

Gleason



THE
TOTAL GEAR
SOLUTIONS™
PROVIDER

BPG
Blade Profile
Grinding Machine

BPG Blade Profile Grinder reduces sharpening costs for bevel gear cutter blades

BPG Highlights

- ✓ **Highly Productive** – Patented Gleason processes such as QUICKEDGE grinding and optional Adaptive Control, and fast, automated blade load/unload system combine to greatly reduce floor-to-floor times and cost per workpiece.
- ✓ **Extremely Versatile** – Easily accommodates a wide variety of Gleason and non-Gleason stick blade types, sizes, materials and geometries.
- ✓ **Operator-Friendly** – Powerful Fanuc or Siemens CNC controller, familiar Windows® environment and Gleason operating software combine to give operators of any experience level the ability to quickly optimize setup and operation.
- ✓ **Exceptionally Accurate and Reliable** – Optimized design resulting in reduced floorspace requirements, lower spare parts inventories, simplified maintenance and ease of setup in day-to-day operation.

The Gleason Blade Profile Grinder (BPG) is an advanced bevel gear stick blade sharpening machine, capable of sharpening a wide range of blade types and sizes. Users benefit from improvements in cycle time, ease of use, and overall cost.

The BPG has been designed to significantly reduce floor-to-floor times and the costs of blade re-sharpening.

This is accomplished using the Gleason patented QUICKEDGE grinding process, high-speed flexible automation and a patented single blade fixture, which is used for all blade types and sizes.

The QUICKEDGE process generates blade profiles using dressable diamond or CBN grinding wheels. This process

provides faster stock removal rates, consistent surface finish, reduced burning, and improved part-to-part consistency.

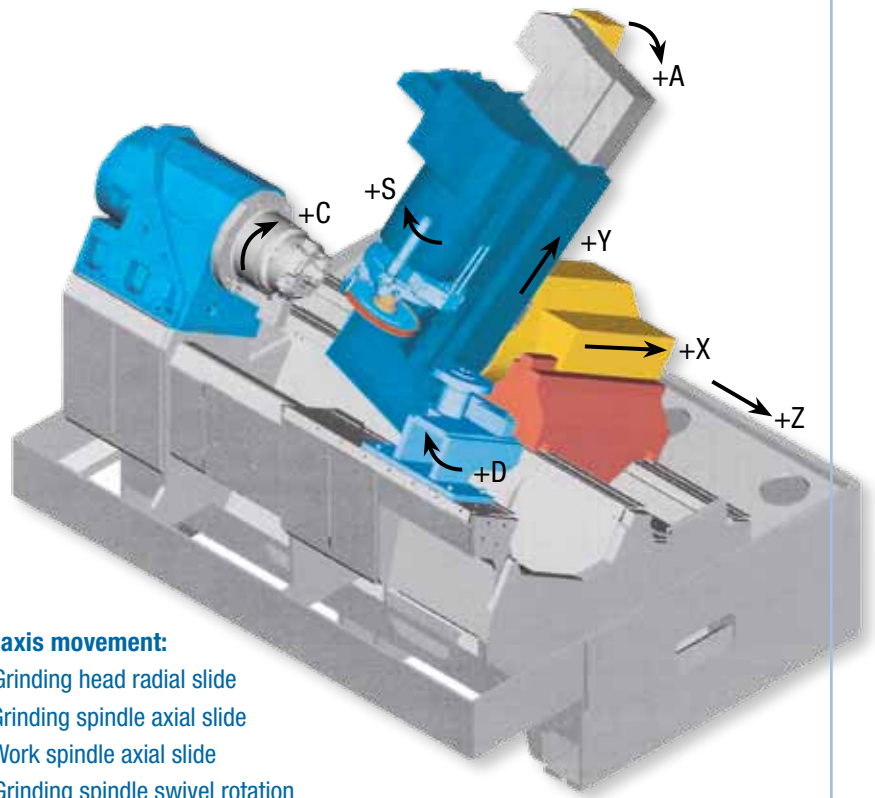
These results are achieved on the wide variety of both Gleason and non-Gleason stick blades, made of both high-speed steel, and tungsten carbide. Sharpening of all geometries, including 2- and 3-face geometric designs, is possible using the QUICKEDGE process.

