



Plastics Industry Pipe Association
of Australia Limited

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Technical Manual

PE PIPE SYSTEM MAINTENANCE GUIDE

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Pipelines Integrity For a Cleaner Environment



Disclaimer

In formulating this manual PIPA has relied upon the advice of its members and, where appropriate, independent testing.

Notwithstanding, users of the manuals are advised to seek their own independent advice and, where appropriate, to conduct their own testing and assessment of matters contained in the guidelines, and to not rely solely on the manual in relation to any matter that may risk loss or damage.

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PE PIPE SYSTEM MAINTENANCE GUIDE

Introduction

Polyethylene pipe forms the basis of Australia's gas reticulation network, is widely used in the mining and irrigation industries and is being used increasingly for the supply of water and disposal of wastewater in new infrastructure and renewals/rehabilitation of existing networks. Polyethylene pipe systems are also particularly suited for trenchless technology applications.

With this increasing use there is a need to ensure that there are a suitable range of fittings which are readily available to allow changes to the pipeline systems and to carry out maintenance or repairs. This guide has been developed to summarise the products that are readily available to the Australian market primarily for maintenance purposes.

This guide is not intended to provide detailed instructions on how to use each product.

Some of these products require specific operator skills so it is imperative that suitably trained personnel install these fittings. Such fittings are typically electrofusion fittings where specific requirements for surface preparation, clamping and bracing, along with compatible electrofusion equipment, are necessary to ensure long-term performance of network systems.

It should be noted that butt fusion welding, which is extensively used in the initial installation of PE pipe systems, is often not a practical joining technique for maintenance purposes and has not been included in this guide. That is not to suggest that butt fusion could not be used under the appropriate circumstances.

Users of this manual should note that this document does not constitute an approved list of products and the onus is on installers to ensure that the proposed fittings to be used have been authorised by the relevant asset owner.

1 TAPPING

1.1 Using Electrofusion Saddles

Size Range: Up to and including DN 375

Manufacturers/Suppliers: Plasson, George Fischer, AGRU, Friatec, Philmac, Durafuse

Comments:

- Jointing surface of pipe must be dry, clean and suitably scraped
- Can be used with pressurised pipe

- Can incorporate integral service isolation valve (with integral cutter) or provide means to connect a separate valve or provide for direct connection to service pipe.
- Suitable for gas, air and water applications
- Check pressure rating of saddle is compatible with operating pressures of pipe system
- Check electrofusion equipment is compatible with fittings
- Follow the manufacturer's installation instructions.

1.2 Using Mechanical Sealing Saddles Size Range: Up to and including DN 375

Manufacturers/Suppliers: Plasson, Philmac, Milnes, Crevet, Hawle , PPI



Comments

- External surface of pipe can be wet
- Can be used with pressurised pipe
- Provide means to connect service isolation valve or direct connection to service pipe via threaded connection
- Ensure saddle is correct size for PE DN — don't use Series 2 Ductile Iron equivalent sized saddles
- Use saddles that fully encircle the pipe and have a positive "stop" to prevent overtightening
- Follow the manufacturer's installation instructions.

2 PUNCTURE OR HOLE REPAIR

2.1 Using Electrofusion Repair and Patch Saddles

Size Range: DN 90 to DN 560 inclusive; smaller sizes available ex stock with larger sizes made to order

Manufacturers/Suppliers:
Friatech



Comments:

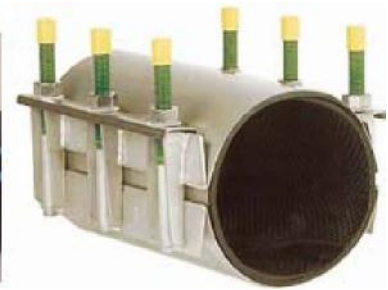
- Jointing surfaces must be dry, clean and suitably scraped
- Lead times need to be considered for made to order components

- Check pressure rating of saddle is compatible with operating pressures of pipe system
- Check electrofusion equipment is compatible with fittings
- Follow the clamp manufacturer's installation instructions.

