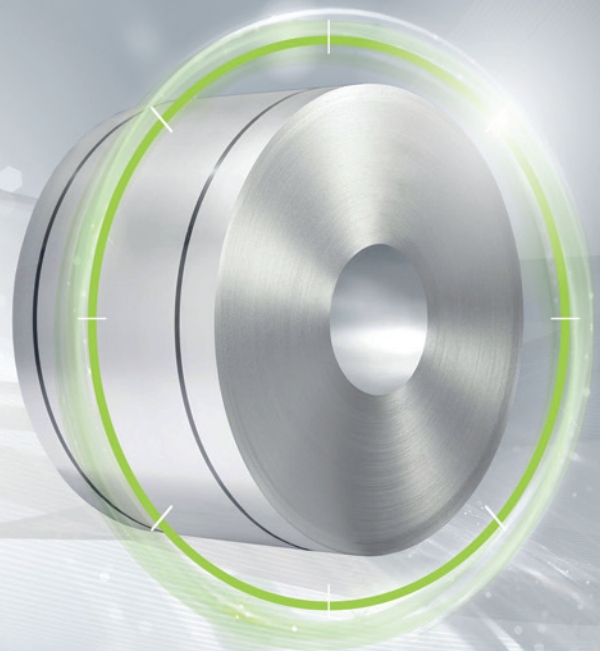


FULLY  
PROCESSED

## isovac high-perm 270-50 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 270-50 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 270-50 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 270-50 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 270-50 A	1.0806	M270-50A	M270-50A 5	50A270	2414	47F155	M-15	50C270	50W270

**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 270-50 A	345	340	470	25	185

**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 $\mu_r$ [-]
	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 270-50 A	1.00	0.57	2.30	1.31	1.61	1.70	1.81	2100

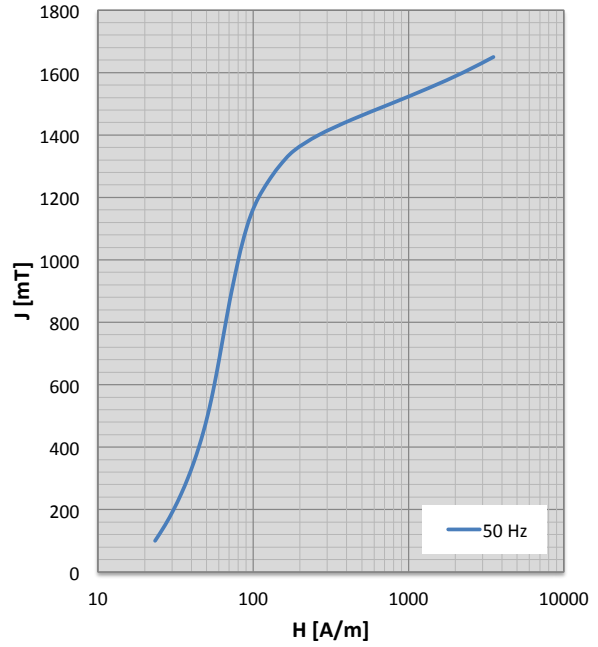
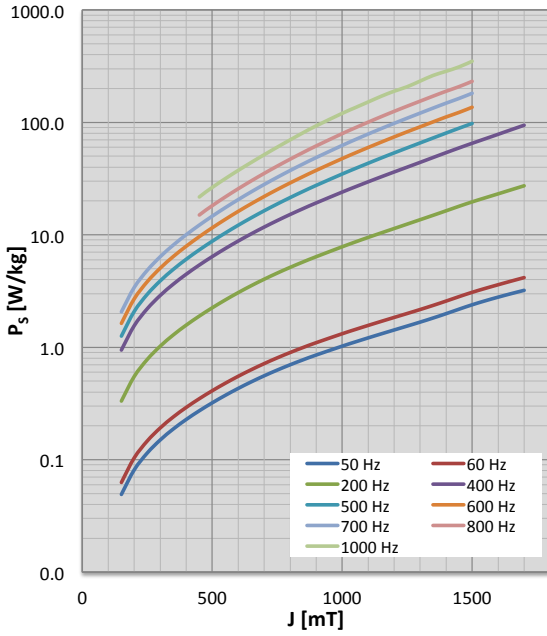
**Physical properties:**

Typical values

Grade named according to isovac®	Density $\rho$ [g/cm³]	Specific electrical resistance $\rho_s$ [ $\mu\Omega\text{cm}$ ]	Thermal conductivity $\lambda$ [W/mK]
isovac HP 270-50 A	7.68	52.0	25

