JFE

Steel bars and wire rods from JFE

JFE Steel Corporation

A Challenging Spirit, Flexibility, Sincerity

Steel Solution

With advanced technologies,
JFE offers steel bars and wire rods
that support our society in various fields.

CONTENTS

Advantages of JFE's steel bars and wire rods

JFE has manufacturing equipment in its west Japan base in Kurashiki and its east Japan base in Sendai, allowing our customers to choose from blast furnace and electric arc furnace materials according to their needs.

High-cleanliness steel with the blast furnace-converter method (Kurashiki)

The combination of the blast furnace, hot-metal pretreatment, top and bottom blown converter, ladle refining, and strongly-stirred vacuum degassing processes has enabled the production of high-cleanliness steel.

Environmentally-friendly steel manufacturing with the electric arc furnace method (Sendai)

JFE's state-of-the-art, Ecological and Economical Arc Furnace (ECOARC) uses iron scraps as raw materials. With this furnace, JFE has achieved people-friendly and environmentally friendly steel manufacturing.

A rich line-up of products

JFE offers a wide product line-up to meet the sophisticated and diverse needs of the market.
We always want to deliver quality products and services that suit our customers' needs quickly. So, we always keep pushing our product development to anticipate our customers' needs in the future.

A wide range of size variations

We can manufacture round bars (steel bars) from 16 mmϕ up to the world's largest 450 mmϕ, square bars up to 750 mm, and coils from 4.2 to 5.2 mmϕ. With our in-house developed 4-roll mill in Kurashiki and 3-roll mill in Sendai, we can manufacture mid-size steel bars with high dimensional accuracy and wire rods with a 0.1-mm pitch.

Excellent surface quality

We have various types of non-destructive inspection equipment for everything from billets to products. In Kurashiki, we can manufacture excellent surface-quality steel bars and wire rods, using the automatic round billet surface scanning equipment. In addition, round billet peeling enables us to manufacture flawless wire rods.

Optimal quality design for application and processing

Through optimal component control and rolling texture control according to the application and processing, we provide products with a range of superior processing characteristics that are needed during secondary processing. These characteristics include descaling property, drawability, cold forginability, achinability, and heat treatment performance.

Typical application

A wide lineup to meet the diverse needs of our customers

Our products are designed and manufactured according to Japanese Industrial Standards (JIS). However, we can also meet your other needs, such as compliance with SAE, AISI, DIN, and other international standards.

<table>
<tr><th>Standard grade</th><th>Equivalent Japanese Industrial Standards (JIS)</th><th>Typical application</th></tr>
<tr><td>Carbon steels for machine structural use
S 10C to 58C
S 09CK to 20CK</td><td>JIS G 4051</td><td>Parts for automobiles, ships, precision machines, and electrical machines</td></tr>
<tr><td>Alloy steels for machine structural use
SMn 420 to 443
SMnC 420、443
SCr 415 to 440
SCM 415 to 822
SNCM220 to 815 (H)</td><td>JIS G 4052
JIS G 4053</td><td>Special parts for construction machines, automobiles, etc., high-tensile bolts, shafts, gears, and various chain pins and bushes</td></tr>
<tr><td>Alloy steel bolting materials for high temperature service
SNB 7, 16</td><td>JIS G 4107</td><td>High-temperature pressure vessel valve and coupling bolts</td></tr>
<tr><td>Spring steels
SUP 9, 12, 9A</td><td>JIS G 4801</td><td>Coil springs for automobiles, automobile stabilizers, and torsion bars</td></tr>
<tr><td>Free-cutting steels
・SUM
22 to 31, 22L, 23L, 24L
・SAE（AISI）
1117, 1213, 1215, 12L14
1215M, 1215MU, 1215ML</td><td>JIS G 4804 and SAE (AISI)</td><td>Parts for automobiles, electrical machines, and precision machines</td></tr>
<tr><td>High carbon chromium bearing steels
SUJ 2, SUJ 3</td><td>JIS G 4805</td><td>Bearings, pins, and machine parts</td></tr>
<tr><td>Boron steels
10 B21 to 10B38 KF10T
15 B23 to 15B41
S35BC, S40BC, S48BC</td><td>—</td><td>High-strength nuts and bolts, machine parts, and load chains</td></tr>
<tr><td>Free-cutting steels for machine structural use (Carbon steels/alloy steels for machine structural use)
<table>
<tr><td rowspan="3">Free-cutting steel with lead</td><td>Additional symbol</td><td>Pb（%）</td></tr>
<tr><td>.....L1</td><td>0.04 to 0.09</td></tr>
<tr><td>.....L2</td><td>0.10 to 0.30</td></tr>
</table>
<table>
<tr><td rowspan="4">Sulfur free-cutting steel</td><td>Additional symbol</td><td>S（%）</td></tr>
<tr><td>.....S0</td><td>0.015 to 0.035</td></tr>
<tr><td>.....S1</td><td>0.040 to 0.070</td></tr>
<tr><td>.....S2</td><td>0.080 to 0.120</td></tr>
</table></td><td>—</td><td>Construction machines, special parts for automobiles, etc., shafts, and gears</td></tr>
</table>

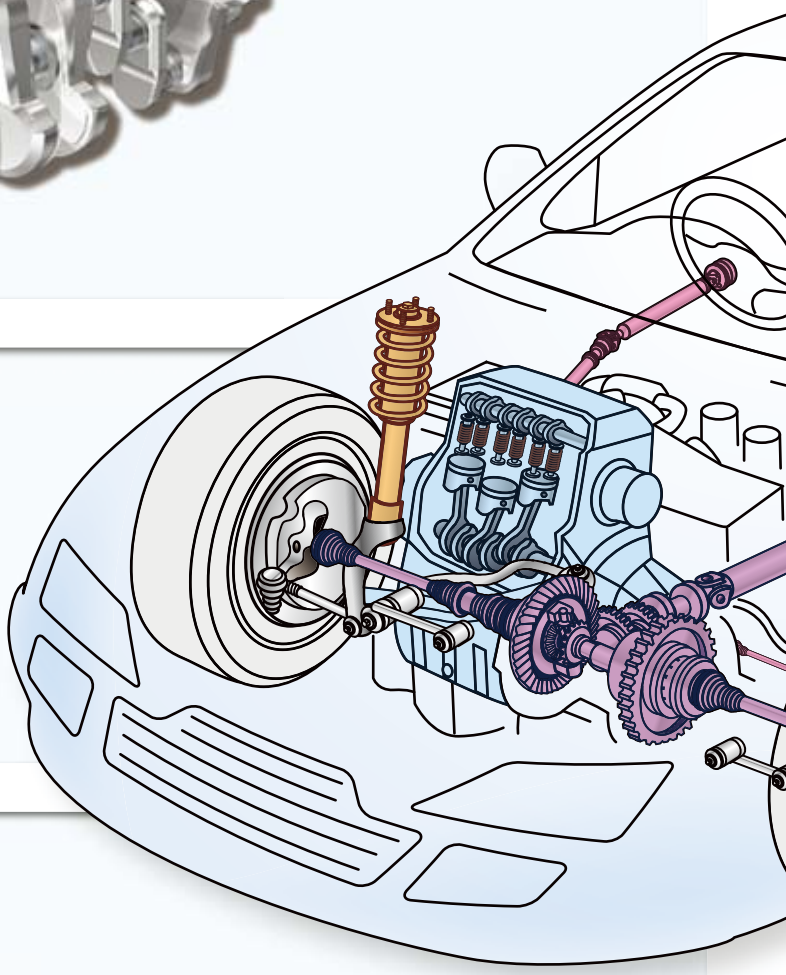
Standard grade	Equivalent Japanese Industrial Standards (JIS)	Typical application
Microalloyed steel NH45MV, NH48MV, S45CVS1, etc.	—	Cranks, for machine structure use, tie bars, and tie rods
Chrome-vanadium steels S 32CC5V to 55CC4V	—	Machinist hand tools, various tools, cutlery, driver bits, and for machine structure use
Wires for high-strength hoops SD785	—	Shear reinforcement for construction use
Piano wire rods SWRS 62A, B to 87A, B	**JIS G 3502**	Piano wires, PC wires and PC stranded wires, oil-hardened and tempered wires, and quality springs
Low carbon steel wire rods SWRM 6K to 22K	**JIS G 3505**	Iron wires, coated iron wires, annealed iron wires, nails, welded wire meshes, barbed wires, and deformed wires, Building metal fittings
High carbon steel wire rods SWRH 27 to 37, 42A, B to 82A, B	**JIS G 3506**	Wire ropes, springs, spokes, spring washers, stranded steel wires, and steel wires
Carbon steels for cold heading Part 1: Wire rods SWRCH 6A to 22A 10K to 50K	**JIS G 3507-1**	Nuts and bolts, small screws, small tacks, and other various machine parts
Rolled steel for general structure SS 330～540	**JIS G 3101**	Foundation bolts for civil engineering and construction and for bridges, Other general machine parts
Rolled carbon steel for cold-finished steel bars SGD A, B 1K to 4K, 3KM to 4KM	**JIS G 3108**	Parts for automobiles, machines, ships, and other general machines and shafts

We support the automobile industry with high-quality steel products.

