

NEW
300GMS/P nano
and 500GMSL

Multi-Sensor Inspection Machines
for High Precision Parts



Solutions for Small, Medium and Large Size Part Inspection: Lab and Shop Floor; Prototype to Production

This latest generation of Gleason GMS® metrology solutions takes gear inspection to an entirely new level, adding value and improving performance across the complete range of applications.

These Gleason systems are faster, easier to operate and more versatile than anything available up until now. They are also easily networked with the latest Gleason Gear Manufacturing Machines in a Closed Loop to improve quality and productivity while reducing scrap and rework.

Models are available for complete inspection in the lab or on the shop floor; for prototype and development jobs; and for 100% in-process inspection of gears in high volumes.

We configure your GMS Metrology System exactly the way you require it, for universal inspection applications or dedicated to your specific application.

At a Glance

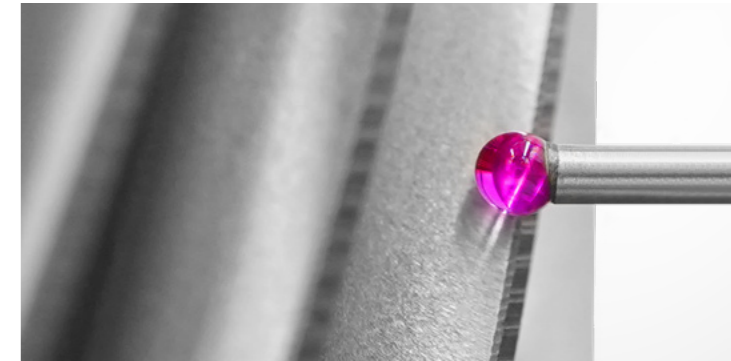
- Reduce cost of ownership by combining multiple inspection tasks onto a single platform.
- Solutions for every gear inspection challenge, whether in the lab or on the shop floor.
- Extremely versatile: GMS Series as well as specialized models GMSP/GMSL/GRSL for specific applications.
- User-friendly: Powerful, intuitive Windows® based GAMA™ applications software to speed throughput and simplify operation.
- Closed Loop Networking with Gleason production machines for real-time gear optimization.
- Faster throughput than earlier generations and competitive models.

Gear Noise Reduction

GMS systems can apply multiple analysis tools to help identify the root cause of gear noise, including Fourier analysis, tooth contact analysis, surface finish analysis and Kinematic Transmission Error Prediction Software (KTEPS). The GMSL Series offers non-contact laser sensor technology to capture high density data at incredibly fast speeds for faster, more accurate gear analysis.

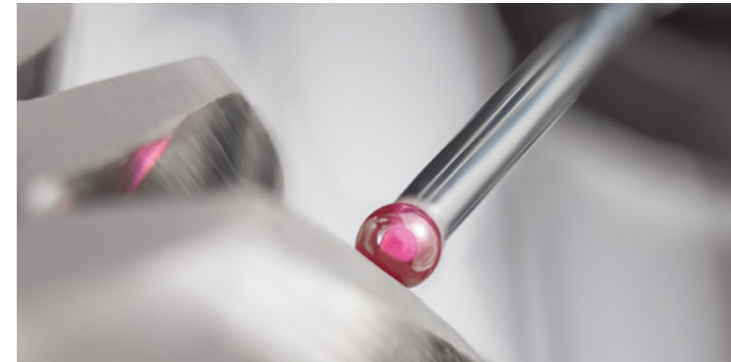
GMS / GMS nano

GMS Series for Analytical
Inspection of Small, Medium
and Large Parts.



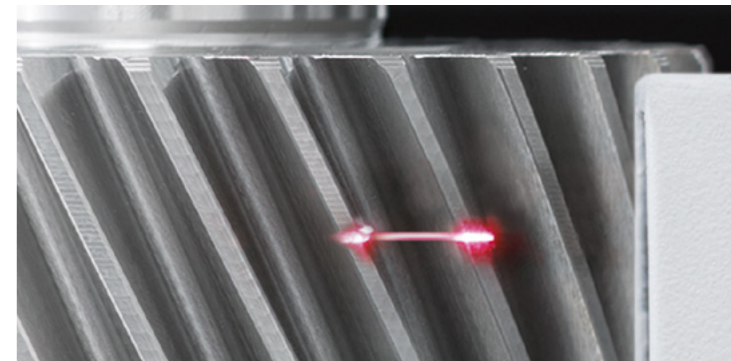
GMSP / GMSP nano

GMSP Series for Factory Floor Inspection
to Save on Queue and Transport Time.



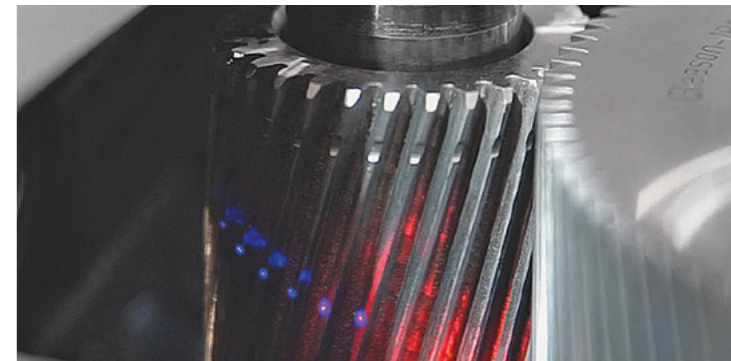
GMSL

GMSL for Non-Contact, Multi-Sensor
Inspection to Speed Gear Design and
Development.



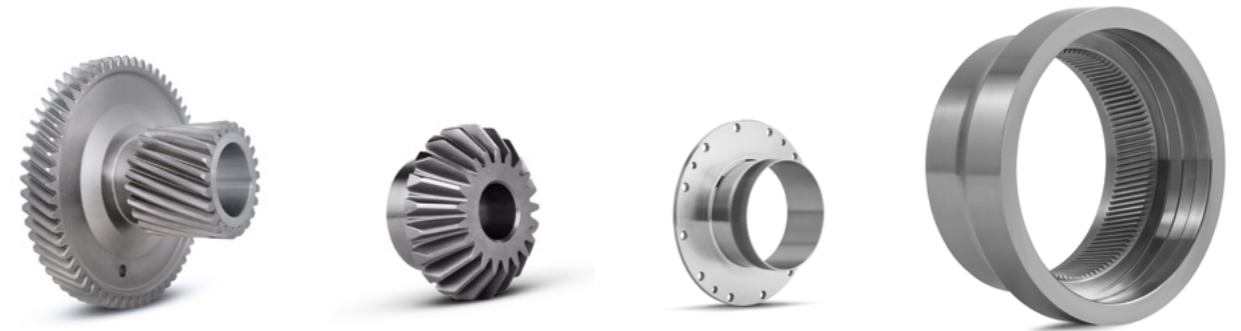
GRSL

GRSL for Non-Contact Laser Inspection
for 100% In-Process Measurement of
Gears in High Volumes.



Inspection at Nano Level: Fine Pitch and Small Diameter Gears for Automotive, Aerospace, Robotics and Similar Size Applications

nano.
inspection at nano level



The GMS nano series of analytical inspection systems combines all the latest inspection capabilities into a single, compact platform for the complete inspection of gears up to 300 mm in diameter and shafts up to 500 mm in length and fine pitch gears as small as .2 module. Repeatability and reliability exceed VDI/VDE2612 form standards up to factor 5.

Evaluation of Waviness at Sub-Micron Level

- Waviness-analysis for profile, lead and pitch.
- Noise analysis with highly sophisticated software tools.
- Sub-micron surface finish measurement with skidless probe.
- High accuracy SP25 3D scanning probes with a broad range of standard styli to meet various inspection challenges.

Resistant to Thermal Deviations and Vibrations

- The reference: highly accurate precision guides, laser-mapped with Invar-scales.
- Optional, patented machine base with super-dampening by air-cushions, field upgrade available.
- Table with axial air-cushioning, no slip-stick, resistant to potential mishaps.

Smart APC

- Optional automatic probe changer with sensor-controlled positions to avoid probe pad collisions.

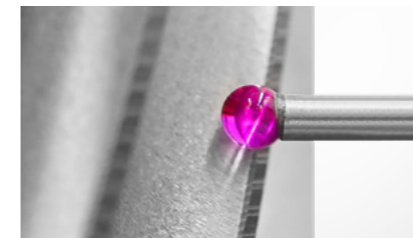
Trendsetting Operation

- Human/Machine Interface (HMI) meets factory space allotment and operator preferences.
- Optional Advanced Operator Interface (AOI) offers video, telephone and voice mail messaging, environmental monitoring and bar code/QR code reading.
- Easily networked in a Closed Loop with the latest Gleason Gear Manufacturing Machines to improve quality and productivity.

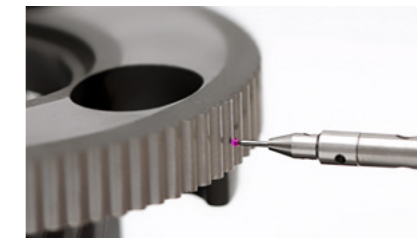
Benefits

- For highest precision and repeatability.
- Evaluation of Waviness at sub-micron level.
- Ideally suited for noise evaluation and analysis.
- Full range of inspection capabilities, fine pitch and CMM.
- Available in standard and "P" execution for the shop floor environment.
- True Windows® based GAMA 3.2 software suite to reduce programming and cycle times.
- Compact design with ergonomic operator work station.

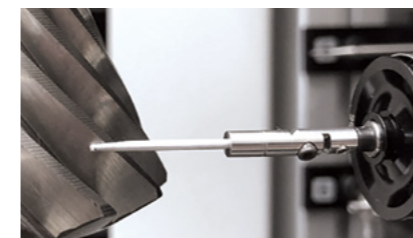
175GMS and 300GMS are particularly well suited for inspection of all types of fine pitch gears and cutting tools as small as .2 module, and surface roughness measurement down to .9 module.



