isovac®

isovac 470-50 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 470-50 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 470-50 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	JIS	GOST	ASTM	AISI	IS648	GB/T2521.1
	Material No.	Abbreviation	60404-8-4	C2552	21427.2	A677			
isovac 470-50 A	1.0812	M470-50A	M470-50A 5	50A470	2214	47F280	-	50C470	50W470

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 470-50 A	330	315	470	33	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

	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
Grade named according to isovac®	50 Hz [W/kg]	60 Hz [W/lb]	50 Hz [W/kg]	60 Hz [W/lb]	[T]	[T]	[T]	[-]
isovac 470-50 A	1.70	0.97	3.90	2.22	1.62	1.71	1.82	2100

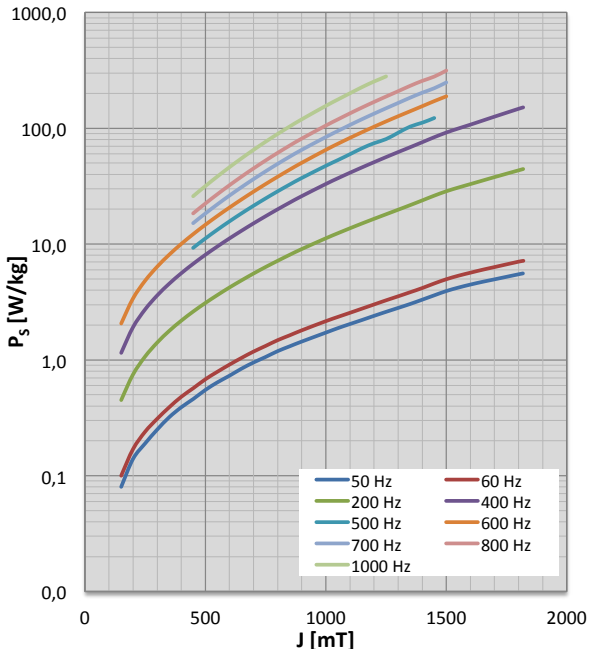
Physical properties:

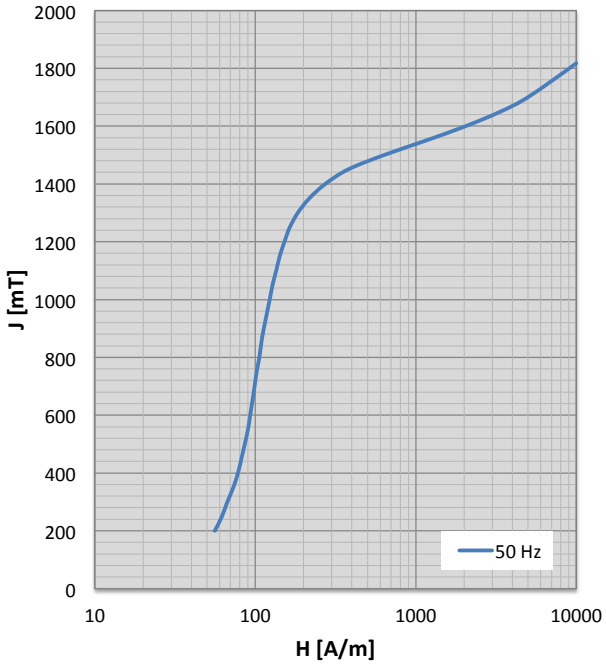
Typical values

Grade named according to isovac®	Density ρ [g/cm³]	Specific electrical resistance ρ_s [μΩcm]	Thermal conductivity λ [W/mK]
isovac 470-50 A	7.76	35.8	33

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

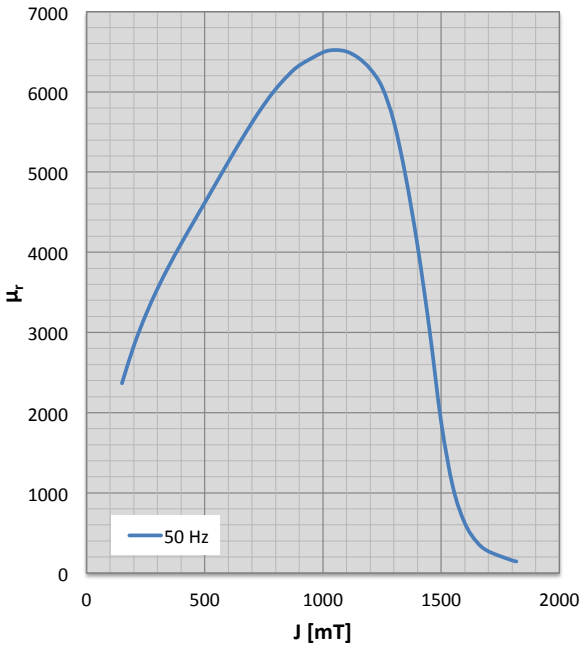
Test direction: Mean value from longitudinal and transverse measurements at indicated frequencies, single-sheet test





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 [-]
150	50	0.08	2368	150	50	0.10	2367	150	53	0.45	2244
200	56	0.14	2832	200	56	0.17	2829	200	60	0.75	2640
250	62	0.19	3215	250	62	0.24	3210	250	67	1.07	2955
300	67	0.25	3544	300	68	0.31	3536	300	74	1.41	3217
350	73	0.32	3836	350	73	0.39	3826	350	81	1.78	3441
400	78	0.39	4106	400	78	0.48	4092	400	87	2.18	3638
450	82	0.46	4363	450	82	0.57	4345	450	94	2.62	3818
500	86	0.55	4617	500	87	0.68	4594	500	100	3.10	3987
550	90	0.64	4873	550	90	0.79	4843	550	106	3.63	4148
600	93	0.73	5128	600	94	0.91	5091	600	111	4.22	4297
650	96	0.84	5378	650	97	1.04	5332	650	117	4.86	4431
700	99	0.95	5617	700	100	1.18	5561	700	123	5.57	4545
750	102	1.06	5838	750	103	1.32	5772	750	129	6.34	4634
800	106	1.19	6034	800	107	1.48	5957	800	136	7.17	4696
850	109	1.31	6198	850	111	1.63	6112	850	143	8.08	4728
900	113	1.44	6329	900	115	1.80	6236	900	151	9.06	4738
1000	123	1.72	6492	1000	124	2.16	6394	1000	169	11.22	4714
1050	128	1.88	6521	1050	130	2.35	6428	1050	178	12.41	4691
1100	135	2.04	6502	1100	136	2.55	6414	1100	188	13.69	4657
1150	142	2.21	6423	1150	144	2.77	6342	1150	198	15.06	4612
1200	152	2.40	6285	1200	153	3.01	6227	1200	209	16.52	4568
1250	164	2.60	6059	1250	165	3.27	6044	1250	220	18.09	4520
1300	184	2.81	5625	1300	183	3.54	5638	1300	235	19.80	4393
1350	217	3.04	4941	1350	217	3.84	4953	1350	261	21.69	4123
1400	273	3.31	4080	1400	273	4.17	4088	1400	302	23.82	3688
1450	378	3.61	3049	1450	378	4.57	3056	1450	388	26.19	2972
1500	634	3.93	1882	1500	634	4.97	1884	1500	631	28.57	1893
1550	1155	4.21	1068	1550	1156	5.33	1067	1550	1154	30.77	1069
1600	2045	4.47	622	1600	2046	5.66	622	1600	2054	32.96	620
1650	3363	4.72	390	1650	3358	6.00	391	1650	3377	35.33	389
1700	4993	4.96	271	1700	4978	6.33	272	1700	5009	37.87	270
1799	9000	5.48	159	1800	9000	7.05	159	1799	9000	43.27	159
1818	10000	5.58	145	1820	10000	7.17	145	1819	10000	44.44	145

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	49	0.40	1631								
150	57	1.15	2084					150	63	2.06	1905
200	66	1.92	2421					200	72	3.40	2198
250	74	2.73	2679					250	82	4.83	2417
300	83	3.60	2883					300	92	6.38	2582
350	91	4.55	3047					350	103	8.10	2706
400	100	5.60	3181	400	108	7.48	2952	400	114	10.03	2797
450	109	6.77	3291	450	116	9.27	3082	450	125	12.21	2861
500	118	8.08	3383	500	125	11.18	3177	500	137	14.68	2903
550	127	9.54	3457	550	135	13.31	3230	550	150	17.49	2925
600	136	11.19	3513	600	147	15.71	3247	600	163	20.67	2928
650	146	13.03	3548	650	160	18.41	3235	650	178	24.28	2912
700	156	15.10	3559	700	174	21.43	3202	700	194	28.37	2879
750	168	17.40	3547	750	189	24.79	3153	750	211	32.98	2828
800	181	19.97	3512	800	206	28.54	3093	800	230	38.15	2764
850	196	22.81	3456	850	224	32.67	3026	850	252	43.93	2688
900	211	25.94	3388	900	242	37.21	2957	900	275	50.34	2607
1000	245	33.03	3243	1000	282	47.40	2823	1000	324	65.10	2453
1050	263	37.01	3174	1050	303	53.12	2757	1050	350	73.49	2384
1100	282	41.29	3104	1100	327	59.68	2678	1100	378	82.58	2315
1150	302	45.92	3032	1150	353	67.19	2590	1150	407	92.42	2246
1200	322	50.93	2965	1200	377	74.29	2532	1200	437	103.07	2186
1250	343	56.38	2904	1250	397	80.62	2508	1250	466	114.59	2135
1300	366	62.26	2824	1300	433	91.43	2390	1300	502	126.96	2061
1350	395	68.62	2723	1350	470	103.36	2285	1350	547	140.28	1964
1400	417	75.74	2673	1400	495	111.67	2249	1400	574	155.04	1941
1450	452	83.72	2553	1450	555	122.58	2080	1450	586	171.52	1969
1500	646	91.85	1848	1500	696	136.32	1716	1500	738	188.63	1618
1550	1156	99.55	1067					1550	1201	205.52	1027
1600	2062	107.46	618					1600	2072	223.44	614
1650	3388	116.33	388					1650	3389	243.70	387
1700	5017	125.98	270					1700	5028	265.82	269
1799	9000	147.04	159					1795	9000	314.80	159
1819	10000	151.40	145					1809	10000	323.63	144

Frequency dependence of magnetic properties

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

700 Hz				800 Hz				1000 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 [-]
400	120	12.16	2649	400	126	14.73	2529	400	139	20.59	2284
450	131	15.15	2724	450	139	18.40	2579	450	156	25.89	2298
500	144	18.37	2767	500	153	22.39	2601	500	173	31.67	2294
550	158	22.04	2771	550	169	26.96	2587	550	193	38.36	2264
600	174	26.23	2744	600	188	32.22	2546	600	216	46.10	2215
650	192	31.00	2696	650	208	38.22	2488	650	240	54.98	2153
700	211	36.40	2635	700	230	45.03	2421	700	267	65.08	2084
750	233	42.47	2567	750	254	52.70	2351	750	297	76.49	2012
800	255	49.26	2496	800	279	61.30	2281	800	328	89.30	1939
850	279	56.82	2424	850	306	70.88	2212	850	362	103.58	1868
900	304	65.13	2353	900	334	81.44	2142	900	398	119.43	1799
1000	361	84.02	2206	1000	399	105.54	1993	1000	475	156.17	1674
1050	391	94.81	2136	1050	434	119.29	1923	1050	516	177.11	1618
1100	422	106.77	2072	1100	469	134.46	1866	1100	560	200.35	1563
1150	455	119.70	2010	1150	506	150.95	1809	1150	606	226.42	1509
1200	490	133.65	1948	1200	545	168.74	1752	1200	653	253.22	1462
1250	527	148.79	1887	1250	586	187.91	1698	1250	699	280.32	1422
1300	565	165.28	1832	1300	628	208.86	1648	1300	757	316.55	1366
1350	611	183.65	1758	1350	679	232.48	1581				
1400	648	202.71	1719	1400	720	256.48	1546				
1450	661	221.72	1746	1450	732	279.43	1576				
1500	782	248.59	1527	1500	830	314.86	1438				

Available Dimensions

Grade named according to isovac®	Delivery form	Width [mm]	Length [mm]
isovac 470-50 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 470-50 A	✓	✓	○	✓	✓

✓ Available ○ On request

Please find further information and downloadable files at www.voestalpine.com/isovac

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ONE STEP AHEAD.