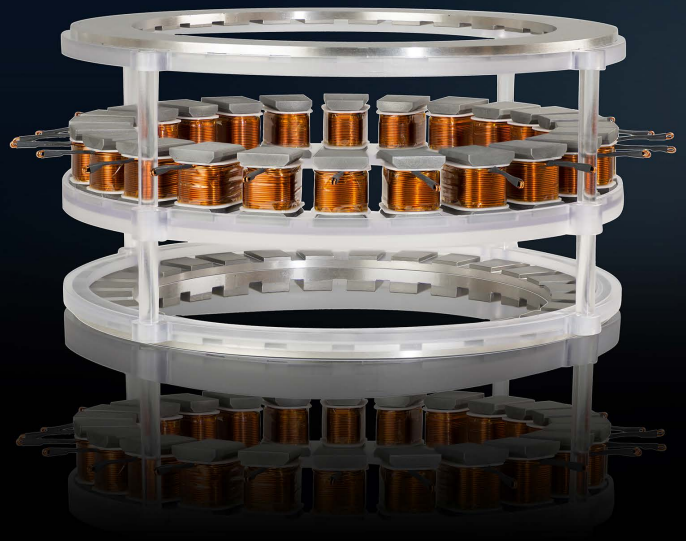


Somaloy®

Material data



Every particle counts

Höganäs 
POWDER THAT EMPOWERS®

What is the most important property for your application?

Somaloy is an isotropic, high resistive Soft Magnetic Composite (SMC) material for electromagnetic applications. Its unique 3D flux properties and net-shaping possibilities enable innovative, compact and powerful component designs.

The Somaloy product range comprises press-ready powder mixes with properties that can be tailored to ensure optimum performance for a wide range of components and applications.

The Somaloy product family

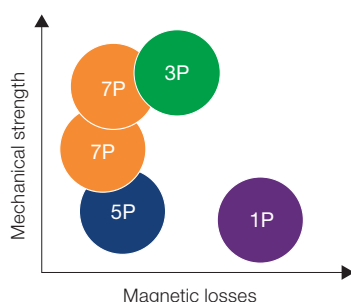
Four groups cover different performance levels (P):

Somaloy 1P Baseline

Somaloy 3P Mechanical strength, permeability

Somaloy 5P Lowest hysteresis losses

Somaloy 7P Lowest losses, mechanical robustness and improved thermal durability



The next generation of sustainable Soft Magnetic Composites

Somaloy 700 7P represents a breakthrough in the development of SMC, designed to meet the increasing demands for efficient, low-loss materials with minimal environmental impact.

Enhanced performance: Lower core losses across a wide frequency range, combined with high permeability and induction, contribute to improved system efficiency.

Sustainability: A water-based coating contributes to a more sustainable production process through reduced environmental impact and improved working conditions,

while low core losses enable lower emissions throughout the product's use phase.

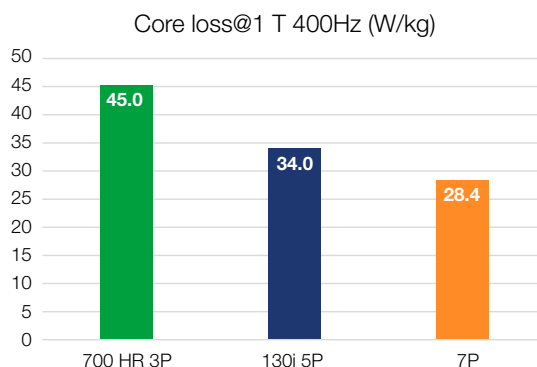
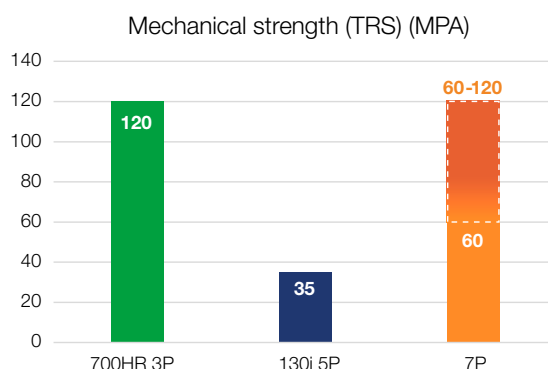
Mechanical strength: Optimised part-curing can double the transverse rupture strength (TRS), ensuring durability and reliability in demanding applications.

Processing: 700 7P can be used with a low level of internal lubricant in combination with die wall lubrication to optimize material properties.

Thermal properties: Excellent thermal conductivity and thermal ageing properties

Comparing SMC data to electric steel-sheets

SMC data is measured on full magnetic core components, while electric steel-sheet data is typically measured on single sheets. As the test methods differ, the data is not directly comparable.



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Somaloy® Product portfolio

Detailed material data for a range of Somaloy products, including different particle sizes, compaction pressures of 600 and 800 MPa, and a range of density values 4

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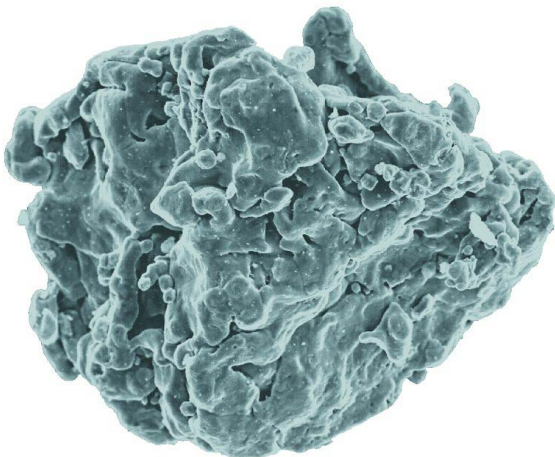
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Density-based

Somaloy 700 7P 7.3 g/cm ³	29
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Somaloy powder particle

Somaloy®

Product portfolio

Somaloy material 1P, 3P and 5P	Density (g/cm³)	Resistivity (μOhm m)	TRS ambient (MPa)	B @ 10000 A/m (T)	μ _{max}	Core losses @ 1T (W/kg)				
						Cross-section 5x5 mm				15x15 mm
						100 Hz	400 Hz	1000 Hz	2000 Hz	1000 Hz
Large particles #40										
Somaloy 700HR 5P	7.50	700	60	1.57	600	6.6	30	92	241	106
Somaloy 1000 5P	7.52	90	65	1.59	720	6.6	31	103	-	217
Somaloy 700HR 1P	7.45	1000	35	1.53	440	10.0	43	125	307	136
Somaloy 700 1P	7.45	400	40	1.56	540	9.9	43	126	312	152
Somaloy 700HR 3P	7.52	600	120	1.57	770	10.4	45	130	319	147
Somaloy 700 3P	7.57	200	125	1.61	850	10.2	45	132	331	183
Somaloy 1000 3P	7.56	70	140	1.63	950	10.3	46	143	-	288

Somaloy material 1P and 5P	Density (g/cm³)	Resistivity (μOhm m)	TRS ambient (MPa)	B @ 10000 A/m (T)	μ _{max}	Core losses @ 1T (W/kg)				
						Cross-section 5x5 mm				15x15 mm
						100 Hz 1 T	1 kHz 1 T	5 kHz 0.5 T	10 kHz 0.1 T	1 kHz 1 T
Medium particles #100										
Somaloy 130i 5P	7.44	20000	35	1.47	350	8.0	93	205	24	94
Somaloy 130i 1P	7.35	8000	33	1.40	290	12.0	132	264	29	134
Somaloy 500 1P	7.37	70	50	1.51	500	12.6	156	387	-	305
Fine particles #200										
Somaloy 110i 1P	7.26	7600	34	1.33	220	14.4	153	276	27	155
Somaloy 110i 5P	7.30	18000	42	1.33	220	9.9	108	209	18	109

Typical product data 800 MPa compaction pressure, magnetic data measured according to CEI/IEC 60404

Somaloy material 700 7P	Density (g/cm³)	TRS ambient (MPa)	B @ 10000 A/m (T)	μ _{max}	Core losses @ 1T (W/kg)		
					Cross-section 5x5 mm		
					100 Hz	400 Hz	1000 Hz
Density-based							
Somaloy 700 7P 0.3% + 7.3 g/cm³	7.30	55	1.44	420	7.2	32	94
Somaloy 700 7P 0.3-0.4% + 7.4 g/cm³	7.40	60	1.50	440	6.8	30	89
Somaloy 700 7P 0.3% + 7.5 g/cm³	7.50	60	1.55	500	6.5	29	84
Somaloy 700 7P (Tall parts) 0.5% + 7.4 g/cm³	7.40	60	1.49	420	6.8	30	89

Measured according to CEI/IEC 60404-6 on ring sample (OD 40 mm / ID 30 mm / H 5 mm)

General			
Material name for drawing: Somaloy 700 1P		Additive(s): 0.4% Kenolube	Compaction: Pressure: 800 MPa Die temperature: Room temperature
		Heat treatment: Atmosphere: Air Temperature: 530°C	

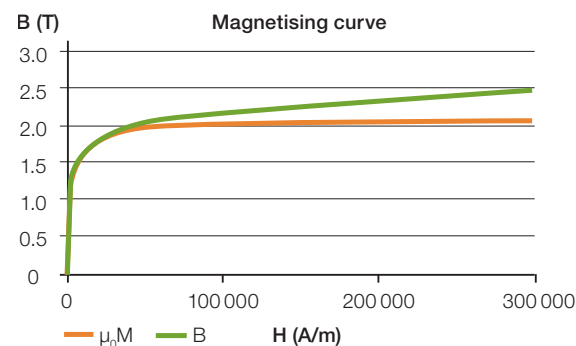
Mechanical properties			Standards	Physical properties			Standards
Transverse rupture strength/150°C	(MPa)	40/40	SS-ISO 3325	Density	(g/cm³)	7.45	SS-ISO 2738
Tensile strength/Yield strength	(MPa)	15/15	SS-EN 10002-1, ISO 2740	Thermal expansion	(K ⁻¹)	11 e-06	ASTM E 228/MPIF 35
Compressive Strength/Yield	(MPa)	350/230	ASTM E9-89a	Thermal conductivity	(W/m²K)	25	ISO 22007-2
Young's modulus	(GPa)	90	ASTM E 1876-99	Resistivity	(μΩm)	400	OD 55 mm / ID 45 mm / H 5 mm
Poisson's ratio	-	0.23	ASTM E 1876-99				
Impact Energy	(J)	2	SS-EN 10045, SS-EN 25754	Powder properties			

Magnetic properties			Standards	
B @ 4000 A/m	(T)	1.31	IEC 60404-4	
B @ 10000 A/m	(T)	1.56	IEC 60404-4	
H _c	(A/m)	210	IEC 60404-4	
μ _r -max	-	540	IEC 60404-4	

Powder properties			Standards	
Apparent density	(g/cm³)	3.33	ISO 3923/1	
Flow	(s/50g)	29	ISO 4490	
Green density	(g/cm³)	7.51	ISO 3927	
Green strength	(MPa)	19	ISO 3995	
Springback	(%)	0.12	ISO 4492, ISO 2740	
Heat treated dim. change	(%)	-0.02	ISO 4492, ISO 2740	
Total dim. change	(%)	0.10	ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	12249	1.59	1.60
81	0.03	0.03	26003	1.78	1.81
147	0.06	0.06	49779	1.91	1.97
249	0.13	0.13	74779	1.95	2.05
335	0.20	0.20	99779	1.98	2.11
407	0.25	0.25	124779	2.00	2.15
711	0.47	0.47	149779	2.01	2.20
1409	0.84	0.84	189779	2.03	2.26
2045	1.03	1.03	229779	2.04	2.33
3240	1.22	1.22	279779	2.05	2.40
5965	1.41	1.41	304779	2.0548	2.44

Core loss

(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz	2000 Hz
0.5 T	1.4/1.7	2.9	6	9	13	16	20	24	28	32	36	87
1.0 T	4.9/5.9	9.9	20	31	43	55	68	82	96	110	126	312
1.5 T	9.9/12	20	42	64	89	114	141	169	199	230	262	661

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model

K _h	0.096	K _{ep}	0.000027
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$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 5000 Hz.

K _h	Hysteresis loss coefficient	f	Frequency (Hz)
K _{ep}	In particle eddy current coefficient	B	Field strength (T)
d	Smallest cross section of component (mm)	ρ	Density (g/cm³)
		resistivity	(μΩm)

General			
Material name for drawing: Somaloy 700 1P	Additive(s): 0.4% Kenolube	Compaction: Pressure: 600 MPa Die temperature: Room temperature	Heat treatment: Atmosphere: Air Temperature: 530°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	47/47		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	15/15		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	330/200		ASTM E9-89a	
Young's modulus (GPa)	100		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	2		SS-EN 10045, SS-EN 25754	

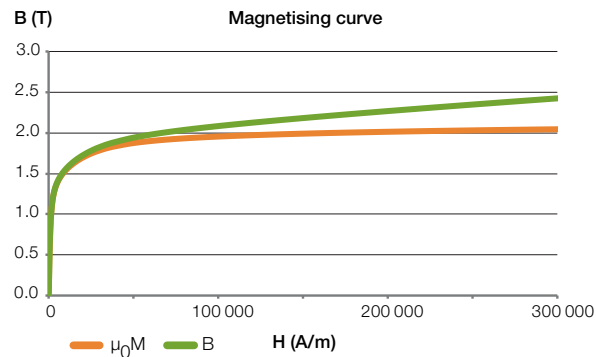
Magnetic properties			Standards	
B @ 4000 A/m (T)	1.25		IEC 60404-4	
B @ 10000 A/m (T)	1.50		IEC 60404-4	
H _c (A/m)	226		IEC 60404-4	
μ _r -max	-	540	IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.39		SS-ISO 2738	
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m²K)	30		ISO 22007-2	
Resistivity (μΩm)	270		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.33		ISO 3923/1	
Flow (s/50g)	29		ISO 4490	
Green density (g/cm³)	7.38		ISO 3927	
Green strength (MPa)	16		ISO 3995	
Springback (%)	0.07		ISO 4492, ISO 2740	
Heat treated dim. change (%)	-0.01		ISO 4492, ISO 2740	
Total dim. change (%)	0.06		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	12275	1.49	1.51
75	0.02	0.02	26377	1.67	1.70
123	0.05	0.05	49810	1.79	1.86
223	0.12	0.12	74810	1.86	1.95
303	0.18	0.18	99810	1.90	2.02
635	0.43	0.43	124810	1.93	2.08
875	0.58	0.58	149810	1.95	2.14
1307	0.78	0.78	189810	1.98	2.22
1935	0.96	0.96	229810	2.00	2.29
3130	1.14	1.14	279810	2.02	2.37
5898	1.31	1.32	304810	2.0326	2.42

