

INSTALLATION

TRENCHING

Trenches should be excavated in accordance with the plans and specifications and should allow adequate space for compaction of the embedment material in the side support zone.

Trenches should be straight and as narrow as practicable at the top of the pipe. The minimum trench widths are specified in Table 1.0.

TABLE 1.0 MINIMUM EMBEDMENT ZONE DIMENSIONS -ASINZS 2566

DN	h	B*	k
80	75	300	100
100	75	350	100
150	75	400	100
200	100	550	150
225	100	550	150
250	100	600	150
300	100	650	150
375	100	800	150

*Note: The tabulated values may provide insufficient clearances for installation purposes in certain circumstances.

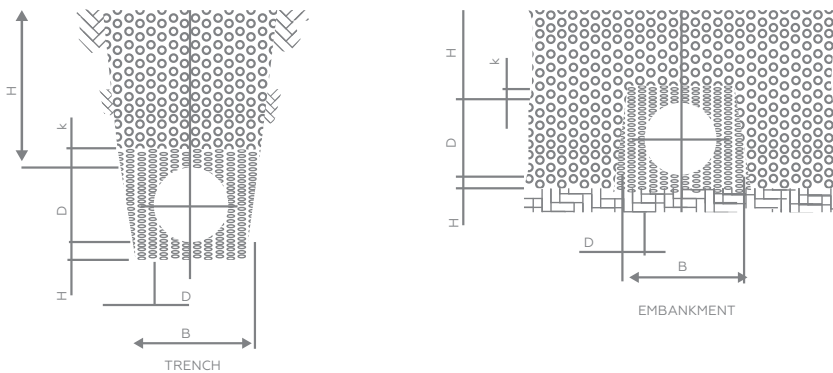


Figure 1.0 - Embedment, clearance and cover dimensions

EMBEDMENT & BACKFILLING

The quality of the embedment material and its compaction, combined with the type and density of the native soil are all relevant to the ultimate performance of PVC-U pipes once installed.

The trench bottom should be as smooth as possible and to grade. Embedment material, used in the bedding, side support and overlay are generally non-cohesive granular materials. PVC-U pipes should not be buried in contact with soil particle sizes larger than 5% of pipe diameter, with 20mm as maximum.

Soil clods must be excluded from the pipe embedment zone and under no circumstances should temporary supports such as bricks or timber be left under or in contact with pipes. If the excavated material is not granular or friable, or does not comply with the project specification, then suitable embedment must be imported.

The information contained in this document should serve as a guide only and is subject to change without notice. For more information please contact Iplex Pipelines Australia Pty Ltd.



INSTALLATION

Jointing or “clearance holes” should be excavated in the bedding for pipe sockets to ensure the pipes are evenly supported along their full length. In the absence of any specification and if the pipe classes are PN6 or PN9, it is important that only non-cohesive or granular embedment be used. Careful attention to the placement of embedment material and the specified relative compaction with an absence of voids is important.

Mechanical joints, especially flanged joints, should be left exposed if possible until the line is tested. Pipes should not be left uncovered. The possibility of pipe flotation in the event of rain and water in the trench will occur unless it is backfilled to a height of at least one and a half diameters above the pipe. The method of placing the remainder of the trench backfill will depend on whether the pipeline is located in an area with no traffic loading or under a roadway. In a roadway it is normal practice to continue backfilling and compacting with good quality embedment material up to pavement level. Heavy compaction of backfill should not commence without at least 300mm of material covering the pipeline.



Figure 2.0 - Imported embedment material is well compacted around the pipe for support.

JOINING INSTRUCTIONS - SOLVENT WELD JOINT (DN15 - DN150)

To achieve a strong, leak free joint in a pressure pipe the correct type of solvent cement must be used. For pressure applications Type P is used.

Note: The pressure pipe joint is designed for an interference fit and only after the application of the solvent cement will it be possible to close the joint fully.

HOW SOLVENT CEMENT WORKS

Iplex solvent cement is a solution of resin in a mixture of solvents, which soften the surfaces when applied to PVC pipes and PVC fittings. It is not glue, as adhesion is due to the solidification of dissolved PVC polymer.

