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Areas of application

The non-oriented electrical steel grade powercore[®] 027-150Y420 from thyssenkrupp is ideal for use in highly efficient automotive drive systems. The steel grade is characterized by very good processing properties, providing advantages in final application regardless of whether it is used in hybrid or electric vehicles or other high-speed motors.

All powercore[®] grades for e-mobility meet requirements for high permeability, high magnetizability and low eddy current losses.

Product advantages

- Application-optimized texture to minimize influence of processing on soft magnetic properties
- Guaranteed yield strengths of up to 420 MPa at room temperature
- Extended magnetic properties beyond standard DIN EN 10303

In addition to the grades for e-mobility and the fully finished standard grades, there are a large number of application-oriented grades for electric motors and generators, such as our high-permeability AP grades and our re-annealable PP grades.

powercore[®] Explorer

In addition to the figures presented in the product information, the powercore[®] Explorer gives developers the following possibilities:

- Tabular and graphic presentations of magnetic properties
- Visual comparison of the magnetic properties of different powercore[®] electrical steel grades based on standard measurements at various frequencies
- Export of material data to common simulation programs for machine design and calculations

We would be pleased to provide you with powercore[®] Explorer on request.

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Magnetic properties

Guaranteed values to DIN EN 10303

Steel grade	Reference grade DIN EN 10303	Max. core loss		Min. polarization		
		[W/kg] at		[T] at		
		400 Hz	1.0 T	2,500	5,000	10,000
				[A/m]	[A/m]	[A/m]
powercore® 027-150Y420	N027-15	15	1,52	1,61	1,73	

Mechanical properties

Guaranteed min. yield strength to DIN EN ISO 6892-1 is **420 MPa**.

Typical average values for grade

Test direction in rolling direction at room temperature	Yield strength*	Tensile strength	Elongation	Micro-hardness
	R _{p0.2}	R _m	A ₈₀	HV5
	[MPa]	[MPa]	[%]	[-]
Steel grade				
powercore® 027-150Y420	429	554	16	196

Physical properties

Steel grade	Density
	ρ
	[kg/dm ³]
powercore® 027-150Y420	7,60

Insulation types

IEC 60404-1-1/04 thyssenkrupp		
Steel grade		
powercore® 027-150Y420	–	uncoated
	EC-3	stabolit® 10
	EC-5-P	stabolit® 20
	EC-4	stabolit® 30
	EC-6	stabolit® 40
	EC-5	stabolit® 60
	–	stabolit® 70

Please refer to the product information on stabolit® for more exact data on insulation coatings.

Dimensions

	Form of supply	Thick- ness	Width	Inside diameter	Outside diameter
		[mm]	[mm]	[mm]	[mm]
Steel grade					
powercore® 027-150Y420	Narrow strip	0,27	20– 500	508	max. 1,360
	Wide strip	0,27	500–1,250	508/610	max. 1,360

Frequency-dependent properties

Typical values for information

50 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.5	56	7110	0,31	0,58
0.6	63	7600	0,42	0,77
0.7	71	7875	0,54	0,99
0.8	80	7920	0,67	1,25
0.9	93	7734	0,81	1,56
1.0	109	7305	0,97	1,95
1.1	133	6601	1,14	2,46
1.2	172	5556	1,34	3,22
1.3	255	4056	1,58	4,60
1.4	520	2143	1,88	8,50
1.5	1487	804	2,22	24,07
1.6	3583	356	2,49	65,19
1.7	6832	199	2,72	139,42
1.8	11644	124	2,94	258,98

60 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.5	56	7083	0,38	0,70
0.6	63	7575	0,52	0,93
0.7	71	7856	0,66	1,19
0.8	80	7913	0,82	1,51
0.9	93	7737	1,00	1,88
1.0	109	7313	1,19	2,35
1.1	132	6613	1,41	2,97
1.2	172	5564	1,65	3,88
1.3	255	4051	1,95	5,54
1.4	522	2134	2,32	10,24
1.5	1494	800	2,75	29,04
1.6	3595	355	3,12	78,55
1.7	6853	198	3,46	167,85
1.8	11681	124	3,88	311,73

200 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.5	61	6485	1,65	2,63
0.6	68	6997	2,24	3,49
0.7	76	7355	2,90	4,48
0.8	84	7537	3,63	5,61
0.9	95	7505	4,43	6,95
1.0	111	7200	5,30	8,59
1.1	133	6583	6,28	10,71
1.2	171	5574	7,38	13,76
1.3	254	4081	8,70	19,25
1.4	509	2192	10,33	34,39
1.5	1352	884	12,08	89,94

