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Areas of application

The non-oriented electrical steel grade powercore[®] 032-190Y330 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 330 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

	Reference grade DIN EN 10303	Max. core loss		Min. polarization	
		[W/kg] at 400 Hz 1.0 T	[T] at 2,500 [A/m]	5,000 [A/m]	10,000 [A/m]
Steel grade					
powercore® 032-190Y330	N035-19	19	1.52	1.62	1.74

Mechanical properties

Guaranteed min. yield strength to DIN EN ISO 6892-1 is **330 MPa**.

Typical average values for grade

Test direction in rolling direction at room temperature	Yield strength*	Tensile strength	Elongation	Micro-hardness
	R _{p0.2} [MPa]	R _m [MPa]	A ₈₀ [%]	HV5 [–]
Steel grade				
powercore® 032-190Y330	371	508	21	175

Physical properties

Steel grade	Density
	ρ [kg/dm ³]
powercore® 032-190Y330	7.65

Insulation types

IEC 60404-1-1/04 thyssenkrupp		
Steel grade		
powercore® 032-190Y330	–	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® 032-190Y330	Narrow strip	0.32	20– 500	508	max. 1,360
	Wide strip	0.32	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	65	6,147	0.37	0.67
0.6	72	6,636	0.49	0.88
0.7	80	6,947	0.63	1.13
0.8	90	7,081	0.78	1.41
0.9	102	7,042	0.94	1.74
1.0	117	6,787	1.12	2.14
1.1	139	6,285	1.32	2.66
1.2	175	5,460	1.54	3.39
1.3	243	4,260	1.81	4.60
1.4	422	2,641	2.11	7.36
1.5	1,093	1,093	2.51	17.87
1.6	2,904	439	2.87	52.12
1.7	6,024	226	3.18	122.77
1.8	10,745	134	3.46	243.71

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	65	6,119	0.45	0.81
0.6	72	6,615	0.61	1.07
0.7	80	6,945	0.78	1.36
0.8	90	7,097	0.96	1.70
0.9	102	7,045	1.17	2.10
1.0	117	6,805	1.39	2.59
1.1	139	6,294	1.64	3.21
1.2	175	5,471	1.91	4.08
1.3	242	4,276	2.24	5.53
1.4	422	2,641	2.62	8.85
1.5	1,094	1,092	3.11	21.49
1.6	2,900	440	3.55	62.52
1.7	60,41	225	3.94	147.94
1.8	10,747	134	4.31	292.59

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	71	5,596	1.98	3.06
0.6	79	6,061	2.69	4.05
0.7	87	6,416	3.49	5.17
0.8	96	6,652	4.37	6.46
0.9	106	6,727	5.34	7.95
1.0	120	6,622	6.40	9.73
1.1	140	6,244	7.51	11.86
1.2	174	5,489	8.83	14.87
1.3	241	4,297	10.35	19.76
1.4	422	2,639	12.23	31.22

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	49	3,255	0.95	1.67
0.3	61	3,918	2.03	3.13
0.4	71	4,467	3.39	4.89
0.5	81	4,926	4.99	6.93
0.6	90	5,302	6.83	9.26
0.7	100	5,593	8.93	11.91
0.8	110	5,801	11.27	14.93
0.9	121	5,921	13.91	18.43
1.0	133	5,963	16.87	22.49
1.1	149	5,868	20.18	27.46
1.2	176	5,412	23.97	34.01
1.3	239	4,325	28.33	44.14
1.4	415	2,687	33.57	66.61

