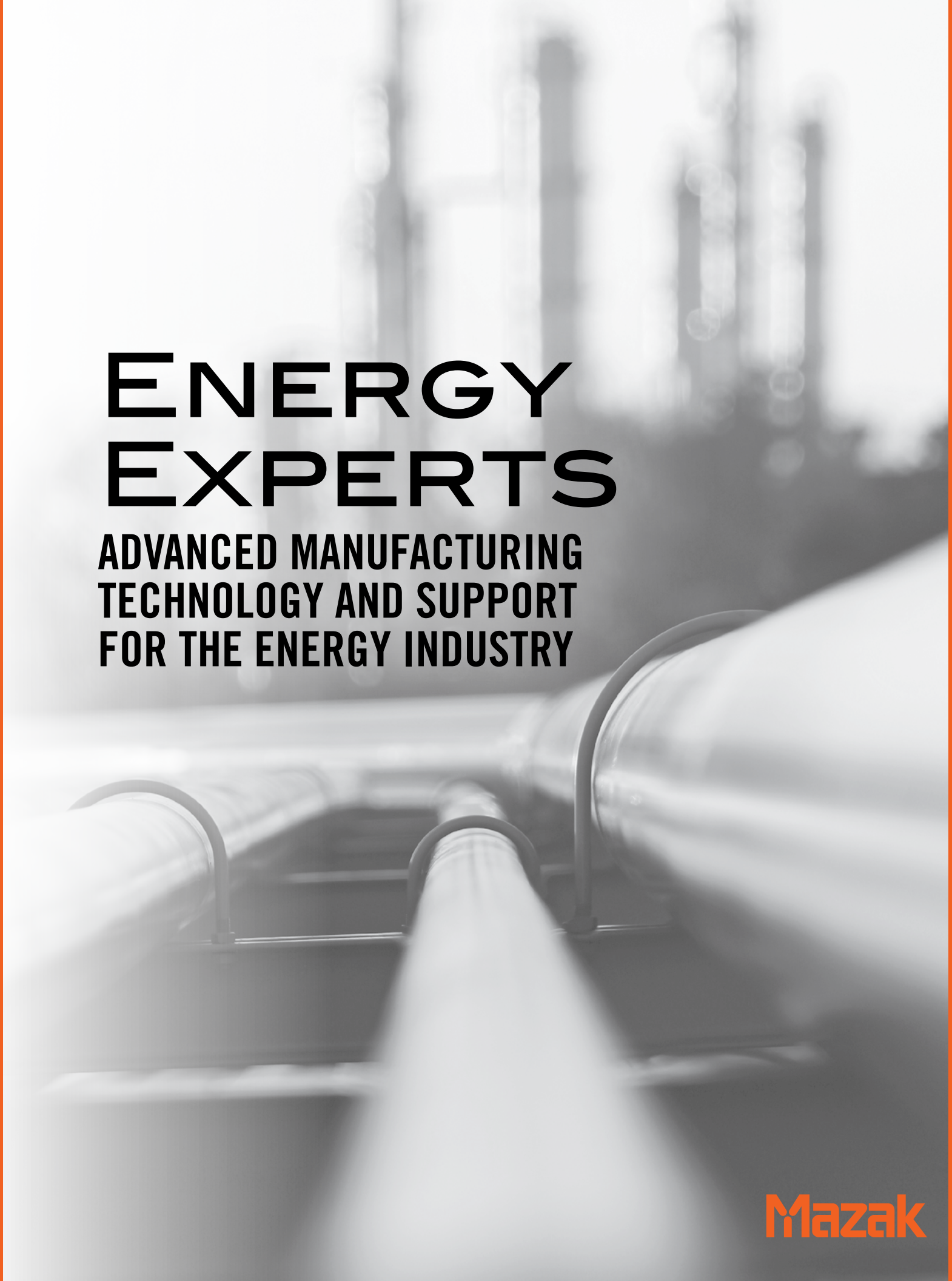
