



[Product Manual]

ELECTRICAL STEEL COILS



CHINA STEEL AND NIPPON STEEL
VIETNAM JOINT STOCK COMPANY

Our Quality, Your Better Life

CONTENTS

CHAPTER	PAGE
1. Foreword	2
2. Product Certificates	3
3. Features of Electrical Steel Coils	4
4. Manufacturing Process	5
5. Specifications	7
5.1 Symbol Description	7
5.2 Classification of insulation films	7
5.3 Magnetic Properties	7
5.4 Tolerances	8
5.5 Classification of Quality	9
6. Product Availability	10
6.1. Unit mass	10
6.2. Available Sizes	10
7. Marking and Packing	10
7.1. Marking for Electrical Steel Coil	10
7.2. Packing for Electrical Steel Coil	11
8. Application Examples	11
9. Major International Standard	12
10. Ordering Information	14
11. Notification	15
12. Unit and Conversion Table	16
12.1 Frequently Used Units and Symbols	16
12.2 Conversion table	16

1. FOREWORD



China Steel and Nippon Steel Vietnam Joint Stock Company, a delicate steel-manufacturing company, we commit to continually improve our Quality Management System and provide good products and will endeavor to pursue both internal and external satisfactions.

China Steel and Nippon Steel Vietnam Joint Stock Company (abbreviated as CSVC) is a joint stock company of Taiwanese and Japanese companies. The main investors are China Steel Corporation (Taiwan, R.O. China) and Nippon Steel Corporation (Japan). CSVC started its construction in September 2011 and start commercial running in November 2013.

CSVC can provide P/O (Pickled & Oiled) CR (Cold Rolled), ASCR (As Cold Rolled), Galvanized (GI & GA) and ES (Electrical Steel) product with high quality. The total annual production capacity is 1.2 million metric tons.

CSVC implemented its quality management system based on ISO 9001 requirement, we especially stress on meeting customer requirement and continually improving products quality. That's why it makes CSVC to be a reliable and trustworthy supplier of steel products. Besides, in order to commit our responsibility to the environment, CSVC also put much effort in reducing or even eliminating of any hazardous substance to make our products eco-friendly.

2. PRODUCT CERTIFICATES

CSVC achieve many certificates such as:

ISO 9001:2015, IATF16949:2016, SIRIM Mark, SNI Mark, QUATEST Mark, TISI Mark, ...

ISO 9001:2015



IATF16949:2016



Quatest3 Mark



SIRIM Mark



ISO 17025:2005



JAPAN Mark



SNI Mark



3. FEATURES OF ELECTRICAL STEEL COILS

Electrical steel sheets are widely used in modern society, such as AC motor, compressor and transformers and so on, the main applications are shown as Table1. To meet the multiple requirements, the specification of electrical steel became more and more diversified. Brief introductions of products are as follows:

■ **Normal grade ES**

Normal grade ES with low iron loss, adequate magnetic flux density and economical price such as 50CSV1300, 50CSV1000, 65CSV1300, 65CSV1000. It could be used in various types of motor and transformer.






























■ **Medium grade ES**

Medium grade ES with improving iron loss, magnetic flux density and surface quality such as 50CSV800, 50CSV700, 50CSV600, 50CSV600H. It could be widely used in all kinds of AC motor, compressor and transformers.

■ **High grade ES**

High grade ES with so good iron loss and magnetic flux density such as 50CSV470, 50CSV470H, 35CSV440 and 35CSV550. It could be used in special kinds of AC motor, compressor and transformers.

Table1. The main applications of ES products

Grade Application	35CSV 440~550	50CSV 470~470H	50CSV 600~800	50CSV 1000~1300
Rotating Machine				
Large size				
Medium size				
General use AC motors				
Compressor Motor				
Small motors & Intermittent service AC motors				
Static Machine				
Small & Medium power transformers				
Audio transformers				
Welding transformers				
Ballast				
Magnetic switch cores				

4. MANUFACTURING PROCESS

Electrical steel sheets are produced by cold rolling from hot-rolled coils. The typical manufacturing processes are described as Fig 1.

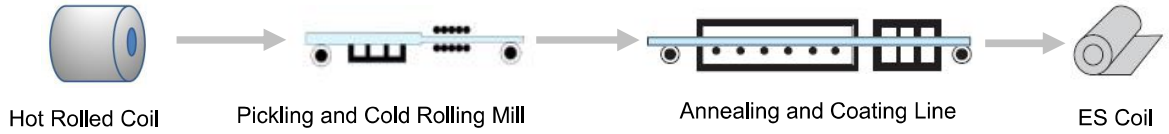


Fig.1: Manufacturing process flow of ES products

CSVC produce its ES products by the combination line of PLTCM (abbreviated from Pickling and Tandem Cold-rolling Mill), and ACL (abbreviated from Annealing and Coating Line) respectively.

