

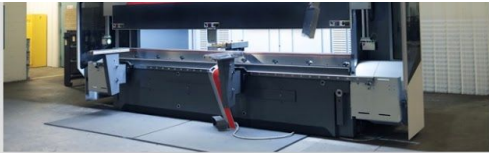
## Turning Abilities

<b>Turning Processes</b>	<ul style="list-style-type: none"> <li>Parting/Cutting</li> <li>Facing</li> <li>Turning: <ul style="list-style-type: none"> <li>■ Contour Turning</li> <li>■ Form Turning</li> <li>■ Taper Turning</li> <li>■ Straight Turning</li> </ul> </li> <li>Threading <ul style="list-style-type: none"> <li>■ External</li> <li>■ Internal</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Shoulder Facing</li> <li>Internal Forming</li> <li>Drilling</li> <li>Knurling</li> <li>Boring</li> </ul>
<b>Materials (Metals)</b>	<ul style="list-style-type: none"> <li>Alloy Steels</li> <li>Aluminum</li> <li>Brass</li> <li>Bronze Alloys</li> <li>Carbon Steel</li> <li>Cobalt</li> <li>Copper</li> <li>Iron</li> </ul>	<ul style="list-style-type: none"> <li>Lead</li> <li>Nickel</li> <li>Stainless Steel</li> <li>Stellite (Hardfacing)</li> <li>Tin</li> <li>Titanium</li> </ul>
<b>Materials (Plastic Polymers)</b>	<ul style="list-style-type: none"> <li>ABS (Acrylonitrile Butadiene Styrene)</li> <li>Acetal</li> <li>Acrylic</li> <li>Fiberglass Reinforced Plastics</li> <li>Nylon</li> <li>Phenolic</li> <li>Polyamide-Imide</li> <li>Polycarbonate</li> <li>Polyetheretherketone (PEEK)</li> </ul>	<ul style="list-style-type: none"> <li>Polyetherimide</li> <li>Polyethylene</li> <li>Polyphenylene Sulfide</li> <li>Polypropylene</li> <li>Polystyrene</li> <li>Polysulphone</li> <li>PTFE (PolyTetraFluoroEthylene)</li> <li>PVC (Polyvinyl Chloride)</li> <li>PVDF (Polyvinylidene Fluoride)</li> </ul>
<b>Materials (Other Materials)</b>	<ul style="list-style-type: none"> <li>Fiberglass</li> <li>Wood</li> </ul>	
<b>Type of Turning Machine (Lathe Type)</b>	<ul style="list-style-type: none"> <li>Lathe <ul style="list-style-type: none"> <li>■ Engine</li> <li>■ Turret</li> <li>■ CNC</li> </ul> </li> </ul>	

<b>Turning Tools and Accessories</b>	Right-Hand Turning Tool Left-Hand Turning Tool Right-Hand Facing Tool Left-Hand Facing Tool Round-Nose Turning Tool Cutoff/Parting Tool Finishing Tool Threading Tool	Knurling Tool Boring Tool Inserts <ul style="list-style-type: none"> <li>■ Wiper Inserts</li> <li>■ Negative Inserts</li> <li>■ Positive Inserts</li> <li>■ Other Inserts</li> </ul> Drill Bits
<b>Chuck Type</b>	Two-Jaw Chuck Three-Jaw Chuck	
<b>Equipment Capabilities</b>	CNC Control Capabilities Large Swing Lathe Bar Feed Milling	CAD Design Services CAM Programming Services Reverse Engineering
<b>Tolerances</b>	Straightness : $\pm 0.0005$ in Concentricity: $\pm 0.001$ in Diameter (outer/inner): $\pm 0.0005$ in ( $\pm 0.0127$ mm) Length (over 24 in): $\pm 0.0005$ in Length (over 610 mm): $\pm 0.0127$ mm	
<b>Part Diameter</b>	Min 0.187 in (4.76 mm)	Max 18 in (381 mm)
<b>Part Length</b>	Min 0.078 in (2 mm)	Max 24 in (610 mm)
<b>Maximum Part Weight/Maximum Lifting Capacity</b>	100 lbs.	

