Ultra-Pure CPVC

Submittal Data Sheet

Job or Customer: .....

Engineer: .....

Contractor: .....

Submitted by: ..... Date

Approved by: ..... Date

Order No: ..... Date

Specification: .....

< STANDARDS >

ASTM D2846

NSF 14 & 61

Please see our listing on agency websites for NSF compliant pipe and fittings.

www.nsf.org
www.icc-es.org

Ultra-Pure® CPVC pipe is made with CPVC 4120 (Type IV, Grade I) resin having a cell classification of 24448 per ASTM D1784. The maximum service temperature for
Ultra-Pure CPVC is 180°F (60°C), at 100psi.

Ultra-Pure CPVC does not corrode or accumulate mineral deposits. It may be used for the distribution of potable water in the United States and where approved by Authorities Having Jurisdiction.

Ultra-Pure® CPVC meets the 25/50 flame spread and smoke development requirement for plenum applications. Ref: ICC-ES PMG-1323 in general accordance with ASTM E 84.

Meets the requirements of FHA Use of Materials Bulletin 76

Ultra-Pure is offered 1/2" through 2" CTS SDR-11 (Copper Tube Size).

Material Properties

Properties	CPVC	Standards
Cell classification	24448	ASTM D1784
Specific gravity	1.55	ASTM D792
Tensile strength, psi at 73°F	7,000	ASTM D638
Modulus of elasticity tensile, psi at 73°F	360,000	ASTM D638
Flexural strength, psi	15,000	ASTM D790
Izod impact, ft.lbs./in. at 73°F, notched	5.0	ASTM D256
Hydrostatic Design Stress, psi at 73°F	2,000	ASTM D1598
Coefficient of thermal expansion in./in./°F (x 10^{-5})	3.4	
Linear expansion, in./10°F per 100' of pipe	0.41	
Maximum operating temperature under pressure 180°F		
Deflection temperature under load, °F at 66 psi	n/a	ASTM D648
Deflection temperature under load, °F at 264 psi	230	ASTM D648

Pipe Availability

CTS SDR-11 Plain End, 10′	Outside Diameter	Min. Wall Thickness	Inside Diameter	Max Working Pressure at 73°F	Max Working Pressure at 180°F	Wt / 100′
1/2″	0.625	0.060	0.484	400 PSI	100 PSI	8
3/4″	0.875	0.080	0.688	400 PSI	100 PSI	16
1″	1.125	0.102	0.888	400 PSI	100 PSI	25
1-1/4″	1.375	0.125	1.094	400 PSI	100 PSI	37
1-1/2″	1.625	0.148	1.296	400 PSI	100 PSI	51
2″	2.125	0.193	1.703	400 PSI	100 PSI	86

CTS SDR-11 Plain End, 20′	Outside Diameter	Min. Wall Thickness	Inside Diameter	Max Working Pressure at 73°F	Max Working Pressure at 180°F	Wt / 100′
1/2″	0.625	0.060	0.484	400 PSI	100 PSI	8
3/4″	0.875	0.080	0.688	400 PSI	100 PSI	16
1″	1.125	0.102	0.888	400 PSI	100 PSI	25
1-1/4″	1.375	0.125	1.094	400 PSI	100 PSI	37
1-1/2″	1.625	0.148	1.296	400 PSI	100 PSI	51
2″	2.125	0.193	1.703	400 PSI	100 PSI	86

Solvent Welding Basics

To make consistently tight joints, the following points should be followed:

- Dry fit all joints prior to solvent welding to confirm proper interference fit
- Do not solvent weld joints that are too loose or too tight
- Always use bevelling tools to prepare pipe ends before cementing
- Do not solvent weld joints without first bevelling pipe ends
- Follow all solvent welding instructions provided in this manual
- The joining surfaces must be softened and made semifluid with the use of a primer
- Sufficient cement must be applied to fill the gap between pipe and fittings
- Assembly of pipe must be made while the cement coatings on the surfaces are still wet and fluid
- Joint strength will develop as the cement cures. If the joint is made properly, the dissolved surfaces in the tight part of the joint will fuse together

NOTICE

Do not use excessive amounts of primers or solvent cement as it can lead to puddling. Puddling of primer and cement in the pipe and fittings can result in product failures and property damage. Always follow the instructions provided with each can of CPVC primer and/or solvent cement.

