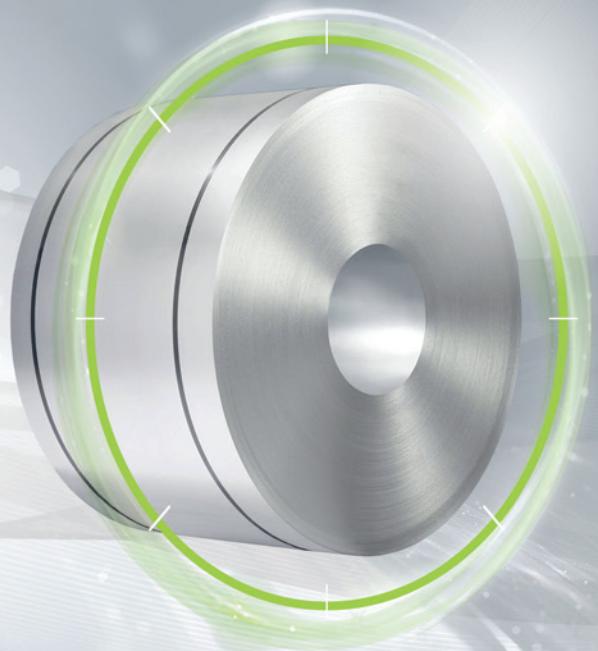


FULLY
PROCESSED

isovac 400-50 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 400-50 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 400-50 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 400-50 A	1.0811	M400-50A	M400-50A 5	50A400	2216	47F240	M-43	50C400	50W400

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 400-50 A	350	330	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
	1.0 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 400-50 A	1.40	0.80	3.40	1.94	1.59	1.68	1.79	1400

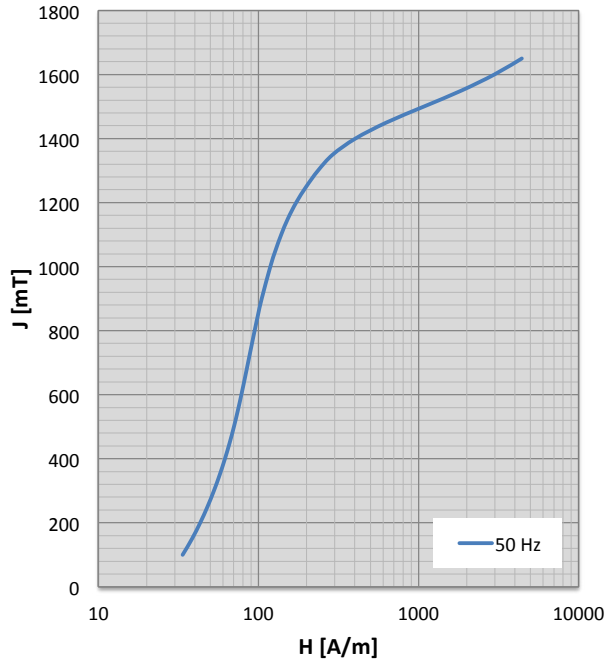
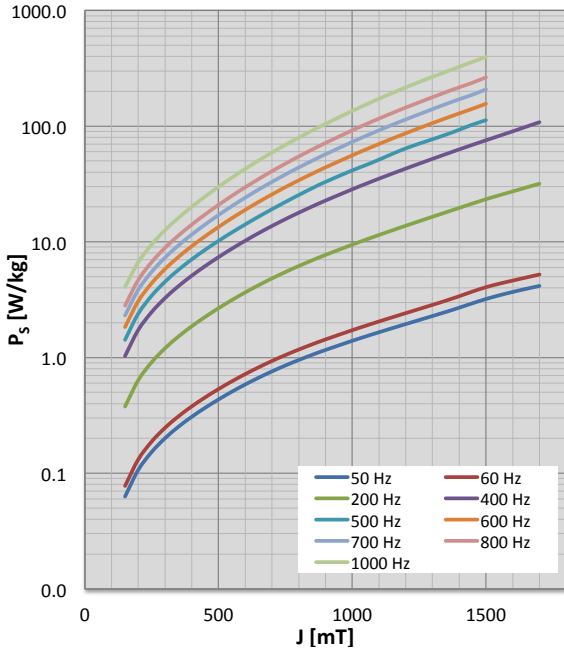
Physical properties:

Typical values

Grade named according to isovac®	Density ρ [g/cm³]	Specific electrical resistance ρ _s [μΩcm]	Thermal conductivity λ [W/mK]
isovac 400-50 A	7.70	45.0	28

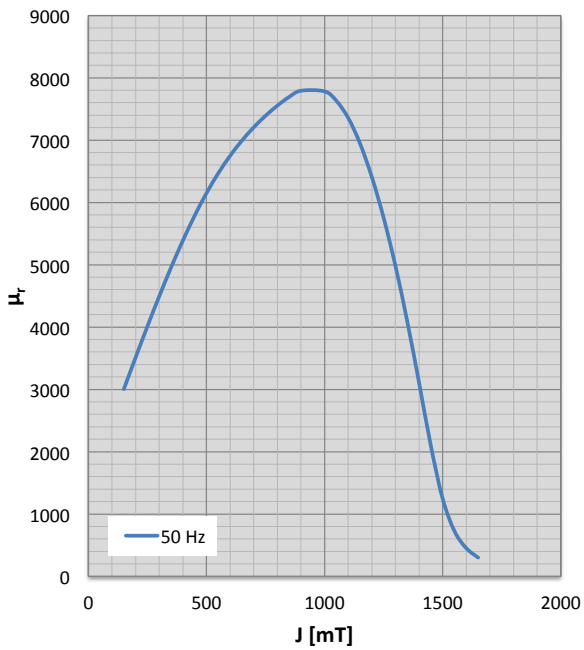
Characteristics P_s/J loss curve and characteristics J/H magnetization curve

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	34	0.02	2489	100	35	0.02	2391				
150	38	0.06	3005	150	40	0.08	2886	150	43	0.38	2670
200	43	0.11	3515	200	46	0.13	3377	200	50	0.64	3027
250	48	0.15	4014	250	51	0.19	3858	250	57	0.91	3375
300	53	0.20	4496	300	55	0.25	4327	300	63	1.20	3710
350	57	0.25	4957	350	60	0.31	4777	350	69	1.52	4029
400	62	0.31	5389	400	65	0.38	5206	400	76	1.86	4326
450	66	0.37	5789	450	69	0.45	5609	450	82	2.24	4597
500	70	0.43	6151	500	73	0.53	5980	500	87	2.67	4838
550	74	0.51	6470	550	77	0.62	6318	550	93	3.14	5047
600	78	0.59	6749	600	81	0.72	6621	600	98	3.66	5222
650	82	0.67	6993	650	84	0.82	6891	650	103	4.22	5366
700	86	0.76	7206	700	88	0.93	7129	700	109	4.83	5480
750	90	0.85	7391	750	92	1.05	7336	750	114	5.48	5563
800	95	0.95	7554	800	96	1.17	7514	800	120	6.18	5619
850	99	1.05	7694	850	101	1.30	7662	850	126	6.92	5648
900	105	1.16	7793	900	106	1.43	7782	900	133	7.71	5653
1000	119	1.39	7782	1000	117	1.72	7937	1000	148	9.45	5600
1050	128	1.52	7630	1050	124	1.88	7960	1050	157	10.42	5545
1100	139	1.65	7355	1100	133	2.05	7880	1100	166	11.46	5459
1150	153	1.79	6944	1150	144	2.23	7629	1150	178	12.57	5332
1200	172	1.95	6407	1200	160	2.42	7165	1200	193	13.77	5163
1250	199	2.11	5752	1250	184	2.63	6467	1250	214	15.07	4945
1300	235	2.28	4978	1300	218	2.85	5561	1300	240	16.47	4631
1350	291	2.48	4089	1350	271	3.10	4490	1350	278	17.98	4151
1400	403	2.70	3105	1400	384	3.39	3327	1400	380	19.64	3375
1450	630	2.95	2090	1450	621	3.72	2173	1450	616	21.45	2270
1500	1081	3.20	1242	1500	1092	4.05	1242	1500	1090	23.34	1242
1550	1857	3.45	724	1550	1901	4.35	701	1550	1899	25.26	675
1600	2977	3.69	451	1600	3074	4.62	439	1600	3072	27.27	438
1650	4418	3.92	302	1650	4596	4.92	296	1650	4600	29.46	309
1700	6084	4.16	223	1700	6366	5.22	218	1700	6378	31.78	228

Frequency dependence of magnetic properties

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

400 Hz				500 Hz				600 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	40	0.35	2097					100	42	0.63	1972
150	48	1.03	2363	150	49	1.42	2322	150	52	1.83	2189
200	57	1.73	2624	200	59	2.40	2555	200	62	3.07	2400
250	66	2.47	2876	250	68	3.42	2779	250	72	4.39	2602
300	75	3.27	3115	300	77	4.52	2989	300	82	5.82	2790
350	83	4.14	3335	350	87	5.72	3180	350	93	7.40	2958
400	92	5.10	3533	400	96	7.05	3346	400	103	9.17	3101
450	100	6.17	3704	450	106	8.54	3484	450	114	11.17	3216
500	109	7.37	3843	500	116	10.20	3588	500	125	13.44	3297
550	117	8.72	3947	550	126	12.06	3655	550	137	16.01	3340
600	125	10.23	4019	600	136	14.15	3688	600	149	18.90	3351
650	134	11.89	4061	650	146	16.51	3692	650	161	22.13	3334
700	143	13.71	4077	700	157	19.15	3670	700	175	25.71	3297
750	152	15.70	4071	750	170	22.10	3627	750	189	29.67	3245
800	163	17.86	4047	800	183	25.39	3568	800	204	34.02	3183
850	174	20.20	4007	850	197	29.04	3497	850	220	38.78	3118
900	185	22.73	3956	900	212	32.98	3421	900	237	43.99	3049
1000	211	28.45	3830	1000	245	41.44	3282	1000	276	55.90	2905
1050	225	31.67	3762	1050	261	45.97	3225	1050	297	62.68	2830
1100	240	35.15	3690	1100	279	51.26	3154	1100	319	70.06	2757
1150	255	38.89	3613	1150	300	57.61	3055	1150	341	78.07	2688
1200	271	42.94	3539	1200	325	64.19	2958	1200	367	86.73	2610
1250	289	47.34	3471	1250	352	70.50	2888	1250	399	96.06	2523
1300	308	52.13	3367	1300	363	77.00	2845	1300	420	106.15	2468
1350	340	57.32	3163	1350	366	84.30	2778	1350	425	117.09	2453
1400	427	62.93	2730	1400	459	93.00	2465	1400	484	128.80	2296
1450	633	68.98	2005	1450	723	103.17	1787	1450	683	141.42	1840
1500	1084	75.47	1250	1500	1106	112.58	1202	1500	1080	156.07	1261
1550	1896	82.44	733								
1600	3085	90.15	435								
1650	4624	98.77	276								
1700	6408	108.07	202								

Available Dimensions

Grade named according to isovac®	Delivery form	Width [mm]	Length [mm]
isovac 400-50 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 400-50 A	✔	✔	☰	✔	✔

✔ Available ☰ On request

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