



Release Agents

Greater Efficiency and Sustainability with the Right Release Agent

02.03.2022 | From John Belyk, Darko Tomazic, Albrecht Vogel

The industry is preparing for the future. Growing demand from different sectors goes hand in hand with the need to keep up with new requirements relating to part quality, increasing competition and pricing pressures. It will also be increasingly important for foundries to reduce their environmental footprint. Truly viable and sustainable ways of optimizing production processes are in demand. Select release agents proven to stand up to the demanding applications in practice can support obtaining these goals.



Sustainability is becoming increasingly important for the die casting industry.

(Source: gemeinfrei / Pixabay)

Die casting innovations are evident: For instance, pioneering technologies promise greater efficiency in the production process. New materials, tools and processing methods are being adopted by the industry on a regular basis. Digitalization also promises further

improvements in manufacturing – including data analysis and the use of robotics optimized production results are achieved while manufacturing higher quality components.

Die Casting on the Rise

These developments address transforming and continually growing demands on the die casting industry. Changes in automotive manufacturing are particularly significant as this segment accounts for a large share in casting production. Even with the forthcoming development to alternative drive systems there is no sign of a trend reducing the importance of the automotive segment. On the contrary, although EV's require significantly fewer casting than that of an internal combustion engine, they utilize a significantly higher portion of [light weighting](#) components. Automotive manufacturers depend on reliable partners in the foundry industry to produce these components. Die casting also benefits from positive economic developments in other key sectors such as in the medical industry where technology development is booming, as well as consumer electronics, the e-bike segment and [5G mobile communications](#).

Higher Competitive Pressure and Poor Life Cycle Assessment of the Die Casting Process

Even though it may sound contradictory in view of the consistently high demand, there is increasing cost and competitive pressure on die casting companies – especially if they operate many machines. Benefits from innovative technologies are often inadequate when viewed from an economical perspective as challenges frequently arise in the production process that cannot be resolved purely with these technological improvements. Such challenges include rapid die wear, high compressed air usage and increasing energy consumption. A leading cause is considerable friction loss in the casting process itself, which can be defined by factors such as temperature, pressure and increasing size and complexity of the casting parts. In many cases there is also a high use of resources such as water which is used for diluting release agents along with the associated increase in wastewater costs.

Yet another increasingly significant challenge for the industry comes as a result of a greater focus on climate and environmental protection: The trade-offs in terms of sustainability. It is not entirely coincidental that the foundry industry is widely considered an energy

intensive and less environmentally friendly industry. Yet there are already many companies today that show that it can be done better: Examples include reducing CO₂ emissions as well as the amount of fresh water required to dilute release agents, the resulting wastewater, and the amount of release agents in the production process itself.

The Key Function of Mold Release Agents

Advanced release agent technology and application expertise places a crucial lever for improved sustainability at a caster's disposal. Release agents have a key function in the production process and their quality features have been largely underestimated to date. They have a major influence on the quality characteristics of manufactured components along with a profound impact on various areas such as process engineering, the component function and not least, on the environment. Specifically, the longevity of casting tools depends on these compounds – and moreover the question of how much mold release agent is actually required.

Choosing the Right Release Agent

The latest generation of release agents offers extremely high performance with a few solutions available that actually deliver maximized process efficiency and environmental impact. Application of minimum quantity release agents are particularly beneficial as only the amount critical for die protection and component release are required for optimal results.

- A highly efficient release agent concentrate substantially reduces the amount of release agent used as only the smallest quantities are needed to give a high demolding performance.
- The application of very small volumes of release agent results in completely novel process and production technology for which there are already various terms on the market such as micro-spraying and minimum quantity spraying.
- To take full advantage of all the benefits requires a certain level of expertise. For instance, a special release agent must be used that conforms to the requirements of the process (new application technology, increased die

temperatures) as well as the component requirements (OEM delivery specifications).

- Using minimum quantities of release agents reduces the gradients between the tension and compression forces in the casting tool, which therefore leads to increased tool service life through the reduction of die heat checking.

Utilizing extremely low quantities of release agent has a positive impact on the casting process:

- Significantly reduced spray volume results in less thermal shock as compared to a conventional application. This results in a longer useful life of the casting die.
- The dramatic reduction in dilution water improves casting structure as is reduced the likelihood of water incorporation into the casting structure (porosity). At the same time, this also reduces freshwater usage and wastewater generation, which would otherwise need to be reprocessed or disposed of at high cost.
- Thanks to significantly reduced spraying time, the total cycle time is also reduced resulting in a higher productivity.
- By omitting the drying stage after spraying the use of expensive compressed air drops dramatically.
- As the thermoregulation of the casting die changes from heating to cooling, less heat energy is needed leading to a better carbon footprint.

ABOUT THE AUTHORS

John Belyk is Global Business Development Director for the die cast industry at Chem-Trend. Having been with the company for 32 years and holding positions within technical service, sales and sales management, John brings forth a depth and breadth of process chemical specialty expertise that spans multiple industries and applications.

Darko Tomazic is Chem-Trend's Die Cast Sales Manager for Northern Europe. While partnering with die casters, industry co-suppliers, and advanced educational institutions, Darko works to identify

opportunities for die casters to better their process for improved profitability and quality. Darko began his chemical speciality education at Hoechst AG prior to hiring into Chem-Trend in 1997.

Albrecht Vogel, Sales and Application Engineer at Chem-Trend has been responsible for the introduction of new products for the die cast industry in southern and western Germany as well as Switzerland for more than 15 years. Basing on in-depth know-how, he helps die cast companies optimize their production processes. Moreover Albrecht, who has around 30 years of experience in the die casting industry, is involved in projects that require specific expertise across Europe.

(ID:48033483)