IPEX

AquaRISE®

READ BEFORE INSTALLING

Solvent Cementing Instructions

2-1/2", 3" & 4" (63mm, 75mm &100mm) AquaRise®

Instructions for SOLVENT CEMENTING 2-1/2", 3" and 4" (63mm, 75mm and 100mm) IPEX AquaRise® CPVC pipe, fittings and accessories using **AquaRise® TWO-STEP CPVC Solvent Cement**

SUMMARY OF PRACTICE

1. Use only AquaRise® primer and AquaRise Two-Step CPVC solvent cement to make solvent cemented joints for 2-1/2" to 4" diameter AquaRise CPVC pipe, fittings and accessories. The following shall be clearly understood and followed:
   - The joining surfaces must be softened (dissolved) and made semi-fluid.
   - Sufficient primer must be used to soften and prepare joining surfaces for a layer of Two-Step solvent cement.
   - Sufficient Two-Step solvent cement must be applied to fill the gap between pipe and fitting.
   - Assembly of pipe and fitting must be made while the surfaces are still wet and fluid.
   - Joint strength develops as the Two-Step solvent cement dries. In the tight part of the joint, the surfaces will tend to fuse together; in the loose part, the Two-Step solvent cement will bond to both surfaces.
2. For 2-1/2" to 4" diameters penetration and dissolving must be achieved by applying AquaRise primer before using the AquaRise Two-Step solvent cement. In cold weather and hot weather more time and additional care is required. See cold and hot weather solvent cementing procedures in this guide for special instructions.
3. Sufficient Two-Step cement must be applied to fill the gap in the loose part of the joint (see Figure 2). Besides filling the gap, adequate Two-Step solvent cement layers will penetrate the surfaces and also remain wet until the joint is assembled.
4. If the Two-Step solvent cement coatings on the pipe and fittings are wet and fluid when assembly takes place, they will tend to flow together and become one solvent cement layer. Also, if the solvent cement is wet, the surfaces beneath them will still be soft, and these dissolved surfaces in the tight part of the joint will tend to fuse together (see Figure 3).
5. As the solvent dissipates, the Two-Step solvent cement layer and the dissolved surfaces will dry and harden with a corresponding increase in joint strength. Completed joints should not be disturbed until they have cured sufficiently to withstand handling. Joint strength develops as the Two-Step solvent cement dries. For information about curing and hardening time and the minimum time before the piping system can be pressure tested see Table 1.

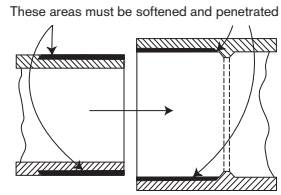


Figure 1: Outside of Pipe and Inside the Fitting Socket to be Softened and Penetrated

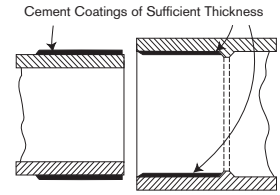


Figure 2: Solvent Cement Coatings of Sufficient Thickness Applied Uniformly around Pipe and inside Fitting Socket

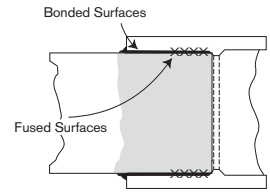
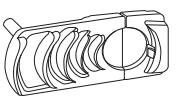


Figure 3: Fused and Bonded Surfaces of Joined Pipe and Fitting

WARNING: FOLLOW ALL PREPARATION AND INSTALLATION PROCEDURES

MATERIAL PREPARATION

1. Cutting the Pipe. It is important to cut the pipe square. A square cut provides the surface of the pipe with the maximum bonding area. Pipe can be easily cut with a wheel-type plastic tubing cutter, power saw, chop saw, or fine toothed saw. Tools used to cut pipe must be designed for plastic piping and must be in good condition in accordance with the tool manufacturer's recommendations. If there is any indication of pipe damage or evidence of pipe end cracking, cut off at least 2 inches (50mm) beyond any visible crack. Using ratchet cutters is not recommended as they may split the pipe if not properly used and maintained.
2. Deburring and Beveling. Burrs and filings can prevent proper contact between pipe and fitting during assembly, and must be removed from the outside and the inside of the pipe prior to assembly. Use the tools provided separately by IPEX which have been specifically designed for this purpose.



