

DSM Somos®

# The Part We Play

November 2008

## DSM Somos® WaterShed® XC 11122 Passes USP Class VI Testing

*Clear, water-resistant WaterShed XC 11122 has passed stringent biological tests and earned a USP Class VI rating. This rating allows med-tech engineers the ability to produce Class VI approved ABS-like prototypes. More inside...*



Photo courtesy of Medical Modeling Inc.



Gray Matters:  
ProtoGen™ 18920 Gray

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Parts that  
Revolutionized  
the Industry

Stereolithography  
Used to Recreate  
Masterpiece



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# DSM Somos® WaterShed® XC 11122 Passes USP Class VI Testing

Developing advanced biocompatible SL resins for the medical industry is becoming increasingly important. According to Wohler's Report 2008, the medical/dental industry is the third largest industry for additive manufacturing after consumer products/electronics and automotive, but growing at a faster rate than either.

For this reason, DSM Somos was excited to recently announce that WaterShed XC 11122 has received USP Class VI approval for medical applications.

"WaterShed XC 11122 is an update to our WaterShed 11120 resin that's been formulated to create parts that are clearer and have less color," says DSM Somos Product Manager Brian Bauman. "Due to its functional properties and high dimensional stability, WaterShed XC has already been widely used by the medical industry for prototyping clear medical device housings and fluid flow analysis models. Now, USP Class VI approval opens up even more possible applications, because the material is proven to be biocompatible."

New WaterShed XC applications could range from medical devices to skin contact applications like hearing-aids and dental devices.

"One thing that's very advantageous about using this resin to create medical parts is that our testing shows it produces dimensionally stable parts that are resistant to water and mois-

ture," says Bauman. "As compared to other stereolithography resins currently on the market, WaterShed XC's stability makes it very attractive for applications where skin and moisture contact with the part is required."

Introduced by DSM Somos in 2007, WaterShed XC has quickly become DSM Somos' most popular resin, with its winning combination of clarity, durability and high dimensional stability. By adding the biocompatibility component, medical design engineers now have a way to produce exceptional ABS-like prototypes that are USP Class VI approved.

For more information, contact DSM Somos today.

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## NanoTool™ Helps Bring Ancient Sarcophagus to Life

It was long believed that the statues of Greek and Roman antiquity were left in their natural state and unpainted. Archaeologists have known for some time that this popular misconception of Western art was largely a renaissance creation. Classical marble carvings would have been painted originally, but in most cases the coloring had been completely weathered and worn away over the centuries.

### Breathing new life into the past

To illustrate this breakthrough in the understanding of ancient art, it was decided to show the world how vibrant these works of art would have looked in their original form. This involved creating reproduction pieces for a special traveling exhibition. With more than 20 full-size colored reconstructions of important Greek and Roman works, 'Multicolored Gods' breaks new ground as the first large-scale effort to recreate the original appearance of ancient sculpture.

One of the exhibition's centre pieces is a section of the Alexander Sarcophagus attributed to the 4th Century BC Lydian King Abdalonymos. This relic, was one of those rare finds containing fragments of original colors, which were painstakingly analyzed and reproduced.

### Preserving and reconstructing with stereolithography

The first challenge with the sarcophagus was to make a replica section that was precise in every detail. The second challenge was to use a material with hardness and surface qualities similar to marble. A silicone mold could not be used to make an impression due to the danger that the precious paint fragments would be removed by the mold. It was therefore decided to use a scanning technology which could be used for producing the replica by stereolithography (SL).

Alphaform AG, a German based service bureau who had previously created

pieces of art for other well known artists was approached to reproduce the part. As Alphaform Director Ralf Deuke recalls: "These kind of projects are far removed from our usual rapid prototyping work, such as in automotive and Formula 1, where we receive well designed files with good surfaces."

The project generated a number of specific challenges: The scan contained a lot of defects due to a combination of the protective glass cover and the space limitations around the original piece in the Istanbul museum. Another big challenge was that the file generated thousands of supports. "Some structural supports are necessary for manufacture by the SL process, but usually not thousands!" says Deuke. "We therefore had to use our experience and know-how to find a good compromise and produce a file that the machines were able to handle and which showed minimal defects."

