INSTALLATION INSTRUCTIONS

Beam Strength - Both PVC and ABS offer a higher modulus of elasticity thus providing the necessary rigidity to withstand service loads with normal DWV support spacing.

Resistance to Hot Water - Throughout a quarter century of use in all types of construction, PVC and ABS-DWV have proven to be acceptable for all types of hot wastes generated in normal use. However, PVC and ABS-DWV cannot be recommended for the repetitive cycling of commercial dishwashing equipment or other applications which generate substantial flows above 140˚F.

Behavior in Structural Fires - The results of a great many tests both in laboratories and actual structures indicate that a plastic DWV system will not increase the fire hazard in a building. Like all thermoplastics, PVC and ABS are combustible but their high ignition temperatures exceed that of most other combustible materials used in building construction. Most common building and decorating materials ignite at a far lower temperature, thus making the plastic DWV system one of the last elements in a structure to catch fire. Like all thermoplastics, PVC and ABS can release potentially dangerous fumes when ignited; however, both laboratory investigation and practical experience have shown that most personal injuries and fatalities which occur in structural fires are the result of toxic fumes caused by the ignition of the first elements in construction to catch fire, typically wooden structural components. By the time a fire reaches such intensity and covers such large areas of a structure so that it would involve any significant amount of plastic DWV, the structure has already been flooded with toxic fumes from a multitude of natural and synthetic materials as mentioned above.

Underground Service - PVC and ABS are nonconductors and are not subject to galvanic action or to electrolysis resulting from the joining of dissimilar metals. They are immune to all kinds of soil acids and salts and will provide years of excellent performance even in the most corrosive soils.

Full Flow - The smooth corrosion resistant interior surface of plastic DWV products prevents the buildup of scale, rust and foreign matter that often impedes flow through metallic pipe.

Easy Installation - Permanent, chemically welded joints are made in minutes through solvent cementing. No dangerous torches, melting pots or other materials are necessary to accomplish a permanent joint which offers the same structural strength as the pipe and fittings in the system.

Lower Cost - The well known advantage of plastic DWV has been its lower material cost compared to metal pipe. It is easy to see that plastic DWV yields significant savings in total installation cost over metallic systems due to the reduced installation lime long life, and no requirements for special tools or machinery to install or prepare the materials for installation.

PVC-DWV FITTINGS

Storage and Handling - PVC-DWV pipe and fittings should be stored undercover whenever possible. Normal care in handling should be exercised to avoid abuse such as gouging, walking on the pipe or fittings, or dropping ends on ground or ahard surface.

Installing PVC-DWV - As with any material, good workmanship is important. PVC pipe and fittings join easily by the solvent cementing process and the joints achieve a permanent set very quickly. Careful layout is therefore especially important since any mistakes in joint alignment cannot be rectified with heating, hammering, or bending to fit.

Cutting PVC Pipe - Tubing cutters with special wheels for plastic pipe are recommended, but a fine-toothed saw may also be used. Be certain to cut the pipe squarely so that all edges of the pipe end will contact the bottom of the fitting socket. Remove all burrs from the end of the pipe.

Preparation Before Joining - Remove all dirt, grease and moisture with a rag from the inside and outside of the pipe and the inside of the fitting socket.

Interference Fit - Be sure that the pipe end fits snugly into the fitting socket. A loose wobbly fit may prevent proper chemical fusion.

Primer - In order to assure adequate penetration and fusion of solvent cement when joining PVC-DWV components, it is necessary to utilize a proper primer. The primer should be applied first to the inside socket surface using a scrubbing motion. Repeated applications may be necessary to soften this surface. Next apply a liberal coat of primer to the surface of the male end of the pipe to the depth of fitting socket. Be sure the entire surface is well softened. Immediately before application of cement, brush the inside socket surface with primer again and without delay, apply cement while the surfaces are still wet with primer.

