



# OptiSonic™ Series Ultrasonic Machining Centers



500 Series



1100 Series

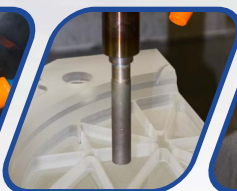


1200 Series

*Innovative Machines for Precision Optics and Technical Ceramics*



CNC Optical  
Grinding Machines



Ultrasonic  
Machining Centers



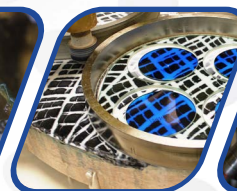
Optical  
Centering Machines



CNC Spherical  
Polishing Machines



CNC Asphere/Freeform  
Polishing Machines



Planetary  
Polishing Machines



Non-Contact  
Metrology Solutions



# Excite your machining.

Machining glass and ceramic materials can present challenges such as accelerated tool wear and long cycle times. Overcome these obstacles with OptiSonic, the latest in ultrasonic machining technology. Engineered specifically for glass and ceramics processing, OptiSonic features the highest quality machine components coupled with proprietary IntelliSonic software to help companies maximize manufacturing efficiency:


- **Superior grinding improvements:** Heavy duty cast iron “meehanite” machine base provides vibration dampening and stability along with liquid-cooled ceramic bearing high precision HSK63F grinding spindles
- **Faster cycle times:** State-of-the-art ultrasonic technology allows for faster speeds and feeds than competitive platforms
- **High performance spindles:** Liquid cooled spindles for process consistency, direct drive spindles for better process control, integral high torque spindle motor for more cutting power
- **High accuracy tool and work spindles:** HSK 63 quick-change holders with different options ensure tools run true
- **Streamlined manufacturing:** Different automatic tool changers available allows for multiple grinding operations in one cycle
- **G Series Software (Optional):** Easy-to-use GUI for precision optics that guides operators through all aspects of the process

Driven by IntelliSonic, ultrasonic oscillation of the tool ensures optimal cutting performance throughout the machining cycle. The adaptive frequency control and automated “tool frequency tuning” creates several benefits:

- **Faster set-up times**
- **Rapid material removal and shorter cycle times due to increased processing speeds and feeds**
- **Reduced force endured by tool and part during machining**
- **Reduced tool wear and longer tool life**

The bottom line is faster and more precise manufacturing of glass and ceramic materials that adds significant value to your bottom line. Take your machining to the next level with OptiSonic.

The right platform for your application:




**500 Series**  
500mm of X-axis travel

Available with:

- 3 axes (OptiSonic 530)
- 4 axes (OptiSonic 540)
- 5 axes (OptiSonic 550)

with G Series (OptiSonic 550X)




**1100 Series**  
1100mm of X-axis travel

Available with:

- 3 axes (OptiSonic 1130)
- 4 axes (OptiSonic 1140)
- 5 axes (OptiSonic 1150)

with G Series (OptiSonic 1150X)