2.2 Using Mechanical Sealing Repair Clamps

Size Range: all sizes dependent on manufacturer

Manufacturers/Suppliers:
Crevet, George Fischer, PPI



Comments:

Use where the pipe is able to maintain its structural integrity

- Use where damage is a clean puncture that is not going to extend beyond the clamp
- Same clamps as used on PVC, DI and steel pipes
- Surfaces must be clean but may be wet
- Follow the clamp manufacturer's installation instructions especially bolting torques
- If leakage persists do not over tighten bolts, remove clamp and repeat installation procedure paying particular attention that surfaces are clean and clamp is correctly positioned over damage
- Stainless steel fittings should not be used in'
 - Permanent ground water conditions
 - High salinity estuarine or similar soils.

3 BRANCH CUT-INS

3.1 Using Electrofusion Fittings





Size Range: Up to and including DN 700 dependent on manufacturer with various outlets

Manufacturers/Suppliers: Plasson, George Fischer, AGRU, Friatec, Durafuse

Comments

- Choice of insert or saddle fittings to suit installation conditions
- Jointing surfaces must be dry, clean and suitably scraped
- Check pressure rating of fitting is compatible with operating pressures of pipe system
- Check electrofusion equipment is compatible with fittings
- Follow the manufacturer's installation instructions.

3.2 Using Fittings with Mechanical Restraint



Size Range: dependent on pressure rating of pipe system, **PN 16** available to **DN 400**, lower pressure ratings in larger sizes varies with supplier. In sizes up to **DN 63** some suppliers offer a slip coupling option.

Manufacturers/Suppliers: Hawle, Viking Johnson, Philmac, Plasson, George Fischer.

Comments:

- External surfaces must be clean but installation can take place in wet conditions
- Need to match pressure rating to application
- May require a combination of couplers and tee fittings depending on site conditions
- Restrained joint flange adapters may also be used
- Follow the fitting manufacturers' installation instructions including pipe end preparation
- Larger diameters may require a reinforcing insert to be placed inside the pipe spigot.

4 VALVE CUT-INS

4.1 Using Valves with Electrofusion and Butt Weld end connections



Size Range: **PN 16** available in sizes up to and including **DN 300**
Manufacturers/Suppliers: Hawle, AVK

Comments:

- Valve has PE pipe "tails" that can be welded directly into pipeline using either butt or electrofusion methods
- Jointing surfaces must be dry , clean and suitably scrapped for electrofusion options
- Check electrofusion equipment is compatible with fittings
- Butt fusion welding can be used for new installations
- Restrained mechanical couplings can be used in wet conditions
- Follow the manufacturers installation instructions including torques and pipe end preparation for mechanical couplings.