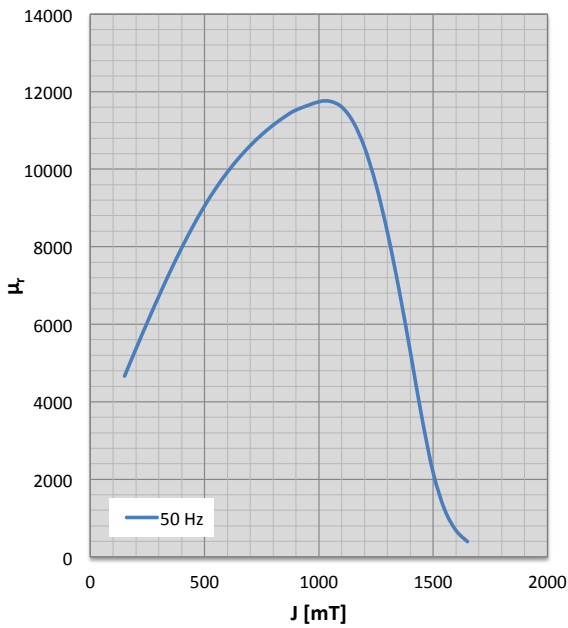
**Characteristics  $P_s/J$  loss curve and characteristics  $J/H$  magnetization curve**

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> [-]
100	23	0.02	3956	100	24	0.02	3848	100	26	0.12	3398
150	27	0.05	4666	150	28	0.06	4514	150	32	0.33	3792
200	31	0.08	5369	200	32	0.10	5173	200	38	0.55	4181
250	34	0.11	6058	250	36	0.15	5819	250	44	0.78	4561
300	38	0.15	6726	300	39	0.19	6446	300	49	1.02	4928
350	41	0.19	7366	350	43	0.24	7046	350	55	1.29	5276
400	45	0.23	7972	400	46	0.29	7614	400	60	1.57	5600
450	48	0.27	8537	450	50	0.35	8142	450	65	1.89	5897
500	51	0.32	9052	500	53	0.41	8624	500	70	2.24	6162
550	54	0.37	9515	550	56	0.48	9055	550	74	2.63	6391
600	56	0.43	9925	600	58	0.55	9437	600	79	3.06	6584
650	59	0.49	10289	650	61	0.63	9775	650	83	3.53	6743
700	61	0.56	10609	700	64	0.72	10071	700	87	4.03	6868
750	64	0.63	10890	750	66	0.80	10331	750	92	4.57	6962
800	67	0.70	11136	800	69	0.90	10558	800	96	5.14	7025
850	69	0.77	11350	850	72	1.00	10755	850	101	5.75	7058
900	73	0.85	11525	900	75	1.10	10916	900	107	6.39	7065
1000	80	1.02	11739	1000	83	1.32	11108	1000	118	7.83	7011
1050	85	1.12	11748	1050	88	1.44	11124	1050	125	8.63	6957
1100	90	1.21	11603	1100	93	1.56	11071	1100	131	9.49	6901
1150	98	1.32	11218	1150	99	1.70	10903	1150	137	10.40	6838
1200	108	1.43	10555	1200	109	1.84	10460	1200	146	11.38	6701
1250	124	1.54	9596	1250	125	2.00	9601	1250	160	12.45	6433
1300	147	1.67	8367	1300	147	2.17	8388	1300	177	13.63	6087
1350	183	1.82	6911	1350	184	2.36	6924	1350	202	14.92	5668
1400	264	1.99	5287	1400	265	2.58	5291	1400	274	16.36	4881
1450	434	2.18	3610	1450	433	2.82	3607	1450	441	17.96	3531
1500	767	2.39	2170	1500	770	3.08	2163	1500	774	19.63	2132
1550	1341	2.59	1221	1550	1360	3.34	1206	1550	1352	21.34	1199
1600	2243	2.79	680	1600	2274	3.60	658	1600	2257	23.15	675
1650	3522	3.00	393	1650	3545	3.87	372	1650	3536	25.15	396
1700	5076	3.21	266	1700	5075	4.16	254	1700	5087	27.29	269

