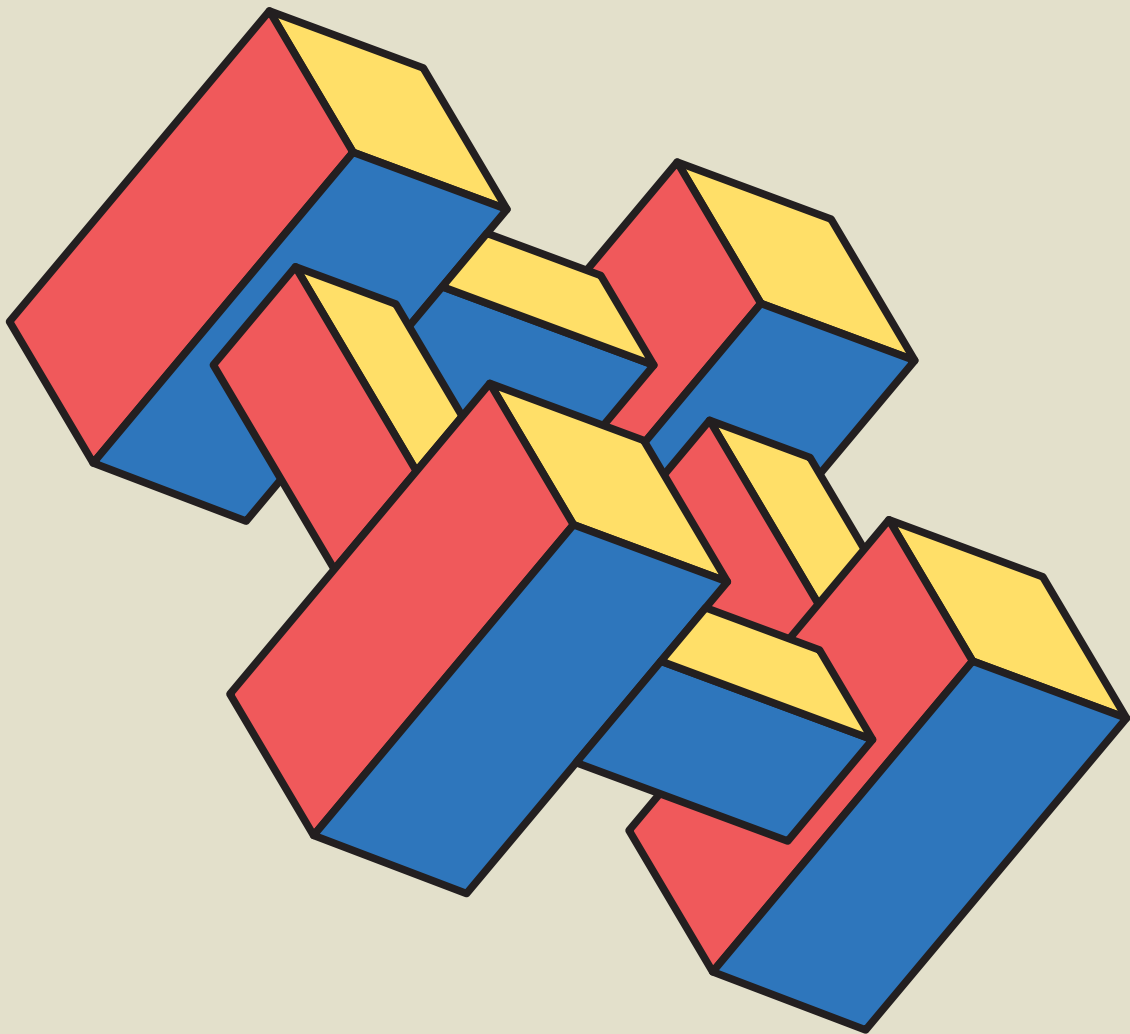


  
CHUBU  
STEEL  
PLATE  
CO.,LTD.

# HEAVY PLATES

ISO 9001  
ISO 14001









Since its establishment, Chubu Steel Plate Co., Ltd. has continued to manufacture various grades of steel plates to meet the requirements of foreign and domestic industrial standards as well as own-branded products, using our developed technology over many years and our sophisticated production facilities.

Our products have been well received in many fields as we have supported the characteristics demanded of steel today, including bendability, weldability, atmospheric corrosion resistance, and abrasion resistance. In order to satisfy our customer requirements, we continue ever forwards, improving our technology and setting higher standards for quality control.

## CONTENTS

Features .....	2
Manufacturing Processes .....	4
Products .....	6
Applications .....	8
Specifications .....	11
Properties .....	23
Size Availability .....	37
Standard Dimensions and Mass .....	41



# Features

To meet ever diversifying and increasingly advanced needs, we are achieving shorter delivery times and consistent quality through computerized control, in addition to preserving the accuracy of the steel plate dimensions using advanced 4-Hi mills, and improving the internal quality with ladle refining process and electromagnetic stirring.

## 1 Excellent quality

We manufacture using carefully selected materials and rely on advanced facilities and technology and through quality control. We provide products excelling in uniformity of their properties.

## 2 A full lineup of products

We produce various steel plates, including steel plates for general structure, steel plates for machine construction, high tensile strength steel plates, and abrasion-resistant steel plate. Customers can choose the appropriate steel plate to their application.





### 3 Fine surface

The sheets are produced using a high-pressure water is used to remove scales from slabs followed by highly advanced mill. We achieve a flat and smooth plate surface.

### 4 Rapid delivery

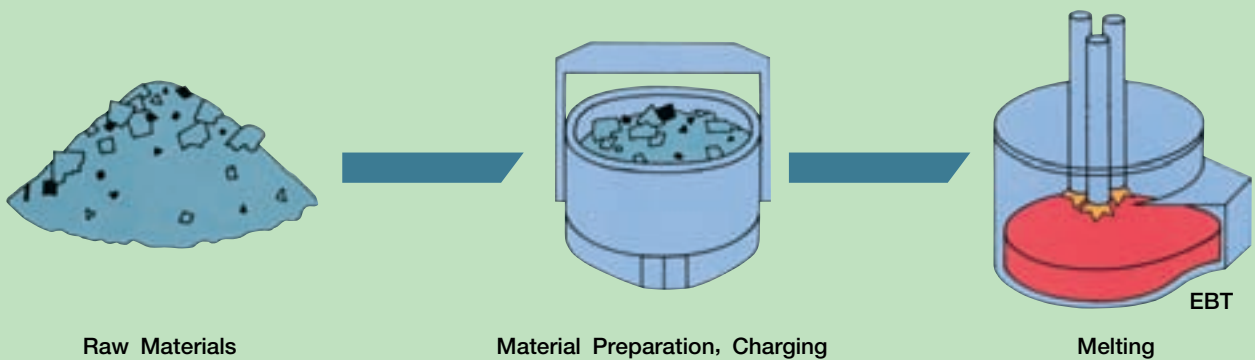
We implement process control and inventory management. We rapidly deliver high-quality products.



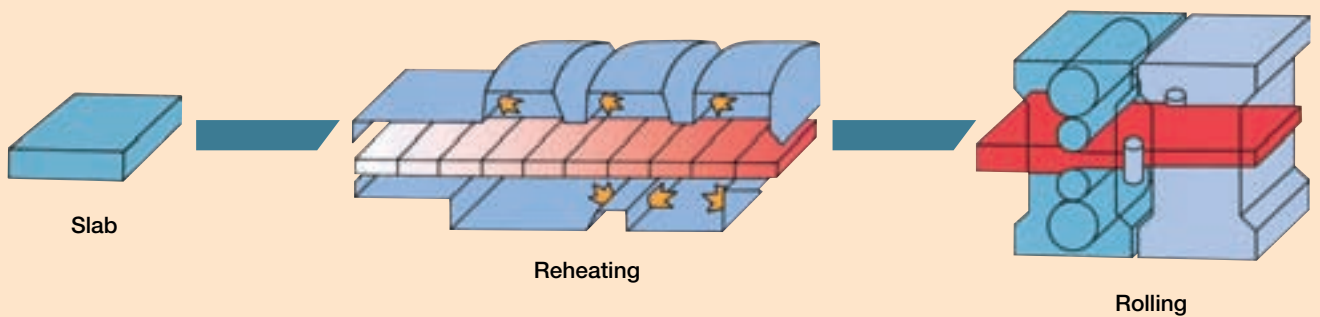
# Manufacturing Processes

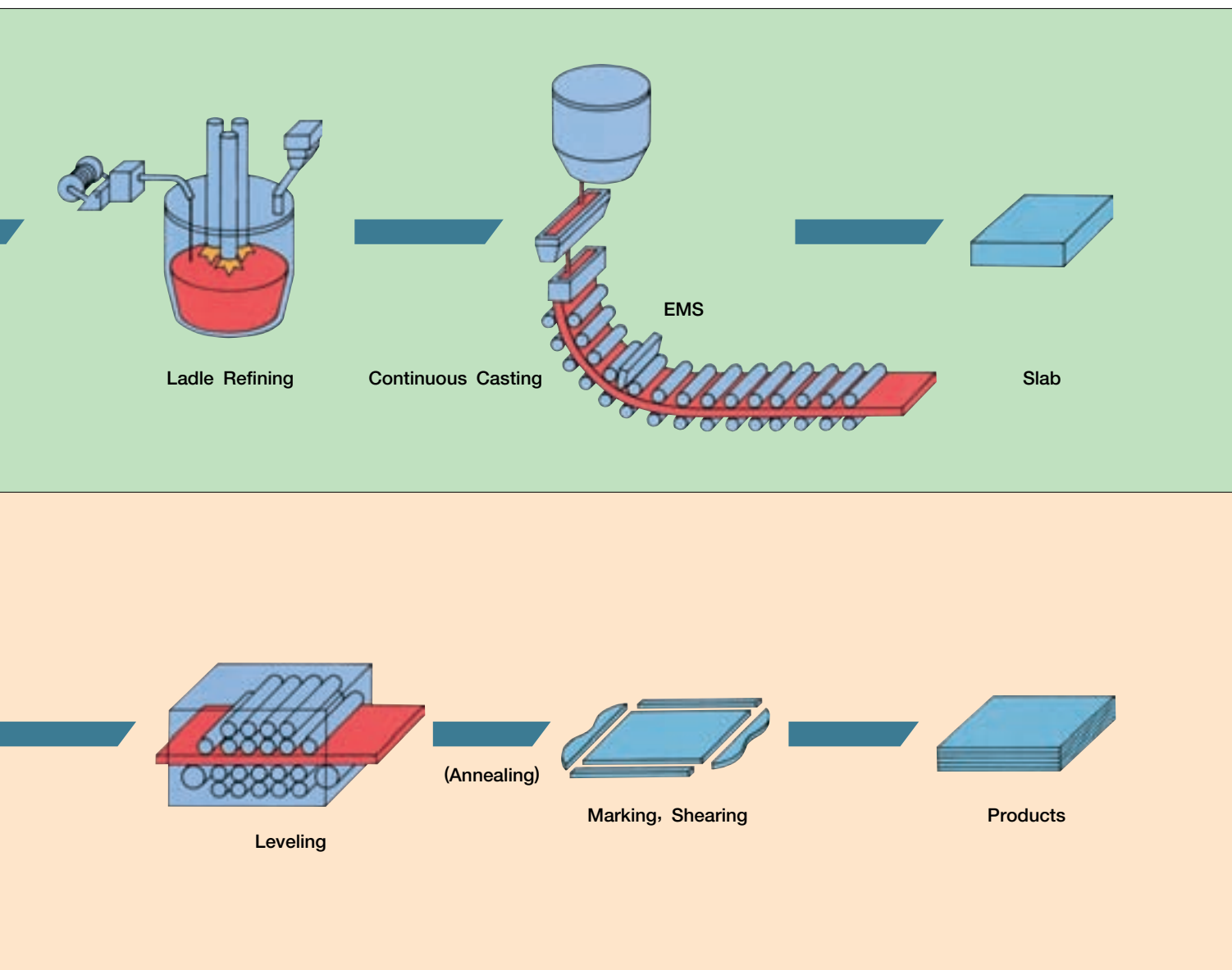
We have achieved shorter process-lines, energy savings, increased productivity, and higher quality level by developing and introducing the latest facilities and technology.

