isovac®

ELECTRICAL STEEL – isovac®

Range of supply
July 2020

voestalpine Steel Division
www.voestalpine.com/isovac

voestalpine
ONE STEP AHEAD.

FULLY PROCESSED ELECTRICAL STEEL

Steel grade	Magnetic sample direction	Specific total loss at 50 Hz		Magnetic polarization at 50 Hz			Mechanical sample direction	Yield strength	0.2 % yield strength	Tensile strength	Elongation	Hardness
		1.0 T P10 [W/kg]	1.5 T P15 [W/kg]	2500 A/m J25 [T]	5000 A/m J50 [T]	10000 A/m J100 [T]		R_{eH} [MPa]	$R_{p0.2}$ [MPa]	R_m [MPa]	A_{80} [%]	HV5 [-]
isovac® fully processed												
EN 10106 [1]		**P10**	**P15**	**J25**	**J50**	**J100**		**R_{eH}**	**$R_{p0.2}$**	**R_m**	**A_{80}**	**HV5**
isovac 235-35 A	Long. + Trans.	0.80	2.10	1.51	1.61	1.74	Transverse	455	445	550	15	210
isovac 250-35 A	Long. + Trans.	0.85	2.20	1.51	1.61	1.74	Transverse	475	470	580	17	210
isovac 270-35 A	Long. + Trans.	0.95	2.35	1.55	1.64	1.77	Transverse	365	355	490	25	165
isovac 300-35 A	Long. + Trans.	1.00	2.50	1.56	1.65	1.77	Transverse	375	365	505	27	165
isovac 330-35 A	Long. + Trans.	1.20	2.80	1.57	1.66	1.79	Transverse	350	335	490	30	150
isovac 270-50 A	Long. + Trans.	1.00	2.40	1.53	1.62	1.74	Transverse	490	470	600	22	220
isovac 290-50 A	Long. + Trans.	1.05	2.55	1.57	1.66	1.78	Transverse	355	350	485	25	185
isovac 310-50 A	Long. + Trans.	1.10	2.70	1.57	1.66	1.78	Transverse	360	355	490	26	185
isovac 330-50 A	Long. + Trans.	1.15	2.90	1.58	1.67	1.79	Transverse	370	365	505	28	185
isovac 350-50 A	Long. + Trans.	1.30	3.10	1.58	1.66	1.78	Transverse	325	310	470	32	165
isovac 400-50 A	Long. + Trans.	1.40	3.40	1.59	1.68	1.79	Transverse	350	330	490	32	170
isovac 470-50 A	Long. + Trans.	1.70	3.90	1.62	1.71	1.82	Transverse	330	315	470	33	150
isovac 530-50 A	Long. + Trans.	2.00	4.50	1.64	1.73	1.84	Transverse	330	305	445	35	135
isovac 600-50 A	Long. + Trans.	2.20	4.80	1.64	1.72	1.84	Transverse	335	310	450	35	135
isovac 700-50 A	Long. + Trans.	2.60	5.60	1.64	1.72	1.84	Transverse	335	285	400	37	115
isovac 800-50 A	Long. + Trans.	2.90	6.15	1.65	1.73	1.85	Transverse	360	300	410	36	120
isovac 940-50 A	Long. + Trans.	3.60	7.60	1.66	1.75	1.87	Transverse	370	305	380	38	125
isovac 310-65 A	Long. + Trans.	1.10	2.65	1.55	1.64	1.76	Transverse	455	450	580	15	215
isovac 330-65 A	Long. + Trans.	1.15	2.80	1.56	1.65	1.77	Transverse	475	470	590	15	215
isovac 350-65 A	Long. + Trans.	1.20	3.00	1.58	1.67	1.79	Transverse	365	360	505	30	185
isovac 400-65 A	Long. + Trans.	1.40	3.30	1.59	1.67	1.79	Transverse	390	375	520	31	185
isovac 470-65 A	Long. + Trans.	1.60	3.90	1.60	1.69	1.80	Transverse	350	330	490	33	170
isovac 530-65 A	Long. + Trans.	1.90	4.40	1.62	1.71	1.82	Transverse	320	300	455	33	155
isovac 600-65 A	Long. + Trans.	2.15	4.80	1.64	1.72	1.83	Transverse	350	320	470	34	155
isovac 700-65 A	Long. + Trans.	2.30	5.30	1.65	1.73	1.84	Transverse	340	310	440	36	145
isovac 800-65 A	Long. + Trans.	2.90	6.40	1.65	1.73	1.84	Transverse	335	280	400	37	125
isovac 1000-65 A	Long. + Trans.	3.90	8.60	1.68	1.77	1.88	Transverse	380	275	355	40	115
isovac 600-100 A	Long. + Trans.	2.20	5.30	1.59	1.68	1.79	Transverse	410	385	520	32	180 [2]
isovac 700-100 A	Long. + Trans.	2.50	5.80	1.60	1.68	1.80	Transverse	420	390	530	30	180 [2]
isovac 800-100 A	Long. + Trans.	2.80	6.80	1.64	1.72	1.83	Transverse	335	310	465	33	150 [2]
isovac 1000-100 A	Long. + Trans.	3.00	8.00	1.64	1.72	1.83	Transverse	345	310	440	34	135 [2]
isovac 1300-100 A	Long. + Trans.	3.80	8.90	1.65	1.73	1.84	Transverse	320	280	400	37	125 [2]
voestalpine special grade		**P10**	**P15**	**J25**	**J50**	**J100**		**R_{eH}**	**$R_{p0.2}$**	**R_m**	**A_{80}**	**HV5**
isovac 940-65 A	Long. + Trans.	2.95	6.40	1.65	1.73	1.85	Transverse	330	280	400	37	125