The BPG ensures ease of operation by implementing state-of-the-art, industry standard controller options, with the Windows® operating system. The operator interface is further enhanced by the use of the Gleason Machine Manager™ (GMM), and PHOENIX® Summary Manager™ software.



Machine concept

- ✓ The patented automatically adjusted coolant header provides coolant to the correct grinding location during all machine cycle motions.
- ✓ The high-speed, direct drive grinding wheel spindle, allows high material removal rates with maximum accuracy.
- ✓ Absolute encoders used on the majority of the machine's axes provides shorter referencing times.
- ✓ On-machine dressing provides simple, inexpensive, and quick wheel dressing in less than a minute.
- ✓ Moveable electrical cabinet provides easy access to machine components.



Machine axis movement:

- X-axis = Grinding head radial slide
- Y-axis = Grinding spindle axial slide
- Z-axis = Work spindle axial slide
- A-axis = Grinding spindle swivel rotation
- C-axis = Work spindle rotation
- D-axis = Dresser spindle rotation
- S-axis = Wheel spindle rotation

Standard features:

- ✓ Automatic wheel dressing and probing.
- ✓ Siemens or GE Fanuc CNC controller.
- ✓ Microsoft Windows®-based operating system.
- ✓ Gleason Machine Manager™ (GMM) and PHOENIX® Summary Manager™ software applications.
- ✓ Self-contained hydraulic, pneumatic, and electrical systems.
- ✓ Simple, ergonomic, quick-change grinding wheel.
- ✓ CNC supported blade fixture adjusts automatically.
- ✓ Small machine footprint.
- ✓ Data transfer capability.

- ✓ Closed loop corrections.
- ✓ Work area lighting.
- ✓ CNC-controlled coolant nozzle.
- ✓ Digital servo drives.

Optional features:

- ✓ Microsoft Windows®-based operating system in various languages.
- ✓ Automatic, high-speed and flexible, loader system.
- ✓ Gleason Blade Inspection Device.
- ✓ Manual blade comparison checker.
- ✓ Blade probing system.
- ✓ Integrated blade edge conditioner.
- ✓ Carbide only or HSS/carbide capable coolant filtration system.
- ✓ Remote diagnostics.

DS 1100

QUICKEDGE – A faster grinding process for stick blades

QUICKEDGE is a patented grinding process available on Gleason cutter sharpening machines for grinding any Gleason, or non-Gleason, stick blade. The process offers users many long-sought capabilities to improve productivity, quality, and economy. Here's how you benefit:

Capabilities and benefits:

- ✓ All Gleason and non-Gleason stick blades (all sizes) can be ground without blade life compromise.
- ✓ 2- and 3-face geometries can be ground, with options to grind backface and T-land.
- ✓ Faster cycle times for all blades (improvement depending on size).
- ✓ Simple, cylindrical grinding wheel with dressable, resin-bond diamond or CBN abrasive.
- ✓ Inexpensive, off-the-shelf aluminum oxide wheel for dressing the diamond grinding wheels.

- ✓ Same or better repeatability compared with all known conventional processes.
- ✓ Fewer development steps, due to improved geometric accuracy.
- ✓ Roughing block blades or broken blades. For carbide stick blades, block roughing economics are equal to or better than the wire EDM process.
- ✓ Simple and robust process, leads to improved production reliability and costs.

