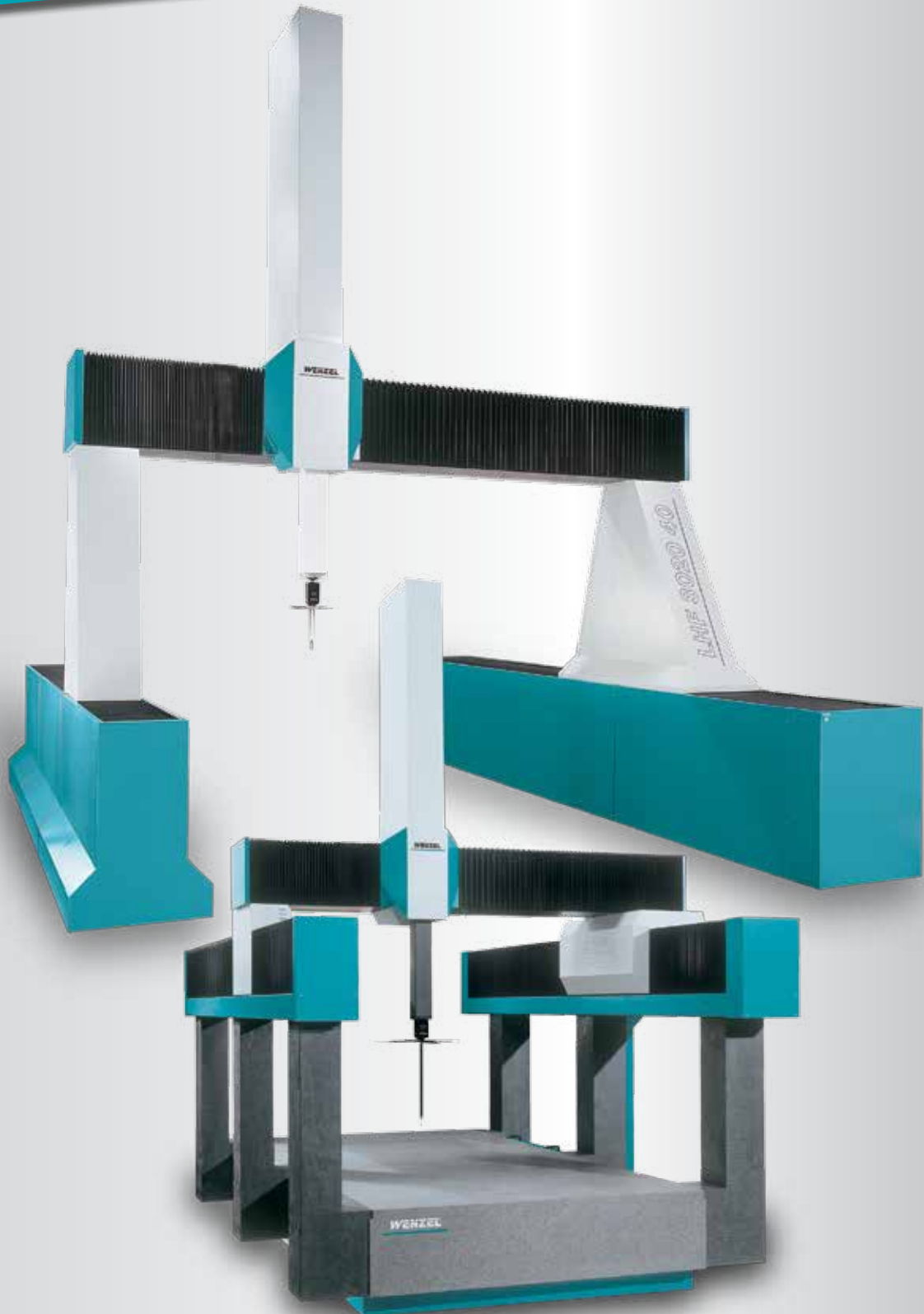
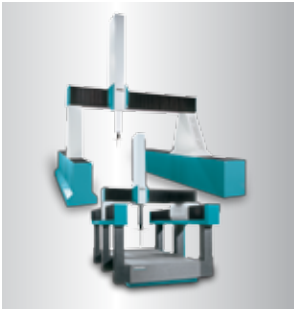


