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DSM Somos® WaterShed™ SL Resin Verifies Accuracy Requirements for Investment Casting

Elgin, Illinois, October 27, 2005 — In the largest accuracy study ever conducted for QuickCast™ parts, Chicago-area service bureau Express Pattern used Somos WaterShed® 11120 stereolithography resin to produce investment cast patterns resulting in a metal part yield of close to 95%—similar to yields achieved by traditional wax patterns made from tooling.

The company built more than 500 QuickCast™ patterns from WaterShed®, ranging in size from 1 to 20 inches. Each pattern was measured multiple times in three to four dimensions, ultimately making 4,300 individual measurements on finished patterns. Based on these efforts, Express Pattern was able to verify that over 98% of all measurements were within the acceptable tolerance band required by manufacturers.

"This study is significant in that it demonstrates the capacity of high-accuracy, high-stability stereolithography resins like WaterShed 11120 to be successfully used in demanding manufacturing applications like investment casting with greater yields than ever before," says DSM Somos Marketing Manager Eva Montgomery. "With the proper SL resin, so much more than just part prototyping can be achieved."



Somos WaterShed® 11120 produces highly accurate and stable investment casting patterns

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“QuickCast™” refers to a hollow build style used in stereolithography to create parts that are subsequently sent to foundries for investment casting. The hollow structure is needed in order to accommodate expansion of the material as it is heated during the casting process. This percentage of hollow space to solid space is referred to as the “void ratio.” The higher the void ratio, the better the part’s success rate will be at the foundry.

“Today’s QuickCast build styles result in a theoretical 87% void ratio—though some resin always fails to drain out of the pattern, causing the void ratio to be less than 87%,” says Montgomery. “A low-viscosity stereolithography resin such as Somos WaterShed 11120 is attractive because of its improved resin drainage and subsequent reliability in building thin-walled parts.”

Tom Mueller, partner at Express Pattern, explains additional factors which led them to choose WaterShed for their study: “One of the key factors affecting the accuracy of QuickCast parts is their ability to resist growth when exposed to air moisture. In the past, we discovered that patterns would expand due to humidity before ever reaching the foundry, which substantially skewed the accuracy of the final product. WaterShed’s high humidity-resistance provides a major advantage in this area.”

Other WaterShed advantages include: high initial green strength to prevent distortion during the post-cure cleaning process, heat deformation characteristics conducive to the investment casting burn-out process, and the overall transparency of the resin. “During the finishing process, WaterShed’s clarity aids in visually inspecting the models for any trapped resin remaining, says Mueller. “Trapped resin expands and cracks the shell if not removed properly and is one of the key causes of failure in the foundry process.”

Based on their study, Express Pattern believes that the production use of stereolithography patterns will have a significant impact on the way investment casting is viewed and the applications for which it is considered. “Without the cost and lead-time required for tooling, investment casting can now be very attractive, cost-effective option for small quantities—even as small as one,” says Mueller.

Those interested in learning more about Somos WaterShed 11120 are invited to contact Somos Marketing Manager Eva Montgomery. In addition, Express Pattern has written a manual for foundries on how to process QuickCast patterns. To obtain a copy, please contact Tom Mueller at Express Pattern (email: tmueller@expresspattern.com).

More About DSM Somos®

DSM Somos is a leading materials supplier to the rapid prototyping industry, providing stereolithography liquids used for the creation of three-dimensional models and prototypes directly from digital data. Somos' patented ProtoFunctional® materials are used by a variety of industries, including automotive, aerospace, medical and telecommunications. Somos' corporate office is located at: 1122 St. Charles Street, Elgin, Illinois, USA, Tel. +1-847-697-0400, Americas@dmsomos.info . For more information on DSM Somos® in Europe: Fax. +39 06 9871694, Europe@dmsomos.info

DSM Somos (www.dmsomos.com) is an unincorporated subsidiary of DSM Desotech Inc. (www.dsmdesotech.com)—a world leader in the development of UV-curable materials—and a member of the global DSM family.

About DSM

DSM (www.dsm.com) is active worldwide in life science products, performance materials and industrial chemicals. The group develops, produces and markets innovative products and services that are designed to raise the quality of life. DSM's products are used in a wide range of end-use markets and applications, including human and animal nutrition and health, cosmetics, pharmaceuticals, the automotive industry, coatings, the construction industry and the electrics & electronics market. The group has annual sales of around €8 billion and employs about 24,000 people worldwide. DSM is a leading world player in many of the markets in which it operates and has plants and facilities on every continent. The company is headquartered in the Netherlands.

More About DSM Somos® Materials

What is stereolithography?

Stereolithography (SL) permits the rapid creation of 3D pieces utilizing a computer-controlled laser that polymerizes light-sensitive resins. The process is highly precise and constructs the object in a series of "additive layers," providing the advantage of producing highly complex forms that are difficult or impossible to fabricate by machining or traditional molding techniques. The evolution of advanced SL materials offers the potential of moving stereolithography from prototyping into production.

DSM Somos ProtoComposites™ are resins reinforced with various materials, such as ceramics and glasses, to produce functional properties not possible using individual components. Somos

ProtoComposite materials are a result of a research and development program investigating the potential for ACT-SL™ (Advanced Composite Technology for StereoLithography).

DSM Somos ProtoFunctional® resins for stereolithography provide advanced technology to respond to the changing needs of new product development and industrial design. In 2003, DSM Somos announced ProtoTool™ ceramic-filled resins, the first member belonging to the new ACT-SL™ technology and the result of a significant research and development program. Traditional non-composite ProtoFunctional materials by DSM Somos satisfy a varying range of characteristics: transparency, superior humidity and heat resistance, and outstanding mechanical properties, replicating those of many production grade plastics such as polypropylene, polyethylene, ABS and PBT. Technical data on all Somos® materials may be found at www.dsmsomos.com

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