Materials Needed for Joining CPVC

- Two-step Solvent Cement: meets ASTM F493 and plumbing codes require them to be orange
- Primer: meets ASTM F656, typically purple or clear

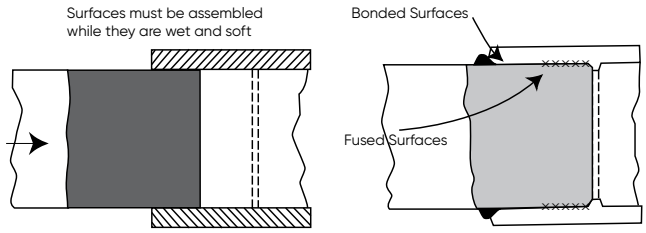
Materials Needed for Joining CPVC

- One-step Solvent Cement: meets ASTM F493 and plumbing codes require them to be yellow

CPVC CTS SDR-11 Pipe & Fittings

Pipe Size Range	Cement Type
1/2" to 2"	Regular-bodied

Sufficient cement must be applied to fill the gap in the loose part of the joint. Besides filling the gap, adequate solvent cement layers will penetrate the surfaces. If the 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 fuse together.



As the solvent dissipates, the solvent cement layer and the dissolved surfaces will dry and harden with a corresponding increase in joint strength. Completed joints must not be disturbed until they have properly set. See the Joint Set Schedule table for details.

Joint strength continues to develop as the solvent cement dries. To determine when solvent cement joints can be pressure tested, see the Joint Cure Schedule table.

Handling & Installation Procedures

Two-Step Solvent Welding Instructions

Step 1 Preparation

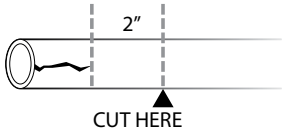
Assemble proper materials for the job. This includes the appropriate cement, primer and applicator for the size of piping system to be assembled, tape measure, contrasting color marker and beveling tool.

CAUTION: Use proper Personal Protective Equipment (PPE) for the job: respirator, safety glasses, gloves and protective clothing.

Step 2 Cutting the Pipe

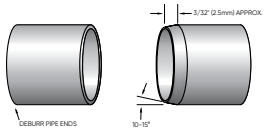
It is important to cut the pipe squarely. A square cut provides the surface of the pipe with the maximum bonding area. Pipe can be easily cut with a wheel-type plastic tubing cutter, chop saw or fine toothed saw. Do not use reciprocating saws.

Tools used to cut pipe must be designed for use with CPVC 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 beyond any visible crack. Use of ratchet cutters is not recommended as they may split the pipe if not properly used and maintained.



Step 3 Preparing Pipe Ends

After cutting, always remove all burrs and filings from both the inside and outside of the pipe and bevel the pipe end using a beveling tool. Remove burrs and filings from the inside of the pipe using a knife edge or file. Failure to remove burrs can scrape channels into pre-softened surfaces, create obstructions inside surface walls, or inadvertently plow cement out of the joint during assembly.



Step 4 Cleaning

Using a clean dry cloth, wipe any dirt and moisture from the fitting socket and the pipe end. Moisture will increase cure times and dirt and grease can prevent adhesion.

Handling & Installation Procedures

Step 5 Dry Fitting

Before applying primer or solvent cement, test all connections (pipe, fittings and accessories) to confirm a proper interference fit exists. Dry-fit contact between properly beveled pipe and fitting sockets is essential in making a good joint. The beveled 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 beveled pipe can only be inserted 1/3 to 2/3 of the way into the fitting socket.

CAUTION: We do not recommend the solvent welding of pipe, fittings or accessories that fit loosely together or where pipe bottoms out in a dry fit. Proper joint strength may not be developed. Please contact IPEX to discuss further.

Do not solvent weld pipe, fittings or accessories if a beveled pipe cannot easily be inserted at least 1/3 of the way into the fitting socket. This may cause excessive stresses during assembly leading to joint failure.

Step 6 Marking the Pipe

Measure the socket depth and mark the outside of the pipe with this dimension, followed by a second mark 1 inch further back. The first line will provide a guide for ensuring enough solvent cement is applied on the pipe. Maintaining a 1 inch distance to the second line once the pipe is inserted into the socket will indicate full and proper insertion of the pipe inside the socket.

