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Areas of application

The non-oriented electrical steel grade powercore® traction 027-140Y420 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® traction 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
powercore®traction 027-140Y420	N027-14	14	1,51	1,61	1,70

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} [MPa]	R _m [MPa]	A ₈₀ [%]	HV5 [–]
Steel grade				
powercore®traction 027-140Y420	447	567	15	201

Physical properties

Steel grade	Density
	ρ [kg/dm ³]
powercore®traction 027-140Y420	7,60

Insulation types

IEC 60404-1-1/04 thyssenkrupp	
Steel grade	
powercore®traction 027-140Y420	– 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®traction 027-140Y420	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°
0,5	54	7310	0,30	0,56
0,6	61	7804	0,40	0,74
0,7	69	8062	0,51	0,96
0,8	79	8088	0,64	1,21
0,9	91	7853	0,78	1,52
1,0	109	7325	0,93	1,92
1,1	135	6493	1,10	2,46
1,2	181	5274	1,30	3,31
1,3	288	3592	1,55	5,02
1,4	661	1687	1,85	10,48
1,5	1900	629	2,17	31,81
1,6	4235	302	2,44	81,25
1,7	7633	178	2,69	165,06
1,8	12666	114	2,95	301,30

60 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
		0°/90°	0°/90°	0°/90°
0,5	55	7288	0,37	0,68
0,6	61	7786	0,49	0,90
0,7	69	8052	0,63	1,16
0,8	79	8086	0,79	1,47
0,9	91	7861	0,96	1,84
1,0	108	7355	1,15	2,32
1,1	135	6503	1,37	2,97
1,2	181	5283	1,61	3,98
1,3	288	3597	1,91	6,03
1,4	659	1692	2,28	12,57
1,5	1893	632	2,69	38,06
1,6	4217	303	3,02	97,06
1,7	7639	178	3,33	198,32
1,8	12660	114	3,66	361,56

200 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
		0°/90°	0°/90°	0°/90°
0,5	59	6749	1,58	2,52
0,6	66	7268	2,15	3,36
0,7	73	7605	2,79	4,33
0,8	82	7745	3,50	5,45
0,9	94	7653	4,28	6,79
1,0	110	7256	5,15	8,47
1,1	134	6525	6,06	10,61
1,2	179	5336	7,18	14,00
1,3	285	3633	8,52	20,82
1,4	662	1684	10,29	44,27
1,5	1898	630	12,39	138,54

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	40	4027	0,74	1,35
0,3	50	4822	1,59	2,56
0,4	58	5482	2,66	4,01
0,5	66	6023	3,93	5,70
0,6	74	6463	5,40	7,64
0,7	82	6795	7,05	9,85
0,8	91	7016	8,91	12,39
0,9	101	7082	10,98	15,36
1,0	115	6927	13,29	18,97
1,1	137	6368	15,88	23,68
1,2	180	5294	18,83	30,64
1,3	285	3632	22,44	44,31
1,4	647	1722	27,22	90,38
1,5				

