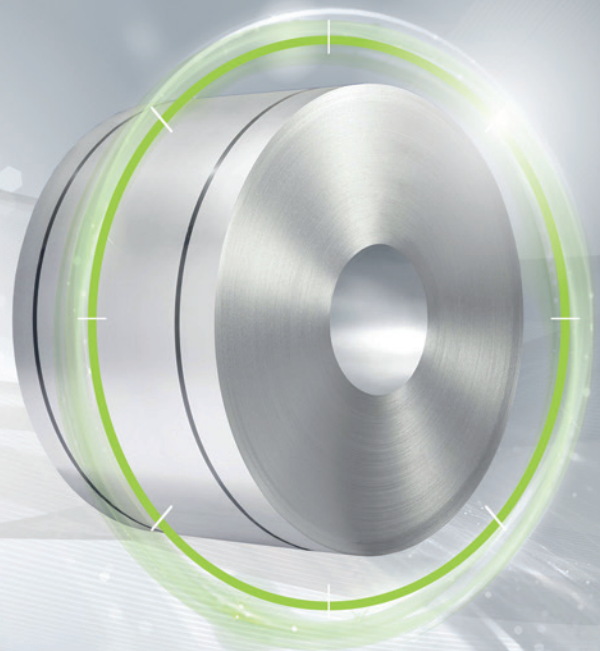


FULLY
PROCESSED

isovac 400-65 A HC

The specialist with high thermal conductivity

Manufactured in the most modern production lines, this fully processed isovac® grade exhibits highly homogeneous properties across the width and length of the entire strip. The result is excellent and consistent processability in the manufacture of highly efficient electrical components.

The high thermal conductivity of isovac 400-65 A HC (high conductivity) ensures rapid heat dissipation in combination with higher polarization while maintaining low specific total losses. This makes innovative design strategies possible for electrical machinery.

Upon request, isovac 400-65 A HC can be supplied with an electrical steel insulation system and can be used directly in as-delivered condition.

Convincing advantages:

- » Potential cost savings in electric machinery based on lower component sizes and thus lower material usage based on higher polarization than that in standard isovac® grades
- » Lower cooling power necessary through higher thermal conductivity than that of standard isovac® grades (conductivity increased by up to 20%)
- » Best processability through consistent mechanical properties and homogeneous, clean surfaces
- » Excellent stackability resulting from high dimensional accuracy in rolling direction and perpendicular to rolling direction (thickness tolerance)
- » Innovative electrical steel insulation systems upon request

voestalpine supplies isovac 400-65 A HC, an electrical steel of the highest quality. We offer you a customer-focused over-all package of products, service and logistics in addition to all the advantages of our integrated metallurgical facility and Steel Service Centers.

Grade named according to conventional international standards:

Grade named according to isovac®	DIN EN 10106		IEC 60404-8-4	JIS C2552	GOST 21427.2	ASTM A677	AISI	IS648	GB/T2521.1
	Material No.	Abbreviation							
isovac 400-65 A HC	1.0821	M400-65A	M400-65A 5	65A400	-	64F235	M-27	65C400	65W400

Mechanical properties:

Tensile test according to DIN EN ISO 6892-1 and hardness according to DIN EN ISO 6507-1 (Typical values);
Test direction: Transverse

Grade named according to isovac®	Yield strength R_{eH} [MPa]	0.2 %-Yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Elongation A_{80} [%]	Hardness HV5 [-]
isovac 400-65 A HC	340	325	490	32	170

Magnetic properties:

in as-delivered condition (Typical values)

Test direction: Mean value from longitudinal and transverse measurements at 50 Hz (60 Hz), single-sheet test

Grade named according to isovac®	Specific total loss				Magnetic polarization			Relative permeability 1.5 T μ_r [-]
	1.0 T P10		1.5 T P15		2500 A/m J25	5000 A/m J50	10000 A/m J100	
	50 Hz [W/kg]	60 Hz [W/lb]	50 Hz [W/kg]	60 Hz [W/lb]	[T]	[T]	[T]	
isovac 400-65 A HC	1.50	0.89	3.50	2.07	1.60	1.68	1.80	1700

