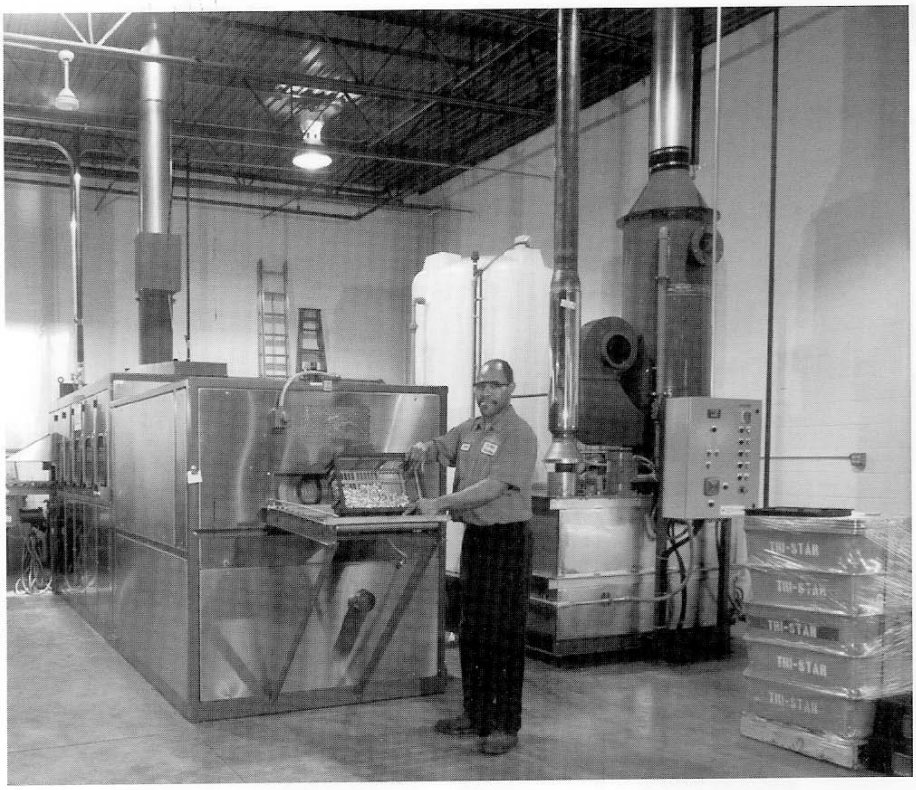
ULTRASONIC SYSTEM
...ensures clean parts

Berlin, CT - *When Tri Star Industries, Inc., determined it needed a better way to clean the metal parts it produces, company President Richard Manwaring didn't just pick up the telephone and call the nearest manufacturer of high-end, ultrasonic cleaning equipment - but he could have.*

Because after a multi-year search for the perfect machine his quest ended successfully just across town in Berlin, CT, at JENFAB, also known as Jensen Fabricating Engineers, Inc.



Tri Star Industries operates 28 Davenport multi-spindle screw machines making threaded fasteners from brass, aluminum, stainless steel and steel that are later used in molded plastic parts. It is a high-volume operation, currently turning out some 325,000 pieces each day, and is heading toward the half-million mark. Mr. Manwaring needed a cleaning system that would help meet the dual goals of reducing the incidence of rejected parts, and producing a better overall product.

The equipment to be selected would have to meet specific performance criteria and help attain an increased market share through quality control. And there was one all-important facet of Tri Star's search that had to be met for it to be successful. The job had to be done at one work station by one machine.

Tri Star makes many types of parts, in varying designs and materials, which require differing wash and rinse solutions for proper cleaning. The key, and the challenge, was in finding a single machine that could handle the changing nature of the jobs assigned to it.

Through much of his search, however, Mr. Manwaring was thwarted, finding machines that met only one of his overall requirements, and didn't provide the universal solution he was seeking.

"We looked at all kinds of variations and types," Mr. Manwaring said. "They all did one thing well, but the drawback was that they didn't do anything else."

Ultimately, Mr. Manwaring found that Jensen Fabricating Engineers Verti-Matic model proved to be the most cost effective solution to achieving his goal, he said. To get the equivalent performance from other manufacturers, "we would have had to buy three or four machines," Mr. Manwaring added.

But going from initial contact to the final sale involved far more than a quick demonstration and a slap on the back. It was a process that required substantial investment of time and effort from both JENFAB and Tri Star personnel.

JENFAB President Kurt Jensen, Vice President of

Sales Jerry Nicholas and the rest of the JENFAB team first focused on Tri Star's operation - what was done, how it was done, and what was involved. They did an in-depth evaluation of the company's needs and then selected a proven design that matched job requirements.