Our steel products have been used for various key parts for machine security, from the heart of the automobile–the engine–to power trains, suspensions, and so on.
We offer advanced steel bars and wire rods that ensure driver safety and contribute to the development of lightweight and energy-saving vehicles.

Engine

Crankshaft
Connecting rod
Rocker arm shaft
Camshaft
Piston pin
Ring gear
Field core



Seat

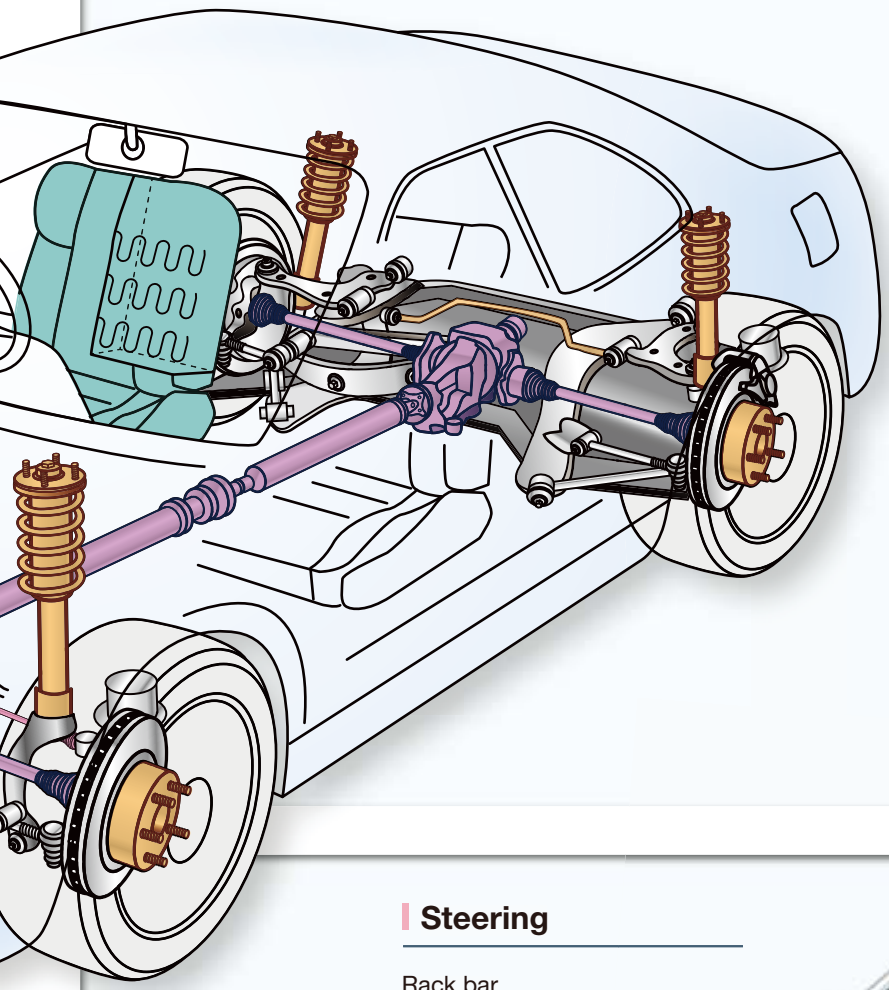
Seat spring

Shared parts

Bearing
Bolt
Nut
Gear

Power trains

Mission gear
Differential gear
Output shaft
CVT pulley
Clutch
Front axle
Rear axle
Ball joint
Constant-velocity joint
Propeller shaft
Joint yoke



Suspension system

Hub unit
Shock absorber
Stabilizer
Steering-knuckle arm

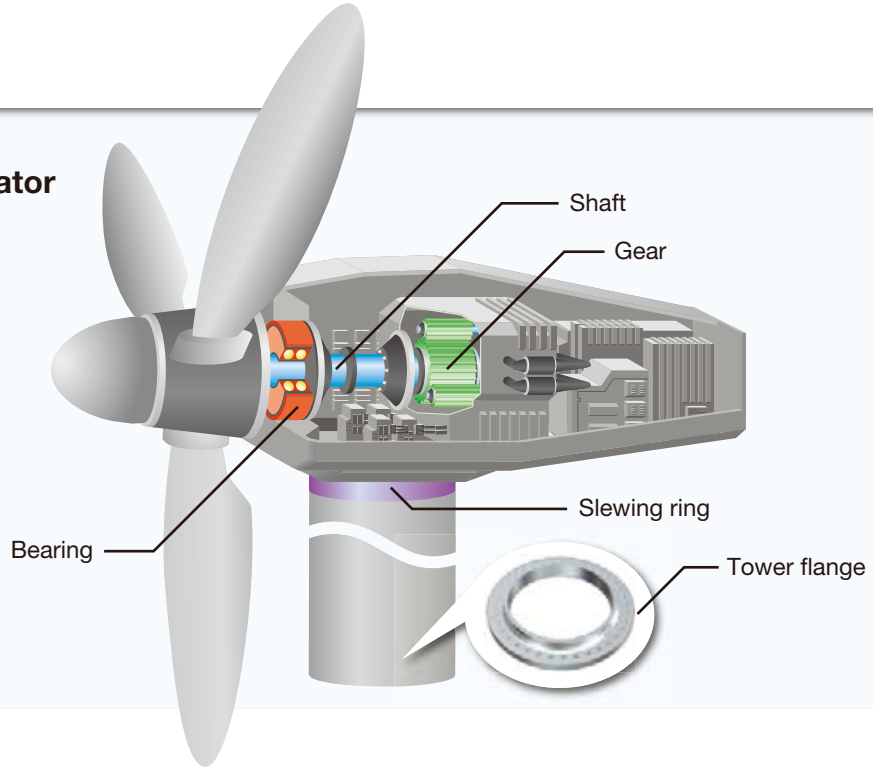
Steering

Rack bar
Pinion gear
Yoke
Tie-rod end
Pitman arm

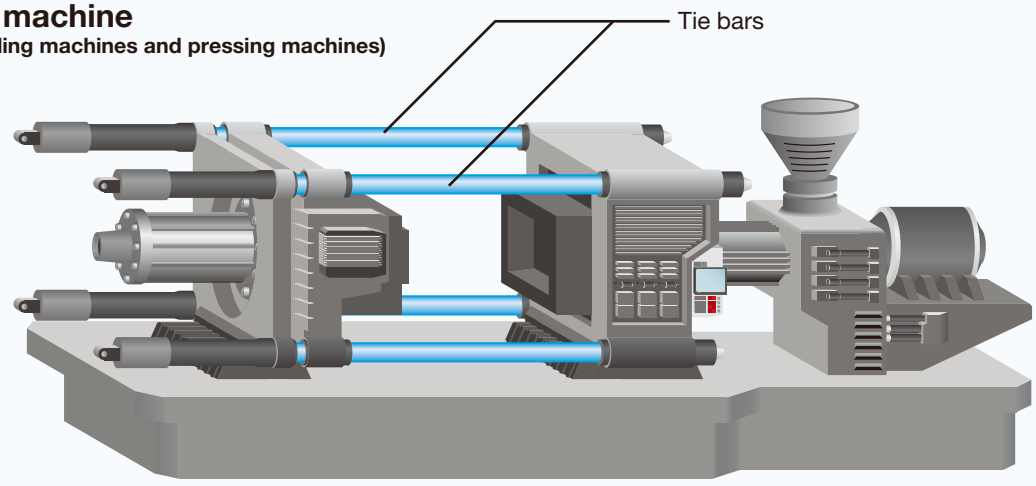
Our steel bars and wire rods have been used in a wide range of industrial fields, including wind-power generators and construction machines.

Our steel bars and wire rods have been used in a wide range of fields, including: wind-power generators, which have been getting increasing attention as a clean energy source; construction machines such as power shovels and dump trucks; ship engines; and industrial machines such as injection molding machines.