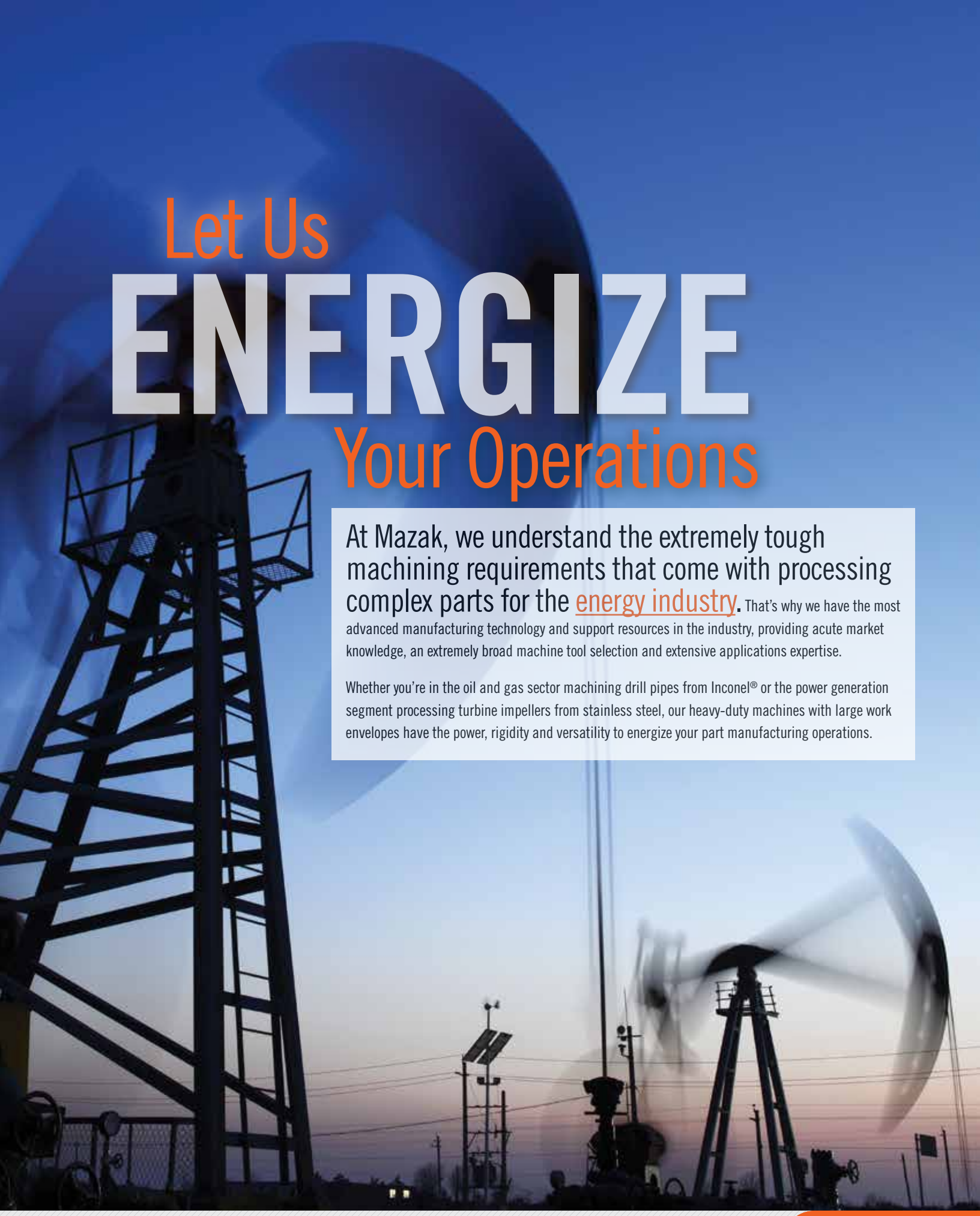


