

# Fuseal<sup>®</sup> Piping Systems Solutions for Special Waste

Advantages of PP and PVDF  
systems over CPVC



# Chemical Resistance Testing for Special Waste Piping

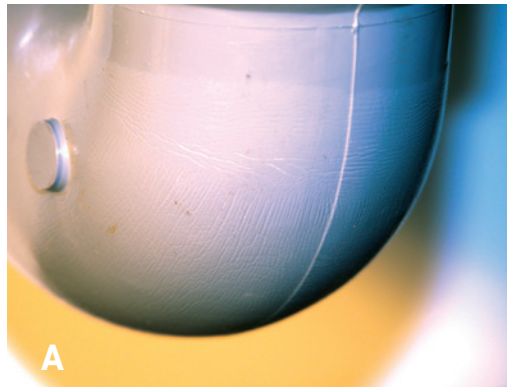
## Fuseal® PP and Fuseal 25/50™ PVDF versus CPVC

By now, many design professionals, contractors and facilities personnel have reviewed or have been shown the independent chemical testing of Fuseal PP and Fuseal 25/50 PVDF against the two CPVC solvent cement joined special waste piping systems as commissioned by Battery Design LLC in 2007. The results clearly showed PP and PVDF to be far superior in safely conveying the chemistries chosen for the independent test over the two CPVC systems tested.

Below you will see the results of the Acetone portion of the test. Complete test results and protocol may be found online at [www.gfpiping.com](http://www.gfpiping.com). It should be noted the eight chemistries used for testing were chosen based on their having been listed by the respective CPVC system manufacturers on their published "Chemical Resistance Charts" as being "Recommended," "Use with Caution," or "Caution." In the case of one of the chemistries used, one of the CPVC system manufacturers chart showed "Not Listed." Several months after this report was released, one of the CPVC system manufacturers changed the listing for seven of the eight chemistries used in the test from "Recommended" or "Caution" to "NOT RECOMMENDED."

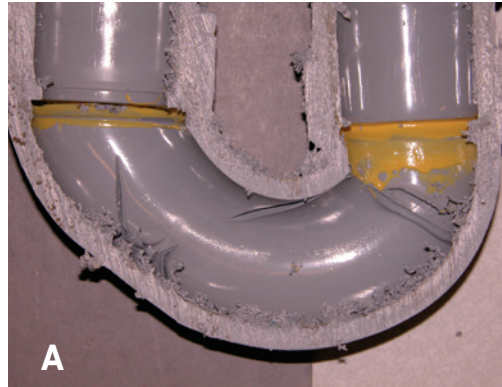
### Acetone

Samples A and D are the CPVC materials; B is Polypropylene (Fuseal®) and C is PVDF (Fuseal 25/50™).



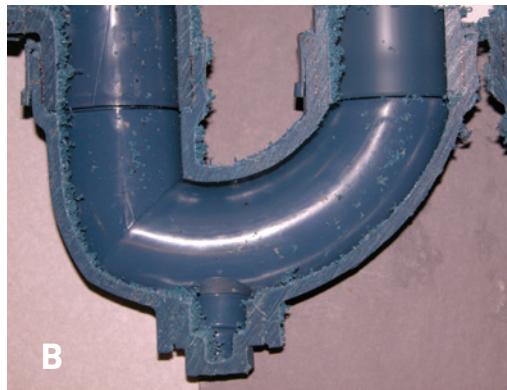
5 days:  
deflection,  
stress cracking

CPVC



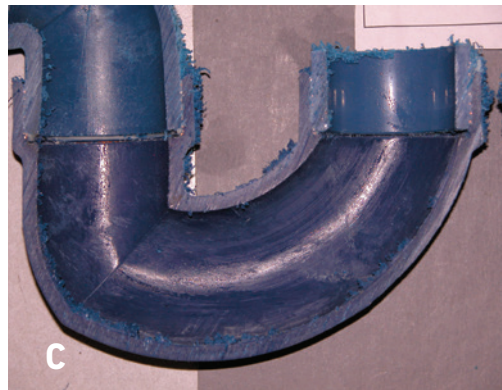
14 days:  
failed pressure  
check, no liquid  
left

