

**ANTI-BACTERIA 3 LAYER PIPE**

**AB-3P<sup>®</sup>**

**HOT FUSION BONDED EPOXY COATED DUCTILE IRON FITTING SOLUTION**

**AB-DF<sup>®</sup>**

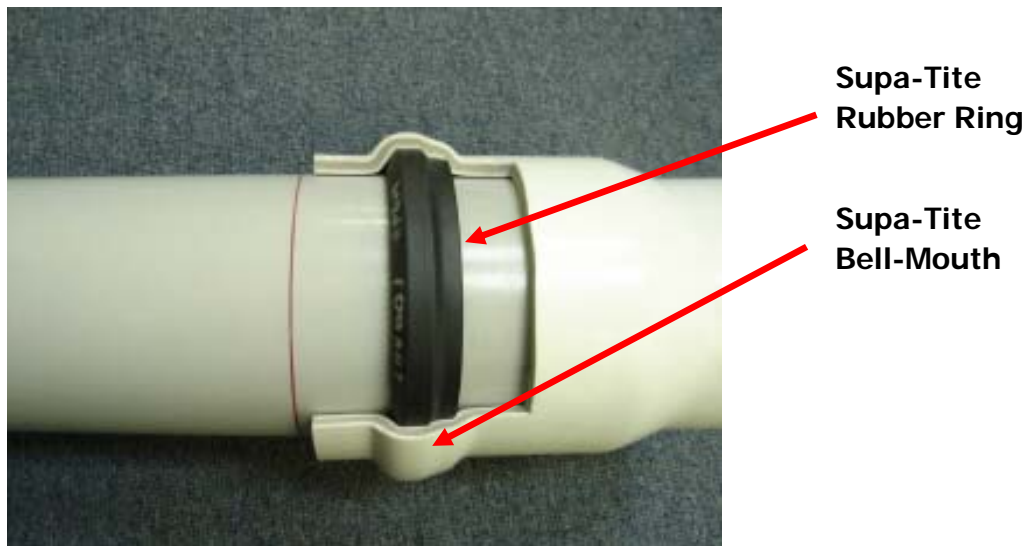
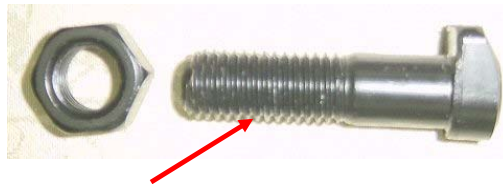
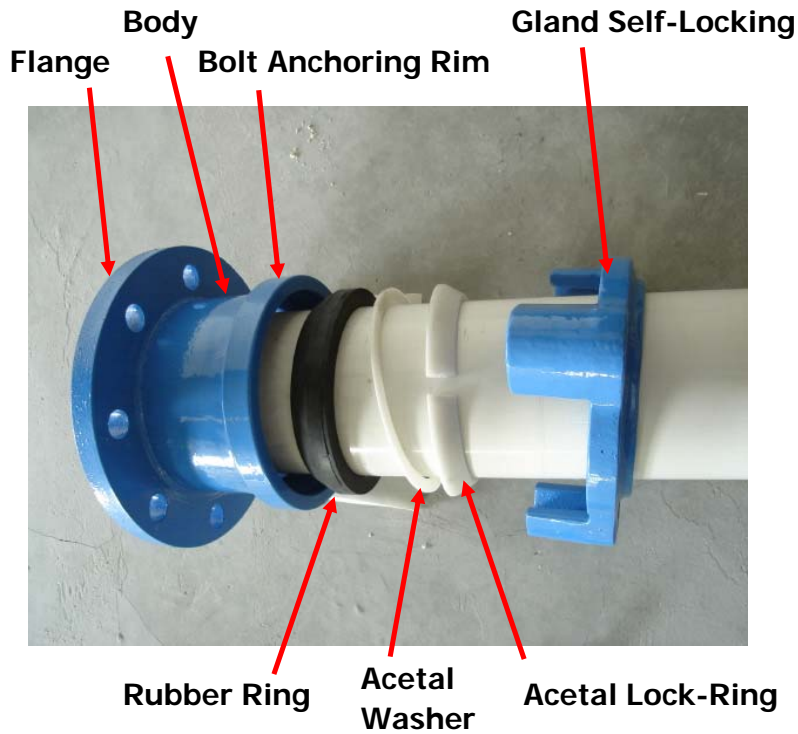
**QUICK INSTALLATION MANUAL**