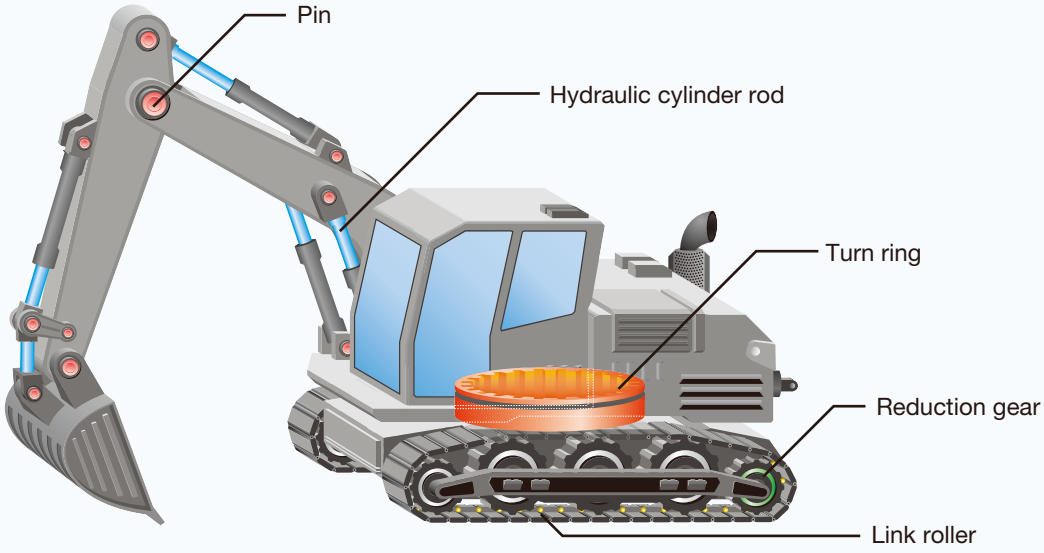
Wind-power generator



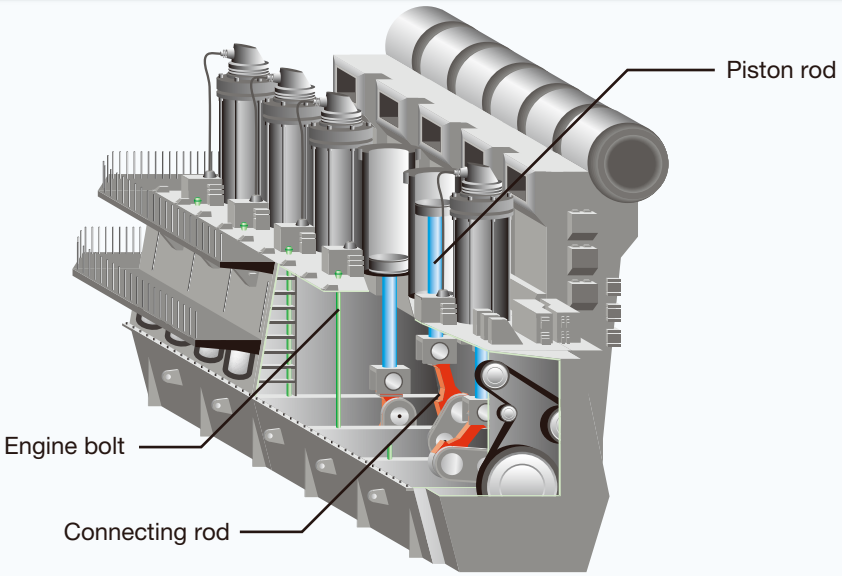
Industrial machine
(Injection molding machines and pressing machines)



