

MIP & P

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Auto-darkening welding helmets



Lincoln Electric has updated its VIKING auto-darkening helmet line with two new series of helmets – the 1840 series featuring a 1.8 in. viewing area height in a compact DIN-sized lens cartridge and the 2450 series featuring a 2.4 in. viewing area height in a U.S. standard 4.5 in. x 5.25 in. sized lens cartridge. The 1840 features externally-controlled continuously variable 9-13 shade control for quick changes without helmet removal. The 2450 series features a protected internal continuously variable 9-13 shade control. Variable sensitivity and variable delay allows the user to adjust the time required to bring the helmet from dark to light. Both helmets include an integrated grind control to allow the user to wear the helmet as a grinding shield.

www.lincolnelectric.ca

Ball-nose end mills for profiling small parts



Sandvik Coromant introduces a new range of small Coro-Mill Plura ball nose end mills for profiling in medium hard to hard steels. The end mills come in diameters from 0.1-0.12 mm (.004" - .0047")

and are suitable for all small die and mould, electronic fibre optic connector and medical tooth implant manufacture, where high precision is important. The tools have a geometry design which prevents the radius from deteriorating from uneven wear.

www.sandvik.coromant.com/ca

Premium ER collet chuck system



BIG Kaiser has introduced Mega ER Grip, a new premium ER collet chuck system featuring a runout accuracy of .00012" (3 microns) at 5xD. The Mega ER Grip was designed to out-

perform all other ER systems in the four most crucial areas of tool holder performance: clamping force, concentricity, rigidity and balance at high spindle speeds. These factors, combined with the system's reliable and stable runout accuracy, amount to significant long-term savings.

www.bigkaiser.com

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Cycle-controlled lathes put teeth in Cougar Tool's oil-field equipment shop

Cougar Tool Manufacturing is a family owned, globally competitive business with facilities in Canada, the U.S., Iraq, Saudi Arabia, Dubai and Abu Dhabi. The company's product lines for the oil industry include single and double-acting drilling jars, shock tools, Mech-Thrusters, mud motors, drill bit protection devices, stabilizers/reamers, and a range of support tools. Most manufacturing takes place at the ISO-certified Edmonton facility.

"We compete with the best in every corner of the globe from our 100,000-sq-ft Edmonton facility, so cost-efficient manufacture of turned parts is a core competency," says Cougar Tool Manager Gary Spencer.

Spencer says MAG's VDF DUS lathes opened his eyes "way back when" to the true potential of what can be done on a CNC machine designed for manual-operation lovers. As a result, 14 VDF

DUS lathes today play a lead role in the company's shops, where they are used to manufacture Cougar's line of specialized downhole tools, as well as refurbish rented tools and produce prototype designs. Boring holes to 32" (813 mm) depth, profiling internally and externally, or cutting/re-cutting threads, the conversationally programmed machines are key in meeting Cougar's requirements for speed and precision in producing short runs of heavy, large parts.

"Our shop is also key to our R&D capability, and the ability to add one-off R&D parts into our work flow, with programming by the operator on the floor, has been a big plus for me," says Spencer.

About 80 percent of the company's approximate \$50 million in annual sales is derived from rental business, so the shop is constantly refurbishing worn and damaged tools to ensure availability.

Continued on Page 5

feature COVER STORY

Continued from the cover



Operator loads a repaired stabilizer in MAG VDF 800 DUS lathe for turning radii, tapers, and cleaning up the selded build up area of the blades.



Cougar Tool bores up to 30 inches depth using this setup on a MAG VDF 560 DUS lathe, though usually works to a depth of 24 inches. This hydraulic housing is bored from both ends to complete the part, then sent out for chroming and honing of the ID.



MAG VDF DUS lathe machines the OD on a DJ10 piston sub. After OD machining, operator will setup steady rest and bore the ID. Part would then be sent out for hard chroming and honing of the ID, where a polypack seal runs.

On the cover: Operator sets position of tooling before running his program, using patented handwheel controls. The part is a 4330 VMod piston sub. OD on this new part will be turned using a carbide insert.



Operator measures OD on a latch mandrel after turning on a MAG VDF 560 DUS.

"We are also developing new lines all the time, always looking for new points of entry into the market," Spencer adds.

Downhole details

The downhole tool business is all about cylindrical, turned parts, Spence emphasizes.

"We make the whole tool when it comes to hydraulically or mechanically acting drilling jars and shock tools, which consist of about 15 external and 10 internal parts, all screwed or fitted together to make a functioning tool," he explains. Drilling jars "jar" stuck drilling tools to free them up, while shock tools and Mech-Thrusters protect drill strings and bits from transient shock loads, ensuring optimum weight-on-bit, penetration and bit life. These tools commonly operate in deep, hot wells, and are subjected to high torques and corrosive environments. As a result, the company is a heavy user of high-carbon steels, such as 4330 VMod and 4145, heat treated and stress relieved.

Regarding manufacturing tolerances for turned parts, Spencer understates somewhat when he says the company's downhole drilling tools "are not Rolls-Royce engines." Cougar's processes are quite stringent, using computer-aided design, finite element analysis and CAM. Sliding and sealing interfaces require tolerances to 0.001" (0.025 mm), often followed by honing and chrome finishing of some bore surfaces.

Lathes: the backbone of manufacturing

"We put the biggest pieces of steel into our VDF DUS machines that we can – often 72" (1829 mm) long and 10-12" (254-304 mm) diameter," says Cougar Production Manager Dave Hemmerling. "Our tooling is relatively basic, involving no turret and no probing capability. We do a lot of deep boring to produce the long housings required for drilling jars." Parts are chucked, using a tailstock

and steady rest for support, if needed.

To take some of the heavyweight work off its 12 VDF 560 DUS machines, Cougar moved up to a VDF 800 DUS in July 2008. The 560's handle part lengths of 40-315 inches (1000-8000 mm) and virtually any weight, with chuck capacity of 11" (280 mm), swing over the bed of 22.4" (570 mm) and spindle motor rated 33 hp (25 kW).

Cougar's VDF 800 DUS machine, by contrast, takes part weights up to 8,816 pounds (4 mt), and lengths to 110" (2,794 mm), with an 18" (457 mm) chuck and swing over the bed of 32" (820 mm). Its 62 hp (46 kW) spindle motor provides speeds of 6 - 1,600 rpm through a two-speed gearbox. Z-axis feed force is 2,800 ft lb (12.5 kN). Designed for constant duty, VDF DUS lathes have the transmission mounted behind the headstock to eliminate thermal effects caused by the gearing, with a backlash-free overload coupling to protect the gearbox. The VDF 800 DUS machine's A-11 spindle is supported with a thermally optimized arrangement of lifetime-lubricated bearings. The Meehanite cast iron bed retains its core sand to enhance vibration damping, while hardened dou-

ble-V guideways distribute high axial cutting forces and prevent skewing. Larger models of the machine handle part lengths up to 787" (20,000 mm).

An "operator's machine"

Although Cougar relies heavily on conversational programming through the CNC, the VDF DUS machine is true to its heritage as an "operator's machine" for one-off parts, and features a patented, ergonomic operator panel and handwheels. "Standardization on these machines has been very helpful, allowing us to transfer part programs from one facility to another over our Predator network," Hemmerling added.

"We work these machines hard, and they have proven themselves oil-field tough, with excellent longevity, backed by excellent service here in Canada," Spencer concludes. "We recently sold our first VDF DUS machine on the used market after years of double-shift work. The bedways were still in great shape and we received about 30% of the machine's original price."

This article was provided by MAG. For more information about MAG, visit: www.mag-ias.com

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