A thin uniform coat is applied to both the spigot and socket and the joint is assembled while the surfaces are still wet and fluid. The cement layers intermingle and become one. The strength of the joint develops as the solvent permeates the PVC and the volatile constituents evaporate.

IMPORTANCE OF PRIMING FLUIDS

Before applying the solvent cement, it is essential to use Iplex Priming Fluid for successful jointing as the fluid not only cleans and degreases, but also removes the glazed surface from the PVC, which allows the solvent cement to permeate into the wall of the pipe or fitting.

The information contained in this document should serve as a guide only and is subject to change without notice. For more information please contact Iplex Pipelines Australia Pty Ltd.

INSTALLATION

TABLE 2.0 - ESTIMATED USAGE RATE (NUMBER OF JOINTS) FOR PRIMING FLUID AND SOLVENT CEMENT (BASED ON 500ML CONTAINER)

NOMINAL DIAMETER DN	PRIMING FLUID (500ml)	SOLVENT CEMENT (500ml)
15	744	248
20	594	198
25	474	158
32	342	114
40	273	91
50	186	62
65	117	39
80	90	30
100	60	20
150	33	11

There are two types of solvent cement joints; pressure joints which require an interference fit and non - pressure joints which may have a small clearance when assembled.

Iplex solvent cements are formulated specifically for each of these applications. Each product is clearly colour coded in accordance with AS3879 (Int.) for easy identification; green for pressure, blue for non-pressure and red for priming.

Note: The use of imported solvent welded PVC-U fittings with parallel sockets will require gap filling solvent complying with ASTM D-2564. Failure to use the appropriate solvent and cleaner will result in joint failure.

IPLEX SOLVENT CEMENT - TYPE P

Type P is used for pressurized potable water installations and is formulated to develop high shear strengths with interference fit.

IPLEX SOLVENT CEMENT - TYPE N

Type N is used for non-pressure applications and is formulated with the gap filling properties needed with a clearance fit. ***It must not be used for pressure applications.***

IPLEX PRIMING FLUID

Priming fluid is used to remove grease and dirt and then to etch the glossy surface of PVC pipes and fittings. It must be applied with a clean, lint free cotton cloth. Brushing the priming fluid on or simply pouring the fluid over the pipes and fittings will not remove grease and dirt.

The information contained in this document should serve as a guide only and is subject to change without notice. For more information please contact Iplex Pipelines Australia Pty Ltd.



INSTALLATION

SOLVENT WELD JOINTING INSTRUCTIONS

Follow steps 1 - 9 carefully. Short cuts will result in poor joints that are likely to cause system failure. Do not work with hot pipes or on hot windy days without protecting the pipes. Keep the lid on to minimise evaporation. Use solvent cements within twelve months of the date stamped on the bottom of the bottle/can. If the solvent cement has become so thick that it does not flow easily, it must be discarded.

STEP 1 - CUT SPIGOT SQUARE AND DEBURR:

Cut the spigot as square as possible using a mitre box and hacksaw or power saw. Remove all swarf and burrs from both inside and outside edges with a knife, file, reamer or sandpaper. Swarf and burrs if left, will wipe off the solvent cement and prevent proper jointing. Also swarf inside pipes can become dislodged and jam taps and valves.



STEP 2 - CHECK ALIGNMENT:

Check the pipe and spigot or fittings for proper alignment. The time for any adjustments is now, not later.



STEP 3 - MARK CLEARLY:

Mark the spigot with a pencil or marker at a distance equal to the internal depth of the socket. Only use pencil or a marker. Do not score or damage the surface of the pipe or fitting.



STEP 4 - DRY FIT THE JOINT

For pressure pipes the interference fit must be reached before the spigot is inserted fully to the pencil mark.



STEP 5 - CLEAN AND SOFTEN THE SURFACE:

Thoroughly clean the inside of the socket and the area between the pencil mark and the spigot end with a clean, lint free cotton cloth dipped in priming fluid (do not use synthetic material). This removes dirt and grease and softens the PVC-U surface. Do not brush or pour the priming fluid on.

