Gleason Large Gear Hobbing Machines: Highly reliable, easy to operate

Since 1897, when Herman Pfauter’s patented hobbing process became the standard in the industry, gear hobbing has remained the most productive and viable of all generating soft cutting processes for producing cylindrical gears.

With the hobbing process, gears are produced to high quality levels and with excellent performance characteristics. Gleason’s large gear hobbing solutions include a broad range of hobbing machine sizes with state-of-the-art features and options, and a strong supporting family of cutting tools, workholding, automation and services.

Throughout the world producers of wind turbine gear boxes, industrial gear boxes, mining equipment, and other gear applications have made Gleason the world’s leading supplier of hobbing solutions for large gears.

Hobbing machine NC axes.
Hobbing process basics
In the hobbing process, the axes of the hob cutting tool and the workpiece cross each other and rotate continuously in a timed relationship. The hob diameter and rotational speed determine the speed along the cutting edge of the tool, which is essential for the efficiency of the chip removal process. After a radial infeed of the hob, it moves in parallel to the workpiece axis and along the workpiece face to generate the involute tooth form by the enveloping cuts.

Enveloping cuts.

Advantages of the hobbing process
✓ Efficient and economical operation
✓ High productivity rate
✓ Versatility of operations
✓ High accuracy / close tolerances
✓ Smooth surface finish

Gear hobbing is used for the effective production of accurate spur, helical, and worm gears, as well as sprockets, splines and other toothed elements.

Gashing process
For workpieces with lower numbers of teeth and/or larger modules as well as for the production of internal ring gears, the gear gashing process provides the most efficient and economical result.

A disc-type cutter produces the gear tooth by tooth in a single-indexing cutting cycle.

Versatility
Variations of the process technology offer a huge range of possibilities for gear finishing, pre-grind hobbing, and production of external and internal or spur and helical gears. Choosing between wet or dry cutting environments and a broad choice of cutting tool substrates and coatings leads to individually customized solutions.

Finish hobbing
High quality Gleason solid hobs in state-of-the-art hobbing technology allows reliable gear manufacturing in highest precision. These machines are also best-suited for the skive hobbing process, which in some cases is used alternatively to gear grinding.

Pre-grind hobbing/gashing
Considering the huge trend towards hard fine finishing of gears, the pre-grind soft cutting process must be executed with highest possible productivity. Gleason hobbing machines in combination with Gleason OPTI-CUT® carbide inserted hobs and gashing cutters achieve this goal with maximum cutting speeds, high stock removal rates and consistent quality.

Shifting strategies
Specific hob shifting strategies allow optimum tool wear management, offering the most economical use of the entire available hob length.
For producers of gears for wind power turbines, for industrial gears, for the mining and shipbuilding industries, and many other applications, Gleason-Pfauter Hobbing Machines offer maximum productivity for roughing and finishing operations on cylindrical gears.

**Highlights and customer benefits:**

- **Reduced production costs**
  Robust and rigid design for the highest metal removal rates and optimum productivity with modern carbide tool concepts.

- **Consistently high accuracy**
  High precision machine design and construction as well as state-of-the-art manufacturing processes provide an effective platform for finish hobbing with sustainable high quality.

- **Versatility**
  The broad range of choices with respect to work area and hob head sizes allows solutions customized to individual requirements (shafts, bore-type workpieces, external and internal gears, small and large modules).

- **Simple maintenance**
  Direct access to all peripheral devices (hydraulics, coolant filtration systems, etc).

- **High efficiency**
  Fast speeds and motions of machine axes reduce non-productive times to an absolute minimum. The entire machine concept is designed for maximum efficiency.

- **User-friendly software program**
  Combined with the latest control and drive technology, for optimal ease of operation!
  **Features such as**
  - Menu-driven systems
  - Plausibility checks
  - Efficient database functions
  - A comprehensive package of functions, covering all production and maintenance requirements.

**Models P 400, P 600 and P 600/800 - Combine high power and small footprint!**

- Module up to 16 mm.
- Workpiece diameters up to 1000 mm.
- Axial travel up to 1000 mm.
- Tailstock maximum position 2000 mm above worktable.
- Easy accessibility.
- Integrated hydraulics and oil mist separator.
Models P 800 to P 6000
set standards for productivity, accuracy and economy.

- **Increase your throughput**
  Our large hobbing machines focus on maximum throughput for large module gears up to 6000 mm diameter

- **Customized solutions**
  The modular platform with a broad range of external and internal hob heads, machine frames, table sizes, main columns and tailstocks allows the creation of individual combinations for a perfect fit with customer needs.