<b>Additional Services Offered</b>	Assembly CAD Design Services Coordinate Measuring Machines (CMM) Deburring Heat Treating	Painting Plating Reverse Engineering Sheet Metal Fabrication Welding – MIG and TIG
<b>Production Volume</b>	1 pc min. Unlimited max Specialty Production Shop	Prototype Low Volume High Volume
<b>Lead Times Available</b>	1 – 2 Weeks Quoted on a Job by Job Basis <i>Rush Services Available</i>	
<b>Additional Information</b>		
<b>Intended Applications</b>	Machine Components Engine Components Turbine Components Hydraulic Components Turbomachinery Components Construction Equipment Shafts Forgings Valves	Pins Thread Rod Fasteners Spindles Sockets Bushings Spacers Fittings Standoffs
<b>Industry Focus</b>	Aerospace Agricultural Architectural Auto/Truck/Transportation Chemical Dental Electronic Food	Machine Tool Marine Medical Military Oil Field Optical Packaging/Converting Pharmaceutical

<b>Industry Standards</b>	ANSI American National Standards Institute ASTM American Society for Testing and Materials AWS American Welding Society ISO International Organization for Standardization Mil-Spec Military Specifications QS QS Is a quality standard developed by the Automotive Industries. RoHS Restriction Of Hazardous Substances (Compliant)
<b>File Formats</b>	DXF MasterCam (MDX, MC8, MC9, SET) PDF Pro-E or Pro/Engineer (DRW,PRT,XPR) SolidWorks (SLDPRT,SLDDRW,SLDDRT) STEP



### Turning

Haas ST-40L	25.5" x 80"
Haas ST-30SSY (bar feeder, live tooling)	16" x 23"
Haas TL-2	16" x 48"
Clausing	20" x 60"



### CNC Vertical Turning Center

- (1) **OM** – 54” Chuck, 64-1/2” Turning Diameter, 50” Turning Height, 17,000 lbs table capacity
- (1) **OM** – 57” Chuck, 78” Turning Diameter, 59” Turning Height, 17,600 lbs table capacity
- (1) **OM 12EX** – 49” Chuck, 57” Turning Diameter, 43” Turning Height, 8,800 lbs table capacity
- (1) **OM** – with live tooling – 40” Chuck, 49” Turning Diameter, 29” Turning Height, 4,400 lbs table capacity
- (1) **OM 16EX** – with live tooling – 63” Chuck, 48.7” Turning Diameter, 59” Turning Height, 17,640 lbs table capacity
- (1) **Honor Seiki** – live tooling 57” Chuck, 78” Turning Diameter, 49” Turning Height, 18,000 lbs capacity

### CNC Turning Center

- (1) **Mori Seiki SL25** – 14” Swing, 30” between centers, 12 Station Turret
- (1) **Mori Seiki SL35** – 17” Swing, 30” between centers, 12 Station Turret
- (1) **Mori Seiki NL3000/1250** – 17” Swing, 48” between centers, 12 Station Turret w/6000 RPM live tooling capability
- (2) **Mori Seiki NL3000/700** – 17” Swing, 28” between centers, 12 Station Turret w/6000 RPM live tooling capability
- (1) **Romi M27** – 16” Swing, 120” between centers, 8 Station Turret
- (2) **Romi M17** – 8” Swing, 30” between centers
- (1) **Takisawa LA-250Y** – 13.8” Swing, 39” between centers, 12 Station Turret w/ 5000 RPM live tooling

