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Active Lubricant for Die Casting of Aluminum

A new fluoride salt-enhanced die lubricant minimizes aluminum oxidation during casting, resulting in parts with reduced porosity, improved structural integrity, and the ability to be heat treated.

Die casting methods allow for the production of small volume parts. High pressures and temperatures allow for the injection of aluminum into a mold. When this process occurs, impurities in the metal rise to the surface of the melt in the split second that the injected molten aluminum travels through the mold. These impurities lead to porosity on the surface of the part. Because the parts are low volume, this means porosity on the surface will often lead to failure throughout the part. Some impurities can lead to failure in the die itself, increasing the cost of manufacturing and material processing.

Researchers at Purdue University have developed a die lubricant that allows for deoxidization of the aluminum melt and prolong die life. Adding fluoride salts to existing lubricants, the oxidized layer, which creates a film on the aluminum melt, will react and give way to the purer molten aluminum when creating a casted product. Even as the manufacturing process occurs in a matter of seconds, the lubricant can efficiently react to produce optimal parts. Because oxidization is prevented, the final cast part can be heat treated. This will lead to a part with a finer surface finish and improved structural integrity.

Advantages:

-Reduced porosity

-Heat treatable products

Potential Applications:

-Die casting methods

-Deoxidization research

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Category

Chemicals & Advanced Materials/Specialty & Performance Chemicals

Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

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Intellectual Property:

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