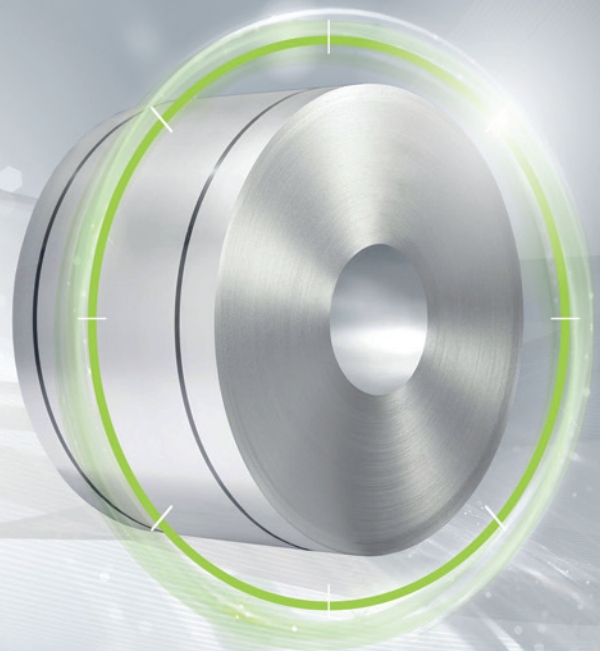


FULLY
PROCESSED

isovac high-perm 400-65 A

The specialist with the highest permeability

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 optimum adjustment of texture increases magnetizability and reduces core losses of isovac HP 400-65 A. This increase in efficiency makes it possible to maintain the same level of performance while reducing component size and saving material, weight and costs. This also means that a higher level of performance can be achieved with the same component size.

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

Convincing advantages:

- » Increased performance achieved by increasing torque based on higher magnetizability (improvement by up to 0.05 T at J25, J50, J100)
- » Possible cost optimization through less material usage, less weight and less space requirement resulting from downsizing while maintaining the same level of performance
- » 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, 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	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	335	320	475	35	160

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	1.40	0.83	3.30	1.95	1.64	1.72	1.84	2800

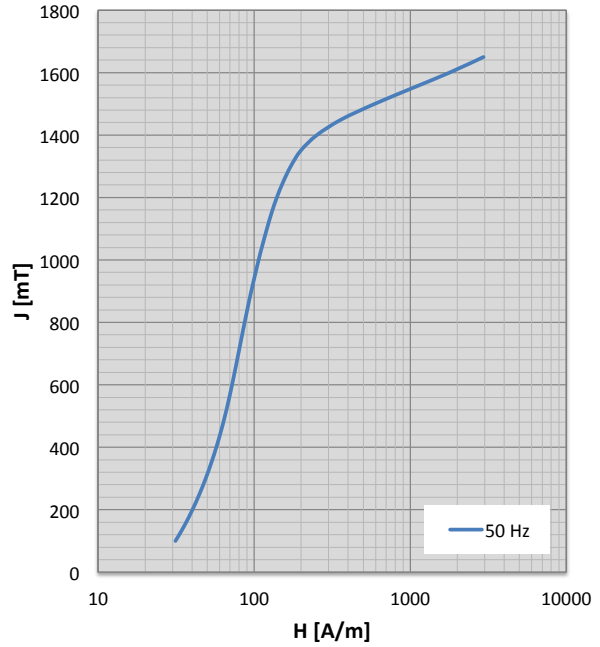
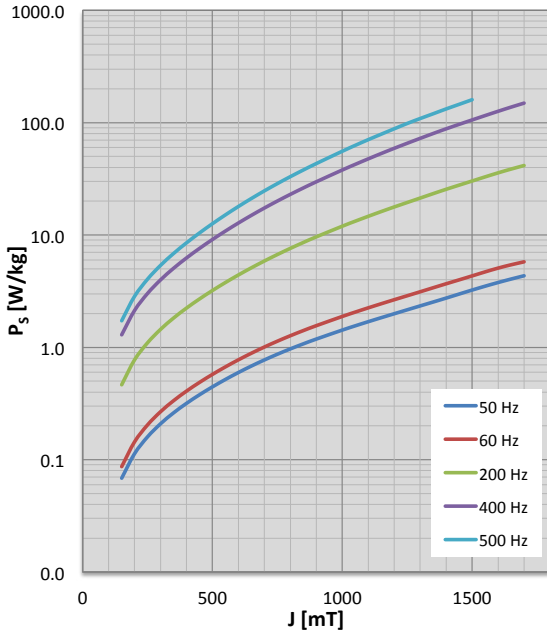
Physical properties:

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	7.71	45.0	28

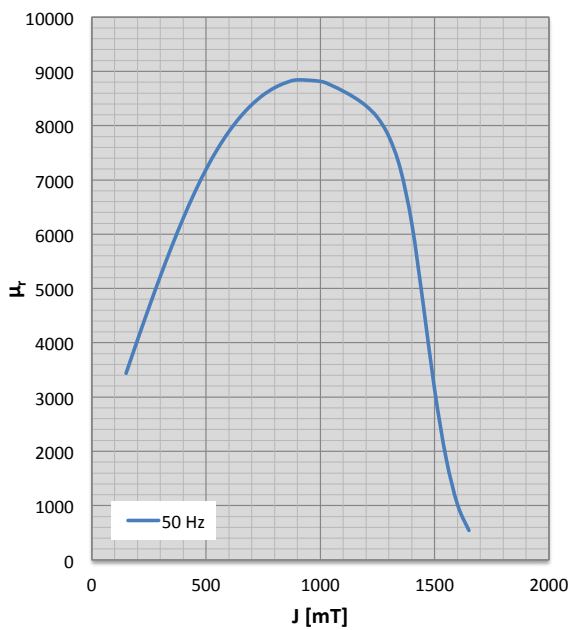
Characteristics P_s/J loss curve and characteristics J/H magnetization curve

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 [-]
100	31	0.02	2820	100	33	0.03	2789	100	36	0.16	2470
150	36	0.07	3439	150	38	0.09	3314	150	44	0.46	2812
200	40	0.11	4050	200	43	0.14	3834	200	51	0.77	3148
250	45	0.16	4648	250	48	0.20	4343	250	59	1.10	3471
300	49	0.21	5226	300	53	0.27	4835	300	66	1.44	3776
350	53	0.26	5776	350	58	0.33	5304	350	74	1.82	4056
400	57	0.32	6292	400	63	0.41	5745	400	81	2.24	4305
450	61	0.38	6768	450	67	0.49	6153	450	88	2.69	4517
500	65	0.44	7195	500	72	0.57	6522	500	96	3.21	4686
550	69	0.52	7569	550	76	0.67	6847	550	103	3.78	4808
600	72	0.60	7891	600	80	0.77	7128	600	110	4.41	4885
650	76	0.68	8163	650	84	0.89	7366	650	117	5.11	4924
700	79	0.77	8386	700	87	1.01	7562	700	125	5.87	4930
750	83	0.87	8565	750	91	1.13	7716	750	133	6.70	4908
800	87	0.97	8699	800	96	1.27	7830	800	141	7.60	4864
850	91	1.07	8792	850	100	1.41	7904	850	150	8.58	4804
900	96	1.19	8843	900	105	1.56	7942	900	160	9.63	4732
1000	107	1.42	8815	1000	117	1.88	7923	1000	181	11.98	4574
1050	113	1.55	8739	1050	123	2.06	7871	1050	192	13.28	4496
1100	121	1.69	8635	1100	131	2.25	7799	1100	204	14.67	4413
1150	129	1.84	8515	1150	139	2.44	7698	1150	216	16.17	4324
1200	140	1.99	8363	1200	150	2.65	7523	1200	229	17.77	4249
1250	153	2.16	8148	1250	164	2.88	7250	1250	241	19.47	4192
1300	172	2.34	7796	1300	182	3.12	6999	1300	256	21.32	4078
1350	199	2.53	7203	1350	205	3.39	6797	1350	279	23.36	3838
1400	252	2.75	6196	1400	254	3.68	6180	1400	329	25.53	3505
1450	362	2.98	4708	1450	364	3.99	4783	1450	436	27.80	3109
1500	592	3.24	3130	1500	593	4.32	3138	1500	653	30.24	2548
1550	1026	3.50	1873	1550	1021	4.70	1862	1550	1057	32.92	1765
1600	1784	3.78	1017	1600	1771	5.07	1026	1600	1784	35.75	1015
1650	2948	4.05	542	1650	2926	5.43	559	1650	2933	38.63	557
1700	4409	4.34	333	1700	4382	5.77	345	1700	4399	41.54	345

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	42	0.48	2036	100	43	0.64	1962
150	52	1.29	2272	150	54	1.72	2168
200	62	2.13	2502	200	65	2.85	2368
250	73	3.02	2720	250	76	4.05	2557
300	83	3.98	2920	300	87	5.36	2727
350	94	5.05	3097	350	99	6.84	2874
400	105	6.25	3244	400	111	8.51	2992
450	116	7.59	3356	450	124	10.42	3074
500	127	9.12	3427	500	138	12.61	3114
550	139	10.85	3454	550	152	15.11	3110
600	151	12.79	3441	600	167	17.95	3068
650	164	14.97	3398	650	184	21.14	2998
700	177	17.39	3333	700	201	24.71	2910
750	192	20.06	3254	750	220	28.68	2812
800	208	23.01	3169	800	240	33.08	2714
850	225	26.23	3086	850	262	37.92	2625
900	243	29.77	3004	900	285	43.26	2542
1000	284	37.91	2841	1000	337	55.67	2386
1050	306	42.56	2758	1050	365	62.83	2308
1100	329	47.64	2677	1100	395	70.61	2233
1150	354	53.16	2600	1150	425	78.98	2163
1200	380	59.13	2522	1200	458	88.21	2095
1250	409	65.55	2443	1250	493	98.39	2027
1300	436	72.52	2379	1300	527	108.87	1969
1350	461	80.08	2336	1350	561	120.04	1923
1400	498	88.14	2241	1400	601	132.54	1858
1450	573	96.64	2030	1450	659	145.62	1736
1500	747	105.75	1720	1500	805	160.09	1532
1550	1105	115.64	1357				
1600	1798	126.28	1003				
1650	2939	137.55	711				
1700	4415	149.26	469				

Available Dimensions

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

✔ Available ☰ On request

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