4.2 Using Valves with Mechanically Restrained Joint end connections



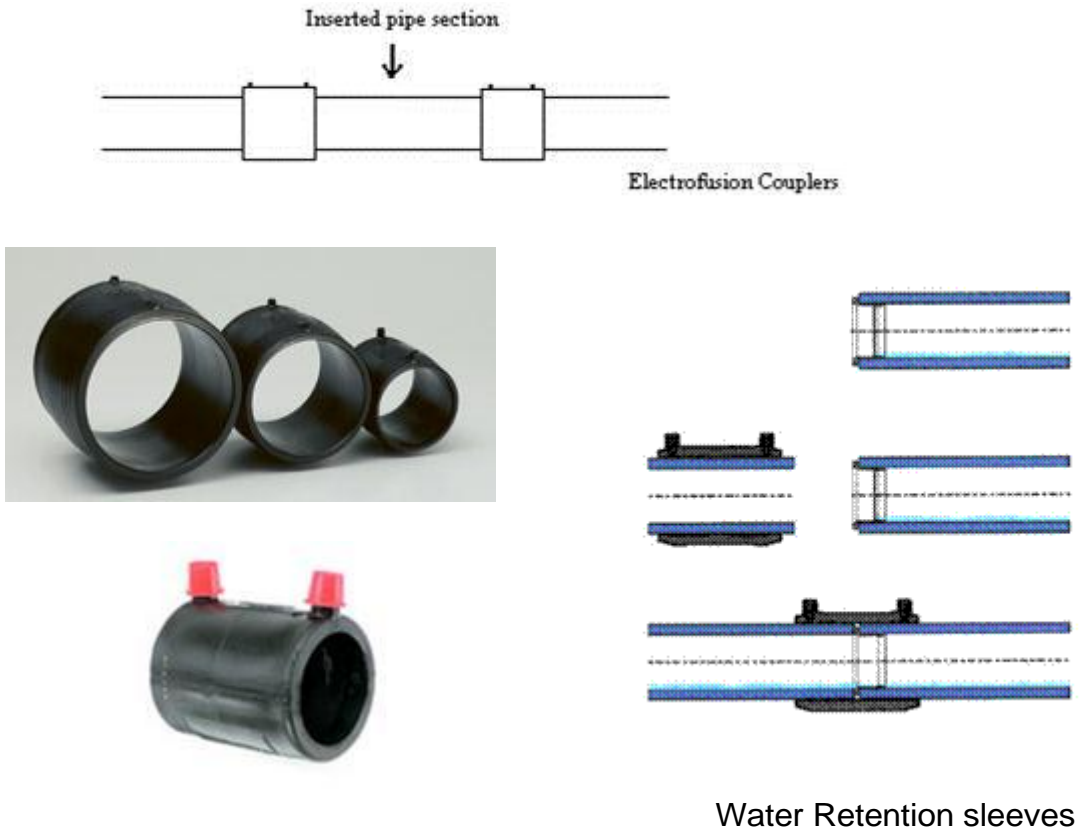
Size Range: dependent on pressure class of pipe system, **PN 16** available in sizes up to and including **DN 300**, above this size need to check with individual suppliers.

Manufacturers/Suppliers: Hawle, AVK, Viking Johnson. Comments:

- Installation can take place in wet conditions on cleaned pipes
- Sizes up to and including DN 300 available with integral restraint
- Larger sizes will need flange adapters
- Follow the valve manufacturer's installation instructions including bolt torques.

5 SECTION REPLACEMENTS

5.1 Using Electrofusion Couplers

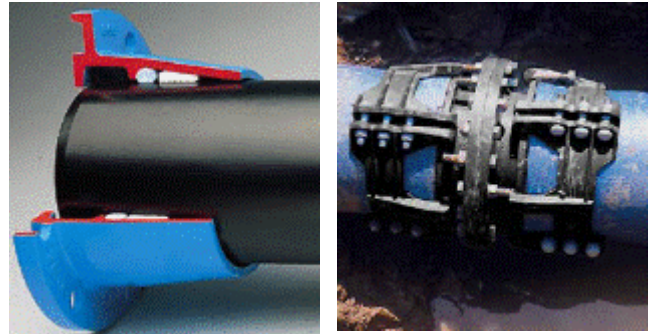
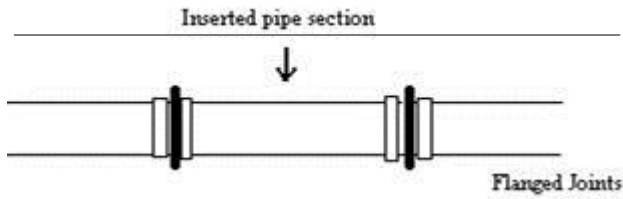


Size Range: up to and including DN 700

Manufacturers/Suppliers: George Fischer, AGRU, Plasson, Friatec. **Comments:**

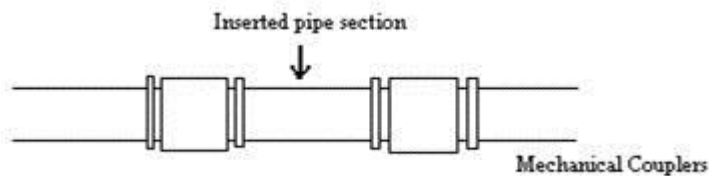
- Jointing surface of pipe must be dry, clean and suitably scraped
- Check pressure rating of coupler is compatible with operating pressures of pipe system
- Inner sleeves available to seal in water to allow electrofusion couplers to be used when water flow cannot be completely stopped
- Check electrofusion equipment is compatible with fittings.

