

Company General Information

Company Name : PT Krakatau Steel (Persero) Tbk.
Date of Establishment : August 31st, 1970
Listed in Stock Exchange : Bursa Efek Indonesia (BEI)/ Indonesia Stock Exchange
Exchange Listed Date : November 10, 2010
Share Code : KRAS

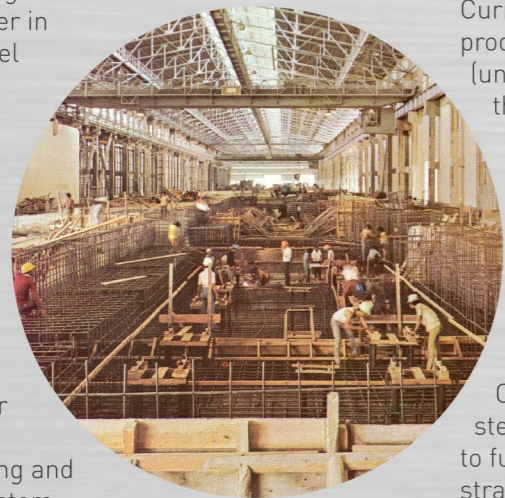
Ownership Republic of Indonesia 80%
Public 20%

Authorized Capital Rp 20.000.000.000.000,-
(Twenty Trillion Rupiahs)

Issued and Paid Up Capital Rp 7.887.500.000.000,-
(Seven Trillion Eight Hundreds Eighty Seven Billion Five Hundreds Million Rupiahs)

Brief Overview of Krakatau Steel

First established as the Trikora Iron Steel Project by President Soekarno, PT Krakatau Steel which constructed at 1970 has grown to be the largest steel producer in Indonesia. Krakatau Steel has demonstrated rapid growth, and in less than ten years, the Company has added various production facilities, such as the Sponge Iron Plant, Steel Billet Plant, and Wire Rod Plant, as well as infrastructure facilities, such as electricity power and a water treatment plant, the Port of Cigading and a telecommunication system. These developments led PT Krakatau Steel (Persero) to become an integrated steel company in Indonesia which has complete infrastructure facilities. As a result of its technical expertise, PT Krakatau Steel (Persero) became the first steel company in Indonesia to be awarded the ISO 9001 and ISO 14001. Previously, the Company had produced spiral pipes for the first time in 1973 with the ASTM A252 and AWWA C200 specifications, and obtained the API 5L certification in 1977 and the BC 1 certification since 2009.

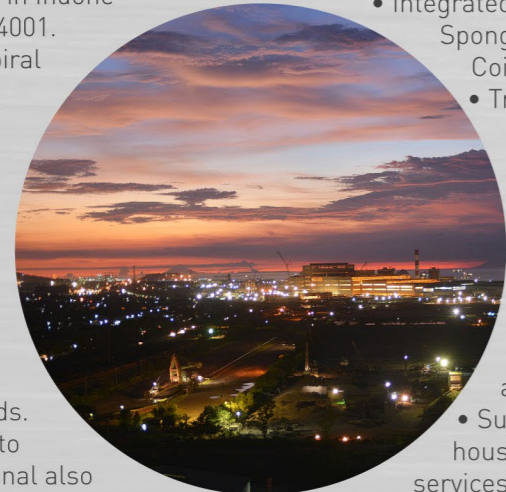


10, 2010, amidst volatile market conditions, PT Krakatau Steel (Persero) succeeded in becoming a public company through its Initial Public Offering (IPO) and listed its stock on the Indonesia Stock Exchange.

Currently, PT Krakatau Steel (Persero) Tbk. has a steel production capacity of 3.15 million tonnes per year (unaudited), producing HRC, CRC and Wire Rods and through subsidiaries, the Company also manufactures steel products for specialized industries and produces steel products such as Spiral Pipes, Electrical Resistance Welding Pipes, Reinforcing Bars, and Section Steel. This rolling capacity will be increased to reach 4.65 million tonnes by 2017 by adding HRC capacity by 1.5 million tonnes. The Company markets its products not just domestically, but also internationally. The Company's expertise to produce such specialized steel, including steel for the defense industry, serves to further strengthen its position as one of the nation's strategic industries.

Scope of Work

- Integrated steel industry, which produces Sponge Iron, Slab, Billets, Hot Rolled Coil, Cold Rolled Coil and Wire Rod.
- Trading activities, comprising sales, distribution and agency work, both domestic and international markets.
- Services, such as designing, engineering and construction, machine maintenance, technical consultancy and provision of infrastructure to support the activities of the Company.
- Supporting activities such as warehousing, workshop, property, port services, education and training, waste and industrial product, power plant, water treatment and information technology services.



In 1993, the Company was awarded the ISO 9001 certification which was also followed by the ISO 9000 certificate because of its solid commitment to maintaining international quality standards. These certifications have been upgraded to the ISO 9001:2000 in 2003. SGS International also awarded another ISO certification highlighting the Company's commitment for environmental awareness and work safety, the ISO 14001, in 1997. On November



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Plant

Cilegon-Cigading Plant Site,
Banten 42435, Indonesia

STEEL AS NATIONAL POWER



HOT ROLLED COIL/PLATE

HRC/P	
DIMENSION	
Thickness	: 1.6 – 25.0mm
Width	: 600 – 2000mm
Coil ID	: 760mm
Coil OD	: 2000mm (Max.)
Coil Weight	: 30MT (Max.)
PRODUCT APPLICATION	
Oil & Gas Pipes Boiler & Pressure Vessels Gas Cylinders/LPG Bottle General & Welded Structures Ship Plate & Buildings General Pipe & Tubes Automotive Parts & Frames Weathering Cor. Resistant Steel Containers Heavy Duty Vehicle	



HOT STRIP MILL

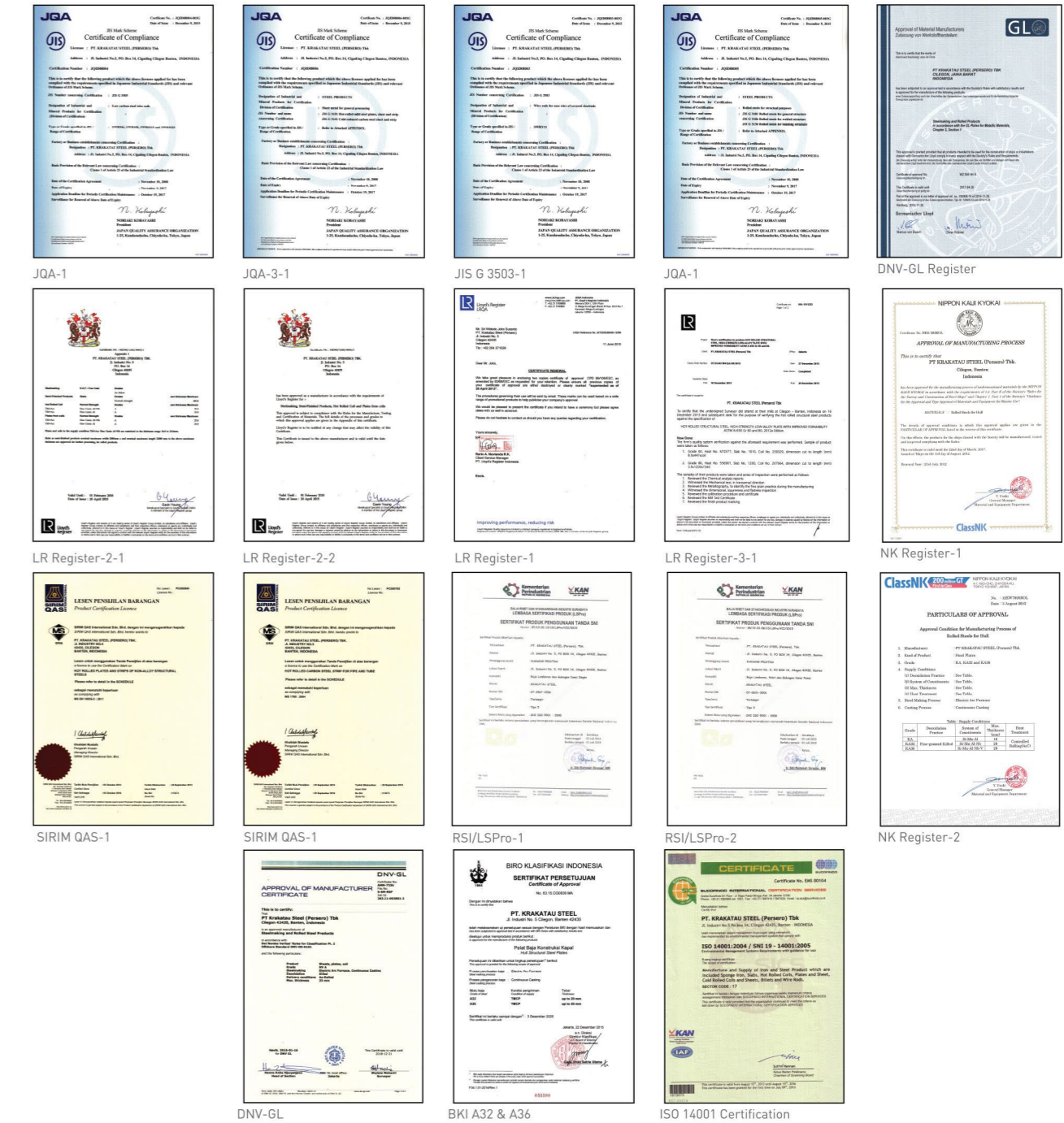
Hot Strip Mill applying German SMS technology.

