Measuring systems for ironing rings and punches

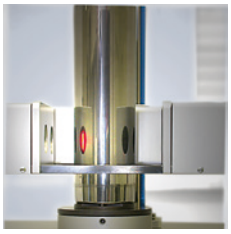
Equipment and proven technology for precision tooling measurement in beverage can industry

RINGMASTER – THE MASTER TOOL FOR RING MEASUREMENT

RINGMASTER provides the following measuring functions for ironing rings:

- inside diameter
- outside diameter
- roundness of inside and outside diameter
- concentricity inside/outside diameter

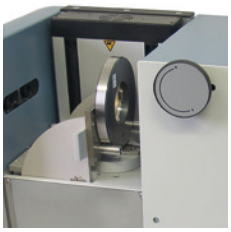
RINGMASTER is characterized by a high measuring accuracy of ±1 µm, fast measurement and very easy operation.



PUNCHMASTER – THE MASTER TOOL FOR PUNCH MEASUREMENT

PUNCHMASTER provides the following functions for the punch measurement:

- outside diameter and roundness at any position
- automatic step- and contour (form) measurement
- software for creation of tolerance models according CAD data
- calculation of transition parameters (radius, angles)

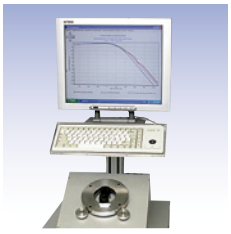


URP – UNIVERSAL RING & PUNCH GAUGE

The **URP** provides the measurement of rings and punches used in beverage can manufacturing. The **URP** combines several measuring functions of **RINGMASTER** and **PUNCHMASTER**.

The gauge is characterized by a high measuring accuracy of ±2 µm

Because of the universal setup, the automatic roundness measument is not provided.



RICOS – RING CONTOUR MEASURING SYSTEM

RICOS provides the following measuring functions for ironing rings:

- inside ring profile
- software for creation of tolerance models according CAD data
- software for comparison of measured contour data with the tolerance models
- measuring tool for angles and radii from the measured profile

RING & PUNCH INSPECTOR

The **RING & PUNCH INSPECTOR** is a helpful tool for visual inspection of both the inside ring and outside punch surface quality.

The **RING & PUNCH INSPECTOR** can be adapted to all ring and punch dimensions, currently used in beverage can industry.

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Expect outstanding performance

Graphical display of roundness of ironing dies

OEG GmbH provides measuring equipment for complete metrology of almost all tools for the beverage can manufacturing like rings, punches and knock outs.

The equipment is based on highly accurate, contactless optical measuring principles. Parameters to be measured are inside and outside diameter, roundness, concentricity and inside profile of rings, outside diameter, roundness and contour (form) of punches. Additionally we offer special software to create tolerance model data for punches and inside ring profile, which enables the operator to compare the measured data with the CAD data according drawing.

All instruments were special developed for the beverage can industry and meet in particular the needs for measurement of ironing rings and punches.

With our worldwide proven measuring technology we guarantee for easiest handling of the equipment in connection with highest measuring accuracy at the same time.

- operation mode for easy measurements
- password protected service mode for configuration

There is no better way to measure rings and punches in beverage can industry!

RINGMASTER – types and measuring functions

RINGMASTER is the Master Tool for measurement of all kind of ironing rings, used in beverage can manufacture. The high number of installations on all continents demonstrates the common acceptance of the gauge in the beverage can industry.

RINGMASTER is not only a measuring gauge, it's a measuring technology.

RINGMASTER is characterized by an optical, contactless measurement with very high accuracy.

It is specially designed for the measurement of ironing rings in beverage can manufacture.

Since his introduction in 1999 the equipment was steadily improved and adapted to the changing demands.

