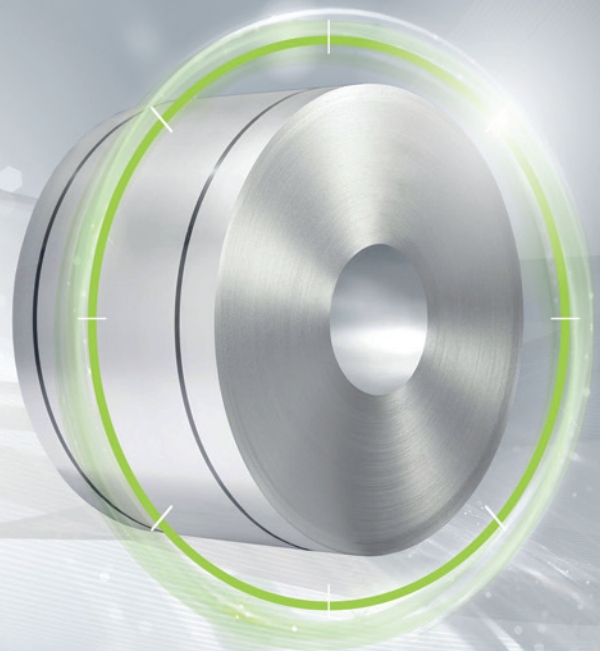


FULLY
PROCESSED

isovac high-perm 310-65 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 310-65 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 310-65 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 310-65 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 310-65 A	1.0892	M310-65A	M310-65A 5	65A310	-	64F190	-	65C310	65W310

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 310-65 A	445	440	565	22	210

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 310-65 A	1.10	0.65	2.65	1.56	1.58	1.67	1.78	1200

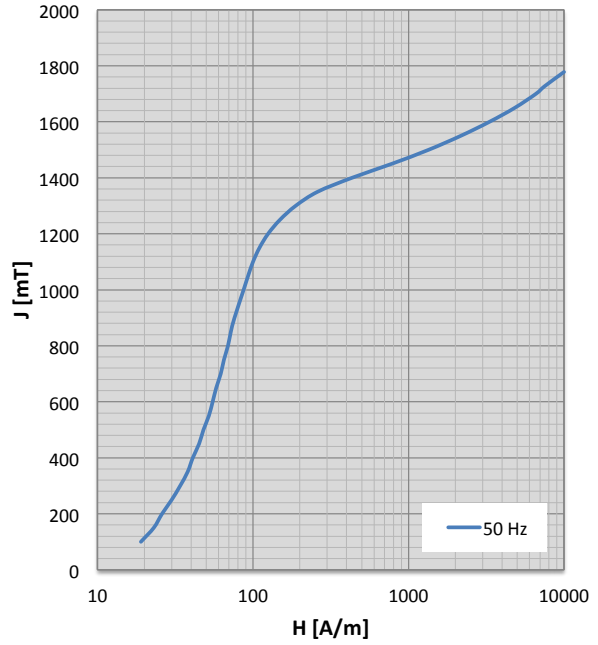
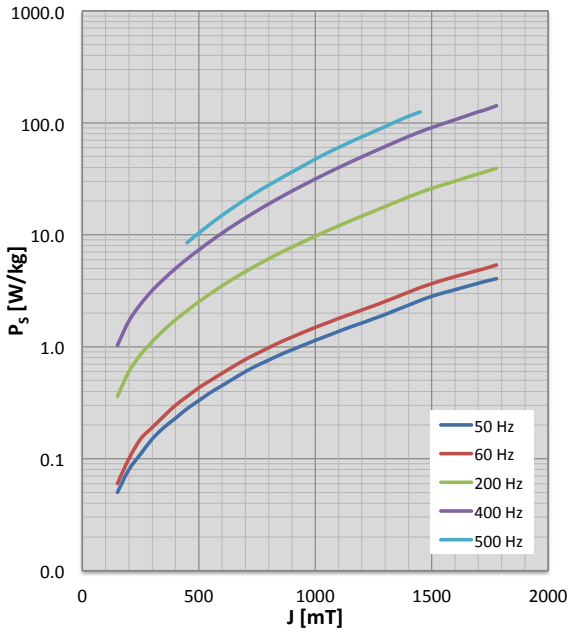
Physical properties:

Typical values

Grade named according to isovac®	Density ρ [g/cm ³]	Specific electrical resistance ρ_s [$\mu\Omega\text{cm}$]	Thermal conductivity λ [W/mK]
isovac HP 310-65 A	7.60	64.5	22

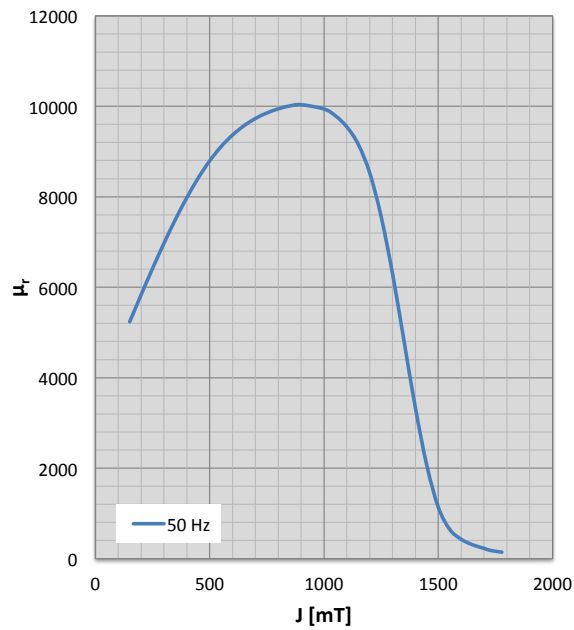
Characteristics P_s/J loss curve and characteristics J/H magnetization curve

