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Irrigation Warehouse Group Pty Ltd
www.polypipe.com.au
Ph 1300 661 417

Electrofusion

Vinidex PE electrofusion system consists of moulded couplings, tapping saddles, and fittings with electric elements contained in the fitting. (Figure 6.3).

When a controlled electrical current is passed through the resistance wire, there is a temperature increase, the resulting heat being transferred to the jointing surfaces until melting occurs. The joint surfaces are held under pressure until cooled.

Vinidex electrofusion fittings require a 39.5 (40) Volt power source provided by a control box from a 240 Volt 50Hz, single phase supply. Where a generator is used, this requires a minimum power of 3 kVA. If multiple control boxes are used on a project, then a 5 kVA generator may be required.

Vinidex electrofusion fittings use a single connection pin of 4.7 mm diameter.

Electrofusion control boxes must not be used in explosive atmospheres. In deep trenches, tunnels, or mine workings, the power source may require approval by the local electricity utility.

All electrofusion joints must be carried out under cover to prevent contamination by dust, moisture and dirt, and be clamped to prevent movement in the joint until the cooling period has been completed.

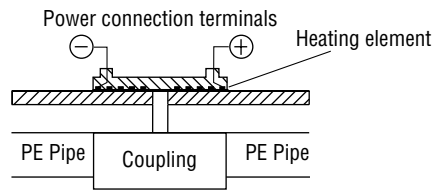


Figure 6.3 Electrofusion

1. Cut the pipes square, and mark the pipes at a length equal to the socket depth.
2. Scrape the marked section of the pipe spigot to remove all oxidised PE layers to a depth of approximately 0.3mm. Use a hand scraper, or a rotating peel scraper to remove the PE layers. Do not use sand paper. Leave the electrofusion fittings in the sealed plastic bag until needed for assembly. Do not scrape the inside of the fitting, clean with an approved cleaner to remove all dust, dirt, and moisture.
3. Insert the pipe into the coupling up to the witness marks. Ensure pipes are rounded, and when using coiled PE pipes, re rounding clamps may be needed to remove ovality. Clamp the joint assembly.
4. Connect the electrical circuit, and follow the instructions for the particular power control box. Do not change the standard fusion conditions for the particular size and type of fitting.
5. Leave the joint in the clamp assembly until the full cooling time has been completed.



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Socket Fusion

Socket fusion of Vinidex PE systems is available in the diameter range 20mm to 110mm.

Socket fusion consists of jointing couplings, and fittings with a close tolerance moulded socket section into which the pipe or fitting spigot is inserted.

The fusion process is achieved by heating the spigot, and socket jointing surfaces above the crystalline melt point temperature of PE by insertion into a heated element tool. The heated joint sections are then assembled, and held until cooling to ambient temperature takes place. See Figure 6.4.

The heater elements are PTFE coated, and at all times must be kept clean and free from contamination. The heater tools need to be set and calibrated to maintain a surface temperature range of 260°C +/- 5°C. All jointing must be performed under cover to prevent contamination of the joints by dust, dirt, or moisture.

1. Cut the pipes square, clean the spigot section with a clean cloth and a non depositing alcohol to the full depth of the socket. Mark the length of the socket. Clean the inside of the socket section.
2. Scrape the outside of the pipe spigot to remove the oxidised layer from the pipe. Do not scrape the inside of the sockets.

3. Confirm the temperature of the heating elements, and ensure that the heating surfaces are clean.
4. Push the spigot, and socket sections on to the heating elements to the full length of engagement, and allow to heat for the appropriate period. See Table 6.1.
5. Pull the spigot and socket sections from the heating elements, and push together evenly to the full length of engagement without distortion of the joints. Clamp the joints and hold until fully cooled. The weld flow bead should then appear evenly around the full circumference of the socket end.

The completed joints must be allowed to cool fully to ambient temperature before performing pressure tests.

