CAST FROM A DIFFERENT MOLD.

DIE CASTING FLUID SOLUTIONS.
THE RIGHT FLUIDS BENEFIT MORE THAN JUST MACHINES. Because when it comes to improving your overall business – and getting the most from your resources – you need the expertise and experience of a proven leader with over 90 years of industrial service.

That’s where Quaker comes in. Trusted around the world as chemists, engineers and technical experts, we’re valuable partners in reducing costs and improving your operations. We provide process expertise and customized support services at the local level, for everything from die casting lubrication to specialty hydraulics to metal machining and finishing. We offer one source of innovative solutions for all of your die casting needs.

By offering a complete package of value-added fluids supported by our worldwide research, technical expertise and hands-on experience, you will see a maximum return in productivity, and in your processes, quality and profitability. From our highly-trained team behind Quaker Chemical Management Services (QCMS®) to our field staff of die casting process engineers, there’s always someone from Quaker available to support you when working with our products and improving your operations. The industry recognizes us through products like DIE SLICK®, and PLUNGER SLICK® but die casters, both large and small, recognize us for solutions and service.

INNOVATIVE OFFERINGS. Uneven protection caused by temperature variation on a die surface is a long-standing challenge in the die casting industry. Temperature variation is caused by the wide-range of die size, design, complexity, parts produced, and heat profile of each system. Traditional die lubricants, unable to adapt to the disparity in die temperatures, can be suitable at protecting hot areas of the die but can cause residue build up in cooler, less demanding areas. This costly dilemma causes solder, lost production time and extra die maintenance.

DIE SLICK® lubricants with heat activated Smart Polymer technology evolved from these challenges. These polymers were developed to form a tough protective die coating when exposed to hot areas of the die while not leaving residue build up in cooler areas. Benefits of using DIE SLICK® release agents with Smart Polymer technology include:

» Bright, clean castings
» No downstream paint or coating problems
» Excellent emulsion stability
» Minimal smoke and no staining
» Enhanced release and wetting characteristics

Castings produced with DIE SLICK®:

<table>
<thead>
<tr>
<th>Castings produced with DIE SLICK®:</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 cylinder engine block</td>
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<tr>
<td>Motorcycle engine</td>
</tr>
<tr>
<td>Internal engine component</td>
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<tr>
<td>Motorcycle pulley</td>
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<tr>
<td>Engine gearbox</td>
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<tr>
<td>Transmission case</td>
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Whether it's high pressure die casting, plunger lubrication, trimming, cleaning or machining, Quaker has advanced, integrated processes to optimize your operations and increase profitability:

» **Die Lubricants** – DIE SLICK® water-based and water free die lubricants with Smart Polymer technology

» **Plunger Lubricants** – PLUNGER SLICK® and POLY SLICK™ plunger tip lubricants

» **Ladle Coatings** – LADLE SLICK™ ceramic coating to protect ladles

» **Trimming Lubricants** – TRIM SLICK™ lubricants for trim dies

» **Hydraulic Fluids** – Specially designed fire-resistant QUINTOLUBRIC® fluids

» **Metal Removal Fluids** – QUAKERCOOL®, and QUAKERCUT® for machining needs

» **Cleaners** – QUAKERCLEAN® and QUAKER FORMULA® process and maintenance cleaners

» **Ancillary Support Products** – ANTI-SOLDER™ paste, QUENCH SLICK™ quenching compounds, greases, squeeze casting lube and more

**BENEFITS OF PROPER LUBRICATION**

**Longer die/tool life → More castings before the die needs to be replaced**

» Proper lubricant selection will allow the caster to apply less volume and decrease thermal shock to the die resulting in longer overall die life

**Extended production cycles without interruption → Reduced down time**

» Casting operations are often interrupted by the need to remove soldering or carbon residue from the die. Selecting the proper lubricant for the job will reduce or eliminate this need providing the caster with more parts in the equivalent time interval.

**More parts produced per hour → Optimizing production rate**

» Reduction of cycle time can be achieved with proper lubrication increasing the number of parts per hour. This is done through optimization of thermal stability of the lubricant and concentration of the formulation.

**Less Scrap → Improved efficiency**

» Reduction of porosity, poor fill, warpage and other defects with proper lubrication can reduce scrap castings and increase overall efficiency
Reduction or elimination of Soldering → Decreased downtime due to die maintenance, improved part quality, and prolonged die life

» Most casters operate with an “acceptable” amount of soldering. This is typically due to improper lubricant selection and/or application. Optimization of the lubricant formulation and application will minimize or eliminate this issue.

Reduced waste production → Lower environmental footprint

» In many cases proper lubricant selection and application can reduce spray volumes by over 50%, resulting in major reduction of waste generated from the casting process.

TECHNICAL EXPERTISE. As specialists in die casting lubrication, Quaker Chemical delivers superior technical service along with customized products. Our team of experts work closely with clients to evaluate and improve their production process. Composition and consistency of lubricants, temperature, automation, safety, waste treatment requirements and numerous other variables are considered by our specialists, then analyzed in our testing laboratories. Stringent quality measures are an integral part of our procedures and manufacturing efficiencies and our advanced research facilities enhance our ability to perform analytical testing including:

» ASTM Colorimeter
» Moisture Analysis
» Refractive Index
» pH and Conductivity
» Thermal Gravimetric Analysis
» Silicone Identification
» Viscosity
» Water Evaluation
» Fluid Stability
» Particle Counts
» Free Amine
» GPC, HPLC, GC
» NMR MALDI, MS
» SEM EDAX
» X-Ray Powder Diffraction
» Fourier Transform Infrared Spectroscopy (FTIR) Analysis

ADVANCED MANUFACTURING. We have over 70,000 ft² of manufacturing and 136,000 gallons of bulk storage capacity. We are not only a blending and emulsification facility, but also a specialty chemical manufacturer synthesizing our own siloxane Smart Polymer release agents’ custom tailored for the die casting industry. This allows us to provide specific solutions for challenging production issues at the lowest possible cost. And we pass this innovative technology and cost savings on to our customers.

A GLOBAL LEADER. The secret to our history of successful innovation begins in our customer's manufacturing plants and process operations all over the world. Our research and development efforts are focused on solving the problems that affect die casters each day and leading global die cast manufacturers depend on Quaker to optimize their operations and increase profitability:

» Aisin
» General Motors
» Honda
» Honeywell
» Meridian
» Metaldyne
» Nemak
» Pace Industries
» Ryobi
» Toyota