

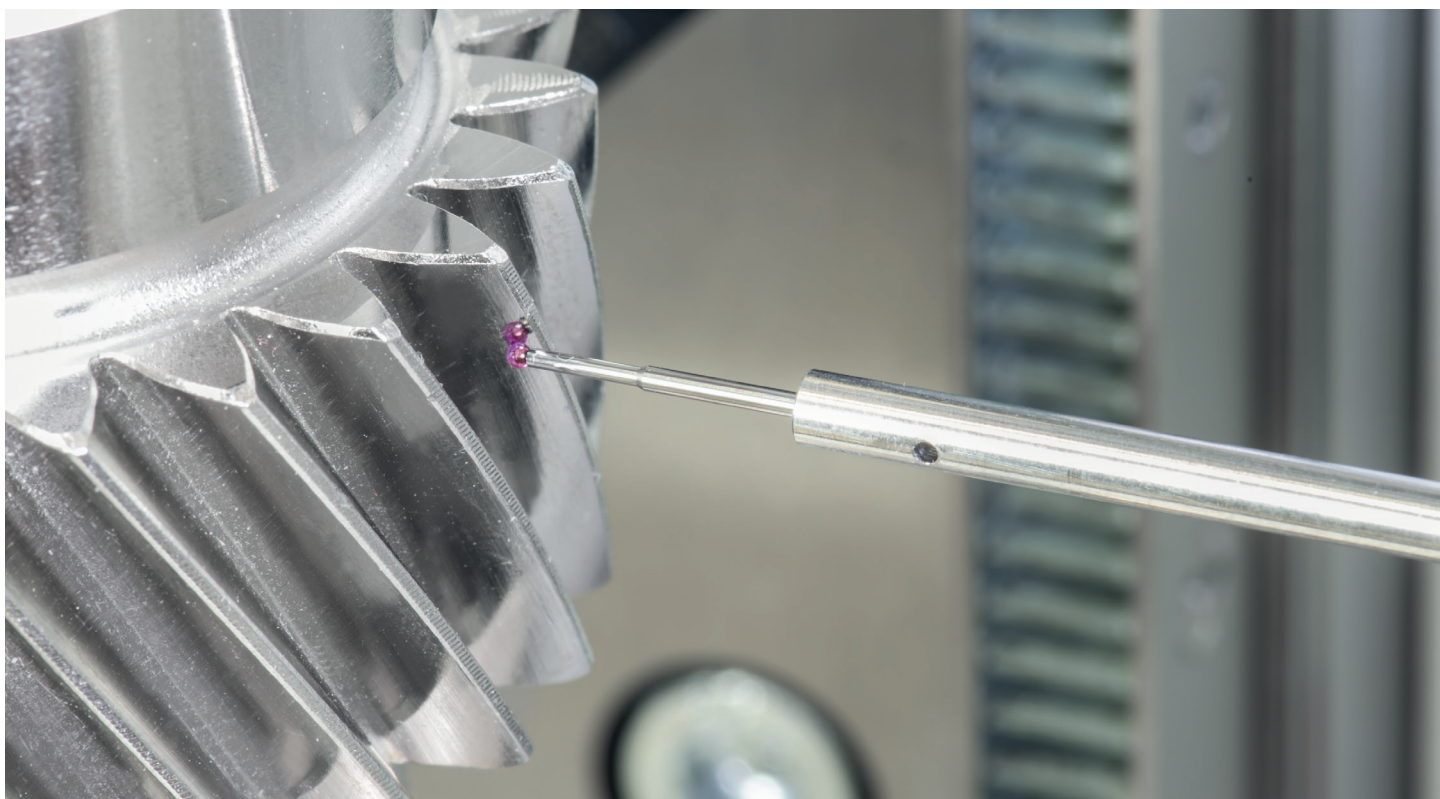


# Gear Measurement

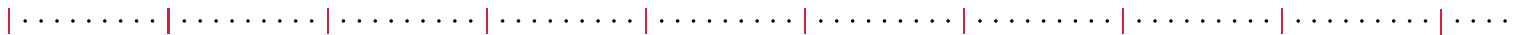
## MarShaft SCOPE 600 *plus* 3D



Starting point above the tooth.



Automatic detection of the tooth gap.





