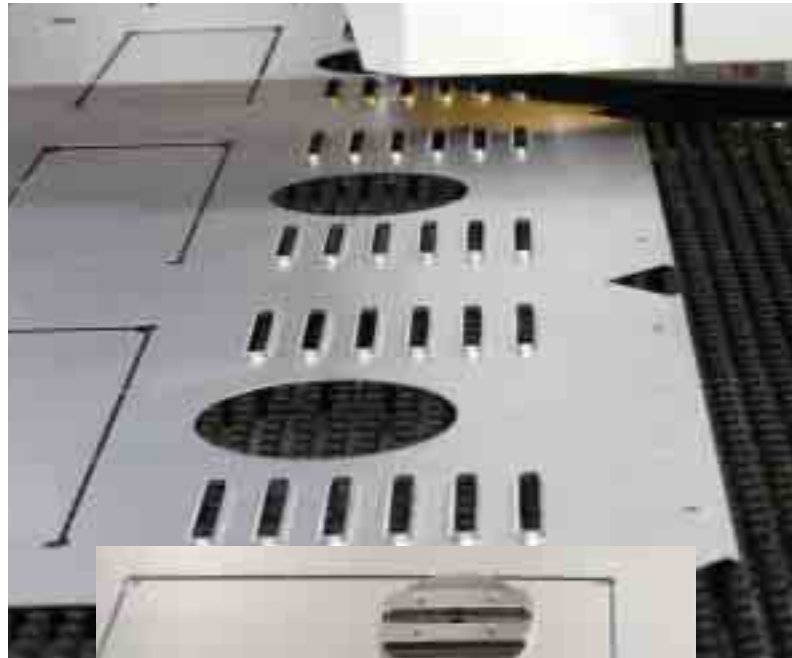


Turret-Press Tools

Take Sheetmetal Forming to a New Height

Smartly tooled brand-new sheetmetal-fabricating machines give an appliance maker a leg up in productivity and in product aesthetics, thanks to improved forming, extruding and embossing capabilities.



Pacific Energy Fireplace Products Ltd., of Vancouver Island in Duncan, British Columbia, has been manufacturing high-efficiency wood- and gas-fired appliances for more than 25 years. Its use of unique sheetmetal forming tools on two Finn-Power Shear Genius (SG) cells—shear-and-punch machines—demonstrate the ability to use full-tonnage upforming stations with a tool larger than 3.5-in. dia. The firm purchased its first SG in August 2003 to take the fabrication workload from three of its aging stand-alone turret presses that it coupled with manual shearing. That move yielded a 40-50-percent jump in parts production. And when orders for its appliances took off after an industry trade show late in 2004—the typical end-of-season slowdown never materialized and the firm found itself running 24-7 even



Closeup of 4½ by ¾-in. upformed obround extrusion (see inset photo of the two-piece 4.125-in. upform extrusion tool). Pacific Energy fabricates this part from 48 by 96 by 0.062-in. sheets of enameling steel, achieving 98.5-percent material utilization, thanks to common-line shearing with no bottom trim.



Last-part unload from a shear-and-punch machine using no trim strip. The third clamp moves, then the machine trims the last part with the punch rather than the shear for maximum sheet utilization.

after the holiday season. It ran to Finn-Power for a second SG to keep up with demand. Pacific Energy had introduced a new line of luxury gas fireplaces that spurred orders and pressure production capacity.

Says Trevor Gregson, Pacific Energy production manager: "In the last two to three years we have easily doubled in size. We have had some growing pains, including bottlenecks in sheetmetal fabrication where we've had to run day and night."

A Shear Genius machine combines a 33-ton 20-station hydraulic turret punch press with a right-angle shear. The turret press features programmable penetration depth, ram speed and stroke length, and offers a work area of 60 by 100 in. The shear houses a 31.6-in. X-axis blade and a 59.64-in. Y-axis blade, and can slice mild steel to 9 gauge and Type 304 stainless steel to 12 gauge.

Pacific Energy typically processes steel sheet from 26 gauge to $\frac{3}{16}$ in. thick. It also runs some stainless steel to 12 gauge, as well as a bit of aluminized and other coated steels.

