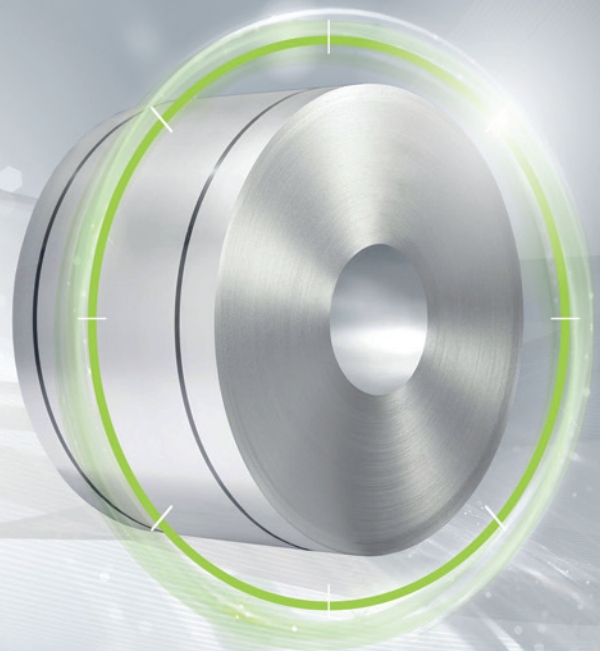


FULLY
PROCESSED

isovac high-perm 330-50 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 330-50 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 330-50 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 330-50 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 HP 330-50 A	1.0809	M330-50A	M330-50A 5	50A330	-	47F190	M-27	50C330	50W330

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 330-50 A	320	310	465	30	165

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 330-50 A	1.25	0.71	2.85	1.62	1.64	1.73	1.84	3200

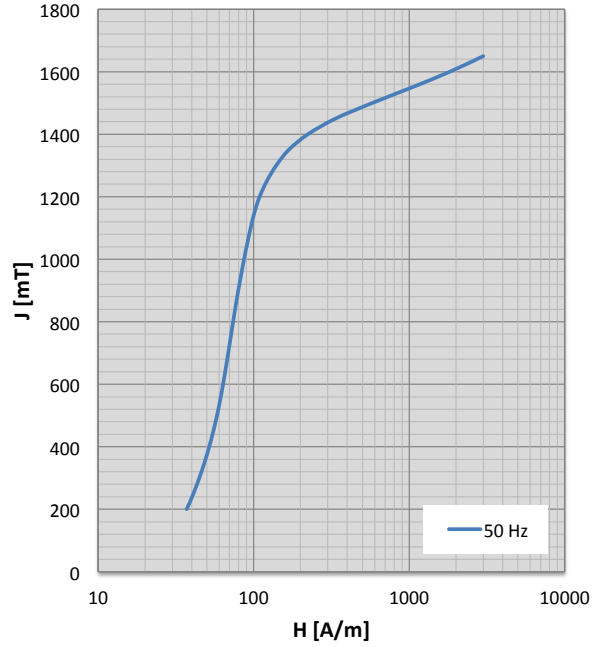
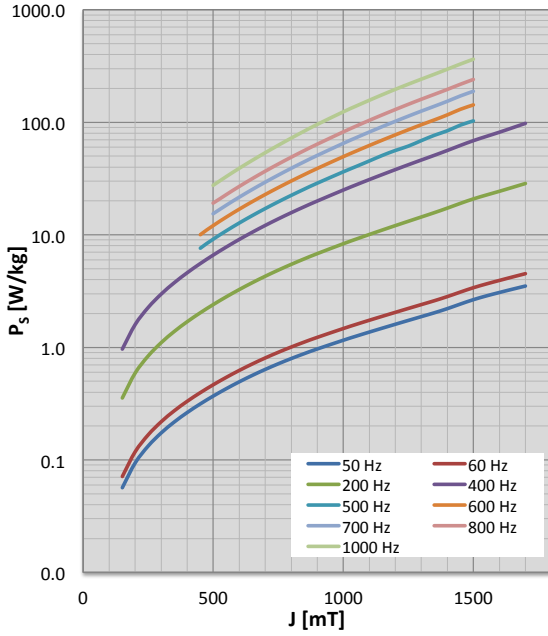
Physical properties:

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 HP 330-50 A	7.71	45.0	28

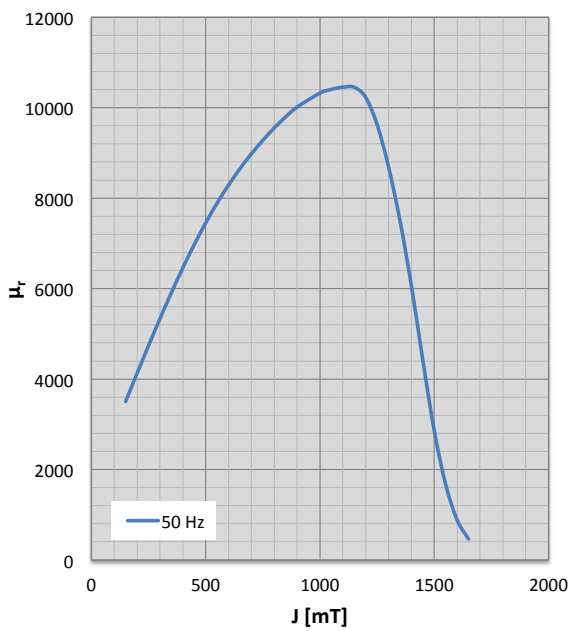
Characteristics P_s/J loss curve and characteristics J/H magnetization curve

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	29	0.02	2859	100	31	0.12	2662
150	33	0.06	3508	150	34	0.07	3463	150	37	0.36	3068
200	37	0.09	4130	200	38	0.12	4061	200	43	0.59	3470
250	41	0.13	4742	250	42	0.17	4649	250	49	0.84	3864
300	45	0.17	5337	300	45	0.22	5222	300	54	1.10	4244
350	48	0.22	5912	350	49	0.27	5774	350	60	1.38	4607
400	52	0.26	6460	400	53	0.33	6300	400	65	1.69	4948
450	55	0.31	6976	450	56	0.40	6795	450	70	2.03	5264
500	58	0.37	7454	500	59	0.47	7253	500	75	2.40	5549
550	61	0.43	7892	550	62	0.54	7672	550	79	2.81	5800
600	64	0.49	8290	600	65	0.62	8052	600	84	3.26	6017
650	66	0.56	8652	650	68	0.71	8396	650	88	3.76	6200
700	69	0.64	8981	700	70	0.81	8707	700	92	4.29	6350
750	71	0.71	9280	750	73	0.90	8988	750	97	4.86	6466
800	74	0.80	9552	800	75	1.01	9242	800	101	5.47	6550
850	77	0.88	9799	850	78	1.12	9469	850	107	6.12	6602
900	80	0.97	10015	900	81	1.23	9665	900	112	6.81	6627
1000	87	1.16	10323	1000	89	1.47	9938	1000	124	8.34	6614
1050	91	1.26	10405	1050	93	1.60	10006	1050	131	9.18	6584
1100	96	1.37	10454	1100	98	1.74	10046	1100	137	10.07	6532
1150	101	1.48	10451	1150	103	1.89	10054	1150	145	11.04	6453
1200	109	1.60	10227	1200	111	2.05	9913	1200	153	12.08	6348
1250	121	1.74	9625	1250	122	2.22	9495	1250	163	13.20	6209
1300	140	1.88	8689	1300	139	2.40	8720	1300	176	14.41	5983
1350	168	2.03	7499	1350	168	2.60	7551	1350	199	15.75	5598
1400	223	2.21	6057	1400	223	2.83	6065	1400	247	17.28	4953
1450	336	2.43	4411	1450	336	3.10	4404	1450	348	19.04	3989
1500	579	2.65	2851	1500	579	3.39	2852	1500	586	20.86	2851
1550	1042	2.87	1664	1550	1039	3.66	1667	1550	1058	22.59	1736
1600	1826	3.07	883	1600	1822	3.93	883	1600	1861	24.38	864
1650	2995	3.29	462	1650	2992	4.22	461	1650	3054	26.39	396
1700	4447	3.51	292	1700	4449	4.52	290	1700	4532	28.59	241
				1750	6051	4.82	246				

