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Areas of application

The non-oriented electrical steel grade powercore® 027-180Y370 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 370 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® 027-180Y370	N027-18	18	1.52	1.61	1.73	

Mechanical properties

Guaranteed min. yield strength to DIN EN ISO 6892-1 is **370 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® 027-180Y370	407	529	18	192

Physical properties

Steel grade	Density
	ρ
	[kg/dm ³]
powercore® 027-180Y370	7.60

Insulation types

IEC 60404-1-1/04 thyssenkrupp		
Steel grade		
powercore® 027-180Y370	–	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® 027-180Y370	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	H	μ_a	P_s	S_s
[T]	[A/m]		[W/kg]	[VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.5	62	6,382	0.37	0.65
0.6	70	6,848	0.49	0.85
0.7	78	7,145	0.62	1.09
0.8	88	7,233	0.77	1.37
0.9	101	7,097	0.93	1.70
1.0	118	6,736	1.11	2.12
1.1	143	6,112	1.32	2.67
1.2	183	5,212	1.54	3.46
1.3	267	3,874	1.81	4.88
1.4	524	2,126	2.14	8.69
1.5	1,501	796	2.52	24.54
1.6	3,702	345	2.84	68.44
1.7	7,103	191	3.11	148.67
1.8	12,236	118	3.38	282.67

60 Hz				
J	H	μ_a	P_s	S_s
[T]	[A/m]		[W/kg]	[VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.5	65	6,099	0.44	0.82
0.6	72	6,632	0.59	1.07
0.7	80	6,987	0.75	1.36
0.8	89	7,151	0.93	1.69
0.9	101	7,123	1.13	2.08
1.0	116	6,851	1.35	2.55
1.1	139	6,281	1.59	3.18
1.2	179	5,340	1.87	4.09
1.3	264	3,916	2.21	5.78
1.4	531	2,099	2.61	10.49
1.5	1,527	783	3.07	29.94
1.6	3,752	340	3.45	83.41
1.7	7,193	189	3.77	180.88
1.8	12,287	118	4.06	341.09
1.9	21,244	72	4.31	628.19

200 Hz				
J	H	μ_a	P_s	S_s
[T]	[A/m]		[W/kg]	[VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.5	69	5,745	1.83	2.98
0.6	76	6,271	2.48	3.92
0.7	84	6,664	3.20	4.97
0.8	92	6,915	3.99	6.18
0.9	103	6,974	4.86	7.58
1.0	118	6,770	5.82	9.28
1.1	139	6,296	6.82	11.36
1.2	177	5,388	8.03	14.44
1.3	262	3,951	9.46	20.09
1.4	531	2,101	11.27	36.43
1.5	1,528	782	13.46	106.22
1.6	3,741	341	15.62	301.66
1.7	7,163	190	17.89	668.84

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	48	3,319	0.83	1.64
0.3	59	4,070	1.80	3.04
0.4	68	4,696	3.01	4.69
0.5	76	5,229	4.44	6.58
0.6	84	5,678	6.07	8.71
0.7	92	6,040	7.90	11.11
0.8	101	6,312	9.94	13.81
0.9	111	6,474	12.18	16.92
1.0	123	6,483	14.69	20.59
1.1	142	6,186	17.49	25.20
1.2	178	5,377	20.67	31.66
1.3	261	3,970	24.40	43.01
1.4	523	2,133	29.15	75.33
1.5	1,475	810	35.05	213.39