# Gear measurement in production

## Automated, fast and process-reliable

### High-precision matrix camera and 2D probe system

The optical/tactile shaft measuring machine MarShaft SCOPE 600 *plus* 3D has a high-precision matrix camera, a new 2D touch probe and a motorized tailstock. A special calibration of the linear axes (Z-X-Y) gives the MarShaft SCOPE 600 *plus* 3D 100% 3D functionality.

### Complete acquisition of all features

In addition to features such as diameter, length, radii, and cam location, further features can be measured with the new 2D probe system that cannot be optically detected, such as concave cam profile and axial run out.

### Complete 3D functionality

The tactile and optical measuring systems operate in the same coordinate system. The measuring station operates with the software platform MarWin and provides the complete 3D functionality in this combination.

### New:

Due to the implementation of the new software/user interface "QE Cylindrical Gear" from the MarGear product group, blind holes or feather key grooves, toothing of straight or helical cylindrical gears can now be measured in addition to camshafts.

The new measurement solution with MarShaft SCOPE 600 *plus* 3D offers the user several advantages:

The automated measuring method measures much faster and more reliably: While conventional coordinate measuring technology requires about 30 to 40 minutes per workpiece, the Mahr measuring station measures a gear shaft with cylindrical teeth in just 5-10 minutes.

In addition, the measuring station is directly in production near the processing machine for the respective processing step. The motor abutment ensures that the workpieces are always clamped with the same clamping force, excluding operator influence.



# Software module "Measurement of Cylindrical Gears"

## Convenient measurement, evaluation and documentation

### 1. Performance scope

The product option "Gear measurement on MarShaft SCOPE 600/850 *plus* 3D" includes the license for the MarWin software module "Measurement of Cylindrical Gears" (QE CYLINDRICAL GEAR). This software module has the following general features:

- Graphical user interface with interactive elements, 3D view and 3D export
- Automatic storage of raw data
- Various export options (ASCII, QS-STAT, CSV, PDF)
- Connection in MarWin Teach-In processes.\*
- Easy transfer of the gear programs from the highly precise MarGear GMX gear measuring machines with the MarWin software to the SCOPE *plus* 3D.
- Complete support of GDE standards
- Complete consideration of the reference end face, therefore also the automatic protocol and evaluation adjustment in the case of a dropped measurement
- Evaluation of the axes determined on the component
- Optional automatic elimination of eccentric errors.
- Output of the tothing axis for subsequent evaluations
- Support for design profiles
- Automatic check of the usability of the probe ball for the specified tothing
- Support for asymmetrical gears

In MarWin 11.x, this software module in combination with the MarShaft SCOPE 600/850 *plus* 3D enables the following measurements and evaluation on the stated gear types.

#### 1.1 Straight and helical cylindrical gears as external teeth and involute profile lines:

- Profile line measurement
- Flank line measurement

- Pitch measurement
- Radial run-out measurement
- Twist measurement
- Topography measurement\*
- Feet mark comparison and compensation\*
- Evaluation of K-charts\*
- Evaluation as per DIN 3960/3962
- Evaluation as per ISO 1328
- Evaluation as per AGMA 2000A88\*
- Evaluation as per CAT 1E4157\*
- Evaluation as per CAT 1E2028\*
- Evaluation as per GOST 1643\*
- Evaluation as per AGMA 2015\*