JENFAB worked with Tri Star for over a year ensuring that the machine Tri Star purchased would do the job. "It's not unusual in this field," Mr. Nicholas said of the long-term sales effort.

Among the criteria Mr. Manwaring considered crucial to his selection were: removal of chips and fines; reduction in the parts rejection rate following cleaning; multi-metal cleaning ability; removal of petroleum-based machining oils; and all parts to emerge "bright", aesthetically pleasing and able to pass mechanical and visual knurl and ID thread inspections.

Tri Star also wanted to eliminate use of mineral spirits and hand washing of parts. Since it wanted to move to an aqueous operation, key issues included environmental friendliness and water consumption.

Other requirements included a closed-loop system for filtration and simultaneous minimization of waste water. After testing and evaluating the design provided by JENFAB, Mr. Manwaring concluded that the Verti-Matic vertical agitation and rotation system met all requirements.

Late last year JENFAB delivered a machine for test and evaluation.

The Vert-Matic design includes 5 stations of controlled cleaning processes, provides for submerged rotation, and finishes with 7 drying stations. Baskets measuring 18" x 12" x 6" enter the machine on a 10' conveyor. All baskets are indexed by a mass transfer device to each cleaning tank's vertical agitation and rotation platform. All axes have adjustable speed and stroke capabilities.

The Verti-Matic design has the following stations or indexes of operation:

Tank #1: Wash, with chip removal filtration system and high volume oil coalescer to remove petroleum-based screw machine oils.

Tank #2: Precision clean wash, with submerged ultrasonic transducers, micron filtration and oil coalescer.

Tank #3: First rinse, with filtration. Also, water is routed to #1 and #2 wash stations to increase chemical and water supply management.

Tank #4: Second rinse, with micron filtration overflow water supply to first rinse at the #3 station. This station further enhances water and chemical make-up supplies, and decreases water consumption by 60 percent. Station #4 is also designed with a counterflow 1-20 GPH system if desired.

Tank #5: Third rinse, and a rust prevention station for steel components. Carbon steel components are gently submerged and processed in an aqueous-based rust prevent, while non-ferrous parts can be programmed to bypass this station.

Dryer: Seven rotating stations gentle tumble with controlled RPM to drain and dry components. Verti-Matic produces cleaned and dried components and parts with a 100 percent zero damage rating. The energy efficient dryer recirculates 5500 CFM of controlled heated dry air.

The Verti-Matic design includes a waste water evaporation system designed to process 20-40 gallons of waste water per hour via gas heating. It further reduces waste streams by 90 percent through evaporation of residual water upon system recharge of process tanks and of rinse discharge. The system includes a 1,000 gallon storage tank with integrated pumps and plumbing that runs from machine process tanks through accumulated storage to the evaporation.

The Verti-Matic is enclosed with interlocking doors and access panels. Tool quality components, such as vertical and horizontal hardened ball rod and bearing systems, transport the baskets through the

machine. Agitation is accomplished via engineered ball rod and bearing systems actuated by pneumatic cylinders. All 304 stainless steel components and fabrications are provided for wetted surfaces.

The Verti-Matic is operated by an AB Series 504 SLC control unit featuring monitoring of all mechanical functions, variable speed adjustment process for all functions, a diagnostic preventive maintenance program, linkage to a three-position input switch with three sets of process parameters and a panelview touch screen operator interface and I/O port or link.

