Magnetfabrik Bonn GmbH

Technical terms of delivery No. TL- 270-01 / Index: 7

Requirements concerning deliverables

- Hard ferrite magnets -

	Orga	Date	Identification code	Index	Description of the change
Revised by	334	08.07.2008	Mr. Krzywinski	4	Sections 4, 7 and 9 revised
Revised by	371	24.05.2013	Mr. Krzywinski	5	Sections 9 revised
Revised by	371	04.07.2013	Mr. Krzywinski	6	Sections 9 revised
Revised by	371	17.04.2024	Dr. Grönefeld	7	Sections 9 revised

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Requirements concerning deliverables

- Hard ferrite magnets -

1. Application and purpose

These technical terms of delivery are considered to be a drawing supplement and consequently part of the contract. All the values and agreements stated in component drawings and specifications take priority over these technical terms of delivery. Ox magnets are manufactured using powder and metalworking technologies based on a sintering process.
Isotropic hard ferrite magnets are labeled hard ferrite 7/21 according to DIN IEC 60404-8-1.
Anisotropic hard ferrite magnets are labeled hard ferrite 20/19 and higher according to DIN IEC 60404-8-1.

2. Definitions:

Not magnetized:	Residual magnetism due to the production process is permitted. The scope and the testing procedure need to be agreed with the customer in individual cases.
Non-magnetic:	No residual magnetism permitted. Testing with steel balls according to testing instruction No. 8.

3. Characteristic material properties

Hard ferrites are subject to a temperature coefficient of flux density and of physical coercive field strength of:

$$TK_{Br} \cong -0.2\ \%/K;\ TK_{HcJ} \cong +0.4\ \%/K$$

In the case of intense cooling, irreversible losses may occur due to temperature-related operating point displacements. The maximum operating temperature is ~ 250 °C.
Magnetized Ox magnets have to be protected against exposure to stray magnetic fields > 80 mT (800 Gauß or 64 kA/m respectively) as these may result in a reduction in the inherent magnetization.

4. Geometric dependency

DIN IEC 60404-8-1 refers to the interdependency between magnetic values and the magnet geometry.
The minimum magnetic values apply only to magnets with a cross-section which remains unchanged along the axis of magnetization, with a volume of between 1 cm² and 200 cm² and with an extent of at least 8 mm in all spatial dimensions.
If these dimensions are not achieved then the maximum deviations set out below are permitted:

B_r	=	10 % less than the minimum catalog value
H_{cB}	=	10 % " " "
H_{cJ}	=	10 % " " "
$(BH)_{max}$	=	15 % " " "

5. Permitted deficiencies

The permitted deficiencies are material- and technology-related and do not affect the magnetic and mechanical properties of the magnets.

Defects whose size exceeds the defined limit by more than 5 % will be acknowledged as defects.

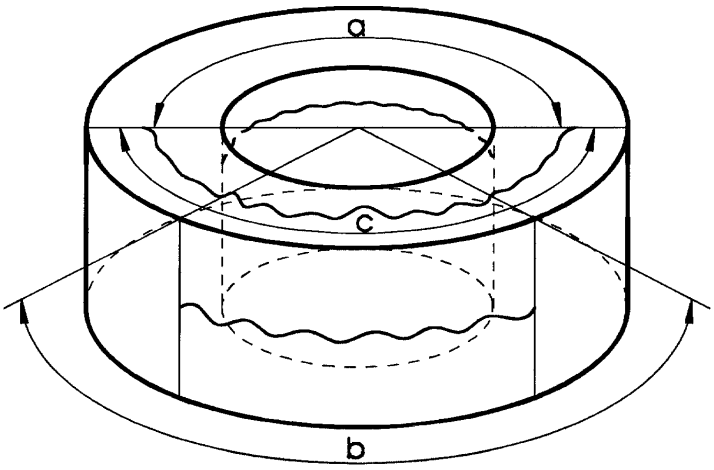
Defects of the same kind affecting the same part will be added together and must not exceed 50 % of the defined permitted defect.