Large 3D Coordinate Measuring Machines
LH, LH Gantry and LHF Series

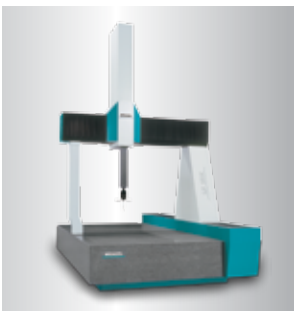


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Overview large Coordinate Measuring Machines**Accurate, fast and reliable**

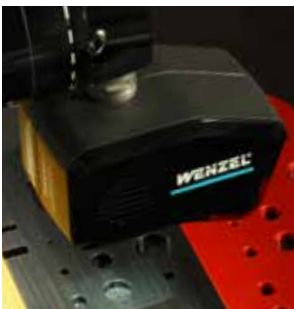
- Accuracy: - Standard
- Premium
- Premium Select

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Machine Concepts**Economical and powerful 3D coordinate measuring machines**

- The LH: Precise in detail
- The LH Gantry: Precise results for dynamic measurement of large components
- The LHF: Wide measuring range and excellent accessibility

Page 14-17

Technology, Support, Sensors and Changer Racks**Perfection in detail by high-quality components**

- Accurate positioning thanks to the optimal path-measuring system technology
- International services
- Compatible sensor systems and changer racks for your needs

Page 18-19

Software**Accurate data for meaningful results**

- Intelligent 3D software solutions based on years of expertise
- Full integration of the hardware in the software environment
- Clear documentation capabilities and interfaces
- Efficient surface reconstruction
- Virtual CMM

LARGE LH, LH GANTRY AND LHF COORDINATE MEASURING MACHINES

Accurate, Fast and Reliable

The Series includes CNC controlled air bearing coordinate measuring machines for a wide range of measuring tasks. The success of our CMMs is based on a proven holistic concept consisting of first-class engineering, intelligent software and accessory options and a comprehensive service package.

Stable, reliable and full of dynamics, the LH is a universal and flexible instrument for different applications. From the smallest gears to large rotor blades, WENZEL offers the optimum solution for every application and size. The LH Series have been proved to be successful in daily use, from small businesses to large international corporations in a range of various industries.



LH 1210

Standard – Premium – Premium Select

The coordinate measuring machines LH, LH Gantry and LHF are available in three accuracy specifications: Standard, Premium and Premium Select:

- In the standard version, it offers an excellent price-performance ratio and is flexible for different applications.
- The Premium models are fitted with a pneumatic active damping system and automatic temperature compensation. Thus, the CMMs are protected against vibration and thermal effects within its environment. In high accelerations and movements, the excellent structural rigidity results in an excellent scanning performance.
- The Premium Select provides the highest level of performance. High-precision scanning measurement results are obtained even at higher accelerations. The Premium Select version is also equipped with a pneumatic active damping system and automatic temperature compensation.



LH 1512



LH 2015 Gantry



LHF 3020

MACHINE CONCEPT

Accurate Measurements Results Quick and Easy

The complete product range of WENZEL stands for precision and performance in 3D measurement. With the new generation of air-bearing coordinate measuring machines WENZEL continues the improvement in precision, efficiency and longevity.

The revolutionary design of the new LH 1210 offers high mechanical accuracy, perfect ergonomics and dynamics.

New Generation CMM with an Innovative Industrial Design

Precision

High precision through overall concept

- Relevant precision machine components work in perfect harmony.
- Identical thermal behavior of granite in all axes ensures the intrinsic accuracy of the LH CMM.
- High-resolution scales provide accurate positioning and precise results.
- Accurate detection of free-form surfaces and geometric elements with an innovative sensor technology.
- Intelligent algorithms and interconnection technologies of the WENZEL controller transmit large amounts of data very quickly.