**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	0.35	2706	100	31	0.45	2692	100	33	0.60	2538
150	40	0.94	2998	150	39	1.26	2950	150	41	1.63	2772
200	47	1.56	3284	200	48	2.08	3204	200	50	2.70	3000
250	55	2.20	3560	250	56	2.96	3447	250	59	3.83	3218
300	62	2.89	3822	300	64	3.90	3674	300	68	5.06	3419
350	70	3.64	4063	350	72	4.93	3879	350	77	6.41	3599
400	77	4.46	4281	400	80	6.07	4059	400	86	7.92	3752
450	84	5.38	4468	450	88	7.34	4206	450	95	9.62	3873
500	92	6.40	4622	500	97	8.77	4316	500	104	11.54	3955
550	99	7.54	4737	550	105	10.38	4385	550	114	13.72	3997
600	105	8.81	4817	600	113	12.17	4418	600	124	16.16	4002
650	113	10.20	4864	650	122	14.17	4418	650	135	18.89	3976
700	120	11.72	4883	700	131	16.37	4393	700	146	21.93	3927
750	128	13.38	4878	750	141	18.80	4347	750	158	25.28	3861
800	136	15.18	4852	800	152	21.46	4285	800	171	28.97	3784
850	145	17.12	4808	850	163	24.36	4214	850	185	33.01	3702
900	154	19.23	4750	900	176	27.53	4134	900	200	37.44	3616
1000	176	23.99	4606	1000	203	34.75	3960	1000	233	47.63	3437
1050	187	26.69	4526	1050	218	38.85	3868	1050	251	53.46	3346
1100	199	29.63	4438	1100	233	43.32	3773	1100	270	59.82	3255
1150	212	32.80	4342	1150	250	48.23	3675	1150	290	66.73	3164
1200	226	36.23	4252	1200	268	53.56	3576	1200	312	74.26	3074
1250	241	39.97	4169	1250	286	59.33	3479	1250	333	82.49	2987
1300	257	44.11	4043	1300	307	65.69	3377	1300	358	91.31	2899
1350	279	48.74	3814	1350	317	72.70	3304	1350	369	101.11	2858
1400	332	53.83	3439	1400	361	80.41	3100	1400	410	111.79	2724
1450	459	59.32	2890	1450	525	88.84	2547	1450	560	122.78	2279
1500	764	65.19	2176	1500	780	97.80	2053	1500	815	136.31	1829
1550	1353	71.46	1359								
1600	2284	78.35	665								
1650	3573	86.03	298								
1700	5120	94.31	192								

**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 <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	44	2.06	2587								
200	54	3.41	2798								
250	63	4.84	2997								
300	72	6.39	3181								
350	82	8.10	3343								
400	92	10.02	3479	400	101	12.04	3240	400	116	17.30	2808
450	102	12.19	3583	450	112	15.00	3296	450	130	21.71	2823
500	113	14.65	3650	500	123	18.17	3336	500	143	26.38	2828
550	124	17.43	3676	550	134	21.70	3344	550	158	31.56	2815
600	135	20.57	3666	600	147	25.69	3323	600	174	37.40	2783
650	147	24.11	3627	650	161	30.17	3277	650	191	44.03	2735
700	160	28.06	3565	700	176	35.20	3213	700	210	51.58	2675
750	174	32.46	3488	750	193	40.83	3136	750	231	60.17	2603
800	190	37.34	3401	800	211	47.09	3050	800	254	69.94	2524
850	206	42.73	3310	850	230	54.05	2962	850	279	80.97	2440
900	224	48.67	3218	900	251	61.74	2872	900	306	93.15	2355
1000	264	62.38	3035	1000	296	79.41	2699	1000	362	120.31	2203
1050	285	70.22	2946	1050	320	89.47	2619	1050	391	135.21	2142
1100	307	78.76	2859	1100	346	100.45	2542	1100	421	151.87	2082
1150	331	88.02	2776	1150	372	112.41	2468	1150	455	170.66	2017
1200	355	98.07	2696	1200	399	125.36	2396	1200	487	189.40	1965
1250	381	108.98	2618	1250	428	139.34	2328	1250	515	207.49	1933
1300	408	120.90	2539	1300	459	154.46	2259	1300	558	233.07	1858
1350	429	134.07	2494	1350	485	171.26	2216	1350	600	261.61	1792
1400	468	148.30	2384	1400	525	189.30	2126	1400	635	284.81	1755
1450	590	163.41	2043	1450	630	208.04	1865	1450	719	311.65	1603
1500	842	181.47	1667	1500	867	231.75	1547	1500	933	349.76	1364

### Available Dimensions

Grade named according to isovac®	Delivery form	Width [mm]	Length [mm]
isovac HP 270-50 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 270-50 A	✔	✔	☰	✔	✔

✔ Available ☰ On request

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