## Milling Capabilities

<b>Milling Processes</b>	Boring Burnishing Counterboring Countersinking Drilling	Pocketing Profiling Reaming Tapping Thread Milling
<b>Materials (Metals)</b>	Alloy Steels Aluminum Cast Iron Brass Bronze Alloys Carbon Steel	Copper Iron Stainless Steel Titanium Zinc – Aluminum
<b>Materials (Plastic Polymers)</b>	ABS (Acrylonitrile Butadiene Styrene) Acetal Acrylic Nylon Phenolic Polycarbonate	Polyetheretherketone (PEEK) Polyethylene Polysulphone PVC (Polyvinyl Chloride) PTFE
<b>Materials (Other Materials)</b>	Composite Materials Fiberglass Wood	
<b>Cutters</b>	Ball End Mill Boring Heads Burnish Tool Chamfer Mill Face Mill	Flat End Mill Reamer Tap Thread Mills Twist Mill
<b>Cutting Tools</b>	Carbide Carbon Steel Cobalt High Speed Steel	High-Speed Steel (HSS) TiAlN Coated Tin Coated

<b>Vise</b>	Plain Swivel-Type Sine-Plate
<b>Equipment Capabilities</b>	Coolant Systems – High Pressure Electric-Drive Motors Power-Operated Table Feeds Servo-Drive Variable Spindle Speeds
<b>Efficiency</b>	Lights Out Manufacturing Lean Manufacturing Principles
<b>Surface Finish</b>	8 µin
<b>Tolerances</b>	Straightness : ± 0.0005 in Concentricity: ± 0.0005 in Diameter (outer/inner): ± 0.0002 in (± 0.005 mm) Length (over 60 in): ± 0.0005 in
<b>Length – Maximum</b>	Horizontal: 39.37 in (1000 mm) Vertical: 84 in (2134 m)
<b>Width– Maximum</b>	Horizontal: 35.43 in (900 mm) Vertical: 32 in (813 mm)
<b>Height– Maximum</b>	Horizontal: 39.37 in (1000 mm) Vertical: 30 in (762 mm)
<b>Additional Capabilities</b>	Assembly CAD Design Services Coordinate Measuring Machines (CMM) Deburring Heat Treating Painting Plating Reverse Engineering Sheet Metal Fabrication Welding – MIG and TIG

# MACHINING CENTERS

Model	Type	Table Travel	Featuring	
Okuma MCM-B	Double Column	80" x 160"	5 sided machining with BC Head	CNC
Okuma MCR-A	Double Column	80" x 200"	5 sided machining with BC Head	CNC
Haas EC-1600	Horizontal	32" x 40" x 64"	4 Axis	CNC
Haas EC-1600	Horizontal	32" x 40" x 64"	4 Axis	CNC
Haas EC-1600	Horizontal	32" x 40" x 64"	4 Axis	CNC
Haas EC-1600	Horizontal	32" x 40" x 64"	4 Axis	CNC



# BORING MILLS

Model	Table Travel	Head Travel	Spindle Size	Controls	
Toshiba BTH-130.R24	118"	90.5"	5.1"	Tosnuc 999	CNC
Toshiba BTH-110.R18	100"	80"	4.3"	Tosnuc 999	CNC
Toshiba BTH-110.R18	100"	80"	4.3"	Tosnuc 999	CNC
DeVlieg 54K-96	96"	76"	5"	Dynapath	CNC
DeVlieg 5H-96	96"	60"	5"	Dynapath	CNC
DeVlieg 4K-72	72"	72"	4"	Dynapath	CNC
DeVlieg 43H-72	72"	60"	4"	Dynapath	CNC
DeVlieg 4K-60	60"	72"	4"	Dynapath	CNC
DeVlieg 3K-72	72"	60"	3"	Dynapath	CNC
DeVlieg 4B-72	72"	48"	4"	DRO	CNC
DeVlieg 3B-48	48"	36"	3"	Allen Bradley	CNC
DeVlieg 3B-48	48"	36"	3"	DRO	CNC
DeVlieg 2B-36	36"	24"	2.5"	DRO	CNC