At present it has 2.400.000 tonnes production capacity and will be increased up to 3.500.000 tonnes per year with the configuration of its production facilities consist of:

- 2 units Reheating Furnace
- Sizing Press
- 1 unit Roughing Stand
- 6 units Finishing Stand
- 2 units Down Coiler

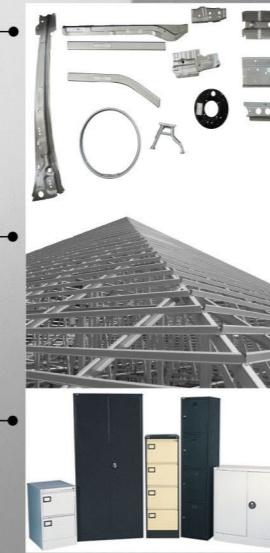


CERTIFICATIONS



COLD ROLLED COIL/SHEET

CRC/S	
DIMENSION	
Thickness	: 0.2-3.0mm
Width	: 762-1250mm
Coil ID	: 508mm
Coil OD	: 2000mm (Max.)
Coil Weight	: 20MT (Max.)
PRODUCT APPLICATION	
General Purposes Galvanized & Galvalum Sheet Pipe & Tubes Automotive Body & Parts Tin Mill Black Plates Enameled Wares Steel Frame Housing Home and Office Appliances Drum	

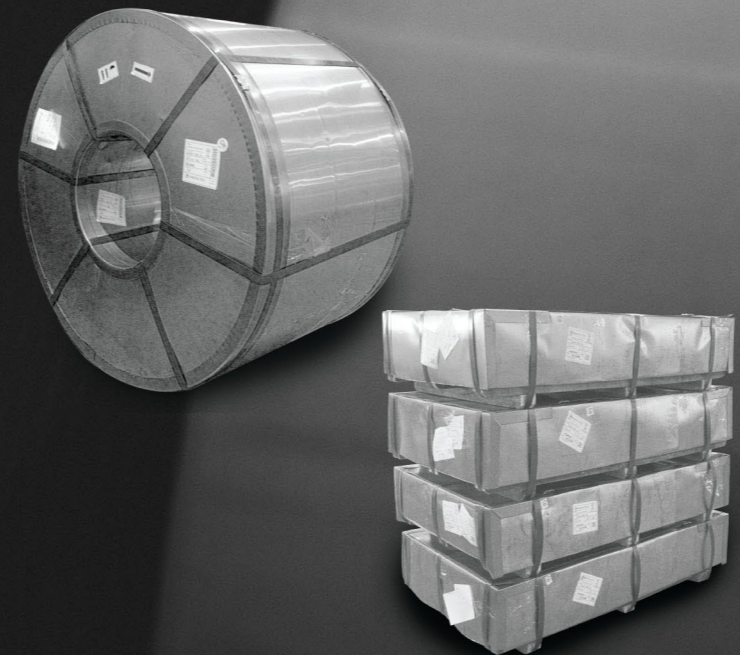


COLD ROLLING MILL

Cold Rolling Mill equipped with French CLECIM technology and it has 650.000 tonnes production capacity per year.

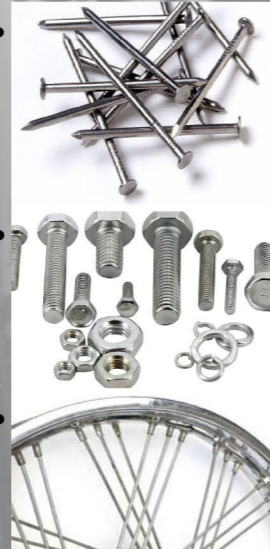
Cold Rolling Mill consist of some production units,such as:

- 1 unit CPL
- 1 unit CTCM
- 2 units ECL
- 1 unit CAL
- 1 unit BAF
- 1 unit TPM
- 1 unit PRP
- 1 unit REC
- 1 unit SHR



WIRE ROD

WR	
DIMENSION	
Diameter	: 5.5 – 20.0mm
Coil ID	: 860mm
Coil OD	: 1250 mm
Coil Weight	: 2.2 MT (Max.)
PRODUCT APPLICATION	
General Wire & Nail Bolt & Nut High Carbon Application Electrode Wire Shafting Bar Wire Mesh Steel Section Grinding Ball Spring Spoke Wire	



WIRE ROD MILL

Wire Rod Mill with the production capacity of 450.000 tonnes per year,and consist of:

- 1 unit of Reheating Furnace
- 1 unit of Roughing Mill
- 1 unit of Intermediate Stand

It was imposed in the plant,which raised the production capacity up to 30.000 tonnes per year. In 1999 an additional stand project and modification on the production facility were started to increase the production capacity to become 450.000 tonnes per year.



PRODUCT SPECIFICATION,2016

Composer
Teguh Sarwono (Leader), Aris Teguh (Co-Leader), Alhadis Syamsuddin (Co-Leader), Wisnu K. (Co-Leader), Adi Kamer Putra, Paris Agustono (PM&MIS); Agung Baskoro, Lutfi Amrullah, Himawan Sutanto (R&D); Yovan Hadiansyah (CTS).

Contributor
Ira Setiawati, Muhammad Qolbun Salim (PM & MIS); Sugeng Pangraksa, Gatuh Ratna Dewi (SA1); Harapati (SA2); Ega Pratida Fauzi (SA3); M. Aldiansyah, Yayan Munir, Bayu Cipta Septiadi (SA4); Iwan Nuryadi (Corcom); Engla S. (MRD)

Pictures & Images
PT Krakatau Steel Collections

Designer
Franky Pakpahan (Corcom)

Printing
PT Percetakan Negara Republik Indonesia (PNRI)



KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

STEEL FOR AUTOMOTIVE PIPE & TUBE

Steel for automotive pipe and tube in major application is used for motorcycle and passenger car. It has functions as frame in the body of vehicle. In addition, pipe & tube manufacturing is carried out by forming and welding process. Thus, it requires the steel with the following characteristic:

- Low-Medium Strength
- Excellent in formability and weldability
- Good appearance (painting)

PT Krakatau Steel (Persero) Tbk. has been producing products which comply with those characteristics.

Specification for Automotive Pipe & Tube (Hot Rolled Pickled Oil) :

Specification	Chemical Composition (%)				Mechanical Properties		
	C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)
JIS G3132 SPHT 1 or equivalent	0,10 max	0,50 max	0,040 max	0,040 max	-	270 min	1,6≤t<3,0 : 32 min 3,0≤t<6,0 : 35 min t≥6,0 : 37 min
JIS G3132 SPHT 2 or equivalent	0,18 max	0,60 max	0,040 max	0,040 max	-	340 min	1,6≤t<3,0 : 27 min 3,0≤t<6,0 : 30 min t≥6,0 : 32 min
JIS G3132 SPHT 3 or equivalent	0,25 max	0,30 max	0,040 max	0,040 max	-	410 min	1,6≤t<3,0 : 22 min 3,0≤t<6,0 : 25 min t≥6,0 : 27 min
KS 34	0,12 max	0,60 max	0,035 max	0,035 max	215 min	340 min	34 min
KS 37	0,25 max	0,90 max	0,035 max	0,035 max	220 min	370 min	26 min
KS 45	0,20 max	1,20 max	0,035 max	0,035 max	310 min	450 min	26 min

Specification for Automotive Pipe & Tube (Cold Rolled Coil) :

Specification	Chemical Composition (%)				Mechanical Properties		
	C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)
JIS G3141 SPCCT or equivalent	0,15 max	0,6 max	0,10 max	0,05 max	-	270 min	0,25≤t<0,30 : 28 min 0,30≤t<0,40 : 31 min 0,40≤t<0,60 : 34 min 0,60≤t<1,00 : 36 min 1,00≤t<1,60 : 37 min 1,60≤t<2,50 : 38 min t≥2,50 : 39 min
KS 34	0,16 max	0,6 max	0,035 max	0,035 max	215 min	340 min	30 min
KS 37	0,18 max	0,8 max	0,035 max	0,035 max	220 min	370 min	28 min

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

COLD ROLLED COIL FOR AUTOMOTIVE BODY & PARTS

PT Krakatau Steel (Persero) Tbk. produce Cold rolled steel for Automotive Body and Parts applications. The steel have some properties such as Low-Medium strength, good weldability and formability, good drawability, non-aging properties, good adherence (paintability), good flatness and stiffness.

The available standard Specification of CRC for body & parts are:

ASTM : A1008 -01 CS Type B, -01 DS Type B, M-01 CS Type B, M-01 DS Type B,
A366 -97 CS Type B, -97 DS Type B, M-97 CS Type B, M-97 DS Type B.
DIN : 1623 St 12.03 g, St 12.03 m, St 13.03 g, St 13.03 m
JIS : G 3141 SPCCT-SD, SPCD-SD, SPCE-SD, SPCF-SD
Others : JSC270C, SPC270C. SPC270D, SP121BQ, KS440

Specification	Chemical Composition (%)				Mechanical Properties		
	C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)
SPCCT-SD	0,02 – 0,06	0,15 – 0,40	0,020 max	0,020 max	-	270 min	0.25 ≤t<0.30 : 28 min
							0.30 ≤t<0.40 : 31 min
							0.40 ≤t<0.60 : 34 min
							0.60 ≤t<1.00 : 36 min
							1.00 ≤t<1.60 : 37 min
							1.60 ≤t<2.50 : 38 min
							t≥2.50 : 39 min
SPCD-SD	0,01 – 0,05	0,15 – 0,25	0,020 max.	0,020 max.	240 max	270 min	0.25 ≤t<0.30 : 30 min
							0.30 ≤t<0.40 : 33 min
							0.40 ≤t<0.60 : 36 min
							0.60 ≤t<1.00 : 38 min
							1.00 ≤t<1.60 : 39 min
							1.60 ≤t<2.50 : 40 min
							t≥2.50 : 41 min
SPCE-SD	0,01 – 0,05	0,15 – 0,25	0,020 max.	0,020 max.	220 max	270 min	0.25 ≤t<0.30 : 32 min
							0.30 ≤t<0.40 : 35 min
							0.40 ≤t<0.60 : 38 min
							0.60 ≤t<1.00 : 40 min
							1.00 ≤t<1.60 : 41 min
							1.60 ≤t<2.50 : 42 min
							t≥2.50 : 43 min
SPCF-SD	0,01 max	0,10 – 0,20	0,015 max	0,010 max	210 max	270 min	0.25 ≤t<0.30 : - min
							0.30 ≤t<0.40 : - min
							0.40 ≤t<0.60 : 40 min
							0.60 ≤t<1.00 : 42 min
							1.00 ≤t<1.60 : 43 min
							1.60 ≤t<2.50 : 44 min
							t≥2.50 : 45 min

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

COLD ROLLED COIL FOR GALVANIZED SHEET

PT Krakatau Steel (Persero) Tbk. produce cold rolled steel for applications using galvanized or galvalum coating on the next process. The steel have some properties such as Low-medium-high strength, excellent in weldability and formability, good coating and paintability, good flanness and stiffness, and accurate and precise dimensions.

The general applications of the steel are frame housing, flex-lok, general stucture, galvanized or galvalum structure.

The available standard Specifications of CRC for Galvanized Sheet are:

JIS : G 3141 SPCC-1D, SPCC-2D, SPCC-4D

Others* : SPCG 250, 300, 550 A, 550B

*) Specifications are created based on the agreement between Krakatau Steel and Customers.