If multiple defects occur to the same part, then these are permitted provided that they do not exceed 75 % of the maximum limit.

Defects not represented in the following will be judged by the same criteria as the recorded defects.

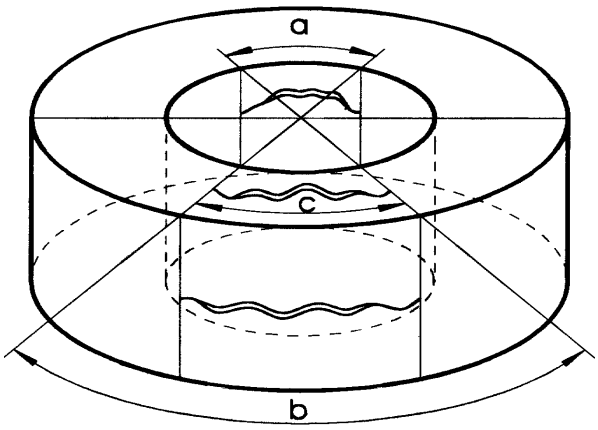
5.1 Isotropic and anisotropic ring magnets

Hair cracks ≤ 0.1 mm

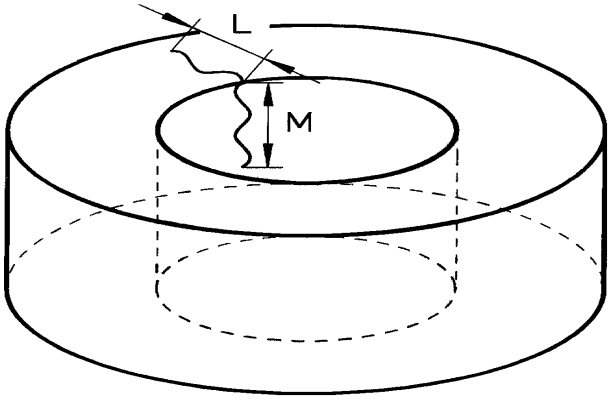


a = Inner circumference < 180°
b = Outer circumference < 120°
c = Face < 180°

cracks > 0.1 mm



a = Inner circumference < 45°
b = Outer circumference < 45°
c = Face

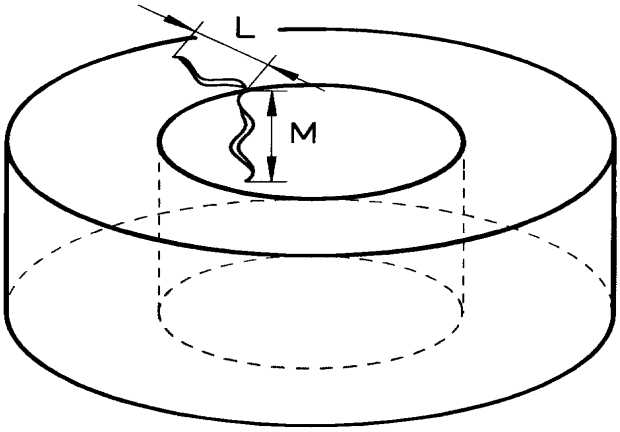


L = < (Ra-Ri)
Cracks in radial direction

M = < Magnet height

Cracks in axial direction

For hair cracks < 0.5 x (Ra-Ri)
or < 0.5 x magnet height
multiple cracks are permitted



Permitted:

L ≤ 1/3 (Ra-Ri)

