

Hydraulic Pump Division **SUCCESS STORY: Atlanta Grotnes Machine Company**

PD140 WITH ELECTRONIC CONTROLS IMPROVES NEW HEAD PRESS MACHINE DESIGN

CUSTOMER

Atlanta Grotnes Machine Company

CHALLENGE

Engineer for Bradford White a more efficient tank expander/head press

SOLUTION

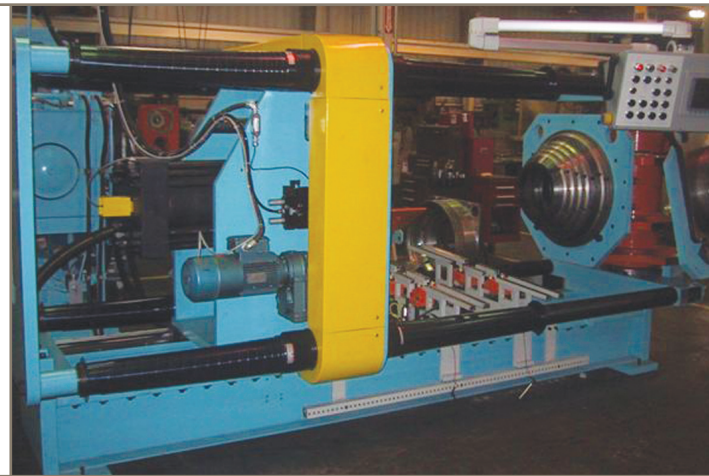
PD140 variable displacement, axial piston pump with electronic controls

VALUE

New design, manufacturing, maintenance and operating efficiencies

CUSTOMER

Atlanta Grotnes Machine Company (www.grotnes.com) has designed and built metal forming equipment for a wide variety of industries since 1956. The machines are used for expanding, shrinking or roll forming – or a combination of the three processes – to manufacture steel drums, transformers, oil filters, wheel rims, lawnmower decks, clothes dryers and hot water heaters. For more than 10 years Atlanta Grotnes has been a loyal Parker customer.



CHALLENGE

Bradford White Corporation, a leading manufacturer of commercial water heaters, needed to replace an aging tank expander/head press that lacked the flexibility to run the wide variety of product models their customers desire.

The company's new product development strategy called for taller, larger diameter models beyond the machine's capabilities. It also lacked the power to press large tank heads without running at higher than desired hydraulic pressures. Furthermore, part set-up and changeover consumed 25–30% of available run time during the one-shift production schedule.

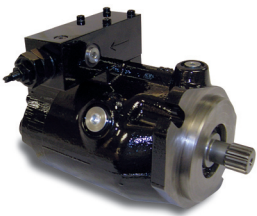
Bradford White tasked Atlanta Grotnes with engineering a new machine that would:

- Accommodate an ever-increasing range of tank sizes

- Operate at reasonable hydraulic pressures
- Reduce set-up and changeover time

Design criteria dictated the new machine would produce a tank/head assembly every two minutes and be capable of processing more than 80 different models ranging from 12- to 36-inches in diameter and varying in length from 20- to 80-inches. During a standard eight-hour shift, Bradford White planned to change part sizes five to seven times.

The new expander/head press envisioned by Atlanta Grotnes chief engineer Archie Tan would demand highly variable, rapidly changing hydraulic flow and pressure rates. First, the tank body would automatically be positioned in an entry/exit cradle. Then four hydraulic cylinders would raise the cradle (3.64 gpm) until the body was centered in the machine. Next, a ram cylinder would extend



“Noise was a big concern for our customer but thanks to the quiet operation of the Parker pump it was no problem to meet their requirement.”

— Archie Tan,
chief engineer, Atlanta
Grotnes

“Set-up is fast and easy now because of the electronic controls. It only takes a second for the operator to dial-up the new settings when a part changes.”

— Wayne Bearden,
general manager, Atlanta
Grotnes



Parker's PD140 gives Bradford White enjoys full electronic control of proportional pressure and displacement, torque limiting, anti-stall and constant flow settings.

(59.97 gpm; 1,000 psi.) to engage one end of the body against the flare tooling (26.67 gpm; 2,000 psi). As the ram retracted, stripper pins would extend (2.16 gpm; 750 psi) to remove the flared body from the tooling. Next, the machine turret would rotate 90° (7.79 gpm; 700 psi) to align the tank body with the head press. A ram cylinder would extend (59.97 gpm; 1,000 psi) to press the head into the tank body (20.00 gpm; 2,000 psi) before retracting (44.75 gpm; 1,000 psi). Finally, the completed head/body assembly would be reloaded in the cradle to roll out of the machine when the cradle tilts (1.70 gpm) and the exit-side cylinders retract (1.19 gpm).

Complicating Tan's design challenge was the fact that exact flow and pressure requirements varied depending upon the diameter and wall thickness of the tank body being produced. A traditional system replete with proportional control and pressure reducing valves (common to the old machine) would require the operator to perform manual adjustments with each part change – a 20-minute time investment Bradford White sought to eliminate.

SOLUTION

Senior Parker hydraulics territory manager Jim Aszman met with Tan and discussed simplifying the high flow/low pressure system using automatic proportional hydraulic pump control. Aszman recommended Parker's PD140 variable displacement, axial piston pump with electronic controls:

- Optimized for fast response and high efficiency in industrial applications, the PD140 would meet the machine's maximum flow requirement of 60 gpm and offer the agility needed to keep pace with rapidly rising and falling flow rates each 120-second cycle.
- Designed with a round, compact housing, the PD140 is quieter than competing "flat surface" pumps. This would help Bradford White meet OSHA's noise requirement of less than 80 dB at 3 feet.
- Featuring digital controls, the PD140 would allow Bradford White to optimize pump performance according to tank size, save and recall part settings on demand and remotely monitor each machine cycle to track system quality and manufacturing efficiency.

VALUE

With the PD140 solution, Parker's Hydraulic Pump Division enabled Atlanta Grotnes to provide significant benefits to Bradford White in terms of design, manufacturing, maintenance and operating cost efficiencies:

Thanks to electronic proportional control, Atlanta Grotnes was able to design the new expander/press with one standard directional control valve rather than five proportional control valves (\$800 per valve). Eight pressure control valves (\$400 per valve) were also eliminated for a total cost savings of \$7,200. With fewer valves, the new system offers further value in terms of fewer potential leak points.

The ability to instantly recall more than 80 tank size settings eliminated 120 minutes of machine downtime per shift by reducing changeover time from 25 to 5 minutes as

the operator is not required to perform manual pump and valve adjustments with each part change (5 minutes per change x 6 changes = 30 minutes = .5 hours vs. 25 minutes per change x 6 changes = 150 minutes = 2.5 hours). As a result, 60 additional tank/head assemblies can be produced per shift.

PD140 digital diagnostics will conceivably eliminate one service call per year, saving Bradford White approximately \$1,000.

By employing a variable displacement pump in the new design, Atlanta Grotnes was able to spec-in a 40 hp motor drawing 46.5 amps at full load current. A fixed displacement pump on the same machine would have necessitated a 75 hp motor drawing 92 amps at full load. As a result, Bradford White will realize annual electricity cost savings.