**REV. 1A**



## Component Name: Same for all AB-DF



# 1 AB-3P® Pipe Installation

## 1.1 Jointing using Supa-Tite Rubber Ring Joints (Above and under ground)

ME-Plas(M) AB-3P pipes are supplied with Supa-Tite rubber ring, pre-assembled at factory. Approved lubricant should be used when jointing pipes to ease the insertion of spigot and is supplied together with pipes.

### 1.1.1 Jointing Procedure (Factory Rubber ring inserted Pipe)

The rubber ring joint should be assembled as recommended by the pipe manufacturer. It is usually pre-assembled at factory.

- Check inside of belled parts and if there is any dirt, clean the Rubber Ring (but do not pull out, clean as it is seated), the socket or the coupling interior, with a rag to remove any dirt or foreign material before assembling.
- Apply approved AB-3P Lubricant on surface of Rubber Ring.
- Align it straight to chamfered spigot male pipe to belled pipe.
- Clean the surface of male pipe and inside of female for insertion.
- Apply lubricant from end to the 3/4 of insertion black marking line. (IMPORTANT!! Instruct worker to apply **almost 100%** until marking line)
- Align straight and even level and push gently with jig for small size, for big size use excavator and push other end of pipe using timber or similar material not to damage the pipe end.
- Make sure marking line is visible and well bordered with belled parts. 5~10mm from edge of pipe is acceptable. If it is farther than 10 mm, it is not properly engaged. Put timber at the other end of spigot male pipe or use proper jig. Light hammering with proper force a few times or use excavator to push further.
- When pipe is properly inserted, there is 5mm gap internally to absorb thermal expansion and vibration or hammering effect.



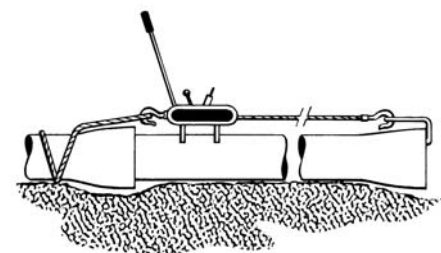
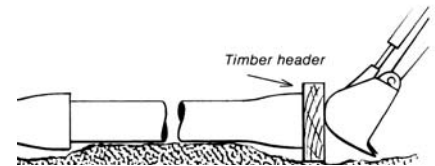
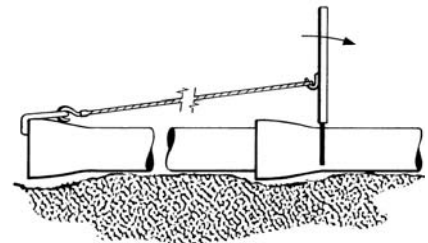
### 1.1.2 Jointing Procedure (Site Rubber ring insertion)

In some special application, the EPDM or special composition rubber rings could be supplied separately in cartons. If you need to install at site, in any cases;

- Clean the ring, the socket or the coupling interior, especially the groove area and the spigot area with a rag or paper to remove any dirt or foreign material before assembling.
- Inspect the ring, pipe spigot chamber, ring groove and sealing surfaces for damages or deformation.
- When inserting the rubber ring, make it like heart shape and seat it into groove.
- Use only Supa-Tite rubber rings which are designed for AB-3P and supplied with the pipe. Insert them as recommended by the ME-Plas(M) Sdn Bhd.
- Use only the lubricant supplied by ME-Plas(m) Sdn Bhd
- Remained procedure is the same as above.

### 1.1.3 Various Method of Assembly for AB-3P Bell-Mouth Pipe

- Crowbar method:  
Complete entry of the spigot into the socket maybe obtained by pushing with crow-bar or suitable level against the face of the socket of the entering pipe.
- Fork Tool Method:  
For joint 80mm to 200mm, fork type tool may be used for assembly. The fork is placed over and behind the socket of the last pipe laid. A wire rope sling is wrapped around the spigot to be joined.
- Trench Excavator method  
Where trench is prepared using excavator, this machine could be used for pushing the pipe into the bell mouth. This method is very effective for large diameter pipe. Please use timber to the edge of the pipe so that excavator bucket does not directly contact the pipe.
- Wire Rope Puller method  
For joint above 200mm, a wire rope or chain puller can be used as shown in diagram. The puller is normally available in hardware shop.