Tool for sizes 1-1/4" and larger.

3. Cleaning. Using a clean dry rag, wipe any dirt and moisture from the fitting socket and the pipe end. Moisture will slow the cure time, and at this stage of assembly, excessive water can reduce joint strength.

4. Dry-Fit all joints to confirm Interference Fit. Before applying primer and Two-Step solvent cement, test all connections (pipes, fittings and accessories) to confirm a proper interference fit exists. Dry-fit contact between properly bevelled pipe and fitting sockets is essential in making a good joint. The bevelled pipe should easily enter the fitting socket and make contact with the inner fitting socket wall before bottoming out. A proper interference fit is present when the bevelled pipe can only be inserted 1/3 to 2/3 of the way into the fitting socket. This interference fit allows the primer and Two-Step solvent cement to effectively join the pipe and fitting.

   DO NOT solvent cement pipe, fittings or accessories that fit loosely together or where pipe bottoms out. Proper joint strength cannot be developed.

   DO NOT solvent cement pipe, fittings or accessories if a bevelled pipe cannot easily be inserted at least 1/3 of the way into the fitting socket. In this case the interference fit is too great and may cause excessive stresses at the connection leading to joint failure.

5. Applicator Size. Use the dauber provided inside the can of AquaRise primer to prime pipe and fitting surfaces to be joined. Primer may also be applied using the swab and blue handle provided inside the carton. Extra swabs and handles are sold separately. Contact IPEX for more information.

   Use the swab and blue handle contained inside this carton to apply AquaRise Two-Step solvent cement. Replacement swabs and handles are sold separately. Contact IPEX for more information.

TWO-STEP SOLVENT CEMENTING PROCEDURE

1. Measure the fitting socket depth and mark the outside of the pipe with this dimension. This will help with application of the proper amount of primer and Two-Step solvent cement on the pipe and also helps indicate full and proper insertion of the pipe inside the fitting socket.
2. Apply primer to socket keeping surfaces wet and applicator wet and in motion until the entire joining surface is properly softened. Avoid puddling.
3. Apply to pipe surface in the same manner equal to depth of socket.
4. Apply again to the fitting socket. Avoid puddling.
5. While the primer is still wet and the surfaces are soft, apply a full, even layer of AquaRise Two-Step solvent cement to the pipe end, equal to the depth of the fitting socket. Like the primer, be aggressive. Remember to apply enough Two-Step solvent cement to fill the gap between the pipe and fitting.
6. Apply a thin layer of AquaRise Two-Step solvent cement to the inside of the fitting socket. This will prevent puddling of the solvent cement inside of the pipe or fitting. Excessive solvent cement applied to the fitting socket can cause the joint to clog and the wall of the pipe or fitting to weaken due to softening by the trapped solvents.
7. Apply a second full, even layer of AquaRise Two-Step solvent cement to the pipe end. Excessive solvent cement on the pipe outer diameter (O.D.) can be wiped away after assembly.
8. Without delay, while the solvent cement is still wet, assemble the pipe and fitting, and twist a 1/8 to 1/4 turn as the pipe is being inserted, if possible. For larger diameter joints mechanical assistance may be required to fully assemble the pipe into the fitting socket. Once the pipe end has reached the fitting socket stop, do not turn any further; doing so could break any fusion that is starting to occur.
9. Hold the pipe and fitting together for approximately 30 seconds to avoid “push-out”.
10. A bead of solvent cement must be formed around the entire socket fitting entrance. With a clean, dry cloth, remove the excess solvent cement from the pipe and fitting socket entrance. This will allow the solvent to evaporate from within the joint.