Typical values for information

400 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.2	44	3650	0,79	1,49
0.3	53	4525	1,67	2,72
0.4	61	5179	2,80	4,23
0.5	69	5726	4,13	5,98
0.6	77	6176	5,66	7,98
0.7	85	6563	7,36	10,21
0.8	94	6765	9,30	12,84
0.9	105	6852	11,44	15,88
1.0	118	6764	13,82	19,51
1.1	138	6352	16,47	24,07
1.2	174	5474	19,47	30,45
1.3	256	4044	22,98	41,52
1.4	510	2184	27,28	71,52
1.5	1352	884	31,93	181,57

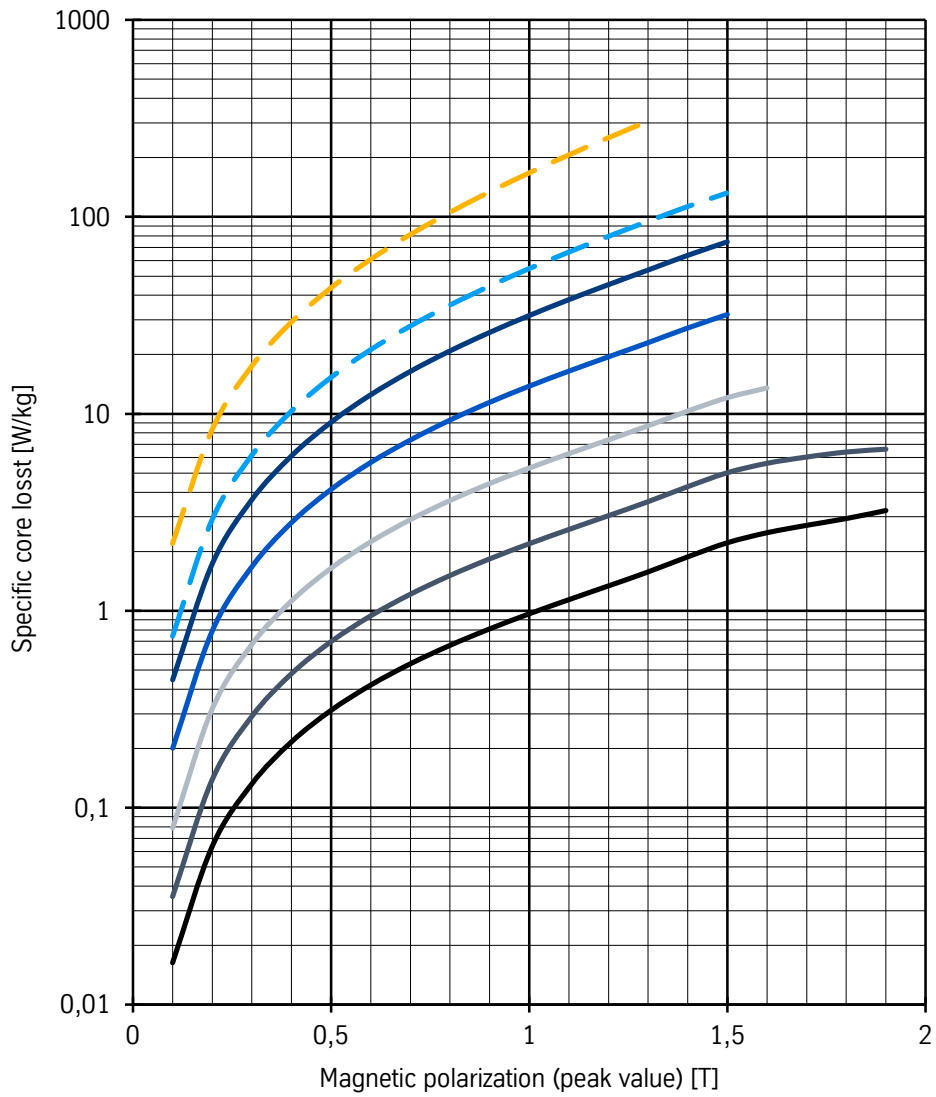
500 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.2	45	3572	1,07	1,90
0.3	55	4330	2,27	3,55
0.4	64	4946	3,81	5,54
0.5	73	5445	5,63	7,86
0.6	82	5850	7,72	10,52
0.7	90	6162	10,10	13,56
0.8	100	6378	12,77	17,03
0.9	110	6496	15,75	21,05
1.0	123	6485	19,08	25,81
1.1	141	6221	22,83	31,74
1.2	175	5453	27,07	39,89
1.3	256	4049	32,01	53,75
1.4	509	2190	38,00	90,93
1.5	1348	886	44,51	227,46