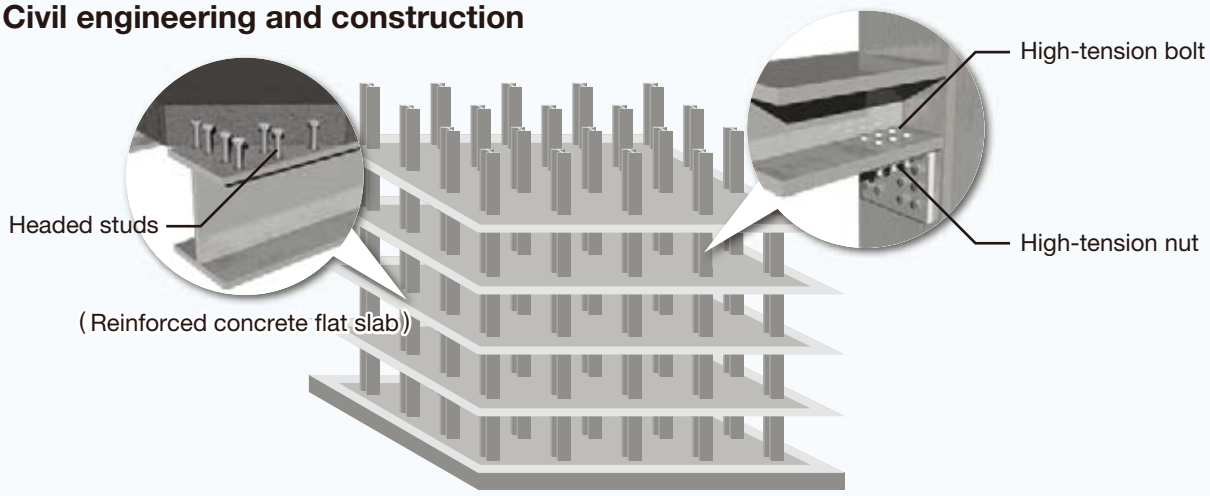
Power shovel



Ship engine



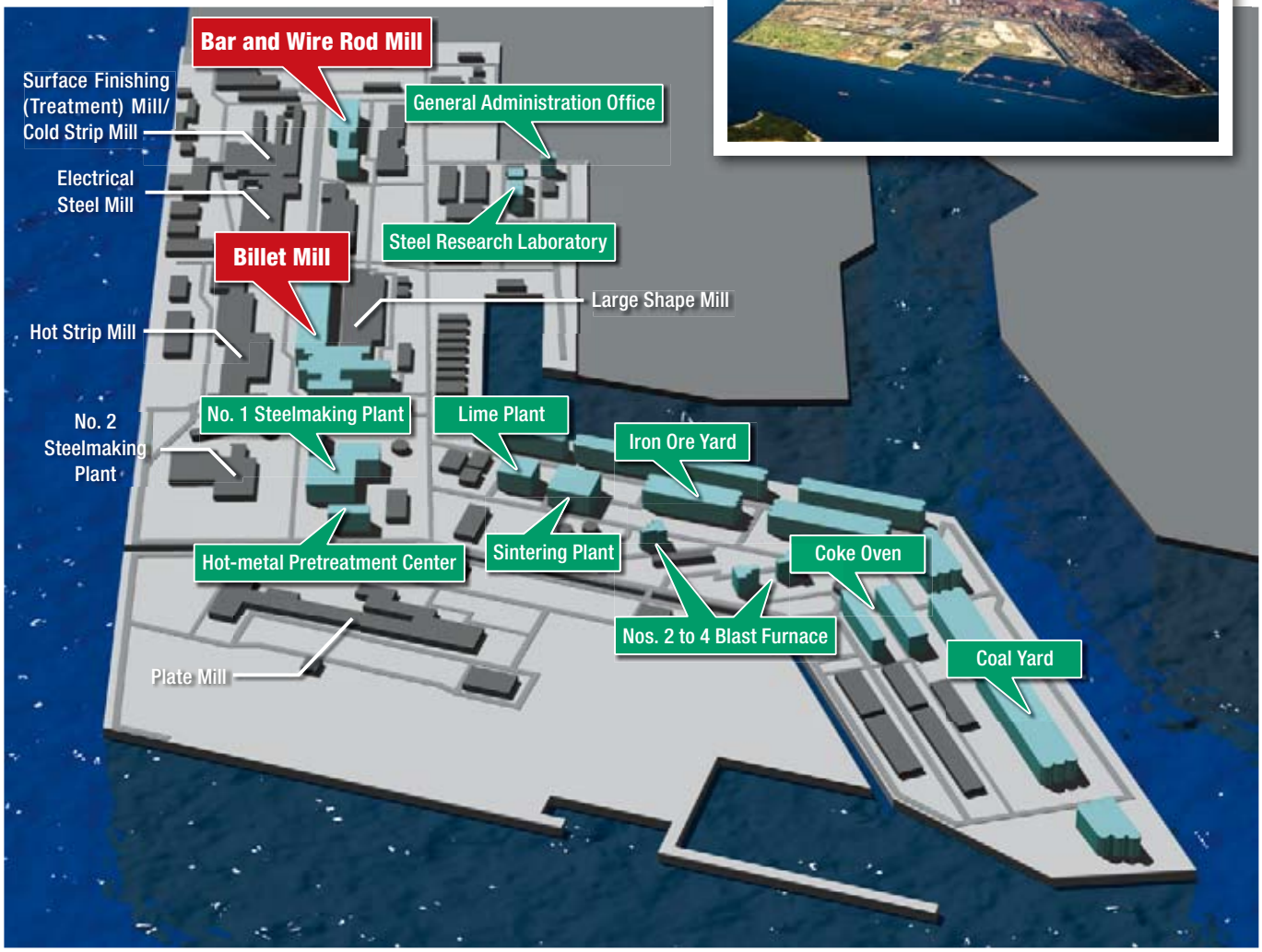
Civil engineering and construction



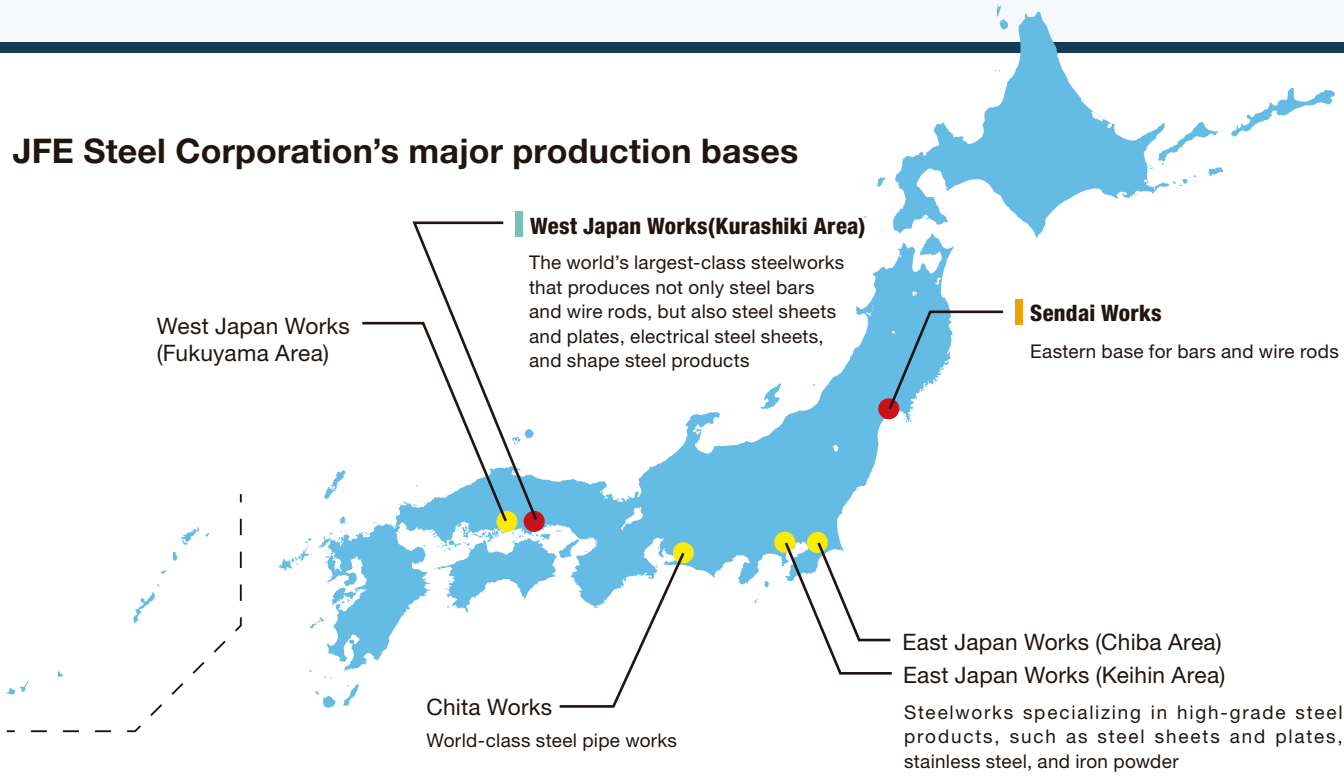
JFE Steel Corporation West Japan Works, the world's largest steelworks, and Sendai Works, that produce steel bars and wire rods

Our production bases consist of two large-scale coastal steelworks located in eastern and western Japan and two other works: Chita Works and Sendai Works. West Japan Works in Kurashiki Area and Sendai Works efficiently produce high-quality steel bar and wire rod products using state-of-the-art technologies.

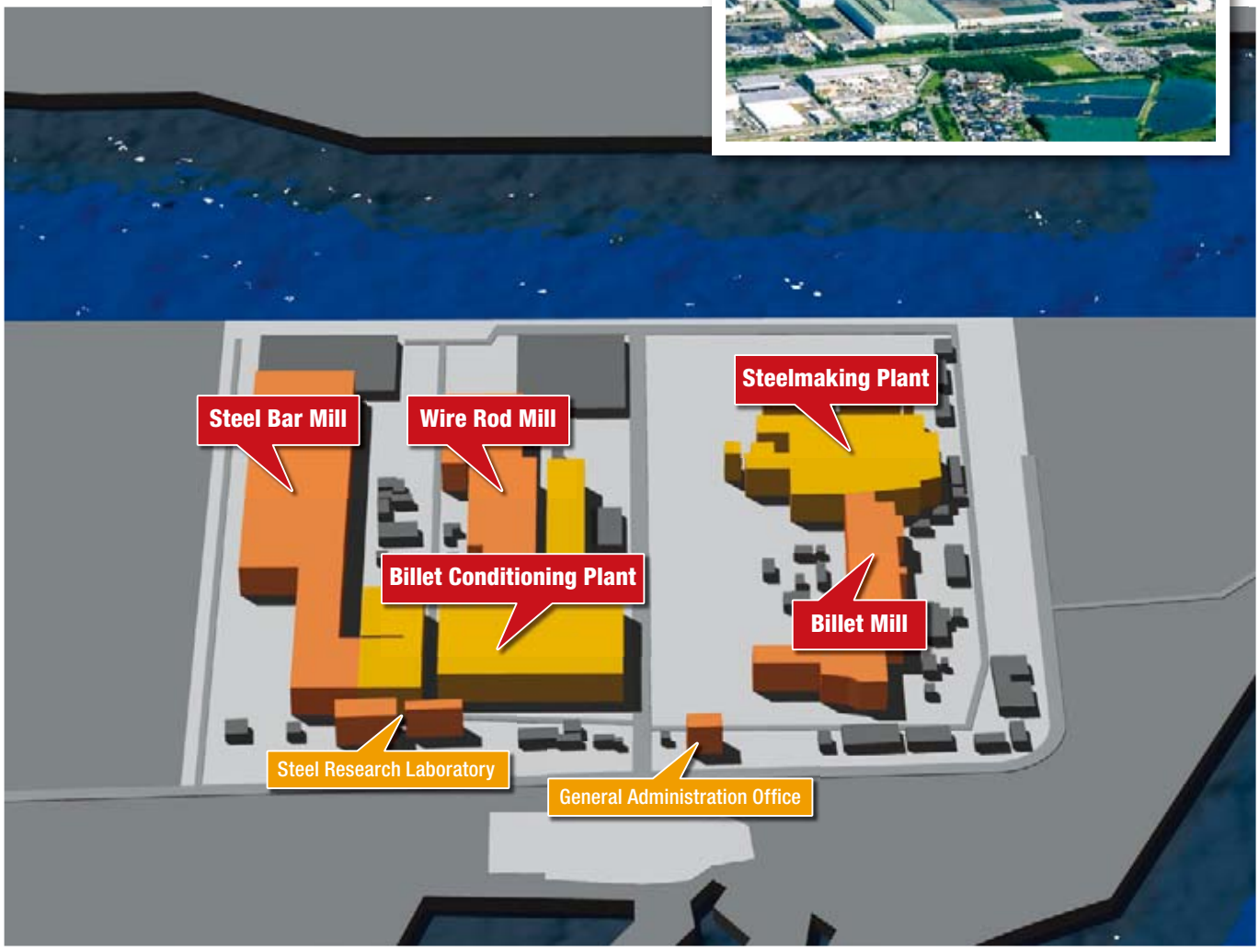
Layout of West Japan Works in Kurashiki Area



JFE Steel Corporation's major production bases



Layout of Sendai Works



Manufacturing process and equipment <overview>

West Japan Works in Kurashiki Area

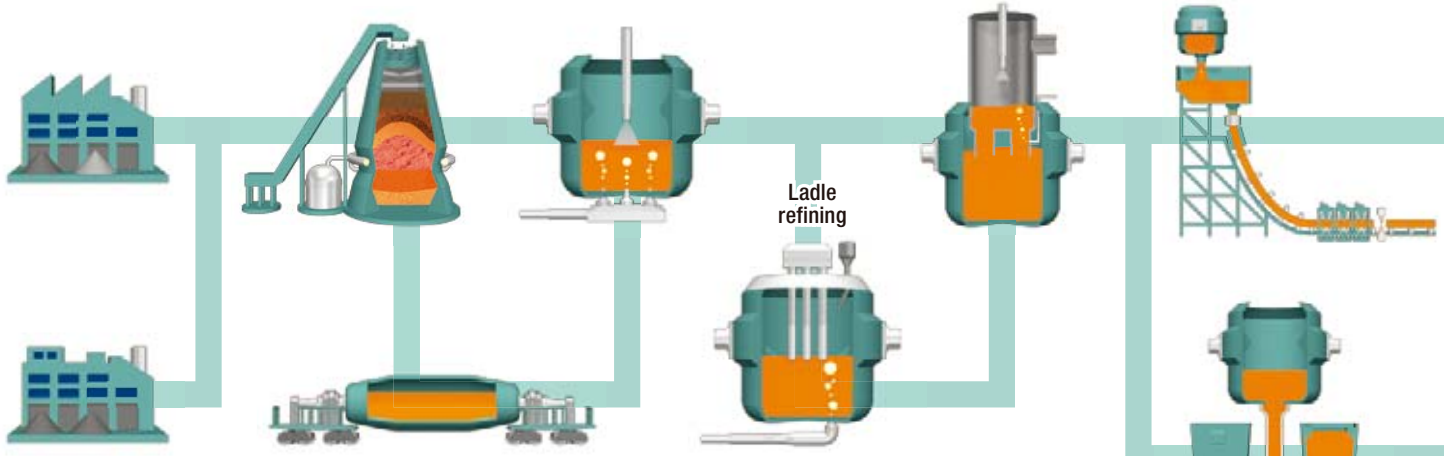
Sintering plant
Iron ore and limestone are heated and hardened to form sintered ore.

