



Issue: June 2017, version 0

Areas of application

The non-oriented electrical steel grade powercore® 030-160Y420 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.

Content

Areas of application	1
Magnetic properties	2
Mechanical properties	2
Physical properties	2
Insulation types	3
Dimensions	3
Frequency-dependent properties	4
Specific core loss	6
Magnetic polarization	7
Contacts	8

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® 030-160Y420	N030-16	16	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® 030-160Y420	433	557	17	199

Physical properties

Steel grade	Density
	ρ
	[kg/dm ³]
powercore® 030-160Y420	7.60

Insulation types

IEC 60404-1-1/04 thyssenkrupp		
Steel grade		
powercore® 030-160Y420	–	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® 030-160Y420	Narrow strip	0.30	20– 500	508	max. 1,360
	Wide strip	0.30	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	58	6,853	0.33	0.60
0.6	65	7,350	0.45	0.80
0.7	73	7,643	0.57	1.02
0.8	83	7,696	0.71	1.29
0.9	96	7,486	0.87	1.61
1.0	113	7,050	1.04	2.02
1.1	139	6,292	1.22	2.58
1.2	184	5,203	1.44	3.41
1.3	280	3,701	1.70	5.00
1.4	579	1,926	2.01	9.46
1.5	1,627	735	2.37	26.87
1.6	3,849	332	2.66	71.82
1.7	7,348	185	2.92	154.44
1.8	12,555	115	3.27	289.68

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	59	6,773	0.41	0.73
0.6	65	7,297	0.55	0.97
0.7	73	7,612	0.71	1.24
0.8	83	7,689	0.88	1.56
0.9	96	7,493	1.07	1.95
1.0	113	7,049	1.28	2.45
1.1	139	6,299	1.52	3.11
1.2	184	5,201	1.78	4.11
1.3	280	3,699	2.11	6.02
1.4	579	1,924	2.49	11.39
1.5	1,626	735	2.94	32.26
1.6	3,860	331	3.30	86.52
1.7	7,323	186	3.69	184.52
1.8	12,605	115	4.05	349.27

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	64	6,259	1.78	2.74
0.6	71	6,749	2.43	3.65
0.7	79	7,090	3.16	4.69
0.8	88	7,272	3.97	5.89
0.9	99	7,256	4.86	7.32
1.0	114	6,954	5.84	9.08
1.1	139	6,313	6.87	11.29
1.2	182	5,249	8.11	14.67
1.3	277	3,732	9.58	21.00
1.4	579	1,924	11.44	39.67
1.5	1,631	733	13.68	114.39
1.6	3,864	331	16.01	312.96
1.7	7,328	186	18.56	684.92