## The Steelmaking Process



## The Rolling Process





# Products

Chubu Steel Plate meets a wide variety of needs through our rich line-up and excellent-quality steel as follows;

- 1) high tensile strength steel with atmospheric corrosion resistance, abrasion resistance, and weldability,
- 2) abrasion-resistant alloy steel plate with excellent impact resistance and abrasion resistance.

## Chubu Steel Plate Standard Products

Steel Plate with Improved Machinability .....	MAC, SS400-MAC
Steel Plate for Laser-Cutting .....	SS400-LS
Hydrochloric/Sulfuric Acid-Resistant Alloy Steel Plate .....	CMW400
High Tensile Strength Steel Plate .....	CK-BESTEN540, CK-BESTEN590, CK-BESTEN590Y
Abrasion-Resistant Alloy Steel Plate .....	ARES690, ARES690UY, ARES880, ARES400

## JIS Products

Rolled Steels for General Structure .....	SS400
Rolled Steels for Welded Structure .....	SM400, SM490, SM490Y, SM520, SM570
Rolled Steels for Building Structure .....	SN400, SN490
Hot-rolled Atmospheric Corrosion Resisting Steels for Welded Structure .....	SMA400, SMA490
Carbon Steel Plates for Boilers and Pressure Vessels .....	SB410
Carbon Steels for Machine Structural Use .....	S10C~S58C
Chrome-Molybdenum Steels .....	SCM440

## Classification Society Standards

NK .....	Nippon Kaiji Kyokai
LR .....	Lloyd's Register of Shipping
ABS .....	American Bureau of Shipping
DNV .....	Det Norske Veritas
CR .....	China Corporation Register of Shipping
GL .....	Germanischer Lloyd(AG)



SS400  
⑪ M38x1980x3350  
304 919337  
JICDARR0407008

SN490C  
⑪ M22x2100x6096  
918169  
JICDARR0407008

# Applications

The Chubu Steel Plate product lines are expanding to cover a diverse range of fields. Our products support a broad array of applications, such as materials for fabricating and manufacturing industrial machinery, construction materials in civil engineering and architecture, and steel plates for shipbuilding.

Buildings

Cranes

Pressure  
Vessels

Rolling Stock

Molds

Bridges

Construction  
Machinery

Storage Tanks

Automobiles

Agricultural  
Machinery

Ships









## ***Specifications***

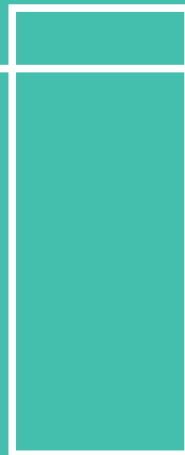
We supply a variety of standardized products that meet JIS standards and shipbuilding standards of countries around the world. Our own-branded products also cover the requirements of a broad range of industrial needs.

**N/mm<sup>2</sup>**



**J**

**%**



# Chubu Steel Plate Standard Products

## Steel Plate with Improved Machinability

Among steel plates for general structure, this standard specifies steel plates with improved machinability for use in applications that require special machining before use, such as molds.

Symbol of grade	Chemical composition %					Tensile test							
	C	Si	Mn	P	S	Yield point or proof stress N/mm <sup>2</sup>				Tensile strength N/mm <sup>2</sup>	Elongation		
						Thickness mm					Thickness mm	%	Specimen
						16 or less	over 16.40 or less	over 40,100 or less	over 100				
MAC	—	—	—	—	—	—	—	—	—	—	—	—	—
SS400-MAC	0.20 or less	0.40 or less	0.80 or less	0.045 or less	0.045 or less	245 or more	235 or more	215 or more	205 or more	400-510	over 5.16 or less over 16.50 or less over 40	17 or more 21 or more 23 or more	No.1A No.1A No.4

## Steel Plate for Laser-Cutting

This standard specifies steel plates with surface conditions appropriate for laser cutting, developed through application of the use of trace elements and sophisticated rolling, taking advantage of the benefits of arc furnace and steel plate process.

Symbol of grade	Chemical composition %					Tensile test					
	C	Si	Mn	P	S	Yield point or proof stress N/mm <sup>2</sup>		Tensile strength N/mm <sup>2</sup>	Elongation		
						16 or less	over 16		Thickness mm	%	Specimen
SS400-LS	0.20 or less	0.40 or less	0.90 or less	0.035 or less	0.035 or less	245 or more	235 or more	400-510	16 or less over 16	17 or more 21 or more	No.1A

## Hydrochloric/Sulfuric Acid-Resistant Alloy Steel Plate

This standard specifies steel plate having properties appropriate for corrosive environments, such as hydrochloric and sulfuric acid, through application of special elements.

Symbol of grade	Chemical composition %									Tensile test				
	C	Si	Mn	P	S	Cu	Ni	Cr	Ti	Yield point or proof stress N/mm <sup>2</sup>	Tensile strength N/mm <sup>2</sup>	Elongation		
												Thickness mm	%	Specimen
CMW400	0.10 or less	0.50 or less	0.60 or less	0.050 or less	0.030 or less	0.60 or less	0.30 or less	0.60 or less	0.030 or less	235 or more	400 or more	—	17 or more	No.1A



## High Tensile Strength Steel Plate

This standard specifies high tensile strength steel plate with excellent weldability used in architecture,bridges,industrial machinery, vehicles.etc.

Symbol of grade	Chemical composition %							Tensile test					Impact test		
	C	Si	Mn	P	S	Cu	Nb+V	Yield point or proof stress N/mm <sup>2</sup>	Tensile strength N/mm <sup>2</sup>	Elongation			Test temperature	Absorbed energy J	Specimen
										Thickness mm	%	Specimen			
CK-BESTEN540	0.19 or less	0.55 or less	1.60 or less	0.025 or less	0.010 or less	0.25 or less	0.10 or less	355 or more	540-640	over 5: 40 or less over 40	23 or more 20 or more	No.5 No.4	—	—	—
CK-BESTEN590	0.18 or less	0.55 or less	1.60 or less	0.020 or less	0.010 or less	0.25 or less	0.15 or less	365 or more	590-710	—	20 or more	No.5	—	—	—
CK-BESTEN590Y	0.18 or less	0.55 or less	1.60 or less	0.020 or less	0.010 or less	0.25 or less	0.15 or less	450 or more	590-710	—	20 or more	No.5	-5℃	47 or more	V notch in rolled direction

Remarks:Steel plates thicker than 12mm will be subjected to impact test. Charpy absorbed energy is the average value of three specimens.  
Impact test specimens are extracted in the direction of rolling. Notching is implemented in the direction of the thickness.

## Abrasion-Resistant Alloy Steel Plate

This standard specifies alloy steel plate with superior abrasion resistance and used in civil engineering, architecture, agriculture, and other industrial machinery.

Symbol of grade	Chemical composition %								
	C	Si	Mn	P	S	Cu	Cr	Mo	B
ARES690	0.35 or less	0.35 or less	1.60 or less	0.040 or less	0.040 or less	0.50 or less	0.70 or less	—	0.0050 or less
ARES690UY	0.40 or less	0.35 or less	1.00 or less	0.040 or less	0.040 or less	0.50 or less	0.70 or less	0.30 or less	0.0050 or less
ARES880	0.50 or less	0.35 or less	1.00 or less	0.030 or less	0.030 or less	0.50 or less	1.20 or less	0.30 or less	—
ARES400	0.20 or less	0.35 or less	1.50 or less	0.030 or less	0.015 or less	0.30 or less	0.30 or less	—	0.0050 or less

# Japanese Industrial Standard (JIS) Products

## Rolled Steel Plates for general Structure

This standard specifies hot-rolled steel plate for general structure used in bridges,ships,vehicles,etc.

Symbol of grade	Chemical composition %					Tensile test							
	C	Si	Mn	P	S	Yield point or proof stress N/mm <sup>2</sup>				Tensile strength N/mm <sup>2</sup>	Elongation		
						Thickness mm					Thickness mm	%	Specimen
						16 or less	over 16.40 or less	over 40.100 or less	over 100				
SS400	—	—	—	0.050 or less	0.050 or less	245 or more	235 or more	215 or more	205 or more	400—510	over 5.16 or less over 16.50 or less over 40	17 or more 21 or more 23 or more	No.1A No.1A No.4

## Rolled Steel Plates for Welded Structure

This standard specifies hot-rolled steel plate with particularly weldability used in bridges,ships,vehicles,etc.

Symbol of grade	Chemical composition %					Tensile test							Impact test		
	C	Si	Mn	P	S	Yield point or proof stress N/mm <sup>2</sup>			Tensile strength N/mm <sup>2</sup>	Elongation			Test temperature	Absorbed energy J	Specimen
						Thickness mm				Thickness mm	%	Specimen			
						16 or less	over 16:40 or less	over 40							
SM400A	Thickness mm 50 or less 0.23 or less over 50 0.25 or less	—	2.5×C or more	0.035 or less	0.035 or less	245 or more	235 or more	215 or more	400—510	over 5:16 or less over 16, 50 or less over 40	18 or more 22 or more 24 or more	No.1A	—	—	—
SM400B	Thickness mm 50 or less 0.20 or less over 50 0.22 or less	0.35 or less	0.60-1.50									No.1A	0℃	27 or more	V notch in rolled direction
SM400C	0.18 or less	0.35 or less	0.60-1.50									No.4	0℃	47 or more	
SM490A	Thickness mm 50 or less 0.20 or less over 50 0.22 or less	0.55 or less	1.65 or less	0.035 or less	0.035 or less	325 or more	315 or more	295 or more	490—610	over 5:16 or less over 16, 50 or less over 40	17 or more 21 or more 23 or more	No.1A	—	—	—
SM490B	Thickness mm 50 or less 0.18 or less over 50 0.20 or less	0.55 or less	1.65 or less									No.1A	0℃	27 or more	V notch in rolled direction
SM490C	0.18 or less	0.55 or less	1.65 or less									No.4	0℃	47 or more	
SM490YA	0.20 or less	0.55 or less	1.65 or less	0.035 or less	0.035 or less	365 or more	355 or more	335 or more	490—610	over 5:16 or less over 16	15 or more 19 or more	No.1A	—	—	—
SM490YB												No.1A	0℃	27 or more	V notch in rolled direction
SM520B	0.20 or less	0.55 or less	1.65 or less	0.035 or less	0.035 or less	365 or more	355 or more	335 or more	520—640	over 5:16 or less over 16	15 or more 19 or more	No.1A	0℃	27 or more	V notch in rolled direction
SM520C												No.1A	0℃	47 or more	
SM570	0.18 or less	0.55 or less	1.70 or less	0.035 or less	0.035 or less	460 or more	450 or more	430 or more	570—720	16 or less over 16 over 20	19 or more 26 or more 20 or more	No.5 No.5 No.4	-5℃	47 or more	V notch in rolled direction

Remarks:1.Depending on requirements, alloys not in the above table can be included.

2.Steel plates thicker than 12mm will be subjected to impact test.

Charpy absorbed energy is the average value of three specimens.

# Rolled Steel Plates for Building Structure

This standard specifies hot-rolled steel plate used in architectures.

Symbol of grade	Chemical Composition %							
	C	Si	Mn	P	S	Ceq		Pcm
						Thickness mm		
						40 or less	over 40	
SN400A	0.24 or less	—	—	0.050 or less	0.050 or less	—	—	—
SN400B	Thickness mm 50 or less      0.20 or less over 50         0.22 or less	0.35 or less	0.60-1.40	0.030 or less	0.015 or less	0.36 or less	0.36 or less	0.26 or less
SN400C	Thickness mm 50 or less      0.20 or less over 50         0.22 or less			0.020 or less	0.008 or less			
SN490B	Thickness mm 50 or less      0.18 or less over 50         0.20 or less	0.55 or less	1.60 or less	0.030 or less	0.015 or less	0.44 or less	0.46 or less	0.29 or less
SN490C	Thickness mm 50 or less      0.18 or less over 50         0.20 or less			0.020 or less	0.008 or less			

Remarks:The inspection certificate contains compositions (copper, nickel, chromium, molybdenum, vanadium, and boron) included in the carbon equivalent or weld crack sensitivity.