Renishaw SP25 digital 3D scanning probes accommodate the widest range of workpiece types, sizes and applications.



Ideal for the inspection of special characteristics for example cycloidal gears.



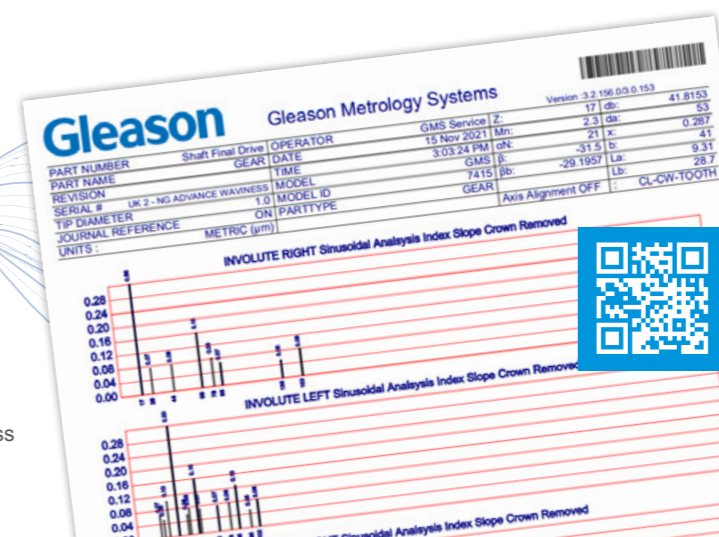
Use of non-skidless style probe type provides surface roughness measurement capability for cylindrical and bevel gears.



Inspection of the complete range of gear cutting tools, even broaches and racks.



Smart Automatic Probe Change (APC) system simplifies operation and reduces non-productive time. 4 or 6 positions for 175GMS, 6 or 9 position for 300GMS nano.



Typical Chart for Advanced Waviness Analysis.



See the new 300GMS nano in action.

Putting Powerful Inspection Right on the Factory Floor

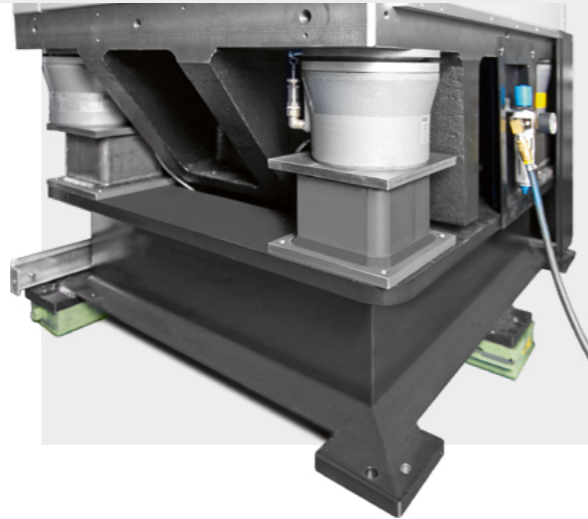
The Gleason GMSP-Series brings a full range of inspection capabilities to the production floor, delivering fast, precise inspection of everything from the smallest fine pitch gears to surface finish inspection and CMM measurement.

Built for the Production Environment

- Featuring a host of integrated systems that compensate for typical production floor thermal dynamics, vibrations and contamination.

- A unique patented base design includes an active leveling system to attenuate a broad spectrum of normal production environment vibrations, yielding measurement values in parallel with those achieved in temperature-controlled inspection rooms.

- The system identifies and applies a compensation for factory floor thermal fluctuations in real time.



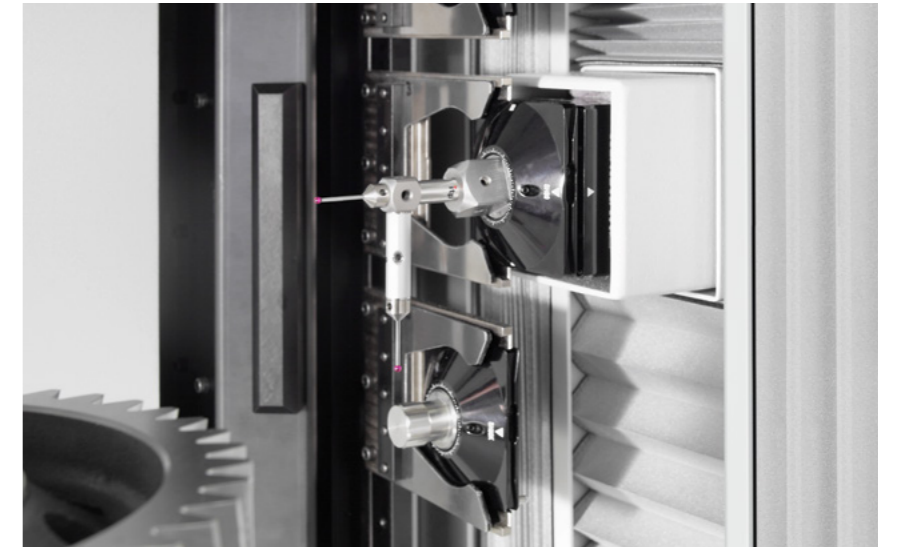
Patented base design with active leveling system minimizes the effects of typical production environment vibration to help achieve measurement values comparable to the typical controlled laboratory.

Shop-Hardened Inspection of Truck Gears and Similar Size Parts

Gleason's "P"-series technology is also available for the 475GMSP bringing shop-floor inspection to larger size and heavier parts.

A special feature of the 475GMSP is the availability of both probe heads: SP80H and SP25 depending on customers applications and preferences, for example when measuring extreme crowning on profile and lead.

For smaller modules and measuring surface roughness the 475GMSP offers both, skidded and skidless probes.



Benefits

- Compensates for typical production floor thermal dynamics, vibrations and contamination.
- Eliminates wasted time for part transport and queues at the lab.
- Achieves measurement values comparable to those in temperature-controlled inspection rooms.

The Ultimate in Inspection Reliability and Versatility for Medium Size Parts

For gear jobbers, truck manufacturers and other producers of medium-size gears for industrial applications, the inspection workload isn't getting any lighter. These GMS systems for medium-size parts take on all

the latest inspection tasks, speed throughput for the complete inspection of any gear, cutting tool or prismatic part, and operate more reliably, around the clock.

User Friendly

- Powerful, intuitive Windows 10 based GAMA applications software to speed throughput and simplify operation.
- Easily networked in a Closed Loop with the latest Gleason Gear Manufacturing Machines to improve quality and productivity.

Built for Reliability

- Solid granite base (except GMSP series machines).
- All axes linear motor driven.
- 0.1 μm resolution scales (actual resolution achieved on machine is much smaller than .1 μm). Absolute scales eliminate need for "homing" sequence.
- High precision work table for increased work capacity.

Extremely Versatile

- Fast, easy, complete inspection of all types of gears and gear cutting tools, even measurement of prismatic parts.
- High accuracy 3D scanning probes with a broad range of styli and optional Automatic Probe Changer with up to eight racks.
- Performs a wide range of surface roughness measurements, as defined in DIN, ISO and ANSI.
- Barkhausen noise analysis technology for the inspection of external cylindrical gears and external shaft diameters for residual and compressive stresses to detect grinding burn.

Benefits

- Complete inspection of all types of gears, gear cutting tools and prismatic parts, up to 650 mm in diameter, lengths up to 1,000 mm.
- Simplified operation and increased throughput with powerful GAMA applications software.
- A single platform performs multiple inspection tasks including surface finish measurement and noise analysis.
- Easily networked with Gleason production machines in a Closed Loop.

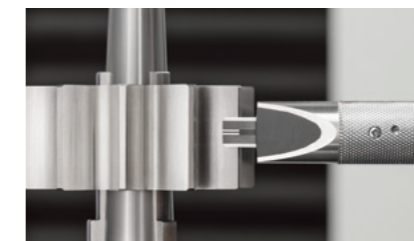


Advanced Operator Interface puts powerful tools right at the operator's fingertips, including:

- Environmental monitoring station to record temperature and humidity.
- Video telephony with Gleason Service or Application Engineering for ease of support.
- Note pad and voice mail messaging.
- Gleason Connect® for enhanced remote diagnostic support.



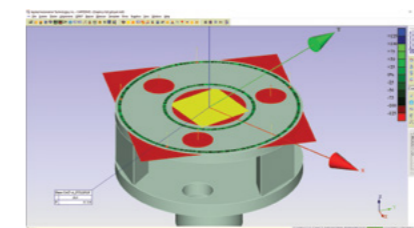
Non-skidded style probe provides surface roughness measurement capability as part of the normal gear inspection process, for gears down to module 1.5.



Barkhausen noise analysis technology for the inspection of external cylindrical gears and external shaft diameters for residual and compressive stresses to detect grinding burn.



By networking with Gleason's GEMS® and KISSsoft® gear design programs, GMS can take many hours out of bevel gear design and optimize production.



3D CMM measurement for position and dimension on non-gear applications.



Shaft-type parts 1,000 mm in length can be accommodated. Tailstock with two speeds in both up and down directions and auto stop on achieved clamping force delivers faster, more consistent part loading/clamping.



Solutions for Large Size Parts Inspection: Gears and Shafts up to 3,000 mm in Diameter, Length up to 2,500 mm

The GMS Series includes 850, 1000, 1300, 1500, 2000 and 3000GMS models for the inspection of larger gears and shafts up to 3,000 mm in diameter and lengths up to 2,500 mm. With their wide array of options, these larger GMS systems set up faster, operate more intuitively and automate the inspection processes to take precious time out of the complete inspection of larger, increasingly complex workpieces.