Specification	Chemical Composition (%)				Mechanical Properties			
	C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)	Hardness (HRB)
SPCC-1D	0,02 – 0,06	0,15 – 0,40	0,020 max	0,020 max	-	-	-	85 min.
SPCC-2D	0,02 – 0,06	0,15 – 0,40	0,020 max	0,020 max	-	-	-	65 – 80
SPCC-4D	0,02 – 0,06	0,15 – 0,40	0,020 max	0,020 max	-	-	-	74 - 89
SPCG 250	0,02 – 0,06	0,15 – 0,40	0,020 max	0,020 max	250 min.	320 min.	25 min.	-
SPCG 300	0,02 – 0,06	0,15 – 0,40	0,020 max	0,020 max	300 min.	340 min.	20 min.	-
SPCG 350	0,02 – 0,06	0,15 – 0,40	0,020 max	0,020 max	350 min.	420 min.	15 min.	-
SPCG 450	0,02 – 0,06	0,15 – 0,40	0,020 max	0,020 max	450 min.	480 min.	10 min.	-
SPCG 500	0,02 – 0,06	0,15 – 0,40	0,020 max	0,020 max	500 min.	520 min.	8 min.	-
SPCG 550	0,02 – 0,09	0,20 – 0,60	0,020 max.	0,020 max.	550 min.	550 min.	2 min.	-

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

COLD ROLLED COIL FOR GENERAL PURPOSE

PT Krakatau Steel (Persero) Tbk. produce cold rolled steel for general applications with properties are low strength, excellent in weldability and formability, good paintability, and accurate dimensions.

The available standard specifications of CRC for General Purpose are:

ASTM : A1008 -01 CS Type B, M-01 CS Type B, A366 -97 CS Type B, M-97 CS Type B
DIN : 1623 St 12.03 g, St 12.03 m, St 13.03 g, St 13.03 m
JIS : G 3141 SPCC-SD, SPCCT-SD
SNI : 07 3567 BJDC-1R, BJDC-SR, BJDCT-SR

Specification	Quality	Chemical Composition (%)				Mechanical Properties		
		C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)
JIS G3141 SPCC or equivalent	Commercial	-	-	-	-	-	-	-
JIS G3141 SPCCT or equivalent	Commercial	0,15 max	0,6 max	0,10 max	0,05 max	-	270 min	0,25<t<0,30 : 28 min
								0,30<t<0,40 : 31 min
								0,40<t<0,60 : 34 min
								0,60<t<1,00 : 36 min
								1,00<t<1,60 : 37 min
								1,60<t<2,50 : 38 min
≥ 2,50 : 39 min								

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

COLD ROLLED COIL FOR PIPE & TUBE

PT Krakatau Steel (Persero) Tbk. produce cold rolled steel for pipe and tube applications. The steel have some properties such as Low-medium strength, good weldability and good formability.

The available standard specifications of CRC for Pipe and Tube are:

ASTM : A1008 -01 CS Type B, ASTM A366 -97 CS Type B
 DIN : 1623 St 12.03 g, St 12.03 m
 JIS : G 3141 SPCC-SD, SPCCT-SD
 Others : KSSTA 290, MP1A, MP1C, SPCK-1, SPCK-3, SPCK-4, KSA 37, KSI 37, KSS 37, MP 38, KSSTA 390, SPCK-5

Typical Chemical Composition & Mechanical Properties

Specification	Chemical Composition (%)				Mechanical Properties		
	C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)
SPCC-SD	0,02 – 0,06	0,15 – 0,40	0,020 max	0,020 max	-	-	-
SPCCT-SD	0,02 – 0,06	0,15 – 0,40	0,020 max	0,020 max	-	270 min	0.25 ≤t<0.30 : 28 min
							0.30 ≤t<0.40 : 31 min
							0.40 ≤t<0.60 : 34 min
							0.60 ≤t<1.00 : 36 min
							1.00 ≤t<1.60 : 37 min
							1.60 ≤t<2.50 : 38 min
							t≥2.50 : 39 min

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

COLD ROLLED FOR ENAMELWARES

Our everyday enamel cookwares are made of cold rolled steel sheet which coated by glass-like vitreous porcelain enamel. The benefits of this economical product are countless: safe and non-toxic for our food, high temperature fire resistant, hard, clean, non-stick and non-stained surfaces, and its beautiful colour and graphical designs; the all households qualities to make our life easier, healthier and brighter.

However, it is not easy to produce highest quality of enamelware products, as well as its raw materials: cold rolled steel sheet. The steel Specification for enamelwares should have good formability, surface adherence, non-aging properties, and excellent enamelability, which means its resistance against unacceptable enamelling defects such as: carbon boil, hair line or fish scale.

PT Krakatau Steel (Persero) Tbk. has been producing JIS G3133 SPP cold rolled sheet use ultra low carbon and titanium-stabilized steel to ensure excellent ground and cover coat formation during and after enamelling process (usually 3 times firing at 810°C). For moderate quality of enamelwares with slight enamelling process, we offers SPCC sheet with Specificational treatments to enhance its drawability and enamelability.

Specification	Quality	Chemical Composition (%)				Mechanical Properties		
		C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)
JIS G3141 SPCC or equivalent	Commercial	-	-	-	-	-	-	-
JIS G3141 SPCCT or equivalent	Commercial	0,15 max	0,6 max	0,10 max	0,05 max	-	270 min	0,25≤t<0,30 : 28 min
								0,30≤t<0,40 : 31 min
								0,40≤t<0,60 : 34 min
								0,60≤t<1,00 : 36 min
								1,00≤t<1,60 : 37 min
								1,60≤t<2,50 : 38 min
t≥2,50 : 39 min								
SPP or equivalent	Deep drawing	0,001 max	0,50 max	0,04 max	0,04 max	-	270 max	0,40≤t<0,60 : 38 min
								0,60≤t<1,00 : 40 min
								1,00≤t<1,60 : 41 min
								1,60≤t<2,50 : 42 min
								t≥2,50 : 43 min

Notes: 65 HRB max for SPCC
Enamelability for SPP are fully guaranteed.

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

COLD ROLLED FOR HOME, OFFICE, & ELECTRICAL APPLIANCES

PT Krakatau Steel (Persero) Tbk. produces Cold rolled steel for Home, Office, and Electrical Appliances. The steel have some properties such as Low strength, good weldability and forming, good flatness and adherence (paintability).

The available standard Specifications of CRC for Home Office Appliances are:

ASTM : A1008 -01 CS Type B, M-01 CS Type B, A366 -97 CS Type B, M-97 CS Type B
DIN : 1623 St 12.03 g, St 12.03 m, St 13.03 g, St 13.03 m
JIS : G 3141, SPCC-SD, SPCCT-SD, SPP (Enamelwares)
SNI : 07 3567, BJDC-SR, BJDCT-SR

Specification	Quality	Chemical Composition (%)				Mechanical Properties		
		C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)
JIS G3141 SPCC or equivalent	Commercial	-	-	-	-	-	-	-
JIS G3141 SPCCT or equivalent	Commercial	0,15 max	0,6 max	0,10 max	0,05 max	-	270 min	0,25≤t<0,30 : 28 min
								0,30≤t<0,40 : 31 min
								0,40≤t<0,60 : 34 min
								0,60≤t<1,00 : 36 min
								1,00≤t<1,60 : 37 min
								1,60≤t<2,50 : 38 min
≥ 2,50 : 39 min								
JIS G3141 SPCD or equivalent	Drawing	0,12 max	0,5 max	0,04 max	0,04 max	240 max	270 min	0,25≤t<0,30 : 30 min
								0,30≤t<0,40 : 33 min
								0,40≤t<0,60 : 36 min
								0,60≤t<1,00 : 38 min
								1,00≤t<1,60 : 39 min
								1,60≤t<2,50 : 40 min
≥ 2,50 : 41 min								
JIS G3141 SPCE or equivalent	Deep Drawing	0,10 max	0,45 max	0,03 max	0,03 max	220 max	270 min	0,25≤t<0,30 : 32 min
								0,30≤t<0,40 : 35 min
								0,40≤t<0,60 : 38 min
								0,60≤t<1,00 : 40 min
								1,00≤t<1,60 : 41 min
								1,60≤t<2,50 : 42 min
≥ 2,50 : 43 min								
JIS G3141 SPCF or equivalent	Deep Drawing non-ageing	0,08 max	0,45 max	0,03 max	0,03 max	210 max	270 min	0,40≤t<0,60 : 40 min
								0,60≤t<1,00 : 42 min
								1,00≤t<1,60 : 43 min
								1,60≤t<2,50 : 44 min
								≥ 2,50 : 45 min

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

DIMENSION COLD ROLLED STEEL COIL SHEET

DIMENSION & WEIGHT

1. Annealed Steel Cold Rolled Coil

Thickness (mm)		Width (mm)		Diameter (mm)		Weight (MT) Max
Min	Max	Min	Max	Min	Max	
0.20	0.24	620	1,100	508	2000	23.4
0.25	3.00		1,250			

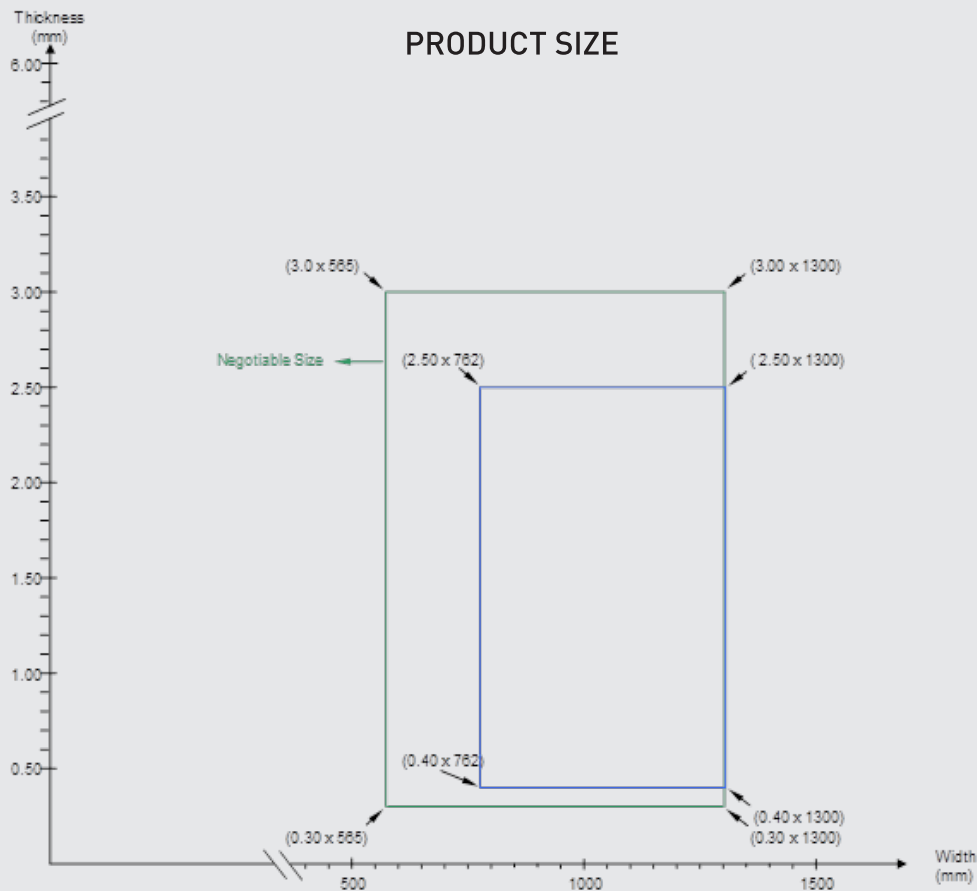
2. Annealed Cold Rolled Sheet

Thickness (mm)		Width (mm)		Lenght (mm)		Weight in one pack (MT) Max
Min	Max	Min	Max	Min	Max	
0.40	2.00	620	1,250	762	4,880	3.0