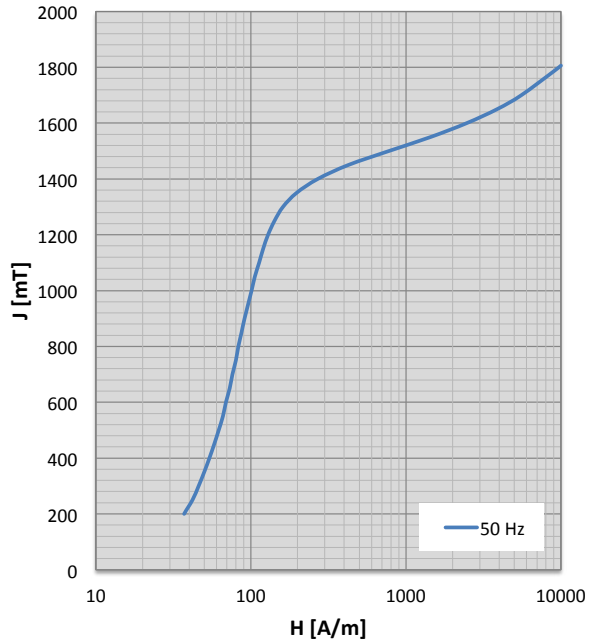
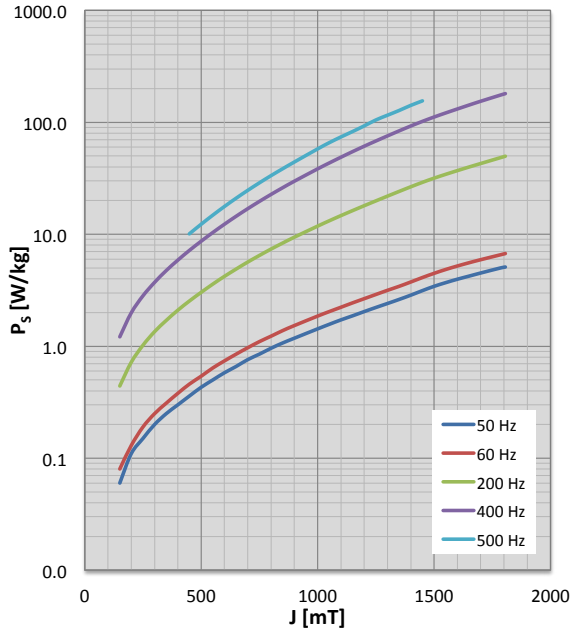
Physical properties:

Typical values

Grade named according to isovac®	Density ρ [g/cm ³]	Specific electrical resistance ρ_s [$\mu\Omega\text{cm}$]	Thermal conductivity λ [W/mK]
isovac 400-65 A HC	7.71	45.0	28

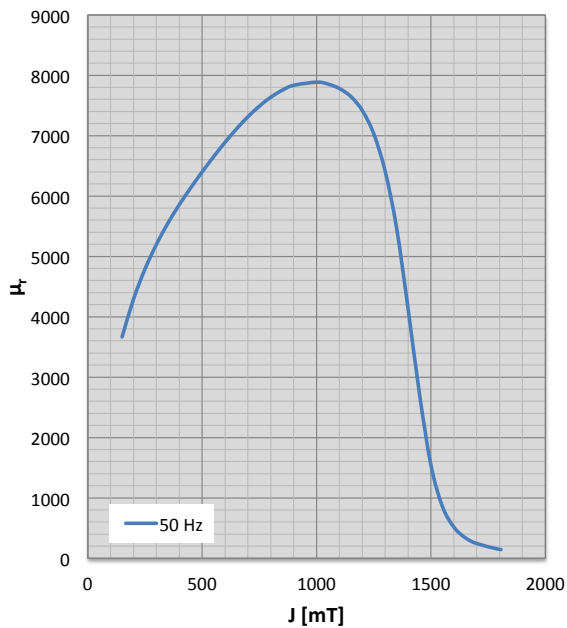
Characteristics P_s/J loss curve and characteristics J/H magnetization curve

Test direction: Mean value from longitudinal and transverse measurements at indicated frequencies, single-sheet test



Characteristics μ_r/J permeability curve

Test direction: Mean value from longitudinal and transverse measurements at 50 Hz, single-sheet test



Frequency dependence of magnetic properties

Test direction: Mean value longitudinal and transverse at indicated frequencies and polarizations, single-sheet test