RINGMASTER measuring functions according type				
Measuring function	ID 40-100/200 vario	ID 40-100/200 automatic	IOC 40-100/200 vario	IOC 40-100/200 automatic
Inside diameter (ID)	✓	✓	✓	✓
Roundness of ID	✓	✓	✓	✓
Outside diameter (OD)			✓	✓
Roundness of OD			✓	✓
Concentricity			✓	✓
Necking die option*	✓	✓	✓	✓

* only with additional calibration masters and mechanical adapters, possibly not suited for all existing ring types

On request, the measuring system for the outside diameter can be motorized adjusted to different diameters (standard is manual adjustment).

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RINGMASTER – general data

Today different types of **RINGMASTER**'s with different measuring functions exist.

Beside the high measuring accuracy, **RINGMASTER** is characterized by a very easy operation and reliability, also under rough environmental conditions.

RINGMASTER is a proven solution in beverage can industry and the leading equipment for this application.

RINGMASTER – MEASURING TECHNOLOGY

For use of **RINGMASTER**, calibration rings are necessary. Calibration rings are rings with the same inside profile like the production rings, used in the plant, which are certified with highest possible accuracy. OEG will supply proposals for the optimum number and types of calibration rings according customer needs.

In connection with special **RINGMASTER** soft- and hardware we provide a measuring technology, which guarantees easiest handling and highest measuring accuracy.

Detailed information will be provided on inquiry.

RINGMASTER measuring accuracy				
Measuring function	ID 40-100/200 vario	ID 40-100/200 automatic	IOC 40-100/200 vario	IOC 40-100/200 automatic
Inside diameter (ID)	±1 µm ±0.039 mil			
Roundness of ID				
Outside diameter (OD)	n.a.		±2 µm ±0.079 mil	
Roundness of OD				
Concentricity				
Necking die option*	±3 µm ±0.118 mil			

n.a. = not applicable

RINGMASTER options and features according type				
Parameter	ID 40-100/200 vario	ID 40-100/200 automatic	IOC 40-100/200 vario	IOC 40-100/200 automatic
Minimum ID	40 mm 1.575 inch			
Maximum ID	100 mm 3.937 inch			
Minimum OD				
Maximum OD	200 mm 7.874 inch			
Maximum land position*	35 mm 1.378 inch			
Adjustment to other ID	manually, by operator	motorized, software controlled by operator	manually, by operator	motorized, software controlled by operator
Adjustment to other OD	n.a.		manually, by operator	
Temperature sensors	no		2	
Forced reference measurement	according time, interval freely selectable		according temperature difference since last reference measurement or time interval	
Autofocus stage	stepper motor driven			
Rotary table				
Connectivity to TCS/ Data export capability	yes			
Remote maintenance capability				
Calibration ring data base				
Operator data base				
Operating systems	Win7 or higher			

ID = Inside Diameter, OD = Outside Diameter

* in relation to measuring table, increase on inquiry no problem

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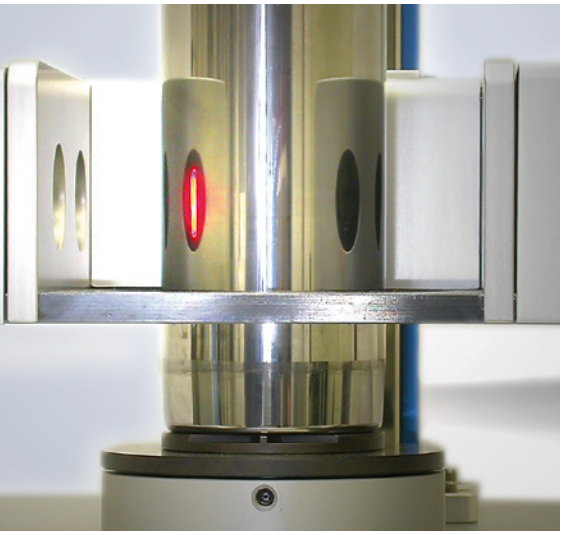
PUNCHMASTER – functions



PUNCHMASTER is the master tool for measurement of punches, used for beverage can manufacturing. **PUNCHMASTER** is characterized by an optical, contactless measurement system with sub-micron accuracy. It is specially designed for the measurement of punches in beverage can industry.

