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# Hardness Testing

according to the

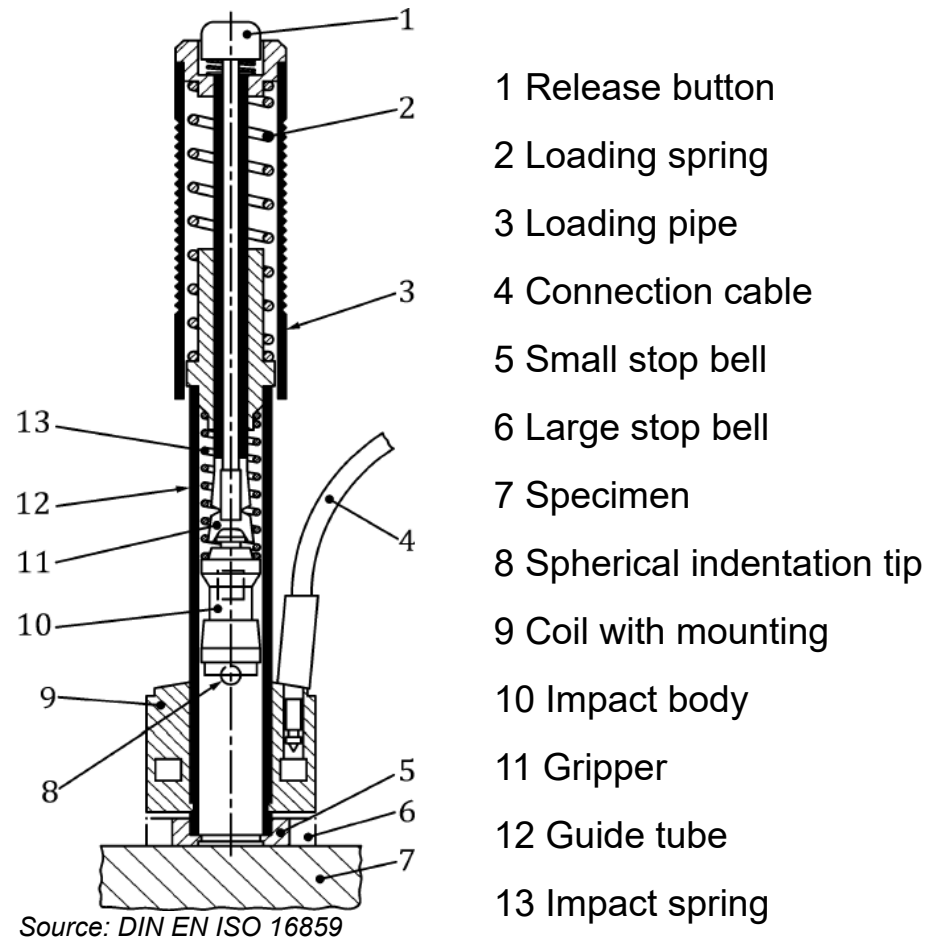
## Rebound-Procedure (Leeb)

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## Normative Basis

- ◆ DIN EN ISO 16859 (previously DIN 50156):  
Metallic materials – Hardness testing according to Leeb
- ◆ ASTM A956:  
Standard Test Method for Leeb Hardness Testing of Steel Products

# Impact Device Structure



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## Leeb-Hardness Values

$$HL = \frac{1000 \times VB}{VA}$$

HL = Hardness Leeb

VB = Rebound speed

VR = Impact speed

- ◆ Conversion of the HL-Values in other scales over empirical determined charts possible (Dependent on materials).

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## Performing a measuring

- ◆ The stop bell needs a stable ground on the specimen.  
Minimum distance to the edge = 5 mm.
- ◆ Measurements, which are not realized vertical, result in wrong values  
(→ Correction factor)
- ◆ Max. Curvature radius of the specimen 30 mm, resp. 50 mm (Type G)  
or special support rings

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## Available Impact Devices – Type D

- ◆ Standard for most testing tasks
- ◆ Min. workpiece mass: 2 kg (5 kg without stable underlay)
- ◆ Min. workpiece thickness: 25 mm (3 mm with coupling)
- ◆ Max. surface roughness (Ra): 2  $\mu\text{m}$



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## Available Impact Devices – Type DC

- ◆ Short impact device
- ◆ Min. workpiece mass: 2 kg (5 kg without stable underlay)
- ◆ Min. workpiece thickness: 25 mm (3 mm with coupling)
- ◆ Max. surface roughness (Ra): 2  $\mu\text{m}$



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## Available Impact Devices – Type DL

- ◆ Thin impact device (Ø 4,2 mm)
- ◆ Min. workpiece mass: 2 kg (5 kg without stable underlay)
- ◆ Min. workpiece thickness: 25 mm (3 mm with coupling)
- ◆ Max. surface roughness (Ra): 2 µm





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## Available Impact Devices – Type D+15

- ◆ Inductor 20 mm relocated, small contact surface  
11 x 14 mm; for measuring in slots and indentations
- ◆ Min. workpiece mass: 2 kg (5 kg without stable underlay)
- ◆ Min. workpiece thickness: 25 mm (3 mm with coupling)
- ◆ Max. surface roughness (Ra): 2  $\mu\text{m}$



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## Available Impact Devices – Type C

- ◆ Impact device with lower impact energy for measuring on hardened surfaces
- ◆ Min. workpiece mass: 0,5 kg (1,5 kg without stable underlay)
- ◆ Min. workpiece thickness: 10 mm (1 mm with coupling)
- ◆ Max. surface roughness (Ra): 0,4  $\mu\text{m}$



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## Available Impact Devices – Type G

- ◆ Impact device with higher impact energy for measuring on castings and forgings
- ◆ Min. workpiece mass: 5 kg (15 kg without stable underlay)
- ◆ Min. workpiece thickness: 70 mm (10 mm with coupling)
- ◆ Max. surface roughness (Ra): 7  $\mu\text{m}$



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## Hardness Test Blocks

- ◆ HLD, HLDL, HLD+15, HLC:

Ø 90 x 55 mm

2,73kg

- ◆ HLG:

Ø 120 x 70 mm

6,17 kg



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## Verification / Calibration

- ◆ Daily, in the relevant hardness range, before using the device  
Tolerable deviation: max. 5% from the hardness value  
Tolerable range: max. 5% from the mean value
- ◆ Every 12 months indirect calibration through the manufacturer on certified test blocks in 3 hardness ranges.



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