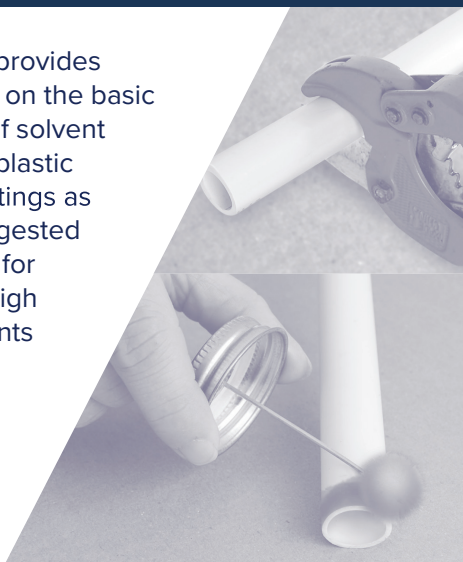




OUR NAME IS OUR BOND

SOLVENT WELDING GUIDE

This guide provides information on the basic principles of solvent welding of plastic pipe and fittings as well as suggested techniques for achieving high strength joints in a wide variety of conditions.



**Training Guide for Solvent
Cement Welding of PVC and
CPVC Plastic Pipe and Fittings**

TABLE OF CONTENTS

INTRODUCTION	3
USE OF SOLVENT CEMENT AND TRAINING: WHY THE NEED?.....	4
HOW DOES SOLVENT WELDING WORK?	4-5
CEMENT TYPES AND BODIES	5-6
PROPER SOLVENT CEMENT WELDING PROCEDURE.....	6-9
PRECAUTIONS WHEN WORKING WITH A BELL-END PIPE	9
DRY JOINTS AND HOW TO AVOID THEM	9
SOLVENT CEMENT WELDING WITHOUT PRIMER	9-11
WELDING LARGE DIAMETER PIPES AND FITTINGS	11-12
SPECIAL CEMENTING CONDITIONS.....	12-13
CHEMICAL APPLICATIONS	13
GENERAL INFORMATION ON MULTIPURPOSE CEMENT.....	13-14
FIRST AID	14
SPECIAL PRECAUTIONS	14
CEMENT PRODUCTS, USE AND SHELF LIFE.....	15
THIRD PARTY CERTIFICATIONS AND ASTM STANDARDS	15-17
SELECTION GUIDE.....	18
AVERAGE SET CURE TIMES TABLES.....	19

INTRODUCTION

Since 1965, E-Z WELD® has been formulating and manufacturing a broad range of high-strength PVC/uPVC, CPVC, and ABS solvent cements, primers, cleaners, and thread sealants ideally formulated for a variety of pipe joining applications. All products are manufactured under tight quality control methods and meet or exceed industry standards where applicable. The maximum shelf life of unopened cans of all E-Z WELD® solvent cements and primers is three years.

Our products are available in regular, medium, heavy bodied and extra heavy bodied formulas. Our wide variety of cements accommodate all schedules and sizes, exceed ASTM standards and comply with all necessary NSF and IAPMO (UPC) industry listings. If your application need is turf management or irrigation, plumbing, industrial, pool and spa, electrical or DIY, E-Z WELD® has a suite of products to serve that need.

E-Z WELD® products have been proudly made in our Riviera Beach, Florida, United States of America facility since 1972. Our facility is home to E-Z WELD® solvent cements, primers, cleaners, and thread sealants.

E-Z WELD® supplies product to some of the largest retailers and plumbing wholesalers in the United States, many of whom are recognized household names. Globally E-Z WELD supplies products to 45+ countries across Latin America, Caribbean, Middle East, Africa, Asia and the European Markets.



SOLVENT CEMENT & TRAINING: WHY THE NEED?