Benefits

- Complete inspection of all types of gears, gear cutting tools and prismatic parts up to 3,000 mm in diameter.
- Constructed to deliver exceptional accuracies and repeatability for the largest workpieces.
- 3D measurement and analysis functionality typically performed by a CMM available as an option.

More Productive

- GAMA, Windows®10 based operating software simplifies programming, automates the inspection process.
- 0.1 µm resolution absolute scales on all the main axes eliminates time-consuming 'homing' sequence at startup.
- Tailstock with optional two speeds both up and down for faster loading/clamping.
- Extended Journal Reference software greatly improves the speed and accuracy of large-part setup.
- Hand-held Advanced Operator Interface enables the operator to be productive from anywhere.

Highly Versatile

- High accuracy 3D scanning probes with a broad range of styli and optional Automatic Probe Changer with up to eight racks.
- Performs a wide range of surface roughness measurements, as defined in DIN, ISO and ANSI.
- Barkhausen noise analysis technology for the inspection of external cylindrical gears and external shaft diameters for residual and compressive stresses to detect grinding burn.
- Offers multiple noise analysis tools via the power of GAMA.
- Supports all major industrial standards including AGMA, DIN, ISO, JIS, GOST, China GB and others.



Advanced Operator Interface (AOI) is particularly useful during part setup, letting you answer program prompts from anywhere in the work area. AOI connects video telephony, notepad and voice mail messaging to Gleason Service for remote diagnostics and support.



With GMS' Journal Reference software, large-part setup is much simpler, faster and more accurate. Precise alignment of workpiece to machine now occurs without the typical 'truing up' steps.

Exceptionally Accurate

- Solid granite base and the largest diameter worktable in its class for greater weight capacity.
- Meehanite® cast iron slide assemblies on all the linear and rotary axes for improved vibration damping.
- Direct-drive, high torque rotary worktable features a .15 arc/second resolution rotary encoder to ensure superior positioning accuracy.
- All the main axes are linear motor driven, with .1 micrometer resolution linear scales.
- Every axis with high performance pre-loaded bearings, precision ground guideways, passive anti-vibration leveling and temperature monitoring for exceptional drive and motion control performance.

3D scanning probes with various stylus sizes up to 800 mm in length and custom configurations including probe extensions up to 500 mm in length for internal gears.



The Multi-Sensor Inspection System: Four Instruments, One Platform

The Gleason GMSL Multi-Sensor Inspection Systems give manufacturers a single compact, reliable and easy-to-operate inspection solution to apply the most desirable gear measurement and analysis methods for both R&D and production applications.

Extremely Versatile

- Tactile probing for traditional gear feature data collection on spur and helical gears, spiral and straight bevel gears, beveloid gears up to 300 mm / 500 mm in diameter; and many types of gear cutting tools, as well as 3D measurements.

Benefits

- Increase throughput while reducing cost with a single platform offering multiple inspection methods.
- Apply advanced laser scanning technology for faster development of increasingly complex gears.
- Thoroughly inspect gears requiring exceptional surface finishes and/or low noise characteristics.
- Reads most standard CAD file formats for reduced programming time.
- Creates CAD files of cylindrical gears for reverse engineering projects.

- Laser probing of a similarly wide range of workpieces, a process particularly well-suited for gear development efforts where massive amounts of data need to be collected faster than feasible with conventional tactile probing.
- Surface finish measurement on gears with ability to evaluate data with common and advanced surface measurement parameters. Supports multiple standards including ASME B46.1, the DIN 4287 and ISO 13565.
- Barkhausen noise analysis technology for the inspection of external cylindrical gears and external shaft diameters for residual and compressive stresses to detect grinding burn.
- Motorized two-axis rotary positioning probe head.

Research and Development Applications

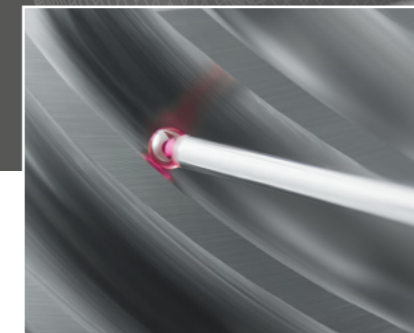
- Full tooth form scanning applications.
- Surface condition testing.
- Complex form profile scanning for rapid prototyping, reverse engineering and other typical R&D applications.

Production Applications

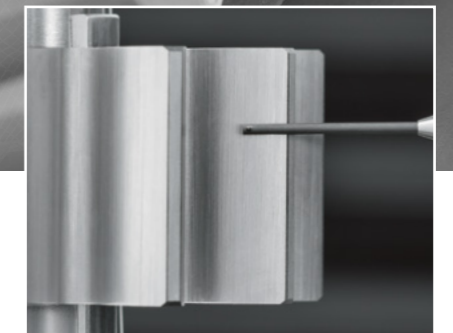
- High-speed topography inspection.
- CAD interface to reduce programming time for non-gear inspection.
- Soft, compliant materials, such as plastic gears.



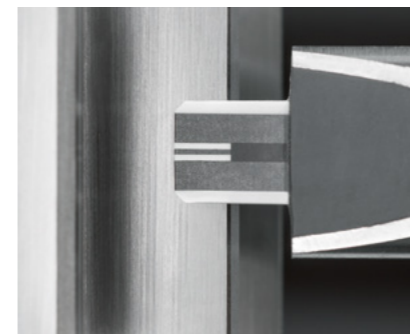
Second generation laser scanner, wireless.



Tactile probing, for the complete inspection of a wide range of gear types, gear cutting tools and even non-gear, CMM-type measurement.



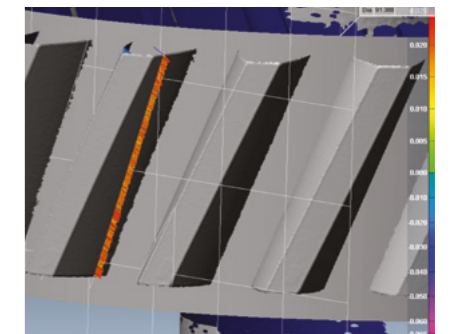
Surface roughness measurement, to help ensure consistently high-quality surface finishes.



Barkhausen noise analysis technology for the inspection of external cylindrical gears and external shaft diameters for residual and compressive stresses to detect grind burn.



3D laser scan for cylindrical and bevel gears. Significant benefit for the reverse engineering of gears. Colors show variations from nominal data depending on the defined tolerance band.



GMSL can take multiple complex sections on a 3D cloud point and export them to speed noise analysis.

Composite and Non-Contact Index, Profile and Lead Analyzer Delivers Unprecedented Speed and Flexibility

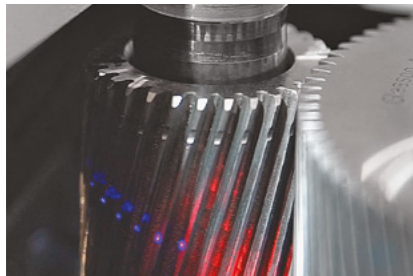
GRSL (Gear Rolling System with Laser) for the first time combines composite testing with advanced non-contact laser technology in a single system. Cycle times for non-contact index, involute and lead inspection are up to 10 times faster than conventional systems for the analysis of cylindrical gears from .4 to 7.2 module, up to 250 mm (10") in diameter.

Unprecedented Inspection Speed

- Performs non-contact index and profile inspection up to 1600% or more faster than conventional machines.
- Inspection of all 31 teeth on a typical helical gear in under 10 seconds, as compared to the 160 seconds needed for index and 4-teeth profile inspection on a conventional analytical machine.
- Performs composite testing as well as index, lead and profile inspection in the same test cycle.
- Overall cycle time savings are even higher since analytical and composite testing are done in the same test cycle.

Greater Flexibility

- View profile characteristics for every tooth for spur and helical gears: fko, fHa, Fa, ffa, faHm, Vaf, others.
- View index: Fp, fp, Fr and Fu.
- View composite: Nick, TCV, T2T, Average DOP, Average Circular Tooth Thickness, Fi" and fi".
- Uses familiar Gleason GAMA/WINROLL™ software interfaces.
- ISO, DIN and AGMA analysis charting.



Benefits

- Exceptionally fast non-contact index, profile and lead inspection.
- Combines composite, testing and analytical inspection into a single cycle.
- Flexibility for a wide range of analyses, including gear noise.
- Runs same GAMA application software suite as tactile systems, eliminating training for operators already familiar with GAMA.



GRSL laser scanning validates parts in seconds, up to 100% of the entire output, with realtime feedback and advanced analytics including profile, lead and pitch measurement, as well as gear noise analysis.

The Gleason Hard Finishing Cell (HFC) is the world's first fully-automated, Closed Loop manufacturing system for the production of precision gears in medium and high volumes. The

system integrates GRSL in-line gear checking with real-time analysis and automatic feedback of corrections to a Gleason 260GX Threaded Wheel Grinding Machine, as well as integration of modules for auxiliary

processes such as part washing and marking. Parts handling throughout the process is fully automated using high-speed robot and pallet system.



See the HFC in action
www.gleason.com/GRSL

The Powerful, Intuitive Interface to Optimize Every Operator's Performance

GAMA 3.2, the most powerful version ever of the popular Windows® based applications suite, opens a world of new options for growing requirements and greater profits with faster throughput.

The Power of GAMA

- Supports the complete inspection of all types of gears, including bevel, internal, external, spur and helical gears, shafts and gear cutting tools.
- Supports every optional tactile probing and non-contact laser scanning application for index, lead, and profile analysis sold within GAMA.

- Multiple waviness analysis tools to help identify the root cause of gear noise.
- Interfaces with measurement software and 3D probe measurement for Geometric Dimensioning and Tolerancing (GD&T).
- Charts easily configured to meet AGMA, DIN, ISO, JIS, GOST, China GB, and other standards including most OEM / TIER 1.
- Supports different output files, connectivity with GEARNET and VDI/VE 2610 GDE.

