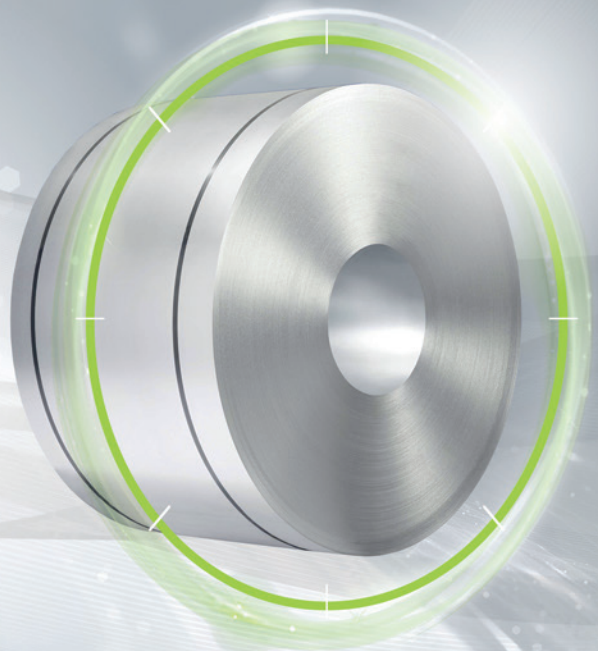


FULLY
PROCESSED

isovac 940-50 A

The perfect solution for direct application

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. Upon request, isovac 940-50 A can be supplied with an electrical steel insulation system and can be used directly in as-delivered condition.

Convincing advantages:

- » 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 940-50 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 940-50 A	1.0817	M940-50A	M940-50A 5	50A1000	-	-	-	-	50W1000

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	0.2 %-Yield strength	Tensile strength	Elongation	Hardness
	R _{eH} [MPa]	R _{p0.2} [MPa]	R _m [MPa]	A ₈₀ [%]	HV5 [-]
isovac 940-50 A	370	305	380	38	125

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 _r
	50 Hz [W/kg]	60 Hz [W/lb]	50 Hz [W/kg]	60 Hz [W/lb]	[T]	[T]	[T]	[-]
isovac 940-50 A	3.60	2.05	7.60	4.33	1.66	1.75	1.87	1700

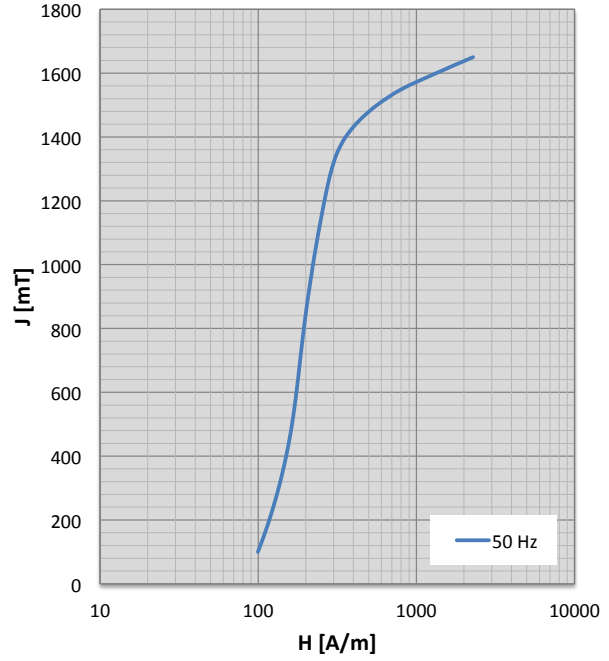
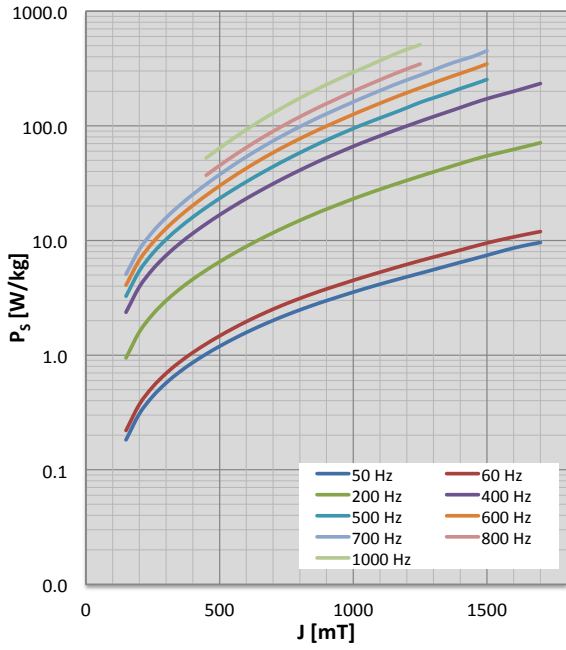
Physical properties:

Typical values

Grade named according to isovac®	Density ρ [g/cm³]	Specific electrical resistance ρ _s [μΩcm]	Thermal conductivity λ [W/mK]
isovac 940-50 A	7.83	19.0	54

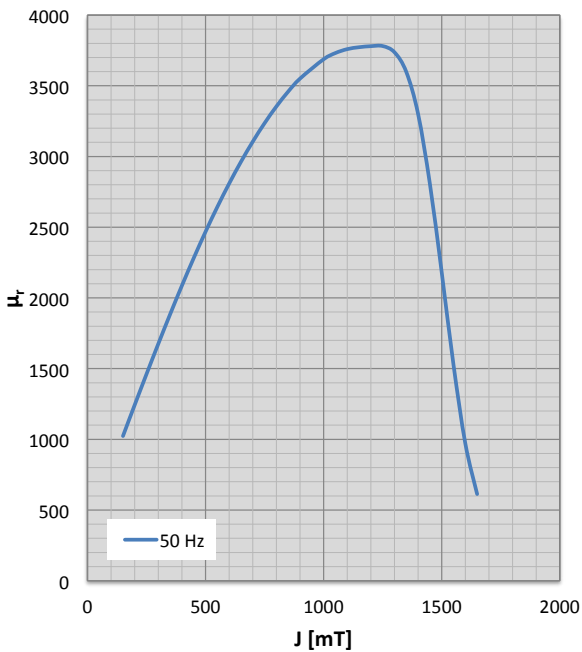
Characteristics P_s/J loss curve and characteristics J/H magnetization curve

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	100	0.06	801	100	96	0.07	829	100	98	0.31	812
150	109	0.18	1023	150	106	0.22	1042	150	111	0.95	985
200	117	0.31	1244	200	116	0.37	1255	200	124	1.59	1155
250	126	0.44	1462	250	125	0.53	1464	250	137	2.27	1322
300	135	0.57	1676	300	134	0.69	1669	300	150	2.98	1482
350	143	0.71	1885	350	143	0.87	1869	350	163	3.75	1634
400	150	0.86	2088	400	151	1.05	2062	400	175	4.59	1776
450	157	1.02	2283	450	159	1.25	2246	450	187	5.51	1905
500	164	1.19	2468	500	166	1.47	2421	500	198	6.52	2020
550	169	1.38	2644	550	172	1.71	2584	550	209	7.63	2118
600	174	1.58	2809	600	178	1.96	2737	600	220	8.86	2201
650	179	1.79	2963	650	183	2.23	2879	650	231	10.20	2270
700	184	2.01	3105	700	188	2.51	3010	700	243	11.66	2324
750	189	2.24	3236	750	194	2.81	3131	750	255	13.25	2366
800	194	2.48	3354	800	199	3.12	3241	800	268	14.95	2396
850	200	2.73	3459	850	206	3.44	3342	850	282	16.79	2415
900	207	2.99	3551	900	212	3.77	3429	900	297	18.75	2425
1000	222	3.54	3688	1000	229	4.49	3557	1000	329	23.07	2426
1050	231	3.84	3732	1050	238	4.88	3593	1050	346	25.42	2422
1100	240	4.15	3759	1100	249	5.29	3615	1100	363	27.91	2414
1150	251	4.48	3773	1150	261	5.72	3624	1150	381	30.56	2405
1200	262	4.81	3780	1200	276	6.18	3589	1200	400	33.36	2390
1250	275	5.17	3781	1250	297	6.66	3479	1250	421	36.35	2370
1300	292	5.56	3737	1300	327	7.15	3282	1300	441	39.56	2349
1350	315	5.98	3598	1350	369	7.67	2996	1350	461	43.06	2325
1400	357	6.44	3301	1400	433	8.24	2635	1400	494	46.80	2255
1450	432	6.91	2806	1450	535	8.86	2220	1450	558	50.73	2089
1500	564	7.43	2181	1500	687	9.50	1764	1500	679	54.63	1786
1550	808	8.01	1525	1550	938	10.12	1292	1550	912	58.37	1345
1600	1336	8.59	970	1600	1464	10.73	882	1600	1429	62.23	903
1650	2282	9.12	613	1650	2410	11.34	597	1650	2371	66.48	595
1700	3543	9.60	409	1700	3674	11.95	411	1700	3638	71.07	406