Many assume that since more than 80% of their activity is with plastic pipe diameters under 4", their techniques of installation, solvent cement ordering, and general understanding of procedure can be safely centered around small diameter pipe. This type of thinking can be dangerous and foolhardy since the importance of technique of installation (and the cost) of large diameter plastic pipe is greatly magnified as the diameter increases. Solvent cement welding in plastic pipe and fittings is the last link in the plastic pipe installation. Poor comprehension and / or work technique can mean failure to the system, even though all of the products used in the installation are correct in themselves. If, however, you consider the cost of large diameter pipe and fittings and review the following data, you will readily draw the conclusion that by using correct materials, properly designed and developed for each individual system, the end result will be time saved and fewer dollars spent. The following information will assist in the following:

- Aid in the determination of E-Z WELD® solvent cement to be used for a specific diameter pipe
- Describe the preparation of large diameter pipe and the application of the cement
- Provide information regarding the cure time of solvent cements used for large diameter pipe and fittings

Contact us or your supplier if you need additional information or instruction. If you have any questions on the information on this pamphlet or need further assistance, please give us a call. Our number is 1-800-327-8460.

HOW DOES SOLVENT WELDING WORK?

The solvents in the cleaner remove residues that may be on the pipe, leaving a good clean surface. Then, primer solvents begin the softening process, "etching" or penetrating the pipe. By doing so, the plastic begins to soften and swell. Cement is similar to primer, but contains higher concentrations of active solvents and dissolved resin, similar to the plastics in the pipe and fitting being welded. The pipe and fitting are both coated, connected and bottomed out, and given a 1/4 turn to ensure an even distribution of the cement.

The swelling and the tapered shape of the fitting will cause the pipe to attempt to “push-off” of the fitting, so some resistance must be applied until the cement takes a “set”. The set usually only takes a minute or two to allow for gentle handling of the joint. The “cure” is the slow increase in strength of the joint. This process involves the evaporation of solvent out of the joint, completing the weld.

In general, solvent cementing fuses the fitting and pipe into a single plastic mass, making the chemical compatibility of cement dependent only on the compatibility of the plastics used by the pipe and fitting manufacturers to the chemicals in question once the cement has cured.

Our cement is effectively only made with the same plastic PVC, CPVC or ABS resins used in the pipe and fitting with added volatile organic solvents (ethers and ketones), which evaporate away from the joint during cure. A properly made joint has the pipe and fitting fused at the base of the fitting.

Incompatible materials and chemicals, such as oxidizers, should be kept away from the liquid cement, primer and cleaner products. For working with cements and primers please follow ASTM F402 for safe handling of these products.

Cure time will vary depending on temperature, product type, pipe size and fit. For set and cure times we recommend following the ASTM guides for solvent cement, such as those found in ASTM D2855. Longer cure times will result in stronger joints.

The SDS should be reviewed by your engineering personnel who must make the final decision as to any unusual system chemical compatibility.

CEMENT TYPES AND BODIES

There are three basic types of Solvent Cements:

PVC used on PVC pipe and fitting (drinking and irrigation water).

CPVC used on CPVC pipe and fitting (hot water application, 140°F to 180°F (60°C to 82°C)).

ABS used on ABS pipe and fitting (drainage, irrigation).

PVC and CPVC cements can be divided into three (3) categories grades):

Regular Body 90 to 500 cps consistency similar to cooking oil.

Medium Body 500 to 1600 cps consistency similar to heavy duty engine oil.

Heavy Body 1600 cps+ consistency similar to honey.

Regular Bodied: This is an excellent cement for pipe and fittings up to 3" in diameter where gaps between pipe and fitting are snug. Check the dry fit, some resistance should be felt as you insert the pipe in to the fitting. Very cost effective and the most popular. If there is any doubt regarding the snugness of the pipe and fitting use a Medium or Heavy Bodied cement.

Medium Bodied: This cement is designed for the pipe and fitting between 3" and 8" in diameter. (Always follow the manufacturers' recommendations). If no resistance is felt as you insert the pipe in to the fitting, we recommend that a second coat of cement should be applied.

Heavy Bodied: This cement is made for pipe and fittings larger than 8" in diameter. If the gaps are large a second coat of cement should also be applied.