Step 7 Select Applicator

Ensure that the right applicator is being used for the size of pipe being joined. The applicator size should be equal to half the pipe diameter. It is important that a proper size applicator be used to help ensure that sufficient layers of cement and primer are applied.

Step 8 Primer Application (If Required)

Using the correct applicator, aggressively work the primer into the socket, keeping the surface and applicator wet until the surface has been softened. More applications may be needed for hard surfaces and cold weather conditions. Re-dip the applicator in primer as required. When the surface is primed, remove any puddles of primer from the socket.

Handling & Installation Procedures

Step 9 Primer Application (If Required)

Aggressively work the primer on to the end of the pipe to a point 1/2" beyond the depth of the fitting socket.

Step 10 Primer Application (If Required)

A second application of primer in the socket is required, keeping the surface and applicator wet until the surface has been softened. When the surface is primed, remove any puddles of primer from the socket.

Step 11 Cement Application

Throughly stir the cement or shake can before each use. Immediately and while the surfaces are still wet, using the correct size applicator, aggressively work a heavy, even layer of cement on to the pipe end equal to the depth of the fitting socket. Do not brush it out to a thin paint type layer, as this will dry too quickly.

Step 12 Cement Application

Aggressively work a medium layer of cement into the socket. Avoid puddling cement in the socket by holding the fitting on an angle. If primer has dried, repeat the two Primer Application steps above.

NOTICE: Avoid pulling the cement in the socket. Excessive cement may cause the fitting to weaken due to softening by the trapped solvents.

Step 13 Cement Application

Apply a second heavy, even layer of cement on the pipe. Apply enough solvent cement to completely fill all the gaps between the pipe and at socket entrance.

Handling & Installation Procedures

Step 14 Assembly

Without delay, while the cement is still wet, assemble the pipe. Use sufficient force to ensure that the pipe bottoms in the socket.

If cement has dried before assembly, discard pipe end and fitting.

Step 15 Assembly

Hold the pipe and socket together for approximately 30 seconds to avoid push out. If push out does occur, the joint will need to be replaced.

Step 16 Assembly

After assembly, a joint should have a ring or bead of cement completely around the juncture of the pipe and socket. If voids in this ring are present, sufficient cement was not applied and the joint may be defective.

Step 17 Removing Excess

With a clean, dry cloth, remove the excess solvent cement from the pipe and socket entrance. This will allow the solvent to evaporate from within the joint and prevent weakening of the pipe.

Step 18 Joint Setting & Curing

Handle newly assembled joints carefully until initial set has taken place. **(Note: in humid weather, allow for at least 50% more curing time.)**

Handling & Installation Procedures

One-Step Method (Solvent Cement)

Procedure

The procedure for one-step solvent cementing is essentially identical to the two-step method. However, because primer is not being applied, be sure to aggressively work the cement into the surface of the pipe using a circular motion.

Apply a heavy even coat of cement to the outside of the pipe end, a light even coat to the fitting socket, and then another layer to the pipe end.

When using one-step cements for CPVC, ensure that it is allowed by the local codes.

Guidelines for Solvent Cement Set & Cure Times

The information listed below is for reference purposes only. Be sure to follow the cement manufacturer's cure time schedule, as times can vary. Extreme heat, cold, and humidity will also have an effect.

- Set time – time required before the joint can be carefully handled
- Cure time – time required before the system can be hydrostatically pressure tested

Set Time Schedule

Pipe Size Range	Temperature Range (°F)		
	60 – 100°	40 – 60°	0 – 40°
1/2" to 1-1/4"	2 minutes	5 minutes	10 minutes
1-1/2" to 2"	5 minutes	10 minutes	2 hours

Cure Time Schedule

For hydrostatic test pressure **below 180psi**:

Pipe Size Range	Temperature Range (°F)		
	60 – 100°	40 – 60°	0 – 40°
1/2" to 1-1/4"	15 minutes	20 minutes	30 minutes
1-1/2" to 2"	30 minutes	45 minutes	1 hour

For hydrostatic test pressure **above 180psi**:

Pipe Size Range	Temperature Range (°F)		
	60 – 100°	40 – 60°	0 – 40°
1/2" to 1-1/4"	6 hours	12 hours	48 hours
1-1/2" to 2"	12 hours	24 hours	96 hours

** Due to the many variables in the field, these figures are to be used as a general guide only. Refer to primer and cement manufacturer for actual cure times.

