

# SKF Waviness Analyzer

Measuring device for medium and large bearing rings and large rollers

MWA 250D, MWA 420D,  
MWA 800D



## General description

The MWA 250D/420D/800D computer based analyzer covers all demands of modern quality control for roundness and waviness. To enable the analysis of small-tolerance fields of mechanical production, the MWA's provide highest accuracy and resolution, not normally available on basic roundness measuring instruments. Possible measuring objects are large rollers and rings.

## Measuring capabilities

The MWA's provides macro geometry measurements and analysis of:

- Roundness
- Harmonics
- Waviness
- Flatness

## Rapid cycle times and flexibility

Simple and fast set-up and operation are ensured by the modular and powerful but user-friendly design of the hard- and software:

- A large number of specialized tools for performing serial measurements are available.
- Individual measuring sequences with an infinite number of evaluation criteria, each with its own tolerance values, are pre-programmable and can be stored for each part of the sample.
- This enables machine operators to perform detailed measurements and get immediate machine-settings and accept/reject decisions from the system without requiring any programming on their part.



- Repeat measurements can be summarized statistically on request, giving the mean ( $\bar{x}$ ), standard deviation ( $s$ ), range and histogram of each criterion used.

## Close to the manufacturing

The design of the MWA 250D/420D/800D has the measuring mechanics placed on a dampened granite plate. This allows the equipment to be used not only in standard measuring rooms or laboratories, but also right on the production floor – and that’s where modern quality assurance mainly takes place.

## Powerful and user-friendly

Roundness and waviness measurements are the two principles traditionally used worldwide to qualify round parts. Each principle has advantages and disadvantages, depending on the requirements.

The software allows both benefits to be utilized and provides an analysis of roundness as well as of waviness.

Additionally Fast Fourier Transformation (FFT) provides detailed harmonics analysis.

## Waviness analysis

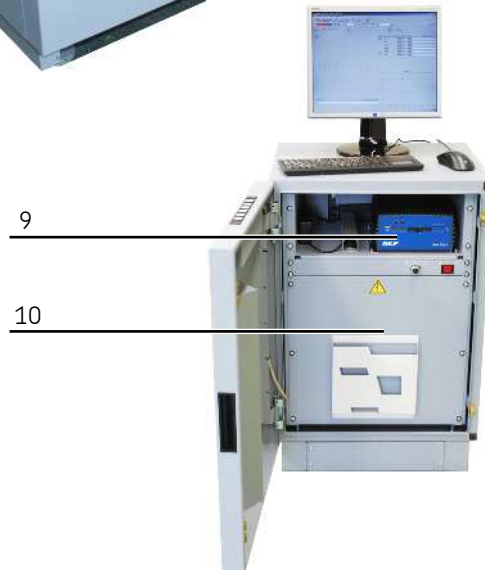
The MWA 250D/420D/800D provides waviness evaluation as outlined below:

- Displacement-proportional readout ( $\mu\text{m}$ ) corresponding to Bendix Waveometer machines (Low Band and High Band)
- Vibration-velocity-proportional read-out ( $\mu\text{m}/\text{sec}$ ), corresponding to SKF standard
- User-programmable waviness evaluation, by selecting any combination of
  - frequency band
  - velocity or displacement proportional read-out
  - r/min in the case of velocity proportional read-out.

## Machine description

For different test pieces and applications there are various measuring stands, sensors and chucks available. In the figure below you see one application.

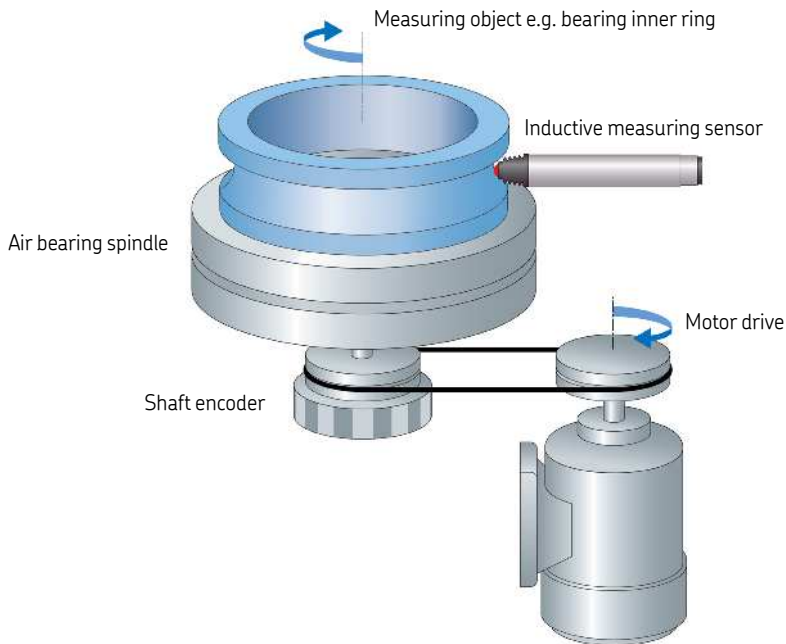
- 1 Measuring stand with sensor holder and sensor
- 2 Air bearing spindle with centring table
- 3 Base plate (stone)
- 4 Vibration damped base frame with pneumatic inside
- 5 Monitor
- 6 Keyboard with touch pad
- 7 Control panel
- 8 Electrical/electronic cabinet
- 9 Measuring electronics MEC 7001 A
- 10 Electric



## Functional principle

The measuring object is placed into the chuck of the spindle which is then set in rotation. The probe is applied manually or pneumatically to the part.