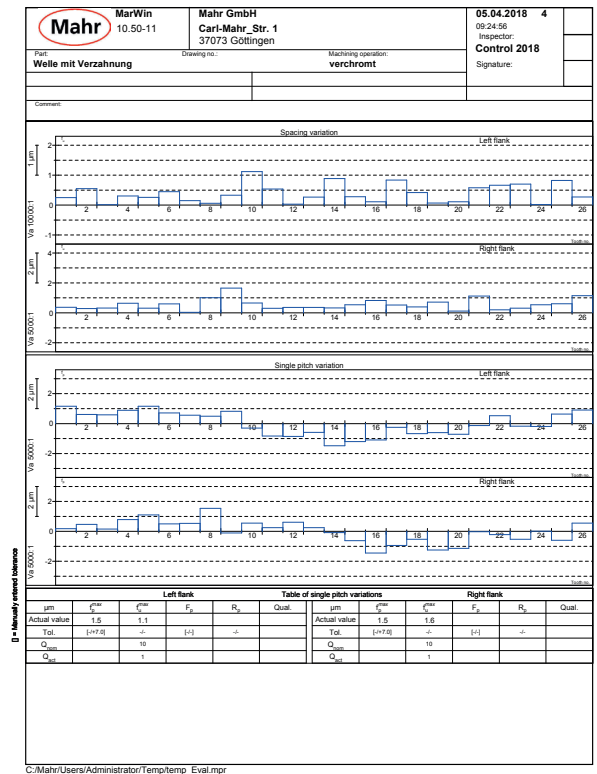
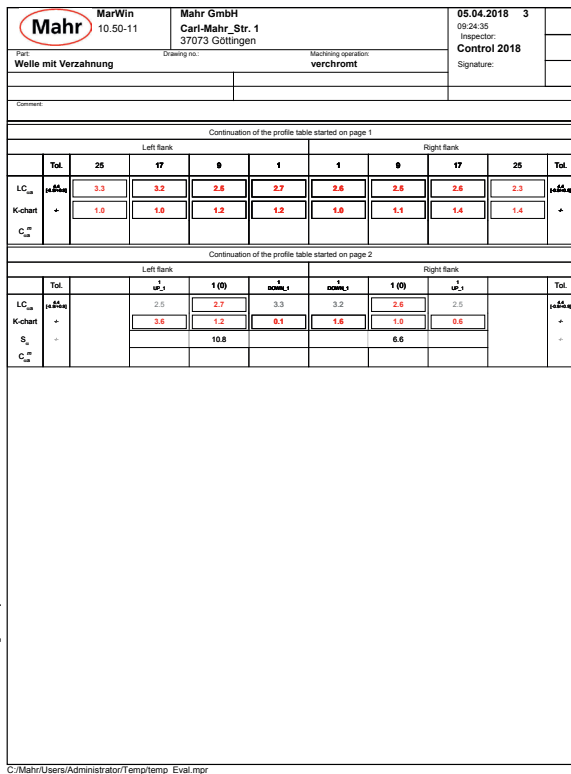
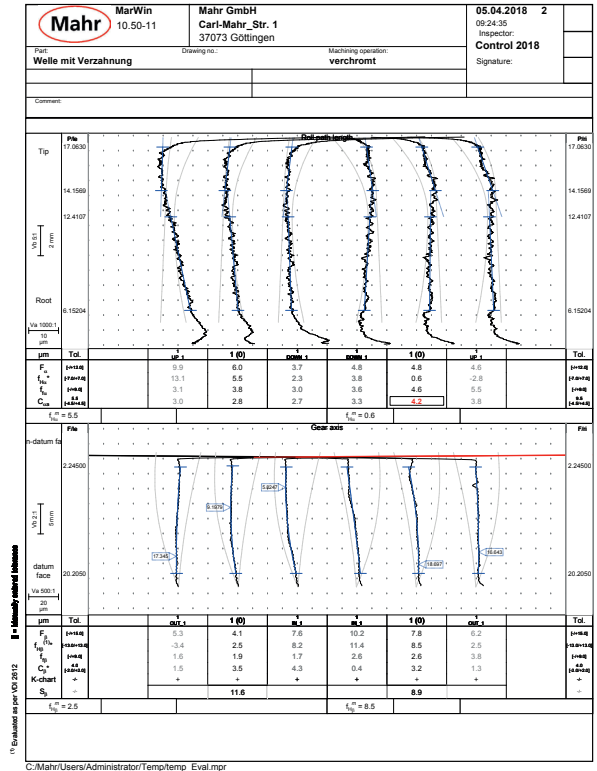
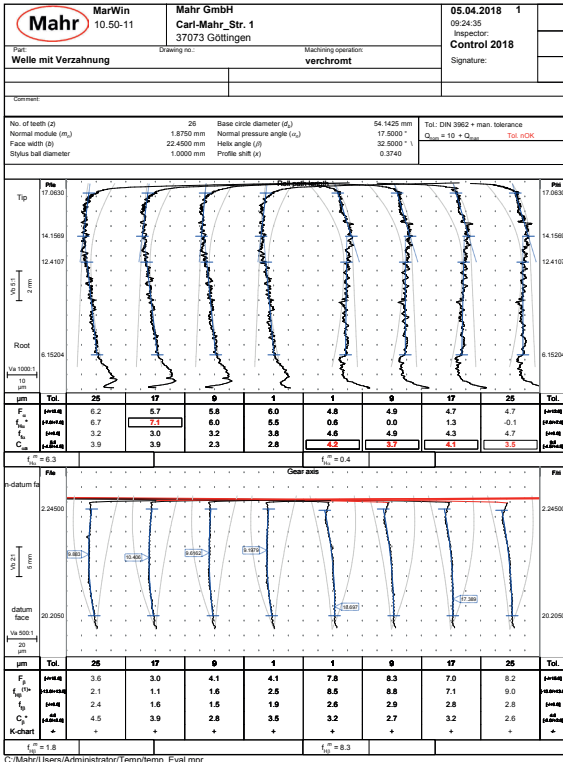
Further evaluations/tolerance tables such as GBT 10095, JIS B1702, RENAULT 01.33.001, VW GEAR STANDARD, DIN5480, ANSI B92.1 are available upon request. In addition to the usual gear parameters, it is possible to convert user-defined measurements in MarWin Professional. These include, for example, features such as the gear face chamfer incl. contour evaluation.\*

