



Member of the FM Global Group

## **CPVC and Steel Pipe Research Project Update**

March 30, 2010

In December 2008, FM Approvals issued an announcement on CPVC/Steel Pipe Compatibility. The announcement verified that all currently FM Approved steel pipe and CPVC products meet and comply with our FM Approvals product testing Standards 1630 “*Steel Pipe for Automatic Fire Sprinkler Systems*” and 1635 “*Plastic Pipe & Fittings for Automatic Sprinkler Systems*” respectively.

The announcement went on to indicate that FM Approvals had learned of incidents involving failure of CPVC piping in fire sprinkler systems that may be due to incompatibility of CPVC with certain steel pipe internal coatings.

In the interest of property loss prevention, an FM Global research project was initiated to investigate the potential effects of such steel pipe coatings on CPVC piping. FM Global has worked diligently to complete the necessary chemical and structural analyses, and the results of those tests are now complete.

### **Overall Purpose of Work**

The purpose of this investigation was to determine if chemicals used to produce antibacterial films (ABF) or antimicrobial coatings (AMC) on the interior of steel sprinkler pipe could potentially lead to degradation and failure of CPVC (chlorinated polyvinyl chloride) pipe and fittings used in fire sprinkler systems.

### **Test Methods**

Deionized (DI) water and organic solvents (n-hexane, or, n-hexane and acetone) were used to extract chemicals from steel pipe internally coated with ABF or AMC.

Analytical chemistry techniques were utilized to identify these extracted chemicals. The tensile properties of CPVC sprinkler pipe specimens exposed to chemicals extracted from ABF or AMC coated steel pipe were measured after extract exposure.

## **CPVC and Steel Pipe Research Project Update *(continued)***

### **Findings**

In some cases degradation, defined by reduction of “Elongation at Break” or “Tensile Strength at Yield” was observed for CPVC specimens exposed for a maximum of 30 days to extracts from ABF/AMC coated steel pipe.

### **Conclusions**

FM Approvals will use the aforementioned testing methods to update Approval Standards 1630 and 1635. The updated standards will be distributed for comments per FM Approvals’ existing standards review process.

Once the updated Approval Standard 1630 and 1635 are finalized, FM Approvals will begin to test all future submitted pipe and fittings to evaluate potential incompatibilities between coated steel pipe and CPVC/plastic piping components in the fire sprinkler system.