(continued)

### NanoTool™ for precision detailing

To faithfully reproduce the fine detail of the piece also required an SL material with hardness and surface qualities similar to marble. Although Alphaform also has laser sintering capabilities (SLS) they decided to use SL because of its superior surface finish, detail resolution and material selection.

“Because they are thermoplastics, SLS materials can’t reproduce mineral-like qualities,” explains Deuke. “The material that could was the NanoTool™ from DSM Somos: a high modulus material designed for high-end engineering applications in automotive and wind-tunnel testing, as well as for rapid tooling.

NanoTool is heavily filled with non-crystalline nanoparticles allowing for faster processing. Being a virtually zero shrinkage polymer, build lines are minimized allowing for a smoother finish.

“We have a lot of experience with NanoTool for the rapid prototyping of F1 aero sections and other parts that need high surface quality,” says Deuke. “It provides extremely fine detail resolution compared to other SL materials. Professor Brinkmann evaluated the material and found it easy to finish and paint – far superior to the plaster normally used to create replicas.”

The complete piece was built in three sections which were then seamlessly fitted together. “Without rapid prototyping it would have been impossible to create this part,” says Deuke. “It’s ironic that a material and process designed for next generation prototyping and manufacture has replicated a 2,500 year old sarcophagus!”



## NanoTool™: Better Materials Redefine SL Application Opportunities

Applications for Somos' variety of general purpose resins as communication models, patterns, and fit and function testing prototypes are well established.

NanoTool composite reinforced SL materials offer a step change in strength, stiffness, temperature resistance, and low water resistance. The highly reinforced (>60% by weight) NanoTool material provides SL parts with very low/no shrinkage and a coefficient of thermal expansion approximately 50% of an unreinforced SL resin. These specialized properties open up a new field of opportunities for SL technology.

Advances in scanning technology are now being combined with new SL capabilities to create applications for low volume tooling, art/sculpture applications and production fixturing.

	NanoTool™	ProtoGen® 18420
<b>Description</b>	<b>Accurate, Stiff ProtoComposite™</b>	<b>All-purpose, ABS-like ProtoFunctional™</b>
<b>Tensile Strength (MPa)</b>	<b>61.7 - 78.0</b>	<b>42.2 - 43.8</b>
<b>Tensile Modulus (MPa)</b>	<b>11,000 - 11,400</b>	<b>2,180 - 2,310</b>
<b>HDT @ 66 psi</b>	<b>225° C / 437° F</b>	<b>55° C / 129° F</b>
<b>Coefficient of Linear Thermal Expansion</b>	<b>42.2 - 48.6 µin/in-°F</b>	<b>91.3 - 95.5 µin/in-°F</b>

Have an idea how to put NanoTool to work for your new application? Visit [www.dsmsomos.com](http://www.dsmsomos.com) or contact:

Christine Woollard  
DSM Somos Sales Coordinator  
847-608-2596

# Somos® ProtoGen™ : Gray Matters

## DSM Somos Introduces New ProtoGen 18920 Gray

For those who want a wide range of color choices in an ABS-like SL resin, DSM Somos now offers a full family of ProtoGen resins, including: 18420 White, 18120 Translucent, and the all-new 18920 Gray.

“For almost two years, we’ve received testimonials from satisfied users of ProtoGen white and translucent,” says DSM Somos Sales Manager Craig Robertson. “That’s why we’re excited to now be able to offer this new gray version of a such a highly successful product.”

Jim Davidson, SL Manager of Laser Reproductions agrees, “We’ve had great success running ProtoGen resins. Fast material processing has helped us increase our throughput, and typically parts need very little finishing. Recently, our customers were looking for a gray material that better represents final product materials and now ProtoGen Gray can meet that need.”

ProtoGen resins are fast-processing, all-purpose materials that create high accuracy ABS-like parts. High dimensional stability and temperature resistance are key in helping prevent warpage of fine details and thin walls during shipment or testing.

ProtoGen parts have a heat deflection temperature (HDT) of 65°C with UV-only post-treatment and >95°C with thermal post-treatment. And because this material exhibits low differential shrink, your parts will be accurate and consistent every time.

