.500	1	10
2367355385 *	2367355785 *	2367355885 *	355	90	500	160	225	750	1.500	1	10
2367355386 *	2367355786 *	2367355886 *	355	110	500	200	225	750	1.500	1	10
2367355387	2367355787	2367355887	355	125	500	225	225	750	1.500	1	10
2367355388	2367355788	2367355888	355	160	500	250	225	750	1.500	1	10
2367355389	2367355789	2367355889	355	200	500	315	225	750	1.500	1	10
2367355390	2367355790	2367355890	355	250	500	400	225	750	1.500	1	10
2367355391	2367355791	2367355891	355	315	500	450	225	750	1.500	1	10

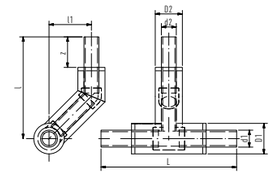
*Branch d2 SDR 11

aquatherm energy branches

aquatherm energy reducing overflow branch

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue SDR 11 / *SDR 9 MF RP



without leakage monitoring	Outer diameter Ø									
Article no.	Ø outside d1	Ø outside d2	Ø outside D1	Ø outside D2	z	l	l1	L	LE	RG
Socket welding process										
2360040138 *	40	32	110	90	225	750	200	1.000	1	10
2360050139 *	50	32	110	90	225	750	200	1.000	1	10
2360050140	50	40	110	110	225	750	210	1.000	1	10
2360063141 *	63	32	125	90	225	750	207,5	1.000	1	10
2360063142	63	40	125	110	225	750	217,5	1.000	1	10
2360063143	63	50	125	110	225	750	217,5	1.000	1	10
2360075144 *	75	32	140	90	225	750	215	1.000	1	10
2360075145	75	40	140	110	225	750	225	1.000	1	10
2360075146	75	50	140	110	225	750	225	1.000	1	10
2360075147	75	63	140	125	225	750	232,5	1.000	1	10
2360090148 *	90	32	160	90	225	750	225	1.000	1	10
2360090149	90	40	160	110	225	750	235	1.000	1	10
2360090150	90	50	160	110	225	750	235	1.000	1	10
2360090151	90	63	160	125	225	750	242,5	1.000	1	10
2360090152	90	75	160	140	225	750	250	1.000	1	10
2360110153 *	110	32	200	90	225	750	245	1.000	1	10
2360110154	110	40	200	110	225	750	255	1.000	1	10
2360110155	110	50	200	110	225	750	255	1.000	1	10
2360110156	110	63	200	125	225	750	262,5	1.000	1	10
2360110157	110	75	200	140	225	750	270	1.000	1	10
2360110158	110	90	200	160	225	750	280	1.000	1	10
2360125159 *	125	32	225	90	225	750	257,5	1.000	1	10
2360125160	125	40	225	110	225	750	267,5	1.000	1	10
2360125161	125	50	225	110	225	750	267,5	1.000	1	10
2360125162	125	63	225	125	225	750	275	1.000	1	10
2360125163	125	75	225	140	225	750	282,5	1.000	1	10
2360125164	125	90	225	160	225	750	292,5	1.000	1	10
2360125165	125	110	225	200	225	750	312,5	1.000	1	10
Butt welding process										
2364160166 *	160	32	250	90	225	750	270	1.000	1	10
2364160167	160	40	250	110	225	750	280	1.000	1	10
2364160168	160	50	250	110	225	750	280	1.000	1	10
2364160169	160	63	250	125	225	750	287,5	1.000	1	10
2364160170	160	75	250	140	225	750	295	1.000	1	10
2364160171	160	90	250	160	225	750	305	1.000	1	10
2364160172	160	110	250	200	225	1000	325	1.000	1	10
2364160173	160	125	250	225	225	1000	337,5	1.000	1	10
2364200174 *	200	32	315	90	225	750	302,5	1.000	1	10
2364200175	200	40	315	110	225	750	312,5	1.000	1	10

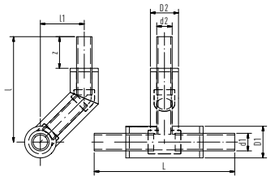
*Branch d2 SDR 9

Continued on the next page ...