Symbol of grade	Tensile test								Impact test				Thickness directional characteristics		Ultrasonic testing		
	Yield point or proof stress		Tensile strength N/mm²	Yield ratio		Elongation		Specimen	Thickness mm	Test temperature °C	Absorbed energy J	Specimen	Thickness mm	Reduction of area %	Thickness mm	Application	Result
	Thickness mm	N/mm²		Thickness mm	%	Thickness mm	%										
SN400A	40 or less over 40	235 or more 215 or more	400~510	—	—	16 or less over 16, 50 or less over 40	17 or more 21 or more 23 or more	No.1A No.1A No.4	—	—	—	—	—	—	—	—	—
SN400B	up to 12 12 or more, 40 or less	235 or more 235~355	400~510	up to 12 12 or more	— 80 or less	16 or less over 16, 50 or less over 40	18 or more 22 or more 24 or more	No.1A No.1A No.4	over 12	0	27 or more	V notch (L direction)	—	—	13 or more	JIS G 0901 applied through cooperation at time received	JIS G 0901 Y grade
SN400C	over 40	215~335											16 or more	25 or more	16 or more	JIS G 0901	
SN490B	up to 12 12 or more, 40 or less	325 or more 325-445	490~610	up to 12 12 or more	— 80 or less	16 or less over 16, 50 or less over 40	17 or more 21 or more 23 or more	No.1A No.1A No.4	over 12	0	27 or more	V notch (L direction)	—	—	13 or more	JIS G 0901 applied through cooperation at time received	JIS G 0901 Y grade
SN490C	over 40	295~415											16 or more	25 or more	16 or more	JIS G 0901	

Ceq = C+ $\frac{Mn}{6}$ + $\frac{Si}{24}$ + $\frac{Ni}{40}$ + $\frac{Cr}{5}$ + $\frac{Mo}{4}$ + $\frac{V}{14}$

Pcm = C+ $\frac{Si}{30}$ + $\frac{Mn}{20}$ + $\frac{Cu}{20}$ + $\frac{Ni}{60}$ + $\frac{Cr}{20}$ + $\frac{Mo}{15}$ + $\frac{V}{10}$ +5B



## Hot-rolled Atmospheric Corrosion Resisting Steel Plates for Welded Structure

This standard specifies welding hot-rolled steel plate with improved atmospheric corrosion resistance for structural use that takes consideration into weldability and is used in bridges, buildings, and other structures.

Symbol of grade	Chemical composition %							Tensile test						Impact test			
	C	Si	Mn	P	S	Cu	Cr	Yield point or proof stress N/mm <sup>2</sup>			Tensile strength N/mm <sup>2</sup>	Elongation			Test temperature	Absorbed energy J	Specimen
								Thickness mm				Thickness mm	%	Specimen			
								16 or less	over 16, 40 or less	over 40							
SMA400AP	0.18 or less	0.55 or less	1.25 or less	0.035 or less	0.035 or less	0.20   0.35	0.30   0.55	245 or more	235 or more	215 or more	400—540	16 or less	17 or more	No.1A	—	—	—
SMA400BP												over 16	21 or more	No.1A	0°C	27 or more	V notch in rolled direction
SMA400CP												over 40	23 or more	No.4	0°C	47 or more	
SMA490AP	0.18 or less	0.55 or less	1.40 or less	0.035 or less	0.035 or less	0.20   0.35	0.30   0.55	365 or more	355 or more	335 or more	490—610	16 or less	15 or more	No.1A	—	—	—
SMA490BP												over 16	19 or more	No.1A	0°C	27 or more	V notch in rolled direction
SMA490CP												over 40	21 or more	No.4	0°C	47 or more	

Remarks:1.Mo+Nb+Ti+V≤0.15%  
2. Steel plates thicker than 12mm will be subjected to impact test.  
Charpy absorbed energy is the average value of three specimens.

## Carbon Steel Plates for Boilers and Pressure Vessels

This standard specifies hot-rolled carbon steel plate used in boilers.

Symbol of grade	Chemical composition %													Tensile test			
	C		Si	Mn	P	S	Cu	Ni	Cr	Mo	Nb	V	Ti	Yield point or proof stress N/mm <sup>2</sup>	Tensile strength N/mm <sup>2</sup>	Elongation %	Specimen
	Thickness mm																
SB410	6 or more, 25 or less over 25, 50 or less	0.24 or less 0.27 or less	0.15—0.40	0.90 or less	0.030 or less	0.030 or less	0.40 or less	0.40 or less	0.30 or less	0.12 or less	0.02 or less	0.03 or less	0.03 or less	225 or more	410—550	21 or more	No.1A

Remarks:1.Cu+Ni+Cr+Mo≤1.00%  
2.Cr+Mo≤0.32%

## Carbon Steel Plates for Machine Structural Use

This standard specifies carbon steel plate for machine construction made by hot-rolling steel and then applying heat treatment and processes such as forging and cutting before use.

Symbol of grade	Chemical composition %								
	C	Si	Mn	P	S	Cu	Ni	Cr	Ni+Cr
S10C	0.08—0.13	0.15—0.35	0.30—0.60	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S12C	0.10—0.15	0.15—0.35	0.30—0.60	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S15C	0.13—0.18	0.15—0.35	0.30—0.60	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S17C	0.15—0.20	0.15—0.35	0.30—0.60	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S20C	0.18—0.23	0.15—0.35	0.30—0.60	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S22C	0.20—0.25	0.15—0.35	0.30—0.60	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S25C	0.22—0.28	0.15—0.35	0.30—0.60	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S28C	0.25—0.31	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S30C	0.27—0.33	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S33C	0.30—0.36	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S35C	0.32—0.38	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S38C	0.35—0.41	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S40C	0.37—0.43	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S43C	0.40—0.46	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S45C	0.42—0.48	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S48C	0.45—0.51	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S50C	0.47—0.53	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S53C	0.50—0.56	0.15—0.35	0.60—0.80	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S55C	0.52—0.58	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less
S58C	0.55—0.61	0.15—0.35	0.60—0.90	0.030 or less	0.035 or less	0.30 or less	0.20 or less	0.20 or less	0.35 or less

Remarks:Please consult with us in advance for specifications shaded as follows  .

## Chrome-Molybdenum Steels

This standard specifies chrome-molybdenum steel plate manufactured by hot-rolling.

Symbol of grade	Chemical composition %								
	C	Si	Mn	P	S	Cu	Ni	Cr	Mo
SCM440	0.38-0.43	0.15-0.35	0.60-0.90	0.030 or less	0.030 or less	0.30 or less	0.25 or less	0.90-1.20	0.15-0.30

## Permissible Variation of Dimensions (JIS G3193)

### ■ Tolerance on Thickness

Units (mm)

Thickness \ Width	up to 1,600	1,600 or more, up to 2,000	2,000 or more, up to 2,500	2,500 or more
3.15 or more, up to 4.00	±0.24	±0.34	±0.34	—
4.00 or more, up to 5.00	±0.45	±0.55	±0.55	±0.65
5.00 or more, up to 6.30	±0.50	±0.60	±0.60	±0.75
6.30 or more, up to 10.0	±0.55	±0.65	±0.65	±0.80
10.0 or more, up to 16.0	±0.55	±0.65	±0.65	±0.80
16.0 or more, up to 25.0	±0.65	±0.75	±0.75	±0.95
25.0 or more, up to 40.0	±0.70	±0.80	±0.80	±1.00
40.0 or more, up to 63.0	±0.80	±0.95	±0.95	±1.10
63.0 or more, up to 100	±0.90	±1.10	±1.10	±1.30
100 or more, up to 160	±1.30	±1.50	±1.50	±1.70

Rolled steel plate for architecture is as follows:

Units (mm)

Thickness \ Width	up to 1,600	1,600 or more, up to 2,000	2,000 or more, up to 2,500	2,500 or more
6.00 or more, up to 6.30	+0.70	+0.90	+0.90	+1.20
6.30 or more, up to 10.0	+0.80	+1.00	+1.00	+1.30
10.0 or more, up to 16.0	+0.80	+1.00	+1.00	+1.30
16.0 or more, up to 25.0	+1.00	+1.20	+1.20	+1.60
25.0 or more, up to 40.0	+1.10	+1.30	+1.30	+1.70
40.0 or more, up to 63.0	+1.30	+1.60	+1.60	+1.90

Remarks: Permissible negative variations are 0.3mm.

■ Tolerance on Length

Units (mm)

Length	Tolerance
600 or more, up to 4,000	+20 0
4,000 or more, up to 6,000	+30 0
6,000 or more, up to 8,000	+40 0
8,000 or more, up to 10,000	+50 0
10,000 or more, up to 15,000	+75 0
15,000 or more, up to 20,000	+100 0
20,000 or more	+0.5% 0

■ Tolerance on Width

Units (mm)

Width	Thickness	Tolerance		
		Mill edge	Cut edge	
			+	—
630 or more, up to 1,000	up to 3.15	0  +not specified	10	0
	3.15 or more, up to 6.00		10	
	6.00 or more, up to 20.0		10	
	20.0 or more		15	
1,000 or more, up to 1,250	up to 3.15	0  +not specified	10	0
	3.15 or more, up to 6.00		10	
	6.00 or more, up to 20.0		15	
	20.0 or more		15	
1,250 or more, up to 1,600	up to 3.15	0  +not specified	10	0
	3.15 or more, up to 6.00		10	
	6.00 or more, up to 20.0		15	
	20.0 or more		15	
1,600 or more, up to 3,000	up to 3.15	0  +not specified	10	0
	3.15 or more, up to 6.00		10	
	6.00 or more, up to 20.0		20	
	20.0 or more		20	



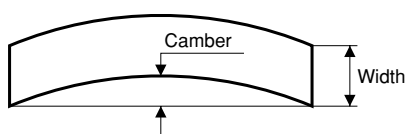
## ■ Maximum Value of Camber

Units (mm)

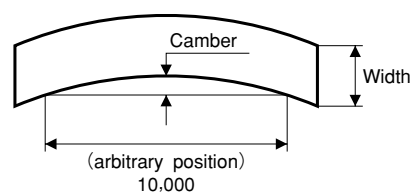
Size	Tolerance
Overall size	0.2% or less of length

Remarks: Does not apply to untrimmed steel sheets.

(Length of steel sheet: up to 10,000 mm)



(Length of steel sheet: more than 10,000 mm)



## ■ Maximum Deviation of Flatness

Units (mm)

Thickness \ Width	up to 2,000	2,000 or more
3.15 or more, up to 4.00	16	—
4.00 or more, up to 5.00	14	24
5.00 or more, up to 8.00	13	21
8.00 or more, up to 15.00	12	16
15.00 or more, up to 25.00	12	16
25.00 or more, up to 40.00	9	13
40.00 or more, up to 80.00	8	11
80.00 or more, up to 150.00	8	10
150.00 or more, up to 250.00	10	15

Remarks: Values in the above table shall be applied to any 2,000mm length. When the length is less than 2,000mm the values shall be applied to the full length. When the wave pitch exceeds 2,000mm, the values shall be applied to the length of the wave pitch, except that when the wave pitch exceeds 4,000mm, they shall be applied to an arbitrary length of 4,000mm.

# Classification Society Standards

## Steel Plates for Shipbuilding

This standard specifies hot-rolled steel plates used for shipbuilding.

### Nippon Kaiji Kyokai(NK)

Grade		Chemical composition %							Tensile test						Impact test		
		Thickness mm	C	Si	Mn	P	S	Other	Yield point or proof stress Thickness mm N/mm <sup>2</sup>	Tensile strength N/mm <sup>2</sup>	Elongation %			Test temperature	Absorbed energy J	Specimen	
Mild steel	KA	50 or less	0.23 or less	0.35 or less	2.5×C or more	0.040 or less	0.040 or less	C+Mn/6 0.40 or less	25 or less over 25	235 or more 220 or more	400-490	5 or less over 5, 10 or less over 10, 15 or less over 15, 20 or less over 20, 25 or less over 25, 35 or less over 35	15 or more 16 or more 17 or more 18 or more 19 or more 20 or more 21 or more	GL200mm	—	—	—
	KB	25 or less over 25, 50 or less	0.21 or less	0.35 or less	0.80 or more	0.040 or less	0.040 or less	C+Mn/6 0.40 or less	—	235 or more		—	—		—	0℃	L:27 or more C:20 or more
High tensile strength steel	KA32	12.5 or less over 12.5, 50 or less	0.18 or less	0.10~0.50	0.70~1.6	0.040 or less	0.040 or less	Cu 0.35 or less Cr 0.20 or less Ni 0.40 or less Mo 0.08 or less Al, Nb, V are separate	—	315 or more	470-590	As above			0℃	L:31 or more C:22 or more	
		0.90~1.6															
	KB36	12.5 or less over 12.5, 50 or less	0.18 or less	0.10~0.50	0.70~1.6	0.040 or less	0.040 or less		—	355 or more	470-620	5 or less over 5, 10 or less over 10, 15 or less over 15, 20 or less over 20, 25 or less over 25, 35 or less over 35	14 or more 15 or more 16 or more 17 or more 18 or more 19 or more 20 or more 21 or more	GL200mm	0℃	L:34 or more C:24 or more	2mmV
			0.90~1.6														

Remarks:When Si≥0.10% with KB grade, it can be made Mn≥0.60%.