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	34	0.34	2381								
150	42	0.96	2675								
200	50	1.60	2965								
250	57	2.26	3246								
300	65	2.98	3513								
350	73	3.75	3761								
400	80	4.61	3987	400	87	6.14	3751	400	94	8.08	3471
450	87	5.55	4186	450	94	7.61	3905	450	102	10.03	3590
500	94	6.61	4353	500	101	9.15	4036	500	110	12.09	3689
550	101	7.79	4485	550	109	10.86	4125	550	119	14.37	3752
600	108	9.10	4583	600	117	12.74	4174	600	129	16.90	3779
650	115	10.55	4649	650	126	14.83	4189	650	140	19.72	3775
700	123	12.13	4685	700	136	17.13	4175	700	151	22.84	3747
750	131	13.86	4694	750	147	19.66	4140	750	164	26.30	3698
800	139	15.74	4678	800	158	22.44	4088	800	177	30.11	3635
850	149	17.78	4639	850	170	25.48	4025	850	192	34.30	3561
900	159	19.99	4581	900	183	28.80	3953	900	207	38.91	3479
1000	182	25.02	4425	1000	212	36.30	3790	1000	242	49.52	3303
1050	195	27.88	4334	1050	227	40.56	3701	1050	261	55.59	3212
1100	208	30.98	4243	1100	244	45.36	3600	1100	281	62.22	3122
1150	222	34.34	4153	1150	264	50.79	3487	1150	303	69.46	3031
1200	237	37.99	4052	1200	282	56.19	3402	1200	326	77.34	2941
1250	255	41.96	3936	1250	297	61.44	3354	1250	349	85.88	2854
1300	269	46.25	3852	1300	322	68.78	3216	1300	374	95.19	2768
1350	280	50.91	3809	1350	344	76.67	3104	1350	398	105.04	2708
1400	307	56.22	3633	1400	370	84.09	3013	1400	429	116.44	2597
1450	391	62.32	3157	1450	465	94.42	2595	1450	502	130.47	2307
1500	609	68.71	2437	1500	653	102.91	2121	1500	675	142.75	1936
1550	1051	74.97	1605								
1600	1824	81.65	885								
1650	2997	89.35	469								
1700	4463	97.87	296								

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 [-]
450	110	12.74	3323	450	118	15.76	3076	450	135	22.65	2686
500	119	15.39	3396	500	129	19.07	3126	500	149	27.51	2704
550	130	18.33	3436	550	141	22.77	3147	550	164	32.92	2702
600	141	21.62	3442	600	154	26.93	3141	600	180	39.02	2680
650	154	25.29	3420	650	168	31.58	3111	650	198	45.91	2641
700	167	29.40	3377	700	184	36.79	3064	700	217	53.71	2588
750	182	33.96	3316	750	201	42.58	3002	750	238	62.50	2525
800	198	39.03	3243	800	219	49.00	2931	800	261	72.41	2452
850	215	44.63	3164	850	238	56.11	2855	850	286	83.51	2375
900	234	50.80	3080	900	259	63.96	2775	900	314	95.81	2296
1000	275	65.01	2909	1000	306	82.19	2612	1000	372	123.92	2145
1050	297	73.12	2826	1050	331	92.69	2531	1050	403	139.75	2078
1100	320	81.97	2744	1100	357	104.12	2455	1100	435	157.00	2016
1150	345	91.60	2663	1150	385	116.47	2383	1150	469	175.89	1954
1200	371	102.07	2583	1200	414	129.90	2311	1200	505	196.34	1895
1250	398	113.43	2505	1250	446	144.54	2237	1250	541	218.23	1840
1300	426	125.75	2430	1300	478	160.31	2169	1300	580	241.76	1787
1350	457	138.89	2369	1350	512	177.16	2111	1350	622	267.37	1733
1400	489	153.81	2282	1400	546	196.05	2041	1400	664	296.52	1678
1450	540	171.48	2098	1450	586	217.77	1925	1450	713	329.35	1606
1500	704	188.60	1791	1500	736	240.30	1674	1500	832	363.61	1457

Available Dimensions

Grade named according to isovac®	Delivery form	Width [mm]	Length [mm]
isovac HP 330-50 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 HP 330-50 A	✔	✔	☰	✔	✔

✔ Available ☰ On request

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