Safe Handling & Storage of Pipe

Care must be taken when handling PVC products to ensure that pipe is not damaged prior to installation. Take the following precautions to ensure PVC products remain in top condition prior to installation.

- Store pipe indoors if possible
- Pipe stored outside must be covered with a wellventilated white tarp
- Always keep pipe clean and covered in its original packaging
- Always store pipe on a flat surface and never store other products on top of pipe
- Do not drop or drag pipe
- Inspect all products for shipping damage prior to installation
- Never install products that are damaged

Solvent Welding Installation

Introduction

Creating optimal solvent welded connections requires attention to detail, proper preparation of components and an understanding of all instructions provided in this manual.

WARNING

DANGER: Highly flammable liquid and vapor may form explosive peroxide. Follow guidelines carefully.

WARNING

During the curing of the solvent welded joints, vapors may accumulate inside the piping system, especially should one end of the line be capped. Nearby sparks from welders or torches may inadvertently ignite these vapors and create a hazardous incident. Attention must be given to removing all vapors using air-blowers or water flushing prior to capping one end of an empty piping system.

Primer and solvent cement are made from flammable liquids and must be kept away from all sources of ignition. Good ventilation must be maintained to reduce fire hazard and to minimize the breathing of solvent vapors. Refer to ASTM F402, Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings. Always adhere to local jobsite and workplace safety regulations.

- Always provide proper ventilation when applying primers and cements
- Avoid skin or eye contact with primers and cements
- Wash immediately if contact occurs to avoid prolonged exposure
- Do not solvent weld joints near open flames or soldering torches
- Use Personal Protection Equipment (PPE) when handling primers and solvent cements
- Always store primer and cement indoors
- For cold weather installation, store primer and cement in a warm location above 40°F
- For hot weather installation, store primer and cement in a cool, shaded location
- Always check bottom of primer and cement cans for date of manufacture and expiry date
- Consult the primer and cement manufacturer directly if unsure that the primer and cement has expired
- Properly discard primer and cement that exceeds its recommended shelf life or expiry date
- Properly discard solvent cement that has hardened or jelled
- Tightly close partially used primer and cement containers
- Always thoroughly shake cement before use

NOTICE

Cement products are formulated for specific material types. To avoid potential joint failure, DO NOT USE PVC cement on CPVC components.

Well Casing Installation Procedures

Cold Weather

Although normal installation temperatures are between 40°F (4°C) and 110°F (43°C), high strength joints have been made at temperatures as low as –15°F (–26°C).

In cold weather, solvents penetrate and soften the plastic pipe and fitting surfaces more slowly than in warm weather. In this situation, the plastic is more resistant to solvent attack and it becomes even more important to pre-soften surfaces with an aggressive primer. Be aware that because of slower evaporation, a longer cure time is necessary.

Tips for solvent cementing in cold weather

- Prefabricate as much of the system as is possible in a heated work area.
- Store cements and primers in a warmer area when not in use and make sure they remain fluid.
- Take special care to remove moisture including ice and snow from the surfaces to be joined.
- Ensure that the temperature of the materials to be joined (re: pipe and fittings) is similar.
- Allow a longer cure period before the system is used.

Note: A heat blanket may be used to speed up the set and cure times.

Hot Weather

There are many occasions when solvent cementing plastic pipe at 95°F (35°C) temperatures and above cannot be avoided. If special precautions are taken, problems can be avoided.

Solvent cements for plastic pipe contain highstrength solvents which evaporate faster at elevated temperatures. This is especially true when there is a hot wind blowing. If the pipe is stored in direct sunlight, the pipe surface temperatures may be 20°F to 30°F (10°C to 15°C) higher than the ambient temperature. In this situation, the plastic is less resistant to attack and the solvents will attack faster and deeper, especially inside a joint. It is therefore very important to avoid puddling the cement inside the fitting socket and to ensure that any excess cement outside the joint is wiped off.

Tips for solvent cementing in hot weather:

- Store solvent cements and primers in a cool or shaded area prior to use.
- If possible, store fittings and pipe or at least the ends to be solvent welded, in a shady area before cementing.
- Try to do the solvent cementing in cooler morning hours.
- Cool surfaces to be joined by wiping with a damp rag.
- Make sure that the surface is dry prior to applying solvent cement.
- Make sure that both surfaces to be joined are still wet with cement when putting them together. With large size pipe, more people on the crew may be necessary.
- Using a primer and a heavier, high-viscosity cement will provide a little more working time.

