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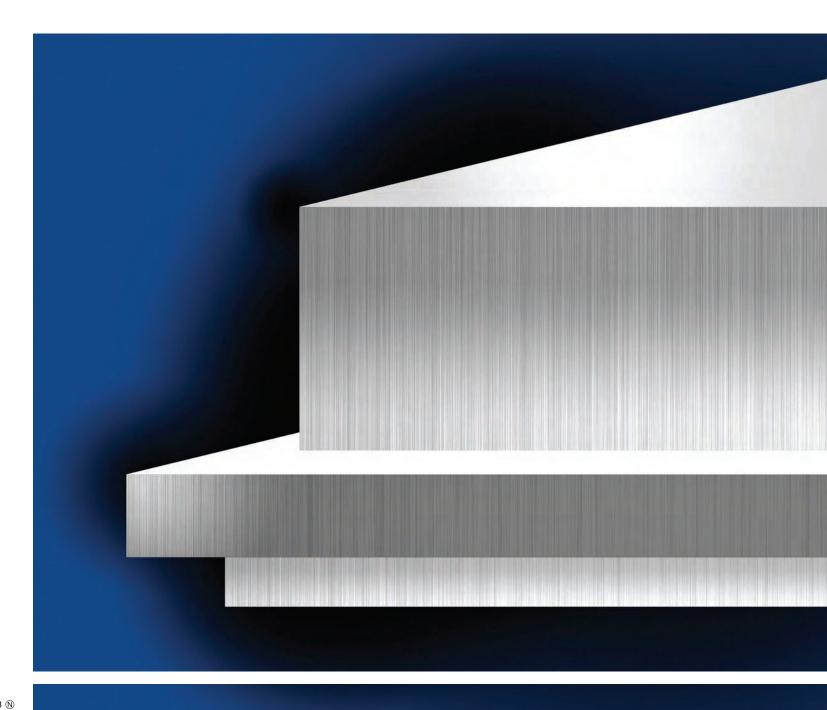
Nippon Steel & Sumikin Stainless Steel Corporation

(Printed on recycled paper) Cat.No. HE001 2009.3 1 2009.3 N



Stainless Steel Plates & Sheets

Nippon Steel & Sumikin Stainless Steel Corporation





The stainless steel divisions of Nippon Steel Corporation and Sumitomo Metal Industries, Ltd. were consolidated into a new company named Nippon Steel & Sumikin Stainless Steel Corporation in 2003.

The most sophisticated stainless steel manufacturing technologies as well as state-of-the-art quality control systems, developed and held by each of these two companies, have now been integrated and wholly taken over by this new company.

Moreover, as Nippon Steel & Sumikin Stainless Steel Corporation plans to strengthen R&D focusing on stainless steel, the company is confident that it will be able to meet the strictest requirements demanded by customers with its stainless steel plates and sheets.

Stainless Steel Plates & Sheets

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Important notice

The technical information in this document simply describes typical characteristics and performance of the product and does not provide any guarantees except for the items clearly stated as specifications or standard values.

Note that NSSC takes no responsibility whatsoever for damage resulting from user failure to observe the instructions presented in this document or improper handling of the product.

The information presented in this document is subject to change

without notice. Please contact the relevant division for the latest information.

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Stainless Steel Plates & Sheets

Features

Our abundant sizes and superior quality should lead you to the new horizon of high cost performance.

1

Wide Range of Products covering Large-Size Plates

- We have established technologies for extra large-size plates with the state-of-the-art production lines including a quarto rolling mill.
- Large plates will enable you to curtail the welding process in fabrication and, as a result, they contribute to reducing your cost and time.
- Large plates will also diminish the size of the undesirable heat-affected zone caused by welding.

2

High Performance Corrosion Resistance, with Abundant Grades for Various Applied Circumstances

- Up-to-date equipment, such as a heat treatment furnace, roller quencher, spray type cooling system, and so on, provide complete solid solution treatments for steel products.
- Moreover, those facilities produce a wide range of grades designed for use in various kinds and levels of corrosive environments.
- Authentic technical data on each product are available anytime for your reference.

3

Quality in Uniformly Highest Level

 Superior technology as well as extensive quality control from steelmaking to finishing assure the stable production of stainless steel plates in uniformly of excellent quality.

4

Prompt Delivery

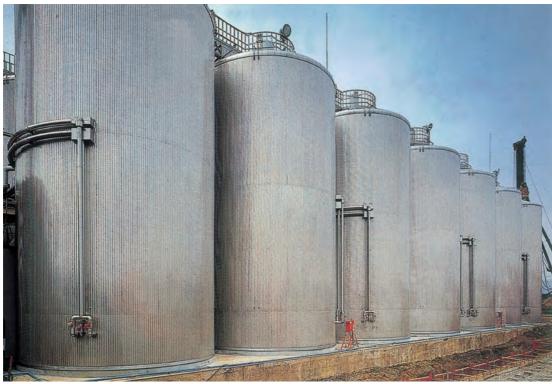
- An exclusive rolling mill is available at all times for the production of stainless steel plates.
- Moreover, an unrivaled volume production system and strict quality control program assure smooth production and on-time delivery.

