HOT ROLLED STEEL



posco



With six plants producing hot-rolled steel and one high-mill plant in Pohang and Gwangyang, POSCO manufactures 9.8 million tons hot-rolled steel products per year. Some of the hot-rolled coils produced at our hot-rolling plants are sold as finished products while others are used as intermediary materials for cold-rolled or electrical steel production, thus being reprocessed into high added value products.

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Pohang & Gwangyang Steelworks



Upon completion of its first-phase manufacturing facility in 1973, Pohang Steelworks, Korea's first integrated steel mill, was finally completed after 4 stages of construction at Young-il Bay in February 1981.

POSCO is capable of producing and processing a variety of carbon steels and stainless steels. The company's global competitiveness was further enhanced when we opened the world's first FINEX commercialization facility in May 2007.

Main products hot-rolled steel, plate, cold-rolled steel, wire rod, electrical steel, stainless steel, API steel, etc. **Crude steel production** 16.185 million tons (as of 2013)



Gwangyang Steelworks is the world's largest integrated steel mill. It features an optimal plant layout with carbon steel processing and high-mill processing capabilities, producing automotive steel, high-strength hot rolled steel, high-quality API steel, and thick plates among other products.

With the goal of specializing in the manufacturing of the world's best automotive steels, Gwangyang Steelworks focuses on enhancing its competitive edge.

Main products hot-rolled steel, plate, cold-rolled steel, car steel, API steel, etc. Crude steel production 20.231 million tons (as of 2013)

The POSCO Quality

Ultra-High Quality Products Which Touch the Customer's Soul



• Customer Inside: We create the best value for customers by keeping their needs foremost. • **Basic Inside**: We focus on fundamentals and principles, eliminating deviation and waste. • Synergy Inside: We seek to grow alongside our supplier chain through trust and communications.

wangyang

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Manufacturing Process & Equipment

In order to deliver quality products, meeting customer's requirements, POSCO is equipped iwth the latest fully-automated computer controlled cutting edge facilities and technologies. These tools guarantee products of the highest precision and quality for our customers.

use. its intended use. Our up-to-date equipment, including Work Roll Shift Mills and On-line Roll Grinders (ORG) enhance plant productivity and improve the quality of the finished coils by controlling the thickness deviation. Iron Ore Limestone LF RH ΡI Coking Coal Sinter Plant Converte Continuous Casting Machine Blast Eurnace Reheating Furnace Coke Oven SLAB Roughing Stands Inspection Continuous Finishing Stands Run-Out Table Skin Pass Mill Down Coiler Hot Rolled Coil **Reheating Furnace** Welder Steel slabs, which are produced in a continuous casting plant, are first Skin Pass Mill conditioned in a reheating furnace before transferring to the steel rolling works. In order to remove the thick scale which can form on the surface of a hot slab, Hot Rolled Coil Vertical Scale Breakers (VSB) are utilized. Uncoiler **Roughing Mill** In this process, slabs whose surface scale share been removed are made into rolled materials with the proper shape, thickness, and width. In the entry and exit area of the roughing mill, an edger rolls the strip in the width direction using an Automatic Width Hot Rolled Coil Control (AWC) system.

Finishing Mill

The purpose of finishing rolling is to adjust the thickness and width of a coil to the specified dimensions and to produce a smooth surface and shape at a desired finishing temperature appropriate appropriate FOR its intended

Run-Out Table

After the finishing mill, the strip passes to the run-out table where it is coiled. While being rolled down the table, the strip is sprayed with water to cool water to cool to the proper temperature to the proper temperature for coiling.

Skin Pass Mill Process

During the skin pass rolling process, various inspection procedures involving surface defect involving surface defect, dimension measurement, and etc., dimension measurement, etc., are conducted in order to improve the improve the shape, mechanical properties and surface profiles of the product.





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Production Facilities





AWC(Automatic Width Control) System

An AWC System, which is attached to the roll of a skin pass rolling mill, automatically adjusts the width of a coil by using the highly-sensitive hydraulic cylinder while monitoring the result width of a coil.



ASC(Automatic Shape Control) System

An ASC (Automatic Shape Control) System, which is attached at the end of a finishing mill, adjusts the flatness of a coil. After that, the ASC System automatically adjusts the pressure of the roll bender to control a strip shape.



highlysensitive hydraulic cylinder while monitoring the resultant thickness of a coil.

Main Uses

Hot-rolled steel products are divided into two groups: hot-rolled coils produced by hot strip mill and hot-rolled steel plates, which are made by cutting material from hot-rolled coils. Some of the hot-rolled coils produced at our hot-rolling plants are sold as finished products while others are used as intermediary materials for cold-rolled or electrical steel production, thus being reprocessed into high value added products. Hot-rolled steel products are widely used in many different industries due to their high strength as well as good weldability, machinability and corrosion resistance.

Steel for Structural Uses

Steel for general and welding structures are produced and are used for building iron structures and the structures of bridges, ships and cars, etc.

- SS330, 400, SM400A, B, C, SM490A, B KS
- SS330, SS400, SS490, SS540, SM400A, B, C, SM490A, B, .IIS C, SM490YA, YB, SM520B, C, SM570
- ASTM A36, A283, A570
- BS1449 PART 1 50/35HR, HS, BS4360, 40B, 43A, B, C, 50B, C BS
- DIN17100 ST22, ST33, ST37-2, ST44-2, ST52-3 DIN

Weather Resistant Steel

This type of steel with enhanced corrosion and atmospheric corrosion resistant properties through the addition of such special elements as P, Cu, and Cr is used in manufacturing containers, special automobiles and construction structures.