### Lloyd's Register of Shipping(LR)

Grade		Chemical composition %							Tensile test					Impact test		
		Thickness mm	C	Si	Mn	P	S	Other	Yield point or proof stress N/mm <sup>2</sup>	Tensile strength N/mm <sup>2</sup>	Elongation			Test temperature	Absorbed energy J	Specimen
A		12.5 or less over 12.5, 50 or less	0.23 or less	0.50 or less	— 2.5×C or more	0.040 or less	0.040 or less	C+Mn/6 0.40 or less	235 or more	400-490	5 or less over 5, 10 or less over 10, 15 or less over 15, 20 or less over 20, 25 or less over 25, 30 or less over 30, 35 or less over 35	14 or more 16 or more 17 or more 18 or more 19 or more 20 or more 21 or more 22 or more	GL200mm	—	—	—
	B	25 or less over 25, 50 or less	0.21 or less	0.50 or less	0.80 or more	0.040 or less	0.040 or less	C+Mn/6 0.40 or less						—	—	—
														0°C	27 or more	2mmV

Remarks:When Si≥0.10% with B grade, it can be made Mn≥0.60%.

### American Bureau of Shipping(ABS)

Grade	Chemical composition %							Tensile test					Impact test		
	Thickness mm	C	Si	Mn	P	S	Other	Yield point or	proof stress	Tensile strength N/mm <sup>2</sup>	Elongation %	Specimen	Test temperature	Absorbed energy J	Specimen
								Thickness	mm						
A	12.5 or less	0.26 or less	—	—	0.040 or less	0.040 or less	C+Mn/6 0.40 or less	25.0 or less	235 or more	400-490	21 or more	GL200mm	—	—	—
	over 12.5, 51 or less	0.23 or less	—	2.5×C or more				over 25.0	225 or more				—	—	—
B	25 or less	0.21 or less	0.35 or less	0.80-1.10	0.040 or less	0.040 or less	C+Mn/6 0.40 or less	—	235 or more				—	—	—
	over 25, 51 or less												0°C	L:27 or more or C:19 or more	2mmV

Remarks:1.When Si≥0.10% with B grade, it can be made Mn≥0.60%.

2.When thickness is less than 7.9mm, the minimum elongation is reduced by 1.25% for each decrease of 0.8mm in thickness.



## ***Properties***

We have specifications supporting various applications including machinability, weldability, impact resistance, abrasion resistance, and atmospheric corrosion resistance. Some of these properties will be explained on the following pages.



Mn

Si

C



# Steel Plate with Improved Machinability SS400-MAC

Application: Molds and other uses requiring machinability.

## 1 Features

### 1 Machinability

Excellent machinability is a result of adding an appropriate amount of sulfur to the SS400 base.

### 2 Mechanical properties

Based on SS400, its usage performance is in no way inferior.

### 3 Economy

Its excellent machinability reduces costs thanks to extended tool life and a lower frequency of replacement.

## 2 Characteristics

### 1 Chemical composition

Symbol of grade	Thickness mm	Chemical composition %				
		C	Si	Mn	P	S
SS400	32	0.11	0.22	0.55	0.012	0.008
SS400-MAC	32	0.09	0.26	0.72	0.012	0.028

### 2 Mechanical properties

Symbol of grade	Thickness mm	Tensile test				Bend test			
		Yield point or proof stress N/mm <sup>2</sup>	Tensile strength N/mm <sup>2</sup>	Elongation %	Specimen	Bending angle	Inside radius	Result	Specimen
SS400	32	266	429	31	No.1A	180°	1.5t	Good	No.1
SS400-MAC	32	274	425	32		180°	1.5t	Good	

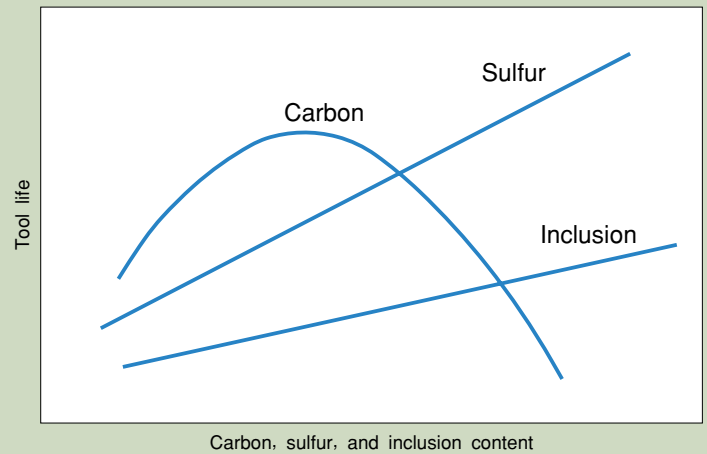


### 3 Machinability

#### 1) Metallurgical factors contributing to machinability

Evaluating machinability in terms of length of tool life from a metallurgical perspective, a maximum amount of carbon positively affecting tool life can be observed, as well as a proportional relationship between the sulfur content and the amount of soft plastic inclusions. These relationships allow us to qualitatively estimate tool life.

Factors Related to Tool Life



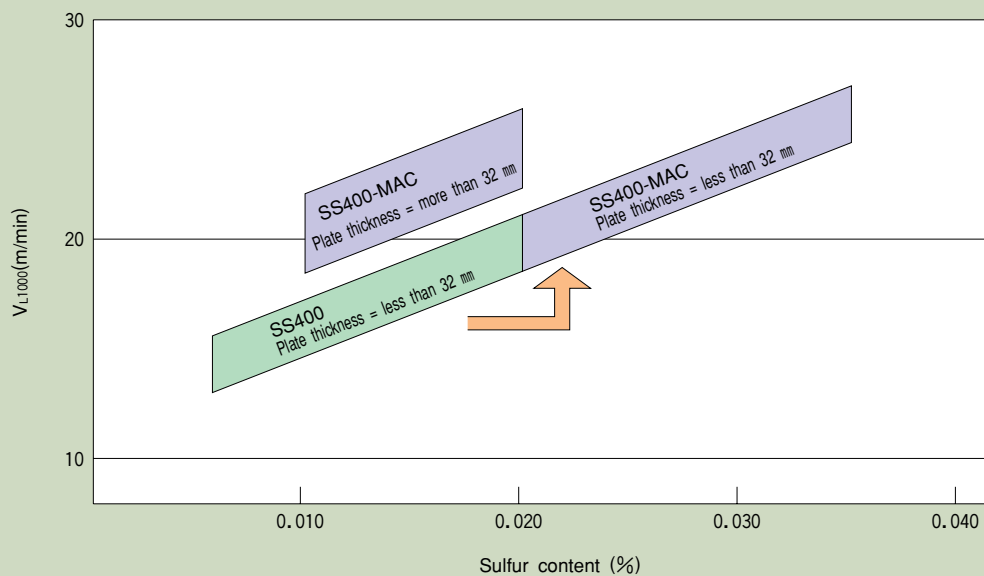
#### 2) Results of machinability testing

$V_{L1000}$  (m/min) is used as the index for evaluating machinability. This is the cutting speed of a drill which can bore a 1,000mm deep hole. A larger value represents better machinability.

$V_{L1000}$  is primarily dependent on carbon and sulfur content. In addition to ensuring sufficient required properties (internal quality, bendability, weldability, etc.) as SS400, the composition is designed to improve machinability. Machinability can be evaluated with the following drill life estimation formula:

$$V_{L1000} = 367.2S + 56C + 7.4 \quad (\text{where } 0.05 \leq C \leq 0.20\%)$$

Using the above formula, we produce the following figure:



# Steel Plate for Laser-Cutting SS400-LS

Application: Various industrial machinery, construction, etc.

## 1 Features

### 1 Laser-cutting properties

Cutting plate thickness and quality of the cut surface can be improved through application of a sophisticated rolling process and taking advantage of tramp elements.

### 2 Workability

By achieving good laser-cutting characteristics without changing the primary chemical composition, bendability and weldability remain excellent; these plates are comparable to conventional steel plates.

### 3 Internal quality

Sound internal quality is achieved thanks to lower sulfur content and reduction of inclusions.

### 4 Economy

With a wider range of appropriate cutting conditions, cutting efficiency is improved to reduce costs.

## 2 Characteristics

### 1 Chemical composition

Symbol of grade	Thickness mm	Chemical composition %				
		C	Si	Mn	P	S
SS400-LS	16	0.09	0.24	0.74	0.021	0.009

### 2 Mechanical properties

Symbol of grade	Thickness mm	Tensile test				Bend test			
		Yield point or proof stress N/mm <sup>2</sup>	Tensile strength N/mm <sup>2</sup>	Elongation %	Specimen	Bending angle	Inside radius	Result	Specimen
SS400-LS	16	304	447	30	No.1A	180°	1.5t	Good	No.1

### 3 Laser-cutting properties (surface roughness processing environment)

Laser-cutting properties are greatly affected by the roughness of surface scales and the characteristics of the scales. Even for the same composition, differences in surface roughness make large difference in the quality that can be obtained.

#### 1) Cutting conditions

##### Cutting materials

- Steel grade:SS400
- Plate thickness:16mm

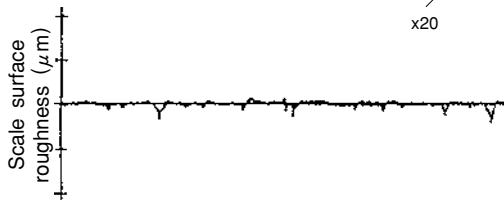
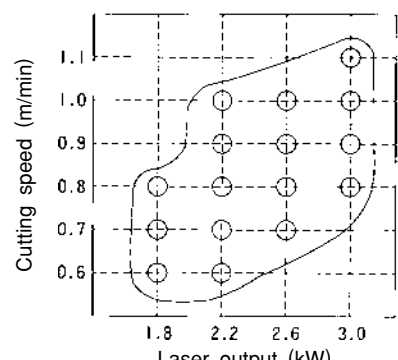
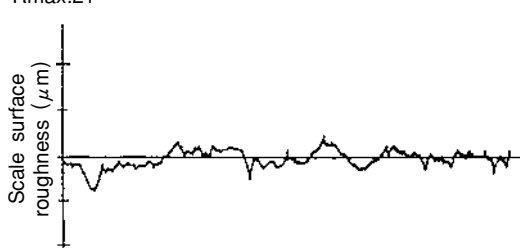
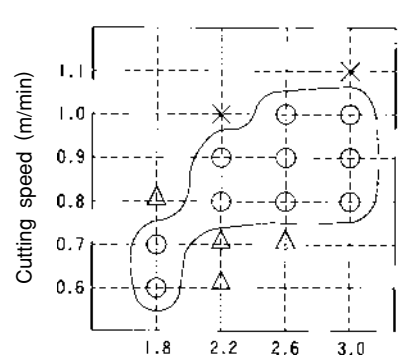
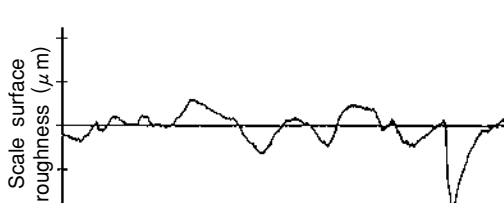
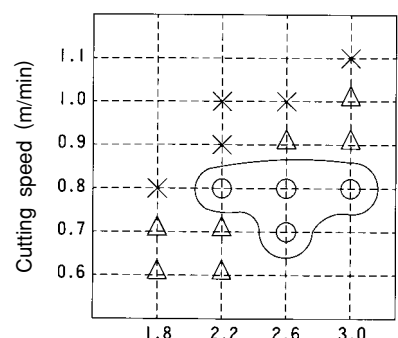
##### Laser processing machine

- Output:1.8~3.0kW
- Focus position: +2.0mm
- Assisting gas pressure:0.8kgf/cm<sup>2</sup>

##### Surface roughness measurement

- Mitutoyo brand
- Surftest 402

#### 2) The effects of surface roughness

	Scale surface roughness (μm)	Cutting speed and laser output tolerance
SS400-LS	<p>Ra:0.8 Rz:8 Rmax:10</p> 	
SS400	<p>Ra:3.6 Rz:19 Rmax:21</p> 	
SS400	<p>Ra:6.8 Rz:46 Rmax:61</p> 	



# Hydrochloric/Sulfuric Acid-Resistant Alloy Steel Plate CMW400

## Steel plate that stands up to hydrochloric and sulfuric acid

### 1 Features

#### 1 Resists hydrochloric acid

This plate takes advantage of the characteristics of electrolytic forged steel that contains special composition, which grant it resistance to hydrochloric acid. This product resists corrosion in a wide variety of usage environments that generate hydrochloric acid and hydrochloric acid gas.