## **2 AB-DF® Epoxy Powder Fusion Bonded (EPFB)**

### **Ductile Iron Fitting Installation**

AB-DF jointing is the mechanical jointing method which is same as mechanical coupling but with some additional easy and error free installation feature using innovative gland design. AB-DF Ductile Iron Fitting Joint with AB-3P pipe usually does not need complicated tools. It is mechanical joint type with innovative gland design. So pipe insertion is easy and does not need any complicated tools.

#### 2.1 Assembly Procedure

##### 2.1.1.1 AB-DF, Gland Design

- Connected Pipe (AB-3P or other pipe) shall be cut square and be free of burrs. Chamfer inside with pile. (Reverse way of normal AB-3P pipe male)
- Clean the end of pipe.
- The most important part of AB-DF is Gland.
- Gland always comes with EPDM Rubber ring and Polymer Lock Ring and Polymer Washer. Check 4 items are not missing.
- Also check required numbers of M18 Bolts, Nuts and Washers are with you.
- Make sure to bring M18 spanner. (Wrench size 27mm)
- Place AB-DF at jointing part.
- Take off wrapping material just before joint. Insert pipe to stopper notch and pull out 5 mm. This is final position.
- Insert Gland to pipe.
- Insert Acetal Lock Ring
- Insert Acetal Washer
- Insert Rubber ring.
- Push pipe into the AB-DF (No need lubricant)
- Tighten gland with L-shaped nut and washer using M-18 spanner. (Wrench size 27mm).
- Check that bolt head is automatically engaged inside of gland bolt hole and hook on the edge of fitting body.
- Tighten the nut about 80% of length only. (a bit loose to turn gland)
- Turn gland.



- Tighten the next nut.
- Repeat this until you tighten all the nut/washer/bolts required.
- Align bolt position of gland to make easier final tightening considering your working space.
- Tighten fully. But make sure that when you tighten one bolt, the next bolt shall be opposite angle across the pipe center. It is same principle when you tighten car tire bolt when repairing flat tire.
- Make sure that all 4 components are installed.
- If you are discrete contractor, please draw a line on pipe along the edge of gland. This will be the indication line of proper insertion position.
- If it is exposed application, maintenance crews can easily identify the firm connection.
- Even for underground application, when you excavate it and do maintenance, the position of line shows you whether pipe is slipped out or still in secured position.
- Normally, when you install AB-DF Fitting with AB-3P Pipe, since AB-3P is much lighter than metal pipe, you may install AB-DF first and then connect pipe manually. You do not need any special tools since it is not spigot joint but mechanical joint. However, when size grows larger like 350mm or 400mm, push pipe in with 1 ~ 2 worker manually maybe a bit hard. So you may still use wire rope puller if necessary.

2.1.1.2 AB-DF Flange Connection (Connection to Valve, MS Flange etc)

Some of the AB-DF fittings are designed to match with other devices such as valve or Mild Steel Fitting/Pipe/Ductile Iron Fitting etc using mechanical flange such as Flange Adaptor, Flange T Joint, Flanged blank-end (Endcap) etc. The most important part is proper tightening when it comes to flange type connection.

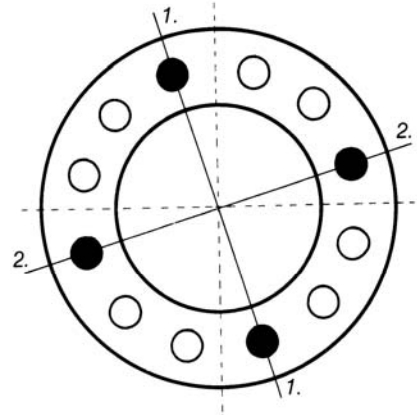
2.1.1.2.1 Required equipment:

- Gasket
- Bolts & Nuts
- Torque Wrench
- Oil / grease
- Spanner / Socket (table)