Core loss												
(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz	2000 Hz
0.5 T	1.5/1.8	3.0	6	10	13	17	21	25	29	34	38	95
1.0 T	5.0/6.0	10	21	33	45	58	72	87	102	118	135	343
1.5 T	10/12	21	43	67	93	120	149	180	212	246	282	730

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.098	K _{ep}	0.000032

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

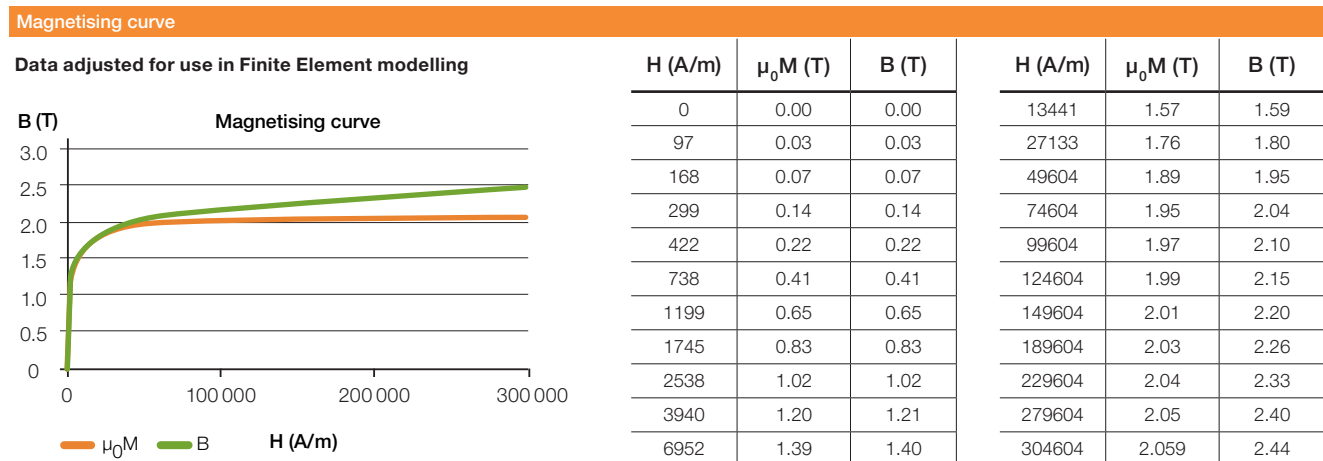
Model is verified up to 1.5 T and 5000 Hz.

K_h Hysterisis loss coefficient
K_{ep} In particle eddy current coefficient
d Smallest cross section of component (mm)
f Frequency (Hz)
B Field strength (T)
ρ Density (g/cm³)
resistivity (μΩm)

General			
Material name for drawing: Somaloy 700HR 1P	Additive(s): 0.4% Kenolube	Compaction: Pressure: 800 MPa Die temperature: Room temperature	Heat treatment: Atmosphere: Air Temperature: 530°C

Mechanical properties			Standards	Physical properties			Standards
Transverse rupture strength/150°C	(MPa)	35/35	SS-ISO 3325	Density	(g/cm³)	7.45	SS-ISO 2738
Tensile strength/Yield strength	(MPa)	10/10	SS-EN 10002-1, ISO 2740	Thermal expansion	(K ⁻¹)	11 e-06	ASTM E 228/MPIF 35
Compressive Strength/Yield	(MPa)	510/250	ASTM E9-89a	Thermal conductivity	(W/m*K)	25	ISO 22007-2
Young's modulus	(GPa)	70	ASTM E 1876-99	Resistivity	(μΩm)	1000	OD 55 mm / ID 45 mm / H 5 mm
Poisson's ratio	-	0.23	ASTM E 1876-99				
Impact Energy	(J)	1.8	SS-EN 10045, SS-EN 25754				
				Powder properties			Standards

Magnetic properties			Standards	Green density	(g/cm³)	7.50	ISO 3927
B @ 4000 A/m	(T)	1.24	IEC 60404-4	Green strength	(MPa)	18	ISO 3995
B @ 10000 A/m	(T)	1.53	IEC 60404-4	Springback	(%)	0.15	ISO 4492, ISO 2740
H _c	(A/m)	225	IEC 60404-4	Heat treated dim. change	(%)	-0.01	ISO 4492, ISO 2740
μ _r -max	-	440	IEC 60404-4	Total dim. change	(%)	0.14	ISO 4492, ISO 2740



Core loss												
(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz	2000 Hz
0.5 T	1.5/1.8	3.0	6.0	9.0	13	16	20	24	28	32	36	86
1.0 T	4.9/5.9	10	21	32	43	56	68	82	96	110	125	307
1.5 T	10/12	20	42	65	89	115	141	169	199	229	261	649

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.097	K _{ep}	0.000027

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 5000 Hz.

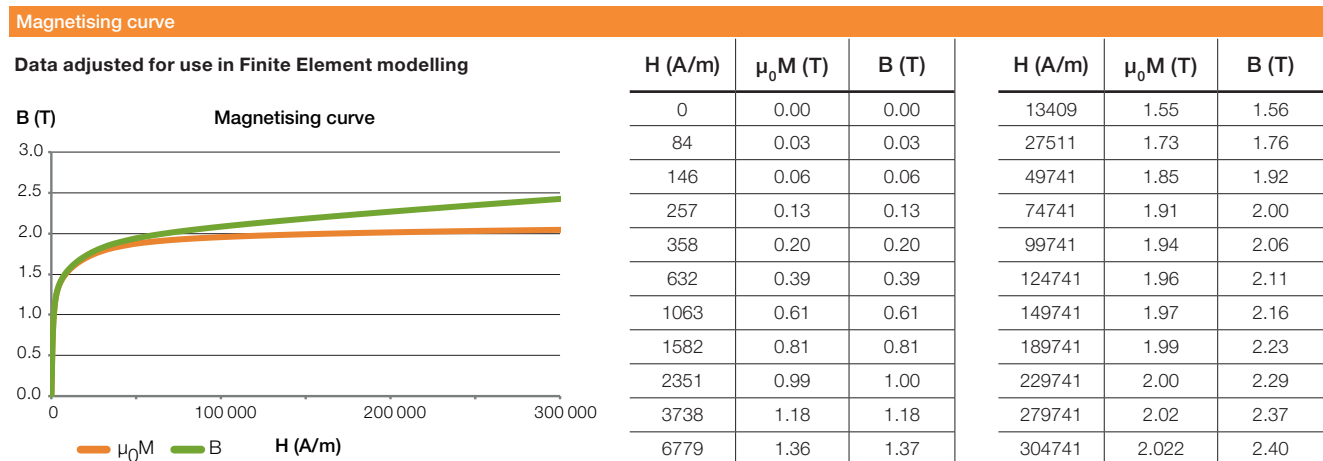
K_h Hysteresis loss coefficient
K_{ep} In particle eddy current coefficient
d Smallest cross section of component (mm)
f Frequency (Hz)
B Field strength (T)
ρ Density (g/cm³)
resistivity (μΩm)

General				
Material name for drawing: Somaloy 700HR 1P		Additive(s): 0.4% Kenolube	Compaction: Pressure: 600 MPa Die temperature: Room temperature	Heat treatment: Atmosphere: Air Temperature: 530°C

Mechanical properties			Standards	Physical properties			Standards
Transverse rupture strength/150°C	(MPa)	34/34	SS-ISO 3325	Density	(g/cm³)	7,35	SS-ISO 2738
Tensile strength/Yield strength	(MPa)	15/15	SS-EN 10002-1, ISO 2740	Thermal expansion	(K ⁻¹)	11 e-06	ASTM E 228/MPIF 35
Compressive Strength/Yield	(MPa)	340/220	ASTM E9-89a	Thermal conductivity	(W/m²K)	30	ISO 22007-2
Young's modulus	(GPa)	80	ASTM E 1876-99	Resistivity	(μΩm)	900	OD 55 mm / ID 45 mm / H 5 mm
Poisson's ratio	-	0.23	ASTM E 1876-99				
Impact Energy	(J)	1.7	SS-EN 10045, SS-EN 25754				
				Powder properties			Standards

Magnetic properties			Standards	
B @ 4000 A/m	(T)	1.18	IEC 60404-4	
B @ 10000 A/m	(T)	1.45	IEC 60404-4	
H _c	(A/m)	227	IEC 60404-4	
μ _r -max	-	450	IEC 60404-4	

Green density	(g/cm³)	7.36	ISO 3927
Green strength	(MPa)	14	ISO 3995
Springback	(%)	0.12	ISO 4492, ISO 2740
Heat treated dim. change	(%)	-0.01	ISO 4492, ISO 2740
Total dim. change	(%)	0.11	ISO 4492, ISO 2740



Core loss												
(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz	2000 Hz
0.5 T	1.6/1.9	3.1	6.0	10	14	17	21	26	30	34	39	95
1.0 T	5.2/6.3	11	22	34	47	60	74	88	104	120	136	339
1.5 T	11/13	22	45	70	96	123	153	183	215	249	284	719

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.103	K _{ep}	0.000032

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * resistivity * 1000} \quad (W/kg)$$

Model is verified up to 1.5 T and 5000 Hz.

K_h Hysterisis loss coefficient
K_{ep} In particle eddy current coefficient
d Smallest cross section of component (mm)
f Frequency (Hz)
B Field strength (T)
ρ Density (g/cm³)
resistivity (μΩm)

General			
Material name for drawing: Somaloy 700 3P	Additive(s): 0.3% 3P Lube	Compaction: Pressure: 800 MPa Die temperature: 80°C	Heat treatment: Atmosphere: Steam Temperature: 530°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	125/125		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	65/65		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	550/280		ASTM E9-89a	
Young's modulus (GPa)	190		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	2		SS-EN 10045, SS-EN 25754	

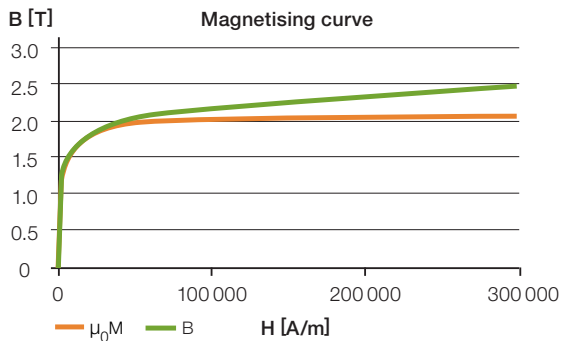
Magnetic properties			Standards	
B @ 4000 A/m (T)	1.37		IEC 60404-4	
B @ 10000 A/m (T)	1.61		IEC 60404-4	
H _c (A/m)	217		IEC 60404-4	
μ _r -max	-	850	IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.57		SS-ISO 2738	
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m·K)	25		ISO 22007-2	
Resistivity (μΩm)	200		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.32		ISO 3923/1	
Flow (s/50g)	34		ISO 4490	
Green density (g/cm³)	7.59		ISO 3927	
Green strength (MPa)	24		ISO 3995	
Springback (%)	0.10		ISO 4492, ISO 2740	
Heat treated dim. change (%)	-0.01		ISO 4492, ISO 2740	
Total dim. change (%)	0.09		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	11450	1.63	1.65
57	0.02	0.02	25469	1.82	1.85
96	0.05	0.05	49777	1.95	2.01
159	0.11	0.11	74777	2.00	2.09
218	0.18	0.18	99777	2.03	2.15
449	0.48	0.48	124777	2.05	2.20
624	0.64	0.64	149777	2.06	2.25
929	0.84	0.85	189777	2.08	2.32
1466	1.06	1.06	229777	2.09	2.38
2471	1.25	1.25	279777	2.11	2.46
5041	1.44	1.45	304777	2.113	2.50

Core loss

(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz	2000 Hz
0.5 T	1.5/1.8	3.0	6.0	10	13	17	21	25	29	33	38	92
1.0 T	5.0/6.1	10	21	33	45	58	71	86	101	116	132	331
1.5 T	10/12	21	43	67	93	119	148	178	209	242	276	703

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model

K _h	0.099	K _{ep}	0.000027
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$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 5000 Hz.

K_h Hysteresis loss coefficient
K_{ep} In particle eddy current coefficient
d Smallest cross section of component (mm)
f Frequency (Hz)
B Field strength (T)
ρ Density (g/cm³)
resistivity (μΩm)

General

Material name for drawing: Somaloy 700 3P	Additive(s): 0.3% 3P Lube	Compaction: Pressure: 600 MPa Die temperature: 80°C	Heat treatment: Atmosphere: Steam Temperature: 530°C
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Mechanical properties			Standards
Transverse rupture strength/150°C	(MPa)	130/130	SS-ISO 3325
Tensile strength/Yield strength	(MPa)	65/65	SS-EN 10002-1, ISO 2740
Compressive Strength/Yield	(MPa)	350/260	ASTM E9-89a
Young's modulus	(GPa)	190	ASTM E 1876-99
Poisson's ratio	-	0.23	ASTM E 1876-99
Impact Energy	(J)	1.8	SS-EN 10045, SS-EN 25754

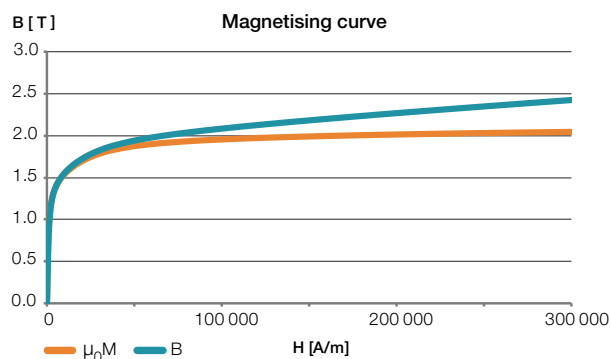
Magnetic properties			Standards
B @ 4000 A/m	(T)	1.34	IEC 60404-4
B @ 10000 A/m	(T)	1.55	IEC 60404-4
H _c	(A/m)	220	IEC 60404-4
μ _r -max	-	780	IEC 60404-4

Physical properties			Standards
Density	(g/cm³)	7.40	SS-ISO 2738
Thermal expansion	(K⁻¹)	11 e-06	ASTM E 228/MPIF 35
Thermal conductivity	(W/m²K)	30	ISO 22007-2
Resistivity	(μΩm)	150	OD 55 mm / ID 45 mm / H 5 mm

Powder properties			Standards
Apparent density	(g/cm³)	3.32	ISO 3923/1
Flow	(s/50g)	34	ISO 4490
Green density	(g/cm³)	7.43	ISO 3927
Green strength	(MPa)	21	ISO 3995
Springback	(%)	0.11	ISO 4492, ISO 2740
Heat treated dim. change	(%)	-0.01	ISO 4492, ISO 2740
Total dim. change	(%)	0.10	ISO 4492, ISO 2740

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	11350	1.57	1.58
59	0.02	0.02	25467	1.75	1.79
99	0.05	0.05	49709	1.88	1.94
171	0.11	0.11	74709	1.93	2.02
236	0.18	0.18	99709	1.96	2.08
480	0.45	0.45	124709	1.98	2.14
663	0.61	0.61	149709	1.99	2.18
977	0.80	0.81	189709	2.01	2.25
1496	1.00	1.00	229709	2.03	2.32
2499	1.20	1.20	279709	2.04	2.40
5024	1.38	1.39	304709	2.05	2.43

Core loss

(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz	2000 Hz
0.5 T	1.5/1.9	3.1	6.0	10	14	18	22	26	31	36	40	101
1.0 T	5.2/6.3	11	22	34	47	61	76	91	108	125	143	367
1.5 T	11/13	22	45	70	98	127	157	190	224	261	299	781

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model

K _h	0.102	K _{ep}	0.000032
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$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * resistivity * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 5000 Hz.

