

**Gleason**



**phoenix**

**280CX & 280C  
Bevel Gear  
Cutting Machines**



THE  
**TOTAL GEAR**  
**SOLUTIONS™**  
PROVIDER

# The Phoenix<sup>®</sup> 280CX and 280C: Taking bevel gear production to the next level

## 280CX Highlights

- ✓ **More productive** – Cycle times on the new Phoenix<sup>®</sup> 280CX are up to 35% less than anything in its class.
- ✓ **Advanced features** – Only the Phoenix<sup>®</sup> 280CX integrates an automatic parts loader, 'first part' checking device and chamfering station right on the machine.
- ✓ **Fast changeover** – New quick-change cutter and arbor designs now make it fast and easy for operators to changeover for new parts and tooling.
- ✓ **Reliable by design** – Built for improved reliability, including simplified guarding and excellent chip containment.
- ✓ **Easier to maintain** – The new design makes service areas more accessible and features fewer moving parts.
- ✓ **Easier to operate** – New software system makes it easier for even less experienced operators to get the most out of the machine with a truly friendly user interface that helps them create programs and operate the machine more productively.
- ✓ **Built in intelligence** – Embedded Condition Monitoring alerts the operator to potential future issues. Problems are solved before they happen.

*From high volume production to lot sizes as small as one, the new Phoenix<sup>®</sup> 280CX and 280C Bevel Gear Cutting Machines raise productivity, flexibility, reliability, and ease of operation to a completely new level.*

For automotive manufacturers requiring the highest volumes of bevel gears to 280 mm in diameter, Phoenix<sup>®</sup> 280CX is highly automated, delivering shorter cycle times and greatly reducing cost per workpiece.

For jobbers that don't require all the automated features, but need improved performance and flexibility, the 280C makes cutter system and arbor changes faster, so moving between part types takes a fraction of the time. And much more...

**Unsurpassed productivity.** The Phoenix<sup>®</sup> machines are the most productive in their class, cutting cycle times up to 35% compared to competitive products.

Powerful direct-drive motors for cutter and work spindles provide the high speeds and high torque needed for the latest cutter systems. Machine motions are shorter and faster than competitive models too, because of the design of the monolithic column and pivoting cutter head, which put cutter and workpiece in closer proximity. In addition, the monolithic column features the extreme rigidity of its predecessor, but now is cast from an advanced polymer composite material for the very high thermal stability and damping needed for today's most productive dry machining.

The 280CX truly excels in the dramatic reduction of non-productive time. It's equipped with a high-speed automatic loader, cutting workpiece changeover to as little as eight seconds. In addition,



