



Case Study

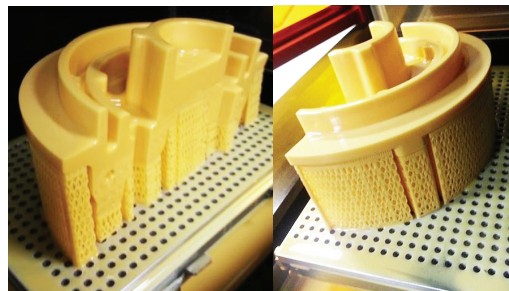
“We’ve been able to print out the parts to make patterns with and send them right to our supplier, cutting out the middle man.” --Don Holder, Process Improvement Engineer, Crane Pumps & Systems

Crane Pumps & Systems | ULTRA® 3SP™

Crane Pumps & Systems is a manufacturer of pumps, accessories and services that provides solutions for aqueous applications including water, HVAC, pressure sewers, pumping and dewatering for wastewater, municipal and military market segments.

Don Holder and Kirk Neer operate Crane’s ULTRA® 3SP™ 3D printer. Holder and Neer are engineering technicians at Crane Pumps & Systems, with 13 years’ and 20 years’ experience, respectively, at the company.

the ability to print waterproof parts at higher resolution. Not only did they want to bring their 3D printing work in-house to have greater control over the process. Another key aspect the team sought was a machine that printed castable materials which will be employed in final-use applications.



An ULTRA Improvement

“We can actually test the parts.”

Choosing 3D Printing

Before choosing EnvisionTEC, Crane’s production process did include 3D printing. The team had a Z Corp 310 powder printer intended for printing concept and scale models for design validation and sales presentations. The team tried to inject the printer’s powder with wax for direct investment casting, a feature advertised by the company. However the team couldn’t successfully achieve this process, hence Crane entered the 3D printer market with the intent to invest in a different technology.

CP&S formerly used less efficient methods to obtain parts. The company paid a 3D print bureau to 3D print their plastic, or they paid to have the pattern made and have the metal parts poured directly. The 3D printer from EnvisionTEC would not only allow them to hold designs in-hand, but test the design as well.

The EnvisionTEC ULTRA® 3SP™ allows the production group at CP&S to test their parts more efficiently, rework iterations and come up with final prototypes more quickly than they were able to previously. A month and a half after receiving their machine in January, CP&S was developing products. The ULTRA®

After owning the Z Corp printer for almost a decade CP&S wanted

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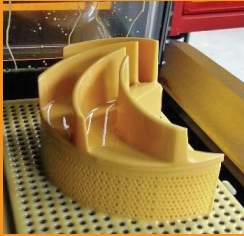
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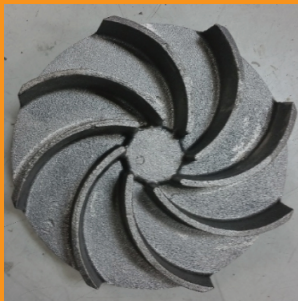
Crane Pumps & Systems | ULTRA® 3SP™



CP&S 3D prints parts on an ULTRA® 3SP™ in halves, like this impeller.



The pieces of the impeller are glued together for use as a pattern.



Sand-casting creates an accurate, functional part.

EnvisionTEC GmbH

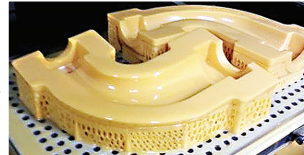
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3SP™ was put to work right away on a project redesigning the hydraulics of a submersible pump and an impeller using E-Denstone 3SP™ Peach. CP&S created different designs for the impeller, which is the part that moves the



Elbow halves on the ULTRA® 3SP™

water in a pump system, as well as an elbow pipe for a new project. With these projects, they were able to proceed directly from printing an iteration to testing its performance.

The impeller was one such piece says Holder: "We can take the part right off the printer. Once we knock the supports off and clean it up we can take it out to the production lab and assemble it on a pump and test the performance of the impeller."

Competing Convenience

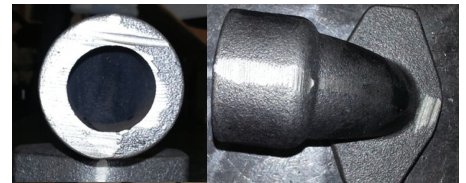
Using EnvisionTEC 3D printing has allowed CP&S to greatly expedite their production schedule. Holder has made five iterations in under a month to the impeller in production.



Elbow core boxes

Lead times for one iteration from an outside source used to be at least one week. Holder was able

to print three of them at a time at the company's headquarters and then go on to test each version. "It's really reduced our cycle time of testing," says Holder.



Cast iron elbow pattern after sand casting

Neer takes just two days to print out a pattern, a drastic improvement to a lead time that would have been three to four weeks. "It is much nicer to have it here [in-house] just for the fact that the parts Kirk's been doing, we've been able to print out the parts to make patterns with and send them right to our supplier, cutting out the middle man," Holder said. Neer added, "We don't have extra work since we're controlling [the process]."

CP&S sends their plastic part to their metal foundry in Mexico where the EnvisionTEC 3D printed part is affixed to a match plate. The match plate is then used to make a sand mold which holds poured molten metal. The 3D prints were thus converted into metal parts, which Holder had in-hand a week later.

About Crane Pumps & Systems

Crane Pumps, originating in 1946, is a North American manufacturer of sump pumps and other items.



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