K _h	Hysteresis loss coefficient	f	Frequency (Hz)
K _{ep}	In particle eddy current coefficient	B	Field strength (T)
d	Smallest cross section of component (mm)	ρ	Density (g/cm³)
		resistivity	(μΩm)

General			
Material name for drawing: Somaloy 700HR 3P	Additive(s): 0.3% 3P Lube	Compaction: Pressure: 800 MPa Die temperature: 80°C	Heat treatment: Atmosphere: Steam Temperature: 530°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	120/120		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	65/65		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	600/290		ASTM E9-89a	
Young's modulus (GPa)	170		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	1.8		SS-EN 10045, SS-EN 25754	

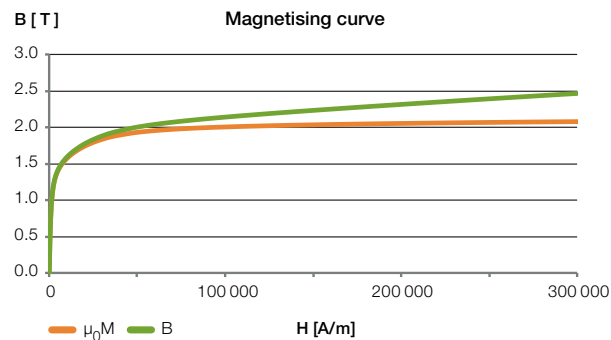
Magnetic properties			Standards	
B @ 4000 A/m (T)	1.31		IEC 60404-4	
B @ 10000 A/m (T)	1.57		IEC 60404-4	
H _c (A/m)	225		IEC 60404-4	
μ _r -max	-	770	IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.52		SS-ISO 2738	
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m·K)	25		ISO 22007-2	
Resistivity (μΩm)	600		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.16		ISO 3923/1	
Flow (s/50g)	35		ISO 4490	
Green density (g/cm³)	7.54		ISO 3927	
Green strength (MPa)	28		ISO 3995	
Springback (%)	0.10		ISO 4492, ISO 2740	
Heat treated dim. change (%)	-0.01		ISO 4492, ISO 2740	
Total dim. change (%)	0.09		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	12040	1.62	1.63
62	0.02	0.02	25943	1.81	1.84
101	0.05	0.05	49791	1.94	2.00
175	0.12	0.12	74791	1.99	2.08
240	0.19	0.19	99791	2.01	2.14
456	0.44	0.44	124791	2.03	2.19
699	0.64	0.64	149791	2.04	2.23
1052	0.84	0.84	189791	2.06	2.30
1666	1.05	1.05	229791	2.07	2.36
2796	1.24	1.25	279791	2.08	2.43
5537	1.43	1.44	304791	2.0866	2.47

Core loss												
(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz	2000 Hz
0,5T	1.5/1.8	3.1	6.0	10	13	17	21	25	29	33	37	89
1,0T	5.1/6.2	10	21	33	45	58	71	85	99	114	130	319
1,5T	9.5/13	20	41	64	90	118	147	177	209	242	276	705

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.101	K _{ep}	0.000027

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 5000 Hz.

K_h Hysteresis loss coefficient
K_{ep} In particle eddy current coefficient
d Smallest cross section of component (mm)
f Frequency (Hz)
B Field strength (T)
ρ Density (g/cm³)
resistivity (μΩm)

General			
Material name for drawing: Somaloy 700HR 3P	Additive(s): 0.3% 3P Lube	Compaction: Pressure: 600 MPa Die temperature: 80°C	Heat treatment: Atmosphere: Steam Temperature: 530°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	130/130		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	55/55		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	330/240		ASTM E9-89a	
Young's modulus (GPa)	170		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	1.9		SS-EN 10045, SS-EN 25754	

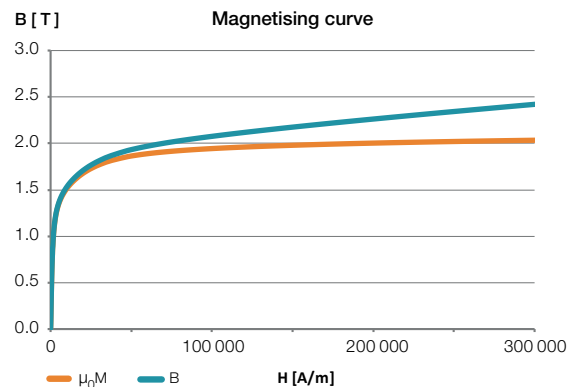
Magnetic properties			Standards	
B @ 4000 A/m (T)	1.30		IEC 60404-4	
B @ 10000 A/m (T)	1.53		IEC 60404-4	
H _c (A/m)	230		IEC 60404-4	
μ _r -max	-	660	IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.40		SS-ISO 2738	
Thermal expansion (K ⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m*K)	30		ISO 22007-2	
Resistivity (μΩm)	300		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.16		ISO 3923/1	
Flow (s/50g)	35		ISO 4490	
Green density (g/cm³)	7.43		ISO 3927	
Green strength (MPa)	25		ISO 3995	
Springback (%)	0.11		ISO 4492, ISO 2740	
Heat treated dim. change (%)	0		ISO 4492, ISO 2740	
Total dim. change (%)	0.11		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	12156	1.56	1.57
69	0.03	0.03	26248	1.74	1.77
107	0.05	0.05	49836	1.86	1.93
197	0.12	0.12	74836	1.92	2.01
265	0.19	0.19	99836	1.95	2.07
516	0.42	0.42	124836	1.97	2.12
767	0.61	0.61	149836	1.98	2.17
1146	0.80	0.81	189836	2.00	2.24
1778	1.00	1.01	229836	2.02	2.30
2940	1.19	1.20	279836	2.03	2.38
5671	1.38	1.38	304836	2.0363	2.42

Core loss

(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz	2000 Hz
0.5 T	1.6/1.9	3.2	7.0	10	14	18	22	26	31	35	40	98
1.0 T	5.3/6.4	11	22	34	47	61	75	91	106	123	140	353
1.5 T	11/13	22	46	71	98	126	156	188	221	256	293	750

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model

K _h	0.104	K _{ep}	0.000032
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$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 5000 Hz.

K_h Hysteresis loss coefficient
K_{ep} In particle eddy current coefficient
d Smallest cross section of component (mm)
f Frequency (Hz)
B Field strength (T)
ρ Density (g/cm³)
resistivity (μΩm)

General

Material name for drawing: Somaloy 1000 3P	Additive(s): 0.3% 3P Lube	Compaction: Pressure: 800 MPa Die temperature: 80°C	Heat treatment: Atmosphere: Steam Temperature: 530°C
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Mechanical properties			Standards
Transverse rupture strength/150°C	(MPa)	140/140	SS-ISO 3325
Tensile strength/Yield strength	(MPa)	70/70	SS-EN 10002-1, ISO 2740
Compressive Strength/Yield	(MPa)	470/290	ASTM E9-89a
Young's modulus	(GPa)	170	ASTM E 1876-99
Poisson's ratio	-	0.23	ASTM E 1876-99
Impact Energy	(J)	1.9	SS-EN 10045, SS-EN 25754

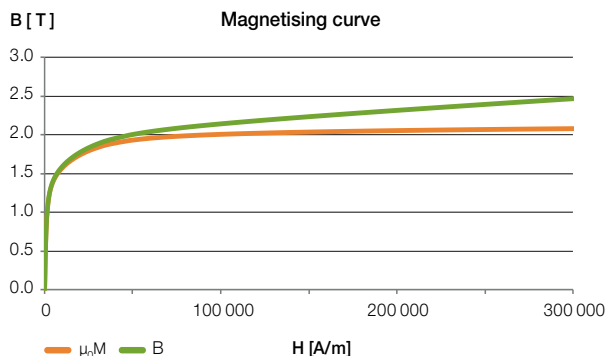
Magnetic properties			Standards
B @ 4000 A/m	(T)	1.42	IEC 60404-4
B @ 10000 A/m	(T)	1.63	IEC 60404-4
H _c	(A/m)	217	IEC 60404-4
μ _r -max	-	950	IEC 60404-4

Physical properties			Standards
Density	(g/cm³)	7.56	SS-ISO 2738
Thermal expansion	(K⁻¹)	11 e-06	ASTM E 228/MPIF 35
Thermal conductivity	(W/m²K)	25	ISO 22007-2
Resistivity	(μΩm)	70	OD 55 mm / ID 45 mm / H 5 mm

Powder properties			Standards
Apparent density	(g/cm³)	3.19	ISO 3923/1
Flow	(s/50g)	36	ISO 4490
Green density	(g/cm³)	7.54	ISO 3927
Green strength	(MPa)	24	ISO 3995
Springback	(%)	0.12	ISO 4492, ISO 2740
Heat treated dim. change	(%)	-0.01	ISO 4492, ISO 2740
Total dim. change	(%)	0.11	ISO 4492, ISO 2740

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	11258	1.62	1.63
55	0.02	0.02	25221	1.81	1.84
83	0.04	0.04	49535	1.94	2.00
141	0.10	0.10	74535	1.99	2.08
193	0.17	0.17	99535	2.01	2.14
405	0.47	0.47	124535	2.03	2.18
565	0.63	0.63	149535	2.04	2.23
862	0.84	0.84	189535	2.05	2.29
1355	1.04	1.04	229535	2.06	2.35
2352	1.24	1.24	279535	2.08	2.43
4905	1.43	1.44	304535	2.0809	2.46

Core loss

(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz
0.5 T	1.5/1.8	3.0	6.0	10	13	17	22
1.0 T	5.0/6.1	10	21	33	46	60	75
1.5 T	10/12	21	44	69	96	125	156

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model

K _h	0.098	K _{ep}	0.000027
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$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * resistivity * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 2000 Hz.

K _h	Hysteresis loss coefficient	f	Frequency (Hz)
K _{ep}	In particle eddy current coefficient	B	Field strength (T)
d	Smallest cross section of component (mm)	ρ	Density (g/cm³)
		resistivity	(μΩm)

General

Material name for drawing: Somaloy 1000 3P	Additive(s): 0.3% 3P Lube	Compaction: Pressure: 600 MPa Die temperature: 80°C	Heat treatment: Atmosphere: Steam Temperature: 530°C
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Mechanical properties			Standards
Transverse rupture strength/150°C (MPa)	140/140		SS-ISO 3325
Tensile strength/Yield strength (MPa)	60/60		SS-EN 10002-1, ISO 2740
Compressive Strength/Yield (MPa)	370/260		ASTM E9-89a
Young's modulus (GPa)	170		ASTM E 1876-99
Poisson's ratio	-	0.23	ASTM E 1876-99
Impact Energy (J)	1.9		SS-EN 10045, SS-EN 25754

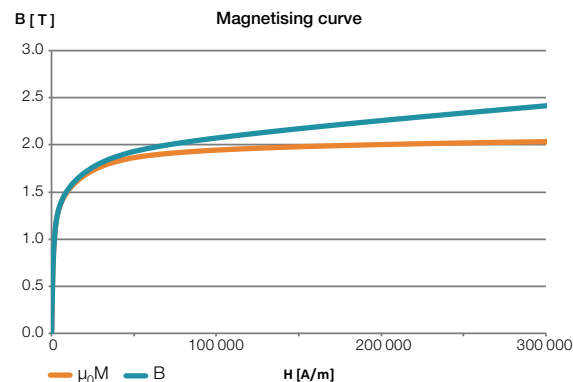
Magnetic properties			Standards
B @ 4000 A/m (T)	1.38		IEC 60404-4
B @ 10000 A/m (T)	1.57		IEC 60404-4
H _c (A/m)	220		IEC 60404-4
μ _r -max	-	900	IEC 60404-4

Physical properties			Standards
Density (g/cm³)	7.42		SS-ISO 2738
Thermal expansion (K ⁻¹)	11 e-06		ASTM E 228/MPIF 35
Thermal conductivity (W/m·K)	30		ISO 22007-2
Resistivity (μΩm)	55		OD 55 mm / ID 45 mm / H 5 mm

Powder properties			Standards
Apparent density (g/cm³)	3.19		ISO 3923/1
Flow (s/50g)	36		ISO 4490
Green density (g/cm³)	7.42		ISO 3927
Green strength (MPa)	21		ISO 3995
Springback (%)	0.11		ISO 4492, ISO 2740
Heat treated dim. change (%)	0		ISO 4492, ISO 2740
Total dim. change (%)	0.11		ISO 4492, ISO 2740

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	10232	1.57	1.58
46	0.02	0.02	24627	1.75	1.79
75	0.04	0.04	49681	1.88	1.94
131	0.09	0.09	74681	1.93	2.02
179	0.16	0.16	99681	1.96	2.08
201	0.19	0.19	124681	1.98	2.13
467	0.58	0.56	149681	1.99	2.18
666	0.79	0.79	189681	2.01	2.25
1024	1.00	1.00	229681	2.02	2.31
1801	1.20	1.20	279681	2.04	2.39
4050	1.39	1.39	304681	2.044	2.43

Core loss

(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz
0.5 T	1.5/1.9	3.1	7.0	10	14	18	23
1.0 T	5.2/6.3	11	22	35	49	64	81
1.5 T	11/13	22	46	73	102	134	168

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model

K _h	0.101	K _{ep}	0.000032
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$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 2000 Hz.