5

Marvelously Aesthetic Surface Finishes

- We apply the process of surface finishing to our products by pickling or buff-polishing.
- We would sincerely like you to enjoy the marvelously aesthetic surface finishes of our products.
- Levels of finishing can be adjusted according to your requirements.

Application Examples



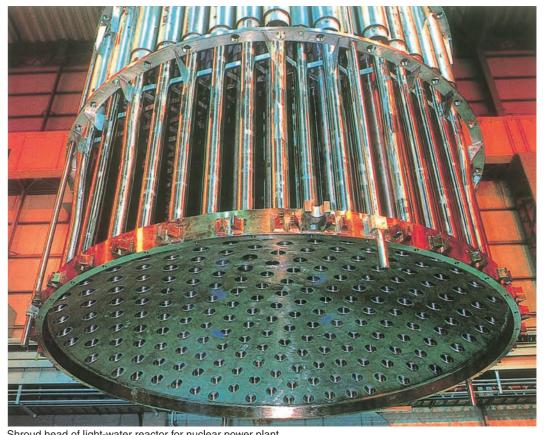
Beer tanks



Hot water tanks



LNG satellite



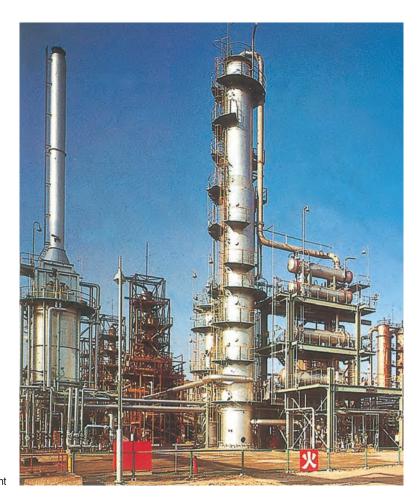
Shroud head of light-water reactor for nuclear power plant