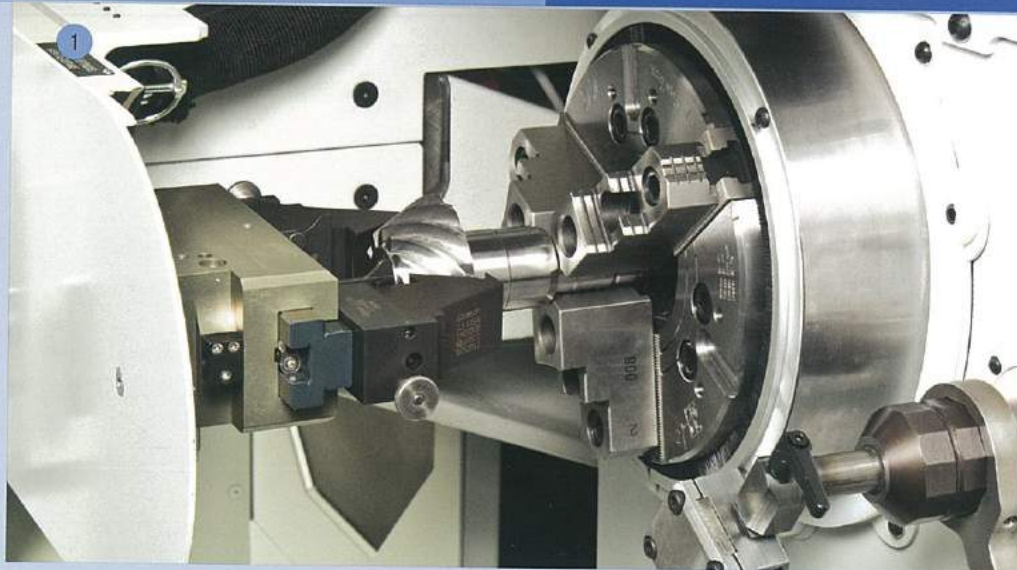
## Performance

changing the cutter system takes a fraction of the time, with a new tool-less hydraulic cutter change system.

The 280CX also features first part checking, which takes most of the wait out of checking parts after cutter change, or when ramping up for a new part number.

A chamfering spindle is integrated into the 280CX too, so parts can be both cut and chamfered in parallel, rather than in typical sequential fashion, substantially reducing cycle time.

Quick-change workholding can now be changed faster from the front of the machine as well, helping reduce costly non-production time.

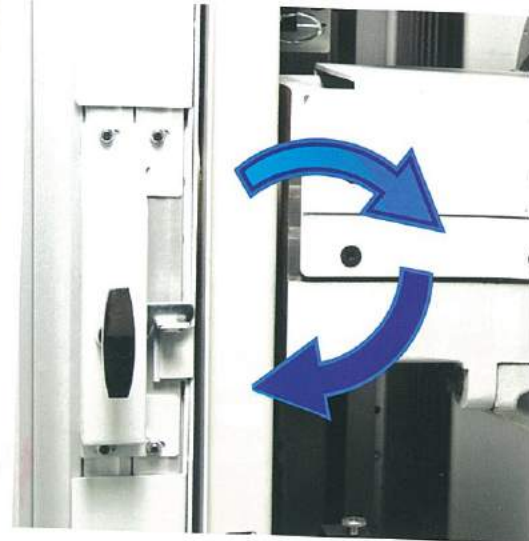


### Reducing non-productive time is as easy as...

- 1 Auto-load in as little as 8 seconds.**  
The 280CX cuts typical cycle times with a high-speed, on-machine parts loader that automates gear and pinion load/unload. In a high volume production environment, time savings can be truly significant.
- 2 Check parts right on machine.**  
Checking a 'first part' can bring production to a costly stop. The 280CX and 280C automate it and put it right on the machine, so checking a part now takes as little as five minutes.
- 3 Chamfer in parallel with cutting.**  
Chamfering adds significantly to bevel gear and pinion cycle times. The 280CX comes equipped with an auxiliary chamfering spindle right on the machine, so chamfering can be done in parallel to a part being cut.

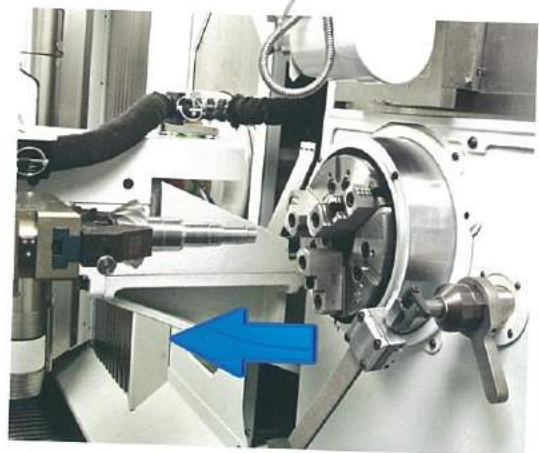
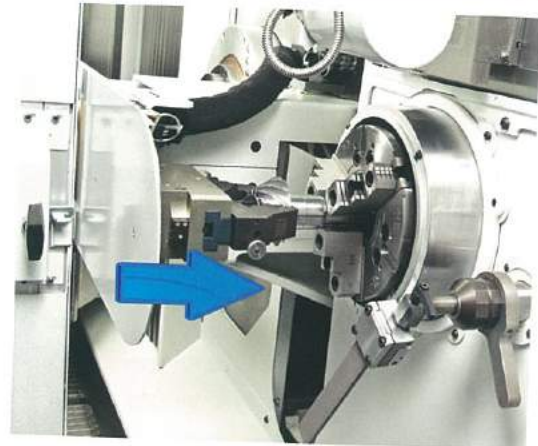
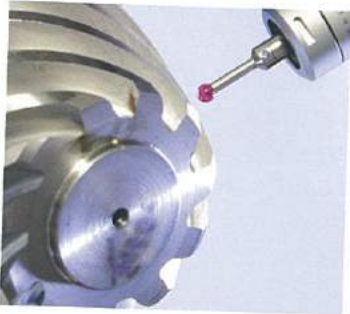
**280CX** (left) is a highly automated solution for automotive and other gear manufacturers seeking greatly improved high volume production.

