

#### PRODUCT MANUAL 2 Electrical Steel





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#### 1. Foreword

Since the electrical steel coils had been produced in 1993, CSC had invested more resources to proceed many research programs in order to develop new production technology. As a result, not only the capacity had greatly been increased but many high grade products developed successfully. CSC ensures a stable supply of high quality non-oriented electrical stell coil to satisfy the requirements of custom ers.

Electrical steel coils are a kind of cold rolled steel with special electrical and magnetic properties. Because the silicon was added, electrical steel previously was called "silicon steel". Electrical steel is classified into grain-oriented and non-oriented by their texture. Currently only non-oriented steel sheets are available from China Steel.

This catalog details general information such as the features, applications, specifications, and other relevant product properties of the electrical steel coils manufactured by China Steel. It serves to help downstream users to understand our materials properties. Because non-oriented electrical steel has the features of uniform electrical and magnetic properties, it is the most suitable material for rotating machines. Generally the electrical steel coils are required to process the following major properties, include iron loss, magnetic flux density, punchability, weldability, flatness, thickness uniformity and etc. China Steel endeavors continuously not only to improve the magnetic properties, but also to develop new coating film. So far its Products have been well accepted and widely used by downstream users. As for the applications of various grades, please refer to the following Table 1.

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Grade Applications		15CS 1200HF	20CS1200HF 20CS1500HF	25CS1500HF 30CS1800HF	35CS 210~550	50CS 230~470	50CS 600~1300
	Huge rotating machines					0	
	Normal rotating machines				0	0	0
Rotating	General use AC motors	0	0	0	0	0	0
Machines	Hermetically sealed motors	0	0	0	0	0	0
	Intermittent AC motors	0	0	0	0	0	0
	medium power transformers	0	0	0	0	0	0
<b>C</b> 11	Audio transformers				0	0	0
Static	Welding transformers	0	0	0	0	0	0
macrimes	Ballast				0	0	0
	Magnetic switch cores				0	0	

Table1: Applications of electrical steel



## 3. Specification

Although the quality of non-oriented magnetic steel coils had been modified and named with the notations of China Steel, but these steel coils completely comform with the requirements of CNS 7217 and JIS C2552. The abridged specifications are stated in the following paragraphs.

#### 3.1 Symbol description

The abridged specifications of China Steel's magnetic steel coils are stated as the following:



Example: 50CS1300 conforms with 50A1300 grade of JIS C2552.

#### 3.2 Insulating Film

The symbol and type of insulating film are as listed in Table 2.

Table 2: Symbol	and Type	of insulating film
1461C 2. Synnoon	and type	or mound ing min

Symbol	Туре	Corresponding JIS symbol
C628 C6N8 G1MN	Semi-inorganic matter (inorganic + organic)	CS-2

#### 3.3 Properties of Specification

General specification please refer to table 3.1, high frequency Specification please refer to table 3.2, semi-process & high Magnetic flux density specification please refer to table 3.3.

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Grade of CSC Spec.	Thickness (mm)	Density (ka/dm³)	Iron Loss, max. (W/kg)	Magnetic Flux Density, min. (T)
			W15/50	B50
35CS210		7.55	2.1	1.60
35CS230		7.55	2.3	1.60
35CS250	0.25	7.60	2.5	1.60
35CS300	0.55	7.65	3.0	1.60
35CS440		7.70	4.4	1.64
35CS550		7.75	5.5	1.68
50CS230		7.55	2.9	1.60
50CS250		7.55	2.5	1.60
50CS270	7.55 2.6		2.6	1.60
50CS290		7.60 2.9		1.60
50CS350		7.65	3.5	1.60
50CS400	0.50	7.65	4.0	1.61
50CS470	0.50	7.70	4.7	1.62
50CS600		7.75	6.0	1.68
50CS700		7.75	7.0	1.68
50CS800		7.75	8.0	1.68
50CS1000		7.85	10.0	1.70
50CS1300		7.85	13.0	1.70
65CS400		7.65	4.0	1.61
65CS470		7.65	4.7	1.62
65CS600	0.65	7.75	6.0	1.65
65CS700	0.05	7.75	7.0	1.65
65CS800		7.75	8.0	1.65
65CS1300		7.75	13.0	1.70

#### Table 3.1: General Specification

Note: (1)This density is used in all calculation of the sectional area of test pieces.