Some pictures of Annealing and Coating Line



Picture 1: Furnace



Picture 2. Coating



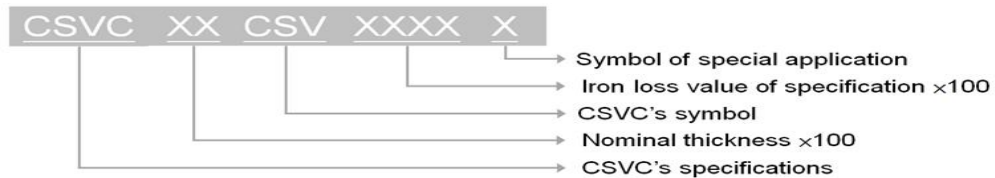
Picture 3. Delivery section

5. SPECIFICATIONS

While much effort has been made to ensure the accuracy of the information contained within this publication, the use of the information is at the user's risk and no warranty is implied or expressed by CSVC with respect to the use of information contained herein. The information in this publication is subject to change without notice. Please contact CSVC office for the latest information.

5.1 Symbol Description

The specifications of CSVC electrical steel coils are stated as the following



5.2 Classification of insulation films

Symbol	Type of insulating film	Remark
C6N8	Semi-inorganic material (inorganic + organic)	Chrome free
C628		Chromate

5.3 Magnetic Properties

Iron Loss and Magnetic Flux Density for Non-Oriented Electrical Steel Coils

Symbol of class	JIS C2552 Classified Symbol	Thickness (mm)	Density kg/dm ³	Iron loss W/kg (max.)	Magnetic flux density T(min.)
				W _{15/50}	B ₅₀
35CSV550	-	0.35	7.75	5.50	1.64
35CSV440	35A440		7.70	4.40	1.64
50CSV1300	50A1300	0.50	7.85	13.00	1.69
50CSV1000	50A1000		7.85	10.00	1.69
50CSV800	50A800		7.80	8.00	1.68
50CSV700	50A700		7.80	7.00	1.68
50CSV600	50A600		7.75	6.00	1.65
50CSV470	50A470		7.70	4.70	1.62
65CSV1300	65A1300		0.65	7.85	13.00
65CSV1000	65A1000	7.80		10.00	1.68
65CSV600	65A600	7.75		6.00	1.66
65CSV800	65A800	7.80		8.00	1.70

Remark:

- (1) The density is used for calculation of cross sectional area of test piece.
- (2) Iron loss W_{15/50} means the iron loss when the frequency is 50 Hz and the maximum magnetic flux density is 1.5T.
- (3) Magnetic flux density B₅₀ means the magnetic flux density at a magnetic field strength of 5000 A/m.

5.4 Tolerances

Dimension Tolerances for Non-Oriented Electrical Steel Coils

5.4.1 Thickness Tolerances JIS C2552

Unit: mm

Width(W)	Thickness	Thickness tolerance (%)	Deviation of thickness in lateral direction(mm)	Width tolerance (Mill edge)	Width tolerance (Cut edge)
$W \leq 1000$	0.35	± 10	0.02 max.	-0/+7	-0/+5
	0.50	± 8	0.03 max.		
	0.65	± 8	0.04 max.		
$W > 1000$	0.35	± 10	0.03 max.		
	0.50	± 8	0.04 max.		
	0.65	± 8	0.04 max.		

Remark:

- (1) The thickness tolerances shall be measured at any point 15 mm or over from the side edge.
- (2) The deviation of thickness in longitudinal direction shall not exceed 8%, 8%, and 6% in the case of nominal thickness 0.35mm, 0.50mm and 0.65mm respectively.
- (3) The deviation of thickness in longitudinal direction means the difference between the maximum thickness and the minimum thickness measured on a steel sheet excluding the portions within 15mm from the edges.

5.4.2 Flatness Tolerances

Unit: mm

Width (w) \ Type	Flatness tolerances (max.)		
	Bow, wave	Edge wave	Centre buckle
$w < 1000$	12	8	6
$1000 \leq w < 1250$	15	9	8
$1250 \leq w < 1600$	15	11	8

Remark:

- (1) The flatness tolerances do not apply for steel plate and sheet after levelling process.
- (2) The values from this table are the height of wave.

5.4.3 Camber Tolerances

Unit: mm

Width (w)	Camber tolerances
$w \geq 630$	2 in length 2000

Remark:

Values from the table shall be applied to any 2000 mm length. For the steel plate and sheet under 2000 mm in length, the values shall be applied to the full length. For the steel plate and sheet over 2000 mm in wave pitch, the values in this table shall be applied to any pitch of wave.

