Specification for Soft Magnetic Material
kOr 156

Nominal data

	Symbol	Unit	Value	Conditions	
General material data					
Chemical composition		at%		$\sim Fe_{80}Si_7B_{13}$	
Saturation flux density (saturation induction)	B_{sat}	mT	1560 1470	H > 300 A/m H > 300 A/m	25°C 100°C
Curie temperature	T_c	°C	400		
Resistance	ρ	µΩm	1,3		
Density	d	g / cm³	7,18	annealed	
Saturation magnetostriction	λ_S	ppm	27	annealed	
Tape thickness[2)]	d	µm	25		
Tape width	b	mm	5 - 130		
Filling factor (stacking factor)	FF	%	>85 >80	b ≤ 25 mm b > 50 mm	
recommended max. storage and operational temperature		°C	150		

Initial permeability[1)]	μ_i		3000 - 15 000 1500 - 5000	in protection case impregnated	25°C 25°C
Power losses (impregnated, cut, no gap)	P_{Fe}	W/kg	18 130 1,0	1 kHz / 1,0 T 10 kHz / 0,6 T 16 kHz / 0,037 T	

Remarks:

1) Initial Permeability depends on annealing and finishing, adjustable.
Given values refer to toroidal cores without gaps or cuts annealed in transverse field.

A_L-values are calculated according to $A_L = \mu_r \mu_0 \frac{A_{Fe}}{l_{Fe}}$

(A_L in mH, A_{Fe} in mm², l_{Fe} in mm, $\mu_0 = 4\pi \cdot 10^{-7}$ Vs/Am)

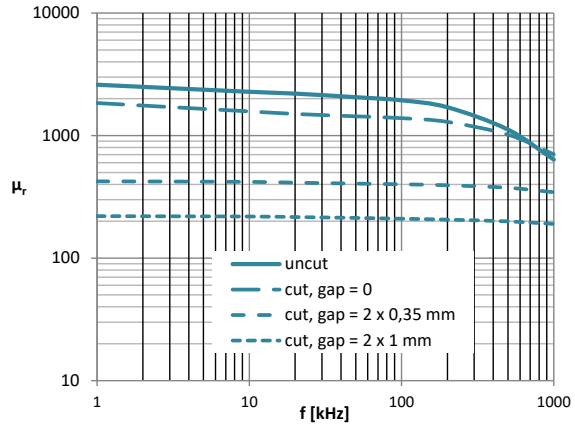
A_{Fe} and l_{Fe} depend on the core dimensions and are indicated in the core datasheets.

2) Effective tape thickness, calculated from length, width and density of a tape sample.
Geometrical tape thickness (measured with a tape stack using a gauge) is higher by 10% - 15% due to roughness.

Material data of specific product specifications may differ due to geometry and dimension.

Data for impregnated uncut and single cut cores of kOr 156, standard quality

Effective Permeability vs. Frequency



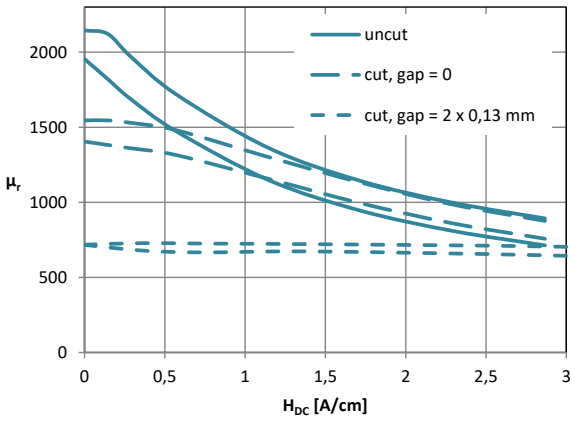
Notes:

Typical curves are shown.
N = 1, U_{eff} = 100 mV
Cores are impregnated with Epoxy

Nominal / minimum permeability for
single cut cores without additional gap:
10 kHz: 1500 / 900
100 kHz: 1100 / 700

Influence of gap depends on the ratio of magnetic path length and gap width.
Displayed example refers to magnetic path length of 280 mm.

