TecMan-002 | SEPTEMBER 2022

GET YOUR MECFLOW QUOTE ONLINE

VISIT TO CREATE YOUR OWN QUOTATION
mecflowquotetool.polypipe.com

MecFlow.
The Future of Supply Systems.

polypipe.com/mecflow

Polypipe
Building Services

1. Contents

1. Polypipe Building Services

AT THE HEART OF INDUSTRIAL AND TALL BUILDINGS.

At Polypipe Building Services, we harness our ingenuity and creativity to deliver class-leading solutions and product sustainability, with optimised whole-life costs, unrivalled technical support and on-the-ground assistance.

We understand the challenges today's projects face, including climate change, air quality and flooding, and in-industry regulations, skilled labour shortages and the lack of on-site storage facilities. From high-rise residential and commercial office projects to healthcare and leisure facilities, we develop systems that support you, that facilitate easier, more cost-effective ways to install.

Integral to our development process is providing innovative sustainable solutions that support safety, whether from the product itself or in the way it's installed. Our products are designed for a long life, use recycled content and are recyclable at end of life, enabling it to live on in the circular economy. We challenge ourselves on how we help solve on-site problems, whether lack of labour or on-site space, and look to develop solutions that benefit both the installing contractors and the occupants alike.

Polypipe Building Services, part of the Genuit Group. Helping construction build better.

MORE INNOVATION. MORE EXPERTISE. MORE SUPPORT.

Polypipe Building Services is always working to develop more exceptional products and more cost-effective ways to complete your project. For nearly 60 years, our Terrain brand has been the industry benchmark for drainage systems, but we offer so much more, including our award-winning supply system MecFlow.

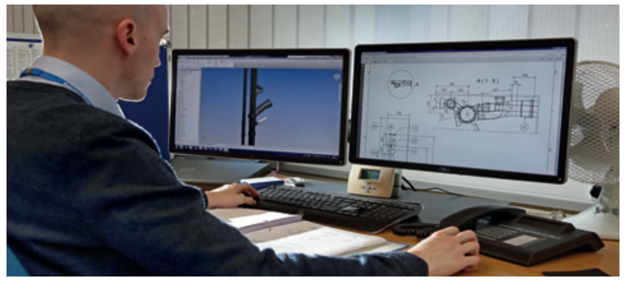
PRODUCTS AND SYSTEMS

Our products, systems and services reflect not only our expertise in tall building applications, but also in the design, performance, and ease of installation within all commercial projects. Our Terrain brand of products and systems have been no exception, from our benchmark, FUZE drainage stacks and PVC soil and waste systems, to the Terrain Q noise reducing system, P.A.P.A.® & Pleura Vent Systems and Firetraps.

However, our continued investment in new technologies and more innovative solutions, enables us to increase our category portfolio, including supply applications like MecFlow. We are constantly working to bring to market only the most sustainable, beneficial, and cost-effective products and systems – engineered from the most practical, recycled and recyclable materials. Together with our Advantage Service, fabrication capabilities and customer support, you're never left without a solution – whatever the challenge. Contact our sales team to discover more at **buildingservices.sales@polypipe.com**

TECHNICAL

All our products and systems are backed by our hands-on technical team, providing expert support to ensure you receive a system that's right for your project. Whether it's a single component, or a fully fabricated system, you can call upon our specialist advice, and rely on us to deliver exactly what you need.



POLYPIPE ADVANTAGE SERVICE

We're constantly working and investing to discover new products and systems that take the complexities out of construction. And we apply that philosophy to ease of installation. Our Polypipe Advantage Service has been specifically introduced to make everything simple from beginning to end. From the design and planning of your project, to ordering, delivery, technical support, and customer service. Through Polypipe Advantage, our Terrain drainage stack systems and MecFlow supply systems can be fabricated to your own specification; created off-site, and delivered as a full, ready-to-install system on-site. Facilitating a faster installation process, whilst addressing skilled labour shortages and the lack of on-site storage facilities.

Welcome to Polypipe Building Services.
Delivering more, to achieve more.

POLYPIPE
ADVANTAGE

2. MecFlow overview

For decades, Polypipe Building Services has focused on its drainage specialism and is well known for its trusted, high quality Terrain drainage solutions.

We've been working hard, leveraging our expertise in plastic pipework systems to bring you more, and we're proud to announce the introduction of our supply system – MecFlow.

MecFlow is a multi-layer, WRAS approved, PP-RCT pipe whose material formulation has been designed for strength, durability and achieves a fire classification rating of B-s1, d0*; making it ideal for hospitals, multi occupancy and tall building projects.

The system's white inner layer incorporates anti-microbial protection, preventing biofilm build-up and has a high resistance to rigorous disinfection processes. Heat and fluctuating temperatures won't phase MecFlow either. Its central layer benefits from the addition of microfibres set in a mesh formation, working to reduce thermal expansion and along with several other additives, increases the mechanical resistance of the system.

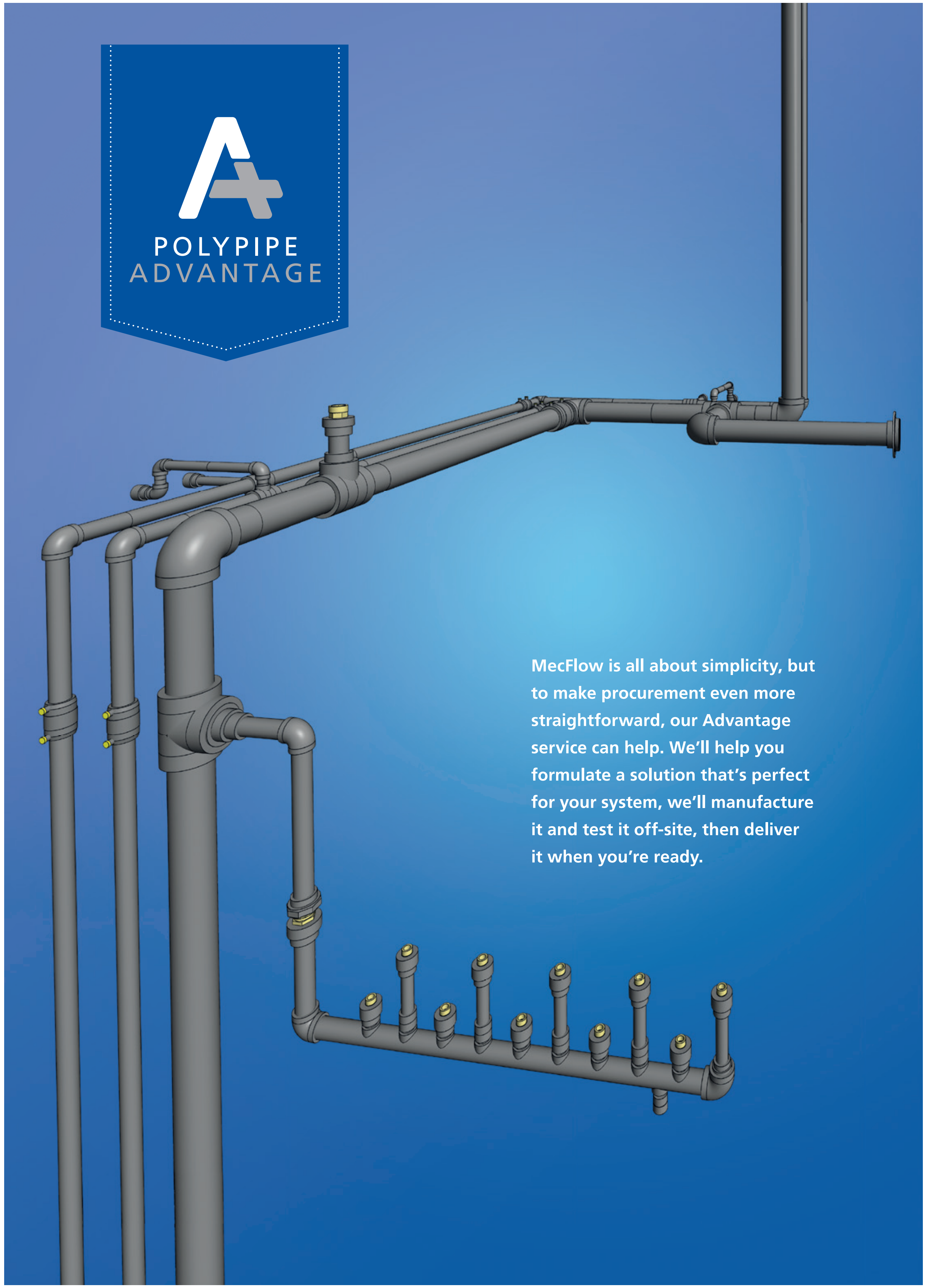
Finally, MecFlow's outer layer is UV stabilised and abrasion resistant, contributing to the system's robust construction, providing overall high resistance to impact, ensuring it's the confident choice when transporting, storing and handling on-site.

*Fire classification rating according to EN13501, installed according to building regulations. We recommend MecFlow be installed with our Firetrap sleeves.

There are multiple ways in which you can experience the MecFlow system. From design through to procurement and installation.

1. Through our Polypipe Advantage service, we can work with you to design a bespoke system, fabricated to your project's specific requirements.
2. Build your own system and procure our range of MecFlow products using the catalogue found on Pages 16 – 29.

Our products have been designed to help reduce installation time on-site using the latest off-site fabrication techniques. See pages 16 – 29 for the full MecFlow product range.



3. Features and benefits

MECFLOW BENEFITS YOUR PROJECT MORE

With its multi-layer PP-RCT material formulation, MecFlow delivers the features and benefits you need to get the job done quickly, easily and without compromising on quality.

MATERIAL

LOW NOISE TRANSMISSION

Due to its material properties the MecFlow system provides high resistance to the propagation of noise from water flowing at high velocities within its internal bore.

ANTI-MICROBIAL PROTECTION

The MecFlow system is manufactured using a patented material additive within the internal bore surface that prevents pathogens attaching and developing into bacterial colonies.

CHEMICAL RESISTANCE

MecFlow has excellent chemical resistance due to its high molecular weight and non-polar polymer structure. It is resistant to fluids from pH1 to pH14.

LESS ON-SITE STORAGE

Through the Polypipe Advantage service, MecFlow is delivered in sections exactly when you need it, reducing the need for long term on-site storage.

ABRASION RESISTANCE

The smooth and mechanically robust bore of the MecFlow system protects against material erosion due to the flow of aggressive fluids over long periods of time.

UV RESISTANCE

The MecFlow material formulation protects against oxidation by direct exposure to UV radiation from sunlight.

DESIGN

TECHNICAL DESIGN

Worried you will have to wait for a technical design to be completed that could take weeks for the size of your project? The Polypipe Advantage team are on hand to support you with technical queries and our promise to you is to return a quote in a speedy fashion, for any enquiry.

TESTING

During manufacturing of the MecFlow product range, items will be constructed in a controlled environment with repeatable test methods. The results of which, ensures a high quality of MecFlow product arrives on-site, time after time.

CONNECTING MECFLOW COMPONENTS TOGETHER

The connection methods are simple, using known and trusted techniques including Butt Welding, Electrofusion and Socket Welding, the MecFlow range can be easily and efficiently connected. Alternative flanged and threaded connection options are also available as well as reducers to suit all connection requirements.

BIM

The MecFlow range is supported with a range of REVIT files designed to an approved BSI Kitemark. The tools provide the ability to design the system with a simple, pre-engineered, data rich 3D model and at the click of a button, you can transfer the design to us - to provide a quotation against it.

INSTALLATION

MAXIMISED WATER QUALITY

The system's smooth bore and high chemical resistance maintains the quality of water supplied over the lifecycle of the MecFlow system.

LESS ON-SITE WASTE

Through the Polypipe Advantage service, MecFlow is delivered in Kits so you get exactly what you need, reducing packing and on-site waste. What's more Polypipe will recycle any offcuts or end caps at the end of your project.

SAFER INSTALLATION

No gas torches or naked flames needed for installation.

INCREASED MECHANICAL STRENGTH

Due to the addition of micro-fibres to the material formulation, the MecFlow system has improved temperature and pressure characteristics giving it excellent mechanical strength over a range of fluid temperatures.

LOWER LABOUR COSTS

With the system's fast installation method and less labour required for installation, projects benefit from a reduction in labour costs.

4. Applications

The MecFlow system and its product range have been designed with flexibility in mind, to ensure ease of installation for a variety of applications.

APPLICATION 1 – BOOSTED COLD WATER SYSTEMS (BCWS)

We typically provide two variations of design styles for this application.

- The first, as a riser with a high-level ceiling grid run-out along corridor spacing
- The second, with a riser and connection to a riser cupboard (or similar) mounted manifold

APPLICATION 2 – LOW TEMPERATURE HOT WATER SYSTEMS (LTHW)

Whether connecting to ventilation systems and AHU's, or any other forms of Low Temperature Hot Water Systems, the MecFlow product range is simple to style and match to your requirements. As a flow and return system you can run concurrent risers, run-outs and connections. Utilise our Tee's, Reducer range and Converter range to manoeuvre throughout the building and connect to all variations of plant coils.

APPLICATION 3 – CHILLED WATER SYSTEMS (CW)

Like the LTHW design, the CW system will likely operate on a flow and return basis. Often in larger pipe sizes and with a wide variation of connection sizes for plant. Our range will provide the options needed to neatly run throughout the CW plant spaces and connect all aspects of the building's cooling system together.

APPLICATION 4 – HEATING SYSTEMS (HS)

Like many piping systems that are often designed for specific applications to meet the everyday needs of their users' requirements. Heating systems come in a diverse range of design styles and we would highly recommend speaking with our technical team to ensure the MecFlow product range will meet all of your heating system requirements.

3D scan demonstrating how Polypipe can add value to your retro fit projects by scanning your building and overlaying with the exact MecFlow pipes and fittings you would need to complete your job.

EXAMPLE SYSTEM 1 – AHU SYSTEMS

Air handling units used in many and varied applications to provide, heating, cooling, and filtration. For heating and cooling applications, either the LPHW or the CW pipework is suitable for the MecFlow system.

EXAMPLE SYSTEM 2 – LPHW SYSTEMS

Heating systems predominantly used in conjunction with boilers for their energy saving qualities. The pipework for these systems is traditionally mild steel, however greater longevity and improved system performance can be achieved using MecFlow. Due to the chemical-resistant properties of the MecFlow inner layer, the build-up of debris within the system, which causes reduction in internal bore, increasing pressure whilst reducing flow rate, is irradicated.

EXAMPLE SYSTEM 3 – CHILLERS

Chillers use a combination of hot gas, water and air as their medium. MecFlow is compatible for the water piping which would encompass both CW and LPHW.

EXAMPLE SYSTEM 4 – FLUID BASED HVAC

Due to the rising cost and reduced availability of refrigerant gas, more systems are moving toward water and brines as the cooling or heating medium for HVAC applications in both commercial and light industrial applications. MecFlow is ideally suited to this application.

EXAMPLE SYSTEM 5 – RETRO FIT AND REPLACEMENT

With fusion weld technology, MecFlow is the smart solution for pipework replacement in any environment, providing minimum disruption to systems and services, delivering fast, efficient installation, whilst enabling significant reduction in the levels of health and safety provision required.

EXAMPLE SYSTEM 6 – DRY AIR COOLERS

Dry air coolers comprise small systems coupled to refrigerant plant and much larger installations used in data centre cooling applications, for example. Outside air is the medium used for cooling the water or brine within the system, all of which can be piped using MecFlow. In addition, advancements in dry air cooler technology are moving toward Adiabatic spray systems. (Using sprayed water or saturated pads to reduce the ambient air temperature and increase efficiency). The MecFlow system, therefore, is perfectly suited to this type of application.

EXAMPLE SYSTEM 7 – COOLING TOWER

Cooling towers are more in the realm of heavy industrial plant, however, they would also benefit from a MecFlow system, as many are situated on hazardous sites and manufacturing plants. The robust hard-wearing, long-lasting nature of the MecFlow system, coupled with its low risk, provides a logical alternative to traditional install methods, whilst encompassing CW, BCW and LPHW.

5. Build your MecFlow System

It couldn't be any easier – the MecFlow product range is designed for you to pick and fit.

Whether you are running pipework up through your building, along corridors, supplying plant equipment or installing manifolds or headers – we've two simple solutions.

1. Through our Polypipe Advantage service, we can work with you to design a bespoke system, fabricated to your project's specific requirements.

2. Loose products are also available, providing the option to self design and install. The loose range can also be used to resolve issues such as corridor runouts clashing with structural materials or other services.

Our products have been designed to help reduce installation time on-site using the latest off-site fabrication techniques. See pages 16 – 29 for the full MecFlow product range.

CAN'T SEE IT? WE HAVE A SOLUTION.

Whilst our portfolio covers most specifications and applications, there may be times when you just can't find what you're looking for. For example:

- Additional pipe diameter
- Additional connection options
- Bespoke variations of the current components
- Different offsets
- Alternative header designs

If this is the case, simply talk to our dedicated Sales or Technical teams who will work with you to develop a system that meets your unique requirements.

It's easy to get started, just contact us at **buildingservices.technical@polypipe.com**

MecFlow Design, Specification and Installation Guide 2022

Frequently asked questions

1. Will I need to sign-off manufacturing drawings to receive items?

Unless you are using the Polypipe Advantage Service for its bespoke drawings and quotation, then you do not need to sign off manufacturing drawings. Simply 'pick and fit'.

2. What is the expected lead time?

Many of the MecFlow product range items will be available from the Polypipe Building Services stock portfolio and at some Merchants. For a list of merchants that stock, please visit **www.polypipe.com/mecflow**. Outside of this, for items that are non stocked, please contact our customer services team **buildingservices.sales@polypipe.com** to find out expected lead-times.

3. Can we be signed-off as Approved Installers for this product?

We believe that the installation of MecFlow has been made so simple that there is no need for a manufacturer approval for installers. However a full and comprehensive range of training on our MecFlow product is available either at your premises, on-site or at our offices in Aylesford.

4. What product installation training is available?

We offer a wide range of training with our specialist MecFlow team:

- In-House training
- Training videos
- On-site (material not provided)
- Virtual training

5. What brackets are required?

Please contact the **Polypipe Advantage team** on **01622 795200**.

6. What transition pieces are available within MecFlow?

Connection to other materials can be achieved using the MecFlow range of threaded fittings, and for larger diameters, flanged connections.

7. What chemicals are suitable for commissioning and dosing?

The use of chlorine dioxide as a disinfectant is permitted, however the level of constant dosing must be strictly controlled and shall not exceed 0.5mg/l. Guidance as to the use of this chemical as a disinfectant is provided in BS EN 806 and the addendum BS 8558:2015. Further guidance is provided in ACoP L8.

8. Do I need to firestop MecFlow?

Although the MecFlow system has an excellent fire classification, the system must be considered as combustible for the purposes of compliance to UK Building Regulation B. With this in mind, where MecFlow pipes of nominal diameter ≥Ø40mm pass through a fire compartment floor or wall, the penetration must be protected with a fire sleeve. Our Firetrap Sleeves have been tested with MecFlow to BS EN 1366-3.

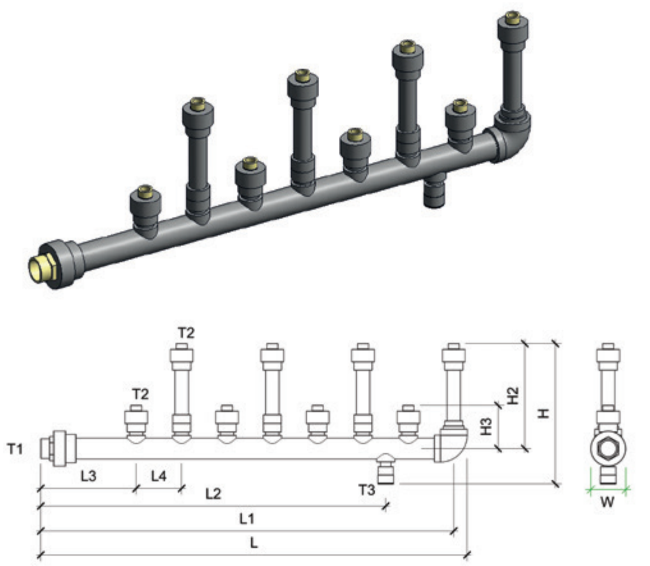
For a copy of the test report and further technical guidance, please contact the **Polypipe Advantage team** on **01622 795200**.

TECHNICAL HUB

We harness ingenuity and creativity to deliver class-leading solutions and product sustainability, with optimised whole-life costs, unrivalled technical support and on-the-ground assistance for the commercial building sector. Providing a wide variety of additional support tools including datasheets, technical manuals, technical bulletins and specification clauses – giving you all the technical information you need to make an informed decision. **www.polypipe.com/commercial-building-services/technical-hub**

6. **Product list -** Manifolds

Manifolds - Horizontal with drain cock



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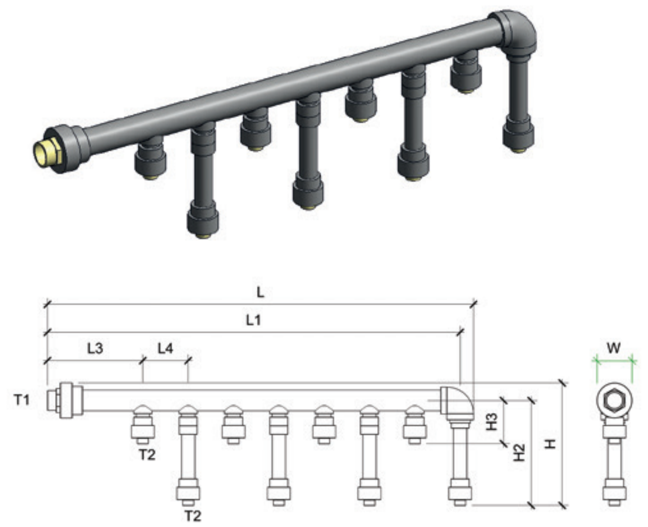
3808.50Y32075Y.12.HDX	12	1443	1410	1245	200	110	340	254	105	86	85	1½"	¾"	½"	Male Threaded	Male Threaded	Female Threaded

Manifolds - Horizontal without drain cock



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or call our customer services or technical teams.

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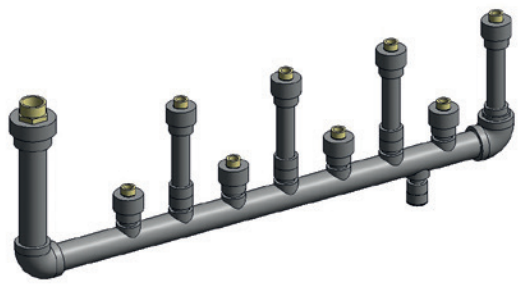
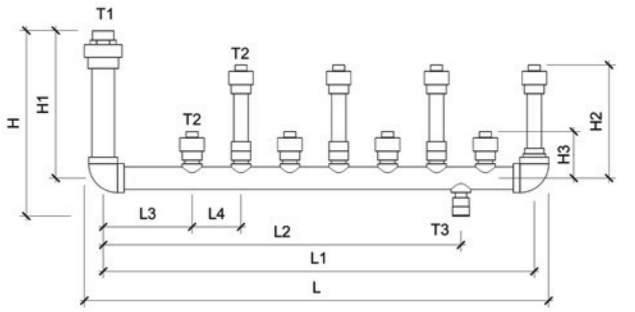
Manifolds - Vertical with drain cock





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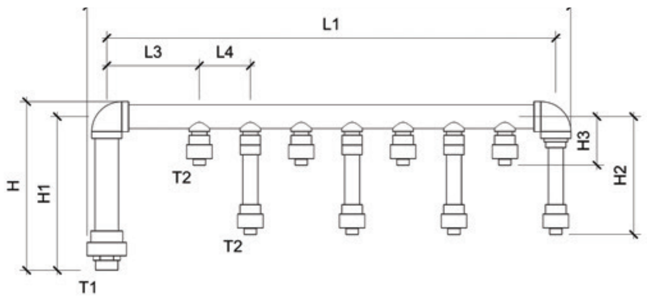
Manifolds - Vertical without drain cock



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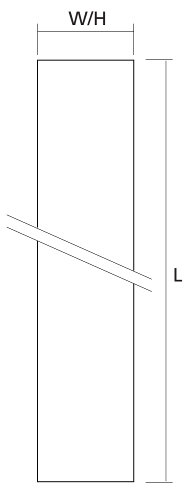
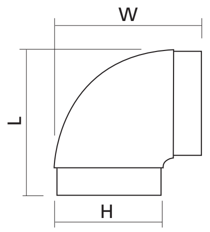
7. **Product list -** Loose Components

Plain Ended Pipe



PIPE	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3000.3.32.40G	32	4000	32	32	32	Spigot	Spigot
3000.5.40.40G	40	4000	40	40	40	Spigot	Spigot
3000.5.50.40G	50	4000	50	50	50	Spigot	Spigot
3000.5.63.40G	63	4000	63	63	63	Spigot	Spigot
3000.5.75.40G	75	4000	75	75	75	Spigot	Spigot
3000.5.90.40G	90	4000	90	90	90	Spigot	Spigot
3000.5.110.40G	110	4000	110	110	110	Spigot	Spigot
3000.5.125.58G	125	5800	125	125	125	Spigot	Spigot
3000.5.160.58G	160	5800	160	160	160	Spigot	Spigot

Elbow - 90° socket



90° ELBOW	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3001S.32.90G	56	56	42	32	32	Socket	Socket
3001S.40.90G	68	68	52	40	40	Socket	Socket
3001S.50.90G	80	80	65	50	50	Socket	Socket
3001S.63.90G	100	100	82	63	63	Socket	Socket
3001S.75.90G	120	120	101	75	75	Socket	Socket
3001S.90.90G	145	145	119	90	90	Socket	Socket
3001S.110.90G	175	175	144	110	110	Socket	Socket
3001S.125.90G	213	213	161	125	125	Socket	Socket
3001B.5.160.90G	227	227	168	160	160	Spigot	Spigot

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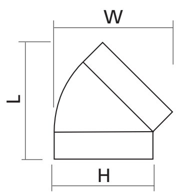
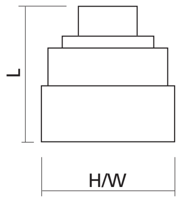
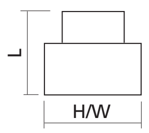
Elbow - 45° socket



45° ELBOW	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3001S.32.45G	56	62	42	32	32	Socket	Socket
3001S.40.45G	67	73	52	40	40	Socket	Socket
3001S.50.45G	81	85	65	50	50	Socket	Socket
3001S.63.45G	98	96	82	63	63	Socket	Socket
3001S.75.45G	121	122	101	75	75	Socket	Socket
3001S.90.45G	140	143	119	90	90	Socket	Socket
3001S.110.45G	168	172	144	110	110	Socket	Socket
3001S.125.45G	194	194	161	125	125	Socket	Socket
3001B.5.160.45G	207	220	166	160	160	Spigot	Spigot