1,000 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.2	51	3098	2,91	4,37
0.3	66	3616	6,16	8,45
0.4	79	4041	10,33	13,47
0.5	91	4389	15,32	19,39
0.6	103	4652	21,16	26,28
0.7	115	4836	27,91	34,26
0.8	129	4942	35,65	43,52
0.9	144	4988	44,50	54,28
1.0	160	4984	54,64	66,91
1.1	178	4931	66,28	82,12
1.2	202	4740	79,65	101,63
1.3	266	3893	94,97	131,70
1.4	521	2138	112,87	205,52
1.5	1359	879	132,37	473,79

2,000 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.2	66	1211	8,33	11,09
0.3	86	1851	17,49	21,83
0.4	104	2301	29,25	35,21
0.5	122	2620	43,65	51,43
0.6	141	2833	60,88	70,86
0.7	162	2955	81,33	94,04
0.8	185	3011	105,49	121,67
0.9	211	3018	133,90	154,46
1.0	240	2989	167,24	193,41
1.1	272	2929	206,38	239,93
1.2	308	2839	252,37	296,86
1.3				

Specific core loss

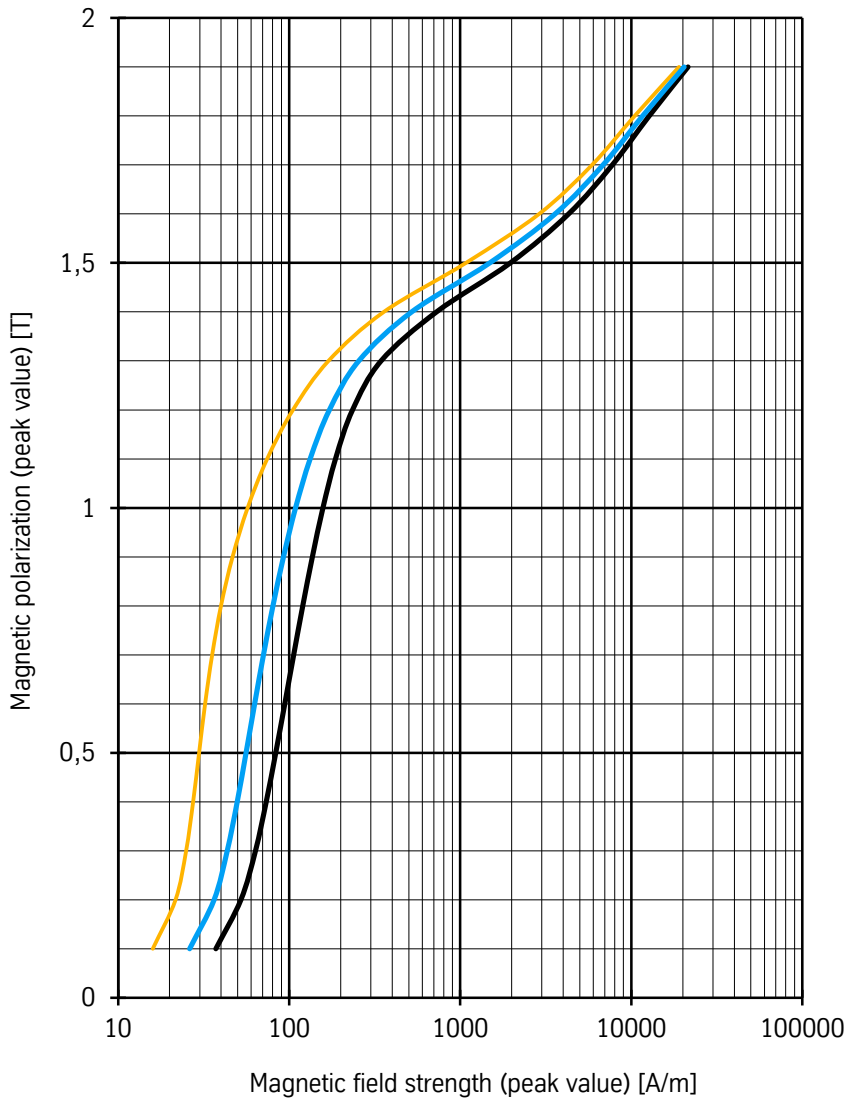
P_s versus J , directional (L/Q/M)



- 027-150Y420/M/50
- 027-150Y420/M/100
- 027-150Y420/M/200
- 027-150Y420/M/400
- 027-150Y420/M/700
- - 027-150Y420/M/1000
- - 027-150Y420/M/2000

Magnetic polarization

J versus H, directional (L/Q/M), 50 Hz



Angle to rolling direction

- 0°
- 0°/90°
- 90°

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