



- *Oriented Silicon Steel*
- *Grain-oriented Electrical Steel*
- *Non-oriented Silicon Steel*
- *Transformer*

Oriented Silicon Steel

The oriented silicon steel is mainly used for the manufacturing of all kinds of transformers. regenerator iron core. According to the different magnet property, the oriented silicon steel is divided into HiB steel and regular oriented silicon steel. Compared to the regular oriented silicon steel, Hi steel has higher magnetic strength, lower iron loss and lower magnetostrictive. The oriented silicon steel of WISCO has excellent electromagnetic property, excellent processing property, high thickness precision, smooth plate shape and good surface quality.

Standard value of selectable grade, density, iron loss, magnetic strength and stacking coefficient (1)

Type	Grade	Thickness mm	Density Kg/dm ³	Iron loss P _{1.7/50} W/kg	Magnetic strength B ₈₀₀ T	Stacking coefficient %
Regular oriented silicon steel Q series	23Q110	0.23	7.65	1.10	1.81	94.5
	27Q120	0.27	7.65	1.20	1.82	95.0
	27Q130			1.30	1.81	
	30Q120	0.30	7.65	1.20	1.82	95.5
	30Q130			1.30	1.81	
	35Q135	0.35	7.65	1.35	1.82	96.0
	35Q145			1.45	1.81	
	35Q155			1.55	1.80	
HiB steel G series (High magnetic strength oriented silicon steel)	23QG090	0.23	7.65	0.90	1.88	94.5
	23QG095			0.95	1.88	
	23QG100			1.00	1.88	
	27QG095	0.27	7.65	0.95	1.89	95.0
	27QG100			1.00	1.89	
	27QG120	0.30	7.65	1.20	1.89	95.5
	30QG105			1.05	1.89	
30QG120	1.20	1.89				
Magnetic domain refinement HiB steel K series (Magnetic domain refinement high magnetic strength oriented silicon steel)	23RK080	0.23	7.65	0.80	1.88	94.5
	23RK085			0.85	1.88	
	23RK090			0.90	1.88	
	23RK095			0.95	1.88	
	27RK085	0.27	7.65	0.85	1.88	95.0
	27RK090			0.90	1.89	
	27RK095			0.95	1.89	
	27RK100			1.00	1.89	
	27RK120	0.30	7.65	1.20	1.89	95.5
	30RK100			1.00	1.89	
	30RK105			1.05	1.89	
30RK120	1.20	1.89				

Note: (1) For the oriented silicon steel not processed by magnetic domain refinement, the magnetic parameters will be tested according to GB/T 3655

(2) For the oriented steel processed after magnetic domain refinement, the magnetic parameters will be tested according to GB/T 13789 in unit sheet method, and should not be used for annealing. (3) The stacking coefficient test will adopt the sample with T: coating.

Typical value of the iron loss and magnetic strength (1)

Type	Grade	Thickness mm	Density Kg/dm ³	Iron loss (W/kg)				Magnetic strength T		
				P _{1.7/50}	P _{1.7/60}	P _{1.5/50}	P _{1.5/60}	B ₈₀₀	B ₂₅₀₀	
Regular oriented silicon steel Q series	23Q110	0.23	7.65	1.05	1.39	0.71	0.94	1.87	1.93	
	27Q120	0.27	7.65	1.11	1.45	0.80	1.05	1.87	1.93	
	27Q130			1.15	1.52	0.83	1.11	1.86	1.93	
	30Q120	0.30	7.65	1.12	1.49	0.82	1.09	1.87	1.94	
	30Q130			1.16	1.52	0.83	1.10	1.86	1.93	
	35Q145	0.35	7.65	1.26	1.68	0.92	1.23	1.85	1.93	
	35Q155			1.30	1.72	0.97	1.28	1.85	1.93	
HiB steel G series (High magnetic strength oriented silicon steel)	23QG090	0.23	7.65	0.88	1.17	0.65	0.85	1.90	1.96	
	23QG095			0.92	1.19	0.66	0.88	1.89	1.96	
	23QG100			0.96	1.26	0.68	0.89	1.89	1.96	
	27QG095	0.27	7.65	0.92	1.23	0.70	0.93	1.91	1.97	
	27QG100			0.96	1.27	0.71	0.94	1.90	1.96	
	27QG120	0.30	7.65	1.04	1.36	0.75	0.99	1.89	1.94	
	30QG105			1.01	1.35	0.76	1.02	1.92	1.97	
	30QG120			1.05	1.40	0.78	1.04	1.91	1.97	
	Magnetic domain refinement HiB steel K series (Magnetic domain refinement high magnetic strength oriented silicon steel)	23RK080	0.23	7.65	0.78	1.05	0.57	0.75	1.91	1.97
		23RK085			0.82	1.09	0.59	0.78	1.90	1.96
23RK090		0.86			1.14	0.62	0.82	1.90	1.96	
23RK095		0.91			1.21	0.64	0.85	1.89	1.95	
27RK085		0.27	7.65	0.82	1.10	0.61	0.81	1.91	1.97	
27RK090				0.86	1.13	0.64	0.85	1.91	1.97	
27RK095				0.90	1.20	0.66	0.87	1.90	1.96	
27RK100				0.95	1.26	0.68	0.90	1.90	1.96	
27RK120		0.30	7.65	1.02	1.35	0.73	0.97	1.89	1.95	
30RK100				0.92	1.21	0.69	0.91	1.92	1.97	
30RK105	0.96			1.27	0.71	0.94	1.91	1.97		
30RK120	1.02	1.35	0.74	0.98	1.90	1.96				