**1200 Series**  
1200mm of X-axis travel

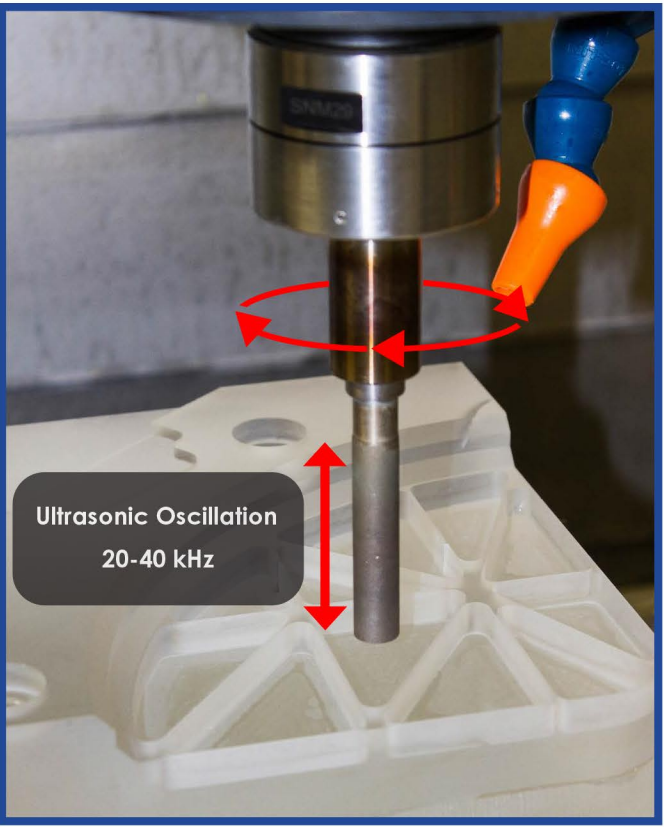
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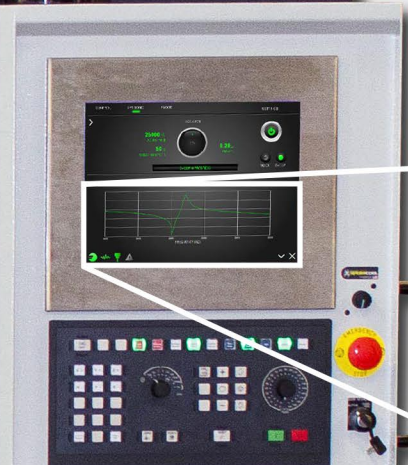
- 3 axes (OptiSonic 1230)
- 4 axes (OptiSonic 1240)
- 5 axes (OptiSonic 1250)

with G Series (OptiSonic 1250X)


# High Performance Ultrasonic Technology

Through the use of a custom designed tool holder, a piezo-electric transducer produces controlled oscillations in the micrometer amplitude range when the tool is at its natural resonant frequency. Since each tool has a different shape and mass, its natural resonant frequency will be different. OptiPro's proprietary IntelliSonic software identifies the resonant frequency for the tool being utilized, then automatically adjusts the frequency based on changing machining conditions to keep the tool oscillating at its optimal resonant frequency, ensuring maximum efficiency.







**Powerful IntelliSonic Software**



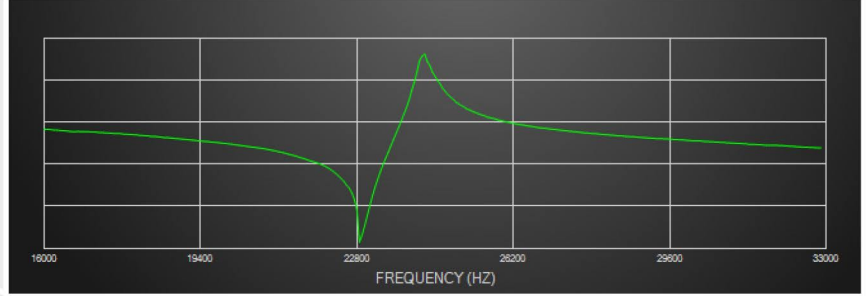
**Frequency Sweep**  
Automatically determines the ideal frequency based on tool geometry