Reducer - Concentric





REDUCER	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3024S.40X32G	40	50	40	40	32	Spigot	Socket
3024S.50X32G	50	40	50	50	32	Spigot	Socket
3024S.50X40G	50	48	50	50	40	Spigot	Socket
3024S.63X32G	63	48	63	63	32	Spigot	Socket
3024S.63X40G	63	64	63	63	40	Spigot	Socket
3024S.63X50G	63	64	63	63	50	Spigot	Socket
3024S.75X32G	75	65	75	75	32	Spigot	Socket
3024S.75X40G	75	65	75	75	40	Spigot	Socket
3024S.75X50G	75	65	75	75	50	Spigot	Socket
3024S.75X63G	75	65	75	75	63	Spigot	Socket
3024S.90X63G	90	71	90	90	63	Spigot	Socket
3024S.90X75G	90	79	90	90	75	Spigot	Socket
3024S.110X50G	110	112	110	110	50	Spigot	Socket
3024S.110X63G	110	73	110	110	63	Spigot	Socket
3024S.110X75G	110	78	110	110	75	Spigot	Socket
3024S.110X90G	110	94	110	110	90	Spigot	Socket
3024S.125X50G	125	193	125	125	50	Spigot	Socket
3024S.125X110G	125	112	125	125	110	Spigot	Socket
3024S.160X110G	160	88	160	160	110	Spigot	Socket
3024S.160X125G	160	90	160	160	125	Spigot	Socket

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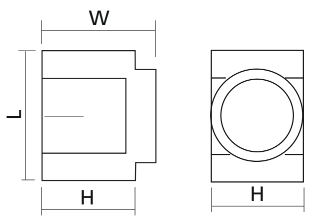
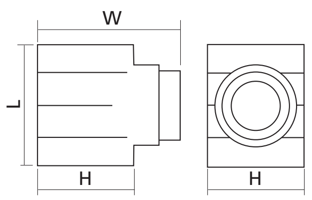
Tee - socket



TEE	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES					
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	BRANCH DN D2 mm	SECONDARY DN D3 mm	PRIMARY	BRANCH	SECONDARY
3004S.32.90G	58	73	43	32	32	32	Socket	Socket	Socket
3004S.40.90G	68	80	53	40	40	40	Socket	Socket	Socket
3004S.50.90G	83	99	66	50	50	50	Socket	Socket	Socket
3004S.63.90G	104	125	85	63	63	63	Socket	Socket	Socket
3004S.75.90G	120	139	101	75	75	75	Socket	Socket	Socket
3004S.90.90G	142	164	120	90	90	90	Socket	Socket	Socket
3004S.110.90G	172	200	144	110	110	110	Socket	Socket	Socket
3004S.125.90G	193	222	163	125	125	125	Socket	Socket	Socket
3004B.5.160.90G	232	297	166	160	160	160	Spigot	Spigot	Spigot

Tee Reducing - socket



TEE REDUCING	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES					
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	BRANCH DN D2 mm	SECONDARY DN D3 mm	PRIMARY	BRANCH	SECONDARY
3004S.40X32X40.90G	68	84	53	40	32	40	Socket	Socket	Socket
3004S.50X32X50.90G	78	90	67	50	32	50	Socket	Socket	Socket
3004S.50X40X50.90G	80	90	67	50	40	50	Socket	Socket	Socket
3004S.63X32X63.90G	93	90	85	63	32	63	Socket	Socket	Socket
3004S.63X40X63.90G	97	108	85	63	40	63	Socket	Socket	Socket
3004S.63X50X63.90G	98	108	85	63	50	63	Socket	Socket	Socket
3004S.75X32X75.90G	155	132	101	75	32	75	Socket	Socket	Socket
3004S.75X40X75.90G	155	132	101	75	40	75	Socket	Socket	Socket
3004S.75X50X75.90G	117	117	101	75	50	75	Socket	Socket	Socket
3004S.75X63X75.90G	119	132	101	75	63	75	Socket	Socket	Socket
3004S.90X50X90.90G	179	155	120	90	50	90	Socket	Socket	Socket
3004S.90X63X90.90G	139	155	120	90	63	90	Socket	Socket	Socket
3004S.90X75X90.90G	139	155	120	90	75	90	Socket	Socket	Socket
3004S.110X63X110.90G	209	180	144	110	63	110	Socket	Socket	Socket
3004S.110X75X110.90G	214	180	144	110	75	110	Socket	Socket	Socket
3004S.110X90X110.90G	167	180	144	110	90	110	Socket	Socket	Socket

* Dimensions given are subject to tolerance of +2mm

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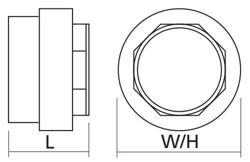
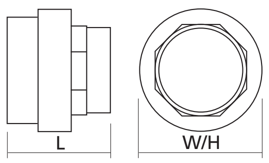
Threaded Adaptor - transition piece, female thread



THREADED ADAPTOR	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3016S.32X075G	-	46	-	32	¾"	Socket	Female Thread
3016S.32X1G	-	52	-	32	1"	Socket	Female Thread HEX
3016S.40X125G	-	64	-	40	1¼"	Socket	Female Thread HEX
3016S.50X15G	-	68	-	50	1½"	Socket	Female Thread HEX
3016S.63X2G	-	76	-	63	2"	Socket	Female Thread HEX
3016S.75X25G	-	83	-	75	2½"	Socket	Female Thread HEX
3016S.90X3G	-	98	-	90	3"	Socket	Female Thread HEX
3016S.110X4G	143	101	143	110	4"	Socket	Female Thread HEX

Threaded Adaptor - transition piece, male thread



THREADED ADAPTOR	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3017S.32X075G	-	59	-	32	¾"	Socket	Male Thread
3017S.32X1G	-	65	-	32	1"	Socket	Male Thread HEX
3017S.40X125G	-	82	-	40	1¼"	Socket	Male Thread HEX
3017S.50X15G	-	86	-	50	1	Socket	Male Thread HEX
3017S.63X2G	-	101	-	63	2"	Socket	Male Thread HEX
3017S.75X25G	-	101	-	75	2½"	Socket	Male Thread HEX
3017S.90X3G	-	125	-	90	3"	Socket	Male Thread HEX
3017S.110X4G	-	133	-	110	4"	Socket	Male Thread HEX

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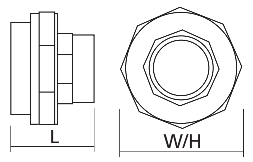
Threaded Adaptor - female adaptor, loose nut

THREADED ADAPTOR	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3019S.32X1G	-	64	-	32	1"	Socket	Female Union Nut
3019S.32X125G	-	84	-	32	1¼"	Socket	Female Union Nut

Threaded Adaptor - adaptor union, female thread

THREADED ADAPTOR	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3058S.32X1G	-	45	-	32	1"	Socket	Female Union Thread
3058S.40X125G	-	48	-	40	1¼"	Socket	Female Union Thread
3058S.50X15G	-	48	-	50	1½"	Socket	Female Union Thread
3058S.63X2G	-	64	-	63	2"	Socket	Female Union Thread
3058S.75X25G	-	79	-	75	2½"	Socket	Female Union Thread
3058S.90X3G	-	75	-	90	3"	Socket	Female Union Thread
3058S.110X4G	-	94	-	110	4"	Socket	Female Union Thread

Threaded Adaptor - adaptor union, male thread



THREADED ADAPTOR	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3057S.32X1G	-	57	-	32	1"	Socket	Male Union Thread
3057S.40X125G	-	63	-	40	1¼"	Socket	Male Union Thread
3057S.50X15G	-	66	-	50	1½"	Socket	Male Union Thread
3057S.63X2G	-	77	-	63	2"	Socket	Male Union Thread
3057S.75X25G	-	101	-	75	2½"	Socket	Male Union Thread
3057S.90X3G	-	96	-	90	3"	Socket	Male Union Thread
3057S.110X4G	-	118	-	110	4"	Socket	Male Union Thread

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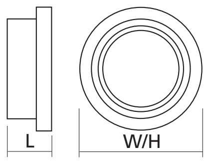
Threaded Adaptor - elbow, female thread

THREADED ADAPTOR	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3016S.32X075.90G	-	-	-	32	¾"	Socket	Female Thread
3016S.32X1.90G	-	-	-	32	1"	Socket	Female Thread HEX

Threaded Adaptor - elbow, male thread

THREADED ADAPTOR	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3017S.32X075.90G	-	-	-	32	¾"	Socket	Male Thread
3017S.32X1.90G	-	-	-	32	1"	Socket	Male Thread HEX

Stub Flange



STUB FLANGE	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3080S.40G	62	25	62	40	-	Socket	Flange
3080S.50G	88	32	88	50	-	Socket	Flange
3080S.63G	97	36	97	63	-	Socket	Flange
3080S.75G	116	38	116	75	-	Socket	Flange
3080S.90G	135	44	135	90	-	Socket	Flange
3080S.110G	160	50	160	110	-	Socket	Flange
3080S.125G	184	52	184	125	-	Socket	Flange
3080B.160G	225	75	225	160	-	Spigot	Flange

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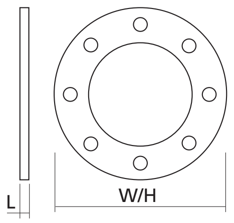
Backing Ring PN16

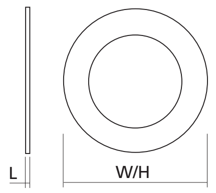


BACKING RING	WIDTH	LENGTH	HEIGHT	FIXINGS		
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PCD mm	HOLE COUNT	BOLT SIZE
3081.40S	150	16	150	110	4	M16
3081.50S	165	18	165	125	4	M16
3081.63S	185	18	185	145	4	M16
3081.75S	200	20	200	160	8	M16
3081.90S	200	20	200	160	8	M16
3081.110S	220	20	220	180	8	M16
3081.125S	250	22	250	210	8	M16
3081.160S	285	22	285	240	8	M20

Backing Ring PN25

BACKING RING	WIDTH	LENGTH	HEIGHT	FIXINGS		
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PCD mm	HOLE COUNT	BOLT SIZE
3081.40.25PN	150	18	150	110	4	M16
3081.50.25PN	165	20	165	125	4	M16
3081.63.25PN	185	22	185	145	8	M16
3081.75.25PN	200	24	200	160	8	M16
3081.90.25PN	200	24	200	160	8	M16
3081.110.25PN	235	24	235	190	8	M20
3081.125.25PN	270	26	270	220	8	M24
3081.160.25PN	300	28	300	250	8	M24

Seal PN16



SEAL	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES		
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	PRIMARY	SECONDARY
3082.40B	59	3	59	40	-	-
3082.50B	73	3.4	73	50	-	-
3082.63B	88	3.4	88	63	-	-
3082.75B	105	3.4	105	75	-	-
3082.90B	126	3.2	126	90	-	-
3082.110B	153	3.2	153	110	-	-
3082.125B	168	3.3	168	-	-	-
3082.160B	212	3.2	212	160	-	-

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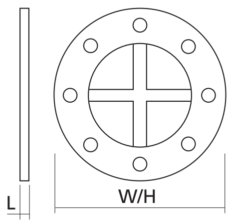
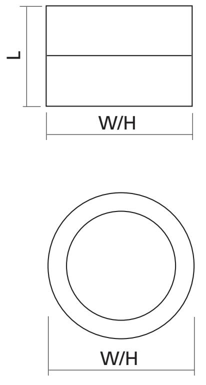
Blanking Flange PN16



BLANKING FLANGE	WIDTH	LENGTH	HEIGHT	FIXINGS		
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PDC mm	HOLE COUNT	BOLT SIZE
3083.40S	150	16	150	110	4	M16
3083.50S	165	18	165	125	4	M16
3083.63S	185	18	185	145	4	M16
3083.75S	200	20	200	160	8	M16
3083.90S	200	20	200	160	8	M16
3083.110S	220	20	220	180	8	M16
3083.125S	250	22	250	210	8	M16
3083.160S	285	22	285	240	8	M20

Double Socket



DOUBLE SOCKET	WIDTH	LENGTH	HEIGHT	CONNECTION TYPES			
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	HEIGHT H mm	PRIMARY DN D1 mm	SECONDARY DN D2 mm	PRIMARY	SECONDARY
3011S.32G	45	42	45	32	-	Socket	Socket
3011S.40G	55	46	55	40	-	Socket	Socket
3011S.50G	68	53	68	50	-	Socket	Socket
3011S.63G	84	63	84	63	-	Socket	Socket
3011S.75G	101	68	101	75	-	Socket	Socket
3011S.90G	117	72	117	90	-	Socket	Socket
3011S.110G	143	99	143	110	-	Socket	Socket
3011S.125G	162	90	162	125	-	Socket	Socket
3011S.160G	206	103	206	160	-	Socket	Socket

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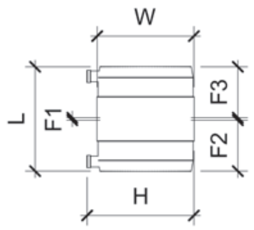
Electrofusion Coupling



COUPLING	WIDTH	LENGTH		HEIGHT	CONNECTION TYPES		
CODE	TOTAL WIDTH W mm	TOTAL LENGTH L mm	FITTED LENGTH F1 mm	FITTED LENGTH F2 mm	FITTED LENGTH F3 mm	HEIGHT H mm	PRIMARY DN D1 mm
3010.32G	49	82	1	41	41	63	32
3010.40G	58	86	2	42	42	73	40
3010.50G	72	102	5	49	49	87	50
3010.63G	86	119	5	57	57	102	63
3010.75G	104	131	2	65	65	120	75
3010.90G	122	146	1	73	73	132	90
3010.110G	149	161	4	79	79	165	100
3010.125G	164	183	3	90	90	178	125
3010.160G	210	191	1	95	95	223	160

Fire Sleeves

FIRE SLEEVES	SIZE	PACK/BOX
CODE	mm	
1925.34	34 x 300	18
1925.42	42 x 300	12
1925.54	54 x 300	8
1925.67	67 x 300	16
1925.76	76 x 300	6
1925.102	102 x 300	12
1925.114	114 x 300	9
1925.127	127 x 300	6
1925.169	169 x 300	4

Product Connections and Sizes

	BSP CONNECTIONS AVAILABLE								BACKING RING PN16					BACKING RING PN25				
DIA. mm	¾"	1"	1¼"	1½"	2"	2½"	3"	4"	DRILLING/ RATING	LENGTH L mm	PCD mm	HOLE COUNT	BOLT SIZE	DRILLING/ RATING	LENGTH L mm	PCD mm	HOLE COUNT	BOLT SIZE
32	✓	✓	✓						BS4504 PN10/16	-	-	-	-	BS4504 PN25/40	-	-	-	-
40			✓						BS4504 PN10/16	16	110	4	M16	BS4504 PN25/40	18	110	4	M16
50				✓					BS4504 PN10/16	18	125	4	M16	BS4504 PN25/40	20	125	4	M16
63					✓				BS4504 PN10/16	18	145	4	M16	BS4504 PN25/40	22	145	8	M16
75						✓			BS4504 PN10/16	20	160	8	M16	BS4504 PN25/40	24	160	8	M16
90							✓		BS4504 PN10/16	20	160	8	M16	BS4504 PN25/40	24	160	8	M16
110								✓	BS4504 PN10/16	20	180	8	M16	BS4504 PN25/40	24	190	8	M20
125									BS4504 PN10/16	22	210	8	M16	BS4504 PN25/40	26	220	8	M24
160									BS4504 PN10/16	22	240	8	M20	BS4504 PN25/40	28	250	8	M24

* Please check detailed product pages for Threaded Adaptor types available in each size.

For a quote, please go to www.polypipe.com/mecflow
or call our customer services or technical teams.

Technical Information

As your specialist construction partner, Polypipe Building Services is always working to develop more exceptional products, provide more technical support and more cost-effective ways to complete your project.

MecFlow is a multi-layer, WRAS approved, PP-RCT pipe whose material formulation has been designed for strength, durability and achieves a fire classification rating of B – s1, d0; making it ideal for multi-occupancy and tall building projects.

As a highly sophisticated product that includes anti-microbial protection, MecFlow prevents biofilm build-up and has a high resistance to rigorous disinfection processes.

Heat and fluctuating temperatures won't phase MecFlow either. Its central layer benefits from the addition of microfibres set in a mesh formation, working to reduce thermal expansion and along with several other additives, increases the mechanical resistance of the system.

The following pages will provide all the technical information you'll need to help design the perfect MecFlow system.

8. Chemical resistance

The use of thermoplastic pipe systems within the commercial market is now widespread. Thermoplastics have replaced traditional materials such as steel, ductile iron and copper. Because of this diversity of use, it is essential that the most suitable plastic material is matched to its proposed application.

This section will provide a guide to compatible material selection. The information within this section has been collated from tests carried out by both national and international standards organisations (ISO/TR10358:1993) as well as tests performed by independent test houses.

The tests were based on the use of pure chemicals. For mixed chemicals, we would advise that pilot tests should be undertaken in order to ascertain the resistance of the material under these circumstances.

PIPE JOINTS

Electrofusion joints are regarded as generally having the same chemical resistance as the material itself. However, the jointing process can leave a certain amount of residual stress within the joint.

SEALS AND SEAT MATERIALS

The working life of seals and seat materials is often different from that of the pipe system and greatly dependent on the working conditions involved.

Tables 4.01 and 4.02 outline their resistance.

SEAL AND SEAT MATERIAL	
MATERIAL TYPE	RESISTANCE
EDPM-Ethylene Propylene Rubber	Satisfactory resistance to most aggressive chemicals, not suitable for oils or fat
FPM-Fluorine Rubber	The most resistant of the elastomers to solvents
3001S.50.45G	NBR-Nitrile Rubber
PTFE-Polytetrafluoroethylene	Resists all the chemicals shown in tables

Table 4.01

TERMINOLOGY FOR CHEMICAL RESISTANCE TABLES	
SYMBOL/TERM	DESCRIPTION
✓	Resistant
O	Conditionally resistant
×	Not recommended
–	No test data available
Technical grade	Technically pure
Saturated	Media has reached its maximum absorption in water at ambient temperature, which is the point where there can be no further absorption
Aqueous	A solution below maximum absorption, expressed as a percentage (%) of saturation (concentration)
Suspension	Insoluble or partially soluble solid carried in an aqueous base normally prepared at ambient temperature
Commercial Proprietary Industrial	Self explanatory, grades of chemical named brands in general use

Table 4.02

Chemical resistance - table 4.03

MecFlow is made from PP-RCT, please follow the column labeled Polypropylene.

CHEMICAL	CONCENTRATION	MATERIAL°C																		
		PVCu			ABS			PE			POLYPROPYLENE			EPDM			FPM			
		20	40	60	20	40	60	20	40	60	20	60	100	20	40	60	20	60	100	120
Acetaldehyde	40% Aqueous Solution	O	×	–	×	–	–	✓	✓	O	✓	O	O	✓	O	O	✓	O	–	–
Acetaldehyde	Technically pure	×	–	–	×	–	–	✓	O	–	O	×	–	✓	O	×	O	×	–	–
Acetic acid	50% Aqueous	✓	✓	O	×	–	–	✓	✓	✓	✓	✓	✓	✓	O	–	O	–	–	–
Acetic acid	Technically pure glacial	O	×	–	×	–	–	✓	✓	O	✓	✓	O	✓	O	–	×	–	–	–
Acetic acid anhydride	Technically pure	×	–	–	×	–	–	✓	O	–	✓	–	–	O	–	–	×	–	–	–
Acetic acid ethylester		×	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	O	–	–	–
Acetic acid isobutyl ester	Technically pure	×	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	×	–	–	–
Acetone	Up to 10% aqueous	×	–	–	O	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	O	×	–	–
Acetone	Technically pure	×	–	–	×	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	×	–	–	–
Acetonitrile	100%	×	–	–	×	–	–	O	–	–	O	–	–	O	–	–	×	–	–	–
Acetophenone	100%	×	–	–	×	–	–	O	–	–	O	–	–	✓	–	–	×	–	–	–
Acrylic acid methyl ester	Technically pure	×	–	–	×	–	–	O	–	–	×	–	–	O	–	–	–	–	–	–
Acrylicethyl	Technically pure	×	–	–	×	–	–	O	–	–	×	–	–	O	–	–	×	–	–	–
Acrylonitrile	Technically pure	×	–	–	×	–	–	✓	✓	✓	✓	–	–	✓	✓	O	O	×	–	–
Adipic acid	Saturated, aqueous	✓	✓	×	×	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Allyl alcohol	96%	O	×	–	×	–	–	✓	✓	✓	✓	O	–	✓	✓	O	O	–	–	–
Ammonia	Gaseous technically pure	✓	✓	✓	×	–	–	✓	✓	✓	✓	✓	–	✓	–	–	✓	–	–	–
Ammonium acetate	Aqueous, all	✓	✓	O	O	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–
Ammoniumpersulphate		✓	✓	O	–	–	–	✓	–	–	O	–	–	✓	–	–	✓	–	–	–
Ammonum salts, aqueous inorganic	Saturated	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Amyl acetate	Technically pure	×	–	–	×	–	–	✓	✓	✓	O	×	–	O	–	–	×	–	–	–
Amyl alcohol	Technically pure	✓	✓	O	×	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	O	–	–	–
Aniline	Technically pure	×	–	–	×	–	–	✓	O	–	✓	O	–	✓	✓	✓	O	O	–	–
Antimony trichloride	90% Aqueous	✓	✓	–	×	–	–	✓	✓	✓	✓	✓	–	✓	–	–	✓	–	–	–
Aqua regia	Mixing ratio	✓	O	–	×	–	–	×	–	–	×	–	–	×	–	–	O	–	–	–
Arsenic acid	80% Aqueous	✓	✓	O	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	–
Barium salts, aqueous inorganic	Saturated	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	–
Beer	Usual commercial	✓	–	–	✓	–	–	✓	–	–	✓	–	–	–	–	–	✓	–	–	–
Benzaldehyde	Saturated, aqueous	×	–	–	×	–	–	✓	✓	O	✓	–	–	✓	✓	O	✓	✓	–	–
Benzene	Technically pure	×	–	–	×	–	–	O	O	–	O	–	–	×	–	–	✓	–	–	–
Benzene sulfonic acid	Technically pure	✓	–	–	–	–	–	✓	✓	O	✓	O	–	✓	✓	O	✓	–	–	–

KEY: – NO DATA × NOT RECOMMENDED O CONDITIONALLY RESISTANT ✓ RESISTANT

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Chemical resistance - table 4.04

MecFlow is made from PP-RCT, please follow the column labeled Polypropylene.

CHEMICAL	CONCENTRATION	MATERIAL°C																		
		PVCu			ABS			PE			POLYPROPYLENE			EPDM			FPM			
		20	40	60	20	40	60	20	40	60	20	60	100	20	40	60	20	60	100	120
Benzine (Gasoline)	Free of lead and aromatic compounds	✓	✓	–	×	–	–	✓	✓	–	○	–	–	×	–	–	✓	–	–	–
Benzoic acid	Aqueous, all	✓	✓	○	✓	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	○	–
Benzyl alcohol	Technically pure	○	–	–	×	–	–	✓	✓	○	✓	○	–	✓	✓	○	✓	–	–	–
Beryllium salts, aqueous, inorganic		✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Borax	Aqueous, all	✓	✓	○	✓	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–
Boric acid	Aqueous, all	✓	✓	○	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
Bromine water	Saturated, aqueous	✓	–	–	×	–	–	×	–	–	×	–	–	×	–	–	✓	–	–	–
Butadiene	Technically pure	✓	–	–	×	–	–	○	–	–	○	–	–	×	–	–	✓	–	–	–
Butane	Technically pure	✓	–	–	✓	–	–	✓	–	–	✓	–	–	×	–	–	✓	–	–	–
Butanediol	10% Aqueous	✓	○	–	×	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Butanol	Technically pure	✓	✓	○	×	–	–	✓	✓	✓	✓	○	–	✓	✓	✓	✓	×	–	–
Butyl acetate	Technically pure	×	–	–	×	–	–	✓	–	–	○	–	–	✓	×	–	○	–	–	–
Butyl phenol p-tertiary	Technically pure	○	×	–	×	–	–	○	–	–	✓	–	–	×	–	–	○	–	–	–
Butylene glycol	Technically pure	✓	✓	○	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	○	–	–
Butylene liquid	Technically pure	✓	–	–	–	–	–	×	–	–	×	–	–	○	–	–	✓	–	–	–
Butyric acid	Technically pure	✓	–	–	×	–	–	✓	–	–	✓	–	–	○	–	–	○	–	–	–
Caesium salts, aqueous inorganic	<Saturated acid	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Cadmium salts, aqueous inorganic	<Saturated acid	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Calcium acetate	Saturated	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Calcium hydroxide	Saturated aqueous	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	–
Calcium lactate	Saturated	✓	✓	–	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Calcium salts, aqueous, inorganic	Saturated acid	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Carbon dioxide	Technically pure, anhydrous	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Carbon tetrachloride	Technically pure	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	✓	–	–	–
Carbonic acid		✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Caro's acid		✓	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	–	–
Caustic potash solution (potassium hydroxide)	50% Aqueous	✓	✓	○	–	–	–	✓	✓	✓	✓	○	–	✓	✓	✓	×	–	–	–
caustic soda solution	50% Aqueous	✓	✓	✓	–	–	–	✓	✓	✓	✓	○	–	✓	✓	✓	×	–	–	–
Chloric acid	10% Aqueous	✓	✓	○	×	–	–	✓	✓	–	×	–	–	✓	✓	✓	✓	✓	–	–
Chloric acid	20% Aqueous	✓	✓	○	×	–	–	○	–	–	×	–	–	○	○	–	✓	✓	–	–
Chlorine	Moist, 97% gaseous	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	✓	–	–	–

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Chemical resistance - table 4.05

MecFlow is made from PP-RCT, please follow the column labeled Polypropylene.