Stainless Steel Plates & Sheets Application Examples

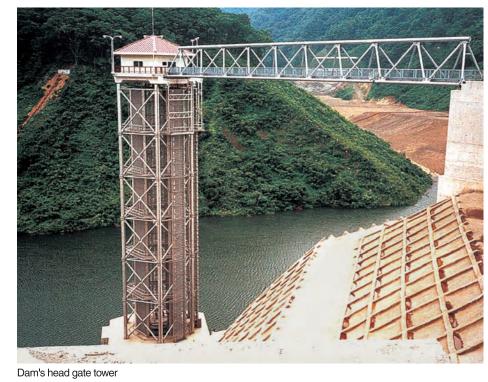
Application Examples



Chemical tanker



Petrochemical plant



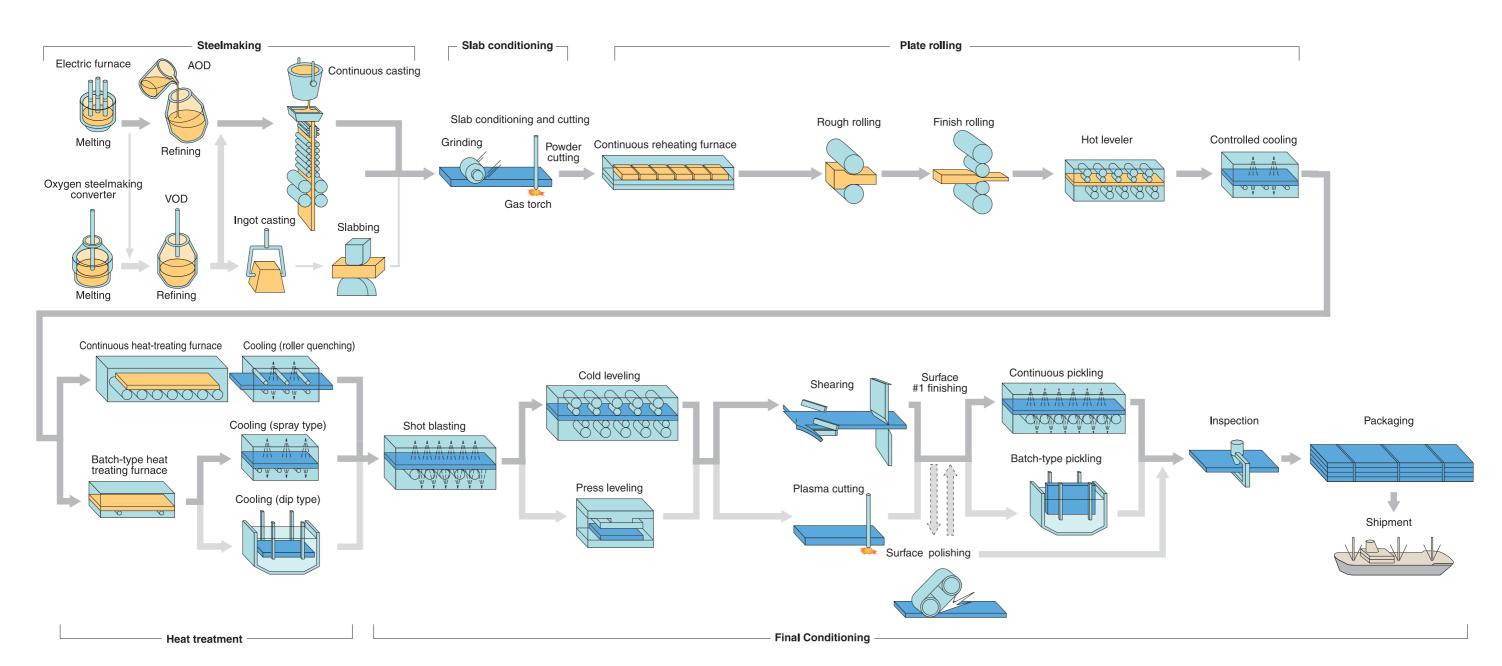


Water supply plant

Stainless Steel Plates & Sheets Manufacturing Flow

Manufacturing Flow

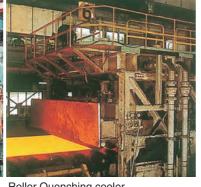
VOD: Vacuum Oxygen Decarburization AOD: Argon Oxygen Decarburization RQ: Roller Quench