Ergonomics and Usability

Just measure

- The easy to use WENZEL measurement software generates fast accurate measurement results.
- Individual user training enables a fast and efficient application.
- Perfect ergonomics for comfortable and safe operation.
- Ease of use with the multifunctional hand box.





Robustness and Durability

Investment protection through robust, modular and innovative engineering

- WENZEL CMMs manufactured from granite are free of internal tensions and extremely wear resistant.
- The guide ways of the X- and Y-axes are fitted with bellows type covers to protect against contamination from dust and dirt.
- The use of high-quality components ensures high machine availability.
- An innovative drive system, bearing and guide way technologies provides low wear of the base material.
- The modular design of the CMM ensures the subsequent upgrading of the LH and offers full security of your investment in the future.

Serviceability

Reduced downtime due to high serviceability

- Long and costly maintenance intervals can be avoided by easy accessibility to maintenance components.
- WENZEL Online Service (WOS) allows quick online diagnosis for help.
- High availability of spare parts due to extremely high level of vertical manufacturing.

LH 1210

Overview measuring range (in mm)

	X-Axis	Y-Axis	Z-Axis
LH 1210	1200	1600 / 2000 2500 / 3000	1000

Further Y-lengths on request.

You will find Information about LH 65, LH 87 and LH 108 CMMs in the brochure 'The new LH Generation'.

THE LH SERIES

Precise in Detail

The air bearing coordinate measuring machines of the proven LH Series offer precision, efficiency and longevity. Thousands of users around the world rely on their high mechanical accuracy and perfect ergonomics every day.

Precision

- Relevant precision machine components work in perfect harmony.
- Identical thermal behavior of granite in all axes ensures the intrinsic accuracy of the LH CMM.
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LH 1512

Overview measuring range (in mm)

	X-Axis	Y-Axis	Z-Axis
LH 1512	1500	2000 / 2500 3000 / 4000	1200

Further Y-lengths on request.

You will find Information about LH 65, LH 87 and LH 108 CMMs in the brochure 'The new LH Generation'.

THE LH GANTRY SERIES

Accurate Results and Dynamic Measurement of Large Components

The LH Gantry is a CNC controlled coordinate measuring machine with air bearings in all axes. The LH Gantry enjoys all of the attributes of the smaller LH Bridge machine, but has been configured to allow the inspection of larger and heavy parts. The 'high drives' of the LH Gantry also ensure maximum stability even during dynamic movements. The LH Gantry CMM showcases a monolithic design with an integral granite table removing the need for a special foundation. Due to their active pneumatic

vibration damping and automatic temperature compensation, the LH Gantry is protected against vibration and thermal effects. With the optional addition of a rotary table, even large gears or other components are measured flexibly and accurately.

Precision and Rigidity

- The 'high drives' of the LH Gantry ensure maximum rigidity and stability.
- The LH Gantry CMM showcases a monolithic design negating the need for a special foundation.
- Provides the best positional resolution through path-measuring system technology with fine scale resolution and bellows covers to provide excellent dirt immunity.

Dynamic

- Dual Y-drives and scales ensure high dynamic stability.
- Backlash-free friction drives in combination with the WENZEL CMM controller ensure optimum acceleration / speed.
- Top mounted Y-drive allows movements and accelerations with little rotational influence.



Robustness and Durability

- Due to the granite construction, the LH Gantry is free of internal tensions and provides an extremely wear resistant frame structure.
- Innovative drive systems, bearing and guide way technologies provide low material wear.

Serviceability

- Air bearing guide elements guarantee wear-free operation and precise guidance.
- High availability of spare parts.



LH 2015

Overview measuring range (in mm)

	X-Axis	Y-Axis	Z-Axis
LH 2015	2000	3000 / 4000 5000	1500

Further Y-lengths on request.

