

isovac 340-50 K HE

The specialist for shorter final annealing times

Production in modern continuous annealing lines ensures that this semi-processed isovac® grade exhibits homogeneous mechanical and magnetic properties. High dimensional accuracy and defined degrees of roughness guarantee best punchability and further processing. isovac 340-50 K HE (high-efficiency) is highly decarbonized in as-delivered condition, which means that the final annealing time at the customer can be significantly shortened. Subsequent annealing at the customer for the purpose of adjusting optimum magnetic properties completely eliminates any mechanical damage introduced to the material during the punching process.

Convincing advantages:

- » Shorter final annealing made possible by the low carbon content and thus reduced overall costs resulting from lower energy input
- » Best processability through consistent mechanical properties and homogeneous, clean surfaces with defined roughness
- » Excellent stackability resulting from high dimensional accuracy (thickness tolerance)

voestalpine supplies isovac 340-50 K HE, 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 10341		DIN EN 10126 DIN EN 10165	IEC/CEI 60404-8-3	ASTM A 683 M	ASTM A 683	AISI	IS15391
	Material No.	Abbreviation						
isovac 340-50 K HE	1.0841	M 340-50 K	M 340-50 E	340-50 K5	47S414M/441M	47S190	M-36/M-43	50-SP-340 E5

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®	0.2 %-Yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Elongation A_{80} [%]	Hardness HV5 [-]
isovac 340-50 K HE	455	500	17	190

Magnetic properties:

after final annealing according to EN 10341 (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 340-50 K HE	1.25	0.71	3.15	1.80	1.57	1.66	1.78	1100

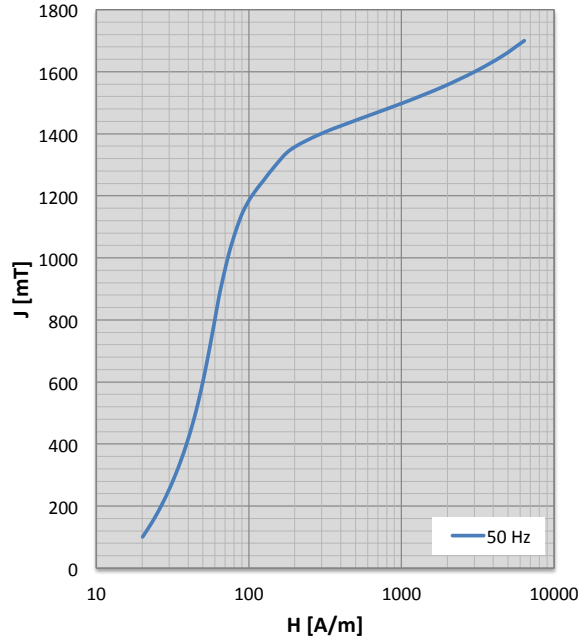
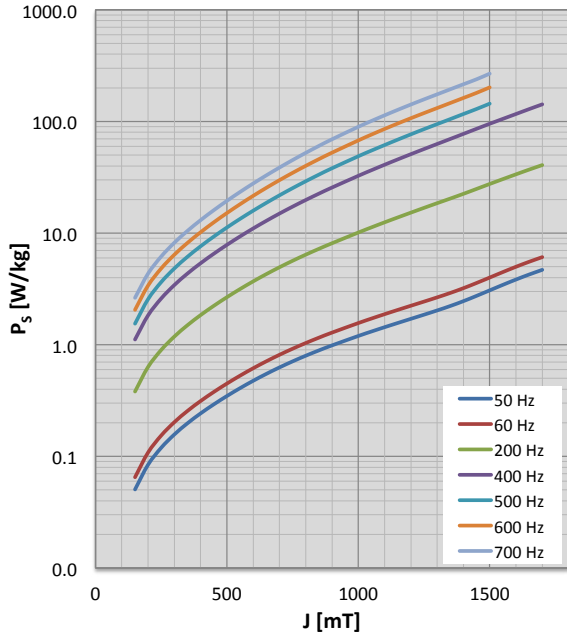
Physical properties:

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 340-50 K HE	7.75	38.5	30

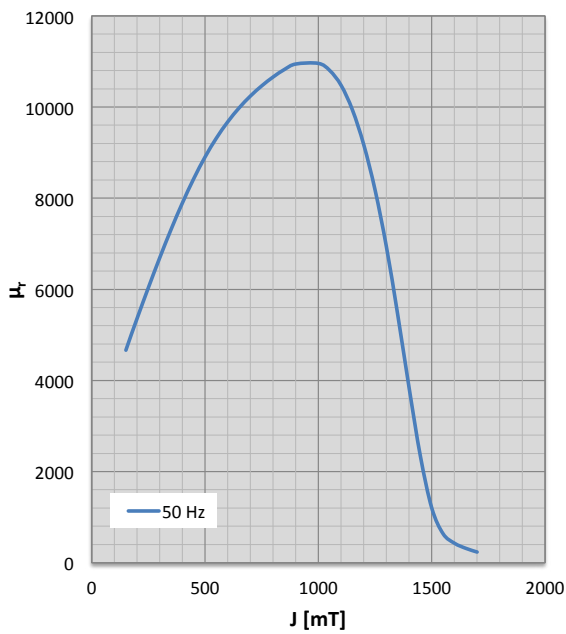
Characteristics P_s/J loss curve and characteristics J/H magnetization curve