#### 2 Resists sulfuric acid

In addition to hydrochloric acid resistance, this product also resists the effects of sulfuric acid. Even in cases where corrosion resulting from sulfuric acid must be considered, this product demonstrates its superiority to other rolled steels, as well as particularly strong corrosion resistance in relatively high-temperature usage environments.

#### 3 Atmospheric corrosion resistance

This steel also resists atmospheric corrosion and will last a long time even when used outdoors or in wet environments.

#### 4 Strength and workability

Workability equivalent to SS400 is obtained by reducing carbon content low.

#### 5 Weldability

Excellent weldability is achieved by paying attention to weld crack sensitivity and reducing carbon content.

### 2 Standard

#### 1 Chemical composition

Symbol of grade	Chemical composition (%)								
	C	Si	Mn	P	S	Cu	Ni	Cr	Ti
CMW400	0.10 or less	0.50 or less	0.60 or less	0.050 or less	0.030 or less	0.60 or less	0.30 or less	0.60 or less	0.03 or less

#### 2 Mechanical properties

Symbol of grade	Yield point or proof stress (N/mm <sup>2</sup> )	Tensile strength (N/mm <sup>2</sup> )	Elongation (%)
CMW400	235 or more	400 or more	17 or more

### 3 Characteristics

#### 1 Chemical composition

In environments wherein corrosive materials are generated, such as incinerators and smoke extraction systems, problems related to hydrochloric and sulfuric acid corrosion can arise near the dew point. One must also consider corrosion from hydrochloric acid gas, as the exhaust from such devices has a high concentration of hydrochloric acid.

“Steel plate that stands up to hydrochloric and sulfuric acid” demonstrates excellent corrosion resistance in this kind of acidic environment, and can be used in particularly severe environments with high temperatures and high concentrations of these chemicals.

Allow us to show you the results of some experiments performed on this “steel plate that stands up to hydrochloric and sulfuric acid.”

Symbol of grade	Chemical composition (mass %)					Ceq (%)	Pcm (%)
	C	Si	Mn	P	S		
CMW400	0.06	0.30	0.26	0.047	0.005	0.30	0.15
SMA400	0.09	0.25	0.67	0.023	0.020	0.34	0.18
SS400①	0.08	0.20	0.68	0.025	0.014	0.24	0.15
SS400②	0.18	0.14	0.59	0.015	0.009	0.29	0.22
Sulfuric acid-resistant steel	0.11	0.26	0.80	0.010	0.005	0.38	0.21

CMW400・・・“Steel plate that stands up to hydrochloric and sulfuric acid”

SMA400・・・W-grade Hot-rolled Atmospheric Corrosion Resisting Steels for Welded Structure

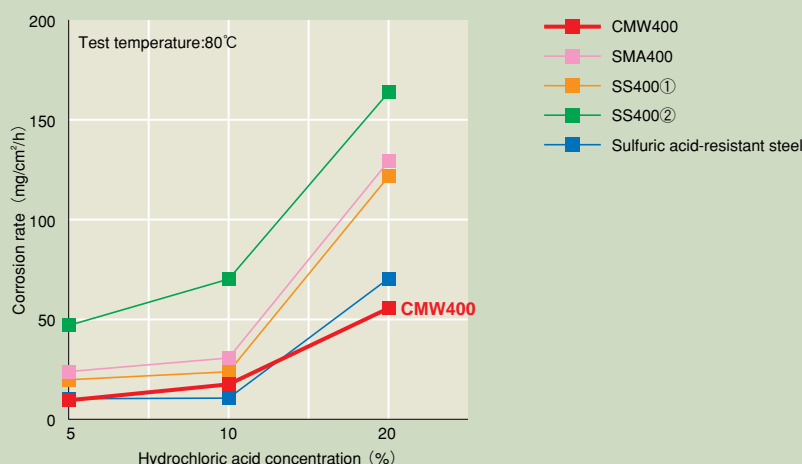
SS400・・・Rolled Steel Plates for General Structure

#### 2 Mechanical properties (plate thickness=6mm)

Symbol of grade	Yield point or proof stress (N/mm <sup>2</sup> )	Tensile strength (N/mm <sup>2</sup> )	Elongation (%)
CMW400	345	509	22

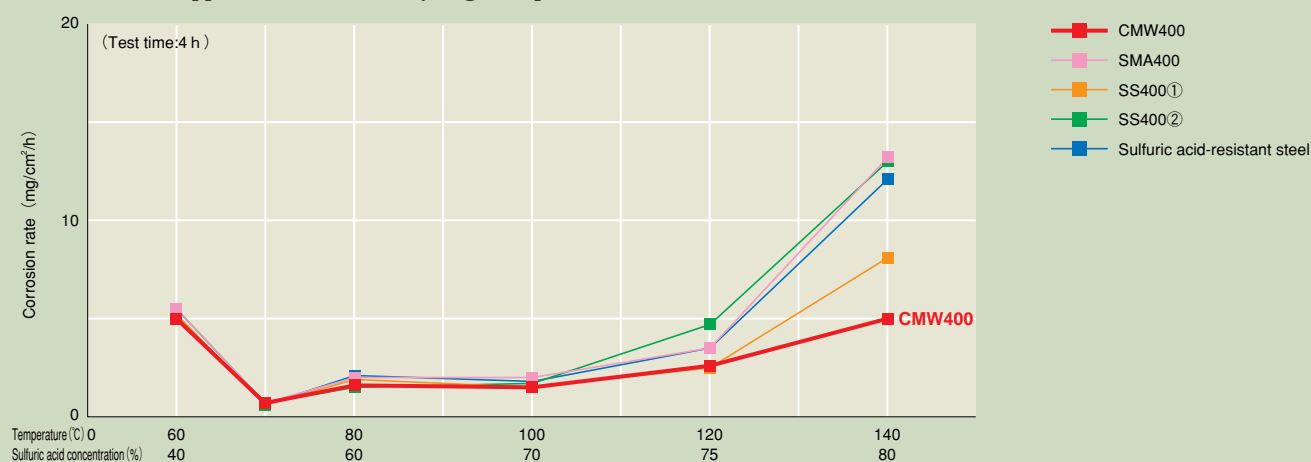
### 3 Hydrochloric acid-resistance (relationship between hydrochloric acid concentration and corrosion rate)

The superiority of this steel is clear at a test temperature of 80°C and concentration of 20%. “Steel plate that stands up to hydrochloric and sulfuric acid” is the suitable product for such severe high-temperature, high-concentration environments.



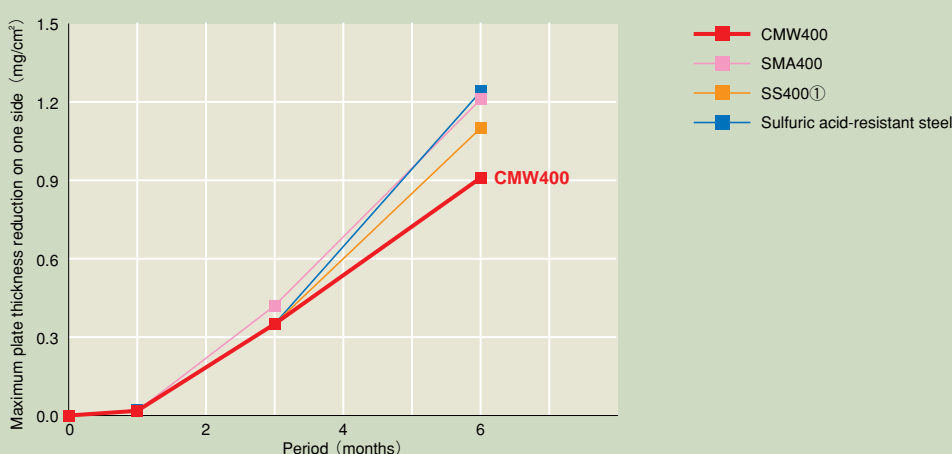
### 4 Sulfuric acid-resistance (relationship between sulfuric acid concentration and corrosion rate)

“Steel plate that stands up to hydrochloric and sulfuric acid” resists sulfuric acid approximately as well as it does hydrochloric acid at temperatures greater than 60°C, and demonstrates its best corrosion resistance in environments where the test temperature exceeds 120°C. Thus this steel has corrosion resistance, even against sulfuric acid, and is particularly well suited for application in relatively high-temperature environments.



### 5 Atmospheric corrosion resistance (Salt spray corrosion test)

To investigate atmospheric corrosion resistance, we implemented progressive salt spray test, and our results showed that “steel plate that stands up to hydrochloric and sulfuric acid” underwent the least reduction in plate thickness. This evaluation took place over a short 6 months of testing, but we believe this steel will demonstrate superior atmospheric corrosion resistance relative to normal steel and sulfuric acid-resistant steel, showing a clearer gap after use over a longer period of time.



# High Tensile Strength Steel Plate CK-BESTEN540/590/590Y

Application: For buildings, bridges, industrial machinery, vehicles, etc.

## 1 Features

### 1 Mechanical properties

The weight of structures using this steel plate can be reduced because it has a higher yield-point and tensile strength than normal steel plates.

### 2 Abrasion and atmospheric corrosion resistance

This steel has extended durability compared with general high tensile strength steel plates because of excellent resistance to abrasion and atmospheric corrosion.

### 3 Workability

As a type of as-rolled high tensile strength steel, it has stable heat memory so that material quality is not affected by heat processing. It has good ductility and a low yield-point compared with quenched and tempered types, simplifying cold processing.

### 4 Weldability

Deliberate chemical composition design and restricted carbon content achieve lower hardening of heat affected zone and excellent characteristics of welded joint.

### 5 Economy

This steel offers cost benefits compared to quenched and tempered type as it is as-rolled high tensile strength steel. With its high tensile strength, costs are reduced by reducing the required material as well as transportation thereof.

## 2 Characteristics

### 1 Chemical composition

Symbol of grade	Thickness mm	Chemical composition %							Ceq %	Pcm %
		C	Si	Mn	P	S	Cu	Nb		
CK-BESTEN540	25	0.13	0.30	1.48	0.019	0.005	0.22	0.012	0.43	0.24
CK-BESTEN590	25	0.17	0.37	1.47	0.018	0.004	0.21	0.038	0.47	0.28
CK-BESTEN590Y	25	0.16	0.39	1.44	0.016	0.004	0.23	0.036	0.45	0.28

Carbon equivalent:  $C_{eq} = C + Si/24 + Mn/6 + Ni/40 + Cr/5 + Mo/4 + V/14$

Weld crack sensitivity:  $P_{cm} = C + Si/30 + Mn/20 + Cu/20 + Ni/60 + Cr/20 + Mo/15 + V/10 + 5B$