**280C** (right) offers jobbers the same Phoenix® performance benefits such as PowerDryCutting® and quick-change tooling, but in a simpler package without internal automation.



**1 Change tools in seconds**

Changing a bevel cutter system on conventional machines has always been a cumbersome and time-consuming process, requiring special mounting tooling. The 280CX's and 280C's new tool-less hydraulic cutter change design now allows an operator to quickly and easily remove and replace a cutter system with the push of a button.



**2 Check parts on machine**

Checking a 'first part' after cutter change or when running a new part number can take upwards of 30-45 minutes, bringing production to a costly stop. That's why the 280CX and 280C put first part check right on the machine, so checking part features like tooth flank form and pitch now takes as little as five minutes.

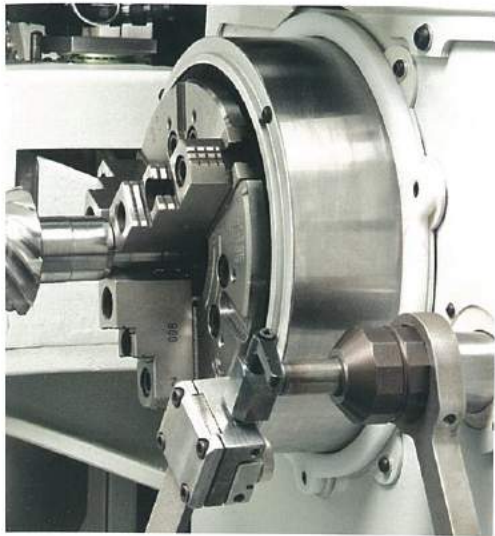
**3 Chamfer in parallel to cutting**

Chamfering can add significantly to bevel gear and pinion cycle times, often requiring that the part be removed, chamfered, and then put back on the machine for additional cutting/finishing. The 280CX comes equipped with an auxiliary chamfering spindle right on the machine, so chamfering of critical features like the toe and heel of pinions on one or both flanks can be done in parallel to a part being cut.

**4 Auto-load in as little as 8 seconds**

The 280CX cuts even deeper into typical cycle times with a high-speed, on-machine parts loader that automates gear and pinion load/unload. In a high volume production environment, the savings in time over the course of even one day can be truly significant.

## Technology



### 5 Quick-change the arbor – from the front.

Arbor changeover can be a time-consuming and tedious process, requiring access from the back of the machine, and the removal of special fasteners. The 280CX and 280C make it faster and easier with a quick-change arbor that is removed from the front of the machine, and with no special tools or fasteners.



### Then run it 24/7; reliably, dependably – profitably.

A cleaner, simpler design means there's less to maintain, and less to worry about, downstream. A servo door system, with robust rails, is used to provide improved reliability as compared to conventional pneumatic door systems.

Guarding has been simplified too, and designed to improve access for routine service. Chip containment is exceptional, ensuring that chips collect more efficiently away from the cutting zone.