The information contained in this document should serve as a guide only and is subject to change without notice. For more information please contact Iplex Pipelines Australia Pty Ltd.



INSTALLATION

STEP 5 - COAT SOCKET FIRST - THEN THE SPIGOT:

Apply a thin, uniform coat of Iplex solvent cement to the socket. Take care to ensure that solvent build up does not occur in the root of the socket - a pool of cement there will severely weaken the pipe or fitting. Now apply a uniform coat of solvent cement to the external surface of the spigot up to the pencil mark.



STEP 6 - ASSEMBLE - HOLD FOR 30 SECONDS:

Assemble the joint quickly before the cement dries by pushing the spigot firmly into the socket as far as the pencil mark, ending with a quarter turn to spread the cement evenly. Hold the joint in this position for at least thirty seconds without movement.



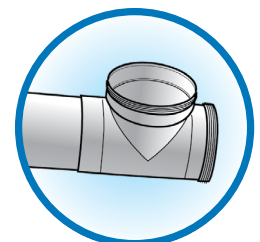
STEP 7 - A VITAL 5 MINUTES:

Wipe off the excess solvent cement from the outside of the joint and where possible from the inside of the joint. Do not disturb the joint for at least a further five minutes - movement may break the initial bond.



STEP 8 - CURING AND TESTING:

Cure time is the time taken for the solvent weld joint to reach the pressure rating of the pipe. **Do not pressure test the joint for at least 24 hours.**



The information contained in this document should serve as a guide only and is subject to change without notice. For more information please contact Iplex Pipelines Australia Pty Ltd.

INSTALLATION

SAFETY PRECAUTIONS FOR SOLVENT WELD PROCEDURES:

- Solvent cement and priming fluids are highly flammable
- In the event of fire, smother with sand or earth or use suitable fire extinguisher
- Store solvent cements and priming fluid in a cool place away from heat, flames and sparks
- Ensure can lids are tightly closed when not in use
- Do not add any other ingredients or solvents to these products
- Do not use solvent cements or priming fluid in confined spaces without adequate ventilation, or near open flames or sparks
- Do not smoke while using these products
- If spilt on skin, wash off with soap and water
- If poisoning occurs, consult a doctor or Poisons Information Centre
- Keep container sealed when not in use
- Safe use - Ensure that directions on the containers of solvent cement and primers are followed at all times

JOINING INSTRUCTIONS - RUBBER RING JOINT (DN80 - DN375)

Iplex PVC-U pipes are supplied with the Rieber jointing system. The Rieber seal is fitted at the time of manufacture and subsequently **MUST NOT BE REMOVED**.

If the ring is tampered with or damaged in any way after leaving the factory then the socket and affected ring must be cut off and scrapped. It is essential to use Iplex Standard or Iplex Plus bactericidal jointing fluid with the Rubber joint.

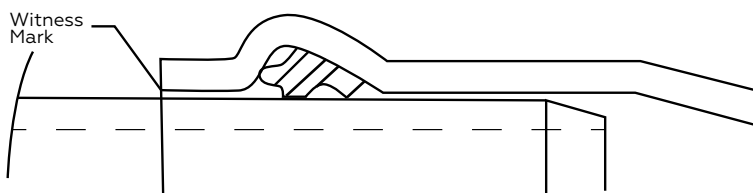


Figure 3.0 - Rieber rubber ring joint is supplied pre-installed in pipe socket.

CUTTING PIPES

PVC-U pipes can be cut to length on site using either a hand saw or powered cutting disc. Ensure that the cut end is then chamfered with an appropriate field-lathing tool to the correct length. The chamfer and new witness mark should replicate the manufactured dimensions.

CLEANING

Remove all dust and dirt from the pipe spigot and socket paying particular attention to the cleanliness of the fixed ring.

The information contained in this document should serve as a guide only and is subject to change without notice. For more information please contact Iplex Pipelines Australia Pty Ltd.

INSTALLATION

LUBRICATE

Apply lubricant to the spigot, fully covering the circumference up to the witness mark. Ensure the lubricant is also applied to the pipe chamfer.