Energy Experts

ADVANCED MANUFACTURING TECHNOLOGY AND SUPPORT FOR THE ENERGY INDUSTRY

Mazak



Let Us ENERGIZE Your Operations

At Mazak, we understand the extremely tough machining requirements that come with processing complex parts for the energy industry. That's why we have the most advanced manufacturing technology and support resources in the industry, providing acute market knowledge, an extremely broad machine tool selection and extensive applications expertise.

Whether you're in the oil and gas sector machining drill pipes from Inconel® or the power generation segment processing turbine impellers from stainless steel, our heavy-duty machines with large work envelopes have the power, rigidity and versatility to energize your part manufacturing operations.

OIL AND GAS – UNDERGROUND

OIL AND GAS – ABOVE GROUND

POWER GENERATION

VARIOUS MATERIALS

TECHNOLOGY

Extensive experience working with oil service OEMs and job shops keeps our research and development focused on developing and refining innovations that enhance your operations. In fact, we continuously monitor trends and identify challenges so that we can create advanced technologies that adapt to an evolving market, including:

- Turning centers with large spindle bores and long bed lengths that allow for the production of long, large-diameter shaft-type parts.
- Multi-Tasking machine functionality for milling, turning, boring, drilling and specialty threading options for API and premium threads.
- 5-axis technology, including turning, that brings versatility to part production and eliminates the need for dedicated equipment and excessive part movement.
- Integral spindle/motor headstocks that deliver increased spindle rigidity for heavy-duty machining and high-speed, high-torque performance.
- A unique headstock design that generates turned features on valves, pipes, and large, odd-shaped parts by keeping the workpiece clamped and stationary, only moving the cutting tool.
- Long Boring Bar (LBB) deep-hole capability for extremely productive DONE IN ONE® machining.
- Long Vertical Mill (LVM) capability for I.D. milling and drilling operations inside long parts.
- Fully programmable tailstocks that enable highly accurate turning of long workpieces.
- Fully programmable steady rests that support long parts for maximum accuracy and process stability for turning and cutting with a Y axis or performing milling operations.
- Advanced CNC technology for easy programming and fast machining.
- Two-pallet changers that increase spindle utilization and make for continuous uninterrupted production.
- Stand-alone robots and PALLETECH system integration for continuous unmanned operations and processing versatility.

SUPPORT

Through our extensive support network, well-established machine service infrastructure, industry partnerships and energy expertise, we can help you productively and profitably tackle your complex part production.

- Eight regional Technology Centers and a Technical Center enhance our support capabilities across North America.
- We work with certified technology partners to provide highly optimized turnkey systems.
- Our vast CAM knowledge can optimize your Multi-Tasking and 5-axis programming.
- Our Optimum Plus total support program fulfills your every part, service and training need.
- We provide secure applications development and guarantee system design privacy.

RELIABLE PARTS FOR EXTREME MEASURES

Our heavy-duty machine tools easily tackle the world's toughest materials with speed, power and precision, which is key when producing reliable energy-based parts that can withstand extreme temperatures, corrosion, pressure and abrasion. The following are part types and materials you can productively process with our machines.

Oil and Gas – Underground:

- ○ Drill pipes, bits, casings and couplings
- ○ Cementing tools
- ○ Casing hangers
- ○ Liner hangers
- ○ Perforating guns
- ○ Fracking tools
- ○ Packers and mandrels
- ○ Wire line components

Oil and Gas – Above Ground:

- ○ Drilling rigs
- ○ Mud pumps
- ○ Frack pumps
- ○ Wellhead equipment

Materials:

- ☐ Inconel
- ☐ Titanium
- ☐ Standard and stainless steels
- ☐ Corrosion-resistant exotic alloys
- ☐ Solid bar
- ☐ Rock bits

Power Generation:

- Turbine blades (dovetails and Christmas tree profiles)
- Turbine blisks
- Rotors
- Impellers
- Natural gas compressors

Materials:

- Inconel
- Titanium
- Standard and stainless steels
- Corrosion-resistant exotic alloys
- Solid bar
- Rock bits

MEET OUR INDUSTRIAL POWERHOUSES

We have one of the broadest, most powerful selections of machine tools for the energy industry. This ensures we can help you optimize your manufacturing capacity, produce precision parts and achieve increased productivity when machining tough materials.

SLANT TURN Series

These powerful turning centers easily tackle the heavy-duty machining of large parts such as pipes, pipeline control valves and turbine wheels. Machines employ headstocks with large-diameter bores as well as high maximum torque spindles. Each features a 12-position drum turret for rapid tool indexing and convenient tool management. Fully programmable NC servo-driven tailstocks allow for automated processes and the drilling of holes on a shaft centerline. Machine configurations can include a milling spindle to perform roughing, grooving, endmilling and facemilling operations.

QUICK TURN NEXUS 400, 450, 500 and 550

These powerful Multi-Tasking turning centers bring unmatched productivity and reduced cycle times for the production of long, large-diameter shaft-type parts. Machines come in a variety of configurations, including those with upper turrets with rotary milling, second spindles, Y-axis capability, long boring bars and long vertical mills. Main spindles feature through-bore sizes of 2", 3", 5.2", 7.2" and 14.7". Maximum spindle speeds from 500 to 2,500 rpm and maximum horsepower ratings from 50 hp to 80 hp make it possible to machine a variety of materials. Optional rear-mounted chucks with safety covers are available for these machines to provide secure, stable support and accurate workholding of long bar and pipe workpieces.

ORBITEC 20

The ORBITEC 20 large part machining center creates true turned surfaces on parts that are difficult, or too large, to rotate. The machine is able to precisely produce these parts via a wholly unique headstock design that creatively performs multiple turning, boring, grooving, facing and threading operations. Furthermore, as a cost-effective, innovative valve body production center, the ORBITEC 20 can complete more than 75% of valve applications in one setup while maintaining high tolerances.

INTEGREX e-H Series

These advanced Multi-Tasking machines easily complete all cutting operations in single setups – turning, milling, drilling – for the DONE IN ONE processing of large parts. An advanced B-axis milling spindle design with Y-axis capability for off-center machining is available on all models. Machine configurations can include second turning spindle versions and those with lower turret rotary tool spindles.