### CONIFLEX® PLUS: A breakthrough in straight bevel gear technology.

Gleason CONIFLEX® PLUS cutters are simply the most productive solution ever offered for straight bevel gear cutting. When combined with the capabilities of the new Phoenix® machines, users can expect to realize a host of significant productivity gains, including:

- ✓ **The use of PENTAC® carbide blades** – with advanced coatings allow wet or dry cutting at speeds as high as 300 meters per minute (1000 sfm) and increase tool life.
- ✓ **CONIFLEX® Plus** – can be used in conjunction with Gleason’s advanced Formate cutting process, which improves cutting speed while providing enhanced rolling capabilities for straight bevel gears and face gears.
- ✓ **Gleason G-AGE™ CONIFLEX correction software** – combined with the electronic summary transfer and storage capabilities of the new Phoenix® machines, help reduce new part changeover and setup times by up to 80%.

## PowerDryCutting® with PENTAC® and PENTAC® PLUS

Gleason pioneered in the use of advanced bevel gear cutting systems such as PENTAC® to achieve extremely high speeds in dry cutting conditions. Now, in combination with the new Phoenix® machines and their optimized-for-dry design, Gleason has introduced PENTAC® PLUS, the next generation and specifically engineered for significantly higher tool life and improved productivity. For example:

- ✓ **Designed to enhance chip flow** – the net result is longer tool life and lower cost per part.
- ✓ **Available for face hobbing and face milling** – in all cutter sizes.



- ✓ **New blade clamp block design** – makes it easier and faster to perform precise height and radial adjustments during cutter building and truing.

## Quick Change Workholding

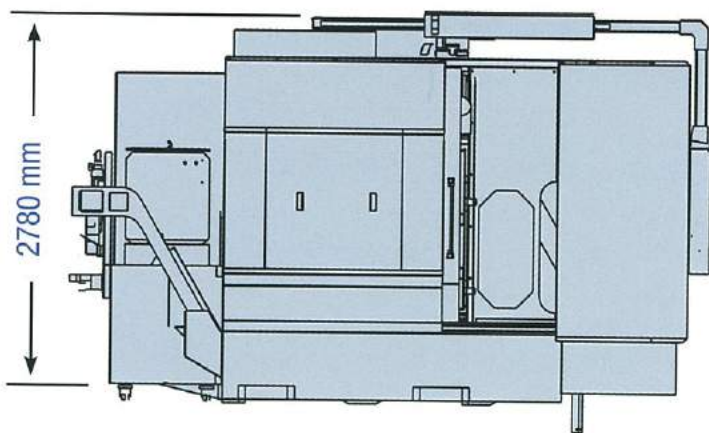
With batch sizes shrinking and lead times shorter than ever, the need to quickly, easily set up machines to run a new part number is paramount. New Gleason bevel gear quick change tooling eliminates much of the costly non-productive time that was once required to change over for

different parts – while at the same time achieving the exceptionally high accuracies required in today’s production environments.

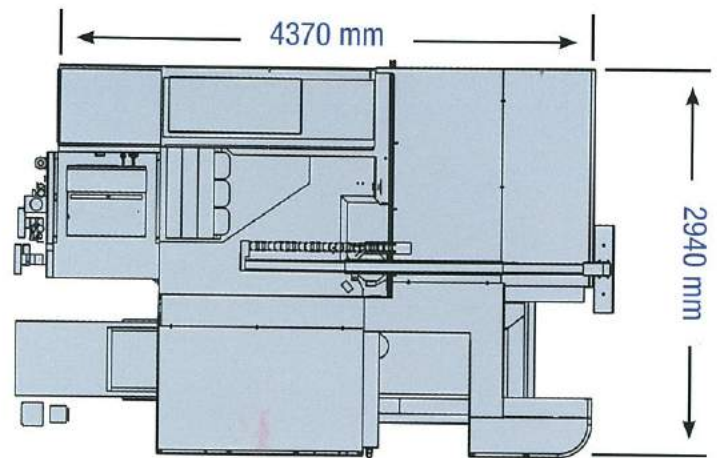
Phoenix® cutter change is the first ever that’s completely tool free, and can be done with just the push of a button. Arbor setup for new parts is equally fast and simple, with a new, front-load design that eliminates most of the usual time and effort.