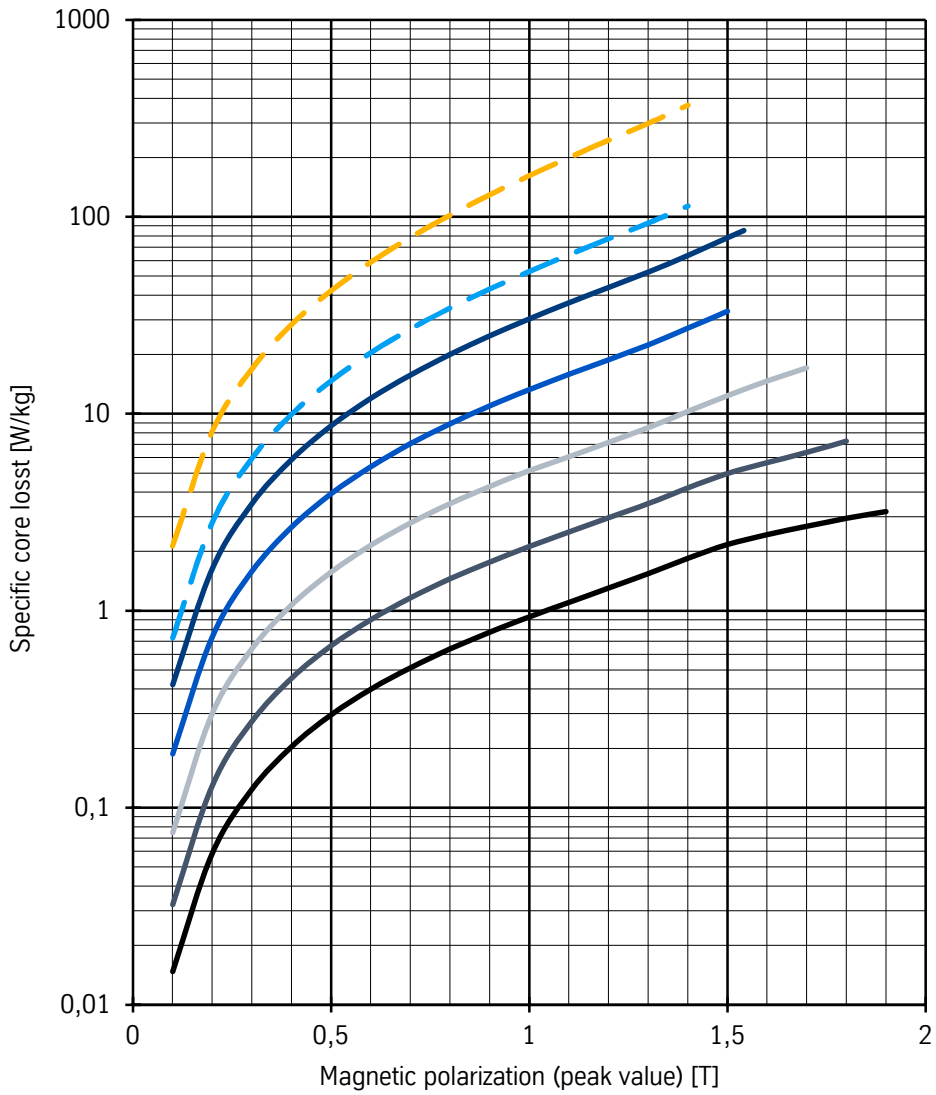
500 Hz				
J [T]	H [A/m]	μ_a	P_s [W/kg]	S_s [VA/kg]
	0°/90°	0°/90°	0°/90°	0°/90°
0,2	41	3871	1,01	1,76
0,3	52	4607	2,17	3,35
0,4	61	5206	3,63	5,27
0,5	70	5706	5,38	7,52
0,6	78	6111	7,39	10,10
0,7	87	6419	9,68	13,05
0,8	96	6621	12,27	16,44
0,9	107	6718	15,16	20,40
1,0	120	6651	18,37	25,16
1,1	140	6238	22,03	31,26
1,2	182	5236	26,23	40,19
1,3	286	3615	31,30	57,53
1,4	653	1708	38,02	116,00
1,5	1816	658	46,70	348,99

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	49	3248	2,81	4,17
0,3	64	3760	5,94	8,13
0,4	76	4195	9,96	12,98
0,5	87	4555	14,75	18,71
0,6	99	4824	20,44	25,39
0,7	111	5017	26,98	33,14
0,8	124	5127	34,49	42,13
0,9	139	5164	43,10	52,65
1,0	154	5154	52,89	65,07
1,1	172	5081	64,30	80,36
1,2	197	4857	77,55	101,00
1,3	294	3518	93,09	137,44
1,4	665	1678	113,56	256,67
1,5				

