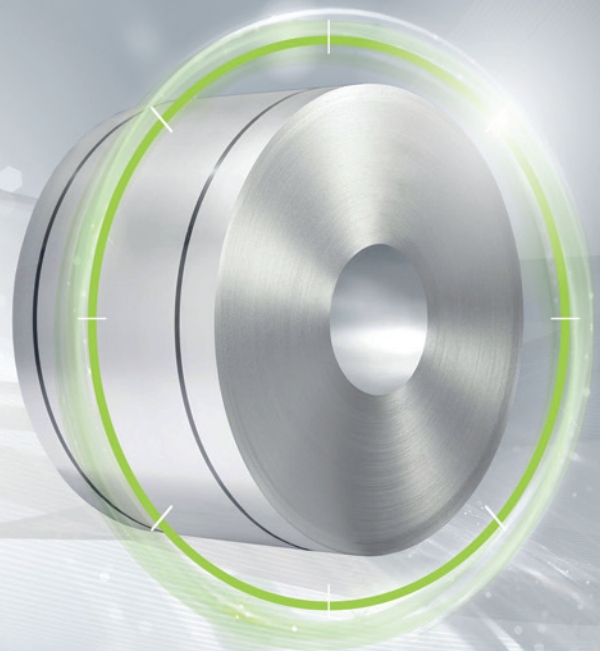


FULLY  
PROCESSED

## isovac 330-50 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 330-50 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 330-50 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 330-50 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 330-50 A HC	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 <sub>eH</sub> [MPa]	0.2 %-Yield strength R <sub>p0.2</sub> [MPa]	Tensile strength R <sub>m</sub> [MPa]	Elongation A <sub>80</sub> [%]	Hardness HV5 [-]
isovac 330-50 A HC	320	315	470	30	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 <sub>r</sub>
	50 Hz [W/kg]	60 Hz [W/lb]	50 Hz [W/kg]	60 Hz [W/lb]	[T]	[T]	[T]	[-]
isovac 330-50 A HC	1.20	0.68	2.85	1.62	1.58	1.67	1.79	1300

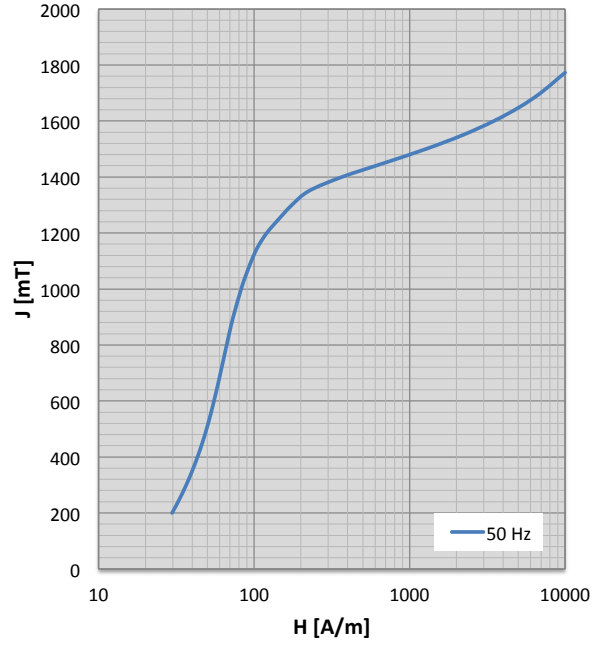
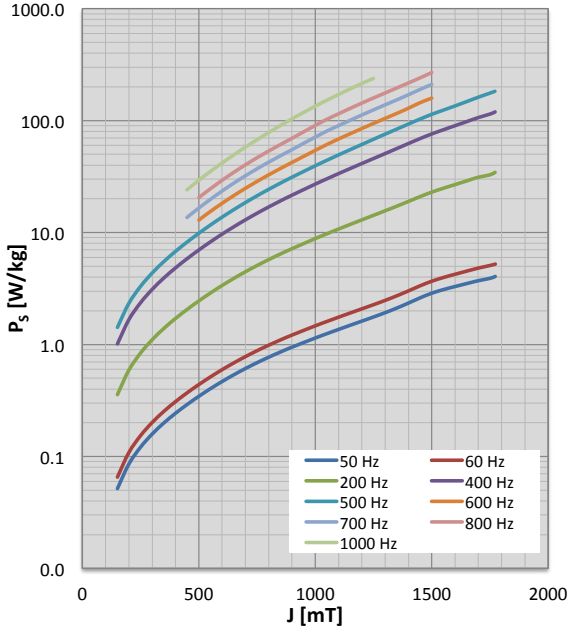
**Physical properties:**