Solvent Welding the Joint - Using a pure bristle brush of adequate size or the dauber in the can, apply a uniform coat of cement to the inside of the socket, taking care to keep the excess cement out of the inside of the fitting. Then apply a coat of cement to the pipe. While both the inside socket surface and the male end of the pipe are soft and wet with solvent cement, insert the pipe into the socket turning 1/4 turn during assembly, but not after the pipe has bottomed out in the socket. A bead of cement should appear at the edge of the socket to indicate that sufficient cement was applied. Remove the excess cement with a clean rag leaving a bead at the socket entrance. Should the cement dry partially before the joint is made up, repeat cementing before assembling.

PVC-DWV FITTINGS (CONT.)

Joint Setting Time - Hold the joint for a few seconds to eliminate any tendency of the pipe to back out. Do not disturb the joint during the following set times:

Ambient Temperature, F	Set Time, Minutes
50	3
70	2
90	1

After this interval, reasonable handling is permissible; however, allow at least thirty minutes to develop maximum handling strength. At lower temperatures a greater period of time may be necessary, up to four hours at 0˚F.

Joining PVC-DWV to Other Piping - Specific solvent cementable adapter fittings are available to join PVC to tubular copper DWV, no hub, cast iron, vitreous clay and bituminous fiber pipe.

Threaded Connections - Do not thread or tap Schedule 40 plastic pipe or fittings. Use only threaded adapters. Use only thread sealants which are specifically marked for use with plastic piping systems. Conventional thread compounds, putty, linseed oil-based products and other substances must be avoided. Turn threads one full turn past hand tight.

Lead Joints - PVC products can be connected to cast iron in the usual manner using oakum and at least one inch of lead. Heat lead to its melting point only. Let cool for four minutes, then caulk joints against iron.

Complete information on proper procedures for making solvent cemented joints with PVC pipe fittings can be obtained from ASTM Standard D2855. All personnel assembling PVC pipe and fittings should be thoroughly familiar with this standard.

ABS-DWV FITTINGS

Storage and Handling - ABS-DWV fittings should be undercover whenever possible. Normal care in handling should be exercised. Avoid abuse such as gouging, walking on the fittings, or dropping ends on the ground or a hard surface.

Installing ABS-DWV - As with any material, good workmanship is important. ABS pipe and fittings join easily by the solvent cementing process and the joints achieve a permanent set very quickly. Careful layout is therefore especially important since any mistakes in joint alignment cannot be rectified with heating, hammering, or bending to fit.

Cutting ABS Pipe - Tubing cutters with special wheels for plastic pipe are recommended, but a fine-toothed saw may also be used. Be certain to cut the pipe squarely so that all edges of the pipe end will contact the bottom of the fitting socket. Remove all burrs from the end of the pipe.

Preparation Before Joining - Remove all dirt, grease and moisture with a rag from the inside and outside of the pipe and the inside of the fitting socket.

Interference Fit - Be sure that the pipe end fits snugly into the fitting socket. A loose wobbly fit may prevent proper chemical fusion.

Solvent Welding the Joint - Using a pure bristle brush of adequate size or the applicator in the can, apply an even, moderate coating of cement in the fitting socket covering the pipe joining surfaces only. If too much cement is applied, the excess may be pushed into the pipe and obstruct the flow. Quickly apply cement to the outside of the pipe covering a distance equal to the depth of the socket.

Insert the pipe the full depth, rotating 1/4 of a turn during insertion to spread the cement. Do not rotate the pipe after it has "bottomed out". A bead of cement should appear at the edge of the socket to indicate that sufficient cement was applied. Remove excess cement with a clean rag, leaving a bead at the socket entrance. Should the cement dry partially before the joint is made up, repeat cementing before assembly.

Joint Setting Time - Hold the joint for a few seconds to eliminate any tendency to separate or turn. Do not disturb the joint until the following set times have elapsed:

Ambient Temperature, F	Set Time, Minutes
50	3
70	2
90	1

After this interval, reasonable handling is permissible; however, allow 15 minutes to develop maximum handling strength.

Joining ABS-DWV to Other Materials - Specific solvent cementable adapter fittings are available to join Mueller ABS to tubular copper DWV, no hub, cast iron, vitreous clay and bituminous fiber pipe.

Threaded Connections - Do not thread or tap Schedule 40 pipe or fittings. Use dry threaded adapters. Use only thread sealants which are specifically marked for use with plastic piping systems. Conventional thread compounds, putty linseed oil-based products and other substances must be avoided. Turn threads one full turn past hand tight.