Front View



Top View



Capacity		Face Milling**	Face Hobbing**
Extreme Ratio		200:1	200:1
Full Depth (Maximum)		20 mm (0.787")	20 mm (0.787")
Face Width (Maximum)		58 mm (2.283")	58 mm (2.283")
Range of Tooth Numbers		1-200 inclusive	1-200 inclusive
Maximum Gear Pitch Diameter		280 mm (11")	280 mm (11")
Maximum Cutter Size		9"	105 mm radius
Normal Module Range		2-13 module	2-13 module
Motor Drives		Speed	Continuous Torque Power
A - Work Spindle	Digital Direct Drive	1200 rpm	271 Nm
C - Cutter Spindle	Digital Direct Drive	1200 rpm	542 Nm
Machine Specifications		Travel	Speed
X - Horizontal (Work Slide)		25-334 mm	13 m/min
Y - Vertical Travel		± 175 mm (±7")	13 m/min
Z - Cutter Slide Travel		125-600 mm (5-23")	13 m/min
B - Root Angle		-5°/+90°	50°/sec
Electrical equipment		Power Consumption	
Coolant	AC Induction		2.2 kW
Hydraulic	AC Induction		2.2 kW
Chip Elevator	AC Induction		.4 kW
Floor Space: Hydraulic unit, electrical enclosures, chip removal system, operator's pendant, smoke/mist collector*			
Length x width		4370 mm x 2940 mm (172" x 116")	
Height		2780 mm (109")	
Weight		17,700 kg (39,000 lbs)	

PHOENIX®, Pentac®, Pentac® Plus, and PowerDryCutting® are registered trademarks of The Gleason Works.

The information and specifications in this publication are subject to change without notice.

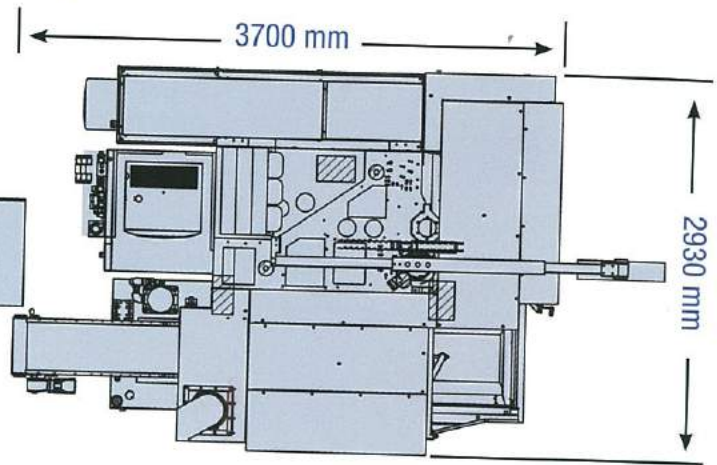
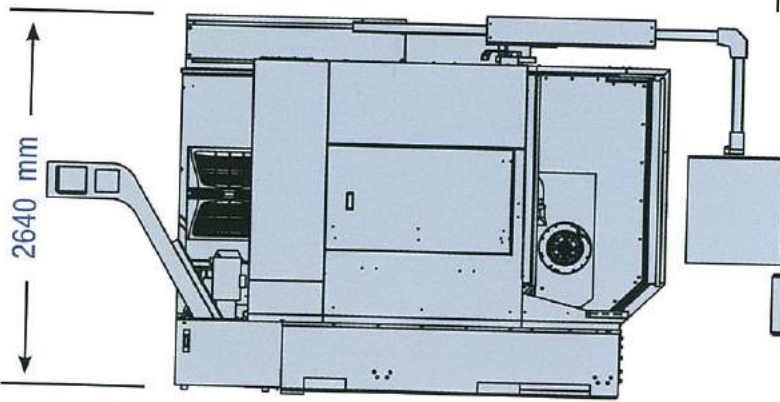
\* does not include options