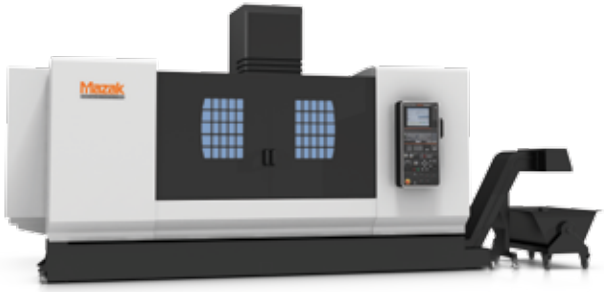
Visit MazakUSA.com/energy to see our complete line of machines for the energy industry.

INTEGREX e-V Series

Perfect for the DONE IN ONE machining of large valves and other complex parts, these advanced Multi-Tasking machines with vertical turning can productively perform milling, turning, drilling and more in single setups. These extremely efficient machines include 150-degree B-axis tilt milling spindles, C-axis turning spindle tables, large capacity tool magazines as well as two-pallet or single table versions.

INTEGREX i-Series

Featuring an extremely broad range of Multi-Tasking solutions, this series effectively combines versatility, speed, accuracy and ease of operation for manufacturers of complex energy components. The series accommodates machining lengths from 15.16" up to 98", part diameters from 13.39" to 25.9" and bar diameters from 2" to 4.02". Various machine configurations include those with a single turning spindle and programmable NC tailstock, twin-turning spindles as well as a lower turret. Such options eliminate multiple setups, fixtures, tools, handling and non-cut times.



VTC-250D/50

This machining center features a full traveling column and fixed table design with split-table capability to productively process long and heavy workpieces. With a table center partition, the machine's work envelope becomes two separate areas so that the machine can be in cycle in one area, while the operator sets up a part in the other. The machine comes with a 6,000-rpm, 50-taper high-torque spindle and delivers fast rapid traverse rates to reduce non-cut tools.

HCN Series

These world-class horizontal machining centers combine outstanding value with high-performance features that allow for maximum productivity when working with challenging materials. Pallet sizes for this series range from 15.7" sq. to 49.2" sq. A wide variety of spindle specifications, featuring 40 and 50 tapers, allow for high-speed, high-horsepower and high-torque metal cutting performance. Tool storage capacities up to 348 tools ensure continuous machining operation and extreme versatility.

EASY PROGRAMMING AND FAST MACHINING

Whether you're running 2-axis turning or Multi-Tasking operations, we're able to meet unique energy industry requirements through our advanced control technology that perfectly complements our machine tools and systems.

MATRIX NEXUS 2 CNC

Simplifies metal working operations on these machines:

- QUICK TURN NEXUS 500 + 550 SERIES
- SLANT TURN NEXUS 500 + 550 SERIES
- VTC-250D/50

The MATRIX NEXUS 2 CNC simplifies operations for parts requiring angled drilling, milling or tapping. With unequaled innovation for conversational programming, the control incorporates a wide variety of advanced features for high-speed, high-accuracy machining and an overall increase in productivity.

MAZATROL SmoothX CNC

Fast, smart and seamless control programming for these machine types:

- INTEGREX e-V Series
- INTEGREX e-H Series
- INTEGREX i Series

As the fastest, most progressive CNC on the market, the user-friendly MAZATROL SmoothX ensures the shortest possible machining cycle times, especially in fine increment programs for simultaneous 5-axis operations. Innovative software functions, including High Gain Feed Forward Control, Smooth Corner Control and Variable Acceleration Control, bring maximum productivity to highly complex parts production. Advanced hardware such as a tilting CNC panel and intuitive, multi-touch control screen allows for complete ease of use, while an SD card stores up to 32GB of program data.

MAZATROL SmoothG CNC

Highly optimized programming for complex workpiece geometries

- HCN Series
- QUICK TURN Series
- SLANT TURN Series
- VCN Series

The MAZATROL SmoothG CNC simplifies operations when processing parts through off-centerline machining as well as angled drilling, milling and tapping. A variety of innovative programming, performance and monitoring functions allow it to provide high-speed, high-accuracy machining. Advanced hardware such as a tilting CNC panel and intuitive, multi-touch control screen allows for complete ease of use, while an SD card stores up to 32GB of program data.

ORBITEC 20/PT 20 CNC

The custom user-friendly CNC for the ORBITEC 20/PT 20 uses regular lathe G-code language to simplify and speed up part programming. It comes with an expansive memory capacity of 2,000 KB (1,000 programs) with 80 sets of tool offsets and 700 sets of macro variable commands. It also offers reliable, precise control of constant surface speed and spindle/C-axis positioning. Furthermore, users can improve tool life via the CNC's tool life management functions.