THE LHF SERIES

Wide Measuring Range and Excellent Accessibility

The LHF is a CNC coordinate measuring machine in a moving bridge design for the high accuracy inspection of very large and heavy parts. The ground-level construction of the LHF allows easy placement of large parts with maximum mobility for the user. The measuring range in the Y-axis is available up to 12 meters in the standard version.

The dual drive in the Y-axis of the LHF makes it unbeatable in terms of dynamics. Thermal influences of the environment or the work piece can be corrected by automatic temperature compensation.

Precision and Stability

- Exactly sized air bearings provide optimal stability of the LHF.
- The cross-section of the Z-axis and the bearing distances are designed for maximum stability, even for large extensions and eccentric loads.
- Best positional resolution through path-measuring system technology with fine scale resolution and bellows covers to provide excellent dirt immunity.
- Inherently stable guide beam.

Dynamic

- Dual Y-drive and scales ensure high dynamics and stability.
- Backlash-free friction drives in combination with the WENZEL control unit ensure optimum acceleration / speed.

Ergonomics

- Optimal placement of the measuring range.
- Backlash-free friction drives in combination with the WENZEL CMM controller unit ensure optimum acceleration / speed.

Serviceability

- Air bearing guide elements guarantee wear-free operation and precise guidance.
- Easily accessible maintenance components.
- High availability of spare parts.





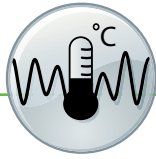
LHF 3020 / LHF 4025

Overview measuring range (in mm)

	X-Axis	Y-Axis	Z-Axis
LHF 3020	3000	4000 / 5000 6000	2000
LHF 4025	4000	10000 / 12000	2500

Further Y-lengths on request.

The LH Series in Detail



Guarantors for stable results

Active damping

The LH Series can be optionally equipped with a pneumatic active damping system, which protects the CMM from external vibrations and kinematic influences.

Thermal compensation

The LH Series can be equipped with an automatically temperature compensation. Thus, the measuring device and work piece is protected against thermal influences of the environment.



Service and application support: We are there for you

Professional user training

Training will be offered as individual training, group training and seminars. The Training can be performed at your place or at your WENZEL technical centre.

Qualified service team

Our service team is there to assist you: for repairs, maintenance, retrofitting and telephone support or with WENZEL Online Service (WOS) - the Internet-based remote diagnostics and remote maintenance service. More information can be found in our Service Brochure.



High resolution scales

Accurate positioning thanks to the optimal path-measuring system technology

The LH Series is equipped with an incremental measuring system, which has a fine grating period, and excellent dirt immunity.

Thus best position resolution and stability at high speed for all linear axes are possible. The highly precise and robust scale tapes contain a very small compensating inherent hysteresis.





Probe Heads, Probe Systems and Scanners

When combined with a variety of innovative sensors the LH Series is a flexible solution for a number of different applications. From the smallest injection molded parts up to large sheet metal forming dies – the LH CMM meets your needs! The LH Series can be equipped with both, manual and motorized probe heads as well as continuously recording systems and indexable probe

heads. With suitable touch trigger, scanning and optical measurement systems LH CMM offers significant results for various applications. Module change racks enable automated changing of stylus modules.



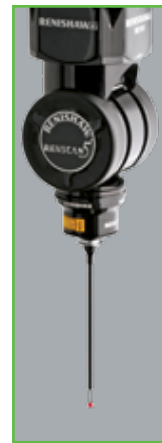
PH10T/PH10M PLUS

Automatically indexable probe head
PH10: Fast probe replacement (auto joint) with the corresponding change systems.



PH20

The 5-axis PH20 and LH are an efficient solution for measuring 3D and prismatic components. The 'Head Touch' function takes measurement points very quickly and reduces cycle times.



REVO™

The revolutionary 5-axis probe system REVO™ coupled with Metrosoft QUARTIS® provides an extremely fast high scanning speed solution with a high degree of measurement flexibility, and thus an extremely high throughput.