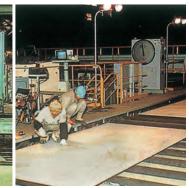












7

Electric furnace Continuous caster Plate rolling mill

Roller Quenching cooler

Continuous pickling line Multi-purpose cutter

Belt polisher

In-line inspection

Available Product Grades

01 : 1	Grade				Chemical Composition (%)								Mechanical Properties						
Stainless Steel	ASTM (A240M)	Symbol of Grades	Others	С	C:	Mo	Р	C	NI:	C*	Ma	Othoro		ensile Propert		Har	dness	Bend Test	
Group	Type	(NSSC)	(JIS)	C	Si	Mn	P	S	Ni	Cr	Мо	Others	Yield Strength MPa	Tensile Strength MPa	Elongation %	HBW	HRBS or HRBW (HV)	Dona Test	
	304		SUS 304	≦0.07	≦0.75	≦2.00	≦0.045	≦0.030	8.0/10.5	17.5/19.5	_	N≦0.10	≧205	≧515	≧40	≦201	≦92	_	
	304H			0.04/0.10	≦0.75	≦2.00	≦0.045	≦0.030	8.0/10.5	18.0/20.0	_		≧205	≧515	≧40	≦201	≦92	_	
	304L		SUS 304L	≦0.030	≦0.75	≦2.00	≦0.045	≦0.030	8.0/12.0	17.5/19.5	_	N≦0.10	≧170	≧485	≧40	≦201	≦92	_	
	304N		SUS 304N1	≦0.08	≦0.75	≦2.00	≦0.045	≦0.030	8.0/10.5	18.0/20.0	_	N:0.10/0.16	≧240	≧550	≧30	≦217	≦95	_	
	304LN		SUS 304LN	≦0.030	≦0.75	≦2.00	≦0.045	≦0.030	8.0/12.0	18.0/20.0	_	N:0.10/0.16	≧205	≧515	≧40	≦217	≦95	_	
	309S		SUS 309S	≦0.08	≦0.75	≦2.00	≦0.045	≦0.030	12.0/15.0	22.0/24.0	_		≧205	≧515	≧40	≦217	≦95	_	
	310S		SUS 310S	≦0.08	≦ 1.50	≦2.00	≦0.045	≦0.030	19.0/22.0	24.0/26.0	_		≧205	≧515	≧40	≦217	≦95	_	
	316		SUS 316	≦0.08	≦0.75	≦2.00	≦0.045	≦0.030	10.0/14.0	16.0/18.0	2.00/3.00	N≦0.10	≧205	≧515	≧40	≦217	≦95	_	
	316L		SUS 316L	≦0.030	≦0.75	≦2.00	≦0.045	≦0.030	10.0/14.0	16.0/18.0	2.00/3.00	N≦0.10	≧170	≧485	≧40	≦217	≦95	_	
	316H			0.04/0.10	≦0.75	≦2.00	≦0.045	≦0.030	10.0/14.0	16.0/18.0	2.00/3.00		≧205	≧515	≧40	≦217	≦95	_	
Austenitic	316LN		SUS 316LN	≦0.030	≦0.75	≦2.00	≦0.045	≦0.030	10.0/14.0	16.0/18.0	2.00/3.00	N:0.10/0.16	≧205	≧515	≧40	≦217	≦95	_	
Steels	317L		SUS 317L	≦0.030	≦0.75	≦2.00	≦0.045	≦0.030	11.0/15.0	18.0/20.0	3.0/4.0	N≦0.10	≧205	≧515	≧40	≦217	≦95	_	
	317LN		SUS 317LN	≦0.030	≦0.75	≦2.00	≦0.045	≦0.030	11.0/15.0	18.0/20.0	3.0/4.0	N:0.10/0.22	≧240	≧550	≧40	≦217	≦95	_	
	321		SUS 321	≦0.08	≦0.75	≦2.00	≦0.045	≦0.030	9.0/12.0	17.0/19.0	_	N≦0.10 Ti:5×(C+N)/0.70	≧205	≧515	≧40	≦217	≦95	_	
	347		SUS 347	≦0.08	≦0.75	≦2.00	≦0.045	≦0.030	9.0/13.0	17.0/19.0	_	Nb:10×C/1.00	≧205	≧515	≧40	≦201	≦92	_	
	904L		SUS 890L	≦0.020	≦1.00	≦2.00	≦0.045	≦0.035	23.0/28.0	19.0/23.0	4.0/5.0	N≦0.10 Cu:1.0/2.0	≧220	≧490	≧35	_	≦90	_	
	S31254	(NSSC 270)		≦0.020	≦0.80	≦1.00	≦0.030	≦0.010	17.5/18.5	19.5/20.5	6.0/6.5	N:0.18/0.22 Cu:0.50/1.00	≧310	≧655	≧35	≦223	≦96	_	
		NSSC 170	SUS 317J2	≦0.06	≦ 1.50	≦2.00	≦0.045	≦0.030	12.00/16.00	23.00/26.00	0.50/1.20	N:0.25/0.40	≧345	≧690	≧40	≦250	≦100	_	
		NSSC 304N		≦0.080	≦1.00	≦2.50	≦0.040	≦0.030	7.50/10.50	18.00/20.00	_	N≦0.25 Nb≦0.14	≧345	≧690	≧40	≦250	≦100	_	
		NSSC 260		≦0.030	≦ 1.50	≦2.00	≦0.040	≦0.030	13.50/16.50	18.50/21.50	2.50/3.50	N:0.16/0.24 Cu:1.00/2.00	≧275	≧550	≧35	≦217	≦95	_	
		NSSC 260A		≦0.030	≦1.00	≦2.00	≦0.040	≦0.030	13.00/17.00	20.00/23.00	3.00/4.00	N:0.10/0.22 Cu:1.50/3.00	≧315	≧600	≧35	≦217	≦95	_	
		NSSC 250		≦0.030	≦1.50	≦2.00	≦0.040	≦0.030	16.00/20.00	24.00/27.00	1.50/3.50	N:0.15/0.35	≧345	≧690	≧40	≦250	≦100 (≦260)	_	
		NSSC 270	SUS 312L	≦0.020	≦0.80	≦1.00	≦0.030	≦0.015	17.50/19.50	19.00/21.00	6.00/7.00	N:0.16/0.25 Cu:0.50/1.00	≧300	≧650	≧35	≦223	≦96 (≦230)	_	

