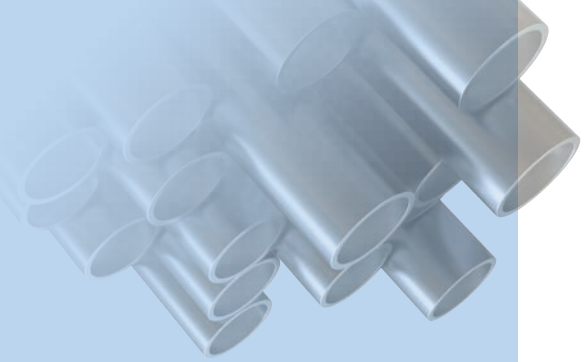
JFE

SPECIALITY PIPE AND TUBE

FOR BOILER AND PETROCHEMICAL PLANT

JFE Steel Corporation

Contents



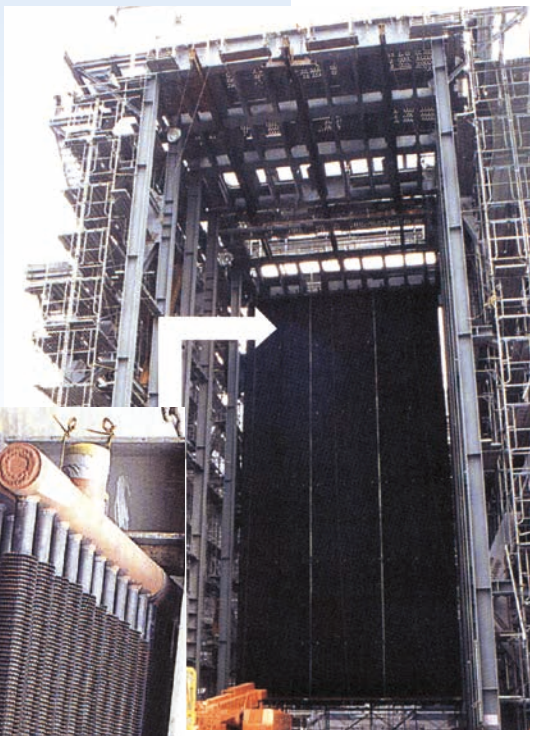
Introduction

Boilers play an important role in various types of plants for the power and chemical industry. With the progress of these industries, modern boilers have become larger in size and the temperature, as well as the pressure, has increased. Therefore, the steel pipes used within them must be of a higher quality.

Chita Works is one of the world's largest specialized steel pipe mills, manufacturing high quality steel pipe for boilers and heat exchangers using integrated processes ranging from raw materials to final quality control. Using their ample knowledge and experience, JFE Steel Corporation has installed up-to-date manufacturing and inspection facilities at Chita Works. Furthermore, Chita Works includes a fully expanded research division, which is making vigorous endeavors in research and development to meet the highly sophisticated needs of the individual users.

JFE Steel strives for the complete satisfaction of its customers and looks forward to their continued patronage.

Boiler Tubes



HRSG module

Pipes for Piping Use

Plant piping

Chita Works : Marking out new directions for challenge along the coordinates of history and technology.

Chita Works began operation in 1943 as part of Kawasaki Heavy Industries. The plant was originally constructed to produce special steels, and manufacture various types of molds, rolling rolls, and other cast steel products. When Kawasaki Steel Corporation was established in 1950, Chita Works became a part of the new company. At that time, the production system was completely renovated in response to the needs of the time and Chita Works became a specialty plant mainly producing steel pipes. Beginning with the construction of a large diameter spiral tube mill in 1961, a succession of new pipe-making shops was built. This established a production system that covered all types of steel pipe from butt-welded tube to seamless.

In April 2003, the operations of Kawasaki Steel and NKK were reorganized, and Chita Works was reborn as part of JFE Steel Corporation.

Chita Works has now become one of the world's leading pipe-making plants, boasting the world's most complete product line of pipe and tubular products made at a single facility. Chita Works is constantly aware of their mission to contribute to society by developing and applying the world's most advanced technologies. With this in mind, they will continue to meet the diverse needs of their customers with the highest levels of product quality.