K _h	Hysteresis loss coefficient	f	Frequency (Hz)
K _{ep}	In particle eddy current coefficient	B	Field strength (T)
d	Smallest cross section of component (mm)	ρ	Density (g/cm³)
		resistivity	(μΩm)

General			
Material name for drawing: Somaloy 700HR 5P	Additive(s): 0.3% 5P Lube	Compaction: Pressure: 800 MPa Die temperature: 100°C	Heat treatment: Atmosphere: Nitrogen Temperature: 650°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	60/60		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	20/20		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	650/110		ASTM E9-89a	
Young's modulus (GPa)	150		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	1.7		SS-EN 10045, SS-EN 25754	

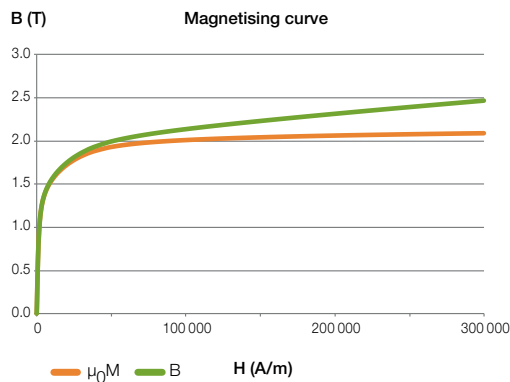
Magnetic properties			Standards	
B @ 4000 A/m (T)	1.33		IEC 60404-4	
B @ 10000 A/m (T)	1.57		IEC 60404-4	
H _c (A/m)	120		IEC 60404-4	
μ _r -max	-	600	IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.50		SS-ISO 2738	
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m²K)	21		ISO 22007-2	
Resistivity (μΩm)	700		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.30		ISO 3923/1	
Flow (s/50g)	33		ISO 4490	
Green density (g/cm³)	7.51		ISO 3927	
Green strength (MPa)	15		ISO 3995	
Springback (%)	0.16		ISO 4492, ISO 2740	
Heat treated dim. change (%)	-0.09		ISO 4492, ISO 2740	
Total dim. change (%)	0.07		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	13228	1.61	1.63
63	0.03	0.03	27279	1.80	1.84
119	0.06	0.06	49771	1.93	1.99
214	0.14	0.14	74771	1.98	2.08
306	0.21	0.21	99771	2.01	2.14
608	0.45	0.45	124771	2.03	2.19
899	0.65	0.65	149771	2.04	2.23
1344	0.86	0.86	189771	2.06	2.30
1996	1.05	1.05	229771	2.07	2.36
3285	1.24	1.24	279771	2.09	2.44
6377	1.43	1.43	304771	2.091	2.47

Core loss												
(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz	2000 Hz
0.5 T	1.0/1.2	1.9	4.0	6.0	9.0	11	14	17	20	23	26	66
1.0 T	3.2/3.9	6.6	14	21	30	39	48	58	69	80	92	241
1.5 T	6.6/7.9	13	28	44	62	80	100	121	144	168	193	516

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.063	K _{ep}	0.000027

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 5000 Hz.

K_h Hysteresis loss coefficient
K_{ep} In particle eddy current coefficient
d Smallest cross section of component (mm)
f Frequency (Hz)
B Field strength (T)
ρ Density (g/cm³)
resistivity (μΩm)

General			
Material name for drawing: Somaloy 700HR 5P	Additive(s): 0.3% 5P Lube	Compaction: Pressure: 600 MPa Die temperature: 100°C	Heat treatment: Atmosphere: Nitrogen Temperature: 650°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	60/60		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	20/20		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	530/110		ASTM E9-89a	
Young's modulus (GPa)	150		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	1.7		SS-EN 10045, SS-EN 25754	

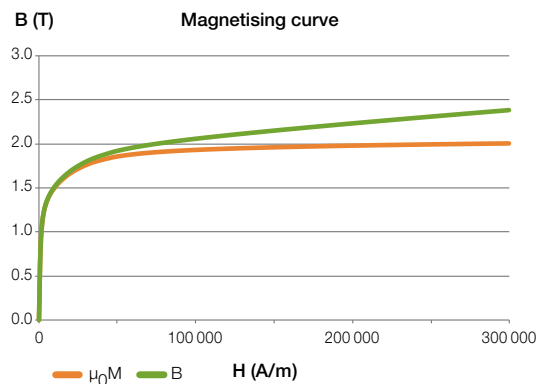
Magnetic properties			Standards	
B @ 4000 A/m (T)	1.28		IEC 60404-4	
B @ 10000 A/m (T)	1.52		IEC 60404-4	
H _c (A/m)	120		IEC 60404-4	
μ _r -max	-	600	IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.40		SS-ISO 2738	
Thermal expansion (K ⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m·K)	26		ISO 22007-2	
Resistivity (μΩm)	600		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.30		ISO 3923/1	
Flow (s/50g)	33		ISO 4490	
Green density (g/cm³)	7.39		ISO 3927	
Green strength (MPa)	13		ISO 3995	
Springback (%)	0.14		ISO 4492, ISO 2740	
Heat treated dim. change (%)	-0.08		ISO 4492, ISO 2740	
Total dim. change (%)	0.06		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	12476	1.54	1.56
63	0.03	0.03	26507	1.73	1.76
110	0.06	0.06	49591	1.85	1.91
197	0.12	0.12	74591	1.90	2.00
288	0.20	0.20	99591	1.93	2.05
559	0.43	0.43	124591	1.94	2.10
829	0.61	0.61	149591	1.96	2.15
1197	0.81	0.81	189591	1.97	2.21
1827	0.99	1.00	229591	1.98	2.27
3009	1.18	1.18	279591	2.00	2.35
5854	1.36	1.37	304591	2.002	2.39

Core loss												
(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz	2000 Hz
0.5 T	1.0/1.2	2.0	4.0	7.0	9.0	12	15	18	21	24	28	73
1.0 T	3.3/4.0	6.8	14	23	31	41	51	62	74	86	99	267
1.5 T	6.8/8.2	14	30	47	65	85	107	130	155	181	209	572

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.065	K _{ep}	0.000032

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 5000 Hz.

K_h Hysteresis loss coefficient
K_{ep} In particle eddy current coefficient
d Smallest cross section of component (mm)
f Frequency (Hz)
B Field strength (T)
ρ Density (g/cm³)
resistivity (μΩm)

General			
Material name for drawing: Somaloy 1000 5P	Additive(s): 0.3% 5P Lube	Compaction: Pressure: 800 MPa Die temperature: 100°C	Heat treatment: Atmosphere: Nitrogen Temperature: 650°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	65/65		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	20/20		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	570/110		ASTM E9-89a	
Young's modulus (GPa)	140		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	1.8		SS-EN 10045, SS-EN 25754	

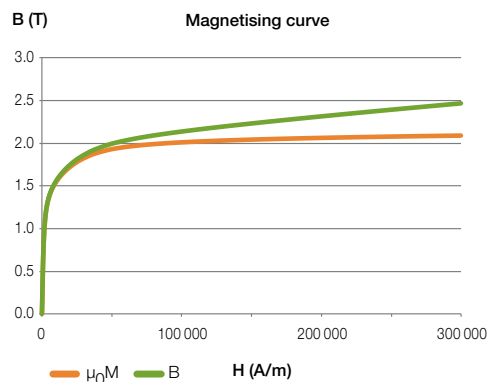
Magnetic properties			Standards	
B @ 4000 A/m (T)	1.36		IEC 60404-4	
B @ 10000 A/m (T)	1.59		IEC 60404-4	
H _c (A/m)	124		IEC 60404-4	
μ _r -max	-	720	IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.52		SS-ISO 2738	
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m·K)	21		ISO 22007-2	
Resistivity (μΩm)	90		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.18		ISO 3923/1	
Flow (s/50g)	35		ISO 4490	
Green density (g/cm³)	7.52		ISO 3927	
Green strength (MPa)	17		ISO 3995	
Springback (%)	0.19		ISO 4492, ISO 2740	
Heat treated dim. change (%)	-0.10		ISO 4492, ISO 2740	
Total dim. change (%)	0.09		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	12534	1.63	1.65
60	0.03	0.03	26544	1.82	1.86
108	0.07	0.07	49812	1.95	2.02
188	0.14	0.14	74812	2.00	2.10
266	0.21	0.21	99812	2.03	2.15
500	0.45	0.45	124812	2.04	2.20
749	0.65	0.65	149812	2.05	2.24
1092	0.85	0.85	189812	2.07	2.31
1686	1.06	1.06	229812	2.08	2.37
2839	1.25	1.26	279812	2.09	2.44
5722	1.44	1.45	304812	2.0963	2.48

Core loss							
(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz
0.5 T	0.9/1.1	1.9	4.0	7.0	9.0	12	15
1.0 T	3.2/3.9	6.6	14	22	31	41	52
1.5 T	6.5/7.9	14	29	46	65	86	109

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.062	K _{ep}	0.000027

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 2000 Hz.

K_h Hysterisis loss coefficient
K_{ep} In particle eddy current coefficient
d Smallest cross section of component (mm)
f Frequency (Hz)
B Field strength (T)
ρ Density (g/cm³)
resistivity (μΩm)

General			
Material name for drawing: Somaloy 1000 5P	Additive(s): 0.3% 5P Lube	Compaction: Pressure: 600 MPa Die temperature: 100°C	Heat treatment: Atmosphere: Nitrogen Temperature: 650°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	65/65		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	25/25		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	480/110		ASTM E9-89a	
Young's modulus (GPa)	130		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	1.8		SS-EN 10045, SS-EN 25754	

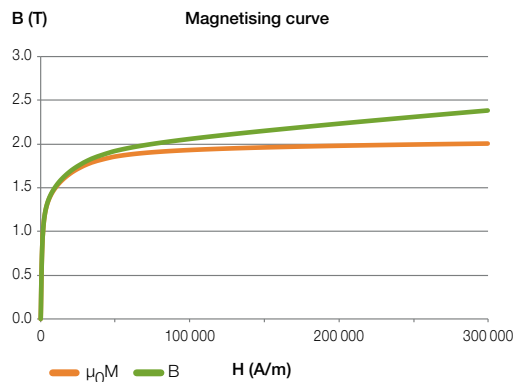
Magnetic properties			Standards	
B @ 4000 A/m (T)	1.31		IEC 60404-4	
B @ 10000 A/m (T)	1.53		IEC 60404-4	
H _c (A/m)	125		IEC 60404-4	
μ _r -max	700		IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.40		SS-ISO 2738	
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m²K)	26		ISO 22007-2	
Resistivity (μΩm)	80		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.18		ISO 3923/1	
Flow (s/50g)	35		ISO 4490	
Green density (g/cm³)	7.42		ISO 3927	
Green strength (MPa)	15		ISO 3995	
Springback (%)	0.17		ISO 4492, ISO 2740	
Heat treated dim. change (%)	-0.09		ISO 4492, ISO 2740	
Total dim. change (%)	0.08		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	12277	1.55	1.56
47	0.02	0.02	26557	1.73	1.76
83	0.05	0.05	49779	1.85	1.92
158	0.11	0.11	74779	1.90	2.00
229	0.18	0.18	99779	1.93	2.05
491	0.45	0.45	124779	1.95	2.10
668	0.60	0.60	149779	1.96	2.15
988	0.79	0.80	189779	1.97	2.21
1557	0.99	1.00	229779	1.99	2.27
2703	1.18	1.19	279779	2.00	2.35
5537	1.37	1.37	304779	2.002	2.39

Core loss							
(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz
0.5T	1.0/1.2	2.0	4.0	7.0	9.0	12	15
1.0T	3.3/4.0	6.8	15	23	33	43	55
1.5T	6.8/8.3	14	30	48	68	90	114

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.064	K _{ep}	0.000032

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 2000 Hz.

K_h Hysterisis loss coefficient
K_{ep} In particle eddy current coefficient
d Smallest cross section of component (mm)
f Frequency (Hz)
B Field strength (T)
ρ Density (g/cm³)
resistivity (μΩm)

General			
Material name for drawing: Somaloy 130i 1P	Additive(s): 0.5% Kenolube	Compaction: Pressure: 800 MPa Die temperature: Room temperature	Heat treatment: Atmosphere: Air Temperature: 530°C

Mechanical properties			Standards
Transverse rupture strength/150°C (MPa)	33/33		SS-ISO 3325
Tensile strength/Yield strength (MPa)	10/10		SS-EN 10002-1, ISO 2740
Compressive Strength/Yield (MPa)	380/220		ASTM E9-89a
Young's modulus (GPa)	60		ASTM E 1876-99
Poisson's ratio	-	0.23	ASTM E 1876-99
Impact Energy (J)	1.0		SS-EN 10045, SS-EN 25754

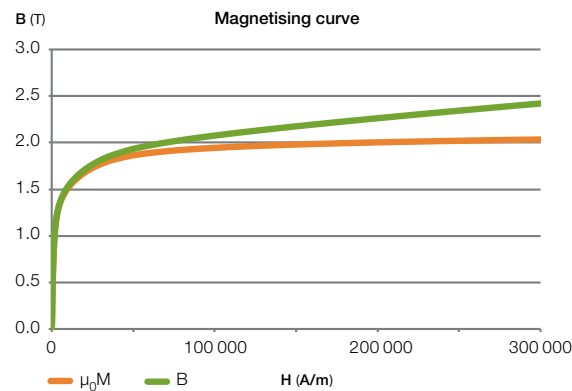
Magnetic properties			Standards
B @ 4000 A/m (T)	1.04		IEC 60404-4
B @ 10000 A/m (T)	1.40		IEC 60404-4
H _c (A/m)	260		IEC 60404-4
μ _r -max	-	290	IEC 60404-4

Physical properties			Standards
Density (g/cm³)	7.35		SS-ISO 2738
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35
Thermal conductivity (W/m²K)	22		ISO 22007-2
Resistivity (μΩm)	8000		OD 55 mm / ID 45 mm / H 5 mm

Powder properties			Standards
Apparent density (g/cm³)	3.25		ISO 3923/1
Flow (s/50g)	26		ISO 4490
Green density (g/cm³)	7.41		ISO 3927
Green strength (MPa)	16		ISO 3995
Springback (%)	0.20		ISO 4492, ISO 2740
Heat treated dim. change (%)	-0.03		ISO 4492, ISO 2740
Total dim. change (%)	0.17		ISO 4492, ISO 2740

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	15579	1.51	1.53
138	0.03	0.04	29120	1.69	1.73
244	0.07	0.07	49706	1.82	1.88
446	0.14	0.15	74706	1.89	1.98
626	0.22	0.22	99706	1.92	2.05
1212	0.45	0.45	124706	1.95	2.11
1808	0.62	0.62	149706	1.97	2.16
2573	0.80	0.80	189706	1.99	2.23
3671	0.97	0.98	229706	2.01	2.30
5514	1.15	1.16	279706	2.03	2.38
8959	1.33	1.34	304706	2.039	2.42

Core loss													
(W/kg)	50/60 Hz	100 Hz	250 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz		(W/kg)	5 kHz	10 kHz	20 kHz	30 kHz
0.5 T	1.8/2.1	3.5	9.0	18	28	39	84		0.05 T	2.9	7.7	20	36
1.0 T	6.0/7.1	12	30	63	97	132	293		0.1 T	11	29	76	134
1.5 T	12/15	24	62	128	198	272	608		0.2 T	41	107	283	500

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.118	K _{ep}	0.000014

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 0.5 T-1.5 T and 5000 Hz.

$$P_{tot} = 91 * B^{1.90} * f^{1.40}$$

Model is verified up to 0.05 T-0.2 T and 5-50 kHz.

