

Acal BFi kOr - amorphous and nanocrystalline cores by Acal BFi

Tape wound cores from Acal BFi

Acal BFi is a long-standing specialist provider for soft magnetic cores from world-leading manufacturers, covering all available core materials and shapes. With the creation of the Acal BFi kOr product lines we complete our portfolio with our own-brand cores, focusing on Fe-based amorphous and nanocrystalline tape wound cores.

Product Management for the Acal BFi kOr line is executed by our Custom Services for Magnetic Components department, including all approvals and preparation of specifications and documentation. Our long-term expertise in designing, testing, manufacturing and application of amorphous and nanocrystalline cores provides customers with maximum product quality and fit – and we ensure this stable high quality with our modern test equipment for impedance analysis, high-current/high-voltage testing, power loss and climate chamber measurement.

Tape material, determining core quality and reproducibility, is used exclusively from world-leading suppliers like Hitachi Metals, Metglas®, VACUUMSCHMELZE®, or AT&M following Acal BFi's strategy to provide high-quality products, yet at competitive cost.

Acal BFi intends to best meet customer's application requirements by providing customized cores in terms of material, size, shape, specification and finishing at attractive prices. We offer this also in lower volumes for development purposes or small projects, even with short lead times.



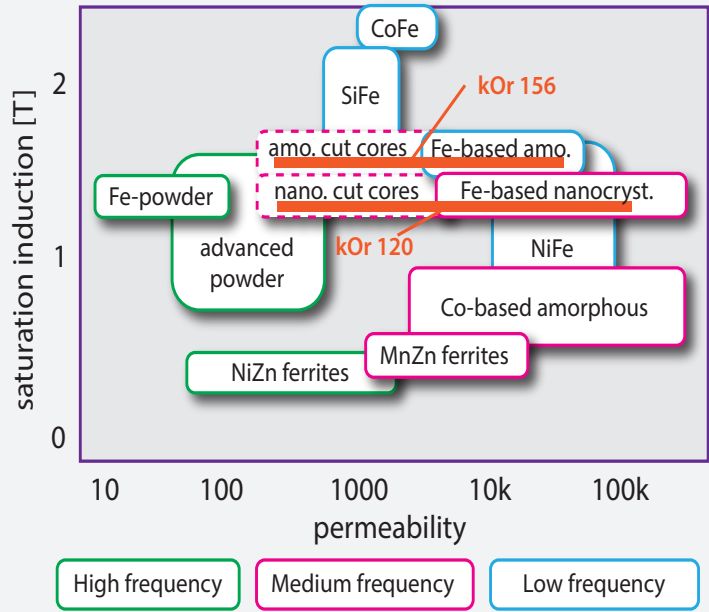
Acal BFi provides the following documents to support the design work for component's development:

- Core material information sheets (material properties and values / curves for magnetic parameters)
- Finishing material information sheets (coatings, impregnations, core boxes)
- Application notes for special shapes (e.g. additional information for cut cores)
- Core datasheets

Product description

Amorphous and nanocrystalline Acal BFi kOr products are made of wound metal ribbons of different material families (see below). The ribbons are fabricated by the Rapid Solidifying Technology, i.e. they are cast directly from the melt with final thickness of 15 – 30 μm being in amorphous state. Magnetic properties are adjusted usually by a heat treatment after core winding, often in a magnetic field. During this treatment, material may be crystallized forming the nanocrystalline state.

Cores can be formed into toroidal, oval, rectangular or more complex shapes during winding. Additionally, the cores can be cut to reduce permeability and to allow usage of bobbins. Since bare cores are not suitable for application due to sharp edges and brittleness of tape material, the cores are protected by a finishing.



This large number of different parameters and combinations for a core is described by a smart and easy-to-use part number system.