Note: (1) For the oriented silicon steel not processed by magnetic domain refinement, the magnetic parameters will be tested according to GB/T 3655 (2) For the oriented steel processed after magnetic domain refinement, the magnetic parameters will be tested according to GB/T 13789 in unit sheet method, and should not be used for annealing. (3) The stacking coefficient test will adopt the sample with T: coating.

Non-oriented Silicon Steel

The non-oriented silicon steel is mainly used for the manufacturing of all kinds of rotation motor and electronic transformer core. According to the different production and process conditions, it can be divided into complete process type non-oriented silicon steel and semi-process type non-oriented silicon steel; in addition, according to the professional application area, the dedicated non-oriented silicon steel is also developed.

Standard value of selectable grade, density, iron loss, magnetic strength and stacking coefficient

Type	Grade	Thickness mm	Density Kg/dm ³	Iron loss P _{1.5/50} W/kg	Magnetic strength B ₅₀₀₀ T	Stacking coefficient %	
Complete process type non-oriented silicon steel	35WW230	0.35	7.60	2.10	1.62	96.0	
	35WW250			2.30	1.62		
	35WW270			2.50	1.62		
	35WW300		7.65	2.70	1.62		
	35WW360			3.30	1.63		
	35WW400			3.60	1.64		
	35WW440	7.70	4.00	1.65			
	50WW270		7.60	2.50	1.62	97.0	
	50WW290	2.70		1.62			
	50WW310	2.90		1.62			
	50WW350	7.65	3.10	1.62			
	50WW400		3.50	1.63			
	50WW470		4.00	1.64			
	50WW600	0.50	7.75	4.30	1.66	98.0	
	50WW700			5.00	1.67		
	50WW800		7.80	6.00	1.68		
50WW1000	7.00			1.70			
50WW1300	8.00			1.73			
Semi-process type non-oriented silicon steel	BDG	0.50	7.80	6.00	1.68	97.0	
	50WGB350			3.50	1.71		
	50WGB400			4.00	1.71		
	50WGB430			4.30	1.68		
	50WGB500			5.00	1.68		
Dedicated non-oriented silicon steel	0.65mm non-oriented	0.65	7.70	5.30	1.64	97.0	
				65W800	6.50		1.70
Dedicated non-oriented silicon steel	For relay and electromagnetic switch	0.70	7.65	3.40	1.48	97.0	
				70WK380	3.80		1.48
				75WK400	4.00		1.48
				80WK420	4.20		1.48
				85WK450	4.50		1.48

Note: (1) The iron loss of the steel for relay and electromagnetic switch is P_{us}, and the magnetic strength is B_{sw}; the iron loss of other grade is P_{so}, and magnetic strength is B_{so}. (2) The magnetic property of the semi-process non-oriented silicon steel is the measuring value after annealing and eliminating the strength. (3) The magnetic parameters are from the sample that half parallel to the rolling direction and half vertical to the rolling direction, the measurement base standard: GB/T 3655.