TP20

Touch trigger probe. Extremely robust and flexible touch trigger probe.



TP200

Compact, module-changing touch trigger probe particularly suitable for measuring tasks with tight dimensional tolerances for 3D free-form surfaces with longer styli.



SP25M

The most compact and versatile probe system for scanning on a global scale.



SP80

Passive probe, equipped with a high resolution digital length-measuring system (0.02 μm), which ensures outstanding measuring precision even when using long stylus inserts (up to 500 mm).



PHOENIX

The optical 3D sensor PHOENIX captures geometry elements and surfaces on different materials in only one working cycle and can be used in combination with tactile probes.



WENZEL SHAPETRACER

The 3D Line Scanner changes your coordinate measuring machine into the ideal machine to record and handle point clouds. Perfect for all who need to record and work on surfaces and outlines of physical objects.

Changer Racks



Changer Rack SCR200

The SCR200 provides automatic, high speed changing between up to six TP200 stylus modules. The SCR200 is powered by the separate probe interface, PI 200, and provides features to facilitate safe stylus changing.



Changer Rack ACR3

The changer rack ACR3 provides a passive means to automatically exchange probes without the need for requalification. Although the ACR3 is a four port unit, two can be linked together so that eight different probes or extensions can be stored in the rack - sufficient for any measurement task.



Changer Rack FCR25

Flexible change racks for automated changing of SP25M scanning and touch-trigger modules with 3 stations (6, 9, 12 and 15 stations also possible).



Changer Rack SCP80

Docking port for SH80 stylus holder, mounted on modular rack system (MRS) for use with the SP80 probe.

WENZEL SOFTWARE

The Intelligent Software for Your Application

The LH Series bridge-type measuring machine - together with the software from the WENZEL Group is a measurement system that allows you to comfortably solve your daily measurement tasks. The powerful

measurement software Metrosoft QUARTIS® is the ideal measurement software for dimensional evaluation of geometry and free-form surfaces.

Metrosoft QUARTIS®: Significant measurement results – quickly and easily!



Metrosoft QUARTIS® is the measuring software that allows you to generate precise measurement results, impressive inspection reports and meaningful statistics even faster and easier. Thereby achieving large time gains and significant financial savings in your measurement process.

Ease of use with Fluent User Interface

The ribbon can save a lot of time. Functions are logically grouped according to working steps. Thus, it is easy to solve measurement tasks.

All tasks in one measurement software

You can probe individual points and scan with Metrosoft QUARTIS® - using ruled geometry as well as free-form elements. All major CAD formats are supported, of course.

Integrated Statistics

Metrosoft QUARTIS® lets you have full control over your process at all times. It provides you with the most important statistical data for the evaluation of your machine or process capability. The direct data transfer to external statistics software, e.g. qs-STAT from Q-DAS, is guaranteed with the standard interface.

Create meaningful measurement reports intuitively

Create meaningful measurement reports in no time with Metrosoft QUARTIS® by using the template library and report generator. Colored displays identify and visualize relevant areas. The free creation of format templates allows a variety of reporting forms, for example language and layout variations.

Error prevention through live preview

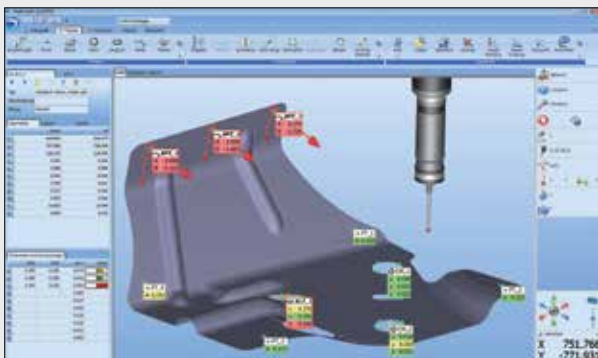
The live preview of each individual work step allows you to intervene in order to correct the measurement process. Therefore, the subsequent work steps are efficiently and proactively accelerated during the creation.