Avoiding Sheet Marking

To produce a 4.125-in.-dia. knockout in 16-gauge hot-rolled steel, with high sheet traverse speeds for all punching and sheet movements along with minimal sheet marking, requires a fabricator to avoid using high form tools in the turret. At Pacific Energy, this is achieved

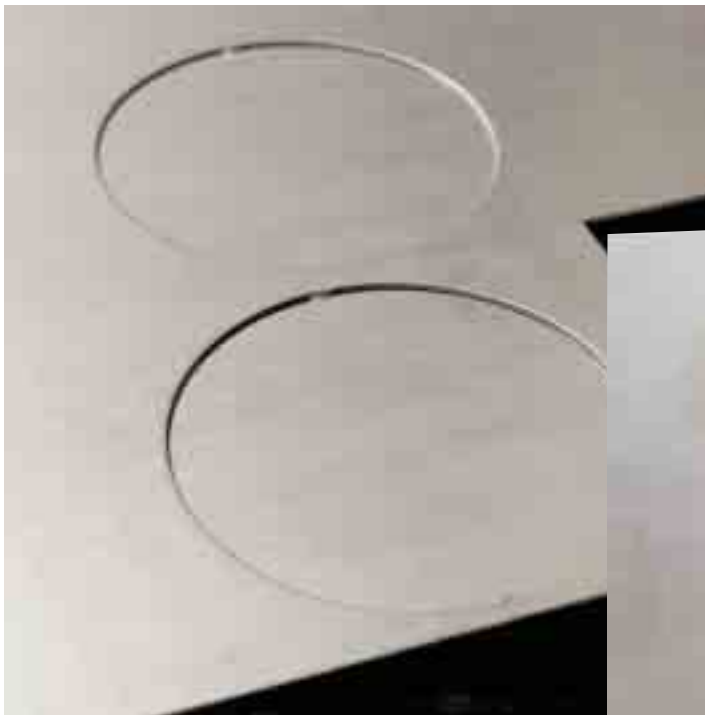


by using the SG's upforming system, which has a separately controlled secondary 25-ton lower hydraulic ram that includes coining dwell built into the upform process. The machine can be programmed to form in either direction depending on the type of form required. It also offers three additional forming modes: deep draw, with built-in coining delay that finds use for embossing; mechanical bottoming, for precision forming; and electronic stroke control.

To upform the knockouts, Pacific Energy employs a special two-piece tool from Mate Precision Tooling, Anoka, MN. The tool includes a custom 3.5-in.

holder that allows for assembly in the turret, and offers the flexibility to allow use of regular 3.5-in. tooling in that station.

Finn-Power's upforming system allows full tonnage throughout the punch stroke in an upward movement in the turret. This feature provides Pacific Energy the maximum flexibility in achieving various forming options. Unlike conventional downforming operations, upforming means that the die never rests higher than table level. So, when the sheet moves it can't crash into the tools, leading to machine downtime, and avoids any scratches on the



Pacific Energy creates 4.125-in.-dia. knockouts in 0.062-in. hot-rolled steel using upform stations (tools are seen in the photo below) on its shear-and-punch machines.



lower sheet surface. This is particularly important with coated materials or materials where cosmetic appearance is critical.

Extrusion Tools

A large 4.125-in. obround extrusion tool used at Pacific Energy in its SG machines functions similarly to the knockout tool. The ability to produce both of these large forms in a standard turret setup saves time by avoiding a secondary operation. It also minimizes scratching and speeds processing times.

To form extrusions, Pacific Energy tools its SG machines with Mate’s Nova oblong extrusion tools. Finished size is ½ by 4 in., to a height of 16 mm, on 17-gauge enameling steel—very-low-carbon steel used for porcelain enamel. It also forms extrusions on 16-gauge hot-rolled steel. The extrusions are fabricated on heat-reflector parts to dissipate heat through the vents.

“Initial part designs called for making louvers,” says Gregson, “but in the enameling process, a louver has a sharp edge that doesn’t lend itself to enameling. It will chip on any sharp corner. So we went to the pierce and extrude sys-

tem using Mate tools and it works very well.

“Forming up in the SG, rather than down,” he continues, “provides a nice, even collar without the use of shimming. It is easy to set up, and we don’t have to worry about dragging the extrusions over the other tools, which can dull the tools.”

An increase in material utilization also has accompanied the SGs.

“The ability to use the edge allows us to squeeze more parts onto the nest,” adds Gregson. “In some cases, we’ve achieved 98.5-percent material utilization.”

A Fresh Look at Embossing

Pacific Energy also is examining use of an offset roller-ball tool on its SG machines, for embossing. The Mate RollerBall includes a stiffening tool and ribbing tool in one, avoiding the need to make a new embossing die set for every new prototype job. The versatile turret-

press tool, which can run as quickly as 1000 in./min. on the soft enameling steel, can be used to stiffen large sheet surfaces, create channels for fluid flow or create aesthetic changes in the sheet surface, to name a few other uses. It will give the company more freedom to experiment with different embossing designs rather than having to purchase hard tools.

Making the roller-ball tool even more attractive is a “wheel-soft” command within the SG control that allows the sheet to begin indexing as the tool approaches, resulting in progressive engagement. This minimizes or eliminates sheet marking. And, if any marks do occur, the control sequence directs the tool to overrun the start point of the embossment by 1 to 2 in. to smooth out the marks. **MF**

Information for this article provided by Finn-Power Intl., Inc., Schaumburg, IL; 847/885-3200; www.finnpower.com.