CHEMICAL	CONCENTRATION	MATERIAL°C																		
		PVCu			ABS			PE			POLYPROPYLENE			EPDM			FPM			
		20	40	60	20	40	60	20	40	60	20	60	100	20	40	60	20	60	100	120
Chlorine	Liquid, technically pure, as double pipe system	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	○	–	–	–
Chlorine	Anhydrous, technically pure, as double pipe system	×	–	–	×	–	–	○	○	–	×	–	–	○	–	–	✓	–	–	–
Chlorine water	Saturated	✓	✓	○	○	–	–	○	○	–	○	–	–	○	–	–	✓	–	–	–
Chloroacetic acid, mono	50% Aqueous	✓	✓	–	×	–	–	✓	✓	○	✓	○	–	○	–	–	×	–	–	–
Chloroacetic acid, mono	Technically pure	✓	✓	○	×	–	–	✓	✓	○	✓	○	–	○	–	–	×	–	–	–
Chlorobenzene	Technically pure	×	–	–	×	–	–	○	–	–	○	–	–	×	–	–	×	–	–	–
Chloroethanol	Technically pure	×	–	–	×	–	–	✓	✓	✓	✓	✓	–	○	–	–	×	–	–	–
Chlorosulphonic acid	Technically pure	○	–	–	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	–
Chromic acid	Aqueous, all	○	○	–	×	–	–	○	–	–	○	–	–	–	–	–	✓	○	–	–
Chromic acid + water + sulphuric acid	50g 15g 35g	✓	✓	○	×	–	–	×	–	–	×	–	–	○	○	–	✓	–	–	–
Chromium (II) - salts, aqueous, inorganic	<Saturated acid	✓	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Compressed air, containing oil		×	–	–	×	–	–	✓	✓	–	○	–	–	×	–	–	✓	–	–	–
Copper salts, aqueous inorganic	<Saturated acid	✓	✓	○	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	–	✓	✓	–	–
Cresol	Cold saturated aqueous	○	–	–	×	–	–	✓	✓	○	✓	–	–	○	–	–	✓	–	–	–
Crotonic aldehyde	Technically pure	×	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	✓	–	–	–
Cyclohexane	Technically pure	×	–	–	×	–	–	✓	✓	✓	✓	–	–	×	–	–	✓	–	–	–
Cyclohexanol	Technically pure	✓	✓	✓	×	–	–	✓	✓	✓	✓	○	–	×	–	–	✓	–	–	–
Cyclohexanone	Technically pure	×	–	–	×	–	–	✓	○	○	✓	○	–	○	–	–	×	–	–	–
Dextrine	Usual commercial	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	–	–
Disobutyl ketone	Technically pure	×	–	–	×	–	–	✓	○	–	✓	–	–	○	○	–	×	–	–	–
Dibrombenzene	<Saturated acid	×	–	–	×	–	–	○	–	–	○	–	–	○	–	–	✓	–	–	–
Dibutyl ether	Technically pure	×	–	–	×	–	–	○	–	–	○	–	–	×	–	–	✓	–	–	–
Dibutyl phthalate	Technically pure	×	–	–	×	–	–	✓	○	○	✓	○	–	○	–	–	○	–	–	–
Dichloroacetic acid	50% Aqueous	✓	✓	○	×	–	–	✓	✓	○	✓	○	–	✓	✓	✓	○	×	–	–
Dichloroacetic acid	Technically pure	✓	✓	○	×	–	–	✓	✓	○	✓	○	–	✓	✓	✓	○	–	–	–
Dichloroacetic acid methyl ester	Technically pure	×	–	–	×	–	–	✓	✓	✓	✓	✓	–	✓	✓	○	×	–	–	–
Dichlorobenzene	Technically pure	×	–	–	×	–	–	○	–	–	○	–	–	○	–	–	✓	–	–	–
Dichloroethylene	Technically pure	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	○	–	–	–
Diesel oil		✓	✓	–	×	–	–	✓	–	–	○	–	–	×	–	–	✓	–	–	–

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Chemical resistance - table 4.06

MecFlow is made from PP-RCT, please follow the column labeled Polypropylene.

CHEMICAL	CONCENTRATION	MATERIAL°C																		
		PVCu			ABS			PE			POLYPROPYLENE			EPDM			FPM			
		20	40	60	20	40	60	20	40	60	20	60	100	20	40	60	20	60	100	120
Diethyl ether		×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	–
Diethylamine	Technically pure	–	–	–	×	–	–	✓	–	–	✓	–	–	O	–	–	×	–	–	–
Dimethyl formamide	Technically pure	×	–	–	×	–	–	✓	✓	O	✓	✓	–	O	–	–	×	–	–	–
Dimethylamine	Technically pure	×	–	–	×	–	–	✓	–	–	×	–	–	O	–	–	×	–	–	–
Dioxane	Technically pure	×	–	–	×	–	–	✓	✓	✓	O	O	–	O	–	–	×	–	–	–
Ethanolamine	Technically pure	×	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	O	–	–	–
Ethyl alcohol (Ethnause)	Technically pure 96%	✓	✓	O	×	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	O	–	–
Ethyl benzene	Technically pure	×	–	–	×	–	–	O	–	–	O	–	–	×	–	–	✓	–	–	–
Ethyl chloride (G)	Technically pure	×	–	–	×	–	–	O	–	–	O	–	–	×	–	–	O	–	–	–
Ethyl ether	Technically pure	×	–	–	×	–	–	✓	–	–	O	–	–	×	–	–	×	–	–	–
Ethylene diamine	Technically pure	O	–	–	×	–	–	✓	✓	✓	✓	✓	–	✓	–	–	O	×	–	–
Ethylene glycol	<50%	✓	✓	✓	O	O	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Ethylene glycol	Technically pure	✓	✓	✓	×	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Ethylenediamine - tetraacetic acid (EDTA)		–	–	–	–	–	–	✓	–	–	✓	–	–	✓	–	–	–	–	–	–
Fluorine	Technically pure	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	–
Fluorosilic acid	32% Aqueous	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	–	–	O	–	–	–
Formaldehyde	40% Aqueous	✓	✓	–	–	–	–	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	–	–
Formamide	Technically pure	×	–	–	×	–	–	✓	✓	✓	✓	✓	–	✓	–	–	O	–	–	–
Formic acid	≥25%	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	–	–	–	–
Formic acid	Up to 50% aqueous	✓	✓	O	O	–	–	✓	✓	✓	✓	O	–	✓	✓	O	✓	O	–	–
Formic acid	Technically pure	✓	O	×	×	–	–	✓	✓	✓	✓	×	–	✓	✓	O	✓	–	–	–
Frigen 12 (freon 12)	Technically pure	✓	–	–	×	–	–	×	–	–	×	–	–	O	–	–	O	–	–	–
Fuel oil		✓	✓	–	×	–	–	✓	–	–	O	–	–	×	–	–	✓	–	–	–
Furfuryl alcohol	Technically pure	×	–	–	×	–	–	✓	✓	✓	✓	O	–	O	–	–	×	–	–	–
Gelatin	Aqueous, all	✓	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	–	✓	–	–	–
Glucose	Aqueous, all	✓	✓	O	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	–
Glycerol	Technically pure	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	✓	✓	O	O	✓	O	–	–
Glycin	10% Aqueous	✓	✓	–	✓	✓	–	✓	✓	–	✓	–	–	–	–	–	✓	–	–	–
Glycolic acid	37% Aqueous	✓	–	–	–	–	–	✓	✓	✓	✓	–	–	–	–	–	✓	–	–	–
Heptane	Technically pure	✓	✓	–	×	–	–	✓	✓	–	O	–	–	×	–	–	✓	–	–	–

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Chemical resistance - table 4.07

MecFlow is made from PP-RCT, please follow the column labeled Polypropylene.

CHEMICAL	CONCENTRATION	MATERIAL°C																		
		PVCu			ABS			PE			POLYPROPYLENE			EPDM			FPM			
		20	40	60	20	40	60	20	40	60	20	60	100	20	40	60	20	60	100	120
Hexane	Technically pure	✓	✓	–	×	–	–	✓	✓	–	O	–	–	×	–	–	✓	–	–	–
Hydrazine hydrate	Aqueous	✓	–	–	×	–	–	✓	✓	✓	✓	✓	–	✓	–	–	O	–	–	–
Hydrochloric acid	Up to 30% aqueous	✓	✓	O	–	–	–	✓	✓	✓	✓	O	–	✓	✓	O	✓	O	–	–
Hydrochloric acid	38% Aqueous	✓	✓	O	×	–	–	✓	✓	–	O	–	–	✓	O	–	✓	–	–	–
Hydrocyanic acid	Technically pure	✓	✓	O	×	–	–	✓	✓	✓	✓	✓	–	✓	O	–	✓	–	–	–
Hydrofluoric acid	40%	✓	O	O	×	–	–	✓	✓	O	✓	✓	–	×	–	–	✓	O	–	–
Hydrogen	Technically pure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	–	✓	✓	✓	–
Hydrogen chloride	Technically pure gaseous	✓	✓	O	×	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Hydrogen peroxide	30% Aqueous	✓	–	–	×	–	–	✓	–	–	✓	–	–	O	–	–	✓	–	–	–
Hydrogen peroxide	90% Aqueous	✓	–	–	×	–	–	O	–	–	–	–	–	×	–	–	O	–	–	–
Hydrogen sulphide	Saturated aqueous	✓	✓	O	–	–	–	✓	✓	✓	✓	✓	–	✓	×	–	✓	✓	–	–
Hydrogen sulphide	Technically pure	✓	✓	✓	–	–	–	✓	✓	O	✓	✓	–	✓	×	–	✓	O	–	–
Hydrquinone	30%	✓	✓	–	–	–	–	✓	✓	✓	✓	✓	–	✓	–	–	–	–	–	–
Lodine-potassium iodide solution (Lugol's solution)		✓	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	✓	–	–	–
Iron salts, aqueous inorganic	≥Saturated acid	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	–
Isooctane	Technically pure	✓	–	–	×	–	–	✓	–	–	✓	–	–	–	–	–	✓	–	–	–
Isopropyl alcohol (ESC)	Technically pure	✓	✓	O	–	–	–	✓	✓	O	✓	O	–	✓	✓	–	✓	–	–	–
Isopropyl ether	Technically pure	×	–	–	×	–	–	O	–	–	O	–	–	O	–	–	×	–	–	–
Lactic acid	10% Aqueous	✓	O	×	✓	O	×	✓	✓	✓	✓	✓	–	✓	✓	O	✓	O	–	–
Lead acetate	Aqueous saturated	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Lead salts, aqueous, inorganic	≥Saturated acid	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Linsead oil	Technically pure	✓	✓	O	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–
Lithium salts, aqueous, inorganic	≥Saturated acid	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Magnesium salts, aqueous inorganic	≥Saturated acid	✓	✓	O	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
Maleic acid	Cold saturated aqueous	✓	✓	O	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Mercury	Pure	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Mercury salts	≥Saturated acid	✓	✓	O	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Methane (natural gas)	Technically pure	✓	–	–	✓	–	–	✓	–	–	✓	–	–	–	–	–	✓	–	–	–
Methanol	All	✓	✓	O	×	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	O	O	–	–
Methyl acetate	Technically pure	×	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	×	–	–	–

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Chemical resistance - table 4.08

MecFlow is made from PP-RCT, please follow the column labeled Polypropylene.

CHEMICAL	CONCENTRATION	MATERIAL°C PVCu 20	PVCu 40	PVCu 60	ABS 20	ABS 40	ABS 60	PE 20	PE 40	PE 60	POLYPROPYLENE 20	POLYPROPYLENE 60	POLYPROPYLENE 100	EPDM 20	EPDM 40	EPDM 60	FPM 20	FPM 60	FPM 100	FPM 120
Methyl amine	32% Aqueous	O	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	×	–	–	–
Methyl bromide	Technically pure	×	–	–	×	–	–	O	–	–	×	–	–	×	–	–	O	–	–	–
Methyl ethyl ketone	Technically pure	×	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	×	–	–	–
Methyl isobutyl ketone		×	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	×	–	–	–
Methyl methacrylate		×	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	×	–	–	–
Methylphenyl (acetophenon)		×	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	×	–	–	–
Milk		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	✓	–	–	–
Mineral water		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mixed acids - nitric 15% - hydrofluoric 15% - sulphuric 18%	3 parts 1 part 2 parts	✓	–	–	×	–	–	O	–	–	×	–	–	×	–	–	✓	–	–	–
Mixed acids - sulphuric - nitric - water	10% 20% 70%	✓	✓	✓	×	–	–	✓	–	–	×	–	–	×	–	–	✓	✓	–	–
Mixed acids - sulphuric - nitric - water	50% 33% 17%	✓	O	–	×	–	–	×	–	–	×	–	–	×	–	–	✓	–	–	–
Mixed acids - sulphuric - nitric - water	50% 31% 19%	✓	–	–	×	–	–	×	–	–	×	–	–	×	–	–	✓	–	–	–
Mixed acids - sulphuric - phosphoric - water	30% 60% 10%	✓	✓	–	×	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
N, N-Dimethylaniline	Technically pure	×	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	–	–	–	–
N, methylpyrrolidon		×	–	–	×	–	–	✓	–	–	✓	–	–	✓	–	–	O	–	–	–
Naphthalene	Technically pure	×	–	–	–	–	–	✓	–	–	✓	–	–	×	–	–	✓	–	–	–
Nickel salts, aqueous in organic	≥Saturated acid	✓	✓	O	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Nitrating acid - sulphuric acid - nitric acid - water	65% 20% 15%	✓	O	–	–	–	–	×	–	–	×	–	–	×	–	–	✓	–	–	–
Nitric acid	6.3% Aqueous	✓	✓	✓	–	–	–	✓	✓	✓	✓	O	–	✓	O	–	✓	✓	–	–
Nitric acid	≥25%	✓	✓	✓	×	–	–	✓	✓	O	✓	–	–	✓	–	–	✓	–	–	–
Nitric acid	65% Aqueous	O	O	×	×	–	–	O	×	–	×	–	–	×	–	–	✓	×	–	–
Nitric acid	85%	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	✓	–	–	–
Nitric acid	100%	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	–

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Chemical resistance - table 4.09

MecFlow is made from PP-RCT, please follow the column labeled Polypropylene.

CHEMICAL	CONCENTRATION	MATERIAL°C PVCu 20	PVCu 40	PVCu 60	ABS 20	ABS 40	ABS 60	PE 20	PE 40	PE 60	POLYPROPYLENE 20	POLYPROPYLENE 60	POLYPROPYLENE 100	EPDM 20	EPDM 40	EPDM 60	FPM 20	FPM 60	FPM 100	FPM 120
Nitrobenzene	Technically pure	×	–	–	×	–	–	✓	–	–	✓	–	–	O	–	–	✓	–	–	–
Nitrotoluene (o-, m-, p-)	Technically pure	×	–	–	×	–	–	✓	O	–	O	–	–	×	–	–	O	–	–	–
Nitrous acid		✓	✓	–	×	–	–	✓	–	–	×	–	–	✓	–	–	✓	–	–	–
Nitrous gases (nitric oxide)	Diluted, moist, anhydrous	✓	–	–	×	–	–	O	–	–	O	–	–	O	–	–	✓	–	–	–
Oleic	Technically pure	✓	✓	✓	×	–	–	✓	✓	O	✓	O	–	×	–	–	✓	×	–	–
Oleum	10% SO3	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	–
Olive oil		✓	✓	✓	×	–	–	✓	✓	O	✓	✓	–	×	–	–	✓	✓	–	–
Oxygen	Technically pure	✓	✓	✓	–	–	–	✓	✓	O	✓	O	–	✓	✓	✓	✓	✓	✓	✓
Ozone	Up to 2%, in air	✓	–	–	×	–	–	O	–	–	O	–	–	O	–	–	✓	–	–	–
Ozone	Cold saturated, aqueous	✓	–	–	×	–	–	O	–	–	O	–	–	×	–	–	✓	–	–	–
Palm oil, palm nut oil		✓	–	–	–	–	–	✓	–	–	✓	–	–	×	–	–	✓	–	–	–
Paraffin emulsions	Usual commercial, aqueous	✓	–	–	–	–	–	✓	–	–	✓	–	–	×	–	–	✓	–	–	–
Parraffin oil		✓	–	–	O	–	–	✓	–	–	✓	–	–	×	–	–	✓	–	–	–
Perchlorid acid	10% Aqueous	✓	–	–	–	–	–	✓	–	–	✓	–	–	✓	–	–	✓	–	–	–
Perchlorid acid	70% Aqueous	✓	–	–	×	–	–	–	–	–	×	–	–	×	–	–	✓	–	–	–
Perchloroethylene (tetrachlorethylene)	Technically pure	×	–	–	–	–	–	O	–	–	O	–	–	×	–	–	✓	✓	–	–
Phenol	Up to10% aqueous	✓	O	–	×	–	–	✓	✓	O	✓	✓	–	✓	✓	O	✓	✓	–	–
Phenol	Up to 90% aqueous	O	–	–	×	–	–	✓	✓	O	✓	✓	–	×	–	–	✓	×	–	–
Phosgene	Gaseous technically pure	✓	O	O	×	–	–	O	–	–	O	–	–	✓	–	–	✓	O	–	–
Phosgene	Liquid, technically pure	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	✓	–	–	–
Phosphoric acid	85% Aqueous	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	O	✓	✓	O	–
Phosphoric acid	Up to 95%	✓	✓	–	×	–	–	✓	✓	–	✓	✓	–	O	–	–	✓	O	–	–
Phosphorous chlorides - trichloride - pentachloride - oxichloride	Technically pure	×	–	–	×	–	–	×	–	–	×	–	–	–	–	–	×	–	–	–
Photographic developer	Usual commercial	✓	✓	O	✓	✓	O	✓	✓	O	✓	–	–	✓	✓	–	✓	–	–	–
Photographic emulsions		✓	✓	–	✓	✓	–	✓	✓	–	✓	–	–	✓	✓	–	✓	–	–	–
Photographic fixer	Usual commercial	✓	✓	O	✓	✓	O	✓	✓	–	✓	–	–	✓	✓	–	✓	–	–	–
Phthalic acid	Saturated, aqueous	✓	O	×	×	–	–	✓	✓	✓	✓	✓	–	✓	O	–	×	–	–	–
Potassium hydroxide	50%	✓	✓	✓	–	–	–	✓	✓	✓	✓	O	–	✓	✓	✓	×	–	–	–

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Chemical resistance - table 4.10

MecFlow is made from PP-RCT, please follow the column labeled Polypropylene.

CHEMICAL	CONCENTRATION	MATERIAL°C																		
		PVCu			ABS			PE			POLYPROPYLENE			EPDM			FPM			
		20	40	60	20	40	60	20	40	60	20	60	100	20	40	60	20	60	100	120
Potassium aluminium salts, (alum), aqueous, inorganic	≤Saturated acid	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	–	–	–	–
Potassium persulphate (potassium peroxidisulfate)	All, aqueous	✓	✓	○	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	–	✓	✓	–	–
Potassium hypochlorite		✓	○	–	–	–	–	○	–	–	○	–	–	✓	–	–	○	–	–	–
Propane	Technically pure, gaseous	✓	✓	–	–	–	–	○	–	–	✓	–	–	–	–	–	✓	–	–	–
Propane	Technically pure, liquid	✓	✓	–	–	–	–	✓	–	–	✓	–	–	–	–	–	✓	–	–	–
Propanol, n- and iso-	Technically pure	✓	○	○	–	–	–	✓	✓	○	✓	○	–	✓	✓	○	✓	–	–	–
Propionic acid	50% Aqueous	✓	✓	○	×	–	–	✓	✓	✓	✓	✓	–	✓	✓	–	○	–	–	–
Propionic acid	Technically pure	✓	○	–	×	–	–	✓	○	○	✓	○	–	✓	○	–	✓	✓	–	–
Propylene glycol	<50%	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	–	✓	○	–	–
Propylene glycol	Technically pure	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Pyridine	Technically pure	×	–	–	×	–	–	✓	○	○	○	○	–	○	–	–	×	–	–	–
Salicylic acid	Saturated	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	–	–	–
Sea water		✓	✓	○	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
Silicic acid		✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	–	–	–
Silicone oil		✓	○	×	✓	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Silver salts, aqueous, inorganic	≤Saturated acid	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Sodium chlorite	Diluted, aqueous	✓	–	–	–	–	–	○	–	–	○	–	–	○	–	–	✓	–	–	–
Sodium hyprochlorite	12.5% Active chlorine, aqueous	✓	✓	–	×	–	–	○	○	–	○	–	–	✓	✓	–	○	–	–	–
Sodium persulphate	Cold saturated, aqueous	✓	✓	○	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	–	✓	✓	–	–
Sodium salts, aqueous, inorganic	≤Saturated acid	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Stannous chloride	Cold saturated, aqueous	✓	○	○	✓	✓	–	✓	✓	✓	✓	✓	–	✓	○	×	✓	✓	–	–
Starch solution	Aqueous all	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Styrene		×	–	–	×	–	–	–	–	–	–	–	–	–	–	–	✓	–	–	–
Succinic acid	Aqueous ,all	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Sulfuryl chloride	Technically pure	×	–	–	×	–	–	×	–	–	×	–	–	–	–	–	✓	–	–	–
Sulphur dioxide	Technically pure, liquid	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	○	–	–	–
Sulphur dioxide	All, moist	✓	✓	○	×	–	–	✓	✓	✓	✓	✓	–	✓	○	×	✓	×	–	–
Sulphuric acid	Saturated aqueous	✓	✓	○	–	–	–	✓	✓	✓	✓	✓	–	✓	×	–	✓	○	–	–
Sulphuric acid	Up to 80% aqueous	✓	✓	✓	×	–	–	✓	✓	○	✓	○	–	○	○	×	✓	○	–	–
Sulphuric acid	Up to 96% aqueous	✓	✓	○	×	–	–	×	–	–	×	–	–	×	–	–	✓	✓	–	–

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Chemical resistance - table 4.11

MecFlow is made from PP-RCT, please follow the column labeled Polypropylene.

CHEMICAL	CONCENTRATION	MATERIAL°C																		
		PVCu			ABS			PE			POLYPROPYLENE			EPDM			FPM			
		20	40	60	20	40	60	20	40	60	20	60	100	20	40	60	20	60	100	120
Sulphuric acid	98%	✓	○	–	×	–	–	×	–	–	×	–	–	×	–	–	○	–	–	–
Tannic acid	Aqueous all	✓	–	–	–	–	–	✓	✓	✓	✓	✓	–	–	–	–	✓	–	–	–
Tetrachlorethylene (perchloroethylene)		×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	✓	–	–	–
Tetrachloroethane	Technically pure	×	–	–	×	–	–	○	–	–	○	–	–	×	–	–	○	–	–	–
Tetraethylene lead	Technically pure	✓	–	–	×	–	–	✓	–	–	✓	–	–	○	–	–	✓	–	–	–
Tetrahydrofurane	Technically pure	×	–	–	×	–	–	○	–	–	○	–	–	○	–	–	×	–	–	–
Tin salts, aqueous, inorganic	≤Saturated acid	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Toluene	Technically pure	×	–	–	×	–	–	○	–	–	○	–	–	×	–	–	✓	–	–	–
Trichloromethane	100%	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	–	–
Trichloroacetic acid	50% Aqueous	✓	○	–	×	–	–	✓	✓	✓	✓	○	–	○	–	–	×	–	–	–
Trichloroacetic acid	Technically pure	○	–	–	×	–	–	✓	○	×	✓	○	–	○	–	–	×	–	–	–
Trichloroethane	Technically pure	×	–	–	×	–	–	○	–	–	○	–	–	×	–	–	✓	–	–	–
Trichloroethylene	Technically pure	×	–	–	×	–	–	×	–	–	○	–	–	×	–	–	✓	–	–	–
Triethylamine	Technically pure	×	–	–	×	–	–	✓	–	–	✓	–	–	×	–	–	×	–	–	–
Trifluoroacetic acid	Up to 50%	×	–	–	×	–	–	✓	–	–	✓	–	–	○	–	–	×	–	–	–
Turpentine oil	Technically pure	✓	○	–	×	–	–	○	○	–	×	–	–	×	–	–	✓	✓	–	–
Urea	Up to 30% aqueous	✓	✓	○	✓	✓	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Urine		✓	✓	○	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–
Vinyl acetate	Technically pure	×	–	–	×	–	–	✓	✓	–	✓	○	–	✓	–	–	×	–	–	–
Vinyl chloride	Technically pure	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	✓	–	–	–
Waste gases, containing alkaline		✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	×	–
Waste gases, containing hydrochloric acid	All	✓	✓	✓	–	–	–	✓	✓	✓	✓	○	–	✓	✓	✓	✓	✓	✓	–
Waste gases, containing hydrogen fluoride	Traces	✓	✓	✓	–	–	–	✓	✓	✓	✓	✓	–	○	○	○	✓	✓	–	–
Waste gases, containing nitrous gases	Traces	✓	✓	✓	–	–	–	✓	○	○	○	○	–	✓	○	○	✓	✓	○	–
Waste gases, containing sulphur dioxide	Traces	○	✓	–	–	–	–	✓	✓	–	✓	–	–	✓	✓	✓	✓	✓	✓	–
Water, drinking, chlorinated	≤0.1ppm Chlorine	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	○	✓	✓	✓	–
Water - distilled - deionised		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	○	✓	✓	✓	✓
Xylene	Technically pure	×	–	–	×	–	–	×	–	–	×	–	–	×	–	–	✓	×	–	–
Zinc salts, aqueous, inorganic	≤Saturated acid	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	–	–

KEY: – NO DATA × NOT RECOMMENDED ○ CONDITIONALLY RESISTANT ✓ RESISTANT

The information in these tables has been supplied by other reputable sources and is to be used ONLY as a guide in selecting equipment for appropriate chemical compatibility. Before permanent installation, test the equipment with the chemicals and under the specific conditions of your application. Ratings of chemical behaviour listed in this chart apply to a 48-hr exposure period, we have no knowledge of possible effects beyond this period. We do not warrant (neither express or implied) that the information in this chart is accurate or complete or that any material is suitable for any purpose.