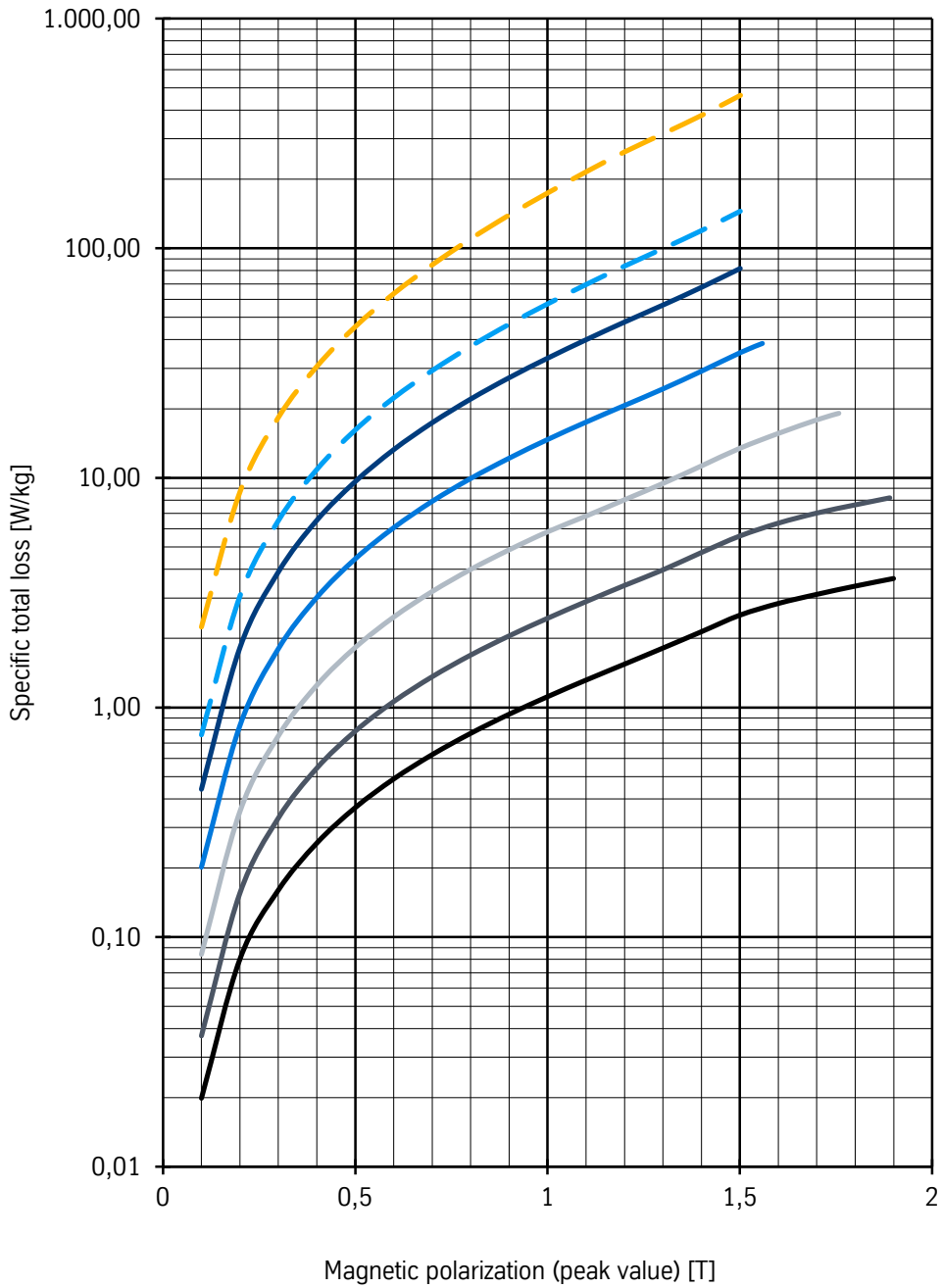
500 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.2	49	3,231	1.14	2.11
0.3	61	3,922	2.44	3.94
0.4	71	4,497	4.08	6.11
0.5	80	4,988	6.02	8.62
0.6	88	5,401	8.25	11.44
0.7	97	5,729	10.76	14.64
0.8	107	5,978	13.57	18.25
0.9	117	6,138	16.71	22.39
1.0	128	6,196	20.22	27.24
1.1	145	6,036	24.16	33.27
1.2	179	5,323	28.63	41.60
1.3	262	3,957	33.86	55.96
1.4	524	2,127	40.36	96.14
1.5	1,478	809	48.59	269.55

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	57	2,814	3.05	4.83
0.3	72	3,312	6.51	9.25
0.4	85	3,737	10.88	14.60
0.5	97	4,085	16.17	20.85
0.6	109	4,365	22.31	28.05
0.7	122	4,570	29.32	36.33
0.8	136	4,697	37.41	45.91
0.9	150	4,761	46.67	57.04
1.0	167	4,779	57.23	69.98
1.1	185	4,740	69.50	85.56
1.2	209	4,573	83.60	105.68
1.3	270	3,837	99.70	137.22
1.4	540	2,065	119.39	219.81
1.5	1,501	796	144.72	580.89

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	70	1,131	8.67	11.93
0.3	92	1,734	18.33	23.31
0.4	110	2,170	30.55	37.33
0.5	128	2,495	45.54	54.14
0.6	147	2,711	63.43	74.22
0.7	168	2,845	84.63	98.13
0.8	192	2,896	109.88	126.65
0.9	219	2,909	139.49	160.59
1.0	249	2,881	174.03	200.76
1.1	282	2,821	215.11	248.86
1.2	321	2,726	262.64	306.61
1.3	367	2,603	315.08	387.58
1.4	594	1,742	378.75	570.03
1.5	1,626	686	462.33	1372.61