### 2. Technical data

- Profile features:  $ff_{\alpha}$ ,  $f_{H\alpha}$ ,  $F_{\alpha}$ ,  $C_{\alpha}$ ,  $C_{\alpha a}$ ,  $LC_{\alpha a}$ ,  $C_{\alpha f}$ ,  $LC_{\alpha f}$
- Flank features:  $ff_{\beta}$ ,  $f_{H\beta}$ ,  $F_{\beta}$ ,  $C_{\beta}$ ,  $C_{\beta I}$ ,  $LC_{\beta I}$ ,  $C_{\beta II}$ ,  $LC_{\beta II}$
- Pitch features:  $f_p$ ,  $f_{pe}$ ,  $F_p$ ,  $F_p z/8$ ,  $f_u$ ,  $R_p$ ,  $F_r$ ,  $f_r$
- Maximal accuracy class 5 (as per DIN 3962).
- Machine tolerances as per VDI/VDE 2612 and 2613 Gear Group II
- Measurement of the workpiece always clamped in the tailstock.
- Smallest stylus diameter: 1mm, smaller diameters upon request.
- Can be used from machine serial number 2500 and higher.

# Example of measuring record

## Professional evaluation and documentation



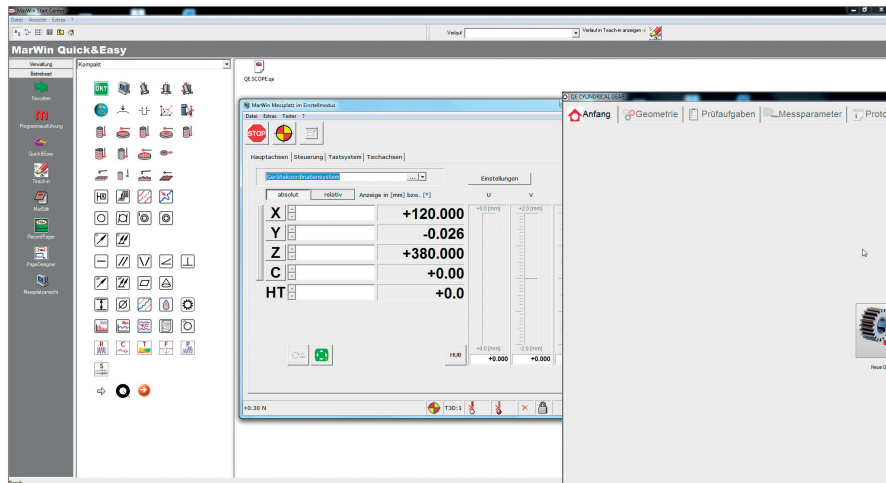
# New MarWin evaluation software "QE Cylindrical Gear"

