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Areas of application

The non-oriented electrical steel grade powercore[®] 035-180Y400 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 400 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® 035-180Y400	N035-19	18	1.52	1.61	1.73	

Mechanical properties

Guaranteed min. yield strength to DIN EN ISO 6892-1 is **400 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® 035-180Y400	443	489	16	224

Physical properties

Steel grade	Density
	ρ
	[kg/dm ³]
powercore® 035-180Y400	7.60

Insulation types

IEC 60404-1-1/04 thyssenkrupp		
Steel grade		
powercore® 035-180Y400	–	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-	Width	Inside	Outside
		ness		diameter	diameter
		[mm]	[mm]	[mm]	[mm]
Steel grade					
powercore® 035-180Y400	Narrow strip	0.35	20– 500	508	max. 1,360
	Wide strip	0.35	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	54	7,363	0.30	0.56
0.6	63	7,641	0.41	0.76
0.7	73	7,656	0.53	1.00
0.8	85	7,472	0.66	1.30
0.9	101	7,109	0.81	1.67
1.0	121	6,563	0.96	2.14
1.1	151	5,788	1.14	2.79
1.2	202	4,733	1.35	3.76
1.3	313	3,309	1.61	5.60
1.4	657	1,696	1.92	10.82
1.5	1,750	683	2.28	29.55
1.6	3,876	330	2.59	73.64
1.7	7,109	191	2.90	151.45
1.8	11,889	121	3.22	277.57

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	54	7,347	0.38	0.68
0.6	63	7,618	0.52	0.92
0.7	73	7,648	0.67	1.22
0.8	85	7,467	0.83	1.58
0.9	101	7,103	1.01	2.02
1.0	121	6,568	1.21	2.59
1.1	151	5,795	1.44	3.36
1.2	202	4,740	1.70	4.52
1.3	312	3,315	2.02	6.74
1.4	658	1,694	2.42	13.03
1.5	1,747	684	2.87	35.45
1.6	3,876	329	3.28	88.40
1.7	7,140	190	3.66	182.58
1.8	11,887	122	4.08	333.37

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	63	6,328	1.87	2.72
0.6	72	6,661	2.56	3.70
0.7	81	6,864	3.34	4.85
0.8	92	6,906	4.21	6.22
0.9	106	6,757	5.18	7.87
1.0	125	6,392	6.18	9.83
1.1	153	5,726	7.36	12.49
1.2	202	4,725	8.73	16.41
1.3	313	3,311	10.37	23.82
1.4	662	1,683	12.48	45.91
1.5	1,749	684	15.06	126.20
1.6	3,896	328	17.73	322.37

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	42	3,813	0.94	1.42
0.3	54	4,406	2.00	2.79
0.4	65	4,883	3.35	4.49
0.5	76	5,246	4.97	6.53
0.6	87	5,516	6.86	8.92
0.7	98	5,690	9.04	11.72
0.8	110	5,790	11.50	15.00
0.9	123	5,808	14.29	18.86
1.0	139	5,727	17.41	23.51
1.1	162	5,413	20.94	29.40
1.2	206	4,630	24.99	37.71
1.3	315	3,288	29.76	52.69
1.4	655	1,702	35.91	96.24
1.5	1,696	705	43.74	254.98