**FAGOR**  
FAGOR AUTOMATION  
**CNC Integration**  
Full integration into the Fagor Tool Library



**Adaptive Frequency Control**  
Adjusts frequency of the tool during machining to ensure optimal cutting performance

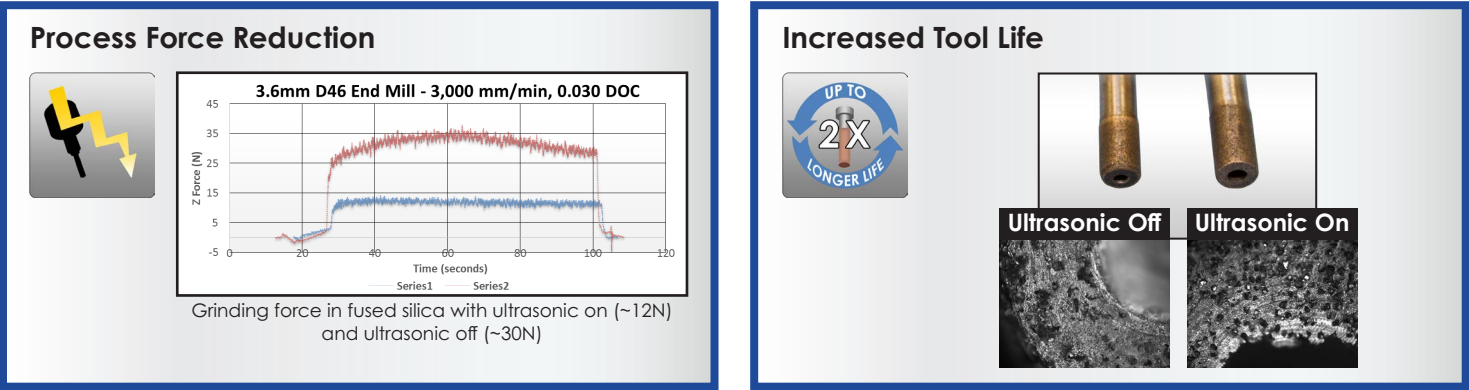


FREQUENCY (Hz)



Benefits

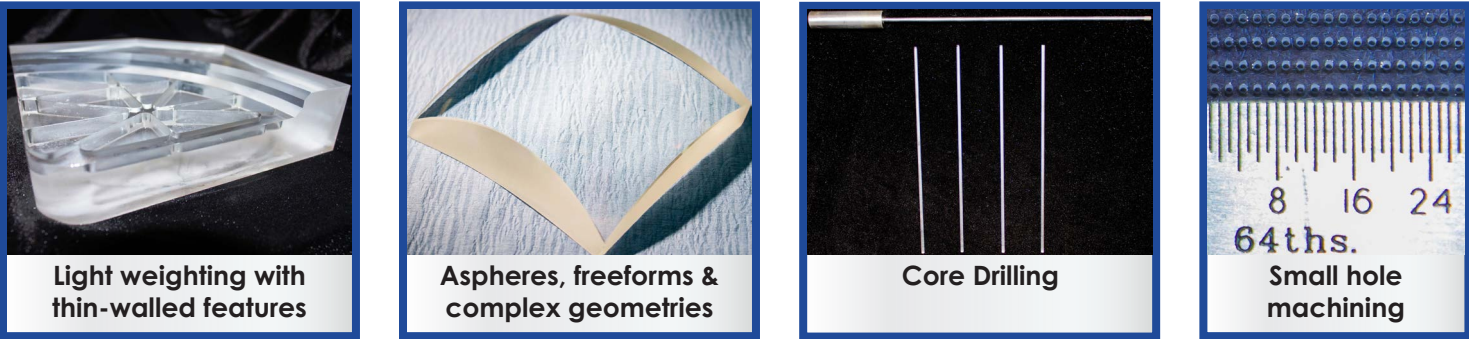
OptiPro's intelligent ultrasonic technology (IntelliSonic) allows manufacturers to greatly reduce grinding times when processing optical glasses and ceramic materials. How? Ultrasonic tool vibration promotes free cutting of material, resulting in significant process force reduction. This gives manufacturers the ability to increase processing speeds and cutting feed rates. A reduction of force on the part also means less force on the tool, specifically the diamond section, resulting in minimal tool wear and longer tool life.



Applications

Multiple industries can benefit from OptiSonic's fast and precise machining performance. Whether you are manufacturing precision components for a semiconductor device, consumer electronic product, medical device, defense system, or other application, the technology found on OptiSonic platforms enable companies to enhance their current capabilities with extreme confidence. From optical materials such as BK7 and fused silica to hard ceramics such as alumina, sapphire and silicon carbide, you can increase production and profitability by greatly reducing cycle times.