- POSCO PAWS50
- JIS SPA-H

Steel for automotive Structural Uses

The type of high strength steel which has extremely excellent drawability and weldability is used in automobile frames, members and wheels.

- ATOS55, 60, 80, 100 AUTOBEAM, STAB POSCO
- JIS SPA-H310, 370, 400, 440, SPFH490, 540, 590
- **ASTM** A715-40, 45, 50, 55, 60, 65, 70, 80



Carbon Steel for Pipe and Tube

This type of steel, excellent in weldability and formability, is widely used in structural pipes, general pipes, special pipes, and machine-structural carbon steel pipe.

- POSCO POSP290A, 340A, 370A, 410A, 440A, 470A, 500A, 540A
- SPHT1, 2, 3, 4, STB340, 410, STK290, 400, 490, 500, 540, .IIS STKM11A, 12B, 13A, 13B, 14B, 16A, 18A

High Carbon Steel

Under this category are carbon steel for machine structures, alloy steel, and tool steel. After going through cold-rolling and QT heat treatment processes, they are used in making a variety of machine parts.

- S10C-S55C, SK60~120, SCM415~440 JIS
- SAE SAE1010~1055
- DIN 50CRV4, 75CR1

Cold Rolled Steel

This cold rolled steel is used in many cold rolled products, such as CR, GI and color plates.

SAE1006~1055 SAF

Steel for Oil Well Pipes

This type of steel, characterized by strict high strength qualities, extremely low temperature toughness, excellent weldability and fracture resistance, is used for drilling in severely cold areas and for deep sea oil wells.

ΔΡΙ 5G-J55, K55, N80, L80

A The usage presented in this section reflects the general use and shall be used as a reference. Please be sure to consult with our associates when making orders for specific usage.

KS Korean Industrial Standards JIS Japanese Industrial Standards DIN Dentsches Institut für Normung BS British Standards ASTM American Society for Testing and Materials SAE Society of Automotive Engineers API American Petroleum Institute

Hot-Rolled Steel for Gas Cylinders

This steel, which has high strength qualities and good formability, is used in high pressure gas containers, with less than a 500l inner capacity, used for holding LPG, acetylene and other high pressure gases.

<\$teel for structural uses>

JIS SG255, 295, 325, 365 ASTM A455

POSC0 Hot Rolled Steel

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Steel for Pipelines

Because of its excellent high strength qualities, extremely low temperature toughness, hydrogen induced crack resistance and good weldability, this steel is used in pipelines.





High Carbon Steels

General Characteristics

High carbon steel is used where greater strength is required and this high strength is obtained through final heat treatment. There are two product groups: high carbon steel products with carbon content of more than 0.30wt.% or those with added alloy elements such as Mn, Cr, Mo, B, and Ni with carbon content of more than 0.15wt.%.

The final specified physical properties of high carbon steel are achieved mostly through the process of hot rolling, pickling, cold rolling and annealing. Final heat treatment is performed after the steel is processed and made into parts.

Product Types and Features

High carbon steel can be broadly categorized into high carbon steel for machine structures and high carbon steel for tools. Then, each category can be divided into general high carbon steel and alloy high carbon steel.

	Types		JIS	SAE	DN	POSCO
	General high carbon steel		S30C, S35C, S40C S45C, S50C, S55C	1030, 1035, 1040, 1045, 1050, 1055	C30, C45, C50, C55	POS20FB, POS45FB
		Ni-Cr-Mo	SNCM220	8620, 8622, 8660	20NiCrMo2, 20NiCrMoS2	-
High carbon		Cr	SCr415, 420, 430	5046	34Cr4, 34CrS4	P0S1062Cr, 1077Cr
steel for machine structures c	Alloy	Cr-Mo	SCM415, 430, 435, 440	4120, 4130, 4135, 4140	34CrMo4, 34CrMoS4	-
	high carbon	Mn	SMn443	1527, 1536, 1541, 1552	34CrMn4, 34CrMnS4	-
	steel	В	-	10B22, 15B27, 15B35	20MnB5, 30MnB5, 27MnCrB5	Autobeam, STAB, POS10B22, POSPM35P
		Others	SUP9	6150	50CrV4, 51CrV4	POS1031MA, 1047MA
High carbon steel for tools	General high carbon steel		S60C, S65C, S70C, S75C, SK65, SK75, SK85, SK95, SK105, SK120	1060, 1065, 1070, 1075, 1080, 1085, 1090, 1095	C80W1	-
	Alloy	/ high carbon steel	SKS51, SKS81	-	75Cr1	POS10A0Cr, POS10A2Cr

Chemical Composition(Wt.%)

Spec.	C	Si	Mn	NI	Gr	Мо
S45C	0.42~0.48					
S50C	0.47~0.53	0.15~0.35	0.60~0.90	-	-	-
S55C	0.52~0.58	*				
SK65	0.60~0.70					
SK85	0.80~0.90	0.10~0.35	0.10~0.50	-	-	-
SK120	1.15~1.25					
SKS51	0.75~0.85	0.35Max	0.50Max	1.30~2.00	0.20~0.50	-
SNCM220	0.17~0.23		0.60~0.90	0.40~0.70	0.40~0.60	0.15~0.25
SCr430	0.33~0.38	0.15 0.25		0.25Max	0.90~1.20	-
SCM435	0.28~0.33	0.10~0.00				0.15~0.30
SMn420	0.17~0.23		1.20~1.50	0.25Max	0.35Max	-
SAE1536	0.30~0.38		1.20~1.55		-	
SAE1541	0.36~0.45	0.15~0.30	1.30~1.65			-
SAE1080	0.74~0.88		0.60~0.90	-		
DN-51CrV4	0.47~0.55	0.25~0.50	0.80~1.10		0.90~1.20	V:0.1~0.2
DN-75Cr1	0.70~0.80	0.15~0.35	0.60~0.80		0.30~0.40	-

Main Uses

High carbon steel is used to make auto parts such as automatic and manual transmission components, seat belt parts as well as in other diverse products like chainsaw teeth, chains, needles, and farming tools.