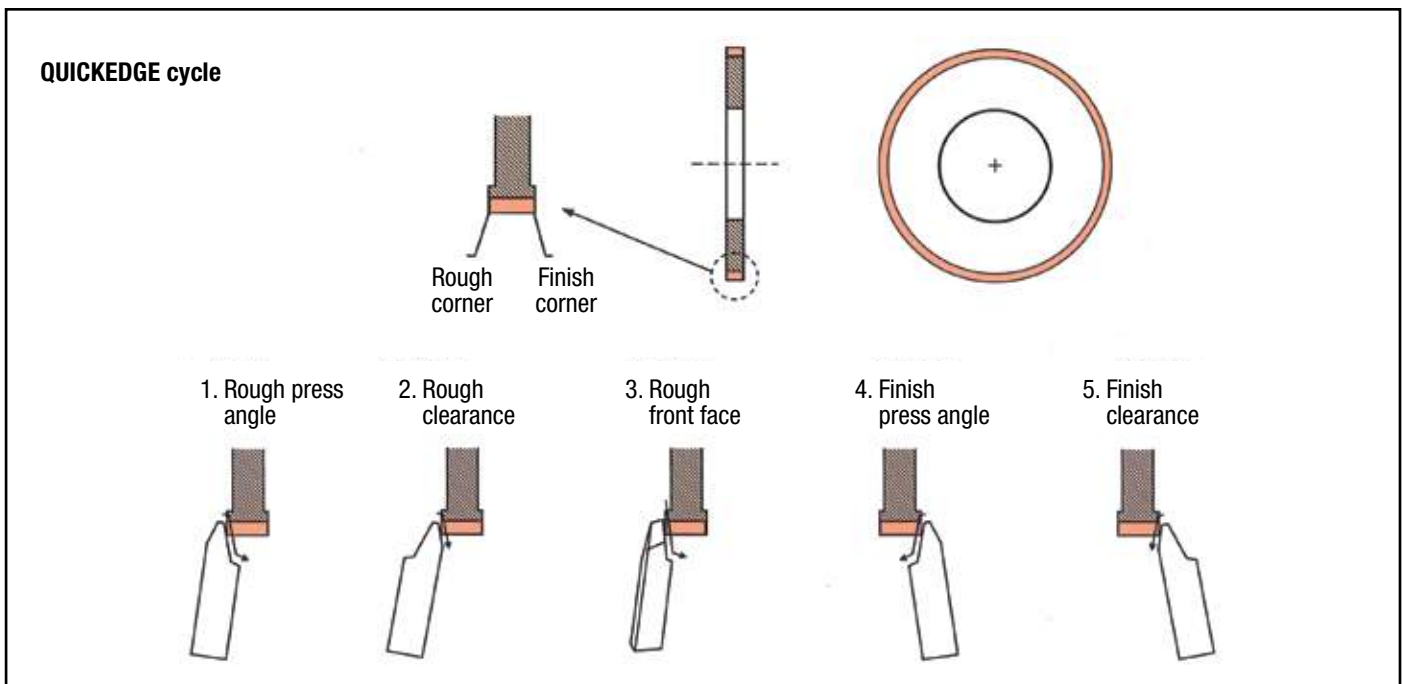
Resharpener process:

The QUICKEDGE process uses a roughing/finishing strategy similar to the “nested wheel” process. Blades are produced with primary and secondary relief surfaces. Both roughing and finishing operations are performed using a path contouring (generating) method. Although the software allows multiple roughing passes,

blades are typically resharpened with single roughing and finishing passes, regardless of blade size or type. Cycle times for blades of different sizes depend primarily on the grinding path length (combined lengths of blade tip, profile and shoulder).



QUICKEDGE is applicable to a wide range of cutter blades.



Adaptive Control: Optimizing the grinding cycle

With Gleason's patented process and proprietary Adaptive Control software, BPG users have the option to further reduce non-productive time by automatically creating a machining cycle with feedrates optimized based on actual contact conditions between the grinding wheel and the blade. Typically, this is a slow, painstaking manual process, made possible only through the extensive knowledge of the operator.

Gleason Adaptive Control senses grinding spindle load when there's contact between wheel and blade, and increases feedrates automatically 'on the fly' when no load exists to minimize non-productive time.

In addition, Gleason Adaptive Control helps to reduce the potential for blade burning and/or cracking that can result from the thermal damage caused when the grinding cycle exceeds optimum requirements.



BPG work area.



Grinding wheel probing.



Grinding wheel dressing.

Automation

The BPG machine's throughput is further improved by the addition of the high-speed loader system. This compact loader has a dual-gripper gantry system for automatic blade loading/unloading.

The loader is faster and more flexible. The loader's gripping system accommodates all blade types and sizes.

High speed loader with dual-gripper gantry system for automatic blade loading/unloading.



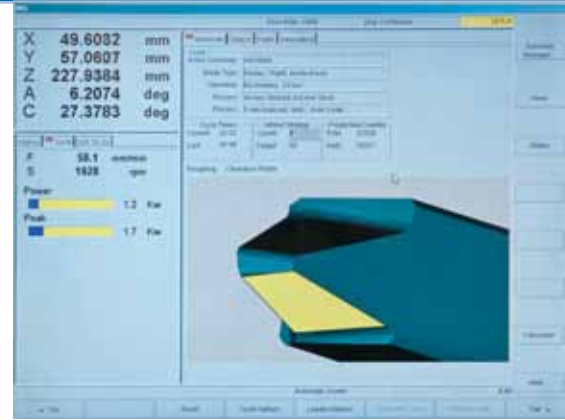
Loading blades from the cassettes.



