



Product Manual

COLD ROLLED STEEL COILS



CHINA STEEL AND NIPPON STEEL
VIETNAM JOINT STOCK COMPANY

Our Quality, Your Better Life

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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 COLD ROLLED STEEL COILS

Cold-rolled steel sheets are widely used in modern society, such as automobile parts, electric appliances, furniture, office equipment, pipe, and so on. To meet the multiple requirements, the specification of cold rolled steel coil became more and more diversified. For example, some specifications focus on their formability due to complicated deformation usage, while others might focus on high tensile strength and so on. Therefore, customers shall always need to choose appropriate specification based on their end usage. Brief introductions of products are as below:

■ **JIS G3141 SPCC/SPCD/SPCE-SD, JFS A2001 JSC270C/D**

JIS/JFS standard of cold-rolled products, grade from commercial quality to deep drawing quality, which can be used in various applications, mainly focus on their deforming properties.

■ **JIS G3141 SPCF/SPCG-SD, JFS A2001 JSC 270E/F**

JIS/JFS standard of cold-rolled ultra-deep drawing products, which have non-aging properties and high average plastic strain ratio.

■ **JIS G3135 SPFC340~590**

High strength steel with improved formability for automobile structures use, tensile strength (TS) from 340 to 590 N/mm², which are widely used in automobile structures or other required high strength parts.

■ **JIS G3133 SPPC/SPPD/SPPE**

Decarburized Steel Sheets and Strip for Porcelain Enameling.

■ **JFS A2001 JSC590Y**

High strength dual-phase CR steel coils for automobile structures with excellent draw ability, such kind of steel has low yield ratio and high elongation properties, which are good deforming in automobile body structures and reinforcement parts.

■ **EN 10130 DC01/DC03/DC04/DC05/DC06**

EN standard of cold-rolled products, grade from commercial quality to deep drawing quality, which can be used in various applications, mainly focus on their deforming properties.

■ **EN 10268 HC260~420LA**

High strength steel containing one or more alloys Nb, Ti and V, yield strength(YS) from 260 to 420 N/mm², which are widely used in automobile structures or other required strength parts.

■ **ASTM A1008 CS/DS/DDS/EDDS**

ASTM standard of cold-rolled products, grade from commercial quality to deep drawing quality, which can be used in various applications, mainly focus on their deforming properties.

■ **SAE J2340 340~420X**

High strength low-alloy CR steel coils for automobiles with high strength, high formability, which are widely used in automobile structures such as bumpers.

■ **ISO 3574 CR1/CR2/CR3/CR4/CR5**

ISO standard of cold-rolled products, grade from commercial quality to deep drawing quality, which can be used in various applications, mainly focus on their deforming properties.

■ **CSVC – SPCC-1B/1D**

Cold rolled full hard (As cold-rolled) products are followed CSVC-standard, which are basically shipped after cold-rolling by tandem cold rolling mill.

4. MANUFACTURING PROCESS

Cold-rolled steel sheets are produced by cold rolling from hot-rolled coil, the typical manufacturing processes are described as Fig1.

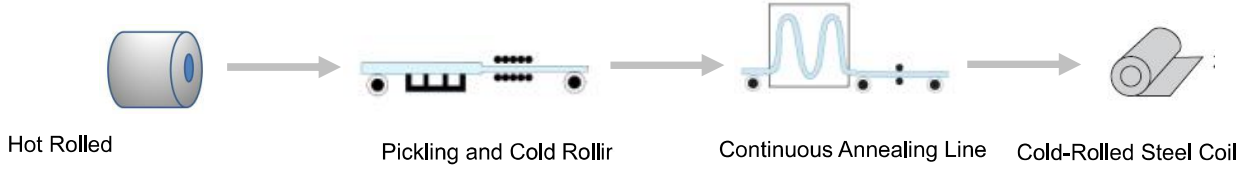


Fig.1: Manufacturing process flow of CR products

CSVC produces its cold rolled products by the combination line of PLTCM (abbreviated from Pickling and Tandem Cold-rolling Mill), and CAL (abbreviated from Continuous Annealing Line) respectively.

Some pictures of Cold Rolling and Annealing line



Picture 1:
Cold Rolling Mill



Picture 2:
Continuous Annealing Line

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 Chemical Compositions and Mechanical Properties

5.1.1 Carbon Steel Sheet for Drawing or Forming

(1) JIS G3141 Cold Reduced Carbon Steel Sheet and Strip

Specification			JIS G3141					
Symbol of Class			SPCC	SPCT ^b	SPCD	SPCE	SPCF ^d	SPCG ^d
Chemical Composition ^a %	C max.		0.15		0.10	0.08	0.06	0.02
	Si max.		-		-	-	-	-
	Mn max.		0.60		0.50	0.45	0.45	0.25
	P max.		0.10		0.040	0.030	0.030	0.020
	S max.		0.035		0.035	0.030	0.030	0.020
Tensile Test ^c Thickness (t)mm	Tensile Strength ^e N/mm ² (min)	0.30≤t	-	270	270	270	270	270
	Yield Point N/mm ² (max)	0.30≤t	-	-	(240)	(220)	(210)	(190)
	Elongation % (min)	0.30≤t<0.40	-	31	33	35	-	-
		0.40≤t<0.60	-	34	36	38	40	42
		0.60≤t<1.00	-	36	38	40	42	44
		1.00≤t<1.60	-	37	39	41	43	45
1.60≤t<2.50	-	38	40	42	44	46		
The average ratio of plastic strain $\bar{\epsilon}$	0.50 ≤t≤ 1.00	-	-	-	-	-	1.5 min	
	1.00 < t≤1.60	-	-	-	-	-	1.4 min	
Bend Test ^f	Bend Angle		(180°)					
	Radius of Inside Surface		Flat on Itself					

Remark:

- Alloying elements other than those specified in the above table can be added as necessary.
- The tensile test value is guaranteed for those SPCC.
- For those under 0.60mm in thickness, the tensile test shall generally be omitted.
- SPCF and SPCG shall be guaranteed for non-ageing property for six months after shipment from the manufacturer's factory.
- The upper limit of yield point or proof stress in parenthesis is informative and can be applied when agreed upon between the purchaser and the supplier.
- The test for bendability may be omitted. However, when designated by the purchaser, the test shall be performed.