3. Full Hard & As Rolled

Thickness (mm)		Width (mm)		Diameter (mm)		Weight (MT) Max
Min	Max	Min	Max	ID	OD	
0.20	0.24	620	1,100	508	2000	23.4
0.25	2.00		1,250			

PRODUCT SIZE



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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

CHECKERED PLATE

Steel checker plate (also known as floor plate) is a steel plate with a raised pattern on one side of the surface.

Application : stairs, walkways, ramps, infrastructure, automobile floor, and engineering stairs

STANDARD	GRADE	GROUP APPLICATION
KRAKATAU STEEL	Checkered	Floor Plate
KRAKATAU STEEL	Checkered 400	Floor Plate



Can be supplied in coil or plate

Gauge : Thin Gauge = 2.30 – 6.00 mm (for Checker)
= 3.50 – 6.00 mm (for Checker 400)
Thick Gauge = 6.00 – 12.70 mm

Width : 600 – 1,524 mm

DIMENSION	STRIP THICKNESS	
	2.30 – 6.00 mm	6.00 – 12.70 mm
Length (L)	26.80 mm	33.00 mm
Width (W)	4.90 mm	7.70 mm
Height (H)	1.50 mm max.	1.50 mm max.
Pitch Size (P)	45.00 mm	60.00 mm
Angle of Profile to Rolling Direction (α)	45	45

Specification	Yield Strength	Tensile Strength	Elongation
Checker 400	Min. 235 MPa	400 - 510 MPa	t 3,00 - 4,99 mm : Min. 21% (Lo : 50 mm)
			t 5,00 - 12,70 mm : Min. 17% (Lo : 200 mm)

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

HOT ROLLED FOR BOILER AND PRESSURE VESSEL APPLICATION

Hot rolled steel plate for boiler and pressure vessel produced by PT Krakatau Steel (Persero) Tbk. has the following properties.

- Strength level according to standard specification
- Good weldability
- Good formability
- Good steel cleanliness achieved by clean steel practice in steelmaking.
- Accurate dimension according to standard

Application of these materials are boiler and pressure vessels in several industries such as power plants, coal gasifiers, refineries, process industries, and petrochemical exchangers. The steel for such applications are ASTM A285, ASTM A516, BSEN 10120, etc. PT Krakatau Steel (Persero) Tbk. supplies the steel in the form of coils or plates with supply condition as as-rolled or thermo-mechanically controlled process (TMCP).

Other application of the steel is LPG bottle. PT Krakatau Steel (Persero) Tbk. has been supplying materials for LPG bottle 3 kg, 12 kg, and 50 kg according to JIS G3116 and SNI 07-3018-2006. As the addition of common mechanical testing, there are other testings which are required for LPG bottle application: bursting test and expansion resistance testing. PT Krakatau Steel (Persero) Tbk. material of SNI 07-3018-2006 Bj TG 255 and Bj TG 295 (equivalent to JIS G3116SG255 and SG295 respectively) shows good performance on the testing.

Hot rolled steel plate for boiler and pressure vessel application

STANDARD	GRADE	GROUP APPLICATION
ASTM A53	ASTM A53 GRB	Pipe Hot Dipped, Zinc-Coated, Welded and Seamless
ASTM A283	ASTM A283 GRA	Plates, Carbon Steel, Low and Intermediate-Tensile Strength
	ASTM A283 GRB	
	ASTM A283 GRC	
	ASTM A283 GRD	
ASTM A285	ASTM A285 GRA	
	ASTM A285 GRB	
	ASTM A285 GRC	
ASTM A515	ASTM A515 GR70	Plates, Carbon Steel, for Intermediate and Higher - Temperature Service
ASTM A516	ASTM A516 GR70	Plates, Carbon Steel, for Moderate and Lower - Temperature Service
BSEN 10120	BSEN 10120 P265NB	Plates for building boilers and pressure vessels such as petroleum, chemical industry, reactor, etc.
SNI 07-3018-2006	Bj TG 255	Welded containers for high pressure gas holder of volume less than 500 l for LPG, acetylene and propane gas.
	Bj TG 295	
JIS G3116	SG255	
	SG295	
SAE 1019	SAE 1019	These steels are the lowest carbon steels of the plain carbon type, and are selected where cold formability is the primary requisite of the user. They are produced both as rimmed and killed steels
SAE 1020	SAE 1020	
SAE 1021	SAE 1021	
SAE 1022	SAE 1022	
SAE 1026	SAE 1026	

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

HOT ROLLED FOR HEAVY EQUIPMENT

High strength structural steel plate for heavy equipment application such as excavator, tractor or dump truck requires high strength and also impact due to its operations in critical condition. The tensile strength required varies depending on the components and specifications, ranging from 440 MPa, 490 MPa, 590 MPa, and 620 MPa or higher. PT Krakatau Steel (Persero) Tbk. has been producing hot rolled steel having tensile strength ranging from 400 to 620 MPa for heavy equipment application using High Strength Low Alloy Steel.

The requirements of steel specification for heavy equipments must have characteristics following these:

- High strength and impact to withstand the impact loads in critical condition
- Good fatigue resistance to improve the life time
- Good weldability while manufacturing process

PT Krakatau Steel (Persero) Tbk. has been producing and supplying the steel specification which comply with those characteristics to the producer of heavy equipment.

Specification for Automotive Structure (Hot Rolled) :

Specification	Chemical Composition (%)				Mechanical Properties			
	C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)	Impact in 0°C (Joule)
SS 400	-	-	0,050 max	0,050 max	t≤16 : 245 min	400 - 510	t≤5 : 21 min	27 min
					16<t<25 : 235 min		5<t<16 : 17 min	
							16<t<25 : 21 min	
SM 490YA	0,20 max	1,60 max	0,035 max	0,035 max	t≤16 : 365 min	490 min	t≤5 : 19 min	27 min
					16<t<25 : 355 min		5<t<16 : 15 min	
							16<t<25 : 19 min	
SM 490YB	0,20 max	1,60 max	0,035 max	0,035 max	t≤16 : 365 min	490 min	t≤5 : 19 min	27 min
					16<t<25 : 355 min		5<t<16 : 15 min	
							16<t<25 : 19 min	
KSAPH 540	0,25 max	1,5 max	0,03 max	0,02 max	375 min	540 min	26 min	27 min
KSAPH 590	0,09 max	1,5 max	0,04 max	0,04 max	440 min	590 min	18 min	27 min
KSAPH 620	0,20 max	1,0 -1,8	0,025 max	0,010 max	550 min	620 min	23 min	27 min

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

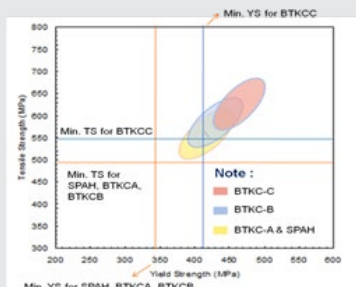
HOT ROLLED FOR WEATHERING CORROSION RESISTANT

Weathering corrosion resistant High-Strength Low-Alloy (HSLA) steel is intended for structural applications where a combination of high strength and enhanced atmospheric corrosion resistance are desired. It has approximately 4 times the atmospheric corrosion resistance of structural carbon steel, good formability and weldability. Thus atmospheric corrosion resistant steel have strength 35–40% higher than carbon steel (effect of vanadium addition). The extra strength of HSLA steel makes it more durable and offers a longer useful life span for chimney, bridge, tubular bridge, container and tank.

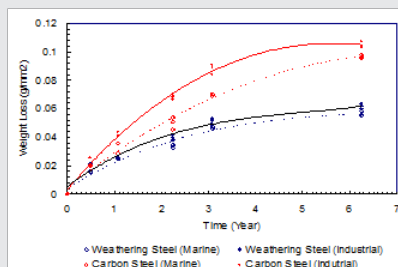
STANDARD	GRADE	GROUP APPLICATION
JIS G3125	SPAH	Having Superior atmospheric corrosion resistance, it is applied to architecture, steel tower, steel container and other structures.
KRAKATAU STEEL	BTKC GRA	Weather corrosion resistance steel for structure
	BTKC GRB	
	BTKC GRC	
BS 4360	BS 4360 WR50A	Weathering resistant steel

Specification	Chemical Compositions									Mechanical Properties		
	C	Si	Mn	P	S	Cu	Ni	Cr	V	Yield Strength (MPa)	Tensile Strength (MPa)	Elongation (%)
SPAH	0.12 max	0.20	0.6 max	0.07	0.035 max	0.25	0.65 Max	0.30	-	355 min	490 min	22 min
		-		-		-						
		0.75	0.15	0.55		1.25						
BTKC-A	0.12 max	0.20	0.20	0.07	0.050 max	0.25	0.65 Max	0.30	-	345 min	485 min	22 min
		-	-	-		-						
		0.75	0.50	0.15		0.55		1.25				
BTKC-B	0.19 max	0.30	0.80	0.040 max	0.050 max	0.25	0.40 Max	0.40	0.02	345 min	485 min	21 min
		-	-			-		-				
		0.65	1.25	0.40		0.65		0.10				
BTKC-C	0.19 max	0.30	0.80	0.040 max	0.050 max	0.25	0.40 Max	0.40	0.04	415 min	550 min	21 min
		-	-			-		-				
		0.60	1.35	0.40		0.70		0.10				

Typical Mechanical Properties



Weight Loss Testing and Measurement



Product Dimension

Thickness	1.80 - 25.0 mm
Width	600 - 2,000 mm
Coil Inner Diameter	760 - 2,000 mm
Coil weight	30 Ton Max
Length for Plate	12000 mm max

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

HOT ROLLED STEEL PLATE FOR ARMOUR APPLICATION

Needs of bullet-proof steel plate (armour plate) for the military industry as well as for the police and other defense functions nowadays can be produced in the country with quality no less than imported steel plates. PT Krakatau Steel (Persero) Tbk. as the state owned and the largest company in the field of steel industry in Indonesia has stepped up its own resources to build the roll-quencher and temper machine, which has been able to produce armour plate with a hardness value equivalent to 500 HBW, so the quality can be equated with a plate of imports.