“ProtoGen excels in both part production and end use,” explains Brian Bauman, Product Manager. “For the service bureau, ProtoGen offers wide processing latitude, fast photospeed, outstanding processing ease (short recoat and fast cleaning), and tolerance to a broad range of temperatures

and humidities both during and after the build.

For the end-user, ProtoGen’s accuracy, HDT, and consistency are what make it a winner.”

Additionally, ProtoGen resins are the first to demonstrate varying material properties based on machine exposure control. Being tunable allows for an even wider range of part possibilities, enabling users the ability to “dial in” for best possible results.

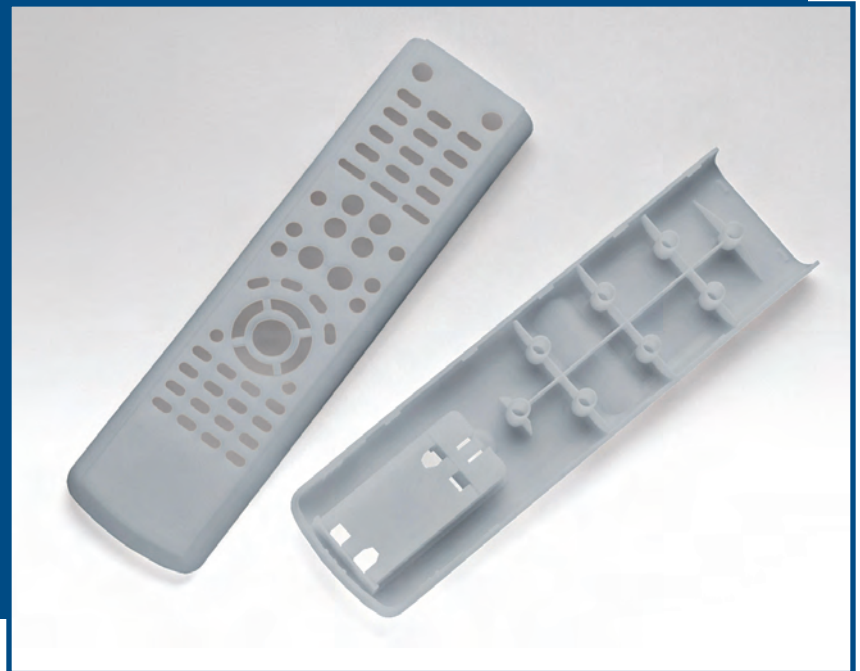
ProtoGen materials are based on Somos Oxetane Advantage™ chemistry. Learn more when you log on to [www.dsmsomos.com](http://www.dsmsomos.com)

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### Somos ProtoGen™ 18920 Gray



## Stereolithography Parts that Revolutionized the Industry!

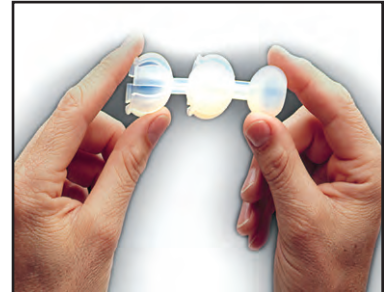


Over the past several years DSM Somos® stereolithography (SL) parts have helped build a brighter future for the rapid prototyping, tooling, and investment casting industries. With advancements in finishing such as MC<sup>2</sup>™, hydro-printing, and clear coating, new applications have emerged allowing parts to be built in less time and for less money than alternative technologies.

To showcase these revolutionary parts, DSM Somos is developing a “virtual display case”—a webpage devoted to the parts that have built an industry. Do you have a SL part you'd like to show-off?

To view our virtual display case visit: [www.dsmsomos.com](http://www.dsmsomos.com)

To submit a SL part photo, contact us: [aaron.boruch@dsm.com](mailto:aaron.boruch@dsm.com)



**Aaron Boruch**  
Editor

*The Part We Play* is published by DSM Somos as an information resource for the rapid prototyping industry. Reader inquiries and suggestions for content are welcomed and should be directed to:

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