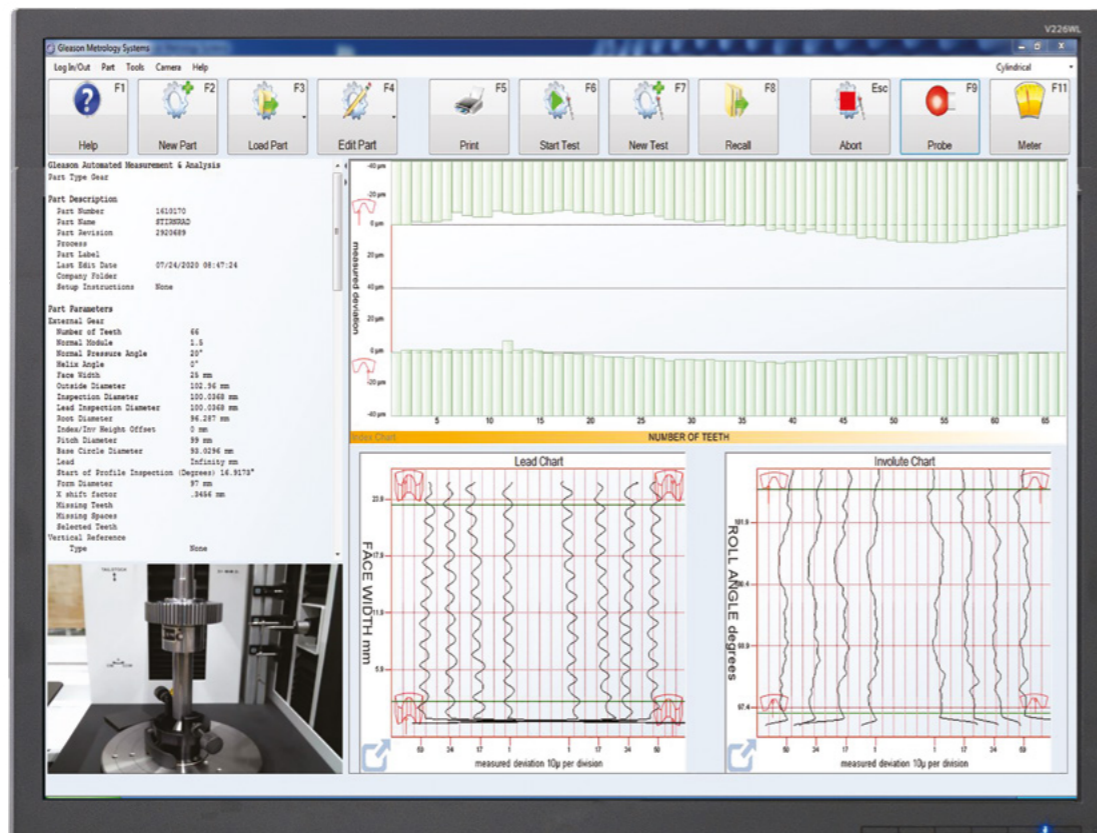
The Added Power of GAMA 3.2

- Inspect multiple tip and root diameters at selected involute heights.
- Advanced surface finish measurement, along with tolerance capabilities.
- Customizable helix and involute filter parameters for Special Test for latest ISO gear standards.
- Custom cylindrical gear lead and profile analysis.
- Expanded bias analysis supports cylindrical gear slope and crown tolerances for top, middle and bottom sections using custom bias charts.

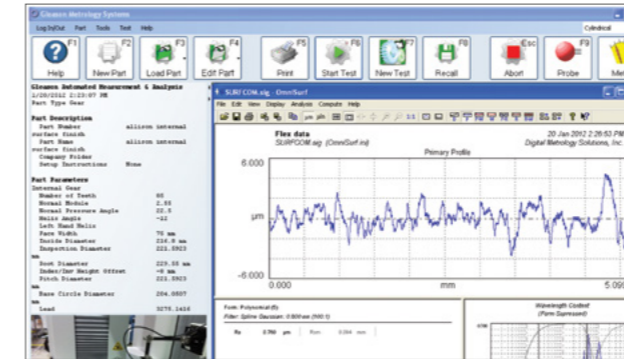
Benefits

- Greatly expanded capabilities, including gear noise analysis.
- Updated control system software delivers faster scanning and optimized probe crash prevention.
- Windows® 10 based for improved security, networking, compliance and full Microsoft support.
- 3.2 Upgrade package instantly brings legacy or later model systems to a new performance level.

With GAMA 3.2, creating a new program is as easy as point and click, regardless of experience level, language requirements or part type. Programs for future parts can be created simultaneously while inspection takes place; measured parts can be re-analyzed as well during inspection of another part. GAMA is truly a multi-tasking application.

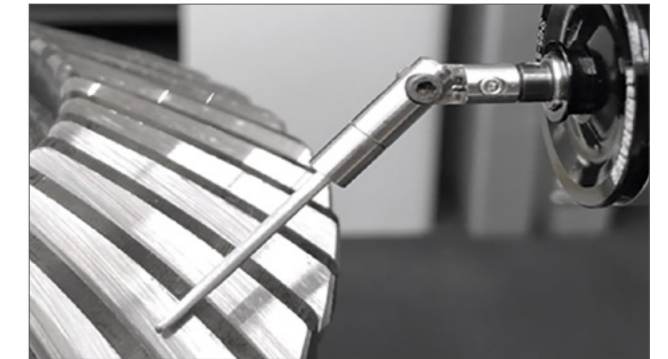


Cylindrical Gear Surface Roughness Measurement



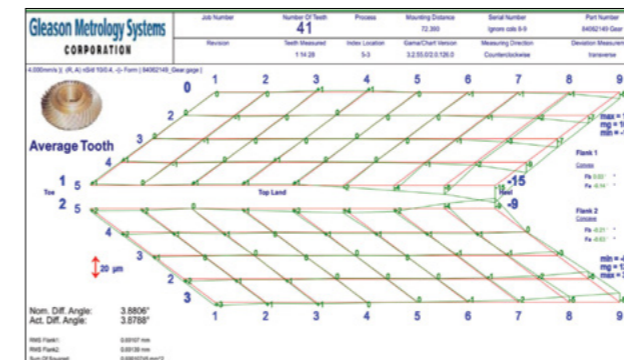
GAMA displays results as the measurement progresses, and then the completed evaluation in an easy-to-interpret graphical form. Choose from the most common parameters as defined by DIN, ANSI and ISO.

Bevel Gear Surface Roughness Measurement



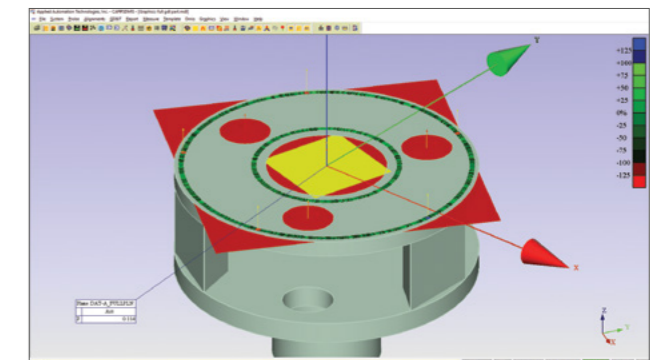
GAMA can now accommodate Surface Roughness Measurement and clearance moves of a wider range of bevel gear types and sizes, through use of a 45° tilted surface finish probe.

ENDREM™ Analysis



With ENDREM™ Analysis, one measurement flank form can be divided into two parts for better analysis of areas prone to noise.

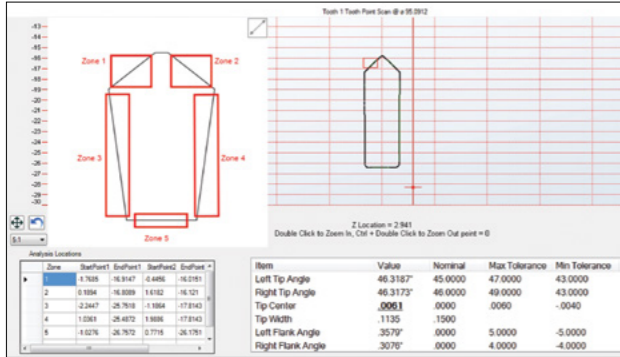
CMM-Type Measurement



GAMA interfaces gear measurement software and Geometric Dimensioning and Tolerancing (GD&T) capability for integration of non-gear features into the common user interface.

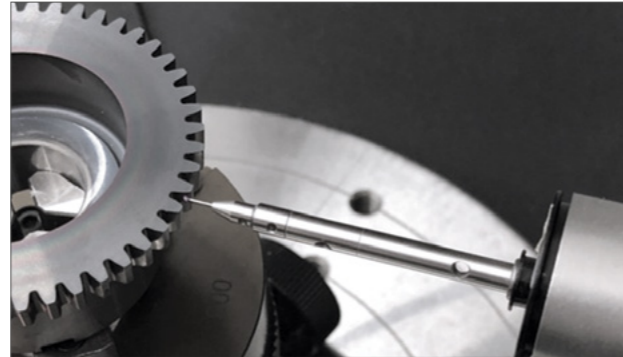
- Find Missing Teeth' test option can now be applied for gears with large numbers of missing teeth.
- Added support for beveloid, internal, spur and helical involute gears, including setup and testing on-centerline; inspecting both flanks at same time.
- Follow Surface Journal' scan option allows probe to follow the runout of the axial and radial journals if beyond the probe travel, saving setup time.
- QC Bottom Center Utility saves time for bottom center centering setup.
- Probe Accuracy Test on Probe Calibration reduces risk of inaccurate inspections by determining whether a probe tip has a chip or other flaw.
- Probe Pad Detection automatically detects a probe pad in a probe changer station, eliminating collisions.
- Automatic multi-tip probe calibration displays all calibrations on one report.
- Allows user to require a probe calibration after a specific number of part inspections.