50 Hz				60 Hz				200 Hz			
J [mT]	H [A/m]	P _s [W/kg]	μ _r [-]	J [mT]	H [A/m]	P _s [W/kg]	μ _r [-]	J [mT]	H [A/m]	P _s [W/kg]	μ _r [-]
150	33	0.06	3665	150	33	0.08	3602	150	40	0.44	3011
200	37	0.11	4292	200	38	0.13	4204	200	47	0.72	3400
250	42	0.15	4789	250	43	0.19	4677	250	54	1.02	3684
300	46	0.20	5198	300	47	0.25	5064	300	61	1.35	3902
350	50	0.25	5548	350	52	0.31	5393	350	68	1.70	4072
400	54	0.30	5856	400	56	0.38	5681	400	76	2.10	4209
450	58	0.36	6136	450	60	0.46	5943	450	83	2.54	4321
500	62	0.43	6400	500	64	0.54	6186	500	90	3.03	4414
550	66	0.50	6651	550	68	0.64	6418	550	97	3.59	4491
600	69	0.58	6890	600	72	0.74	6637	600	105	4.21	4552
650	73	0.66	7112	650	76	0.85	6838	650	113	4.89	4595
700	76	0.76	7313	700	79	0.97	7019	700	121	5.65	4620
750	80	0.85	7489	750	83	1.10	7177	750	129	6.47	4627
800	83	0.96	7637	800	87	1.23	7307	800	138	7.38	4615
850	87	1.07	7753	850	91	1.38	7406	850	148	8.35	4585
900	91	1.18	7834	900	96	1.53	7476	900	158	9.42	4541
1000	101	1.43	7886	1000	106	1.86	7529	1000	180	11.83	4420
1050	106	1.57	7855	1050	111	2.04	7509	1050	192	13.20	4348
1100	113	1.72	7780	1100	118	2.23	7435	1100	205	14.68	4275
1150	120	1.87	7647	1150	125	2.44	7295	1150	218	16.27	4201
1200	129	2.04	7415	1200	134	2.66	7103	1200	232	18.00	4113
1250	142	2.22	7029	1250	146	2.90	6836	1250	248	19.87	4011
1300	161	2.41	6406	1300	163	3.16	6338	1300	263	21.92	3936
1350	197	2.62	5463	1350	197	3.43	5461	1350	279	24.15	3847
1400	270	2.86	4130	1400	270	3.75	4129	1400	324	26.56	3441
1450	425	3.14	2714	1450	427	4.11	2703	1450	448	29.11	2575
1500	776	3.43	1538	1500	779	4.48	1532	1500	781	31.72	1529
1550	1439	3.70	857	1550	1440	4.85	857	1550	1447	34.34	852
1600	2468	3.97	516	1600	2468	5.21	516	1600	2491	37.04	511
1650	3874	4.23	339	1650	3875	5.57	339	1650	3908	39.89	336
1700	5550	4.51	244	1700	5556	5.93	243	1700	5589	42.85	242
1786	9000	5.01	158	1786	9000	6.57	158	1786	9000	48.43	158
1806	10000	5.10	144	1806	10000	6.73	144	1805	10000	49.81	144

Frequency dependence of magnetic properties

Test direction: Mean value longitudinal and transverse at indicated frequencies and polarizations, single-sheet test

400 Hz				500 Hz			
J [mT]	H [A/m]	P _s [W/kg]	μ _r [-]	J [mT]	H [A/m]	P _s [W/kg]	μ _r [-]
100	40	0.47	2013				
150	49	1.21	2431				
200	59	1.99	2709				
250	69	2.82	2902				
300	79	3.72	3038				
350	89	4.74	3132				
400	100	5.88	3195	400	110	8.03	2888
450	111	7.19	3232	450	123	10.08	2917
500	122	8.67	3249	500	136	12.29	2924
550	135	10.37	3248	550	151	14.82	2902
600	148	12.30	3231	600	167	17.71	2857
650	162	14.48	3200	650	185	20.99	2798
700	177	16.93	3155	700	204	24.68	2730
750	193	19.66	3099	750	224	28.81	2659
800	210	22.70	3034	800	246	33.41	2587
850	228	26.06	2960	850	269	38.50	2514
900	248	29.78	2882	900	294	44.20	2437
1000	292	38.40	2724	1000	352	57.88	2262
1050	316	43.35	2645	1050	384	65.80	2178
1100	341	48.79	2567	1100	414	74.01	2116
1150	368	54.73	2488	1150	445	82.73	2058
1200	395	61.17	2415	1200	481	92.93	1986
1250	424	68.11	2348	1250	523	104.93	1902
1300	455	75.66	2273	1300	557	115.78	1858
1350	491	83.89	2189	1350	591	127.59	1817
1400	522	92.71	2135	1400	637	141.75	1750
1450	575	101.97	2007	1450	705	155.49	1637
1500	828	111.53	1442	1500	892	171.19	1337
1550	1458	121.32	846				
1600	2498	131.60	510				
1650	3920	142.63	335				
1700	5611	154.23	241				
1785	9000	175.43	158				
1805	10000	180.47	144				

Available Dimensions

Grade named according to isovac®	Delivery form	Width [mm]	Length [mm]
isovac 400-65 A HC	Wide strip / Slit strip	19 – 1590	-
	Cut-to-length sheets	300 – 1590	300 – 5000

Deliverable coating systems

Grade named according to isovac®	Uncoated	C-3	Backlack	C-5	C-6
isovac 400-65 A HC	✔	✔	☰	✔	✔

✔ Available ☰ On request

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