Plastic Vs. Metal in Piping Systems

Plastic Vs. Metal in Piping Systems A basic guide to selection and use.
In many applications plastic pipe, valves and filters can be a viable replacement for metal. Recent estimates show that about 25% of the expenditures for metal pipe, valves and filters could be spent on plastic ones. And, in a lot of those systems, plastic would not just do the job, it would be better.

We can summarize some of the things that support the fact that in many applications where metal valves are specified, plastic ones would do a better, more cost effective job.

First and foremost is the corrosion resistance advantage of plastics over metal. This results in some obvious, and not so obvious, benefits. More than just being a low maintenance valve, a plastic one will never jam, stick, or fail because of rust or corrosion.

Another often overlooked benefit of corrosion resistance is that plastic filter vessels never have to be painted to withstand corrosive environments or harsh climatic conditions. They can be installed and used right out of the box in places where a metal valve would have to be epoxy coated just to survive.

Another benefit is cost. Not only the cost of the individual filter vessel but the total cost of the installed system. When all costs are considered, including freight, installation and service life, a metal system will in most cases be more expensive.

The differences can be significant. Exotic metal alloy systems can cost up to 13 times that of a plastic system. Even carbon steel can be almost twice the cost of PVC - depending on the size and complexity of the piping system involved.

Flow rates are another area where plastic pipe has an advantage. The interior of plastic pipe is smooth and clean and it will stay that way year after year. Metal pipe can rust, corrode and scale - resulting in reduced flow rates and higher pressure drops over time.

Often, users are not aware of the engineering advances that have been made with regard to plastic piping materials over the last several years. Users of metal pipe, valves, and fittings are often concerned with what they believe to be the mechanical strength limitations of plastics. While it is true that there is no commonly available plastic system that can match the temperature/pressure service levels of metals, significant advances have been made. And plastic piping systems are now commonly available that provide adequate tensile strength or operation up to 200F. Plastic pipe is also available that maintains its pressure bearing capabilities for over 50 years.