5.2 Using Mechanically Restrained Joint Couplings and/or Flange Adaptors



Size Range: dependent on pressure rating of pipe system, PN 16 available in sizes up to and including DN 400, lower pressure ratings in larger sizes.

Manufacturers/Suppliers: Hawle, AVK, Viking Johnson, George Fischer, Straub, Plasson, Philmac



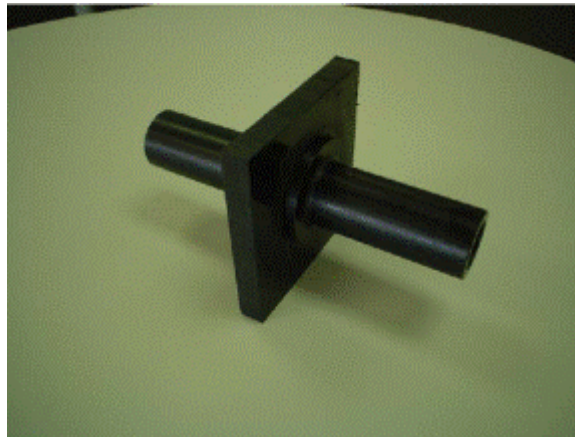
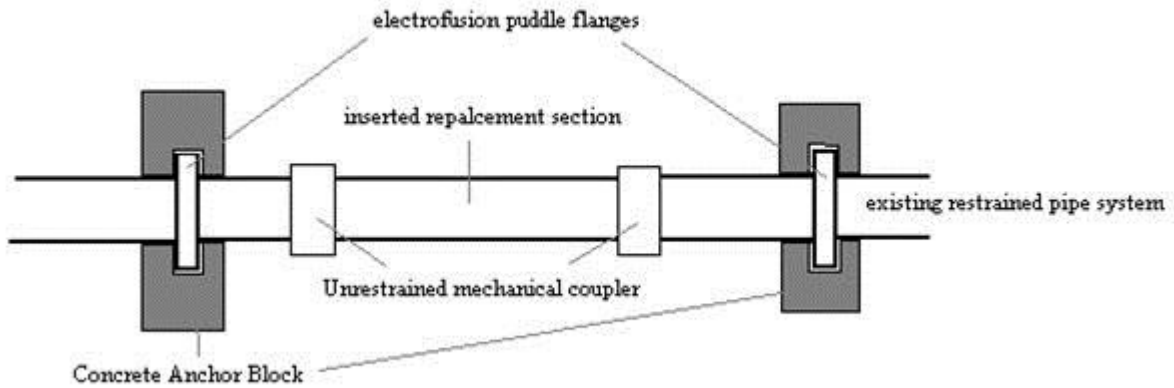
Comments:

- Installation can take place in wet conditions
- Need to match coupling or flange adaptor specifications to pressure class of pipe system — due to the high end loads larger sizes have progressively lower pressure class limits
- Follow the fitting manufacturer's installation instructions including pipe end preparation.

5.3 Using Unrestrained Joint Mechanical Coupling

Size Range: all sizes

Manufacturers/Suppliers: Hawle, AVK, Waga, Straub.