Stainless Steel Plates & Sheets

Available Product Grades

Available Product Grades

		Grade			Chemical Composition (%)								Mechanical Properties						
Stainless Steel	ASTM	Symbol of Grades	Others				_						Tensile Properties			Hardness			
Group	(A240M) Type	(NSSC)	(JIS)	С	Si	Mn	Р	S	Ni	Cr	Мо	Others	Yield Strength MPa	Tensile Strength MPa	Elongation %	HBW	HRBS or HRBW (HV)	Bend Test	
	405		SUS 405	≦0.08	≦1.00	≦1.00	≦0.040	≦0.030	≦0.60	11.5/14.5	_	AI:0.10/0.30	≧170	≧415	≧20	≦179	≦88	180°	
	430		SUS 430	≦0.12	≦1.00	≦1.00	≦0.040	≦0.030	≦0.75	16.0/18.0	_		≧205	≧450	≧22	≦183	≦89	180°	
	444	(NSSC 190L)	SUS 444	≦0.025	≦1.00	≦1.00	≦0.040	≦0.030	≦1.00	17.5/19.5	1.75/2.50	N≦0.035 *	≧275	≧415	≧20	≦217	≦96	180°	
Ferritic Steels		NSSC 410W		≦0.030	≦1.00	≦1.00	≦0.040	≦0.030	_	11.50/13.50	_		≧205	≧440	≧22	≦183	≦88	180°	
		NSSC 410WM		≦0.030	≦0.50	≦1.00	≦0.035	≦0.025	≦0.50	10.75/12.00	_	N≦0.025	≧315	≧430	≧20	≦230	(≦240)	90°	
		NSSC 190L		≦0.015	≦0.50	≦0.50	≦0.040	≦0.030	_	18.00/20.00	1.75/2.25	Cb≧8x (C+N) V≦0.20,N≦0.015	≧275	≧410	≧22	≦217	≦96	180°	
		NSSC 409L		≦0.030	≦1.00	≦1.00	≦0.040	≦0.030	_	10.50/11.45	_	Ti:6×C/0.75	≧175	≧360	≧28	_	(≦180)	180°	
Martensitic	410		SUS 410	0.08/0.15	≦1.00	≦1.00	≦0.040	≦0.030	≦0.75	11.5/13.5	_		≧205	≧450	≧20	≦217	≦96	180°	
Steels	410S		SUS 410S	≦0.08	≦1.00	≦1.00	≦0.040	≦0.030	≦0.60	11.5/13.5	_		≧205	≧415	≧22	≦183	≦89	180°	
	S32101		LDX2101®**	≦0.040	≦1.00	4.0/6.0	≦0.040	≦0.030	1.35/1.70	21.0/22.0	0.10/0.80	N:0.20/0.25 Cu:0.10/0.80	≧450	≧650	≧30	≦290	_	_	
	S32304			≦0.030	≦1.00	≦2.50	≦0.040	≦0.030	3.0/5.5	21.5/24.5	0.05/0.60	N:0.05/0.20 Cu:0.05/0.60	≧400	≧600	≧25	≦290	≦32 (HRC)	_	
Austenitic- Ferritic	S31803	NSSC DX1	SUS 329J3L	≦0.030	≦1.00	≦2.00	≦0.030	≦0.020	4.5/6.5	21.0/23.0	2.5/3.5	N:0.08/0.20	≧450	≧620	≧25	≦293	≦31 (HRC)	_	
Steels	S32205			≦0.030	≦1.00	≦2.00	≦0.030	≦0.020	4.5/6.5	22.0/23.0	3.0/3.5	N:0.14/0.20	≧450	≧655	≧25	≦293	≦31 (HRC)	_	
	S32750			≦0.030	≦0.80	≦1.20	≦0.035	≦0.020	6.0/8.0	24.0/26.0	3.0/5.0	N:0.24/0.32 Cu≦0.50	≧550	≧795	≧15	≦ 310	≦32 (HRC)	_	
			SUS 329J4L	≦0.030	≦1.00	≦1.50	≦0.040	≦0.030	5.50/7.50	24.00/26.00	2.50/3.50	N:0.08/0.30	≧450	≧620	≧18	≦302	(≦320)	_	

^{**} Sold under license from Outokumpu Stainless AB (re. patents on LDX2101® grade)

Quality Management System (at Yawata Works)

Evenines	Drodusto		Registration		
Examiner	Products	Quality System	Scope of Accreditation	Number	
JIC Quality Assurance Ltd.	Stainless Steel and Stainless Clad Steel Plates	ISO9001-2000	Design, Development and Production of Stainless Steel and Stainless Clad Steel Plates	1886	

Approved Standards (at Yawata Works)

Examiner	Products		Registration		
Examine	Floducis	Quality System	Scope of Accreditation	Number	
JIC Quality Assurance Ltd.	Stainless Steel Plates	JIS G 4304	Stainless Steel Plates (Cut-plate and in Coil)	QA0806001	
TÜV	Stainless Steel Plates	PED97/23/EC	Remark : European Pressure Vessels Direction	01 202 J/Q-02 0005	
, , ,	Stammood Stool Flatos	AD2000 W0	Remark : German Technology Standard	No.0035	