Note: During hot weather the expansion-contraction factor may increase. Refer to the expansion-contraction design criteria in this manual.

Handling & Installation Procedures

Additional Handling and Storage Considerations

PVC is a strong, lightweight material, about one fifth the weight of steel or cast iron. Piping made of this material is easily handled and, as a result, there is a tendency for them to be thrown about on the jobsite. Care should be taken in handling and storage to prevent damage to the pipe.

PVC pipe should be given adequate support at all times. It should not be stacked in large piles, especially in warm temperature conditions, as bottom pipe may become distorted and joining will become difficult.

For long-term storage, pipe racks should be used, providing continuous support along the length. If this is not possible, timber supports of at least 3" bearing width, at spacings not greater than 3' centers, should be placed beneath the piping. If the stacks are rectangular, twice the spacing at the sides is required. Pipe should not be stored more than seven layers high in racks. If different classes of pipe are kept in the same rack, pipe with the thickest walls should always be at the bottom. Sharp corners on metal racks should be avoided.

For temporary storage in the field when racks are not provided, care should be taken that the ground is level and free of sharp objects (i.e. loose stones, etc.). Pipe should be stacked to reduce movement, but should not exceed three to four layers high.

Most pipe is now supplied in crates. Care should be taken when unloading the crates; avoid using metal slings or wire ropes. Crates may be stacked four high in the field. The above recommendations are for a temperature of approximately 80°F (27°C). Stack heights should be reduced if higher temperatures are encountered, or if pipe is nested (i.e. pipe stored inside pipe of a larger diameter). Reduction in height should be proportional to the total weight of the nested pipe, compared with the weight of pipe normally contained in such racks.

Since the soundness of any joint depends on the condition of the pipe end, care should be taken in transit, handling and storage to avoid damage to these ends. The impact resistance and flexibility of PVC pipe is reduced by lower temperature conditions. The impact strength for both types of piping materials will decrease as temperatures approach 32°F (0°C) and below. Care should be taken when unloading and handling pipe in cold weather. Dropping pipe from a truck or forklift may cause damage. Methods and techniques normally used in warm weather may not be acceptable at the lower temperature range.

When loading pipe onto vehicles, care should be taken to avoid contact with any sharp corners (i.e. angle irons, nail heads, etc.), as the pipe may be damaged.

While in transit, pipe should be well secured and supported over the entire length and should never project unsecured from the back of a trailer.

Larger pipe may be off-loaded from vehicles by rolling them gently down timbers, ensuring that they do not fall onto one another or onto a hard, uneven surface.

Prolonged Outdoor Exposure

Prolonged exposure of PVC pipe to the direct rays of the sun will not damage the pipe. However, some mild discoloration may take place in the form of a milky film on the exposed surfaces. This change in color merely indicates that there has been a harmless chemical transformation at the surface of the pipe. A small reduction in impact strength could occur at the discolored surfaces but they are of a very small order and are not enough to cause problems in field installation.

Protection – Covering

Discoloration of the pipe can be avoided by shading it from the direct rays of the sun. This can be accomplished by covering the stockpile or the crated pipe with a light colored opaque material such as canvas. If the pipe is covered, always allow for the circulation of air through the pipe to avoid heat buildup in hot summer weather. Make sure that the pipe is not stored close to sources of heat such as boilers, steam lines, engine exhaust outlets, etc.

Handling & Installation Procedures

Pressure Rating VS. Temperature

Temperature (°F)	De-Rating Factor	Pressure Rating (psi)
73	1.00	400
80	1.00	400
90	0.91	360
100	0.82	325
120	0.65	260
140	0.50	200
160	0.40	160
180	0.25	100

CTS SDR-11 CPVC Pipe Flow Performance

CPVC CTS SDR-11 pipe is made to ASTM D2846 and is OD-controlled. It is produced under the Ultra-Pure® name.