aquatherm energy reducing overflow branch

(continued) for aquatherm energy blue SDR 11 / *SDR 9 MF RP

with PUR rigid foam insulation and PE casing pipe



without leakage monitoring		Outer diameter Ø								
Article no.	d1	d2	D1	D2	z	l	l1	L	LE	RG
2364200176	200	50	315	110	225	750	312,5	1.000	1	10
2364200177	200	63	315	125	225	750	320	1.000	1	10
2364200178	200	75	315	140	225	750	327,5	1.000	1	10
2364200179	200	90	315	160	225	750	337,5	1.000	1	10
2364200180	200	110	315	200	225	1000	337,5	1.000	1	10
2364200181	200	125	315	225	225	1000	370	1.500	1	10
2364200182	200	160	315	250	225	1000	382,5	1.500	1	10
2364250183 *	250	32	400	90	225	750	345	1.000	1	10
2364250184	250	40	400	110	225	1000	355	1.000	1	10
2364250185	250	50	400	110	225	1000	355	1.000	1	10
2364250186	250	63	400	125	225	1000	362,5	1.000	1	10
2364250187	250	75	400	140	225	1000	370	1.000	1	10
2364250188	250	90	400	160	225	1000	380	1.000	1	10
2364250189	250	110	400	200	225	1000	400	1.000	1	10
2364250190	250	125	400	225	225	1000	412,5	1.000	1	10
2364250191	250	160	400	250	225	1000	425	1.500	1	10
2364250192	250	200	400	315	225	1000	457,5	1.500	1	10
2364315193 *	315	32	450	90	225	1000	370	1.000	1	10
2364315194	315	40	450	110	225	1000	380	1.000	1	10
2364315195	315	50	450	110	225	1000	380	1.000	1	10
2364315196	315	63	450	125	225	1000	387,5	1.000	1	10
2364315197	315	75	450	140	225	1000	395	1.000	1	10
2364315198	315	90	450	160	225	1000	405	1.000	1	10
2364315199	315	110	450	200	225	1000	425	1.000	1	10
2364315200	315	125	450	225	225	1000	437,5	1.000	1	10
2364315201	315	160	450	250	225	1000	450	1.000	1	10
2364315202	315	200	450	315	225	1000	482,5	1.500	1	10
2364315203	315	250	450	400	225	1000	525	1.500	1	10
2364355204 *	355	32	500	90	225	1000	395	1.000	1	10
2364355205	355	40	500	110	225	1000	405	1.000	1	10
2364355206	355	50	500	110	225	1000	405	1.000	1	10
2364355207	355	63	500	125	225	1000	412,5	1.000	1	10
2364355208	355	75	500	140	225	1000	420	1.000	1	10
2364355209	355	90	500	160	225	1000	430	1.000	1	10
2364355210	355	110	500	200	225	1000	450	1.000	1	10
2364355211	355	125	500	225	225	1000	462,5	1.000	1	10
2364355212	355	160	500	250	225	1000	475	1.000	1	10
2364355213	355	200	500	315	225	1000	507,5	1.000	1	10
2364355214	355	250	500	400	225	1000	550	1.500	1	10
2364355215	355	315	500	450	225	1000	575	1.500	1	10

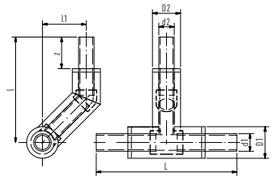
*Branch d2 SDR 9

aquatherm energy branches

aquatherm energy reducing overflow branch

for aquatherm energy blue OT SDR 11 / *SDR 9 MF RP

with PUR rigid foam insulation and PE casing pipe

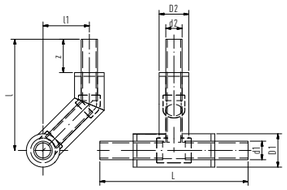


without leakage monitoring		Outer diameter Ø								
Article no.	d1	d2	D1	D2	z	l	l1	L	LE	RG
Socket welding process										
2460040280 *	40	32	110	90	225	750	200	1.000	1	10
2460050281 *	50	32	110	90	225	750	200	1.000	1	10
2460050282	50	40	110	110	225	750	210	1.000	1	10
2460063283 *	63	32	125	90	225	750	207,5	1.000	1	10
2460063284	63	40	125	110	225	750	217,5	1.000	1	10
2460063285	63	50	125	110	225	750	217,5	1.000	1	10
2460075286 *	75	32	140	90	225	750	215	1.000	1	10
2460075287	75	40	140	110	225	750	225	1.000	1	10
2460075288	75	50	140	110	225	750	225	1.000	1	10
2460075289	75	63	140	125	225	750	232,5	1.000	1	10
2460090290 *	90	32	160	90	225	750	225	1.000	1	10
2460090291	90	40	160	110	225	750	235	1.000	1	10
2460090292	90	50	160	110	225	750	235	1.000	1	10
2460090293	90	63	160	125	225	750	242,5	1.000	1	10
2460090294	90	75	160	140	225	750	250	1.000	1	10
2460110295 *	110	32	200	90	225	750	245	1.000	1	10
2460110296	110	40	200	110	225	750	255	1.000	1	10
2460110297	110	50	200	110	225	750	255	1.000	1	10
2460110298	110	63	200	125	225	750	262,5	1.000	1	10
2460110299	110	75	200	140	225	750	270	1.000	1	10
2460110300	110	90	200	160	225	750	280	1.000	1	10
2460125301 *	125	32	225	90	225	750	257,5	1.000	1	10
2460125302	125	40	225	110	225	750	267,5	1.000	1	10
2460125303	125	50	225	110	225	750	267,5	1.000	1	10
2460125304	125	63	225	125	225	750	275	1.000	1	10
2460125305	125	75	225	140	225	750	282,5	1.000	1	10
2460125306	125	90	225	160	225	750	292,5	1.000	1	10
2460125307	125	110	225	200	225	750	312,5	1.000	1	10
Butt welding process										
2464160308 *	160	32	250	90	225	750	270	1.000	1	10
2464160309	160	40	250	110	225	750	280	1.000	1	10
2464160310	160	50	250	110	225	750	280	1.000	1	10
2464160311	160	63	250	125	225	750	287,5	1.000	1	10
2464160312	160	75	250	140	225	750	295	1.000	1	10
2464160313	160	90	250	160	225	750	305	1.000	1	10
2464160314	160	110	250	200	225	1000	325	1.000	1	10
2464160315	160	125	250	225	225	1000	337,5	1.000	1	10
2464200316 *	200	32	315	90	225	750	302,5	1.000	1	10
2464200317	200	40	315	110	225	750	312,5	1.000	1	10