PUNCHMASTER features the following measuring functions:

- Outside diameter at any z-position (height position)
- Automatic step measurement
- Measurement of step position
- Measurement of outside punch profile
- Angle measurement (in any z-ranges)
- Calculation of transition radius and transition angle
- Outside diameter of knock outs (only in connection with special adapters and additional masters)

For the evaluation of the measuring results we provide the following software tools:

- software for creation of tolerance models for the punch profile according CAD drawing;
- software for evaluation of measured punch profile and comparison with the tolerance model;

Beside the high measuring accuracy **PUNCHMASTER** is characterized by a very easy operation and reliability. **PUNCHMASTER** is a proven solution in beverage can industry and the leading equipment for this application.

PUNCHMASTER measuring software

The **PUNCHMASTER** software controls the acquisition of measuring data and the motorized, fully automatic measurement. It offers simple measuring functions like the automatic step measurement and more time consuming functions like the measurement of the complete outside punch profile or the step profile. In respect to the profile measurement, which can take up to several minutes (depending on scanning range and step width), a housing and semi-active vibration isolators are available to avoid influences of the environment on the measuring results.

Beside the automatic measuring functions the software offers also interactive measurements. In this case, the gauge is operated by joystick.

PUNCHMASTER – technical parameters*	
Measuring accuracy for diameter/ roundness**	±1 µm ±0.039 mil
Measuring accuracy for outside profile/ contour	
Minimum outside diameter	40 mm 1.575 inch
Maximum outside diameter	100 mm 3.937 inch
Maximum punch height	250 mm 9.843 inch
Knock out option***	yes

* parameters can be adapted to special demands on inquiry

** roundness of calibration master <0.5 micron required

*** special adapters and additional calibration masters are necessary

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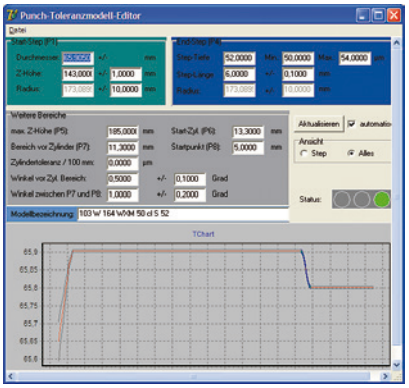
PUNCHMASTER – software for creation of tolerance models



The **PUNCHMASTER** features the high accurate measurement of the punch profile.

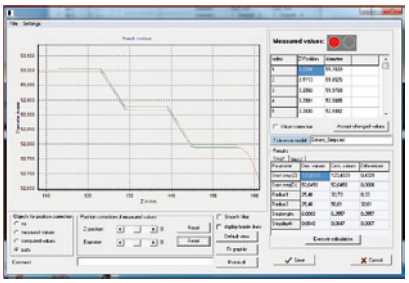
For the operator it is very important to compare the measured profiles with the desired punch profile according drawing. For that reason OEG GmbH has developed a software module, which can create tolerance models, using the most important data from the drawings of the punch.

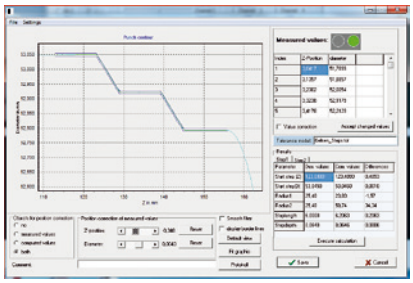
That affects the data for the transition radii and angles of the step and the complete punch profile.