Example: 28.9 feet of 1" pipe will hold one (1) gallon of water

Flow Velocity (ft/s) is calculated using the following equation:

$$v = 0.4085 \times (Q/d)$$

Where:

Q = flow rate in gallons per minute (GPM)
d = inside diameter of the pipe (Target OD – Min Wall per ASTM D2846)

Friction loss per 100' of pipe:

$$h_f = 0.2083 \times \left(\frac{100}{C}\right)^{1.85} \times \frac{Q^{1.85}}{d^{4.87}}$$

$$\Delta P \text{ (psi)} = h_f \ / \ 2.31$$

Where:

h_f = head loss in feet of water per 100' of pipe
Δp = pressure loss in psi per 100' of pipe
C = Hazen-Williams Friction Factor (equal to 150 for HDPE)

CPVC CTS SDR-11 Pipe Capacity

Pipe Size	Length in Feet per Gallon
1/2"	96.1
3/4"	47.9
1"	28.9
1-1/4"	19.4
1-1/2"	13.9
2"	8.10

Handling & Installation Procedures

CTS SDR-11 CPVC Pipe Flow Performance

Velocity of Flow (in ft/sec) for CPVC CTS SDR-11 Pipe

Flow GPM	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
1	1.60					
2	3.20	1.60				
3	4.81	2.40	1.44			
4	6.41	3.20	1.93	1.29		
5		4.00	2.41	1.61	1.16	
6		4.79	2.89	1.94	1.39	
7		5.69	3.37	2.26	1.62	
8		6.39	3.85	2.58	1.85	1.08
9		7.19	4.33	2.90	2.08	1.22
10		7.99	4.82	3.23	2.31	1.35
12			5.78	3.87	2.78	1.62
14			6.74	4.52	3.24	1.89
16			7.71	5.16	3.70	2.16
18				5.81	4.16	2.43
20				6.46	4.63	2.70
25					5.78	3.38
30					6.94	4.05
35						4.73
40						5.40
50						6.75
60						
70						
80						

Pressure Loss (in lbs. per square inch) per 100 feet of CPVC CTS SDR-11 Pipe

Flow GPM	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
1	1.19					
2	4.28	0.79				
3	9.06	1.67	0.49			
4	15.42	2.84	0.83	0.31		
5		4.28	1.25	0.47	0.21	
6		6.00	1.75	0.66	0.29	
7		7.98	2.33	0.88	0.39	
8		10.22	2.98	1.12	0.50	0.13
9		12.71	3.70	1.40	0.62	0.17
10		15.45	4.50	1.70	0.75	0.20
12			6.31	2.38	1.06	0.29
14			8.39	3.17	1.41	0.38
16			10.74	4.05	1.80	0.49
18				5.04	2.24	0.60
20				6.12	2.72	0.73
25					4.11	1.11
30					5.76	1.55
35						2.07
40						2.65
50						4.00
60						
70						
80						

Use with Caution: Flow Velocity above 5 ft/second may cause turbulence or create damaging surge pressures.

Additional Installation Information

Water Treated with Chlorine & Disinfection of Building Water Distribution

Chlorine is used by many municipalities as a disinfectant. The EPA limits Chlorine use in drinking water to 4 parts per million (ppm). Chlorine at use levels below 300 parts per million will not negatively impact CPVC.

The CPVC hot and cold water distribution system may require system disinfection. Please refer to local plumbing code for system disinfection. When no other method is available, follow the time limitations and exposure levels listed below.

1. Flush the system with potable water until discolored water does not appear at any of the outlets.
2. Fill the system with a water chlorine solution containing at least 50 parts per million of chlorine. The system shall be valved in the closed position and allowed to stand for 24 hours. Alternatively, the system shall be filled with water chlorine solution containing at least 200 parts per million of chlorine. The system shall be valved in the closed position and allowed to stand for 3 hours.
3. Following the standing time, the system shall be flushed with water until the chlorine is purged from the system.

Fittings & Installation

Fittings for CPVC pipe shall conform to ASTM D2846. Solvent cement joints shall be made with cement meeting ASTM F493, and installed as dictated by applicable codes.

System Testing

System Acceptance (Hydrostatic Pressure) Test

After the Ultra-Pure CPVC system has been installed, it is important to test and inspect it for joint integrity. Leave all concealed pipe and fittings uncovered until the required test is completed and approved by the local Authority Having Jurisdiction.

Generally, a test pressure of 1.5 times the system working pressure for the pipe installed is adequate. It is recommended that hydrostatic testing be carried out before commissioning the line into usage. The following hydrostatic test procedure should be followed after all the solvent welded joints, in the section to be tested, have been allowed to cure fully (see tables in Average Joint and Cure Schedule).