aquatherm energy reducing overflow branch

with PUR rigid foam insulation and PE casing pipe

(continued) for aquatherm energy blue OT SDR 11 / *SDR 9 MF RP



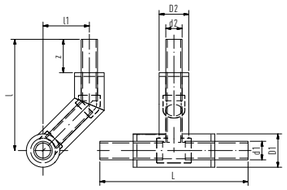
without leakage monitoring		Outer diameter Ø								
Article no.	d1	d2	D1	D2	z	l	l1	L	LE	RG
2464200318	200	50	315	110	225	750	312,5	1.000	1	10
2464200319	200	63	315	125	225	750	320	1.000	1	10
2464200320	200	75	315	140	225	750	327,5	1.000	1	10
2464200321	200	90	315	160	225	750	337,5	1.000	1	10
2464200322	200	110	315	200	225	1000	357,5	1.000	1	10
2464200323	200	125	315	225	225	1000	370	1.000	1	10
2464200324	200	160	315	250	225	1000	382,5	1.000	1	10
2464250325 *	250	32	400	90	225	750	345	1.000	1	10
2464250326	250	40	400	110	250	1000	355	1.000	1	10
2464250327	250	50	400	110	225	1000	355	1.000	1	10
2464250328	250	63	400	125	225	1000	362,5	1.000	1	10
2464250329	250	75	400	140	225	1000	370	1.000	1	10
2464250330	250	90	400	160	225	1000	380	1.000	1	10
2464250331	250	110	400	200	225	1000	400	1.000	1	10
2464250332	250	125	400	225	225	1000	412,5	1.000	1	10
2464250333	250	160	400	250	225	1000	425	1.500	1	10
2464250334	250	200	400	315	225	1000	457,5	1.500	1	10

*Branch d2 SDR 9

aquatherm energy reducing overflow branch

with PUR rigid foam insulation and PE casing pipe

for aquatherm energy blue SDR 17.6 / SDR 11 MF RP



without leakage monitoring		Outer diameter Ø								
Article no.	d1	d2	D1	D2	z	l	l1	L	LE	RG
Socket welding process										
2367125400 *	125	32	225	90	225	750	257,5	1.000	1	10
2367125401 *	125	40	225	110	225	750	267,5	1.000	1	10
2367125402 *	125	50	225	110	225	750	267,5	1.000	1	10
2360125403 *	125	63	225	125	225	750	275	1.000	1	10
2360125404 *	125	75	225	140	225	750	282,5	1.000	1	10
2360125405 *	125	90	225	160	225	750	292,5	1.000	1	10
2360125406 *	125	110	225	200	225	750	312,5	1.000	1	10
Butt welding process										
2367160407 *	160	32	250	90	225	750	270	1.000	1	10
2367160408 *	160	40	250	110	225	750	280	1.000	1	10
2367160409 *	160	50	250	110	225	750	280	1.000	1	10
2367160410 *	160	63	250	125	225	750	287,5	1.000	1	10
2367160411 *	160	75	250	140	225	750	295	1.000	1	10
2367160412 *	160	90	250	160	225	750	305	1.000	1	10
2367160413 *	160	110	250	200	225	1000	325	1.000	1	10

*Branch d2 SDR 11

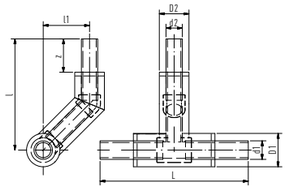
Continued on the next page ...

aquatherm energy branches

aquatherm energy reducing overflow branch

with PUR rigid foam insulation and PE casing pipe

(continued) for aquatherm energy blue SDR 17.6 / SDR 11 MF RP



without leakage monitoring		Outer diameter Ø								
Article no.	d1	d2	D1	D2	z	l	l1	L	LE	RG
2367160414	160	125	250	225	225	1000	337,5	1.000	1	10
2367200415 *	200	32	315	90	225	750	302,5	1.000	1	10
2367200416 *	200	40	315	110	225	750	312,5	1.000	1	10
2367200417 *	200	50	315	110	225	750	312,5	1.000	1	10
2367200418 *	200	63	315	125	225	750	320	1.000	1	10
2367200419 *	200	75	315	140	225	750	327,5	1.000	1	10
2367200420 *	200	90	315	160	225	750	337,5	1.000	1	10
2367200421 *	200	110	315	200	225	1000	357,5	1.000	1	10
2367200422	200	125	315	225	225	1000	370	1.500	1	10
2367200423	200	160	315	250	225	1000	382,5	1.500	1	10
2367250424 *	250	32	400	90	225	750	345	1.000	1	10
2367250425 *	250	40	400	110	225	1000	355	1.000	1	10
2367250426 *	250	50	400	110	225	1000	355	1.000	1	10
2367250427 *	250	63	400	125	225	1000	362,5	1.000	1	10
2367250428 *	250	75	400	140	225	1000	370	1.000	1	10
2367250429 *	250	90	400	160	225	1000	380	1.000	1	10
2367250430 *	250	110	400	200	225	1000	400	1.000	1	10
2367250431	250	125	400	225	225	1000	412,5	1.000	1	10
2367250432	250	160	400	250	225	1000	425	1.500	1	10
2367250433	250	200	400	315	225	1000	457,5	1.500	1	10
2367315434 *	315	32	450	90	225	1000	370	1.000	1	10
2367315435 *	315	40	450	110	225	1000	380	1.000	1	10
2367315436 *	315	50	450	110	225	1000	380	1.000	1	10
2367315437 *	315	63	450	125	225	1000	387,5	1.000	1	10
2367315438 *	315	75	450	140	225	1000	395	1.000	1	10
2367315439 *	315	90	450	160	225	1000	405	1.000	1	10
2367315440 *	315	110	450	200	225	1000	425	1.000	1	10
2367315441	315	125	450	225	225	1000	437,5	1.000	1	10
2367315442	315	160	450	250	225	1000	450	1.000	1	10
2367315443	315	200	450	315	225	1000	482,5	1.500	1	10
2367315444	315	250	450	400	225	1000	525	1.500	1	10
2367355445 *	355	32	500	90	225	1000	395	1.000	1	10
2367355446 *	355	40	500	110	225	1000	405	1.000	1	10
2367355447 *	355	50	500	110	225	1000	405	1.000	1	10
2367355448 *	355	63	500	125	225	1000	412,5	1.000	1	10
2367355449 *	355	75	500	140	225	1000	420	1.000	1	10
2367355450 *	355	90	500	160	225	1000	430	1.000	1	10
2367355451 *	355	110	500	200	225	1000	450	1.000	1	10
2367355452	355	125	500	225	225	1000	462,5	1.000	1	10
2367355453	355	160	500	250	225	1000	475	1.000	1	10
2367355454	355	200	500	315	225	1000	507,5	1.000	1	10
2367355455	355	250	500	400	225	1000	550	1.500	1	10
2367355456	355	315	500	450	225	1000	575	1.500	1	10