(2)W15/50 indicates the iron loss when the frequency is 50 Hz and the maximum magnetic flux density is  $1.5T(1.5Wb/m^2)$ 

(3)B50 indicates the magnetic flux density under the magnetic force 5000a/m.

(4)Density is for reference only, the actual density will vary with the chemical composition of steel grades.

Grade of CSC Spec.	Thickness (mm)	Density (kg/dm³)	lron Loss, max. (W/kg)	Magnetic Flux Density, min. (T)
			W10/400	B50
15CS1200HF	0.15	7.65	12.0	1.60
20CS1200HF	0.20	7.65	12.0	1.62
20CS1500HF	0.20	7.65	15.0	1.63
25CS1500HF	0.25	7.65	15.0	1.65
30CS1800HF	0.30	7.65	18.0	1.65

#### Table 3.2: High Frequency Specification

Note: (1)This density is used in all calculation of the sectional area of test pieces.

(2)W15/50 indicates the iron loss when the frequency is 50 Hz and the maximum magnetic flux density is 1.5T(1.5Wb/m<sup>2</sup>)

(3)B50 indicates the magnetic flux density under the magnetic force 5000a/m.

(4)Density is for reference only, the actual density will vary with the chemical composition of steel grades.

#### Table 3.3: Semi-Process & High Magnetic Flux Density Specification

Туре	Grade of CSC Spec. (mm)		Density (kg/dm³)	Iron Loss, max. Density (W/kg) (kg/dm³)	
				W15/50	B50
Semi- Process	50CS600 AC		7.85	6.0	1.73
	50NE1 ANC	0.50	7.80	4.0	1.70
	50HE1 ANC		7.75	3.5	1.67
Lliab	35CS250H	0.25	7.65	2.5	1.60
Magnetic	35CS300H	0.55	7.65	3.0	1.60
Flux Density	50CS470H	0.50	7.70	4.7	1.62
	50CS600H	0.50	7.75	6.0	1.68

Note: (1)This density is used in all calculation of the sectional area of test pieces.

(2)W15/50 indicates the iron loss when the frequency is 50 Hz and the maximum magnetic flux density is 1.5T(1.5Wb/m<sup>2</sup>)

(3)B50 indicates the magnetic flux density under the magnetic force 5000a/m.

(4)Iron loss of Semi-Process Product were annealed at 750°C\*2hr.

(5)Density is for reference only, the actual density will vary with the chemical composition of steel grades.

#### 3.4 Tolerances on Dimensions

Please refer to Table 4.

Table 4: Tolerances on Di	mensions
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unit: mm

Tolerance on thickness	Deviation of thickness in transverse direction	Tolerance on width
± 0.01	0.02	+4 0

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## 4. Available Sizes

•Thickness: 0.15, 0.20, 0.25, 0.35, 0.50, 0.65 mm

•Width range: 1000~1200 mm

Please consult with us, if other sizes are required.

## 5. Typical Properties

#### 5.1 Typical Mechanical Properties and Space Factor

Please refer to Table 5 and Table 6 for typical values.

#### Table 5: Typical Mechanical Properties and Space Factor of General and High Frequency Products

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Туре	Grade of CSC	Yield St (N/n	trength nm²)	Tensile S (N/n	Strength nm²)	Elongation (%)		Hardness		Space Factor
	Spec.	L	С	L	С		С	HR30T	HV1	(%)
	35CS210	425	436	535	544	15	15	72	234	
	35CS230	415	411	521	517	16	16	71	230	)
	35CS250	389	400	515	536	21	21	69	202	
	35CS300	341	355	483	505	23	22	66	191	
	35CS440	308	310	430	445	30	31	62	161	
	35CS550	292	302	403	414	34	35	59	142	
	50CS230	441	450	561	566	21	20	74	226	
	50CS250	411	421	532	542	19	21	72	223	
	50CS270	420	446	542	570	23	26	73	218	
	50CS290	376	394	513	537	25	26	71	205	
	50CS350	348	359	481	496	28	29	68	179	
Conoral	50CS400	318	329	453	473	29	31	66	176	
General	50CS470	294	297	442	452	36	36	63	159	
	50CS600	275	267	413	418	38	39	60	139	
	50CS700	298	318	424	443	36	35	60	142	99
	50CS800	332	342	407	414	35	32	61	141	
	50CS1000	313	323	402	410	37	38	58	136	
	50CS1300	312	330	388	394	37	38	59	135	
	65CS400	313	327	465	485	32	34	68	187	
	65CS470	336	353	484	501	31	33	68	181	
	65CS600	276	278	411	415	37	38	59	144	
	65CS700	290	300	421	434	36	38	60	142	
	65CS800	300	314	433	427	37	38	61	144	
	65CS1300	316	324	402	408	37	38	62	149	
	15CS1200HF	366	393	459	481	13	10	68	187	
High	20CS1200HF	398	396	492	501	12	11	68	213	
Frequency	20CS1500HF	357	370	467	484	15	16	66	184	
requercy	25CS1500HF	355	367	471	491	21	20	66	188	
	30CS1800HF	358	374	472	497	20	23	67	191	