K _h	Hysteresis loss coefficient	f	Frequency (Hz)
K _{ep}	In particle eddy current coefficient	B	Field strength (T)
d	Smallest cross section of component (mm)	ρ	Density (g/cm³)
		resistivity	(μΩm)
f	Frequency (kHz)		
B	Field strength (T)		

General

Material name for drawing: Somaloy 130i 1P	Additive(s): 0.5% Kenolube	Compaction: Pressure: 600 MPa Die temperature: Room temperature	Heat treatment: Atmosphere: Air Temperature: 530°C
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Mechanical properties			Standards
Transverse rupture strength/150°C	(MPa)	41/41	SS-ISO 3325
Tensile strength/Yield strength	(MPa)	15/15	SS-EN 10002-1, ISO 2740
Compressive Strength/Yield	(MPa)	300/210	ASTM E9-89a
Young's modulus	(GPa)	70	ASTM E 1876-99
Poisson's ratio	-	0.23	ASTM E 1876-99
Impact Energy	(J)	1.0	SS-EN 10045, SS-EN 25754

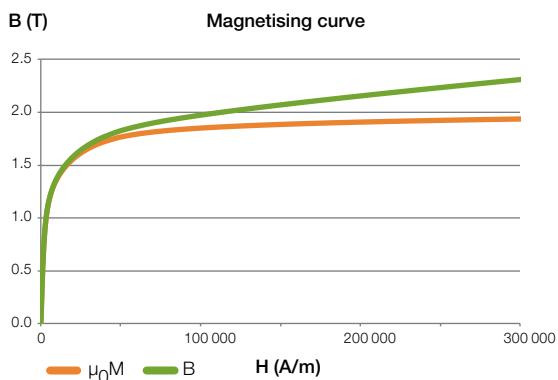
Physical properties			Standards
Density	(g/cm³)	7.22	SS-ISO 2738
Thermal expansion	(K ⁻¹)	11 e-06	ASTM E 228/MPfIP 35
Thermal conductivity	(W/m²K)	27	ISO 22007-2
Resistivity	(μΩm)	5900	OD 55 mm / ID 45 mm / H 5 mm

Magnetic properties			Standards
B @ 4000 A/m	(T)	0.97	IEC 60404-4
B @ 10000 A/m	(T)	1.30	IEC 60404-4
H _c	(A/m)	296	IEC 60404-4
μ _e -max	-	270	IEC 60404-4

Powder properties			Standards
Apparent density	(g/cm ³)	3.25	ISO 3923/1
Flow	(s/50g)	26	ISO 4490
Green density	(g/cm ³)	7.27	ISO 3927
Green strength	(MPa)	14	ISO 3995
Springback	(%)	0.15	ISO 4492, ISO 2740
Heat treated dim. change	(%)	-0.03	ISO 4492, ISO 2740
Total dim. change	(%)	0.12	ISO 4492, ISO 2740

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	$\mu_0 M$ (T)	B (T)	H (A/m)	$\mu_0 M$ (T)	B (T)
0	0.00	0.00	15940	1.43	1.45
139	0.03	0.03	29603	1.61	1.65
246	0.07	0.07	49771	1.73	1.80
434	0.14	0.14	74771	1.81	1.90
614	0.20	0.20	99771	1.85	1.98
1180	0.42	0.42	124771	1.88	2.04
1790	0.59	0.59	149771	1.91	2.10
2569	0.76	0.76	189771	1.94	2.18
3704	0.92	0.93	229771	1.96	2.25
5626	1.10	1.10	279771	1.99	2.34
9157	1.26	1.28	304771	1.997	2.38

Core loss

(W/kg)	50/60 Hz	100 Hz	250 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz		(W/kg)	5 kHz	10 kHz	20 kHz	30 kHz
0.5 T	1.8/2.2	3.7	9.5	20	30	42	93		0.05 T	3.1	8.3	22	40
1.0 T	6.2/7.5	13	32	67	104	143	327		0.1 T	12	31	83	147
1.5 T	13/15	25	65	136	213	296	683		0.2 T	43	114	306	544

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model

K_h	0.123	K_{ep}	0.000020
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$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 0.5 T-1.5 T and 5000 Hz.

$$P_{tot} = 91 * B^{1.89} * f^{1.42}$$

Model is verified up to 0.05 T-0.2 T and 5-50 kHz.

K_h	Hysteresis loss coefficient	f	Frequency (Hz)
K_{ep}	In particle eddy current coefficient	B	Field strength (T)
d	Smallest cross section of component (mm)	ρ	Density (g/cm ³)
		resistivity	($\mu\Omega m$)

f Frequency (kHz)
B Field strength (T)

General			
Material name for drawing: Somaloy 500 1P	Additive(s): 0.5% Kenolube	Compaction: Pressure: 800 MPa Die temperature: Room temperature	Heat treatment: Atmosphere: Air Temperature: 500°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	50/50		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	15/15		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	310/220		ASTM E 89a	
Young's modulus (GPa)	110		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	1		SS-EN 10045, SS-EN 25754	

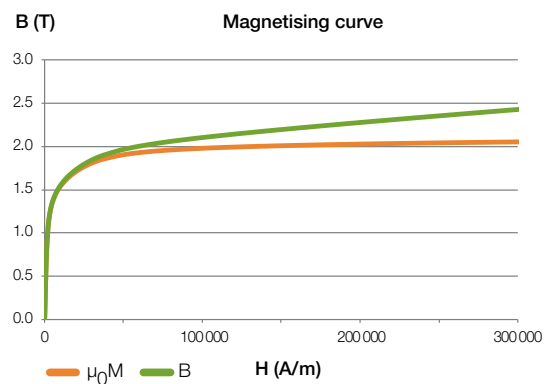
Magnetic properties			Standards	
B @ 4000 A/m (T)	1.26		IEC 60404-4	
B @ 10000 A/m (T)	1.51		IEC 60404-4	
H _c (A/m)	270		IEC 60404-4	
μ _r -max	-	500	IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.37		SS-ISO 2738	
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m·K)	23		ISO 22007-2	
Resistivity (μΩm)	70		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.19		ISO 3923/1	
Flow (s/50g)	27		ISO 4490	
Green density (g/cm³)	7.39		ISO 3927	
Green strength (MPa)	15		ISO 3995	
Springback (%)	0.16		ISO 4492, ISO 2740	
Heat treated dim. change (%)	-0.06		ISO 4492, ISO 2740	
Total dim. change (%)	0.10		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	13525	1.56	1.58
95	0.03	0.03	28841	1.75	1.78
169	0.06	0.06	50231	1.86	1.92
283	0.14	0.14	75231	1.92	2.01
420	0.23	0.23	100231	1.95	2.08
792	0.49	0.49	125231	1.97	2.13
1059	0.64	0.64	150231	1.99	2.18
1511	0.83	0.83	190231	2.01	2.25
2219	1.01	1.02	230231	2.03	2.32
3567	1.20	1.20	280231	2.05	2.40
6621	1.38	1.39	305231	2.0573	2.44

Core loss											
(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz
0.5 T	1.8/2.2	3.7	8	12	16	20	25	30	34	40	45
1.0 T	6.2/7.5	13	26	40	54	70	86	102	119	137	156
1.5 T	13/15	26	53	82	112	143	176	211	247	284	323

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.123	K _{ep}	0.000014

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 5000 Hz.

K _h	Hysteresis loss coefficient	f	Frequency (Hz)
K _{ep}	In particle eddy current coefficient	B	Field strength (T)
d	Smallest cross section of component (mm)	ρ	Density (g/cm³)
		resistivity	(μΩm)

General			
Material name for drawing: Somaloy 500 1P	Additive(s): 0.5% Kenolube	Compaction: Pressure: 600 MPa Die temperature: Room temperature	Heat treatment: Atmosphere: Air Temperature: 500°C

Mechanical properties			Standards
Transverse rupture strength/150°C (MPa)	55/55		SS-ISO 3325
Tensile strength/Yield strength (MPa)	15/15		SS-EN 10002-1, ISO 2740
Compressive Strength/Yield (MPa)	250/180		ASTM E9-89a
Young's modulus (GPa)	120		ASTM E 1876-99
Poisson's ratio	-	0.23	ASTM E 1876-99
Impact Energy (J)	1		SS-EN 10045, SS-EN 25754

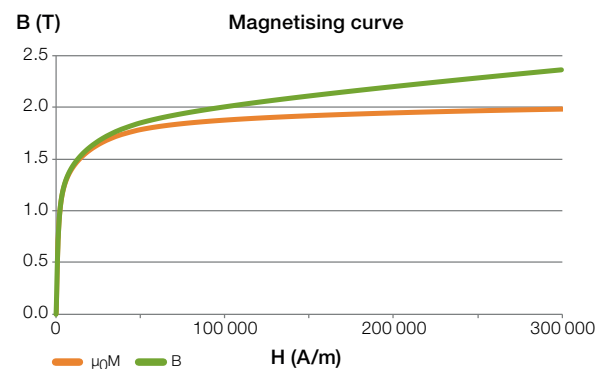
Magnetic properties			Standards
B @ 4000 A/m (T)	1.19		IEC 60404-4
B @ 10000 A/m (T)	1.43		IEC 60404-4
H _c (A/m)	280		IEC 60404-4
μ _r -max	-	550	IEC 60404-4

Physical properties			Standards
Density (g/cm³)	7.22		SS-ISO 2738
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35
Thermal conductivity (W/m²K)	28		ISO 22007-2
Resistivity (μΩm)	50		OD 55 mm / ID 45 mm / H 5 mm

Powder properties			Standards
Apparent density (g/cm³)	3.19		ISO 3923/1
Flow (s/50g)	27		ISO 4490
Green density (g/cm³)	7.23		ISO 3927
Green strength (MPa)	13		ISO 3995
Springback (%)	0.12		ISO 4492, ISO 2740
Heat treated dim. change (%)	-0.04		ISO 4492, ISO 2740
Total dim. change (%)	0.08		ISO 4492, ISO 2740

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	13126	1.49	1.50
88	0.03	0.03	27541	1.66	1.70
145	0.06	0.06	49767	1.78	1.85
248	0.12	0.12	74767	1.84	1.94
347	0.19	0.19	99767	1.88	2.00
698	0.44	0.44	124767	1.90	2.06
954	0.59	0.59	149767	1.92	2.11
1396	0.78	0.78	189767	1.94	2.18
2076	0.96	0.96	229767	1.96	2.25
3384	1.13	1.14	279767	1.98	2.33
6377	1.31	1.32	304767	1.984	2.37

Core loss

(W/kg)	50/60 Hz	100 Hz	200 Hz	300 Hz	400 Hz	500 Hz	600 Hz	700 Hz	800 Hz	900 Hz	1000 Hz
0.5 T	1.9/2.3	3.9	8	12	17	22	27	32	38	43	49
1.0 T	6.5/7.8	13	27	42	58	75	93	112	131	152	174
1.5 T	13/16	27	56	87	120	155	193	232	274	317	363

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model

K _h	0.127	K _{ep}	0.000020
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$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 1.5 T and 5000 Hz.

K_h Hysteresis loss coefficient
K_{ep} In particle eddy current coefficient
d Smallest cross section of component (mm)
f Frequency (Hz)
B Field strength (T)
ρ Density (g/cm³)
resistivity (μΩm)

General			
Material name for drawing: Somaloy 130i 5P	Additive(s): 0.3% 5P Lube	Compaction: Pressure: 800 MPa Die temperature: 80°C	Heat treatment: Atmosphere: Nitrogen Temperature: 650°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	35/35		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	15/15		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	310/110		ASTM E9-89a	
Young's modulus (GPa)	100		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	0.6		SS-EN 10045, SS-EN 25754	

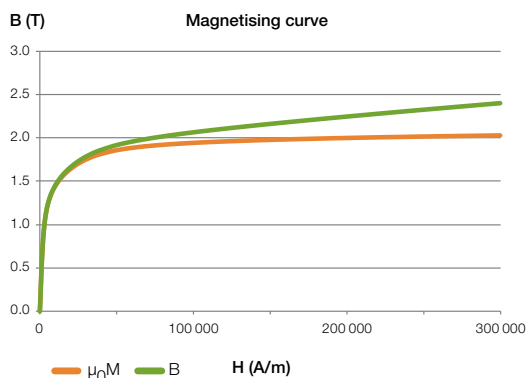
Magnetic properties			Standards	
B @ 4000 A/m (T)	1.14		IEC 60404-4	
B @ 10000 A/m (T)	1.47		IEC 60404-4	
H _c (A/m)	153		IEC 60404-4	
μ _r -max	-	350	IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.44		SS-ISO 2738	
Thermal expansion (K ⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m·K)	19		ISO 22007-2	
Resistivity (μΩm)	20000		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.58		ISO 3923/1	
Flow (s/50g)	22		ISO 4490	
Green density (g/cm³)	7.43		ISO 3927	
Green strength (MPa)	8		ISO 3995	
Springback (%)	0.22		ISO 4492, ISO 2740	
Heat treated dim. change (%)	-0.10		ISO 4492, ISO 2740	
Total dim. change (%)	0.12		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	14364	1.55	1.57
116	0.04	0.04	27712	1.73	1.76
205	0.07	0.07	49770	1.86	1.92
361	0.14	0.14	74770	1.91	2.01
525	0.22	0.22	99770	1.94	2.07
1182	0.54	0.54	124770	1.96	2.12
1509	0.65	0.65	149770	1.98	2.17
2126	0.83	0.83	189770	2.00	2.23
3046	1.01	1.01	229770	2.01	2.30
4644	1.19	1.19	279770	2.02	2.38
7841	1.37	1.38	304770	2.030	2.41

Core loss												
(W/kg)	50/60 Hz	100 Hz	250 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz	(W/kg)	5 kHz	10 kHz	20 kHz	30 kHz
0.5 T	1.2/1.4	2.4	6.1	13	20	27	61	0.05 T	2.3	6.2	16	29
1.0 T	4.0/4.8	8.0	21	43	67	93	214	0.1 T	9.2	24	64	113
1.5 T	8.1/9.8	16	42	88	138	192	448	0.2 T	36	95	250	442

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.079	K _{ep}	0.000014

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 0.5 T-1.5 T and 5000 Hz.

$$P_{tot} = 90 * B^{1.97} * f^{1.40}$$

Model is verified up to 0.05 T-0.2 T and 5-50 kHz.

