

TAKING **SOLID MOLDING** INTO THE 21ST CENTURY



HISTORY OF THE **SOLID MOLD PROCESS**

Starting with the ancient Egyptians, Investment Castings have been made for thousands of years, using the Solid Mold process. In the mid-1950's, the "shell" process was developed and most aerospace Investment Casting companies focused on this new technology. As a result, in our industry, the Solid Mold process changed very little during the past 50 years.

The Jewelry manufacturing industry continued to use the Solid Mold process exclusively and continued to make significant improvements in the materials and equipment used for Solid Mold production.

Friolzheim, Germany became the center for this development in Europe.

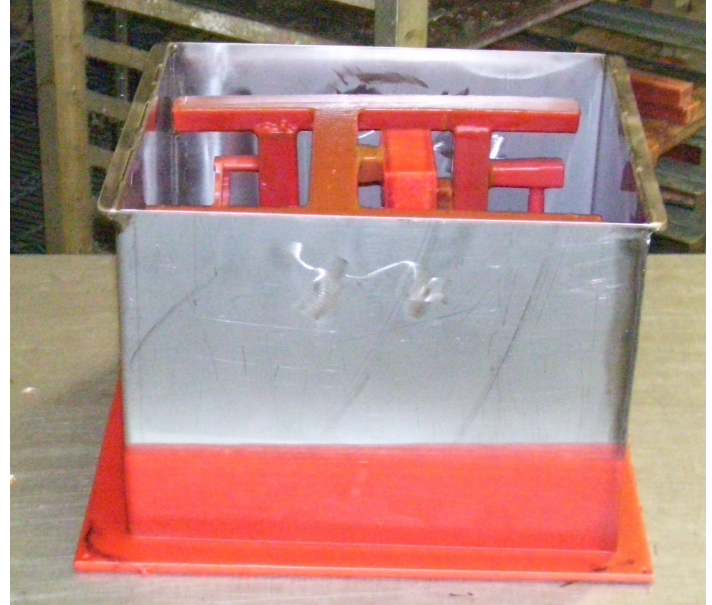
Cera-Met has worked closely with the premier Solid Molding equipment manufacturer in Friolzheim, Schultheiss, to fully apply recent technical developments to our Aerospace products.

ADVANTAGES OF USING THE **SOLID MOLD PROCESS**

The Solid Mold process is the preferred method for producing complex pumps and housing used in turbine engine fuel and lubrication system. The gypsum based molding material allows complex internal configurations to be produced without the use of preformed ceramic cores. The Solid Mold process also offers a distinct advantage in terms of manufacturing "speed" to reduce cycle times for prototype castings. The Solid Mold process will also facilitate the production of complex aluminum castings with extremely thin and delicate features. This is because the solid mold refractory is easier to remove from the castings compared with the stronger shell material.

HOW THE **SOLID MOLD PROCESS** WORKS

Wax patterns are injected, gated and assembled to form a wax cluster. This assembly is designed to be a plumbing system that will allow the wax to be melted out of the mold and a plumbing system to allow molten aluminum to enter the resulting internal cavity. Care is taken to reduce metal turbulence and insure maximum cleanliness of the molten aluminum. A metal “flask” is placed over the wax cluster and sealed to a bottom plate.



A gypsum based refractory is blended with water and poured into the flask while in a vacuum chamber. The vacuum allows the refractory mix to surround the wax cluster and fill all the internal features of the wax patterns. The Solid Mold refractory quickly hardens to a solid monolithic structure without generating heat which might distort the wax patterns.

The flask is then placed in an oven to remove the wax and “fire” the ceramic material, creating a very smooth and strong mold to accept the molten aluminum.

CERA-MET: ADVANCING THE STATE-OF-THE-ART IN **SOLID MOLDING TECHNOLOGY**

- Precise metering of refractory and water for each batch of material.
- Exceptional control over the vacuum level and sequencing during molding.
- Unique capabilities to introduce vibration during the molding cycle.
- Highly automated molding cycle to reduce operator related variation.
- Proprietary vacuum assist casting equipment to fill thin sections without using excessive casting temperatures.
- Special gating and mold designs to maximize melt cleanliness and metallurgical integrity.

PRODUCT SIZE LIMITATIONS

Cera-Met can produce Solid Mold castings ranging in size from extremely small, with multiple parts per cluster, up to single parts as large as 36" X 36" X 36".

We excel on parts with very complex internal and external shapes.

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*"The supplier our customers can always
count on"*