PROGRAMMING OPTIMIZATION

CAM software, which generates part-machining programs for CNC machine tools, is essential for the quick and accurate processing of energy parts with complex geometries. However, with the wide variety of CAM software available today, it can be difficult to differentiate between the intricacies of each one as they relate to your application requirements.

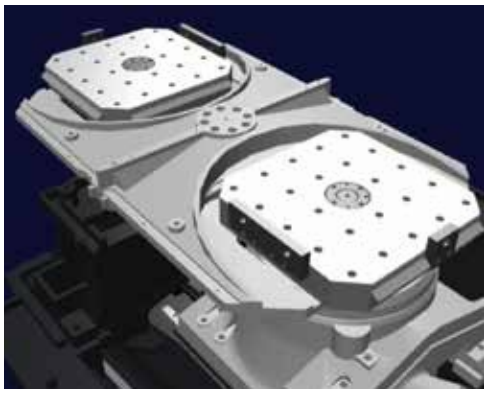
At Mazak, we have proficiency in all of the leading CAM systems, which enables us to help you optimize your Multi-Tasking and 5-axis programming no matter what system you are running inside your shop.

OUR EXTENSIVE CAM SOFTWARE EXPERIENCE can assist you in tasks that include:

- Determining the best possible CAM system for your needs.
- Programming every machine tool in your shop in a uniform manner.
- Reading any type of electronic data and manipulating it for machining efficiency.
- Generating efficient tool paths for a variety of complex geometries quickly and easily.
- Simulating the machining process in a “virtual” environment to ensure program accuracy.
- Producing clear, easy to understand process setup documentation for the shop floor.

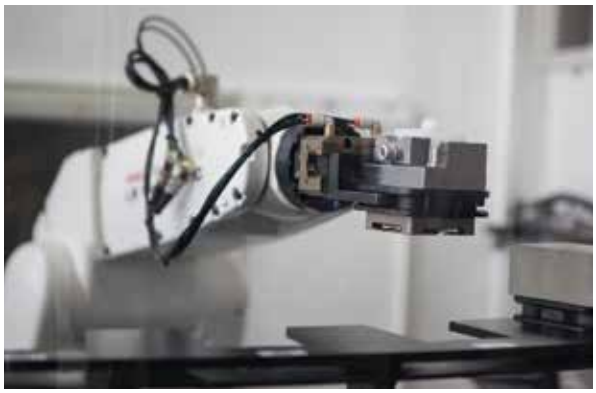
UNINTERRUPTED MACHINING AND LIGHTS-OUT PRODUCTION

Adding automation to energy part production can greatly increase your machine tool utilization and give you the competitive advantage. Through our own internal capabilities and strategic partnerships, we can provide you with a standardized or customized automation system that offers immediate benefits for increased productivity and consistent part quality.



TWO-PALLET CHANGERS

Several of our machines for the energy industry come standard with a built-in two-pallet changer. Whether a standard or optional feature, two-pallet changers increase spindle utilization and provide continuous uninterrupted production. This simple, efficient type of automation allows an operator to load, unload and inspect parts on one pallet, while the machine continues to work uninterrupted on parts fixtured on the other pallet.



STAND-ALONE ROBOTS

Stand-alone articulated robots make it easy for manufacturers to handle part transfers and peripheral operations, eliminating the challenges that come with handling large, heavy or cumbersome parts. These robots use rotary joints to achieve an increased change of motion. From simple two-joint robots to complex 10-joint robots, you have the power to choose just how much range of motion is necessary to gain the competitive advantage.

PALLETECH AUTOMATION SYSTEM

Compatible with all of our horizontal machining centers and most of our vertical and 5-axis models, the PALLETECH Automation System, which is exclusive to Mazak, offers fully automated, unattended operations. Its flexibility brings high levels of efficiency to both low- and high-volume production. It is available in 1-, 2- and 3-level pallet stocker configurations. And because of its modular pre-engineered construction, PALLETECH easily expands and can accommodate up to 16 machines, 6 to 240 pallets and up to eight loading stations.