		A	0	Ô.	S.
Clutch Diaphragm	Automission plate	Buckle	Tongue	Seat Recliner	Timing Chain
DN-50CrV4	JIS-S45C	JIS-S50C	JIS-S55C	JIS-SNCM220	SAE1070

	111/1/1		
Impact Beam	Knitting Needle	Shank	
AUTOBEAM	JIS-SK85	JIS-SCM435	



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Weather Resistant Steel

General Characteristics

Weather resistant steel features superior corrosion resistance compared to regular steel and thus suffers less rusting when exposed to the atmosphere. Resistance to moisture and oxygen in the atmosphere is greatly increased. In particular, saltwater resistant steels are excellent for use in marine environments.

Product Types and Features

Corrosion resistant steel contains alloying elements such as Cu, Cr, Ni, and P. at the surface, the steel acquires a stable crystal structure which reduces surface oxidization.

Comparison of rust layer development between weather resistant steel and regular steel



Corrosion Resistant Steel Types

Product name abbreviation	Corrosion resistance	Tensile strength	C	Si	Mn	Cu	Cr	Ni	Р	S
JIS-SPA-H	Weather resistance	≥490MPa	≤0.12	0.20~0.75	0.20~0.50	0.25~0.55	0.30~1.25	≤0.65	0.07~0.15	≤ 0.035
POSEIDON500	Saltwater resistance	≥500MPa	≤0.10	≤0.50	≤1.00	≤0.50	≤ 1.50	≤0.50	≤0.03	≤0.015
P0S1007MA	Saltwater resistance	≥520MPa	≤0.12	≤0.50	≤ 1.50	0.25~0.55	≤2.00	≤0.50	0.07~0.15	≤0.025

Surface Treatment of Weather Resistant Steel

Weather resistant steel can be used with various surface conditions such as unpainted, general painting, and rust stabilization coating.



Unpainted

Weather resistant steel can be directly exposed to and used in the atmosphere without additional surface treatment. Unpainted weather resistant steel is known for its superb corrosion resistance when exposed to the atmosphere, about fivefold greater than that of regular steel. It should be noted, though, that during the early stages of atmospheric exposure, weather resistant steel forms a coating of rust similar to that of regular steel, with possible contamination occurring when rain washes rust off the steel into the environment. In order to promote even rusting on the surface of unpainted weather resistance steel, a balanced wet and dry cycle must be repeated over a period of time. It is important that unpainted steel not face long term exposure to salt spray in coastal areas or to sulfur oxygen compounds such as sulfur dioxide.

Painted

Paint products meant for regular carbon steel can also be used on weather resistant steel to prevent rust. When regular anticorrosive paint is used on weather resistant steel, its corrosion resistance effect is nearly doubled, thanks to the metal's excellent paint adhesion properties. Weather resistant steel used in ocean shipping containers is mostly finished with regular paint products.



Rust Stabilization Coating

been treated with this particular coating.

Long-term Exposure and Corrosion Test for **Saltwater Resistant Steel**

Long-term saltwater exposure testing conducted in Pohang, Gwangyang and Shihwa over a period of two years have confirmed that saltwater resistant steel's anti-corrosion properties are greatly superior to that of regular steel.







As an alternative to regular paint, this surface treatment coating can be applied in order to form stable oxide film on the surface of weather resistant steel. Various surface treatment methods have been developed and used. As a result, more and more of weather resistant steel used in building exterior and roofing materials are treated with rust stabilization coating. A rust stabilization coating method has been developed in Korea as well. The exterior of the POSCO Museum has



Regular carbon steel



POSEIDON 500

Steel for Oil Well Pipes & Pipelines

General Characteristics

API steel pipes refer to oil well pipes and pipelines, which are used in extracting and transporting crude oil, gasoline, and, etc.

Product Types and Features

Steel Pipes for Oil Wells

It is a general term for all casing and tubing used in drilling oil or gas wells, extracting crude oil or natural gas, etc.

• Casing is a steel pipe inserted into an oil or gas well in order to prevent its wall from collapsing and to stop water or soil from infiltrating the well. • Tubing is a steel pipe inserted through the casing and extending down to the oil deposit after the oil well is established. It is used to pump crude oil up to ground level.

Pipelines

Pipelines are a series of installed pipes to transport crude oil, oil products, or natural gas from source to destination. Either toughness-oriented steel or corrosion-resistant steel is used to make such pipes depending on the environmental characteristics of their installation. · Steel for toughness is used to make pipe which resists fracture due to external impact or internal pressure, particularly at low temperature. · Steel for corrosion resistance is used to produce pipe which withstands the harsh conditions and chemicals found in oil and gas wells.



Tubing



Casing



Line pipe

How to Mark API Strength

•The number written on API steel is the minimum of yield strength required by specification. The unit used is ksi.

(1ksi=6.8923, MPa=0.70307kg/mm²)

· API strength is the value required when a pipe is formed. For special purpose API steel pipes, the required strength value is measured after

the formed pipe undergoes heat treatment processing.