Note: (1)The result was tested in accordance with JIS C2550 method.

(2)The data on above table is one example of sampling and for reference only.

Remarks: \*1  $\rightarrow$  L : Test direction – Longitudinal

 $*2 \rightarrow T$ : Test direction – Transverse

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#### Table 6: Typical Mechanical Properties and Space Factor of Semi-Process and High Magnetic Flux Density Products

Туре	Grade of CSC Spec.	Yield Strength (N/mm²)		Tensile Strength (N/mm²)		Elongation (%)		Hardness		Space Factor (%)
		L	С	L	С	L	С	HR30T	HV1	(70)
Semi- Process	50CS600AC	308	332	372	380	36	36	59	140	
	50NE1-ANC	405	414	443	450	24	23	68	172	
	50HE1-ANC	430	440	475	491	21	21	68	186	
	35CS250H	349	363	466	495	20	23	66	187	99
High Magnetic Flux Density	35CS300H	310	329	434	455	23	24	64	183	
	50CS470H	312	319	437	461	36	38	63	161	
	50CS600H	258	256	386	408	27	25	58	137	

Note: (1)The result was tested in accordance with JIS C2550 method.

(2)The data on above table is one example of sampling and for reference only.

Remarks: \*1  $\rightarrow$  L : Test direction – Longitudinal \*2  $\rightarrow$  T : Test direction – Transverse

#### 5.2 Typical Electrical and Magnetic Properties

As a result of modifying metallurgical in manufacturing, the electrical and magnetic properties have been greatly enhanced. Please refer to Table 7 and Table 8 for typical values.

Grade of	Resistivity	Iron Loss (W/kg)					Magnetic Flux Density (T)					
Spec.	(μΩ- )	W <sub>10/50</sub>	W <sub>15/50</sub>	W <sub>10/60</sub>	W <sub>15/60</sub>	W <sub>10/400</sub>	B3	B10	B25	B50	B100	
35CS210	62	0.81	2.04	1.02	2.46	15.57	1.36	1.48	1.57	1.67	1.79	
35CS230	62	0.90	2.18	1.11	2.75	17.31	1.32	1.45	1.55	1.65	1.78	
35CS250	54	0.91	2.34	1.15	2.72	17.40	1.37	1.49	1.59	1.68	1.80	
35CS300	48	0.98	2.45	1.23	2.85	18.10	1.37	1.51	1.60	1.70	1.81	
35CS440	39	1.34	2.92	1.66	3.63	21.59	1.41	1.55	1.64	1.72	1.83	
35CS550	30	1.92	4.08	2.36	5.07	28.31	1.42	1.57	1.66	1.71	1.85	
50CS230	62	0.98	2.30	1.26	2.97	22.97	1.31	1.45	1.56	1.66	1.78	
50CS250	62	1.04	2.42	1.34	3.12	24.43	1.32	1.46	1.57	1.67	1.79	
50CS270	62	1.12	2.52	1.43	3.22	25.42	1.30	1.47	1.57	1.67	1.79	
50CS290	54	1.08	2.61	1.39	3.21	25.94	1.35	1.49	1.59	1.69	1.81	
50CS350	49	1.16	2.73	1.49	3.42	27.42	1.37	1.52	1.62	1.70	1.82	
50CS400	44	1.34	2.98	1.70	3.81	28.69	1.40	1.54	1.63	1.72	1.82	
50CS470	43	1.51	3.29	1.91	4.20	31.64	1.42	1.57	1.66	1.73	1.85	
50CS600	34	1.76	4.06	2.23	4.94	36.80	1.41	1.56	1.65	1.72	1.84	
50CS700	29	2.09	4.47	2.62	4.73	40.31	1.40	1.57	1.67	1.72	1.86	
50CS800	32	2.46	4.98	3.07	6.43	43.72	1.36	1.55	1.66	1.72	1.85	
50CS1000	26	2.51	5.42	3.15	6.89	48.39	1.41	1.58	1.67	1.75	1.87	
50CS1300	23	2.87	5.88	3.60	7.42	50.78	1.21	1.57	1.67	1.75	1.87	
65CS400	45	1.40	3.20	1.83	4.20	39.06	1.35	1.50	1.61	1.70	1.81	
65CS470	44	1.71	3.64	2.21	4.72	41.87	1.37	1.55	1.64	1.73	1.83	
65CS600	29	2.10	4.69	2.70	6.19	53.10	1.38	1.54	1.65	1.71	1.84	
65CS700	30	2.33	5.18	2.99	6.71	56.44	1.37	1.57	1.66	1.72	1.85	
65CS800	29	2.11	5.36	2.73	6.27	54.90	1.37	1.54	1.65	1.71	1.84	
65CS1300	27	3.18	5.92	4.05	8.33	66.51	1.12	1.55	1.67	1.72	1.86	
15CS1200HF	54	0.94	2.26	1.14	2.76	10.80	1.29	1.43	1.53	1.63	1.77	
20CS1200HF	54	0.83	2.21	1.01	2.50	11.41	1.33	1.46	1.56	1.66	1.79	
20CS1500HF	49	0.98	2.29	1.21	2.81	12.51	1.37	1.50	1.59	1.68	1.80	
25CS1500HF	49	0.92	2.13	1.14	2.64	13.93	1.39	1.51	1.60	1.67	1.81	
30CS1800HF	49	1.01	2.28	1.25	2.85	16.45	1.34	1.50	1.59	1.69	1.81	