### 2 Mechanical properties

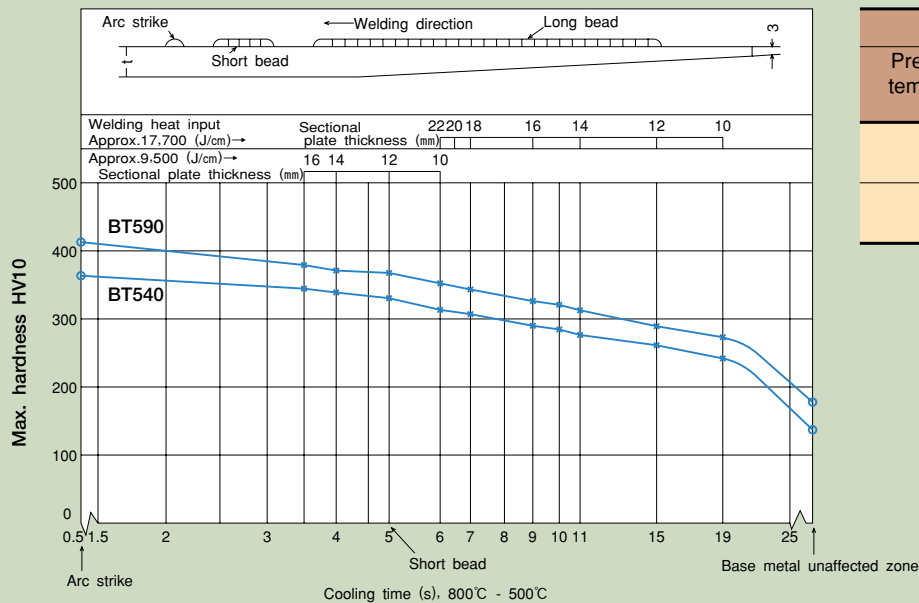
Symbol of grade	Thickness mm	Tensile test				Impact test	
		Yield point or proof stress N/mm <sup>2</sup>	Tensile strength N/mm <sup>2</sup>	Elongation %	Specimen	vEo J	Specimen
CK-BESTEN540	25	422	598	35	No.5	91	V notch
CK-BESTEN590	25	425	650	34		116	
CK-BESTEN590Y	25	490	647	37		152	



Symbol of grade	Thickness mm	Bend test			
		Bending angle	Inside radius	Result	Specimen
CK-BESTEN540	25	180°	1.0t closely contact	Good	No.1
CK-BESTEN590	25	180°	1.0t closely contact	Good	
CK-BESTEN590Y	25	180°	1.0t closely contact	Good	

### 3 Weldability

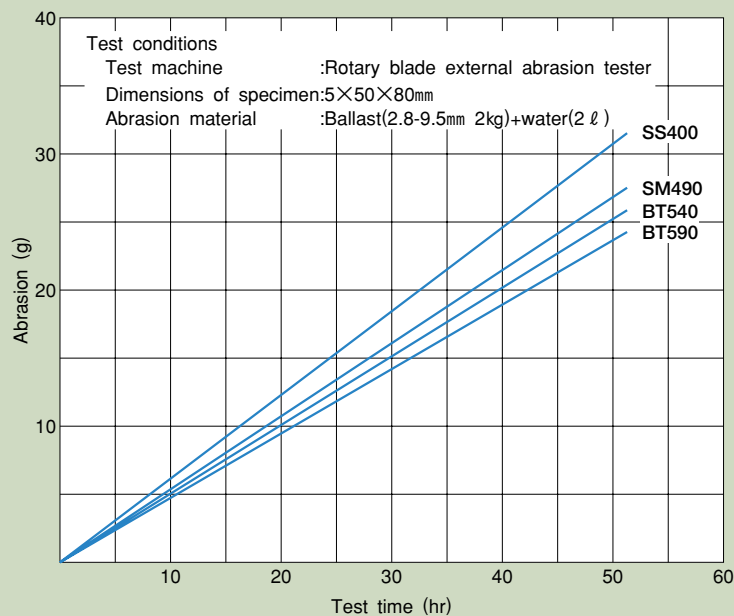
#### 1) Taper Hardness Test



#### 2) Y-Groove Weld Cracking Test

BT590		
Pre-heating temperature °C	Surface crack ratio %	Cross-section crack ratio %
25	0	0
100	0	0

### 4 Abrasion Resistance Test





# Abrasion-Resistant Alloy Steel Plate ARES690

Application: For civil engineering works, construction, agricultural and other industrial machinery

## 1 Features

### 1 Abrasion resistance and atmospheric corrosion resistance

Special alloys of manganese, chromium, boron, etc., provide excellent abrasion resistance, and these plates also have excellent atmospheric corrosion resistance compared with normal steel plates.

### 2 Abrasion resistance and impact resistance after heat treatment

Addition of boron performs excellent hardenability through heat treatment to improve abrasion and impact resistance.

### 3 Weldability

The composition design gives consideration to weldability enabling fillet and butt welding with relatively low constrain.

### 4 Economy

This steel offers cost benefits compared to quenched and tempered type as it is as-rolled. Costs are further reduced by extending the life through quenching and tempering.

## 2 Characteristics

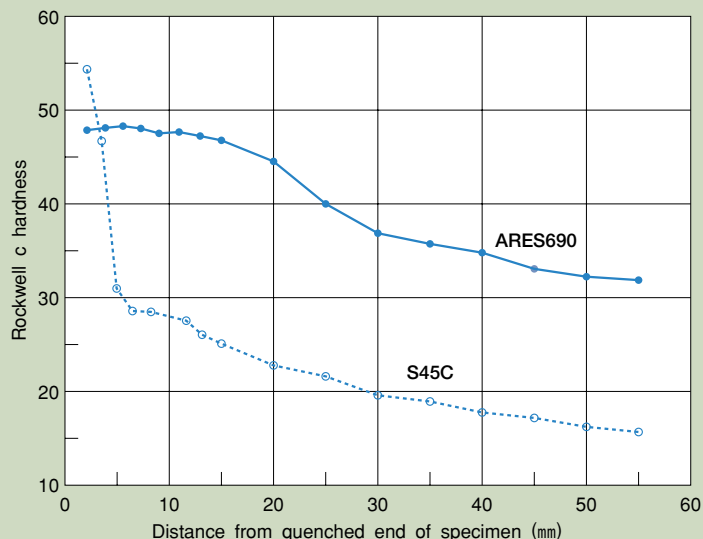
### 1 Chemical composition

Symbol of grade	Thickness mm	Chemical composition %							
		C	Si	Mn	P	S	Cu	Cr	B
ARES690	35	0.27	0.34	1.27	0.015	0.005	0.15	0.64	0.0030

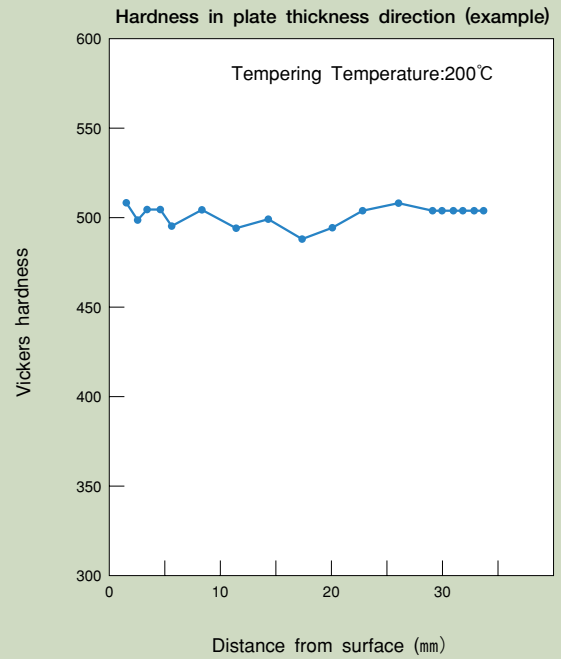
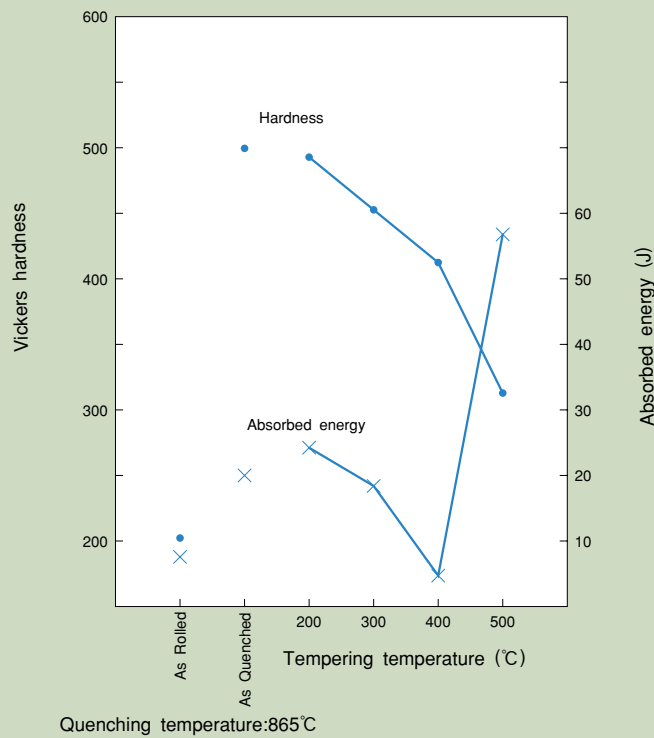
### 2 Mechanical properties

Symbol of grade	Thickness mm	Tensile test				Brinell hardness HBW
		Yield point or proof stress N/mm <sup>2</sup>	Tensile strength N/mm <sup>2</sup>	Elongation %	Specimen	
ARES690	35	391	716	25	No.4	217

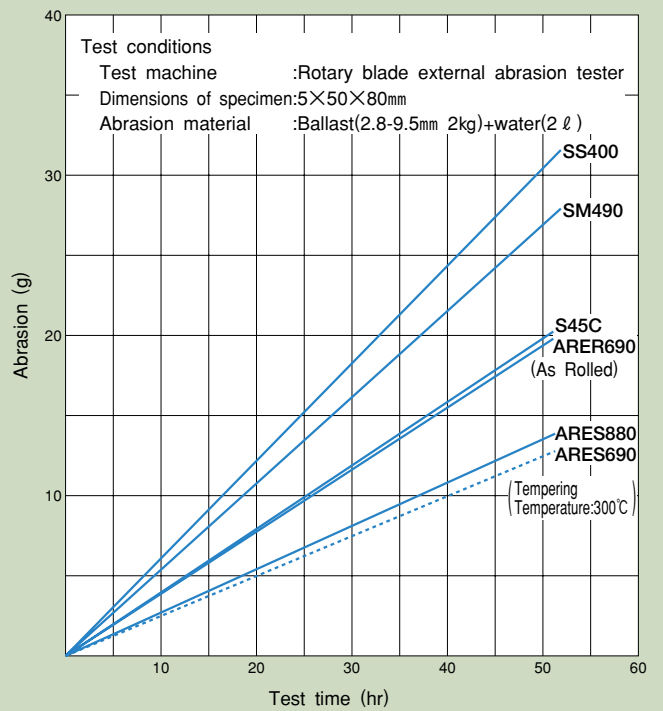
### 3 Hardenability (End Quenching Method)



# 4 Characteristics after heat treatment



# 5 Abrasion resistance



# Abrasion-Resistant Alloy Steel Plate ARES880

Application: For civil engineering works, construction, agricultural and other industrial machinery

## 1 Features

### 1 Abrasion resistance, atmospheric corrosion resistance

Special alloys of manganese, chromium, boron, etc., provide excellent abrasion resistance, and these plates also have excellent atmospheric corrosion resistance compared with normal steel plates.

### 2 Economy

This steel offers cost benefits compared with quenched and tempered type as it is as-rolled.