Transmission Gears



Even transmission gears with irregularly shaped clutch teeth and particularly tight tolerances can be easily inspected for typical features such as roof, sides, symmetry, centrality and more.

Power Skiving Cutter Inspection



GAMA 3.2 expands the user's ability to inspect a complete range of gear cutting tools, including hobs, shaper cutters, shaving tools – and now all types of Power Skiving cutters, even in cylindrical execution.

- Single-start worm shaft inspection, with 'per part' capability to change number of axial pitch locations.
- XZ45D Surface Finish Probe can now be used on all bevel gear part types.
- Improved scan accuracy of surface finish of bevel gears, configured with Renishaw SP25 probes.

- Lead and profile analyses for both maximum and minimum bias tolerances.
- Vertical charts display the General Index Tolerance true position.
- Input parameters now imported to SQL, with all gear input parameters.

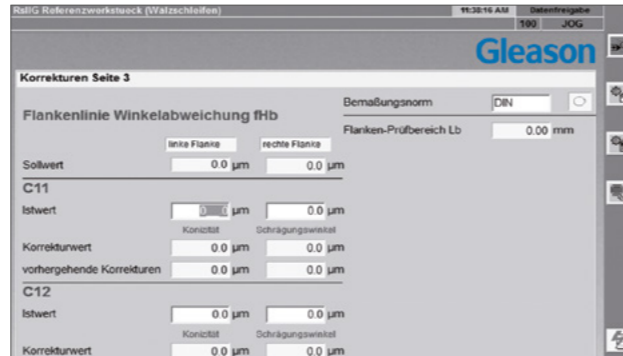
- Journal measurement analysis with tolerance ability.
- Journals display true position output on charts; also added to QDAS.

Worm Shaft Inspection



For single-start worm shafts, GAMA 3.2 now gives users the ability to specify the number of axial pitch locations.

Closing the Loop



With GAMA, Gleason manufacturing machines can be networked in a Closed Loop so corrective actions are fast and accurate.

GAMA 3.2 Technology Upgrade for Your Existing Systems

GAMA 3.2 Upgrade Package makes it easy to take your existing Gleason inspection systems to their highest performance level – all at a fraction of the cost of new equipment. In addition to all the new features and of GAMA 3.2, the package offers you:

The Latest Controls System Software:

- Improved scanning speed.
- Improved probe crash prevention.
- Increased reliability.

Application Versatility:

- Windows® 10 Operating system upgrade available for most models of SIGMA, GMM, GMS and GBX.

* Additional hardware and/or software purchase may be required for some options. An additional fee may be required for integrated third party packages. Also note that a GAMA 3.1 'Light' Update is available as well, enabling you to upgrade your machines to Windows 10 but at reduced cost. This includes new hardware, Windows 10 and proven GAMA 3.1 software. You have the option to upgrade to GAMA 3.2 at any time later.

Windows 10 Operating System, Providing:

- Improved security and protection.
- Network and IT compliance.
- Full Microsoft support (Windows 7 support no longer available).

Industrial Grade Specially Engineered Computer Hardware*:

- Upgraded core series CPU to I5 for faster performance and better graphics.
- Ultrafast speed in start up, data access, analysis, and SPC processing.
- Screen loads and changes pages in 0.5 seconds or less.
- Solid state drives – increased reliability and less risk of failures.
- New monitor, mouse and keyboard when required.

Enhanced QDAS interface includes

- Import language from other QDAS configurations to the QDAS characteristic text fields.
- Enables a QDAS Shift Counter to track inspection frequency of a part for specific machines.
- Instructs QDAS to add a field on the cylindrical gear Start Test dialog and enter the job ticket number.
- Separate flank form deviation tolerances are now available for concave and convex flanks of bevel gears.
- ENDREM™ Analysis, using one measurement to divide the flank form into two parts for noise analysis.
- Advanced Circular Geometry programming capability to support 10-500 UPR Gaussian filter cutoff.

- Force Part Temperature Entry for all cylindrical gears can require the operator to enter the part temperature before inspecting any cylindrical gear. Part temperature growth compensation has been added to the tip and root diameter measurements.
- GD&T Workpiece Temperature Compensation of diameters and distance values based on the part temperature coefficient of expansion and nominal temperature.



Meeting the Challenge of Gear Noise Analysis

With the surge in Electric Vehicles and other noise-sensitive applications, gear noise reduction is now of paramount importance. GAMA applications software can apply multiple analysis tools to help identify the root cause of gear noise. The input to these tools is measurement data collected during the inspection of a gear. These tools save the

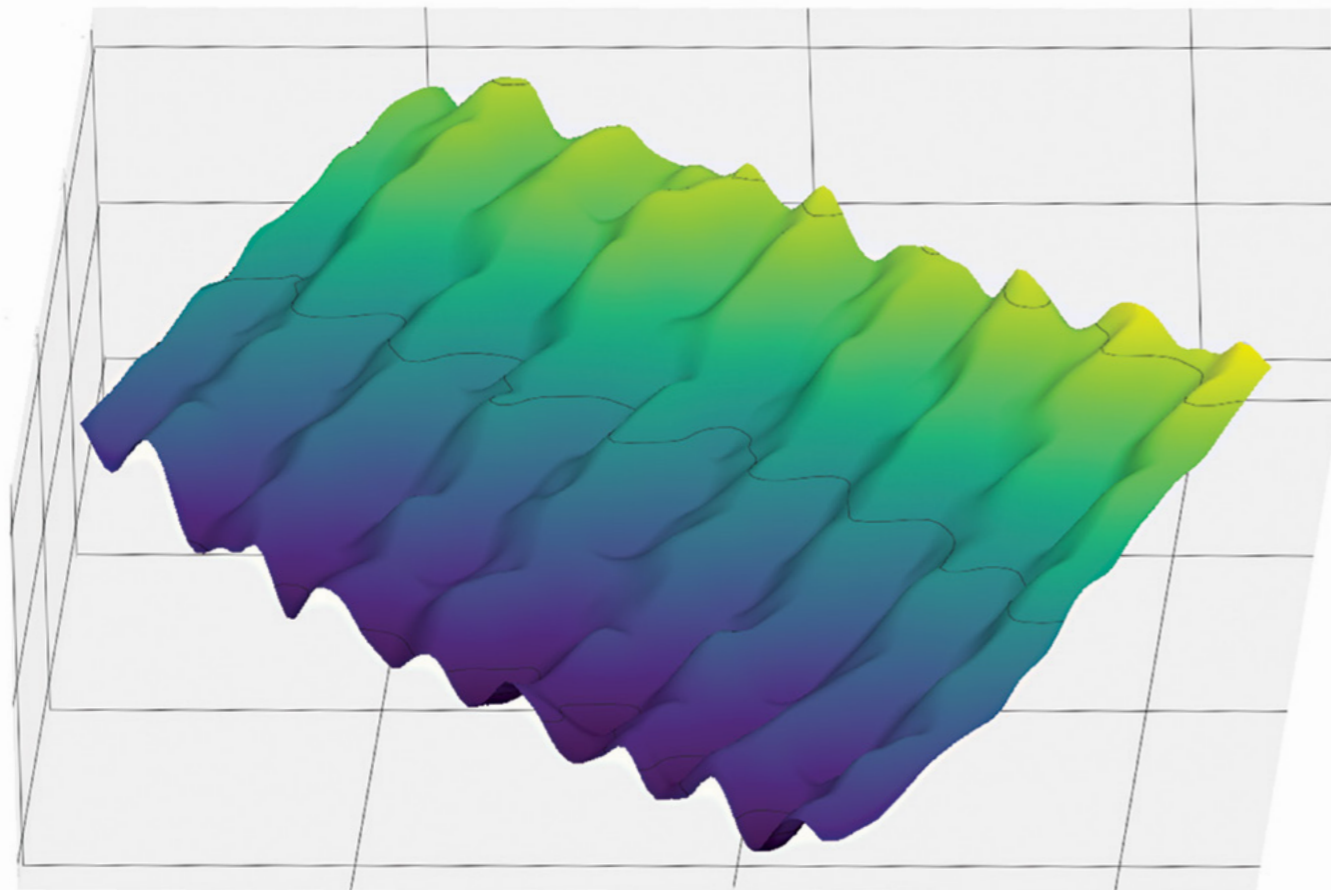
GAMA user time with extremely user-friendly input requirements and mathematically optimized outputs for ease of interpretation.

New Analysis Tools

The GMS Series are all capable of performing contact analysis, using the same GAMA software. The GMSL Series offers additional benefits, due

to its ability to capture high density data at speeds up to 800% faster than tactile probing.

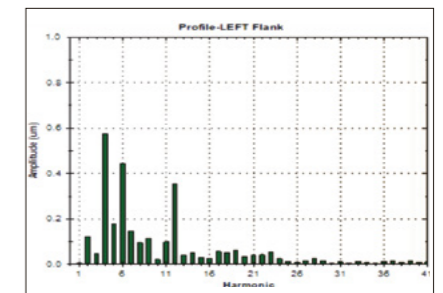
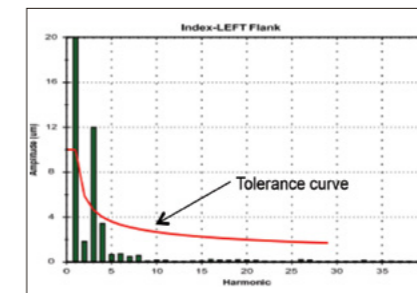
Gleason brings a significant advantage to its customers by combining multiple analysis tools on one platform. With GAMA, you can benefit from any/all of these powerful tools:



1. Fourier Analysis

Evaluates individual harmonics values of a production gear on a single tooth for lead and profile as well as pitch. Fourier Analysis of Bearing Surface waviness can determine one of the main causes of low-frequency noise in a gear box.

