BORE HOLE INSPECTION SYSTEM

EXAMPLES AND FIELDS OF APPLICATION
MEHR ALS DIE SUMME ALLER TEILE

TURNED PARTS
Chip detection & foreign particles

Detection of manufacturing defects, chips and foreign particles in bore holes and blind holes.

Sizes from 3 – 40 mm

Detection of cross-bores and aborted drill holes.

Ø: depth up to 1:3

Detection of blind holes Ø depth < 1:3 stampings possible too.

Sizes from 3 – 40 mm

Detection of thread defects inside bore holes and blind holes.

Sizes from 3 – 40 mm
Cross bores

Detection of manufacturing defects, chips and foreign particles in bore holes and blind holes

Sizes from 3 – 40 mm

Detection of cross-bores and aborted drill holes

Ø: depth up to 1:3

Detection of blind holes

Ø depth < 1:3 stampings possible too

Sizes from 3 – 40 mm

Detection of thread defects inside bore holes and blind holes

Sizes from 3 – 40 mm

Detection of groove control inside of the bore hole

Sizes from 3 – 40 mm

MEHR ALS DIE SUMME ALLER TEILE
**Existing feature**

- Detection of manufacturing defects, chips and foreign particles in bore holes and blind holes
  - Sizes from 3 – 40 mm
  - Ø: depth up to 1:3

- Detection of cross-bores and aborted drill holes

- Groove control inside of the bore hole

- Detection of blind holes
  - Ø depth < 1:3 stampings possible too
  - Sizes from 3 – 40 mm

- Detection of thread defects inside bore holes and blind holes
  - Sizes from 3 – 40 mm

**MEHR ALS DIE SUMME ALLER TEILE**
Blind holes & blind bores

Detection of manufacturing defects, chips and foreign particles in bore holes and blind holes
Sizes from 3 – 40 mm

Detection of cross-bores and aborted drill holes
Ø: depth up to 1:3

Groove control inside of the bore hole

Detection of blind holes
Ø depth < 1:3 stampings possible too
Sizes from 3 – 40 mm

Detection of thread defects inside bore holes and blind holes
Sizes from 3 – 40 mm
Internal thread control

Detection of manufacturing defects, chips and foreign particles in bore holes and blind holes

Sizes from 3 – 40 mm

Detection of cross-bores and aborted drill holes

Ø: depth up to 1:3

Groove control inside of the bore hole

Sizes from 3 – 40 mm

Detection of blind holes

Ø depth < 1:3 stampings possible too

Sizes from 3 – 40 mm

Detection of thread defects inside bore holes and blind holes

Sizes from 3 – 40 mm
MEHR ALS DIE SUMME ALLER TEILE

FITTINGS
**Chip detection & foreign particles**

Detection of chips, foreign particles and manufacturing defects in fittings

Sizes from 3 – 40 mm

Detection if feature is present and if the sealing rings fit correctly inside of the fitting

Sizes from 3 – 40 mm
**Existing feature**

Detection of chips, foreign particles and manufacturing defects in fittings

Sizes from 3 – 40 mm

Detection if feature is present and if the sealing rings fits correct inside of the fitting

Sizes from 3 – 40 mm
MEHR ALS DIE SUMME ALLER TEILE

PLASTIC PARTS
Chip detection & foreign particles

- Detection of foreign particles and manufacturing defects in breaches, blind holes and cavities
- Detection of cross bores in breaches and blind holes
- Detection if a feature exists (e.g. contacts or labels) inside of the plastic part
- Detection of blind holes
- Detection of threads

Ø: depth up to 1:3
Sizes from 3 – 40 mm
Sizes from 3 – 40 mm
Sizes from 3 – 40 mm
Sizes from 3 – 40 mm
Cross bores

Detection of foreign particles and manufacturing defects in breaches, blind holes and cavities

Detection of cross bores in breaches and blind holes

Detection if a feature exists (e.g. contacts or labels) inside of the plastic part

Detection of blind holes

Detection of threads

Ø: depth up to 1:3

Sizes from 3 – 40 mm

Sizes from 3 – 40 mm
Existing feature

- Detection of foreign particles and manufacturing defects in breaches, blind holes and cavities
  - Ø: depth up to 1:3
- Detection of cross bores in breaches and blind holes
  - Ø: depth up to 1:3
- Detection if a feature exists (e.g. contacts or labels) inside of the plastic part
  - Sizes from 3 – 40 mm
- Detection of blind holes
  - Sizes from 3 – 40 mm
- Detection of threads
  - Sizes from 3 – 40 mm
## Blind holes & blind bores

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Ø: depth up to</th>
<th>Sizes from</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection of foreign particles and manufacturing defects in breaches, blind holes and cavities</td>
<td></td>
<td>1:3</td>
<td>3 – 40 mm</td>
</tr>
<tr>
<td>Detection of cross bores in breaches and blind holes</td>
<td></td>
<td>1:3</td>
<td>3 – 40 mm</td>
</tr>
<tr>
<td>Detection if a feature exists (e.g. contacts or labels) inside of the plastic part</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detection of blind holes</td>
<td></td>
<td></td>
<td>3 – 40 mm</td>
</tr>
<tr>
<td>Detection of threads</td>
<td></td>
<td></td>
<td>3 – 40 mm</td>
</tr>
</tbody>
</table>
Internal thread control