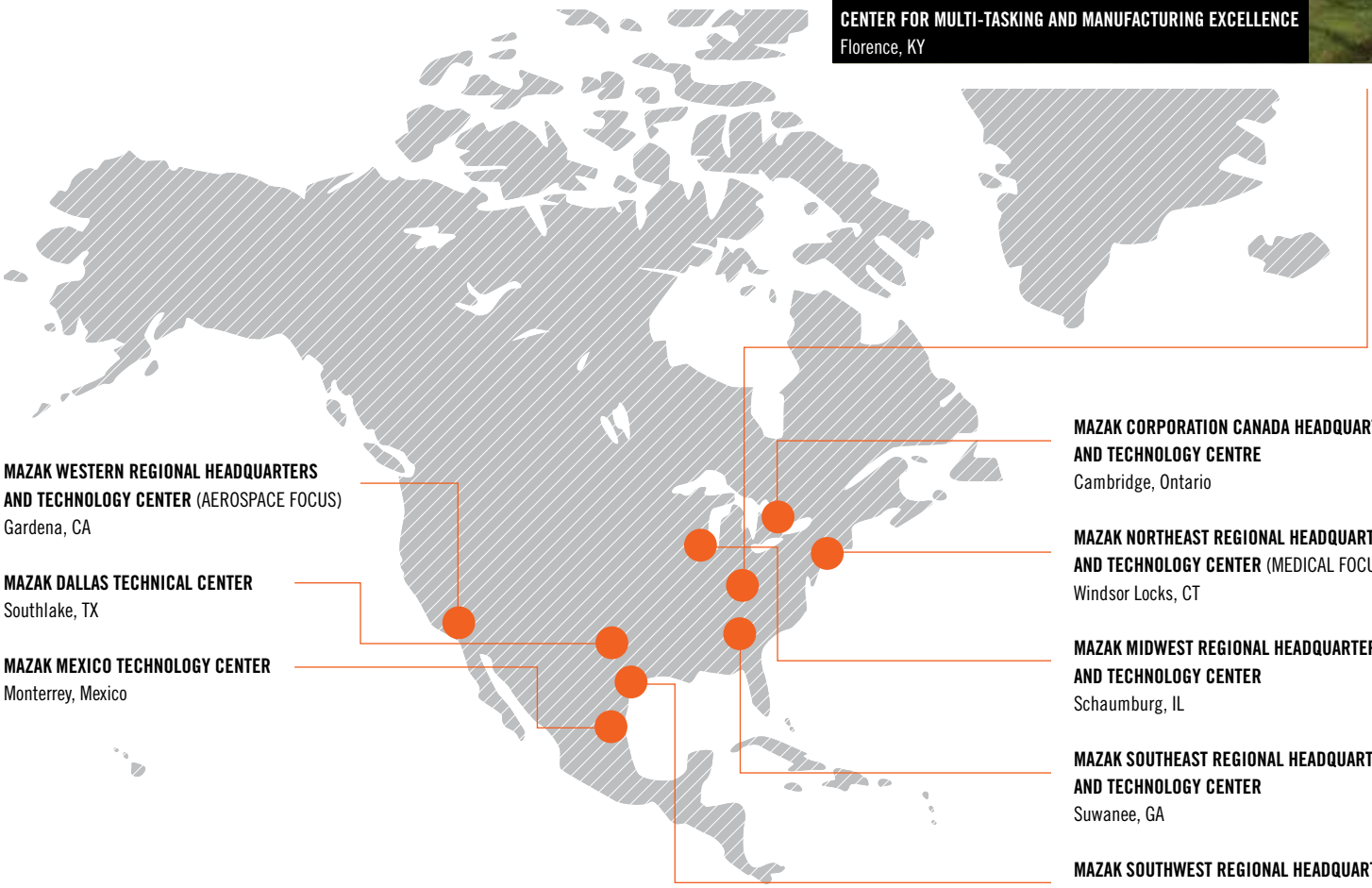
WE'VE GOT YOUR BACK

We believe in working closely with each of our energy customers to increase their productivity, efficiency and equipment utilization, and we are able to do so through our Technology and Technical Centers and Optimum Plus total support program.

Technology and Technical Centers

Our eight Technology Centers and a Technical Center spread across North America provide easy access to the latest, most advanced manufacturing systems for optimizing your part-production processes. You can also take advantage of each location's industry expertise, training programs and application resources to achieve improved throughput, shorter production lead times and increased profitability.

MAZAK NATIONAL TECHNOLOGY CENTER & CENTER FOR MULTI-TASKING AND MANUFACTURING EXCELLENCE
Florence, KY



MAZAK WESTERN REGIONAL HEADQUARTERS AND TECHNOLOGY CENTER (AEROSPACE FOCUS)
Gardena, CA

MAZAK DALLAS TECHNICAL CENTER
Southlake, TX

MAZAK MEXICO TECHNOLOGY CENTER
Monterrey, Mexico

MAZAK CORPORATION CANADA HEADQUARTERS AND TECHNOLOGY CENTRE
Cambridge, Ontario

MAZAK NORTHEAST REGIONAL HEADQUARTERS AND TECHNOLOGY CENTER (MEDICAL FOCUS)
Windsor Locks, CT

MAZAK MIDWEST REGIONAL HEADQUARTERS AND TECHNOLOGY CENTER
Schaumburg, IL

MAZAK SOUTHEAST REGIONAL HEADQUARTERS AND TECHNOLOGY CENTER
Suwanee, GA

MAZAK SOUTHWEST REGIONAL HEADQUARTERS AND TECHNOLOGY CENTER (ENERGY FOCUS)
Houston, TX

Click here for more information on Mazak Technology Centers.