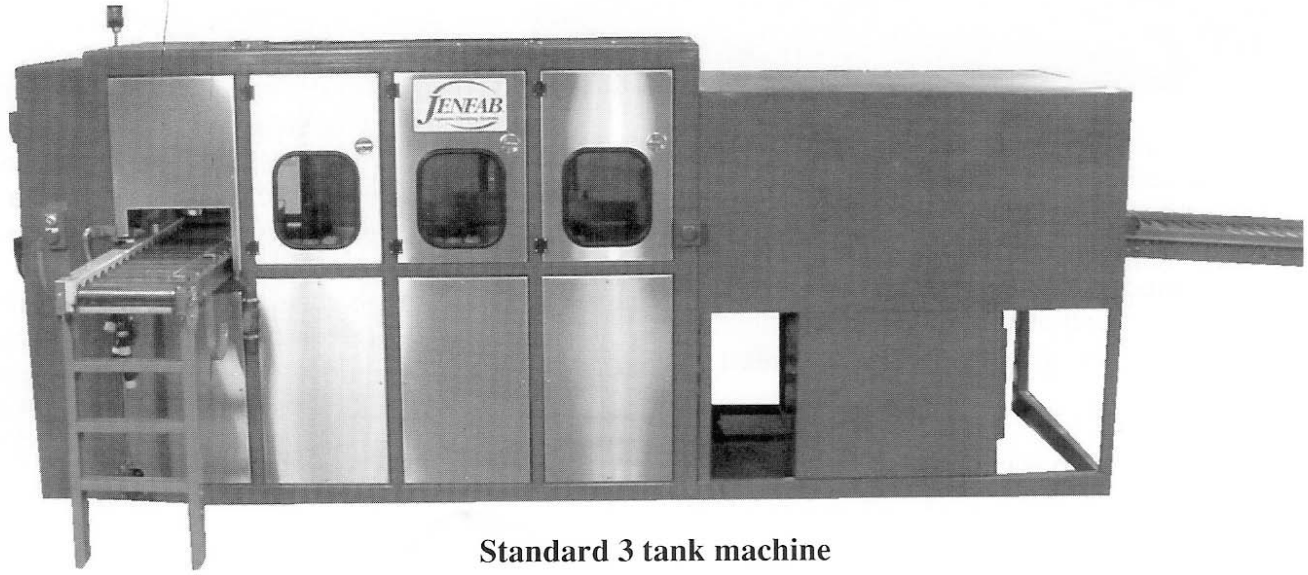
JENFAB delivered the Verti-Matic to Tri Star on Nov. 8 and the firm started a 90-day shakedown operation. During that period various timing cycles and cleansing combinations were tested while Tri Star personnel became familiar with its operation. The final result was "the proper combination to clean everything," Mr. Manwaring said.

Tri Star now has a first shift going full bore and an increasing effort on its second shift, producing more than 20,000 parts per hour. After three months of operation the Verti-Matic is handling the full day's output in a single shift.

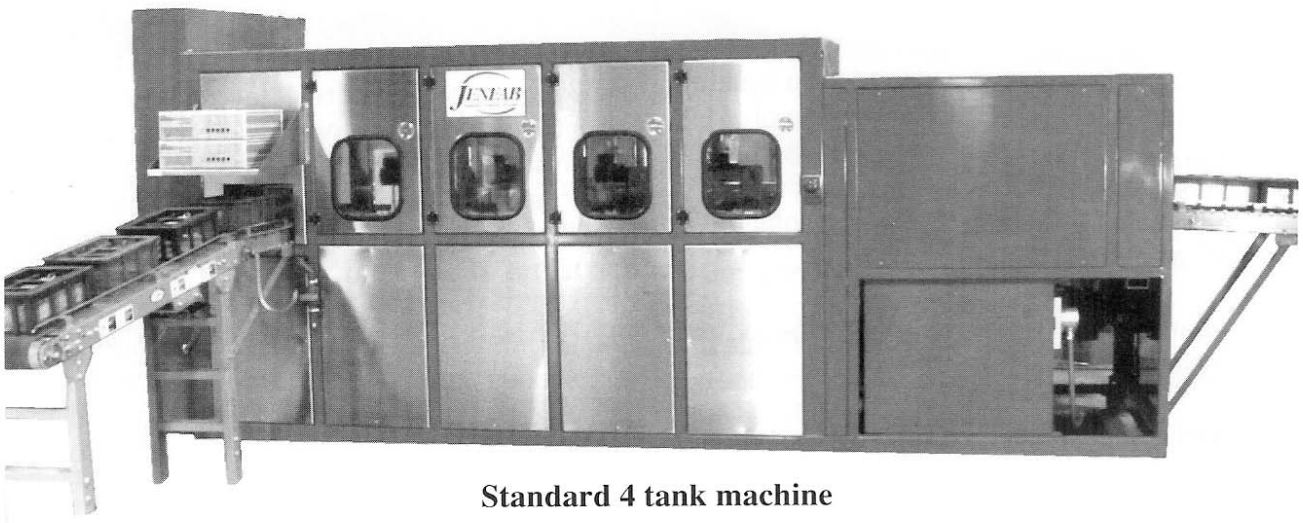
Mr. Manwaring expects the Verti-Matic to be even busier than it has since February. As the numbers grow closer to the half-million mark, Mr. Manwaring expects it to continue operating into the second shift to fulfill demand. "The machine is doing a really good job keeping up with the output of 28 automatic screw machines," he said. "The parts are clean, there are no chips."

The machine's output represents a significant statement about its capabilities, but perhaps the best testimony to the value the Verti-Matic has brought to Tri Star comes from the customers, Mr. Manwaring said. Despite the millions of parts the Verti-Matic has processed since it started operation, "there have been no calls concerning parts cleanliness."

JENFAB will be at IMTS-2002 in Booth #D-4713 with an array of parts cleaning equipment.



Standard 3 tank machine



Standard 4 tank machine