Table 1. Solvent Cement Cure Times

AVERAGE INITIAL SET SCHEDULE FOR PVC/CPVC SOLVENT CEMENTS

Temperature Range	Pipe Sizes 1/2" – 1-1/4" (20mm – 40mm)	Pipe Sizes 1-1/2" – 2" (50mm – 63mm)	Pipe Sizes 2-1/2" – 4" (75mm – 100mm)
60° – 100°F (16° – 38°C)	2 minutes	5 minutes	30 minutes
40° – 60°F (5° – 16°C)	5 minutes	10 minutes	2 hours
0° – 40°F (-18° – 5°C)	10 minutes	15 minutes	12 hours

Note - Initial set schedule is the necessary time to allow before the joint can be carefully handled. In damp or humid weather allow 50% more set time.

AVERAGE JOINT CURE SCHEDULE FOR PVC/CPVC SOLVENT CEMENTS

Relative Humidity 60% or Less	Pipe Sizes 1/2" – 1-1/4" (20mm – 40mm)		Pipe Sizes 1-1/2" – 2" (50mm – 63mm)		Pipe Sizes 2-1/2" – 4" (75mm – 100mm)	
Temperature range during assembly and cure periods	psi (Bar)		psi (Bar)		psi (Bar)	
	up to 160 (up to 11)	160 to 370 (11 to 26)	up to 160 (up to 11)	160 to 315 (11 to 22)	up to 160 (up to 11)	160 to 315 (11 to 22)
60° – 100°F (16° – 38°C)	15 minutes	6 hours	30 minutes	12 hours	1-1/2 hours	24 hours
40° – 60°F (5° – 16°C)	20 minutes	12 hours	45 minutes	24 hours	4 hours	48 hours
0° – 40°F (-18° – 5°C)	30 minutes	48 hours	1 hour	96 hours	72 hours	8 days

Note - Joint cure schedule is the necessary time to allow before pressurizing system. In damp or humid weather allow 50% more cure time.

CAUTION: These figures are estimates based on testing done under laboratory conditions. Although this information is widely published across the industry, these charts should be used as a general reference only. Field working conditions can vary significantly and will increase set and cure times.

PRESSURING SOLVENT CEMENT JOINTS

Care must be taken to allow solvent cemented joints to adequately cure and develop full strength. A number of factors will impact the required cure time before joints can be pressurised. These factors include:

a. On-site temperature and humidity

b. Pipe diameter (larger diameter joints require more time to cure)

c. Internal operating pressure

d. Internal operating temperature

In general, these cure times will allow cold water AquaRise lines to be pressurised to the levels shown.

Based on field experience, hot water lines may require an additional 50% longer cure time or more, before operating at full hot water service conditions. Contractors performing repairs, modifications or maintenance must allow joints to properly cure before pressurising the system with hot water. Reduced operating pressures and temperatures may allow the system to return to service earlier.

Contractors performing repairs, modifications or maintenance may wish to use the AquaRise maintenance couplings when quicker return to service time is needed. This mechanical coupling allows for immediate return to full operating conditions. Contact IPEX for more information.

COLD WEATHER SOLVENT CEMENTING – BELOW 50ºF (10ºC)

1. Prefabricate as much of the system as possible in a heated area.
2. Store AquaRise primer and AquaRise Two-Step solvent cement in a warm location above 40°F (5°C) when not in use and make certain cement remains fluid.
3. Take special care to remove moisture including snow and ice from the surfaces being joined including pipe ends and fitting and valve sockets.
4. Ensure that the pipe, fittings and valves are at the same temperature prior to solvent cementing.
5. Ensure the surfaces are sufficiently softened with AquaRise primer and AquaRise Two-Step cement before joining. Check for proper softening of surfaces and correct amount of primer and solvent cement on a sample pipe. Surfaces are sufficiently softened when scraping a blade on the treated part results in the effortless removal of some of the plastic.
6. Allow a longer cure period before the system is pressure tested. A heating blanket may be used to speed up the set and cure times.
7. Read and follow all instructions carefully before installation.