Specification	Thickness (mm)	Hardness (HBW)
KSW 450	6,00 - 20,00	420 - 480
KSW 500	6,00 - 20,00	480 - 540

Process of Quech & Temper :

Wear resistant steel plate KSW 450 and KSW 500 are designed using specification alloy steel with high contents of carbon and manganese, and using molybdenum, chromium and nickel alloy to obtain a superior hardening properties.

The process of steel making specification using a ladle furnace which undergo an intensive process to get the best quality of steel slab which is very clean and homogeneous.

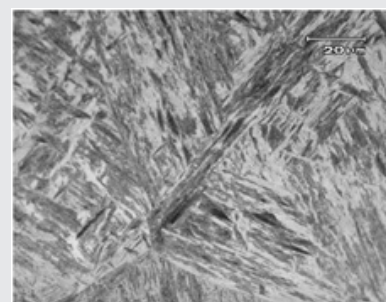
Steel slab then processed in the hot strip mill to produce steel plates with dimensions of thickness, width and length according to the order. Furthermore, the steel plate is processed in the roll-quencher to produce steel plate with martensite structure which has a very high hardness. At the final stage the steel plate is processed in a temper furnace to get a tempered martensite structure that ensures superior toughness properties.

Specification	Thickness (mm)	Chemical Composition, max in wt%					Carbon Equivalent, Typical
		C	Mn	Cr	Ni	Mo	
KSW 450	6,00 - 20,00	0,30	1,4	0,8	0,30	0,25	0,55
KSW 500	6,00 - 20,00	0,30	1,4	1,0	0,50	0,40	0,60

Certification & Test Result

KSW 500 plate has been used by PT Pindad as raw material for body armor 6x6 APC that was ordered by the Ministry of Defence; and the entire production process until the test has gained acceptance tests in which the military certificate was issued by Directorate of Standardization & Airworthiness, Directorate General of Defence Facility, Ministry of Defence.

The wear resistance test result of KSW 500 which performed at Laboratory of Materials Testing Department of Metallurgy & Materials Engineering University of Indonesia shows Specificationific abrasion values 0.3×10^{-7} mm³/kg, which is equal and even better than imported plates.



Typical Microstructure

Available Dimension

Available dimensions of KSW 450 and 500 steel plates are in the table below. Ordering for Specificational dimensions can also be accepted as far as in the range of roll-quencher machine capacity, in particular for the length of the plate which is now limited to 3 meters. Likewise, for booking with a particular plate shapes can also be met through sales representatives who have been appointed.

Specification	Thickness (mm)	Width (mm)	Length (mm)
KSW 450	6,00 - 20,00	1000 - 1600	3000 max
KSW 500	6,00 - 20,00	1000 - 1600	3000 max

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

HOT ROLLED STEEL PLATE FOR SHIP BUILDING APPLICATION

Hot rolled steel plate for shipbuilding produced by PT Krakatau Steel (Persero) Tbk. has the following properties.

- Strength level according to standard
- High toughness
- Good formability
- Good weldability
- Excellent corrosion resistant

Some advantages of ship plate from PT Krakatau Steel (Persero) Tbk.

- Accurate dimension
- Suitable chemical composition
- Its high impact resistant at temperature up to as low as -40°C makes the plates suitable for extreme environment ranging from warm tropical ocean to cold polar ocean

Application: Material for pier facilities, bridge, dock, and other construction near corrosive environment.

PT Krakatau Steel (Persero) Tbk. is currently capable of producing ship plate with various class of certifications, from the ordinary strength (Grade A and B) until higher strength (Grade A32 and A36).

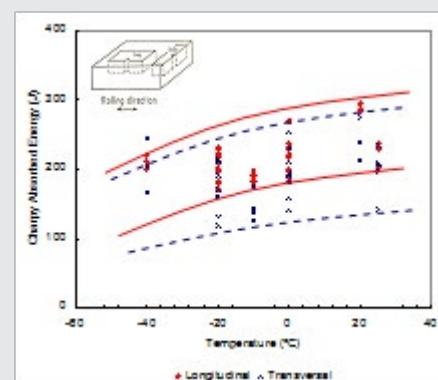
STANDARD	GRADE
Klasifikasi Indonesia (KI)	KI Grade A, KI Grade B, KI A32, KI A36
ABS Register	ABS Grade A, ABS AH32, ABS AH36
BV Register	BV Grade A, BV Grade B, BV AH32, BV AH36
GL Register	GL Grade A, GL Grade B
LR Register	LR Grade A
NK Register	NK Grade A, NK A32, NK A36
DNV Register	NV Grade A, NV A32, NV A36
RINA Register	RINA Grade A, RINA Grade AH32, RINA Grade AH36
ASTM A131	A131 Grade B

Typical mechanical properties requirements of ship plate.

Ship Plate Grade	YS (MPa)	TS (MPa)	Elongation (%)	Impact Energy (Joule)
Grade A	235 min	400 – 520	22 min	Not Specificationified
Grade B	235 min	400 – 520	22 min	27 min (Long) at 0°C 20 min (Trans) at 0°C
Grade A32	315 min	440 – 590	22 min	31 min (Long) at 0°C 22 min (Trans) at 0°C
Grade A36	355 min	490 – 620	21 min	34 min (Long) at 0°C 24 min (Trans) at 0°C

Typical range of ship plate produced by PT Krakatau Steel (Persero) Tbk.

Thickness	4.00 – 25.00 mm
Width	600 – 2,050 mm
Length	6,000 – 12,000 mm



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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

HOT ROLLED STEEL FOR AUTOMOTIVE STRUCTURE

Steel for automotive structures in major application is used for heavy vehicle. Heavy vehicles such as medium-heavy truck and bus have heavy load which need material made from steel that resist its load. Chassis is one of component that functions to absorb engine and driveline torque, endure shock loading, and accommodate twisting on uneven road surfaces. Therefore, it requires material made from steel which fulfill those functions. The main components of Chassis generally consist of Side Rail and Cross Member.

PT Krakatau Steel (Persero) Tbk. has been producing the steel which comply with those requirements. The excellences following these:

- Medium-High Strength
- Excellent in formability
- Good impact and fatigue resistance
- Good surface appearance (painting)

Specification for Automotive Structure :

Specification	Chemical Composition (%)				Mechanical Properties		
	C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)
JIS G3113 SAPH 310*	-	-	0,04 max	0,04 max	≤ 6,0 : 185 min	310 min	1,60 ≤ t < 2,00 : 33 min
					6,0 ≤ t < 8,0 : 185 min		2,00 ≤ t < 2,50 : 34 min
					≥ 8,0 : 175 min		2,50 ≤ t < 3,15 : 36 min
							3,15 ≤ t < 4,00 : 38 min
							4,00 ≤ t < 6,30 : 40 min
≥ 6,30 : 41 min							
JIS G3113 SAPH 370*	-	-	0,04 max	0,04 max	≤ 6,0 : 225 min	370 min	1,60 ≤ t < 2,00 : 32 min
					6,0 ≤ t < 8,0 : 225 min		2,00 ≤ t < 2,50 : 33 min
					≥ 8,0 : 215 min		2,50 ≤ t < 3,15 : 35 min
							3,15 ≤ t < 4,00 : 36 min
							4,00 ≤ t < 6,30 : 37 min
≥ 6,30 : 38 min							
JIS G3113 SAPH 400*	-	-	0,04 max	0,04 max	≤ 6,0 : 255 min	400 min	1,60 ≤ t < 2,00 : 31 min
					6,0 ≤ t < 8,0 : 235 min		2,00 ≤ t < 2,50 : 32 min
					≥ 8,0 : 235 min		2,50 ≤ t < 3,15 : 34 min
							3,15 ≤ t < 4,00 : 35 min
							4,00 ≤ t < 6,30 : 36 min
≥ 6,30 : 37 min							
JIS G3113 SAPH 440*	-	-	0,04 max	0,04 max	≤ 6,0 : 305 min	440 min	1,60 ≤ t < 2,00 : 29 min
					6,0 ≤ t < 8,0 : 295 min		2,00 ≤ t < 2,50 : 30 min
					≥ 8,0 : 275 min		2,50 ≤ t < 3,15 : 32 min
							3,15 ≤ t < 4,00 : 33 min
							4,00 ≤ t < 6,30 : 34 min
≥ 6,30 : 35 min							
KSAPH 540	0,18 max	1,5 max	0,03 max	0,02 max	375 min	540 min	26 min
KSAPH 590	0,20 max	1,6 max	0,02 max	0,02 max	440 min	590 min	23 min
KSAPH 620	0,20 max	1,8 max	0,02 max	0,02 max	550 min	620 min	18 min

Note: *) PT Krakatau Steel (Persero) Tbk. also produced in Hot Rolled Pickled Oil

PRODUCT SPECIFICATION

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KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

HOT ROLLED STEEL FOR REROLLING

PT Krakatau Steel (Persero) Tbk. has been supplying hot rolled coil for rerolling application. The HRC has the following properties.

- Accurate dimension according to standard
- Suitable chemical composition according to standard
- Good profile and flatness
- Good surface quality
- Good picklability

Related to the formation of aluminum nitride precipitate in subsequent annealing process, hot rolled coil for rerolling requires a different coiling temperature. Generally, coiling temperature requirement is classified into two different value: high and low coiling temperature. High coiling temperature is employed for steel to be processed in continuous annealing, while low coiling temperature is for steel to be processed in batch annealing furnace. With the existing facilities in hot strip mill, PT Krakatau Steel (Persero) Tbk. are capable to fulfill these two requirement, making the steel suitable for the desired application.

List of hot rolled coil for rerolling produced by PT Krakatau Steel (Persero) Tbk.