Effective Permeability vs. Bias Field



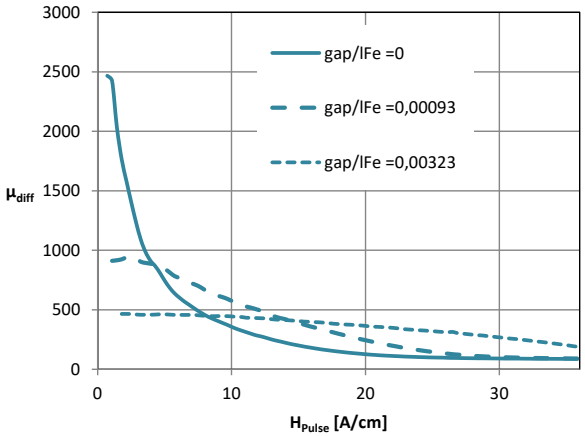
Notes:

Cores are impregnated with Epoxy

N = 1, U_{eff} = 100 mV
$I_{DC} = H_{DC} \cdot I_{Fe}$
upper curves: 10 kHz; lower curces: 100 kHz

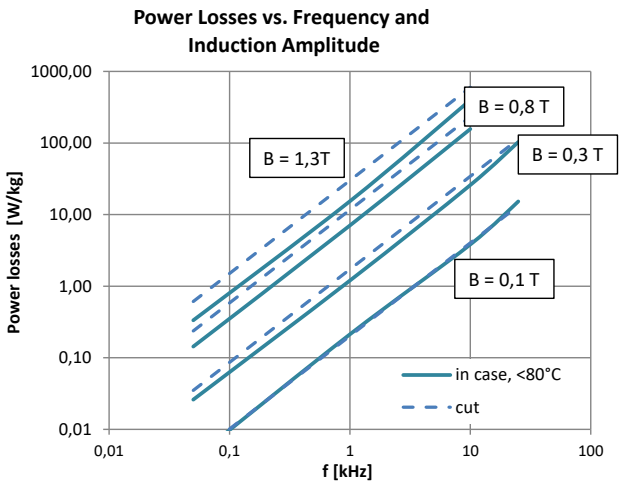
Influence of gap depends on the ratio of magnetic path length and gap width.
Displayed example refers to magnetic path length of 280 mm.

Differential Permeability vs. Pulse Field



μdiff monitored during pulse

Nominal power loss data



Notes:

Excited with sinusoidal voltage of an amplitude corresponding to the indicated peak induction.

Losses increase under mechanical stress, e.g. coating, impregnation, and wire winding without sufficient protection.

Additional losses occur when cutting and introducing gaps.

Steinmetz-coefficients (nominal data):

$$P_{Fe} = k\, f^{a} \hat{B}^{b}$$

P_{Fe} in W/kg, f in kHz, B in T
Valid for B ≤ 1 T, f = 5 … 100 kHz.

Valid for room temperature.

	Part Number	k	a	b
kOr 156 in case	156-TB-...	6,5	1,51	1,74
kOr 156 cut core standard quality	156-RI-...-1C-...	18	1,3	1,95

Part number system:

	material	-	shape	finish	-	size	-	perm./cuts	-version
example:	156	-	T	B	-	252010	-	10	-1
	156	-	R	I	-	25	-	2C	-2

material:	number denotes B_S in 10 mT; available materials see page 1
shape:	T = toroid, R = rectangular, O = oval, E = E-shape, U = U-shape, I = bar
finish:	B = protection box (usually plastic case), E = Epoxy coating, I = Epoxy impregnation, EI = impregnation + coating, V = sprayed varnish, S = soft impregnation + glass fiber wrapped
size:	toroid: OD ID H; rectangular: standard number or B C H; bar: A B C
permeability:	for non-cut cores of kOr 156: minimum permeability in 1000 for cores with rectangular hysteresis loop (Z-loop): "Z"
cuts:	for cut cores: number of cuts + "C" for bars: empty
version:	version number (e.g. different coatings). This is not the revision state!