PROPER SOLVENT CEMENT WELDING PROCEDURE

1. Select the proper solvent cement for the work, pipe cleaner and primer.
2. Obtain any needed safety equipment (gloves, eye protection, etc.) prior to starting work.
3. Make sure you are following local codes regarding cement and primers. If job conditions are unusual, for example, freezing, or hot and windy, additional precautions should be taken.
4. Choose a dauber/applicator that is sized properly for the work to be done. Daubers, brushes or applicators should be 1/2 the diameter of the fittings being joined (2" brush/applicator for 4" pipe). This reduces the time required to apply the cement, resulting in better joints.
5. For small diameters of plastic pipe, cutters are available to produce easy straight cuts. Larger pipes should be cut with a tool producing square cuts. Cut the pipes neatly and square - this is very important as most of the joint strength is obtained at the bottom of the tapered pipe fittings. Straight cuts ensure that the pipe can bottom out properly in the fitting, producing the strongest possible joints.



6. Pipes must also be deburred before assembly. Deburr the pipe, inside and out. - Burrs left from cutting can act to scrape needed cement out of the joint, which can cause leaks. Use of a blade, file or cloth is recommended to deburr the pipe ends. As the fittings are tapered, a clean and even cut is essential so that applied cement is not scraped from the joint during assembly. Do not sand or abrade the walls of the pipe or fitting - this may change the dimensions of the pipe.



7. Plastic pipe and fittings are manufactured with very close tolerances. Check the dry fit of the pipe and fitting to be cemented first. To check for the “interference fit”, insert the dry pipe into the fitting. On typical plastic pipe and fittings, a resistance should be felt 1/2 to 2/3 of the socket depth.



8. Use pipe cleaner to remove any inks, grease, dirt, waxes and / or oils from the pipe surfaces. Wipe pipe and fitting with cleaner, using a clean rag on larger pipe sizes. This is done to ensure that oils, inks, dirt and / or grease are removed and are not incorporated into the joint.



9. Use a primer to soften both pipe and fitting prior to cement. Apply a coat of primer to start the softening of the pipe and fitting. Primer may not be required in pipes under 3” nor is recommended for thin wall, styrene or ABS pipe. Check local codes. A primer starts the penetration – swelling process before the cement application. While the use of a primer results in a better bond, it will require a longer cure time initially.



10. While the primer is still wet, use a proper sized applicator to quickly and evenly coat the cement to the pipe and fitting. Best results are had when the cement is “flowed” on the pipe surface- not thinly brushed. Apply the solvent cement with the proper size brush (natural, not synthetic) or roller. While daubers are sometimes provided with canned cements, they are in no way correct for use on larger diameter pipe and fittings. The rule of thumb for proper size applicator is one that is approximately 1/2 the width of the pipe diameter. (That is, for a 2” diameter pipe, use at least a 1” wide brush and for a 6” diameter pipe, use a 3” wide brush, etc.) Apply the cement rapidly yet be sure to completely cover all required surface areas of the pipe and fitting.

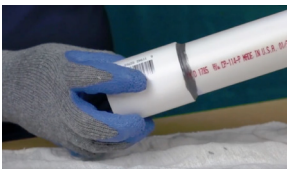


11. If conditions are such that fast evaporation will result, pre-cool pipe fitting and cement, work in shade if possible, and apply additional coatings on pipe when necessary prior to joining the pieces.

12. Working quickly, insert the pipe into the fitting until it bottoms, giving the pipe a 1/4 turn to help evenly distribute the cement. The cement on both the pipe and fitting must be fluid at this time or a failure may occur later.



13. The pipe and fitting must now be compressed tightly for 15 seconds to 3 minutes as the swelling action of the tapered fitting tends to push-off the pipe. Assistance or mechanical means may be required on larger pipe sizes. The cement should appear to “wet” the surfaces of the pipe and fitting when assembled.



14. Wipe away excess cement that is pushed out of the joint with a dry rag. A wet bead of cement on the outside of the fitting is a good



sign, as it indicates that sufficient cement has been used, and that the cement was fluid when assembled. Excess cement on the pipe can, however, weaken it, so it must be wiped off.

15. The set joint must be treated carefully during the initial curing time, and not be mechanically disturbed. Allow the cemented joint to cure according to the recommended time. Do not use compressed gas to test pipe as a failure may have explosive force. Allow the pipe interiors to vent the solvent vapors and avoid using sparking or open flame equipment (power drills or torches) near areas where solvent vapors may exist - an explosion could occur.

16. Tighten the caps of the products used after completion of the job. The cleaners, primers and cements will last much longer.