Specific core loss

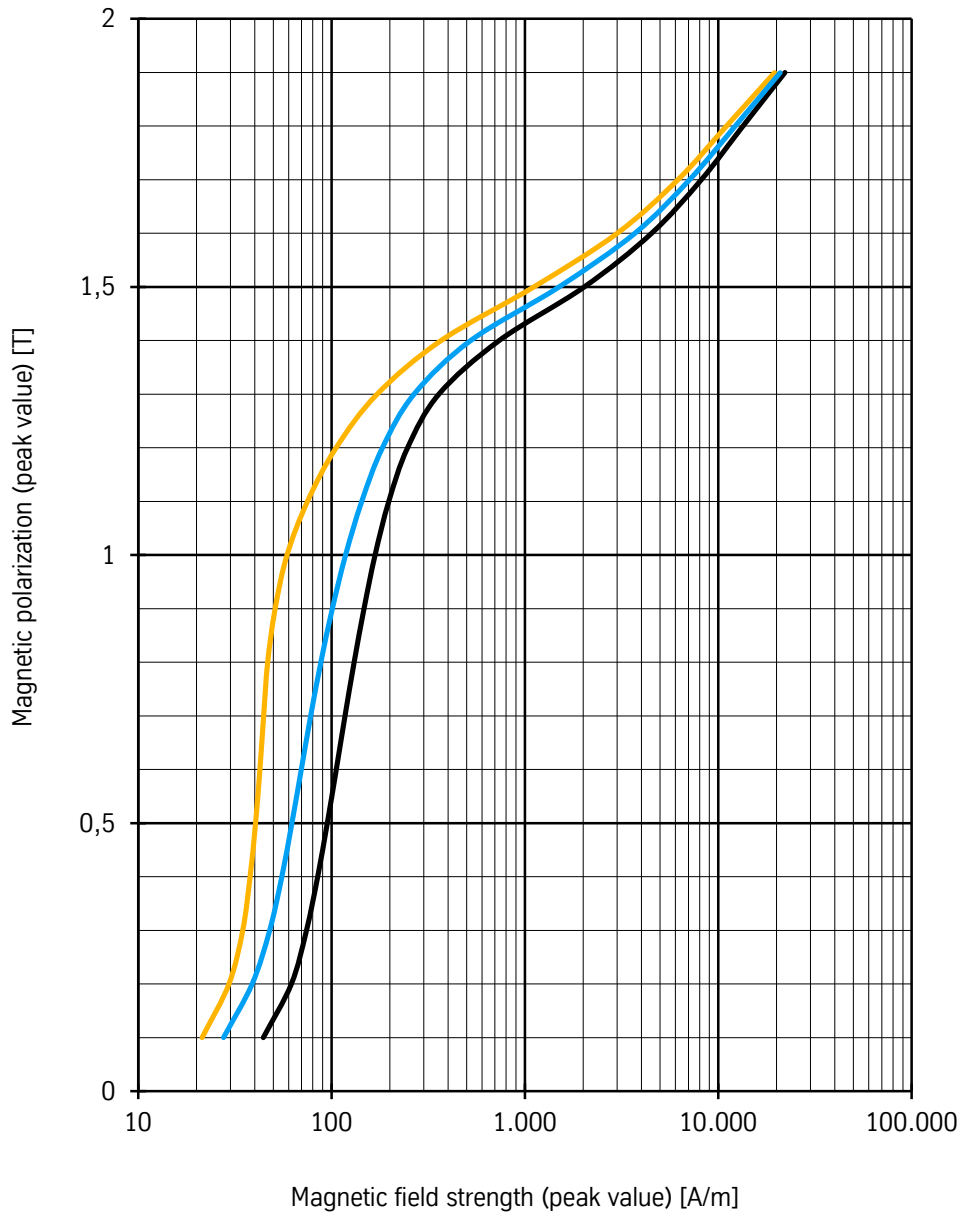
P_s versus J , directional (L/Q/M)



- 027-180Y370/M/50
- 027-180Y370/M/100
- 027-180Y370/M/200
- 027-180Y370/M/400
- 027-180Y370/M/700
- 027-180Y370/M/1000
- - 027-180Y370/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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