Optimum Plus

This total support program represents our company-wide commitment to helping you maximize the value of your Mazak purchase, achieve the best possible competitive advantage and keep your equipment running smoothly at all times.

The program encompasses five distinct areas to ensure complete customer care.

SINGLE-SOURCE SERVICE

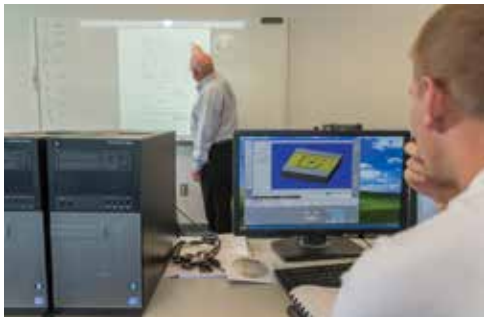
We are your single point of contact for any Mazak-related service need, whether it involves a machine, control, accessory or automation solution.

MACHINE & CNC SUPPORT

Every Mazak machine comes with a comprehensive warranty, free technical phone support and software upgrades for the entire life of the product.

PARTS SUPPORT

We have the industry's largest inventory of spare parts, ensuring 97% same-day shipping on part orders. Click here to register for after hours parts support.



PROGRESSIVE LEARNING

We partner with our customers to train them to achieve the highest levels of productivity and profitability.

SPINDLE & UNIT REBUILD

Our industry-leading exchange and rebuild program offers new and remanufactured spindles, index tables, ATC shifters and milling turrets for 24-hour shipment.

MACHINE SPECIFICATIONS

		QUICK TURN NEXUS 400-II	QUICK TURN NEXUS 400-II MY	QUICK TURN NEXUS 450-II	QUICK TURN NEXUS 450-II M
CAPACITY	*The maximum machining length varies depending on the chuck type universal and second spindle models.*	22.83" (MAX. MACHINING DIAMETER)	22.83" (MAX. MACHINING DIAMETER)	22.83" (MAX. MACHINING DIAMETER)	22.83" (MAX. MACHINING DIAMETER)
		40.395"/40"* 81.77"/80"* 123.020"/120"*	82.88"/80"* 125.58"/120"*	38.69"/40"* 80.065"/80"* 121.315"/120"*	38.69"/40"* 80.065"/80"* 121.315"/120"*
MILLING SPINDLE	SPINDLE CONNECTION	N/A	#40	N/A	#40
	MAXIMUM SPEED (RPM)	N/A	4,000	N/A	4,000
	MOTOR OUTPUT (30-MIN. RATING)	N/A	10 HP	N/A	10 HP
TURNING SPINDLE	CHUCK SIZE	12"	12"	15"/18" OPT	15"/18" OPT
	MAXIMUM SPEED (RPM)	2,500	2,500	2,000	2,000
	MOTOR OUTPUT (30-MIN. RATING)	50 HP	50 HP	50 HP	50 HP
MAGAZINE	NUMBER OF TOOLS	12	12	12	12
STROKE	X-AXIS	12.2"	13.39"	12.2"	12.2"
	Y-AXIS**	N/A	8" (80" AND 120" BED LENGTHS)	N/A	N/A
	Z-AXIS***	42.13" (40" BED LENGTH) 83.50" (80" BED LENGTH) 124.75" (120" BED LENGTH)	42.13" (40" BED LENGTH) 83.5" (80" BED LENGTH) 124.75" (120" BED LENGTH)	42.13" (40" BED LENGTH) 83.50" (80" BED LENGTH) 124.75" (120" BED LENGTH)	42.13" (40" BED LENGTH) 83.50" (80" BED LENGTH) 124.75" (120" BED LENGTH)

* Maximum machining length/bed length ** For machines with Y-axis *** Dependent on bed length **** Dependent upon chuck size ***** Long boring bar option available