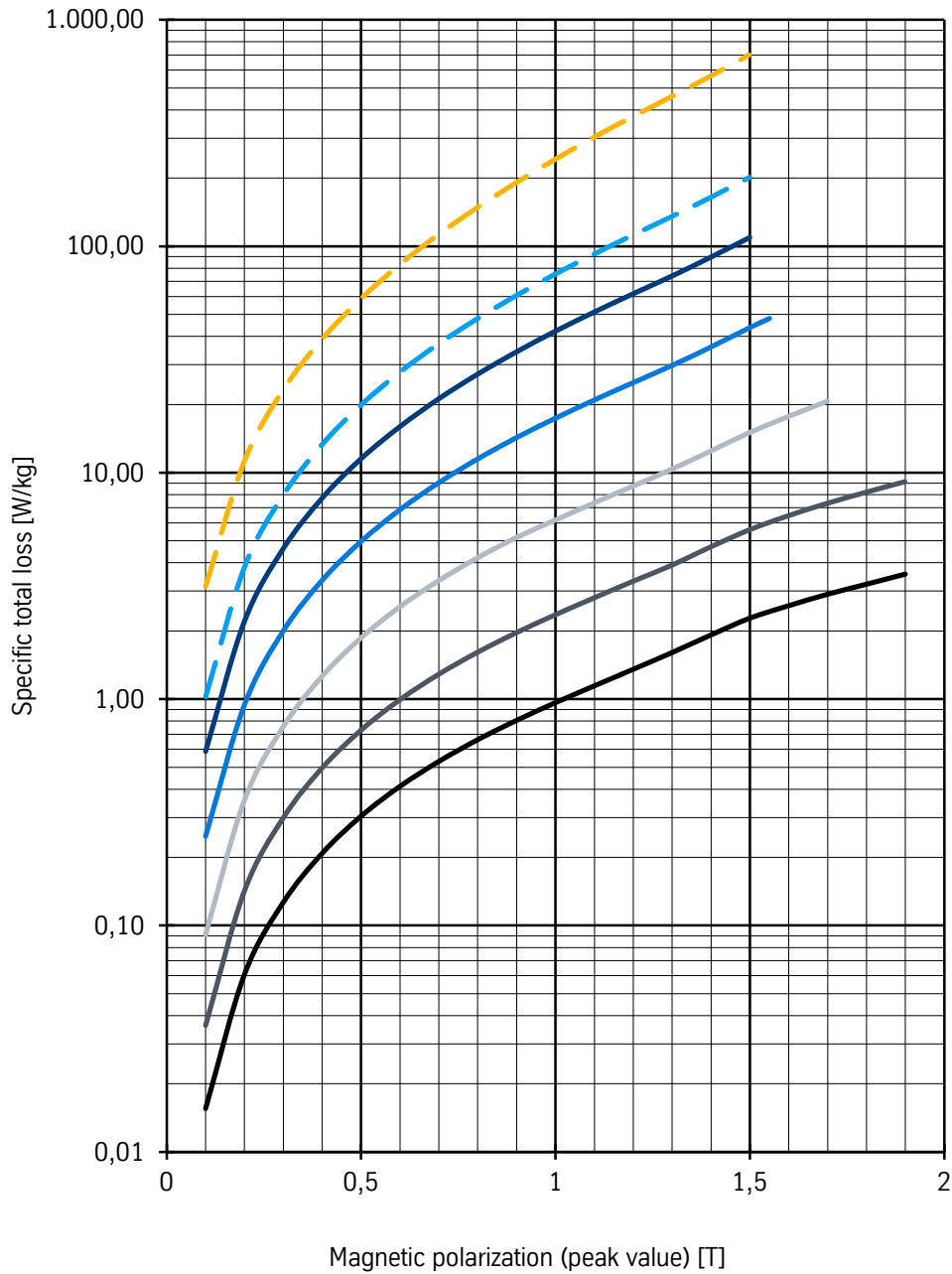
500 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.2	45	3,554	1.32	1.91
0.3	58	4,083	2.79	3.75
0.4	71	4,505	4.67	6.06
0.5	82	4,829	6.93	8.83
0.6	94	5,060	9.60	12.11
0.7	107	5,207	12.67	15.94
0.8	120	5,286	16.16	20.42
0.9	135	5,302	20.15	25.70
1.0	151	5,260	24.69	32.01
1.1	171	5,112	29.83	39.87
1.2	212	4,515	35.72	50.72
1.3	319	3,245	42.61	69.78
1.4	663	1,681	51.49	124.80
1.5	1,703	702	62.53	324.09

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	58	2,728	3.82	4.93
0.3	77	3,090	7.97	9.82
0.4	95	3,368	13.34	16.03
0.5	112	3,560	19.93	23.62
0.6	130	3,668	27.83	32.77
0.7	150	3,710	37.15	43.67
0.8	172	3,709	47.98	56.55
0.9	195	3,671	60.68	71.75
1.0	221	3,602	75.43	89.81
1.1	249	3,512	92.48	111.56
1.2	281	3,399	112.31	139.46
1.3	344	3,009	135.51	183.11
1.4	700	1,592	164.65	298.62

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	81	990	11.27	13.52
0.3	107	1,492	23.29	27.05
0.4	133	1,797	38.98	44.72
0.5	161	1,981	58.79	66.95
0.6	192	2,076	83.27	94.45
0.7	227	2,109	113.04	128.26
0.8	265	2,105	148.72	169.21
0.9	308	2,071	191.49	218.53
1.0	356	2,015	242.52	277.71
1.1	409	1,947	303.93	348.35
1.2	467	1,875	375.08	435.94
1.3	534	1,790	459.60	556.69
1.4	793	1,306	566.01	822.49