*Branch d2 SDR 11

aquatherm energy green pipes/basic elements/bends

aquathermenergy fibre composite pipe, Rod of 5.8 m for aquatherm energy green SDR 9 MF RP

Fibre composite pipe as single pipe in rods of 5.8 m each with PUR rigid foam insulation and PE casing pipe

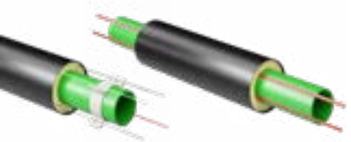
Brandes Wioniq

without leakage monitoring	with leakage monitoring		Outer diameter Ø			
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Casing pipe D	LE [m]	RG
Socket welding process						
1313032010	1313032011	1313032012	32	90	5,8	10
1313040012	1313040013	1313040014	40	110	5,8	10
1313050014	1313050015	1313050016	50	110	5,8	10
1313063016	1313063017	1313063018	63	125	5,8	10
1313075018	1313075019	1313075020	75	140	5,8	10
1313090020	1313090021	1313090022	90	160	5,8	10
1313110022	1313110023	1313110024	110	200	5,8	10
1313125024	1313125025	1313125026	125	225	5,8	10
Butt welding process						
1313160026	1313160027	1313160028	160	250	5,8	10

aquatherm energy green in dimensions from 200 mm (medium pipe) available on request.

aquathermenergy fibre composite pipe, Rod of 11.6 m for aquatherm energy green SDR 9 MF RP

Fibre composite pipe as single pipe in rods of 11.6 m each with PUR rigid foam insulation and PE casing pipe



Brandes Wioniq

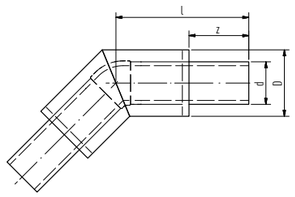
without leakage monitoring	with leakage monitoring		Outer diameter Ø			
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Casing pipe D	LE [m]	RG
Socket welding process						
1313032110	1313032111	1313032112	32	90	11,6	10
1313040112	1313040113	1313040114	40	110	11,6	10
1313050114	1313050115	1313050116	50	110	11,6	10
1313063116	1313063117	1313063118	63	125	11,6	10
1313075118	1313075119	1313075120	75	140	11,6	10
1313090120	1313090121	1313090122	90	160	11,6	10
1313110122	1313110123	1313110124	110	200	11,6	10
1313125124	1313125125	1313125126	125	225	11,6	10
Butt welding process						
1313160126	1313160127	1313160128	160	250	11,6	10

aquatherm energy green in dimensions from 200 mm (medium pipe) available on request.

aquatherm energy bend 45° SL 500

for aquatherm energy green SDR 9 MF RP

with PUR rigid foam insulation and PE casing pipe



without leakage monitoring	with leakage monitoring		Outer diameter Ø						
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Casing pipe D	LE [m]	RG	kg	LE	RG
Socket welding process									
1383032001	1383032701	1383032801	32	90	225	500	1,114	1	10
1383040002	1383040702	1383040802	40	110	225	500	1,516	1	10
1383050003	1383050703	1383050803	50	110	225	500	0,131	1	10
1383063004	1383063704	1383063804	63	125	225	500	2,485	1	10
1383075005	1383075705	1383075805	75	140	225	500	3,273	1	10
1383090006	1383090706	1383090806	90	160	225	500	4,434	1	10
1383110007	1383110707	1383110807	110	200	225	500	6,504	1	10
1383125008	1383125708	1383125808	125	225	225	500	8,407	1	10
Butt welding process									
1383160009	1383160709	1383160809	160	250	225	500	11,573	1	10

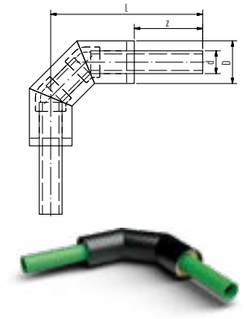
Also available in 15° and 30° versions.