STANDARD	GRADE	GROUP APPLICATION
BSEN	BSEN 10111 DD11	Mild steel/low carbon steel, may still fall under the category of Specification steel if any Specification properties is Specified in the steel
SAE	SAE 1006, 1008, 1010, 1012, 1015, 1016, 1018, 1019, 1020, 1021, 1022, 1026	These steels are the lowest carbon steels of the plain carbon type, and are selected where cold formability is the primary requisite of the user. They are produced both as rimmed and killed steels
ASTMA	ASTM A1006, A1008, A1008 CS TYPE B, A1010, A1010M1, A1010M2, A1011, A1011B, A1011 CS TYPE B, A1012	

PT Krakatau Steel (Persero) Tbk. supplies HRC for rerolling with the following dimension

Thickness	1.60 mm (min)
Width	600 – 2,000 mm

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HOT ROLLED STEEL OIL AND GAS PIPELINE APPLICATION

With over 20 years' experience, Krakatau Steel supplies more than 1.6 million metric tons of Hot Rolled Coil (HRC) for oil and gas pipeline application with various type of specification both API-5L Series for application in offshore to sour gas as well as API-5CT series for casing tube application. HRC for oil and gas pipeline application has very stringent requirements so parameter process in steel making and hot rolling mill should be controlled precisely.

Slab produced for this application should have a good internal quality and surface quality with implementation of Clean Steel Practice.

Processing condition in steel making Krakatau Steel :

- Killed Steel
- Secondary Metallurgy : Vacuum Degasser and Laddle Furnace
- Continuous Casting

Thus, Thermo Mechanical Controlled Process (TMCP) is should be applied in hot rolling mill to achieve HRC with the following properties :

- Strength level according to standard
- High toughness
- Good formability
- Good weldability
- No Bauschinger Effect

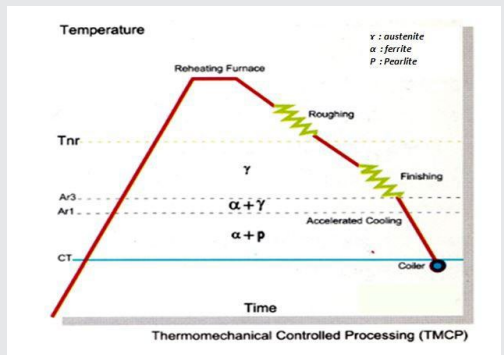
STANDARD	GRADE	GROUP APPLICATION
API 5CT	API 5CT H40	Hot rolled steel for casing, pipe and tubing is used for drilling, high weldability and excellent fracture resistance.
	API 5CT J55	
	API 5CT K55	
API 5L	API 5L GRA	Hot rolled steels makes excellent pipeline material because of its strength, low temperature toughness, weldability and hydrogen induced crack resistance (sour services). Use in pipeline transportation system in the petroleum and natural gas industries.
	API 5L GRB PSL 1	
	API 5L GRB M	
	API 5L GRB N	
	API 5L X42	
	API 5L X42 M	
	API 5L X46 BM	
	API 5L X46 M	
	API 5L X52 M	These use in pipeline transportation systems in the petroleum and natural gas industries, for use as casing and tubing for wells, as well as for other applications, applies to pipe piles in which the steel cylinder acts as a permanent load-carrying member, or as a shell to form cast-in-place concrete piles.
	API 5L X52 M0	
	API 5L X52 MS	
	API 5L X56 M	
	API 5L X60 M	
	API 5L X60 M0	
	API 5L X60 MS	
	API 5L X65 M	
	API 5L X65 M0	
	API 5L X65 MS	
	API 5L X70 M	
	API 5L X80	
ASTM A139	ASTM A139 GRB	For Electric-Fusion (Arc)-Welder Steel
DNV 485	DNV 485	Sub marine pipe line system
DNV OS F101	OS F101 GR450	
	OS F101 GR450 USF	

Product Dimension

Thickness	1.80 - 25.0 mm
Width	600 - 2,000 mm
Coil ID	760 mm
Coil OD	2,000 mm Max
Coil weight	30 Ton Max

Scheme of TMCP

1. Reheating slab before hot rolling process
2. Controlled rolling above non-recrystallization temperature
3. Controlled rolling at recrystallization temperature
4. Cooling after rolling



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STEEL FOR AUTOMOTIVE PARTS

Steel for automotive parts in major application is used for passenger and commercial vehicles. Passenger vehicles such as Multi Purpose Vehicle (MPV) and Sport Utility Vehicle (SUV) and Commercial Vehicle such as Light Truck need parts that function as frame and connector made from steel. Kinds of the parts such as Panel Roof, Back Door, Pillar, Frame, Reinforce, etc.

The excellences of products made by PT Krakatau Steel (Persero) Tbk. following these:

- Low-Medium strength
- Good weldability and formability
- Excellent in formability and drawability
- Good flatness and stiffness
- Good appearance (painting)
- Non-ageing properties
- Good appearance (painting)
- Non-ageing properties

Specification for Automotive Parts (Hot Rolled Pickled Oil) :

Specification	Quality	Chemical Composition (%)				Mechanical Properties		
		C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)
JIS G3131 SPHC or equivalent	Commercial	0,15max	0,60 max	0,050 max	0,050 max	-	270 min	1,6<t<2,0 : 29 min
								2,0<t<2,5 : 29 min
								2,5<t<3,2 : 29 min
								3,2<t<4,0 : 31 min
								t ≥ 4,0 : 31 min
JIS G3131 SPHD or equivalent	Drawing	0,10 max	0,50 max	0,040 max	0,040 max	-	270 min	1,6<t<2,0 : 32 min
								2,0<t<2,5 : 32 min
								2,5<t<3,2 : 35 min
								3,2<t<4,0 : 37 min
								t ≥ 4,0 : 39 min

Specification for Automotive Parts (Cold Rolled Coil) :

Specification	Quality	Chemical Composition (%)				Mechanical Properties		
		C	Mn	P	S	YS (MPa)	TS (MPa)	Elongation (%)
JIS G3141 SPCC or equivalent	Commercial	-	-	-	-	-	-	-
JIS G3141 SPCCT or equivalent	Commercial	0,15 max	0,6 max	0,10 max	0,05 max	-	270 min	0,25<t<0,30 : 28 min
								0,30<t<0,40 : 31 min
								0,40<t<0,60 : 34 min
								0,60<t<1,00 : 36 min
								1,00<t<1,60 : 37 min
								1,60<t<2,50 : 38 min
t ≥ 2,50 : 39 min								

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JIS G3141 SPCD or equivalent	Drawing	0,12 max	0,5 max	0,04 max	0,04 max	240 max	270 min	0,25<t<0,30 : 30 min
								0,30<t<0,40 : 33 min
								0,40<t<0,60 : 36 min
								0,60<t<1,00 : 38 min
								1,00<t<1,60 : 39 min
								1,60<t<2,50 : 40 min
								t ≥ 2,50 : 41 min
JIS G3141 SPCE or equivalent	Deep Drawing	0,10 max	0,45 max	0,03 max	0,03 max	220 max	270 min	0,25<t<0,30 : 32 min
								0,30<t<0,40 : 35 min
								0,40<t<0,60 : 38 min
								0,60<t<1,00 : 40 min
								1,00<t<1,60 : 41 min
								1,60<t<2,50 : 42 min
								t ≥ 2,50 : 43 min
JIS G3141 SPCF or equivalent	Deep Drawing non-ageing	0,08 max	0,45 max	0,03 max	0,03 max	210 max	270 min	0,40<t<0,60 : 40 min
								0,60<t<1,00 : 42 min
								1,00<t<1,60 : 43 min
								1,60<t<2,50 : 44 min
								t ≥ 2,50 : 45 min

WEAR RESISTANT STEEL PLATE

Wear resistant steel plate for mining industry, exploration, forestry or agro-industry can be produced in the country with quality no less than imported steel plates. PT Krakatau Steel (Persero) Tbk as the state owned and the largest company in the field of steel industry in Indonesia has stepped up with its own resources to build the roll-quencher and temper machine, which has been able to produce wear plate with a hardness value equivalent to 500 HBW.

End-use application :

Recommended end-use application are: bucket, chute, mixer, bearing, crusher, grinder, wear line, dump truck etc.

Specification :		
Specification	Thickness (mm)	Hardness (HBW)
KSTA 400	6,00 - 20,00	380 - 420
KSTA 450	6,00 - 20,00	420 - 480
KSTA 500	6,00 - 20,00	480 - 540

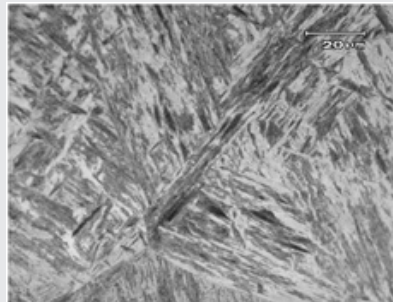
HBW : Brinell Harness Number

Process Quech & Temper :

Wear resistant steel plate KSTA 400, 450 and 500 are designed using special alloy steel with high contents of carbon and manganese, and using molybdenum, chromium and nickel alloy to obtain a superior hardening properties.

The process of steel making specifically using a ladle furnace which undergo an intensive process to get the best quality of steel slab which is very clean and homogeneous.

Steel slab then processed in the hot strip mill to produce steel plates with dimensions of thickness, width and length according to the order. Furthermore, the steel plate is processed in the roll-quencher to produce steel plate with martensite structure which has a very high hardness. At the final stage the steel plate is processed in a temper furnace to get a tempered martensite structure that ensures superior toughness properties.



Typical Microstructure

Specification	Thickness (mm)	Chemical Composition, max in wt%					Carbon Equivalent, Typical
		C	Mn	Cr	Ni	Mo	
KSTA 400	6,00 - 20,00	0,28	1,4	0,8	0,30	0,25	0,50
KSTA 450	6,00 - 20,00	0,30	1,4	0,8	0,30	0,25	0,55
KSTA 500	6,00 - 20,00	0,30	1,4	1,0	0,50	0,40	0,60

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Certification & Test Result

The wear resistance test result of KSTA 500 which performed at Laboratory of Materials Testing Department of Metallurgy & Materials Engineering University of Indonesia shows specific abrasion values 0.3×10^{-7} mm³/kg, which is equal and even better than imported plates.

Available Dimension

Available dimensions of KSTA 400, 450 and 500 steel plates are in the table below. Ordering for special dimensions can also be accepted as far as in the range of roll-quencher machine capacity, in particular for the length of the plate which is now limited to 3 meters. Likewise, for booking with a particular plate shapes can also be met through sales representatives who have been appointed.