Various applications involving 3, 4, or 5 axis machining, including:



Soft optical glass to hard ceramic materials:

- BK7
  - Zerodur
  - Fused Quartz
  - Fused Silica
- Pyrex
  - ALON
  - Zirconia
  - PCA
- Sapphire
  - Spinel
  - Silicon Carbide
  - Other glass and Ceramics



OptiSonic 500 Series

Entry-level platform with 500mm of X-axis travel  
Available in 3, 4, or 5 axis configurations

OptiSonic 550X

TOP    FRONT

**Standard Features:**

- Workpiece probing • Tool probing
- Coolant through spindle

**Optional Features:**

- Automatic tool changer (24 tool on OptiSonic 530 and 540 with C-Axis, 6 tool on OptiSonic 540 with B-Axis, 550, and 550X)
  - Integrated spherometer (OptiSonic 550X)
- Asphere fabrication with G Series (OptiSonic 550X)
- Freeform fabrication (OptiSonic 540, 550, and 550X)

Specifications\*

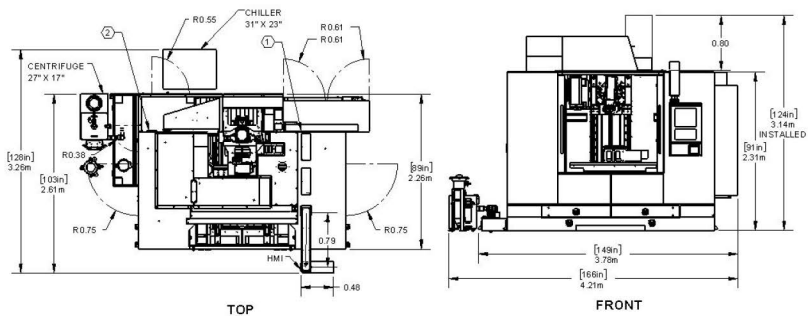
|  | OptiSonic 530  | OptiSonic 540   | OptiSonic 550  | OptiSonic 550X   |
|--|--|---|--|--|
| <b>Travels</b><br>X - Axis Travel<br>Y - Axis Travel<br>Z - Axis Travel<br>B - Axis Travel<br>C- Axis Travel           | 500 mm (19.6")<br>400 mm (15.7")<br>500 mm (19.6")<br>—<br>—                     | 500 mm (19.6")<br>400 mm (15.7")<br>500 mm (19.6")<br>-90° to 90° (Optional)<br>0° to 360° (Optional) | 500 mm (19.6")<br>400 mm (15.7")<br>500 mm (19.6")<br>-90° to 90°<br>0° to 360°  | 500 mm (19.6")<br>400 mm (15.7")<br>500 mm (19.6")<br>-90° to 90°<br>0° to 360°  |
| <b>Workpiece</b><br>Part Size<br>Max Plano Diameter Capability**<br>Maximum Weight                                     | 475 mm x 375 mm (18.7" x 14.8")<br>—<br>300 kg (660 lbs.)                        | 475 mm x 375 mm (18.7" x 14.8")<br>—<br>250 kg (550 lbs.)   | 475 mm x 375 mm (18.7" x 14.8")<br>—<br>250 kg (550 lbs.)                        | 5 - 300 mm (.2" - 11.8")<br>Ø 350 mm (13.7")<br>129 kg (284 lbs.)                |
| <b>Workpiece Rotation</b><br>Spindle Speed<br>Hydro-Expansion Chuck<br>C-Axis Position and Hold                        | —<br>Optional<br>—   | Positional C-Axis<br>N/A<br>Standard<br>Standard  | Positional C-Axis<br>N/A<br>Standard<br>Standard                                 | Positional C-Axis w/ Spindle Mode<br>0 - 500 rpm<br>Standard<br>Standard         |
| <b>Tool Spindle</b><br>Max Tool Diameter***<br>Max Tool Weight<br>Tool Spindle Speed<br>Max Power<br>Tool Holder Style | 250 mm (9.8")<br>6 kg (13.2 lbs.)<br>1,000 - 18,000 rpm<br>18kW (24hp)<br>HSK63F | 250 mm (9.8")<br>6 kg (13.2 lbs.)<br>1,000 - 18,000 rpm<br>18kW (24hp)<br>HSK63F                      | 250 mm (9.8")<br>6 kg (13.2 lbs.)<br>1,000 - 18,000 rpm<br>18kW (24hp)<br>HSK63F | 250 mm (9.8")<br>6 kg (13.2 lbs.)<br>1,000 - 18,000 rpm<br>18kW (24hp)<br>HSK63F |
| <b>Facility Requirements</b><br>Electrical<br>Air Supply   | 480V +/- 5%, 50A<br>100PSI, 3-5 CFM clean dry air                                | 480V +/- 5%, 57A<br>100PSI, 3-5 CFM clean dry air   | 480V +/- 5%, 57A<br>100PSI, 3-5 CFM clean dry air                                | 480V +/- 5%, 67A<br>100PSI, 3-5 CFM clean dry air                                |

