

# INSTALLATION

# **ASSEMBLY AND INSTALLATION**

These design and installation guidelines shall be read in conjunction with AS/NZS 3500.2 Sanitary Plumbing and Drainage. In the event of a conflict, AS/NZS 3500.2 shall take precedence.

The products are not be installed adjacent to heat sources, such as boilers, naked flame, hot water or steam lines, where the environment may exceed the design temperature of the pipe system.

Iplex Wavin HDPE pipe and fittings may be welded using two techniques, butt-welding and electrofusion.

# **BUTT-WELDING**

Butt-welding is an economical and effective jointing technique where two pipe ends, two fittings ends or a pipe end and a fitting end are permanently fused together by melting end faces simultaneously and then, pressing them together. Butt-welding shall be performed using a butt-welding machine. It is essential to maintain a high standard of hygiene during butt-welding operations as contamination from oil, grease, sunscreen or barrier cream may result in brittle or weak welded joints. If a risk of hand-borne contamination from sunscreen or barrier cream exists, the use of disposable rubber gloves during surface cleaning, cutting and de-burring is recommended.

The butt-welding jointing procedure is described and illustrated as follows:

### **STEP 1**

#### Check environmental conditions and skills

Confirm the work area is clean, dry and well protected, away from drafts and rain which may result in a poor outcome. Welding is a skilled operation that requires training and currency. Confirm the skill of the operator before commencing work.

#### **STEP 2**

#### Prep butt-welding machine

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Thoroughly clean the heater plate with Iplex recommended alcohol cleaning wipe before connecting it to power and raising the heater plate temperature. Confirm the heater plate temperature is 220°C ±15°.

NOTE - The use of unsuitable alcohol wipes may cause weld failure.

CAUTION - Do not touch the heated plate as considerable heat is generated, sufficient to cause a serious burn injury.

#### **STEP 3**

#### Clean and cut pipe to required length

Taking into account that in the welding process a few millimetres of pipe will be consumed through facing and welding, cut the pipe to the required length using a rotary pipe cutter. Thoroughly clean the pipe and/or fittings in the weld zone with Iplex recommended alcohol cleaning wipes. The pipe or fitting ends are then square and free from burrs. If necessary, carefully de-burr pipe or fitting ends before placing the products in the welding machine.

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WWW.IPLEX.COM.AUEMAIL INFO@IPLEXPIPELINES.COM.AUV1 2019PLUMBING, ELECTRICAL AND IRRIGATION 1300 0 IPLEX (1300 0 47539)• CIVIL 13 10 86

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## **TECHNICAL INFORMATION**

# WAVIN HDPE DRAINAGE SYSTEM

# INSTALLATION

# **STEP 4**

Clamp both pipe ends in the welding machine and ensure alignment

# **STEP 5**

### Simultaneously trim both pipe ends using the face planer

Keep planer blade rotating while slowing reducing facing pressure. Stopping the planer rotation while still in contact with the product may create uneven surfaces.

# **STEP 6**

### Check and confirm that ends are matching

If product ends are not closely matching either re-clamp to correct alignment and/ or repeat end facing. After re-clamping, it will be necessary to reface the product ends again with the planer.

# **STEP 7**

**Insert heater plate and bring product face against the heat plate** Apply a higher pressure for a few seconds to ensure full contact.

# **STEP 8**

Reduce pressure until nearly zero, ensuring light contact with heater plate is maintained so that heat is soaked into both product ends

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# INSTALLATION

## **STEP 9**

#### Maintain heat soaking contact until a molten bead is formed

For products between DN40 and DN200 the bead width shall be approximately 1mm. For product DN250 and DN315 a bead width of approximately 1.5mm is appropriate. Table 1 below provides a guide to the time required to develop the required bead width.

#### TABLE 1. GUIDE TO BEAD SIZE

DN40	DN50-DN110	DN125	DN160	DN200	DN250	DN315
30s	40s	60s	80s	100s	140s	170s

### **STEP 10**

As soon as bead width is fully developed, quickly open the welding machine, remove the heater plate and immediately bring the molten ends together



#### Gently apply welding pressure and maintain for required cooling time

Table 2 below provides a guide to the time required to cool the joint before removing the completed assembly from the welding machine. Ambient temperature may impact these values.



# TABLE 2. GUIDE TO REQUIRED COOLING TIME

DN40- DN75	DN90	DN110	DN125	DN160	DN200	DN250	DN315
60s	70s	80s	100s	120s	200s	280s	340s
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# **STEP 12.**

#### Inspect the weld beads for evenness

Uneven weld beads indicate poor alignment or out of roundness. Large weld beads could be caused by either excessive heater temperature and/or too high a welding force. A small weld bead could be caused by a too low a heater temperature and/or too low a welding force. In both cases the weld should be rejected due to probable reduced strength. ..... .....



# **STEP 13**

Remove assembly from the welding machine after cooling time has elapsed

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#### **TECHNICAL INFORMATION**

# **WAVIN HDPE DRAINAGE SYSTEM**



# INSTALLATION

# **ELECTROFUSION WELDING**

Electrofusion couplers are fitted with an embedded resistance wire that converts electric energy into heat within the welding zone, using appropriate welding equipment. As the HDPE material expands during the heating process, the necessary welding pressure is generated within the joint. A properly prepared and executed electrofusion weld provides a leak free full-strength joint, however insufficient preparation, unapproved alcohol wipes, inadequate restraint or joint movement, contamination from oil, grease, sunscreen, and non-observance of these instructions may lead to a faulty connection. If a risk of hand-borne contamination from sunscreen or barrier cream exists, the use of disposable rubber gloves during surface cleaning and pipe peeling is recommended.