Typical values

Grade named according to isovac®	Density ρ [g/cm³]	Specific electrical resistance ρ <sub>s</sub> [μΩcm]	Thermal conductivity λ [W/mK]
isovac 330-50 A HC	7.71	45.0	28

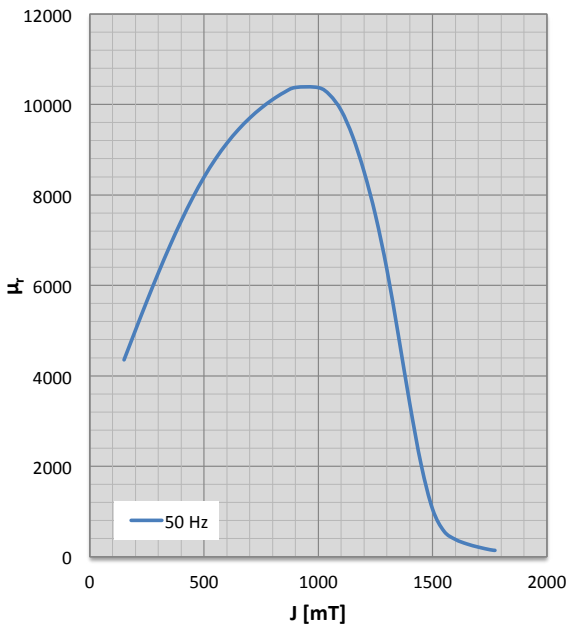
**Characteristics  $P_s/J$  loss curve and characteristics  $J/H$  magnetization curve**

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



**Characteristics  $\mu_r/J$  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 <sub>s</sub> [W/kg]	μ <sub>r</sub> [-]	J [mT]	H [A/m]	P <sub>s</sub> [W/kg]	μ <sub>r</sub> [-]	J [mT]	H [A/m]	P <sub>s</sub> [W/kg]	μ <sub>r</sub> [-]
150	26	0.05	4351	150	26	0.07	4303	150	32	0.36	3519
200	30	0.09	5010	200	30	0.11	4929	200	38	0.59	3875
250	33	0.12	5654	250	34	0.15	5541	250	44	0.84	4221
300	37	0.16	6276	300	37	0.20	6133	300	50	1.10	4553
350	40	0.20	6868	350	41	0.25	6697	350	55	1.39	4867
400	43	0.24	7423	400	44	0.31	7226	400	61	1.71	5157
450	46	0.29	7934	450	48	0.37	7714	450	66	2.06	5420
500	49	0.34	8393	500	51	0.44	8153	500	72	2.45	5649
550	52	0.40	8795	550	54	0.51	8538	550	77	2.89	5842
600	55	0.47	9143	600	57	0.60	8872	600	82	3.37	6001
650	58	0.54	9443	650	59	0.68	9158	650	87	3.89	6128
700	61	0.61	9700	700	62	0.78	9402	700	92	4.46	6225
750	64	0.69	9920	750	65	0.88	9607	750	97	5.07	6296
800	67	0.77	10108	800	68	0.99	9777	800	102	5.73	6344
850	70	0.86	10266	850	72	1.10	9915	850	108	6.43	6370
900	73	0.95	10376	900	75	1.21	10016	900	114	7.17	6375
1000	83	1.14	10372	1000	84	1.47	10083	1000	127	8.83	6328
1050	89	1.25	10209	1050	90	1.61	10018	1050	135	9.75	6279
1100	96	1.36	9867	1100	97	1.75	9778	1100	142	10.75	6224
1150	106	1.49	9295	1150	106	1.91	9272	1150	148	11.82	6165
1200	121	1.62	8515	1200	121	2.08	8525	1200	159	12.98	6058
1250	144	1.76	7550	1250	144	2.27	7569	1250	176	14.24	5836
1300	175	1.92	6349	1300	175	2.48	6366	1300	197	15.64	5377
1350	225	2.12	4900	1350	225	2.72	4912	1350	232	17.19	4578
1400	367	2.34	3384	1400	366	3.01	3392	1400	362	18.96	3458
1450	688	2.61	2031	1450	686	3.34	2035	1450	683	20.94	2142
1500	1275	2.87	1049	1500	1274	3.67	1050	1500	1275	22.95	1050
1550	2202	3.09	563	1550	2201	3.97	563	1550	2205	24.87	533
1600	3485	3.29	382	1600	3482	4.24	382	1600	3488	26.80	381
1650	5104	3.50	284	1650	5097	4.52	285	1650	5106	28.91	300
1700	6960	3.71	214	1700	6946	4.81	215	1700	6960	31.18	227
1752	9000	3.91	155	1752	9000	5.09	155	1748	9000	32.68	155
1773	10000	4.05	141	1773	10000	5.23	141	1772	10000	34.48	141

