

# Electron beam hardening

*Electron beam during hardening*

## Technology

A focused, high-frequency deflected electron beam converts the kinetic energy of the electrons into heat at the surface of the workpiece. This results in rapid, localised heating of the material and the depth of penetration can be precisely controlled.

The high heat conduction into the surrounding material then forces a high cooling rate without additional coolant (self-quenching), resulting in the hardening of this surface layer in suitable materials. In this way, local functional surfaces with excellent wear resistance properties can be produced.

By extending this process to re-melt the surface layers, it is possible to further modify the properties of functional surfaces.

## Applications

- Automobile Industry
  - Transmission components, valve seats
- Mechanical and plant engineering
  - Cam disks, shafts, thrust rings, stop or running surfaces
- Fixture construction
  - Localized functional areas
- Toolmaking
  - Cutting stamp

## Contact

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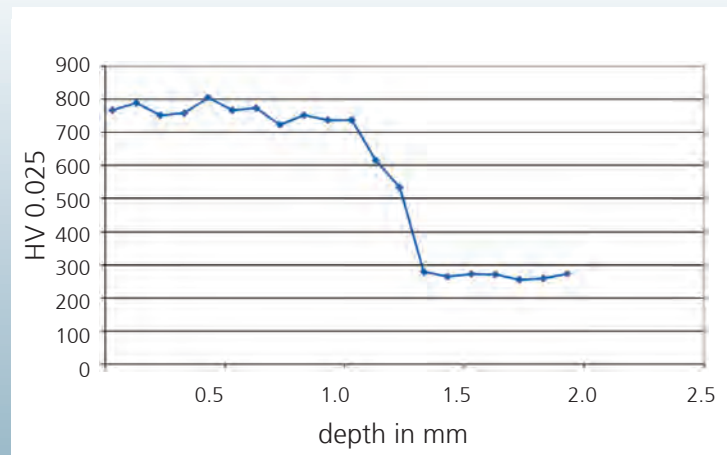
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Cam discs



Shaft, C60, electron beam hardened

### Advantages over conventional hardening processes

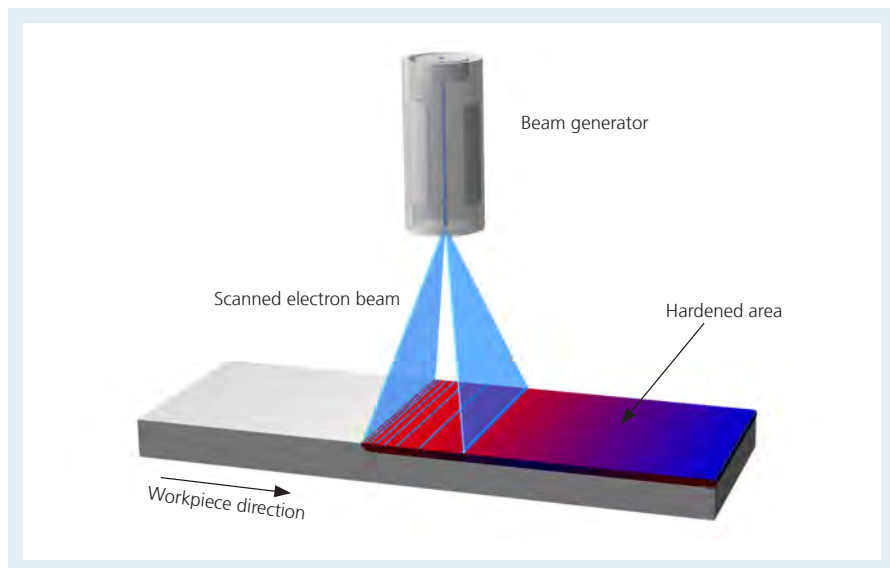
- Precisely adjustable hardening depth
- Localized hardening of exposed surface areas
- Low hardening distortion
- Hardening can be a finishing process
- Metallic bright surfaces after hardening
- Highly repeatable CNC-controlled process management
- Both steel and cast steel can be hardened

### Technical specifications

Beam generator	10 kW/60 kV
NC axes	2 orthogonal linear axes, 1 rotary axis
Feed rate	≤ 6 m/min
Hardness depth	0.1 ... 1.0 mm
Width of the hardening field	up to 100 mm
Part dimensions	max. 1000 mm × 500 mm × 450 mm
Additional equipment	multi-axis devices

### Our offer

- Expert advice
- Feasibility studies
- Technology development for customer parts
- Sample production
- Processing of special customer parts
- Single-part production
- Hardness testing during production
- Metallographic determination of the edge hardness depth



Technology of surface hardening with an electron beam



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