9. System sizing

For successful, long-lasting system performance, system sizing is crucial. A number of factors must be taken into account by the Design Engineer, and the system must be designed in accordance with design recommendations, including:

- BS 1997
- BS EN 806
- BS 8558:2015
- IOP design guide 2002
- WRAS Water Regulation Guidelines
- CIBSE guide G and C

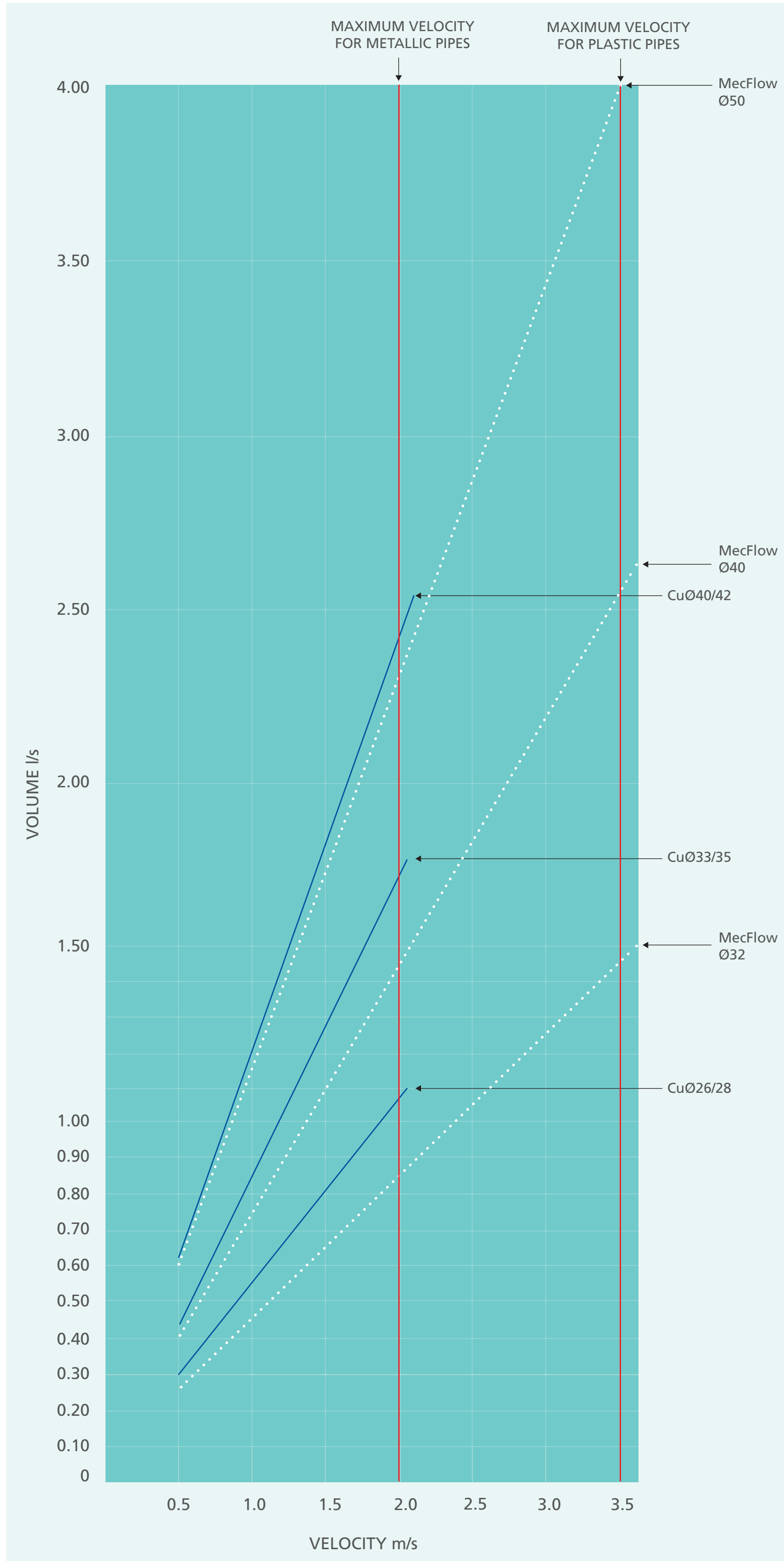
The following section details the key parameters of the system that must be considered in order to complete a satisfactory design.

Diameter equivalence - between MecFlow and copper pipes (Cu)

QUICK EQUIVALENCE TABLE	
Cu PIPE OD mm	MECFLOW PIPE OD mm
28	32
35	40
42	50
54	63
67	75
76.1	90
89.9	110
108	125

Table 5.01

NOTE: For accurate sizing please refer to MecFlow Temperature and Pressure ratings table on page 48, Table 5.09



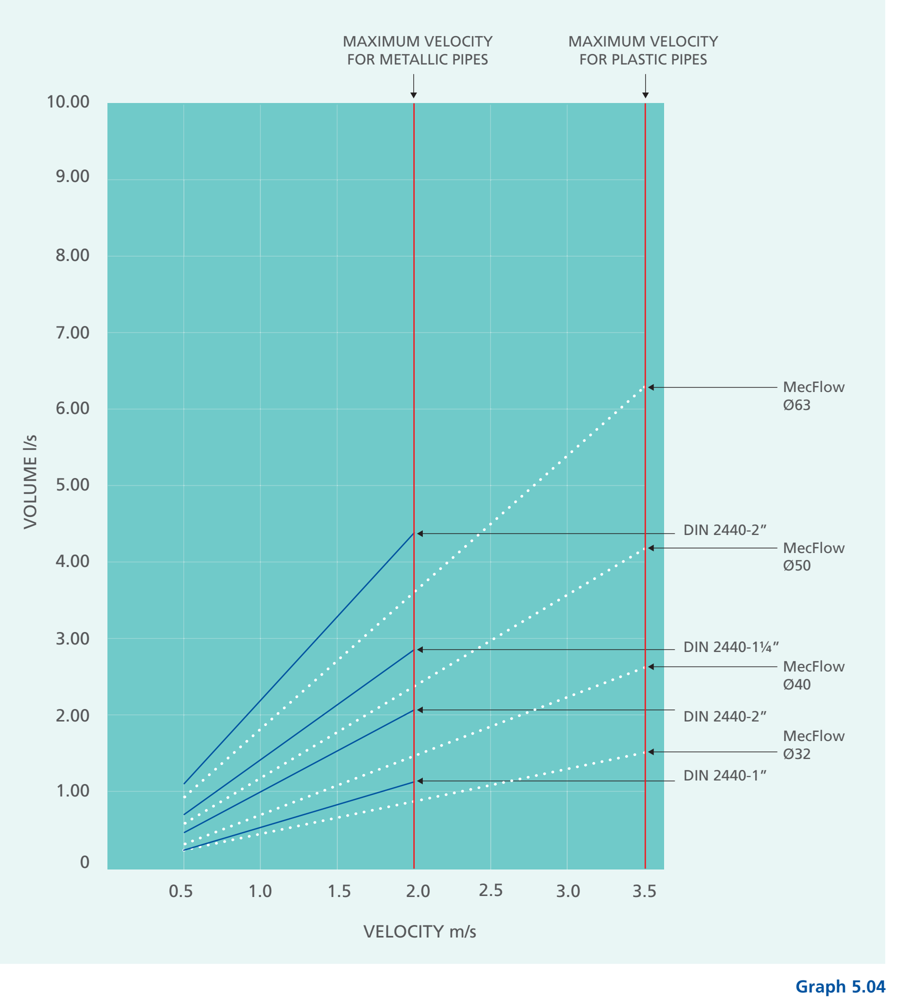
Graph 5.02

Diameter equivalence - between MecFlow and steel pipes

QUICK EQUIVALENCE TABLE	
STEEL OD inches	MECFLOW OD mm
1	32
1¼	40
1½	50
2	63
2½	75
3	90
4	110
5	125
6	160

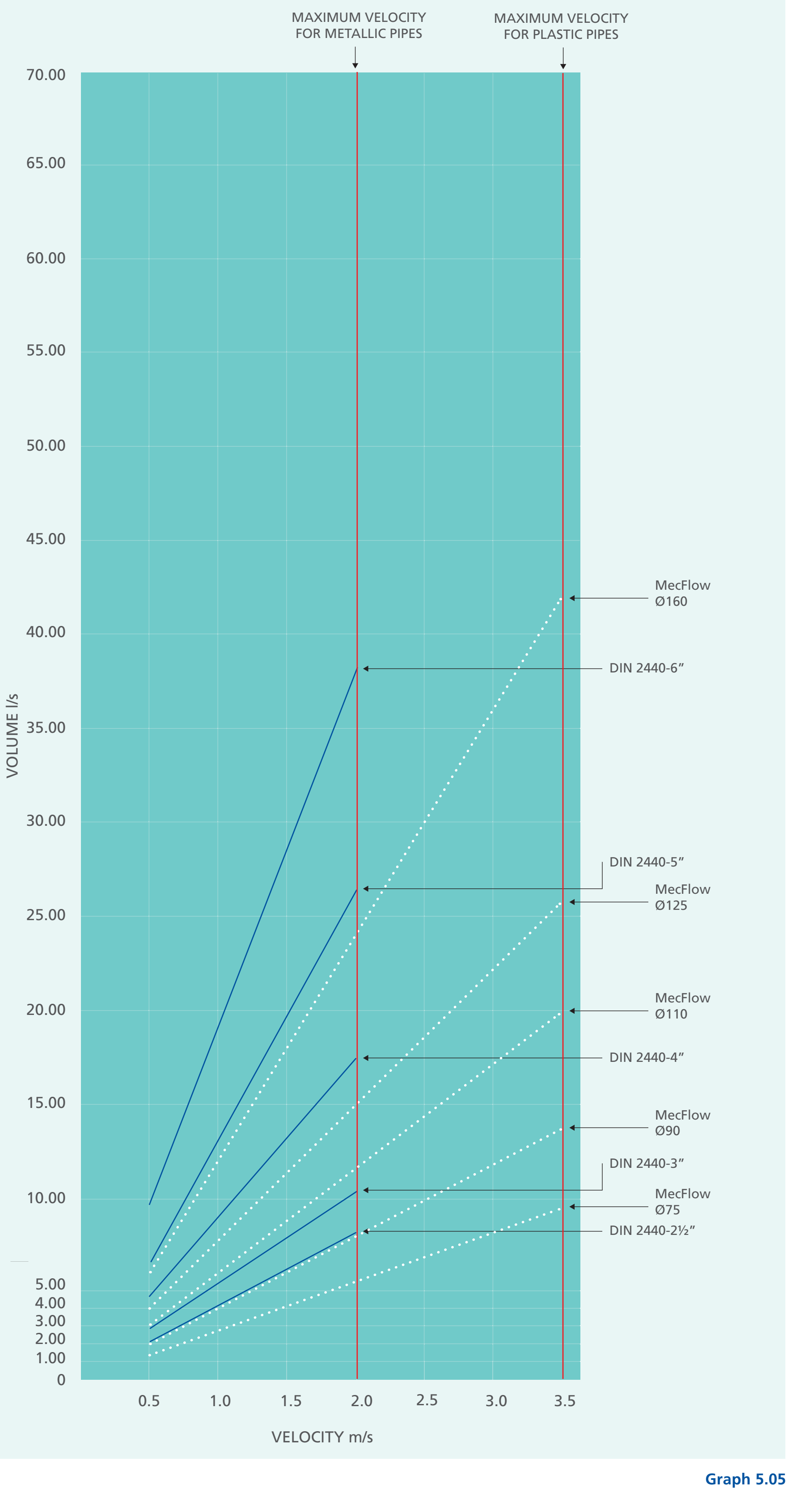
This table shows threaded steel, thin wall steel should follow the copper table 5.01

Table 5.03



Graph 5.04

Diameter equivalence - between MecFlow and steel pipes continued



Graph 5.05

Co-efficient of loss (φ) - by product type

FITTING	PRODUCT IMAGE	SYMBOL	COMMENT	φ
Tee				0.25
			Separation of flow	0.25
			Conjunction of flow	0.80
			Counter current in case of separation of flow	1.80
			Counter current in case of conjunction of flow	3.00
Tee in derivation				1.30
Tee in reduced derivation				0.30
Tee of influx				0.60
Tee of reduced influx				0.90

Table 5.06 → = Flow direction

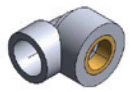
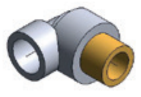
FITTING	PRODUCT IMAGE	SYMBOL	COMMENT	φ
Elbow 90°				1.13
Elbow with female thread				1.40
Elbow with male thread				1.60
Elbow 45°			Up to 160mm	0.50
Socket				0.25
Reducer large Ø to small Ø			Reduction by: 1 dimension 2 dimension 3 dimension 4 dimension 5 dimension 6 dimension	 0.40 0.50 0.60 0.70 0.80 0.90

Table 5.07 → = Flow direction

Co-efficient of loss (φ) - by product type

FITTING	PRODUCT IMAGE	SYMBOL	COMMENT	φ
Conic expansion			ß = 10° ß = 20° ß = 30° ß = 40°	0.20 0.45 0.60 0.75
Expansion with free unload				1.00
Transition piece with female thread				0.50
Transition piece with male thread				0.70

Table 5.08 → = Flow direction

MecFlow temperature and pressure ratings

TEMPERATURE	YEARS OF SERVICE	MECFLOW DIAMETER 32mm		MECFLOW DIAMETERS 40 - 160mm	
		BAR	PSI	BAR	PSI
10°C	1	39.20	568.52	25.08	363.75
	5	38.20	554.04	24.40	353.89
	10	37.57	544.90	24.04	348.67
	25	36.75	533.01	23.52	341.12
	50	36.50	529.38	23.36	338.80
	100	35.95	521.41	23.00	333.58
20°C	1	34.15	495.30	21.85	316.90
	5	33.05	479.34	21.15	306.75
	10	32.77	474.70	20.97	304.14
	25	32.00	464.12	20.48	297.03
	50	31.70	459.76	20.30	294.42
	100	31.10	451.79	19.93	289.06
30°C	1	29.80	432.21	19.08	276.73
	5	29.00	420.60	18.56	269.19
	10	28.45	412.63	18.20	263.96
	25	27.90	404.65	17.85	258.89
	50	27.62	400.59	17.68	256.42
	100	27.05	392.32	17.31	251.06
40°C	1	26.05	377.82	16.67	241.77
	5	25.20	365.49	16.12	233.80
	10	24.65	357.51	15.77	228.72
	25	24.37	353.45	15.60	226.25
	50	23.82	345.47	15.24	221.03
	100	23.52	341.12	15.05	218.28
50°C	1	23.05	334.31	14.75	213.93
	5	22.17	321.54	14.19	205.80
	10	21.60	313.28	13.82	200.44
	25	21.30	308.93	13.63	197.78
	50	20.75	300.95	13.20	191.44
	100	20.45	296.60	13.00	188.54
60°C	1	19.37	280.93	12.40	179.84
	5	18.80	272.67	12.03	174.48
	10	18.50	268.31	11.84	171.72
	25	17.92	259.90	11.47	166.35
	50	17.70	256.71	11.30	163.89
70°C	1	16.55	240.03	10.59	153.59
	5	15.67	227.27	10.00	145.03
	10	15.40	223.35	9.85	142.86
	25	15.10	219.00	9.66	140.10
	50	14.90	216.10	9.50	137.78
80°C	1	13.82	200.44	8.84	128.21
	5	13.22	191.73	8.46	122.70
	10	12.92	187.38	8.27	119.94
	25	12.70	184.19	8.10	117.48
95°C	1	10.75	155.91	6.88	99.78
	5	10.15	147.21	6.49	94.12

Table 5.09

MecFlow pressure loss tables

The following pressure loss tables can be used as a design guide. To identify the correct pressure loss value, follow these steps:

Step 1
Look up the required flow system flow rate

Step 2
Reference the design velocity

Step 3
Identify the chosen diameter

Step 4
Read the R-value - loss mbar/m

FLOW l/s	EXTERNAL DIAMETER mm	20	25	32
	THICKNESS mm	2.8	3.5	4.4
	INTERNAL DIAMETER mm	14.4	18.0	23.2
	'R'– PRESSURE LOSS (mbar/m) **'V'– VELOCITY (m/s)**			
0.32	R	32.86	11.21	3.33
	V	**1.96**	**1.26**	**0.76**
0.34	R	36.62	12.48	3.70
	V	**2.09**	**1.34**	**0.80**
0.36	R	40.56	13.80	4.09
	V	**2.21**	**1.41**	**0.85**
0.38	R	44.69	15.19	4.50
	V	**2.33**	**1.49**	**0.90**
0.40	R	49.00	16.64	4.92
	V	**2.46**	**1.57**	**0.95**
0.45	R	60.59	20.51	6.05
	V	**2.76**	**1.77**	**1.06**
0.50	R	73.32	24.76	7.28
	V	**3.07**	**1.96**	**1.18**
0.55	R	87.19	29.38	8.62
	V	**3.38**	**2.16**	**1.30**
0.60	R	102.18	34.35	10.06
	V	**3.68**	**2.36**	
0.65	R		39.69	11.60
	V		**2.55**	**1.54**
0.70	R		45.38	
	V		**2.75**	**1.66**
0.75	R		51.43	14.98
	V		**2.95**	**1.77**
0.80	R		57.84	16.81
	V		**3.14**	**1.89**
0.85	R		64.60	18.75
	V		**3.34**	**2.01**
0.90	R		71.71	20.78
	V		**3.54**	**2.13**
0.95	R			22.19
	V			**2.25**
1.00	R			25.13
	V			**2.37**
1.10	R			29.86
	V			**2.60**
1.20	R			34.98
	V			**2.84**
1.30	R			40.47
	V			**3.08**
1.40	R			46.34
	V			**3.31**
1.50	R			52.58
	V			**3.55**

Table 5.10 For example only.

MecFlow - pressure loss

FLOW l/s		'R'– PRESSURE LOSS (mbar/m) 'V'– VELOCITY (m/s)
	EXTERNAL DIAMETER mm	32
	THICKNESS mm	4.4
	INTERNAL DIAMETER mm	23.2
0.01	R	
	V	
0.02	R	
	V	
0.03	R	
	V	
0.04	R	0.10
	V	**0.09**
0.05	R	0.15
	V	**0.12**
0.06	R	0.20
	V	**0.14**
0.07	R	0.25
	V	**0.17**
0.08	R	0.32
	V	**0.19**
0.09	R	0.38
	V	**0.21**
0.10	R	0.46
	V	**0.24**
0.11	R	0.54
	V	**0.26**
0.12	R	0.62
	V	**0.28**
0.13	R	0.71
	V	**0.31**
0.14	R	0.81
	V	**0.33**
0.15	R	0.91
	V	**0.35**
0.16	R	1.01
	V	**0.38**
0.17	R	1.12
	V	**0.40**
0.18	R	1.24
	V	**0.43**
0.19	R	1.36
	V	**0.45**
0.20	R	1.48
	V	**0.47**
0.22	R	1.74
	V	**0.52**
0.24	R	2.02
	V	**0.57**
0.26	R	2.32
	V	**0.62**
0.28	R	2.64
	V	**0.66**
0.30	R	2.98
	V	**0.71**

Table 5.11

FLOW l/s		'R'– PRESSURE LOSS (mbar/m) 'V'– VELOCITY (m/s)
	EXTERNAL DIAMETER mm	32
	THICKNESS mm	4.4
	INTERNAL DIAMETER mm	23.2
0.32	R	3.33
	V	**0.76**
0.34	R	3.70
	V	**0.80**
0.36	R	4.09
	V	**0.85**
0.38	R	4.50
	V	**0.90**
0.40	R	4.92
	V	**0.95**
0.45	R	6.05
	V	**1.06**
0.50	R	7.28
	V	**1.18**
0.55	R	8.62
	V	**1.30**
0.60	R	10.06
	V	**1.42**
0.65	R	11.60
	V	**1.54**
0.70	R	13.24
	V	**1.66**
0.75	R	14.98
	V	**1.77**
0.80	R	16.81
	V	**1.89**
0.85	R	18.75
	V	**2.01**
0.90	R	20.78
	V	**2.13**
0.95	R	22.19
	V	**2.25**
1.00	R	25.13
	V	**2.37**
1.10	R	29.86
	V	**2.60**
1.20	R	34.98
	V	**2.84**
1.30	R	40.47
	V	**3.08**
1.40	R	46.34
	V	**3.31**
1.50	R	52.58
	V	**3.55**

Table 5.12

MecFlow - pressure loss

FLOW l/s									
	EXTERNAL DIAMETER mm	40	50	63	75	90	110	125	160
	THICKNESS mm	3.7	4.6	5.8	6.8	8.2	10	11.4	14.6
	INTERNAL DIAMETER mm	32.6	40.8	51.4	61.4	73.6	90.0	102.2	130.8
	'R'– PRESSURE LOSS (mbar/m) 'V'– VELOCITY (m/s)								
0.10	R	0.09							
	V	**0.12**							
0.20	R	0.30	0.10						
	V	**0.24**	**0.15**						
0.30	R	0.59	0.21						
	V	**0.36**	**0.23**						
0.40	R	0.97	0.34						
	V	**0.48**	**0.31**						
0.50	R	1.43	0.49						
	V	**0.60**	**0.38**						
0.60	R	1.97	0.68	0.23					
	V	**0.72**	**0.46**	**0.29**					
0.70	R	2.58	0.88	0.30					
	V	**0.84**	**0.54**	**0.34**					
0.80	R	3.27	1.12	0.37					
	V	**0.96**	**0.61**	**0.39**					
0.90	R	4.02	1.37	0.46	0.20				
	V	**1.08**	**0.69**	**0.43**	**0.30**				
1.00	R	4.85	1.65	0.55	0.24				
	V	**1.20**	**0.76**	**0.48**	**0.34**				
1.10	R	5.74	1.95	0.65	0.28				
	V	**1.32**	**0.84**	**0.53**	**0.37**				
1.20	R	6.71	2.28	0.76	0.32				
	V	**1.44**	**0.92**	**0.58**	**0.41**				
1.30	R	7.75	2.63	0.87	0.37	0.16			
	V	**1.56**	**0.99**	**0.63**	**0.44**	**0.31**			
1.40	R	8.84	3.00	0.99	0.42	0.18			
	V	**1.68**	**1.07**	**0.67**	**0.47**	**0.33**			
1.50	R	10.01	3.39	1.12	0.48	0.20			
	V	**1.80**	**1.15**	**0.72**	**0.51**	**0.35**			
1.60	R	11.24	3.80	1.25	0.54	0.23			
	V	**1.92**	**1.22**	**0.77**	**0.54**	**0.38**			
1.70	R	12.54	4.23	1.39	0.60	0.25			
	V	**2.04**	**1.30**	**0.82**	**0.57**	**0.40**			
1.80	R	13.91	4.69	1.54	0.66	0.28			
	V	**2.16**	**1.38**	**0.87**	**0.61**	**0.42**			
1.90	R	15.34	5.17	1.70	0.72	0.30	0.12		
	V	**2.28**	**1.45**	**0.92**	**0.64**	**1.45**	**0.30**		
2.00	R	16.84	5.67	1.86	0.79	0.33	0.13		
	V	**2.40**	**1.35**	**0.96**	**0.68**	**0.47**	**0.31**		
2.20	R	20.02	6.72	2.20	0.94	0.39	0.15		
	V	**2.64**	**1.68**	**1.06**	**0.74**	**0.52**	**0.35**		
2.40	R	23.47	7.87	2.58	1.10	0.46	0.18		
	V	**2.88**	**1.84**	**1.16**	**0.81**	**0.56**	**0.38**		
2.60	R	27.17	9.09	2.97	1.26	0.53	0.20	0.11	
	V	**3.11**	**1.99**	**1.25**	**0.88**	**0.61**	**0.41**	**0.32**	
2.80	R	31.13	10.40	3.39	1.44	0.60	0.23	0.13	
	V	**3.35**	**2.14**	**1.35**	**0.95**	**0.66**	**0.44**	**0.34**	
3.00	R	35.34	11.79	3.84	1.63	0.68	0.26	0.14	
	V	**3.59**	**2.29**	**1.45**	**1.01**	**0.71**	**0.47**	**0.37**	

Table 5.13

MecFlow - pressure loss

FLOW l/s	EXTERNAL DIAMETER mm	40	50	63	75	90	110	125	160
	THICKNESS mm	3.7	4.6	5.8	6.8	8.2	10	11.4	14.6
	INTERNAL DIAMETER mm	32.6	40.8	51.4	61.4	73.6	90.0	102.2	130.8
	'R'– PRESSURE LOSS (mbar/m) **'V'– VELOCITY (m/s)**								
3.20	R		13.26	4.32	1.83	0.77	0.29	0.16	
	V		**2.45**	**1.54**	**1.08**	**0.75**	**0.50**	**0.39**	
3.40	R		14.81	4.81	2.04	0.85	0.33	0.18	
	V		**2.60**	**1.64**	**1.15**	**0.80**	**0.53**	**0.41**	
3.60	R		16.44	5.34	2.26	0.94	0.36	0.20	
	V		**2.75**	**1.73**	**1.22**	**0.85**	**0.57**	**0.44**	
3.80	R		18.15	5.89	2.49	1.04	0.40	0.22	
	V		**2.91**	**1.83**	**1.28**	**0.89**	**0.60**	**0.46**	
4.00	R		19.94	6.46	2.73	1.14	0.43	0.24	
	V		**3.06**	**1.93**	**1.35**	**0.94**	**0.63**	**0.49**	
4.50	R		24.77	8.00	3.37	1.41	0.53	0.29	0.09
	V		**3.44**	**2.17**	**1.52**	**1.06**	**0.71**	**0.55**	**0.33**
5.00	R		30.08	9.70	4.08	1.70	0.64	0.35	0.11
	V		**3.82**	**2.41**	**1.69**	**1.18**	**0.79**	**0.61**	**0.37**
5.50	R			11.55	4.85	2.02	0.76	0.41	0.13
	V			**2.65**	**1.86**	**1.29**	**0.86**	**0.67**	**0.41**
6.00	R			13.54	5.69	2.36	0.89	0.48	0.15
	V			**2.89**	**2.03**	**1.41**	**0.94**	**0.73**	**0.45**
6.50	R			15.69	6.58	2.73	1.03	0.56	0.17
	V			**3.13**	**2.20**	**1.53**	**1.02**	**0.79**	**0.48**
7.00	R			17.99	7.53	3.12	1.18	0.64	0.20
	V			**3.37**	**2.36**	**1.65**	**1.10**	**0.85**	**0.52**
7.50	R			20.43	8.55	3.53	1.33	0.72	0.22
	V			**3.61**	**2.53**	**1.76**	**1.18**	**0.91**	**0.56**
8.00	R				9.62	3.97	1.50	0.81	0.25
	V				**2.70**	**1.88**	**1.26**	**0.98**	**0.60**
8.50	R				10.75	4.44	1.67	0.90	0.28
	V				**2.87**	**2.00**	**1.34**	**1.04**	**0.63**
9.00	R				11.95	4.93	1.85	1.00	0.31
	V				**3.04**	**2.12**	**1.41**	**1.10**	**0.67**
9.50	R				13.20	5.44	2.04	1.10	0.34
	V				**3.21**	**2.23**	**1.49**	**1.16**	**0.71**
10.00	R				14.51	5.97	2.24	1.21	0.37
	V				**3.38**	**2.35**	**1.57**	**1.22**	**0.74**
10.50	R				15.88	6.53	2.45	1.32	0.40
	V				**3.55**	**2.47**	**1.65**	**1.28**	**0.78**
11.00	R					7.11	2.67	1.44	0.44
	V					**2.59**	**1.73**	**1.34**	**0.82**
11.50	R					7.72	2.89	1.56	0.47
	V					**2.70**	**1.81**	**1.40**	**0.86**
12.00	R					8.35	3.13	1.69	0.51
	V					**2.82**	**1.89**	**1.46**	**0.89**
12.50	R					9.00	3.37	1.82	0.55
	V					**2.94**	**1.96**	**1.52**	**0.93**
13.00	R					9.68	3.62	1.95	0.59
	V					**3.06**	**2.04**	**1.58**	**0.97**
13.50	R					10.37	3.88	2.09	0.63
	V					**3.17**	**2.12**	**1.65**	**1.00**
14.00	R					11.10	4.14	2.23	0.67
	V					**3.29**	**2.20**	**1.71**	**1.04**

