Thermoplastics are widely used to transport many different media including water, gases and chemicals; however, it can be challenging to convince new users that thermoplastics offer benefits over traditional metallic piping. Continuing to educate non-plastic users as to the safety that thermoplastics offer is our industry’s most basic challenge. Let’s consider why a designer might choose thermoplastics.

Advantages of thermoplastics
In general, thermoplastics are more economical than metallic systems for many reasons. Thermoplastics possess a smoother inner surface and require less power to transmit the fluid. The friction factor will remain the same for the lifetime of the pipeline because it’s inherently corrosion resistant; therefore, a smaller diameter pipe might be used since accounting for additional friction due to future corrosion is not necessary. Plastics are lightweight and can often lower the cost of installation due to their ease of handling. This is realized through lower freight charges, less manpower or simpler hoisting and rigging equipment onsite, or simpler trenching requirements, if buried.

Thermoplastics are non-conductive and are therefore immune to galvanic or electrolytic erosion. They do not require cathodic protection and can be installed in a range of corrosive environments from non-threatening applications such as salty air to extremely dangerous EPA superfund sites with high volumes of toxic or lethal chemicals. Thermoplastics are impervious to many chemicals and offer a wide variety of material choices that are available to suit many applications. Understanding different materials’ strengths and weaknesses is the key to choosing the best material for the application.

Material options
Now that designers are considering thermoplastics, it’s beneficial to separate plastics into general families with similar characteristics. This is accomplished by separating them by their chemical makeup. There are vinyl materials, including polyvinyl chloride (PVC) and chlorinated PVC (CPVC), which are often the go-to material for chemical transport as they are well accepted and widely available. Another group of thermoplastics is polyolefins such as polyethylene (PE) and polypropylene (PP). PE is also very available and well regarded in many applications such as gas distribution and water supply. PP is recognized as the material of choice for many applications with varying pH levels as it handles acids and bases very well. Fluoropolymers make up the final group of thermoplastic materials. Fluoropolymers are high molecular weight thermoplastics that offer incredible chemical resistance for strong acids. Polyvinylidene fluoride (PVDF) is a particularly good material for transporting acids. For the most extreme chemical transport applications, materials such as perfluoroalkoxy (PFA) or ethylene chlorotrifluoroethylene (ECTFE) are used with extreme confidence. ECTFE is far less permeable than thermoplastics and can be used in applications like chlorine dioxide and 98 percent sulfuric acid where other fluoropolymers will typically start to fail soon after exposure.

With all the available materials on the market, it can be overwhelming for many designers. In addition to technical requirements, there are often other obstacles to overcome such as availability and price. These have to be balanced with the desired system lifetime. Designers will often rely on mere internet search engines to figure out compatibility of chemicals. While there
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**STEP 1:**
Consult the Editorial Calendar. Is there a topic listed that you know well?

**2019 Editorial Calendar:**
- **February/March 2019**
  - Plastics Fabrication
- **April/May 2019**
  - Material Handling
- **June/July 2019**
  - Membership Directory/Distributor Best Practices
- **August/September 2019**
  - Marine/Preview of the Annual Convention
- **October/November 2019**
  - Annual IAPD Source Guide
- **December 2019/January 2020**
  - Building and Construction

**STEP 2:**
Let IAPD staff know you’re interested in contributing to that issue by contacting:

Liz Novak at lnovak@iapd.org

We’ll work out a deadline that works for you and help you with any questions you might have.

**STEP 3:**
Follow these simple guidelines:
- Word count of 800-1,500
- Articles should be educational in nature; no trade names permitted in the body of the article
- Trade names are permitted in photo captions
- Photos are encouraged
- Submit article in a Word document and the images as separate high-resolution files

**STEP 4:**
See your name in lights! (or, well, in print)

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Asahi/America’s Chem Proline® Advance PE safely transporting bleach.
most demanding applications. The principle of butt fusion is to heat two surfaces to a molten state, make contact between the two surfaces and then allow the two surfaces to fuse together by application of force. The force causes the flow of the melted materials to join. Upon cooling, the two parts are united. Nothing is added or changed chemically between the two components being joined.

“There are plenty of applications where thermoplastics are the ideal solution. When considering which material is the best choice, designers must balance performance characteristics, ease of installation and system lifetime while being careful about project budgets. The good news is that with more choices on the market, designers can confidently choose a material and joining method that will satisfy the application.”

Electrofusion is a simplified and safe method of joining pipe or fittings based on melting the outer surface of the pipe and the inner surface of the electrofusion coupling by using an integral electric wire. Electrofusion is an effective method for joining PP and PE. As an alternative to butt fusion, electrofusion can be used for repairs and difficult connections in hard to reach locations. While electrofusion is desirable because of the simplicity, most serious installations choose butt fusion because it doesn’t require specialty fittings.

There are plenty of applications where thermoplastics are the ideal solution. When considering which material is the best choice, designers must balance performance characteristics, ease of installation and system lifetime while being careful about project budgets. The good news is that with more choices on the market, designers can confidently choose a material and joining method that will satisfy the application.

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