(2) ASTM A1008 Cold Rolled Low Carbon and High-Strength Steel-Alloy with Improved Formability, Solution Hardened and Bake Hard enable Steel Sheet

Classification		CS TYPE			DS TYPE		DDS ^{f,g}	EDDS ^j
symbol		A ^{d,e,f,g}	B ^d	C ^{d,e,f,g}	A ^{e,i}	B		
Chemical Composition %	C	0.10 max.	0.02~0.15	0.08 max.	0.08 max.	0.02~0.08	0.06 max.	0.02 max.
	Mn max.	0.6			0.5		0.5	0.4
	P max.	0.025		0.1	0.02		0.02	0.02
	S max.	0.035			0.02		0.025	0.02
	Al min.	... ^a			0.01	0.02	0.01	0.01
	Si	... ^a						
	Cu max.	0.20 ^h			0.2		0.2	0.1
	Ni max.	0.2			0.2		0.2	0.1
	Cr max. ^b	0.15			0.15		0.15	0.15
	Mo max.	0.06			0.06		0.06	0.03
	V max.	0.008			0.008		0.008	0.1
	Nb max.	0.008			0.008		0.008	0.1
	Ti max. ^c	0.025			0.025		0.025	0.15
	N	... ^a						

Remark:

- Where an ellipsis (...) appears in the table, though no specified, the analysis result shall be reported.
- Chromium is permitted, at the purchaser's option, to 0.25% maximum when the carbon content is less than or equal to 0.05%.
- For steels containing 0.02% or more carbon, titanium is permitted at the producer's option, to the lesser of 3.4N+1.5S or 0.025%.
- When an aluminum deoxidized steel is required for the application, it is permissible to order commercial steel (CS) to a minimum of 0.01% total aluminum.
- Specify Type B to avoid carbon level below 0.02%.
- It is permissible to furnish as a vacuum degassed or chemically stabilized steel, or both, at the purchaser's option.
- For carbon levels less than or equal to 0.02%, it is permissible to use vanadium, columbium or titanium, or a combination thereof, as stabilizing elements at the purchaser's option. In such cases, the applicable limit for vanadium or columbium shall be 0.10% max. and limit for titanium shall be 0.15% max.
- When copper steel is specified, the copper limit is a minimum requirement. When copper steel is not specified, the copper limit is a maximum requirement.
- If produced utilizing a continuous anneal process, stabilized steel is permissible at the producer's option, and Footnotes f and g apply.
- Shall be furnished as vacuum degassed and stabilized steel

(3) SAE J403 Carbon Steel

Grade	Chemical Composition %				
	C	Si	Mn	P	S
1002(1)	0.02~0.04		0.35max.	0.030max.	0.035max.
1003(1)	0.02~0.06		0.35max.		
1004(1)	0.02~0.08		0.35max.		
1005(2)	0.06max.		0.35max.		
1006(2)	0.08max.		0.25~0.40		
1007(1)	0.02~0.10		0.50max.		
1008 (2)	0.10max.		0.30~0.50		
1009(2)	0.15max.		0.60max.		
1010	0.08~0.13		0.30~0.60		
1012	0.10~0.15		0.30~0.60		
1013	0.11~0.16		0.30~0.60		
1015	0.13~0.18		0.30~0.60		
1016	0.13~0.18		0.60~0.90		
1017	0.15~0.20		0.30~0.60		
1018	0.15~0.20		0.60~0.90		
1019	0.15~0.20		0.70~1.00		
1020	0.18~0.23		0.30~0.60		
1021	0.18~0.23		0.60~0.90		
1022	0.18~0.23		0.70~1.00		

Remark:

- (1) Ultra low carbon, interstitial free stabilized and non-stabilized steel shall not be supplied for these grades.
 - (2) Ultra low carbon, interstitial free stabilized and non-stabilized steel may be supplied for these grades.
- Manganese limits for Structural Shapes, Plates, Strip, Sheets and Welded Tubing shall be as follows:
SAE1006 requires Mn 0.45% maximum and SAE1008 requires Mn 0.50% maximum.

(4) JIS G3141 Cold Reduced Carbon Steel Sheet and Strip (SPCC-1D/2D/4D/8D)

Specification		JIS G3141			
Classification		SPCC-1D	SPCC-2D*	SPCC-4D*	SPCC-8D
Hardness	HRB	85 min.	74 ~ 89	65 ~ 80	50 ~ 71
	HV	170 min.	135 ~ 185	115 ~ 150	95 ~ 130
Bend Angle		-	180°	180°	
Radius of Inside Surface		-	Thickness×2.0	Thickness×1	Flat on Itself

Remark:

- As to hardness, either HRB or HV shall be applied.
- (*) CSVC is developing

(5) EN 10130 Cold Rolled Sheet for Drawing and Forming

Steel name		DC01	DC03	DC04	DC05	DC06	DC07*
Chemical Composition %	C max.	0.12	0.10	0.08	0.06	0.02	0.01
	Mn max.	0.60	0.45	0.40	0.35	0.25	0.20
	P max.	0.045	0.035	0.030	0.025	0.020	0.020
	S max.	0.045	0.035	0.030	0.025	0.020	0.020
	Ti max.	-	-	-	-	0.3	0.2
Tensile Test	Tensile Strength MPa	270~410	270~370	270~350	270~330	270~330	250~310
	Yield Proof Stress MP (max.)	280	240	210	180	170	150
	Elongation % (min.)	28	34	38	40	41	44
	ratio of plastic strain r₉₀ (min.)	-	1.3	1.6	1.9	2.1	2.5
	tensile strain hardening exponent n₉₀ (min.)	-	-	0.180	0.200	0.220	0.230

Remark:

- a. 1MPa=1 N/mm²
- b. Titanium may be replaced by niobium. Carbon and nitrogen shall be completely stabilized.
- c. When the thickness is greater than 0.5 mm and less than (incl.) 0.7 mm the minimum value for elongation is reduced by 2 units. For a thickness less than (incl.) 0.5 mm, the minimum value is reduced by 4 units.
- d. The values of r₉₀ and n₉₀ only apply to products with a thickness equal to or greater than 0.5 mm.
- e. When the thickness is over 2 mm, the value for r₉₀ is reduced by 0.2.
- f. For design purposes the lower limit of Yield Proof Stress for grades DC01, DC03, DC04 and DC05 may be assumed to be 140 MPa.
- g. (*) CSVC is developing

(3) JFS A2001 Cold Rolled Steel Sheet and Strip for Automobile Use

Designation		JSC270C	JSC270D	JSC270E	JSC270F
Tensile strength N/mm²		270 min.	270 min	270 min	270 min
Yield strength N/mm²	0.4≤t<0.8	145~ 265	135~ 225	130~ 205	120~ 185
	0.8≤t<1.0	135~ 255	125~ 215	120~ 195	110~ 175
	1.0≤t≤ 2.0	125~245	115~205	110~185	100~165
Elongation	0.4≤t< 0.6	37~46	40~49	42~52	44~52
	0.6≤t< 0.8	38~47	41~50	43~51	45~53
	0.8≤t< 1.0	39~48	42~51	44~52	46~54
	1.0≤t< 1.2	40~49	43~52	45~53	47~55
	1.2≤t< 1.6	41~50	44~53	46~54	48~56
	1.6≤t< 2.0	42~53	45~55	47~56	49~58
	t=2.0	43~55	46~57	48~58	50~60
Mean plastic strain ratio r	0.5≤t≤1.0	-	1.2 min.	1.4 min.	1.6 min.
	1.0<t ≤ 1.6	-	1.1 min.	1.3 min.	1.5 min.

(6) ISO 3574 Cold Reduced Carbon Steel Sheet of Commercial and Drawing Qualities

Steel name		CR1	CR2	CR3	CR4	CR5	
Chemical Composition %	C max.	0.15	0.10	0.08	0.06	0.02	
	Mn max.	0.60	0.50	0.45	0.45	0.25	
	P max.	0.050	0.040	0.030	0.030	0.020	
	S max.	0.035	0.035	0.03	0.03	0.02	
	Ti max.	-	-	-	-	0.15	
Tensile Test	Tensile Strength MPa (max.)		410	370	350	350	350
	Yield Proof Stress MPa (max.)		280	240	220	210	190
	Elongation % (min.)	$t \leq 0.06\text{mm}$	27	33	35	37	39
		$0.6\text{mm} < t$	28	34	36	38	40
	ratio of plastic strain r_{90} (min.)		-	-	1.3	1.4	1.7
	tensile strain hardening exponent n_{90} (min.)		-	-	0.16	0.19	0.22

Remark:

Titanium may be replaced totally or partially by niobium or vanadium. Carbon and nitrogen shall be completely stabilized.

5.1.2 High Strength Steel Sheets with Improved Formability for Automobile Structural Uses

(1) JIS G3135 Cold Reduced High Strength Steel Sheet and Strip with Improved Formability for Automobile Structural Uses

Classification symbol	Tensile Test				Test Piece	Bend Test		
	Tensile Strength N/mm ²	Yield Proof Stress N/mm ²	Elongation % Thickness (t) mm			Bend Angle	Radius of Inside surface	Test Piece
			$0.6 \leq t < 1.0$	$1.0 \leq t \leq 2.3$				
SPFC340	340 min.	175 min.	34 min.	35 min.	JIS NO.5 Perpendicular to rolling direction	180°	JIS NO.3 Perpendicular to rolling direction	Flat on itself
SPFC370	370 min.	205 min.	32 min.	33 min.				Flat on itself
SPFC390	390 min.	235 min.	30 min.	31 min.				Flat on itself
SPFC440	440 min.	265 min.	26 min.	27 min.				Flat on itself
SPFC490	490 min.	295 min.	23 min.	24 min.				Flat on itself
SPFC540	540 min.	325 min.	20 min.	21 min.				Thickness × 0.5
SPFC590	590 min.	355 min.	17 min.	18 min.				Thickness × 1.0
SPFC490Y	490 min.	225 min.	24 min.	25 min.				Flat on itself
SPFC540Y	540 min.	245 min.	21 min.	22 min.				Thickness × 0.5
SPFC590Y	590 min.	265 min.	18 min.	19 min.				Thickness × 1.0

(2) JFS A2001 Cold Rolled Steel Sheet and Strip for Automobile Use

Designation	Tensile strength N/mm ²	Yield strength N/mm ²			Elongation						Mean plastic strain ratio \bar{r}	
		0.4≤t<0.8	0.8≤t<1.0	1.0 ≤t ≤2.0	0.4≤t<0.6	0.6≤t<0.8	0.8≤t<1.0	1.0≤t<1.2	1.2≤t<1.6	1.6≤t≤2.0	0.5≤t≤1.0	1.0<t≤1.6
JSC340P	340 min	165≤ 255≥	155≤ 245≥	145≤ 235≥	35~45	36~46	37~47	38~48	39~49	≥40	1.4 min.	1.3 min.
JSC370P	370 min	175≤ 265≥	165≤ 255≥	155≤ 245≥	33~43	34~44	35~45	36~46	37~47	≥38	1.4 min.	1.3 min.
JSC390P	390 min	205≤ 305≥	195≤ 295≥	185≤ 285≥	31~42	32~43	33~44	34~45	35~46	≥36	1.4 min.	1.3 min.
JSC340W	340 min	205≤ 305≥	195≤ 295≥	185≤ 285≥	33~43	34~44	35~45	36~46	37~47	≥38	-	-
JSC370W	370 min	205≤ 305≥	195≤ 295≥	185≤ 285≥	30~40	31~41	32~42	33~43	34~44	≥35	-	-
JSC390W	390 min	245≤ 355≥	235≤ 345≥	225≤ 335≥	29~40	30~41	31~42	32~43	33~44	≥34	-	-
JSC440W	440 min	285≤ 390≥	275≤ 380≥	265≤ 370≥	26~38	27~39	28~40	29~41	30~42	≥31	-	-
JSC590R	590 min	430≤ 580≥	420≤ 570≥	410≤ 560≥	-	17~32	17~32	18~33	18~33	≥18	-	-
JSC590Y	590 min	340≤ 460≥	330≤ 450≥	320≤ 440≥	-	17~32	18~33	19~34	20~35	≥21	-	-