Detection of foreign particles and manufacturing defects in breaches, blind holes and cavities

Detection of cross bores in breaches and blind holes

Detection if a feature exists (e.g. contacts or labels) inside of the plastic part

Detection of blind holes

Detection of threads

Sizes from 3 – 40 mm

Sizes from 3 – 40 mm

Sizes from 3 – 40 mm
MEHR ALS DIE SUMME ALLER TEILE

NUTS
Chip detection & foreign particles

Detection of chips, foreign particles and manufacturing defects
Sizes from 3 – 40 mm

Detection of thread defects inside of nuts
Sizes from 3 – 40 mm

Thread counting
Sizes from 3 – 40 mm
Internal thread control

Detection of chips, foreign particles and manufacturing defects
Sizes from 3 – 40 mm

Detection of thread defects inside of nuts
Sizes from 3 – 40 mm

Thread counting
Sizes from 3 – 40 mm
Completeness check

- Detection of chips, foreign particles and manufacturing defects
- Detection of thread defects inside of nuts
- Thread counting

Sizes from 3 – 40 mm
MEHR ALS DIE SUMME ALLER TEILE

PIPE ENDS
Chip detection & foreign particles

- Detection of chips, foreign particles and manufacturing defects inside or at pipe endings
- Detection of cross bores in pipe endings
- Detection if feature is present and if the sealing rings fit correctly inside of the pipe

Sizes from 3 – 40 mm
Ø: depth up to 1:3
Cross bores

Detection of chips, foreign particles and manufacturing defects inside/ at pipe endings
Sizes from 3 – 40 mm Ø: depth up to 1:3

Detection of cross bores in pipe endings
Sizes from 3 – 40 mm Ø: depth up to 1:3

Detection if feature is present and if the sealing rings fits correct inside of the pipe
Sizes from 3 – 40 mm Ø: depth up to 1:3
Existing feature

Detection of chips, foreign particles and manufacturing defects inside/ at pipe endings
Sizes from 3 – 40 mm Ø: depth up to 1:3

Detection of cross bores in pipe endings
Sizes from 3 – 40 mm Ø: depth up to 1:3

Detection if feature is present and if the sealing rings fits correct inside of the pipe
Sizes from 3 – 40 mm Ø: depth up to 1:3
MEHR ALS DIE SUMME ALLER TEILE

BOTTLES
Form defects

Detection of form defects

Detection of casting defects

Detection of burrs
Casting defects

Detection of form defects
Detection of casting defects
Detection of burrs
Burrs

Detection of form defects

Detection of casting defects

Detection of burrs
Diameter-Depth-Ratio 1:3

Example - Depth of field various testing cylinders (thread emulation)

Img. 1: Ø 5 mm, length = 15 mm
Img. 2: Ø10 mm, length = 30 mm
Img. 3: Ø20 mm, length = 60 mm
Img. 4: Ø30 mm, length = 90 mm

Example - Depth of field Testing cylinder (graph paper)

Ø 30 mm, length = 120 mm
Diameter-Depth-Ratio 1:4

Example - Depth of field
various testing cylinders (thread emulation)

Img. 1: Ø 5 mm, length = 15 mm
Img. 2: Ø10 mm, length = 30 mm
Img. 3: Ø20 mm, length = 60 mm
Img. 4: Ø30 mm, length = 90 mm

Example - Depth of field
Testing cylinder (graph paper)

Ø 30 mm, length = 120 mm
## Technical Parameters

### CCD-cameras
- **Sensor type**: CCD Mono
- **Resolution**: 1.31 Megapixels
- **Resolution (h x v)**: 1,280 x 960 Pixel
- **Sensor size**: 1/3 "
- **Pixel size**: 3.75 µm
- **Optical area**: 6 mm (1/2.67")
- **Sensor diagonal**: 6 mm
- **Interface**: USB2
- **Lens mount**: C-Mount
- **Level of protection**: IP30
- **Power supply**: USB-cable

### Lens
- **Focal length**: F=6.5 mm
- **Aperture**: 2 < F < 11
- **Back Focus**: 10.5 mm
- **Opening angle**: 46°
- **Ratio Ø : depth**: 1.3
- **Minimum bore Ø**: 3 mm
- **Maximum bore Ø**: 120 mm

### Lighting
- **Dark field ring light**: 162 powerful 5 SMD LED
- **Light field diameter**: 100 mm
- **Color**: red / 625 nm
- **DC voltage**: 10 - 30 V
- **Operating current**: 0.9 A
- **Protection**: IP40

### Optional equipment
- **C-Mount adapter**

### Weight
- **Total weight**: ca. 4.5 kg