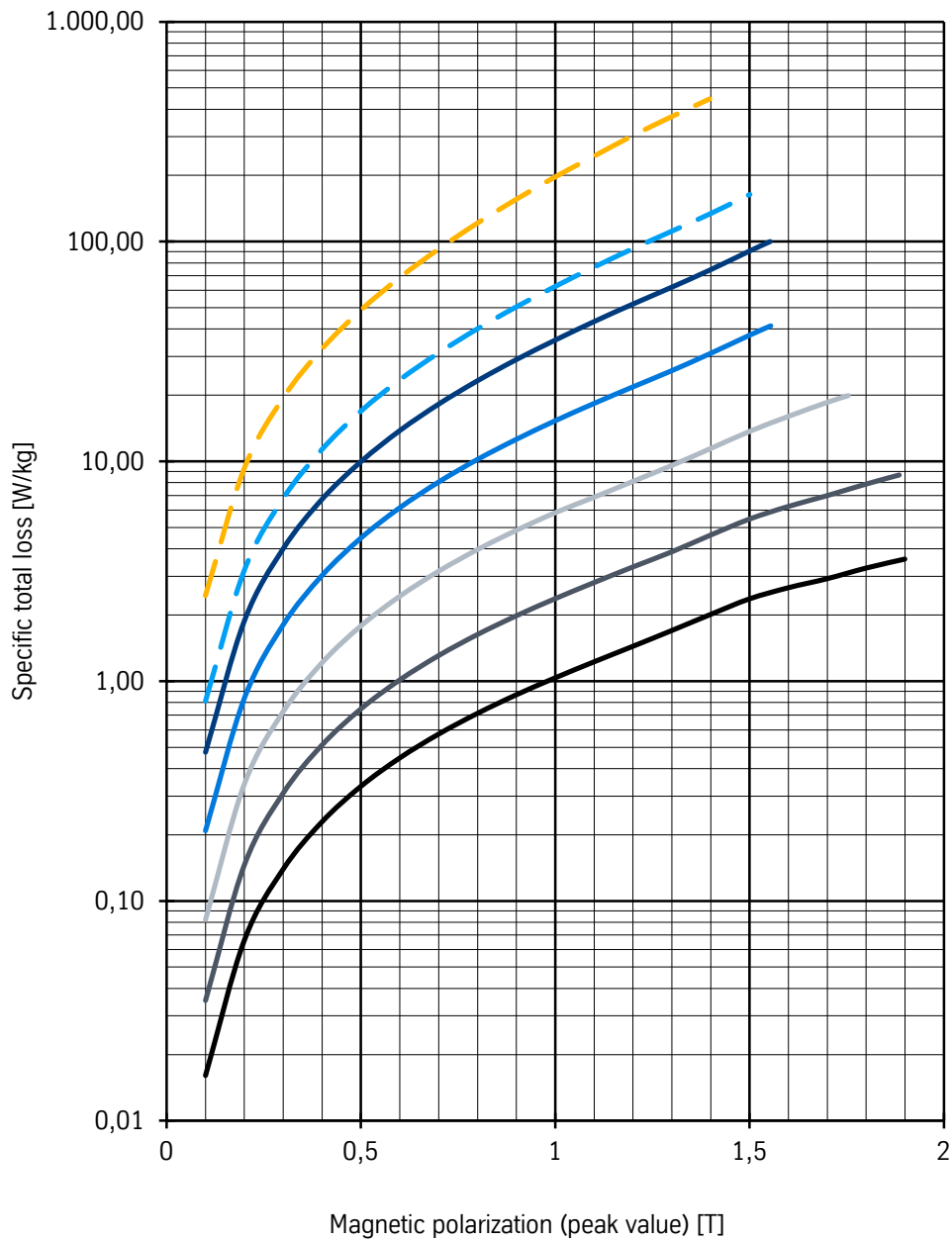
Typical values for information

400 Hz					500 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]	J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°		0°/90°	0°/90°	0°/90°	0°/90°
0.2	43	3,664	0.84	1.49	0.2	45	3,517	1.15	1.94
0.3	54	4,410	1.81	2.81	0.3	57	4,196	2.47	3.68
0.4	63	5,018	3.03	4.40	0.4	67	4,749	4.14	5.80
0.5	72	5,528	4.48	6.24	0.5	76	5,204	6.14	8.27
0.6	81	5,929	6.15	8.36	0.6	86	5,567	8.45	11.12
0.7	89	6,228	8.05	10.79	0.7	96	5,828	11.09	14.40
0.8	99	6,421	10.21	13.59	0.8	106	6,000	14.09	18.18
0.9	110	6,512	12.60	16.85	0.9	118	6,076	17.48	22.60
1.0	123	6,475	15.30	20.76	1.0	131	6,079	21.32	27.85
1.1	143	6,124	18.35	25.74	1.1	149	5,859	25.70	34.46
1.2	183	5,207	21.82	32.88	1.2	186	5,143	30.66	43.67
1.3	278	3,725	25.86	45.71	1.3	279	3,708	36.42	59.93
1.4	575	1,937	31.01	82.86	1.4	577	1,931	43.52	105.93
1.5	1,587	753	37.48	231.88	1.5	1,588	753	52.68	292.00

1,000 Hz					2,000 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]	J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°		0°/90°	0°/90°	0°/90°	0°/90°
0.2	54	2,934	3.20	4.62	0.2	71	1,127	9.31	11.91
0.3	70	3,405	6.79	8.99	0.3	92	1,723	19.48	23.52
0.4	84	3,794	11.35	14.37	0.4	113	2,122	32.53	38.20
0.5	97	4,097	16.93	20.78	0.5	133	2,394	48.79	56.24
0.6	111	4,312	23.51	28.35	0.6	156	2,549	68.62	78.38
0.7	126	4,439	31.16	37.25	0.7	182	2,622	92.44	105.30
0.8	142	4,486	40.10	47.76	0.8	212	2,626	121.43	138.07
0.9	160	4,477	50.47	60.15	0.9	245	2,599	155.81	177.51
1.0	180	4,422	62.50	74.82	1.0	283	2,528	196.89	224.86
1.1	202	4,324	76.56	92.59	1.1	326	2,445	244.89	280.94
1.2	230	4,159	92.84	115.51	1.2	372	2,352	303.62	352.68
1.3	290	3,569	111.50	151.65	1.3	435	2,197	370.31	446.65
1.4	603	1,849	134.11	248.26					
1.5	1,645	727	163.52	642.78					