(3) EN 10268 Cold Rolled Steel Flat Products with High Yield Strength for Cold Forming

Steel Name	Chemical composition %								Tensile Test				
	C max.	Si max.	Mn max.	P max.	S max.	Al min.	Ti max.	Nb max.	0.2% Proof Stress MPa	Tensile Strength MPa	Elongation % min.	Plastic strain ratio min. r_{90}	Strain hardening exponent min. n
HC220Y	0.01	0.30	0.90	0.080	0.025	0.010	0.12	0.09	220~ 270	340~ 420	33	1.6	0.18
HC260LA	0.10	0.50	1.0	0.03	0.025	0.015	0.15	0.09	260~ 330	350~ 430	26	-	-
HC300LA	0.12	0.50	1.4	0.03	0.025	0.015	0.15	0.09	300~ 380	380~ 480	23	-	-
HC340LA	0.12	0.50	1.5	0.03	0.025	0.015	0.15	0.09	340~ 420	410~ 510	21	-	-
HC380LA	0.12	0.50	1.60	0.03	0.025	0.015	0.15	0.09	380~ 480	440~ 560	19	-	-
HC420LA	0.14	0.50	1.60	0.03	0.025	0.015	0.15	0.09	420~ 520	470~ 600	17	-	-

Remark:

- 1MPa=1 N/mm²
- The minimum values for r_{90} and n_{90} only apply to products of thickness greater than (incl.) 0.5 mm.
- When the thickness is greater than 0.5 mm and less than (incl.) 0.7 mm, the minimum value for elongation is reduced by 2 units.
- For products with thickness over 2 mm the minimum r_{90} value is reduced by 0.2

(4) SAE J2340 High Strength Automotive Steel

Grade	Chemical Composition %			Tensile Test			
	C	P	S	Yield Proof Stress	Tensile Strength	Elongation %	Test Piece
	max.	max.	max.	MPa	MPa		
340X	0.13	0.060	0.015	340~440	410 min.	22 min.	rolling direction
420X	0.13	0.060	0.015	420~520	490 min	18 min.	rolling direction
420Y	-	0.060	0.015	420~520	520 min	16 min.	rolling direction

Remark:

1. Cu+Ni+Cr+Mo≤0.05% on heat analysis. When one or more of these elements are specified, the sum does not apply; in which case, only the individual limits on the remaining unspecified elements will apply.
2. The mechanical property requirements shall be determined in longitudinal direction unless otherwise specified and shall be performed per section 10.
3. For thickness less than 2.5 mm, minimum percent elongation is permitted to be 2% less than the value shown.

5.1.3 JIS G3133 Decarburized Steel Sheets and Strip for Porcelain Enameling

Symbol of Class	SPPC	SPPD	SPPE	
Chemical Composition %	C	0.008 max.	0.008 max.	0.008 max.
	Mn	0.5 max.	0.5 max.	0.5 max.
	P	0.04 max.	0.04 max.	0.04 max.
	S	0.04 max.	0.04 max.	0.04 max.
Tensile Test	Yield point N/mm ²	-	240 max.	220 max.
	Tensile strength N/mm ²	270 min.	270 min.	270 min.
Elongation %	0.40 ≤t<0.6	34 min.	36 min.	38 min.
	0.60 ≤t< 1.00	36 min.	38 min.	40 min.
	1.00 ≤t< 1.60	37 min.	39 min.	41 min.
	1.60 ≤t≤ 2.00	38 min.	40 min.	42 min.
Bendability	Bending angle	180		
	Inside radius	Flat on itself		
	Test Piece	No.5 Parallel to rolling direction		

Remark:

1. Elements as Ti, Nb, Zr, V and B may be added. In such case, the content of the elements added shall be reported.
2. For steel sheets and strip under 0.60mm in thickness, the tensile test shall normally be omitted when not requested by the purchaser.

5.1.4 Cold Rolled Full Hard Steel Sheet in Coil (ASCR)

Grade	Chemical Composition %				
	C max.	Si max.	Mn max.	P max.	S max.
SPCC-1B/1D	0.06	0.05	0.3	0.03	0.015
	0.08	0.05	0.3	0.03	0.02
ASCR 1015	0.13 – 0.18	0.05	0.3 – 0.6	0.03	0.035
ASCR 1017	0.15 – 0.20	0.05	0.3 – 0.6	0.03	0.035
ASCR 1022	0.18 – 0.23	0.05	0.7 – 1.0	0.03	0.035

Remark:

Cold rolled full hard (ASCR) mean as - Cold Rolled coils should be sold as cold rolled condition, rolling oil is remained (no rust prevented oil), based on this situation, customers should be reminded to use coils as soon as possible. (Basically within 2 months)

5.2 Tolerances

5.2.1 Thickness Tolerances

(1) JIS G3141- Thickness Tolerance

Unit : mm

Thickness(t)	Width(w)			
	w<1000	1000≤w<1250	1250≤w<1630	w≥1630
t < 0.40	±0.04	±0.04	-	-
0.4 ≤ t < 0.60	±0.05	±0.05	±0.06	-
0.60 ≤ t < 0.80	±0.06	±0.06	±0.06	±0.07
0.80 ≤ t < 1.00	±0.06	±0.07	±0.08	±0.09
1.00 ≤ t < 1.25	±0.07	±0.08	±0.09	±0.11
1.25 ≤ t < 1.60	±0.09	±0.10	±0.11	±0.13
1.60 ≤ t < 2.00	±0.11	±0.12	±0.13	±0.15
2.00 ≤ t	±0.13	±0.14	±0.15	±0.17

Remark:

1. Thickness shall be measured at a normal portion for steel strip and at any point not less than 15mm inward from each edge for steel sheet.
2. These specifications are applied for SPCC-SD/1D/2D/4D/8D, SPCCD, SPCE, SPCF, SPCG....
3. The tolerance on thickness shall be applied to the nominal thickness.

