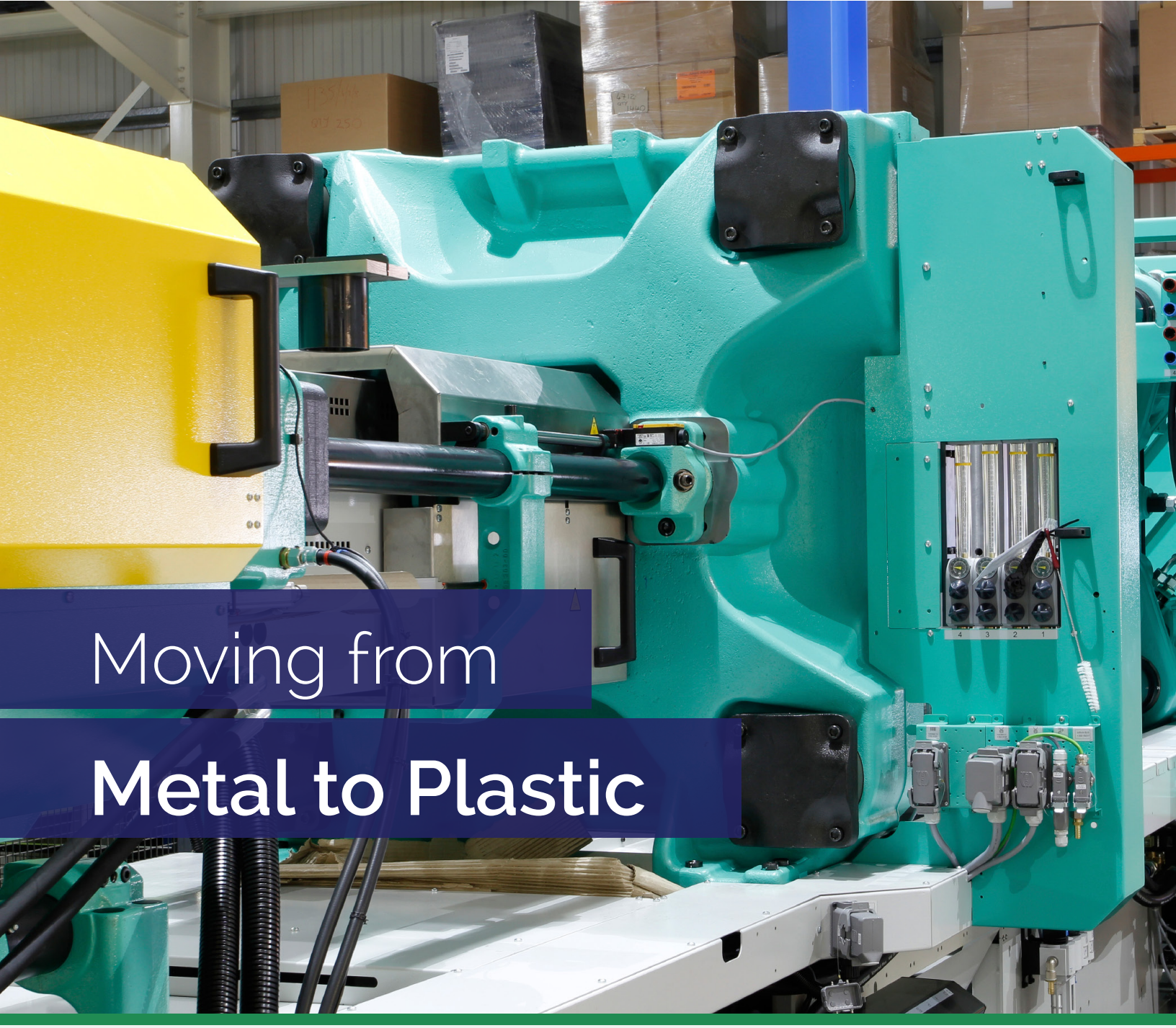

Moving from Metal to Plastic

K&B
Molded Products

Moving from Metal to Plastic

Today's leading plastics manufacturers continue to keep pace through both innovation and ingenuity. K&B Molded Products understands how to leverage its technology to create superior injection molded alternatives to conventionally machined metal parts. These plastic components:

Are equal in strength

Have a faster turnaround time for manufacturing

Promise a much lower price point

Taking Advantage of Plastic Components

Almost every manufacturing industry has become aware of the benefits of converting metal products to plastic, but none have taken advantage of it more than the automotive industry.

They are uniquely situated to gain the greatest benefits from this conversion. The automotive industry is a highly regulated, mass production industry that gleans advantages from most of plastics capabilities. Metal to plastic conversions allows them to reduce vehicle weight while meeting federal emission standards.

Chemical and heat resistant engineered plastics are especially promising for fuel systems, fluid handling systems, and other under the hood applications. Plastic parts can be formed to the same tight tolerances as metal and in many situations, are just as tough.

Plastics are a highly engineered product and can be modified for application specific characteristics that are better than metal. Typically a plastic part is up to 50 percent lighter in weight than its metal counterpart and the manufacturing conversion will reduce total manufacturing costs.

