

## CPVC: An Alternative To Steel Pipe For Fire Sprinkler Systems

Since 1984, more than 191,000 miles of chlorinated polyvinyl chloride (CPVC) fire sprinkler pipe and fittings have been installed in various commercial and residential applications. First used in water distribution systems in 1959, CPVC piping systems have grown in popularity because of their fast and easy installation process, which allows contractors to meet tight deadlines and even tighter budgets. Found in high-rise buildings, hotels, healthcare facilities and single-family homes, CPVC has proven to be a highly effective alternative to steel pipe for residential and light hazard, wet pipe commercial sprinkler systems. CPVC must be installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*; NFPA 13D *Standard for the Installation of Sprinkler Systems in One and Two family Dwellings and Manufactured Homes*; and NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height* and the manufacturer's product data sheets. A few points when considering CPVC systems are:

### **Durability & Long Service**

CPVC pipe and fittings have a natural immunity to scale, corrosion and microbiologically influenced corrosion. CPVC systems have a 50-year life expectancy with a safety factor of two according to Blazemaster, the CPVC manufacturer.

### **Superior Hydraulics**

The Hazen-Williams C-factor is used to describe the amount of friction loss that is encountered when water flows through a pipe. New black steel pipe has a C-factor of 120 compared to the C-factor of 150 for CPVC pipe. This higher C-value indicates that CPVC pipe has less friction loss which often allows for pipe downsizing of at least one size smaller in diameter than steel.

### **Flame & Smoke Resistance**

Because it offers outstanding resistance to fire and has low smoke generation qualities, the CPVC fire sprinkler piping systems are approved for use in plenum spaces in accordance with NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilation Systems*.

### **Greater Productivity**

CPVC piping systems often are easier to install and sometimes easier to modify than metal systems. Field installation is quick, simple and clean, and the pipe is lightweight and easy to handle and transport.

### **Hangers and Supports**

As pipe diameter increases, pipe becomes more rigid and requires fewer hangers. Smaller sizes around 1 inch require support every six to seven feet. For steel, pipe hangers are required at about twice that spacing for smaller diameters. But, with larger CPVC pipe, there is less of a differential. The additional cost is nominal compared to the overall labor and cost savings.

### **Residential Installations**

Sprinkler installation in new homes is affordable -- typically only about 1 to 1.5% the cost of new home construction when using CPVC.

### **Versatility**

In light-hazard or residential occupancies, another installation option is that CPVC systems may be installed exposed. CPVC pipe and fittings may be installed in this manner (without protection) when certain standard measures of fire protection (sprinklers) are present and when installed within its "listing" in accordance with the manufacturer's product literature.

### **Conclusion**

No material is compatible in all environments. Metal corrodes in salty environments; CPVC can be damaged by contact with certain chemicals found in some construction products. For instance, CPVC is not compatible with edible oils, petroleum or solvent based sealants, synthetic oils or glycol based antifreeze. Incompatible materials may compromise the integrity of the CPVC piping system. Although CPVC pipe has not been approved for use in all environments, it has proven to be highly effective alternative to metal fire-sprinkler systems in light-hazard and residential occupancies. CPVC must be protected during construction more so than steel piping.

\*For the complete article by Matthew Kuwatch, global marketing manager Blazemaster, CPVC Fire Sprinkler Systems; consult the May 2007 Edition of the Plumbing Engineer, CPVC: A Smart Alternative to Steel pipe Fire Sprinkler Systems.

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