(2) ASTM A568/A568M Thickness Tolerances

Table 15: Thickness is measured at any point across the width not less than 1 in. (25.4 mm) from a side edge

Unit: Inch

Specified Width, in.	Specified Ordered Thickness, in.B				
	0.014 to 0.019	Over 0.019 A to 0.039	Over 0.039 to 0.057	Over 0.057 to 0.071	Over 0.071 to 0.098
Over 15 to 72	Thickness Tolerances, Over, in., No Tolerance UnderC				
	0.002	0.003	0.004	0.005	0.005

Table S1.3: Thickness is measured at any point across the width not less than 3/8 in. (9.5 mm) from a side edge

Unit: Inch

Specified Width, in.	Specified Ordered Thickness, in.B				
	0.014 to 0.019	Over 0.019 A to 0.039	Over 0.039 to 0.057	Over 0.057 to 0.071	Over 0.071 to 0.098
Over 15 to 72	Thickness Tolerances, Over, in., No Tolerance UnderC				
	0.004	0.006	0.008	0.01	0.01

Remark:

- a. Minimum Thickness, 0.021 in. for high-strength, low-alloy.
- b. The specified thickness range captions apply independent of whether the ordered thickness is started as a nominal or minimum
- c.. The tolerance provided in the table are based on minimum thickness (tolerance over, no tolerance under). For nominal thickness, the tolerance id divides equally over and under.

(3) JIS G3135 Thickness Tolerances

Thickness(t)	Width(w)				
	$w \leq 630$	$630 \leq w \leq 1000$	$1000 < w \leq 1250$	$1250 < w \leq 1600$	$1600 < w$
$0.60 < t \leq 0.80$	± 0.06	± 0.06	± 0.06	± 0.07	± 0.08
$0.80 < t \leq 1.00$	± 0.07	± 0.07	± 0.08	± 0.09	± 0.10
$1.00 < t \leq 1.25$	± 0.08	± 0.08	± 0.09	± 0.10	± 0.12
$1.25 < t \leq 1.60$	± 0.09	± 0.10	± 0.11	± 0.12	± 0.14
$1.60 < t \leq 2.00$	± 0.10	± 0.11	± 0.12	± 0.14	± 0.16
$2.00 < t \leq 2.3$	± 0.12	± 0.13	± 0.14	± 0.16	± 0.18

The measuring points of thickness shall be arbitrary points 25 mm or over inside from the edge for the mill edge, and arbitrary points 15 mm or over inside from the edge for the cut edge

(4) JFS A2001- Thickness Tolerances

Unit: mm

Minimum Tensile strength TS (N/mm ²)	Width(w)				
	Thickness (t)	$w < 1000$	$1000 \leq w < 1250$	$1250 \leq w < 1600$	$w \geq 1600$
270 < TS ≤ 780	$0.4 \leq t < 0.60$	±0.05	±0.05	±0.07	±0.08
	$0.60 \leq t < 0.80$	±0.06	±0.06	±0.07	±0.08
	$0.80 \leq t < 1.00$	±0.07	±0.08	±0.09	±0.10
	$1.00 \leq t < 1.25$	±0.08	±0.09	±0.10	±0.12
	$1.25 \leq t < 1.60$	±0.10	±0.11	±0.12	±0.14
	$1.60 \leq t < 2.00$	±0.11	±0.12	±0.14	±0.16
	$2.00 \leq t$	±0.13	±0.14	±0.16	±0.18
780 ≤ TS	$0.60 \leq t < 0.80$	±0.08		±0.09	-
	$0.80 \leq t < 1.00$	±0.09		±0.10	-
	$1.00 \leq t < 1.25$	±0.10		±0.12	-
	$1.25 \leq t < 1.60$	±0.12		±0.14	-
	$1.60 \leq t < 2.00$	±0.14		±0.16	-
	$2.00 \leq t$	±0.16		±0.18	-

(5) EN 10131 Thickness Tolerances

Table A: Tolerances on thickness for steel grades with a specified minimum yield strength $Re < 260$ MPa. The thickness may be measured at any point located more than 40mm from the edges **Unit: mm**

Thickness(t) \ Width(w)	$w \leq 1200$	$1200 < w \leq 1500$	$1500 < w$
$0.35 \leq t \leq 0.40$	± 0.03	± 0.04	± 0.05
$0.40 < t \leq 0.60$	± 0.03	± 0.04	± 0.05
$0.60 < t \leq 0.80$	± 0.04	± 0.05	± 0.06
$0.80 < t \leq 1.00$	± 0.05	± 0.06	± 0.07
$1.00 < t \leq 1.20$	± 0.06	± 0.07	± 0.08
$1.20 < t \leq 1.60$	± 0.08	± 0.09	± 0.10
$1.60 < t \leq 2.00$	± 0.10	± 0.11	± 0.12
$2.00 < t \leq 2.50$	± 0.12	± 0.13	± 0.14
$2.50 < t \leq 3.00$	± 0.15	± 0.15	± 0.16

Table B: Tolerances on thickness for steel grades with a specified minimum yield

strength $260 \leq Re < 340$ MPa

Unit: mm

Thickness(t) \ Width(w)	$w \leq 1200$	$1200 < w \leq 1500$	$1500 < w$
$0.35 \leq t \leq 0.40$	± 0.04	± 0.05	± 0.06
$0.40 < t \leq 0.60$	± 0.04	± 0.05	± 0.06
$0.60 < t \leq 0.80$	± 0.05	± 0.06	± 0.07
$0.80 < t \leq 1.00$	± 0.06	± 0.07	± 0.08
$1.00 < t \leq 1.20$	± 0.07	± 0.08	± 0.10
$1.20 < t \leq 1.60$	± 0.09	± 0.11	± 0.12
$1.60 < t \leq 2.00$	± 0.12	± 0.13	± 0.14
$2.00 < t \leq 2.50$	± 0.14	± 0.15	± 0.16

