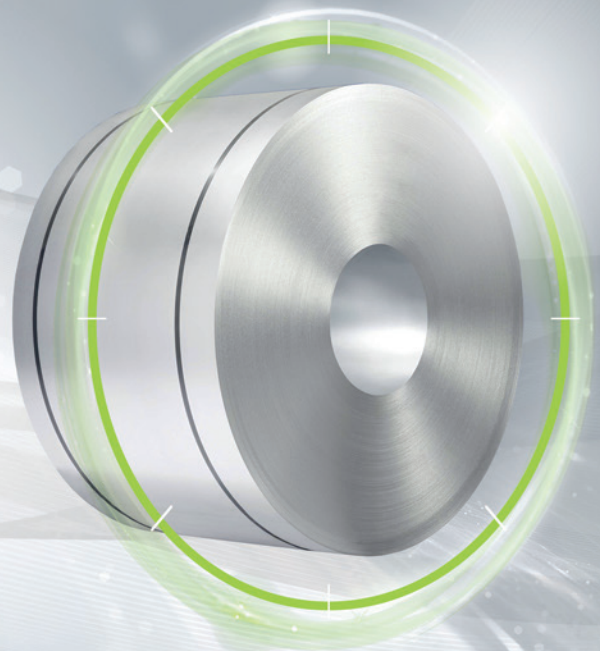


FULLY
PROCESSED

isovac 400-65 A

The perfect solution for direct application

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

Convincing advantages:

- » 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, 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 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	0.2 %-Yield strength	Tensile strength	Elongation	Hardness
	R _{eH} [MPa]	R _{p0.2} [MPa]	R _m [MPa]	A ₈₀ [%]	HV5 [-]
isovac 400-65 A	390	375	520	31	185

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
	1.0 T P10		1.5 T P15		2500 A/m J25	5000 A/m J50	10000 A/m J100	1.5 T μ _r
	50 Hz [W/kg]	60 Hz [W/lb]	50 Hz [W/kg]	60 Hz [W/lb]	[T]	[T]	[T]	[-]
isovac 400-65 A	1.40	0.83	3.30	1.95	1.59	1.67	1.79	1400

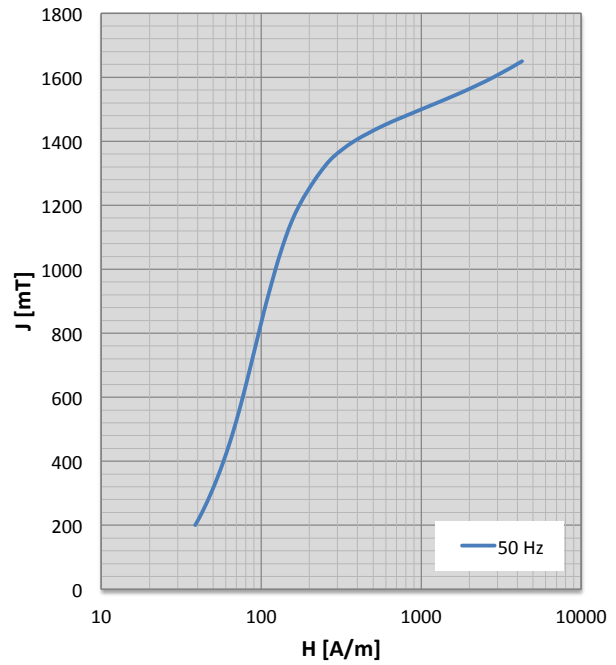
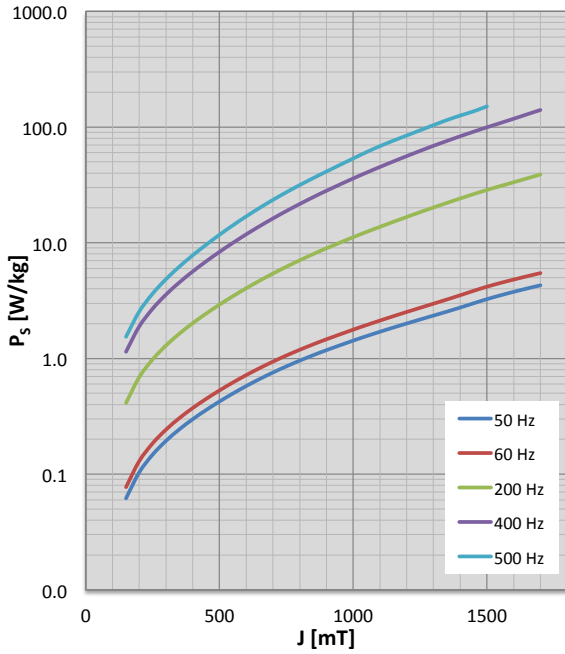
Physical properties:

Typical values

Grade named according to isovac®	Density ρ [g/cm³]	Specific electrical resistance ρ _s [μΩcm]	Thermal conductivity λ [W/mK]
isovac 400-65 A	7.68	52.0	25

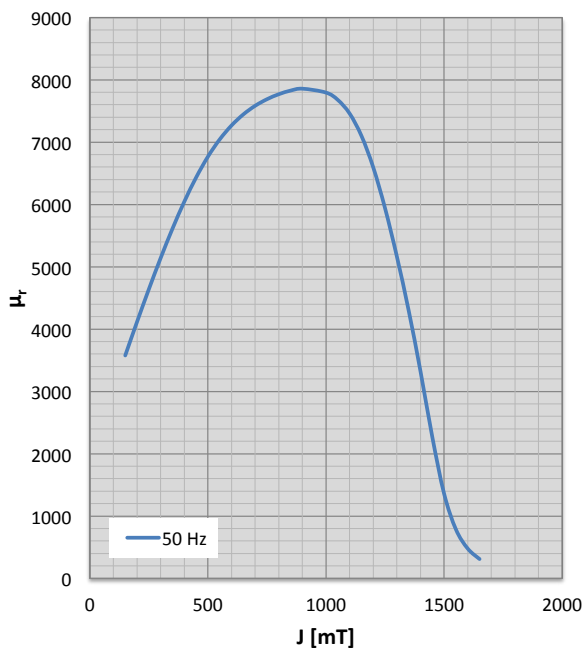
Characteristics P_s/J loss curve and characteristics J/H magnetization curve

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	34	0.14	2565
150	34	0.06	3579	150	36	0.08	3479	150	41	0.41	2896
200	39	0.10	4117	200	41	0.13	3993	200	49	0.69	3221
250	44	0.15	4641	250	46	0.18	4494	250	56	0.98	3534
300	48	0.19	5142	300	51	0.24	4977	300	63	1.29	3828
350	53	0.24	5612	350	56	0.30	5433	350	70	1.64	4098
400	58	0.30	6045	400	61	0.37	5857	400	78	2.02	4337
450	63	0.36	6433	450	66	0.45	6242	450	85	2.44	4539
500	67	0.42	6768	500	70	0.53	6583	500	92	2.92	4698
550	72	0.50	7045	550	75	0.62	6873	550	99	3.45	4810
600	77	0.58	7268	600	79	0.72	7117	600	107	4.04	4879
650	81	0.66	7446	650	83	0.82	7317	650	114	4.70	4912
700	86	0.76	7584	700	88	0.94	7477	700	122	5.42	4915
750	91	0.85	7689	750	92	1.06	7603	750	130	6.20	4894
800	96	0.96	7769	800	97	1.19	7698	800	138	7.05	4857
850	102	1.07	7828	850	102	1.32	7765	850	147	7.97	4808
900	108	1.18	7858	900	107	1.46	7800	900	157	8.96	4750
1000	123	1.43	7795	1000	121	1.77	7752	1000	178	11.17	4610
1050	132	1.56	7678	1050	128	1.94	7666	1050	189	12.40	4532
1100	142	1.70	7459	1100	137	2.13	7571	1100	201	13.73	4456
1150	155	1.85	7102	1150	147	2.32	7471	1150	212	15.16	4381
1200	173	2.00	6594	1200	160	2.52	7240	1200	227	16.70	4278
1250	198	2.17	5938	1250	180	2.74	6744	1250	246	18.38	4124
1300	231	2.35	5164	1300	209	2.97	5947	1300	267	20.17	3946
1350	281	2.54	4296	1350	256	3.23	4864	1350	296	22.08	3730
1400	381	2.75	3322	1400	359	3.52	3617	1400	378	24.12	3240
1450	586	3.00	2267	1450	576	3.84	2370	1450	580	26.32	2326
1500	1004	3.25	1357	1500	1014	4.17	1359	1500	1007	28.59	1370
1550	1740	3.51	785	1550	1777	4.49	762	1550	1764	30.89	771
1600	2829	3.76	478	1600	2911	4.81	465	1600	2893	33.32	468
1650	4269	4.02	310	1650	4419	5.13	306	1650	4397	36.01	306
1700	5957	4.29	226	1700	6196	5.47	222	1700	6170	38.88	221

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	39	0.42	2157	100	40	0.57	2091
150	49	1.14	2381	150	51	1.54	2270
200	58	1.89	2600	200	61	2.54	2444
250	68	2.69	2807	250	72	3.63	2608
300	78	3.56	2997	300	83	4.84	2757
350	88	4.54	3164	350	95	6.22	2884
400	99	5.65	3303	400	107	7.79	2986
450	110	6.90	3407	450	120	9.61	3057
500	121	8.34	3472	500	134	11.72	3092
550	133	9.97	3493	550	148	14.14	3087
600	145	11.82	3477	600	164	16.90	3050
650	158	13.90	3432	650	180	20.01	2987
700	172	16.22	3367	700	198	23.47	2909
750	187	18.79	3290	750	216	27.31	2823
800	203	21.63	3209	800	236	31.52	2737
850	219	24.75	3131	850	257	36.14	2658
900	237	28.16	3056	900	279	41.27	2584
1000	276	35.96	2908	1000	329	53.52	2432
1050	297	40.38	2833	1050	357	60.78	2350
1100	319	45.19	2760	1100	386	68.41	2276
1150	341	50.41	2692	1150	416	76.21	2218
1200	366	56.07	2616	1200	442	84.52	2163
1250	395	62.21	2528	1250	465	93.70	2104
1300	419	68.80	2472	1300	506	103.83	2045
1350	434	75.80	2459	1350	570	114.78	1992
1400	481	83.23	2320	1400	574	125.72	1940
1450	627	91.13	1912	1450	545	136.60	1822
1500	1012	99.47	1363	1500	1025	151.05	1342
1550	1763	108.32	850				
1600	2907	118.01	465				
1650	4420	128.79	258				
1700	6195	140.40	183				

Available Dimensions

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

✔ Available ☰ On request

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