Table 5.14

MecFlow - pressure loss

FLOW l/s	EXTERNAL DIAMETER mm	40	50	63	75	90	110	125	160
	THICKNESS mm	3.7	4.6	5.8	6.8	8.2	10	11.4	14.6
	INTERNAL DIAMETER mm	32.6	40.8	51.4	61.4	73.6	90.0	102.2	130.8
	'R'– PRESSURE LOSS (mbar/m) **'V'– VELOCITY (m/s)**								
14.50	R					11.84	4.42	2.38	0.72
	V					**3.41**	**2.28**	**1.77**	**1.08**
15.00	R					12.61	4.70	2.53	0.76
	V					**3.53**	**2.36**	**1.83**	**1.12**
15.50	R						4.99	2.69	0.81
	V						**2.44**	**1.89**	**1.15**
16.00	R						5.29	2.85	0.86
	V						**2.52**	**1.95**	**1.19**
16.50	R						5.60	3.01	0.91
	V						**2.59**	**2.01**	**1.23**
17.00	R						5.92	3.18	0.96
	V						**2.67**	**2.07**	**1.27**
17.50	R						6.24	3.35	1.01
	V						**2.75**	**2.13**	**1.30**
18.00	R						6.58	3.53	1.06
	V						**2.83**	**2.19**	**1.34**
18.50	R						6.92	3.71	1.12
	V						**2.91**	**2.26**	**1.38**
19.00	R						7.27	3.90	1.17
	V						**2.99**	**2.32**	**1.41**
19.50	R						7.63	4.09	1.23
	V						**3.07**	**2.38**	**1.45**
20.00	R						7.99	4.29	1.29
	V						**3.14**	**2.44**	**1.49**
20.50	R						8.37	4.49	1.35
	V						**3.22**	**2.50**	**1.53**
21.00	R						8.75	4.69	1.41
	V						**3.30**	**2.56**	**1.56**
21.50	R						9.14	4.90	1.47
	V						**3.38**	**2.62**	**1.60**
22.00	R						9.54	5.11	1.53
	V						**3.46**	**2.68**	**1.64**
22.50	R						9.94	5.33	1.60
	V						**3.54**	**2.74**	**1.67**
23.00	R							5.55	1.66
	V							**2.80**	**1.71**
23.50	R							5.77	1.73
	V							**2.86**	**1.75**
24.00	R							6.00	1.80
	V							**2.93**	**1.79**
24.50	R							6.23	1.87
	V							**2.99**	**1.82**
25.00	R							6.47	1.94
	V							**3.05**	**1.86**
25.50	R							6.71	2.01
	V							**3.11**	**1.90**
26.00	R							6.96	2.08
	V							**3.17**	**1.93**
26.50	R							7.21	2.15
	V							**3.23**	**1.97**

Table 5.15

MecFlow - pressure loss

FLOW l/s	EXTERNAL DIAMETER mm	40	50	63	75	90	110	125	160
	THICKNESS mm	3.7	4.6	5.8	6.8	8.2	10	11.4	14.6
	INTERNAL DIAMETER mm	32.6	40.8	51.4	61.4	73.6	90.0	102.2	130.8
	'R'– PRESSURE LOSS (mbar/m) **'V'– VELOCITY (m/s)**								
27.00	R							7.46	2.23
	V							**3.29**	**2.01**
27.50	R							7.72	2.31
	V							**3.35**	**2.05**
28.00	R							7.98	2.38
	V							**3.41**	**2.08**
28.50	R							8.25	2.46
	V							**3.47**	**2.12**
29.00	R							8.52	2.54
	V							**3.54**	**2.16**
29.50	R								2.62
	V								**2.20**
30.00	R								2.71
	V								**2.23**
30.50	R								2.79
	V								**2.27**
31.00	R								2.87
	V								**2.31**
31.50	R								2.96
	V								**2.34**
32.00	R								3.05
	V								**2.38**
32.50	R								3.13
	V								**2.42**
33.00	R								3.22
	V								**2.46**
33.50	R								3.31
	V								**2.49**
34.00	R								3.41
	V								**2.53**
34.50	R								3.50
	V								**2.57**
35.00	R								3.59
	V								**2.60**
35.50	R								3.69
	V								**2.64**
36.00	R								3.79
	V								**2.68**
36.50	R								3.88
	V								**2.72**
37.00	R								3.98
	V								**2.75**
37.50	R								4.08
	V								**2.79**
38.00	R								4.18
	V								**2.83**
38.50	R								4.29
	V								**2.87**
39.00	R								4.39
	V								**2.90**

Table 5.16

MecFlow - pressure loss

FLOW l/s	EXTERNAL DIAMETER mm	40	50	63	75	90	110	125	160
	THICKNESS mm	3.7	4.6	5.8	6.8	8.2	10	11.4	14.6
	INTERNAL DIAMETER mm	32.6	40.8	51.4	61.4	73.6	90.0	102.2	130.8
	'R'– PRESSURE LOSS (mbar/m) **'V'– VELOCITY (m/s)**								
39.50	R								4.50
	V								**2.94**
40.00	R								4.60
	V								**2.98**
40.50	R								4.71
	V								**3.01**
41.00	R								4.82
	V								**3.05**
41.50	R								4.93
	V								**3.09**
42.00	R								5.04
	V								**3.13**
42.50	R								5.15
	V								**3.16**
43.00	R								5.26
	V								**3.20**
43.50	R								5.38
	V								**3.24**
44.00	R								5.49
	V								**3.27**
44.50	R								5.61
	V								**3.31**
45.00	R								5.73
	V								**3.35**
45.50	R								5.85
	V								**3.39**
46.00	R								5.97
	V								**3.42**
46.50	R								6.09
	V								**3.46**
47.00	R								6.21
	V								**3.50**
47.50	R								
	V								
48.00	R								
	V								
48.50	R								
	V								
49.00	R								
	V								
49.50	R								
	V								
50.00	R								
	V								
50.50	R								
	V								
51.00	R								
	V								
51.50	R								
	V								

Table 5.17

10. Jointing methods

Thermo-form welding

One advantage of MecFlow over traditional supply systems is its ability to offer thermo-form welded joints, creating a consistent, robust joint for the lifecycle of the installation.

Effectively eliminating the boundary between the pipe and the fitting, thermo-form welding provides a homogenous joint, bonded at a molecular level, effectively making the join as strong as the pipe itself.

The MecFlow system has three methods of thermo-form welding: butt fusion, socket fusion, and electrofusion, all of which use a heat source to facilitate an effective weld process.

Table 6.01 shows the diameters which can be welded via each process.

WELDING OPTIONS			
PIPE Ø	SOCKET FUSION	BUTT FUSION	ELECTROFUSION
20	✓		✓
25	✓		✓
32	✓		✓
40	✓	✓	✓
50	✓	✓	✓
63	✓	✓	✓
75	✓	✓	✓
90	✓	✓	✓
110	✓	✓	✓
125	✓	✓	✓
160		✓	✓

Table 6.01

MECHANICAL JOINTING

In addition to thermo-form welding, a large range of threaded and flanged jointing methods are available, allowing the MecFlow system to be jointed to other materials, and to connect valves and other system components.

Jointing preparation

PIPE CUTTING

There are a number of methods of correctly cutting pipe prior to joining. In all cases, the cut pipe should be square and de-burred. Additional preparation steps are included in the specific welding instructions as and when required. The cutting method and post-cutting preparation are detailed below.

MANUAL PIPE CUTTING

While these are the recommended cutting methods, other methods can be used, provided the pipe isn't damaged as a result. All cuts should be square, with less than 5° of deviation, and without any jagged edges.

Ratchet cutters with a sharp, pointed blade should be used for smaller pipe sizes, this prevents the pipe from deforming during cutting.

Hand saws may be used, however it is crucial to ensure the cut is square, and the edges are as smooth as possible.

Support the pipe during cutting to prevent movement, allowing the end to be cut as square as possible.

Recommendation: Mobile work benches can be used as a clamping device to achieve a 90 degree cut.

Alternatively, tube cutters can be used. Ensure the cutting wheel has a radius greater than the pipe wall.

DO NOT

Do not use tube cutters with a dull or flat blade. Blunt blades can oval the pipe and can cause an inconsistent cut.

Jointing preparation - continued

Cutting using power tools

When using powered saws, blades intended for hardwood offer the best results. Where possible, avoid angled or jagged cuts, as additional preparation will be required prior to welding.

DO NOT

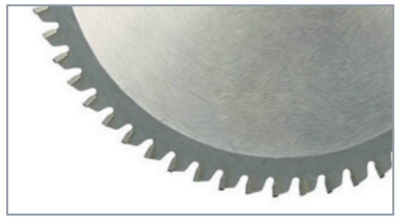
Do not cut the pipe using power tools where the temperature is below 4°C. Place the pipe in an environment with a higher ambient temperature before cutting.

For a cut that requires minimal finishing work, use a 60-100T circular tungsten carbide blade suitable for cutting plastic.

Both hand saws and reciprocating saws may also be used.

Recommendation: Ensure blade is sharp and between 10-14pt.

A wide tooth blade will result in a rough jagged cut.

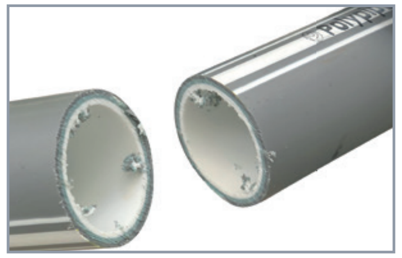


A fine toothed blade may overheat the pipe.

Inspection and cleaning/de-burring

ATTENTION!

A blunt or incorrect cutting tool may cause stresses during the cutting process, first check the cutting tool to ensure it is suitable. Pipe should not be cut below a temperature of 4°C



Once a cut is made, check the ends of the pipe for damage, both internally and externally. If any damage is identified, mark and remove the damaged area, cutting a few millimetres beyond the damage.

Dirt and oil can be removed from the pipe's surface using an isopropyl alcohol-based cleaner (91% by volume or greater).

Remove any debris left after cutting and de-burr using a de-burring tool or reaming tool.

A successful cut should be square, smooth and de-burred.

Socket fusion welding

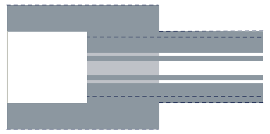
SOCKET FUSION WELDING

Socket fusion welding is carried out by heating the outer surface of the pipe and the socket of a corresponding fitting, before inserting the pipe into the fitting.

The pipe is then held in the socket and allowed to cool. This forms a homogenous bond, with the weld surface covering the entire area of the pipe spigot/fitting socket insertion. For pipe diameters up to 63mm, this process can be carried out by hand, however for diameters of 75mm and above, a socket fusion welding machine must be used.

Diagram 6.02

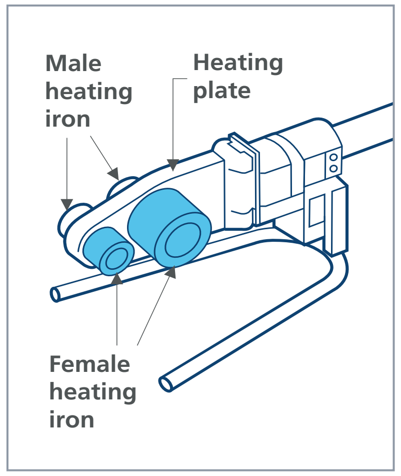
Pre-weld



Post-weld

HAND SOCKET FUSION WELDING – Ø32MM TO Ø63MM

EQUIPMENT AND SET-UP



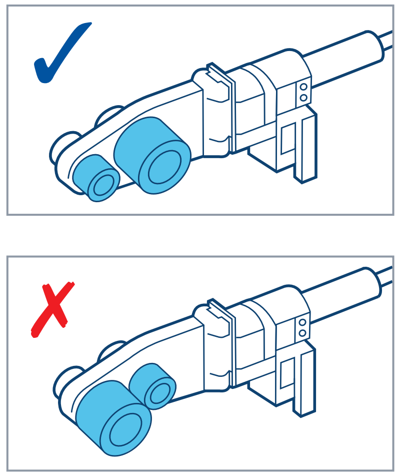


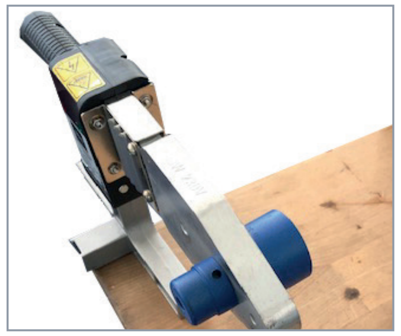
Diagram 6.03

1. Check the hand welding tool and relevant male/female irons for damage.

2. Before turning the hot plate on, the relevant male and female heating irons must be mounted onto the base hand welding device. Make sure they are fitted square.

   a. The heating irons must be mounted into the correct hole on the hot plate, consult the tool's instruction manual if you are unsure which iron mounts to which hole.

   b. It is crucial that the base of the heating iron is in full contact with the hot plate, as shown diagram 6.03 above.



3. Plug the hand welding device in and allow it to reach the correct welding temperature. This should take between 10 and 30 minutes.

4. While the device is heating, re-tighten the bolts holding the male and female irons on to the hot plate.

   Recommendation: Use safety gloves and sleeves, using a hex key to tighten.

Socket fusion welding - continued

PRE-WELDING PROCESS

1. Before carrying out the first weld, check that the male and female irons have reached a temperature of 260°C.
2. Cut the pipe to the required length. The cut must be square and de-burred.
3. Bevel the pipe according to table 6.05.
4. Mark the pipe insertion depth on the pipe, as shown in table 6.05.
5. Mark the desired angular rotation of the fitting to the pipe. If the fitting is a coupling, or the first bend or branch, this step is not required.

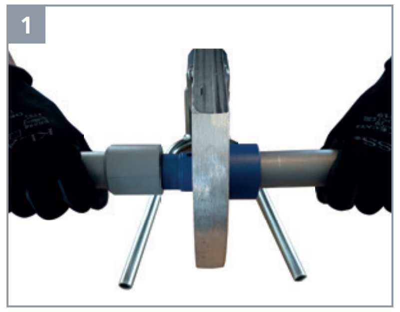
WELDING PROCESS

TEMPERATURES & TIMES OF THERMO-FUSION (DVS 2207-11)

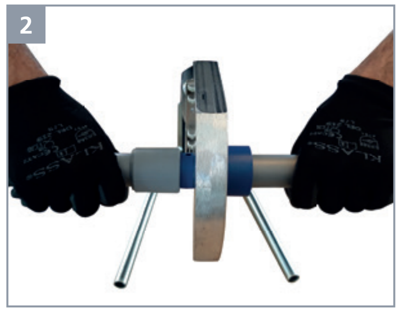
PIPE OD mm	HEATING TIME (Seconds)	JOINT TIME (Seconds)	COOLING TIME	
			FIXED (Seconds)	TOTAL (Minutes)
20	6	4	6	2
25	7	4	10	2
32	8	6	10	4
40	12	6	20	4
50	18	6	20	4
63	24	8	30	6
75	30	8	30	6
90	40	8	40	6
110	50	10	50	8
125	60	10	60	8

Table 6.04 Note: 160mm is butt weld only.

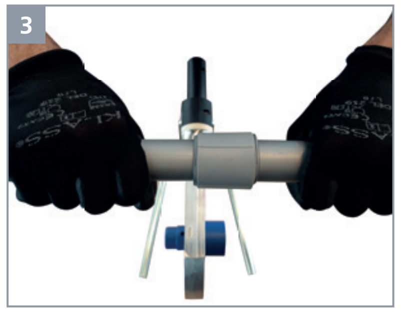
WELDING PROCESS STEP-BY-STEP



1. Pre-mark the insertion depth on each pipe. Push the pipe into the female iron and push the fitting on to the male iron. Insert to the mechanical stop. Do not twist the pipe or fitting.



2. Once the pipe and fitting both reach the mechanical stop, apply heat for the required time.



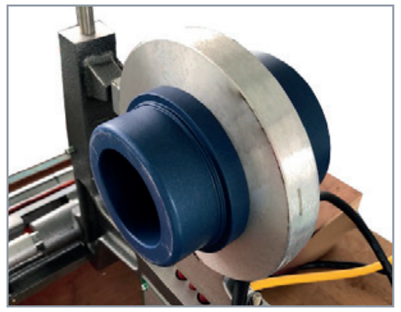
3. Once the heating time is reached, remove the pipe and fitting from the hot plate, and immediately push them together, without twisting, to the insertion depth marked on the pipe. This must be completed within the joint time listed in table 6.04. Continue to hold the pipe and fitting together for the duration of the cooling time specified in table 6.04.

Socket fusion welding - continued

MACHINE SOCKET FUSION WELDING – Ø32MM TO Ø125MM

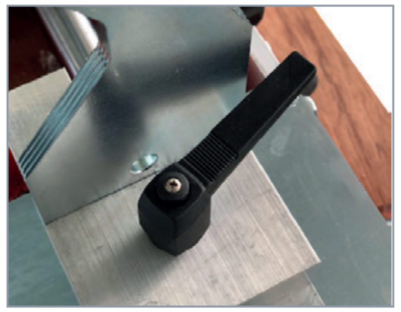
EQUIPMENT AND SET-UP

1. Place the socket welding machine on a secure bench. Set the correct diameter of the pipe being socket welded.



2. Set the machine up, including the following steps:
   a. Attach the correct diameter clamps and supports.
   b. Attach the hot plate.
   c. Bolt the correct male/female irons to the hot plate, in their correct positions.

3. Turn the machine on and allow the hot plate to reach a temperature of 260°C. This should take between 10 and 30 minutes.



4. While waiting for the hot plate to reach the required temperature, adjust the pipe and fitting clamps to approximately the correct level, using the pipe and fittings as a guide.

Socket fusion welding - continued

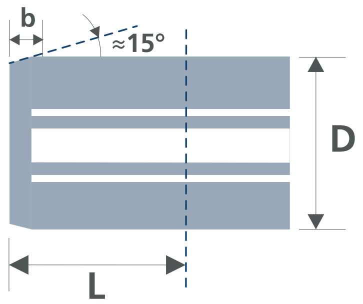
PRE-WELDING PROCESS

1. Before carrying out the first weld, check that the male and female irons have reached a temperature of 260°C.
2. Cut the pipe to the required length. The cut must be square and de-burred.
3. Bevel the pipe according to table 6.05.
4. Mark the pipe insertion depth on the pipe, as shown in diagram 6.06. (Only required when hand-welding).
5. Mark the desired angular rotation of the fitting to the pipe. If the fitting is a coupling, or the first bend or branch, this step is not required.

BEVELING AND INSERTION OF THE PIPES (DVS 2207-11)		
Ø PIPE 'D' mm	BEVELING 'b' mm	WELDING DEPTH 'L' mm
20	-	14
25	2	16
32	2	18
40	2	20
50	2	23
63	2	27
75	3	31
90	3	35
110	3	41
125	3	46

Table 6.05

Diagram 6.06



WELDING PROCESS

There are a number of socket fusion machines available, each with different operation methods. The user should familiarise themselves with the correct method for their machine before welding.

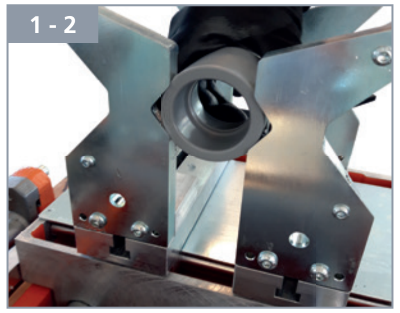
TEMPERATURES & TIMES OF THERMO-FUSION (DVS 2207-11)				
PIPE OD mm	HEATING TIME (Seconds)	JOINT TIME (Seconds)	COOLING TIME	
			FIXED (Seconds)	TOTAL (Minutes)
20	6	4	6	2
25	7	4	10	2
32	8	6	10	4
40	12	6	20	4
50	18	6	20	4
63	24	8	30	6
75	30	8	30	6
90	40	8	40	6
110	50	10	50	8
125	60	10	60	8

Table 6.07

Socket fusion welding - continued

WELDING PROCESS STEP-BY-STEP

1. Set the star wheel. Mount the pipe and socket into the machine. Socket (right) and pipe (left).
2. Using a methyl alcohol wipe, clean the pipe spigot and the fitting socket to be welded.
3. Set the machine cam to the correct Ø size to be welded.
4. Drop in the heated irons attached to the hot plate.
5. Move the pipe and fitting onto their socket/spigot irons.
6. Gently move the pipe and fitting to the stop points on their respective irons. Lightly maintain pressure so that they do not back off and keep the weld surface on the irons for the relevant heating time, as shown in table 6.07.
7. Once the heating time is reached, pull the star wheel back until pipe/spigot are free of heated irons and remove the hot plate.
8. Move the pipe spigot onto the fitting socket and move the pipe into the socket, the pre-set cam will insert the pipe into the socket at the pre-set depth.
9. Lightly maintain pressure on the machine bed to prevent the welding surfaces from separating.
10. Lock the bed off and leave the unit to cool for the time listed in table 6.07.
11. Once the cooling time has elapsed, remove the welded piece from the machine bed.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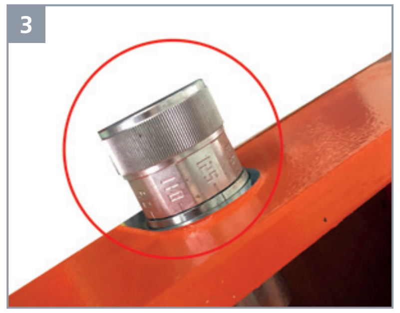
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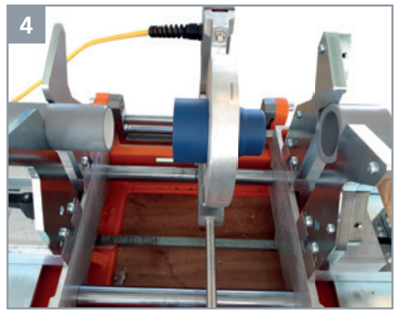
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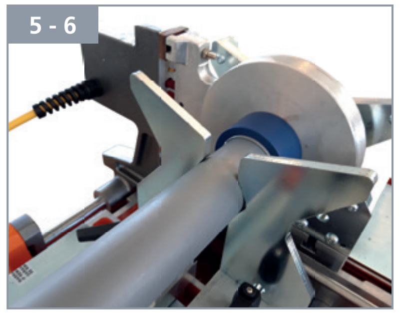
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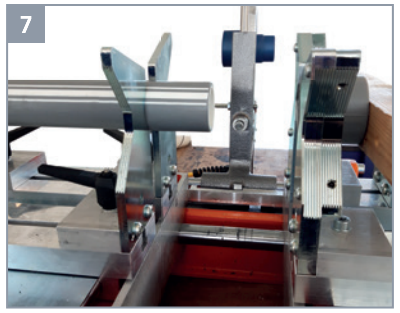
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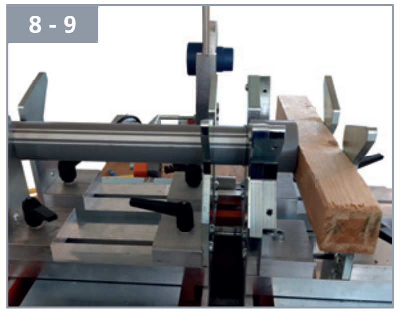
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10 - 11

Butt fusion welding

BUTT FUSION WELDING – Ø160MM

Butt fusion welding is a process by which the ends of the pipes to be jointed are heated and then pressed together under a known force for a pre-determined cooling down period. This forms a homogenous weld throughout the butt weld surface.

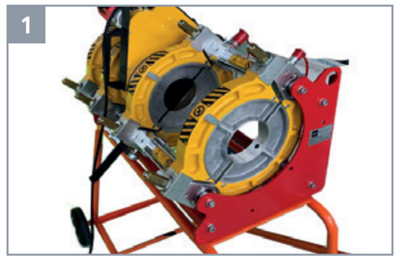
EQUIPMENT AND SET-UP

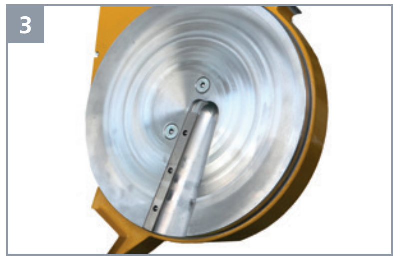
There are a number of butt fusion machines available from multiple manufacturers, ranging from manual to fully-automatic operation. The welding machine used should be suitable for use with MecFlow pipes and fittings, with a maximum SDR (diameter to wall thickness ratio) of 7.5. The machine must be placed in an environment with a stable temperature, without exposure to high winds.

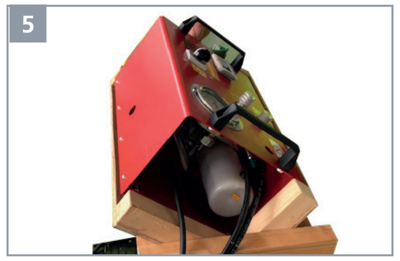
The equipment must:

1. Be set up on a secure base, at a comfortable working height.
2. Have the clamps set correctly for the diameter of the pipe that has to be welded.
3. Have a planner which can be used to square up both mating surfaces prior to heating.

   Note: Example shown is on a counter-weight balance.
4. Have a hot plate which can be introduced to the mating surfaces throughout the heating cycle of the process. The hot plate must be capable of reaching 210°C ±10°C.
5. Use a hydraulic drive system to move the pipe surfaces together and clamp them to the correct force for the duration of any cycles which require pressure to be applied.
6. Include a manometer to take drag and clamp pressure readings.