Blast furnace
Iron ore is melted and reduced to pig iron.

Steel converter
After the pig iron is poured into the furnace, oxygen is blown in to remove carbon and refine it to molten steel.

Continuous casting
<with electro magnetic stirrer>

The molten steel is continuously cast into blooms.



Coke oven
Coke is manufactured from baked coal at high temperatures in the coke plant.

Hot-metal pretreatment
Oxygen and lime are blown into hot metal to remove impurities such as sulfur and phosphorus.

Secondary refining
<ladle refining and vacuum degassing>

Non-metallic inclusions are further removed from the molten steel to achieve higher quality.

Ingot casting
The molten steel is cast with ingot molds.


Blast furnace


Steel converter


Ladle refining equipment


Vacuum degassing equipment

Sendai Works

Electric arc furnace
Iron scraps are melted and refined to produce molten steels.

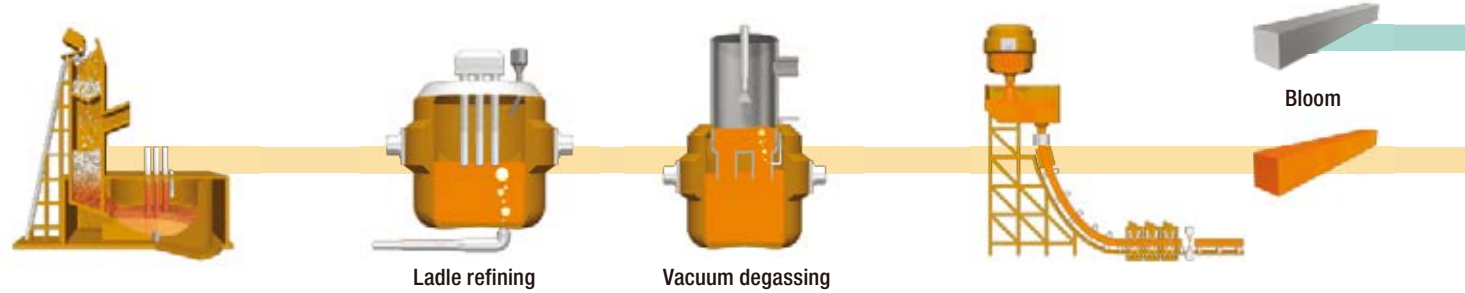
Secondary refining
<ladle refining and vacuum degassing>

Non-metallic inclusions are further removed from the molten steel to achieve higher quality.

Continuous casting
<with electro magnetic stirrer>

The molten steel is continuously cast into blooms.

(From West Japan Works)




Electric arc furnace (ECOARC)


Ladle refining equipment


Vacuum degassing equipment


Continuous casting machine

Billet rolling

The bloom are rolled out into billets.

Steel bar and wire rod rolling

Billets are rolled out into steel bars and wire rods.

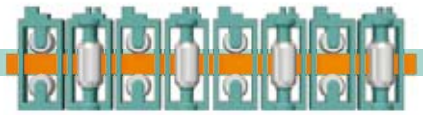
Wire rod secondary processing

Pickling, bonderizing + spheroidizing + wire drawing

Cold-drawn wire rods

(bearing steel)

Bloom



Steel bars

Φ 16 to 90mm

Bars in coil and wire rods

- Bars in coil
  Φ 16 to 38mm
  □ 12.7 to 27mm
- Wire rods
  Φ 4.2 to 19mm

Ingot

Round bar

Φ 95 to 450mm

Square bar

□ 250 to 750mm

Continuous casting equipment

Ingot casting machine

Equipment used in No. 1 Steelmaking Plant

Furnace	Steel converter (LD-KGC method)	200 t / operation	3 units
Secondary refining equipment	Ladle refining equipment	200 t / operation	1 unit
	Vacuum degassing equipment	200 t / operation	2 unit
Continuous casting machine	Fully curved continuous casting	4 strand *1	1 unit
Ingot casting equipment	Bottom casting	Ingot weight 12 t / 24 t	2 unit

*1: Bloom dimensions: 300 mm (thickness) × 400 mm (width), and 400 mm (thickness) × 560 mm (width)

Wire rod rolling

Billets are rolled out into wire rods.

Billet rolling

The bloom are rolled out into billets.

Wire rods

Φ 5.5 to 18mm

Steel bar rolling

Billets are rolled out into steel bars.

Steel bars

Φ 17 to 120mm

Bars in coil

Φ 16.7 to 52mm

Billet rough rolling mill

Billet finishing rolling mill

Equipment used in Steelmaking Plant [Nominal capacity: 852,000 tons annually]

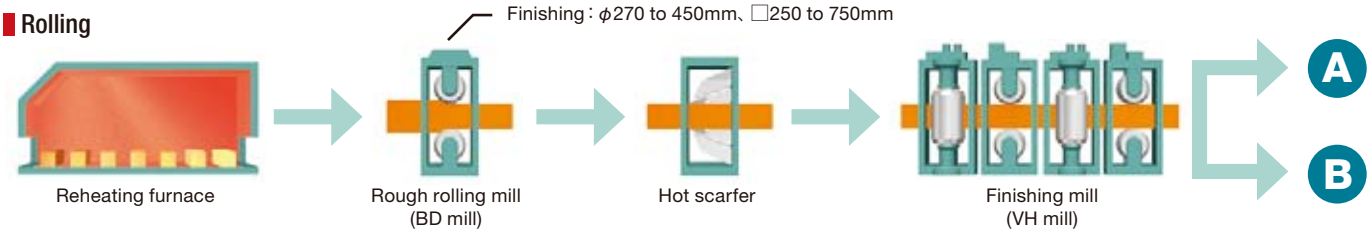
130T UHP electric arc furnace	75 MVA transformer, electrode 24 inch in dia. Eccentric bottom tapping type ecological and economical arc furnace	1 unit
Ladle refining equipment	16 MVA transformer, electrode 16 in dia., LF process truck type	1 unit
Vacuum degassing equipment	2-vessel revolving type, oxygen top blowing possible	1 unit
Continuous casting machine	Fully curved continuous casting, 4 strand *2	1 unit

*2: Bloom dimensions: 310 mm (thickness) × 400 mm (width)