PRECAUTIONS WHEN WORKING WITH BELL-END PIPE

When cementing bell-end pipe, be careful not to apply an excessive amount of cement to the bell socket, as the pipe has a thinner wall in this area and a puddle of excess cement is capable of weakening, and even penetrating, the pipe.

DRY JOINTS AND HOW TO AVOID THEM

A typical failure of large plastic pipe jobs occurs when a dry joint is made. When the pipe assembly is delayed, by using a small dauber, or other causes, the cement will “flash-off” its solvents and fail to weld the plastics, producing a dry joint. The active solvents are very quick to evaporate and are required for the cement to work properly. You have no additional time to produce a large joint than a small one - Work quickly!

A common additional problem with dry joints is that the semifluid cement makes bottoming the pipe difficult, if not impossible. As a result, the joint is likely to fail.

A proper joint has only a thin layer of cement inside the actual joint, with a majority toward the open end of the tapered fitting. The dry joint has the typical poor distribution of torn unbonded cement.

SOLVENT CEMENT WELDING WITHOUT PRIMER

If local codes permit, successful joints can be made without a primer using cement alone, but extra care must be given to the installation. It is important that a good interference fit exists between the pipe and fittings. It is for this reason we recommend that joints being made without a primer be limited to systems 2” and smaller for pressure

applications (water systems only) or 6" and smaller for DWV or non-pressure applications. (Check local code requirements.) Extra care must also be given in applying the cements to make sure proper penetration and softening of the pipe and fitting surfaces is achieved.

- 1.** Select the proper cement for the work as well as pipe cleaner.
- 2.** Obtain any needed safety equipment (gloves, eye protection, etc.) prior to starting work.
- 3.** Choose a dauber/applicator that is sized properly for the work to be done. Daubers, brushes or applicators should be 1/2 the diameter of the fittings being joined (2" brush/applicator for 4" pipe). This reduces the time required to apply the cement, resulting in better joints.
- 4.** For small diameters of plastic pipe, cutters are available to produce easy straight cuts. Larger pipes should be cut with a tool producing square cuts. Cut the pipes neatly and square - this is very important as most of the joint strength is obtained at the bottom of the tapered pipe fittings. Straight cuts ensure that the pipe can bottom out properly in the fitting, producing the strongest possible joints.
- 5.** Pipes must also be deburred before assembly. Deburr the pipe, inside and out. - Burrs left from cutting can act to scrape needed cement out of the joint, which can cause leaks. Use of a blade, file or cloth is recommended to deburr the pipe ends. As the fittings are tapered, a clean and even cut is essential so that applied cement is not scraped from the joint during assembly. Do not sand or abrade the walls of the pipe or fitting - this may change the dimensions of the pipe. Plastic pipe and fittings are manufactured with very close tolerances. Check the dry fit of the pipe and fitting to be cemented first. To check for the "interference fit", insert the dry pipe into the fitting. On typical plastic pipe and fittings, a resistance should be felt 1/2 to 2/3 of the socket depth.
- 6.** Use pipe cleaner to remove any inks, grease, dirt, waxes and/or oils from the pipe surfaces. Wipe pipe and fitting with cleaner, using a clean rag on larger pipe sizes. This is done to ensure that oils, inks, dirt and/or grease are removed and are not incorporated into the joint.
- 7.** Use a proper sized applicator to quickly and evenly coat the cement to the pipe and fitting. Best results are had when the cement is "flowed" on the pipe surface- not thinly brushed. Apply the solvent cement with the proper size brush (natural, not synthetic) or roller. Apply the cement rapidly yet be sure to completely cover all required

surface areas of the pipe and fitting. Working quickly, insert the pipe into the fitting until it bottoms, giving the pipe a 1/4 turn to help evenly distribute the cement. The cement on both the pipe and fitting must be fluid at this time or a failure may occur later.

8. The pipe and fitting must now be compressed tightly for 15 seconds to 3 minutes as the swelling action of the tapered fitting tends to push-off the pipe. Assistance or mechanical means may be required on larger pipe sizes. The cement should appear to “wet” the surfaces of the pipe and fitting when assembled.