Challenge

Technology

History

▶ Start of plant or equipment operation
▶ Topics
▶ Prize-related

Chronology of Chita Works

History of Cast and Tubular Products

1943 Chita Works established as special steel plant.
1945 Steelmaking shop begins operation.
1949 South casting shop begins operation.
1950 Kawasaki Steel Corporation established.
1953 Demming implementation prize.
1961 North casting shop begins operation.
Spiral tube mill begins operation.
1964 Medium diameter ERW pipe mill (14''mill) begins operation.
1970 Small diameter seamless pipe mill begins operation.
1971 Butt-welded tube mill begins operation.
OCTG equipment start up.
1972 Small diameter ERW pipe mill begins operation.
1978 Medium diameter seamless pipe mill begins operation.
Medium diameter ERW pipe mill (26''mill) begins operation.
1979 V-process casting equipment start up.
1981 Cumulative pipe production at Chita Works reaches 10 million tons.
1983 High grade special OCTG production equipment expanded.
Development of numerical control (NC) rolling technology for seamless pipe.
(Awarded the Okochi Memorial Special Production Prize)
1985 ERW pipe production technology using full cage forming method.
(Awarded the Aida A ward of Japan Society for Technology of Plasticity.)
1990 CBR forming mill for stainless ERW pipe started up.
Modernization of small diameter heavy wall ERW pipe mill.
Stainless flexible tubing mill begins operation.
Square pipe (square column) production equipment started up.
1991 Special pipe mill equipment expanded.
Start of production of cast high speed steel rolls.
1993 ISO 9001 certification (pipe).
Establishment of high productivity production technology for stainless seamless pipe.
(Awarded the Okochi Memorial Special Production Prize).
1994 Modernization of spiral tube mill.
1998 Start of production of cast super high speed steel rolls.
Development of martensitic stainless steel seamless pipe for line pipe.
(Awarded the MITI Minister's Prize)
1999 ISO 9001 certification (castings).
ISO 14001 certification.
2000 HISTORY™ Pipe production equipment started up.
50th anniversary of establishment of Kawasaki Steel Corporation.
Cumulative production of seamless steel pipe reaches 10 million tons.
2002 JFE Holdings, Inc. established.
2003 JFE Steel Corporation established.
2004 Developments of centrifugal cast HSS rolls for hot strip mills.
(Awarded the ICHIMURA Industrial Prize in Industry for Excellent Achievement)
2006 The HISTORY™ Steel Tubes with Excellent Mechanical Properties.
for by Thermo-Mechanical Control Process in Tube Reducing.
(Awarded the Japan Society for Technology of Plasticity・Aida Technology Award)
2007 Small Diameter Seamless Pipe production equipment expanded.
2008 Medium Diameter Seamless Pipe production equipment expanded.
2013 70th anniversary of establishment of Chita factory.
2014 Cumulative production of seamless steel pipe reaches 15 million tons.

Location of Chita Works

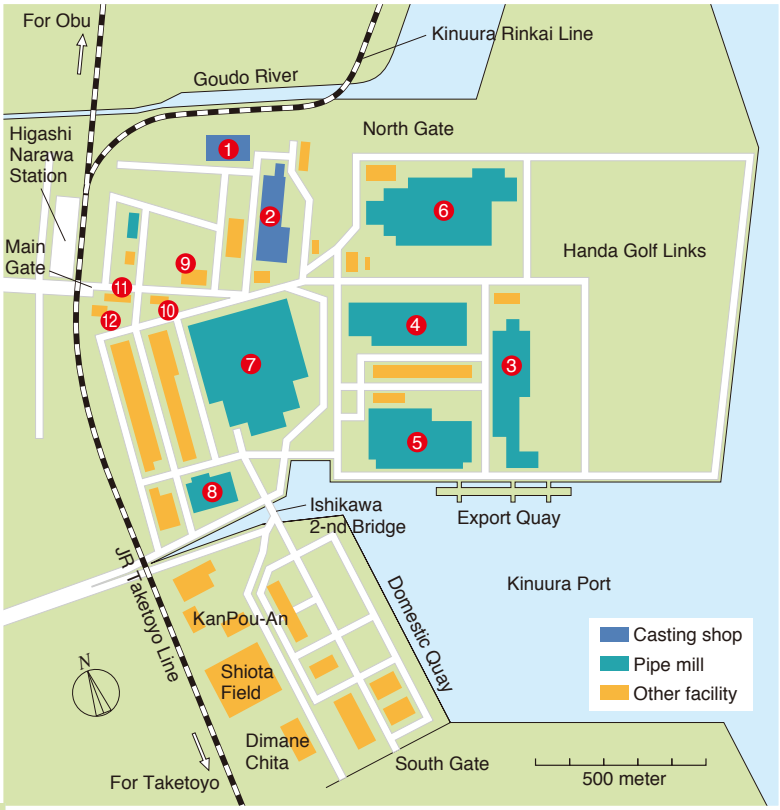
Located in the center of Japan, with excellent access to world markets Chita Works is part of the Chukyo Industrial Zone and faces Kinuura Bay.

Giving it good access to the world's sea lanes. Located almost in the center of the Kinuura Coastal Industrial Zone, Chita takes advantage of its excellent site conditions as a base for supplying tubular products to users around the world while coexisting with nature. The site also has outstanding access to other related industries, beginning with the company's East Works and West Works which supply materials for pipemaking. In short, Chita enjoys an excellent location for growing hand in hand with companies around the world.

*Upstream facilities is to be shut down by Sep. 2023.

An Integrated Production System and Ideal Layout

The group of shops that make up Chita Works was laid out on a 1.81 million m² site to create the ideal pipe production system. All aspects of the production system, from unification of research and development to concentration of technology and efficient quality control are realized by taking full advantage of the features of the location. This modern plant is a tangible symbol of Chita's confidence that it can meet demand for steel pipes of all types and sizes as one of the world's leading pipemaking works.



1. North casting shop
2. South casting shop
3. Medium diameter ERW pipe mill (26" mill)
4. Small diameter ERW pipe mill (6" mill)
5. Small diameter ERW pipe mill (4" mill)
6. Medium diameter seamless pipe mill
7. Small diameter seamless pipe mill
8. Special steel pipe mill
9. Main building
10. Tubular Products and Castings Research Dept.
11. Quality Assurance Group (Inspection)
12. Training Center

Site area : 1.81×10^6 m²

By Train **JR Line (From Nagoya station)**
- Total time expected is 1 Hour -
Take a Tokaido Line train towards Toyohashi and stop at Obu station.
Change trains to Taketoyo Line. Stop at Higashi-Narawa station, just in front of Chita Works.

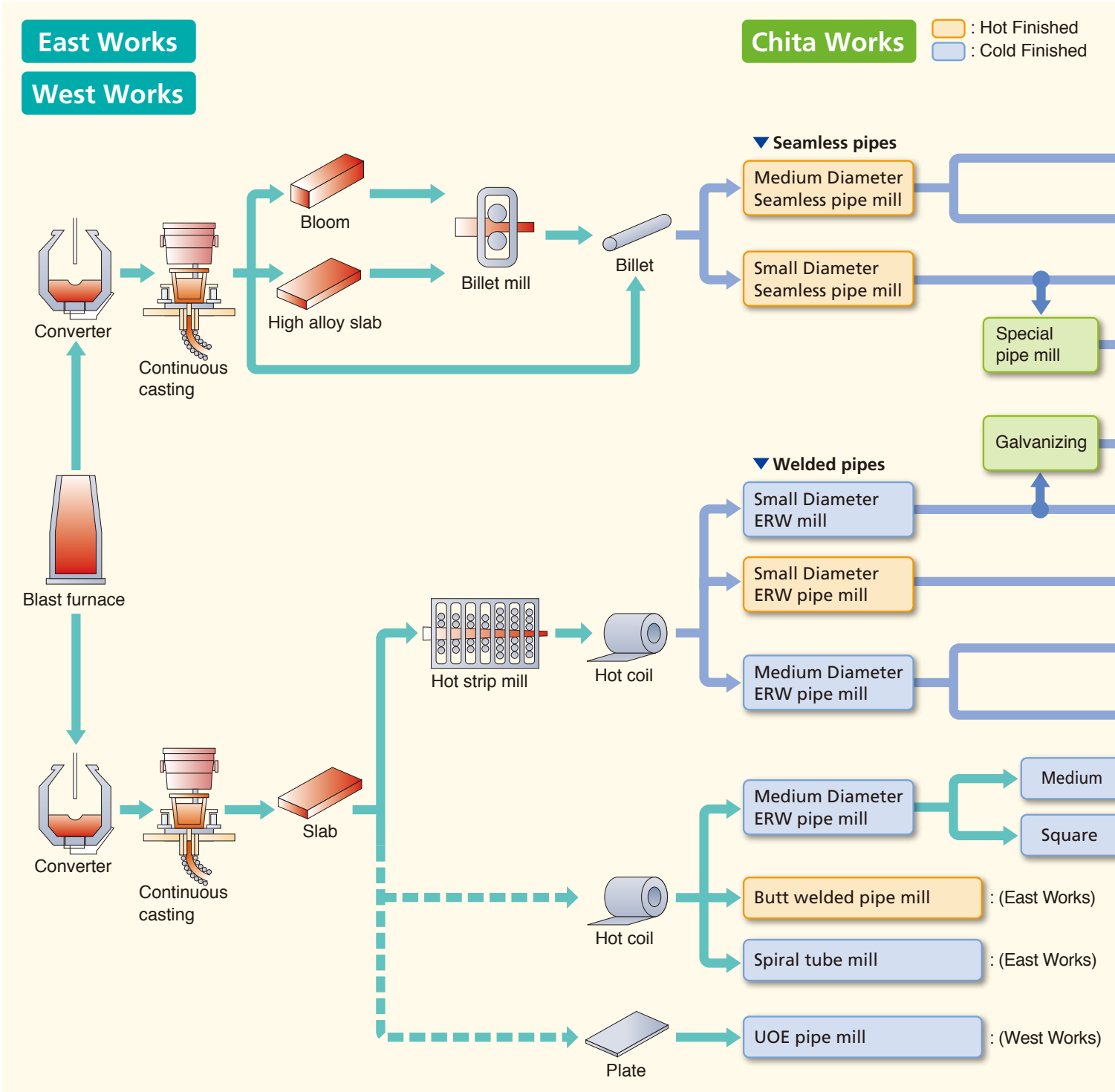
Meitetsu Line (From Shin-Nagoya station)
-Total time expected is 50 minutes.
Take a Utsumi-kowa Line train from Shin-Nagoya station and stop at Chita-Handa station.
Take a taxi from Chita-Handa to Chita Works.(10 Minutes)

By Car 10 minutes by car from Handa I.C. to Chita Works.

One of the world's leading pipe mills

Tubular Products and Applications

World's most complete line of tubular products

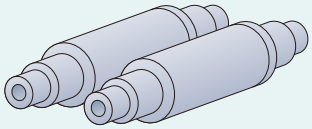


Cast Products and Applications

Rolling rolls

- High speed tool steel
- Super high speed tool steel
- Grain
- Ductile
- Adamite

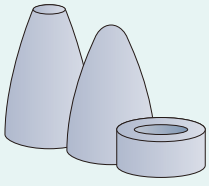
etc.

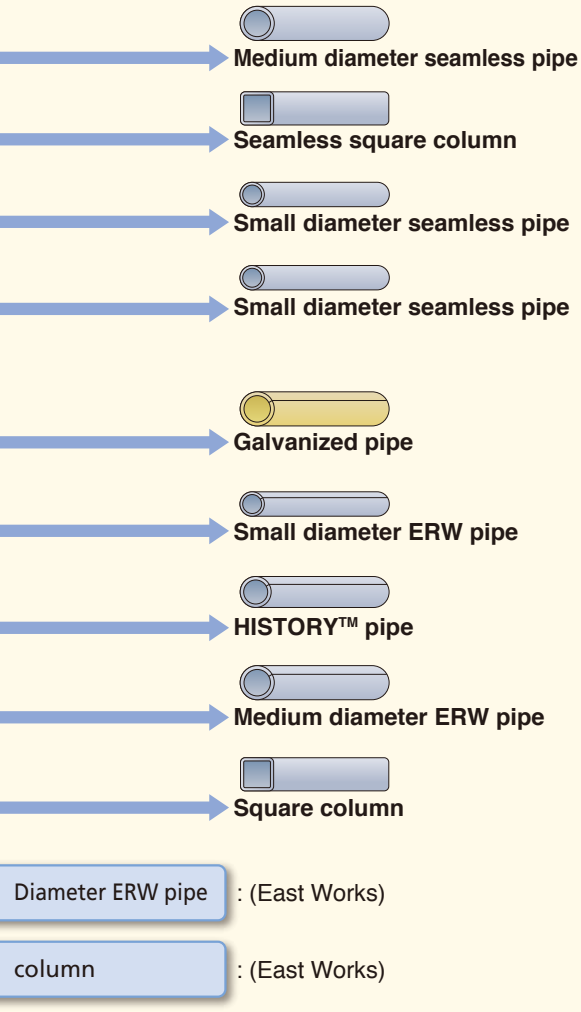


V-process cast products

- Plugs for seamless pipe rolling
- Heat-and wear-resistant products
- Cast steel footing hardware
- Weather-resistant design panels

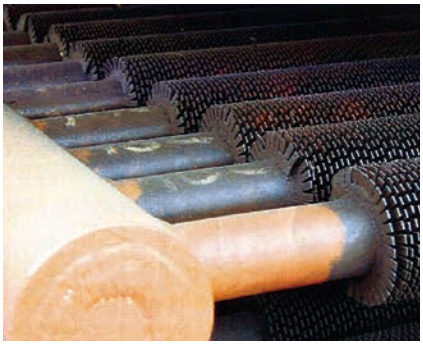
etc.





Energy-related Tubular Products

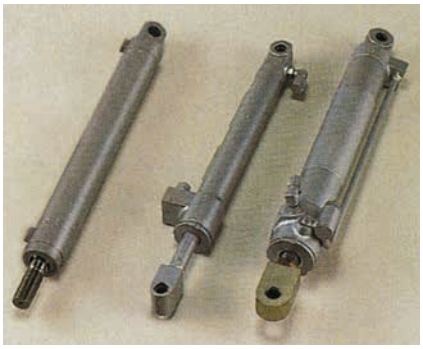
- **Boiler and heat transmission use**
  Boiler water tubes, flue pipes, superheat tubes, Heat exchangers
- **Oil country tubular goods(OCTG)**
  Casing and tubing for oil wells
- **Line pipe**
  Line pipe for transportation of oil, gas, etc.
- **Others**
  Geothermal power generation, nuclear power



FIN TUBE

Machine Structural Use and Material Piping

- **Automobile parts**
  Shafts, rods, frames, cylinders, exhaust manifolds, etc.
- **Industrial machinery and transportation equipment parts**
  Cylinders, bushes, frames, etc.
- **Others**
  Scuba diving tanks



General Piping

- **Water works**
  City water and sewerage piping, industrial water piping
- **Gas piping**
  Gas lead tubes, gas feed / support pipe
- **Others**
  Plant piping, office building air conditioning piping
  Low temperature piping

Civil Engineering and Construction

- **Steel pipe pile, steel pipe sheet pile**
  Bridge foundations, building foundations, quays, revetments, breakwaters, Steel pipe piles for landslide prevention (mechanical screw), etc.
- **General structural and architectural structural use**
  Buildings (square column), steel towers, scaffolding, supporting columns, etc.

Seamless Pipe Process Equipment

Using the mandrel mill method and plug mill method, these mills produce high grade small and medium diameter pipes with excellent dimensional accuracy.
Seamless pipes play an active role as the "arterial system" in a wide range of modern industries, in various piping applications, and oil well tubulars. Chita produces these products by a dynamic manufacturing process.

Product types

- Boiler tubes
- Line pipes
- OCTG
- Pipes for general structural use
- Pipes for machine structural use
- Material pipes
- Square pipes etc