aquatherm energy green bends & branches

aquatherm energy elbow 90° SL 500

for aquatherm energy green SDR 9 MF RP

with PUR rigid foam insulation and PE casing pipe



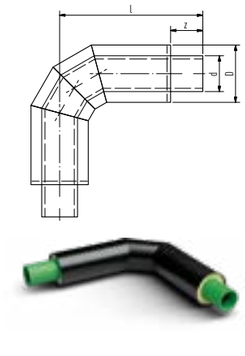
without leakage monitoring	with leakage monitoring		Outer diameter Ø							
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Casing pipe D	z	l	kg	LE	RG
Socket welding process									
1383032040	1383032740	1383032840	32	90,0	225	500	1,120	1	10
1383040041	1383040741	1383040841	40	110,0	225	500	1,433	1	10
1383050042	1383050742	1383050842	50	110,0	225	500	1,812	1	10
1383063043	1383063743	1383063843	63	125,0	225	500	2,513	1	10
1383075044	1383075744	1383075844	75	140,0	225	500	3,294	1	10

Also available in 60° and 75° versions.

aquatherm energy elbow 90° SL 1000

for aquatherm energy green SDR 9 MF RP

with PUR rigid foam insulation and PE casing pipe



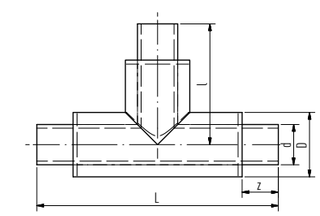
without leakage monitoring	with leakage monitoring		Outer diameter Ø							
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Casing pipe D	z	l	kg	LE	RG
Socket welding process									
1383032020	1383032720	1383032820	32	90	225	1.000	2,582	1	10
1383040021	1383040721	1383040821	40	110	225	1.000	3,770	1	10
1383050022	1383050722	1383050822	50	110	225	1.000	4,293	1	10
1383063023	1383063723	1383063823	63	125	225	1.000	6,000	1	10
1383075024	1383075724	1383075824	75	140	225	1.000	7,341	1	10
1383090025	1383090725	1383090825	90	160	225	1.000	8,988	1	10
1383110026	1383110726	1383110826	110	200	225	1.000	14,523	1	10
1383125027	1383125727	1383125827	125	225	225	1.000	18,239	1	10
Butt welding process									
1383160028	1383160728	1383160828	160	250	225	1.000	24,112	1	10

Also available in 60° and 75° versions.

aquatherm energy branch

for aquatherm energy green SDR 9 MF RP

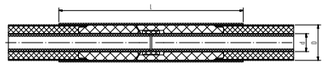
with PUR rigid foam insulation and PE casing pipe



Brandes

without leakage monitoring	with leakage monitoring		Outer diameter Ø							
Article no.	Brandes system Article no.	Wioniq system Article no.	Medium pipe d	Casing pipe D	z	l	L	LE	RG	RG
Socket welding process										
1363032001	1363032701	1363032801	32	90	225	500	1.000	1,633	1	10
1363040002	1363040702	1363040802	40	110	225	500	1.000	2,243	1	10
1363050003	1363050703	1363050803	50	110	225	500	1.000	2,500	1	10
1363063004	1363063704	1363063804	63	125	225	500	1.000	3,500	1	10
1363075005	1363075705	1363075805	75	140	225	500	1.000	4,712	1	10
1363090006	1363090706	1363090806	90	160	225	500	1.000	6,440	1	10
1363110007	1363110707	1363110807	110	200	225	500	1.000	9,323	1	10
1363125008	1363125708	1363125808	125	225	225	500	1.000	0,012	1	10
Butt welding process										
1363160009	1363160709	1363160809	160	250	225	500	1.000	0,016	1	10

aquatherm energy shrink sleeve WTD

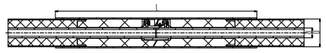


Article no.	Ø outside carrier pipe d	Ø outer casing pipe D	l	LE	RG
Socket welding process: The moulded part required to connect the service pipes is included in the scope of delivery.					
1390032022	32	90,0	600	1	10
1390040024	40	110,0	600	1	10
1390050026	50	110,0	600	1	10
1390063028	63	125,0	600	1	10
1390075030	75	140,0	600	1	10
1390090032	90	160,0	600	1	10
1390110034	110	200,0	600	1	10
1390125036	125	225,0	600	1	10
Butt welding process: No moulded part is required to connect the carrier pipes.					
1390160038	160	250,0	600	1	10
1390200040	200	315,0	600	1	10
1390250042	250	400,0	600	1	10
1390315044	315	450,0	600	1	10
1390355045	355	500,0	600	1	10

Shrink sleeve, ready-made, including sealing tape with PUR rigid foam elements and accessories for re-wrapping weld seams.

Colour: black, standard width: 600 mm

aquatherm energy insulating E-joint WTD

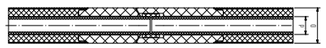


Article no.	Ø outside carrier pipe d	Ø outer casing pipe D	l	LE	RG
Socket welding process					
1390032046	32	90,0	600	1	10
1390040047	40	110,0	600	1	10
1390050048	50	110,0	600	1	10
1390063049	63	125,0	600	1	10
1390075050	75	140,0	600	1	10
1390090051	90	160,0	600	1	10
1390110052	110	200,0	600	1	10
1390125053	125	225,0	600	1	10
1390160054	160	250,0	600	1	10
1390200055	200	315,0	600	1	10
1390250056	250	400,0	600	1	10

Shrink sleeve, ready-made, including sealing tape with PUR rigid foam elements and accessories for re-wrapping weld seams.