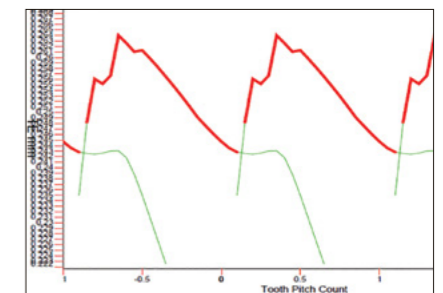
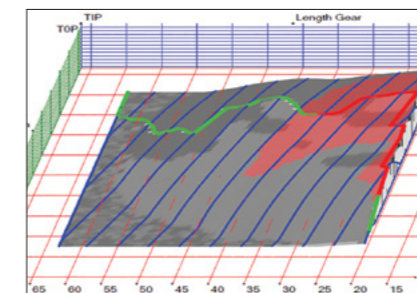
Fourier Analysis



2. Tooth Contact Analysis

GAMA contact analysis software computes transmission error along the meshing path, generates ease off topographical charts and identifies misalignments, helping to optimize gear surface geometry.

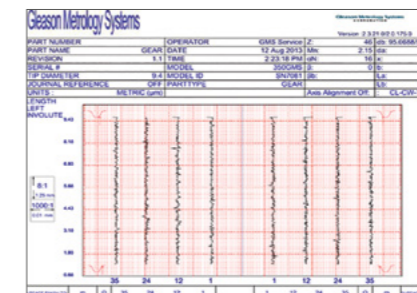
Tooth Contact Analysis



3. Surface Finish Analysis

GAMA can measure up to 72 different surface finish characteristics with advanced filter methods to analyze high-frequency noise and micro-waviness.

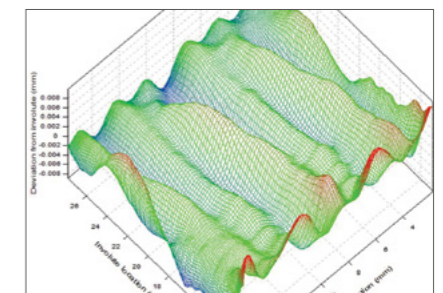
Surface Finish Analysis



4. GAMA/KTEPS

KTEPS uses a revolutionary analysis approach for determining and diagnosing gear noise. GAMA's unique ability to communicate with KTEPS puts this easy-to-use interface at your fingertips.

GAMA/KTEPS



5. Loaded Contact Analysis

Design engineers consider the effect of tooth bending under varying load. GAMA can write gear part parameters including tolerances and inspection test data that can be shared with KISSsoft for both gear and gearbox design optimization purposes.

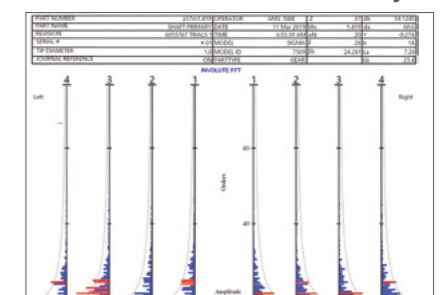
Loaded Contact Analysis



6. GAMA Advanced Waviness Analysis

Additional evaluation with FFT is also possible for each single measurement trace. This chart shows the profile, enabling the operator to see in which harmonic the gear will fail (red = out of tolerance).

GAMA Advanced Waviness Analysis



The Complete Array of Workholding Solutions to Meet Any Workpiece Requirement

Gleason offers GMS users a variety of tooling and workholding solutions to help minimize costly setup time for a wide variety of part types and inspection requirements, and to help ensure that inspection results aren't compromised by the use of anything less than the highest precision components.

Gleason LeCount Expanding Mandrels, for example, are renowned around the world for their excellent repeatability, and the ability to quickly load and unload parts.

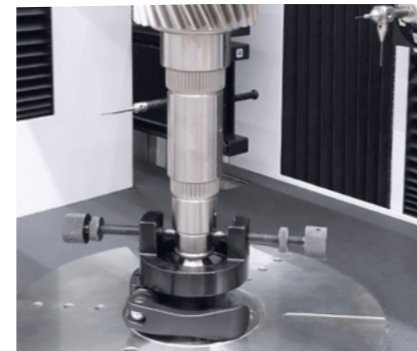
With a wide variety of expansion ranges, only 12 Gleason LeCount Mandrels can accommodate parts with bore sizes ranging from .375 to 7.00" (9.5 to 178 mm), with an accuracy of .0001" (2.5 microns) T.I.R.



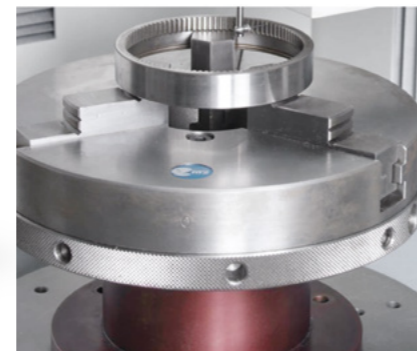
Gleason LeCount® arbors: 3-jaw slide mandrels with various clamping ranges.

Other tooling and workholding solutions include:

- Probe tips from 0.1 to 5 mm in diameter, with custom configurations for the most complex inspection requirements.
- A2LA-certified masters and artifacts.
- Various diameter 3-jaw precision chucks, and magnetic chucks, with adapters.
- A complete array of centering and leveling devices, arbors, and locating tooling.



Support for workpiece clamping: 10-155 mm.



Precision 3-jaw chucks available in various sizes.

Keeping Your Inspection Assets Up and Running Productively – and Profitably

While your gear inspection requirements have never been more complex, getting the support you need to maximize the performance of your GMS inspection system has never been easier. Your GMS system comes the industry's most complete array of service and support capabilities. Choose from:

Basic Service Plan:

Alignment checks for X, Y, Z; for top center, bottom center; A2LA measurement uncertainty report.

Silver Service Plan:

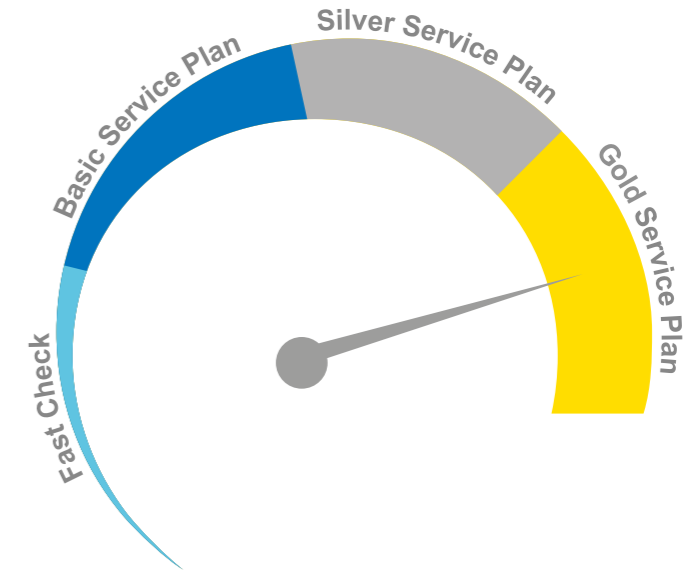
Basic Plan plus: Preventive maintenance; alignment adjustments; A2LA before measurement uncertainty report; software part program back up.

Gold Service Plan:

Silver plan plus: Update of GAMA software to current levels, where applicable; software backup of new system; updated machine control software for GAMA systems; up to 10 hours telephone support during the year.

Gleason Connect Services

Our Gleason Connect® Service provides you with online support in analyzing and rectifying faults and servicing your Gleason machines.



Through a secure Gleason Connect web browser, Gleason can view the screen, even create a part program. With a video interface, we can also observe the live inspection and support.

Your path to networked production: Gleason Connect is free-of-charge during warranty and already pre-installed in all current Gleason controls. Included in Silver and Gold Service Plans.