Figure 6.4
Schematic Sketch of the Fusion Welding Process

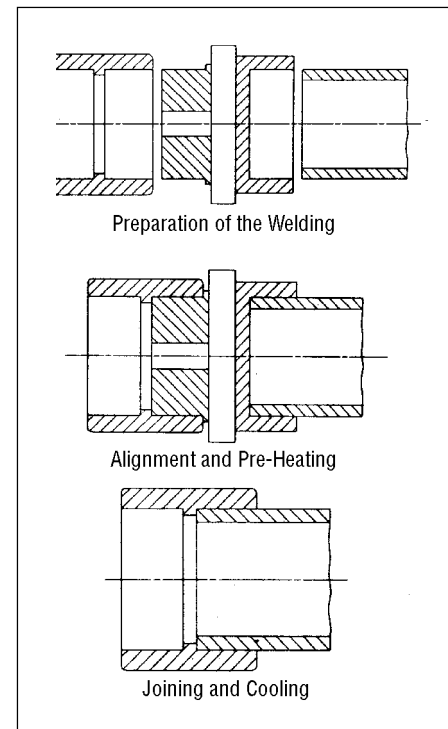


Table 6.1 Socket Fusion Times

Pipe Diameter DN mm	Tool Heating Time seconds	Assembly Time seconds	Cooling Time minutes
16	5	4	2
20	5	4	2
25	8	4	2
32	10	6	4
40	15	6	4
50	20	6	4
63	25	8	6
75	30	8	6
90	40	8	6
110	50	10	8

Notes:

1. Heating times are for PN12.5 wall sections.
2. Cooling times are the times for the assembly to be held within the clamps.
3. Socket fusion not recommended for pipes SDR17 and below.

Mechanical Joint Fitting Plasson Assembly Instructions

General instructions for all sizes.

Before assembly – ensure that end of pipe to be inserted in fittings is free of scratches and other imperfections and that both the pipe and the fitting are clean of mud, stones, etc.

Do not overtighten nut when closing. NEVER use wrenches or spanners with handle lengths longer than 46cm – excessive torque during tightening can spread nut cone and result in pull outs. PTFE tape should be used in threaded connections. If fittings are reused ensure split ring is sharp and bites into pipe to avoid pull outs.

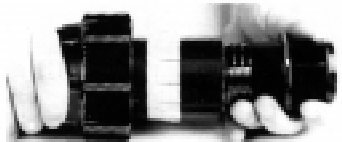
Plasson Rural Fittings for Rural Pipe 1/2-2"



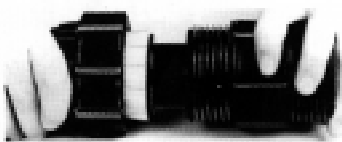
1. Cut pipe square, deburr, chamfer internal edge of pipe with knife.



2. Separate components of fitting and mount them on pipe, first the nut, followed by the split ring. Make sure the large end of the split ring faces towards the fitting.



3. Insert barbed end of tail into pipe so that flange is hard against pipe face. If necessary, use a rubber mallet or a piece of timber and hammer.



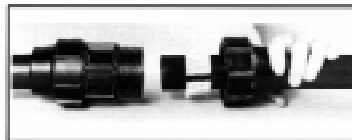
4. Insert spigot end of tail into body of fitting until it passes through rubber O-ring and flange butts against shoulder of fitting. Lubricate with silicone lubricant if necessary.



5. Push split ring hard against flange and firmly hand tighten nut onto fitting body.

Plasson compression fittings for metric polyethylene pipe (OD Series) AS4130 or AS1159

Sizes 16mm to 63mm



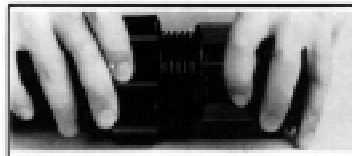
1. Chamfer the end of the pipe with a file or chamfering tool.

2. Separate the components of the fitting and mount them on the pipe, first the nut, followed by the split ring. Make sure the large end of the split ring faces towards the fitting.

Note: For sizes 16 to 63mm it is not essential to 'separate the components' – just loosen nut slightly, push lubricated pipe firmly into fitting so it passes through the O-ring to the interior step inside the fitting. If using this method it is wise to place a witness mark on the pipe to ensure the pipe passes correctly through O-ring and up to the fitting step. Hand tighten nut.

3. Twist the pipe into the body of the fitting until it passes through the rubber O-ring and butts up against the interior step of the fitting body. Fitting is made easier by lubricating with silicone lubricant.

4. Push up split ring to the body of the fitting (split ring can be opened with a screwdriver if necessary).



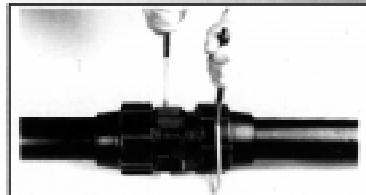
5. FIRMLY hand tighten the nut onto fitting body (note: nut should be closed firmly but nut does not need to actually meet the body). If a chain wrench is used for tightening maximum handle length is 46cm. (sizes 50 and 63mm).