Colour: black, standard width: 600 mm

aquatherm energy post-insulation sleeve set

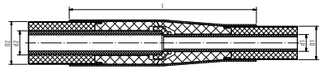


Article no.	Ø outside carrier pipe d	Ø outer casing pipe D	LE	RG
Socket welding process: The moulded part required for connecting the carrier pipes is included in the scope of delivery				
1340032114	32	90,0	1	10
1340040115	40	110,0	1	10
1340050116	50	110,0	1	10
1340063117	63	125,0	1	10
1340075118	75	140,0	1	10
1340090119	90	160,0	1	10
1340110120	110	200,0	1	10
1340125121	125	225,0	1	10
Butt welding process: No moulded part is required to connect the carrier pipes				
1340160122	160	250,0	1	10
1340200123	200	315,0	1	10
1340250124	250	400,0	1	10
1340315125	315	450,0	1	10
1347355126	355	500,0	1	10

Consisting of PUR rigid foam elements and dimension-dependent moulded part, without shrink sleeve.

Accessories required for processing: Mono Top 40 insulating tape and primer.

aquatherm energy reducing sleeve

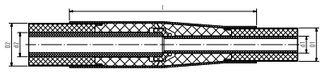


Article no.	Ø outside d2	Ø outside d1	Ø outside D1	Ø outside D2	l	LE	RG
Socket welding process							
1340040103	40,0	32,0	90	110	900	1	10
1340050104	50,0	32,0	90	110	900	1	10
1340050105	50,0	40,0	110	110	900	1	10
1340063106	63,0	40,0	110	125	900	1	10
1340063107	63,0	50,0	110	125	900	1	10
1340075108	75,0	50,0	110	140	900	1	10
1340075109	75,0	63,0	125	140	900	1	10
1340090110	90,0	63,0	125	160	900	1	10
1340090111	90,0	75,0	140	160	900	1	10
1340110112	110,0	75,0	140	200	900	1	10
1340110113	110,0	90,0	160	200	900	1	10
1390125020	125,0	90,0	160	225	900	1	10
1390125021	125,0	110,0	200	225	900	1	10

Red. insulating sleeve consisting of shrink sleeve with PUR rigid foam elements, dimension-dependent moulded part and accessories in a total length of 900 mm.

aquatherm energy reducing sleeve

for aquatherm energy green SDR 9

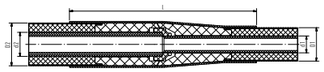


Article no.	Ø outside d2	Ø outside d1	Ø outside D1	Ø outside D2	l	LE	RG
alternating socket and butt welding process							
2340160001	**160,0**	**110,0**	**200**	**250**	**900**	**1**	**10**
2340160003	**160,0**	**125,0**	**225**	**250**	**900**	**1**	**10**

Red. insulating sleeve consisting of shrink sleeve with PUR rigid foam elements, dimension-dependent moulded part and accessories in a total length of 900 mm.

aquatherm energy reducing sleeve

for aquatherm energy blue SDR 11

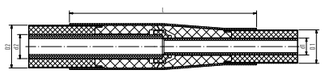


Article no.	Ø outside d2	Ø outside d1	Ø outside D1	Ø outside D2	l	LE	RG
alternating socket welding process							
2340160020	**160,0**	**110,0**	**200**	**250**	**900**	**1**	**10**
2340160021	**160,0**	**125,0**	**225**	**250**	**900**	**1**	**10**
2340200022	**200,0**	**125,0**	**225**	**315**	**900**	**1**	**10**
butt welding on both sides							
2340200023	**200,0**	**160,0**	**250**	**315**	**900**	**1**	**10**
2340250024	**250,0**	**160,0**	**250**	**400**	**900**	**1**	**10**
2340250025	**250,0**	**200,0**	**315**	**400**	**900**	**1**	**10**
2340315026	**315,0**	**200,0**	**315**	**450**	**900**	**1**	**10**
2340315027	**315,0**	**250,0**	**400**	**450**	**900**	**1**	**10**

Red. insulating sleeve consisting of shrink sleeve with PUR rigid foam elements, dimension-dependent moulded part and accessories in a total length of 900 mm.

aquatherm energy reducing sleeve

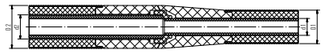
for aquatherm energy blue SDR 17.6



Article no.	Ø outside d2	Ø outside d1	Ø outside D1	Ø outside D2	l	LE	RG
2347160060	**160,0**	**110,0**	**200**	**250**	**900**	**1**	**10**
2347160062	**160,0**	**125,0**	**225**	**250**	**900**	**1**	**10**
2347200064	**200,0**	**125,0**	**225**	**315**	**900**	**1**	**10**
2347200066	**200,0**	**160,0**	**250**	**315**	**900**	**1**	**10**
butt welding on both sides							
2347250068	**250,0**	**160,0**	**250**	**400**	**900**	**1**	**10**
2347250070	**250,0**	**200,0**	**315**	**400**	**900**	**1**	**10**
2347315072	**315,0**	**200,0**	**315**	**450**	**900**	**1**	**10**
2347315074	**315,0**	**250,0**	**400**	**450**	**900**	**1**	**10**

Red. insulating sleeve consisting of shrink sleeve with PUR rigid foam elements, dimension-dependent moulded part and accessories in a total length of 900 mm.