9. Wipe away excess cement that is pushed out of the joint with a dry rag. A wet bead of cement on the outside of the fitting is a good sign, as it indicates that sufficient cement has been used, and that the cement was fluid when assembled. Excess cement on the pipe can, however, weaken it, so it must be wiped off.

10. The set joint must be treated carefully during the initial curing time, and not be mechanically disturbed. Allow the cemented joint to cure according to the recommended time. Do not use compressed gas to test pipe as a failure may have explosive force. Allow the pipe interiors to vent the solvent vapors and avoid using sparking or open flame equipment (power drills or torches) near areas where solvent vapors may exist - an explosion could occur.

11. Tighten the caps of the products used after completion of the job. The cleaners, primers and cements will last much longer.

WELDING LARGE DIAMETER PIPE AND FITTINGS

(6” Diameter and Larger)

As pipe diameter increases, so does the difficulty in installing it. The professional installer should be able to successfully assemble large diameter pipe and fittings by following the Proper Solvent Cement Welding Procedure listed on this guide along with the following additional recommendations.

1. It is extremely important to use the appropriately sized applicator to ensure that enough cement is applied to fill the larger gap that exists between the pipe and fittings. The rule of thumb for proper size applicator is one that is approximately 1/2 the width of the pipe diameter. (That is, for a 2” diameter pipe, use at least a 1” wide brush and for a 6” diameter pipe, use a 3” wide brush, etc.) Apply the cement rapidly yet be sure to completely cover all required surface areas of the pipe and fitting.

2. It is very important to use the appropriate cement for the size of pipe and fittings that are being installed. A medium bodied cement can be used for pipes and fittings up to 6" in diameter, depending of the application. Heavy bodies cements can be used for pipe and fitting applications of up to 12 inches in diameter. For larger pipe, Extra Heavy Body cements are recommended.
3. End of pipe must be cut square and chamfered (beveled).
4. Increase the size of the joining crew: For jobs with pipe diameters of 6" - 8" it is recommended that a 2-person crew works per joint. For 10" - 30": 3-4 people per joint. It is important in large diameter joining that the primer and cement be applied simultaneously to the pipe and fittings.
5. Make sure to apply a second, full layer of cement to the pipe.
6. Because of the short sockets in many large diameter fittings, IT IS VERY IMPORTANT TO HAVE PIPE BOTTOMED INTO THE FITTING. Large diameter pipe is heavy and can develop significant resistance during insertion, before reaching socket bottom. Mechanical assistance may be required on very large pipe and fittings.
7. Large diameter pipe and fittings require longer set and cure times. (In cold weather, a heat blanket may be used to speed up the set and cure times.) Please reference our set and cure time guide for additional information.
8. Prefabricate as many joints as possible.
9. If pipe is to be buried, make as many joints as possible above ground, then after joints have cured, carefully lower into trench.
10. Never bury empty cans, brushes, or anything else containing wet cement, primer, or cleaner next to the pipe.

SPECIAL CEMENTING CONDITIONS

Very hot, sunny and or windy conditions can cause the cements and primers to quickly evaporate, before the solvents can penetrate the surfaces -resulting in dry joints. Under these conditions, you should keep the pipe, fittings and cements shaded and cool and work as fast as possible.

Very cold freezing weather also can present problems, as solvent cement should be stored above 40°F (4°C) to prevent gelling due to cold. The action of the cement depends on the diffusion and evaporation of solvents in the joint, and these are both slowed in freezing weather. Set and cure times will be much longer in cold weather - consult the ASTM

guides for cure time- when the weather is cold.

Solvent cementing is possible when some water is present, although this is not ideal. All attempts should be made to keep the work piece dry as possible. Large pipe and fittings may require several people working to make a single joint. Mechanical assistance may be required on very large pipe and fittings.

CHEMICAL APPLICATIONS

Installations of plastic pipe and fittings for chemical applications requires more skill than other installations; joint failures in these systems could be life threatening. It is for this reason we recommend the following tips for these applications. Tips for Installation:

1. Installers should be very familiar and have prior experience in solvent cement welding. If possible, installers should be trained and certified to ASME B31.3 and ASTM D2855.
2. Allow at least two to three times the normal set and cure times.
3. Flush the piping system before putting it into operation.
4. Installers should use extra care during assembly to ensure proper installation of system.
5. Make sure the proper cement for the specific application is used.
6. If there is any doubt about compatibility of materials (pipe, fittings or cement) with chemicals in system, manufacturers of materials should be contacted.