K _h	Hysteresis loss coefficient	f	Frequency (Hz)
K _{ep}	In particle eddy current coefficient	B	Field strength (T)
d	Smallest cross section of component (mm)	ρ	Density (g/cm³)
		resistivity	(μΩm)
f	Frequency (kHz)		
B	Field strength (T)		

General			
Material name for drawing: Somaloy 130i 5P	Additive(s): 0.3% 5P Lube	Compaction: Pressure: 600 MPa Die temperature: 80°C	Heat treatment: Atmosphere: Nitrogen Temperature: 650°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	40/40		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	20/20		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	310/120		ASTM E9-89a	
Young's modulus (GPa)	90		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	0.6		SS-EN 10045, SS-EN 25754	

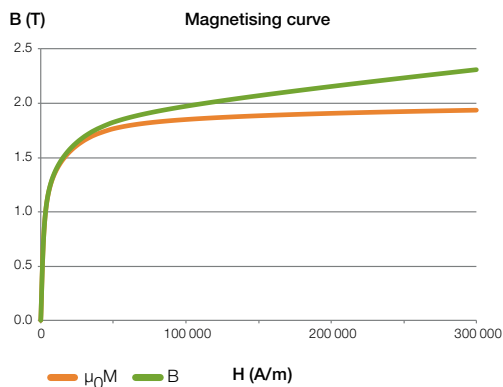
Magnetic properties			Standards	
B @ 4000 A/m (T)	1.09		IEC 60404-4	
B @ 10000 A/m (T)	1.41		IEC 60404-4	
H _c (A/m)	158		IEC 60404-4	
μ _r -max	340		IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.30		SS-ISO 2738	
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m²K)	26		ISO 22007-2	
Resistivity (μΩm)	17000		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.58		ISO 3923/1	
Flow (s/50g)	22		ISO 4490	
Green density (g/cm³)	7.33		ISO 3927	
Green strength (MPa)	7		ISO 3995	
Springback (%)	0.18		ISO 4492, ISO 2740	
Heat treated dim. change (%)	-0.09		ISO 4492, ISO 2740	
Total dim. change (%)	0.09		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	14470	1.47	1.48
107	0.03	0.03	28127	1.64	1.68
194	0.07	0.07	49652	1.76	1.83
344	0.13	0.13	74652	1.82	1.91
501	0.21	0.21	99652	1.85	1.97
944	0.41	0.41	124652	1.87	2.02
1425	0.60	0.60	149652	1.88	2.07
2031	0.77	0.77	189652	1.90	2.14
2941	0.94	0.95	229652	1.92	2.20
4563	1.12	1.12	279652	1.93	2.28
7828	1.29	1.30	304652	1.935	2.32

Core loss													
(W/kg)	50/60 Hz	100 Hz	250 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz		(W/kg)	5 kHz	10 kHz	20 kHz	30 kHz
0.5 T	1.2/1.5	2.5	6.3	13	21	29	68		0.05 T	2.9	7.9	22	39
1.0 T	4.1/4.9	8.3	22	46	72	101	242		0.1 T	11	31	84	151
1.5 T	8.3/10	17	44	94	149	210	510		0.2 T	43	119	324	583

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.081	K _{ep}	0.000020

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 0.5 T-1.5 T and 5000 Hz.

$$P_{tot} = 97 * B^{1.95} * f^{1.45}$$

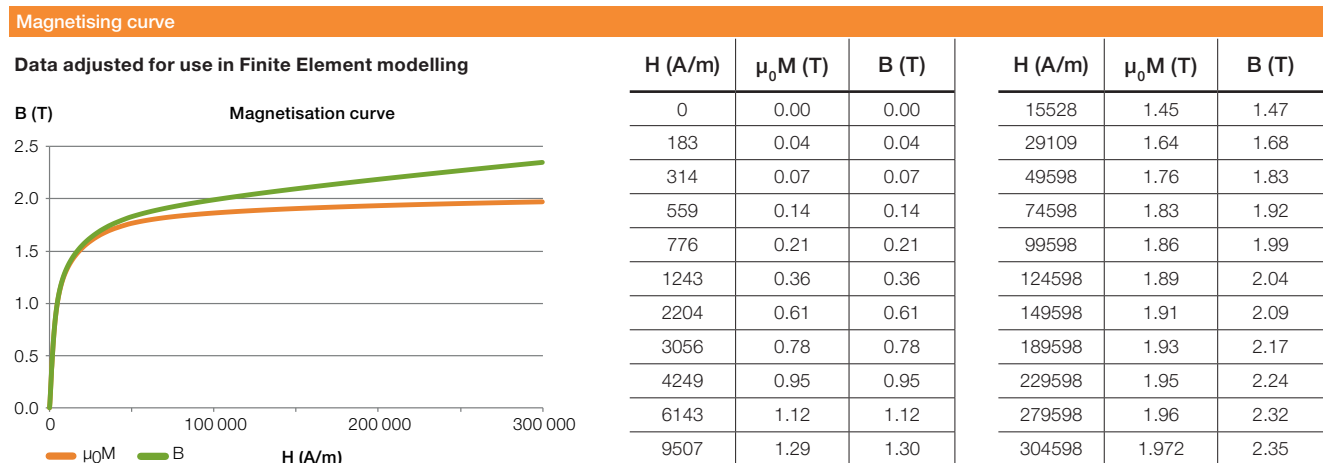
Model is verified up to 0.05 T-0.2 T and 5-50 kHz.

K _h	Hysteresis loss coefficient	f	Frequency (Hz)
K _{ep}	In particle eddy current coefficient	B	Field strength (T)
d	Smallest cross section of component (mm)	ρ	Density (g/cm³)
		resistivity	(μΩm)
f	Frequency (kHz)		
B	Field strength (T)		

General			
Material name for drawing: Somaloy 110i 1P	Additive(s): 0.5% Kenolube	Compaction: Pressure: 800 MPa Die temperature: Room temperature	Heat treatment: Atmosphere: Air Temperature: 530°C

Mechanical properties			Standards		Physical properties			Standards	
Transverse rupture strength/150°C (MPa)	34/34		SS-ISO 3325		Density (g/cm³)	7.26		SS-ISO 2738	
Tensile strength/Yield strength (MPa)	15/15		SS-EN 10002-1, ISO 2740		Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Compressive Strength/Yield (MPa)	370/260		ASTM E9-89a		Thermal conductivity (W/m·K)	18		ISO 22007-2	
Young's modulus (GPa)	70		ASTM E 1876-99		Resistivity (μΩm)	7600		OD 55 mm / ID 45 mm / H 5 mm	
Poisson's ratio	-	0.23	ASTM E 1876-99						
Impact Energy (J)	0.9		SS-EN 10045, SS-EN 25754						

Magnetic properties			Standards		Powder properties			Standards	
B @ 4000 A/m (T)	0.93		IEC 60404-4		Apparent density (g/cm³)	3.31		ISO 3923/1	
B @ 10000 A/m (T)	1.33		IEC 60404-4		Flow (s/50g)	24		ISO 4490	
H _c (A/m)	315		IEC 60404-4		Green density (g/cm³)	7.32		ISO 3927	
μ _r -max	220		IEC 60404-4		Green strength (MPa)	14		ISO 3995	
					Springback (%)	0.16		ISO 4492, ISO 2740	
					Heat treated dim. change (%)	-0.02		ISO 4492, ISO 2740	
					Total dim. change (%)	0.14		ISO 4492, ISO 2740	



Core loss														
(W/kg)	50/60 Hz	100 Hz	250 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz			(W/kg)	5 kHz	10 kHz	20 kHz	30 kHz
0.5 T	2.1/2.6	4.3	11	22	33	45	95			0.05 T	3.0	7.0	16	26
1.0 T	7.2/8.6	14	36	74	113	153	327			0.1 T	12	27	61	100
1.5 T	15/18	29	74	151	231	314	674			0.2 T	44	101	233	379

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model							
K _h	0.143	K _{ep}	0.000010			K _h	Hysteresis loss coefficient
						K _{ep}	In particle eddy current coefficient
						d	Smallest cross section of component (mm)
						f	Frequency (Hz)
						B	Field strength (T)
						ρ	Density (g/cm³)
						resistivity	(μΩm)

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * resistivity * 1000} \quad (W/kg)$$

Model is verified up to 0.5 T-1.5 T and 5000 Hz.

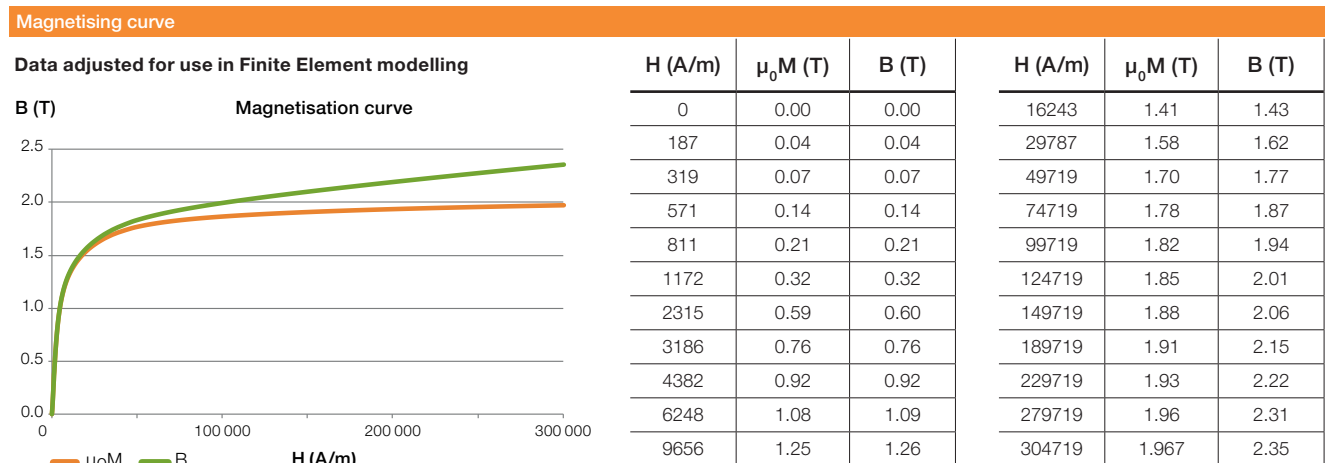
$$P_{tot} = 143 * B^{1.93} * f^{1.20}$$

Model is verified up to 0.05 T-0.2 T and 5-50 kHz.

General			
Material name for drawing: Somaloy 110i 1P	Additive(s): 0.5% Kenolube	Compaction: Pressure: 600 MPa Die temperature: Room temperature	Heat treatment: Atmosphere: Air Temperature: 530°C

Mechanical properties			Standards		Physical properties			Standards	
Transverse rupture strength/150°C (MPa)	50/50		SS-ISO 3325		Density (g/cm³)	7.10		SS-ISO 2738	
Tensile strength/Yield strength (MPa)	20/20		SS-EN 10002-1, ISO 2740		Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Compressive Strength/Yield (MPa)	280/240		ASTM E9-89a		Thermal conductivity (W/m²K)	23		ISO 22007-2	
Young's modulus (GPa)	100		ASTM E 1876-99		Resistivity (μΩm)	3100		OD 55 mm / ID 45 mm / H 5 mm	
Poisson's ratio	-	0.23	ASTM E 1876-99						
Impact Energy (J)	0.9		SS-EN 10045, SS-EN 25754						

Magnetic properties			Standards		Powder properties			Standards	
B @ 4000 A/m (T)	0.85		IEC 60404-4		Apparent density (g/cm³)	3.31		ISO 3923/1	
B @ 10000 A/m (T)	1.23		IEC 60404-4		Flow (s/50g)	24		ISO 4490	
H _c (A/m)	350		IEC 60404-4		Green density (g/cm³)	7.12		ISO 3927	
μ _r -max	210		IEC 60404-4		Green strength (MPa)	13		ISO 3995	
					Springback (%)	0.11		ISO 4492, ISO 2740	
					Heat treated dim. change (%)	-0.02		ISO 4492, ISO 2740	
					Total dim. change (%)	0.09		ISO 4492, ISO 2740	



Core loss													
(W/kg)	50/60 Hz	100 Hz	250 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz		(W/kg)	5 kHz	10 kHz	20 kHz	30 kHz
0.5 T	2.2/2.7	4.5	11	23	35	47	100		0.05 T	3.2	7.4	17	28
1.0 T	7.5/9.0	15	38	77	118	161	344		0.1 T	12	28	65	105
1.5 T	15/18	31	77	158	242	329	710		0.2 T	46	106	244	399

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.149	K _{ep}	0.000011

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * resistivity * 1000} \quad (W/kg)$$

Model is verified up to 0.5 T-1.5 T and 5000 Hz.

$$P_{tot} = 143 * B^{1.92} * f^{1.21}$$

Model is verified up to 0.05 T-0.2 T and 5-50 kHz.