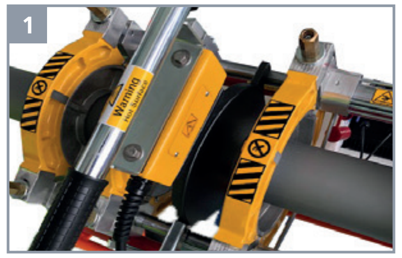


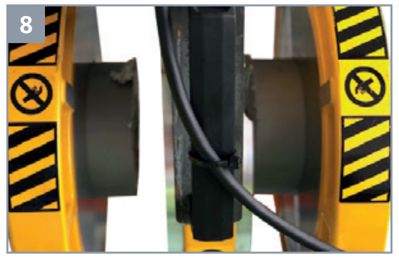


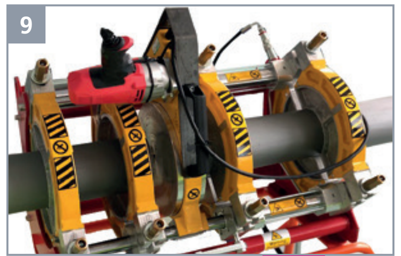
Butt fusion welding - continued

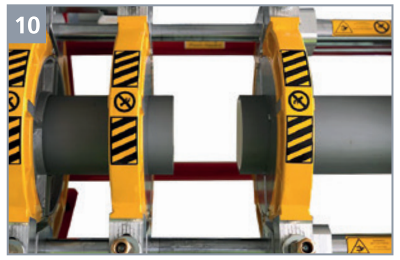
PRE-WELDING PROCESS

1. Before switching the machine on, check the surface of the hot plate for any damage to the teflon coating. Any damaged hot plates should be replaced.
2. Clean both surfaces of the hot plate with methyl alcohol.
3. Turn the machine on and allow the hot plate to reach a temperature of 210°C. Check this temperature with a thermometer before carrying out the first weld.
4. Cut the pipes to be jointed, ensuring the cuts are square.
5. While waiting for the hot plate to reach temperature, set the pipe clamps to the correct clamping force and check the function of the drive system and planing device.
6. Assemble the pipe pieces into the butt fusion machine and clamp accordingly. When working with long pipes, additional support may be required.
7. Once the pipes are clamped correctly, the drag pressure must be determined. Move the hydraulic drive and read the pressure on the manometer.
8. Bring the planing device into the bed of the machine, turn on and lightly bring the pipe surfaces to the planer.
9. Plane the pipe ends until they are flat to the planing device.
10. Remove the planing device and bring the mating surfaces together. They must align with a minimum axial deflection of ≤10% of the wall thickness.
11. When the pipes are together, check the gap between the planed ends. This should not exceed the dimension stated in table 6.10 at any point around the mating face's circumference.









Under no circumstances must the ends of the pipe be touched or contaminated from this point forward. If they are then they must be re-planed.

Butt fusion welding - continued

BUTT WELDING PROCESS

There are a number of butt fusion machines available, each with different operation methods. The welding process should take place in a temperature stable environment above 5°C, avoiding areas of high winds. Welding should only be carried out once all pre-welding processes are completed satisfactorily.

There are five timed steps to follow for the butt fusion welding process. These timings vary depending on the diameter being welded.

MAXIMUM SEPARATION OF THE PIPES PREPARED TO BE WELDED	
PIPE OD mm	SEPARATION mm
≤355	0.5

Table 6.08

BUTT WELDING PROCESS STEP-BY-STEP

STEP 1 – t1
Forming of the weld bead (under pressure).

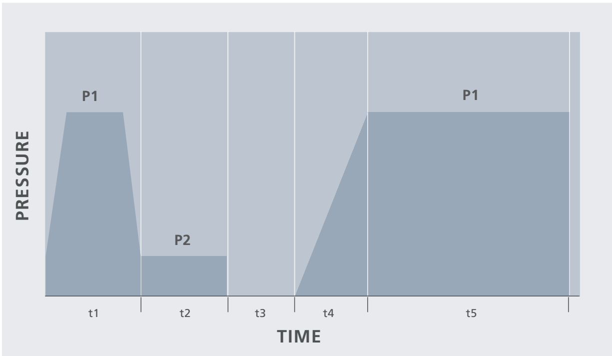
STEP 2 – t2
Heating soak time (no pressure).

STEP 3 – t3
Removal of the heat element and bringing the mating faces together. This is a maximum time allowed for this step.

STEP 4 – t4
Pressure increase on the mating faces.

STEP 5 – t5
Cooling time (under pressure).

Diagram 6.09



PARAMETERS OF BUTT WELDING ACCORDING TO DVS 2207-11					
PIPE THICKNESS mm	PROTRUDING OF THE INITIAL WELDING CORD *h mm	HEATING TIME t2 Seconds	TIME FOR REMOVING THE PLATE t3 Seconds	TIME FOR REACHING PRESSURE t4 Seconds	COOLING TIME t5 minutes
4.5	0.5	135	5	6	6
4.5 - 7	0.5	135 - 175	5 - 6	6 - 7	6 - 12
7 - 12	1.0	175 - 245	6 - 7	7 - 11	12 - 20
12 - 19	1.0	245 - 330	7 - 9	11 - 17	20 - 30
19 - 26	1.5	330 - 400	9 - 11	17 - 22	30 - 40
26 - 37	2.0	400 - 485	11 - 14	22 - 32	40 - 55
37 - 50	2.5	485 - 560	14 - 17	32 - 43	55 - 70

Table 6.10

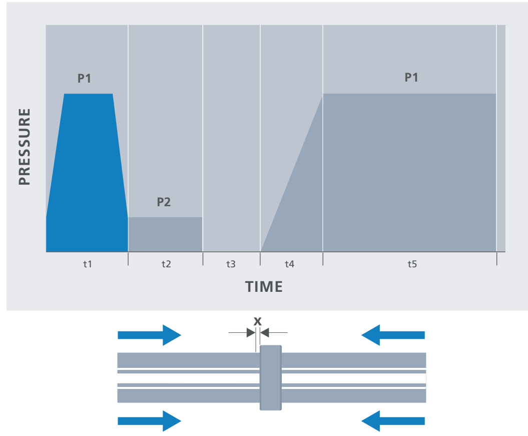
The values for applied pressure by Ø are machine-specific and the operator must familiarise themselves with the relevant tables before beginning the welding process.

STEP 1 – t1

The purpose of this step is to create a bead of material around the circumference of both mating surfaces (this is not the finished bead). The size of this bead is machine-specific and the operator should familiarise themselves with the machine instructions before beginning.

1. Clean the hot plate with a cotton cloth.
2. Bring the mating surfaces to the hot plate and apply the relevant pressure to the hot plate.
3. Begin t1 time sequence.
4. On completion of t1 **move to Step 2 – t2**.

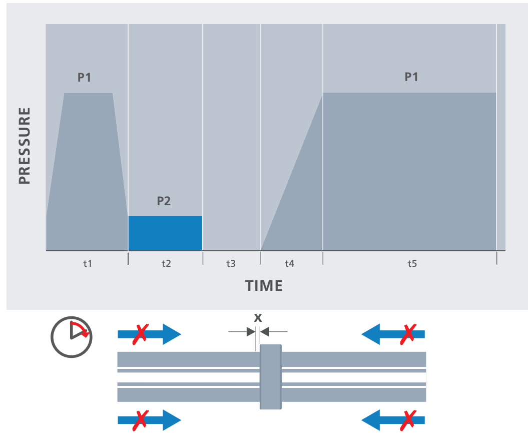
Diagram 6.11 – t1 Showing up of the welding cord



STEP 2 – t2

1. Immediately after completing the time for t1, reduce the pressure on the mating surfaces such that the only pressure applied is to keep the mating surfaces in contact with the hot plate.
2. Begin t2 time sequence.
3. On completion of t2 **move to Step 3 – t3**.

Diagram 6.12 – t2 Heating

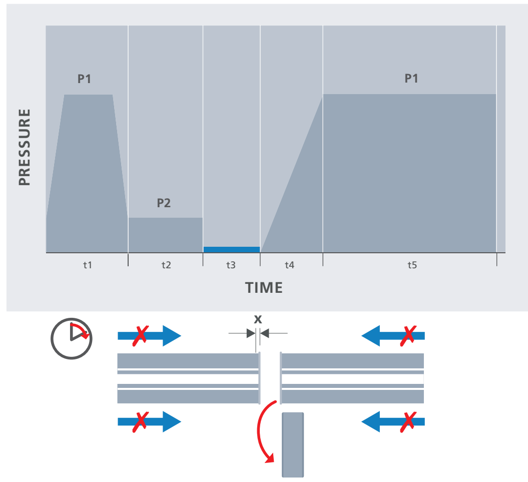


STEP 3 – t3

IMPORTANT: THIS STEP MUST BE COMPLETED WITHIN THE SPECIFIED TIME

1. Immediately after completing t2, remove the mating faces from the hot plate.
2. Remove the hot plate from the machine bed.
3. Quickly bring the mating surfaces together.
4. Once the mating faces are together, **move to Step 4 – t4**.

Diagram 6.13 – t3 Removing the heating element

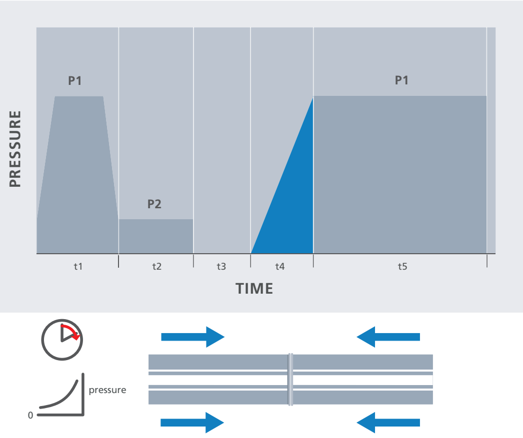


Butt fusion welding - continued

STEP 4 – t4

1. Immediately after completing t3, apply the relevant pressure to the machine pressure, and add the drag pressure to the force established in the pre-weld phase.
2. Once the correct pressure is reached, **move to** Step 5 – t5.

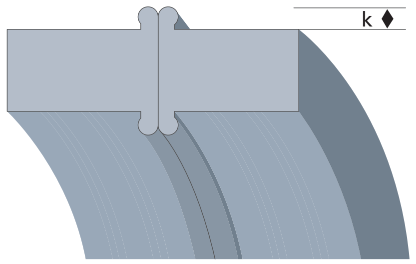
Diagram 6.14 – t4 Pressure increase



VISUAL INSPECTION

The only non-destructive method for checking weld quality is to inspect the external bead that is formed during the process. An ideal bead is shown in diagram 6.16 (below). Graph 6.17 (opposite) shows the acceptable size of external bead (k) at the inspection levels shown in table 6.18 on the next page.

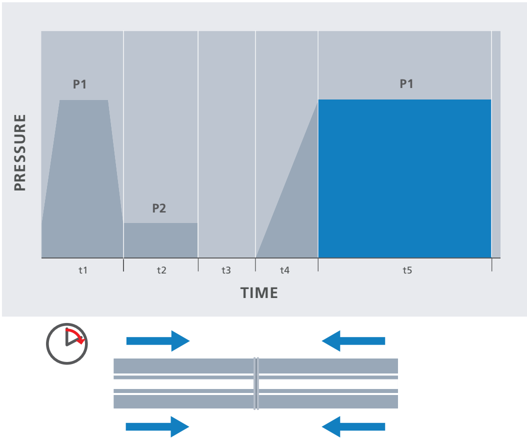
Diagram 6.16

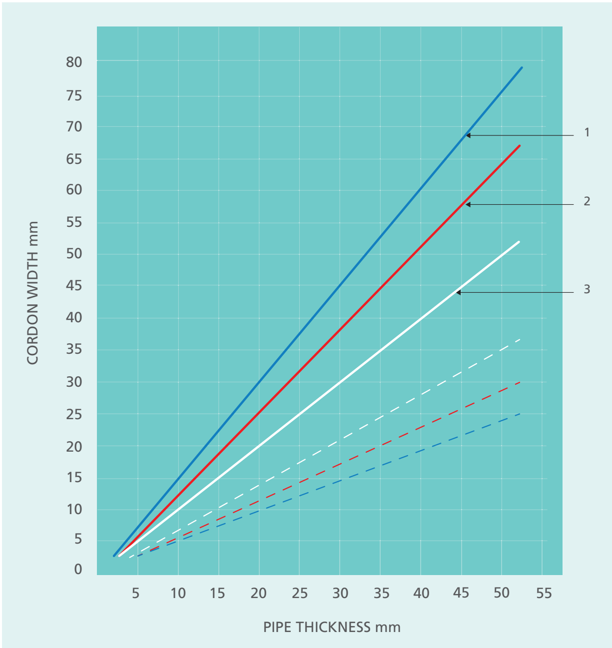


STEP 5 – t5

1. Begin time t5 and ensure that the drive bed of the machine is secured throughout the cooling period.
2. Once the t5 time is reached, release the pressure on the mating face.
3. Once the pressure on the mating faces is released, remove the welded piece from the machine.

Diagram 6.15 – t5 Cooling





Graph 6.17

KEY

Inspection Level 3 Upper Limit	Inspection Level 3 Lower Limit
Inspection Level 2 Upper Limit	Inspection Level 2 Lower Limit
Inspection Level 1 Upper Limit	Inspection Level 1 Lower Limit

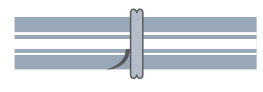
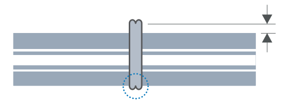
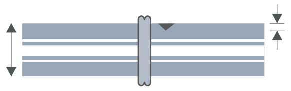
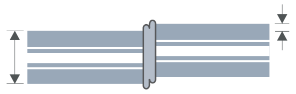
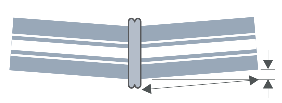
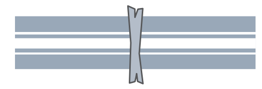
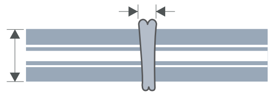
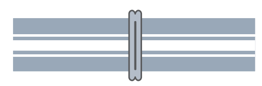
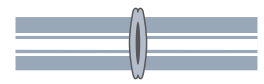
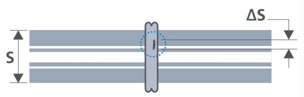
COMMON WELD DEFECTS					
	DEFECT	DESCRIPTION	EVALUATION		
			LEVEL 1	LEVEL 2	LEVEL 3
1		Surface cracks in a parallel or transverse direction to the weld – check the weld area, the heat-affected area and the pipe surface close to the weld.	Not allowed	Not allowed	Not allowed
2		Local or continued notches in parallel to the weld with the notch root in the core material. Causes are: Incorrect pressure adjustment Too short annealing time Too short cooling time	Not allowed	Not allowed	Not allowed
3		Notches close to the weld. Caused by: Incorrect adjustment of clamping jaws Damage during transport Incorrect weld preparation	Allowed only if Δs ≤ 0,5 mm	Allowed only if Δs ≤ 1,0 mm	Allowed only if Δs ≤ 2,0 mm
4		Misalignment of pipes Machine not set up correctly	Allowed only if e≤2 mm	Allowed only if e≤4 mm	Allowed only if e≤5 mm
5		Angular misalignment of pipes Machine set up incorrectly Machine failure during weld process	Allowed only if e ≤1 mm	Allowed only if e ≤2 mm	Allowed only if e ≤4 mm
6		Sharp edges on external weld bead Incorrect welding parameters Excessive weld pressure	Not allowed	Not allowed	Not allowed
7		Irregular weld bead width Check annealing time Check weld plate for temperature Check weld pressure	Allowed values are defined in the Bead width table opposite	Allowed values are defined in the Bead width table opposite	Allowed values are defined in the Bead width table opposite
8		'Dry' joint on part or all of weld bead i.e. no fusion achieved. Contaminated hot plate Hot plate out of temperature (low and high) Time t3 too long	Not allowed	Not allowed	Not allowed
9		Hollow's between the butt weld surfaces Low cooling pressure Insufficient cooling time	Not allowed	Not allowed	Not allowed
10		Contamination or gas pockets in butt weld bead Contamination during weld process Wet pipe surface during welding	Allowed isolated pores only if Δs≤ 0,05s	Allowed isolated pores only if Δs≤ 0,10s	Allowed isolated pores only if Δs≤ 0,15s

Table 6.18

Electrofusion welding

ELECTROFUSION WELDING – Ø32mm to Ø160mm

Electrofusion welding provides a simple, rapid method of creating a consistent weld between the spigots inserted into the electrofusion fitting, and the electrofusion fitting itself.

It's important to note that this is the only joint method by which MecFlow pipes of the same diameter, but with differing wall thicknesses, can be jointed.

Each coupling features a barcode label that can be read by the electrofusion machine for the purpose of set-up and weld condition data storage.

The label also contains the welding conditions that need to be set, should the electrofusion machine require a manual set-up.

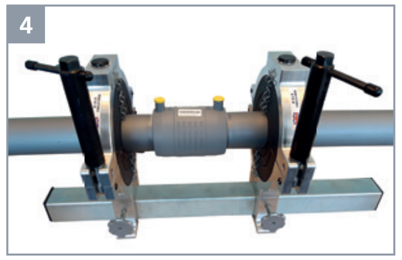
MECFLOW ELECTROFUSION COUPLINGS – Ø32mm to Ø160mm

EQUIPMENT AND SET-UP

There are several welding machines available that are suitable for welding MecFlow electrofusion couplings. The welding voltage for all couplings is 40V, and the welding time varies by diameter. A rotary pipe scraper is also required for de-oxidation of the pipe surface before welding.

PRE-WELDING PROCESS

1. Cut the pipe square and use a turbo scraper to de-oxidise the pipe, up to Ø63mm. Above Ø63mm orbital planers and hand planers can be used.
2. Mark the insertion depth of the coupling on both pipe surfaces to be welded.
3. Using a cotton cloth, wipe the internal surface and ends of the scraped and de-oxidised pipes.
4. Remove electrofusion couplings from packaging and insert the pipe.

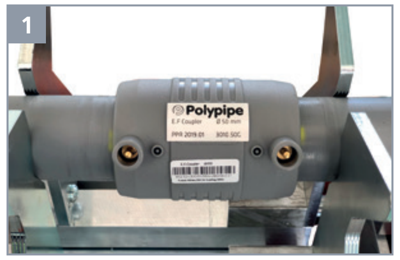


Electrofusion welding - continued

WELDING PROCESS

The operator must be familiar with the sequence of the electrofusion welding machine before carrying out this step. Make sure the electrofusion machine is connected to a reliable and stable power source.

1. Insert the de-oxidised pipe ends into both sides of the coupling. Make sure the pipe ends are pushed fully to the coupling centre stop, and there is no angular deflection between the pipe and the coupling. Check that there is an air gap around the circumference of the coupling.
2. Tighten the supports/brackets around the pipe.
3. Connect the terminals of the welder to the electrofusion coupling.
4. Provided the machine is not showing an error, cycle the machine through the welding sequence, if available use a bar coding reader to scan the coupling.
5. Once the weld sequence has successfully completed, leave the welded coupling to cool down for the time indicated on the label. Do not disturb the coupling during the cooling period. Cooling time should be extended in ambient temperatures above 25°C, or when welding in strong direct sunlight.



WELD QUALITY

Providing an easily-recognised reference point, our electrofusion couplings feature visual indicators, showing that the welding process has been successful. The pictures opposite show a coupling before and after welding. Providing the indicators have risen within the coupling, the weld cycle has been successful.

Pre-weld

Post-weld

Mechanical welding

FLANGED CONNECTIONS – Ø40MM TO Ø160MM

Flanged connections are available in the MecFlow range with the following weld connections:

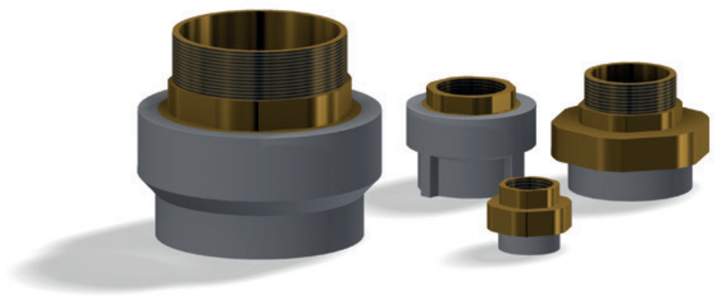
- Socket fusion welding – Ø32mm up to Ø125mm
- Butt fusion welding – Ø160mm

Care must be taken to tighten flanged connections evenly during installation.

THREADED CONNECTIONS – Ø32mm x ¾"BSP to Ø110mm x 4"BSP

Threaded connections are available in BSPM and BSPF thread types. Appropriate welding methods are listed below:

- Socket fusion threaded connections – Ø32mm to ¾" up to Ø110mm to 4"



11. Installation

It's vital that the MecFlow system is installed correctly to maximise its performance over its service life.

The following installation methods are engineered to support the system performance over a number of applications. For niche applications, we recommend that you contact the Polypipe Advantage team on 01622 795200.

PIPE WEIGHTS

Pipe weights and filled pipe weights are shown in the table below.

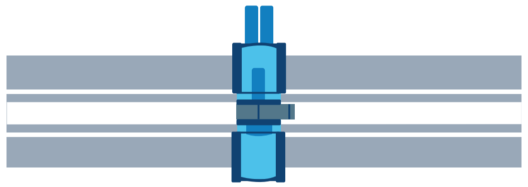
SYSTEM BRACKETING – GENERAL

- The brackets used to install the MecFlow system must be capable of supporting the pipe weights as shown in Table 7.01.
- Brackets must be rubber lined to prevent the pipe surface from being dented or damaged by the bracket ring. For noise-sensitive operations the use of isophonic brackets is recommended.
- Guide brackets and anchor brackets should be placed on the system in accordance with 7.03 and 7.04.
- Guide brackets – Guide brackets must control the axial movement of the pipe in the direction of the applied thermal movement forces.
- Anchor brackets – Anchor brackets lock the pipe into position, and should be robust enough to counteract any thrust forces applied to the pipe due to thermal movement.

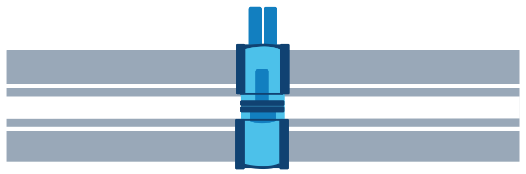
PIPE WEIGHTS		
PIPE Ø mm	PIPE WEIGHT/m (kg)	PIPE + WATER/m (kg)
32	0.35	0.78
40	0.39	1.23
50	0.60	1.92
63	0.96	3.05
75	1.36	4.32
90	1.96	6.22
110	2.92	9.28
125	3.77	11.99
160	6.10	19.64

Table 7.01

Diagram 7.02



MecFlow bracket with spacer (anchors and guides)



MecFlow bracket without spacer (anchor)

System bracketing

Brackets should be connected to the substrate using threaded rod or another sufficient containment method (see diagram 7.02). If threaded rod is used, the rod length should be kept to a minimum to prevent the bracket fixing from bending or swinging when the system is in operation.

BRACKET DISTANCES – GENERAL

HORIZONTAL BRACKET DISTANCES			
PIPE OD mm	20°C	50°C	70°C
32	120	110	95
40	125	115	100
50	145	135	120
63	165	155	135
75	175	160	140
90	185	170	145
110	200	170	150
125	205	175	155
160	210	180	160

Table 7.03

VERTICAL BRACKET DISTANCES			
PIPE OD mm	20°C	50°C	70°C
32	156	145	124
40	163	150	130
50	189	176	156
63	215	202	176
75	228	208	182
90	241	221	189
110	260	221	195
125	267	228	202
160	273	234	208

Table 7.04

Thermal movement

CONTROL OF THERMAL MOVEMENT

Due to the microfibre additive featured in the MecFlow system, expansion and contraction due to temperature change is significantly reduced. However, it is still important to control thermal movement to counteract the forces generated. This can be achieved using various installation techniques and a combination of anchor and guide brackets.

MECFLOW COEFFICIENT OF THERMAL EXPANSION: 0.04mm/m°C

The general equation for calculating thermal movement in a system (or part of a system) is listed below.

Equation 1

$$\Delta L = L \times \lambda \times \Delta t$$

ΔL = Calculated thermal movement

L = Length

λ = Coefficient of thermal expansion for MecFlow

Δt = Expected temperature difference

The value for 'Δt' should be taken as the difference between the ambient temperature at the time of system installation and the fluid temperature once the system is operating.

As the pipe must generally be at the ambient temperature prior to commissioning, ambient temperature should not be taken into account during the operation of the system.

WORKED EXAMPLE

Calculate the thermal movement seen in the pipe below.

System pipe length = 6m

Temperature difference = 20°C

L = 6m, Δt = 20°C, λ = 0.04mm/m/°C

$\Delta L = L \times \lambda \times \Delta t$

$\Delta L = 6 \times 0.04 \times 20$

ΔL = 4.8mm

The table below shows the rate of thermal movement by pipe length for a given change in temperature.

LENGTH (L)	Δt 1°C	10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C
	LINEAR EXPANSION mm								
1m	0.0	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2
3m	0.1	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6
5m	0.2	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0
10m	0.4	4.0	8.0	12.0	16.0	20.0	24.0	28.0	32.0
15m	0.6	6.0	12.0	18.0	24.0	30.0	36.0	42.0	48.0
20m	0.8	8.0	16.0	24.0	32.0	40.0	48.0	56.0	64.0
25m	1.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0
30m	1.2	12.0	24.0	36.0	48.0	60.0	72.0	84.0	96.0
35m	1.4	14.0	28.0	42.0	56.0	70.0	84.0	98.0	112.0
40m	1.6	16.0	32.0	48.0	64.0	80.0	96.0	112.0	128.0
45m	1.8	18.0	36.0	54.0	72.0	90.0	108.0	126.0	144.0
50m	2.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0

Table 7.05

Thermal movement - continued

THERMAL MOVEMENT – CONTROL METHODS

The following methods provide thermal movement control for the MecFlow system.

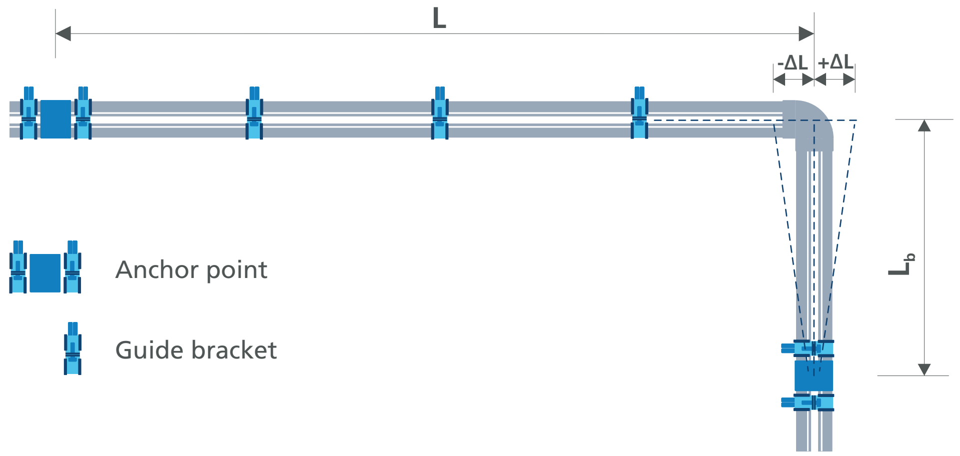
- Deflection leg
- Expansion loop
- Pre-stressing
- Sliding tee's
- Fully locked (anchored)

DEFLECTION LEG

Deflection leg control is where a bend in the system is allowed to 'flex' in a controlled manner, so as to allow for thermal movement (see diagram 7.06).

If this method is used it is essential to place anchor brackets at distances 'L' and 'L_b' from the bend point. Distance 'L_b' must be calculated to take into account the distance 'L', the pipe diameter, and the system temperature conditions.