Typical value of non-oriented silicon steel iron loss and magnetic strength

Grade	Thickness mm	Density Kg/dm ³	Iron loss (W/Kg)				Magnetic strength T		
			50Hz		60Hz		2500A/m	5000A/m	
			1.0T	1.5T	1.0T	1.5T			
35WW230	0.35	7.60	0.78	2.05	1.05	2.65	1.56	1.65	
35WW250			0.89	2.22	1.13	2.80	1.57	1.66	
35WW270			0.95	2.40	1.20	2.90	1.57	1.66	
35WW300			7.65	1.07	2.60	1.34	3.16	1.59	1.67
35WW360				1.21	2.75	1.50	3.31	1.59	1.67
35WW400				1.21	3.18	1.51	3.40	1.59	1.68
35WW440	7.70	1.30	3.75	1.61	3.60	1.63	1.71		
50WW270	0.50	7.60	0.98	2.40	1.27	3.05	1.58	1.67	
50WW290			1.06	2.60	1.38	3.22	1.58	1.67	
50WW310			1.18	2.75	1.52	3.49	1.58	1.67	
50WW350			7.65	1.20	2.95	1.53	3.53	1.60	1.68
50WW400				1.28	3.15	1.61	3.66	1.60	1.68
50WW470			7.70	1.41	3.25	2.05	4.50	1.64	1.72
50WW600	7.75	1.76	3.95	2.42	5.30	1.61	1.69		
50WW700		1.87	4.30	2.95	6.40	1.61	1.69		
50WW800		7.80	2.18	4.85	3.64	7.68	1.63	1.71	
50WW1000	7.85		2.49	5.60	3.92	8.22	1.66	1.74	
50WW1300		2.52	5.90	4.27	8.92	1.67	1.75		

Execution standard and grade description

Execution standard: The non-oriented silicon steel of WISCO respectively executes the state standard GB/T 2521-2008 and WISCO enterprise standard Q/WG(GG)05-2012, If the customer has special requirement, dedicated technical agreement can be signed.

Grade description: The non-oriented silicon steel grade No. composed of the thickness, enterprise name and non-oriented code and iron loss.

For example: 50WW470

- 50—— 100 times of the thickness value,
- WW—— Non-oriented silicon steel of WISCO,
- 470—— 100 times of iron loss.

Typical value of the non-oriented silicon steel mechanical property

Type	Grade	Thickness mm	Tensile strength R _m MPa	Extension rate A %	Hardness Hv5		
Complete process type non-oriented silicon steel	35WW250	0.35	520	17	195		
	35WW270		520	17	195		
	35WW300		520	27	180		
	35WW360		520	29	175		
	35WW400		500	31	170		
	35WW440		440	31	140		
	50WW270	0.50	530	25	200		
	50WW290		520	27	195		
	50WW310		525	30	190		
	50WW350		530	30	185		
	50WW400		520	33	170		
	50WW470		450	37	155		
	50WW600		425	42	130		
	50WW700		430	43	130		
	50WW800		385	48	107		
	50WW1000		360	50	100		
	50WW1300		360	52	100		
	Semi-process type non-oriented silicon steel		BDG	0.50	385	46	155
			50WGB350		350	40	130
			50WGB400		360	40	120
50WGB430		420	40		160		
50WGB500		400	40		150		
MW101		385	40		125		
Dedicated non-oriented silicon steel		0.65mm non-oriented	0.65		65W530	425	43
	65W800			380	50	110	
	For relay and electromagnetic switch	0.70	70WK340	545	36	190	
			70WK380				
		0.75	DWK2-75	530	37	190	
		0.80	DWK2-80	530	37	190	
		0.85	DWK2-85	530	37	190	

Note: (1) The mechanical property adopts the horizontal sample measurement value (2) Measurement basis standard: GB/T 2522, GB/T 228.

Dimension scope (Supplied according to steel coil)

Grade	Thickness mm	Width (mm)		Single coil weight t
		Edge cutting	Burring	
35WW250	0.35	950 ~ 1100	—	2 ~ 7
35WW270				
35WW300		950 ~ 1200		2 ~ 8
35WW360				
35WW400		950 ~ 1200		
35WW440		950 ~ 1200		
50WW270	0.50	950 ~ 1100	—	2 ~ 8
50WW290		950 ~ 1200		
50WW310		950 ~ 1200		
50WW350				
50WW400		1000 ~ 1200	1000 ~ 1240	3 ~ 9
50WW470				
50WW600		1000 ~ 1200	1000 ~ 1250	
50WW700				
50WW800				
50WW1000				
50WW1300				

Allowable dimension difference

Nominated thickness mm	Allowable thickness difference mm		Horizontal thickness difference mm		Allowable width difference mm
	High grade	Regular grade	High grade	Regular grade	
0.35	± 0.015	± 0.015	≤ 0.020	≤ 0.012	+ 1.5 0
0.50	± 0.015	± 0.020	≤ 0.015	≤ 0.015	
0.65	± 0.030	± 0.030	≤ 0.020	≤ 0.020	
0.70	± 0.030		≤ 0.020		
0.75	± 0.030		≤ 0.025		
0.80					
0.85					

Selection of the surface insulation coating

The non-oriented silicon steel normally adopts the semi-organic insulation coating, and coating of other types can also be adopted according to the customer's requirements. The semi-process product has no insulation coating on the surface, so the customer should have annealing conditions.