Specific core loss

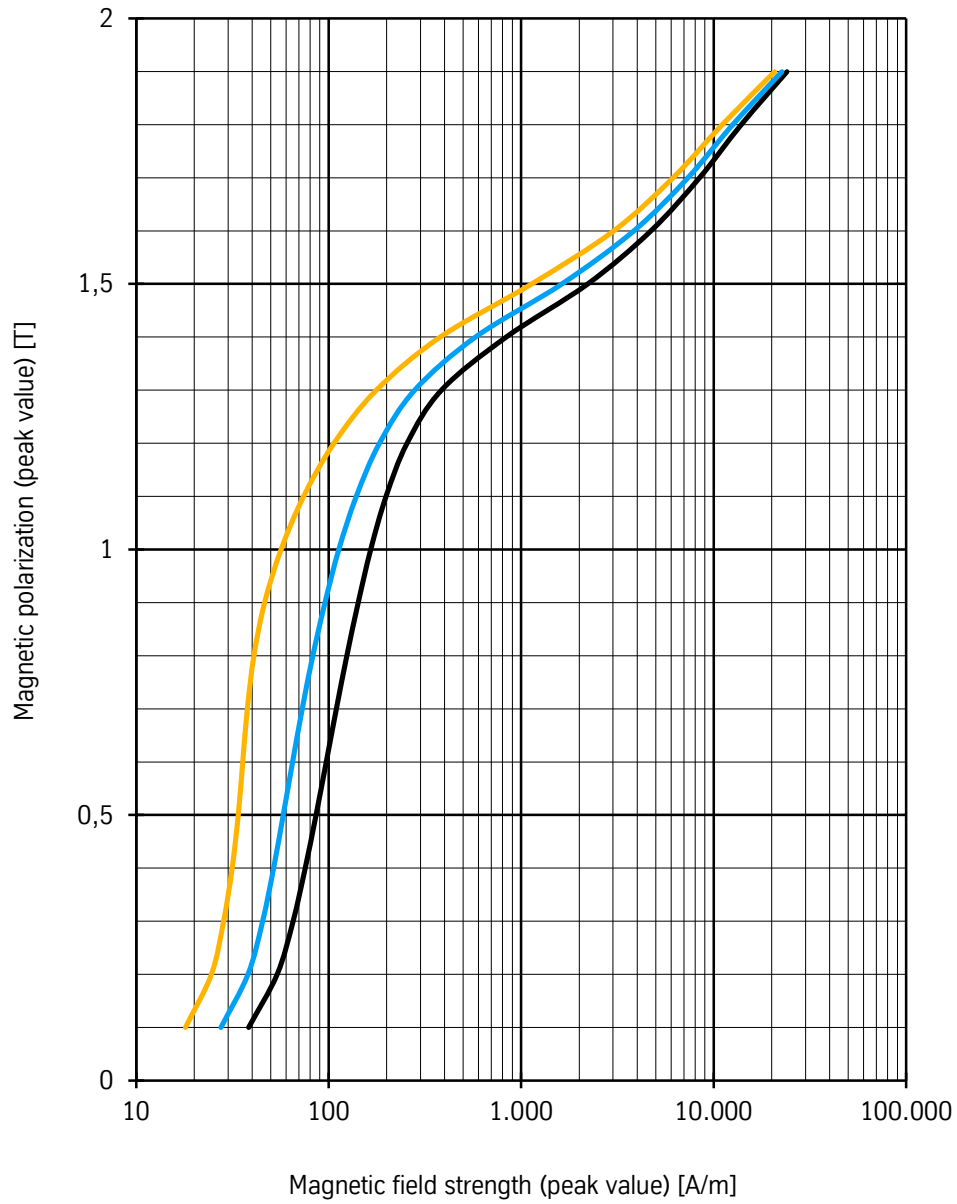
P_s versus J , directional (L/Q/M)



- 030-160Y420/M/50
- 030-160Y420/M/100
- 030-160Y420/M/200
- 030-160Y420/M/400
- 030-160Y420/M/700
- 030-160Y420/M/1000
- 030-160Y420/M/2000

Magnetic polarization

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



Angle to rolling direction

- 0°
- 0°/90°
- 90°

Contacts

thyssenkrupp Steel Europe AG
Production Electrical steel Bochum
Castroper Straße 228
44791 Bochum

Technical Customer Support

Marco Tietz
T: +49 234 508-51493
F: +49 234 508-51068
marco.tietz@thyssenkrupp.com

Dr. Hans-Georg Vanik
T: +49 234 508-51220
F: +49 234 508-51068
hans-georg.vanik@thyssenkrupp.com

Taner Keser
T: +49 234 508-51539
F: +49 234 508-51068
taner.keser@thyssenkrupp.com

Sales

Michael Schmitz
T: +49 234 508-51183
F: +49 234 508-51057
michael.schmitz@thyssenkrupp.com

Robert Prim
T: +49 234 508-51214
F: +49 234 508-51057
robert.prim@thyssenkrupp.com

Thomas Sube
T: +49 234 508-51558
F: +49 234 508-51045
thomas.sube@thyssenkrupp.com

Applications Engineering

Karsten Machalitz
T: + 49 234 508-51565
karsten.machalitz@thyssenkrupp.com

Florian Herget
T: + 49 234 508-51490
F: +49 234 508-51951490
florian.herget@thyssenkrupp.com

Abdullah Kahveci
T: + 49 234 508-51498
F: +49 234 508-51951498
abdullah.kahveci@thyssenkrupp.com

Special mill grades are supplied subject to the special conditions of thyssenkrupp. Other delivery conditions not specified here will be based on the applicable specifications. The specifications used will be those valid on the date of issue of this product information brochure.

General information

All statements as to the properties or utilization of the materials and products mentioned in this brochure are for the purpose of description only. Guarantees in respect of the existence of certain properties or utilization of the material mentioned are only valid if agreed in writing. Subject to technical changes without notice. Reprints, even extracts, only with the permission of thyssenkrupp Steel Europe AG. The latest information can be found on the Internet: www.thyssenkrupp-steel.com/publications