\* Specifications subject to change. Contact OptiPro for the latest specifications.  
\*\* Machine is capable of manufacturing maximum plano size in small volume. For medium and large production quantities of this plano size, consider OptiPro's larger platform.  
\*\*\* Max tool diameter is 75 mm (3") with a full Automatic Tool Changer magazine.  
All platforms come standard with USB and ethernet communication.



# OptiSonic 1100 Series

Extended platform with 1100mm of X-axis travel  
Available in 3, 4, or 5 axis configurations



**Standard Features:**

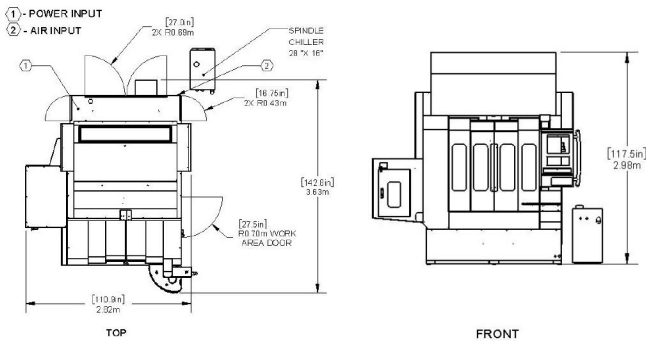
- Workpiece probing • Tool probing
- Coolant through spindle

**Optional Features:**

- Automatic tool changer (30 tool)
- Integrated spherometer (OptiSonic 1150X)
- Asphere fabrication with G Series (OptiSonic 1150X)
- Freeform fabrication (OptiSonic 1140, 1150, and 1150X)

# OptiSonic 1200 Series

Large, bridge-style platform with 1200mm of X-axis travel  
Available in 3, 4, or 5 axis configurations



**Standard Features:**

- Workpiece probing • Tool probing
- Coolant through spindle
- Automatic tool changer (8 Tool)

**Optional Features:**

- Integrated spherometer (OptiSonic 1250X)
- Asphere fabrication with G Series (OptiSonic 1250X)
- Freeform fabrication (OptiSonic 1240, 1250, and 1250X)