Electrofusion welding is to be performed using a fully serviceable electrofusion welding machine. Failure to adhere to these welding instructions can lead to overheating of the pipe connection during the welding process and in extreme cases, may result in fire.

The electrofusion jointing procedure is described and illustrated as follows:

### **STEP 1**

### Check environmental conditions and skills

Confirm the work area is clean, dry and well protected, away from drafts and rain which may result in a poor outcome. Electrofusion welding is a skilled operation that requires training and currency. Confirm the skill of the operator before commencing work.

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## **STEP 2**

#### Clean and cut the pipe

Thoroughly clean the pipe and/or fittings in the weld zone with Iplex recommended alcohol cleaning wipes. Cut the pipe to the required length using a rotary pipe cutter to produce a square end free from burrs. If necessary, carefully de-burr pipe or fitting ends. Check for obvious barrelled pipe ends and trim to remove. The product ends must be cut precisely and should be fully inserted until the marked position on the pipes.

arked position on the pipes.

NOTE - The use of unsuitable alcohol wipes may cause weld failure.

#### **STEP 3**

Measure the length of the coupler with a measuring ruler or tape to calculate the peeling length and mark area to be peeled with a permanent marker

The formula for peeling length = (coupler length ÷ 2) + 10mm. If the coupler is required to be a sliding or repair coupler the peeling length is equal to the length of the coupler.



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# **STEP 4**

#### Peel pipe with a rotary peeler or hand scraper past the marking and clean peeled area.

Never use sand or emery paper. Ensure that the complete surface of the peeling area is peeled sufficiently to a depth between 0.1mm and 0.2mm. Measure the circumference of the peeled end to ensure it was not reduced to less than the diameter listed in Table 3 below. Clean the peeled area with an Iplex approved alcohol cleaning wipe in circumferential direction and let the alcohol evaporate.

NOTE - The use of unsuitable alcohol wipes can cause welding failure. .....

### TABLE 3. MINIMUM CIRCUMFERENCE OF PEELED AREA

DN40	DN50	DN56	DN63	DN75	DN90	DN110	DN125	DN160	DN200	DN250	DN315
39.6	49.6	55.6	62.6	74.6	89.6	109.6	124.6	159.6	199.6	249.6	314.6

# **STEP 5**

Remark the insertion depth and insert product ends up to marks

# **STEP 6**

#### Restrain pipe and/or fitting against movement

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Ensure a low stress installation by securing pipe and electrofusion couplers against movement during heating and cooling. Use pipe clamp where appropriate to maintain alignment.

#### **STEP 7**

#### Welding Process

Connect the power cables and follow the instructions on the display of the welding machine. During and after welding cycle, check messages on the display of the welding machine. When the welding cycle is completed, remove the power cables. For a successful weld both pop-up indicators have to be visible. If not, the coupler must be cut out and a new coupler should be installed.

NOTE - Never cycle an electrofusion coupler twice. A faulty coupler must be cut out and be replaced with a new coupler.

CAUTION - Do not touch or move the electrofusion coupler during the fusion welding process and cool-down phase as considerable heat is generated, sufficient to cause burn injury.









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**STEP 8** 

#### **Cooling Phase**

At the completion of the cooling phase as indicated by the welding machine display, remove assembly from the clamping.



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#### **TECHNICAL INFORMATION**

# **WAVIN HDPE DRAINAGE SYSTEM**



# TESTING

# **LEAK TESTING**

Acceptance leak testing is commonly achieved by either a low-pressure air or vacuum testing.

# LOW-PRESSURE AIR TEST

# **STEP 1**

Prior to commencing pressure testing, ensure all inlets, outlets and access openings are capped and sealed.

# **STEP 2**

Slowly introduce air into the section under test until a gauge pressure of 15kPa is achieved, then shut off the supply valve and air pump.

### **STEP 3**

Allow the pressure to stabilise for a minimum of 3 minutes whilst monitoring the pressure gauge for signs of leakage.

# **STEP 4**

Once the pressure has stabilised, reduce the pressure to 10kPa and then begin recording the time and drop in pressure over the minimum test duration specified in Table 4.

# **STEP 5**

The system has passed low pressure air testing provided the pressure drop over the minimum test duration is  $\leq 3$ kPa.

	LENGTH OF PIPEWORK UNDER TEST (METRES)								
PIPE SIZE	50	100	150	200	250	300			
	Minimum Test Duration (Minutes)								
≤ DN110	2	2	2	2	3	3			
DN125	2	2	3	3	4	5			
DN160	3	3	3	5	6	6			
DN200	3	4	6	8	10	12			
DN250	4	5	8	10	13	15			
DN315	6	9	14	18	23	29			

#### TABLE 4. 3 KPA PRESSURE CHANGE ACCEPTANCE

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#### **TECHNICAL INFORMATION**

# **WAVIN HDPE DRAINAGE SYSTEM**



# TESTING

# **VACUUM TEST**

Acceptance leak testing is commonly achieved by either a low-pressure air or vacuum testing.

## **STEP 1**

Prior to commencing pressure testing, ensure all inlets, outlets and access openings are capped and sealed.

# **STEP 2**

Slowly apply vacuum to the section under test until a gauge pressure of -15kPa is achieved, then shut off the supply valve and air pump.

# **STEP 3**

Allow the vacuum to stabilise for a minimum of 3 minutes whilst monitoring the pressure gauge for signs of leakage.

# **STEP 4**

Once the vacuum has stabilised, reduce the vacuum to -10kPa and then begin recording the time and drop in vacuum over the minimum test duration.

# **STEP 5**

The system has passed vacuum testing provided the pressure increase (vacuum decrease) over the minimum test duration is  $\leq 3$  kPa.

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