aquatherm energy insulating red socket set

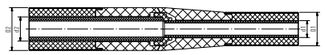


Article no.	Ø outside d2	Ø outside d1	Ø outside D1	Ø outside D2	LE	RG
2340040030	**40,0**	**32,0**	**90**	**110**	**1**	**10**
2340050031	**50,0**	**32,0**	**90**	**110**	**1**	**10**
2340050032	**50,0**	**40,0**	**110**	**110**	**1**	**10**
2340063033	**63,0**	**40,0**	**110**	**125**	**1**	**10**
2340063034	**63,0**	**50,0**	**110**	**125**	**1**	**10**
2340075035	**75,0**	**50,0**	**110**	**140**	**1**	**10**
2340075036	**75,0**	**63,0**	**125**	**140**	**1**	**10**
2340090037	**90,0**	**63,0**	**125**	**160**	**1**	**10**
2340090038	**90,0**	**75,0**	**140**	**160**	**1**	**10**
2340110039	**110,0**	**75,0**	**140**	**200**	**1**	**10**
2340110040	**110,0**	**90,0**	**160**	**200**	**1**	**10**
2340125041	**125,0**	**90,0**	**160**	**225**	**1**	**10**
2340125042	**125,0**	**110,0**	**200**	**225**	**1**	**10**

Consisting of PUR rigid foam elements and moulded part, without shrink sleeve.
Accessories required for processing: Mono Top 40 insulating tape and primer.
Socket welding method up to 125 x 110 mm, then socket welding method on one side and butt welding method on one side.

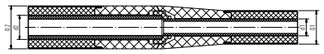
aquatherm energy insulating red socket set

for aquatherm energy blue SDR 11



Article no.	Ø outside d2	Ø outside d1	Ø outside D1	Ø outside D2	LE	RG
alternating socket and butt welding process						
2344160050	**160,0**	**110,0**	**200**	**250**	**1**	**10**
2344160051	**160,0**	**125,0**	**225**	**250**	**1**	**10**
2344200052	**200,0**	**125,0**	**225**	**315**	**1**	**10**
butt welding on both sides						
2344200053	**200,0**	**160,0**	**250**	**315**	**1**	**10**
2344250054	**250,0**	**160,0**	**250**	**400**	**1**	**10**
2344250055	**250,0**	**200,0**	**315**	**400**	**1**	**10**
2344315056	**315,0**	**200,0**	**315**	**450**	**1**	**10**
2344315057	**315,0**	**250,0**	**400**	**450**	**1**	**10**
2344355058	**355,0**	**250,0**	**400**	**500**	**1**	**10**
2344355059	**355,0**	**315,0**	**450**	**500**	**1**	**10**

Consisting of PUR rigid foam elements and moulded part, without shrink sleeve.
Accessories required for processing: Mono Top 40 insulating tape and primer.

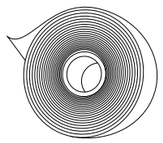


aquatherm energy insulating red socket set

for aquatherm energy blue SDR 17.6

Article no.	Ø outside d2	Ø outside d1	Ø outside D1	Ø outside D2	LE	RG
alternating socket and butt welding process						
2347160061	**160,0**	**110,0**	**200**	**250**	**1**	**10**
2347160063	**160,0**	**125,0**	**225**	**250**	**1**	**10**
2347200065	**200,0**	**125,0**	**225**	**315**	**1**	**10**
butt welding on both sides						
2347200067	**200,0**	**160,0**	**250**	**315**	**1**	**10**
2347250069	**250,0**	**160,0**	**250**	**400**	**1**	**10**
2347250071	**250,0**	**200,0**	**315**	**400**	**1**	**10**
2347315073	**315,0**	**200,0**	**315**	**450**	**1**	**10**
2347315075	**315,0**	**250,0**	**400**	**450**	**1**	**10**
2347355077	**355,0**	**250,0**	**400**	**500**	**1**	**10**
2347355079	**355,0**	**315,0**	**450**	**500**	**1**	**10**

Consisting of PUR rigid foam elements and moulded part, without shrink sleeve.
Accessories required for processing: Mono Top 40 insulating tape and primer.



aquatherm energy Mono Top 40 insulating tape

for re-insulating joints with aquatherm insulating sleeve set

Article no.	Dimensions	LE	RG
9702411000	**energy Width 50 mm Length 15m**	**1**	**10**
9702411001	**energy Width 100 mm Length 15m**	**1**	**10**

aquatherm energy primer

Article no.	Article	LE	RG
9702411002	**Container, 1 litre**	**1**	**10**

aquatherm energy connection collar

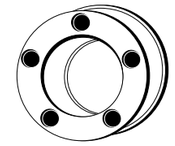
Sleeve as termination of the PUR insulation layer from the casing pipe to the carrier pipe

Article no.	Outer diameter Ø Medium pipe d	Casing pipe D	LE	RG
2390032001	**32**	**90**	**1**	**10**
2390050002	**40-50**	**110**	**1**	**10**
2390075003	**63-75**	**125 - 140**	**1**	**10**
2390090004	**90**	**160**	**1**	**10**
2390110005	**110**	**200**	**1**	**10**
2390125006	**125**	**225**	**1**	**10**
2390160007	**160**	**250**	**1**	**10**
2390200008	**200**	**315**	**1**	**10**
2390250009	**250**	**400**	**1**	**10**
2390315010	**315/355**	**250 / 500**	**1**	**10**

aquatherm energy components & accessories

aquatherm energy annulus seal

Pipe collar for wall penetration



Article no.	Ø outer core hole	Ø outside carrier pipe d	Ø outer casing pipe D	LE	RG
9701214212	**150**	**32**	**90**	**1**	**10**
9701214214	**200**	**50**	**110**	**1**	**10**
9701214218	**200**	**63**	**125**	**1**	**10**
9701214220	**200**	**75**	**140**	**1**	**10**
9701214222	**250**	**90**	**160**	**1**	**10**
9701214224	**300**	**110**	**200**	**1**	**10**
9701214226	**350**	**125**	**225**	**1**	**10**
9701214230	**350**	**160**	**250**	**1**	**10**
9701214234	**400**	**200**	**315**	**1**	**10**
9701214238	**500**	**250**	**400**	**1**	**10**
9701214242	**550**	**315**	**450**	**1**	**10**
9701214244	**600**	**355**	**500**	**1**	**10**

aquatherm energy line warning tape

Colour: yellow / print in black: "Attention district heating pipe"