\*\* for requirements beyond specified values, consult application engineering

# Technical Data: 280C

Front View

Top View



Capacity		Face Milling**	Face Hobbing**
Extreme Ratio		200:1	200:1
Full Depth (Maximum)		20 mm (0.787")	20 mm (0.787")
Face Width (Maximum)		58 mm (2.283")	58 mm (2.283")
Range of Tooth Numbers		1-200 inclusive	1-200 inclusive
Maximum Gear Pitch Diameter		280 mm (11")	280 mm (11")
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B - Root Angle		-5°/+90°	50°/sec
Electrical equipment		Power Consumption	
Coolant	AC Induction		2.2 kW
Hydraulic	AC Induction		2.2 kW
Chip Elevator	AC Induction		.4 kW
<b>Floor Space:</b> Hydraulic unit, electrical enclosures, chip removal system, operator's pendant, smoke/mist collector*			
Length x width		3700 mm x 2930 mm (146" x 115")	
Height		2640 mm (104")	
Weight		15,600 kg (34,400 lbs)	

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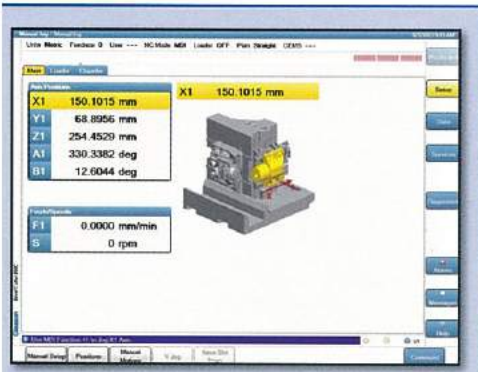
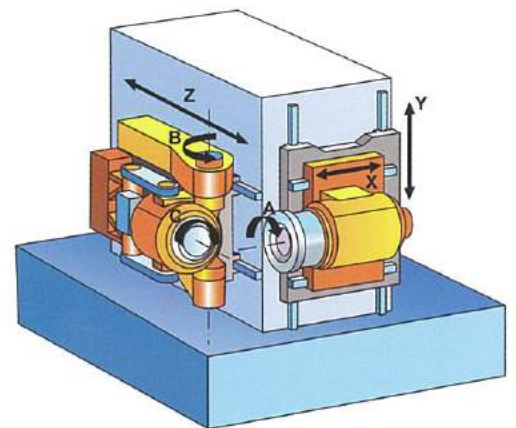


## High IQ: The smartest bevel gear cutting machine ever built

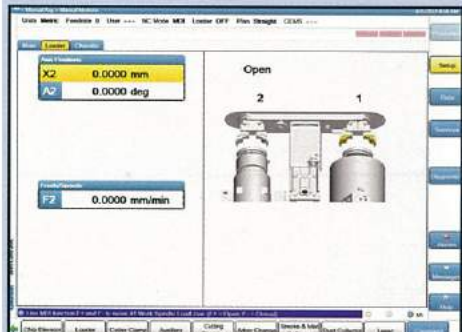
By now, Gleason customers have come to expect the power of Fanuc 30i or Siemens 840D CNC, and Gleason's Windows® based, user friendly software on their machines. But with these new machines, Gleason has taken 'user-friendly' to the next level, with a new 'Global Software Platform' that greatly empowers even less experienced operators, and gives them the ability to get the most out of these new machines.