API Standard system

API - 5 0 - 0	00-0	000
12	3	4

①:Usage

L	Steel pipe for pipelines	a pipe used t
СТ	Steel pipes for oil wells	a pipe used to pump o
) : Grade		
	А, В	
	X	
	H, J, K, N	

③: Minimum yield strength (unit: ksi)

④: PSL1 or PSL2

Division	PSL1	PSL2
Strength/Impact	YP, TS only minimum regulated/no guarantee	YP, TS up to maximum regulated/0℃
Components	only five primary element (C, Mn, Si, P, S) guaranteed	Cu, Ni, Cr, Mo, Nb, V, and Ti marked in M/S

API Standard types

	Usage	
Pipe for pipelines	Regular, HIC, SSCC, Cold climate	A25-1, A25-11, X42, X46, X52, X *divided into regu
Pipe for oil wells	Casing & Tubing	Group 1 : H40, J Group 2 : C75-1, Group 3 : P110 Group 4 : Q125(·

Specification per use based on TS Min standard

<u></u>	Division	For pipeline	For oil well
Product specification	Less than 40kgf/mm ² class	A25-1, 2, A	H40
	Less than 60kgf/mm ² class	B, X42~X70	J55
	Less than 70kgf/mm ² class	X80	K55, N80, C95
	70kgf/mm² class	X100	P110, Q125

to transport crude oil and natural gas to its destination

out crude oil and natural gas from the oil deposit to ground level

pipe for refining

pipe for crude oil/gas

serial number

Specification

A, B X56, X60, X65, X70, X80, X100 ular material and Level 2 material

J55, K55, N80 , C75-2, C75-3, C90-1, C90-2, L80, C95

-1, -2, -3, -4)

General Characteristics

The name refers to all steel products used for automotive structures. These are steels which have have high tensile strength, greater than 500MPa, and yield strength, greater than 300MPa. High strength is obtained by adding alloy elements or cooling to low temperature. Steel products with tensile strength greater than 1,000MPa can be manufactured.

POSCO produces ATOS 60 to 100 grade in compliance with the ATOS (AuTOmobile Structural Steel) specification.

Product Types, Components, Materials, and Material Property

Specifications	Thickness(mm)	Chemical Composition(wt.%)						
		C	Si	Mn	Р	S	Nb	
ATOS55	2.3~12.7	≤ 0.20	≤ 0.40	≤ 1.50	≤ 0.03	≤ 0.03		
ATOS60	2.3~12.7	≤ 0.20	≤ 0.40	≤ 1.50	≤ 0.03	≤ 0.03	Addad	
ATOS80	2.3~14.0	≤ 0.20	≤ 0.40	≤ 2.00	≤ 0.03	≤ 0.03	Auueu	
AT0S100	4.0~8.0	≤ 0.20	≤ 0.40	≤ 2.00	≤ 0.03	≤ 0.03		

\frown			Tensile Test				Bending Test	
Cussifisations	Weld Delet	Tensile	Elongation(%),	Thickness(mm) *F	Rolling Direction	Denting		T I D'
Specifications	(MPa)	Strength (MPa)	No.5 Test Piece, 2.5~5.0	No.5 Test Piece, 5.0~6.3	No.1 Test Piece, 6.3~12.7	Angle	Inner Radius	(JIS No.3)
ATOS55	≥ 540	≥ 340	≥ 20	≥ 21	≥ 14	180°	1.5t	Perpendicular to Rolling Direction
ATOS60	≥ 590	≥ 420	≥ 19	≥ 20	≥ 13	180°	1.5t	Perpendicular to Rolling Direction
ATOS80	≥ 780	≥ 700	≥ 14	≥ 14	≥ 9	180°	1.5t	Perpendicular to Rolling Direction
AT0S100	≥ 980	≥ 880	≥ 8 (N	No. 5 test piece a	pplied)	90°	3.0t	Perpendicular to Rolling Direction

Remarks) 1. The number inside parentheses is for reference only.

2. Appearance, form, dimension, weight and permissible tolerances comply with JIS G 3134.

3. Number of tensile test pieces and bending test pieces for ATOS 60 & 80: throughout the same type and thickness of steel, one piece per class. If the weight exceeds 50 tons, two pieces per class.

4. Number of tensile, impact and bending test pieces for ATOS 100: use one sample per slab unit for tensile test; use one piece per class for impact test throughout the same type and thickness of steel; use one piece per class for bending test throughout the same type and thickness of steel, but in excess of 50 tons, use two pieces per class.

5. A bending test piece is perpendicular to JIS unit 3 rolling direction.

ATOS80

· It has high strength and excellent cold forming ability, used in making boom and arms, truck and trailer frames.

ATOS100

· It has hardness equal to that of wear resistant steel of 300HBW class.

· If the steel is heated higher than 300°C, its strength could be reduced.

· It is suitable to make boom and arms in specialty vehicles due to its high strength and excellent impact resistance at low temperature.