Lead Joints - ABS products can be connected to cast iron in the usual manner using oakum and at least one inch of lead. Heat lead to its melting point only. Let joint cool four minutes, then caulk the joints against the iron.

GENERAL INSTALLATION TECHNIQUES - PVC & ABS

Alignment and Grade - Align all piping system components properly without strain. Do not bend or pull pipe into position after being solvent welded.

Supporting DWV - Any conventional pipe clamps, hangers or brackets with a bearing width of at least 3/4" are suitable. Do not compress, distort, cut or abrade the piping. Be sure to allow for free movement of the supported pipe.

Controlling Thermal Expansion and Contraction - Plastic DWV will expand or contract at a greater rate than metallic pipe. This however is not a problem in a one or two-story building because of the short runs, numerous branches in the line, or frequent changes in direction; all of which tend to absorb thermal movement. Support the piping without rigid restraint at branches and changes in directions. Do not anchor pipe rigidly in the walls or in the joints.

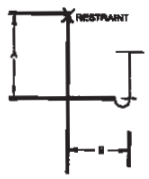
In high-rise systems (3 stories or more) expansion/contraction can be controlled by one of two methods:

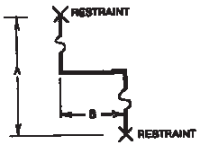
A. **Expansion Joints** - Expansion joints have an O-ring set in groove to provide a seal while permitting the pipe to move within the fitting. A joint may be located at intervals of 10', 20' or 30' maximum. If ambient conditions are not at an extreme, the fitting is installed at its neutral position (midpoint) so that movement can be in either direction.

   Vertical pipe must be anchored either by securing a branch adjacent to the expansion joints or by installing fixed clamps around the pipe at or near the expansion joint to prevent the weight of the stack from telescoping into the joint. The expansion joints can be installed in long horizontal runs when the joint is anchored securely.

B. **Offsets** - A change in direction alone, if properly designed, will accommodate thermal expansion. The diagram below shows the amount of offset needed for three inch and four inch pipe when the temperature fluctuation is 50 for 20' or 40' stacks.

Run Length in Ft. (A)	Pipe Diameter	ABS Offset Length in Inches (B)	PVC Offset Length in Inches (B)
20	3	30	16
20	4	33	17
40	3	42	22
40	4	48	25





If a stack is subject to longitudinal movement at a point of connection of a branch or trap arm, the minimum length of this branch shall be as outlined below, based on 50˚F temperature change.

Run Length in Ft. (A)	Diameter Branch	ABS Length of Branch in Inches (B)	PVC Length of Branch in Inches (B)
6	1	10	5
	2	12	6
	3	14	7
8	1	12	6
	2	13	7
	3	16	8
10	1	14	7
	2	15	8
	3	18	9
20	1	19	10
	2	21	11
	3	26	14
30	1	23	12
	2	26	14
	3	32	17

Trenches - Trenches should have a smooth compacted bottom free of stones or projections. Place pipe with continuous support along its bottom quadrant. Water test to be sure all joints are leak free, leaving test water in the system until the building sewer is connected and the entire system above ground is tested. Back fill with fine soil or granular material, tamping around the pipe and at least 6" above the pipe.

Pipe Encased in Concrete Slab - It is generally permitted to encase pipe in concrete slabs and this does not present a problem even under thermal expansion force. Extra care, however, should be taken in testing all joints prior to pouring concrete over the pipe. To prevent the pipe from floating on the concrete, anchors made from U-bends of reinforcing rod are recommended.

Plumbing Vent - ABS - Plumbing vents exposed to sunlight should be protected by exterior type water-based synthetic paints only. Where roof or ambient temperatures can exceed 165˚F, the terminals should be protected by reflective shielding and insulation.

Anti-Freeze Protection - Plastic DWV systems can be protected from freezing through application of salt solution such as 2-1/2 lbs. magnesium chloride in a gallon of water or 3 lbs. of table salt in a gallon of water. For temperatures below 10˚F, use five quarts of glycerol mixed with four quarts of water. Do not use alcohol or petroleum-based products.