Table C: Tolerances on thickness for steel grades with a specified minimum yield strength
 $340 \leq Re \leq 420$ MPa

Unit: mm

Thickness(t) \ Width(w)	$w \leq 1200$	$1200 < w \leq 1500$	$1500 < w$
$0.35 \leq t \leq 0.40$	± 0.04	± 0.05	± 0.06
$0.40 < t \leq 0.60$	± 0.05	± 0.06	± 0.07
$0.60 < t \leq 0.80$	± 0.06	± 0.07	± 0.08
$0.80 < t \leq 1.00$	± 0.07	± 0.08	± 0.10
$1.00 < t \leq 1.20$	± 0.09	± 0.10	± 0.11
$1.20 < t \leq 1.60$	± 0.11	± 0.12	± 0.14
$1.60 < t \leq 2.00$	± 0.14	± 0.15	± 0.17
$2.00 < t \leq 2.50$	± 0.16	± 0.18	± 0.19

Remark:

These specifications are applied for EN 10130 DC01, DC03, DC04, DC05, DC06...

(6) Thickness Tolerances ISO16162

Thickness(t) \ Width(w)	$600 \leq w \leq 1200$	$1200 < w \leq 1500$	$1500 < w \leq 1800$
$t \leq 0.40$	± 0.04	± 0.05	-
$0.40 < t \leq 0.60$	± 0.05	± 0.06	± 0.08
$0.60 < t \leq 0.80$	± 0.07	± 0.08	± 0.09
$0.80 < t \leq 1.00$	± 0.08	± 0.09	± 0.10
$1.00 < t \leq 1.20$	± 0.09	± 0.10	± 0.12
$1.20 < t \leq 1.60$	± 0.11	± 0.12	± 0.14
$1.60 < t \leq 2.00$	± 0.13	± 0.14	± 0.16
$2.00 < t \leq 2.50$	± 0.15	± 0.16	± 0.18

(7) SAE J1058 Thickness Tolerances

Thickness(t) \ Width (W)	$t = 0.5$	$0.55 < t \leq 1.00$	$1.05 < t \leq 1.5$	$1.6 < t \leq 2.5$
$W \leq 1850$	± 0.06	± 0.08	± 0.10	± 0.12

(8) JIS G3133 Thickness Tolerances

Thickness(t)	Width(w)			
	$600 \leq w \leq 1000$	$1000 < w \leq 1250$	$1250 < w \leq 1600$	$1600 < w$
$0.40 < t \leq 0.60$	± 0.05	± 0.05	± 0.06	-
$0.60 < t \leq 0.80$	± 0.06	± 0.06	± 0.06	± 0.07
$0.80 < t \leq 1.00$	± 0.06	± 0.07	± 0.08	± 0.09
$1.00 < t \leq 1.25$	± 0.07	± 0.08	± 0.09	± 0.11
$1.25 < t \leq 1.60$	± 0.09	± 0.10	± 0.11	± 0.13
$1.60 < t \leq 2.00$	± 0.11	± 0.12	± 0.13	± 0.15
$2.00 < t \leq 2.5$	± 0.13	± 0.14	± 0.15	± 0.17

(9) CSVC ASCR Thickness Tolerance

According to JIS G3141 standard table A for mill edge type.

Thickness should be measured at nominal portion for steel strip and at nay point not less than 25 mm inward from each edge for steel sheet.

Off gauge shall be winded into each end of head & tail as maximum 20m length.

5.2.2 Width Tolerances

(1) JIS G3141 Width Tolerances

Unit: mm

Width (w)	Class A		Class B	
	Upper	Lower	Upper	Lower
$w < 1250$	7	0	3	0
$w \geq 1250$	10	0	4	0

Remark :

Class B generally applies to the re-cutting or precise cutting practice. Unless specified by the customer, class A is to be applied
 These specifications are applied for SPCC-SD/1D/2D/4D/8D, SPCD, SPCE, SPCF, SPCG

(2) JFS A2001 Width Tolerances

Unit: mm

Width (w)	Class A		Class B	
	Upper	Lower	Upper	Lower
$w < 1250$	7	0	3	0
$w \geq 1250$	10	0	4	0

(3) ASTM A568 Width Tolerances

Unit: in(mm)

Width (w)	Tolerances	
	Upper	Lower
30 (762) < w ≤ 48 (1219)	3/16 (4.7)	0
48 (1219) < w ≤ 60 (1524)	1/4 (6.3)	0
60 (1524) < w ≤ 80 (2032)	5/16 (7.9)	0

Remark:

These specifications are applied for A414/A414M, A424, A606; A659/A659M, A794, A1008/A1008M, A1011/A1011M, A1039/AA1039M...

These specifications are applied for EN 10130, DC01, DC03, DC04, DC05, DC06 ...

(4) EN 10131 Width Tolerances

Unit: mm

Width (w)	Normal Tolerance	
	Upper	Lower
w ≤ 1200	4	0
1200 < w ≤ 1500	5	0
1500 < w	6	0

Remark :

These specifications are applied for EN 10130, DC01, DC03, DC04, DC05, DC06 ...