Specification	Thickness (mm)	Width (mm)	Length (mm)
KSTA 400	6,00 - 20,00	1000 - 1600	3000 max
KSTA 450	6,00 - 20,00	1000 - 1600	3000 max
KSTA 500	6,00 - 20,00	1000 - 1600	3000 max



KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

INFRASTRUCTURE APPLICATION

Steel in modern decades is always playing a significant role as a major material for all construction buildings, bridges, towers and other structural appliances to build our cities, town and countries. In other words, steel is indeed a national power.

General & Welded Structures

For general and welded structures as for building and bridges, hot rolled steel grades are supplied with medium-high strength and good weldability. The available standard specifications are:

- JIS G 3101 SS 400, SS 490, SS 540 for structural steel application
- DIN 17100 St 37, St 44, St 50, St 52 for structural steel application
- BS 4360 43A, B, C, 50A, B, C for structural steel application
- BSEN 10025 S275 (J0, JR, J2), S355 (J0, JR, J2) for welded structure application
- JIS G 3136 SN 400A, B, C, SN 490A, B, C for square pipe application
- JIS G 3106 SM 400A, B, C, SM490YA, YB, SM570 for superior strength and weldability structure
- ASTM A570 Gr 30, 33, 36, 40, 45, 50 for structural steel application
- DIN 17175 15Mo3 for fire resistant steel application

JIS G 3101 (Rolled Steel for General Structure)

Specification	TS (MPa)	Yield Strength (MPa)		Tensile Strength (MPa)	Elongation (%)	
		t ≤ 16 mm	16 < t ≤ 25 mm		5 < t ≤ 16 mm	16 < t ≤ 25 mm
SS 400	400-510	245 min	235 min	400 – 510	17 min	21 min
SS 490	490-610	285 min	275 min	490 – 610	15 min	19 min
SS 540	540 min	400 min	390 min	540 min	13 min	17 min

JIS G 3101 (Rolled Steel for Welded Structure)

Specification	Yield Strength (MPa)		Tensile Strength (MPa)	Elongation (%)	
	t ≤ 16 mm	16 < t ≤ 25 mm		5 < t ≤ 16 mm	16 < t ≤ 25 mm
SM 400 A,B,C	245 min	235 min	400 – 510	18 min	22 min
SM 490 A,B,C	325 min	315 min	490 – 610	17 min	21 min
SM 490 YA,YB	365 min	355 min	490 – 610	15 min	19 min
SM 520 B, C	365 min	355 min	520 – 640	15 min	19 min
SM 570	460 min	450 min	570 - 720	19 min	26 min (16 < t ≤ 20mm) 20 min (20 < t ≤ 25mm)

Detail Specification for Infrastructure Application

STANDARD	GRADE	GROUP APPLICATION
AS 1594-1992	HA 200	General Structures for Building, Bridges Ships
	HA250	
	HA300	
	HA350	
AS/NZ 1594 - 2002	HA 250	
	HA 350	
ASTM A36	ASTM A36	Carbon steel of structural quality for use welded construction of bridges and buildings and general structural purpose.

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STANDARD	GRADE	GROUP APPLICATION
ASTM A242	ASTM A242 GR2	High Strength Low-Alloy Structural Steel
ASTM A284	ASTM A284 GRC	Machine Parts and General Construction
	ASTM A284 GRD	
ASTM A569	ASTM A569	This material is intended for parts where bending, moderate forming or drawing, and welding may be involved.
ASTM A570	ASTM A570 GR30	Structural Steel
	ASTM A570 GR33	
	ASTM A570 GR36	
	ASTM A570 GR40	
	ASTM A570 GR45	
	ASTM A570 GR50	
ASTM A572	ASTM A572 GR42	High Strength Low-Alloy Columbium-Vanadium Structural Steel
	ASTM A572 GR50	
	ASTM A572 GR55	
ASTM A573	ASTM A573 GR70	Structural Carbon Steel Plates of Improved Toughness
ASTM A607	ASTM A607 GR50	High - Strength low Alloy Columbium-Vanadium Steel for Structural Quality
ASTM A792	ASTM A792 GR50A	This product is intended for applications requiring corrosion resistance or heat resistance, or both.
	ASTM A792 GR50B	
ASTM A907	ASTM A907 G36	Good Tension stress and Yield strength
	ASTM A907 GR30	
BS 4360	BS 4360 GR43A	High - Strength low Alloy Columbium-Vanadium Steel for Structural Quality
	BS 4360 GR50B	
	BS 4360 GR50C	
	BS 4360 GR55C	
BSEN 10025	BSEN S235J0	Welded Structure for Building, Bridges, ships, Petroleum Storage, Tank Containers
	BSEN S235JR	
	BSEN S275J2	
	BSEN S275JR	
	BSEN S355JR	
	BSEN S355J0	
	BSEN S355JR	
MS EN 10025-2:2011	S275JR	Hot Rolled Products of Structural Steel
	S275J0	
	S275J2	
	S355JR	
	S355J0	
	S355J2	
CSA G4021	CSA G4021 300W	Structural, Carbon & HSLA Steel Plate
	CSA G4021 350W	
DIN 1543	DIN 1543 ST37-2 CU3	Welded Structure for Building, Bridges, ships, Petroleum Storage, Tank Containers
	DIN 1543 ST52-2 CU3	
DIN 17100	DIN 17100 ST37-2	Applies to steel sections (including wide flange beams), steel bars, wire rod, flat products(strip, plate, wide flats) seamless and welded, square and rectangular hollow sections, forgings and semi-finished products in the general structural steels named, which are delivered in the hot formed or normalized condition after production
	DIN 17100 ST44-2	
	DIN 17100 ST52-3	
DIN 17175	DIN 17175 15Mo3	Seamless Steel Pipe/ tube It is used for the pipelines of boiler industry or Fire Resistant Steel



STANDARD	GRADE	GROUP APPLICATION
EN 10025	EN 10025 S235JR+AR	Hot rolled products of non-alloy structural steels
	EN 10025 S355J0C	
	EN 10025 S355J0G	
	EN 10025 S355JRG	
JIS G3101	SS330	Having each strength level, it is applied to structural materials for architecture, bridge, ships, rolling stocks and other structures.
	SS400	
	SS490	
	SS540	
JIS G3106	SM400A	Having superior strength and weldability, it is applicable to architecture, bridge, ships, rolling stock body, petroleum storage tanks, container and other constructions.
	SM400B	
	SM400C	
	SM490A	
	SM490B	
	SM490C	
	SM490YA	
	SM490YB	
JIS G3136	SN400B	Hot rolled – seismic improved structural steels, used for structural members buildings, architecture structures.
	SN490B	
JIS G3466	STKR 400	Carbon steel Square for general structural purposes
SNI 07 0601	BJPC	General Fabrication & Drawing Quality
	BJPS	
	BJPE	Corrugated Steel Structures

STANDARD	GRADE	GROUP APPLICATION
JIS A5525	SKK400	Welded pipes with low and high frequency welding.
JIS G3232	SPHT1	
	SPHT2	
	SPHT3	
	SPHT4	
MS 1768:2004	SPHT1	Hot-Rolled Carbon Steel Strip for Pipes and Tubes
	SPHT2	
ASTM A252	ASTM A252 GR 1	Electrical Resistance Welded Carbon steel for Boiled Tube
	ASTM A252 GR 2	
	ASTM A252 GR 3	
ASTM A53	ASTM A53 GR B	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
KRAKATAU STEEL	SPHK 1	Welded steel pipes and tubes
	SPHK 2	

Product Dimension

Thickness	1,60 - 25.0 mm
Width	600 - 2,000 mm
Coil Inner Diameter	760 - 2,000 mm
Coil weight	30 Ton Max
Length for Plate	12000 mm max

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General Pipe & Tubes

For general pipes and tubes, as for small-medium welded pipes & tubes for structural and/or non-structural uses, hot rolled steel grades are supplied with low-medium strength, good formability and bendability, and good weldability. The available standard specifications are:

JIS G 3132 SPHT 1, 2, 3, 4 for pipe and tube application

ASTM A252 Grade 1, 2, 3 for piling pipe application

JIS G 3132 (Hot rolled carbon steel for pipes & tubes)

Spec	Yield Strength (MPa)		Tensile Strength (MPa)	Elongation (%)	
	t < 1.6 mm	1.6 ≤ t < 3.0 mm		3.0 ≤ t < 6.0 mm	6.0 ≤ t ≤ 13 mm
SPHT 1	30 min	32 min	270 min	35 min	37 min
SPHT 2	25 min	27 min	340 min	30 min	32 min
SPHT 3	20 min	22 min	410 min	25 min	27 min
SPHT 4	15 min	18 min	490 min	20 min	22 min

ASTM A252 (Hot rolled carbon steel for piling pipe)

Spec	Yield Strength (MPa)	Tensile Strength (MPa)	Elongation (%)
Grade 1	205 min	345 min	30 min
Grade 2	240 min	415 min	25 min
Grade 3	310 min	455 min	20 min

PRODUCT SPECIFICATION FOR GENERAL PIPE AND TUBE APPLICATION

STANDARD	GRADE	GROUP APPLICATION
JIS A5525	SKK400	Welded pipes with low and high frequency welding.
JIS G3232	SPHT1	
	SPHT2	
	SPHT3	
	SPHT4	
MS 1768:2004	SPHT1	Hot-Rolled Carbon Steel Strip for Pipes and Tubes
	SPHT2	
ASTM A252	ASTM A252 GR 1	Electrical Resistance Welded Carbon steel for Boiled Tube
	ASTM A252 GR 2	
	ASTM A252 GR 3	
ASTM A53	ASTM A53 GR B	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
KRAKATAU STEEL	SPHK 1	Welded steel pipes and tubes
	SPHK 2	

Product Dimension

Thickness	1,60 - 25.0 mm
Width	600 - 2,000 mm
Coil Inner Diameter	760 - 2,000 mm
Coil weight	30 Ton Max



KRAKATAU STEEL
PARTNERSHIP FOR SUSTAINABLE GROWTH

WIRE ROD FOR COLD HEADING QUALITY

Wire rod for the manufacture of low carbon steel wires by cold heading and cold forging. Forged to make bolts, nuts and screws. This steel requires strict quality control, because the steel is placed under severe working conditions and used for Specificational purpose. The Specificational steel for cold heading application grade SWRCH 8A, 10A, 12A and 18A

Specification	KRAKATAU STEEL	Chemical Composition (%)					
		C	Si	Mn	P	S	Al
JIS G3507 SWRCH 8A	KS 1008 ACH	0.10 max	0.10 max	0.60 max	0.30 max	0.035 max	0.02 min
JIS G3507 SWRCH 10A	KS 1010 ACH	0.08-0.13	0.10 max	0.30-0.60	0.30 max	0.035 max	0.002 min
JIS G3507 SWRCH 12A	KS 1012 ACH	0.10 - 0,15	0,10 max	0,30-0,60	0,30 max	0.035 max	0.002 min
JIS G3507 SWRCH 18A	KS 1018 ACH	0.15-0.20	0.10 max	0.60-0.90	0.30 max	0.035 max	0.002 min

Fabrication Performance:	
Drawability	5*
Headability	A
Weldability	5*
Coating	5*

*1-Limited to 5-Exellent

**A-Applicable

**NA-Not Applicable

Specification	Mechanical Properties :		
	(Typical)		
	YS (Kg/mm ²)	TS (Kgmm ²)	EL (%)
SWRCH 8A	—	40 max	25 min
SWRCH 10A	—	45 max	25 min
SWRCH 12A	—	46 max	23 min
SWRCH 18A	—	48 max	23 min

*Basis in diameter 5,5-7,0 mm.