Diagram 7.06



The equation to calculate distance 'L_b' is given as:

Equation 2

$$L_b = \lambda \times \sqrt{d \times \Delta L}$$

λ = MecFlow coefficient of thermal movement

d = Outside diameter of pipework

ΔL = Calculated thermal movement for distance L

Thermal movement - continued

The table below indicates the distance 'L_b' for a given thermal movement by pipe diameter.

PIPE OD mm	LINEAR EXPANSION mm											
	10	20	30	40	50	60	70	80	90	100	110	120
	L_b mm											
32	0.72	1.01	1.24	1.43	1.60	1.75	1.89	2.02	2.15	2.26	2.37	2.48
40	0.80	1.13	1.39	1.60	1.79	1.96	2.12	2.26	2.40	2.53	2.65	2.77
50	0.89	1.26	1.55	1.79	2.00	2.19	2.37	2.53	2.68	2.83	2.97	3.10
63	1.00	1.42	1.74	2.01	2.24	2.46	2.66	2.84	3.01	3.17	3.33	3.48
75	1.10	1.55	1.90	2.19	2.45	2.68	2.90	3.10	3.29	3.46	3.63	3.79
90	1.20	1.70	2.08	2.40	2.68	2.94	3.17	3.39	3.60	3.79	3.98	4.16
110	1.33	1.88	2.30	2.65	2.97	3.25	3.51	3.75	3.98	4.20	4.40	4.60
125	1.41	2.00	2.45	2.83	3.16	3.46	3.74	4.00	4.24	4.47	4.69	4.90
160	1.60	2.26	2.77	3.20	3.58	3.92	4.23	4.53	4.80	5.06	5.31	5.54

Note: Linear expansion is calculated using equation 1 for the distance 'L'.

Table 7.07

EXPANSION LOOPS

Expansion loop control is where a loop in the system is allowed to 'flex' in a controlled manner, allowing thermal movement (see diagram 7.08). If this method is used it is essential to place anchor brackets at distances 'L' and 'L_b' from the bend point. Distance 'L_b' must be calculated, take into account the distance 'L', the pipe diameter, and the system temperature conditions.

'L_b' should be calculated in accordance with equation 2. 'L_2' should be calculated using equation 3; the minimum 'L_2' value is 210mm.

Table 7.07 above, gives the distance 'L_b' for a given thermal movement by pipe diameter.

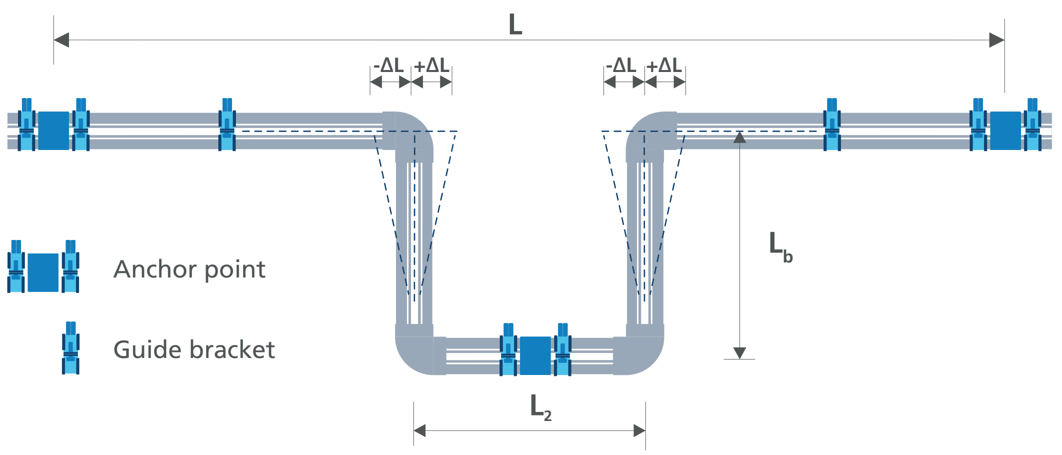
Equation 3

$$L_{2min} = 2 \times \Delta L \times SD$$

ΔL = Calculated thermal movement for distance L

SD = Safety distance = 150mm

Diagram 7.08



Thermal movement - continued

PRE-STRESSING

The pre-stressing method is useful in instances where space is limited, and the distance 'L_b' for either the deflection leg or expansion loop method needs to be kept to a minimum. The system is installed with pre-stressed elements in the opposite direction to the intended thermal movement, ensuring that when the system is commissioned thermal movement is limited, or in certain cases is eliminated.

For both deflection legs and expansion loops the distance 'L_{bps}' is calculated using equation 4.

Equation 4 Single Arm

$$a = (\sqrt{D \times \Delta L}) \times \lambda$$

Equation 5 Double Arm

$$L_b = \lambda \times \sqrt{\frac{d \times \Delta L}{2}}$$

The distance 'L_2' is calculated as per standard expansion loops using equation 3. Again, the minimum distance is 150mm.

Diagram 7.09

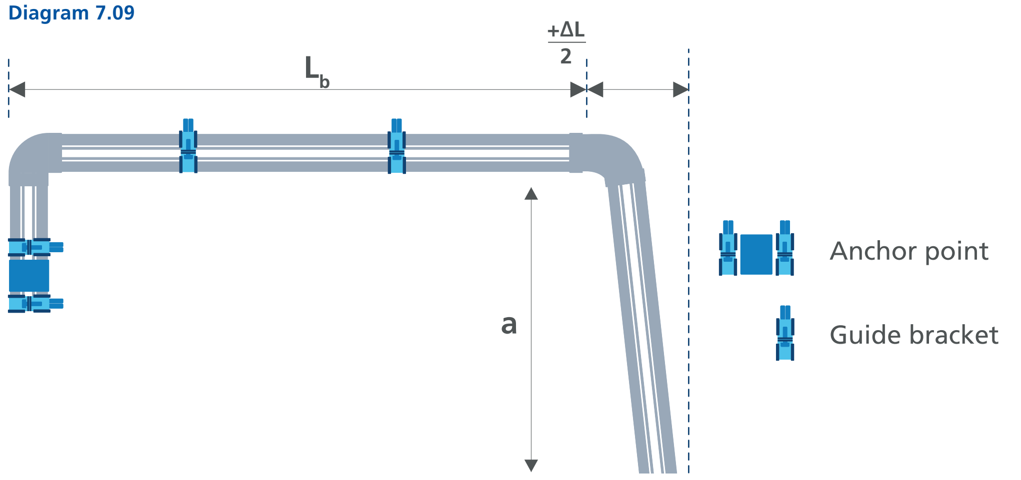
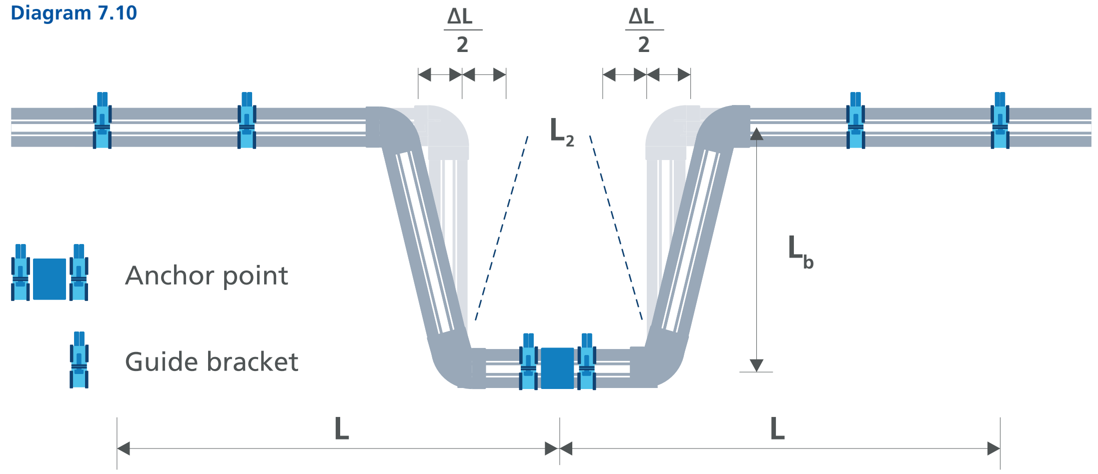


Diagram 7.10



Thermal movement - continued

The table below indicates the distance 'L_{bps}' for a given thermal movement by pipe diameter.

PIPE OD mm	LINEAR EXPANSION mm											
	10	20	30	40	50	60	70	80	90	100	110	120
	L_{bps} mmw											
32	0.51	0.72	0.88	1.01	1.13	1.24	1.34	1.43	1.52	1.60	1.68	1.75
40	0.57	0.80	0.98	1.13	1.26	1.39	1.50	1.60	1.70	1.79	1.88	1.96
50	0.63	0.89	1.10	1.26	1.41	1.55	1.67	1.79	1.90	2.00	2.10	2.19
63	0.71	1.00	1.23	1.42	1.59	1.74	1.88	2.01	2.13	2.24	2.35	2.46
75	0.77	1.10	1.34	1.55	1.73	1.90	2.05	2.19	2.32	2.45	2.57	2.68
90	0.85	1.20	1.47	1.70	1.90	2.08	2.24	2.40	2.55	2.68	2.81	2.94
110	0.94	1.33	1.62	1.88	2.10	2.30	2.48	2.65	2.81	2.97	3.11	3.25
125	1.00	1.41	1.73	2.00	2.24	2.45	2.65	2.83	3.00	3.16	3.32	3.46
160	1.13	1.60	1.96	2.26	2.53	2.77	2.99	3.20	3.39	3.58	3.75	3.92

Note: Linear expansion is calculated using equation 1 for the distance 'L'.

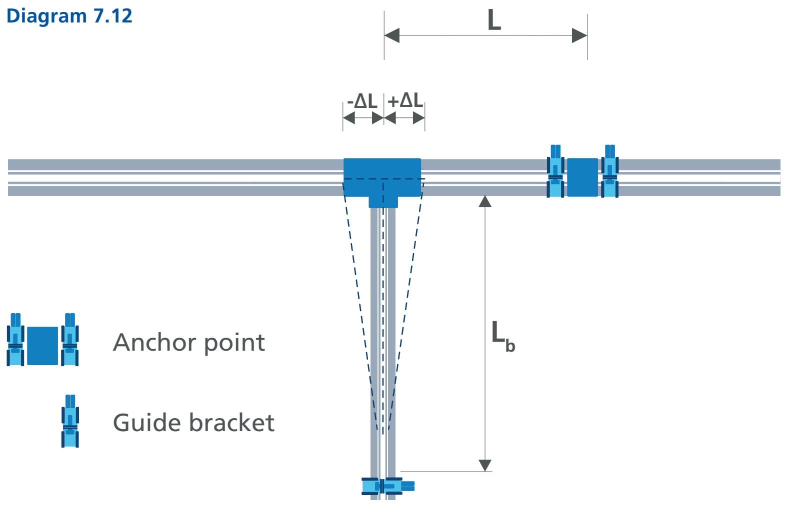
Table 7.07

SLIDING T

The Sliding T is a similar method to the deflection leg for controlling thermal movement. The distance 'L' is used to determine the thermal movement to be controlled using equation 1, and the distance 'L_b' is determined using equation 2. This method cannot be configured as a pre-stressed solution.

Diagram 7.12 indicates the distance 'L_b' for a given thermal movement by pipe diameter.

Diagram 7.12



Compensating for changes in length using an expansion leg, 'L_b'

Thermal movement - continued

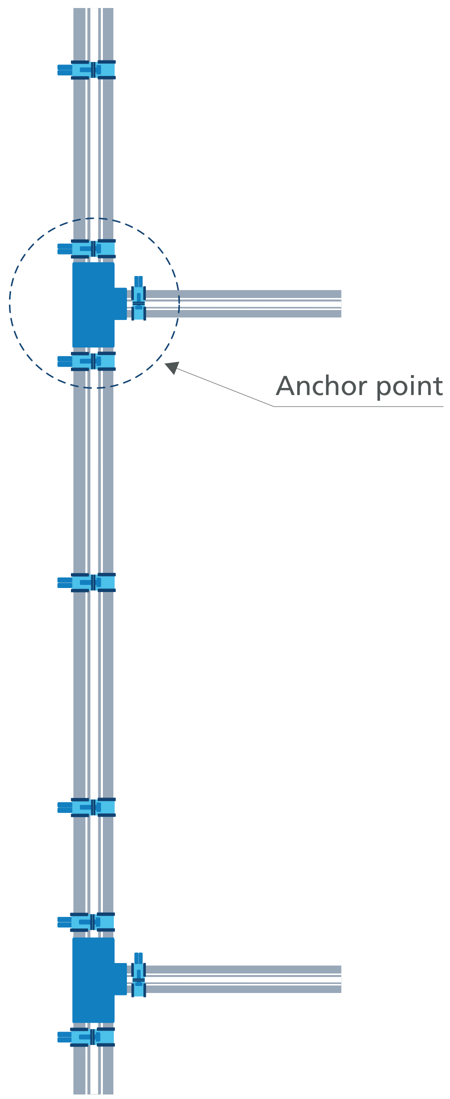
FULLY LOCKED SYSTEM

The fully locked system is ideal for BCWS and CWS service risers as there is minimal thermal movement to control. The fully locked system relies on anchor points placed at each floor level of the riser which effectively 'locks' the axial thermal movement of the system. As the system is locked there is no movement acting on any branches in the section of riser between the two anchor points.

The maximum distance between two anchor points is 3 metres. Guidance on how to create an anchor point is given in diagram 7.13. Anchor brackets should be close coupled to the supporting substrate, and if threaded rod is being used it must be capable of supporting the bracket in position. As a rule of thumb, rod size should be at least M8 for Ø32mm and M10 for sizes up to Ø160mm.

Guide brackets are also required to support the pipe, and these distances can be referenced in table 7.04 – vertical bracket distances.

Diagram 7.13

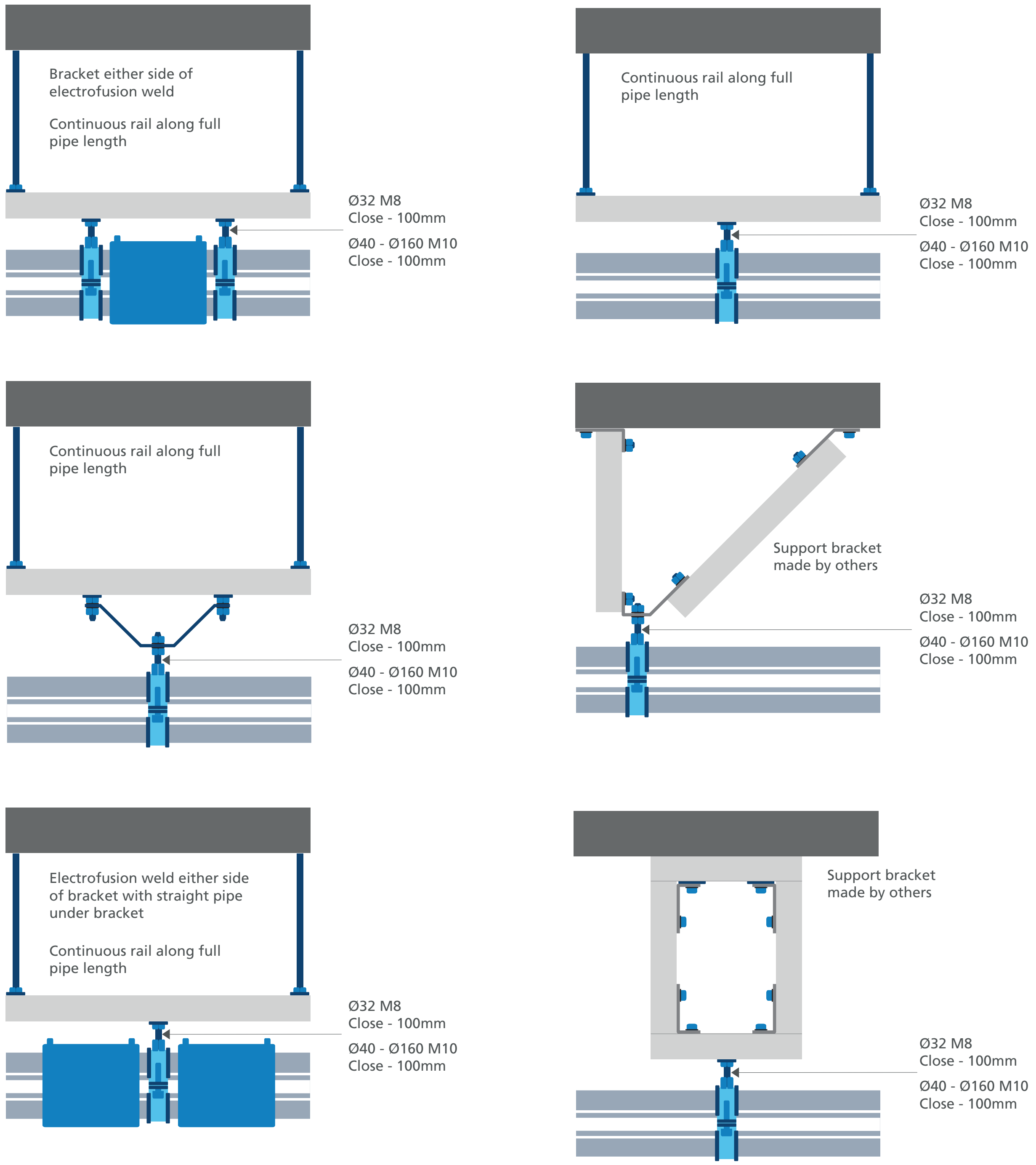


Thermal movement - continued

ANCHOR POINTS

Diagram 7.14 below shows how to create a horizontal/vertical anchor point.

Diagram 7.14



Thermal movement - continued

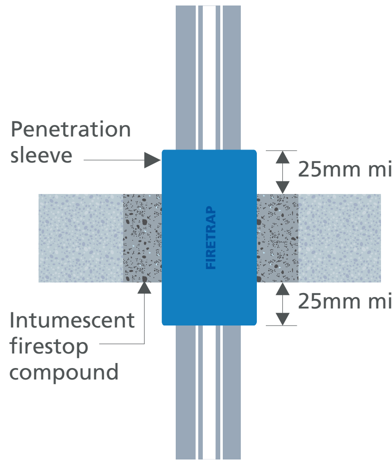
COMPENSATORS

Standard, 'off-the-shelf' compensators must not be used within the MecFlow system. If a different method of expansion control is needed, please contact the Polypipe Advantage team for technical guidance on **01622 795200**.

FLOOR/WALL PENETRATIONS

In instances where MecFlow pipes penetrate floors and walls, care must be taken to protect the surface of the pipe from any mechanical damage. This is achieved by sleeving the pipe with protection (insulation material) throughout the penetration. For fire rated compartments see the section on fire compartmentation.

Diagram 7.15

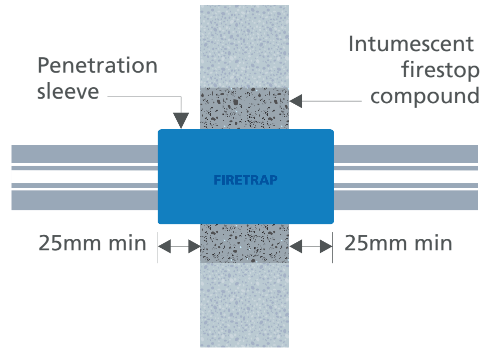


Floor penetration

BUILDING EXPANSION JOINTS

Where the MecFlow system crosses building expansion joints, care must be taken to protect the system from excessive building movement. There are several installation solutions available, and the Polypipe Advantage team are on hand to offer technical guidance and identify the best solution for your project; dependent on the direction and extent of the thermal movement.

Diagram 7.16



Wall penetration

TRACE HEATING/HEAT TAPE

Both trace heating and heat tapes can be used on MecFlow systems. The products used must be checked with the manufacturer as being suitable for plastic pipe, and the surface temperature of the MecFlow system must not exceed 70°C at any point. Care must be taken in both the design and installation of these external heat sources.

Thermal movement - continued

FIRE COMPARTMENTATION

Although the MecFlow system has an excellent fire rating classification, the system must be considered as combustible for the purposes of compliance to UK Building Regulation B. With this in mind, where MecFlow pipes of nominal diameter ≥Ø40mm pass through a fire compartment floor or wall, the penetration must be protected with a fire sleeve.

Our Firetrap Sleeves have been tested with MecFlow to BS EN 1366-3. For a copy of the test report and further technical guidance, please contact the Polypipe Advantage team on **01622 795200**.

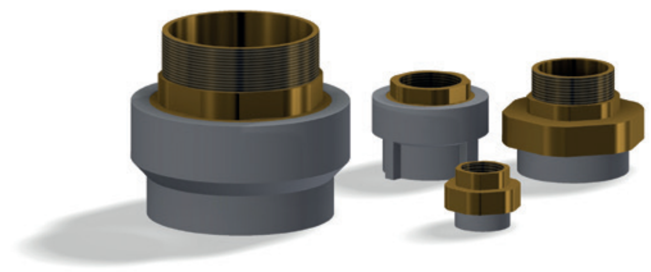
Diagram 7.17

INSULATION

The MecFlow system is compatible with all common pipe insulation materials. Insulation thickness should be selected in accordance with Building Regulations, design standards and industry guides, such as the Domestic Heating Compliance Guide and the TIMSA Guidance for Achieving Compliance with Part L of the Building Regulations.

CONNECTION TO OTHER MATERIALS

Connection to other materials can be achieved using the MecFlow range of threaded fittings, and for larger diameters, flanged connections. Thread forms are manufactured to British Standards, as detailed below.



THREADED CONNECTIONS

BS EN 10226-1:2004 – Pipe threads where pressure tight joints are made on the threads. Taper external threads and parallel internal threads. Dimensions, tolerances and designation.

UNIONS

BS EN ISO 228-1:2003 – Pipe threads where pressure-tight joints are not made on the threads. Dimensions, tolerances and designation.

MECFLOW CONNECTED TO COPPER SYSTEMS

Under certain conditions, by-products of copper in water systems can cause a reaction in the MecFlow material. For MecFlow pipes where copper is present in heating circuits at 70°C, the following max pressures and velocities shown in Table 7.18, should be observed.

Although brass is an alloy of copper and zinc, there is little risk of significant oxidation in threaded brass fittings, therefore these can be discounted from the above.

PRESSURE AND VELOCITY			
MAXIMUM WATER TEMPERATURE	MAXIMUM SERVICE PRESSURE		MAXIMUM WATER VELOCITY
	20-32mm	40-250mm	
70°C	14 bar	9 bar	1.50m/s

Table 7.18

12. System commissioning & maintenance

The purpose of system commissioning is to test that the system as installed is leak-free, clear of impurities and – where required – is disinfected before being placed into service. In the UK there are several guidance documents that detail how to test and flush the system, which include (but aren't limited to):

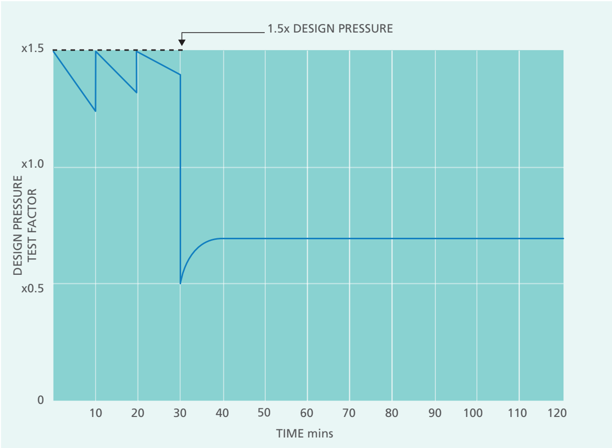
- BS EN 806-4:2010 – Specifications for installations inside buildings conveying water for human consumption.
- BS 8558:2015 Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages. Complementary guidance to BS EN 806
- WRAS Water Regulations Guide.
- The Control of Legionella in Water Systems – Approved Code of Practice L8.
- Guidance on which systems require disinfection prior to commissioning is also detailed in the aforementioned documents.

HYDROSTATIC PRESSURE TESTING

The MecFlow system should be tested as a plastic system as described in the above guidance documents. There are two test methods, Test A and Test B (graphs 8.01 & 8.02), prescribed for the testing of plastic systems. Either of these methods are suitable for MecFlow.

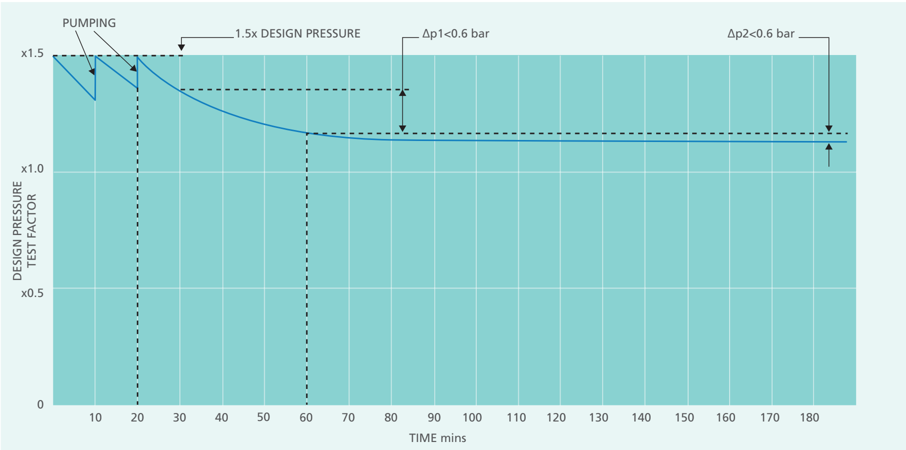
Although the MecFlow system can comfortably be tested at 1.5 times its nominal pressure rating, care should be taken to check that all components, supplied by others, installed in the MecFlow system are able to withstand the applied test pressure. Once the hydrostatic pressure test is completed, the result should be recorded and documented as per the client's requirement.

Water tightness procedure - Test A



Graph 8.01

Water tightness procedure – Test B



Graph 8.02

System commissioning - general

TESTING WITH AIR

It is not recommended to site test the MecFlow system using compressed air.

