

## Electrofusion Jointing

This section covers the tools required for electrofusion jointing, setting up the tools for use, preparing the pipes and fittings for jointing. Fusing the pipes and fitting together with the electrofusion machine.

Electrofusion control unit



welding cable



Primary cable 110v



Primary cable 240v



Pipe shears



Cleaning fluid and cloth



Pipe roller cutters

### Important:

It should be noted that electrofusion and socket fusion fittings are not always compatible. The length of the spigot does not permit a joint to be made.

### Tools

**Electrofusion control unit** is a fully automatic unit for fusing pipe and electrofusion fittings together, it can operate at either 240 volts or 110 volts. This is suitable for fusing all electrofusion joints from 16mm - 110mm.

**Welding cable** this has a plug at each end, one end is screwed onto the top socket of the electrofusion control unit, the other in is plugged into an electrofusion fitting to make joints.

**Primary cable 110v** This has a plug at each end. One end is screwed onto the bottom socket of the electrofusion control unit, the other end is plugged into a 110 volt building site power transformer, to provide power to the electrofusion control unit.

**Primary cable 240v.** This has a plug at each end. One end is screwed onto the bottom socket of the electrofusion control unit, the other end is plugged into a 240v socket to provide power to the electrofusion control unit.

**Pipe shears** for snipping through pipes 16 to 25mm o.d.

**Pipe roller cutters** for cutting the pipe at right angle.  
One size for 25-63mm pipes.  
One size for 75-110mm pipes.  
The pipe must not be cut with a saw or serrated blade since this will leave unacceptable burrs.

**Cleaning fluid** for cleaning the pipe

**Lint free cloth** Apply the cleaning fluid to the cloth to clean the pipe.

**Note:**

The new electrofusion control unit is now supplied with 3 outputs.



*The electrofusion control unit is portable*



*Attach the power cable  
(110v Primary cable shown)*



*Attach the welding cable*

**Note:**

Only the cables come as standard with the electrofusion control unit. The other tools can be obtained separately or are available as standard tools with INSTAFLEX socket fusion machinery. Cleaning fluid and lint free cloth must be purchased separately.

## **Preparing the electrofusion control unit for use**

The electrofusion control is small and relatively light weight device and is designed for ease of transportation around site.

Internally it is a complicated electrical device and can easily be broken or develop a fault if dropped. Care must be taken when in use to always place it on a flat and level surface where it is unlikely to be knocked off or damaged.

To operate select whether you will be using a 240 volt domestic power supply or a 110 volt building site power source and select the lead with the appropriate plug.

Attach the primary power cable to the control unit by plugging it into the socket at the bottom of the box, then rotating the outer plastic ring on the plug clockwise. The thread will secure the cable to the control unit.

Attach the welding cable to the control unit by plugging it into the socket at the top of the box, then rotating the outer plastic ring clockwise the thread will secure the cable to the control unit.

**Note:**

The new electrofusion control unit is now supplied with 3 outputs.

Plug in and check that all lights come on



Ready light on



Moisten cloth with cleaning fluid



Clean the fitting



Plug the control unit primary cable into a power source. All the lights on the front of the control panel should illuminate briefly while the control unit conducts a self diagnostic test.

When this is completed the "power" light in the bottom right hand corner should remain illuminated, this indicates the control unit is ready to begin welding.

If the alarm light comes on, there may be a fault with the unit and George Fischer Sales Ltd. should be contacted Tel: 01203 535535.

The electrofusion control unit will operate satisfactorily within the conditions listed below.

110v		240v	
Min	Max	Min	Max
Mains voltage	88v	127v	185v
Mains frequency	47Hz	65Hz	47Hz
Temperature	15°C	40°C	15°C
			40°C

## Preparing the fittings

Clean the polybutylene fittings internally with Tangit KS. Reiniger, cleaning fluid.

Apply the cleaning fluid to a clean, dry, lint free cloth.