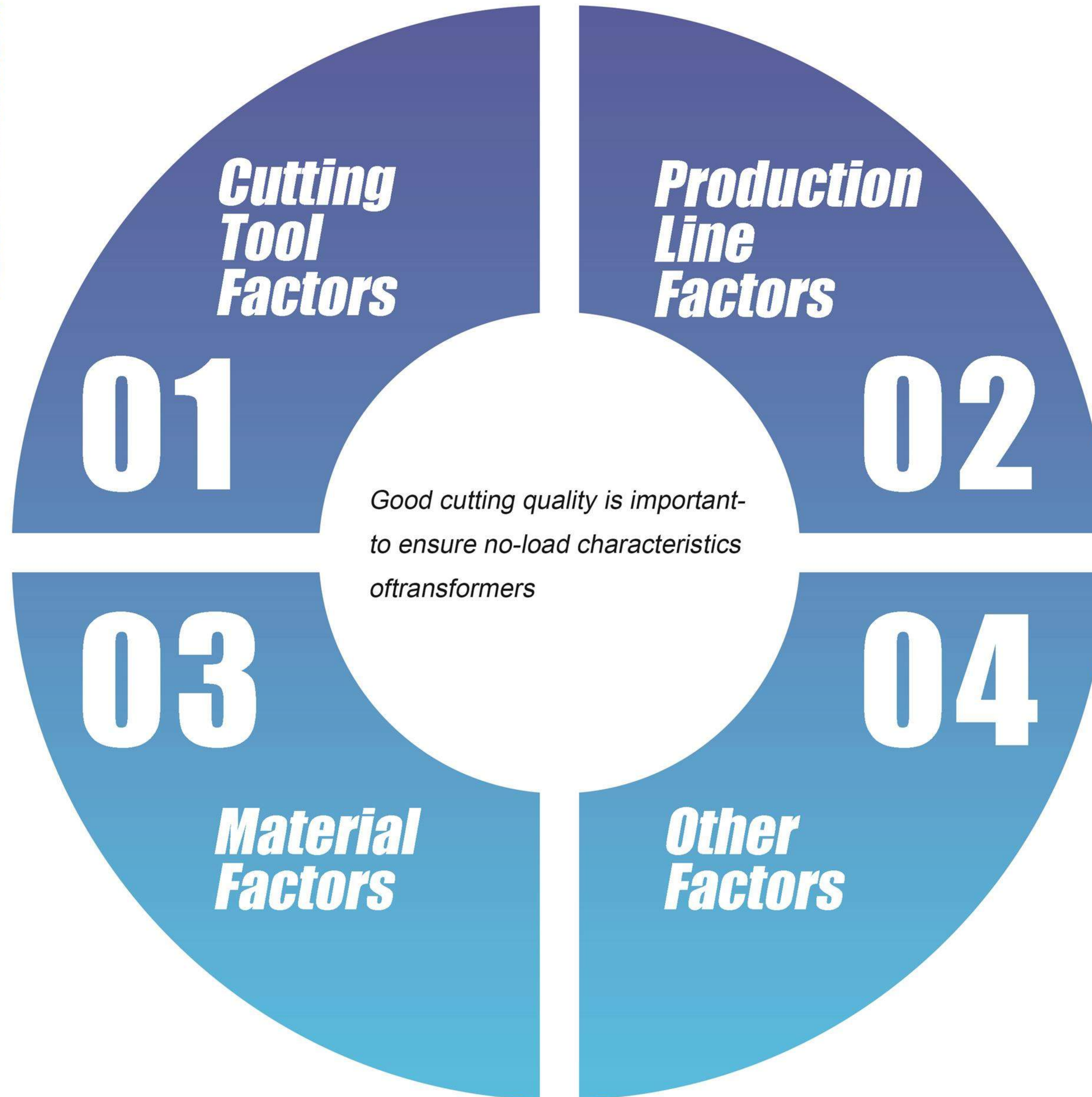
Lab conditions of iron loss and magnetic property parameter

All the grades can ensure that the supplied property is lower than the maximum iron loss, and higher than the minimum magnetic strength and minimum stacking coefficient. Unless otherwise specified, the iron loss is the value at 1.5T and 50Hz, and the specified magnetic strength is the value at 5000A/m.



- ▶ Blade condition
- ▶ Gap between blades
- ▶ Overlap
- ▶ Grinding precision
- ▶ Grinding cycle

- ▶ Material thickness
- ▶ Mechanical properties
- ▶ Coil state
- ▶ Defects
- ▶ Coating



- ▶ Production line
- ▶ Production speed
- ▶ Feed centering
- ▶ Stability

- ▶ Gap between platens
- ▶ Tension pressure
- ▶ Position of guides
- ▶ Separation

