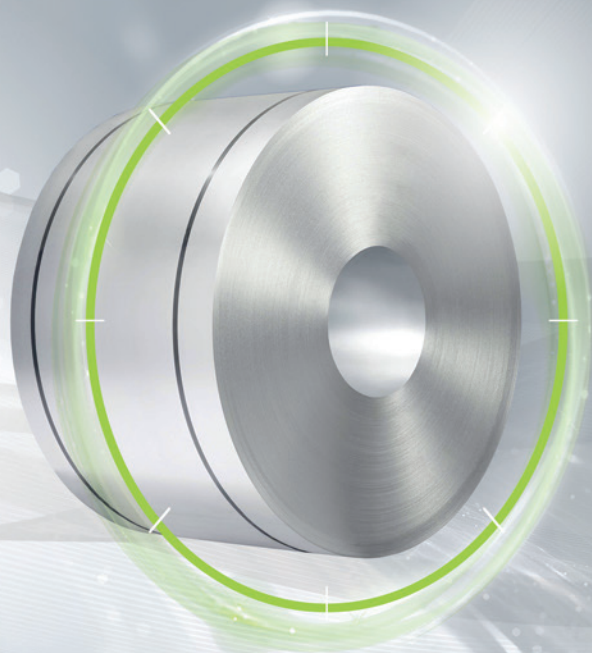


FULLY  
PROCESSED

## isovac high-perm 210-35 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 210-35 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 210-35 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 210-35 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 210-35 A	1.0802	M210-35A	M210-35A 5	35A210	-	-	-	-	35W210

**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 210-35 A	435	430	540	15	200

**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 210-35 A	0.75	0.42	1.95	1.09	1.56	1.65	1.77	900

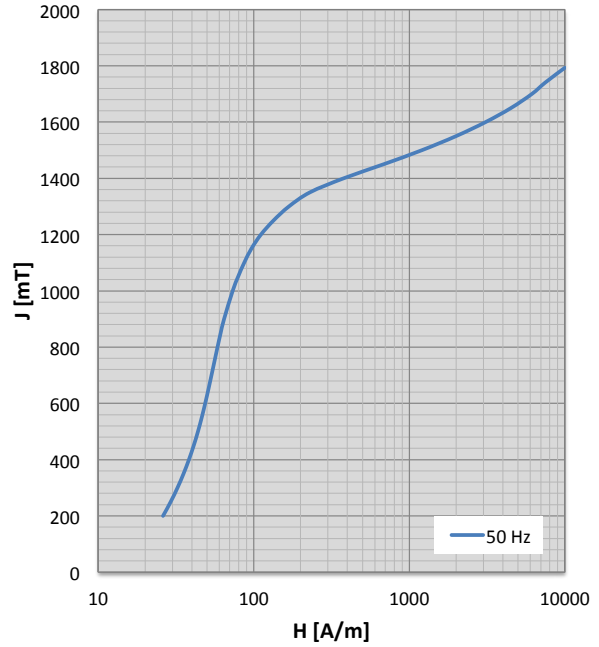
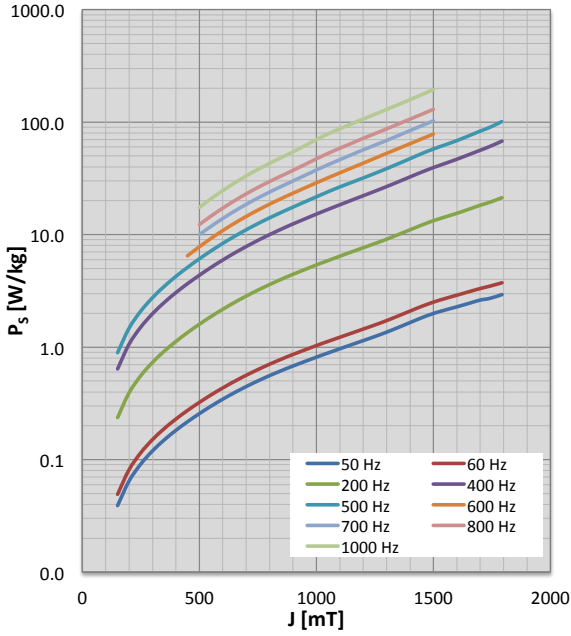
**Physical properties:**

