

# For Home Fire Protection – Copper, Steel or Plastic?

## *New Building Codes to Require Fire Sprinkler Systems in Homes*

All newly constructed one- and two-family homes will soon have to include automatic fire sprinkler systems, according to a recent ruling by the International Code Council, which develops model building codes and standards in the U.S.

The “burning” question for builders and buyers of those homes, beginning in January 2011, is whether they would rather be protected by plastic, steel or copper—the three principal piping materials used in today’s sprinkler systems. All are approved for use in both commercial and residential structures.

Threaded steel pipe was for many years preferred for sprinkler systems in commercial facilities. Steel pipe is inexpensive and easy to

install in open, accessible areas, and where its bulky, rough-looking appearance is not objectionable to occupants.

But appearance matters to homeowners, and rigid steel pipe is hard to work with in confined spaces and especially difficult to accommodate in design-conscious residential interiors. Another drawback is that in “wet” (water-filled) fire sprinkler systems, rusted or discolored discharge water from steel pipe can multiply the damage caused by fire.

When copper tubing was introduced around 1930, it captured a major share of the fire sprinkler market. Unlike steel, lightweight copper tubing can be formed to match difficult structures such as archways, is easily and quickly cut

to length, and copper joints don’t require labor-intensive threading. Instead, soldered or brazed joints can be made on the spot using equally lightweight copper fittings. Copper tube also offers a slimmer profile, which is easier to hide and install, and discharge water from copper systems is typically free of rust or sediment.

Copper-tube fire sprinklers are frequently specified to protect irreplaceable buildings and collections. This includes the Library of Congress, Pennsylvania’s State Capitol, Independence Hall in Philadelphia and other structures where aesthetics of the exposed system and potential water damage to priceless interiors and documents are prime concerns.

While copper systems may have a higher initial materials cost, this is offset by the significant advantages copper offers, including lower maintenance and long-term performance. In addition, copper’s high recycled content and limitless recyclability support green construction practices.

In recent years, two types of plastic pipe and fittings have been approved for fire sprinkler systems: rigid CPVC and flexible PEX. Their

advantages are ease of installation (CPVC joints are glued together; PEX uses compression fittings), and relatively lower materials cost. Because many home buyers face budget constraints, the ICC ruling mandating residential sprinklers would seem to favor plastic systems.

However, homeowners may be concerned about entrusting their families’ safety to all-plastic fire suppression systems that are inherently vulnerable to fire. Unlike steel and copper tubing, which easily withstand extreme temperatures, plastic quickly loses strength when exposed to even moderate heat. In a fire, plastic can melt, and many plastics release toxic fumes when exposed to flame. Plastic pipe also has far lower pressure ratings, flow rates and burst strength compared to the same size copper tube.

Although it is far from certain that the regulation requiring fire sprinkler systems in homes will ever actually go into effect—opponents like the National Association of Home Builders and homeowner groups have two years to contest the ruling—proponents argue that sprinkler systems save lives and are worth any additional cost. **HP**