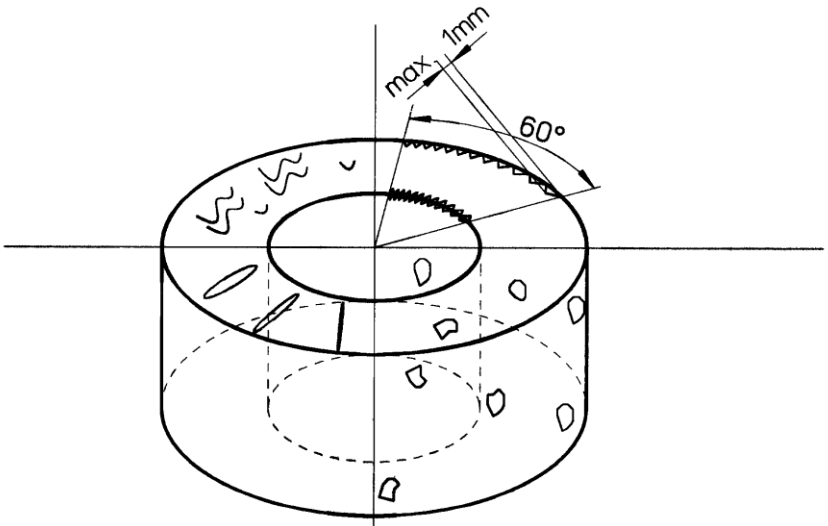
M ≤1/3 Magnet height

Lateral and tool marks

Marks permitted up to length of 11 mm. Multiple marks are permitted provided that gaps of at least 0.5 mm are present. Circular marks up to 1.5 mm diameter are permitted.

Edge splintering

Permitted over an angle of 60° with a maximum splinter distance of 1 mm.



Grinding marks

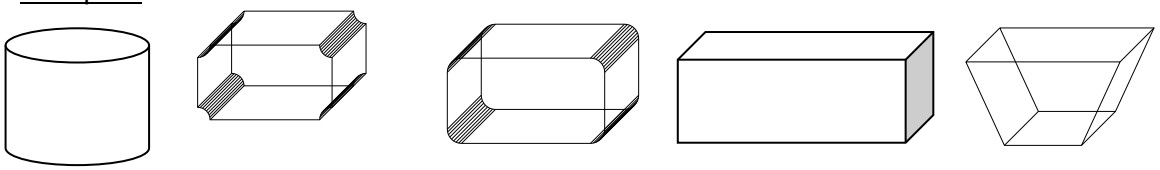
Grinding marks are permitted up to 0.05 mm in depth and 5 % of the surface.

Adhering and sintered material

Adhesions are permitted within the tolerances permitted for the blank. They are not permitted on ground surfaces.

5.2 Isotropic and anisotropic rod and shaped magnets

Examples:



Cracks ≤ 0.1 mm:
Permitted up to 1/3 of the corresponding measuring direction.

Cracks ≥ 0.1 mm:
Permitted up to 20 % of the corresponding measuring direction.

Edge splintering:
Total splintering: up to a maximum of 10 % per edge and maximum depth of 1 mm.

Surface splintering:
Total quantity of the splintering and voids per surface: maximum of 5 % of the surface with a maximum depth of 1 mm.

Grinding marks:
Grinding marks are permitted up to a depth of 0.05 mm and up to 5 % of the surface.

Adhering and sintered material:
Adhesions are permitted within the tolerances of the blank but not on ground surfaces.

6. Coating

Ox magnets do not need coating.

7. Safety instructions

Detailed information about the handling of permanent magnets is available on our homepage: www.magnetfabrik.de, under Downloads, "Safety instructions"

8. Health risk on contact with food and drinking water

We **always recommend** avoiding direct contact between food or drinking water and Ox magnets.

9. Hazardous substances

Our statement regarding Hazardous substances (ROHS & REACH) is provides on our homepage: www.magnetfabrik.de/ in the download documents.

As part of the initial sampling documentation, the material data sheet can be attached on request, from which the composition of the product can be taken.

For customized products, an entry is usually made in the International Material Data System (IMDS). Information about an entry is provided automatically via the customer's USER ID in the IMDS.