Weight Savings due to High Strength Steel

- · It is calculated as resistance against bending displacement: high strength steel thickness = regular steel thickness X (YS regular steel / YS high strength steel)^{0.5}
- · Reinforcement design is also needed for buckling (related to dimension, occurring in elastic region)



Adequate Welding Material Suggestion

Specifi- cations	Yield strength tensile strength (MPa)	Bending ratio (R/t)	Ceq	Heat treatment	Heat input (butt joint)		Welding material								
170000	YS ≥ 390		0.05		Solid-wire		AWS A5.28-05-ER80SG (Ex. KISWEL ZO-60)								
A10560	TS ≥ 590	-	0.35	Pre-heating, Post-heating	-	Flux-cored	AWS A5.29-07-E81T1-Ni1 (Ex. KISWEL K81-T)								
470000	YS ≥ 700		0.40			Solid-wire	AWS A5.28-05-ER120SG (Ex. KISWEL ZH-120)								
A10580	TS ≥ 780	-	0.40	usually not required	0.3~1.0 kJ/mm heat input	Flux-cored	AWS A5.29-07-E121T1-G (Ex. KISWEL K120TG)								
4105100	YS ≥ 880	3.0	3.0 0.47										amount test (in progress)	Solid-wire	AWS A5.28-05-ER130SG (Ex. ESAB Spoolarc 140)
ATOS100	TS ≥ 980	3.0				Flux-cored	AWS A5.29-07-E130T1-G (Ex. KISWEL Z0-60)								

· Regarding elastic deflection, reinforcement design is necessary with thickness reduction (proportional to 'elasticity displacement E X thickness3').

			(Unit : mm, MPa)
ATO	S60	ATO	S80
Thickness of original material	Thickness when ATOS 100 used	Thickness of original material	Thickness when ATOS 100 used
14	9.2	14	12.3
12	7.9	12	10.6
10	6.6	10	8.8
9	5.9	9	7.9
8	5.3	8	7.1
7	4.6	7	6.2
6	3.9	6	5.3
5	3.3	5	4.4
4	2.6	4	3.5
3	2.0	3	2.6
(YS 390)	(YS 880)	(YS 700)	(YS 880)
lightening po	otential 34%	lightening po	otential 34%

Hot Rolled Steel Sheets & Strips for Deep Drawing

: These specifications are applied to the hot-rolled steel strips for cold-rolled deep drawing that are manufactured by POSCO.

Specifications	Thickness	Chemical Composition(wt.%)									
Specifications	(mm)	C	Si	Mn	Р	S	Sol-Al	Others			
POSHRD2	1.8~7.0	≤ 0.03	≤ 0.03	≤ 0.25	≤ 0.02	≤ 0.02	≤ 0.06	-			
POSHRD25	2.0~7.0	≤ 0.005	≤ 0.03	≤ 0.20	≤ 0.02	≤ 0.02	≤ 0.06	Ti 0.005~0.05 Nb 0.005~0.04			
POSHRD3	2.0~7.0	≤ 0.005	≤ 0.03	≤ 0.20	≤ 0.02	≤ 0.02	≤ 0.06	Ti 0.01~0.06			

Notes) 1. External appearance, shape, dimension, weight and thickness tolerance with SAE. 2. This specification guarantees chemical composition without mechanical properties.

Acid Sulfuric Corrosion Resistance and Weather Resistance High Strength Steel Sheets & Strips

: These specifications are applied to the acid sulfuric corrosion resistance and weather resistance hot-rolled high-strength steel sheets and strips that are manufactured by POSCO.

Creations	Thickness	Chemical Composition(wt.%)								
Specifications	(mm)	C	Si	Mn	Р	S	Others			
ANCOR-H (Acid Sulfuric Corrosion Resistant Steel)	1.8~7.0	≤ 0.10	≤ 0.50	≤ 0.80	≤ 0.035	≤ 0.035	Cu ≤ 0.50 Cr ≤ 0.50			
HICON700W (Weather Resistant High Strength Steel)	2.3~6.5	≤ 0.12	≤ 0.45	≤ 2.50	≤ 0.035	≤ 0.01	Cu ≤ 0.55 Cr ≤ 1.20			

Notes) 1. External appearance, shape, dimension, weight and thickness tolerance with SAE. 2. This specification guarantees chemical composition without mechanical properties.

Hot Rolled Steel Sheets & Strips for Automotive structural

: These specifications are applied to the hot rolled steel sheets and strips for automotive structures that are manufactured by POSCO.

Creations	Thickness			Chemical Com	position(wt.%)		
Specifications	(mm)	C	Si	Mn	Р	S	Nb
ATOS55	2.3~12.7	≤ 0.20	≤ 0.40	≤ 1.50	≤ 0.03	≤ 0.03	
ATOS60	2.3~12.7	≤ 0.20	≤ 0.40	≤ 1.50	≤ 0.03	≤ 0.03	Addad
ATOS80	2.3~14	≤ 0.20	≤ 0.40	≤ 2.00	≤ 0.03	≤ 0.03	Auueu
AT0S100	4~8.0	≤ 0.20	≤ 0.40	≤ 2.00	≤ 0.03	≤ 0.03	

Notes) 1. External appearance, shape, dimension, weight and thickness tolerance with JIS G 3193(ANCOR-H), JIS G 3134(HICON700W).

2. Number of tension test pieces and bend test pieces: one pieces each of the same charge and same thickness. However, in excess of 50 ton, two pieces of each. 3. Bending test piece JIS No.3, perpendicular to rolling direction.

4. Number of tensile, impact and bending test pieces for ATOS 100: use one sample per slab unit for tensile test; use one piece per class for impact test throughout the same charge. and thickness of steel; use one piece per class for bending test throughout the same charge and thickness of steel, but in excess of 50 tons, use two pieces per class.

Hot Rolled Steel Sheets & Strips for the Impact Beams and Stabilizers of Automobiles

: These specifications are applied to the hot rolled steels strips for the impact beams and stabilizers of automobiles that are manufactured by POSCO.