## 2 Characteristics

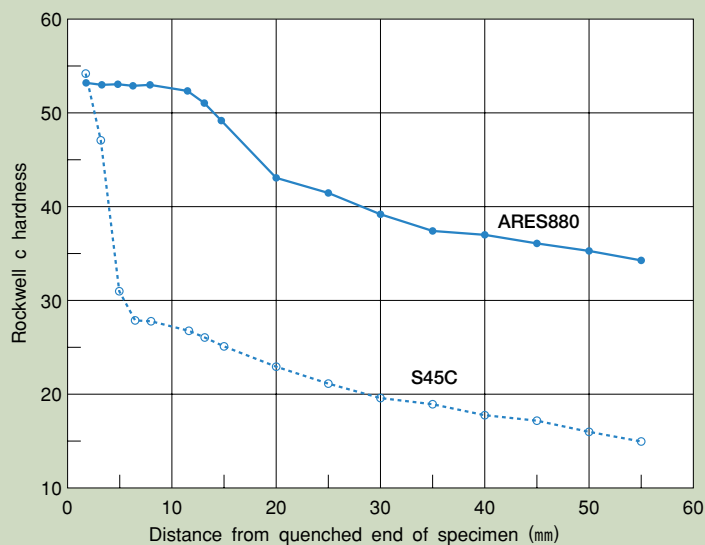
### 1 Chemical composition

Symbol of grade	Thickness mm	Chemical composition %							
		C	Si	Mn	P	S	Cu	Cr	Mo
ARES880	25	0.40	0.28	0.79	0.016	0.006	0.17	1.06	0.16

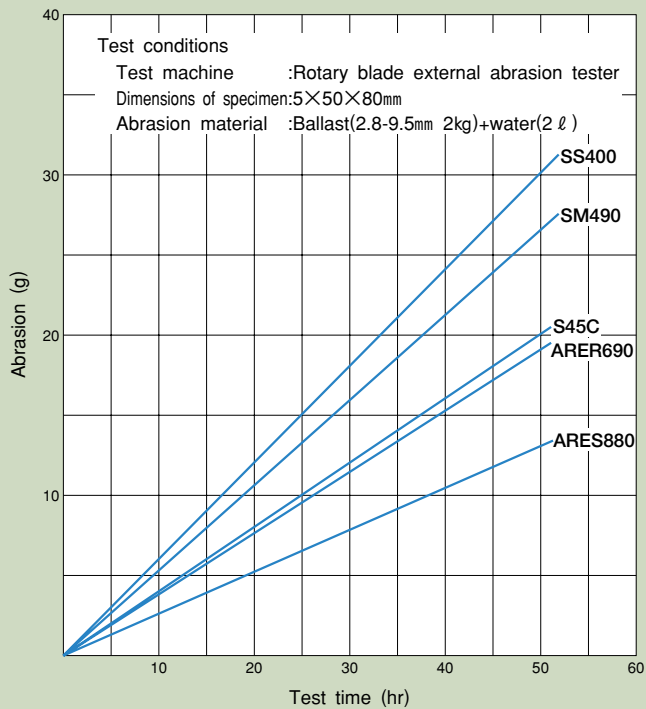
### 2 Mechanical properties

Symbol of grade	Thickness mm	Tensile test				Brinell hardness HBW
		Yield point or proof stress N/mm <sup>2</sup>	Tensile strength N/mm <sup>2</sup>	Elongation %	Specimen	
ARES880	25	—	941	17	No.5	285

### 3 Hardenability (End Quenching Method)

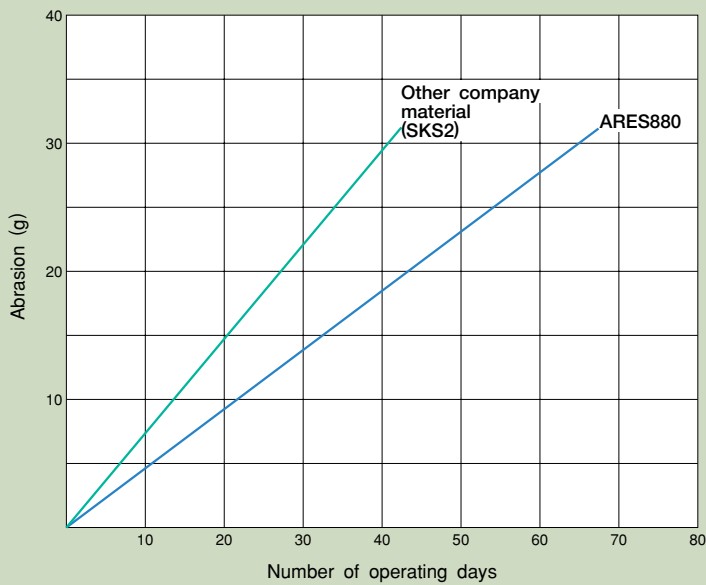


## 4 Abrasion resistance

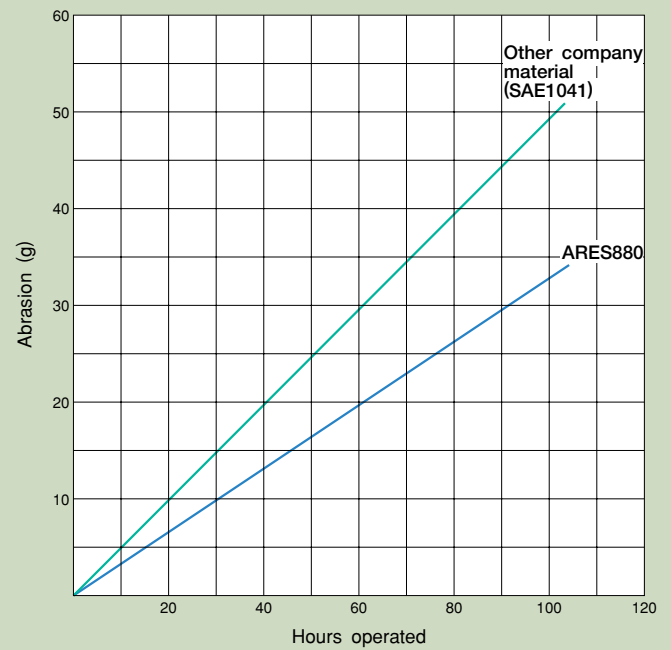


### ○Actual Application

ARES880 has been used for the knife edge of bulldozers used at the upper Tenryu River dam construction site in Nagano Prefecture. Results of abrasion resistance testing are shown in the figure below:



The abrasion resistance of ARES880 as used for the scraper bite on our dust pelletizing machine is as shown in the figure below:

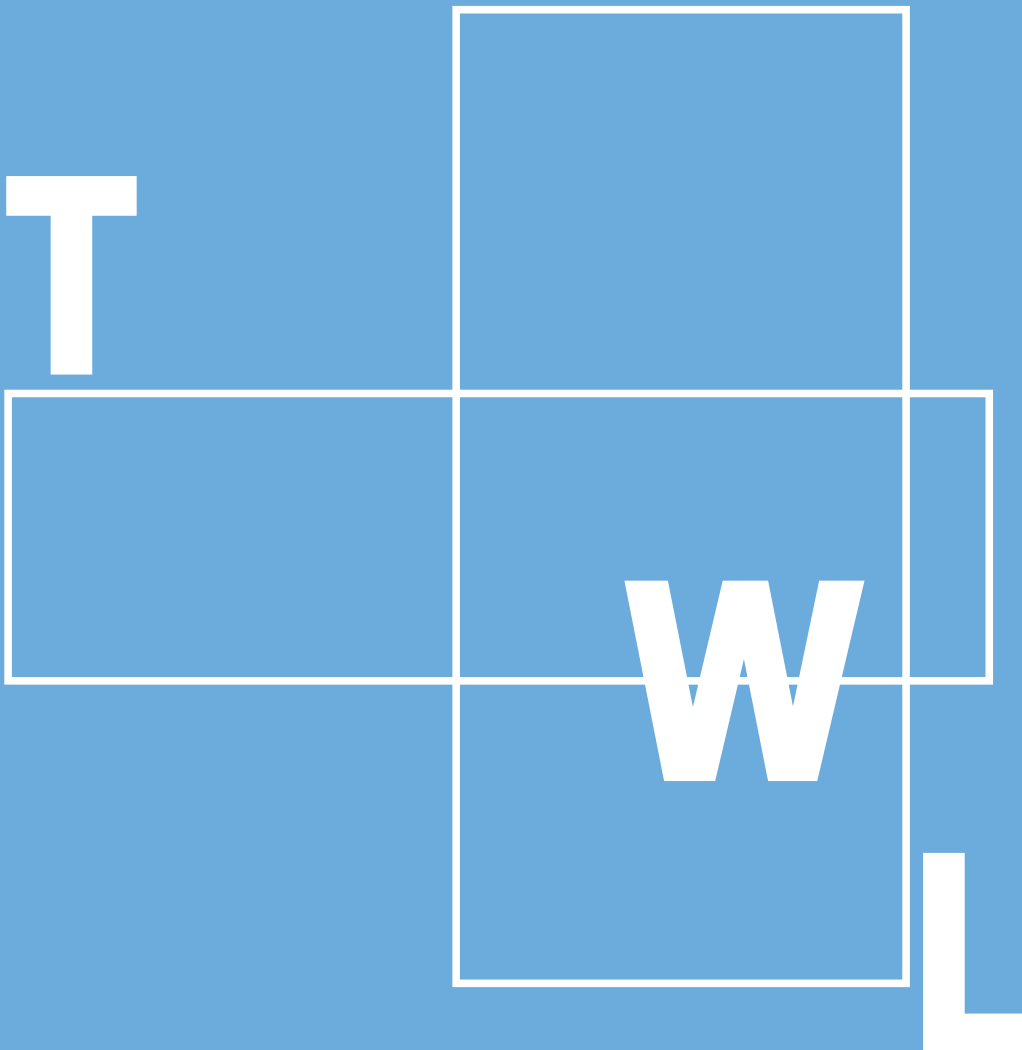






## ***Size Availability***

Standard products based on JIS or other standards and other custom products are available to meet your needs.



## Size Availability:Quick Reference Table

Width mm Thickness mm	1,219	1,300	1,400	1,524	1,600	1,700	1,829	1,900	2,000	2,100	2,134	2,200	2,300	2,438
6	6.1 7.3	6.1 7.3	6.1 7.3	6.1 8.0					12.2 13.0					
7	6.1 7.3	6.1 7.3	6.1 7.3	6.1 8.0										
8		6.1 7.3	6.1 7.3	6.1 8.0										
9		6.1 7.3	6.1 7.3											
12														
14														
16														
19														
22														
25									12.2 13.0					
28		12.2 13.0												
30														
32														
35														
36														12.2 12.4
38													12.2 12.5	9.1 11.8
40											12.2 12.9	12.2 12.3	9.1 11.7	9.1 11.0
45								12.2 12.7	9.1 12.0	9.1 12.0	9.1 11.2	9.1 10.9	9.1 10.5	9.1 9.8
50		12.2 12.6	9.1 11.7			12.2 12.8	9.1 11.8	9.1 11.3	9.1 10.8	9.1 10.8	9.1 10.1	9.1 9.8	9.1 9.3	6.1 8.8
55	9.1 12.1	9.1 11.4	9.1 10.6		12.2 12.3	9.1 11.5	9.1 10.8	9.1 10.4	9.1 9.8	9.1 9.8	9.1 9.1	6.1 8.8	6.1 8.4	6.1 8.0
60	9.1 11.0	9.1 10.4	9.1 9.7	9.1 11.8	9.1 11.2	9.1 10.6	9.1 9.9	9.1 9.2	6.1 8.8	6.1 8.4	6.1 8.3	6.1 7.9	6.1 7.6	6.1 7.3
65	9.1 10.2	9.1 9.6	6.1 8.9	9.1 11.0	9.1 10.6	9.1 9.9	9.1 9.2	6.1 8.5	6.1 8.3	6.1 7.8	6.1 7.7	6.1 7.3	6.1 7.1	6.1 6.7
70	9.1 9.4	6.1 8.9	6.1 8.3	9.1 10.3	9.1 9.8	9.1 9.2	6.1 8.5	6.1 8.0	6.1 7.7	6.1 7.2	6.1 7.2	6.1 6.8	6.1 6.6	6.1 6.2
75	6.1 8.8	6.1 8.3	6.1 7.7	9.1 9.6	9.1 9.1	6.1 8.5	6.1 8.0	6.1 7.4	6.1 7.1	6.1 6.7	6.1 6.7	6.1 6.3	6.1 6.1	5.9 5.6
80	6.1 8.2	6.1 7.7	6.1 7.2	6.1 8.9	6.1 8.5	6.1 8.0	6.1 7.4	6.1 7.1	6.1 6.7	6.1 6.7	6.1 6.3	6.1 6.1	6.1 6.0	5.7 5.4
85	6.1 7.7	6.1 7.3	6.1 6.7	6.1 8.8	6.1 8.3	6.1 7.9	6.1 7.4	6.1 6.9	6.1 6.6	6.1 6.2	5.9 5.8			
90	6.1 7.3	6.1 6.9	6.1 6.4	6.1 8.3	6.1 7.8	6.1 7.4	6.1 7.0	6.1 6.5	6.1 6.2	5.9 5.6	5.5 5.3			
95	6.1 6.9	6.1 6.5	6.1 5.7	6.1 7.3	6.1 7.0	6.1 6.5	6.1 6.1	5.9 5.6	5.6 5.3					
100	6.1 6.5	6.1 6.2	5.8 5.4	6.1 6.9	6.1 6.6	6.1 6.2	5.8 5.5							
105	6.1 6.2	5.8 5.4	5.0 4.8	6.1 6.6	6.1 6.2	5.9 5.6								
110	5.9 5.4	5.4 4.8	4.6 4.4	6.1 6.3	5.9 5.6									
115	5.6 5.2	5.2 4.8		6.1 6.3	5.9 5.6									
120	5.4 5.0	5.0 4.6		6.0 5.7	5.7 5.4									
130				5.5 5.3										
140				5.1 4.8										
150				4.8 4.6										

