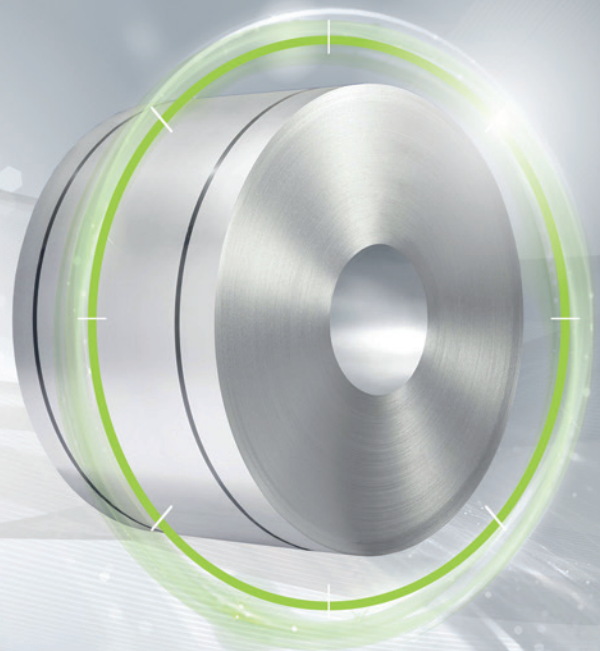


FULLY
PROCESSED

isovac high-perm 400-65 A HC

The specialist for high permeability 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. Its high thermal conductivity and optimized texture make isovac HP400-65A HC (high-perm/high-conductivity) ensure rapid heat dissipation in combination with increased magnetizability and low specific total loss. This makes innovative design strategies possible for electrical machinery.

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

Convincing advantages:

- » Lower cooling power necessary through higher thermal conductivity than that of standard isovac® grades (conductivity increased by up to 20%)
- » Increased performance achieved by increasing torque based on higher magnetizability (improvement by up to 0.05 T at J25, J50, J100)
- » 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 HP 400-65 A HC, an electrical steel of the highest quality. We offer you a customer-focused overall 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 HP 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 HP 400-65 A HC	275	265	430	31	150

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 HP 400-65 A HC	1.50	0.89	3.40	2.01	1.68	1.76	1.86	4500

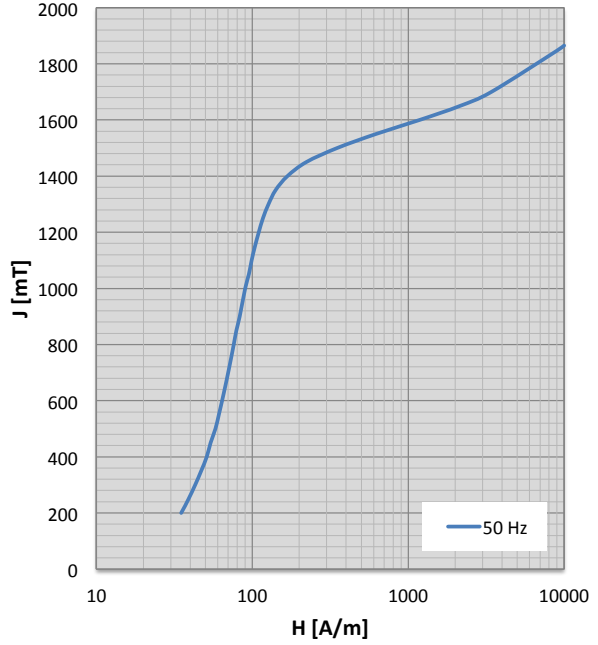
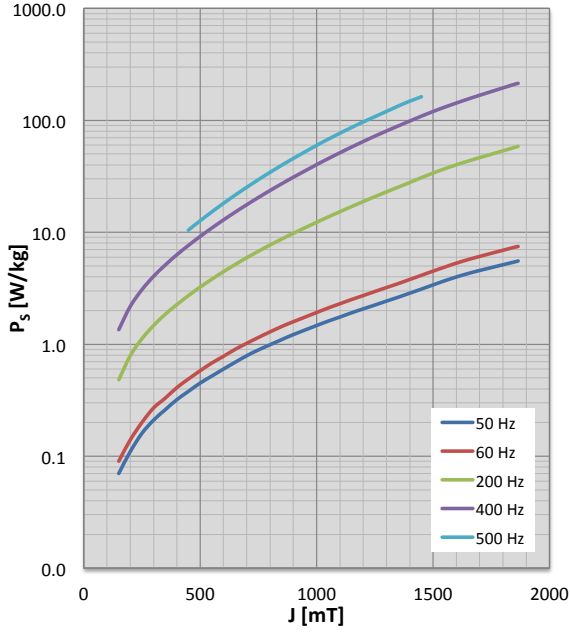
Physical properties:

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 HP 400-65 A HC	7.76	35.8	33