Creations	Thickness	Chemical Composition(wt.%)									
Specifications	(mm)	C	Si	Mn	Р	S	Sol-Al	Cr	В		
AUTOBEAM	1.6~7.0	≤ 0.30	-	≤ 1.50	-	≤ 0.005	≤ 0.12	0.10~0.30	-		
STAB	1.6~7.0	≤ 0.30	≤ 0.25	≤ 1.00	≤ 0.025	≤ 0.015	≤ 0.10	0.20~0.40	0.001~0.005		

Notes) 1. External appearance, shape, dimension, weight and thickness tolerance with KS D 3555(AUTOBEAM), JIS G3193 (STAB). 2. Number of tension test pieces and bend test pieces: one pieces each of the same charge and same thickness. However, in excess of 50 ton, two pieces of each.

3. Bending test piece: JIS No.3 rolling direction.

Creations	Yield Point	Tensile Strength Elongation			Bending Test		
Specifications	(MPa)	(MPa)	Test Piece	%	Bending Angle	Inner Dia.	Test Piece/Direction
ANCOR-H	≥ 245	≥ 400	No.5 Rolling Direction	≥ 25	180°	1.5t	JIS No1. Transverse to Rolling Direction
HICON700W	≥ 700	750~950	No.5 Rolling Direction	≥ 12	90°	1.0t	JIS No5. Transverse to Rolling Direction

(Tensile Test			Bending Test			
6	acifications		Tensile	Elongation(%),	Thickness(mm) *F	Rolling Direction	Doudina		Tables	
-Sh	ecifications	Yield Point (MPa)	Strength (MPa)	No.5 Test Piece, 2.5~5.0	No.5 Test Piece, 5.0~6.3	No.1 Test Piece, 6.3~12.7	Angle	Inner Dia.	Test Piece (JIS No.3)	
	ATOS55	≥ 540	≥ 340	≥ 20	≥ 21	≥ 14	180°	1.5t	Transverse to Rolling Direction	
	ATOS60	≥ 590	≥ 420	≥ 19	≥ 20	≥ 13	180°	1.5t	Transverse to Rolling Direction	
	ATOS80	≥ 780	≥ 700	≥ 14	≥ 14	≥ 9	180°	1.5t	Transverse to Rolling Direction	
	AT0S100	≥ 980	≥ 880	≥ 8 (N	No. 5 test piece a	oplied)	90°	3.0t	Transverse to Rolling Direction	

Specifications	Viold Doint/MDo)	Bendir	ıg Test	Bemark		
Specifications		Bending Angle	Inner Dia.	Reillark		
AUTOBEAM	490~784	180°	1.5t	Steel pass through proper heat treatment to come		
STAB	-	180°	1.5t	out as finished products		

🖄 The product standards are subject to change. Please be sure to confirm the recent standards when making orders or to consult our associates.

Available Dimensions

Hot Rolled Steel Coil TS 300MPa Class



Hot Rolled Steel Coil TS 400MPa Class



Hot Rolled Steel Coil TS 500MPa Class



Hot Rolled Steel Coil TS 600MPa Class



 $\underline{\wedge}$ The available sizes are subject to change. Please consult with the POSCO contact person before ordering.

(Unit : mm)

3.	.0	4.	5	6	.0	8	2	15	0.0	22	2.0	24	.0
							_						
 											-		

Available Dimensions

Hot Rolled Steel Coil TS 800MPa Class



P/O Coil Thickness Width 1.0 1.2 1.4 1.6 1.8 2.0 2.3 600 700 800 900 1,000 1,100 1,200 1,300 1,400 1,500 1,600

Checkered Coil TS 300MPa Class



 \triangle The available sizes are subject to change. Please consult with the POSCO contact person before ordering.



POSCO Hot Rolled Steel 25

Packing & Marking



Conversion Factors

Weight

Classification	kilogram	Ounce	Pound	Short Ton (2,000lbs)	Long Ton (2,240lbs)	Metric Ton (1,000kg)
	kg	0Z	lb	st	lt	t
kilogram(kg)	2	35.2740	2.20462	1.001102	0.09842	0.001
Ounce(oz)	0.02835	1	0.06250	0.03125	0.02790	0.00002835
Pound(lb)	0.45359	16	1	0.00050	0.04464	0.00045
Short Ton(st)	907.185	32,000	2,000	1	0.89286	0.90719
Long Ton(It)	1,106.05	35,840	2,240	1.12	1	1.01605
Metric Ton(t)	1,000	35,274	2,204.62	1.10231	0.98421	1

Leaner Measure

Classification	Millimeter mm	Centimeter cm	centimeter Meter Inch Foot cm m In. ft		Yard yd	Mile ml	
Millimeter(mm)	1	0.1	0.001	0.03937	0.0032808	0.0010936	0.0 ₆ 6214
Centimeter(cm)	Centimeter(cm) 10		0.01	0.3937	0.032808	0.010936	0.0 ₆ 6214
Meter(m)	1,000	100	1	39.37	3.28083	1.0936	0.0 ₆ 6214
Inch(in.)	25.40	2.540	0.0254	1	0.0833	0.02778	0.0 ₆ 6214
Foot(ft)	304.8	30.48	0.3048	12	1	0.3333	0.0 ₆ 6214
Yard(yd)	914.4	91.44	0.9144	36	3	1	0.0 ₆ 6214
Mile(ml)	1,609,347.0	160,934.70	1,609.35	63,360	5,280	1,760	1

Force

Classification	kgf	lbf	N
kgf	1	2.205	9.807
lbf	4.536×10 ⁻⁴	1	4.448
N	1.020×10 ⁻¹	2.248×10 ⁻¹	1

Force Per Unit Area

Classification	kgf	lbf	N
kgf/mm ²	1	1.422×10 ³	9.807
lbf/ln²(psi)	7.031×10 ⁻⁴	1	6.895×10 ⁻³
N/mm², Mpa	1.020×10 ⁻¹	1.450×10 ²	1

Energy

Classification	kgf-m	lbf-lb	J, N-m	cal
kgf-m	1	7.233	9.807	2.343
lbf-lb	1.383×10 ⁻¹	1	1.356	3.239×10 ⁻¹
J, N-m	1.020×10 ⁻¹	7.376×10 ⁻¹	1	2.389×10 ⁻¹
cal	6.268×10 ⁻¹	3.087	4.186	1

POSCO Hot Rolled Steel 26

 $\,$ $\!$ Marking labels are attached when requested by customers.

