



## Comparison Of Fire Sprinkler Piping Materials

The Building and Fire Research Laboratory of the National Institute of Standards and Technology (NIST) with a grant from the United States Fire Administration, conducted a literature based study comparing the characteristics of Chlorinated Polyvinyl Chloride (CPVC), Polybutylene (PB), copper and steel fire sprinkler pipe primarily related to light hazard and residential installation. The report addresses key variables such as:

- material properties
- usage criteria and limitations
- system design
- installation requirements
- economics
- maintenance

Attached is a summation of these variables affecting fire sprinkler pipe selection.

For a copy of the complete report contact:

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## *Comparison of Fire Sprinkler Piping Materials: Steel, Copper, Chlorinated Polyvinyl Chloride and Polybutylene in Residential and Light Hazard Installations*

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**Summation of Variables Affecting Fire Sprinkler Pipe Selection**

Property	Pipe or Tube Type				
	Steel Sch. 40	Typical lightwall steel	Copper Type M	CPVC SDR 13.5	PB SDR 11
<b>color</b>	black	silver	copper	bright orange	grey
<b>weight of the DN25 (1 in.) size (kg/m)</b>	2.5	1.8	0.7	0.4	0.2
<b>melting point (MP) or heat distortion temperature (HDT)</b>	(MP) 1427-1538°C (2600-2800°F)	(MP) 1427-1538°C (2600-2800°F)	(MP) 1082°C (1980°F)	(HDT) 103°C (217°F)	(MP) 122-126°C (252-259°F)
<b>damage susceptibility</b>	low	low	low	high with UV exposure and impacts	high with UV exposure and impacts
<b>corrosion susceptibility design C factor</b>	high/ 120	high/ 120	moderate/ 150	low/ 150	low/ 150
<b>occupancy classification NFPA standards</b>	not limited	not limited	not limited	NFPA 13 light hazard, 13D, 13R, concealed and restricted exposure NFPA 90A	NFPA 13 light hazard, 13D and 13R concealed only
<b>maximum ambient temperature</b>	not limited	not limited	not limited	66°C (150°F)	49°C (120°C)
<b>flexibility/hanger spacing for the DN25 (1 in.) size (m)</b>	not flexible/ 3.7	not flexible/ 3.7	slightly flexible/ 2.4	flexible/ 1.8	very flexible/ 1.0
<b>expansion concerns/solutions</b>	negligible	negligible	negligible	yes/offsets direction changes, loops	yes/ snaking pipe
<b>fitting type</b>	threaded grooved flanged plain-type	threaded grooved flanged plain-type	soldering brazing grooved	primer/solvent cement	heat fusion crimping
<b>compatible antifreeze</b>	not limited*	not limited*	not limited*	glycerine*	ethylene glycol propylene glycol methanol glycerine*

\*NFPA recommends that only antifreeze solutions of glycerine or propylene glycol be used when the sprinkler system is connected to potable water.