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	19	0.02	4629								
150	23	0.05	5236	150	23	0.06	5112	150	30	0.36	3785
200	26	0.08	5834	200	27	0.10	5670	200	37	0.60	4096
250	30	0.11	6416	250	31	0.15	6213	250	43	0.85	4395
300	34	0.15	6973	300	35	0.19	6733	300	49	1.11	4676
350	38	0.19	7498	350	39	0.24	7223	350	56	1.41	4934
400	41	0.23	7982	400	43	0.30	7674	400	62	1.74	5163
450	45	0.28	8417	450	47	0.36	8079	450	68	2.10	5356
500	48	0.33	8795	500	50	0.43	8431	500	75	2.52	5509
550	52	0.39	9110	550	54	0.50	8724	550	81	2.98	5616
600	55	0.45	9366	600	57	0.58	8961	600	87	3.50	5683
650	58	0.52	9571	650	61	0.67	9149	650	94	4.07	5715
700	62	0.60	9731	700	64	0.77	9295	700	100	4.69	5719
750	65	0.68	9853	750	68	0.87	9402	750	107	5.37	5699
800	69	0.76	9944	800	71	0.98	9479	800	115	6.11	5664
850	72	0.85	10008	850	75	1.10	9528	850	122	6.91	5616
900	76	0.94	10036	900	79	1.22	9545	900	131	7.77	5558
1000	87	1.14	9940	1000	90	1.49	9454	1000	149	9.72	5408
1050	93	1.25	9791	1050	96	1.63	9333	1050	159	10.82	5317
1100	100	1.37	9544	1100	103	1.79	9160	1100	169	12.01	5224
1150	110	1.50	9157	1150	112	1.95	8904	1150	179	13.31	5131
1200	125	1.63	8526	1200	126	2.13	8408	1200	192	14.70	5010
1250	149	1.78	7561	1250	150	2.32	7526	1250	208	16.21	4823
1300	188	1.94	6292	1300	188	2.54	6295	1300	232	17.88	4523
1350	260	2.14	4811	1350	259	2.79	4821	1350	281	19.75	4046
1400	433	2.35	3326	1400	433	3.07	3329	1400	436	21.76	3262
1450	781	2.59	2053	1450	784	3.37	2053	1450	784	23.86	2144
1500	1346	2.82	1136	1500	1351	3.66	1136	1500	1356	25.96	1125
1550	2169	3.03	646	1550	2173	3.95	645	1550	2182	28.01	607
1600	3316	3.23	428	1600	3320	4.23	427	1600	3332	30.15	425
1650	4825	3.46	306	1650	4836	4.52	305	1650	4848	32.53	322
1700	6597	3.69	227	1700	6619	4.82	226	1700	6630	35.09	240
1727	7500	3.83	183	1727	7500	4.99	183	1726	7500	36.35	183
1778	10000	4.05	142	1779	10000	5.38	142	1777	10000	39.32	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			
J [mT]	H [A/m]	P _s [W/kg]	μ _r [-]	J [mT]	H [A/m]	P _s [W/kg]	μ _r [-]
100	31	0.39	2635				
150	40	1.03	2855				
200	48	1.70	3069				
250	57	2.40	3273				
300	66	3.18	3461				
350	75	4.03	3627				
400	84	5.00	3766	400	93	6.78	3474
450	93	6.09	3873	450	104	8.50	3491
500	103	7.33	3941	500	115	10.37	3494
550	113	8.75	3969	550	128	12.50	3471
600	124	10.35	3961	600	141	14.92	3425
650	135	12.15	3923	650	156	17.65	3362
700	147	14.15	3864	700	171	20.69	3286
750	160	16.39	3789	750	188	24.06	3204
800	173	18.86	3705	800	205	27.76	3121
850	188	21.58	3619	850	223	31.83	3041
900	204	24.58	3532	900	242	36.37	2959
1000	238	31.50	3354	1000	289	47.37	2760
1050	257	35.47	3263	1050	315	53.64	2663
1100	277	39.81	3167	1100	338	60.13	2596
1150	298	44.54	3070	1150	362	67.32	2523
1200	320	49.68	2985	1200	390	75.07	2450
1250	344	55.26	2918	1250	424	83.29	2390
1300	369	61.42	2808	1300	447	92.54	2316
1350	407	68.23	2586	1350	465	103.20	2189
1400	534	75.54	2204	1400	585	114.29	1939
1450	832	83.12	1660	1450	909	125.21	1530
1500	1362	90.75	1105	1500	1369	137.30	1095
1550	2179	98.39	690				
1600	3338	106.52	423				
1650	4863	115.61	272				
1700	6651	125.45	201				
1726	7500	130.03	183				
1777	10000	142.19	141				

Available Dimensions

Grade named according to isovac®	Delivery form	Width [mm]	Length [mm]
isovac HP 310-65 A	Wide strip / Slit strip	19 – 1440	-
	Cut-to-length sheets	300 – 1440	300 – 5000

Deliverable coating systems

Grade named according to isovac®	Uncoated	C-3	Backlack	C-5	C-6
isovac HP 310-65 A	✔	✔	☰	✔	✔

✔ Available ☰ On request

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