(5) ISO 16162 Width Tolerances

Unit: mm

Width (w)	Normal Tolerance	
	Upper	Lower
w ≤ 1200	3	0
1200 < w ≤ 1500	5	0
1500 < w	6	0

(6) JIS G3135 Width Tolerances/ JIS G3133

Unit: mm

Width (w)	Normal Tolerance	
	Upper	Lower
w ≤ 1250	7	0
1250 < w	10	0

(7) CSVC ASCR Width Tolerance

Unit: mm

Tolerances	
Upper	Lower
7 (aiming 5)	0

Remark:

- a. Edge type: mill edge only
- b. Saw edge and crack edge shall be accepted as maximum 0.5mm depth
- c. These specifications are applied for ASCR

5.2.3 Flatness Tolerances

(1) JIS G3141 Flatness Tolerances

Unit: mm

Flatness (max.) Width (w)	Classification	Class A			Class B		
		Bow Wave	Edge Wave	Center Buckle	Bow Wave	Edge Wave	Center Buckle
w < 1000		12	8	6	2	2	2
1000 ≤ w < 1250		15	9	8	3	2	2
1250 ≤ w < 1600		15	11	8	4	3	2
1600 ≤ w		20	13	9	5	4	2

Remark:

Class A applies to the normally refined steel sheets.

Class B generally applies to the steel sheets of stretcher-leveled steel sheet.

Bow: curving of the whole steel sheet, either in the rolling direction or in the transverse direction to the rolling direction.

Wave: rippling in the rolling direction of the sheet.

Edge wave: wave appearing on the edge of steel sheet.

Centre wave: wave appearing on the center part of steel sheet.

(2) JIS G3135 Flatness Tolerances

Unit : mm (max)

Flatness (max.) Width(w)	Bow, Wave			Edge Wave			Center Buckle		
	1	2	3	1	2	3	1	2	3
w < 1000	12	16	18	8	11	12	6	8	9
1000 ≤ w < 1250	15	19	21	10	12	13	8	10	11
1250 ≤ w < 1600	15	19	21	12	14	15	9	11	12
1600 ≤ w	20	-	-	14	-	-	10	-	-

Remark :

Grade 1 to 3 shall be applied to the steel grade with its lower limit specification value of tensile strength (1) under 780 N/mm² (2)780 N/mm²(3)980 N/mm² respectively.

(3) JFS A2001 Flatness Tolerances

Unit: mm (max)

Tensile strength Width(mm)	TS ≤ 440	440 < TS < 780	780 ≤ TS
W < 1000	8	8	11
1000 ≤ W < 1250	9	10	12
1250 ≤ W < 1600	11	12	14
1600 ≤ W	13	14	-

(4) ASTM A568 Flatness Tolerances (All Designations)

Unit: in. (mm)

Thickness(t)	Specified Yield Point, min		Under 45ksi	45 to 50 ksi
	Width (w)		(Under 310 MPa)	(310 to 345 MPa)
t ≤ 0.044(1.12)	w ≤ 36 (914)		3/8 (9.5)	3/4 (19.1)
	36 (914) < w ≤ 60 (1524)		5/8 (15.9)	1 1/8 (28.6)
	60 (1524) < w		7/8 (22.2)	1 1/2 (38.1)
0.044(1.12) < t	w ≤ 36 (914)		1/4 (6.4)	3/4 (19.1)
	36 (914) < w ≤ 60 (1524)		3/8 (9.5)	3/4 (19.1)
	60 (1524) < w ≤ 72 (1829)		5/8 (15.9)	1 1/8 (28.6)

Remark:

Tolerances for high-strength, low-alloy steel with specified minimum yield point in excess of 50 ksi are subject to negotiation.

(5) EN 10131 Flatness Tolerances

Unit: mm

Thickness	t < 0.7		0.7 ≤ t < 1.2		1.2 ≤ t	
	YS < 260	260 ≤ YS < 340	YS < 280	280 ≤ YS < 360	YS < 280	280 ≤ YS < 360
600 ≤ W < 1200	10	13	8	10	7	8
1200 ≤ W < 1500	12	15	10	13	8	11
1500 ≤ W	17	20	15	19	13	17

(6) JIS G3133 Flatness Tolerances

Unit: mm

Width	Type of strain		
	Bow and wave	Edge wave	Centre buckle
W < 1000	12	8	6
1000 ≤ W < 1250	15	9	8
1250 ≤ W < 1600	15	11	8
1600 < W	20	13	9

(7) CSVC - ASCR Flatness Control

Unit: mm

Thickness (t)	Wave Length (L)	Steepness: H/L (%)
t < 0.4	> 300	≤ 2.0
t ≥ 0.4	> 300	≤ 1.5

Remark:

CSVC should control the flatness to meet customer requirement, the figures above should be the basic control level, and customer can negotiate the control figures based on their applications.

5.2.4 Camber Tolerances

(1) JIS G3141 Camber Tolerances

Unit: mm

Width (w)	Tolerance (max.)
$30 \leq w < 40$	8 (Any portion of 2000 in length)
$40 \leq w < 630$	4 (Any portion of 2000 in length)
$630 \leq w$	2 (Any portion of 2000 in length)

(2) JFS A2001 Camber Tolerances

Unit: mm

Minimum tensile strength TS (N/mm ²)	Tolerance (max.)
$TS < 780$	≤ 2 (Any portion of 2000 in length)
$780 \leq w$	≤ 3 (Any portion of 2000 in length)

(3) ASTM A568 Camber Tolerances

Unit: in. (mm)

Production	Tolerance
Coils	1/4 (6.35) in any 8 ft (2438 mm)

(4) EN 10131 Camber Tolerances

Unit: mm

Production	Tolerance
Coils	≤ 5 in any 2000 length

(5) ISO 16162 Camber Tolerances

Unit: mm

Production	Tolerance
Coils	≤ 20 in any 5000 length

(6) JIS G3135 Camber Tolerances

Unit: mm

Width (w)	Tolerance (max.)
$w < 630$	≤ 4 per an arbitrary length of 2000
$630 \leq w^a$	≤ 2 per an arbitrary length of 2000