**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 <sub>s</sub> [W/kg]	μ <sub>r</sub> [-]	J [mT]	H [A/m]	P <sub>s</sub> [W/kg]	μ <sub>r</sub> [-]	J [mT]	H [A/m]	P <sub>s</sub> [W/kg]	μ <sub>r</sub> [-]
100	32	0.37	2555	100	35	0.53	2333				
150	40	1.01	2804	150	44	1.42	2557				
200	48	1.67	3050	200	52	2.34	2776				
250	56	2.36	3287	250	61	3.31	2986				
300	64	3.11	3510	300	71	4.35	3184				
350	72	3.93	3717	350	80	5.50	3363				
400	80	4.83	3902	400	89	6.79	3521				
450	88	5.84	4061	450	98	8.23	3652	450	107	10.67	3387
500	96	6.98	4190	500	107	9.85	3753	500	117	12.92	3448
550	104	8.26	4285	550	117	11.68	3820	550	127	15.43	3479
600	112	9.68	4349	600	127	13.72	3856	600	139	18.24	3482
650	120	11.25	4386	650	137	16.00	3865	650	151	21.36	3462
700	129	12.98	4398	700	147	18.52	3852	700	164	24.81	3425
750	138	14.87	4388	750	158	21.28	3821	750	178	28.60	3376
800	148	16.92	4361	800	170	24.30	3777	800	193	32.74	3321
850	158	19.15	4318	850	183	27.60	3723	850	208	37.27	3262
900	169	21.56	4263	900	196	31.20	3659	900	224	42.27	3195
1000	194	27.06	4124	1000	228	39.46	3508	1000	265	54.20	3003
1050	208	30.19	4042	1050	245	44.19	3423	1050	289	61.13	2897
1100	222	33.59	3953	1100	263	49.35	3335	1100	311	68.46	2820
1150	237	37.30	3857	1150	280	54.98	3248	1150	334	76.34	2748
1200	255	41.36	3759	1200	304	61.19	3149	1200	357	84.91	2674
1250	277	45.81	3661	1250	334	68.09	3033	1250	383	94.30	2597
1300	292	50.74	3542	1300	350	75.66	2943	1300	411	104.63	2517
1350	306	56.24	3337	1350	353	83.92	2864	1350	418	115.88	2493
1400	407	62.36	2839	1400	444	93.08	2540	1400	479	128.95	2329
1450	700	69.05	1939	1450	737	103.20	1797	1450	756	144.44	1719
1500	1278	75.96	1046	1500	1325	113.66	1017	1500	1276	158.73	1049
1550	2211	82.80	566	1550	2278	124.00	575				
1600	3503	89.97	380	1600	3586	135.10	377				
1650	5124	97.88	279	1650	5205	147.78	267				
1700	6976	106.36	211	1700	7039	161.69	201				
1752	9000	114.69	156	1751	9000	176.21	155				
1772	10000	119.53	141	1771	10000	182.54	141				



Available Dimensions

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

✔ Available ☰ On request

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