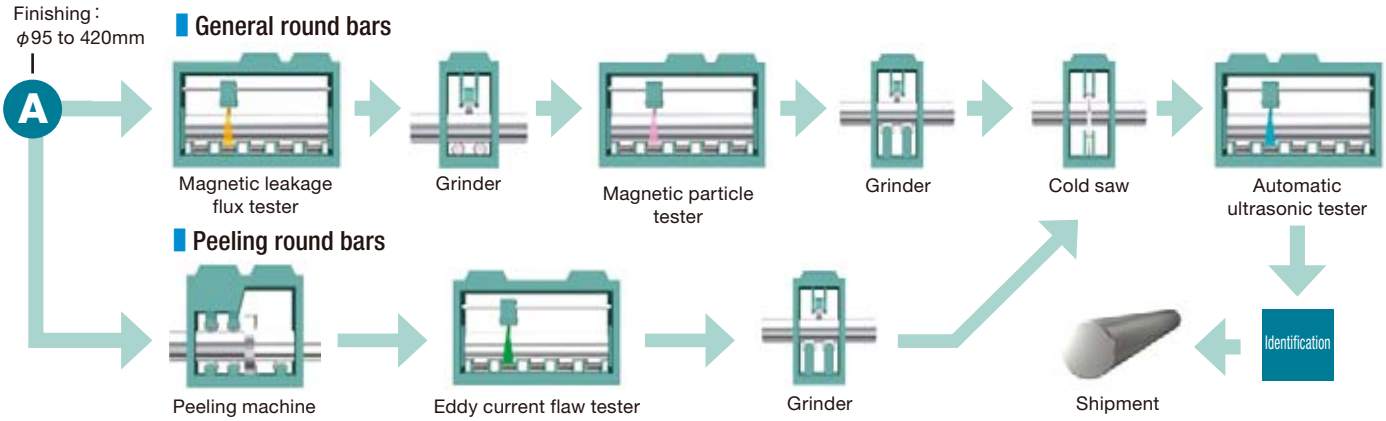
Manufacturing processes and equipment

Manufacturing Process at Billet Mill

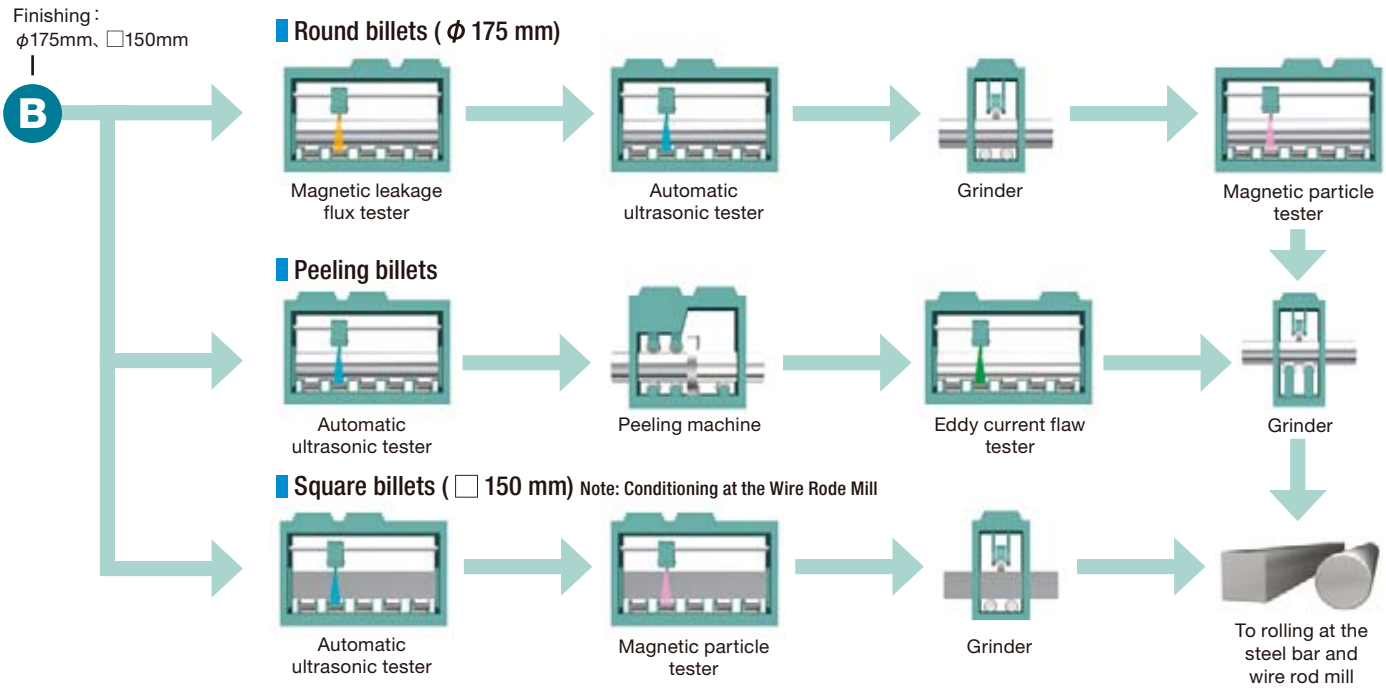
Rolling



Conditioning A (Product)



Conditioning B (to the steel bar and wire rod mill)




Rough rolling mill


Finishing rolling mill


Automatic ultrasonic tester


Peeling machine

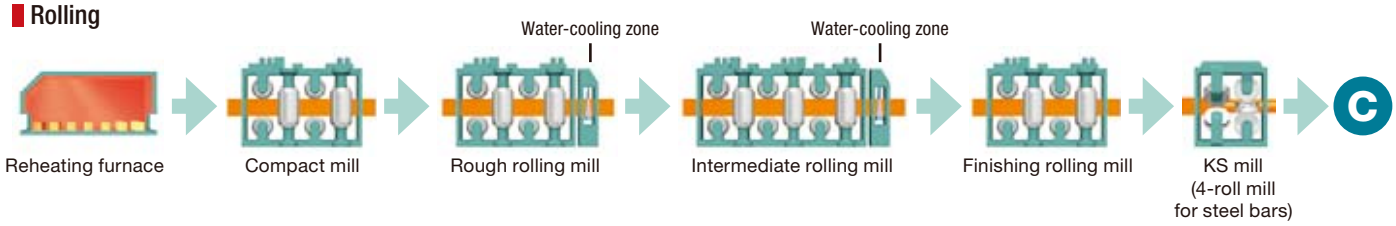
Equipment used in Billet Mill

Rolling mill	Rough rolling mill (high-lift dual reversible system)	1 unit
	Finishing rolling mill (dual continuous type, VH mill)	4 stands
Conditioning inspection equipment	Press straightener	2 units
	Magnetic leakage flux tester	1 unit
	Automatic ultrasonic tester for round bar full cross section	2 units
	Magnetic particle tester	2 units
	Billet grinder equipment	5 units
	Peeling machine	2 units
	Eddy current flaw tester	1 unit

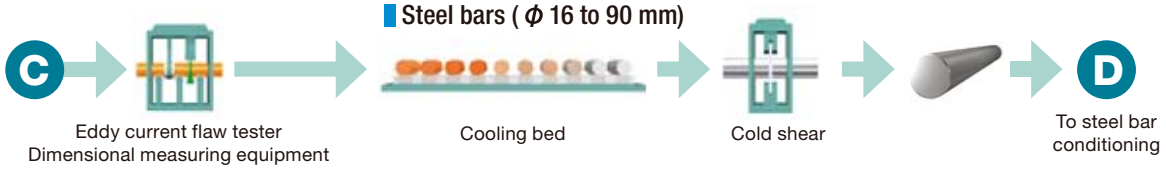
[Nominal capacity: 1,440,000 tons annually]

Manufacturing process at Steel Bar and Wire Rod Mill

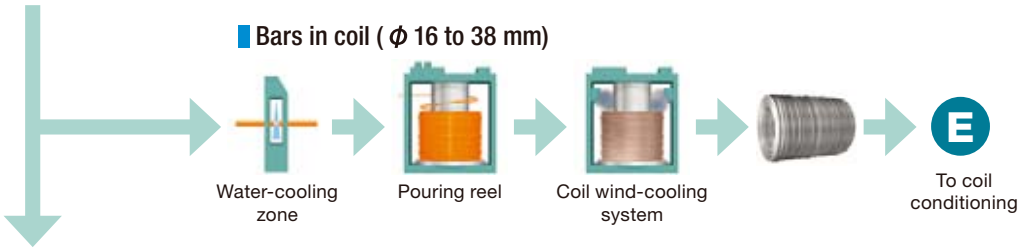
Rolling



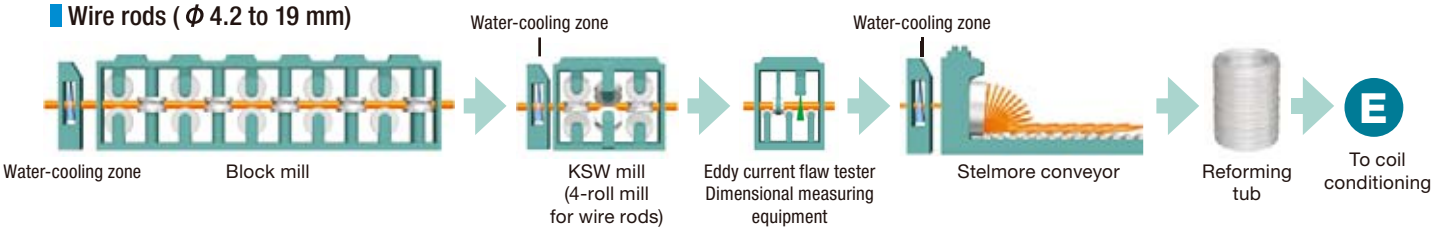
Steel bars (ϕ 16 to 90 mm)



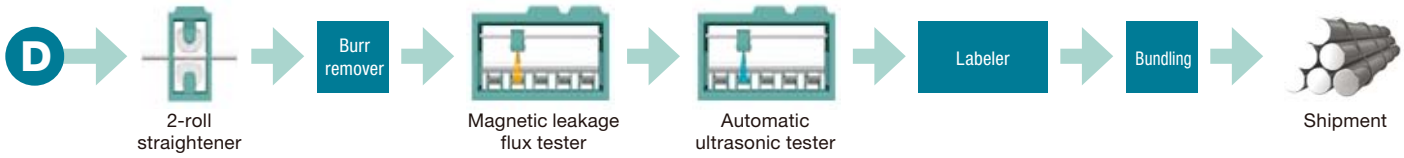
Bars in coil (ϕ 16 to 38 mm)



Wire rods (ϕ 4.2 to 19 mm)



Steel bar conditioning



Coil conditioning

Equipment used in Steel Bar and Wire Rod Mill

Rolling mill	Rough rolling mill (H-V system)	8 units
	Intermediate rolling mill (H-V system)	6 units
	Finishing rolling mill (H-V system)	4 units
	KS mill (4-roll mill for steel bars)	2 stands
	Wire rod finishing rolling mill (block mill)	10 stands
	KSW mill (4-roll mill for wire rods)	3 stands
Conditioning inspection equipment	Straightener	2 units
	Magnetic leakage flux tester	2 units
	Automatic ultrasonic tester for round bar full cross section	2 units
	Magnetic particle tester	1 unit

[Nominal capacity: 580,000 tons annually]


Rough rolling mill


KS mill


Steel bar conditioning line


Stelmore conveyor

Manufacturing processes and equipment

Manufacturing process at Billet Rolling Mill

Reheating furnace → Rough rolling mill → Hot scarfer → Finishing rolling mill → Shear → Indication → To billet conditioning