GENERAL INFORMATION ON MULTIPURPOSE CEMENT

The E-Z WELD® 208 Multipurpose Solvent Cement is targeted toward do-it-yourself plastic pipe projects, ordinary plumbing applications and as an emergency repair tool, because it is suitable for plastic pipe jobs and materials - CPVC and PVC. In this way, a consumer will not accidentally use PVC cement in a CPVC hot water application- which could be prone to failure.

It is made from the same materials, solvents and resins, under the same care and conditions as the other certified products in the E-Z WELD® cement line. The resin used is CPVC - the higher performance version of PVC, allowing for hot water usage, as would be encountered in a typical CPVC installation. Because of this, there should be no compatibility problems of this material with PVC pipe and fittings. All major solvent cement manufacturers produce an all-purpose or multipurpose cement. The amber color of these products is due to the CPVC resin used in the cement.

ASTM standards are written only for specific plastic pipe adhesive systems: (i.e. ASTM - 2564, Standard Specification for Solvent Cement for Poly Vinyl Chloride (PVC) Plastic Piping Systems). Due to the lack of a single ASTM standard for a multipurpose or all-purpose product, third party certification agencies have no written method to refer to. As a result, no NSF or IAPMO approval process is currently available. Depending on local codes, the multipurpose product may not be suitable for use and a different product should be used. The cement is more than adequate for use on pipes up to 6" in diameter, although we recommend use of clear or purple primer on PVC and CPVC pipes 3" and over. As in soldering, the strength of a properly made and cured joint will greatly exceed all normal working pressures such as those used in a typical installation. As in all solvent welding, if the system passes its initial required hydro testing, any future failure is unlikely. Solvent cemented joints are not subjected to chemical erosion, as the weld is essentially the pipe materials being joined themselves. If the pipe and fittings are compatible with the liquids being transported, the properly made and cured joint will be compatible as well.

FIRST AID

Inhalation: If breathing is difficult, vacate to fresh air. If breathing problems persist, seek immediate medical attention.

Eyes: Flush eyes thoroughly with water for 15 minutes. Get immediate medical attention.

Internal: If swallowed give 1 or 2 glasses of water immediately, call physician, hospital or poison control immediately. DO NOT INDUCE VOMITING.

SPECIAL PRECAUTIONS

Ensure adequate ventilation to avoid vapor build up which may cause flash fire. Vapor build up may also cause dizziness, headaches or eye watering. If symptoms are experienced, use respiratory protection (NOISH/MSHA TC-23C or equivalent) or leave and provide more fresh air. Avoid contact with eyes, skin and clothing by use of safety glasses and gloves. Professionals should consult ASTM Standard F402-18 Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings. Professional users should also read the Safety Data Sheet for the product.

CEMENT PRODUCTS, USE AND SHELF LIFE

As with all adhesive products, the end user shall determine the product condition, its suitability for the intended use, verify his ability to make successful joints and assume all risk and liability in connection therein. As a rule, unopened cement products stored at 70°F are typically suitable for use from three years of manufacture. Primers and cleaners being solvent only do not expire. We guarantee most all products for 3 years unopened cans. Due to the many factors that are involved in solvent cementing pipes and fittings, we do not cover any types of consequential damages (labor, damage to property or other) from use or misuse of the product.

Please Note: We have a distributor program where the outside shipping boxes are marked with a 3-year use by date. This assists in ensuring proper turnover, re-ordering and distribution of all cased products from external warehouses- including primer and cleaners.

We suggest the following guidelines for all Warehouse Managers:

- Store product between 40° - 90°F (4°C - 32°C)
- Best kept between 70° - 80°F (21°C - 27°C)
- Not in direct sunlight
- Turn inventory ideally every 6 months
- Rotate your stock
- Remember! These products are flammable! Store properly!

THIRD PARTY CERTIFICATIONS AND ASTM STANDARDS

Many codes and regulations exist in the plumbing business, especially when drinking (potable) water is involved. The ASTM (American Society for Testing and Materials) sets the standards for many products including our own.