## Table 7: Typical electrical and magnetic properties of General and High Frequency Products

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Note: (1)The result was tested in accordance with JIS C2550 method.

(2)The data on above table is one example of sampling and for reference only.

_	High Magnetic Flux Density Products												
	Туре	Grade of	Resistivity (µΩ-)	Iron Loss (W/kg)				Magnetic Flux Density (T)					
		Spec.		W <sub>10/50</sub>	W <sub>15/50</sub>	W <sub>10/60</sub>	W <sub>15/60</sub>	W <sub>10/400</sub>	B3	B10	B25	B50	B100
	Semi- Process	50CS600AC <sup>(1)</sup>	18	1.67	4.00	2.17	5.28	45.85	1.48	1.58	1.66	1.74	1.86
		50NE1-ANC <sup>(1)</sup>	21	1.50	3.63	1.96	4.81	41.99	1.46	1.56	1.64	1.72	1.85
		50HE1-ANC <sup>(1)</sup>	26	1.41	3.29	1.81	4.31	36.16	1.47	1.56	1.63	1.72	1.84
N	High Magnetic Flux Density	35CS250H	49	0.94	2.26	1.19	2.73	18.27	1.39	1.52	1.61	1.70	1.82
		35CS300H	44	1.01	2.45	1.28	2.92	19.25	1.41	1.53	1.63	1.72	1.84
		50CS470H	43	1.45	3.30	1.84	4.05	30.90	1.41	1.56	1.66	1.74	1.85
		50CS600H	29	1.79	3.78	2.25	5.08	38.50	1.40	1.57	1.67	1.76	1.86

#### Table 8: Typical electrical and magnetic properties of Semi-Process and High Magnetic Flux Density Products

Note: (1)Samples were annealed at 750°C x 2 hrs and tests were conducted in accordance with JIS C2550 method.

(2)The data on above table is one example of sampling and for reference only.

#### 5.3 Deviation of Thickness in Transverse Direction

Please refer to Table 9 for typical values.

#### Table 9: Typical Values of the Thickness Deviation in Transverse Direction

	Thickness deviation from the width center to the following position						
	5mm distant from edge	15mm distant from edge	25mm distant from edge	50mm distant from edge			
Mean Value	0.010mm	0.006 mm	0.004 mm	0.003 mm			
Maximum Value	0.020mm	0.012mm	0.008mm	0.006mm			

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The insulating film used on electrical steel coils is a type of water-based mixture of inorganic and organic matter. There are three kinds of coating film that are design for different applications. Please refer to Table 10 for the properties.