[1] Steel grade designation deviates from standard
[2] Hardness HV10 [-]

FULLY PROCESSED ELECTRICAL STEEL

Steel grade	Magnetic sample direction	Specific total loss at 50 Hz 1.0 T P10 [W/kg]	Specific total loss at 50 Hz 1.5 T P15 [W/kg]	Magnetic polarization at 50 Hz 2500 A/m J25 [T]	Magnetic polarization at 50 Hz 5000 A/m J50 [T]	Magnetic polarization at 50 Hz 10000 A/m J100 [T]	Mechanical sample direction	Yield strength R_{eH} [MPa]	0.2 % yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Elongation A_{80} [%]	Hardness HV5 [-]
isovac® fully processed high-perm												
voestalpine special grade		P10	P15	J25	J50	J100		R_{eH}	$R_{p0.2}$	R_m	A_{80}	HV5
isovac HP 210-35 A	Long. + Trans.	0.75	1.95	1.56	1.65	1.77	Transverse	435	430	540	15	200
isovac HP 235-35 A	Long. + Trans.	0.85	2.05	1.56	1.65	1.77	Transverse	445	440	560	19	210
isovac HP 250-35 A	Long. + Trans.	0.90	2.15	1.61	1.70	1.81	Transverse	355	350	485	24	165
isovac HP 270-35 A	Long. + Trans.	1.00	2.35	1.61	1.70	1.81	Transverse	370	355	500	29	160
isovac HP 300-35 A	Long. + Trans.	1.15	2.55	1.63	1.71	1.83	Transverse	325	310	455	30	160
isovac HP 330-35 A	Long. + Trans.	1.30	2.85	1.68	1.76	1.87	Transverse	300	280	440	32	130
isovac HP 230-50 A	Long. + Trans.	0.94 [1]	2.20 [1]	1.57 [1]	1.65 [1]	1.77 [1]	Transverse	470	460	590	25	225
isovac HP 250-50 A	Long. + Trans.	0.95	2.25	1.56	1.65	1.77	Transverse	445	440	560	18	220
isovac HP 270-50 A	Long. + Trans.	1.00	2.30	1.61	1.70	1.81	Transverse	345	340	470	25	185
isovac HP 290-50 A	Long. + Trans.	1.05	2.45	1.62	1.71	1.82	Transverse	360	355	490	30	180
isovac HP 310-50 A	Long. + Trans.	1.10	2.65	1.63	1.72	1.83	Transverse	370	355	500	31	180
isovac HP 330-50 A	Long. + Trans.	1.25	2.85	1.64	1.73	1.84	Transverse	320	310	465	30	165
isovac HP 350-50 A	Long. + Trans.	1.35	3.00	1.67	1.76	1.86	Transverse	280	270	430	33	150
isovac HP 400-50 A	Long. + Trans.	1.40	3.25	1.68	1.76	1.87	Transverse	290	275	440	34	150
isovac HP 470-50 A	Long. + Trans.	1.85	3.95	1.69	1.77	1.87	Transverse	290	275	400	37	135
isovac HP 530-50 A	Long. + Trans.	2.00	4.20	1.70	1.78	1.89	Transverse	300	280	420	35	135
isovac HP 600-50 A	Long. + Trans.	2.25	4.70	1.70	1.78	1.88	Transverse	250	230	370	26	115
isovac HP 290-65 A	Long. + Trans.	1.05	2.55	1.58	1.67	1.78	Transverse	440	435	560	20	210
isovac HP 310-65 A	Long. + Trans.	1.10	2.65	1.58	1.67	1.78	Transverse	445	440	565	22	210
isovac HP 330-65 A	Long. + Trans.	1.15	2.80	1.62	1.70	1.82	Transverse	365	345	480	29	185
isovac HP 350-65 A	Long. + Trans.	1.25	2.90	1.62	1.70	1.81	Transverse	350	335	480	29	180
isovac HP 400-65 A	Long. + Trans.	1.40	3.30	1.64	1.72	1.84	Transverse	335	320	475	35	160
isovac HP 470-65 A	Long. + Trans.	1.70	3.80	1.68	1.76	1.86	Transverse	300	280	445	35	155
isovac HP 530-65 A	Long. + Trans.	1.80	4.10	1.67	1.76	1.86	Transverse	315	295	450	35	155
isovac HP 800-65 A	Long. + Trans.	2.40	5.40	1.68	1.76	1.86	Transverse	250	240	385	25	120
isovac HP 1300-100 A	Long. + Trans.	3.60	8.50	1.67	1.75	1.86	Transverse	250	230	380	37	120 [2]
isovac HP 1400-100 A	Long. + Trans.	5.40	13.00	1.69	1.78	1.88	Transverse	385	275	360	39	110 [2]

[1] Magnetic measurement pursuant to DIN IEC 60404-2, eroded edges
[2] Hardness HV10 [-]

