



January 12, 2010

## **A Greener & Cleaner Approach to Investment Casting Shell and Core Removal**

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What method does your company use today to remove shell and core from Investment Castings (IC)? Depending upon your part designs you have selected something that gives you a chance to clean the IC to sufficient levels for your next processes. If you have a complex IC with internal passageways you probably have selected a chemical bath system combined with high pressure water blast and bead blast. If you have clusters of parts with no internal passageways you might have a high volume automated water blast system, a manual or automated mechanical impact method, or a media blast method. Each of these processes have their pros and cons. What we're hearing in general is that a process with fewer cons and more pros is needed.

This better method needs to minimize energy usage, not generate enormous amounts of waste that requires treatment prior to disposal, not require the part to be oversized to protect final tolerances, and result in cleaner parts. In short, IC de-coring needs to get MORE GREEN AND CLEAN!

KMT Robotic Solutions has introduced a revolutionary new approach to IC de-coring that takes advantage of the unique capability of a 6-axis industrial robot to put a controlled amount of high pressure water cleaning energy exactly where it is needed. The "right level" of energy is the amount that efficiently removes the shell and core within the shortest possible cycle times while ensuring that the cast part cannot be damaged. Through extensive 6 Sigma testing KMT cleaning process experts have determined that there are specific parameters that must be held to enable this process. These include distance from the part, angle to the part, velocity of motion across the part...all of which can be tightly controlled for each part design using a programmable industrial robot. KMT has developed the expertise to assist customers in identifying the key parameters for their castings and designing efficient systems to meet these needs.

Beyond the definition of these parameters, the key is to determine a method to efficiently deliver a high percentage of the energy that is generated when water is pressurized to the appropriate range. This ensures that minimal energy is wasted pumping the water to pressures beyond those that should be delivered to the part. The goal is to use the minimum amount of water pumped to just the right pressure for the cleaning requirements for each IC. To this end KMT has developed a proprietary family of high efficiency nozzles and cleaning heads along with a cost effective approach for dynamic control of the water pressure being delivered by the high pressure pump.

This robotic technology gets wrapped in an enclosure that serves three major purposes. First, it encloses the process so that the system is safe. Second, the enclosure contains and dampens the noise from the process, and third, it contains and manages the waste into a filtration system.

Based on each plant's requirements KMT can also recommend a filtration system to facilitate an open or closed loop water system.

KMT has experience using this process to clear core materials from clusters of IC parts such as prosthetic devices and valve components, as well as from large single part castings such as aircraft engine stators.

The result is a process that:

- utilizes less energy to create cleaning power
- improves the cleanliness of the part
- eliminates the need for chemicals and associated disposal costs
- reduces the secondary cleaning requirements and associated costs of those processes
- can minimize the need for designing oversized parts to ensure that final part tolerances can be held
- utilizes equipment that is durable and reliable
- reduces operating costs

There is an important new choice that is GREENER AND CLEANER for removing shell and core from Investment Castings that should be considered for your operations. KMT Robotic Solutions is able to demonstrate this new process on your Investment Castings in our Auburn Hills, MI facility. Contact us at [solutions@kmtrobotic.com](mailto:solutions@kmtrobotic.com) or by calling Steve Laski, Cleaning Product/Technology Manager at 248-829-2832 or Roberta Zald, Director, Business Development at 248-829-2814.

KMT Robotic Solutions was formed in December of 2006 with the union of KMT Cutting Systems in Ronneby, Sweden and Robotic Production Technology in Auburn Hills, Mich. KMT Robotic Solutions has more than 3500 robots installed around the world and more than 25 years experience developing, designing, building, servicing and supporting robotic cutting, trimming and cleaning solutions for manufacturing customers. With direct and relationship partner locations in Europe, the Americas, China, and Japan, KMT is strategically positioned to serve the global market. KMT Robotic Solutions. Creating value through automation. <http://www.kmtrobotic.com>