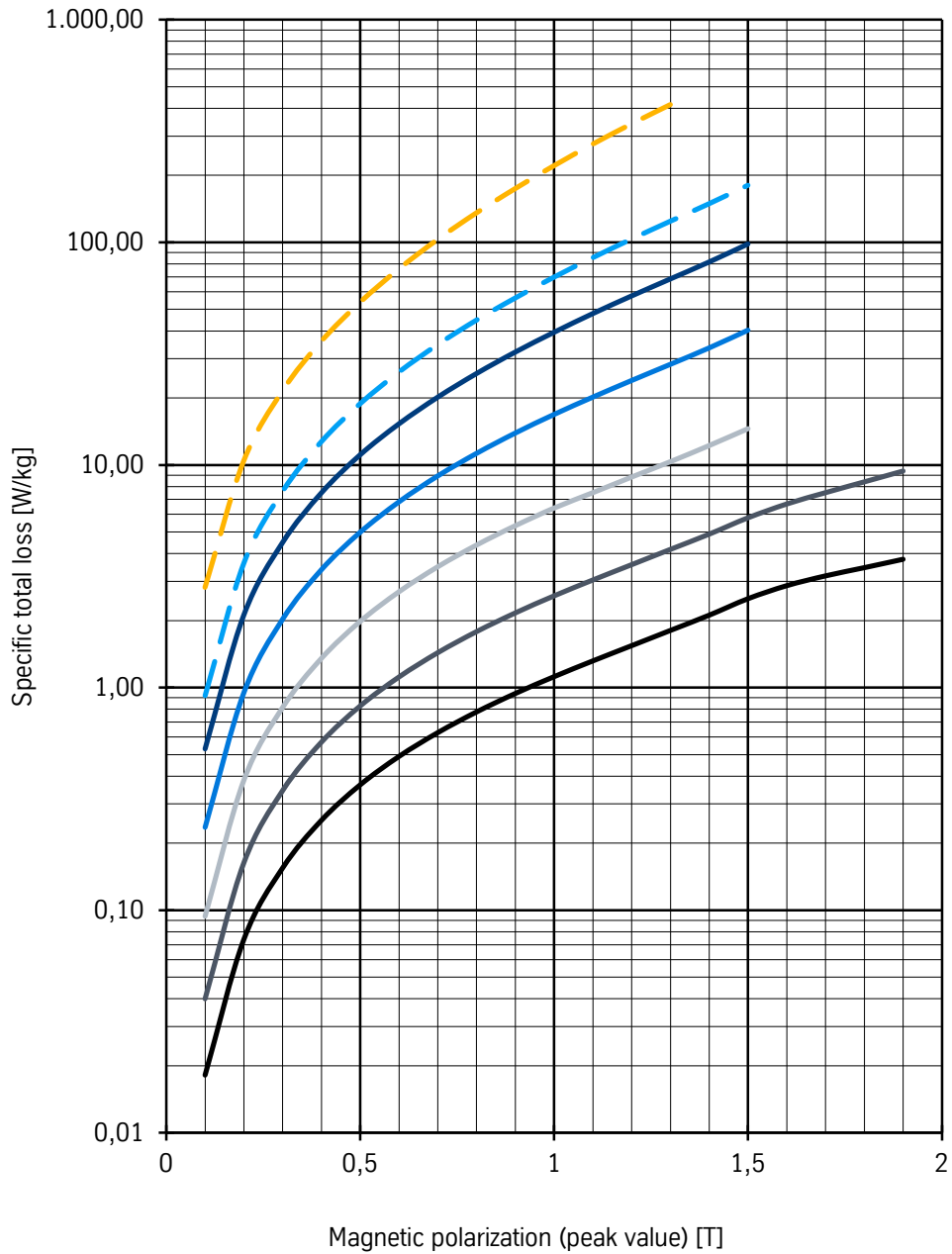
500 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0.2	51	3,123	1.29	2.17
0.3	64	3,726	2.77	4.11
0.4	75	4,221	4.61	6.45
0.5	86	4,636	6.81	9.17
0.6	96	4,972	9.36	12.29
0.7	107	5,223	12.27	15.87
0.8	118	5,402	15.55	19.97
0.9	130	5,505	19.23	24.71
1.0	144	5,545	23.43	30.25
1.1	159	5,504	28.20	36.95
1.2	183	5,230	33.64	45.63
1.3	243	4,261	39.88	58.75
1.4	423	2,635	47.39	87.61

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	61	2,592	3.63	5.18
0.3	79	3,016	7.62	10.04
0.4	95	3,360	12.74	16.01
0.5	110	3,625	18.86	23.11
0.6	126	3,805	26.17	31.51
0.7	143	3,908	34.75	41.38
0.8	161	3,947	44.76	53.01
0.9	182	3,943	56.28	66.67
1.0	204	3,903	69.82	82.80
1.1	228	3,832	85.41	101.92
1.2	256	3,727	103.56	125.35
1.3	293	3,534	124.53	156.84
1.4	427	2,609	149.25	216.47

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	80	1,002	10.47	13.31
0.3	104	1,535	21.59	26.11
0.4	126	1,894	36.02	42.31
0.5	150	2,121	53.90	62.40
0.6	178	2,234	76.07	87.29
0.7	209	2,281	103.21	117.68
0.8	244	2,287	135.79	154.58
0.9	282	2,258	174.56	198.92
1.0	325	2,203	221.17	252.52
1.1	373	2,136	276.54	314.95
1.2	425	2,061	340.95	391.69