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Film code	C628	C6N8	G1MN (EB5350S)			
Application grades	Without Cr-free requirement	With Cr-free requirement	With Cr-free requirement			
Composition	inorganic + organic	inorganic + organic	inorganic + organic			
Average thickness of film	Normal: 0.7μm Heavy: 1.0μm	Normal: 0.7μm Normal: 0.7μm Heavy: 1.0μm Heavy: 1.0μm				
Interlaminar Resistance (JIS C2550)	Normal:>6Ω-cm <sup>2</sup> /sheet Heavy:>25Ω-cm <sup>2</sup> /sheet	Normal:>6Ω-cm²/sheet Heavy:>25Ω-cm²/sheet	>50Ω-cm²/sheet			
Resistance to Corrosion	Area of rust<50% after 5 hrs solut	Area of rust<10% after 5 hrs spraying by 5% 、35°C NaCl solution.				
Bending Test	No film peeled after bending(Bend radius 10mm),the adhesion is very good.					
Solvent Test	No film peeled after rubbing 50 times with alcohol.					
Punchability	Film is firmly bonded on to mo	otor sheet that it will never pee	l off due to cutting and punching.			
Heat Resistance	Film remains shinning and adheres well after 1 hr at 750°C protected by N2 gas					

#### Table 10: Characteristics of insulating film

## 6. Precaution Notes While in Use

#### 6.1 Avoiding rust and aging:

- (1)Due to slitting and punching that cause broken coating film, the ruptured surface will easily rusted, particularly in summer season when the relative humidity is high. So, it needs careful package and anti-rust treatment.
- (2)For having better magnetic property, electrical steel generally was produced without temper rolling process. To avoiding coil break in slitting process, it is necessary to keep coils away from long storage time.

#### 6.2 Stress-relief annealing

Magnetic properties of electrical steel coils will be deteriorated by mechan cal strains when it was sheared and punched into lamminations or cores. In order to relieve these stresss and restore the original magnetic properties, general stress-relief annealing is necessary. The following points are observed when laminations or cores are processed to stres-relief annealing.

- (1)There are two kinds of coating film to be used in CSC'electrical steel coils and they are adapted to various annealing temperature. Please refer the informations of table10 when strees-relief is necessary to be done.
- (2)The magnetic property almost was not affected by ordinary industrial cooling rate scale, but excessive heating and cooling will make distortion in cores. However, cooling should be taken until it reaches 350°C so that no strain will occur in material.
- (3) Since carburization and excessive oxidation will deteriorate magnetic properties of steel, the atmospheric gas must be carefully controlled and the dew point must be kept low. On the other hand, theoiland grease remained during fabrication also must be removed completely, and the low carbon materials are recommended to be used in the base and cover of annealing furnace.

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## 7. Packing and Label in coils