Material families

Currently, cores from two material families are offered:

kOr 156 products are made of cost-efficient Fe-based amorphous material with high saturation induction, dedicated for low-frequency power applications. Acal BFi offers standard C-cores (and other non-standard sizes as well as other shapes on request).

kOr 120 products are made of Fe-based nanocrystalline material. Its unique combination of magnetic properties makes kOr 120 superior to other materials, especially ferrites, for power and EMI applications with operating frequencies of 1 – 100 kHz. Acal BFi offers standard toroidal cores (and other non-standard sizes as well as other shapes on request).

	materials base	B_s [T]	λ_s [ppm]	tape width [μm]	reference materials			
					Hitachi Metals / Metglas	VAC	Magnetec	AT&M
kOr 156	Fe-base amorphous	1.56	27	26	2605SA1			1K101
kOr 120	Fe-base nanocrystalline	1.20	<1	17-20	FT-3	VP500/800	Nanoperm	1K107B

Note: Tape thickness is defined here as mean thickness measured by weight, length and width of tape using a known density. Often geometrical thickness, measured with a gauge or by the height of a stack, is used – this effective thickness is higher by about 10 - 15%.

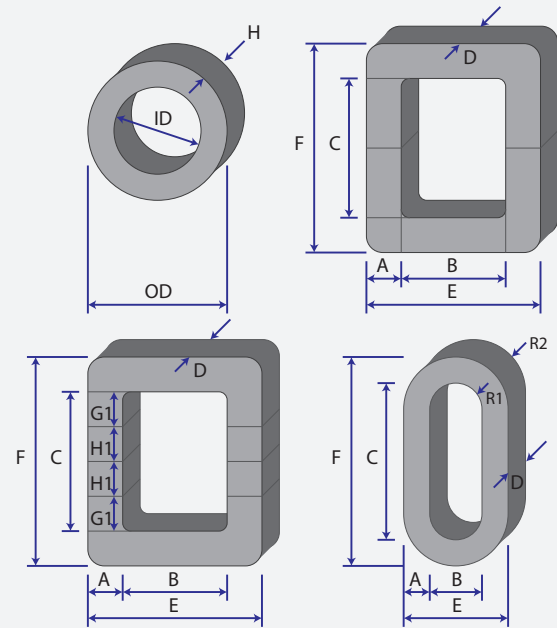
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Shapes, cuts and dimensions

Acal BFi offers C-, E-, U- and I-cores in standard types as well as in customized sizes. Number and position of cuts can be adapted to the application. For development purposes, we offer uncut cores or different variants to enable the developer to optimize the design.

Several different nomenclatures are used globally to define the dimensions and geometrical tolerances of cores or core pieces. The drawings to the right depict the nomenclature used for the Acal BFi kOr line. In general, nominal dimensions are given for bare cores, not including the finishing!

The following table shows the nomenclature used for Acal BFi kOr rectangular cores (with or without cuts) as well as the standard tolerances and a comparison to other popular nomenclatures:



Dimension (mm)	Acal BFi kOr	Acal BFi kOr standard tolerances [\pm mm]	SU norm	VAC
Overall length	F		B	a
Overall width	E		A	b
Window length	C	1,3	G	e
Window width	B	0,5	F	g
Overall height / ribbon width	D	D \leq 30mm: 0,5 D > 30mm: 1,0	D	f
Build up	A	A < 8mm: 0,5 8 \leq A \leq 15mm: 0,8 A > 15mm: 1,0	E	c
Inner radius	R1		R	r

Finishings

Depending on shape and size of the core, as well as the application requirements (UL classes, mechanical conditions), Acal BFi can provide different finishings (standard temperature classes in brackets):

- Plastic core boxes; cores are fixed with glue (min. E: 120°C)
- Epoxy coating (min B: 130°C)
- Impregnation with resin (F: 155°C)
- Enforcement with fiber tape and impregnation (F: 155°C)

All materials and components are conformal with UL, RoHS and REACH regulations. Further information about these materials is provided in our finishing materials information sheets.