FULLY PROCESSED ELECTRICAL STEEL

Steel grade	Magnetic sample direction	Specific total loss at 50 Hz		Magnetic polarization at 50 Hz			Mechanical sample direction	Yield strength	0.2 % yield strength	Tensile strength	Elongation	Hardness
		1.0 T P10 [W/kg]	1.5 T P15 [W/kg]	2500 A/m J25 [T]	5000 A/m J50 [T]	10000 A/m J100 [T]		R_{eH} [MPa]	$R_{p0.2}$ [MPa]	R_m [MPa]	A_{80} [%]	HV5 [-]
isovac® fully processed high-conductivity												
voestalpine special grade		P10	P15	J25	J50	J100		R_{eH}	$R_{p0.2}$	R_m	A_{80}	HV5
isovac HP 235-35 A HC	Long. + Trans.	0.80	2.00	1.60	1.69	1.81	Transverse	350	340	460	18	165
isovac 250-35 A HC	Long. + Trans.	0.95	2.25	1.55	1.64	1.76	Transverse	355	340	480	25	160
isovac HP 300-35 A HC	Long. + Trans.	1.20	2.60	1.67	1.76	1.88	Transverse	285	265	415	32	130
isovac HP 250-50 A HC	Long. + Trans.	0.95	2.25	1.60	1.69	1.81	Transverse	–	380	505	19	195
isovac HP 310-50 A HC	Long. + Trans.	1.20	2.75	1.63	1.72	1.83	Transverse	305	300	450	32	160
isovac 330-50 A HC	Long. + Trans.	1.20	2.85	1.58	1.67	1.79	Transverse	320	315	470	30	170
isovac HP 330-50 A HC	Long. + Trans.	1.30	2.85	1.67	1.76	1.86	Transverse	280	270	430	33	150
isovac 400-50 A HC	Long. + Trans.	1.45	3.35	1.61	1.70	1.82	Transverse	310	290	450	33	150
isovac 470-50 A HC	Long. + Trans.	1.80	4.00	1.63	1.71	1.83	Transverse	300	280	430	35	130
isovac HP 530-50 A HC	Long. + Trans.	2.10	4.40	1.71	1.79	1.89	Transverse	255	235	375	31	115
isovac 600-50 A HC	Long. + Trans.	2.45	5.30	1.64	1.72	1.83	Transverse	325	280	400	37	115
isovac HP 350-65 A HC	Long. + Trans.	1.35	3.10	1.63	1.71	1.83	Transverse	325	310	465	35	160
isovac 400-65 A HC	Long. + Trans.	1.50	3.50	1.60	1.68	1.80	Transverse	340	325	490	32	170
isovac HP 400-65 A HC	Long. + Trans.	1.50	3.40	1.68	1.76	1.86	Transverse	275	265	430	31	150
isovac 470-65 A HC	Long. + Trans.	1.65	3.90	1.63	1.71	1.82	Transverse	300	280	450	33	155
isovac 600-65 A HC	Long. + Trans.	2.20	5.00	1.65	1.73	1.84	Transverse	320	295	435	35	140
isovac 700-100 A HC	Long. + Trans.	2.75	6.30	1.61	1.69	1.81	Transverse	390	370	500	34	165