Specific core loss

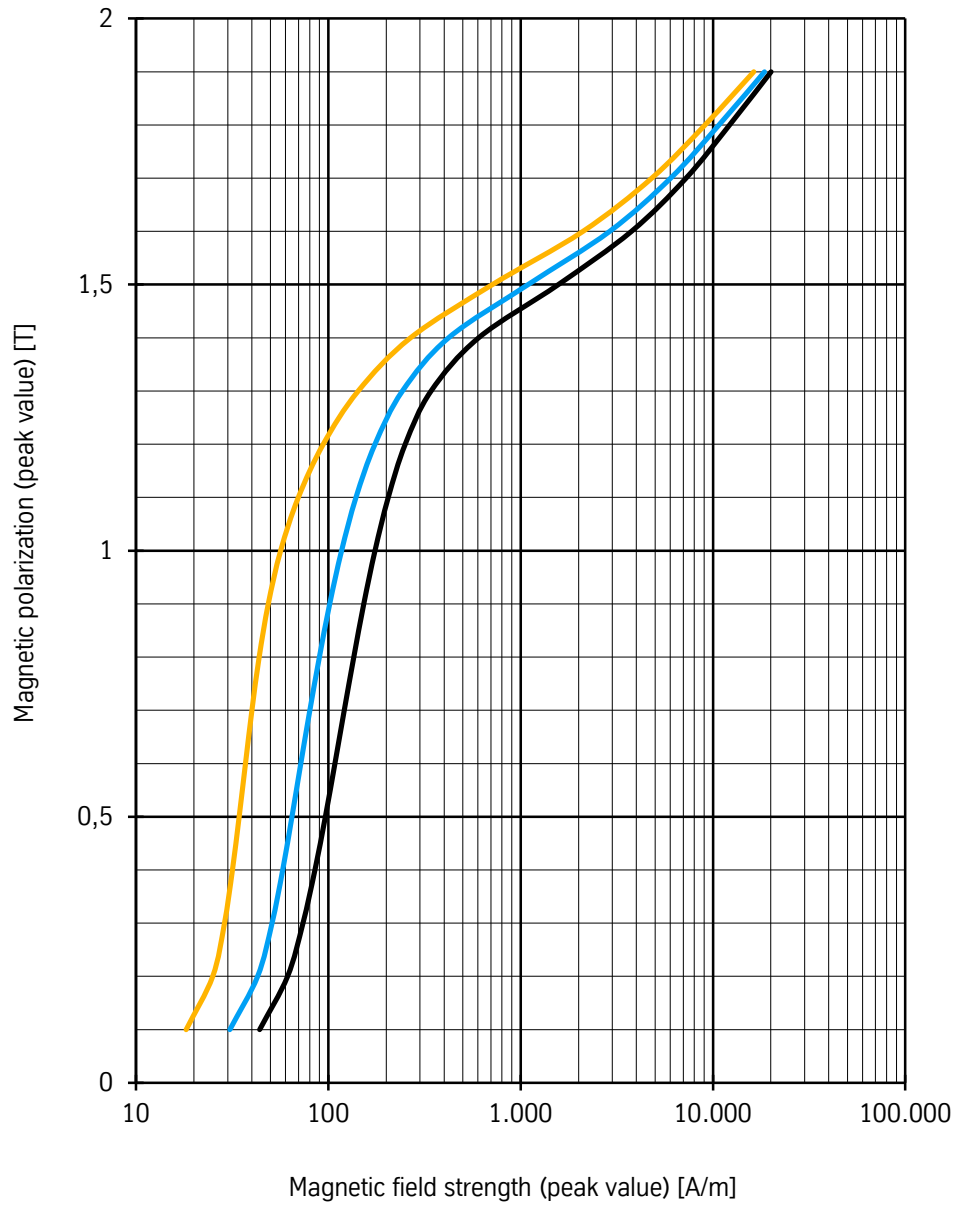
P_s versus J , directional (L/Q/M)



- 032-190Y330/M/50
- 032-190Y330/M/100
- 032-190Y330/M/200
- 032-190Y330/M/400
- 032-190Y330/M/700
- 032-190Y330/M/1000
- 032-190Y330/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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