Typical values

Grade named according to isovac®	Density $\rho$ [g/cm <sup>3</sup> ]	Specific electrical resistance $\rho_s$ [ $\mu\Omega\text{cm}$ ]	Thermal conductivity $\lambda$ [W/mK]
isovac HP 210-35 A	7.60	64.5	22

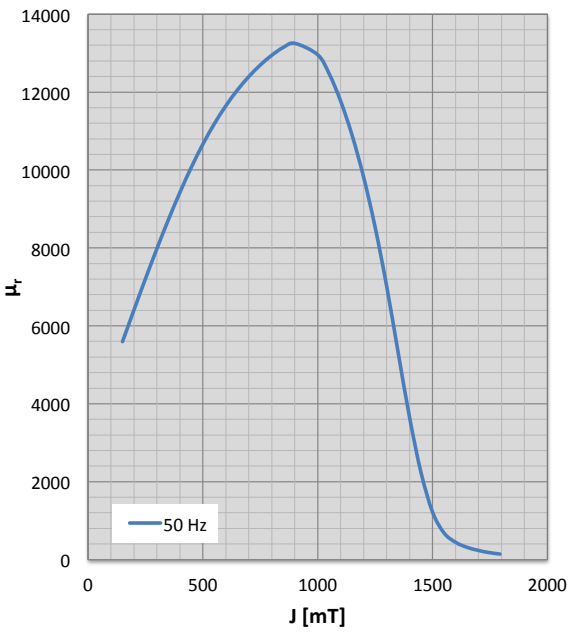
**Characteristics  $P_s/J$  loss curve and characteristics  $J/H$  magnetization curve**

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



**Characteristics  $\mu_r/J$  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	21	0.08	4285
150	23	0.04	5591	150	23	0.05	5528	150	25	0.24	4793
200	26	0.06	6409	200	26	0.08	6298	200	30	0.39	5296
250	29	0.09	7209	250	30	0.12	7054	250	34	0.56	5789
300	32	0.12	7985	300	33	0.15	7787	300	38	0.73	6267
350	35	0.15	8726	350	36	0.19	8490	350	43	0.92	6725
400	38	0.18	9426	400	39	0.23	9157	400	47	1.12	7159
450	41	0.22	10074	450	42	0.27	9779	450	50	1.35	7562
500	44	0.26	10664	500	45	0.32	10349	500	54	1.60	7930
550	46	0.30	11188	550	47	0.38	10862	550	57	1.87	8259
600	49	0.34	11648	600	50	0.43	11317	600	60	2.17	8551
650	51	0.39	12050	650	52	0.50	11716	650	64	2.49	8808
700	53	0.45	12398	700	54	0.56	12062	700	67	2.84	9031
750	56	0.50	12695	750	57	0.63	12354	750	70	3.21	9224
800	58	0.56	12946	800	59	0.70	12596	800	73	3.60	9389
850	61	0.62	13147	850	62	0.78	12783	850	76	4.01	9526
900	64	0.68	13251	900	65	0.86	12884	900	80	4.44	9632
1000	73	0.81	12957	1000	74	1.03	12683	1000	88	5.37	9724
1050	79	0.89	12466	1050	80	1.12	12309	1050	93	5.88	9697
1100	87	0.97	11763	1100	87	1.22	11712	1100	98	6.43	9605
1150	97	1.05	10881	1150	97	1.33	10874	1150	105	7.01	9411
1200	111	1.14	9809	1200	111	1.45	9811	1200	116	7.64	9009
1250	134	1.24	8525	1250	134	1.57	8541	1250	135	8.33	8274
1300	168	1.36	7016	1300	168	1.72	7041	1300	165	9.11	7085
1350	229	1.50	5315	1350	228	1.89	5328	1350	225	10.01	5427
1400	378	1.65	3639	1400	379	2.09	3634	1400	374	11.03	3675
1450	683	1.82	2223	1450	690	2.30	2213	1450	682	12.16	2235
1500	1205	1.99	1216	1500	1207	2.51	1211	1500	1195	13.29	1237
1550	1997	2.14	681	1550	1971	2.70	685	1550	1958	14.35	702
1600	3096	2.28	445	1600	3040	2.89	457	1600	3032	15.47	459
1650	4507	2.44	314	1650	4449	3.10	329	1650	4446	16.78	324
1700	6142	2.62	235	1700	6104	3.32	245	1700	6109	18.24	240
1741	7500	2.71	185	1741	7500	3.48	185	1741	7500	19.38	185
1793	10000	2.93	143	1793	10000	3.73	143	1793	10000	21.28	143

