Demagnetization of bearings

Fully assembled bearings or single bearing rings

MM DN + CT-U, VE
MM DM + HLE

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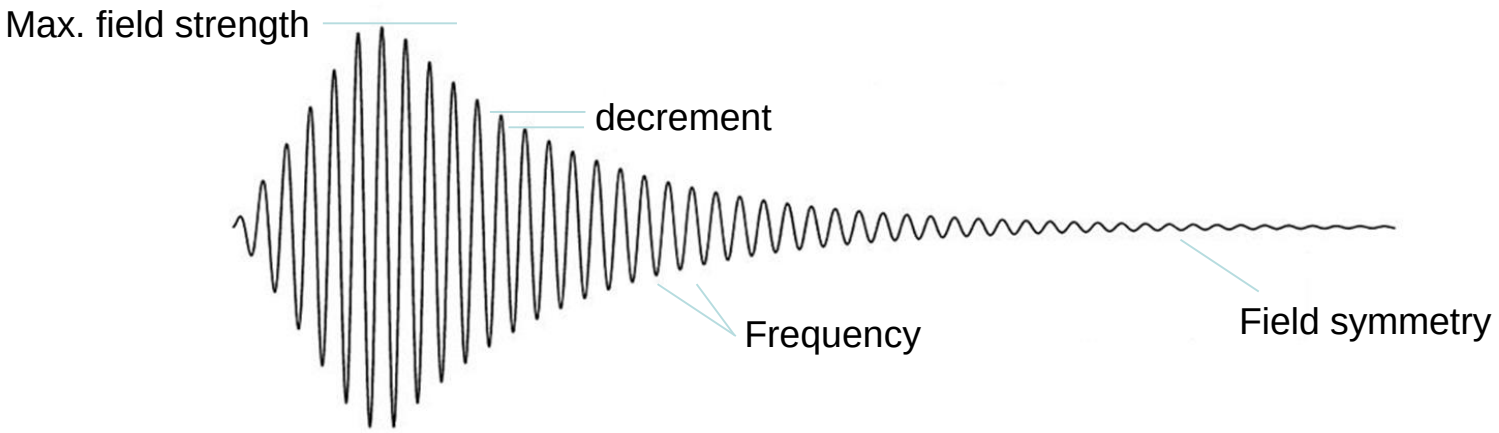
Technology: Demagnetization through decaying alternating magnetic field

Goal: the best possible distribution of the domain magnetization direction in the demagnetized material

Max. field strength [kA/m]	Reversal of hard magnetic domains, penetration depth
Frequency [Hz]	Penetration depth
Effective range [LxWxH, m^3]	Full magnetic fluxing of material
Field homogeneity	Uniform effect in the material
Decay precision	Low decrement and best field symmetry at the end of the process for the best possible domain distribution



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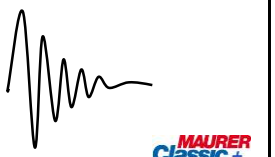
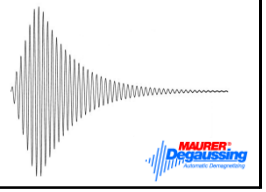
Demagnetization Technologies

Technology	Coil module	Field strength	Effective range	Field homogeneity	Decay precision	
Field reduction through increasing distance (continuous process)	Coil					
	Plate / Yoke					
Pulse without energy feeding (capacitor discharge)	Coil					
	Plate / Yoke					
Pulse with energy feeding (MaurerDegaussing)	Coil					
	Plate / Yoke					

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Machines for demagnetization of assembled bearings and single bearing rings, diameter range 50...600mm