- K_h Hysteresis loss coefficient
- K_{ep} In particle eddy current coefficient
- d Smallest cross section of component (mm)
- f Frequency (Hz)
- B Field strength (T)
- ρ Density (g/cm³)
- resistivity (μΩm)

General			
Material name for drawing: Somaloy 110i 5P	Additive(s): 0.4% 5P Lube	Compaction: Pressure: 800 MPa Die temperature: 60°C	Heat treatment: Atmosphere: Nitrogen Temperature: 650°C

Mechanical properties			Standards	
Transverse rupture strength/150°C (MPa)	42/42		SS-ISO 3325	
Tensile strength/Yield strength (MPa)	25/25		SS-EN 10002-1, ISO 2740	
Compressive Strength/Yield (MPa)	270/110		ASTM E9-89a	
Young's modulus (GPa)	90		ASTM E 1876-99	
Poisson's ratio	-	0.23	ASTM E 1876-99	
Impact Energy (J)	0.6		SS-EN 10045, SS-EN 25754	

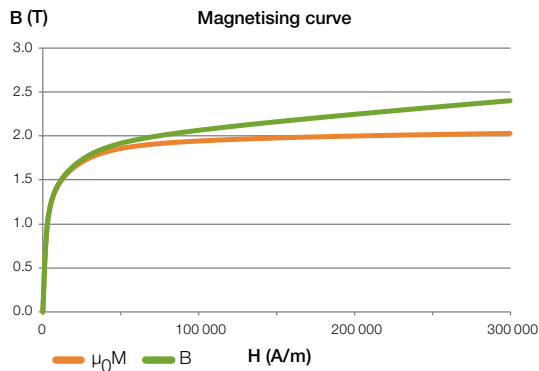
Magnetic properties			Standards	
B @ 4000 A/m (T)	0.90		IEC 60404-4	
B @ 10000 A/m (T)	1.33		IEC 60404-4	
H _c (A/m)	207		IEC 60404-4	
μ _r -max	-	220	IEC 60404-4	

Physical properties			Standards	
Density (g/cm³)	7.30		SS-ISO 2738	
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35	
Thermal conductivity (W/m·K)	15		ISO 22007-2	
Resistivity (μΩm)	18000		OD 55 mm / ID 45 mm / H 5 mm	

Powder properties			Standards	
Apparent density (g/cm³)	3.42		ISO 3923/1	
Flow (s/50g)	28		ISO 4490	
Green density (g/cm³)	7.33		ISO 3927	
Green strength (MPa)	9		ISO 3995	
Springback (%)	0.23		ISO 4492, ISO 2740	
Heat treated dim. change (%)	-0.13		ISO 4492, ISO 2740	
Total dim. change (%)	0.10		ISO 4492, ISO 2740	

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	17216	1.51	1.53
185	0.04	0.04	30659	1.69	1.73
321	0.08	0.08	50401	1.81	1.87
581	0.15	0.15	75401	1.88	1.97
828	0.22	0.22	100401	1.91	2.04
1232	0.34	0.34	125401	1.94	2.10
2434	0.63	0.63	150401	1.96	2.15
3361	0.80	0.81	190401	1.98	2.22
4638	0.98	0.98	230401	2.00	2.29
6674	1.16	1.16	280401	2.02	2.37
10343	1.33	1.35	305401	2.028	2.41

Core loss												
(W/kg)	50/60 Hz	100 Hz	250 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz	(W/kg)	5 kHz	10 kHz	20 kHz	30 kHz
0.5 T	1.5/1.8	2.9	7.4	15	23	32	68	0.05 T	1.7	4.4	11	19
1.0 T	4.9/5.9	9.9	25	52	79	108	236	0.1 T	7.0	18	46	79
1.5 T	10/12	20	51	105	162	222	489	0.2 T	29	74	188	326

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model			
K _h	0.098	K _{ep}	0.000010

$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 0.5 T-1.5 T and 5000 Hz.

$$P_{tot} = 88 * B^{2.04} * f^{1.35}$$

Model is verified up to 0.05 T-0.2 T and 5-50 kHz.

K _h	Hysteresis loss coefficient	f	Frequency (Hz)
K _{ep}	In particle eddy current coefficient	B	Field strength (T)
d	Smallest cross section of component (mm)	ρ	Density (g/cm³)
		resistivity	(μΩm)
f	Frequency (kHz)		
B	Field strength (T)		

General

Material name for drawing: Somaloy 110i 5P	Additive(s): 0.4% 5P Lube	Compaction: Pressure: 600 MPa Die temperature: 60°C	Heat treatment: Atmosphere: Nitrogen Temperature: 650°C
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Mechanical properties			Standards
Transverse rupture strength/150°C (MPa)	44/44		SS-ISO 3325
Tensile strength/Yield strength (MPa)	25/25		SS-EN 10002-1, ISO 2740
Compressive Strength/Yield (MPa)	300/130		ASTM E9-89a
Young's modulus (GPa)	80		ASTM E 1876-99
Poisson's ratio	-	0.23	ASTM E 1876-99
Impact Energy (J)	0.7		SS-EN 10045, SS-EN 25754

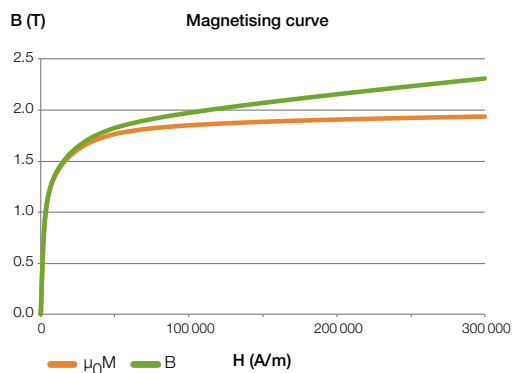
Magnetic properties			Standards
B @ 4000 A/m (T)	0.85		IEC 60404-4
B @ 10000 A/m (T)	1.25		IEC 60404-4
H _c (A/m)	210		IEC 60404-4
μ _r -max	-	210	IEC 60404-4

Physical properties			Standards
Density (g/cm³)	7.14		SS-ISO 2738
Thermal expansion (K⁻¹)	11 e-06		ASTM E 228/MPIF 35
Thermal conductivity (W/m²K)	20		ISO 22007-2
Resistivity (μΩm)	6000		OD 55 mm / ID 45 mm / H 5 mm

Powder properties			Standards
Apparent density (g/cm³)	3.42		ISO 3923/1
Flow (s/50g)	28		ISO 4490
Green density (g/cm³)	7.17		ISO 3927
Green strength (MPa)	10		ISO 3995
Springback (%)	0.18		ISO 4492, ISO 2740
Heat treated dim. change (%)	-0.14		ISO 4492, ISO 2740
Total dim. change (%)	0.04		ISO 4492, ISO 2740

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0.00	0.00	16748	1.38	1.40
171	0.03	0.03	30123	1.56	1.59
314	0.07	0.07	49799	1.68	1.74
581	0.13	0.13	74799	1.74	1.84
844	0.20	0.20	99799	1.78	1.91
1108	0.28	0.28	124799	1.81	1.97
2499	0.57	0.58	149799	1.83	2.02
3439	0.73	0.74	189799	1.86	2.10
4768	0.90	0.90	229799	1.88	2.17
6792	1.06	1.07	279799	1.90	2.25
10374	1.22	1.24	304799	1.909	2.29

Core loss

(W/kg)	50/60 Hz	100 Hz	250 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz	(W/kg)	5 kHz	10 kHz	20 kHz	30 kHz
0.5 T	1.5/1.8	3.0	7.6	16	24	33	71	0.05 T	2.0	5.2	13	23
1.0 T	5.0/6.0	10	26	53	81	111	245	0.1 T	8.3	21	54	93
1.5 T	10/12	21	52	108	167	229	509	0.2 T	34	86	219	378

Measured according to CEI/IEC 60404-6:2003 on ring sample (OD 55 mm / ID 45 mm / H 5 mm).

Loss model

K _h	0.100	K _{ep}	0.000011
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$$P_{tot} = K_h * f * B^{1.75} + K_{ep} * f^2 * B^2 + \frac{B^2 * f^2 * d^2}{1.8 * \rho * \text{resistivity} * 1000} \quad (\text{W/kg})$$

Model is verified up to 0.5 T-1.5 T and 5000 Hz.

$$P_{tot} = 99 * B^{2.02} * f^{1.35}$$

Model is verified up to 0.05 T-0.2 T and 5-50 kHz.

K _h	Hysteresis loss coefficient	f	Frequency (Hz)
K _{ep}	In particle eddy current coefficient	B	Field strength (T)
d	Smallest cross section of component (mm)	ρ	Density (g/cm³)
		resistivity	(μΩm)
f	Frequency (kHz)		
B	Field strength (T)		

Somaloy® 700 7P

7.3 g/cm³

General			
Material name for drawing: Somaloy 700 7P (0.3% + 7.3)	Additive(s): 0.3% 7P Lube	Compaction: Density: 7.3 g/cm ³ Die temperature: 100°C	Heat treatment: Atmosphere: 99% N ₂ + 1% O ₂ Temperature: 620°C

Mechanical properties			Standards
Transverse rupture strength/150°C (MPa)	55/55		ISO 3325
Compressive upper Yield/Strength (MPa)	179		ASTM E9-19
Young's modulus (GPa)	165		Calculated Value
Poisson's ratio	-	0.27	Calculated Value
Impact Energy (J)	1.1		ISO 148, ISO 5754

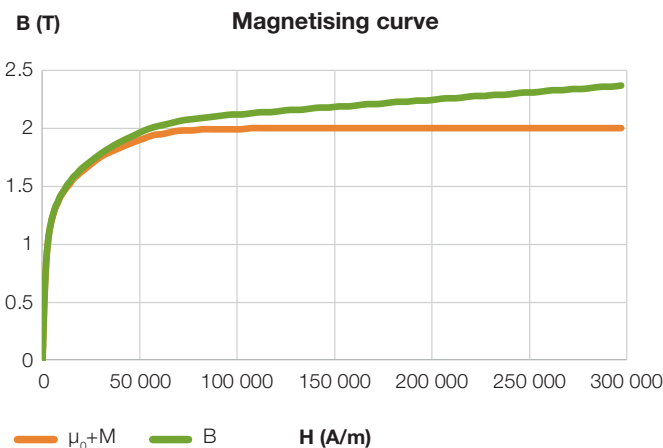
Magnetic properties			Standards
B @ 4000 A/m (T)	1.16		IEC 60404-4
B @ 10000 A/m (T)	1.44		IEC 60404-4
H _c (A/m)	137		IEC 60404-4
μ _r -max	-	420	IEC 60404-4

Physical properties			Standards
Density (g/cm ³)	7.30		SS-ISO 2738
Thermal expansion (K-1)	11 e-06		ASTM E 228/MPIF 35
Thermal conductivity (W/(m·K))	42		ISO 22007-2

Powder properties			Standards
Apparent density (g/cm ³)	3.42		ISO 3923/1
Flow (s/50g)	26		ISO 4490
Green density (g/cm ³)	7.3		ISO 3927
Green strength (MPa)	12		ISO 3995
Springback (%)	0.13		ISO 4492, ISO 2740
Heat treated dim. change (%)	-0.07		ISO 4492, ISO 2740
Total dim. change (%)	0.06		ISO 4492, ISO 2740

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0	0	19860	1.62	1.65
143	0.06	0.06	29802	1.75	1.78
270	0.12	0.12	38436	1.82	1.87
379	0.19	0.19	52067	1.91	1.98
486	0.25	0.25	62067	1.95	2.03
676	0.35	0.35	77067	1.98	2.08
801	0.42	0.42	87067	1.99	2.10
935	0.48	0.48	102067	1.99	2.12
1157	0.58	0.58	122067	2.00	2.15
1408	0.68	0.68	142067	2.00	2.18
1603	0.75	0.75	162067	2.00	2.20
1953	0.85	0.85	182067	2.00	2.23
2587	0.98	0.98	202067	2.00	2.25
3542	1.11	1.11	222067	2.00	2.28
5165	1.23	1.24	242067	2.00	2.30
7133	1.33	1.34	262067	2.00	2.33
10038	1.43	1.44	287067	2.00	2.36
15818	1.56	1.58	297067	2.00	2.37

Core loss							
(W/kg)	50 Hz	100 Hz	200 Hz	400 Hz	600 Hz	800 Hz	1000 Hz
0.5 T	1.1	2.2	4.5	9.6	15	21	27
1.0 T	3.5	7.2	15	32	51	72	94
1.5 T	6.7	14	29	65	107	155	206

Measured according to CEI/IEC 60404-6 on ring sample (OD 40 mm / ID 30 mm / H 5 mm)