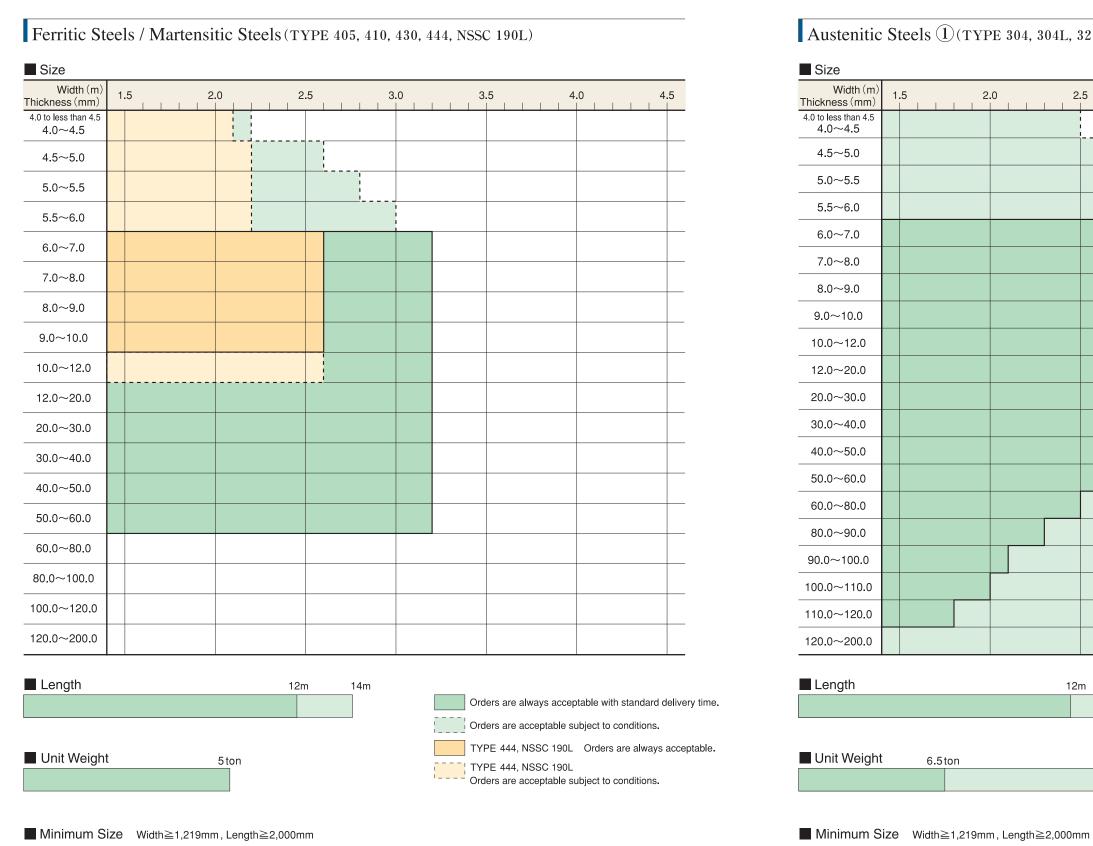
Ship Classification Societies (at Yawata Works)

Society	Products						
Nippon Kaiji Kyokai	Stainless Steel and Stainless Clad Steel Plates						
(NK)	Works Approval Yawata Works						
Lloyd's Register of Shipping (LR)	Stainless Steel and Stainless Clad Steel Plates						
Det Norske Veritas (DNV)	Stainless Steel and Stainless Clad Steel Plates						
Bureau Veritas (BV)	Stainless Steel and Stainless Clad Steel Plate						
	Works Approval Yawata Works (Mode I)						
The American Bureau of Shipping (ABS)	Stainless Clad Steel Plates						
The Korean Register of Shipping (KR)	Stainless Steel and Stainless Clad Steel Plates						

^{*} Ti+Cb:0.20+4(C+N)/0.80

Sizes Available

Please contact us when you need other type or size than mentioned above.



Austenitic Steels ①(TYPE 304, 304L, 321, 347, 309S, 310S) 2.0 3.0 (Thickness≥18mm) Maximum thickness by specific type is as below. 120mm for TYPE 321 12m 14m 45mm for TYPE 347 50mm for TYPE 309S, TYPE 310S 15ton Orders are always acceptable with standard delivery time.

Orders are acceptable subject to conditions.

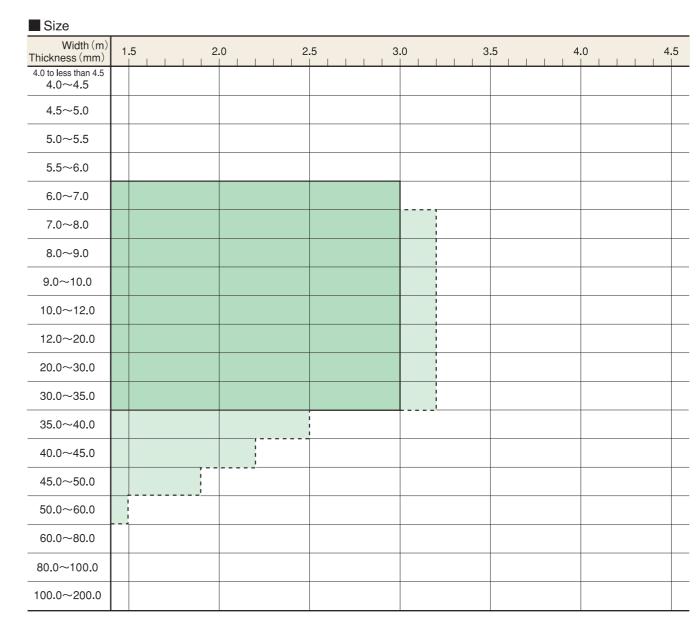
Please contact us when you need other type or size than mentioned above.