5.5 Classification of Quality

Classification	Common Specification	Typical Application
Low Grade	50CSV1300	AC Motor, Small size rotating machines, audio transformers, ballast
	50CSV1000	
	65CSV1300	
	65CSV1000	

Medium Grade	50CSV800	General used of AC motor, compressor motor, welding transformer, ballast, Small and medium size rotating machines
	50CSV700	
	50CSV600	
	50CSV600H	
	65CSV600	
High Grade	65CSV800	Used of AC motor, compressor motor and transformer which need good iron loss and magnetic flux density
	35CSV550	
	35CSV440	
	50CSV470	
	50CSV470H	

6. PRODUCT AVAILABILITY

6.1 Unit mass

Product Type	Maximum Unit Mass
Electrical Steel Coil	20MT/Coil

6.2 Available Sizes

Unit: mm

Product Type	Thickness			Width	Inner Diameter
Electrical Steel Coil	0.35	0.50	0.65	1000 ~ 1250	508

Remark:

The above data is reference only. Actual available sizes range shall be confirmed with CSVC sales department.

7. MARKING AND PACKING

7.1 Marking for Electrical Steel Coil



CÔNG TY CỔ PHẦN CHINA STEEL & NIPPON STEEL VIỆT NAM
CHINA STEEL AND NIPPON STEEL VIETNAM JOINT STOCK COMPANY
Địa chỉ: Khu công nghiệp Mỹ Xuân A2, Phường Mỹ Xuân, Thị xã Phú Mỹ, Tỉnh Bà Rịa Vũng Tàu, Việt Nam.
 Address: My Xuan A2 Industrial Zone, My Xuan Ward, Phu My Town, Ba Ria-Vung Tau Province, Vietnam.

Tên Sản Phẩm Product Name	HOT ROLLED COIL P&O	 QUATEST 3 <small>JIS G 3131:2010</small>
Khách Hàng Customer	DENYO VIETNAM	
Tiêu Chuẩn Specification	JIS G3131	
Mức Thép Steel Grade	SPHC-PO	
Kích Thước Size	2.000mm x1219.0mm × COIL	Mật Nhiệt Heat no. 2D268
Mã Cuộn Coil ID	3596352	Ngày Sản Xuất Product Date 31.01.2020
Khối Lượng Tịnh Net mass 8,450 kg	 3596352	 8,450
Khối Lượng Tổng Gross mass 8,510 kg		

Sản Xuất Tại Việt Nam
Made in Viet Nam

(The label is a sample and just for reference)

7.2 Packing for Electrical Steel Coil



8. APPLICATION EXAMPLES



Case 1

Film/Paper wrapping + Paper edge protector + Metal edge protector + Hard board paper + Metal protector + Circumferential strapping + Eye strapping

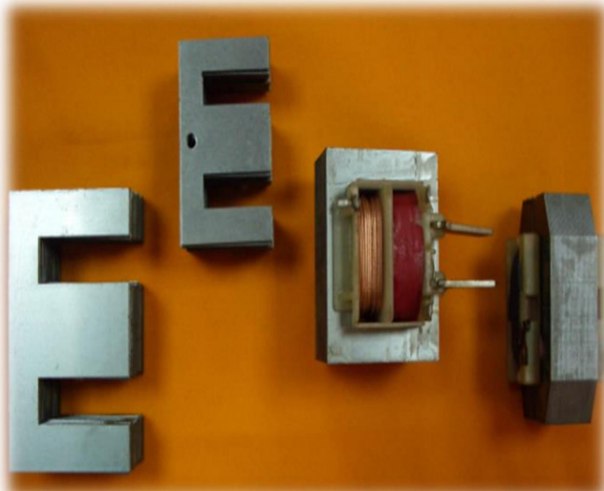


Case 2

Film/Paper wrapping + Paper edge Protector - Hard Board paper + Circumferential strapping + Eye Strapping



1. Converter Motor and Compressor



2. Motor Iron Core

3. Motor Iron Core

9. MAJOR INTERNATIONAL STANDARD

Thickness (mm)	Iron-Loss W/kg W15/50	Vietnam	Taiwan	Japan	IEC	BS/EU	China	America
		CSVC -ES	CSC - ES	JIS C2552 (2000)	IEC 60404-8-4 (1998)	BS EN 10106 (1996)	GB/T 2521 (1996)	ASTM A677-05 (W15/50)
0.35	2.10	-	35CS210	35A210	-	-	-	-
	2.30	-	-	35A230	M230-35A5	-	35W230	-
	2.35	-	-	-	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	36F157(3.05)
	3.22	-	-	-	-	-	-	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	-
	4.40	35CSV440	35CS440	35A440	-	-	35W440	-
5.50	35CSV550	35CS550	-	-	-	-	-	