Solvent Cement & Primer Related ASTM Standards:

- D2855-15 Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets
- D2564-12 (2018) Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems

- F402-18 Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings
- F656-15 Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings
- F493-14 Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings

These ASTM standards require certain levels of performance from the covered products.

For example, ASTM D2564-12 (2018) Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems requires a cement having a minimum viscosity when tested depending on its class, a minimum lap shear when tested and good cure strength when tested with hydrostatic pressure. For the working professional, ASTM D2855-15 Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets and F402-18 Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings, are must read documents. They teach the standard method to make proper joints safely.

<http://www.astm.org/>

NSF International, The Public Health and Safety Company, is an independent, not for profit organization providing a wide range of services around the world. For more than 55 years, NSF has been committed to public health, safety and protection of the environment. While focusing on food, water, indoor air and the environment, NSF develops national standards, provides learning opportunities through its Center for Public Health Education and provides third-party conformity assessment services while representing the interests of all stakeholders. The primary stakeholder groups include industry, the regulatory community and the public at large. NSF is widely recognized for our scientific and technical expertise in the health and environmental sciences. Its professional staff includes engineers, chemists, toxicologists and environmental health professionals with broad experience both in public and private organizations. Serving manufacturers operating in more than 80 countries, the NSF Mark is recognized for its value in international trade around the world and is respected by regulatory agencies at the local, state and federal levels.

IAPMO, The International Association of Plumbing and Mechanical Officials, is another third party organization that is well known in the plumbing industry. Since first developing the Uniform Plumbing Code in 1945, IAPMO has been dedicated to the orderly yet aggressive evolution of codes and product standards best able to address the needs of the public and the plumbing/mechanical communities in hundreds of jurisdictions. Products evaluated and listed by the Plumbing and Mechanical Research Committees must meet or exceed the requirements of acceptable, applicable standards and the Uniform Plumbing and Mechanical Codes. The research committees cause products to be tested in certified independent laboratories all over the United States. If the products are found acceptable for listing by the Research Committee, they are listed in our Directory of listed plumbing products which lists tens of thousands of products, from fixtures to pipes to septic tanks to back-flow protection devices. The Directory is updated monthly. In order to safeguard health and safety and to maintain the integrity of IAPMO R & T's Listing Program, its Listing Compliance Department employs a staff of seven inspectors. All independent contractors, these inspectors travel the entire world conducting unannounced inspections of manufacturing plants and warehouses. Compliance with applicable standards and adherence to proper manufacturing methods and processes is verified. Independent laboratory testing of randomly selected samples is conducted. Should products fail to live up to contractual levels of quality, they are ordered withdrawn from the market.

Product Description				Pipe Size																					
Type		No.	Color	ASTM	½	¾	1	1¼	1½	2	2½	3	4	6	8	10	12	14	18	24	30				
				ISO (DIN)	20	25	32	40	50	63	75	90	110	160	200	250	315	350	450	600	750				
PVC CEMENTS	REGULAR BODY	202	Clear																						
		205	Clear																						
	MEDIUM BODY	204	Clear																						
		222	Blue																						
	MEDIUM BODY	207	Orange																						
		227*	FlowGuard Gold®																						
SPECIALTY CEMENTS	BEET-RI-CAL	201	Clear																						
	POOL PLU-R & SPA	203	Blue																						
	MULTI-PLU-R, POSE	208**	Amber																						
	ALL WEATHER	215	Clear																						
	TRAVEL-STON	220***	Green																						
ABS CEMENT	MEDIUM BODY	210	Black																						
PRIMERS & CLEANERS	PRIMER	211	Clear																						
		212	Purple																						
	WASH & CON-CR-TOR	213	Purple																						
		CLEANER	214	Clear																					
INDUSTRIAL GRADE	PRIMER	221	Purple																						
		224	Clear																						
	PVC CEMENTS	MEDIUM BODY	206	Gray																					
			209	Cloudy																					
		HEAVY BODY	216	Gray																					
				218	Clear																				
	CPVC CEMENTS	EXTRA HEAVY BODY	219	White																					
		HEAVY BODY		217	Gray																				
				230**	Gray																				
				231	Orange																				
			786	Orange																					

Legend

Schedule 40

Schedule 80

* FlowGuard Gold® is a registered trademark of Lubrizol Corporation

** For CPVC & PVC Chemical Piping Systems.

*** For ABS TO PVC Transition Joints.

How to use this guide

1. Select the proper E-Z Weld Products for your application based on pipe material type, diameter and schedule (40 / 80).