		INTEGREX i-SERIES (100 / 200 / 300 / 400 SERIES MACHINES)	INTEGREX e-H SERIES (e-420 MACHINES)	INTEGREX e-H SERIES (500 / 670 / 800 MACHINES)	INTEGREX e-V SERIES (6 MACHINES)
CAPACITY	*The maximum machining length varies depending on the chuck type universal and second spindle models.*	20.4-33.6"/40"* 39.8"/40"* 59.8"/60"*	60.2"/60"* 79.8"/80"* 118.1"/120"*	59.7"/60"* 119.6"/120"* 157.9"/160"* 238"/240"* 318"/320"*	FROM 41.34" – 137.80" (MAX. MACHINING DIAMETER)
MILLING SPINDLE	SPINDLE CONNECTION	HSK (CAPTO C6 / KM63)	#40 CAPTO HSK	#50 CAPTO HSK	#50 CAPTO HSK
	MAXIMUM SPEED (RPM)	12,000 (20,000)	12,000	10,000	10,000–15,000
	MOTOR OUTPUT (30-MIN. RATING)	10 – 30 HP	30 HP	50 HP	50 HP
TURNING SPINDLE	CHUCK SIZE	6" – 12"	10" – 15"	15" – 50"	FROM 32" – 65"
	MAXIMUM SPEED (RPM)	6,000 – 2,000	4,000	3,300 – 700	FROM 600 – 75
	MOTOR OUTPUT (30-MIN. RATING)	15 – 40 HP	40 HP	40 –60 HP	FROM 50 – 60 HP
MAGAZINE	NUMBER OF TOOLS	36T (72T, 220T) *110T NOT AVAILABLE FOR i-100/150*	40T (80T, 120T, 160T)	40T (80T, 120T, 160T)	FROM 40 – 330
STROKE	X-AXIS	17.7" – 24.2"	33.26"	34.2" – 51.1"	FROM 60.04" – 120.28"
	Y-AXIS	8.2" – 9.8"	16.5"	19.6" – 31.4"	FROM 41.73" – 72.83"
	Z-AXIS	22.4" – 98"	62.3" – 122.5"	62.9" – 329.9"	FROM 52.95" – 70.87"

* Maximum machining length/bed length

QUICK TURN NEXUS 450-II MY*****	QUICK TURN NEXUS 500	QUICK TURN NEXUS 550	QUICK TURN NEXUS 550 MY
22.83" (MAX. MACHINING DIAMETER)	26.37" (MAX. MACHINING DIAMETER)	26.37" (MAX. MACHINING DIAMETER)	26.37" (MAX. MACHINING DIAMETER)
80.065"/80"* 121.315"/120"*	120.875"/120"* 164.675"/160"*	120.875"/120"* 164.675"/160"*	120.875"/120"* 164.675"/160"*
#40	N/A	#40	#40
4,000	N/A	4,000	4,000
10 HP	N/A	10 HP	10 HP
15"/18" OPT	21"/24" OPT	21"/24" OPT	21"/24" OPT
2,000	500 TO 1,000****	500 TO 1,000****	500 TO 1,000****
50 HP	80 HP	80 HP	80 HP
12	12	12	12
13.39"	22.75"	22.75"	22.75"
8" (80" AND 120" BED LENGTHS)	N/A	N/A	8" ± 4"
83.5" (80" BED LENGTH) 124.75" (120" BED LENGTH)	120.87" (120" BED LENGTH) 164.67" (160" BED LENGTH)	120.87" (120" BED LENGTH) 164.67" (160" BED LENGTH)	120.87" (120" BED LENGTH) 164.67" (160" BED LENGTH)

VTC-250D/50	HCN SERIES	ORBITEC 20	SLANT TURN SERIES
82.7" (TABLE RIGHT/LEFT)	FROM 15.7"– 49.2" (PALLET SIZE)	28.4" (PALLET SIZE)	Ø35.83" (MAX. MACHINING DIAMETER)
25" (TABLE LONGITUDINAL)			40 – 160"*
#50	#50 (MOST MODELS) HSK	CAPTO C8	CAT 40/ER400
6,000	8,000–16,000	600	4,000
30 HP	50 HP (MOST MODELS)	40 HP	10 HP
N/A	N/A	N/A	Ø18 – 40"
N/A	N/A	N/A	300 – 1600
N/A	N/A	N/A	60 HP
24	FROM 40 – 330	60	12 – 15
69.30"	FROM 22.05" – 86.60"	11.02"	18.25" – 27.5"
25"	FROM 25.20" – 63.50"	N/A	N/A
25.60"	FROM 25.20" – 72.80"	48.43"	46.25" (40" BED LENGTH) 164.96" (160" BED LENGTH)

COMPREHENSIVE MANUFACTURING SOLUTIONS FOR THE ENERGY INDUSTRY

Mazak

www.MazakUSA.com

MAZAK CORPORATION
NORTH AMERICAN MANUFACTURING HEADQUARTERS
8025 Production Drive, Florence, KY 41042
Tel: (859) 342-1700 Fax: (859) 342-1865

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