Appendix

Appendix

	Brinell	Roci	kwell	Shore	Tensile		Brinell	Roci	well	Shore	Tensile
Vickers Hardness No.	Diameter of Ball 10mm Load 3,000kg	B Scale Load 100kg	C Scale Load 100kg	ЦС	Strenght Approxi mate value	Vickers Hardness No.	Diameter of Ball 10mm Load 3,000kg	B Scale Load 100kg	C Scale Load 100kg	ЦС	Strenght Approxi mate value
0.40	пь	IIIID		07	Kyi/iiiii	100	007	IIND	10.7	113	Kgi/iiiii
940	-	-	68.0	97	-	420	397	-	42.7	57	140
920	-	-	67.5	96	-	410	388	-	41.8	-	136
900	-	-	67.0	95	-	400	379	-	40.8	55	131
880	-	-	66.4	93	-	390	369	-	39.8	-	127
860	-	-	65.9	92	-	380	360	(110.0)	38.8	52	123
840	-	-	65.3	91	-	370	350	-	37.7	-	120
820	-	-	64.7	90	-	360	341	(109.0)	36.6	50	115
800	-	-	64.0	88	-	350	331	-	35.5	-	112
780	-	-	63.3	87	-	340	322	(108.0)	34.4	47	109
760	-	-	62.5	86	-	330	313	-	33.3	-	105
740	-	-	61.8	84	-	320	303	(107.0)	32.2	45	103
720	-	-	61.0	83	-	310	294	-	31.0	-	100
700	-	-	60.1	81	-	300	284	(105.5)	29.8	42	97
690	-	-	59.7	-	-	295	280	-	29.2	-	96
680	-	-	59.2	80	-	290	275	(104.5)	28.5	41	94
670	-	-	58.8	-	-	285	270	-	27.8	-	92
660	-	-	58.3	79	-	280	265	(103.5)	27.1	40	91
650	-	-	57.8	-	-	275	261	-	26.4	-	89
640	-	-	57.3	77	-	270	256	(102.0)	25.6	38	87
630	-	-	56.8	-	-	265	252	-	24.8	-	86
620	-	-	56.3	75	-	260	247	(101.0)	24.0	37	84
610	-	-	55.7	-	-	255	243	-	23.1	-	82
600	-	-	55.2	74	-	250	238	99.5	22.2	36	81
590	-	-	54.7	-	210	245	233	-	21.3	-	79
580	-	-	54.1	72	206	240	228	98.1	20.3	34	78
570	-	-	53.6	-	202	230	219	96.7	(18.0)	33	75
560	-	-	53.0	71	199	220	209	95.0	(15.7)	32	71
550	505	-	52.3	-	195	210	200	93.1	(13.4)	30	68
540	496	-	51.7	69	190	200	190	91.5	(11.0)	29	65
530	488	-	51.1	-	186	190	181	89.5	(8.5)	28	62
520	480	-	50.5	67	183	180	171	87.1	(6.0)	26	59
510	473	-	49.8	-	179	170	162	85.0	(3.0)	25	56
500	465	-	49.1	66	174	160	152	81.7	(0.0)	24	53
490	456	-	48.4	-	169	150	143	78.7	-	22	50
480	448	-	47.7	64	165	140	133	75.0	-	21	46
470	441	-	46.9	-	160	130	124	71.2	-	20	44
460	433	-	46.1	62	156	120	114	66.7	-	-	40
450	425	-	45.3	-	153	110	105	62.3	-	-	-
440	415	-	44.5	59	149	100	95	56.2	-	-	-
430	405	-	43.6	-	144	95	90	52.0	-	-	-
						90	86	48.0	-	-	-
						85	81	41.0	-	-	-

Conversion Factors

Weight

The weight tables on the following pages show calculated weights of steel products, which thickness, width and length are specified by inch and feet. Calculation is done on the basis of the basic weights show below. Calculation methods for area, weight per unit area are in accordance with KS D3500.

Classification	kgf/mm²	lbf/in²(psi)	N/mm², MPa
Basic weight as specified by standards specification kg/in, ft ²	7.85kg/mm, m ² 18.524	0.2833 1bs/in, m ² 18.505	40.8 1bs/in, ft ² 18.507