Bolt size	Spanner size (mm across flats)
M16	24
M18	27
M20	30
M24	36
M27	41
M30	46
M33	50
M36	55
M39	60
M45	70
M52	80

2.1.1.2.2 Procedure

- ◆ As with all flange assemblies, rubber gasket and faces of flanges must be free of sand, grit, grease or other matter.
- ◆ Hold the gasket in correct position on a clean flange face aligns until faces of both flanges meet.
- ◆ Insert the upper and lower bolts, and then hand tightens the nuts. Insert the remaining bolts and then hand-tighten the nuts.
- ◆ Tighten the opposite sets of bolts in the sequence, ie. start with bolts of the upper and lower sides of the flange, followed by the right and left bolts.
- ◆ Tighten all sets of bolts around the flange by achieving the recommended bolt torque. Check and if necessary, re-tighten the bolts. Installation is complete.



2.1.1.2.3 Bolting Torque

The chart indicates the approximate bolt torques required to seal flanged joints against internal pressure.

Bolts must be tightened in the correct sequence with sufficient circuits to ensure that the required bolt torque is achieved on each bolt.

Nominal Size DN	PN16 Flanged Bolting Torque Nm
80	70
100	80
150	120
200	115
250	165
300	180
350	175
400	220

2.1.1.2.4 Bolting Details

The chart indicates the approximate bolt torques required to seal flanged joints against internal pressure.

Nominal Diameter DN	PN16 Flange		
	No	Dia	Length mm
80	8	M16	65
100	8	M16	65
150	8	M20	70
200	12	M20	70
250	12	M24	80
300	12	M24	85
350	16	M24	90
400	16	M27	95

## 2.1.2 Thrust block design for AB-DF Ductile Iron Fitting (Anchor Block)

### 2.1.2.1 Purpose

The main purpose of thrust block is to prevent AB-DF fittings in the pipe line from moving when pressure load is applied. The thrust blocks absorb the load from the AB-DF fitting and transfer it to a wide load bearing area on the wall of trench. Thrust blocks are required whenever pipelines;

- Change its direction
- Reduce its diameter
- Ends
- Connected to Valve
- Negotiate a curve where a soft soil condition is encountered.

### 2.1.2.2 Installation

It is very good practice to ensure that the pipe adjacent to the AB-DF fittings are firmly secured before installation of thrust blocks. For buried pipe application, fittings are usually restrained by concrete blocks cast at site. This is to ensure that neither the AB-DF fittings nor the AB-3P/Other connected pipes will move when thrust block has been installed. The thrust block should be positioned symmetrically along the line through which the resultant thrust acts and rest firmly against the side of trench.

The soil type and depth will also affect the efficiency of the thrust transfer but to make easier reference, here is some indicative thrust block size.

2.1.2.3 Typical Thrust Block (NOT APPLICABLE FOR NTB TYPE FITTING)

Sufficient support should be provided at AB-DF joint to ensure that the joints do not move when subjected to internal hydrostatic pressure. You may refer to guideline standard thrust block dimension for more details. However the dimension varies when soil condition is changed like soft soil or hard rock. Please consult with professional consultant. However, NTB type fitting does not require thrust block.