## Specifications\*

|                                 | OptiSonic 1130                    | OptiSonic 1140                    | OptiSonic 1150                    | OptiSonic 1150X                   |
|---------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| <b>Travels</b>                  |                                   |                                   |                                   |                                   |
| X - Axis Travel                 | 1,100 mm (43.3")                  | 1,100 mm (43.3")                  | 1,100 mm (43.3")                  | 1,100 mm (43.3")                  |
| Y - Axis Travel                 | 600 mm (23.6")                    | 600 mm (23.6")                    | 600 mm (23.6")                    | 600 mm (23.6")                    |
| Z - Axis Travel                 | 800 mm (31.5")                    | 800 mm (31.5")                    | 800 mm (31.5")                    | 800 mm (31.5")                    |
| B - Axis Travel                 | —                                 | -90° to 90° (Optional)            | -90° to 90°                       | -90° to 90°                       |
| C- Axis Travel                  | —                                 | 0° to 360° (Optional)             | 0° to 360°                        | 0° to 360°                        |
| <b>Workpiece</b>                |                                   |                                   |                                   |                                   |
| Part Size                       | 1,075 mm x 575 mm (42.3" x 22.6") | 1,075 mm x 575 mm (42.3" x 22.6") | 1,075 mm x 575 mm (42.3" x 22.6") | 10 - 500 mm (.4" - 19.6")         |
| Max Plano Diameter Capability** | —                                 | —                                 | —                                 | Ø 550 mm (21.7")                  |
| Maximum Weight                  | 800 kg (1,763.7 lbs.)             | 350 kg (770 lbs.)                 | 350 kg (770 lbs.)                 | 154 kg (340 lbs.)                 |
| <b>Workpiece Rotation</b>       |                                   |                                   |                                   |                                   |
| Spindle Speed                   | —                                 | Positional C-Axis                 | Positional C-Axis                 | Positional C-Axis w/ Spindle Mode |
| Hydro-Expansion Chuck           | Optional                          | N/A                               | N/A                               | 0 - 500 rpm                       |
| C-Axis Position and Hold        | —                                 | Standard                          | Standard                          | Standard                          |
| <b>Tool Spindle</b>             |                                   |                                   |                                   |                                   |
| Max Tool Diameter***            | 250 mm (9.8")                     | 250 mm (9.8")                     | 250 mm (9.8")                     | 250 mm (9.8")                     |
| Max Tool Weight                 | 6 kg (13.2 lbs.)                  | 6 kg (13.2 lbs.)                  | 6 kg (13.2 lbs.)                  | 6 kg (13.2 lbs.)                  |
| Tool Spindle Speed              | 1,000 - 18,000 rpm                | 1,000 - 18,000 rpm                | 1,000 - 18,000 rpm                | 1,000 - 18,000 rpm                |
| Max Power                       | 18kW (24hp)                       | 18kW (24hp)                       | 18kW (24hp)                       | 18kW (24hp)                       |
| Tool Holder Style               | HSK63F                            | HSK63F                            | HSK63F                            | HSK63F                            |
| <b>Facility Requirements</b>    |                                   |                                   |                                   |                                   |
| Electrical                      | 480V +/- 5%, 60A                  | 480V +/- 5%, 65A                  | 480V +/- 5%, 75A                  | 480V +/- 5%, 100A                 |
| Air Supply                      | 100PSI, 3-5 CFM clean dry air     | 100PSI, 3-5 CFM clean dry air     | 100PSI, 3-5 CFM clean dry air     | 100PSI, 3-5 CFM clean dry air     |

\* Specifications subject to change. Contact OptiPro for the latest specifications.  
\*\* Machine is capable of manufacturing maximum plano size in small volume. For medium and large production quantities of this plano size, consider OptiPro's larger platform.  
\*\*\* Max tool diameter is 75 mm (3") with a full Automatic Tool Changer magazine.  
All platforms come standard with USB and ethernet communication.