HOT WEATHER SOLVENT CEMENTING – ABOVE 86ºF (30ºC)

1. Store AquaRise primer and AquaRise Two-Step solvent cement in a cool or shaded area prior to use.
2. If possible store pipe and fittings in a shaded area prior to solvent cementing.
3. Cool surfaces to be joined with a clean, damp rag. Be sure the surface is dry prior to priming and solvent cementing.
4. Try solvent cementing joints in the cooler morning hours.
5. Make sure both surfaces to be joined are still wet with solvent cement when joining them together. With larger size pipe more people on the crew may be necessary.
6. Vigorously stir or shake the AquaRise Two-Step solvent cement before use.
7. System anchoring and final connections should be made during the cooler hours of the day to account for expansion and contraction.

SYSTEM ACCEPTANCE (HYDROSTATIC PRESSURE) TEST

See www.ipexaquarise.com for complete details on system testing.

DANGER: PRESSURE TESTING WITH COMPRESSED AIR IS DANGEROUS AND CAN RESULT IN INJURY OR DEATH. DO NOT USE AIR TO TEST AQUARISE PIPE, FITTINGS AND ACCESSORIES.

INSTALLATION WARNING

- Dry fit all joints prior to solvent cementing to confirm proper interference fit.
- Discard fitting joints without proper interference fit.
- DO NOT solvent cement joints that are too loose or too tight.
- Always use AquaRise bevelling tools to prepare pipe ends before cementing.
- DO NOT solvent cement joints without first bevelling pipe ends.
- Use only AquaRise primer and AquaRise Two-Step solvent cement to join 2-1/2" (63mm) to 4" (100mm) AquaRise pipe, fittings and accessories.
- Always use AquaRise primer when joining 2-1/2" (63mm) to 4" (100mm) AquaRise pipe, fittings and accessories.
- DO NOT use other primers or solvent cements to connect AquaRise pipe, fittings and accessories.
- Follow all solvent cementing instructions provided with this product.
- Follow all AquaRise installation instructions. See www.ipexaquarise.com for details.

SAFETY WARNING

- IPEX fully endorses safety and protective measures recommended by government agencies when installing AquaRise CPVC pipe, other plastic pipe or metal pipe.
- Always provide proper ventilation when applying primers and cements and/or soldering materials.
- Avoid unnecessary skin or eye contact with primers and cements and/or soldering materials.
- Wash immediately if contact occurs to avoid prolonged exposure.
- Follow all manufacturer-recommended precautions when cutting or sawing pipe or when using any flame, heat or power tools.
- After hydrostatic testing, thoroughly flush the system for at least 10 minutes to remove residual trace amounts of solvent cement or flux/solder components.
- Avoid open flames or soldering around solvent cement joints.
- NEVER TEST AQUARISE PIPE, FITTINGS OR ACCESSORIES WITH COMPRESSED AIR. SERIOUS INJURY OR DEATH CAN OCCUR.

SAFE HANDLING OF TWO-STEP SOLVENT CEMENT

1. AquaRise primer and AquaRise Two-Step solvent cement for plastic pipe is made from flammable liquids and should be kept away from all sources of ignition. Good ventilation should be maintained to reduce fire hazard and to minimize the breathing of solvent vapors. Avoid contact with skin and eyes.
2. Refer to ASTM F402, Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings.
3. For additional safety information consult the material safety data sheet for this product which is available from IPEX. See www.ipexaquarise.com for details.

LIMITED WARRANTY AND LIABILITY

AquaRise Products are sold subject to a Limited Warranty and Limitation of Liability. The Products must be used only in applications and under conditions (handling, installation, testing, use, etc.) that are strictly in compliance with the AquaRise Technical Manual and the AquaRise Installation Guides currently available from the Vendor at the time of installation. The AquaRise system has specifically designed pipe, fittings, valves and solvent cements and is only designed for operation using genuine AquaRise products. For complete details see www.ipexaquarise.com.

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