

# ForCAST

The Newsletter of the American Metalcasting Consortium

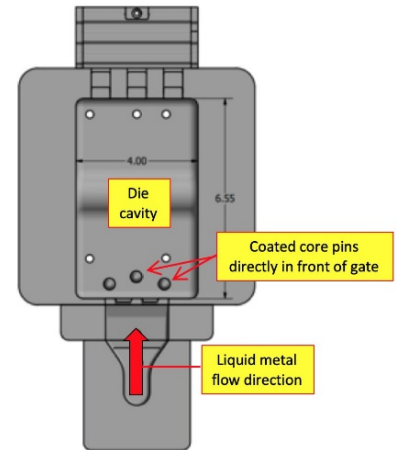
Spring 2021



## ADVANCED ENGINEERED COATINGS WITH EXTENDED DIE LIFE FOR TOOLING

Die casting is a high volume, low-cost manufacturing process used to produce near-net shape components in a variety of industries, including automotive and defense. During die casting, liquid metals such as aluminum, magnesium or zinc are injected into a re-usable steel die at high speed and pressure, using an electronically-controlled machine. To prevent the castings from sticking to the die, a lubricant is sprayed onto the faces of the die prior to the production of each casting. While required to allow the casting to be ejected from the die, these lubricants have detrimental effects, including reducing the quality of the castings, increasing manufacturing costs, and reducing die life.

Led by the Colorado School of Mines and sponsored by the North American Die Casting Association (NADCA), the AMC Advanced Coatings project is identifying permanent thin-film coatings that can be applied to the surface of a die to reduce or eliminate the amount of conventional organic lubricant used. A steel die will be used in the evaluation of different coatings. The die has been fabricated with three, small-diameter steel core pins that are positioned in front of the gate where the liquid metal enters the cavity. The steel core pins will be covered with different coatings, and the amount of solidified aluminum sticking to each coating will be quantitatively compared. A range of coatings produced by the physical vapor deposition (PVD) process will be evaluated including coatings containing lubricious phases such as molybdenum disulfide, coatings with lubricious surface layers (such as AlCrVN), and coatings consisting of stable oxides, nitrides, borides and carbides.



*Schematic drawing of one side of die casting die, showing the locations of the PVD-coated core pins*

## METALCASTING CONGRESS

AMC exhibited and attended technical presentations at the 2021 Metalcasting Congress, 125th Anniversary, sponsored by the American Foundry Society (AFS). This is one of the premier international events for the metalcasting industry featuring industry suppliers with technical, management, and research presentations from experts around the world. This year's event took place virtually on April 12-22, 2021, and was well attended and supported.



## UPCOMING EVENTS

- NADCA Die Casting Congress, October 4-6, 2021, Indiana Convention Center, Indianapolis, Indiana
- AMC Technology Review, November 3-5, 2021, Hilton Garden Inn O'Hare, Des Plaines, Illinois
- The Defense Manufacturing Conference (DMC), December 13-16, 2021, Gaylord Rockies Resort and Convention Center, Denver, Colorado

**AMC**  
AMERICAN METALCASTING CONSORTIUM

For more information about AMC go to  
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