### CNC Horizontal Machining Centers

- (1) **Mori Seiki NH5000** – Cat 40, 24” Cube, 10,000 RPM, 1000 PSI Thru Coolant, 60 ATC
  - (2) **Mori Seiki NH6300** – Cat 50, 36” Cube, 8000 RPM, 1000 PSI Thru Coolant, 60 ATC
  - (2) **Kitamura HX630i** – Cat 50, 36” Cube, 12,000 RPM, 1000 PSI Thru Coolant, 50 ATC
  - (1) **Kitamura HX800iL** – Cat 50, 59” Cube, 12,000 RPM, 1000 PSI Thru Coolant, 100 ATC
  - (1) **Kitamura HX800G** – Cat 50, 60” Cube, 12,000 RPM, 1,000 PSI Thru Coolant, 62 ATC
  - (2) **Toyoda FA800** – Cat 50, 48” Cube, 12,000 RPM, 350 PSI Thru Coolant, 120 ATC
  - (1) **Toyoda FA1050** – Cat 50, 60” Cube, 6,000 RPM, 350 PSI Thru Coolant, 120 ATC
- (Haimer Shrink Fit Balanced Tooling and Standard Modular Fixture Tables on all HMC’s w/interchangeable tombstones, fixtures, & vises)
- (1) **Mori Seiki NHX8000** – Cat 50, 55” Cube, 8,000 RPM, 1000 PSI Thru Coolant, 120 ATC
  - (1) **Kitamura HX630G** – Cat 50, 36” Cube, 12,000 RPM, 1000 PSI Thru Coolant, 50 ATC

### CNC Vertical Machining Centers

- (1) **Mori Seiki SV503B** – Cat 40, 20”x 40”, 10,000 RPM, 1000 PSI Thru Coolant, 30 ATC, SMW Set-Up Switcher, and Cincinnati Full Contouring 4<sup>th</sup> Axis Rotary
  - (1) **Mori-Seiki NV5000** – Cat 50, 20” x 40”, 8000 RPM, 1000 PSI Thru Coolant, 30 ATC
  - (1) **Mori-Seiki ML300 Partner** – Cat 40, 18” x 120”, 6000 RPM, 30 ATC
  - (1) **Bridgeport VMC 1000 XP** – Cat 40, 20” x 40”, 10,000 RPM, 30 ATC, (1) w/SMW Set-Up Switcher
  - (1) **Brother TC32BN Tapping Center** – BT-30, 16” x 22”, 16,000 RPM, 40 ATC
  - (1) **Toyoda FV1165** – Cat 40, 25” x 43”, 8,000 RPM, 30 ATC
  - (1) **Haas TM-2P** – Cat 40, 16” x 40”, 6,000 RPM, 20 ATC
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### CNC Horizontal Boring Mills

- (1) **G&L** – 5” Spindle, 72”V x 96” H w/rotary table
- (1) **G&L** – 5” Spindle, 96”V x 120” H w/rotary table
- (1) **Ikegai** – 5” Spindle, 98”V x 138”H w/Full Contouring 4<sup>th</sup> Axis
- (1) **Mitsubishi MAF150E-2022** – 6” Spindle, 118”V x 157.5”H w/ Full Contouring 4<sup>th</sup> Axis (44,000 lb. max weight capacity)

### 5 Axis Machining Centers

- (1) **DMS 5-Axis Continuous Motion Router** – 72” x 156” x 48”, 24 HP, 18,000RPM, 24 ATC

### Manual Boring Mills

- (2) **Kuraki** – 4” Spindle, 48”V x 60” H w/DRO and rotary table
- (1) **Kuraki** – 5” Spindle, 72”V x 84” H w/DRO

### Manual Mills

- (5) **ProtoTRAKs**
- (3) **Bridgeports**
- (1) **Fryer MB – 14Q 3 Axis Mill**



### Milling

Haas VF-7 (4th axis rotary table)	84" x 32" x 30"
Haas VF-6SS (4th axis rotary table)	64 x 32" x 30"
Haas VF-3SSYT (4th axis rotary table)	40" x 26" x 25"
Haas VF-3YT (4th axis rotary table)	40" x 26" x 25"
(2) Haas VF-2SS (4th axis rotary table)	30" x 16" x 20"