**TYPICAL THRUST BLOCK FOR NON-END LOAD RESISTANT SYSTEM USING AB-3P & AB-DF**

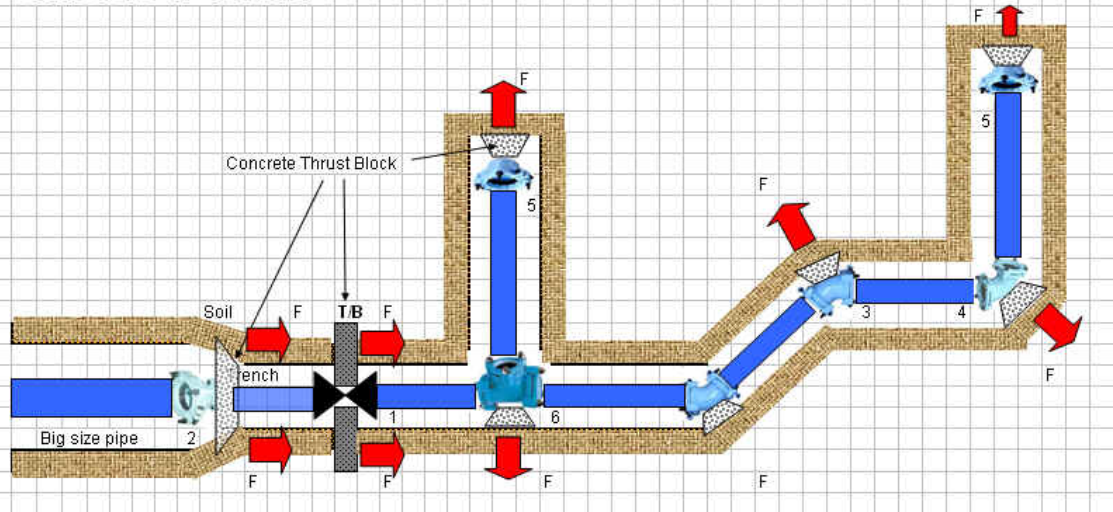


Figure:

1. Gate valve using paddle flange , 2. AB-DF Tapered Reducer , 3.&4. AB-DF 45 deg Bends , 5. AB-DF Blank Ends , 6. AB-DF Equal Tee

### 3 Tapping and D.I. Tapping Saddle

It shall have screwed groove inside of cutter to hold drilled pipe wall or another type is at the tip of drill which is on the center of cutter, they have cut-pipe wall holding pin. See photos below.



Screwed cutter type



Holding Pin type



Ductile Iron Tapping Saddle with Convex Liner Grip

Precaution: *Please do not use PE tapping saddle which does not has internal rubber ring to fight against slip on the pipe surface. Without internal rubber, tapping may turn or even slipped along pipe length. Also do not allow to use heated steel spike to poke pipe for tapping. It will make eddy current under the tapped position.*

#### General Tapping Procedure

- Mount the saddle
  - Fit the ferrule/strap on to the saddle. Fasten the saddle with bolt and nuts.
  - Place the flat washer over the ferrule stem.
  - Screw Tapping device on to the stem and open the valve in the body
  - Make sure the cock built in the ferrule is correctly open and all screws are tightened before setting drill.
- Drilling
  - Rotate T or X bar to advance spindle until the cutter touch pipe wall
  - When it touches, slow down the feed.
  - Give additional feed to pierces the pipe wall. (1 cm or depending on pipe size)
  - Withdraw the spindle/cutter fully and close the valve.
  - Unscrew the complete head-works from the valve body
- Completion
  - After raising the drill, close the ferrule.
  - Make sure that your cutter hold cut pipe piece so that it will not go in the pipe and stuck to water meter.

## 4 Repairing Damaged AB-3P Pipe

Repairing AB-3P is easy using two AB-DF coupling. In fact, you can also use repair patching kit.

- 4.1 Cut the damaged pipe.
- 4.2 Make proper short length of straight pipe and chamfer and debur both side (inside of pipe NOT outside).
- 4.3 Insert two couplings on both sides of pipes.
- 4.4 Place short length straight pipe in between two coupling.
- 4.5 Pull and place jointing part in the middle of coupling and tighten bolt.
- 4.6 Same for another side of coupling.
- 4.7 If you are not so sure, see the drawing.

## 5 Solvent Cement Jointing

For light application in the building etc, solvent cement jointing with PVC fittings can be also used. To achieve strong joints in a pressure pipe works, the correct type of solvent cement must be used. ME-Plas(M) insist to use IPS Weld-On® solvent cement with its **primer** which is manufactured with a controlled amount of resin and solvents.

It must be emphasized that this is not a gluing process, instead an adhesion mechanism achieved through the molecular bonding of resin solidification as the solvents evaporate which is very similar like welding.



*However, it shall be strongly emphasized that due to the dependency of workmanship which is usually beyond control of end client, we strongly recommend to use Bell mouth Rubber Ring joint and AB-DF Fittings unless it is impossible to avoid Solvent Cement Joint. "Supa-Tite" Rubber Ring Joint method is much more reliable than any Solvent cement or Fusion welding or even HI-3R:ABS injection molded fitting joint.*

Also note that for bigger diameter pipe, the complete application of solvent cement also takes some time. If you use quick drying type, you can not achieve proper connection.

