Somos® Element improves quality of investment casting process with 20% cost and time savings

US based product and tool development service bureau, Peridot, Inc., is using Somos® Element to transform investment casting and open up new business opportunities. Compared to other processes Somos® Element produces a high-quality finish with features including low residual ash and makes casting patterns lighter and easier to handle in foundry environments. Somos® Element has helped Peridot cut investment casting costs by up to 20% and reduce time-to-market by between 10% and 20%.

Peridot, Inc. is a product and tool development service bureau that has been providing several different casting, prototype and product-making services to the marketplace for over 20 years. They serve multiple industries and have built a strong reputation for excellent quality and service. Their customers comprise many major OEMs including Whirlpool, Caterpillar, ITT Defense, and Taylor Made Systems.

A significant portion of Peridot’s business centers around investment casting where they produce casting patterns for a variety of products used in several different industries, including white goods, industrial equipment, automotive and military applications. Peridot has two main routes to the market, developing casting patterns for foundries and providing investment casting techniques to produce finished products directly for end customers.

Quality is critical when creating investment casting patterns. Any changes in techniques and/or materials are closely scrutinized to ensure they deliver the same level or enhanced quality. Peridot was an early adopter of using 3D printed patterns for a portion of their casting portfolio. They use traditional investment casting techniques for many applications, but choose 3D printing patterns when time is a factor. Accuracy and ash content of traditional SLA materials was always a concern and limited the adoption of this process.

When DSM introduced Somos® Element, Peridot was very intrigued as the material was tailored specifically for 3D printed pattern investment casting applications. The material is antimony-free and designed to improve the repeatability and quality of 3D printed casting patterns. Also, patterns created with Somos® Element leave only trace amounts of lightweight, easily-removable ash residue after burnout of the pattern and have excellent green strength, so breakage is reduced during handling and storage. With these significant performance characteristics and the time advantages for creating high quality patterns the first time they make them, Peridot saw this as an opportunity to transform the way they handle investment casting and decided to evaluate this new material.

Dave Hockemeyer, President of Peridot, states why the company has built up a strong relationship with Somos®, “One of the issues for a service bureau like Peridot is that we find some material manufacturers supply to us, but will also compete with us. Somos® is one of the few that does not do that. We feel the support from Somos® is superior to most other material product suppliers, so it’s a real partnership. They have a research and support team that is second to none. We look to them to provide the latest cutting-edge technology and that is why we were excited to test Somos® Element.”

Peridot decided to put Somos® Element to the test with one of their customers, a foundry that manufactures pump equipment. They used Somos® Element to create casting patterns to produce various titanium parts used to make housings for the pump equipment which are used in many industrial and civil environments, such as water, oil and gas processing.

These parts have tight tolerances so this was the perfect application to test the patterns made with this new material. Both Peridot and the foundry were impressed with the 3D printed patterns and the final titanium parts that were made from the first pattern.
“There is increasing demand from foundry customers for high-quality patterns that allow them to produce flawless, end-use parts quickly and efficiently. With Somos® Element, finally we have a material that can be used to create patterns on an SLA machine that burns-out and performs well in the foundry. It is significant improvement on what we used to do with SLA patterns and means we can help customers produce clean, smooth parts. The material also has low residual ash and is antimony free which allows us to create beautifully flawless titanium and other super alloy metal parts. The customer was very pleased with the parts and has confirmed that they would like to continue using 3D printed patterns made with Somos® Element,” says Hockemeyer.

Somos® Element reduces costs and the time it takes to create parts using the investment casting process. Peridot says Somos® Element cuts investment casting costs by up to 20 percent and reduces time-to-market between 10 percent and 20 percent. Somos® Element achieves these savings because of features such as less burn-out ash, efficient processing and improved 3D pattern production. Peridot can now reduce the number of spare patterns that they print and ship out because the improved quality of the 3D printed pattern made with Somos® Element.

Since the qualification and introduction of Somos® Element to Peridot, they have increased the amount of jobs they have for investment casting. Somos® Element is also helping Peridot improve the quality of services and products it delivers to customers and is opening new market opportunities. In a short space of time, Somos® Element related projects now account for 30 percent of all the company’s SLA work and is expected to increase to 50 percent within a year.

“Somos® Element is proving to be a very important innovation for Peridot. We have a long and rich history in metal casting products and services for our customers and we’ve managed to build a strong reputation. Somos® Element is quickly becoming a critical part of our business as it provides us with a new, more reliable and better quality alternative to metal printing,” says Hockemeyer.

The company says that as well as Somos® Element cutting production time, the 3D printed pattern process allows hollow patterns to be created, which also reduces the volume of material needed. Peridot is able to create these hollow patterns by the use of TetraShell™ technique and software. Because the material can produce a hollow or honeycomb pattern, it reduces final weight of the part by as much as 50 percent (compared to other 3DP patterns) which helps to reduce shipping costs and makes pattern handling in a foundry environment easier. Somos® Element also delivers a better-quality finish than other investment casting processes, which reduces the amount of finishing and labor needed in post-production. In addition, Somos® Element improves quality is its low residual ash capability means a much cleaner, pit-free surface finish for final products.

One area where Peridot sees Somos® Element helping to open and expand into new markets is as an alternative to Direct Metal Laser Sintering (DMLS) or 3D printed metals, where casting replaces direct manufacture. Using Somos® Element is often more cost effective and the casting is repeatable and more reliable. Also, quality standards are being established for products manufactured using DMLS, which could be an issue for high-stress products such as pumping equipment or for mission-critical applications like aerospace.

“There are several methods, materials and technologies for investment casting. One of the key challenges we faced, and I believe the industry in general faces, is looking at and then implementing new ways of working. This is where I think Somos® Element performs so well. The benefits of Somos® Element – low cost, faster time to market, better quality – are self-evident. Also, factor in how easy it has been to switch to using Somos® Element and how it improves not just the end-product, but also the investment casting process itself. We are definitely experiencing the benefits of embracing Somos® Element as a new product in our portfolio,” says Hockemeyer.