Fast and easy operation

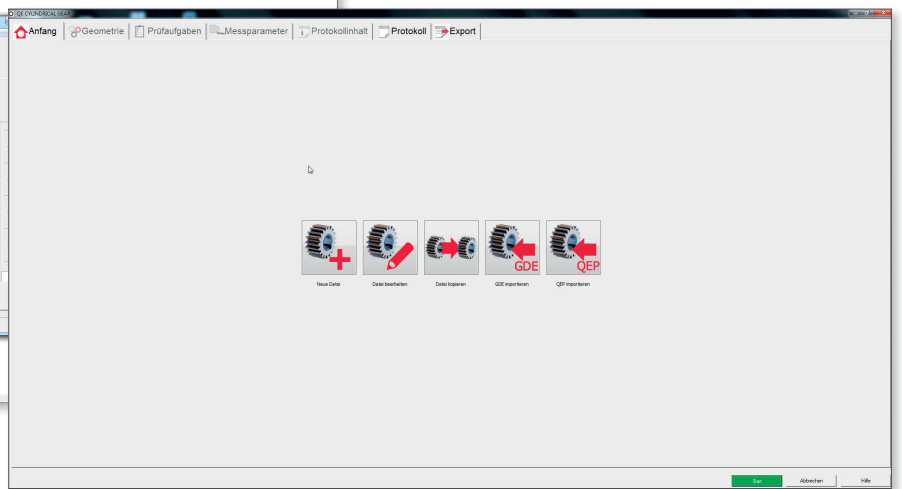
Easy creation of measuring programs

New, easiest operation of the new MarWin evaluation software "QE Cylindrical Gear". An experienced metrologist can operate the software after one day of training.

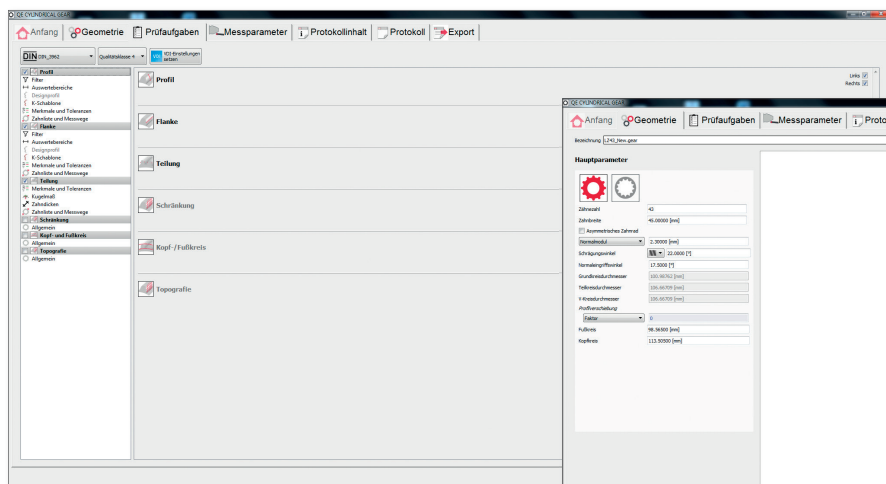
Example of creating a measuring program:



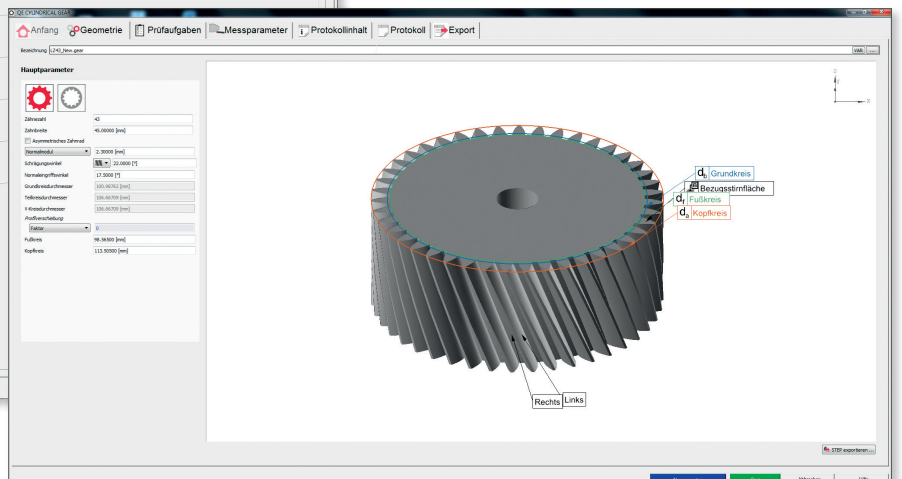
Start MarWin Quick&Easy



Start QE Cylindrical Gear



Load gear data, e.g. GED data



Overview of gear parameters

# Gear measurement with the MarShaft SCOPE 600 *plus* 3D

## Your advantages – Increase of productivity

You reach a new dimension with the MarShaft SCOPE 600 *plus* 3D in order to improve the production quality of your gears and optimize them economically:

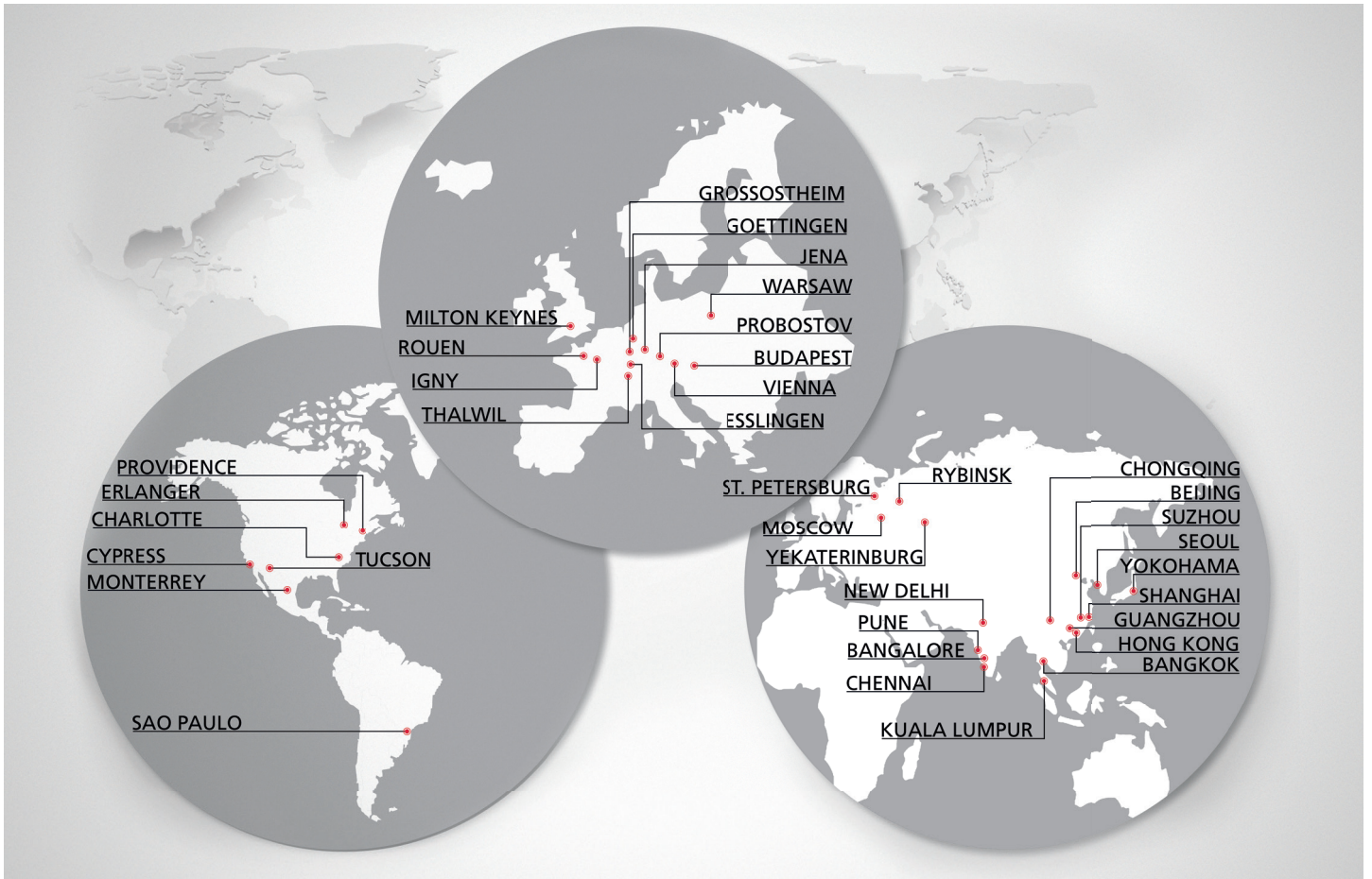
- accelerated processes
- increased efficiency
- fast amortization of the investment

The MarShaft SCOPE 600 *plus* 3D increases your productivity, thus decreasing your operating costs.



MarShaft SCOPE 600 *plus* 3D





Partner of manufacturing companies worldwide.

**CLOSE** to our customers.

**Got QUESTIONS? Want more INFORMATION?**

Call us at +49 (0) 551 7073 800, or email us at [info@mahr.de](mailto:info@mahr.de)



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**EXACTLY**

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