ASSEMBLY

Insert the leading edge of the spigot into the socket mouth. It is essential that the pipes be aligned in a straight line before attempting to make the joint. A small, longitudinal force applied to the socket end of the pipe is sufficient to insert the spigot into the adjacent pipe socket. For larger diameter pipes requiring a crowbar for jointing, protect the pipe socket with a wooden block.

Care must be taken to ensure that the pipe is not under-inserted as this may result in a leaking joint as the pipe contracts as a result of Poisson's and/or thermal effects. Under-insertion is signified by the witness mark not being pushed up to the end of the socket. Note: When pressurised, Poisson contraction will cause a shortening of the pipes and this might re-expose the witness mark. This is acceptable.

This is generally only a risk with uncontrolled insertion using mechanical equipment like the bucket of a back hoe. If simple insertion past the witness mark has occurred, i.e. pushing it ever so slightly past so the witness mark is now hidden from view, say up to 5mm, there is no significant risk to the performance of the joint. Insertion too far past the

witness mark may result in stress to the transition region at the back of the socket to the barrel of the pipe, especially where uncontrolled insertion using mechanical equipment like the bucket of a backhoe or excavator.

As a manufacturer, Iplex Pipeline's recommendation is that all pipes should be installed to the witness mark, inline with the various current guidelines, standards and codes. This allows the joint to handle both expansion and contracting of the PVC pipe in service which occurs due to temperature and pressure changes.

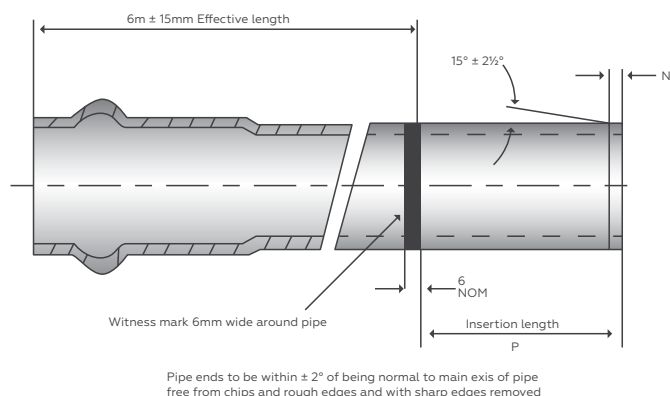


Figure 4.0 - Typical pipe spigot details for rubber ring joint pipes.

TABLE 3.0 TYPICAL PIPE SPIGOT DETAILS FOR RUBBER RING JOINTED PIPES

DN	MEAN INSERTION DEPTH "P"	MEAN CHAMFER LENGTH "N"
80	121	13
100	129	14
150	145	18
200	173	17
225	180	25
250	194	27
300	201	30
375	236	35

The information contained in this document should serve as a guide only and is subject to change without notice. For more information please contact Iplex Pipelines Australia Pty Ltd.



INSTALLATION

If insufficient Iplex Plus is available to complete jointing pipes for non-potable water applications a solution of soap and water can be used until extra lubricant is delivered. This cannot be done for water supply pipelines, as they will usually require the use of approved bactericidal lubricants.

Keep container closed when not in use to avoid spillage or contamination by dust or dirt.

Safety Use - Follow the directions given on the container.

DUCTILE IRON SOCKET JOINTS

PVC-U pipes can be used with ductile iron socketed fittings complying with AS/NZS 2280.

JOINTING FLUIDS (LUBRICANTS)

Note: It is essential to use Iplex Standard or Iplex Plus bactericidal jointing fluid with all Iplex PVC-U elastomeric jointed systems. Other lubricants especially MINERAL BASED GREASES, MUST NOT BE USED.

Iplex Plus bactericidal jointing fluid is recommended for potable water supplies as it contains a bactericide designed to limit the growth of bacteria by disinfection at its source. During installation bacteria can enter the system and form a colony in the joint area, which is highly resistant, (even to high levels of chlorine) and can cause continuing infection of the line. Being water-soluble, the fluid is quickly removed from potable water systems when flushing commences.