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	63	1261	8,17	10,65
0,3	83	1919	16,96	21,07
0,4	100	2379	28,45	34,08
0,5	117	2714	42,29	49,75
0,6	135	2939	58,99	68,58
0,7	155	3074	78,74	90,98
0,8	178	3128	102,13	117,79
0,9	203	3142	129,73	149,45
1,0	232	3094	161,99	187,38
1,1	263	3030	200,12	233,30
1,2	299	2929	245,48	291,46
1,3	351	2721	298,53	377,83
1,4	718	1442	369,46	633,88
1,5				

Specific core loss

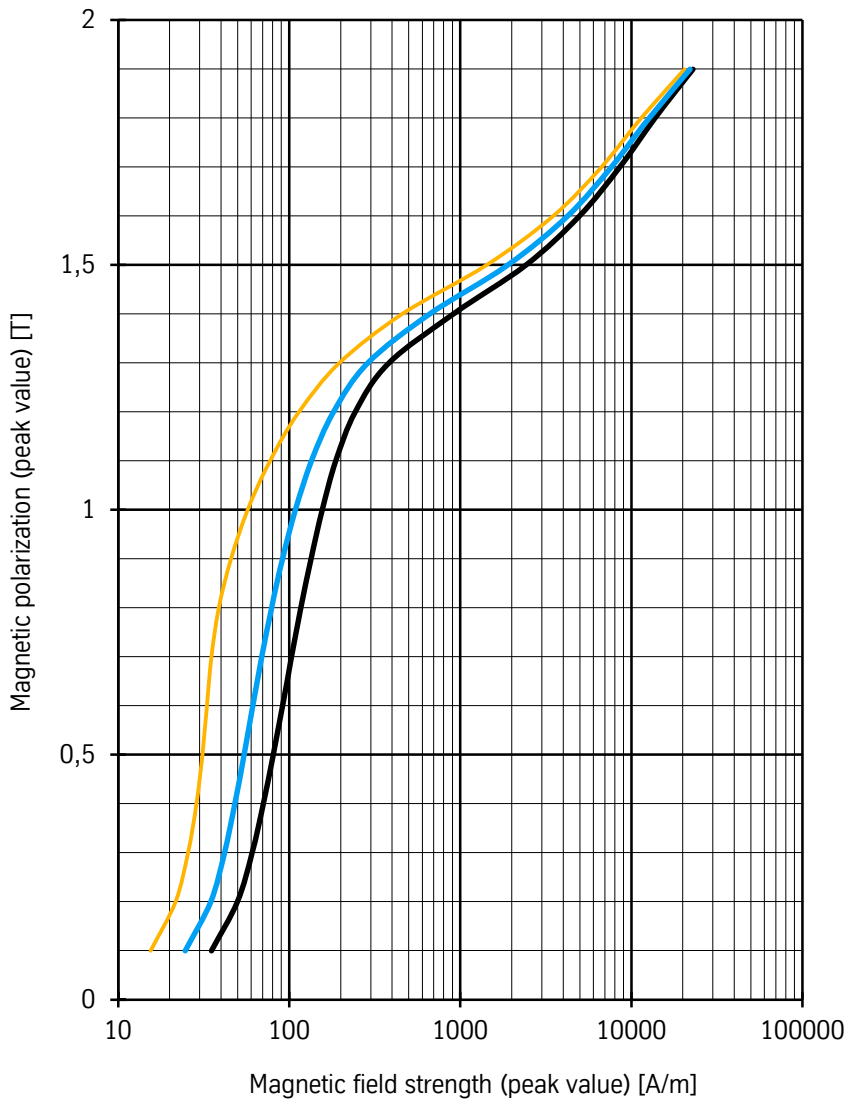
P_s versus J , directional (L/Q/M)



- 027-140Y420/M/50
- 027-140Y420/M/100
- 027-140Y420/M/200
- 027-140Y420/M/400
- 027-140Y420/M/700
- 027-140Y420/M/1000
- 027-140Y420/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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