Remarks:Minimum and maximum thicknesses for plates are as follows:

- MUKI ..... $6 \leq t \leq 150$
- MAC.SS400.SS400-MAC ..... $6 \leq t \leq 120$
- SS400-LS ..... $9 \leq t \leq 28$
- CMW400 ..... $6 \leq t \leq 28$   
(Plate thickness $\times$ 2000 $\times$ 6096 mm is the standard size. Please consult with us in advance for other sizes.)
- SM400A ..... $6 \leq t \leq 100$
- SM400B.SM490A·B·C.SN490B ..... $6 \leq t \leq 60$
- SM400C.SN400A·B.SMA400AP·BP·CP.  
SM490YA·YB.SM520B·C.ARES400 ..... $6 \leq t \leq 50$
- SMA490AP·BP·CP ..... $9 \leq t \leq 19$

- SN400C.SN490C ..... $16 \leq t \leq 50$
- BT540 ..... $6 \leq t \leq 50$
- BT590.BT590Y.SM570 ..... $6 \leq t \leq 40$   
(Please consult with us in advance for maximum length and BT590Y, SM570 plates with plate thickness under 9 mm or over 25 mm.)
- SC ..... $6 \leq t \leq 80$   
(Standard plate width for plate thickness of over 60mm is 2000-2200mm. Please consult with us in advance for other plate widths. Please consult with us in advance for plate thicknesses of over 75mm.)
- SCM440.ARES880 ..... $12 \leq t \leq 60$
- ARES690 ..... $12 \leq t \leq 60$

### • Interpreting the table

- 1.The upper numbers in the table indicate the maximum standard length and the lower numbers indicate the maximum manufacturable length (in meters).
- 2.Please consult with us for products in the area shaded  . (Orders in the 1,214 $\times$ 2,438 size with a thickness of 60 mm or less can be ordered without consultation.) Additionally, please consult with us in advance for SMA490 with a thickness of less than 10 mm and a width of 2,000 mm or more.
- 3.Only BT and SC can be ordered for the area shaded  .
- 4.Please consult with us in advance for orders requiring unit mass of under 5t.

Specifications for Plates with Unit Mass under 5t

Width mm Thickness mm	1,219	1,300	1,400	1,524	1,600	1,700	1,829	1,900	2,000	2,134	2,200	2,300	2,438	2,500
45	9.1 9.1	9.1 10.5	9.1 9.8	6.1 9.0	6.1 8.5	6.1 8.0	6.1 7.5	6.1 7.2	6.1 6.8	6.1 6.5	6.1 6.2	5.9 5.9	5.6 5.6	5.4 5.4
50	6.1 8.2	6.1 9.5	6.1 8.8	6.1 8.1	6.1 7.7	6.1 7.2	6.1 6.7	6.1 6.5	6.1 6.1	5.8 5.8	5.6 5.6	5.3 5.3	5.0 5.0	4.9 4.9
55	6.1 7.5	6.1 8.6	6.1 8.0	6.1 7.3	6.1 7.0	6.1 6.6	6.1 6.1	5.9 5.9	5.6 5.6	5.3 5.3	5.1 5.1	4.8 4.8	4.6 4.6	4.4 4.4
60	6.1 6.8	6.1 7.9	6.1 7.3	6.1 6.7	6.1 6.4	6.0 6.0	5.6 5.6	5.4 5.4	5.1 5.1	4.9 4.9	4.6 4.6	4.4 4.4	4.2 4.2	4.1 4.1
65	6.1 6.3	6.1 7.3	6.1 6.7	6.1 6.2	5.9 5.9	5.5 5.5	5.1 5.1	5.0 5.0	4.7 4.7					
70	5.9 5.9	6.1 6.7	6.1 6.3	5.7 5.7	5.5 5.5	5.1 5.1	4.8 4.8	4.6 4.6	4.4 4.4					
75	5.5 5.5	6.1 6.3	5.8 5.8	5.4 5.4	5.1 5.1	4.8 4.8	4.5 4.5	4.3 4.3	4.1 4.1					
80	5.1 5.1	5.9 5.9	5.5 5.5	5.0 5.0	4.8 4.8	4.5 4.5	4.2 4.2	4.0 4.0	3.8 3.8					
85	4.8 4.8	5.5 5.5	5.1 5.1	4.7 4.7	4.5 4.5	4.2 4.2	3.9 3.9	3.8 3.8	3.6 3.6					
90	4.5 4.5	5.2 5.2	4.9 4.9	4.5 4.5	4.2 4.2	4.0 4.0	3.7 3.7	3.6 3.6	3.4 3.4					
95	4.3 4.3	5.0 5.0	4.6 4.6	4.2 4.2	4.0 4.0	3.8 3.8	3.5 3.5	3.4 3.4	3.2 3.2					
100	4.1 4.1	4.7 4.7	4.4 4.4	4.0 4.0	3.8 3.8	3.6 3.6	3.3 3.3	3.2 3.2	3.0 3.0					
105	3.9 3.9	4.5 4.5	4.2 4.2	3.8 3.8	3.6 3.6	3.4 3.4	3.2 3.2	3.0 3.0						
110	3.7 3.7	4.3 4.3	4.0 4.0	3.6 3.6	3.5 3.5	3.3 3.3	3.0 3.0							
115	3.5 3.5	4.1 4.1	3.8 3.8	3.5 3.5	3.3 3.3	3.1 3.1								
120	3.4 3.4	3.9 3.9	3.6 3.6	3.3 3.3	3.2 3.2									



## ***Standard Dimensions and Mass***

**mm**

**kg**



Thickness mm	Unit mass kg/m <sup>2</sup>	Width mm (ft)		914(3)			1,219(4)			1,524(5)			
		Length mm (ft)		1,829(6)	3,658(12)	5,486(18)	2,438(8)	4,877(16)	7315(24)	3,048(10)	6,096(20)	9,144(30)	12,192(40)
6	47.10			78.8	157	236	140	280	420	219	438	—	—
9	70.65			118	236	354	210	420	630	328	656	985	1,313
12	94.20			158	315	472	280	560	840	438	875	1,313	1,750
16	125.6			210	420	630	373	747	1,120	583	1,167	1,751	2,334
19	149.2			249	499	748	443	887	1,330	693	1,386	2,080	2,772
22	172.7			289	577	866	513	1,027	1,540	802	1,604	2,407	3,029
25	196.2			328	656	984	583	1,166	1,750	911	1,823	2,734	3,646
28	219.8			368	735	1,102	653	1,307	1,960	1,021	2,042	3,064	4,084
30	235.5			394	787	1,181	700	1,400	2,100	1,094	2,188	3,283	4,376
32	251.2			420	840	1,260	747	1,493	2,240	1,167	2,334	3,502	4,667
35	274.8			459	918	1,378	817	1,634	2,450	1,276	2,553	3,831	5,106
36	282.6			473	946	1,417	840	1,680	2,520	1,313	2,625	3,939	5,251
38	298.3			499	998	1,496	887	1,773	2,660	1,386	2,771	4,158	5,542
40	314.0			525	1,050	1,574	933	1,867	2,800	1,459	2,917	4,377	5,834
45	353.2			591	1,182	1,771	1,050	2,100	3,149	1,641	3,281	4,925	6,564
50	392.5			656	1,312	1,968	1,167	2,333	3,500	1,823	3,646	5,471	7,293
55	431.8			722	1,444	2,165	1,283	2,567	3,850	2,006	4,011	6,019	—
60	471.0			788	1,576	2,362	1,400	2,800	4,200	2,188	4,316	6,566	—
65	510.2			853	1,706	2,558	1,516	3,034	4,549	2,370	4,740	7,112	—
70	549.5			919	1,838	2,755	1,633	3,267	4,900	2,552	5,105	—	—
75	588.8			984	1,968	2,952	1,750	3,500	5,250	2,735	5,410	—	—
80	628.0			1,050	2,100	3,149	1,866	3,733	5,600	2,917	5,834	—	—
85	667.2			1,116	2,232	3,345	1,983	3,966	5,949	3,609	6,198	—	—
90	706.5			1,181	2,392	3,543	2,100	4,200	6,300	3,282	6,563	—	—
95	745.8			1,247	2,494	3,740	2,217	4,434	—	3,464	6,928	—	—
100	785.0			1,313	2,626	3,936	2,333	4,667	—	3,646	7,293	—	—
105	844.3			1,378	2,756	4,133	2,450	4,900	—	3,829	—	—	—
110	863.5			1,444	2,888	4,330	2,566	5,134	—	4,011	—	—	—

(kg)

1, 829 (6)			2, 000			2, 134 (7)			2, 438 (8)		
6, 096 (20)	9, 144 (30)	12, 192 (40)	6, 096 (20)	9, 144 (30)	12, 192 (40)	6, 096 (20)	9, 144 (30)	12, 192 (40)	6, 096 (20)	9, 144 (30)	12, 192 (40)
—	—	—	574	861	1, 148	—	—	—	—	—	—
788	1, 181	1, 575	861	1, 292	1, 723	919	1, 378	—	—	—	—
1, 050	1, 575	2, 101	1, 148	1, 723	2, 297	1, 226	1, 838	2, 451	1, 400	2, 100	2, 800
1, 400	2, 100	2, 801	1, 531	2, 297	3, 063	1, 634	2, 450	3, 268	1, 866	2, 800	3, 733
1, 664	2, 495	3, 327	1, 819	2, 729	3, 638	1, 941	2, 911	3, 882	2, 217	3, 326	4, 434
1, 926	2, 888	3, 851	2, 105	3, 158	4, 210	2, 247	3, 369	4, 494	2, 566	3, 849	5, 133
2, 188	3, 280	4, 315	2, 392	3, 588	4, 783	2, 553	3, 828	5, 105	2, 916	4, 373	5, 831
2, 451	3, 675	4, 902	2, 679	4, 020	5, 359	2, 860	4, 288	5, 719	3, 266	4, 899	6, 532
2, 626	3, 938	5, 252	2, 871	4, 307	5, 741	3, 064	4, 595	6, 128	3, 500	5, 249	—
2, 801	4, 200	5, 602	3, 062	4, 594	6, 124	3, 268	4, 901	6, 536	3, 733	5, 599	—
3, 064	4, 595	6, 128	3, 350	5, 026	6, 700	3, 575	5, 361	7, 150	4, 084	6, 125	—
3, 151	4, 725	6, 302	3, 445	5, 169	6, 890	3, 676	5, 514	7, 353	4, 199	6, 299	—
3, 326	4, 988	6, 652	3, 637	5, 456	7, 273	3, 881	5, 820	—	4, 433	6, 649	—
3, 501	5, 250	7, 002	3, 828	5, 743	7, 655	4, 085	6, 126	—	4, 666	—	—
3, 939	5, 907	—	4, 306	6, 460	—	4, 595	6, 891	—	5, 250	—	—
4, 376	6, 563	—	4, 785	7, 479	—	5, 106	7, 658	—	5, 833	—	—
4, 815	7, 220	—	5, 264	—	—	5, 618	—	—	6, 417	—	—
5, 252	—	—	5, 741	—	—	6, 128	—	—	—	—	—
5, 689	—	—	6, 219	—	—	—	—	—	—	—	—
6, 127	—	—	6, 698	—	—	—	—	—	—	—	—
6, 565	—	—	7, 177	—	—	—	—	—	—	—	—
7, 002	—	—	7, 655	—	—	—	—	—	—	—	—
7, 439	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—

# MEMO

[illegible]





HEAD OFFICE	5-1,Kousudohri,Nakagawa-ku,Nagoya,Japan 454-8506	TEL:+81-52-661-3811	FAX:+81-52-654-1425
STEEL WORKS	5-1,Kousudohri,Nakagawa-ku,Nagoya,Japan 454-8506	TEL:+81-52-661-3818	FAX:+81-52-661-2265
TOKYO OFFICE	13FNihonbashiPlazaBldg.,2-3-4,Nihonbashi,Chuo-ku,Tokyo,Japan 103-0027	TEL:+81-3-3270-0121	FAX:+81-3-3270-0125
OSAKA OFFICE	7FHigobashiCenterBldg.,1-9-1,Edobori,Nishi-ku,Osaka,Japan 550-0002	TEL:+81-6-6446-1176	FAX:+81-6-6446-1171