2. Verify that product chosen is suitable for pipe size by following with the proper schedule limits. If selection is out of schedule limit, select alternative product according to pipe application and size.

Average Number of Joints per Quart Can*

Pipe Nominal Size	ASTM	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	18
	ISO (DIN)	20	25	32	40	50	63	75	90	110	160	200	250	315	350	450
Number of Joints		300	200	125	105	90	60	50	40	30	10	6	2-3	1-2	3/4	1/2

*This chart should be used as a general reference only as these figures are estimates based on testing done under laboratory conditions. Field working conditions can vary significantly.

Pipe Size Equivalent Chart

ASTM	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	18
ISO (DIN)	20	25	32	40	50	63	75	90	110	160	200	250	315	350	450

Average Handling / Set-up Times⁺

Handling / Set-up time is the time required prior to handling the joint carefully. In damp or humid weather, allow 50% additional cure time.						
Temperature While Joining	Pipe Diameter 1/2" to 1 1/4" 15 mm to 32 mm	Pipe Diameter 1 1/2" to 2" 40 mm to 50 mm	Pipe Diameter 2 1/2" to 5" 65 mm to 125 mm	Pipe Diameter 6" to 8" 150 mm to 200 mm	Pipe Diameter 10" to 16" 250 mm to 375 mm	Pipe Diameter 16"+ 400 mm
16 °C - 38 °C (60 °F - 100 °F)	2 minutes	5 minutes	25 minutes	30 minutes	2 hours	4 hours
5 °C - 16 °C (40 °F - 60 °F)	5 minutes	10 minutes	50 minutes	2 hours	8 hours	16 hours
-18 °C - 5 °C (0 °F - 40 °F)	10 minutes	15 minutes	4 hours	10 hours	24 hours	48 hours

+ This chart should be used as a general reference only as these figures are estimates based on testing done under laboratory conditions. Field working conditions can vary significantly.

Average Joint Cure Times⁺⁺

Joint Cure Time is the time required before pressure testing the system. In damp or humid weather, allow 50% additional cure time.							
Relative Humidity 60% or Less	Pipe Diameter 1/2" to 1 1/4" 15 mm to 32 mm	Pipe Diameter 1 1/2" to 2" 40 mm to 50 mm	Pipe Diameter 2 1/2" to 8" 65 mm to 200 mm	Pipe Diameter 10" to 15" 250 mm to 375 mm	Pipe Diameter 16"+ 400 mm		
Temperature While Joining and Curing	up to 145 psi / 10 bar	145 to 363 psi / 10 to 25 bar	up to 145 psi / 10 bar	145 to 363 psi / 10 to 25 bar	up to 145 psi / 10 bar	145 to 363 psi / 10 to 25 bar	up to 100 psi / 7 bar
16 °C - 38 °C (60 °F - 100 °F)	15 min	6 hrs	30 min	12 hrs	1 1/2 hrs	24 hrs	48 hrs
5 °C - 16 °C (40 °F - 60 °F)	20 min	12 hrs	45 min	24 hrs	4 hrs	48 hrs	96 hrs
-18 °C - 5 °C (0 °F - 40 °F)	30 min	48 hrs	1 hour	96 hrs	72 hrs	8 days	8 days

++ This chart should be used as a general reference only as these figures are estimates based on testing done under laboratory conditions. Field working conditions can vary significantly.

Fahrenheit to Celsius Conversion Chart





OUR MISSION STATEMENT

To offer consistent products with uncompromising quality through continuous improvement and innovation. To exceed our customers expectations with personalized service. To provide a clean and safe work environment while ensuring respect for and empowerment of our employees. To always conduct business ethically, responsibly and honestly.

E-Z WELD

IPS Corporation
100 Trousdale Way
Hartsville, TN 37074

United States of America

Tel: +1 310 886 7600

Email: sales@e-zweld.com

E-ZWELD

www.e-zweld.com