Remark

JIS G3133 also allow this standard

(7) CSVC – ASCR Camber Tolerance

Unit: mm

Production	Tolerance
Coils	2 in any 2000

5.3 Classification of Quality

Classification	Quality	Common Specification	Typical Applications
Forming Fabrication	1.Commercial Quality (CQ)	JIS G3141 SPCC JSC270C ASTM A1008 CS EN DC01 ISO CR1	Furniture or Refrigerator Panel, Piping, Steel Drum, Tool Box, Computer Case, Cabinet Lock, Electronic Parts, etc.
	2.Drawing Quality (DQ)	JIS G3141 SPCD JSC270D ASTM A1008 DQ EN DC03 ISO CR2	Motor Housing Fender, Chassis, lamp Shell, Inner and Outer panel for Automobile, Roast Oven, etc.
	3.Deep Drawing Quality (DDQ)	JIS G3141 SPCE/ SPCF JSC 270E ASTM A1008 DDS DIN EN DC04 ISO CR3~CR4	Fuel Tank, Oil Can, Fender, Bumper, Trunk Lid, Inner and Outer panel for Automobile, Front Lamp Set, Lighting Fixture, etc.
	4.Extra Deep Drawing Quality(EDDQ)	JIS G3141 SPCG JFS JSC270F ASTM A1008 EDDS EN DC05~DC06 ISO CR5	Oil Can, Fuel Tank for Automobile, Inner Panel for Automobile, etc.
Structural Use	1.HSLA (SS)	EN HC260~420LA SAE 340~420X	Frame, Automobile Body, Roofing Deck, etc.
	2.High Strength Sheet with Improved Formability for Automobile Quality	JIS SPFC340~590 SPFC590Y JSC340~440W, JSC440~590R, 590Y	Fender Bumper, Luggage Carrier, Automobile Frame, Bonnet and Trunk, etc.
Porcelain Enameling Use	Special Steel Strip	JIS G3133 SPPC JIS G3133 SPPD JIS G3133 SPPE	Kitchen Appliance, Bath Tub, Construction Material, etc.
ASCR	Full Hard Steel Strip	CSVC - ASCR	GI/GL/PPGI/PPGL

6. PRODUCT AVAILABILITY

6.1 Unit Mass

Product Type	Maximum Unit Mass
CR Coil (Carbon Steel or Strength Low Alloy Steel)	20MT/Coil
ASCR Coil (Full Hard Low Carbon Steel)	20MT/Coil

6.2 Available Sizes

Product Type	Thickness	Width	Coil Inner Diameter
CR Coil (Carbon Steel)	0.40~ 0.49	700 ~ 1300	508 or 610
	0.50 ~ 0.59	700 ~ 1400	
	0.60 ~ 0.69	700 ~ 1500	
	0.70 ~ 0.79	700 ~ 1550	
	0.80 ~ 1.60	700 ~ 1600	
	1.61 ~ 2.00	700 ~ 1600	
CR Coil (High Strength Low Alloy Steel)	0.40 ~ 2.00	700 ~ 1500	508 or 610
ASCR Coil (Full Hard Carbon Steel)	0.20 ~ 1.2	800~1250	508

7. SURFACE FINISHED AND OILING

7.1 Surface finished

Roughness code	Ra (μm)	Description
R25	0.6 max	Bright Finish (for ASCR only)
R35	0.6 ~ 1.3	Dull Finish
R32	0.4 ~ 0.8	Fine dull finish

7.2 Oiling

Classification	Oil amount ($\text{mg}/\text{m}^2/ 1 \text{ side}$)	Description
Normal oil, light	400~800	Normal rust prevented oil, light oil amount
Normal oil, medium	800~1200	Normal rust prevented oil, medium oil amount
Normal oil, heavy	1200~1600	Normal rust prevented oil, heavy oil amount
DOS-A oil, medium	25~50	Special DOS oil, medium amount
DOS-A oil, heavy	50~100	Special DOS oil, heavy amount
DOS-A oil, extra heavy	100~140	Special DOS oil, extra heavy amount

8. MARKING AND PACKING

8.1. Packing for cold rolled steel

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	Thép Cuộn CR (CR COIL)		Mã Chất Lượng Quality Type	CQS GP
Tiêu Chuẩn Specification	COIL EN 10130		Mã Nhiệt Heat no.	KQ824
Mác Thép Steel Grade	DC01 A-m		Ngày Sản Xuất Product Date	05.02.2020
Kích Thước Size	2.000mm x1500.0mm × COIL			
Mã Cuộn Coil ID	359904			
Khối Lượng Tịnh Net mass	19,980	kg		
Khối Lượng Tổng Gross mass	20,060	kg		
Sản Xuất Tại Việt Nam Made in Viet Nam		359904	19,980	

(This label is a sample and just for reference)

8.2. Packing for cold rolled steel



Case 1

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



Case 2

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

9. APPLICATION EXAMPLES



Oil Drum



Slide Trough for Chair



Slide Rail



Office Furniture



Automobile



Refrigerator

10. CONVERSION TABLES

Length	ft	in	mm	m
	1	12	304.8	0.3048
	0.083	1	25.4	0.0254
	0.003	0.03937	1	0.001

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

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

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

Stress	ksi(=1000psi)	psi	kgf/mm ²	N/mm ² (=MPa)
	1	1000	0.703070	6.89476
	0.001	1	0.703070×10 ⁻⁴	6.89476×10 ⁻³
	1.42233	1422.33	1	9.80665
	0.145038	145.038	0.101972	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

11. ORDERING 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 (Name, Number, Grade)		JIS G3141 SPCC-SD GP R35
	Temper	A, S,8,4,2,1	
	Surface Roughness	R32, R35	
		Ra	
	Surface Finish	Bright Finish (B)	
		Dull Finish (D)	
	Surface Quality	Unexposed (UE)	
		General Purposes (GP)	
General Exposed (GE)			
Severe Exposed (SE)			
2	Edge Type	Mill Edge	Cut Edge
		Cut Edge	
		Mill Option (ME/CE)	
3	Oiled Type		DOS-A
4	Oil Weight		Medium Oiled
5	Dimensions (Thickness × Width× coil)		1.0mm×1219mm×Coil
6	Inner Diameter		ID 610
7	Mass	Max. Mass	10ton max.
		Order Mass	450 ton
8	Applications and Fabricating Methods		Steel drum
9	Special Requirements (if Required)		Hardness : 55 HRB max.

Note:

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 requirements.