FULLY PROCESSED ELECTRICAL STEEL

Steel grade	Magnetic sample direction	Specific total loss at 50 Hz		Magnetic polarization at 50 Hz			Mechanical sample direction	Yield strength	0.2 % yield strength	Tensile strength	Elongation	Hardness
		1.0 T P10 [W/kg]	1.5 T P15 [W/kg]	2500 A/m J25 [T]	5000 A/m J50 [T]	10000 A/m J100 [T]		R_{eH} [MPa]	$R_{p0.2}$ [MPa]	R_m [MPa]	A_{80} [%]	HV5 [-]
isovac® fully processed high-frequency												
voestalpine special grade		**P10**	**P15**	**J25**	**J50**	**J100**		**R_{eH}**	**$R_{p0.2}$**	**R_m**	**A_{80}**	**HV5**
isovac 330-35 A HF	Long. + Trans.	1.20	2.80	1.56	1.65	1.77	Transverse	400	370	520	30	165
isovac HP 270-50 A HF	Long. + Trans.	0.95	2.25	1.58	1.67	1.79	Transverse	460	450	580	23	220
isovac HP 330-50 A HF	Long. + Trans.	1.25	2.80	1.60	1.69	1.80	Transverse	385	370	510	30	180
isovac 350-50 A HF	Long. + Trans.	1.30	3.00	1.58	1.66	1.78	Transverse	390	370	510	30	185
isovac 470-50 A HF	Long. + Trans.	1.60	3.80	1.60	1.69	1.81	Transverse	380	360	520	33	170
isovac 530-50 A HF	Long. + Trans.	1.75	4.20	1.64	1.72	1.84	Transverse	345	325	485	35	155
isovac 700-50 A HF	Long. + Trans.	2.15	4.60	1.64	1.73	1.84	Transverse	345	310	440	35	135
isovac 800-50 A HF	Long. + Trans.	2.40	5.20	1.64	1.72	1.84	Transverse	375	330	450	35	140
isovac 530-65 A HF	Long. + Trans.	1.65	4.00	1.60	1.69	1.80	Transverse	365	345	500	33	170
isovac 600-65 A HF	Long. + Trans.	1.70	4.00	1.59	1.68	1.80	Transverse	355	335	490	32	175
isovac 800-65 A HF	Long. + Trans.	2.50	5.50	1.65	1.73	1.85	Transverse	350	315	440	35	140
isovac® fully processed high-strength												
voestalpine special grade		**P10**	**P15**	**J25**	**J50**	**J100**		**R_{eH}**	**$R_{p0.2}$**	**R_m**	**A_{80}**	**HV5**
isovac 470-50 A HS	Long. + Trans.	1.70	3.70	1.55	1.64	1.76	Transverse	560	525	635	26	220
isovac 350-65 A HS	Long. + Trans.	1.30	3.00	1.55	1.64	1.76	Transverse	475	465	600	25	220
isovac 530-65 A HS	Long. + Trans.	2.00	4.50	1.56	1.64	1.76	Transverse	540	510	630	25	215