CPVC



14 days:  
no change

Polypropylene



14 days:  
no change

PVDF



3 days:  
leakage

CPVC



14 days:  
failed pressure  
check, no liquid  
left

CPVC

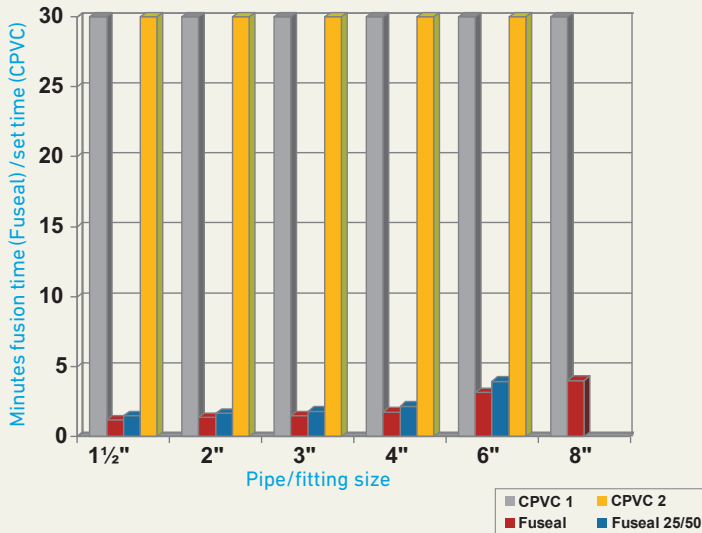
## The Fallacy of Labor Savings

### Installing CPVC solvent cement special waste piping over PP or PVDF (electrofusion or MJ) systems

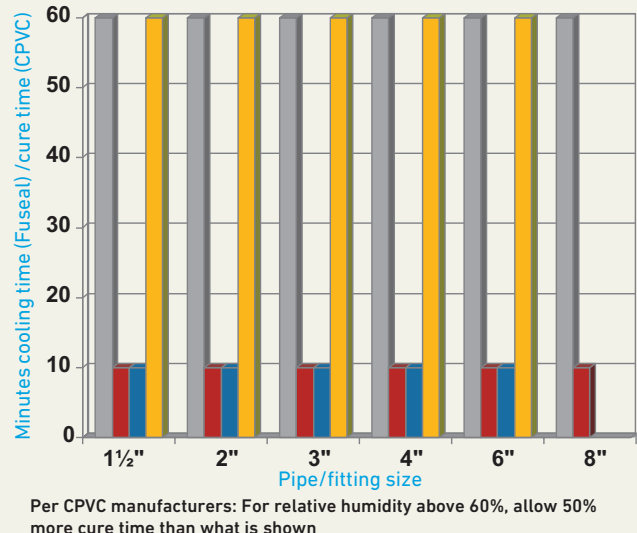
One of the key selling points used by those who would push the installation of solvent-cement joined CPVC piping systems over PP or PVDF systems is the perception of solvent cement joining being a much faster process than all electrofusion and certain mechanical joint installation procedures. The reality is that CPVC special waste solvent cement joined systems are only faster to install than PP or PVDF systems when the installer does not adhere to manufacturers' published installation procedures.

The two charts shown below show the reality of the actual added labor time to install CPVC solvent cemented over that of PP or PVDF electrofusion joined systems when adhering to published installation instructions for all systems.

Installation (fusion vs. CPVC set) time 60°–100°F



Installation (fusion cooling vs. CPVC cure) times 60°–100°F



The information shown on the above charts should elicit concern from design professionals involved in projects where CPVC special waste piping may be presented as an alternate to specified electrofusion systems under “value engineering” suggestions. If the savings being presented with CPVC special waste piping being allowed as an alternate is in installation labor, the design professional should be concerned with whether the product will be installed properly, as product not installed to specific published manufacturers’ instructions, could affect the product warranty.

## Validation

It should be noted that GF Piping Systems manufactures CPVC piping systems which are sold and installed throughout the world. We easily could have introduced a special waste piping system manufactured of CPVC material to the marketplace several years ago (and are still in a position to do so today) had our Research and Development group not expressed concerns over potential product failure in certain special waste piping applications, as there was no way to keep track of where the product would be installed.

### Specification for Fuseal® PP Piping System

Pipe and fittings shall conform to the requirements of ASTM F-1412, standard specification for polyolefin pipe and fittings for corrosive waste drainage systems.

All fittings shall be manufactured by GF Piping Systems, Little Rock, AR, so they are compatible with Fuseal pipe. The system shall be joined by the use of electrical resistance coils energized by a variable low voltage power supply via a duplex connector. Each fusion collar will be furnished with a band clamp for sizes 1 1/2”–4”.

### Specification for Fuseal 25/50™ PVDF Piping System

All PVDF laboratory waste piping shall be Fuseal 25/50 Kynar® PVDF materials, as manufactured by GF Piping Systems, Little Rock, AR. To ensure compatibility and uniformity, all materials and equipment shall be by this manufacturer.

Pipe and fittings shall meet the requirements of ASTM F-1673, standard specification for Polyvinylidene Fluoride (PVDF) corrosive waste drainage systems. In addition, all systems components shall be certified under UL 723 to have a flame spread of less than 25 and a smoke density of less than 50 using the ASTM E-84 test method. PVDF materials shall be rated by the manufacturer to 280°F intermittent service.

Joining method shall utilize the Electro Plus electrofusion equipment as manufactured by GF Piping Systems, Little Rock, AR. Any alternative joining techniques or required transitions to other materials shall be as recommended by the manufacturer.

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