Rub the moist cloth firmly around the inside of the fitting, on all faces to be joined

Place the cleaned fitting carefully on the working surface. Avoid any moisture or dirt getting inside the fitting.

**Note**

**Do not handle the inside of the fitting after cleaning it as your hand will dirty the fitting and it will need to be cleaned again.**

Several fittings can be pre-cleaned at one time, so long as the cloth is still moist with cleaning fluid and the assembly area is not dusty or wet.



Snip the pipe sizes 25mm and below.



Cutting pipe sizes 25mm and above.



Moisten cloth with cleaning fluid



Clean the pipe



Keep cleaned pipe off surfaces

## Preparing the pipe.

The pipe must be cut at right angles, using the appropriate pipe cutters. Shears for pipe 16 up to 25mm and roller cutter for pipes above 25mm.

The pipe should not be cut with a hacksaw or similar serrated blade as this will leave unacceptable burrs, and probably result in a cut which is not at right angles to the pipe, which is very important.

The pipe must be free from deep scratches and burrs.

### Note

**The pipes in all sizes must NOT be chamfered**

Apply the cleaning fluid to a clean dry, lint free cloth.

Rub the moist cloth firmly around the outside of the pipe about 100mm up the pipe for fittings below 63mm and about 200mm up the pipe for fittings above 63mm. (It is necessary to clean the pipe this far, because when making electrofusion joints it is standard practice to slip the fitting fully onto one end of the pipe).

This should remove any dirt and the printed marks on the pipe (If it does not you may be using the wrong cleaning fluid)

### Note

**Remember not to handle the outside of the cleaned pipe with your hand as this will make it dirty, and it will need to be cleaned again.**

**If you have to put the pipe down ensure the clean end does not come into contact with any surfaces.**

Mark insertion depth with a tape measure...



...or mark insertion depth from centre mark on fitting



Mark the insertion depth on the pipe after it has been cleaned.

**Do not use a wax pencil to mark the insertion depth.**

Pipe o.d.	Insertion depth
16mm	27mm
20mm	30mm
25mm	34mm
32mm	37mm
40mm	40mm
50mm	44mm
63mm	50mm
75mm	67mm
90mm	73.5mm
110mm	80mm

The insertion depths shown above are the distance from the centre to the edge of the electrofusion fitting, so a fitting of the appropriate size which has a mark showing its centre can be used as an aid for marking the insertion depth.

**Note**

**It is important to mark both ends of pipe which will be inserted into the electrofusion fittings, to avoid errors.**

The pipe is now ready for electrofusion jointing.

## **Electrofusing the pipe and fittings together**

Alignment line on pipe



Marks at 45° intervals to aid alignment



All the pipes have a line down one side and the fittings have external marks every 45° these enable installers to keep prefabricated pipes and fittings in the correct alignment when doing electrofusion joints on site.

The pipes will touch in the centre of the electrofusion sockets, the other fittings have a "Z" dimension shown in the product guide, to help calculate what lengths to cut pipes to. So it is easy to calculate the lengths of the pipes required for electrofusion installations. The "Z" dimension method is described elsewhere.

The electrofusion fittings are usually used to join pre-fabricated pipework sub-assembled together on site.