Austenitic Steels ②(TYPE 316, 316L, 317L) Size $Width\left(m\right)$ 2.0 2.5 3.0 3.5 Thickness (mm) 4.0 to less than 4.5 $4.0 \sim 4.5$ 4.5~5.0 5.0~5.5 5.5~6.0 6.0~7.0 7.0~8.0 8.0~9.0 9.0~10.0 10.0~12.0 12.0~20.0 20.0~30.0 30.0~40.0 (Thickness≥18mm) 40.0~50.0 50.0~60.0 60.0~80.0 80.0~90.0 90.0~100.0 100.0~110.0 110.0~120.0 120.0~200.0 Length 12m 14m Orders are always acceptable with standard delivery time. Orders are acceptable subject to conditions. Unit Weight TYPE 317L : Thickness≦50mm 6.5ton 15ton

■ Minimum Size Width≥1,219mm, Length≥2,000mm

Please contact us when you need other type or size than mentioned above.

Austenitic-Ferritic (Dual-phase) Steels (S31803, S32304, S32101, NSSC DX1)





Orders are always acceptable with standard delivery time.

15

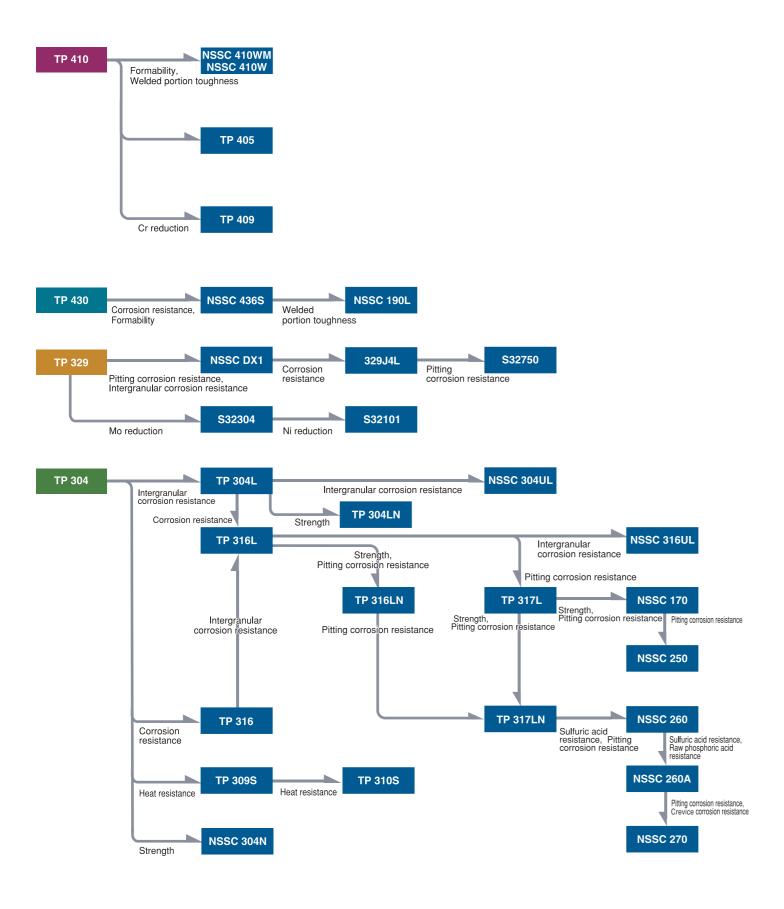
Orders are acceptable subject to conditions.

■ Unit Weight 4.5ton 6.5ton

■ Minimum Size Width≥1,219mm, Length≥2,000mm

Please contact us when you need other type or size than mentioned above.