Somaloy® 700 7P

7.4 g/cm³

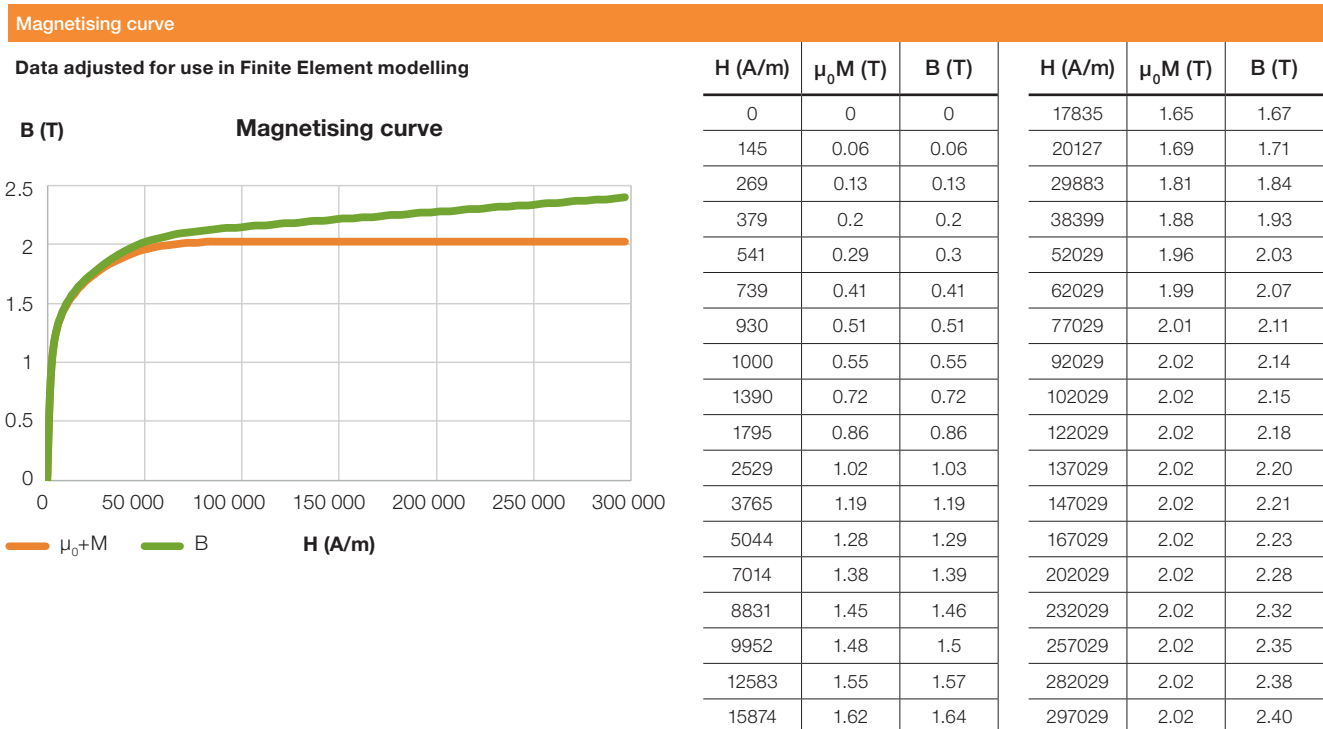
General			
Material name for drawing: Somaloy 700 7P (0.3-0.4% + 7.4)	Additive(s): 0.3-0.4% 7P Lube	Compaction: Density: 7.4 g/cm ³ Die temperature: 100°C	Heat treatment: Atmosphere: 99% N ₂ + 1% O ₂ Temperature: 620°C

Mechanical properties			Standards
Transverse rupture strength/150°C (MPa)	60/60		ISO 3325
Compressive upper Yield/Strength (MPa)	179		ASTM E9-19
Young's modulus (GPa)	172		Calculated Value
Poisson's ratio	-	0.28	Calculated Value
Impact Energy (J)	1.1		ISO 148, ISO 5754

Magnetic properties			Standards
B @ 4000 A/m (T)	1.22		IEC 60404-4
B @ 10000 A/m (T)	1.50		IEC 60404-4
H _c (A/m)	137		IEC 60404-4
μ _r -max	-	440	IEC 60404-4

Physical properties			Standards
Density (g/cm ³)	7.40		SS-ISO 2738
Thermal expansion (K-1)	11 e-06		ASTM E 228/MPIF 35
Thermal conductivity (W/(m·K))	37		ISO 22007-2

Powder properties			Standards
Apparent density (g/cm ³)	3.42		ISO 3923/1
Flow (s/50g)	26		ISO 4490
Green density (g/cm ³)	7.4		ISO 3927
Green strength (MPa)	13		ISO 3995
Springback (%)	0.14		ISO 4492, ISO 2740
Heat treated dim. change (%)	-0.08		ISO 4492, ISO 2740
Total dim. change (%)	0.06		ISO 4492, ISO 2740



Core loss							
(W/kg)	50 Hz	100 Hz	200 Hz	400 Hz	600 Hz	800 Hz	1000 Hz
0.5 T	1.0	2.1	4.3	9.1	14	20	26
1.0 T	3.3	6.8	14	30	48	68	89
1.5 T	7.0	14	28	62	102	146	193

Measured according to CEI/IEC 60404-6 on ring sample (OD 40 mm / ID 30 mm / H 5 mm)

Somaloy® 700 7P

7.5 g/cm³

General			
Material name for drawing: Somaloy 700 7P (0.3% + 7.5)	Additive(s): 0.3% 7P Lube	Compaction: Density: 7.5 g/cm ³ Die temperature: 100°C	Heat treatment: Atmosphere: 99% N ₂ + 1% O ₂ Temperature: 620°C

Mechanical properties			Standards
Transverse rupture strength/150°C (MPa)	60/60		ISO 3325
Compressive upper Yield/Strength (MPa)	171		ASTM E9-19
Young's modulus (GPa)	180		Calculated Value
Poisson's ratio	-	0.28	Calculated Value
Impact Energy (J)	0.9		ISO 148, ISO 5754

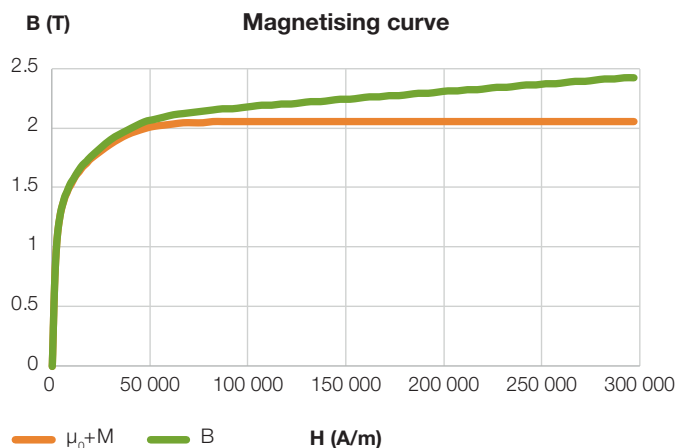
Magnetic properties			Standards
B @ 4000 A/m (T)	1.27		IEC 60404-4
B @ 10000 A/m (T)	1.55		IEC 60404-4
H _c (A/m)	135		IEC 60404-4
μ _r -max	-	500	IEC 60404-4

Physical properties			Standards
Density (g/cm ³)	7.50		SS-ISO 2738
Thermal expansion (K ⁻¹)	11 e-06		ASTM E 228/MPIF 35
Thermal conductivity (W/(m·K))	35		ISO 22007-2

Powder properties			Standards
Apparent density (g/cm ³)	3.42		ISO 3923/1
Flow (s/50g)	26		ISO 4490
Green density (g/cm ³)	7.5		ISO 3927
Green strength (MPa)	11		ISO 3995
Springback (%)	0.16		ISO 4492, ISO 2740
Heat treated dim. change (%)	-0.09		ISO 4492, ISO 2740
Total dim. change (%)	0.07		ISO 4492, ISO 2740

Magnetising curve

Data adjusted for use in Finite Element modelling



H (A/m)	μ ₀ M (T)	B (T)	H (A/m)	μ ₀ M (T)	B (T)
0	0	0	17531	1.7	1.72
143	0.07	0.07	19790	1.74	1.76
265	0.14	0.14	29697	1.86	1.9
363	0.2	0.2	38289	1.94	1.98
565	0.33	0.33	51952	2.01	2.07
739	0.43	0.43	66952	2.04	2.12
1052	0.61	0.61	81952	2.05	2.15
1356	0.75	0.75	101952	2.05	2.18
1636	0.85	0.85	121952	2.05	2.2
1988	0.96	0.96	141952	2.05	2.23
2460	1.06	1.07	156952	2.05	2.25
3136	1.17	1.17	176952	2.05	2.27
4175	1.28	1.28	191952	2.05	2.29
6550	1.42	1.43	211952	2.05	2.32
8387	1.49	1.5	231952	2.05	2.34
10757	1.56	1.57	251952	2.05	2.37
13748	1.63	1.65	281952	2.05	2.41
15538	1.67	1.69	296952	2.05	2.42

Core loss							
(W/kg)	50 Hz	100 Hz	200 Hz	400 Hz	600 Hz	800 Hz	1000 Hz
0.5 T	1.0	2.0	4.1	8.7	14	19	25
1.0 T	3.2	6.5	14	29	46	64	84
1.5 T	6.3	13	27	60	97	138	184

Measured according to CEI/IEC 60404-6 on ring sample (OD 40 mm / ID 30 mm / H 5 mm)

Somaloy® 700 7P

7.4 g/cm³ (Tall parts*)

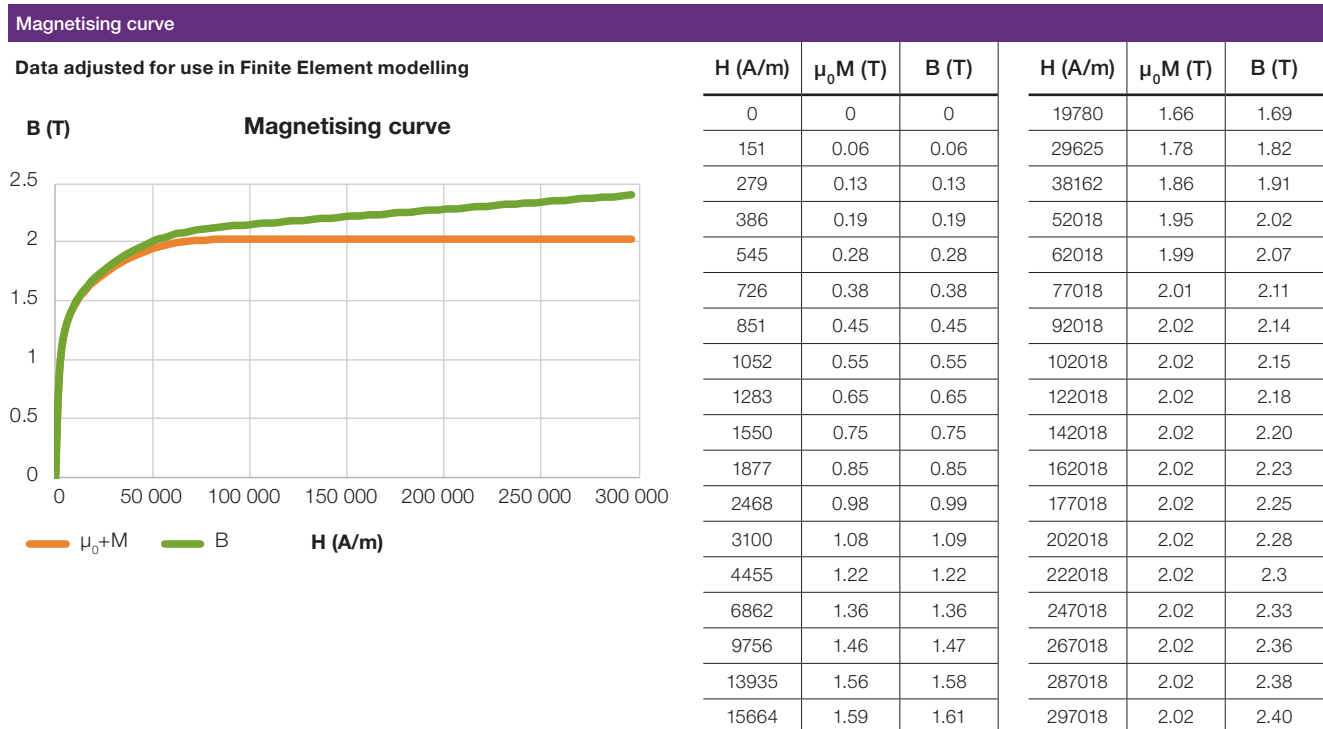
General			
Material name for drawing: Somaloy 700 7P (0.5% + 7.4)	Additive(s): 0.5% 7P Lube	Compaction: Density: 7.4 g/cm ³ Die temperature: 100°C	Heat treatment: Atmosphere: 99% N ₂ + 1% O ₂ Temperature: 620°C

Mechanical properties			Standards
Transverse rupture strength/150°C (MPa)	60/60		ISO 3325
Compressive upper Yield/Strength (MPa)	179		ASTM E9-19
Young's modulus (GPa)	172		Calculated Value
Poisson's ratio	-	0.28	Calculated Value
Impact Energy (J)	1.0		ISO 148, ISO 5754

Magnetic properties			Standards
B @ 4000 A/m (T)	1.19		IEC 60404-4
B @ 10000 A/m (T)	1.49		IEC 60404-4
H _c (A/m)	136		IEC 60404-4
μ _r -max	-	420	IEC 60404-4

Physical properties			Standards
Density (g/cm ³)	7.40		SS-ISO 2738
Thermal expansion (K ⁻¹)	11 e-06		ASTM E 228/MPIF 35
Thermal conductivity (W/(m·K))	37		ISO 22007-2

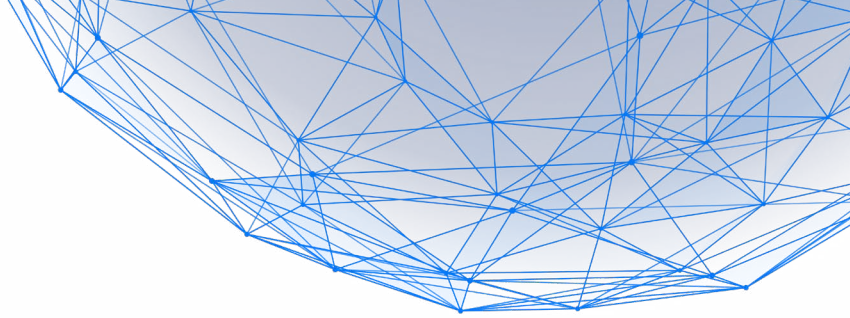
Powder properties			Standards
Apparent density (g/cm ³)	3.38		ISO 3923/1
Flow (s/50g)	26		ISO 4490
Green density (g/cm ³)	7.5		ISO 3927
Green strength (MPa)	11		ISO 3995
Springback (%)	0.16		ISO 4492, ISO 2740
Heat treated dim. change (%)	-0.08		ISO 4492, ISO 2740
Total dim. change (%)	0.08		ISO 4492, ISO 2740



Core loss							
(W/kg)	50 Hz	100 Hz	200 Hz	400 Hz	600 Hz	800 Hz	1000 Hz
0.5 T	1.0	2.1	4.3	9.1	14	20	26
1.0 T	3.3	6.8	14	30	48	68	89
1.5 T	6.5	14	29	62	103	147	195

Measured according to CEI/IEC 60404-6 on ring sample (OD 40 mm / ID 30 mm / H 5 mm)

* Datasheet values are based on 0.5% 7P Lube for tall-part geometries.
See the FAQ for additional information.

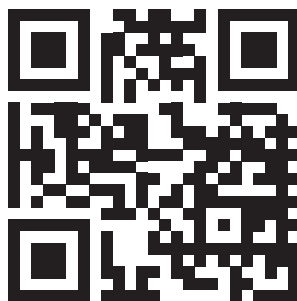


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