WIRE ROD FOR WELDING ELECTRODE

Welding Electrode Wire is a low carbon steels for stick electrode applications in carbon grades For covered electrode wire which are principally used for arc welding. Precise component control is required to ensure weldability and deposit metal quality. It is supplied with low strength, good drawability and Specificational chemical compositions.

Specification	Chemical Composition						Mechanical properties (Typical)		
	C	Si	Mn	P	S	Cu	YS (Kg/mm ²)	TS (Kg/mm ²)	El (%)
JIS G3503 SWRY11	0.09 max	0.03 max	0.35-0.65	0.020 max	0.023max	0.20 max	24-34	35-45	20 min

Fabrication Performance:	
Drawability	5*
Headability	NA**
Weldability	5*
Coating	5*

*1-Limited to 5-Exellent

**NA-Not Applicable

PRODUCT SPECIFICATION

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WIRE ROD HIGH CARBON GRADE SWRH

High Carbon Steel Wire Rod are used for high carbon steel for prestressed concrete (PC) wires, wire ropes, steel core for cable (wire strand), etc., and are supplied with medium-high strength, medium formability & drawability, and excellent cleanliness. Available specifications are JIS G 3506 SWRH 42A, 62A, 62B, 67A, 67B, 72A, 72B, 77B and 82B. High carbon steel used for shafting bar automotive application medium strength, good formability and excellent cleanliness. Available specification are JIS G 4051 S 30C, 35C and 45C.

Specification	EQUIVALENT	GROUP APPLICATION
JIS G 4051 S 30C	KS 1030	Carbon Steel for Shafting Bar
JIS G 4051 S 35C	KS 1035	
JIS G 4051 S 45C	KS 1045	
JIS G 3506 SWRH 42A	KS 1042A	Umbrella Ribs, Helical Wire
JIS G 3506 SWRH 62A	KS 1062A	Screw Driver, Spring Wire
JIS G 3506 SWRH 62B	KS 1062B	Screw Driver, Spring Bed
JIS G 3506 SWRH 67A	KS 1067A	Cable Housing, Spring Bed, Wire Rope Strand
JIS G 3506 SWRH 67B	KS 1067B	Bead Wire, Spring Bed, Wire Rope Strand
JIS G 3506 SWRH 72A	KS 1072A	ACSR, Bead Wire, Wire Rope Strand
JIS G 3506 SWRH 72B	KS 1072B	
JIS G 3506 SWRH 77B	KS 1077B	Frame Spring Bed, Wire for Rolling Door
JIS G 3506 SWRH 82 B	KS 1082B	Wire Rope, PC Strand
	KS 1082B1	PC Strand, PC Wire

Fabrication Performance:	
Drawability	5*
Headability	NA
Weldability	2*
Coating	3*

*1-Limited to 5-Exellent
 **A-Applicable
 **NA-Not Applicable

Mechanical Properties :		
	Standard	Typical
Yield Strength (kg/mm ²)	-	57 – 108
Tensile Strength (kg/mm ²)	-	68 – 130
Elongation (%)	-	8 – 14

*Basis in diameter 5,5-7,0.

Chemical Composition & Mechanical Properties

Specification	Diameter	Chemical Composition (%)				Mechanical Properties		
		C	Mn	P	S	YS (Kg/mm ²)	TS (Kg/mm ²)	Elongation (%)
KS 1042A	5,5-14	0.39-0.46	0.15-0.35	0.30-0.60	0.030 max	57-68	68-78	8-14
KS 1062A	5,5-7,0	0.59-0.66	0.15-0.35	0.30-0.60	0.030 max	71-81	86-98	8-12
KS 1062B	5,5-7,0	0.59-0.66	0.15-0.35	0.60-0.90	0.030 max	78-87	94-104	8-12
KS 1067A	5,5-7,0	0.64-0.71	0.15-0.35	0.30-0.60	0.030 max	79-88	98-105	8-12
KS 1067B	5,5-7,0	0.64-0.71	0.15-0.35	0.60-0.90	0.030 max	81-90	98-108	8-12
KS 1072A	5,5-7,0	0.69-0.76	0.15-0.35	0.30-0.60	0.030 max	83-91	99-109	8-12
KS 1072B	5,5-7,0	0.69-0.76	0.15-0.35	0.60-0.90	0.030 max	88-96	108-115	8-12
KS 1077B	5,5-7,0	0.74-0.81	0.15-0.35	0.60-0.90	0.030 max	92-100	110-120	7-12
KS 1082B	5,5-7,0	0.79-0.86	0.15-0.35	0.60-0.90	0.030 max	96-108	115-130	7-12
KS 1082B1	8,0-11,0	0.79-0.86	0.15-0.35	0.60-0.90	0.030 max	96-108	115-130	7-12



Chemical Composition for Shafting Bar Automotive Application

Specification	KRAKATAU STEEL Chemical Composition (%)				
	C	Si	Mn	P	S
KS 1030	0.27-0.33	0.15-0.35	0.60-0.90	0.030 max	0.035 max
KS 1035	0.32-0.38	0.15-0.35	0.60-0.90	0.030 max	0.035 max
KS 1045	0.42-0.48	0.15-0.35	0.60-0.90	0.030 max	0.035 max

WIRE ROD LOW-MEDIUM CARBON

Low-medium Carbon Steel Wire Rod are used for general wires, wire mesh, general fasteners, fence, galvanish etc., and are supplied with low-medium strength, good formability & drawability and good weldability. Available Specificationifications are JIS G 3505 SWRM 6, 8, 10, 12, 15, 20.

Specification	EQUIVALENT		GROUP APPLICATION
	KRAKATAU STEEL	AISI / SAE	
JIS G 3505 SWRM 6	KS 1006	1006	Nails, Wire Mesh
JIS G 3505 SWRM 8	KS 1008	1008	
JIS G 3505 SWRM 8	KS 1008	1008	Shafting bar, Automotif
JIS G 3505 SWRM 10	KS 1010	1010	Nails
			Wire Galvanish
JIS G 3505 SWRM 12	KS 1012	1012	Wire Mesh
JIS G 3505 SWRM 15	KS 1015	1015	Nails, Wire Mesh
JIS G 3505 SWRM 20	KS 1020	1020	Nails, Wire Mesh

Specification	Diameter	Chemical Composition				Mechanical properties (Typical)		
		C	Mn	P	S	YS (Kg/mm ²)	TS (Kg/mm ²)	EL (%)
SWRM 6	5,5-20.0	0.08 max	0.60 max	0.040 max	0.040 max	22-35	32-44	21-31
SWRM 8	5,5-20.0	0.10 max	0.60 max	0.040 max	0.040 max	22-35	35-46	21-31
SWRM 10	5,5-20.0	0.08-0.13	0.30-0.60	0.040 max	0.040 max	22-35	36-47	21-31
SWRM 12	5,5-20.0	0.10-0.15	0.30-0.60	0.040 max	0.040 max	24-36	38-48	21-31
SWRM 15	5,5-20.0	0.13-0.18	0.30-0.60	0.040 max	0.040 max	26-40	41-56	21-29
SWRM 20	5,5-20.0	0.15-0.20	0.30-0.60	0.040 max	0.040 max	27-40	45-58	19-28

*Basis in diameter 5,5-7,0

Fabrication Performance:	
Drawability	5*
Headability	NA**
Weldability	5*
Coating	5*

*1-Limited to 5-Exellent

**NA-Not Applicable

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WIRE ROD FOR DEFORMED BAR IN COIL

Deformed bar in coil was manufactured PT Krakatau Steel (Persero) Tbk. by using lines of wire rod mill production process. Diameter of 6-16 mm were used commercially, have been used for the support of construction with the customize size. Excellence deformed bar in coil compared with deformed bars such as have high tensile strength, high elongation, good weldability, zero waste, save costs and saving time. Market demand for wire mesh will now move to the high product segment high tensile elongation, thus forcing manufacturers for the fulfillment these demand. Deformed bar in coil applications for the manufacturing industry, EPC, Precon and wire mesh.

KRAKATAU STEEL	EQUIVALENT	GROUP APPLICATION	
KS1318	JIS G 3112 SD 490	Low Carbon (Good Weldability)	Deformed Bar In coil for General construction
KS1325V	JIS G 3112 SD 490	Medium Carbon	

Mechanical Properties :		
	Standard	Typical
Yield Strength (kg/mm ²)	50 - 63	50 - 56
Tensile Strength (kg/mm ²)	63 min	65 - 75
Elongation (%)	13 min	16 - 25
Ratio TS/YS	-	1,25 min

Specification	Diameter	Chemical Composition				
		C	si	Mn	P	S
KS 1318	6.0-13.0	0.17-0.21	0.16-0.20	1.50-1.7	0.030 max	0.030 max
KS1325V	6.0-13.0	0.25-0.27	0.20-0.30	1.40-1.50	0.030 max	0.030 max

WIRE ROD FOR GRINDING BALL

Grinding Balls are made from high carbon steel (0.80-1.0%C) with controlled amounts of alloying. PT Krakatau Steel (Persero) Tbk. has been experienced to supply raw material round bar for the grinding ball manufacture for Specification KS1082B2 and 1095GB

KRAKATAU STEEL	EQUIVALENT	GROUP APPLICATION
KS 1082 B2	JIS G 3507 SWRH 82B	Alloy Steel For Grinding Ball
KS 1095 GB		

Chemical Composition

Specification	Chemical Composition				
	C	si	Mn	P	S
KS 1082B2	0.76-0.84	0.15-0.35	0.70-0.80	0.030 max	0.030max
KS 1095GB	0.92-1.0	0.15-0.35	0.70-0.80	0.030 max	0.030max