Iplex Plus is safe and has no detrimental effect on the rubbers used in gasket materials and because of its properties, can also lower jointing forces.

Keep the container closed when not in use to avoid spillage or contamination by dust or dirt.

As a safety precaution avoid contact with eyes. If contact does occur, flush with copious amounts of water. If ingested drink copious amounts of water.

EXPANSION AND CONTRACTION

Distortion can occur when laying pipes in direct sunlight. When one side of the pipe is hotter than the other it may develop a slightly bent shape, which may make jointing difficult. Common practice is to rotate pipes or place pipes in the shade to offset any uneven temperatures within the pipe. Plastic pipe will contract as it cools, after laying in hot weather. A 6-metre length of PVC-U pipe will expand or contract approximately 5mm for each 10°C rise or fall in temperature.

The following precautions should be taken to ensure that the joints do not pull apart:

- Laying is best done in the cooler parts of the day.
- Rubber ring systems will allow for thermal movement of the pipeline after having been laid.
In both cases, backfill each length, at least partially, as laying proceeds.

The information contained in this document should serve as a guide only and is subject to change without notice. For more information please contact Iplex Pipelines Australia Pty Ltd.

PVC-U PRESSURE PIPE

INSTALLATION

INSTALLING ON A CURVED ALIGNMENT

PVC-U pipes are flexible enough to be easily curved evenly along their length. Pipes should always be joined directly in line before the alignment of the pipes is altered.

TABLE 4.0 - MINIMUM PIPELINE RADII

PIPE CLASS	RADIUS OF CURVED PIPE*
All	300 x Nominal pipe diameter

**Note: Some authorities may not allow PVC-U pipes to be curved or may not allow curved PVC-U pipes to be drilled or tapped. As an alternative, tapped DI connectors can be used.*

CONCRETE ENCASUREMENT

Where concrete encasement is required, PVC-U pipes shall be set to line and level on either bags of natural fibre filled with sand and cement mix or on concrete blocks or saddles cast to the outside diameter of the barrel and located near the socket. Precautions shall be taken to prevent movement, flotation or deformation of the pipe while pouring concrete.

Where damage to pressure pipe surfaces could occur as a result of differential movement of the encased pipe, the pipe and fittings shall be protected by wrapping the pipe in a compressible membrane made of polyethylene, PVC, Petrolatum tape or felt.

For further information refer to AS/NZS 2032 'Installation of PVC pipe systems'.

The information contained in this document should serve as a guide only and is subject to change without notice. For more information please contact Iplex Pipelines Australia Pty Ltd.



PVC-U PRESSURE PIPE

INSTALLATION

TAPPED SERVICE CONNECTIONS

PVC-U pipes can be tapped using approved tapping bands and hole cutters. Fine toothed 'shell cutters' or hole saws are recommended.

Several proprietary bands including Crevet Taptite DI and Milnes Gunmetal bands are recommended for use with PVC-U pressure pipe. Tapping saddles must comply with AS/NZS 4793 "Mechanical Tapping Bands for Waterworks Purposes".

ABOVE GROUND SUSPENDED PIPELINES

Un-plasticised PVC pressure pipes can be used above ground provided they are protected from long-term exposure to ultra violet radiation. In direct sunlight acrylic paint may be a suitable barrier. As a general rule pipes should be rubber ring jointed and a minimum class PN9 should be specified.

Full circle supports should surround the pipes and "padded" with compressible material such as 3mm thick insertion rubber, protecting the exterior surface of the pipe from abrasion. Special provision for thrust support of fittings is also required.

TABLE 5.0 RECOMMENDED SPAN BETWEEN SUPPORTS FOR PVC-U PIPES (FOR DEFLECTIONS LESS THAN L/500)

PIPE DESIGNATION	SPAN (METRE)
DN100 PN 9 or higher	2
DN150 PN 9 or higher	2
DN150 PN 12 or higher	3
DN200 to DN450 PN 9 or higher	3

The information contained in this document should serve as a guide only and is subject to change without notice. For more information please contact Iplex Pipelines Australia Pty Ltd.