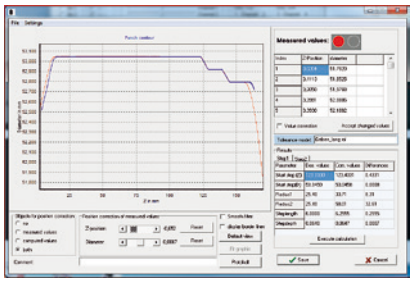
The model has to be produced once for each punch type.

It is stored in the data base and can be loaded always, if measuring data for this punch type has to be evaluated.

PUNCHMASTER – software for evaluation of measuring data and comparison with tolerance model







The **PUNCHMASTER** software does not only control the measuring functions and the movements. The software is also equipped with a tool for evaluation of the measured punch profile data. This tool allows the operator, to load the punch tolerance model (created with the according software) and the measured profile data in one and the same diagram.

The software provides among others the good/bad decision for the measured punch profile.

Calibration punches with certificates

Calibration punches are necessary for the use of **PUNCHMASTER**.

Calibration punches are special manufactured for the diameter range to be measured with some special features for **PUNCHMASTER** calibration.

A calibration punch is necessary for each of the standard diameters at customer site (for example 53 mm, 57 mm, 66 mm).

Also for the measurement of knock outs calibration parts are necessary.

Please contact OEG for more detailed information if necessary.

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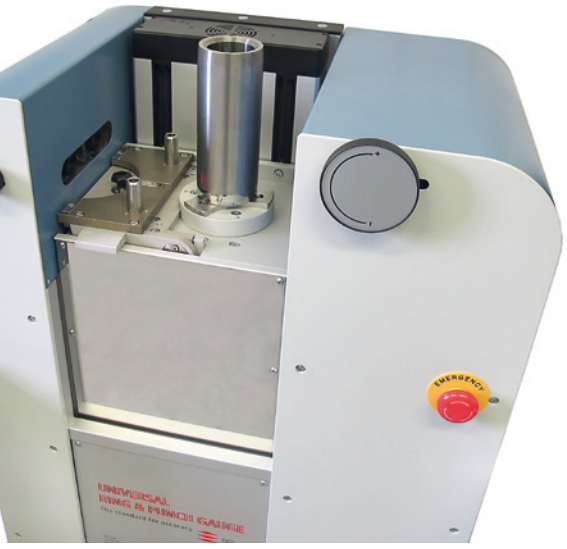
URP 100 Universal ring and punch gauge

URP setup for ring measurement



URP setup for punch measurement

The **URP 100** serves for the highly accurate measurement of the inside diameter of ironing rings and the outside diameter of punches, used in beverage can manufacture. The **URP** was specially developed for the use in beverage can industry. The **URP** gauge combines the measuring and evaluation functions of **RINGMASTER** and **PUNCHMASTER**, but has not the same measuring accuracy and no automatic roundness measuring function.

There are 2 versions of the **URP 100** exist. The standard version is the **URP 40-100**.

The **URP 20-100** possesses a bigger measuring range, which allows also the measurement of smaller tools, used in particular for the bottle can production.

URP Measuring function		
Parameter	URP 40-100	URP 20-100
Inside diameter (ID) of ironing rings	✓	✓
Roundness of ID of ironing rings	✓ but manually rotation	✓ but manually rotation
Outside diameter (OD) of punches	✓	✓
Roundnessof OD of punches	✓ but manually rotation	✓ but manually rotation
Necking die option*	✓	✓
Knock out option*	✓	✓

* special adapters and calibration masters are necessary

URP technical parameters		
Parameter	URP 40-100	URP 20-100
Measuring accuracy* for ID of ironing rings and outside diameter of punches	±2 µm ±0.079 mil	
Measuring accuracy* for outside profile/contour of punches	±2 µm ±0.079 mil	
Minimum inside diameter to be measured	40 mm 1.575 inch	20 mm 0.787 inch
Maximum inside diameter to be measured	100 mm 3.937 inch	
Maximum outside diameter to be measured	100 mm 3.937 inch	
Maximum punch height contour scan	250 mm 9.843 inch	
Knock out option** measuring accuracy*	yes ±2 µm ±0.079 mil	
Necking die option** measuring accuracy*	yes ±3 µm ±0.118 mil	