Article no.	Article	LE	RG
9700050191	**Roll (250 m)**	**1**	**10**

aquatherm energy adhesive

Article no.	Article	LE	RG
9700000004	**Cartridge (290 ml)**	**1**	**10**

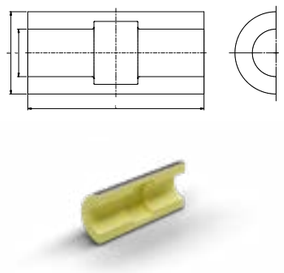
aquatherm energy shrink tape

Article no.	Width	Length	LE	RG
9702411002	**100 mm**	**10m**	**1**	**10**

aquatherm energy half shells

straight

with PUR rigid foam insulation and PE casing pipe

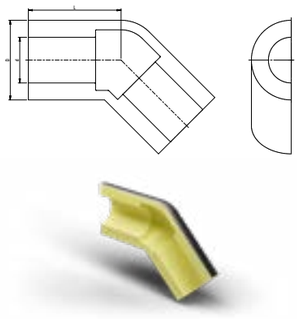


Article no.	Ø outside Service pipe d	Ø outside Outer casing D	Ø inside Half shell d	Ø outside Half shell D	l	LE	RG
2370032001	32	90	35	90	474	1	10
2370040001	40	110	43	110	476,5	1	10
2370050001	50	110	53	110	476,5	1	10
2370063001	63	125	66	125	476,5	1	10
2370075001	75	140	79	140	476,5	1	10
2370090001	90	160	94	160	476,5	1	10
2370110001	110	200	115	200	478	1	10
2370125001	125	225	130	225	482	1	10
2370160001	160	250	165	250	455	1	10
2370200001	200	315	205	315	455	1	10
2370250001	250	400	256	400	455	1	10
2370315001	315	450	320	450	455	1	10

aquatherm energy half shells

45° bend

with PUR rigid foam insulation and PE casing pipe

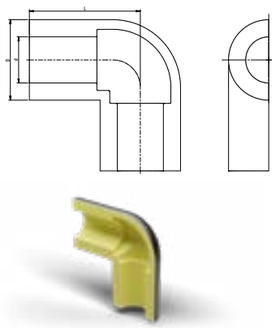


Article no.	Ø outside Service pipe d	Ø outer casing pipe D	Ø inside Half shell d	Ø outside Half shell D	l	LE	RG
2380032002	32	90	35	90	242,5	1	10
2380040002	40	110	43	110	244,5	1	10
2380050002	50	110	53	110	246,5	1	10
2380063002	63	125	66	125	249	1	10
2380075002	75	140	79	140	251,5	1	10
2380090002	90	160	94	160	254,5	1	10
2380110002	110	200	114	200	258,5	1	10
2380125002	125	225	129	225	262	1	10
2380160002	160	250	165	250	330	1	10
2380200002	200	315	205	315	381	1	10
2380250002	250	400	256	400	417	1	10

aquatherm energy half shells

90° bend

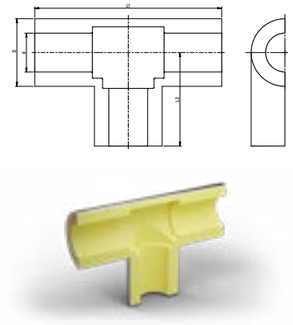
with PUR rigid foam insulation and PE casing pipe



Article no.	Ø outside Service pipe d	Ø outside Outer casing D	Ø inside Half shell d	Ø outside Half shell D	l	LE	RG
2380032001	32	90	35	90	252	1	10
2380040001	40	110	43	110	256	1	10
2380050001	50	110	53	110	261	1	10
2380063001	63	125	66	125	267,5	1	10
2380075001	75	140	79	140	273,5	1	10
2380090001	90	160	94	160	281	1	10
2380110001	110	200	114	200	291	1	10
2380125001	125	225	129	225	310,5	1	10
2380160001	160	250	165	250	380	1	10
2380200001	200	315	205	315	444	1	10
2380250001	250	400	256	400	475	1	10

aquatherm energy half shells T-piece

with PUR rigid foam insulation and PE casing pipe



Article no.	Ø outside Service pipe d	Ø outside Outer casing D	Ø inside Half shell d	Ø outside Half shell D	L1	L2	LE	RG
2360032010	32	90	35	90	504	252	1	10
2360040010	40	110	43	110	511	255,5	1	10
2360050010	50	110	53	110	522	261	1	10
2360063010	63	125	66	125	535	267,5	1	10
2360075010	75	140	79	140	547	273,5	1	10
2360090010	90	160	94	160	562	281	1	10
2360110010	110	200	114	200	582	291	1	10
2360125010	125	225	129	225	623	311,5	1	10
2360160010	160	250	165	250	760	380	1	10
2360200010	200	315	205	315	880	440	1	10
2360250010	250	400	256	400	956	478	1	10

aquatherm GmbH
Biggen 5 | 57439 Attendorn | Germany
Tel: +49 2722 950 0 | Mail: info@aquatherm.de

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Made in Germany

Part of the Solution
www.aquatherm.de