CT-U

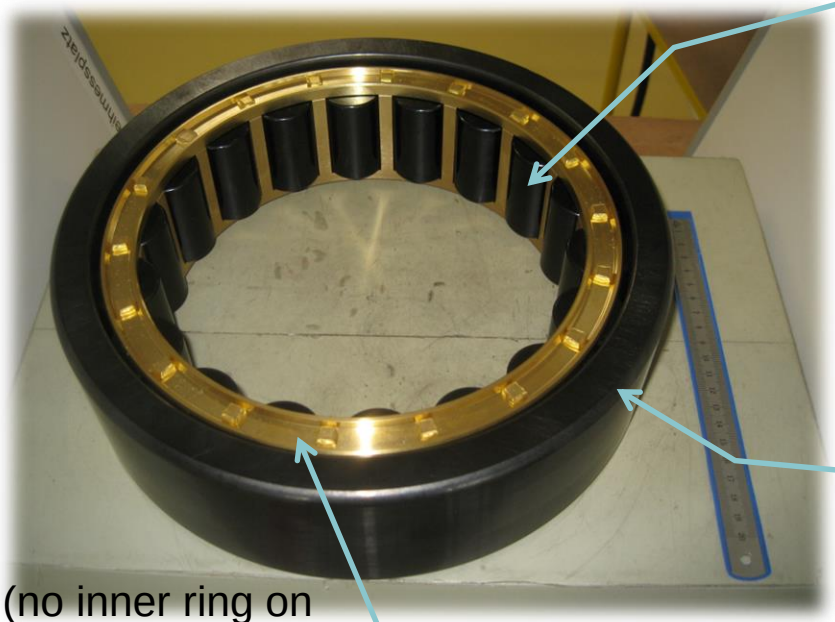
MM DN

MM DM

MM VE or HLE

MM VE or HLE +
protective housing

What are the critical residual magnetism spots on a bearing?



(no inner ring on the photo)

Rollers or balls:

Turn the rollers or balls when measuring to detect residual magnetism on the whole surface. Put the measuring probe directly on contact of the surface.
(A proper demagnetization of the rolling elements is the biggest challenge)

Ring:

Scan the whole surface with the Hall sensor probe

Cage:

Can only be magnetized when made of ferromagnetic steel

The right choice of the demagnetizer depends on the type of the bearing

(d ~ 50...600mm), target residual magnetism below 4A/cm (based on experience)

	Ball bearings	Cylinder roller and needle bearings
riveted brass cage	 ~150kA/m	 ~200 - 250kA/m
plastic or metal cage	  ~100 - 150kA/m	  ~150 - 200kA/m

Rolling elements become strongly magnetized in riveted cages (due to the riveting process)

Rollers need more field strength for demagnetization as balls (crosswise fluxing)

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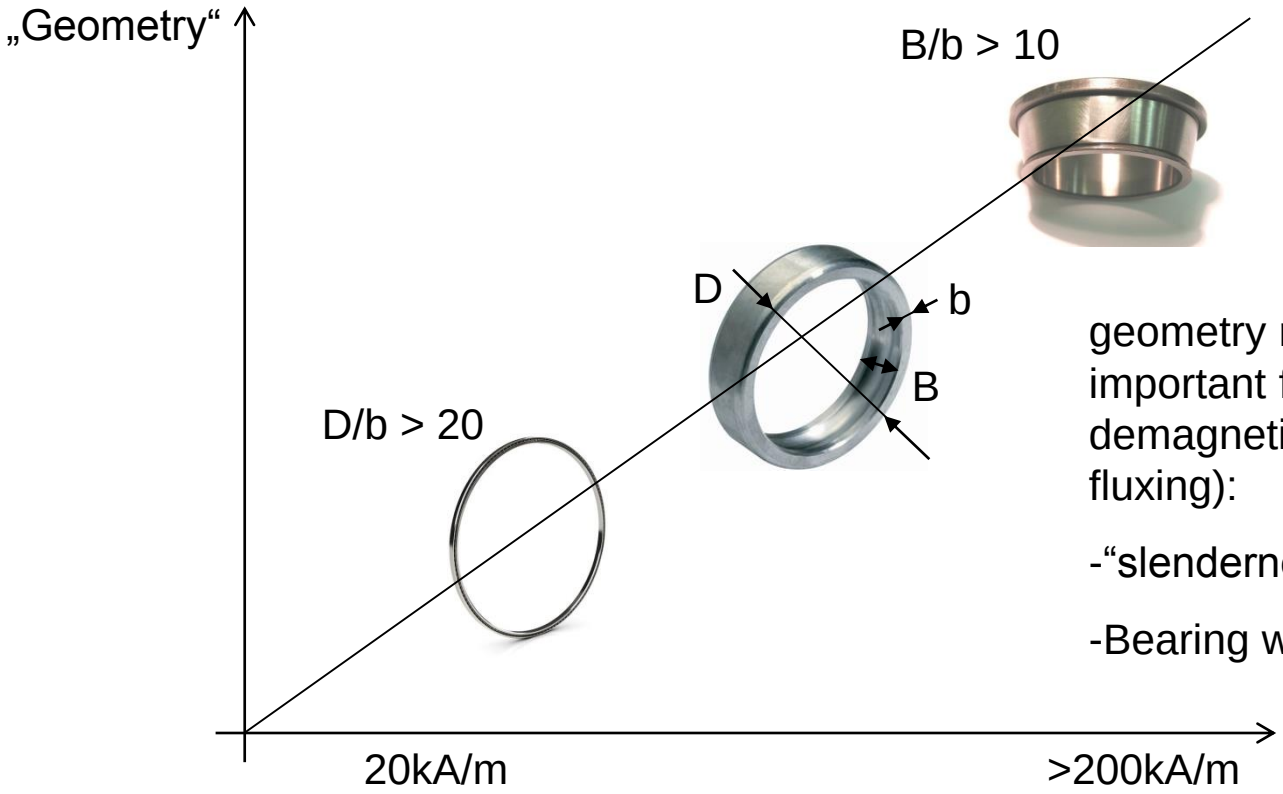
Influence of the ring geometry on the field strength needed for a proper demagnetization