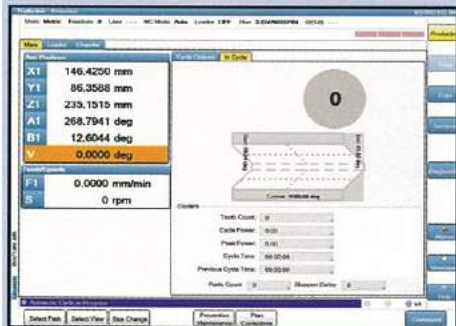
Of course, they're fully network-ready as well, allowing the user to upload/download data to and from other gear processing or inspection equipment.



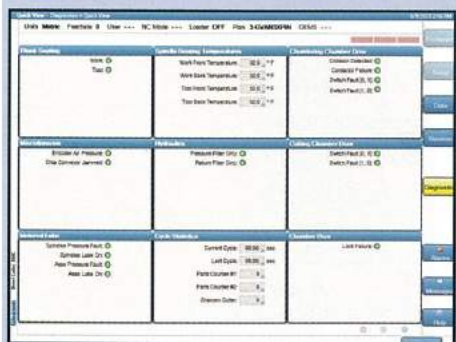
### 1 Get set up



### 2 Program faster



### 3 Get answers



### 4 Solve problems

**At your fingertips:** The ability to optimize machine performance across the full range of bevel gear processes – face milling, face hobbing, and Coniflex® for straight bevel gears.

#### Operators can now:

- ✓ **Get set up** – Language, user preferences, security and other operator considerations are easy to customize.
- ✓ **Program faster** – Using a menu-driven, data entry session with parameters already defined, operators can quickly create, and modify, the perfect program for any gear.
- ✓ **Get answers** – Throughout production, operators see a display that puts all of the critical information they need to manage every aspect of the process right at their fingertips.
- ✓ **Solve problems** – A diagnostics screen displays a collection of the most common 'debug' components to monitor machine behavior and solve service issues. Operations manuals, instruction videos, and other materials are instantly available on-screen when needed.

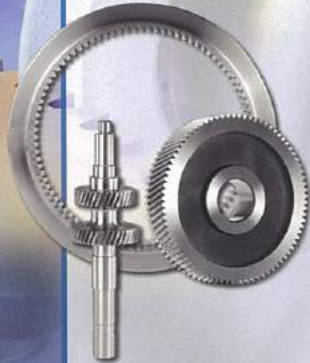
Providing customized solutions for all major gear manufacturing processes on a global basis with an industry-leading array of machines, tools, workholding, inspection and service products:

**BEVEL GEAR SOLUTIONS up to 2,500 mm**



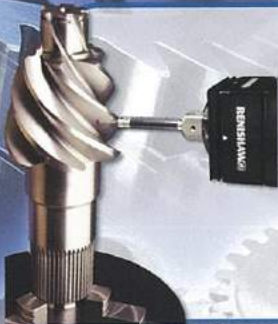
- ✓ Cutting (Spiral and Straight)
- ✓ Cutter Build
- ✓ Grinding
- ✓ Quenching
- ✓ Cutting Tools, All Processes
- ✓ Blade Grinding
- ✓ Lapping
- ✓ Roll Testing
- ✓ Design Software
- ✓ Workholding
- ✓ Global Services

**CYLINDRICAL GEAR SOLUTIONS up to 10,000 mm**



- ✓ Hobbing, Gashing
- ✓ Power Skiving
- ✓ Shaping
- ✓ Shaving
- ✓ Threaded Wheel and Combined Grinding
- ✓ Cutting Tools, All Processes
- ✓ Combined Processes
- ✓ Chamfering/Deburring
- ✓ Profile Grinding
- ✓ Honing
- ✓ Workholding
- ✓ Global Services

**METROLOGY SOLUTIONS all types of gears and gear tools**



- ✓ Analytical Inspection
- ✓ Functional Gages
- ✓ A2LA Gear Calibration Lab
- ✓ Master Gears
- ✓ Workholding
- ✓ Global Services



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