[1] Hardness HV10 [-]

FULLY PROCESSED ELECTRICAL STEEL

Steel grade	Magnetic sample direction	Specific total loss at 400 Hz [1] 1.0 T P10 [W/kg]	Specific total loss at 400 Hz [1] 1.5 T P15 [W/kg]	Magnetic polarization at 50 Hz [1] 2500 A/m J25 [T]	Magnetic polarization at 50 Hz [1] 5000 A/m J50 [T]	Magnetic polarization at 50 Hz [1] 10000 A/m J100 [T]	Mechanical sample direction	Yield strength R_{eH} [MPa]	0.2 % yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Elongation A_{80} [%]	Hardness HV5 [-]
isovac® automotive grades												
EN 10303 [2]		**P10**	**P15**	**J25**	**J50**	**J100**		**R_{eH}**	**$R_{p0.2}$**	**R_m**	**A_{80}**	**HV5**
isovac HP NO25-13 Y420	Long. + Trans.	On request	On request	On request	On request	On request	Longitudinal	On request	On request	On request	On request	On request
isovac HP NO27-14 Y420	Long. + Trans.	13.50	33.00	1.54	1.64	1.76	Longitudinal	440	435	550	19	180
isovac HP NO27-18 Y320	Long. + Trans.	On request	On request	On request	On request	On request	Longitudinal	On request	On request	On request	On request	On request
isovac HP NO30-15 Y420	Long. + Trans.	14.15	34.90	1.54	1.64	1.76	Longitudinal	440	430	550	19	195
isovac HP NO30-19 Y320	Long. + Trans.	15.80	38.50	1.58	1.67	1.79	Longitudinal	335	330	445	20	145
isovac HP NO30-22 Y250	Long. + Trans.	18.80	44.00	1.66	1.74	1.85	Longitudinal	295	280	435	26	134
isovac HP NO35-18 Y420	Long. + Trans.	16.50	40.00	1.55	1.64	1.76	Longitudinal	455	445	570	23	200
isovac HP NO35-19 Y370	Long. + Trans.	17.00	41.30	1.59	1.68	1.80	Longitudinal	380	375	500	21	180
isovac NO35-22 Y460	Long. + Trans.	21.40	51.00	1.51	1.60	1.72	Longitudinal	500	470	600	25	205
isovac NO35-26 Y500	Long. + Trans.	24.50	56.40	1.51	1.60	1.72	Longitudinal	560	530	630	27	210

Further NO grades are available upon request.

Indicated steel grades are excerpts from the isovac® product range.