After performing each measurement, the results are automatically checked for plausibility, and then presented on the monitor and documented on an attached printer.



## Technical specifications

- Mechanics
  - Working range MWA 250D:
    - Min. OD to max. OD – rings: 90 to 250 mm (3.5 to 9.84 in.)
    - Min. bore: 90 mm (3.5 in.)
    - Min. OD rollers: 20 mm (0.79 in.)
    - Max. height: 250 mm (9.84 in.)
  - Working range MWA 420D:
    - Min. OD to max. OD – rings: 90 to 420 mm (3.5 to 16.54 in.)
    - Min. bore: 150 mm (5.9 in.)
    - Min. OD rollers: 20 mm (0.79 in.)
    - Max. height: 250 mm (9.84 in.)
  - Working range MWA 800D:
    - Min. OD to max. OD – rings: 190 to 800 mm (7.48 to 31.47 in.)
    - Min. bore: 200 mm (7.9 in.)
    - Min. OD rollers: 190 mm (7.48 in.)
    - Max. height: 250 mm (9.84 in.)
  - Workpiece weight:
    - MWA 250D/ MWA 420D: max. 100 kg (220 lbs)
    - MWA 800D: max. 250 kg (550 lbs)
  - Spindle: Vertical air bearing spindle
  - Spindle speed adjustable: 3 to 15 r/min
  - Maximum spindle load:
    - MWA 250D/ MWA 420D: Axial 2 000 N (450 lbs) centrally
    - MWA 800D: Axial 5 000 N (1 125 lbs) centrally
  - Paint: Silver-grey RAL 7001
- Electronics
  - Measuring electronics: MEC 7001 A; for details see data sheet MEC 7001 A
  - Sensor: Various inductive measuring sensors available
  - Software: WinMWA, operating system Windows 10; for details see data sheet MEC 7001 A
- System accuracy
  - $\Delta r$  - Repeatability measured at 5 r/min spindle speed, optimum conditions and optimum work piece:
    - MWA 250D: < 0,05  $\mu\text{m}$  (2  $\mu\text{in.}$ )
    - MWA 420D: < 0,05  $\mu\text{m}$  (2  $\mu\text{in.}$ )
    - MWA 800D: < 0,15  $\mu\text{m}$  (6  $\mu\text{in.}$ )
- Dimensions and weights
  - Dimensions (H x W x D)
    - MWA 250D/MWA 420D: 1 600 x 1 520 x 590 mm (63.0 x 59.8 x 23.2 in.)
    - MWA 800D: 1 673 x 1 970 x 900 mm (65.9 x 77.6 x 35.4 in.)

- Weight:
  - MWA 250D/ MWA 420D: Approx. 540 kg (1 190 lbs)
  - MWA 800D: Approx. 1 240 kg (2 737 lbs)
- Requirements
  - Electrical system: See rating plate, 230 V/50 Hz/500 VA, 115 V/60 Hz/500 VA, 230 V/60 Hz/500 VA  $\pm$  10%
  - Pneumatic system
    - Air pressure 5,5 bar (79.8 psi) at least
    - Air consumption 3 Nm<sup>3</sup>/h
    - Air quality, instrument air = dry, filtered and oil free oil < 0,01 mg/m<sup>3</sup>, water pressure dew point = 2 °C
  - Temperature: Normal temperatures, Temperature gradient less than 1 degree/hour, no fan blowing on the equipment, no open doors near by which can increase the temperature gradient
  - Air humidity: Must not exceed 60% in summer and 70% in winter, if the relative humidity is higher, we recommend air-conditioning
  - Location: Install the machine on flat, firm ground; install the machine where it is not exposed to shocks (e.g. near forging machines, presses and the like), it should not be located on floors where you can easily feel vibrations with your legs.

Technical specifications subject to change without notice.

For more information on your specific application, please contact our engineers at QT.

Please contact:

**SKF Österreich AG**  
**Quality Technology**

Seitenstettner Strasse 15 · A 4401 Steyr · Austria

Tel: +43 (0)7252 797-571 · Fax: +43 (0)7252 797-574 · Email: qt-steyr@skf.com

**Web Site: [www.skf.com/qt-steyr](http://www.skf.com/qt-steyr)**

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