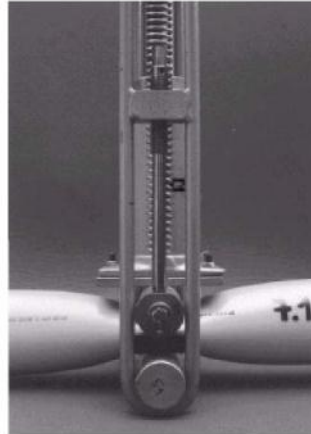


Comments:

- When using unrestrained couplings in most pressure applications the existing pipeline will need to be anchored either side of the replaced section
- Electrofusion puddle flanges or similar can be used to provide anchor points on the existing pipeline on both sides of the replaced section
- Ensure the concrete anchor blocks are of suitable size to restrain pipe
- Ensure that the replacement section has the same SDR as the existing pipe
- Follow the coupling manufacturer's installation instructions including bolt torques and pipe end preparation.

6 FLOW CONTROL USING SQUEEZE OFF TOOLS

Manufacturers/Suppliers: Plasson, Swan Imports



Comments:

- Squeeze off can be used like a valve to close off the flow of material through a PE pipeline.
- For practical purposes limited to around DN 400 and the process needs to be carefully monitored as there are limits on the wall thickness and diameter of pipes that can be squeezed off.
- The rate of squeeze-off and the release rate require close monitoring so as not to damage the pipe — particularly the rate of release of the clamp
- Squeezed off areas must be marked, never squeezed off twice in the same location and consideration given to post squeeze off reinforcement or removal of the squeezed off area.
- ASTM F 1041 can be used as a reference guide.
- WSAA Tech Note 1 is also a useful reference — see www.wsa.asn.au

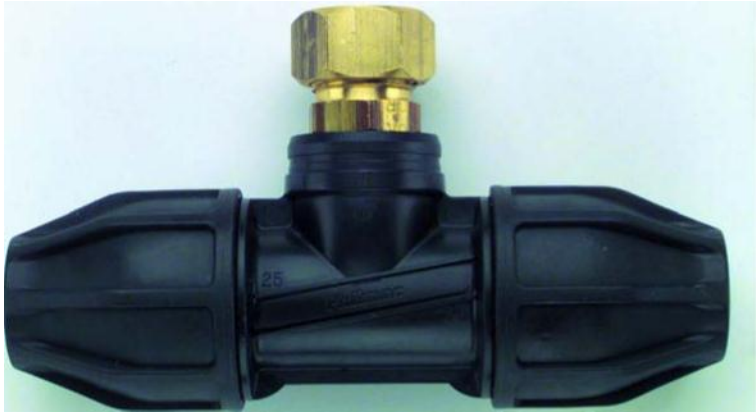
- Tools may be manually or hydraulically operated depending on the force required to effect the squeeze-off.
- Tools should comply with ASTM F1563: Standard Specification for Tools to Squeeze-Off Polyethylene (PE) Gas Pipe or Tubing.

7 SPECIALTY FITTINGS

7.1 Transition Fittings — EF and Mechanical

- To transition from PE to other pipe materials
- Follow the fitting manufacturer's installation instructions





Suppliers Contact List

Brand	Suppliers
AGRU	AGRU Australia
AVK	Iplex Pipelines
Durafuse	Philmac Australia
Friatec	Philmac Australia
George Fischer	George Fischer Australia, Iplex Pipelines
Hawle	Vinidex
Philmac	Philmac Australia
Plasson	Plasson Australia, Vinidex
PPI	PPI Corporation
Straub	Philmac Australia
Viking Johnson	Philmac Australia
Waga	George Fischer Australia, Iplex Pipelines

Supplier	Contact Details
AGRU Australia	1300 136 698, sales@agru.com.au
George Fischer	(02) 9502 8000, australia.ps@georgefischer.com
Iplex Pipelines	13 18 40, sales@iplexpipelines.com.au
Philmac Australia	(08) 8300 9200, philmac@philmac.com.au
Plasson Australia	(02) 9362 2433, info@plasson.com.au
PPI Corporation	(07) 3865 3699, sales@ppi.com.au
Vinidex	13 11 69, info@vinidex.com.au