- **Covering today’s and tomorrow’s demands**
  Different sizes of external hobheads up to 70 kW and internal milling heads up to 80 kW cover all potential gearing needs. All machine sizes can be equipped with external and/or internal heads.

- **Module up to 45 mm.**
- **Workpiece diameter up to 6000 mm.**
- **Axial travel up to 2200 mm.**
OPTI-mize your large gear production with Gleason gear cutting tools

Our broad new range of gear cutters helps you choose the OPTI-mum tool for your gear cutting jobs. From single-part to large-scale production – always the optimum tool concept:

✓ **OPTI-CUT®**

Maximum metal removal rates and cutting speeds using highly productive OPTI-CUT® tools. With the OPTI-CUT® tool system you get all the performance benefits of the unique replaceable, indexable carbide insert technology. The OPT-CUT® family is very versatile too, including gear gashing, hobbing and shaping products.

✓ **Solid hobs**

Whether roughing with E-Z™ Cut hobs (roughing hob) or finishing with top quality finishing cutters – Gleason offers the right solution.

The latest Gleason workholding systems save time and money

Around the globe and around the clock, Gleason workholding solutions are raising the bar on the speed, precision and flexibility of workpiece changeover operations during production.

Gleason’s highly popular X-Pandisk® workholding range is now available specifically for large bore-type parts weighing up to 2000 kg. The workpiece is centered and clamped automatically. Major producers of wind power transmissions are already applying this new product with excellent results.

X-Pandisk Highlights:

✓ Workpiece changeover times reduced by up to 70% (compared to manual clamping)
✓ Automatic centering < 30 µm
✓ Automatic clamping
✓ Modular structure for flexible modification of centering diameter
✓ Short centering length (approx. 35 mm) adequate
✓ Centering diameter from 150 to 550 mm
✓ Can be used for hobbing and shaping machines
✓ Automatic loading of workpieces possible

**Workpiece changeover times reduced by up to 70%**

Clamping fixture for internal gears.

Clamp plate

Axial clamping principle

Draw rod

Expanding centering element centers the workpiece in the bore

Pre-centering and insertion aid for the workpiece

Workpiece weight up to 2000 kg

X-Pandisk
Automation solutions for large hobbing machines

Fast and flexible workpiece loading/unloading systems to meet every requirement are available for large hobbing machines:
- Gantry loader for shaft-type parts.
- 2-station ring loader with chain magazine with flexible pallets for bore parts.
- Customized solutions available on request.

Another option is the zero point clamping system now available for gear-cutting machines. This allows workpieces and workholding equipment to be set up in parallel with production. The only non-productive time remaining is pallet change time. There is no longer any need to align in the machine. The system and the corresponding workholding equipment is ideally adapted to suit your workpieces, guaranteeing maximum accuracies while minimizing set-up costs.

Highlights:
- Repeatable accuracy of the zero point clamping system to < 0.005 mm possible
- Can be used for all workpiece sizes
- Set-up in parallel with production
- Zero point intersection means short pallet changeover time
- Pallets weighing up to 8 tons can be loaded automatically
- Pallets can be loaded manually by indoor crane
- Economic for both serial and batch production

Set-up in parallel with production!

Transport load up to 8000 kg.
Diameter at circumference up to 2000 mm.
At every stage of the gear production process, Gleason offers advanced new technology to significantly reduce production time and cost. Gleason offers a full range of vertical and horizontal hobbing machines, gear shapers (with electronic and mechanical helical guides), shaving and honing machines, and advanced profile and threaded wheel grinding machines for the manufacture of spur and helical gears. A complete range of bevel gear cutting, grinding, lapping and testing machines is available from Gleason. The cutting tools, grinding wheels, workholding, support services and software are offered for all major gear manufacturing processes. Gleason’s ability to provide manufacturing and inspection solutions for all types of gears is unmatched.

At Gleason, we recognize that service is as important to our Customers as the technology that makes Gleason machines the most productive in the world. Our customers enjoy a lasting personal partnership that ensures your gear production needs are satisfied. Gleason Global Services (GGS) maximizes your uptime. You can rely on our 250 service professionals serving over 50 countries throughout the Americas, Europe, and Asia to work around the clock to support your needs.

With a manufacturing presence worldwide, as well as service and technical support in over 20 countries, Gleason is truly a global company. Our broad-based infrastructure and strong worldwide presence place us in a unique position to respond to customer requirements anywhere, anytime. In addition to machine service Gleason also offers application engineering services, development programs, training, gage certification and repair parts programs.