* calibration masters with roundness <0.5 micron required

** additional adapter and masters are necessary

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RICOS & TOMRIC

Measurement and Evaluation of the inside profile of ironing rings in beverage can manufacturing

RICOS MEASURING TASK

The correct inside profile of ironing rings used in beverage can manufacture is essential for many quality parameters of the produced cans. Therefore it is usual, in particular after the rework of rings, to check the inside ring profile using a measuring system.

A common method for this measuring task is the use of a mechanical tracer. The mechanical tracer itself is able to measure the profile data. But without the possibility to compare the measured data with the desired data according CAD drawing, a statement about the accordance of the profile with the desired profile is hardly possible.

RICOS uses a mechanical tracer as well, but has the big advantage compared to other tracer systems, that an exact statement about the real ring profile in comparison to the profile according CAD drawing is possible. This advantage produced by both the special mechanical construction of **RICOS** and the additional software package **TOMRIC**, which allows the creation of tolerance models.

The mechanical construction of **RICOS** offers the following advantages:

- the sensitive tip of the tracer is absolutely protected against damage at any time, except during the measurement itself;
- the electronic control unit of the tracer is protected inside the housing;
- the tracer unite is mounted inside the housing and thereby protected against damage and disadjustment;
- **RICOS** offers a system of easy replaceable position adapters to guarantee, that always the area of interest (around ironing edge and land, if land is present) can measured with high precision. A pin carrier with 3 pins is present to do this for axial direction and two so called stops are present for radial direction.

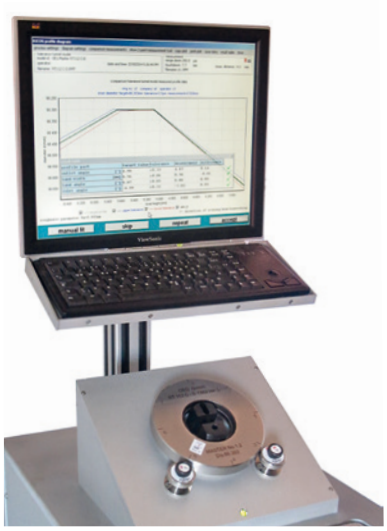
The measurement software of **RICOS** contains a test if the measured profile is always inside the tolerance tunnel. The software calculates a result table from the profile with numerical values of all position and angle values of interest.

Additional there is implemented a 2-point-measurement tool. By using this tool the operator can select 2 points on the measured profile and software will calculate:

- absolute and relative positions
- angle of gradient from straight line through points
- radius of circular arc through this points and the point on profil between

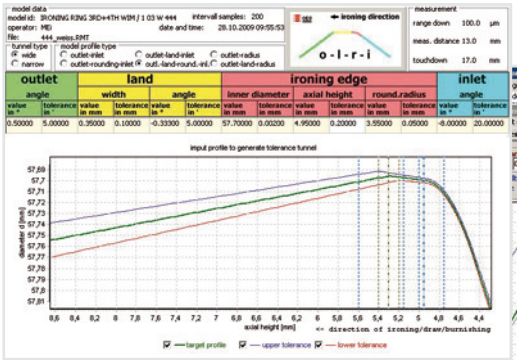
TOMRIC is a special software, which was developed to enable the evaluation of the measured profile data. As the important data of the ring drawing are entered in the software, **TOMRIC** creates a detailed profile model including also the tolerances (the so called tolerance tunnel model For each type of ring a special tolerance tunnel model can be created. By help of the model, a good/bad decision can be made after the measurement.

The picture above shows the input mask of **TOMRIC** to create the tolerance tunnel model.