0.50	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	-	-	-	-	-	-	47F210(3.64)
	4.00	-	50SC400	50A400	M400-50A5	M400-50A	50W400	47F240(4.18)
	4.70	50CSV470	50CS470	50A470	M470-50A5	M470-50A	50W470	47F280(4.87)
	5.30	-	-	-	M530-50A5	M530-50A	-	-
	5.40	-	-	-	-	-	50W540	-
	6.00	50CSV600	50CS600	50A600	M600-50A5	M600-50A	50W600	-
	7.00	50CSV700	50CS700	50A700	M700-50A5	M700-50A	50W700	47F400(6.96)
	8.00	50CSV800	50CS800	50A800	M800-50A5	M800-50A	50W800	47F450(7.84)
	9.40	-	-	-	M940-50A5	M940-50A	-	-
10.0	50CSV1000	50CS1000	50A1000	M1000-50A5	-	50W1000	-	
13.0	50CVS1300	50CS1300	50A1300	-	-	50W1300	-	
0.65	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)
	4.70	-	65CS470	-	M470-65A5	M470-65A	-	64F275(4.79)
	5.30	-	-	-	M530-65A5	M530-65A	-	64F320(5.57)
	6.00	65CSV600	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)
	10.0	65CSV1000	-	65A1000	M1000-65A5	M1000-65A	65W1000	64F550(9.58)
	13.0	65CSV1300	65SC1300	65A1300	-	-	65W1300	-
16.0	-	-	65A1600	-	-	65W1600	-	

10. ORDER INFORMATION

For promptly and properly processing of your orders, please clearly specify the items as shown in the table below. If you need to confirm any information about CSVC's products or services, please feel free to contact with CSVC's sales or QC/QA department.

Required Ordering Data			Example
1	Specification		CSVC 50CSV1300
2	Coating Type	C628	C6N8
		C6N8	
3	Edge Type	Cut Edge	Mill Edge
		Mill Edge	
4	Surface Quality	Unexposed (UE)	UE
		General Purposes (GP)	
5	Dimensions	(Thickness × Width × Coil)	0.50mm×1200mm×Coil
6	Inner Diameter		ID 508mm
7	Mass	Max. Mass	10 MT max.
		Order Mass	450 MT
8	Application	(or Fabrication Methods)	Small Motor cores
9	Special Requirements (if any)		W _{15/50} : 6.3 Max

Notes:

1. The contents of this catalog are for reference only. Customers are recommended to consult the specifications published by the corresponding associations.
2. Information of the available steel grades, sizes, marking and packing as shown herein may be updated without notice to comply with actual production situations.
3. Customers are recommended to confirm with CSVC, should you have any questions concerning steel specifications or ordering requirement.

11. NOTIFICATION

11.1 Rust Prevention

Due to slitting and punching process that causing broken coating film, the ruptured surface will easily become rusted. So, careful package and anti-rust treatment are required for where is high humidity.

11.2 Magnetic aging:

For having better magnetic property, ES product is intended to produce without temper rolling process. The aging phenomenon is also easy to happen and cause coil break when slitting. Please be careful to keep coils away from long storage time.

11.3 Stress-relief annealing:

- Magnetic properties of magnetic steel coils will be deteriorated by mechanical strains when it was sheared and punched into interlaminations or cores. In order to relieve these stress and restore the original magnetic properties, generally stress-relief annealing is necessary.
- The magnetic properties almost was not affected by ordinary industrial cooling rate scale, but abrupt 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.

11.4 Precaution

Please be careful when unpacking the coils. The steel strip or packing material may make injury.

- The information in this catalog is intended for reference only and may be subject to change without notice. For more information regarding either sales or techniques. Please contact to C1, C2 - Sale Department or P5-Quality Control and Quality Assurance department

12. UNITS AND CONVERSION TABLES

12.1. Frequently Used Units and Symbols

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

12.2. Conversion Table

Length	ft	in	mm	m
	1	12	304.8	0.3048
	0.08333	1	25.4	0.0254
	0.003281	0.03937	1	0.001

Weight	1kg = 2.20462 lb
---------------	------------------

Force	1kgf = 9.80665 N
--------------	------------------

Stress	ksi(=1000psi)	psi	kgf/mm ²	N/mm ² (MPa)
	1	1000	0.70307	6.89476
	0.001	1	0.703070×10 ⁻⁴	6.89476×10 ⁻³
	1.42233	1422.33	1	9.80665
	0.145038	145.038	1.101972	1

Absorbed Energy	ft-lbf	Kgf-m	N-m (=Joule)
	1	0.138255	1.35582
	7.23301	1	9.80665
	0.737562	0.101972	1

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