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	104	0.83	767	100	112	1.16	714	100	114	1.51	695
150	121	2.36	903	150	129	3.26	842	150	133	4.08	814
200	138	3.94	1037	200	147	5.43	968	200	152	6.74	931
250	155	5.61	1167	250	165	7.73	1088	250	171	9.59	1042
300	172	7.40	1289	300	183	10.21	1201	300	191	12.72	1145
350	189	9.37	1402	350	202	12.94	1304	350	212	16.23	1237
400	206	11.54	1502	400	222	15.99	1393	400	233	20.21	1316
450	224	13.97	1588	450	242	19.40	1467	450	256	24.75	1380
500	241	16.70	1658	500	262	23.26	1523	500	280	29.95	1424
550	259	19.76	1709	550	284	27.61	1560	550	306	35.89	1449
600	278	23.18	1743	600	307	32.49	1579	600	334	42.58	1456
650	297	26.99	1762	650	331	37.95	1583	650	362	50.05	1449
700	318	31.21	1769	700	356	44.02	1577	700	393	58.29	1433
750	340	35.86	1765	750	384	50.73	1562	750	425	67.33	1412
800	365	40.97	1752	800	413	58.13	1542	800	459	77.16	1388
850	391	46.55	1734	850	445	66.25	1520	850	495	87.83	1366
900	419	52.60	1711	900	479	75.06	1496	900	532	99.41	1344
1000	480	66.14	1660	1000	550	94.69	1447	1000	614	125.78	1297
1050	511	73.62	1636	1050	587	105.48	1424	1050	658	140.78	1270
1100	544	81.64	1611	1100	625	116.90	1401	1100	705	157.13	1242
1150	578	90.25	1583	1150	664	129.17	1377	1150	754	174.90	1213
1200	614	99.51	1556	1200	711	143.41	1344	1200	806	193.93	1185
1250	651	109.46	1529	1250	764	159.93	1303	1250	859	214.20	1158
1300	691	120.08	1498	1300	808	174.91	1281	1300	916	236.33	1129
1350	734	131.44	1459	1350	854	191.17	1259	1350	980	260.44	1097
1400	777	144.00	1434	1400	915	210.88	1218	1400	1049	285.83	1062
1450	820	157.96	1429	1450	975	230.35	1182	1450	1118	313.20	1032
1500	877	172.13	1361	1500	1047	253.20	1140	1500	1200	345.99	995
1550	1009	185.58	1159								
1600	1438	199.64	898								
1650	2351	215.77	664								
1700	3636	233.59	461								

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 [-]
100	118	1.90	676								
150	138	5.07	786								
200	158	8.36	892								
250	179	11.90	993								
300	201	15.80	1087								
350	223	20.19	1171								
400	247	25.20	1241	400	259	29.62	1232	400	289	41.59	1106
450	272	30.93	1296	450	286	37.01	1256	450	321	52.27	1118
500	299	37.52	1334	500	314	45.03	1272	500	355	63.87	1124
550	328	45.07	1351	550	344	54.19	1277	550	393	77.16	1120
600	359	53.62	1352	600	378	64.62	1271	600	434	92.37	1107
650	392	63.19	1341	650	414	76.36	1256	650	480	109.58	1087
700	427	73.79	1320	700	453	89.44	1235	700	528	128.89	1062
750	464	85.45	1295	750	494	103.90	1210	750	578	150.39	1036
800	502	98.19	1268	800	538	119.77	1183	800	631	174.15	1009
850	543	112.05	1244	850	585	137.11	1157	850	686	200.26	985
900	586	127.15	1220	900	633	156.07	1131	900	743	228.73	962
1000	679	161.57	1172	1000	737	199.55	1080	1000	872	292.69	913
1050	730	181.19	1145	1050	792	224.43	1054	1050	944	328.63	885
1100	783	202.68	1118	1100	854	251.66	1025	1100	1025	369.54	854
1150	839	226.06	1091	1150	923	281.28	992	1150	1111	416.43	825
1200	897	250.52	1064	1200	993	312.49	961	1200	1190	463.71	802
1250	961	275.94	1035	1250	1060	345.60	937	1250	1260	509.64	788
1300	1032	305.79	1003	1300	1142	385.71	906	1300	1373	574.61	754
1350	1107	339.76	971								
1400	1174	371.79	949								
1450	1239	403.98	930								
1500	1346	451.26	887								

Available Dimensions

Grade named according to isovac®	Delivery form	Width [mm]	Length [mm]
isovac 940-50 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 940-50 A	✔	✔	☰	✔	✔

✔ Available ☰ On request

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