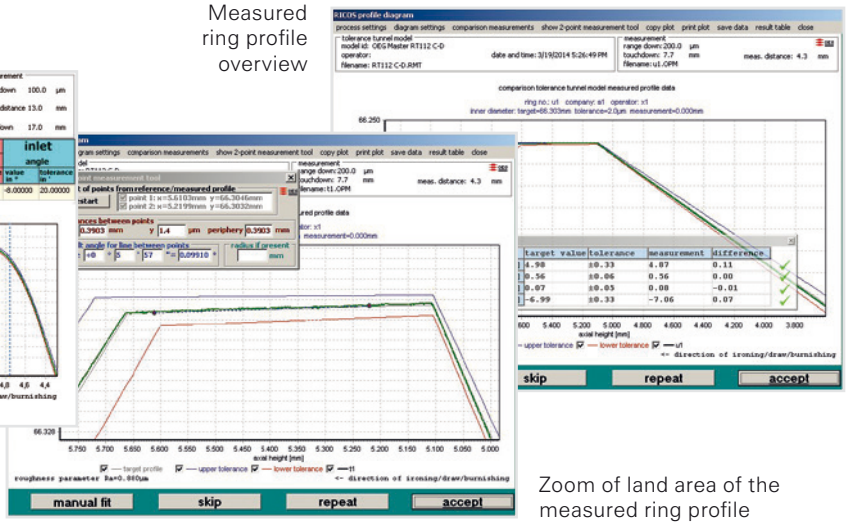
Only by interaction of the measuring system (which provides the real ring profile) and the **TOMRIC** software (which allows the presentation of the measured profile in relation to the desired profile and tolerances), a correct evaluation and assessment of the ring is possible.

RICOS and **TOMRIC** are absolutely special designed for the measuring and evaluation demands in the beverage can industry. Therefore **RICOS** allows an easier and faster ring measurement in connection with a perfect evaluation of the measuring results than currently known systems.



Input mask of software **TOMRIC**

Measured ring profile overview



Zoom of land area of the measured ring profile

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RING & PUNCH INSPECTOR

Visual inspection of inside surface quality and profile of ironing rings and outside surface quality of punchs for beverage can manufacture

The **RING & PUNCH INSPECTOR** provides fatigue free and detailed inspection of the inside surface of each kind of ironing ring.

Using a stereo zoom microscope and a special illumination, a high contrast image is provided to the operator. The mechanical setup was specially designed to meet the needs in beverage can manufacturing and enables the exact positioning of the ring and punch under the microscope. The stereo zoom microscope has a large zoom factor, which provides as well overview and detailed inspection.