Automation concepts may vary depending on machine controls and/or geographic region of sale.

The patented universal blade-clamping fixture also reduces load/unload times. This fixture eliminates the need for multiple fixtures for different blade types and sizes and ensures repeatable blade seating.

Robot transfers stick blades to the tilt station.



Powerful, user-friendly CNC controls help simplify and automate operation.



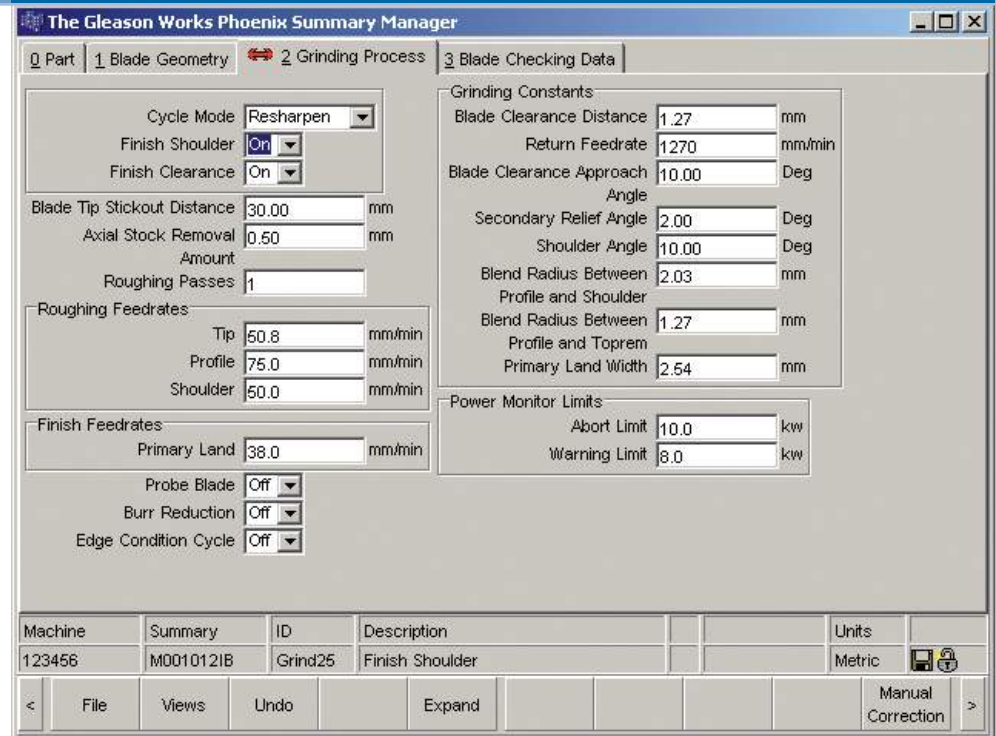
Gantry loader takes stick blade from the tilt station and transfers it to the grinding area of the machine.



The BPG uses the PHOENIX® Summary Manager™ to perform tasks associated with summaries. A summary is a set of values which define specific part and process characteristics.

During production, a job-specific summary is loaded and enabled on a machine. The BPG is capable of storing multiple summaries, and supports transfers over a network.

The Gleason Machine Manager™ (GMM) is the interface that allows the machine operator to perform various machine functions.



PHOENIX® Summary Manager™, used in this example for grinding process monitoring.