Pressure testing with compressed air is strictly prohibited with Ultra-Pure CPVC.

Prior to testing, precautions must be taken to protect personnel and property in case of test failure.

HYDROSTATIC TEST PROCEDURE

1. Where possible, visually inspect the installed piping for evidence of physical damage or deficiencies.
2. Split the system into convenient test sections, not exceeding 1,000 feet.
3. Slowly fill the pipe section with water, preferably at a velocity of 1.0 ft/s or less. Any entrapped air must be evacuated by venting from the high points. Do not pressurize at this stage.
4. Leave the section for at least 1 hour to allow equilibrium temperature to be achieved.
5. Check the system for leaks. If clear, check for and remove any remaining air and increase pressure up to 50 psi (345 kPa). Do not pressurize further at this stage.
6. Leave the section pressurized for 10 minutes. If the pressure drops, inspect for leaks. If the pressure remains constant, slowly increase the hydrostatic pressure to 1.5 times the system working pressure but do not exceed the maximum working pressure of any system components.
7. Leave the section pressurized for a period not exceeding 1 hour. During this time, the pressure should not change if the test is successful. If there is a significant drop in static pressure or extended times are required to achieve pressure, either joint leakage has occurred or air remains in the line. Inspect for leakage and if none is apparent, reduce the pressure and check for trapped air. All air must be removed before further testing.
8. Any joint leaks should be repaired and allowed to cure fully before re-pressurizing and testing.

⚠ WARNING

- **NEVER** use compressed air or gas in Ultra-Pure CPVC pipe.
- **NEVER** use or test Ultra-Pure CPVC with compressed air or other gases. Do not use air-over-water boosters. **Use of compressed air or gas in Ultra-Pure CPVC pipe can result in explosive failures and cause severe injury or death.**

NOTICE

Do not exceed the maximum working pressure of any system components including pipe, fittings, valves, threaded adapters, unions, maintenance couplings or flanges.

- The pressure rating of all components must be reduced when operating temperatures exceed 73°F.
- Exceeding the maximum working temperature or pressure of the system may result in system failure and/or property damage.

Specifications

Ultra-Pure CPVC CTS SDR-11 Pipe

Scope

This specification sheet covers the manufacturers' requirements for CPVC CTS (Copper Tube Size) SDR-11 pressure pipe. The pipe meets or exceeds all applicable ASTM and NSF standards and are suitable for potable water.

CPVC Materials

Rigid CPVC (chlorinated polyvinyl chloride) used in the manufacturing of Ultra-pure CTS SDR-11 pipe complies with the material requirements of ASTM D1784 and has a cell classification of 24448. The CPVC complies with the requirements of ASTM D2846 for use in hot & cold water distribution systems.

Raw material used in the manufacturing shall contain the standard specified amounts of color pigment, stabilizers, and other additives. The compounds used are listed to the requirements of NSF 14 & 61 for use in potable water service.

The pipe compound shall be listed and labeled as having a Flame Spread Index (FSI) of not more than 25 and a Smoke Developed Index (SDI) of not more than 50 when tested in general accordance with ASTM E84 or UL 723.

Dimensions

Physical dimensions and properties of CPVC CTS SDR-11 pipe shall meet or exceed the requirements of ASTM D2846.

Marking

CPVC CTS SDR-11 is marked as prescribed in ASTM D2846 and NSF 14. The marking includes the following:

Nominal size, CPVC-4120, SDR 11, pressure ratings, applicable ASTM & NSF standards.

Sample Specification

All Ultra-Pure CPVC CTS SDR-11 pipe shall conform to ASTM D2846 and be third party certified to NSF 14. All CPVC CTS SDR-11 pipe from 1/2" to 2" shall be made with a CPVC compound having a minimum cell classification of 24448 per ASTM D1784. Solvent Cement used in joining socket type joints shall meet or exceed the requirements of ASTM F493. Solvent cement shall be listed by NSF for use in potable water systems.

About IPEX

About IPEX by Aliaxis

As leading suppliers of thermoplastic piping systems, IPEX by Aliaxis provides our customers with some of the world's largest and most comprehensive product lines. All IPEX by Aliaxis products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have earned a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX by Aliaxis products are:

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, PP, PVDF, PE, ABS, and PEX pipe and fittings
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems