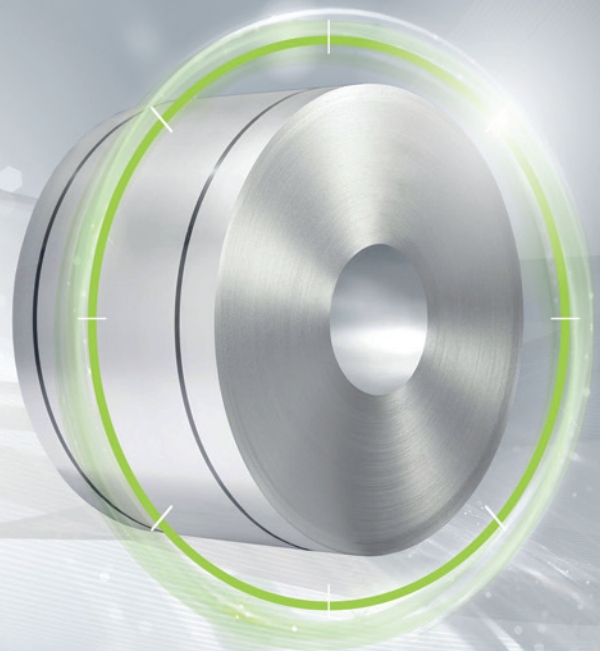


FULLY
PROCESSED

isovac 470-50 A HC

The specialist 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.

The high thermal conductivity of isovac 470-50 A HC (high conductivity) ensures rapid heat dissipation in combination with higher polarization while maintaining low specific total losses. This makes innovative design strategies possible for electrical machinery.

Upon request, isovac 470-50 A HC can be supplied with an electrical steel insulation system and can be used directly in as-delivered condition.

Convincing advantages:

- » Potential cost savings in electric machinery based on lower component sizes and thus lower material usage based on higher polarization than that in standard isovac® grades
- » Lower cooling power necessary through higher thermal conductivity than that of standard isovac® grades (conductivity increased by up to 20%)
- » 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 HC, an electrical steel of the highest quality. We offer you a customer-focused over-all 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 470-50 A HC	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 HC	300	280	430	35	130

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 470-50 A HC	1.80	1.03	4.00	2.28	1.63	1.71	1.83	2200

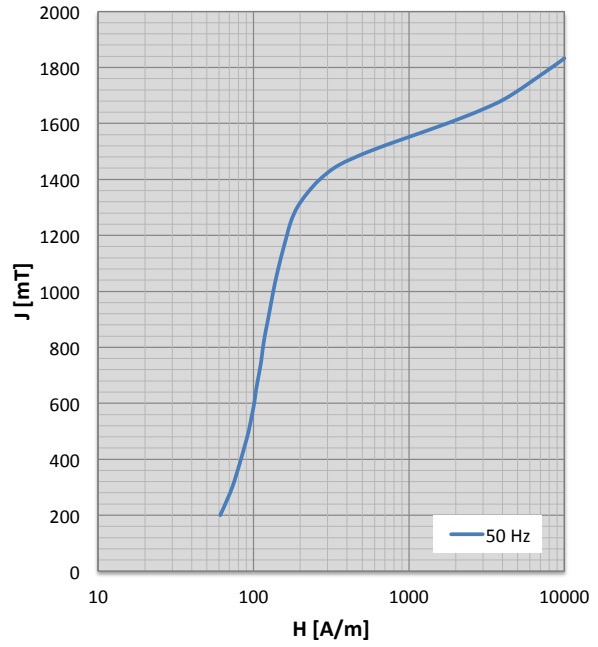
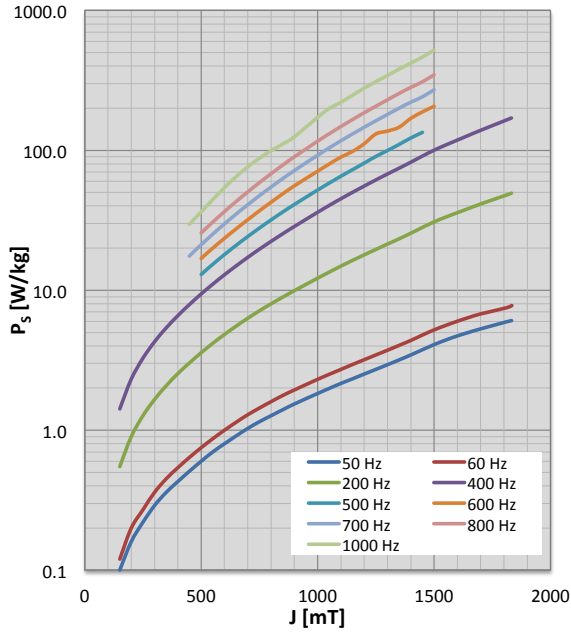
Physical properties:

Typical values

Grade named according to isovac®	Density ρ [g/cm³]	Specific electrical resistance ρ_s [$\mu\Omega\text{cm}$]	Thermal conductivity λ [W/mK]
isovac 470-50 A HC	7.78	31.1	36

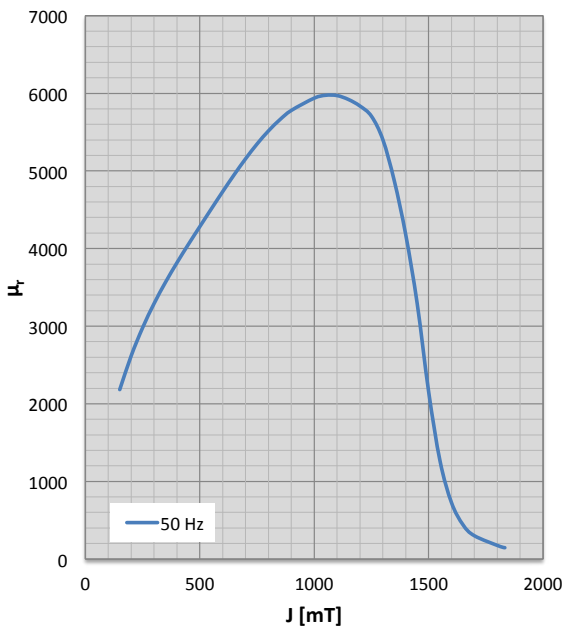
Characteristics P_s/J loss curve and characteristics J/H magnetization curve

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	55	0.10	2181	150	55	0.12	2158	150	59	0.55	2016
200	61	0.16	2618	200	62	0.20	2585	200	67	0.90	2360
250	67	0.22	2980	250	68	0.27	2938	250	76	1.27	2632
300	73	0.29	3291	300	74	0.36	3240	300	84	1.66	2859
350	78	0.36	3566	350	79	0.45	3507	350	91	2.08	3054
400	83	0.43	3817	400	85	0.54	3750	400	99	2.54	3229
450	88	0.51	4054	450	90	0.64	3979	450	106	3.03	3391
500	93	0.60	4283	500	95	0.75	4201	500	112	3.58	3548
550	97	0.70	4510	550	99	0.87	4421	550	118	4.18	3700
600	101	0.80	4734	600	103	1.00	4637	600	124	4.83	3847
650	104	0.91	4951	650	107	1.14	4846	650	130	5.54	3983
700	108	1.03	5157	700	110	1.29	5044	700	136	6.31	4104
750	112	1.15	5347	750	114	1.44	5227	750	142	7.13	4204
800	115	1.27	5516	800	118	1.60	5389	800	149	8.00	4279
850	119	1.40	5661	850	122	1.77	5528	850	156	8.93	4328
900	124	1.54	5780	900	127	1.94	5641	900	165	9.93	4354
1000	134	1.83	5938	1000	137	2.31	5793	1000	183	12.20	4353
1050	140	1.99	5975	1050	143	2.51	5829	1050	193	13.49	4333
1100	147	2.16	5971	1100	150	2.72	5829	1100	204	14.88	4299
1150	155	2.33	5920	1150	158	2.95	5785	1150	215	16.35	4253
1200	164	2.52	5836	1200	167	3.19	5709	1200	226	17.91	4220
1250	174	2.72	5705	1250	178	3.45	5586	1250	237	19.58	4196
1300	191	2.94	5402	1300	195	3.73	5312	1300	253	21.38	4082
1350	221	3.18	4871	1350	223	4.04	4828	1350	280	23.32	3833
1400	267	3.45	4176	1400	267	4.38	4169	1400	314	25.55	3554
1450	351	3.76	3290	1450	350	4.79	3293	1450	369	28.13	3130
1500	554	4.09	2155	1500	554	5.21	2156	1500	549	30.81	2174
1550	980	4.41	1259	1550	980	5.61	1259	1550	977	33.33	1262
1600	1757	4.72	725	1600	1755	6.01	725	1600	1771	35.83	719
1650	2971	5.01	442	1650	2963	6.40	443	1650	2997	38.52	438
1700	4507	5.30	300	1700	4491	6.78	301	1700	4542	41.36	298
1814	9000	5.97	160	1814	9000	7.52	160	1813	9000	48.08	160
1833	10000	6.07	146	1834	10000	7.78	146	1832	10000	49.40	146

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	55	0.53	1438								
150	66	1.42	1821								
200	76	2.32	2102								
250	86	3.27	2316								
300	96	4.29	2487								
350	106	5.39	2626								
400	116	6.59	2743								
450	126	7.92	2844	450	135	10.83	2654	450	144	14.06	2481
500	136	9.41	2932	500	145	12.97	2753	500	155	16.88	2559
550	145	11.06	3009	550	155	15.34	2818	550	168	20.00	2605
600	155	12.90	3074	600	167	17.99	2853	600	182	23.51	2623
650	166	14.93	3124	650	181	20.93	2863	650	198	27.47	2616
700	176	17.18	3157	700	195	24.20	2854	700	215	31.92	2590
750	188	19.65	3172	750	211	27.82	2832	750	234	36.94	2549
800	201	22.35	3167	800	227	31.82	2799	800	255	42.57	2497
850	215	25.31	3143	850	245	36.21	2758	850	278	48.86	2436
900	231	28.56	3104	900	264	41.02	2709	900	302	55.73	2374
1000	266	36.08	2993	1000	308	52.04	2588	1000	352	70.90	2261
1050	285	40.41	2927	1050	332	58.38	2520	1050	380	79.88	2196
1100	306	45.10	2860	1100	356	65.32	2457	1100	410	89.42	2138
1150	328	50.12	2793	1150	382	72.73	2395	1150	434	98.19	2106
1200	350	55.55	2731	1200	410	81.04	2326	1200	474	111.45	2016
1250	372	61.44	2674	1250	442	90.44	2251	1250	533	130.84	1866
1300	398	67.76	2601	1300	471	99.70	2195	1300	544	137.24	1900
1350	428	74.55	2513	1350	505	110.21	2127	1350	570	146.31	1886
1400	452	82.21	2464	1400	540	122.51	2065	1400	625	169.09	1782
1450	484	91.00	2386	1450	577	134.36	2000	1450	643	188.15	1794
1500	629	100.21	1898	1500	680	148.14	1755	1500	729	206.37	1638
1550	1019	109.13	1211								
1600	1782	118.30	714								
1650	2997	128.31	438								
1700	4546	139.01	298								
1812	9000	165.00	160								
1832	10000	170.15	146								

Available Dimensions

Grade named according to isovac®	Delivery form	Width [mm]	Length [mm]
isovac 470-50 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 470-50 A HC	✔	✔	☰	✔	✔

✔ Available ☰ On request

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