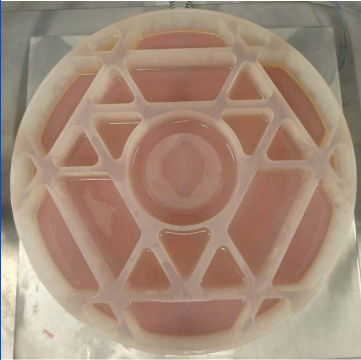
## Specifications\*

|                                 | OptiSonic 1230                    | OptiSonic 1240                    | OptiSonic 1250                    | OptiSonic 1250X                   |
|---------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| <b>Travels</b>                  |                                   |                                   |                                   |                                   |
| X - Axis Travel                 | 1,200 mm (47.2")                  | 1,200 mm (47.2")                  | 1,200 mm (47.2")                  | 1,200 mm (47.2")                  |
| Y - Axis Travel                 | 700 mm (27.6")                    | 700 mm (27.6")                    | 700 mm (27.6")                    | 700 mm (27.6")                    |
| Z - Axis Travel                 | 500 mm (19.6")                    | 500 mm (19.6")                    | 500 mm (19.6")                    | 500 mm (19.6")                    |
| B - Axis Travel                 | —                                 | -90° to 90° (Optional)            | -90° to 90°                       | -90° to 90°                       |
| C- Axis Travel                  | —                                 | 0° to 360° (Optional)             | 0° to 360°                        | 0° to 360°                        |
| <b>Workpiece</b>                |                                   |                                   |                                   |                                   |
| Part Size                       | 1,175 mm x 675 mm (46.2" x 26.6") | 1,175 mm x 675 mm (46.2" x 26.6") | 1,175 mm x 675 mm (46.2" x 26.6") | 10 - 500 mm (.4" - 19.6")         |
| Max Plano Diameter Capability** | —                                 | —                                 | —                                 | Ø 550 mm (21.7")                  |
| Maximum Weight                  | 800 kg (1,763.7 lbs.)             | 350 kg (770 lbs.)                 | 350 kg (770 lbs.)                 | 350 kg (770 lbs.)                 |
| <b>Workpiece Rotation</b>       |                                   |                                   |                                   |                                   |
| Spindle Speed                   | —                                 | Positional C-Axis                 | Positional C-Axis                 | Positional C-Axis w/ Spindle Mode |
| Hydro-Expansion Chuck           | Optional                          | N/A                               | N/A                               | 0 - 200 rpm                       |
| C-Axis Position and Hold        | —                                 | Standard                          | Standard                          | Standard                          |
| <b>Tool Spindle</b>             |                                   |                                   |                                   |                                   |
| Max Tool Diameter***            | 250 mm (9.8")                     | 250 mm (9.8")                     | 250 mm (9.8")                     | 250 mm (9.8")                     |
| Max Tool Weight                 | 6 kg (13.2 lbs.)                  | 6 kg (13.2 lbs.)                  | 6 kg (13.2 lbs.)                  | 6 kg (13.2 lbs.)                  |
| Tool Spindle Speed              | 1,000 - 18,000 rpm                | 1,000 - 18,000 rpm                | 1,000 - 18,000 rpm                | 1,000 - 18,000 rpm                |
| Max Power                       | 18kW (24hp)                       | 18kW (24hp)                       | 18kW (24hp)                       | 18kW (24hp)                       |
| Tool Holder Style               | HSK63F                            | HSK63F                            | HSK63F                            | HSK63F                            |
| <b>Facility Requirements</b>    |                                   |                                   |                                   |                                   |
| Electrical                      | 480V +/- 5%, 57A                  | 480V +/- 5%, 60A                  | 480V +/- 5%, 67A                  | 480V +/- 10%, 67A                 |
| Air Supply                      | 100PSI, 3-5 CFM clean dry air     | 100PSI, 3-5 CFM clean dry air     | 100PSI, 3-5 CFM clean dry air     | 100PSI, 3-5 CFM clean dry air     |

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\*\*\* Max tool diameter is 75 mm (3") with a full Automatic Tool Changer magazine.  
All platforms come standard with USB and ethernet communication.

# Case Studies

## Light Weighting Zerodur



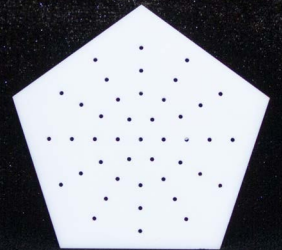
- 75% bulk material removal of Zerodur mirror
- Each of the smaller triangle pockets is 2.5 inches deep and took 20 minutes
- Three positioning pockets good to 20 microns to each other
- Process was 6 times faster with OptiSonic vs. non-OptiSonic machining

## Automated Core Drilling Process



- 400mm x 200mm x 200mm stack of glass producing 20mm cores
- Cycle time of 3.5 minutes per core
- Machine programmed to probe tool after each core to ensure no material was in the core drill before moving onto next core
- Fully automated to run 10 hours unmanned
- Cores are within +/- 0.02mm diameter tolerance

## Hole Drilling in Alumina



- Drilling AD-99.5 Alumina
- Pentagon side: 27mm
- Part thickness: 1.7mm
- Hole diameter: 0.8mm
- Machining time: Less than 1 minute per hole

# Unparalleled Dedication to Customer Success

## Sales

Developing Partnerships

## Service

Reinforcing Relationships

## Support

Ensuring Excellence

[www.optipro.com/the-optipro-difference](http://www.optipro.com/the-optipro-difference)



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