[1] Magnetic measurement pursuant to DIN IEC 60404-2
[2] Steel grade designation deviates from standard

SEMI-PROCESSED ELECTRICAL STEEL

		Magnetic values after final annealing according to EN 10341										
		Specific total loss at 50 Hz		Magnetic polarization at 50 Hz			Relative permeability					
Steel grade	Magnetic sample direction	1.0 T P10 [W/kg]	1.5 T P15 [W/kg]	2500 A/m J25 [T]	5000 A/m J50 [T]	10000 A/m J100 [T]	1.5 T μ_r [-]	Mechanical sample direction	0.2 % yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Elongation A_{80} [%]	Hardness HV5 [-]
isovac® semi-processed												
EN 10341 [1]		**P10**	**P15**	**J25**	**J50**	**J100**	**μ_r**		**$R_{p0.2}$**	**R_m**	**A_{80}**	**HV5**
isovac 560-50 K	Long. + Trans.	1.80	4.10	1.64	1.72	1.84	2100	Transverse	440	490	18	180
isovac 660-50 K	Long. + Trans.	2.10	4.90	1.65	1.73	1.85	2400	Transverse	410	455	23	165
isovac 800-65 K	Long. + Trans.	2.70	6.50	1.65	1.74	1.85	2600	Transverse	410	450	22	170
isovac 1000-65 K	Long. + Trans.	3.00	7.40	1.66	1.74	1.86	3000	Transverse	315	365	33	135
isovac 1800-100 K	Long. + Trans.	5.20	14.00	1.66	1.74	1.86	2000	Transverse	315	360	34	130
isovac® semi-processed high-perm												
voestalpine special grade		**P10**	**P15**	**J25**	**J50**	**J100**	**μ_r**		**$R_{p0.2}$**	**R_m**	**A_{80}**	**HV5**
isovac HP 290-50 K HE	Long. + Trans.	1.10	2.85	1.60	1.68	1.80	1600	Transverse	420	470	22	185
isovac HP 310-50 K HE	Long. + Trans.	1.20	2.90	1.60	1.68	1.80	1500	Transverse	445	490	18	185
isovac HP 340-50 K HE	Long. + Trans.	1.30	3.30	1.64	1.72	1.84	2800	Transverse	360	450	20	170
isovac® semi-processed high-efficiency												
EN 10341 [1]		**P10**	**P15**	**J25**	**J50**	**J100**	**μ_r**		**$R_{p0.2}$**	**R_m**	**A_{80}**	**HV5**
isovac 340-50 K HE	Long. + Trans.	1.25	3.15	1.57	1.66	1.78	1100	Transverse	455	500	17	190
isovac 390-50 K HE	Long. + Trans.	1.45	3.50	1.61	1.70	1.82	1750	Transverse	400	450	23	170
isovac 450-50 K HE	Long. + Trans.	1.55	3.80	1.61	1.70	1.82	1750	Transverse	400	450	23	170
isovac 560-50 K HE	Long. + Trans.	2.00	4.50	1.63	1.71	1.83	2400	Transverse	355	385	30	145
isovac 520-65 K HE	Long. + Trans.	1.80	4.40	1.62	1.70	1.82	2100	Transverse	390	450	23	170
voestalpine special grade		**P10**	**P15**	**J25**	**J50**	**J100**	**μ_r**		**$R_{p0.2}$**	**R_m**	**A_{80}**	**HV5**
isovac 420-50 K HE	Long. + Trans.	1.50	3.60	1.61	1.70	1.82	1750	Transverse	400	450	23	170
isovac 420-65 K HE	Long. + Trans.	1.50	3.70	1.59	1.67	1.79	1300	Transverse	450	490	18	185
isovac 470-65 K HE	Long. + Trans.	1.55	3.90	1.59	1.67	1.79	1300	Transverse	450	490	18	185