Data / Models	GRSL	175GMS	300GMS/P nano	300GMSL	350GMS	475GMS/P	500GMSL	650GMS	850GMS	1000GMS	1300GMS	1500GMS	2000GMS	3000GMS
Workpiece dia., max.	250 mm / 10.0"	175 mm / 6.9"	300 mm / 11.8"	300 mm / 11.8"	350 mm / 13.8"	475 mm / 18.7"	500 mm / 19.7"	650 mm / 25.6"	850 mm / 33.4"	1,000 mm / 39.4"	1,300 mm / 51.2"	1,500 mm / 59.1"	2,000 mm / 78.7"	3,000 mm / 118.1"
Module/Diametral pitch, range	0.4 - 7.2 mm / 64 - 3.5 DP	0.2 - 6.35 mm / 127 - 1.4 DP	0.2 - 18 mm / 127 - 1.4 DP	0.2 - 18 mm / 127 - 1.4 DP	0.3 - 18 mm / 85 - 1.4"	0.4 - 18 mm / 64 - 1.4"	0.5 - 22 mm / 50.8 - 1.15"	0.5 - 22 mm / 50.8 - 1.15"	0.5 - 22 mm / 50.8 - 1.15"	0.5 - 22 mm / 50.8 - 1.15"	0.5 - 22 mm / 50.8 - 1.15"	0.5 - 32 mm / 50.8 - 1.15"	0.8 - 32 mm / 31.75 - 0.8"	0.8 - 32 mm / 31.75 - 0.8"
Helix angle (in degrees)	0 - 90	0 - 90	0 - 90	0 - 90	0 - 90	0 - 90	0-90	0 - 90	0 - 90	0 - 90	0 - 90	0 - 90	0 - 90	0 - 90
Workpiece length*, max.	154 mm / 6.1"	380 mm / 14.9"	300GMS nano: 500 mm / 19.7" 300GMS/P nano: 450 mm / 17.7"	500 mm / 19.7"	650 mm / 25.6"	650 mm / 25.6"	1,000 mm / 39.7"	1,000 mm / 39.7"	1,300 mm / 51.2"	1,300 mm / 51.2"	1,300 mm / 51.2"	1,300 mm / 51.2"	2,000 mm / 78.7"	2,000 mm / 78.7"
Workpiece weight**, max.	6.8 kg / 15 lbs.	22.7 kg / 50 lbs.	100 kg / 220 lbs.	100 kg / 220 lbs.	100 kg / 220 lbs.	300 kg / 660 lbs.	300 kg / 660 lbs.	550 kg / 1,210 lbs.	1,800 kg / 3,969 lbs.	2,200 kg / 4,840 lbs.	2,200 kg / 4,851 lbs.	6,800 kg / 15,000 lbs.	12,000 kg / 27,000 lbs.	19,000 kg / 42,000 lbs.
Table height	801 mm / 31.5"	1,070 mm / 42"	940 mm / 37"	937 mm / 37"	937 mm / 37"	950 mm / 37.4"	960 mm / 37.8"	960 mm / 37.8"	965 mm / 38"	1,010 mm / 39.8"	1,036 mm / 41"	1,378 mm / 54.3"	1,366 mm / 53.8"	1,378 mm / 54.3"
Performance data														
Position measuring system	0.1 µm high resolution scales							0.1 µm high resolution scales						
Ambient requirements														
Humidity	Not to exceed 60 % and non-condensing							Not to exceed 60 % and non-condensing						
Temperature limits in which the specified u95 uncertainty are guaranteed	GMS Models: Ambient temp.: 20°C ± 2°C / 68°F ± 4°F Thermal fluctuation: ≤ 1°C / hour; 1.5°C / day / ≤ 1.8°F / hour; 2.7°F / day Thermal gradient: ≤ 1.0°C / meter / ≤ 1.8°F / º							GMS/P Models: Ambient temp.: +15-35 °C / 60-95 °F Thermal fluctuation: ≤ 1 °C / hour; 1.5 °C / day / ≤ 1.8 °F / hour; 2.7 °F / day Thermal gradient: ≤ 1.0 °C / meter / ≤ 1.8 °F / º			GMS/L Models: Ambient temp.: 20 °C ± 2 °C / 68 °F ± 4 °F Thermal fluctuation: ≤ 1 °C / hour; 1.5 °C / day / ≤ 1.8 °F / hour; 2.7 °F / day Thermal gradient: ≤ 1.0 °C / meter / ≤ 1.8 °F / º			
Measuring range														
W	-	-	-	-	-	-	-	-	-	-	-	400 mm / 15.7"	625 mm / 24.6"	1,000 mm / 39.4"
X	-	100 mm / 3.9"	185 mm / 8.7"	275 mm / 10.8"	185 mm / 7.3"	250 mm / 10"	350 mm / 13.8"	350 mm / 13.8"	425 mm / 16.7"	550 mm / 21.6"	670 mm / 26.3"	550 mm / 21.6"	550 mm / 21.6"	550 mm / 21.6"
Y	-	150 mm / 5.9"	200 mm / 7.9"	275 mm / 10.8"	250 mm / 10"	250 mm / 10"	550 mm / 21.6"	550 mm / 21.6"	550 mm / 21.6"	650 mm / 25.6"	700 mm / 27.5"	850 mm / 33.5"	1,085 mm / 42.7"	1,500 mm / 59.1"
Z*	-	305 mm / 12.0"	450 mm / 17.7"	450 mm / 17.7"	450 mm / 17.7"	450 mm / 17.7"	600 mm / 23.6"	600 mm / 23.6"	1,000 mm / 39.4"	1,000 mm / 39.4"	1,300 mm / 51"	1,000 mm / 39.4"	1,200 mm / 47.2"	1,200 mm / 47.2"
Dimensions, weights, power														
Width	639 mm / 25.2"	825 mm / 32.5"	1,065 mm / 42"	1,333 mm / 70"	1,775 mm / 69.9"	1,767 mm / 69.5****	1,483 mm / 58.4"	1,930 mm / 75.9"	2,175 mm / 85.6"	2,175 mm / 85.6"	2,548 mm / 100.3"	2,637 mm / 103.8"	3,150 mm / 124"	3,662 mm / 144.1"
Length	1,270 mm / 50"	950 mm / 37.4"	1,000 mm / 39"	1,925 mm / 64"	1,418 mm / 55.8"	1,635 mm / 64.4****	2,240 mm / 88.2"	2,105 mm / 82.8"	2,589 mm / 101.9"	2,629 mm / 103.5"	2,887 mm / 113.6"	2,753 mm / 108.3"	3,352 mm / 132.9"	3,650 mm / 143.7"
Height	1,340 mm / 52.8"	1,857 mm / 73"	1,857 mm / 73"	2,135 mm / 84"	2,042 mm / 80.4"	2,127 mm / 83.7****	2,533 mm / 99.8"	2,515 mm / 99"	2,988 mm / 117.6"	2,988 mm / 117.6"	3,155 mm / 124.2"	3,300 mm / 129.9"	3,970 mm / 156.3"	3,985 mm / 156.9"
Machine weight	818 kg / 1,800 lbs.	2,250 kg / 4,961 lbs.	2,560 kg / 5,644 lbs.	4,000 kg / 8,800 lbs.	3,250 kg / 7,165 lbs.	4,000 kg / 8,818 lbs.	5,500 kg / 12,125 lbs.	5,500 kg / 12,125 lbs.	8,480 kg / 20,230 lbs.	8,480 kg / 18,695 lbs.	10,200 kg / 22,491 lbs.	11,785 kg / 25,981 lbs.	19,175 kg / 42,273 lbs.	21,801 kg / 48,063 lbs.
Packaged machine weight		2,720 kg / 6,000 lbs.	2,923 kg / 6,444 lbs.	4,700 kg / 10,340 lbs.	4,180 kg / 9,190 lbs.	4,350 kg / 9,570 lbs.	8,480 kg / 18,695 lbs.	8,480 kg / 18,695 lbs.	8,480 kg / 18,695 lbs.	10,854 kg / 23,930 lbs.	8,058 kg / 17,765 lbs.	13,425 kg / 29,535 lbs.	21,050 kg / 46,300 lbs.	26,700 kg / 58,670 lbs.
Power requirements	110/220 V (±10 %), 50 to 60 H							110/220 V (±10 %), 50 to 60 H						

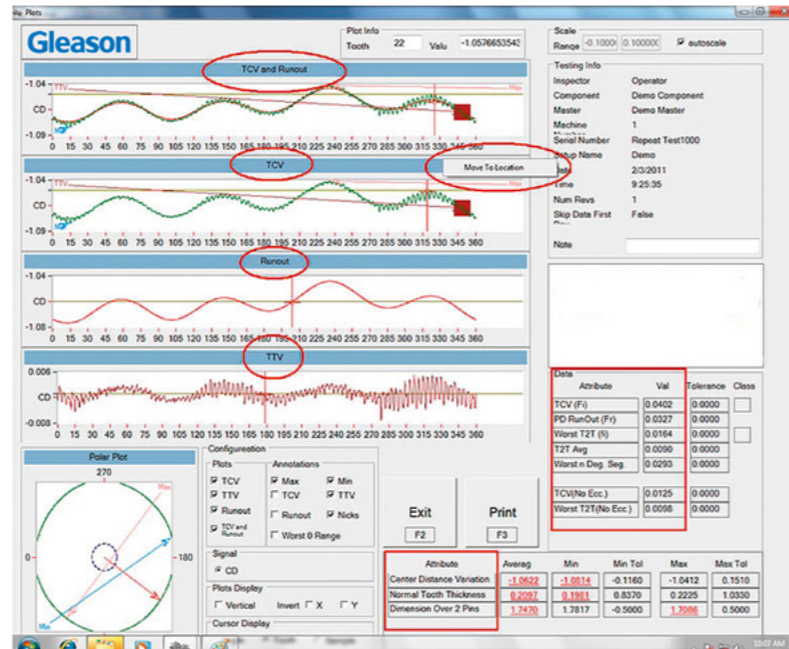
* Larger travels for Z-axis and tailstocks available on request (not available on 175GMS).
 ** Heavier load capacities available on request.
 *** Overall dimensions for 475GMS/P model: Width: 1,397 mm / 55.0", Length: 1,857 mm / 73.1", Height: 2,390 mm / 94.0"
 All specifications subject to change without notice.

for more information
www.gleason.com/gms

GRS2 systems offer the flexibility and precision performance necessary to meet the composite testing demands of gear manufacturers. Manual or motorized double flank rollers are available for inspection of external and internal gears of various materials including powdered metal and plastic.

GMS Test Analysis Software:

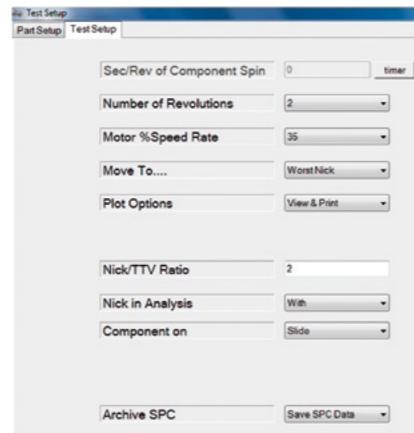
- Total Composite Variation.
- Worst Tooth-to-Tooth Variation.
- Average Tooth-to-Tooth.
- Runout.
- Calculate Functional DOP Value.
- Nick Detection with the “Move to Location” – Allows the user to quickly and very accurately locate a nick for Rework, which saves time and money.