Based on a target value for residual magnetism smaller 4A/cm



geometry ratios of the rings are important for the demagnetization (longitudinal fluxing):

-“slenderness ratio” (D/b)

-Bearing width / thickness (B/b)

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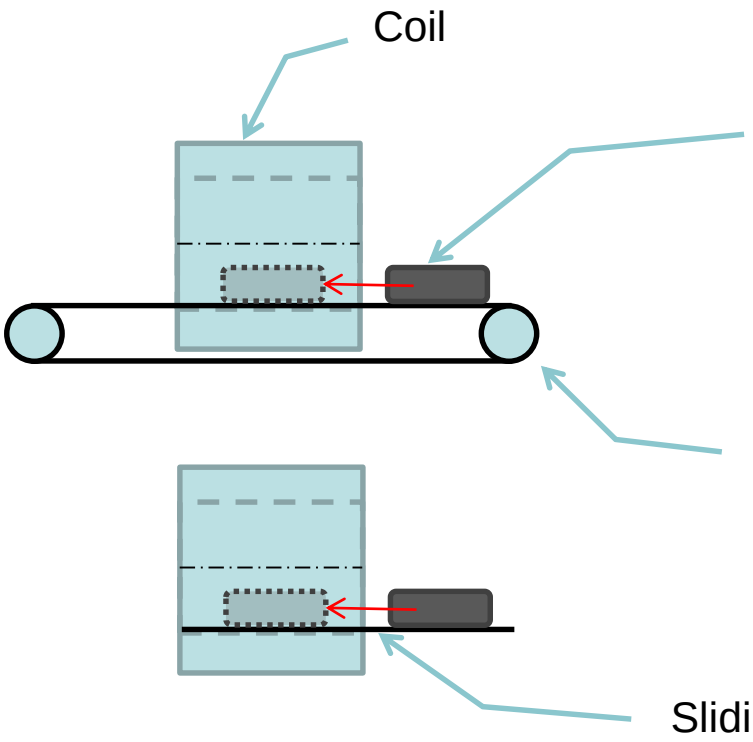
Handling & Automation



Cycle times	
pulse duration	approx. 7s
cycle time	approx.15...30s

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Key arguments

process reliability

- Maurer Degaussing pulse demagnetization with high field strength, provides very low residual magnetism, even for fully assembled bearings
- Residual magnetism < 4A/cm reached (C_{pk} = 1.67)
- Standard procedure leads to consistent results (each bearing faces always exactly the same demagnetization pulse)

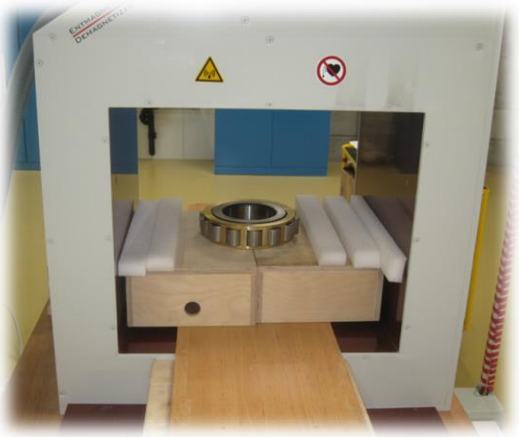
high throughput

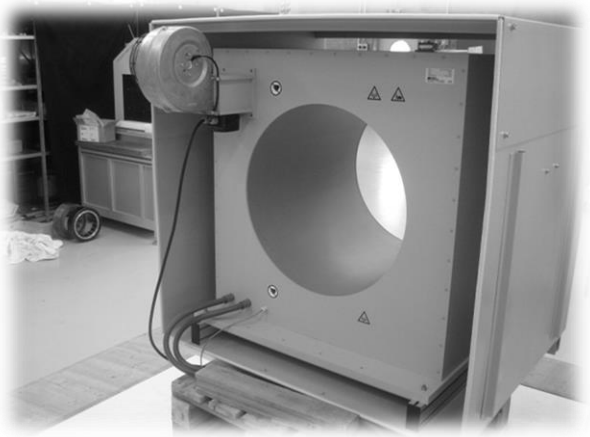
- Demagnetization of up to 4 bearings per minute
- Demagnetization of multiple bearings at once
- Easy integration in automated or manual production lines

easy to use

- Triggering of the pulse by “pushing the button”
- External communication by a simple 24V interface
- Operator friendly (no special know how is required)

Examples





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