Guide to Selection of Approproate Grade of NSSC Series Stainless Steels



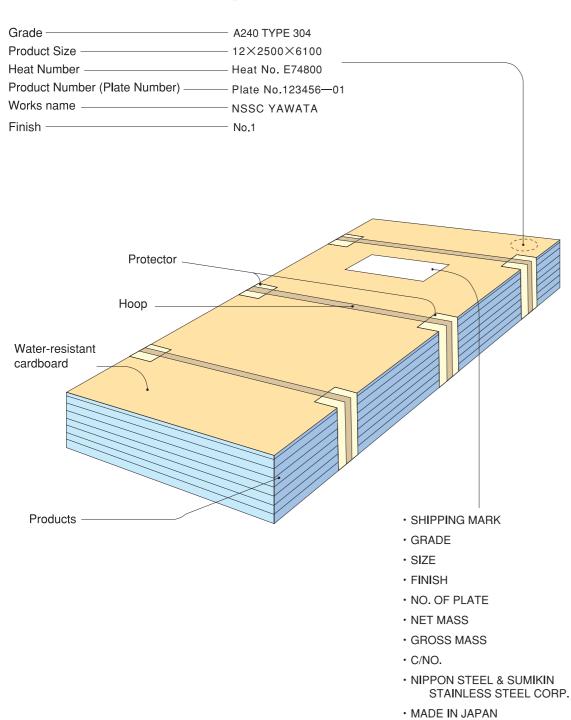
List of NSSC Series Stainless Steels

					resista	ance	T					
Stainless Steel Group	Symbol of Grade (similar grade)	Chemical Composition		Stress corrosion resistance			Formability Deep drawability	Strength	Heat-resistance	Weldability	Application examples	
	NSSC 270 (—)	20Cr-18Ni-6Mo-0.7Cu-0.2N-LC	0	0	0	0		0			Seawater water conversion device, Chimney, Salt manufacture plant, Food manufacture plant	
	NSSC 260A (—)	22Cr-16Ni-3.5Mo-2Cu-0.2N-LC	0		0	0		0			Chemical tanker, Chimney, Sulfuric acid plant	
	NSSC 260 (—)	20Cr-15Ni-3Mo-1.5Cu-0.2N-LC			0	0		0			Chimney, Sulfuric acid plant	
Austenitic	NSSC 250	25Cr-18Ni-2.5Mo-0.3N-LC		0	0	0		0			Chemical plant, Food manufacture plant	
Steels	NSSC 170 (SUS 317J2)	25Cr-13Ni-0.9Mo-0.3N			0			0			Exhaust gas desulfurizer, Waste fluid processor, High temperature usage	
	NSSC 304UL (SUS 304L)	18Cr-10Ni-ULC				0					Nuclear fuel reprocess equipment	
	NSSC 316UL (SUS 316L)	17Cr-15Ni-2Mo-ULC				0					Nuclear fuel reprocess equipment	
	NSSC 304N (SUS 304N2)	18Cr-8Ni-0.2N						0			Equipment which needs higher strength than Type 304	
Austenitic- Ferritic Steels	NSSC DX1 (SUS 329J3L)	22Cr-5Ni-3Mo-0.13N-LC		0	0			0			Chemical plant, Energy related plant, Chemical tanker	
	NSSC 190L (SUS 444)	19Cr-2Mo-Nb-V-ULC-LN		0	0	0				0	Chemical plant, Hot water tank	
	NSSC 436S (-)	17Cr-1.2Mo-0.2Ti-LC-LN			0		0				Automotive exhaust system part, Kitchen equipment, Household electric appliances part, Building interior material, Gate	
Ferritic Steels	NSSC 410WM (SUS 410L)	11Cr-LC-LN-Ni								0	Marine container frame material	
	NSSC 410W (SUS 410L)	12Cr-LC						0		0	Heat-resistant equipment	
	NSSC 409L (SUH 409)	11Cr-Ti-LC					0		0	0	Equipment related to automotive exhaust system	

Marking and Packaging

(Example)

Record on the actual product



Precautions in Use

If stainless steel sheets are improperly handled or used, they cannot fully exhibit their characteristic features. When handling or using stainless steel sheets, attention should be paid to the following points.

Storage and Unloading

- If stainless steel sheets get wet during unloading or storage, rusting will occur. Accordingly, stringent
 care should be taken to avoid their unloading on rainy days or their getting wet by seawater. Storage
 at high humidity or in a sulfur-dioxide atmosphere should be avoided. Storage in a dry, clean place is
 recommended.
- 2. Damaged packing paper should be repaired.

Handling

1. To avoid injury, do not handle unpacked sheets by bare hand. In handling these sheets, careful handling and use of protective gloves are recommended.

Directions for Ordering

Stainless steel sheet and strip can demonstrate their optimum characteristic performances when the appropriate steel grade is properly selected in terms of application, design, fabrication and other similar conditions. Please place your orders after obtaining the advice of Nippon Steel & Sumikin Stainless Steel regarding the above conditions.

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When placing orders

Please include the following information as specifically as possible.

- Standard to be applied for example, JIS G 4304, AISI, ASTM, any special specification, etc.
- 2. Grade

for example, JIS (SUS No.), AISI (Type No.), etc.

- Surface Finish
 as heat-treated or not, pickled or not, Buff finish No., one or both side(s)
- 4. Size

 $Thickness \times Width \times Length \ (availability \ of \ enlarged \ scale)$

5. Volume

Number of plate(s) and weight

6. Usage and how to be processed

Name of plant, Temperature to be applied, Pressure, Kind of liquid or gas applied, Method and conditions of processing, Method of welding, etc.

7. Delivery time

Technical services

Please feel free to consult Nippon Steel & Sumikin Stainless Steel's headquarters as to technical matters such as grade selection and applications of stainless steel sheet and strip. Nippon Steel & Sumikin Stainless Steel is ready to offer appropriate technical services on the basis of extensive research and expertise and achievements accumulated over long years of technical services.