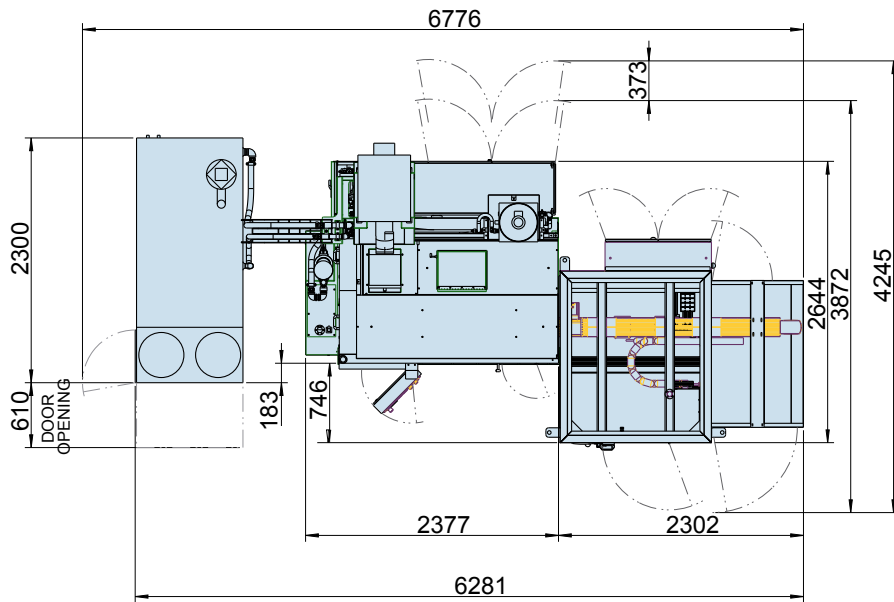
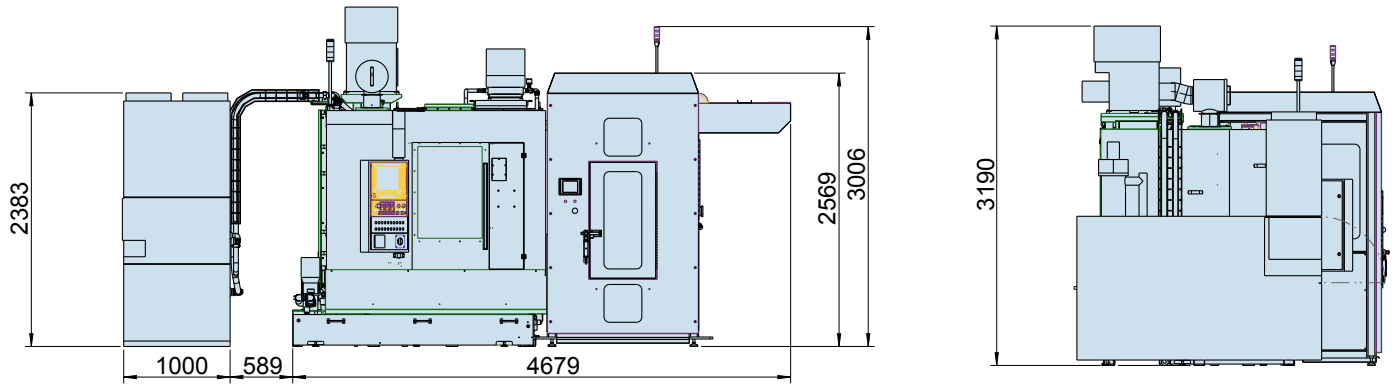
Machine specifications	Metric	Travel English	Speed
X-Radial slide	-60 to +60 mm	-2.362 to +2.362"	7.5 m/min
Y-Tangential slide	-40 to +140 mm	-1.574 to +5.512"	5.0 m/min
Z-Axial slide	80 to 480 mm	3.150 to 18.898"	10 m/min
A-Swivel axis	-45 to +45 degrees		15 deg./sec
C-Work spindle			100 rpm
Electrical equipment (motors)		Maximum speed	Continuous torque power
X-Radial slide	Digital Servodrive	10,000 rpm	5 Nm
Y-Tangential slide	Digital Servodrive	10,000 rpm	5 Nm
Z-Axial slide	Digital Servodrive	1,450 rpm	5 Nm
A-Swivel axis	Digital Servodrive	1,500 rpm	5 Nm
C-Work spindle	Digital Direct Drive		100 Nm
D-Dresser spindle	Digital Direct Drive		0.7 kW
S-Grinding spindle	Digital Direct Drive		20 kW
Hydraulic	AC Induction		1.5 kW
Lubrication	AC Induction		0.18 kW
Coolant return pump	AC Induction		1.7 kW

Actual machine limitation is subject to gear parameters, machinability of material and metal removal rates.

For requirements beyond specified values, and for face gear and Gleason Power Skiving applications, consult Application Engineering.

All specifications subject to change without notice. PHOENIX® is a registered trademark of The Gleason Works.

Machine Dimensions



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