Specific core loss

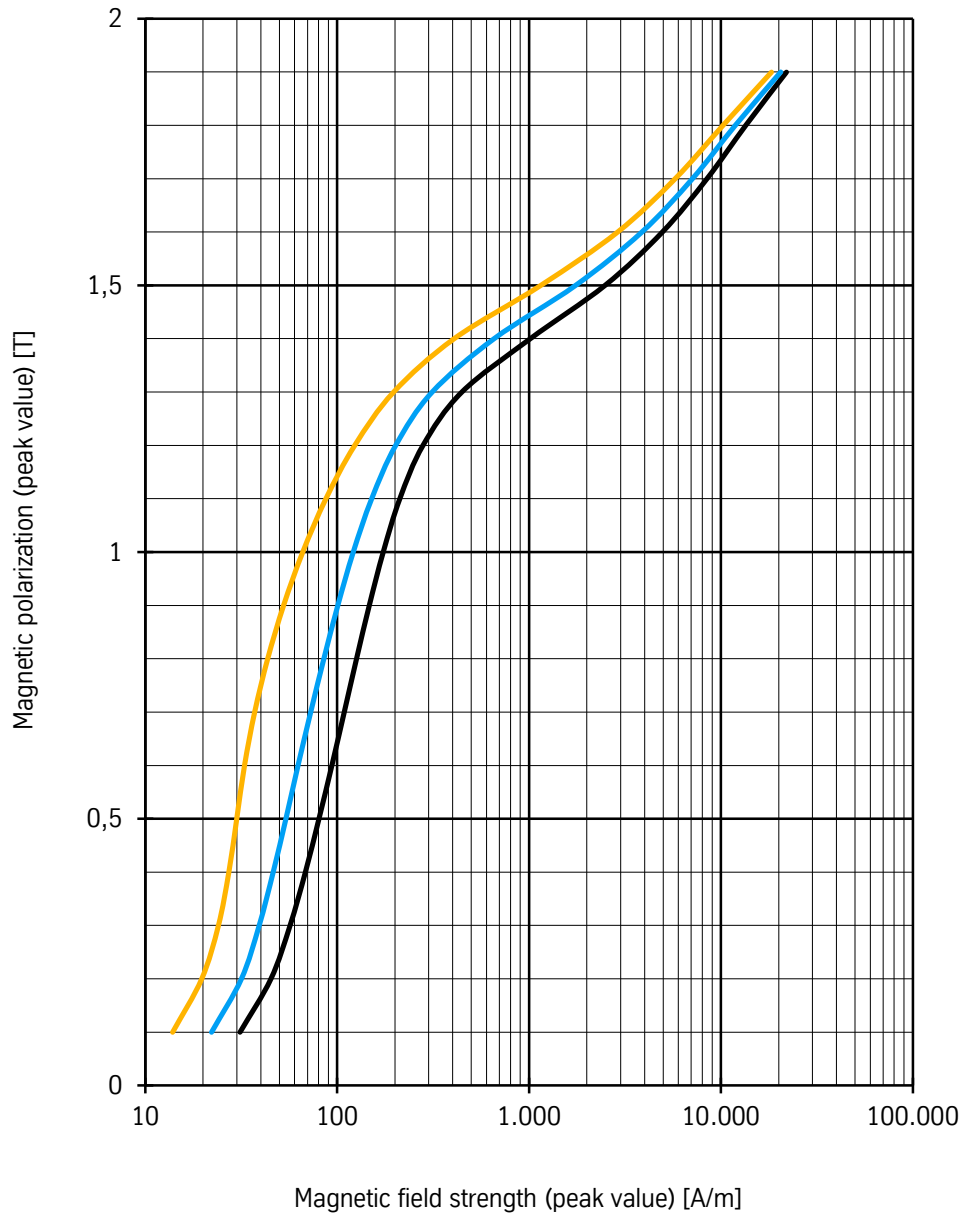
P_s versus J , directional (L/Q/M)



- 035-180Y400/M/50
- 035-180Y400/M/100
- 035-180Y400/M/200
- 035-180Y400/M/400
- 035-180Y400/M/700
- 035-180Y400/M/1000
- 035-180Y400/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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