Weight Table

Width	1,000	762							914							1,219					
Length Thickness	1,000	1,524	1,829	2,134	2,438	2,743	3,048	1,829	2,134	2,438	2,743	3,048	3,658	1,829	2,134	2,438	2,743	3,048			
1.2	9.24	10.9	13.1	15.3	17.5	19.7	21.9	15.7	18.4	21.0	23.6	26.2	31.5	21.0	24.5	28.0	31.5	35.0			
1.4	10.99	12.8	15.3	17.9	20.4	23.0	25.5	18.4	21.4	24.5	27.6	30.6	36.7	24.5	28.6	32.7	36.7	40.6			
1.6	12.56	14.6	17.5	20.4	23.3	26.3	29.6	21.0	24.5	28.0	31.5	35.0	42.0	28.0	32.7	37.3	42.0	46.7			
1.8	14.13	16.4	19.7	23.0	26.3	29.6	32.8	23.6	27.6	31.5	35.4	39.4	47.2	31.5	36.8	42.0	27.2	52.5			
2.0	15.70	18.2	21.9	25.5	29.2	32.9	36.5	26.2	30.6	35.0	39.4	43.7	52.5	35.0	40.8	46.7	52.5	58.3			
2.3	18.06	21.0	25.2	29.4	33.6	37.8	41.9	30.2	35.2	40.2	45.3	50.3	60.4	40.3	47.0	53.7	60.4	67.1			
2.6	20.41	23.7	28.4	33.2	37.9	42.7	47.4	34.1	39.8	45.5	51.2	56.9	68.2	45.5	53.1	60.7	68.2	75.8			
2.9	22.76	26.4	31.7	37.0	42.3	47.7	52.9	38.0	44.4	50.7	57.1	63.4	76.1	50.7	59.2	67.6	76.1	84.6			
3.0	23.55	27.3	32.8	38.3	43.8	49.3	54.7	39.4	45.9	52.5	59.0	65.6	78.7	52.5	61.3	70.0	78.7	87.5			
3.2	25.12	29.2	35.0	40.8	46.7	52.7	58.3	41.8	49.0	56.0	63.0	70.0	84.0	56.0	65.3	74.7	84.0	93.3			
4.5	35.32	41.0	49.2	57.4	65.6	74.0	82.0	59.0	68.9	78.7	88.3	98.1	118	78.7	91.9	105	118	131			
5.0	39.25	45.6	54.7	63.8	72.9	82.2	91.2	65.6	76.7	87.5	98.4	109	131	87.5	102	117	131	146			
6.0	47.10	54.7	65.6	76.6	87.5	98.6	109	78.7	91.9	105	118	131	157	105	123	140	157	175			
7.0	54.95	63.8	76.6	89.4	102	115	128	91.9	107	122	138	153	184	123	143	163	184	204			
8.0	62.80	73.0	87.5	102	117	132	146	105	122	140	157	174	210	140	163	187	210	233			
9.0	70.65	82.0	98.5	115	131	148	165	118	138	157	177	197	236	158	184	210	236	263			
10.0	78.50	91.2	109	128	146	164	182	131	153	175	197	219	262	175	204	233	262	292			
11.0	86.35	100	120	140	160	181	201	144	168	192	216	241	289	193	225	257	289	321			
12.0	94.20	109	131	153	175	197	219	157	184	210	236	262	315	210	245	280	315	350			

POSCO Hot Rolled Steel 29

Appendix

Width-Weight Curves for Coils (Coil ID=30Inch)



						4									4 000				(Unit : mm)
1,2	219				1,524														
3,658	4,877	1,829	2,134	2,438	2,743	3,048	3,658	6,096	9,144	12,192	1,829	2,134	2,438	2,743	3,048	3,658	6,096	9,114	12,192
42.0	56.0	26.3	30.6	35.0	39.4	43.8	52.5	87.5	131	175	31.5	36.8	42.0	47.3	52.5	63.0	105	158	210
49.0	65.3	30.6	35.7	40.8	45.9	51.1	61.3	102	153	204	36.8	42.9	49.0	55.1	61.3	73.5	123	184	245
56.0	74.7	35.0	40.8	46.7	52.5	59.3	70.0	117	175	233	42.0	49.0	56.0	63.0	70.0	84.0	140	210	280
63.0	84.0	39.4	46.0	52.5	59.1	65.6	78.8	131	197	263	47.3	55.2	63.0	70.9	78.8	94.5	158	236	315
70.0	93.3	43.8	51.1	58.3	65.6	72.9	87.5	146	219	292	52.5	61.3	70.0	78.8	87.5	105	175	263	350
80.5	107	50.3	58.7	67.1	75.5	80.0	101	168	252	336	60.4	70.5	80.5	90.6	101	121	201	302	403
91.0	121	56.9	66.4	75.8	85.3	94.8	114	190	284	379	68.3	79.7	91.0	102	114	137	228	341	455
101	135	63.4	74.0	84.7	95.1	106	127	211	317	423	76.1	88.8	101	114	127	152	254	381	508
105	140	65.6	76.6	87.5	98.4	109	131	219	328	438	78.8	91.9	105	118	131	158	263	394	525
112	149	70.0	81.7	93.3	105	117	140	233	350	467	84.0	98.0	112	126	140	168	280	420	560
157	210	98.5	115	131	148	164	197	328	492	656	118	138	157	177	197	236	394	591	788
175	233	109	128	146	164	182	219	365	547	729	131	153	175	197	219	263	438	656	875
210	280	131	153	175	197	219	263	438	656	875	141	184	210	236	263	315	525	788	1,050
245	327	153	179	204	230	255	306	511	766	1,021	184	214	245	276	306	368	613	919	1,225
280	373	175	204	233	263	292	350	583	875	1,167	210	245	280	315	350	420	700	1,050	1,400
315	420	197	230	263	295	328	394	656	985	1,313	236	276	315	354	394	473	788	1,182	1,575
350	467	219	255	292	328	365	438	729	1,094	1,459	263	306	350	394	438	525	875	1,313	1,750
385	513	241	281	321	361	401	481	802	1,203	1,604	289	337	385	433	481	578	963	1,444	1,926
420	560	263	306	350	394	438	525	875	1,313	1,750	315	368	420	473	525	630	1,050	1,575	2,101

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