Manufacturing process at Billet Conditioning Plant

Shot blast → Magnetic particle tester → Automatic ultrasonic tester → Grinder → Inspection testing → To rolling at wire rod/steel bar mill

Manufacturing process at Wire Rod Mill

Rolling

Reheating furnace → No. 1 rough rolling mill → No. 2 rough rolling mill → No. 1 intermediate rolling mill → A

Finishing rolling/Stelmore conveyor <2 lines>

A → No. 2 intermediate rolling mill (Pre-finishing mill) → Finishing mill (NT block mill) → Eddy current flaw tester Dimensional measuring equipment → Water-cooling zone → Stelmore conveyor → Reforming tub → B Coil conditioning

Coil conditioning

B → Hook conveyor → Appearance testing, identification testing, magnetic particle testing, etc. → Bundling → Weighing → Shipment

Equipment used in Billet Rolling Mill

Reheating furnace	Walking-beam type, 200 tons per hour	1 unit
Rough rolling mill	Horizontal dual reversible system	1 unit
Hot scarfer	Scarfing: 1.0 to 2.0 mm	1 unit
Finishing rolling mill	4 stands (V-H)	1 unit
Cooling bed	Rake type, 2 beds	1 unit

[Nominal capacity: 1,152,000 tons annually]

Equipment used in Billet Conditioning Plant

Shot blast	150 t/h	2 units
Magnetic particle tester	1 unit of automatic flaw-detecting device	4 units
Automatic ultrasonic tester	3MHz	1 unit
Billet grinder	With magnetic particle tester	7 units
Press straightener	–	1 unit

[Nominal capacity: 1,080,000 tons annually]

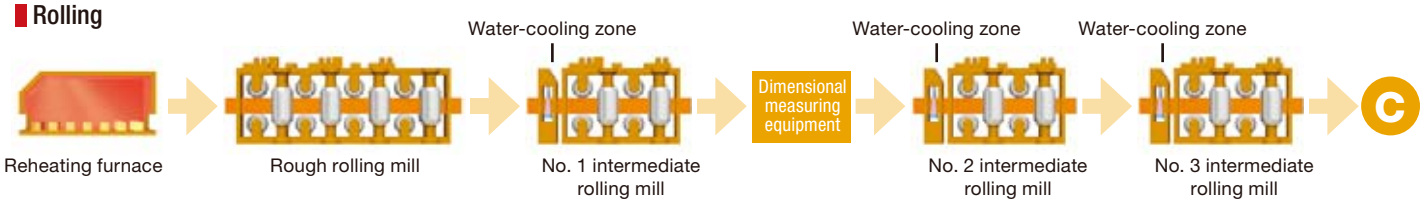
Equipment used in Wire Rod Mill

Reheating furnace	Walking-beam type, 130 tons per hour	–
Rolling mill	No. 1 rough rolling mill (continuous V-H system)	2 units
	No. 2 rough rolling mill (horizontal dual close top type)	7 units
	No. 1 intermediate rolling mill (horizontal dual close top type)	6 units
	No. 2 intermediate rolling mill (Pre-finishing mill)	2 units × 2 systems
	Finishing rolling mill (NT block mill)	2 stands
	Stelmore conveyor (forced-wind cooling type)	2 systems
	Eddy current flaw tester	2 units
	Dimensional measurement equipment	2 units
Conditioning inspection equipment	Magnetic particle tester	1 unit

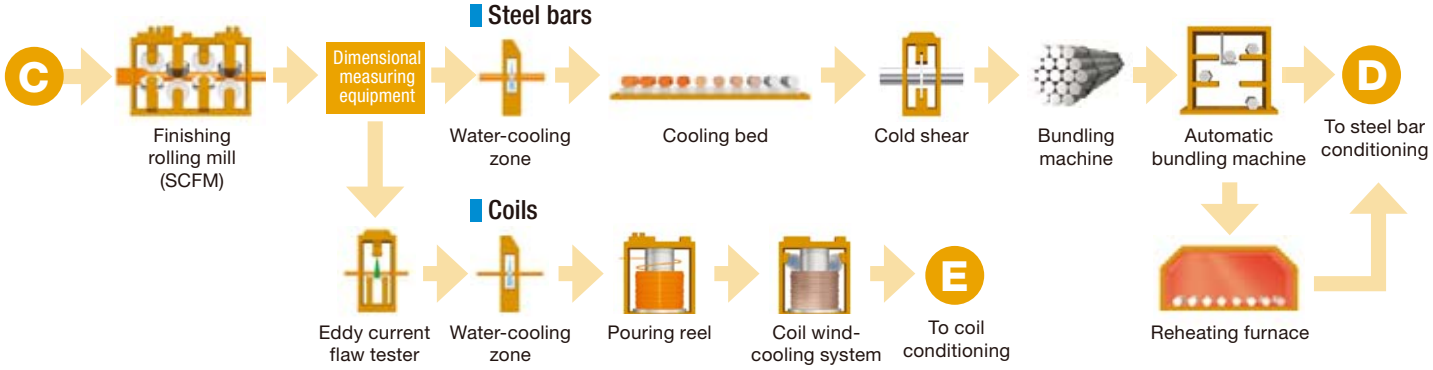
[Nominal capacity: 300,000 tons annually]

Manufacturing process at Steel Bar Mill

Rolling

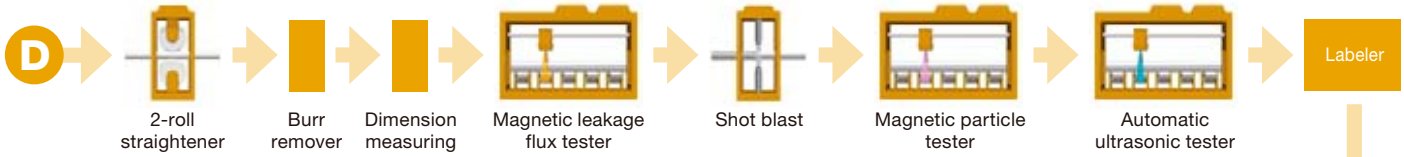


Steel bars

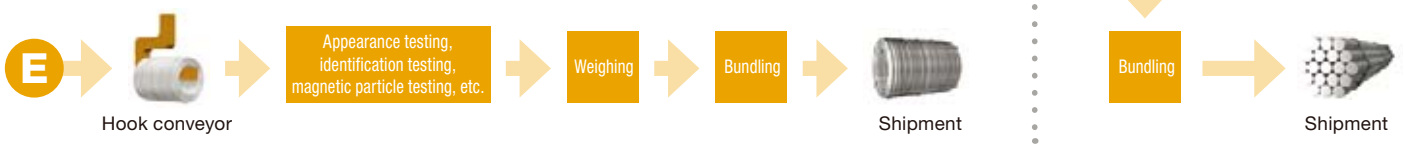


Coils

Steel bar conditioning



Coil conditioning

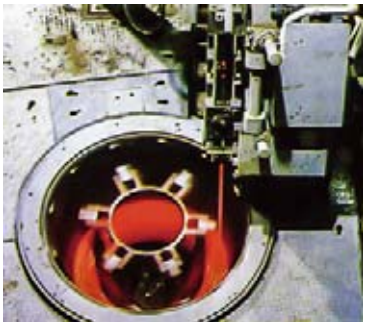


Equipment used in Steel Bar Mill

Reheating furnace	6 top and low zone walking-beam type, 3-split type, 180 tons per hour	–
Rolling mill	Rough rolling mill (Fully continuous H-V system)	8 units
	No. 1 intermediate rolling mill (Fully continuous H-V system)	4 units
	No. 2 intermediate rolling mill (Fully continuous H-V system)	4 units
	No. 3 intermediate rolling mill (Fully continuous H-V system)	4 units
	Finishing rolling mill: 3-roll type (SCFM: size-chance-free mill)	4 units
	Dimensional measuring equipment: projective continuous revolution type, etc.	3 units
	Reel:pouring type	2 units
	Cooling bed: rake type	1 unit
	Cold shear: Down-cut type	2 units
Conditioning inspection equipment	Straightener	3 units
	Burr remover	3 units
	Dimensional measuring equipment	3 units
	Magnetic leakage flux tester	3 units
	Magnetic particle tester	3 units
	Automatic ultrasonic tester (phased array type)	2 units
Reheating furnace	Roller-hearth non-oxidizing atmosphere furnace	1 unit

[Nominal capacity: 720,000 tons annually]


Steel bar rolling mill


Pouring reel


SCFM (size-chance-free mill)


Cooling bed

Standard dimensions and bundling/indication

1. Standard dimensions (mm in dia.)

Wire rods and bars in coil

Round bars		Square bars
5.5	19	12.7
6	20	14
6.35	21	16
6.5	22	18
7	23	19
8	24	19.3
9	25	20
9.5	26	22
10	27	24
11	28	25
12	29	27
12.7	30	
13	31	
14	32	
15	33	
16	34	
17	36	
18	38	

- Mid-size wire rods and bars in coil with a 0.1-mm pitch may also be available. Please contact us.
- Round bars with a diameter from 4.2 to 5.5 mm may also be available. Please contact us.