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Datasheets / Specifications

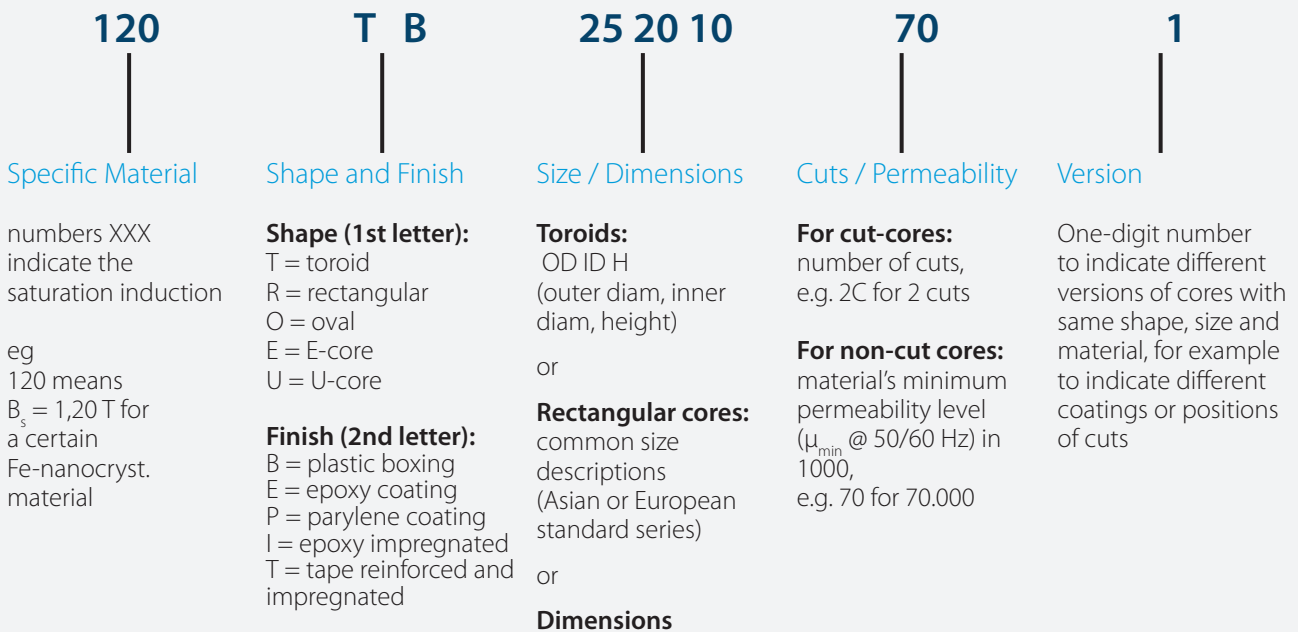
All offered cores have an individual datasheet which contains:

- Part name, used material family
- Specified values (dimensional, electrical, magnetic, test specification)
- Nominal values (informative)
- Other typical values and application information (informative)

Informative values are not subject to tests, but serve for design purpose. For example, specified electrical parameters may be converted into physical or material parameters, or recommendations for design are given.

Part numbering system, Web catalogue entry

The Acal BFi kOr line uses the following part number syntax for amorphous and nanocrystalline cores:



Examples:

- 120-TB-252010-70-1 nanocr. toroid in plastic boxing with OD = 25mm, ID = 20mm, H = 10mm and $\mu_{min} = 70k$
- 156-RI-0125-1C-1 amorphous rectangular impregnated core with 1 cut equivalent to AMCC-0125

Our standard offer reflects only a small selection of the most common sizes. Also, our online catalog subsumes all permeability levels and number and positions of cuts within a core type group, and consequently the published datasheets are meant as examples. Please contact us for an customised offer for your special application.

Lead times

If on stock we deliver quickly from our logistics hub near Frankfurt (Main), Germany within 2 days. If not stocked, our usual lead times comprise of production and transport as follows:

Production time:	samples:	5 - 10 working days	
	series parts:	15 working days for toroids, 25 working days for special shapes and cut cores	
Transport time:	<100 kg:	1 - 2 weeks by air freight	(Quicker delivery times subject to agreement.)
	>100 kg:	7 weeks by sea freight	

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