[1] Steel grade designation deviates from standard

SEMI-PROCESSED ELECTRICAL STEEL

		Magnetic values after final annealing according to EN 10341										
		Specific total loss at 60 Hz		Magnetic polarization at 60 Hz			Relative permeability					
Steel grade	Magnetic sample direction	1.0 T P10 [W/lb]	1.5 T P15 [W/lb]	2500 A/m J25 [T]	5000 A/m J50 [T]	10000 A/m J100 [T]	1.5 T μ_r [-]	Mechanical sample direction	0.2 % yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Elongation A_{80} [%]	Hardness HV5 [-]
isovac® CRML (Cold Rolled Motor Lamination)												
ASTM A726-05 [1]		**P10**	**P15**	**J25**	**J50**	**J100**	**μ_r**		**$R_{p0.2}$**	**R_m**	**A_{80}**	**HV5**
isovac 47D175	Long. + Trans.	0.66	1.65	1.60	1.68	1.80	1600	Transverse	420	470	22	185
isovac 47D190	Long. + Trans.	0.71	1.82	1.64	1.72	1.84	2500	Transverse	360	450	20	170
isovac 47D215	Long. + Trans.	0.80	1.94	1.61	1.70	1.82	1900	Transverse	400	460	18	175
isovac 64D290	Long. + Trans.	1.06	2.60	1.62	1.70	1.82	2200	Transverse	390	450	23	170
isovac 64D360	Long. + Trans.	1.23	3.14	1.63	1.71	1.83	2400	Transverse	355	385	30	145
isovac 64D430	Long. + Trans.	1.53	3.78	1.65	1.74	1.85	2600	Transverse	410	450	22	170
isovac 71D410	Long. + Trans.	1.48	3.84	1.63	1.71	1.83	2400	Transverse	355	385	30	145
voestalpine special grade		**P10**	**P15**	**J25**	**J50**	**J100**	**μ_r**		**$R_{p0.2}$**	**R_m**	**A_{80}**	**HV5**
isovac 47D165	Long. + Trans.	0.63	1.57	1.60	1.68	1.80	1600	Transverse	420	470	22	185

Indicated steel grades are excerpts from the isovac® product range.
Additional CRML grades (Cold Rolled Motor Lamination) are available based on the ASTM A683 and ASTM A726-05 standard.

[1] Steel grade designation deviates from standard

COLD-ROLLED POLE SHEETS

Steel grade	Sample direction	0.2 % yield strength $R_{p0.2}$ min. [MPa]	Tensile strength R_m min. [MPa]	Elongation A_{80} min. [%]	Magnetic polarization Minimum value at [2] 5000 A/m J50 [T]	Magnetic polarization Minimum value at [2] 15000 A/m J150 [T]
Cold-rolled pole sheets						
Standard grades according to EN 10265		$R_{p0.2}$	R_m	A_{80}	J50	J150
250-TF-183	Transverse	250	325	16	1.60	1.83
300-TF-182	Transverse	300	375	15	1.55	1.82
350-TF-181	Transverse	350	425	13	1.52	1.81
400-TF-180	Transverse	400	450	10	1.50	1.80
voestalpine special grade		$R_{p0.2}$	R_m	A_{80}	J50	J150
450-TF-179	Transverse	450	500	10	1.48	1.79
500-TF-178	Transverse	500	530	10	1.46	1.78
550-TF-177 [1]	Transverse	550	570	10	1.46	1.78
600-TF-176 [1]	Transverse	600	620	8	1.46	1.78
800-TF-178 [1]	Transverse	800	980	6	1.46	1.78

The values indicated in the table are guaranteed.

[1] On request

[2] DC (Direct current)

HOT-ROLLED POLE SHEETS

Steel grade	Sample direction	0.2 % yield strength $R_{p0.2}$ min. [MPa]	Tensile strength R_m min. [MPa]	Elongation min. [%] A_{80}	Elongation min. [%] A_5	Magnetic polarization Minimum value at [1] 5000 A/m J50 [T]	Magnetic polarization Minimum value at [1] 15000 A/m J150 [T]
Hot-rolled pole sheets							
Standard grades according to EN 10265		$R_{p0.2}$	R_m	A_{80}	A_5	J50	J150
250-TG-180	Transverse	250	350	22	26	1.60	1.80
300-TG-180	Transverse	300	400	20	24	1.60	1.80
350-TG-179	Transverse	350	450	18	22	1.55	1.79
400-TG-179	Transverse	400	500	16	19	1.55	1.79
450-TG-179	Transverse	450	550	14	17	1.54	1.79
500-TG-179	Transverse	500	600	12	14	1.53	1.79
550-TG-178	Transverse	550	650	12	14	1.52	1.78
600-TG-178	Transverse	600	700	10	12	1.50	1.78
650-TG-178	Transverse	650	750	10	12	1.48	1.78
700-TG-178	Transverse	700	800	10	12	1.46	1.78
Ultra-high-strength voestalpine special grade		$R_{p0.2}$	R_m	A_{80}	A_5	J50	J150
750-VA-175	Long. + Trans.	750	800	10	12	1.46	1.75
900-VA-175	Long. + Trans.	900	940	-	10	1.46	1.75