Overall, plastics parts are comparable, if not superior, to metal in that they:

- ✓ Have a tensile strength comparable to some metals
- ✓ Reduced weight for similar metal parts by up to 50%
- ✓ Are manufactured by a highly repeatable process with less scrap material waste
- ✓ Have a lower manufacturing costs when compared to metal parts
- ✓ Have reduced secondary operations, such as painting, machining or assembly
- ✓ Can be designed for enhanced regulatory compliance
- ✓ Greater design flexibility allowing for more complex shapes and geometries
- ✓ Variety of manufacturing processes, including over molding and insertion molding
- ✓ Improved aesthetics
- ✓ Have a better market stability for material cost
- ✓ Less weight and lower packaging reduces overall shipping costs
- ✓ Offer better chemical resistance

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Using Engineered Plastics in Manufacturing Applications

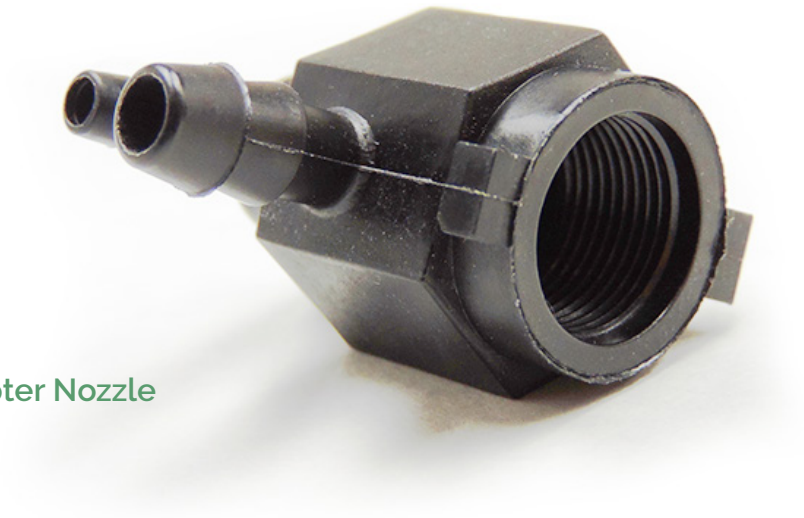
There are greater than 25,000 types of engineered plastics that are capable of being used in manufacturing applications, with new blends and recipes continually being designed for customers.

When a specific application or performance requirement is encountered, a new plastic can be engineered to meet those expectations. Hybrids and plastic blends can be designed to not only outperform metals, with respect to strength or other characteristics, but can also include dies and surface finishes that are more aesthetically pleasing than metal finishes.

One of the fundamental cost reducing aspects of a metal to plastic conversion is the ability of plastics to combine multiple parts into a single mold, instead of manufacturing separate metal pieces and fastening or welding them together. With proper design, the manufacturer eliminates many secondary operations and assembly. A joint that might be problematic between two metal components can be a single seamless structure in plastic. This makes plastic ideal for fluid or gas handling as there is less chance for leakage at these joints.

This greater freedom of design and molding, of plastic parts with respect to metal manufacturing, is another advantage of a metal to plastic conversion. Designers are no longer limited by the ability of a cutting or forming tool to shape a part. They are freer to be creative when designing complex molds.

This design freedom is enhanced by plastics lighter weight (and the structural limitations that it mitigates), its ability to handle harsher environments, and its enhanced production capabilities, both in speed and off the line appearance.



» Adapter Nozzle

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A Metal to Plastic Case Study

One example of a successful metal to plastic conversion was the redesign of a cast iron motor mount for a pump assembly used in a residential septic system. The original cast iron component used three leg rods that were screwed into a body to elevate the motor inside the septic tank. It had various machining characteristics, incorporating tight tolerances and flatness specs, as well as, five machined and tapped holes.

The design was not stable and the material was inherently brittle. At K&B we took a fresh approach to the physical and mechanical design. We replaced the cast iron with a polyester alloy, providing impact strength and chemical resistance without loss of mechanical performance.

An innovative rib design compensated for the loss of mass of the cast iron and molded support legs added stability. Four threaded holes were molded in place at compound angles. The only secondary operation then required for the mount was to tap the threads of a set hole which could not be molded without adding substantial costs to the tool. This resulted in a very affordable design, even for the relatively small volume required.

Other successes include the replacement of an aluminum forced-air fuel oil nozzle with one made of plastic, realizing a **90% reduction in costs** with annual production of up to 125,000 parts.

» **Polycarbonate/PBT Polyester Alloy Support Cross for Motor Mount**

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About K&B Molded Products

K&B Molded Products has been in the business since 1964. With 50+ years in the industry, we have deep insights into the behavior of plastics as they are exposed to the stresses of manufacturing. As part of our service portfolio, we also provide ultrasonic welding for the joining of thermoplastics and other non-ferrous materials, eliminating the need to use fasteners, glues, or other adhesives during product assembly.

Our capabilities extend beyond plastics to the machining of castings, steel, and alloys, which we accomplish with the same quality and precision. Working in both mediums gives us a unique understanding of metal to plastics conversions. As leaders in the field of metal-to-plastic conversions, we are continually identifying opportunities to assist customers with improved performance while reducing the cost of components currently produced in metal.

For more information, please contact K&B Molded Products.

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