#### 7.1 Package in Coils



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## 7.2 Label of Coils



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		Taiwan	Japan	IEC	BS/EU	China	America
Fhickness	Iron Loss	CSC ES	IIS C2552	IEC 60404 8	<b>PS EN 10106</b>	GP/T 2521	ASTM A677 04
	W/Kg W15/50	CSC ES	(2000)	4(1998)	(1996)	(1996)	(W15/50)
111111	2 10	3508210	354210				
	2.10		35A210	M230-3545		35W230	
	2.30	_		M235-35A5	M235-35A		
	2.50	35CS250	35A250	M250-35A5	M250-35A	35W250	36F145(2.52)
	2.70	_	35A270	M270-35A5	M270-35A	35W270	36F155(2.70)
	2.87	_	_	_	—	_	36F165(2.87)
	3.00	35CS300	35A300	M300-35A5	M300-35A	35W300	36F175(3.05)
0.35	3.22	—	—		_	<u> </u>	36F185(3.22)
	3.30	—	—	M330-35A5	M330-35A	35W330	—
	3.40	—	—	—	—	—	36F195(3.40)
	3.60	—	35A360	M360-35A5	—	35W360	36F205(3.57)
	4.00	—	—	—	—	35W400	—
0.35 0.50	4.40	35CS440	35A440	—	—	35W440	—
	5.50	35CS550	—	—	—	<u> </u>	America ASTM A677- (W15/50) 
	2.30	50CS230	50A230	—	—	50W230	—
	2.50	—	50A250	M250-50A5	M250-50A	50W250	—
	2.70	—	50A270	M270-50A5	M270-50A	50W270	—
	2.90	50CS290	50A290	M290-50A5	M290-50A	50W290	47F165(2.87)
	3.10	—	50A310	M310-50A5	M310-50A	50W310	47F180(3.13)
	3.30	—	—	M330-50A5	M330-50A	50W330	47F190(3.31)
	3.50	50CS350	50A350	M350-50A5	M350-50A	50W350	47F200(3.48)
	3.64	-	—	—	—		4/F210(3.64)
0.50	4.00	50CS400	50A400	M400-50A5	M400-50A	50W400	4/F240(4.18)
	4.70	50CS470	50A470	M470-50A5	M470-50A	50W470	4/F280(4.8/)
	5.30	_		M530-50A5	M530-50A		—
	5.40	5005600	501600	— M600.50.4.5	— M600.50A	50W540	
	0.00	5005000	50A000	M600-50A5	M600-50A	50W600	
	7.00 8.00	5005700	50A 800	M200 50A5	M800 50A	50W/00	47F450(0.90)
	9.00		J0A800	M940-50A5	M940-50A	50 1 800	
	10.00	50051000	5041000	M1000-50A5		50W1000	
0.35 0.50	13.00	50CS1000	50A1300		_	50W1300	
	3 10			M310-65A5	M310-65A		
	3.30	_	_	M330-65A5	M330-65A	_	_
	3.50	_	_	M350-65A5	M350-65A	_	64F200(3.48)
	3.66	_	_	_	_		64F210(3.66)
	3.92	_	_	—	_	_	64F225(3.92)
	4.00	_	_	M400-65A5	M400-65A	_	64F235(4.09)
	4.33	—	_	_	_	_	64F250(4.33)
0.65	4.70	65CS470	_	M470-65A5	M470-65A	_	64F275(4.79)
	5.30	—	—	M530-65A5	M530-65A	—	64F320(5.57)
	6.00	65CS600	—	M600-65A5	M600-65A	65W600	_
	7.00	—	—	M700-65A5	M700-65A	65W700	—
	8.00	65CS800	65A800	M800-65A5	M800-65A	65W800	64F500(8.70)
	10.00	—	65A1000	M1000-65A5	M1000-65A	65W1000	64F550(9.58)
	13.00	65CS1300	65A1300	—	—	65W1300	—
	16.00	—	65A1600	_	_	65W1600	—

Note:  $W_{15/50}$  is maximum specific total loss at a peak magnetic flux density of 1.5T and a frequency of 50 HZ

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Items	Unit	Symbol				
Electric current	ampere	А				
Voltage	volt	V				
Electric resistance	ohm	Ω				
Inductance	henry	Н				
Magnetic flux	weber	Wb				
Magnetic field strength	oersted	Oe				
Magnetic flux density	tesla	Т				
Iron loss	watt per kilogram	W/kg				
Frequency	hertz	Hz				
Power	watt	W				

#### Frequently Used Units and Symbols

CHINA STEEL CORPORATION 15

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#### Conversion Table

magnetic field strength										
	00	ersted	A/m			A/in				
1 Oersted		1	$7.96 \times 10$			2.02				
1 A/m	1.25	56×10	1			$2.54 \times 10^{-2}$				
1 A/in	4.9	5×10-1	3.94×10			1				
magnetic flux density										
	]	T $Wb/m^2$		$/\mathrm{m}^2$	Line/in <sup>2</sup>					
1 Gauss	1	10	$10^{-4}$		)-4	6.45				
$1 T 10^4$			1		l	$0.45 \times 10^{4}$				
$1 \text{ Wb/m}^2$ $10^4$			1		1	$6.45 \times 10^{4}$				
1 Line/in <sup>2</sup>	$1 \text{ Line/in}^2$ $1.55 \times 10^{-1}$		$1.55 \times 10^{-5}$		$\times 10^{-5}$	1				
iron Loss										
		W/kg			W/lb					
1 W/kg	3	1			4.54×10 <sup>-1</sup>					
1 W/lt	0	2.204			1					

## **10. Services of Sales and Techniques**

The information in this catalog is intended for reference only and may be subject to change without notice. For more informations regarding either sales or techniques, please contact the 6th Section of the sales Department or the Export Trade Section of the Sales Department or the Technical Service Section of the Metallurgical Department or China Steel Global Trading Corporation respectively.

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