SYSTEM REPAIR

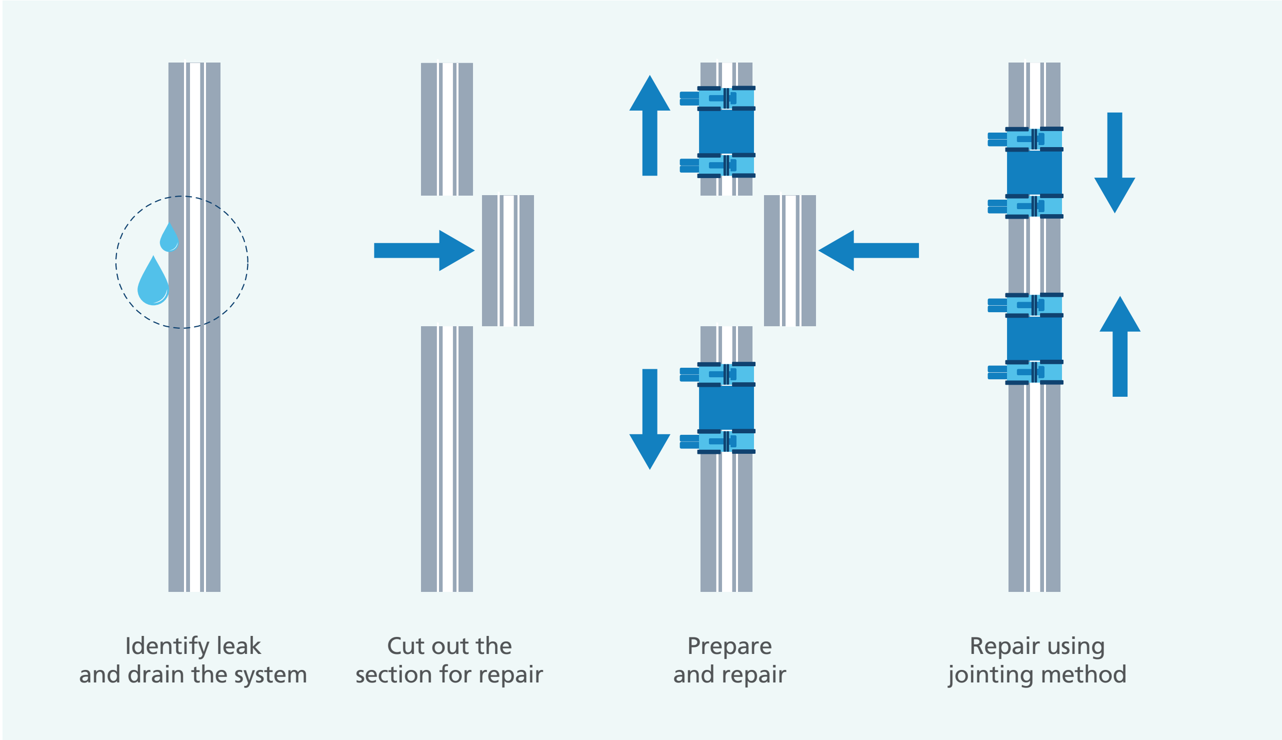
If a leak is discovered in the MecFlow system during testing there are two methods of repair available.

1. 'Cutting in' using electrofusion couplings as slip couplings.
2. Using a PPR plug repair kit.

Cutting in a new section of MecFlow using electrofusion couplings

1. Drain the system completely before cutting out the repair section.
2. Measure and mark the section(s) to be cut out.
3. Cut out the section for repair. Make sure the cuts are square.
4. Ensure the cut pipe ends are dry. Mark the EF coupling insertion depth.
5. De-oxidise the pipe ends ready for welding.
6. Prepare the repair piece and de-oxidise the pipe ends.
7. Slip the electrofusion couplings onto the repair piece.
8. Offer the repair piece up to the job and slip the couplings onto the system.
9. Line the couplings up to the insertion depth marks on both sides.
10. Ensure there is no external stress on the system and/or couplings.
11. Go through the welding process as described in Jointing Methods, Section 10.
12. The system can be re-tested once the EF couplings have completed their cooling time.

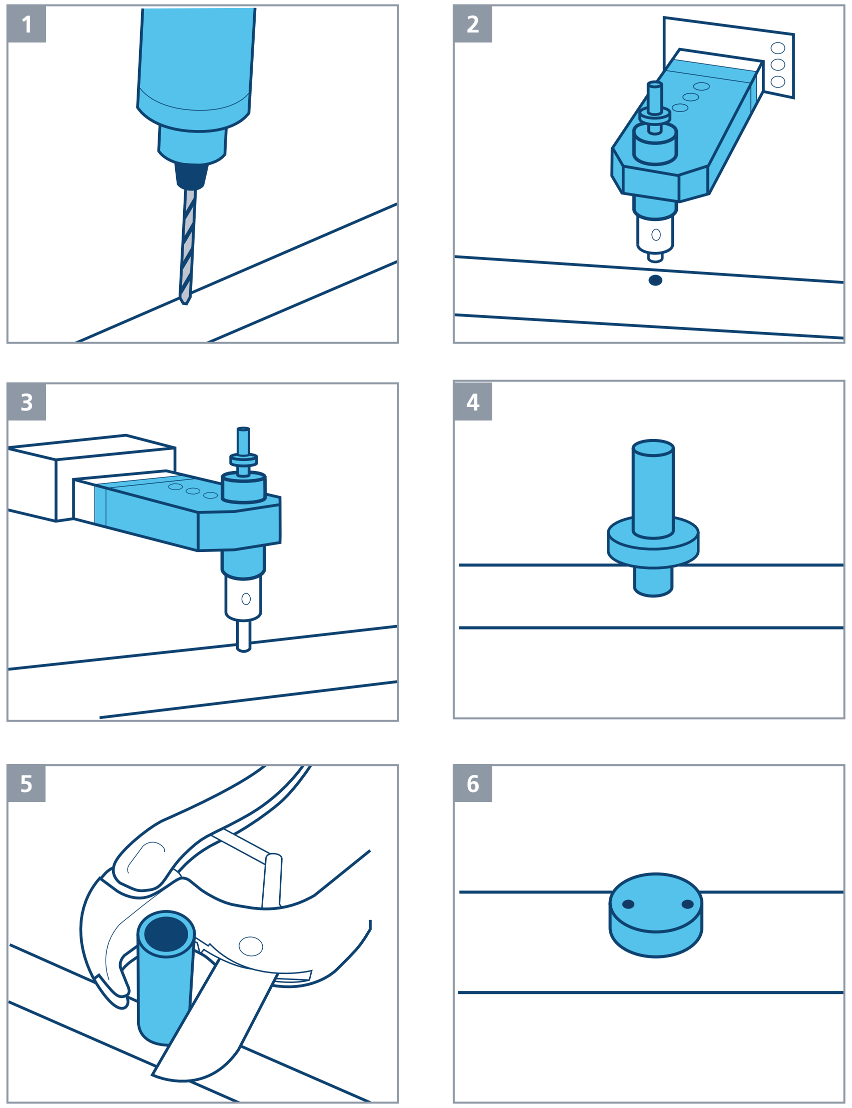
Diagram 8.03



System commissioning & maintenance - general (continued)

PLUGGING USING REPAIR KIT

1. Drain the system section to be repaired completely. Drill the hole to be repaired with an M8 drill bit – ensure that the hole is at 90° to the pipe.
2. Using the repair iron, heat the hole surface and repair plug at the same time for 15 seconds.
3. Remove the iron from the hole and insert the repair plug immediately.
4. Hold plug in place for 1 minute.
5. Cut off any remaining protrusion of the repair plug.
6. The joint shall be ready for testing after 5 minutes.



System commissioning & maintenance - general (continued)

SYSTEM FLUSHING

Once the hydrostatic test has been successfully completed the system should be flushed with drinking water immediately before commissioning. Flushing should be carried out in accordance with the aforementioned guidance documents. If the system is not placed in service after testing and flushing, it should be flushed according to procedures at regular intervals.

CHEMICAL DISINFECTION

Where a MecFlow system needs to be disinfected before being brought into service, the methods described in the previously mentioned guidance documents must be strictly adhered to.

Care must be taken to select the correct disinfectant, ensure that the dilution is controlled, ensure the level of disinfectant over a given contact period is observed, that samples are taken at the correct points to assess the efficiency of the disinfection, and finally that the system is thoroughly flushed through after the disinfection to remove the disinfectant before the system is put into service.

THERMAL DISINFECTION

MecFlow can withstand thermal disinfection process ≤70°C.

SHOCK CHEMICAL DISINFECTION

Although the MecFlow system does not promote bacterial growth, it is possible that it may be installed in a system that, under certain circumstances, could require disinfection during its service life – either as part of a maintenance regime or because the level of bacterial growth in the total system presents a hazard.

In this instance, the total system may require shock disinfection. Documents such as 'The Control of Legionella in Water Systems – Approved Code of Practice L8' provide guidance on methods of shock disinfection, and these must be rigidly adhered to. If there is any doubt about the method, chemical, temperature or contact period prescribed in the above, or any other guidance document, then please contact the Polypipe Advantage team on 01622 795200 for further technical advice.

CHLORINE DIOXIDE

The use of chlorine dioxide as a disinfectant is permitted however the level of constant dosing must be strictly controlled and shall not exceed 0.5mg/l. Guidance as to the use of this chemical as a disinfectant is provided in BS EN 806 and the addendum BS 8558:2015. Further guidance is provided in ACoP L8.

13. Certification & approvals

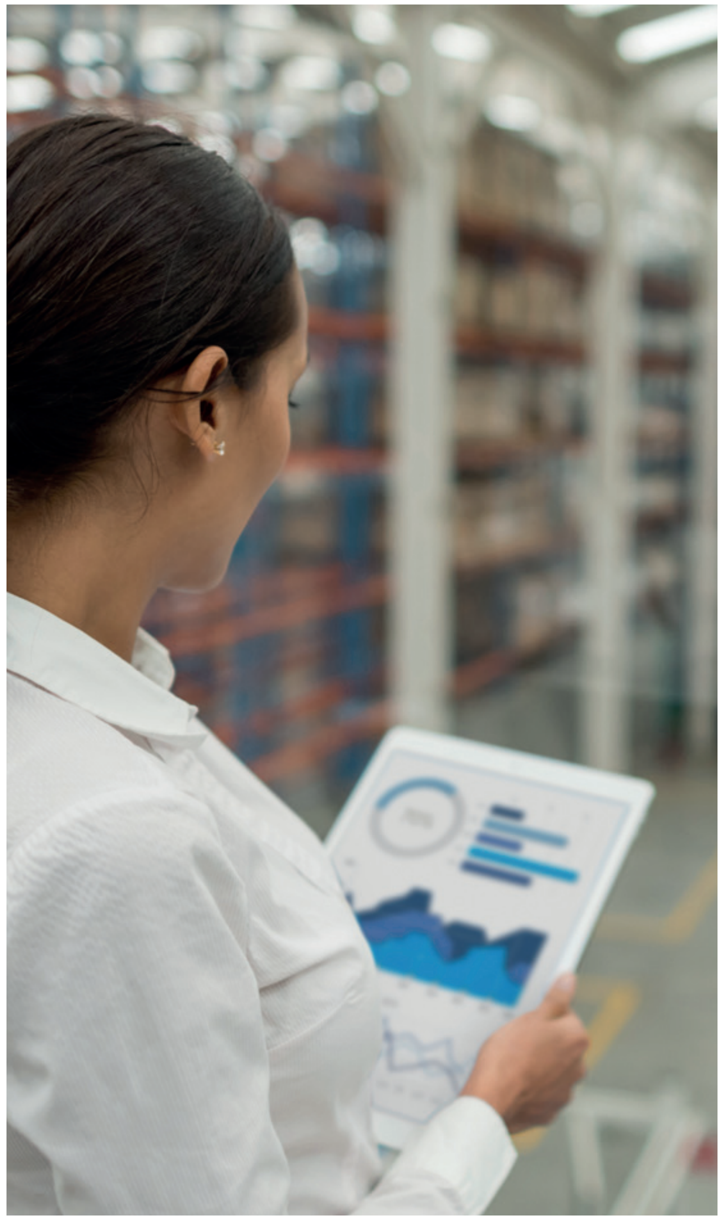
Quality Management System

The MecFlow range is manufactured under a strict Quality Management System (QMS). The MecFlow QMS is periodically third party audited and certified to ISO 9001 Quality Management.

The system requires demonstrated compliance to:

- Organisational competence, training and documentation.
- QA measurement and test equipment – periodic calibration and documentation.
- Inspection and measurement of input raw material and documentation.
- Process control documentation and recording of process conditions.
- Inspection and measurement of finished product and documentation.
- Treatment, storage and handling of finished product and documentation.
- Product marking and traceability.
- Treatment of non-conforming material/product, corrective action and documentation.
- New product design and change of product design process, recording and documentation.

Please go to www.polypipe.com/mecflow for our latest certificates and for any further information or advice, please call the Polypipe Advantage team on **01622 795200**.



Quality assurance

To underpin the QMS, the MecFlow product is checked several times during its manufacture and testing.

RAW MATERIAL INPUT

Before any raw materials enter the manufacturing facility, checks are made to affirm that they conform with the relevant manufacturing standards. Tolerances are provided to be measured against, and any materials which are out of tolerance are rejected.

MATERIAL FORMULATION

Once the raw material is accepted into the manufacturing facility, the required materials recipe is formulated in the mixing plant. Post-mixing, the material is tested for its mechanical and processing characteristics. Any out of tolerance material is assessed and, where possible, re-worked into other non-pressure products.

PRODUCT MANUFACTURE

During manufacture, products are periodically checked for dimensional stability and processing conditions are logged. Any non-conforming products are assessed and, where possible, re-worked into other non-pressure products.

POST PRODUCTION TESTS

Post manufacture the products are subjected to several individual checks to assess:

- Dimensions
- Finished appearance
- Material homogenity
- Hydrostatic pressure resistance
- Mechanical behaviour
- Tensile strength
- Material resistance to elevated temperature

Any test failure will result in further checks to the manufacturing batch. All failed product batches will be assessed for suitability for recycling back into a non-pressure production process.

POLYPIPE ADVANTAGE

The Polypipe Advantage team is on-hand to provide support and system design to deliver an end-to-end water supply solution. They'll create a system that's specific to your project, and all under factory-controlled conditions within our state-of-the-art fabrication facility. Your Kit will then be delivered to site, ready for installation.

- Designed using BIM technology, in line with ISO 15874 standards
- Fabricated, tested and fully inspected under factory-controlled conditions
- Delivered to site as a ready-to-install Kit
- Delivered in accordance with FORS Silver – when transported directly from Polypipe

Certification

The MecFlow system is made to the manufacturing standards stated below. These standards set out the dimensional, physical and mechanical characteristics that each individual product shall conform to.

ISO 15874 Plastics piping systems for hot and cold water installations – Polypropylene (PP)

- Part 1 – General
- Part 2 – Pipes
- Part 3 – Fittings
- Part 5 – Fitness for purpose of the system
- Part 7 – Guidance for assessment of conformity

DIN 8077 Polypropylene (PP) pipes - PP-H, PP-B, PP-R, PP-RCT – Dimensions.

DIN 8078 Polypropylene (PP) pipes - PP-H, PP-B, PP-R, PP-RCT – General Quality Requirements & Testing.

NTC 4897-2 Systems of plastic pipes for hot and cold water – Polypropylene (PP).

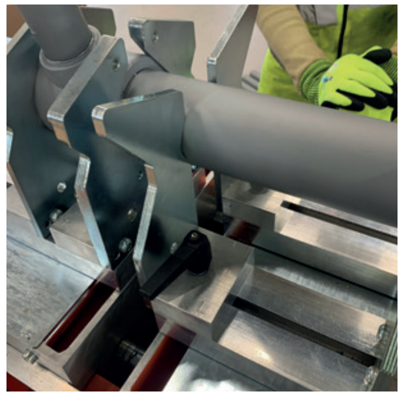
RP 01.00 Common requirements for AENOR Certification of Plastic Products.

RP 01.78 Special regulations of the Certificate of Conformity AENOR for Piping Systems in random polypropylene with modified crystalline structure (PP-RCT) and fiberglass (FV) for hot and cold water installations inside the structure of the Buildings.

BS EN ISO 1043-1:2011+A1:2016 Plastics. Symbols and abbreviated terms. Basic polymers and their special characteristics.

ISO 9080:2003 Plastics piping and ducting systems – Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation.

BS EN ISO 7686:2005 Plastic pipes and fittings. Determination of opacity.



The MecFlow system is Cradle to Cradle Gold Certified®. This is a globally recognised measure of safer, more sustainable products made for the circular economy.

WRAS CERTIFICATION

The MecFlow system has both WRAS material and WRAS product approval. For a copy of the certificates, please contact Polypipe Advantage team, email **buildingservices.technical@polypipe.com** or call 01622 795200.

WRAS 1907063 – MecFlow Pipe and Fittings

FIRE COMPARTMENTALISATION

MecFlow has been 3rd Party tested with Polypipe Firetrap Sleeves (passive fire protection products) to achieve a 2-hour insulation and integrity compartment rating. Testing was performed at Exova, Warrington, and a test certificate can be requested through Polypipe Advantage team, email **buildingservices.technical@polypipe.com** or call 01622 795200.

FIRE CLASSIFICATION

The MecFlow system has been 3rd party tested to the standard stated below and achieved a classification of B-s1, d0. This is the highest classification that an inorganic material can obtain. The test was performed by AIFITI, Madrid, and a test certificate can be requested through Polypipe Advantage team, email **buildingservices.technical@polypipe.com** or call 01622 795200.

BS EN 13501-1:2018 Fire classification of construction products and building elements. Classification using data from reaction to fire tests.

TERMS AND CONDITIONS

For our Terms and Conditions please visit our website: **www.polypipe.com/trading-terms-conditions**

14. Technical specification

System description

The MecFlow system shall be as indicated on the drawings, manufactured in accordance with ISO 9001 and delivered within the agreed programme of works.

The product shall be designed and delivered as a fabricated solution in accordance with site specific design criteria with welds pre-tested during the manufacturing process.

The system shall be manufactured using multi-layer pipe technology made from reinforced Polypropylene, suitable for use in the following applications:

1. Boosted Cold Water
2. LPHW / LTHW
3. Chilled Water
4. Heating

The MecFlow product shall be suitable for water temperatures up to 95°C. Operating pressures vary dependant on fluid temperatures, as displayed in the Working Pressures table within the MecFlow Technical Manual.

Pipework joints and connections are to be made utilising electrofusion jointing methods, providing a homogenous weld.

TEMPERATURE	YEARS OF SERVICE	MECFLOW DIAMETERS 32mm		MECFLOW DIAMETERS 40 - 160mm	
		BAR	PSI	BAR	PSI
10°C	1	39.20	568.52	25.08	363.75
	5	38.20	554.04	24.40	353.89
	10	37.57	544.90	24.04	348.67
	25	36.75	533.01	23.52	341.12
	50	36.50	529.38	23.36	338.80
	100	35.95	521.41	23.00	333.58
20°C	1	34.15	495.30	21.85	316.90
	5	33.05	479.34	21.15	306.75
	10	32.77	474.70	20.97	304.14
	25	32.00	464.12	20.48	297.03
	50	31.70	459.76	20.30	294.42
	100	31.10	451.79	19.93	289.06
30°C	1	29.80	432.21	19.08	276.73
	5	29.00	420.60	18.56	269.19
	10	28.45	412.63	18.20	263.96
	25	27.90	404.65	17.85	258.89
	50	27.62	400.59	17.68	256.42
	100	27.05	392.32	17.31	251.06
40°C	1	26.05	377.82	16.67	241.77
	5	25.20	365.49	16.12	233.80
	10	24.65	357.51	15.77	228.72
	25	24.37	353.45	15.60	226.25
	50	23.82	345.47	15.24	221.03
	100	23.52	341.12	15.05	218.28
50°C	1	23.05	334.31	14.75	213.93
	5	22.17	321.54	14.19	205.80
	10	21.60	313.28	13.82	200.44
	25	21.30	308.93	13.63	197.78
	50	20.75	300.95	13.20	191.44
	100	20.45	296.60	13.00	188.54
60°C	1	19.37	280.93	12.40	179.84
	5	18.80	272.67	12.03	174.48
	10	18.50	268.31	11.84	171.72
	25	17.92	259.90	11.47	166.35
	50	17.70	256.71	11.30	163.89
70°C	1	16.55	240.03	10.59	153.59
	5	15.67	227.27	10.00	145.03
	10	15.40	223.35	9.85	142.86
	25	15.10	219.00	9.66	140.10
	50	14.90	216.10	9.50	137.78
80°C	1	13.82	200.44	8.84	128.21
	5	13.22	191.73	8.46	122.70
	10	12.92	187.38	8.27	119.94
	25	12.70	184.19	8.10	117.48
95°C	1	10.75	155.91	6.88	99.78
	5	10.15	147.21	6.49	94.12

Table 10.01

$$p = \frac{\sigma}{S \times SF}$$

p = Admissible work pressure
σ = Hydrostatic effort at MPa
S = Pipes series
SF = Security factor

Working pressure supported by the pipes for pressurised water.

The maximum work pressures according to the resistance equation to the internal pressure in accordance with DIN 8078, bearing in mind a security factor SF.

System description

TECHNICAL CHARACTERISTICS			
PROPERTIES	VALUES	UNITS	STANDARDS
Material	PPR CT RP + FV	-	-
Density	>0.93	g/cm^3	ISO 1183
Melt mass flow rate (230°C/2,16kg)	0.25	g/10'	ISO 1133
Hydrostatic (hoop) stress (20°C–1h) a 15 Mpa	No fault	-	ISO 1167
Hydrostatic (hoop) stress (95°-22h) a 4.2 Mpa	No fault	-	ISO 1167
Hydrostatic (hoop) stress (95°C–165h) a 4.0 Mpa	No fault	-	ISO 1167
Hydrostatic (hoop) stress (95°C–1000h) a 3.8 Mpa	No fault	-	ISO 1167
Thermal stability (110°C–8760 h) a 2.6 Mpa	No fault	-	ISO 1167
Longitudinal retraction (135°C)	<2	%	ISO 2505
Tensile Modulus	>950	Mpa	ISO 527
Tensile strain at yield	>12	%	ISO 527
Ultimate tensile stress	>30	Mpa	ISO 527
Lineal thermal expansion	<0.04	mm/m°C	-
Thermal conductivity coefficient	0.24	W/m°C	DIN 52612
Opacity	SI	-	ISO 7686
Impact resistance determination (ball drop method)	H50≥1m (s3,2) H50≥0.7m (s4 - s5 - s6,3- s8)	m	EN 1411
Roughness k	0.003	mm	-

Table 10.02

The MecFlow product shall be offered to meet fire classification level B-s1,d0 in accordance with EN13501.

The MecFlow product is a low smoke, zero halogen product with anti-microbial and anti-fouling properties built into the product. The product is disinfection resistant with no degradation of the pipe during the disinfection process.

The MecFlow product is UV stabilised and has a high abrasion resistance ensuring a durable, reliable product during installation.

The MecFlow product range offers comprehensive solutions inclusive of riser pipework, run-out to manifolds, run-out to corridor (with tee connections into separate supply areas), as well as a range of two to twelve-port manifolds (other combinations to be made available upon request).

MecFlow products shall be supplied with minimal packaging. Where items are to be supplied loose (in the case of electrofusion couplings), they are to be supplied in returnable totes, to minimise the quantity of waste on-site. Where possible, pipework systems shall be delivered on returnable stillages.

INSTALLATION

The pipework should be insulated (by others) in accordance with the application of use and specification requirements.

The Installation Engineer shall take care to ensure adequate bracketry and fire sleeves are used as per the specification requirements.

TESTING

The MecFlow product will be supplied with pre-tested welds for fabricated sections of pipework. Post-installation testing shall be carried out in-line with the specification requirements to ensure all electrofusion couplings have been fired correctly as per manufacturer guidelines.

FLUSHING

The MecFlow product shall be flushed in accordance with the specification requirements.

15. Support

As the industry moves forward, we're here right by its side. MecFlow, through our Polypipe Advantage service, is proof of our commitment to making things simple for our customers, an innovative plastic water supply system that's designed for the future.

Our website also provides useful information to keep you up to date with news and innovations as they happen, including how MecFlow can further enhance your project, whilst providing a streamlined, cost-effective, labour and time-saving alternative to traditional piping methods.

The future of supply systems starts here.

To find out more visit polypipe.com/mecflow

Polypipe Building Services

Investing in our business and our people enables us to bring more expertise, more support and more innovation to our customers, helping them to create safe and sustainable commercial buildings, whether newbuild or refurbishment projects.

BUILDING SERVICES SPECIALISM

Having made significant investment in expanding our portfolio to include not only our trusted and well-established Terrain drainage systems, but also MecFlow, our new supply system, we're committed to working with our customers to provide the best building services solutions for their project. From schools, hospitals and tall buildings to shopping centres, local authorities and commercial and industrial developments, we provide drainage and supply solutions that help our customers create safe and sustainable services within buildings.

SERVICE AND SUPPORT

Recognising the challenges the construction industry faces, we continuously research and develop products and services that enable us to support our customers more – from working with Engineers to design the best solutions for complex projects to helping Contractors overcome labour shortage issues, a lack of on-site storage and on-site waste management. We develop services to support our customers so that together, we can achieve more.

POLYPIPE ADVANTAGE SERVICE

The Polypipe Advantage service has been specially developed to complement our products and services offering. The Polypipe Advantage team is with you every step of your project, from initial design and project planning, through to manufacture and delivery. By creating fabricated Terrain drainage stacks and MecFlow Solutions off-site, we're able to provide our customers quick and more efficient installations on-site. For more information on how the Polypipe Advantage service could benefit your next project, email: **buildingservices.technical@polypipe.com**.

SUPPORTING PRODUCTS AND LITERATURE

With both drainage and water supply systems in its portfolio, Polypipe Building Services has a number of solutions for your next project. More information on these systems can be found at: **polypipe.com/commercial-building-services**

TAKING YOUR PROJECT FURTHER

As part of the Genuit Group, we have a number of complementary water and climate management systems available to maximise the comfort and efficiency of your commercial building:

Nuaire Ventilation Systems
Our Nuaire brand has been at the forefront of packaged Air Handling Units (AHUs) for over 20 years, designing and manufacturing market leading ranges. Explore the full range of Nuaire ventilation systems at **www.nuaire.co.uk**.

Polypipe Underfloor Heating
Underfloor heating systems are increasingly popular and are rapidly becoming the heat source of choice for commercial and multioccupancy residential developments. For more information on our range of Underfloor Heating Systems, controls and manifolds visit: **www.polypipeUFH.com**.

Polypipe: Inspiring Green Urbanisation
To help address the pressures that urbanisation and climate change place on our built environment, we've developed a new generation of technologies that sustain and optimise urban green assets through extended and fully integrated water management solutions. Systems that make space for water, alleviate flooding and capture, store and reuse rainwater, whilst enabling and inspiring Green Urbanisation. **www.polypipe.com/civils/gi**

Polypipe Advantage
+44 (0)1622 795200

Terrain Drainage
+44 (0)1622 795200

The Polypipe Way
+44 (0)1709 770000

Polypipe: Inspiring Green Urbanisation
+44 (0)1509 615100

Notes

Notes

MecFlow.
The future of
supply systems.

Polypipe Building Services
New Hythe Business Park
College Road
Aylesford
Kent
ME20 7PJ
Tel +44 (0) 1622 795200
Email buildingservices.technical@polypipe.com
www.polypipe.com/mecflow