### **Electrofusion spigots, elbows, tees and reducers**

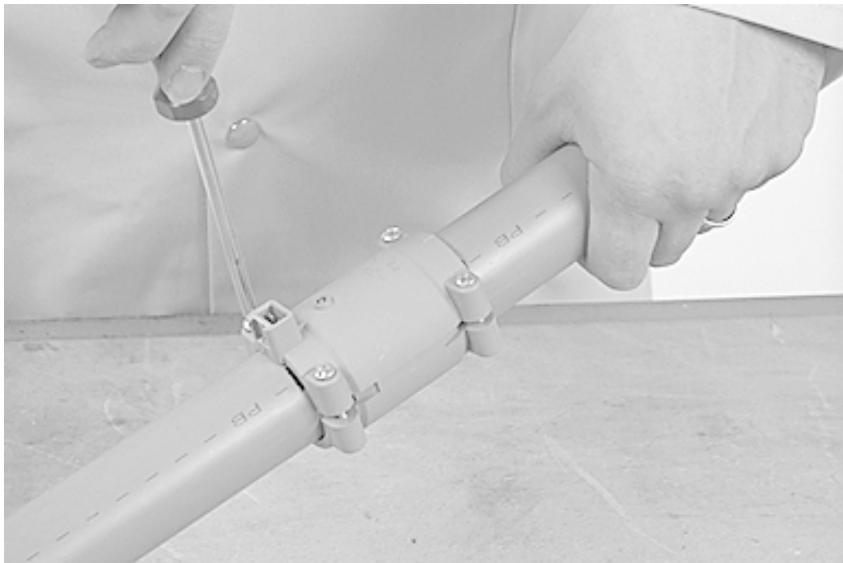
The electrofusion spigots sizes from 16 to 63mm o.d. are usually fused with socket fusion into the end of a fitting, typically an elbow or tee.

When jointing in situ the prepared pipe end is then inserted its full distance into the spigot, elbows, tees or reducers and the 2 screws on either side of the fitting are firmly tightened to prevent the pipe from slipping out.

The electrofusion fitting will now be ready for jointing.

### **Electrofusion socket**

The electrofusion sockets are available in all sizes from 16 to 110mm. They normally have the full length of the socket slipped onto one pipe end.



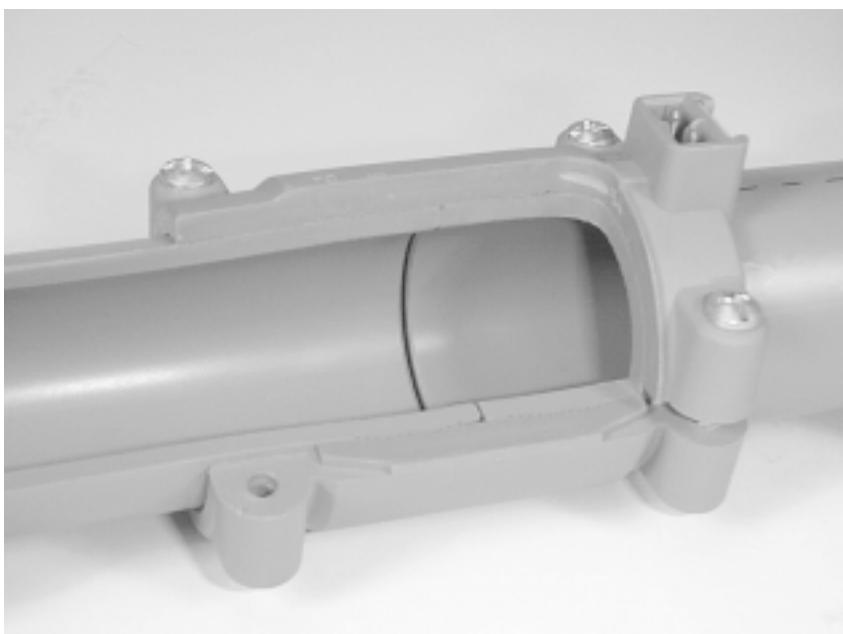
Note: Electrofusion fittings now use an allen key fixing and not screwdriver fixing as illustrated in these examples.

The other pipe end is brought up flush to the pipe end with the electrofusion socket.

The socket is slipped over both pipe ends, so the insertion marks on both pipe ends are just disappearing this confirms the pipe ends are positioned exactly in the centre of the electrofusion fitting.

The 4 screws around the electrofusion socket are tightened to hold the pipes firmly in place.

The electrofusion socket is now ready for jointing



Cross section through an electrofusion joint

## Jointing electrofusion fittings to the pipe

The fusion joint occurs between the outside wall of the pipe and the inside surface of the electrofusion fitting.

As a result the electrofusion fittings will be a permanent part of the pipe work system.

