

Products

New VA Technology Shellbuilding System Responds to Technology-based Investment Casting Industry

Computer technology combined with the “can do” attitude of investment casters over the past few decades has resulted in remarkable achievements regarding complex shapes using alloys using unique properties. Consequently, investment casting is firmly established as a technology-based manufacturing process.

The same computer technology has enabled global sourcing with its root demands of standardization of product quality and lower unit cost.

This standardization, however, is achievable only if process variables are quantifiable, measurable, and available to control. The myriad of variables in the shell room fit these requirements. The control of variables in the shellbuilding process can have a dramatic result on the down-

stream processes of investment casting.

A common technical strategy has developed: minimum human intervention from wax to dewax, with significantly different degrees of process control to meet the requirement within each industry segment.

Because the process control culture differs slightly from one market to the next, shell room processes can be categorized into three major industry segments: (1) commercial investment castings with control requirements to achieve the highest productivity with the lowest unit cost, the fastest unit cycle times and maximum shell quantities per hour; (2) medical investment castings with *higher* control requirements to achieve high productivity, high quality and process traceability; and (3)

aerospace with the *highest* control requirements to achieve high productivity, highest quality, predictable performance, and the highest degree of process traceability.

In each case however, the base requirement remains the same: variability avoidance with predictable yield and zero defect.

The common culture demands not only excellence in individual equipment control but also excellence in integration of the shell room within the total investment casting manufacturing environment.

For this reason, VA Technology, in cooperation with aerospace parts manufacturers, has developed process evaluation tools to specify and measure stucco rainfall quality performance. Traditional rotary rainfall sanders provide excellent stable performance,

however the specific requirements for hot end jet engine parts, requires preferred characteristics to be incorporated into the machine.

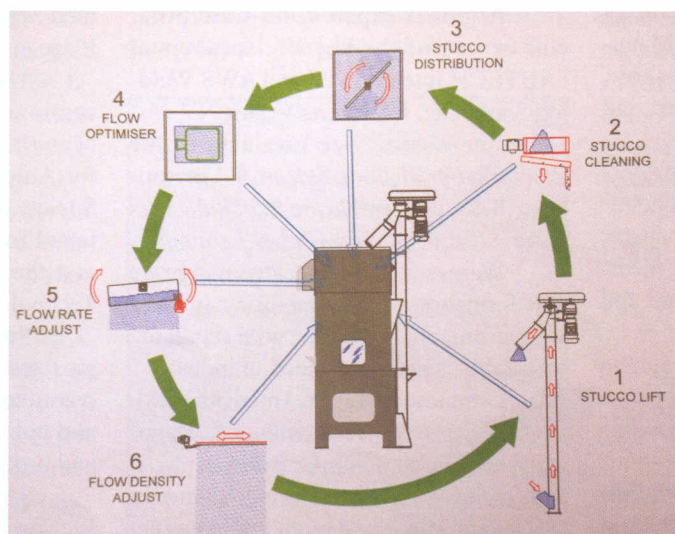
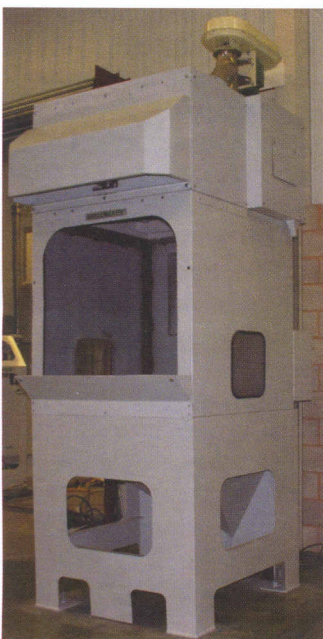
Some of these characteristics include: adjustable sand flow, built-in cleaning, constant flow throughout the rainfall cycle and controlled distribution.

In addition to the sander machine design, it was necessary to integrate shell quality assurance monitoring with the sanding process.

By taking an existing design and integrating the many new characteristics and control capabilities, the company developed a highly versatile machine, the V2 Series, with a reduced footprint for easier installation within an automated cell, plus improved dust emission characteristics for a safer environment.

To close the loop for quality assurance, a shell weighing system is incorporated within the automated cell, and the software is equipped with a shell weight module. Individual shell coat weights for every shell produced are measured and historical data taken and stored for retrieval and analysis.

The data gathered from the engineering program has provided a sound data platform for further technical development, and a synergy is developing regarding other key machines used in the shellbuilding process.



The V2 series machine is shown at left. The stucco cycle is illustrated above.