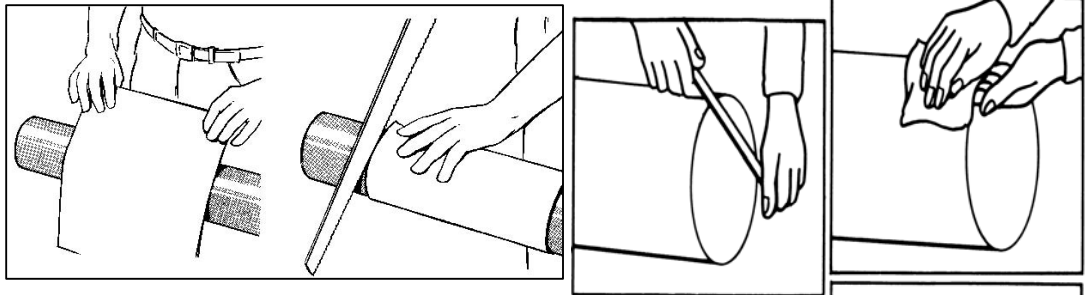
We also recommend using blue or green colored solvent cement even if it is a little bit higher cost. With colored solvent cement, worker can easily identify the even spreading and application of solvent cement on the surface of pipe to be joined.

We can supply above solvent cement, 1 inch brush (For 100mm and above diameter) and clean mope for primer application with more economical price than other retailed outlet.

If pipe is larger than 100mm, use 1 inch wide brush to apply solvent cement which is faster to prevent curing before actual joint insertion. So choose proper brush and try to pull out brush hairs with your finger and take out all loosened hair so that it will not be stuck on the pipe while applying it. Loosened hairs of brush may cause leakage problem.

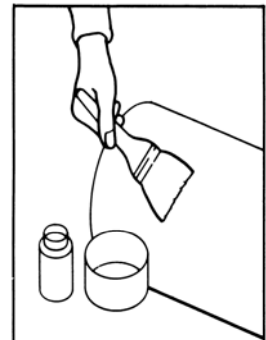
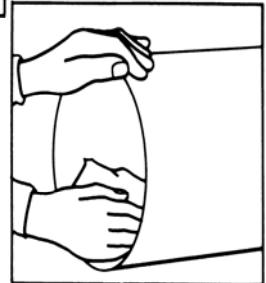
### 5.1.1 Above Ground Solvent weld jointing instructions

- Make a square cut using a mitre box and fine-toothed panel saw.
- Remove all burrs and swarf.
- Chamfer the external pipe edge with file or electrical grinder. (IMPORTANT)
- Clean the pipe and matching socket, using priming fluid to the manufacturer's pipe recommendations.
- Keep the cleaned surfaces free of dirt and grease. Failure to do so could lead to inadequate bonding and will result in joint failure.



NOTE: This is a very important step: the priming fluid not only cleanses the surface but also prepares for a durable and long lasting joint.

- **Apply primer to FITTING and immediately with the solvent cement to the FITTING again.**
- **Apply primer to PIPE and immediately with the solvent cement to the PIPE again.** (Inside of the socket and again to the pipe spigot), over an area corresponding to the socket depth.
- While the surface is still wet, **push and twist** the fitting into the pipe.
- Hold the cemented joints for 10 seconds without movement.
- **Clean the excess of solvent cement** with a clean cloth.
- The pipe may be handled, but not unduly strained for 1 hour. Wait 24 hours before testing or use.



### 5.1.2 Underground Buried Solvent Cement Jointing

In case of underground application, **extreme care shall be taken.**

- Lay the pipe before making solvent welding.
- Follow the step of "5.7.1 Above ground jointing" procedure.
- After jointing is done, immediately backfill the pipe trench. This will reduce any excessive expansion or contraction during the curing process of solvent weld joint.
- This joint will sustain the end thrust to which the pipe will be submitted when under pressure. Care should be taken that excess adhesive does not flow into the pipe bore.
- Wipe off any that has been expelled from the mouth of the bell mouth socket. Do not disturb the joint for at least 30 minutes although the jointing may continue.