The screws on the fittings only hold the pipe and fittings together when prior to and during electrofusion jointing process. They do not add mechanical strength or extended life expectancy.

Plug in welding cable



**Note:**

The new electrofusion control unit is now supplied with 3 outputs.

The 'Ready' light should be on



Press 'Start'



To make an electrofusion joint simply plug the welding cable from the electrofusion control unit, into the electrofusion fitting.

You will hear a beep as the cable is plugged in and the ready light, on the electrofusion control unit should come on.

If the alarm comes on, do not use this fitting and return it George Fischer for examination/replacement.

**Note**

**With 75, 90 and 110mm electrofusion sockets and all electrofusion tees and elbows each end is joined separately. It is important to plug the welding cable into all ends of the fitting before starting any joints. So the electrofusion control unit can perform its diagnostics on the fitting to check that no faults exist. (If you do not do this you could find you have fused one end. But the other end has a fault and you need to cut the half fused electrofusion fitting out and replace a length of pipe).**

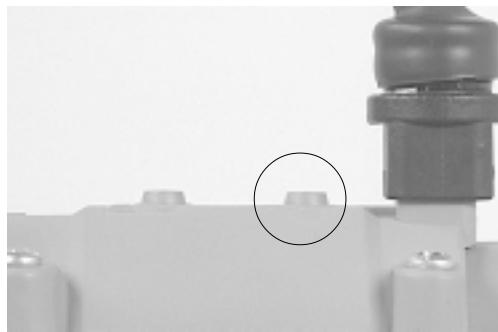
If the fitting does not have a fault, simply press the start button.

No timer has to be set.

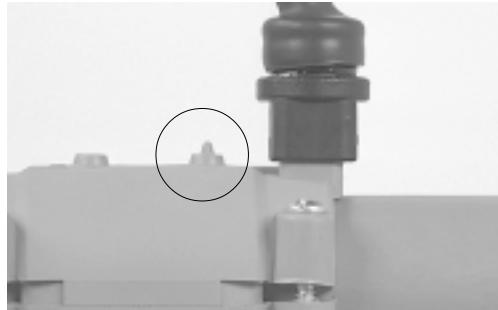
The electrofusion process is fully automatic, it will recognise the fitting being fused and automatically fuse it for the correct time, but the fusion times are listed below for reference.

Pipe o.d. mm	Total fusion time seconds
16mm	45
20mm	50
25mm	65
32mm	75
40mm	85
50mm	105
63mm	120
75mm	105 each end
90mm	110 each end
110mm	120 each end

*Joint indicator starts to show*



*Joint indicator fully showing*



*Hold the joint in place*



**Note:**

The new electrofusion control unit is now supplied with 3 outputs.

*'End' light will show when the joint is complete*



*Remove the welding cable*



As the electrofusion control unit is fusing the pipe and fitting together, a little indicator pip will rise from within the fitting to indicate a joint has been successfully made.

Although the electrofusion fitting gets warm during the electrofusion process, it is never unsafe, or too hot to handle.

If for any reason the indication pip does not rise or you are uncertain the joint had been made (someone may have switched off the power) or a fault develops during the fusion process. Leave the fitting for a minimum of 1 hour, then you can go back and re-make the joint safely.

When the joint has been completed a beeper will sound and the end light will come on. This indicates that a successful joint should have been made.

During electrofusion jointing the pipe and fitting should not be moved, or subjected to unnecessary stresses. The pipe and fitting should be allowed to cool for a few minutes after each joint has been made, before being moved or subjected to stress.

Minimum cooling times before moving pipe and fittings

Pipe o.d.	Minimum cooling time
16mm	4 mins
20mm	4 mins
25mm	4 mins
32mm	4 mins
40mm	4 mins
50mm	6 mins
63mm	6 mins
75mm	6 mins
90mm	6 mins
110mm	6 mins

Wait one hour after the last joint has been made before filling the system with water and pressure testing, up to 15 bar pressure.