Unlimited possibilities thanks to DMIS

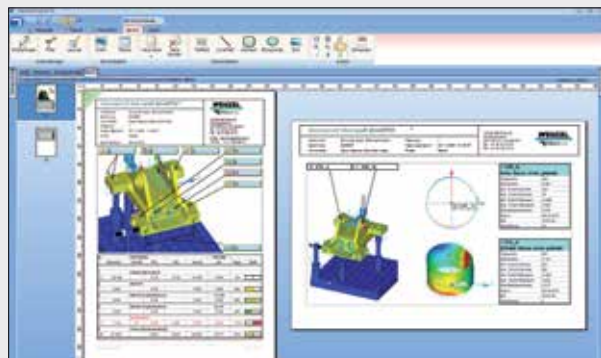
Through its unique design, Metrosoft QUARTIS® is the perfect measuring software for the vendor-neutral DMIS programming language.

Organized data management

Metrosoft QUARTIS® provides safe data storage within an integrated database. The automatic backup ensures the traceability of your measurement results at all times.



Metrosoft QUARTIS®: Measurement Process



Metrosoft QUARTIS®: Measurement Report



DMIS 5.2 Dimensional

For reverse engineering and surface generation, PointMaster is one of the most efficient software packages available worldwide. Do you want to evaluate your measured surfaces quickly and easy in Metrosoft

QUARTIS®? It's no problem with the 'Virtual CMM' from WENZEL!

Virtual CMM

The Virtual CMM allows dimensional evaluation of assemblies directly on the 3D model and is the interface between PointMaster and the measurement software Metrosoft QUARTIS®. Consequently surface data is used as the basis for complete measurement programs and reports analog to a common measurement system. If such a measurement program is executed, measuring points are virtually probed on the generated surface data. – The Virtual CMM simplifies the measurement on flexible and sensitive materials. Even hard to reach areas and areas that cannot be reached measured with tactile methods, can be easily evaluated.

PointMaster:
Efficient reverse engineering and surface generation



PointMaster is the successful software from WENZEL with its proven modules: Reverse Engineering, Verification, CAD/CAM and CT.

Simple solution of complex tasks

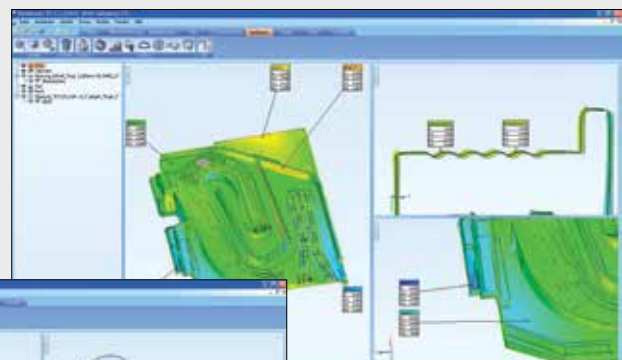
The success of PointMaster is based on a complete object-oriented operation. This allows a simple and intuitive application. Highly complex tasks can be solved easily with only minimal training.

Versatile functions and modules

PointMaster offers visual support with the interactive „Shading“ feature. For example, discontinuity is displayed the same way as the form control lines that are important for the construction of the surfaces. Surface trimming with BSpline curves, adoption of CAD data for the reverse engineering as well as ruled geometry recognition complete the range of functionality of PointMaster.



Measuring Interface Standard



PointMaster: Verification



PointMaster: Reverse Engineering

Innovation for success

WENZEL Group GmbH & Co. KG is one of the leading manufacturers of industrial metrology solutions. The wide range of WENZEL products includes solutions in the fields of coordinate measuring machines, gear metrology, computed tomography and high speed measuring and digitizing systems. Founded in 1968 as a family business, WENZEL Group combines tradition

with innovation, relies on values such as reliability, trust and respect for the environment. Subsidiaries as well as sales and service partners worldwide represent the company in more than 50 countries. The WENZEL Group employs more than 650 people worldwide.

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