Measurement of fracture elongation: A_{80} for thicknesses < 3 mm
A_5 for thicknesses ≥ 3 mm

[1] DC (Direct current)

INSULATING VARNISH SYSTEMS AND SERVICES

Deliverable insulating varnish systems

Product variant	Uncoated	C-3	Backlack	C-5	C-6
isovac®	✓	✓	✓	✓	✓
Cold-rolled pole sheets	✓	✓	On request	✓	✓

Range of properties for available insulating varnish systems

Requirements	C-3		Backlack	C-5		C-6
Layer thickness	1 µm	2-4 µm	2-8 µm	1 µm	2-3 µm	3-10 µm
Layer thickness tolerance	± 0.5 µm	± 1.0 µm	± 1.0 µm	± 0.5 µm	± 1.0 µm	± 1.5 µm
Insulation resistance	+	++	+++	++	+++	+++
Corrosion resistance	+	++	++	++	+++	+++
Punchability	+++	+++	+++	++	++	++
Al die casting	++	+	+	+++	++	++
Weldability	+	+	+	+++	++	+
Resistance to annealing	+	+	+	+++	++	++
Pressure resistance	+	+	+	+++	++	+++
Abrasion resistance	+++	+++	+++	+++	++	+++
Burn-off repair	+	+	+	+++	++	+++
AISI	C-3	C-3	C-3	C-5	C-5	C-6

+ Not recommended ++ Recommended +++ Highly recommended

Selected services

Inside coil diameter of 500 mm	Cost-saving advisory services	Material selection and innovation advisory services	Logistics advisory services to effectively reduce lead times

Indicated references are standard values. Limitations are possible depending on thickness. Available insulating varnish systems and combinations of widths and thicknesses vary depending on the steel grade.

DIMENSIONS

Available dimensions: wide strip (coil)

Product variant	Thickness [mm]	Width [1] max. [mm]	Outside diameter max. [mm]	Inside diameter [mm]
isovac®	0.25 - 1.00	1600	2000	600
Cold-rolled pole sheets	0.70 - 1.00	1600	2000	600
Hot-rolled pole sheets	2.00 - 12.00	1620 (1750)	2000	600

Available dimensions: slit (slit strip)

Product variant	Thickness [mm]	Strip width [1] [mm]	Outside diameter max. [mm]	Inside diameter [mm]
isovac®	0.25 - 1.00	19 - 1600	850 - 2000	500 / 600
Cold-rolled pole sheets	0.70 - 1.00	19 - 1600	850 - 2000	500 / 600

Available dimensions: cut-to-length (sheet)

Product variant	Thickness [mm]	Width [mm]	Length [mm]	Package weight max. [t]
isovac®	0.25 - 1.00	300 - 1550	300 - 5000	6
Cold-rolled pole sheets	0.70 - 1.00	300 - 1550	300 - 5000	6
Hot-rolled pole sheets	2.00 - 12.00	900 - 1620 (1750)	1250 - 14000	10

[1] Indicated references are standard values. The available combinations of widths and thicknesses and supply forms vary depending on the steel grade and insulating varnish system. Limitations are possible depending on thickness.

Customized thicknesses can be supplied for individual solutions.

This document provides an overview of the electrical steel products supplied by the voestalpine Steel Division. Other grades are available upon request. Please find further information and downloads under the following link: www.voestalpine.com/isovac

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