Sizes 75mm to 125mm



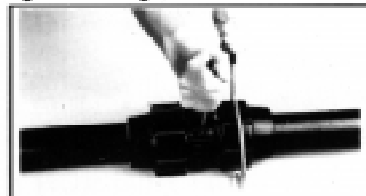
1. Draw the nut, bushing and O-ring onto the end of the pipe to a distance of about twice the pipe diameter. Fitting is made easier by lubricating pipe, O-ring and inside of fitting with silicone lubricant.

2. Insert pipe into the fitting until stopped by the step. Push O-ring and bushing forward until they reach the fitting.



3. Tighten nut with chain wrench or Plasson spanner until O-ring and bushing enter the fitting, and reach end position.

4. Unscrew nut from fitting. Open the split ring and mount on pipe with large end against bushing.



5. Tighten the nut by means of two chain wrenches with maximum handle length 40-46cm or with Plasson wrench (note: nut should be closed firmly but nut does not need to actually meet the body).

160mm fittings

Undo and take out bolts and nuts. ■ Take the two shell halves apart. ■ Remove the exposed sleeve and O-ring and place over the pipe end. ■ Push fitting completely home over pipe end. ■ Push O-ring and sleeve into original position. ■ Place the two shell halves with grip rings inserted over pipe and fitting body. Now insert bolts, washers and nuts and tighten until the shells are in contact with each other.

jointing

Flanged Ends

Vinidex PE pipes are provided with flange connections by using PE stub ends jointed to the ends of the pipes by either electrofusion or butt welding.

These are used in conjunction with metal backing plates, and rubber sealing gaskets in order to provide a demountable joint. Sealing gaskets are made from natural rubber or polychloroprene depending on the fluid being carried.

Where hot fluids or chemical reagents are carried, the suitability of the sealing gasket material must be determined, and the advice of Vinidex engineers obtained. The sealing gaskets must be clean and free from creases when fitted to the flange assembly.

Flanges are available across the full size range of Vinidex PE pipes (up to 1000mm diameter), and to the same pressure PN rating as the pipes.

Metal backing plates are available in hot dip galvanised form, and thickness to AS 2129, and AS 4087 as required. The thickness of the metal backing plate must be assessed for the operating pressures in each particular pipeline using the requirements of AS 2129 and AS 4087.

The fixing bolts must be tightened evenly around the flange. Bolts must not be over tightened, and a torque wrench should be used to prevent buckling of the metal backing plate.

Hugger Bolted Couplings

Bolted couplings are fitted directly to the ends of the PE pipes, and the serrated inside section of the coupling grips the outside diameter of the PE pipe, providing longitudinal restraint.

The central rubber sealing ring provides a pressure seal.

The ends of the PE pipes must be cut square, and be free from all dirt and grease when pushed together, without a gap between the pipe ends.

The seal ring must be clean, and fitted evenly over the ends of the pipe. The coupling housing must be fitted evenly over the rubber ring, and the bolts tightened fully.

Threads

The cutting of threads is not recommended.

Where threaded fittings are used then :

1. Only PTFE tape should be used as a sealant. Hemp, paste, and petroleum compounds must not be used.
2. The joint should be made firm by hand, or by strap wrench to prevent over straining of the joint. Serrated jaw wrenches must not be used.
3. Where possible, the pipeline system should be designed so as to ensure that PE/metal thread joints are such that the male thread is PE, and the female thread form is metal.

Figure 6.5
Stub Flanges & Backing Plates

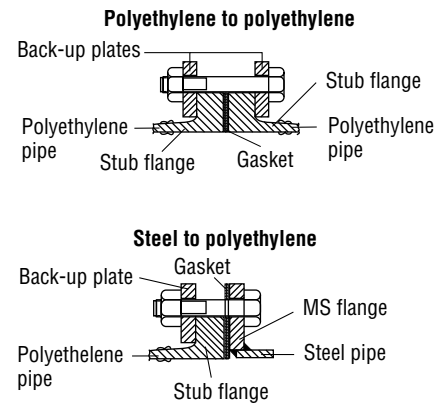


Figure 6.6
Hugger Bolted Couplings