Steel bars

Round bars						Square bars
16	34	55	110	220	400	250
17	36	56	115	230	410	300
18	37	58	120	240	420	350
19	38	60	125	250	430	400
20	40	62	130	260	450	450
21	41	63	135	270		500
22	42	65	140	280		550
23	43	68	145	290		600
24	44	70	150	300		650
25	45	73	155	310		700
26	46	75	160	320		750
27	47	78	165	330		
28	48	80	170	340		
29	50	85	175	350		
30	51	90	180	360		
31	52	95	190	370		
32	53	100	200	380		
33	54	105	210	390		

- Round bars with a diameter of up to 90 mm and a 1.0-mm pitch may also be available. Please contact us.
- Please contact us about any length not listed above.

2. Bundling

<1> Wire rods and bars in coil

Size

Coil size (mm in dia.)	Standard coil weight (kg)	Coil diameter (mm)	Coiling direction
4.2 to 19	2,100	Inner: 700 to 1,100 Outer: 1,250 to 1,400	 Anticlockwise
16 to 38	2,100	Inner: 900 to 1,100 Outer: 1,300 to 1,500	

Coil bundling

Standard coil weight (kg)	Number of coils bundled	Bundling method
2,100	Single coil	Four positions with hoop bands
1,000 (Divided coil)	Two coils	Four positions with hoop bands (For divided coils, two positions with iron wires)

<2> Steel bars

Steel bar size/bundling

Size (mm in dia.)	Available length (m)	Standard bundling weight	Bundling method
16 to 90	5.0 to 7.0	2t	Four positions with iron wires
95 to 120	3.5 to 12.5		
125 to 450	3.5 to 12.5	Not bundled	

Products

Wire rods and bars in coil (ϕ 4.2 to 38 mm)

Steel bars (ϕ 16 to 90 mm)

Round bars (ϕ 95 to 120 mm)

3. Examples of indication and standard inspection cards

<1> Wire rods and bars in coil

Metal plate	Inspection card (tag)
	
1 piece per coil	1 piece per coil

<2> Round bars

Label for round bars with a diameter from 30 to 90 mm*	Label for round bars with a diameter of 95 mm or more	Label for square bars
		
At one end : 1 per bar	At one end : 1 per bar	At one end : 1 per bar

*No label is provided for bars with a diameter of less than 30 mm.

*For steel bars with a diameter from 16 to 90 mm, the same inspection card as wire rods and bars in coil are provided (1 piece per bundle).

Round bars (φ 125 to 450 mm)

Square bars (□ 250 to 750 mm)

Square wire rods (□ 12.7 to 27.0 mm)

Standard dimensions and bundling/indication

1. Standard dimensions (mm in dia.)

Wire rods and bars in coil

5.5	12	19.6	33
5.7	12.3	20	34
6	12.7	21	35
6.35	13	21.8	36
6.4	13.5	22	37
7	14	23	38
7.5	14.5	23.5	40
8	15	24	41
8.3	15.5	24.5	42.5
8.7	15.6	25	43
9	16	25.4	43.5
9.5	16.3	26	44
9.7	16.7	27.2	45
10	17	28	46
10.3	17.5	29	47
10.5	18	30	48
11	19	31	50
11.5	19.4	32	52

Steel bars

17	28	46	67	95
17.5	29	47	68	100
18	30	48	70	103
19	31	50	72	105
19.4	32	52	73	108
19.6	33	53	75	110
20	34	54	77	115
21	35	55	78	120
21.8	36	56	79	
22	37	56.5	80	
23	38	57	82	
23.5	40	58	83	
24	41	59	85	
24.5	42.5	60	86	
25	43	62	87	
25.4	43.5	63	88	
26	44	64	90	
27.2	45	65	92	

- Wire rods and bars in coil with a diameter from 16.7 to 83 mm and a 0.1-mm pitch may also be available at the steel bar mill. Please contact us.

2. Bundles

<1> Wire rods and bars in coil

Mill	Size (mm in dia.)	Standard coil weight		Standard coil shape (mm)			Coiling direction	Bundling method
		Nominal	Weight (kg)	Inner dia.	Outer dia.	Height		
Steel bar mill	16.7 to 52	1t	1,100	1,000 to 1,050	1,450 to 1,500	350 to 650	 Anticlockwise	Four positions with hoop bands
		2t	2,200	1,000 to 1,050	1,450 to 1,500	850 to 1,300		
Wire rod mill	5.5 to 18	1t	1,000	800 to 1,000	1,250 to 1,400	400 to 800		
		2t	2,000	800 to 1,000	1,250 to 1,400	1,000 to 1,550		

<2> Steel bars

Mill	Size (mm in dia.)	Available length (m)	Standard bundling weight		Bundling method
			Size (mm in dia.)	Weight	
Steel bar mill	17 to 120	3.5 to 9.5 *1	17	1t	Four positions with iron wires
			18 to 120	2t	

*1: Round bars with a length from 9.5 m to 12 m may be available. Please contact us.

Products

Wire rods (ϕ 5.5 to 18 mm)

Bars in coil (ϕ 16.7 to 52 mm)

3. Examples of indication of standard inspection cards

<1> Wire rods and bars in coil

Metal plate

1 piece per coil

<2> Steel bars

Label *2	Inspection card (tag)
	
At one end or on the top side: 1 per bar	At one end: 1 per bar

*2: The label is not placed on products with a diameter of less than 30 mm.

Steel bars (ϕ 17 to 29 mm)

Steel bars (ϕ 30 to 120 mm)

We offer total solutions on material development and its processing.

JFE Steel Research Laboratory is one of the world's largest research laboratories. (in the steel industry)

- Creation of new technologies through the integration of different fields of technology
- Challenging research aimed at the development of ultimate products including processes and analyses

Analysis
Analysis & Characterization Research Dept.,
Numerical Simulation Research Dept.,
Instrument & Control Engineering Research Dept., etc.

Steel Bar & Wire Rod Research Dept. (Sendai/Kurashiki)

Processes
Steelmaking Research Dept.,
Rolling & Processing Research Dept., etc.

Products
Sheet Products Research Dept.,
Tubular Products Casting Research Dept.,
Iron Powder & Magnetic Materials Research Dept., etc.

Process analysis technology

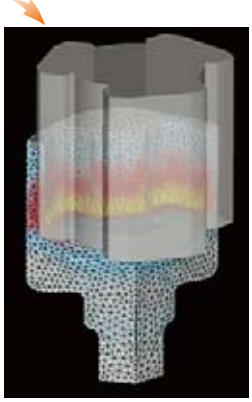
We will contribute to the optimization of our customers' manufacturing processes by fully utilizing the thermomechanical treatment process analysis technology.

300 t forging machine

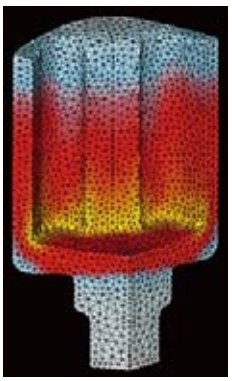
Punching

Analysis software
DEFORM™–3D(PC)
DEFORM™–HT

Before forging



During forging



After forging

Equivalent strain

An example of the analysis of strain distribution in the forging of a constant-velocity joint

List of our developed products

We provide products that meet the needs of our customers.

A: Energy-saving
B: Property advancing
C: Process omitting

Product area	Developed product	Example application, purpose	Needs		
			A	B	C
Case hardening steels	Case hardening steels for high-strength gear (tooth root bending, tooth surface, impact fatigue)	Transmission gears, differential gears, etc.	●	●	
	Case hardening steels with high forginability	Gears, splines, etc.	●		●
	Case hardening steels with constant and low quench distortion	Gears, other gears with splines in general		●	●
Steels for induction hardening	Low deformation resistance steel for forging	Constant-velocity joints	●		●
Heat treatment free steel	Microalloyed steel (THF, NH48MV, TBH)	Companion flanges, tie bars for industrial machinery, etc.	●	●	●
	On-line quenched and self tempered steel (TQF)	Cylinder rods, pins, etc.	●	●	●
	Normalizing free steel (TNF)	Shafts, gears (machined parts)	●		●
Free cutting steel without lead addition	BN free cutting steel (CCBN)	Motor shafts, hose joints, etc.		●	
	Free cutting steel substituted for 12L14 (CCC:12C14)	Spool valves, printer shafts, brake pistons, etc.		●	
Steels for bolts	Steels for high-strength bolts	Bolts in general	●	●	
	Steels for tapping bolts with carburization	Fastening of components to seat frames, etc.		●	●

Functional and structural evaluation technologies

In order to respond to our customers' needs, we have many kinds of testing equipment based on manufacturing process analysis technologies for evaluating various mechanical properties.

Gear fatigue testing machine

Transmission electron microscope

Ultrasonic fatigue test device

Cat.No.H1E-001-06

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