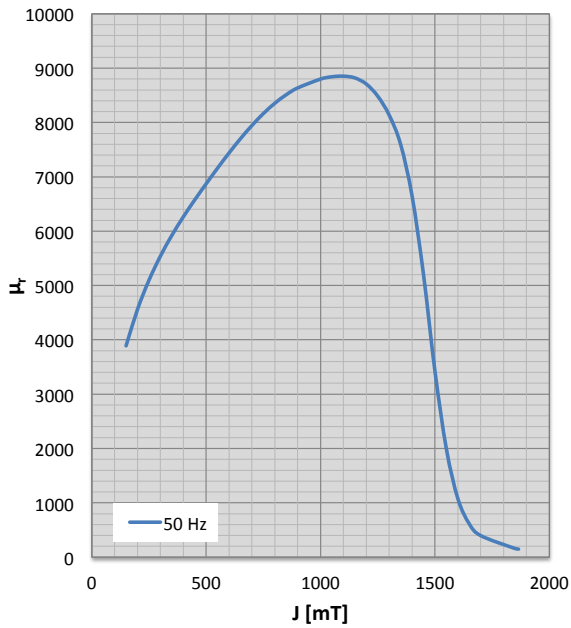
Characteristics P_s/J loss curve and characteristics J/H magnetization curve

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 [-]
				100	27	0.03	2947	100	33	0.18	2414
150	31	0.07	3888	150	32	0.09	3782	150	40	0.48	2963
200	35	0.11	4561	200	36	0.14	4408	200	48	0.79	3344
250	39	0.16	5096	250	41	0.20	4902	250	55	1.12	3625
300	43	0.21	5540	300	45	0.27	5309	300	62	1.47	3841
350	47	0.26	5922	350	49	0.33	5656	350	69	1.85	4013
400	51	0.32	6262	400	53	0.41	5965	400	77	2.26	4154
450	54	0.38	6575	450	57	0.49	6248	450	84	2.72	4272
500	58	0.45	6872	500	61	0.58	6517	500	91	3.24	4374
550	61	0.52	7161	550	65	0.68	6777	550	98	3.81	4462
600	64	0.60	7439	600	68	0.78	7027	600	105	4.45	4534
650	67	0.69	7702	650	71	0.90	7262	650	113	5.15	4587
700	70	0.79	7945	700	75	1.02	7477	700	121	5.93	4620
750	73	0.89	8164	750	78	1.15	7666	750	129	6.77	4630
800	76	0.99	8354	800	81	1.29	7826	800	138	7.70	4618
850	79	1.10	8511	850	85	1.44	7953	850	148	8.70	4583
900	83	1.22	8636	900	89	1.59	8052	900	158	9.79	4530
1000	90	1.47	8799	1000	97	1.92	8188	1000	181	12.29	4389
1050	95	1.61	8841	1050	102	2.11	8231	1050	194	13.72	4307
1100	99	1.75	8852	1100	106	2.30	8238	1100	207	15.27	4219
1150	104	1.91	8820	1150	112	2.51	8194	1150	222	16.96	4124
1200	110	2.07	8707	1200	118	2.72	8103	1200	237	18.81	4026
1250	117	2.24	8483	1250	125	2.96	7956	1250	253	20.81	3927
1300	127	2.43	8134	1300	135	3.21	7667	1300	270	22.97	3826
1350	141	2.63	7594	1350	150	3.48	7156	1350	289	25.29	3721
1400	168	2.86	6643	1400	176	3.79	6343	1400	308	27.87	3621
1450	222	3.11	5194	1450	226	4.13	5112	1450	337	30.76	3423
1500	350	3.39	3415	1500	349	4.50	3419	1500	428	33.83	2791
1550	621	3.69	1987	1550	620	4.89	1989	1550	660	36.93	1869
1600	1183	3.99	1076	1600	1182	5.30	1077	1600	1193	40.06	1067
1650	2148	4.28	611	1650	2144	5.70	612	1650	2149	43.24	611
1700	3417	4.56	396	1700	3406	6.09	397	1700	3424	46.46	395
1847	9000	5.42	163	1847	9000	7.33	163	1846	9000	57.06	163
1865	10000	5.54	148	1864	10000	7.47	148	1863	10000	58.51	148

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 [-]
150	52	1.35	2308				
200	61	2.18	2592				
250	71	3.07	2792				
300	81	4.04	2936				
350	92	5.10	3039				
400	102	6.30	3109	400	112	8.39	2849
450	114	7.65	3154	450	124	10.45	2888
500	125	9.18	3178	500	137	12.67	2900
550	137	10.92	3184	550	152	15.21	2876
600	151	12.89	3172	600	169	18.13	2827
650	165	15.12	3144	650	187	21.46	2760
700	180	17.63	3100	700	207	25.24	2685
750	196	20.45	3042	750	229	29.51	2605
800	214	23.60	2972	800	252	34.32	2525
850	234	27.12	2891	850	277	39.69	2445
900	255	31.03	2805	900	303	45.68	2363
1000	303	40.19	2630	1000	365	59.75	2180
1050	328	45.50	2544	1050	399	67.86	2095
1100	356	51.34	2459	1100	432	76.68	2027
1150	385	57.72	2376	1150	467	86.30	1960
1200	415	64.67	2299	1200	504	96.70	1896
1250	446	72.21	2229	1250	542	107.88	1836
1300	481	80.33	2153	1300	582	120.11	1778
1350	519	89.04	2069	1350	626	134.00	1717
1400	552	98.56	2019	1400	671	148.40	1661
1450	576	108.98	2004	1450	713	162.42	1619
1500	632	119.96	1890	1500	766	181.23	1559
1550	798	131.15	1545				
1600	1266	142.72	1005				
1650	2188	154.87	600				
1700	3453	167.46	392				
1846	9000	209.07	163				
1862	10000	214.00	148				

Available Dimensions

Grade named according to isovac®	Delivery form	Width [mm]	Length [mm]
isovac HP 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 HP 400-65 A HC	✔	✔	☰	✔	✔

✔ Available ☰ On request

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