GMS test analysis software speeds and simplifies the inspection process.

Component Test Setup:

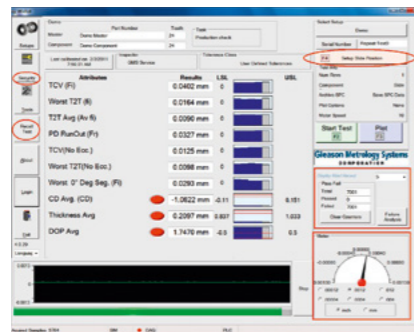
- Time Based Inspection Number of Revolution Inspection (1-8 Revolutions).
- Set Motor Speed (10-100%).
- Move To Location After Test Completion: No Location Move – High Point – Worst Nick – Master Gear Start Location.
- Plot Options Include: Auto View – Auto Print – Auto Print & View of Test Results.
- Determine Nick / TTV Ratio.



Component test setup is fast and easy.

WINROLL™ Main Screen Interface:

- Security
- Recall & Re-Analyze Data.
- Visual Indicators.
- Master Only Once (F4 Setup Slide Position).
- SPC Analysis.



WINROLL main screen interface is simple and intuitive.



GRS2 Double Flank Gear Roller System

Dimensions	
Measuring range	external 31.75 - 254 mm / 1.25 - 10"
	internal 63.5 - 254 mm / 2.5 - 10"
Overall dimensions	width 200 mm / 7.8"
	length 650 mm / 25.6"
	height 150 mm / 7.5"
Load height	255 mm / 10.0"
Module diametral pitch range	0.4 - 2.5 mm / 64" - 10"
Maximum workpiece weight	6.8 kg / 15 lbs.
Maximum workpiece length	254 mm / 10"
Maximum workpiece diameter	254 mm / 10"
Center distance range	254 mm / 10"
Machine weight	40 kg / 88 lbs. less optional tooling, workbench, enclosures, master gears.
Performance Data	
Position measuring system	LVDT or optional linear tape scale; QDAS interface optional
Repeatability	0.0025 mm / 0.0001"
Supply Data	
Power requirements	115 V, 230 V ± 10 % (50 - 60 Hz)
Ambient Requirements	
Permissible ambient temperature	15°C to 35°C / 60°F to 95°F



GRS2 Heavy-Duty Double Flank Gear Roller System

Dimensions	
Maximum part O.D.	304.8 mm / 12.6"
Maximum workpiece weight	22.7 kg / 50 lbs.
Center distance	321.31 mm / 12.65"
Headstock	available as option
System weight (less any optional workholding, master gears, headstocks, tailstocks etc.)	227 kg / 500 lbs.

Pitch Diameter Measurement Systems

Ideal for use both in quality labs and manufacturing cells, Gleason Metrology Systems DOP enable manufacturers to gather reliable dimensions over pins or balls measurements to verify actual tooth thickness (or space width) at the pitch diameter.

A unique constant-pressure gauging system is employed to ensure accuracy across the range of measurement. They also feature a precision linear rail set, contact-dampening mechanism and a friction-free platen locator.

Pitch Diameter Measurement Systems

Dimensions		DOP160	DOP320
Measuring range	external	0 - 160 mm / 0 - 6.5"	0 - 320 mm / 0 - 12.5"
	internal	38.1 - 160 mm / 1.5 - 6.3"	38.1 - 320 mm / 1.5 - 12.5"
Overall dimensions	width	406 mm / 16"	406 mm / 16"
	length	762 mm / 30"	889 mm / 35"
	height	381 mm / 15"	381 mm / 15"
Module diametral pitch range		0.4 - 2.5 mm / 64" - 0.098"	
Maximum workpiece weight		6.8 kg / 15 lbs.	
Maximum workpiece diameter		160 mm / 6.5"	
Machine weight		40 kg / 88 lbs.	
Performance Data			
Data collection interface		Digital readout or PC-based display; QDAS optional	
Repeatability		0.0025 mm / 0.0001"	
Supply Data			
Power requirements		115 V, 230 V ± 10 % (50 - 60 Hz)	
Ambient Requirements			
Humidity		40 % to 60 % non-condensing	
Permissible ambient temperature		15°C to 35 C / 60°F to 95°F	



North America's First A2LA Accredited Gear Calibration Lab

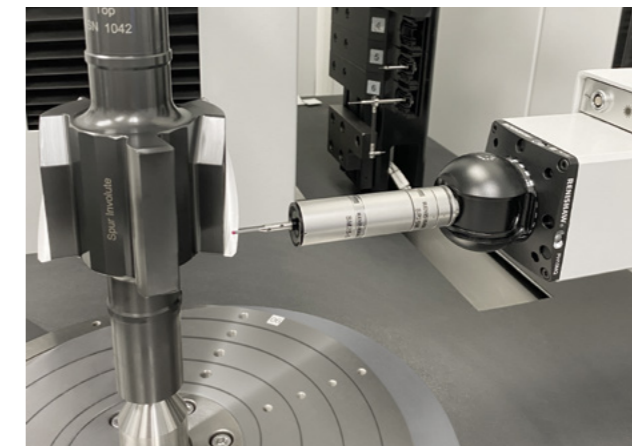
Through the Gleason Metrology Systems Calibration Laboratory, GMS has the equipment, experience, and accreditations to meet your ISO 9000 and 17025:2017 calibration requirements. With the addition of the latest Gleason 300GMSL Gear Measurement System and GAMA 3.2 analytics software, utilizing our proven accuracy enhancement technologies, the measurement capabilities and scope of these calibration services are the largest in North America, and include:

- Calibration services for gears and splines including index, helix, profile, tooth thickness, dimension over pins, major and minor diameters.
- A2LA accredited on-site calibration of analytical gear and spline measurements systems regarding gear involute and helix.
- Calibration of master gears, spline gauges and artifacts.
- Master gears used for radial composite testers.
- Fellows lead and involute artifacts.
- Any other pitch, helix, or involute artifacts for qualifying gear testing instruments.
- Plug and ring involute spline gauges as well as tapered master plugs.
- Precision spheres, diameter and roundness.
- Expedited calibrations.



GMS supports your ISO 9000 certification with the required 17025:2017 accredited calibration services.

- All A2LA accredited measurements are traceable to S.I. through NIST.
- Supports ISO 9000 certification with the required ISO 17025:2017 accredited calibration services.
- Non-accredited contract services for gears, straight sided splines, spiral bevels, and more up to 400mm diameter.
- Provides complete inspection needs including reverse engineering.



The lab is now equipped with a Gleason 300GMSL Gear Measurement System with all its inherent inspection capabilities.

High Quality Master Gears

Gleason Master Gears are used in double and single flank gear roll inspection systems, honing machines and gear measuring systems as test gears. Gleason provides different types of master gears, such as cylindrical gears and pinions, for most machines and applications.

Different master gear sizes according to DIN 3970 are provided on request. These master gears are produced to quality B which relates to quality 3 regarding $F_{H\alpha}$ and $F_{H\beta}$. Master gears not requiring DIN 3970 are produced in quality 3 according to DIN 3962.

Special calibration services are available at our Gleason Metrology Systems plant in Dayton, Ohio USA. Master gears are delivered with an inspection protocol which documents measurements of the main characteristic values and defines measurement positions to meet the highest quality standards.

In general, Gleason designs master gears according to the DIN 3970. On request we provide special designs according to your specifications. Gleason Master Gears are designed to check the whole active tooth length of the workpiece. Additionally, Gleason adds a tip chamfer to protect the gear flanks.

Manufacturing Ranges and Materials

Dimensions	
Minimum diameter	6 mm / 0.25"
Maximum diameter spur	500 mm / 20.0"
Maximum diameter helical	300 mm / 12.0"
Minimum pitch	0.1 module / 254 DP
Maximum pitch	25.4 module / 1 DP
Maximum face width	150 mm / 6.0"
Helix angle	0 to 89°
Maximum number of teeth	550
Standard material	Tool steel 62Rc (Special materials are available)



Spline Gauges and Spline Arbors

Gleason is a leading supplier of spline, tapered spline master gears, and variable spline gauges. We offer design engineering services for all, with options for calibrations, coatings and setting masters. Types include:

- Involute
- Serrated
- Straight (Parallel-Sided)
- Tapered
- Spur
- Helical

Applications:

- Go and No/Go Rings and Plugs
- Tapered Master Plugs
- Variable Spline Indicator Rings and Plugs
- Setting Masters
- Expanding Collet Spline Arbors



Plug Gauges



Ring Gauges

Plug Gauge Manufacturing Ranges and Materials

Dimensions	
Minimum diameter	5 mm / 0.1875"
Maximum diameter	500 mm / 20.0"
Minimum pitch	0.1 module / 254 DP
Maximum pitch	25.4 module / 1 DP
Maximum length	300 mm / 12.0"
Maximum helix	45°
Maximum taper	15°
Maximum number of teeth	550
Standard material	Tool steel 62Rc (Special materials are available)

Ring Gauge Manufacturing Ranges and Materials

Dimensions	
Minimum diameter	5 mm / 0.1875"
Maximum diameter	500 mm / 20.0"
Minimum pitch	0.1 module / 254 DP
Maximum pitch	25.4 module / 1 DP
Maximum length	150 mm / 6.0"
Maximum helix	45°
Maximum taper	15°
Maximum number of teeth	550
Standard material	Tool steel 62Rc (Special materials are available)

Variable Spline Indicator Gauges

Variable spline indicator gauges enable manufacturers to control the fit between mating splines. Numerical values can be obtained for effective and actual tooth thickness or space width.

These gauges are available in a large variety of body styles and are highly accurate and repeatable.



Complete Solutions from One Source



Gleason

info@gleason.com
www.gleason.com