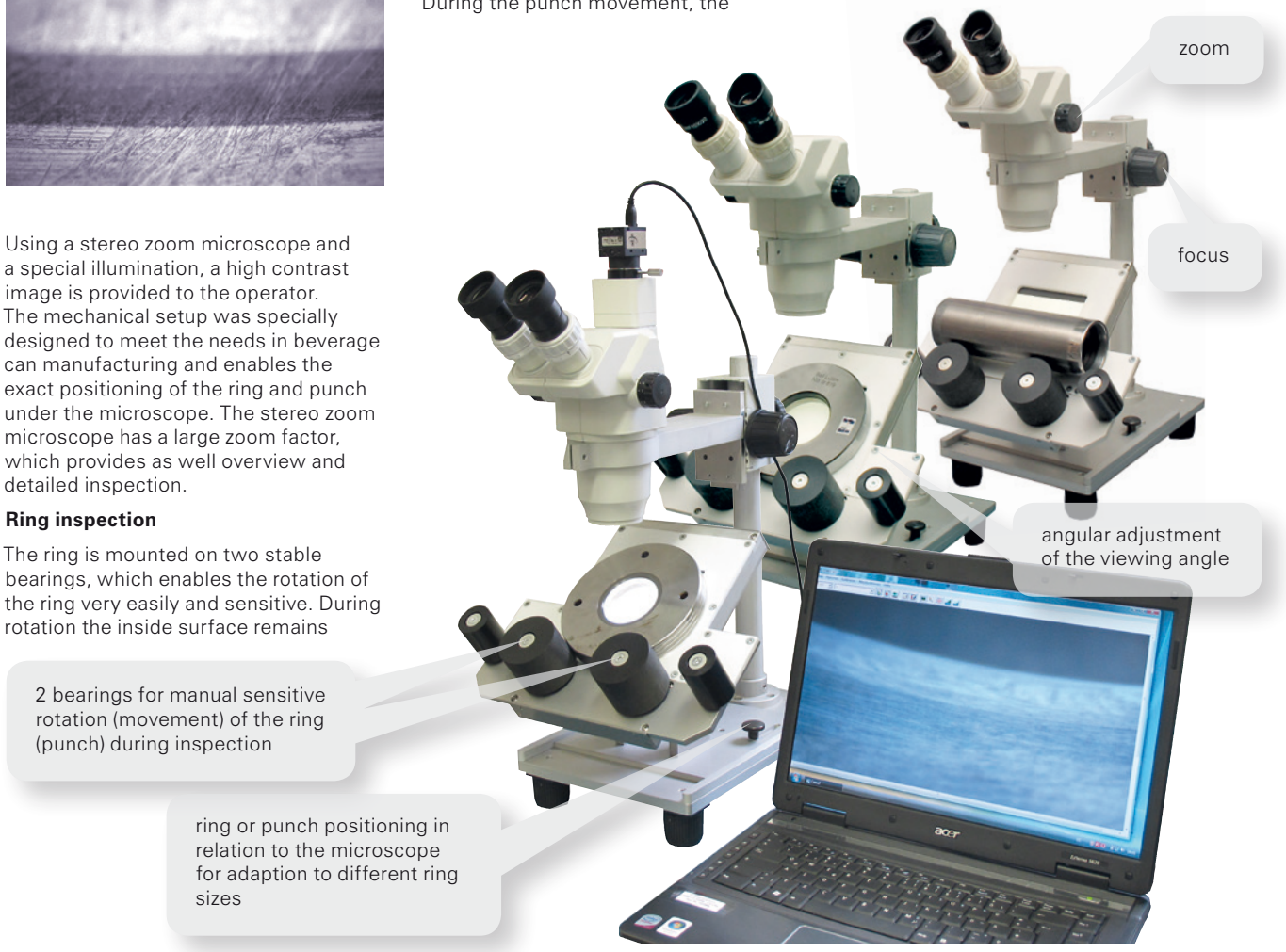
Ring inspection

The ring is mounted on two stable bearings, which enables the rotation of the ring very easily and sensitive. During rotation the inside surface remains constantly in the image plane of the microscope. According the inside form of the ring, different viewing angles can be adjusted. The **RING & PUNCH INSPECTOR** can be adapted to all ring sizes.

Punch inspection

The punch is mounted on two stable bearings, which enables the movement of the punch under the micorcope. During the punch movement, the outside surface remains constantly in the image plane of the microscope. 2 additional bearings on the left and right side enable the inspection of the complete punch. The **RING & PUNCH INSPECTOR** can be adapted to all punch sizes.

The **RING & PUNCH INSPECTOR** is the perfect completion of the tool room equipment!



Attachments

The **SPECIAL WORKBENCH**, shown on some of the product pictures does not belong to the standard scope of supply of the measuring equipment. It must be ordered additionally.

The **SPECIAL WORKBENCH** allows a comfortable and fatigue free work with the can tool metrology systems. It has the following features:

- special stable table construction;
- passive vibration isolators (standard)
- semi active vibration isolators (optional, if tool room is located close to body maker);
- work plate of the instruments and table plates are on the same height;
- special PC-case with door (lockable);
- 4 cases for attachments (like calibration rings, punches etc., certificates).

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