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	20	0.02	3962	100	20	0.02	3946	100	25	0.14	3163
150	23	0.05	4665	150	24	0.06	4584	150	31	0.38	3489
200	27	0.08	5359	200	27	0.11	5214	200	38	0.63	3810
250	30	0.12	6038	250	31	0.15	5830	250	44	0.90	4122
300	33	0.16	6692	300	34	0.20	6424	300	50	1.18	4419
350	36	0.20	7314	350	38	0.26	6989	350	56	1.50	4696
400	39	0.24	7895	400	41	0.31	7517	400	62	1.84	4949
450	42	0.29	8428	450	44	0.38	8002	450	68	2.23	5172
500	45	0.35	8904	500	47	0.45	8435	500	74	2.67	5361
550	47	0.41	9318	550	50	0.53	8812	550	80	3.15	5513
600	50	0.48	9674	600	53	0.62	9137	600	86	3.70	5628
650	52	0.55	9980	650	55	0.71	9416	650	91	4.29	5711
700	55	0.63	10241	700	58	0.81	9655	700	97	4.94	5763
750	57	0.71	10465	750	61	0.92	9860	750	103	5.65	5789
800	60	0.80	10658	800	63	1.04	10037	800	110	6.41	5792
850	62	0.89	10824	850	66	1.16	10190	850	117	7.23	5773
900	65	0.99	10943	900	69	1.28	10310	900	125	8.11	5736
1000	73	1.20	10957	1000	76	1.56	10413	1000	142	10.12	5615
1050	78	1.31	10800	1050	81	1.72	10362	1050	151	11.26	5533
1100	84	1.44	10476	1100	86	1.88	10164	1100	161	12.49	5437
1150	92	1.57	9936	1150	93	2.05	9747	1150	171	13.81	5329
1200	105	1.71	9171	1200	106	2.24	9084	1200	183	15.25	5229
1250	125	1.86	8176	1250	125	2.43	8160	1250	198	16.83	5140
1300	150	2.03	6929	1300	150	2.66	6953	1300	207	18.54	4997
1350	189	2.22	5436	1350	188	2.91	5476	1350	214	20.39	4673
1400	297	2.46	3837	1400	294	3.21	3877	1400	293	22.48	3888
1450	546	2.74	2332	1450	538	3.57	2360	1450	531	24.88	2520
1500	1031	3.07	1199	1500	1017	4.00	1215	1500	1016	27.55	1217
1550	1841	3.44	635	1550	1819	4.48	644	1550	1826	30.45	599
1600	3018	3.84	429	1600	2989	4.99	433	1600	3007	33.61	430
1650	4567	4.26	316	1650	4536	5.54	319	1650	4568	37.05	340
1700	6382	4.69	235	1700	6352	6.09	236	1700	6401	40.69	252

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	33	0.42	2419					100	38	0.76	2074
150	42	1.11	2642	150	45	1.54	2469	150	49	2.05	2233
200	50	1.83	2860	200	55	2.56	2644	200	60	3.39	2388
250	59	2.60	3069	250	65	3.64	2810	250	72	4.83	2534
300	68	3.43	3263	300	75	4.82	2963	300	83	6.40	2667
350	77	4.34	3439	350	85	6.14	3098	350	95	8.17	2784
400	86	5.37	3591	400	96	7.62	3212	400	107	10.19	2879
450	95	6.53	3716	450	107	9.31	3299	450	120	12.49	2949
500	105	7.85	3807	500	119	11.23	3356	500	133	15.12	2989
550	114	9.33	3863	550	130	13.41	3379	550	147	18.14	2997
600	124	11.01	3886	600	143	15.88	3372	600	162	21.57	2978
650	134	12.88	3881	650	156	18.67	3341	650	178	25.45	2935
700	145	14.96	3854	700	170	21.79	3291	700	195	29.80	2876
750	157	17.26	3808	750	185	25.27	3226	750	213	34.65	2806
800	170	19.79	3750	800	202	29.14	3152	800	233	40.04	2730
850	183	22.57	3684	850	220	33.41	3074	850	255	45.99	2653
900	198	25.61	3610	900	239	38.10	2994	900	278	52.54	2578
1000	231	32.59	3442	1000	281	48.81	2834	1000	327	67.65	2431
1050	250	36.59	3351	1050	303	54.87	2757	1050	354	76.29	2361
1100	268	40.96	3263	1100	326	61.49	2682	1100	382	85.69	2292
1150	287	45.73	3180	1150	351	68.75	2605	1150	411	95.90	2226
1200	310	50.94	3079	1200	378	76.70	2529	1200	442	106.93	2161
1250	339	56.62	2953	1250	405	85.35	2453	1250	474	118.87	2099
1300	358	62.86	2890	1300	435	94.68	2378	1300	508	131.90	2036
1350	364	69.73	2913	1350	455	105.03	2349	1350	540	146.36	1995
1400	412	77.40	2703	1400	501	116.64	2226	1400	584	162.43	1908
1450	588	85.98	2016	1450	663	129.39	1777	1450	697	180.36	1636
1500	1019	95.38	1213	1500	1032	144.43	1196	1500	1035	201.96	1191
1550	1824	105.51	696								
1600	3022	116.65	428								
1650	4590	129.03	283								
1700	6419	142.33	208								

Available Dimensions

Grade named according to isovac®	Delivery form	Width [mm]	Length [mm]
isovac 340-50 K HE	Wide strip / Slit strip	19 – 1560	-
	Cut-to-length sheets	300 – 1560	300 – 5000

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