**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	23	0.22	3681	100	25	0.32	3424				
150	29	0.64	4047	150	31	0.89	3756				
200	35	1.06	4410	200	37	1.48	4083				
250	40	1.51	4765	250	44	2.09	4403				
300	46	1.98	5109	300	50	2.75	4710				
350	51	2.49	5439	350	56	3.47	5003				
400	57	3.05	5749	400	61	4.25	5276	400	64	5.23	5146
450	61	3.67	6037	450	67	5.12	5525	450	69	6.48	5344
500	66	4.35	6299	500	72	6.09	5748	500	74	7.80	5520
550	71	5.11	6532	550	77	7.17	5940	550	80	9.26	5657
600	75	5.95	6734	600	82	8.36	6102	600	85	10.86	5755
650	79	6.85	6905	650	87	9.65	6236	650	91	12.61	5820
700	83	7.83	7046	700	92	11.04	6342	700	97	14.49	5857
750	87	8.88	7154	750	96	12.52	6422	750	104	16.51	5872
800	92	10.00	7231	800	102	14.10	6477	800	110	18.65	5868
850	96	11.18	7275	850	107	15.76	6508	850	117	20.91	5853
900	101	12.44	7291	900	113	17.56	6510	900	124	23.34	5834
1000	113	15.22	7248	1000	127	21.67	6406	1000	138	28.86	5820
1050	119	16.75	7196	1050	135	24.04	6301	1050	146	32.00	5789
1100	125	18.41	7127	1100	142	26.53	6215	1100	155	35.40	5696
1150	132	20.21	7034	1150	149	29.09	6169	1150	163	39.09	5596
1200	142	22.16	6875	1200	158	31.87	6089	1200	175	43.17	5474
1250	158	24.30	6572	1250	174	35.01	5877	1250	194	47.73	5286
1300	183	26.72	5963	1300	196	38.60	5421	1300	210	52.74	4948
1350	234	29.48	4930	1350	241	42.68	4630	1350	241	58.19	4384
1400	377	32.58	3625	1400	384	47.32	3518	1400	385	64.22	3471
1450	685	35.95	2284	1450	703	52.48	2205	1450	722	70.95	2206
1500	1200	39.43	1223	1500	1237	57.70	1132	1500	1202	78.33	1219
1550	1965	42.93	674	1550	2020	62.76	623				
1600	3039	46.77	458	1600	3105	68.43	448				
1650	4452	51.25	337	1650	4515	75.34	342				
1700	6112	56.23	250	1700	6158	83.20	257				
1741	7500	60.73	185	1740	7500	89.68	185				
1793	10000	67.79	143	1792	10000	100.92	143				



### Available Dimensions

Grade named according to isovac®	Delivery form	Width [mm]	Length [mm]
isovac HP 210-35 A	Wide strip / Slit strip	19 – 1320	-
	Cut-to-length sheets	300 – 1320	300 – 5000

### Deliverable coating systems

Grade named according to isovac®	Uncoated	C-3	Backlack	C-5	C-6
isovac HP 210-35 A	✔	✔	☰	✔	✔

✔ Available ☰ On request

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