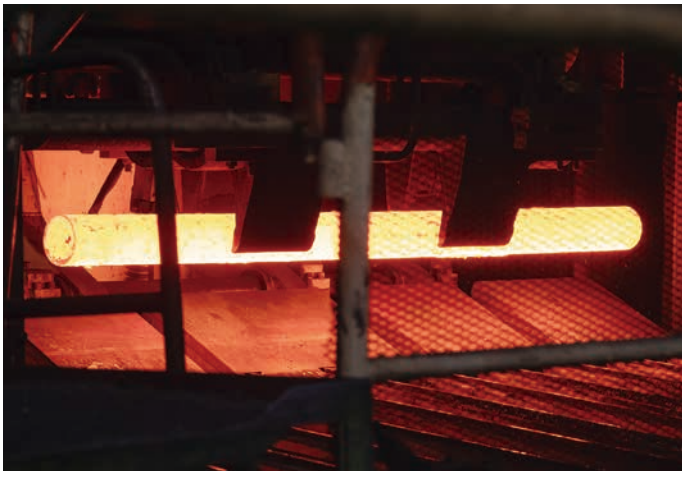
Small diameter seamless pipe mill

Capacity	444,000 tons/year
Equipment	Mandrel mill process ·····1 Heat treatment equipment ·····3 Upsetter ·····1 Thread cutting line ·····3
Product dimensions	Outside diameter 25.4-177.8 mm Wall thickness 2.3-40 mm Length 4.0-28.5 m

Medium diameter seamless pipe mill

Capacity	468,000 tons/year
Equipment	Plug mill process ·····1 Heat treatment equipment ·····1 Thread cutting line ·····1
Product dimensions	Outside diameter 177.8-426.0 mm Wall thickness 5.1-65.0 mm Length 5.5-13.5 m

Regenerative burner type rotary hearth heating furnace

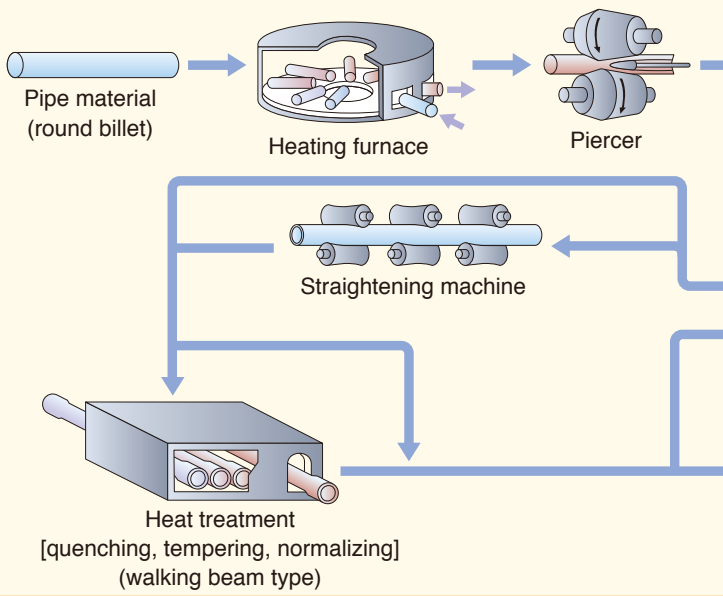


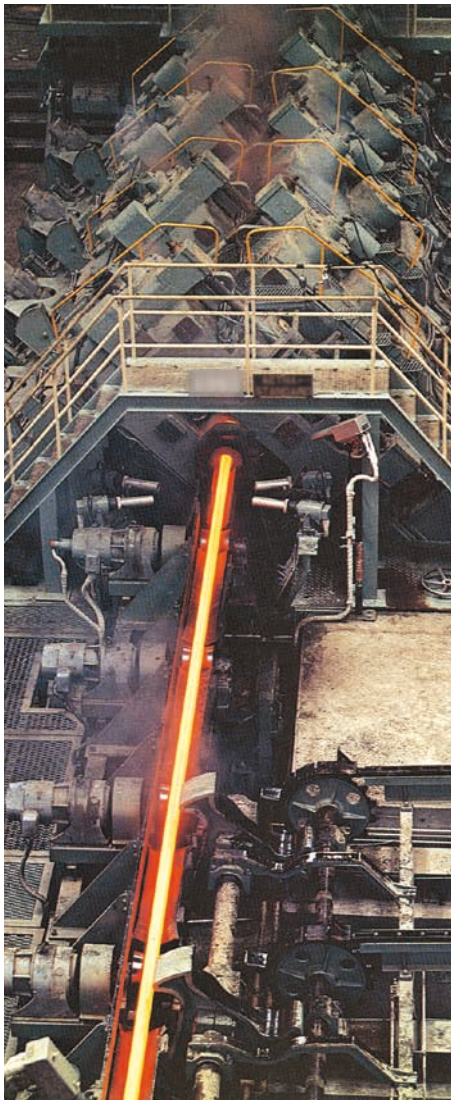
Rotary hearth heating furnace

Piercer

Manufacturing Flowchart

Seamless pipe production process

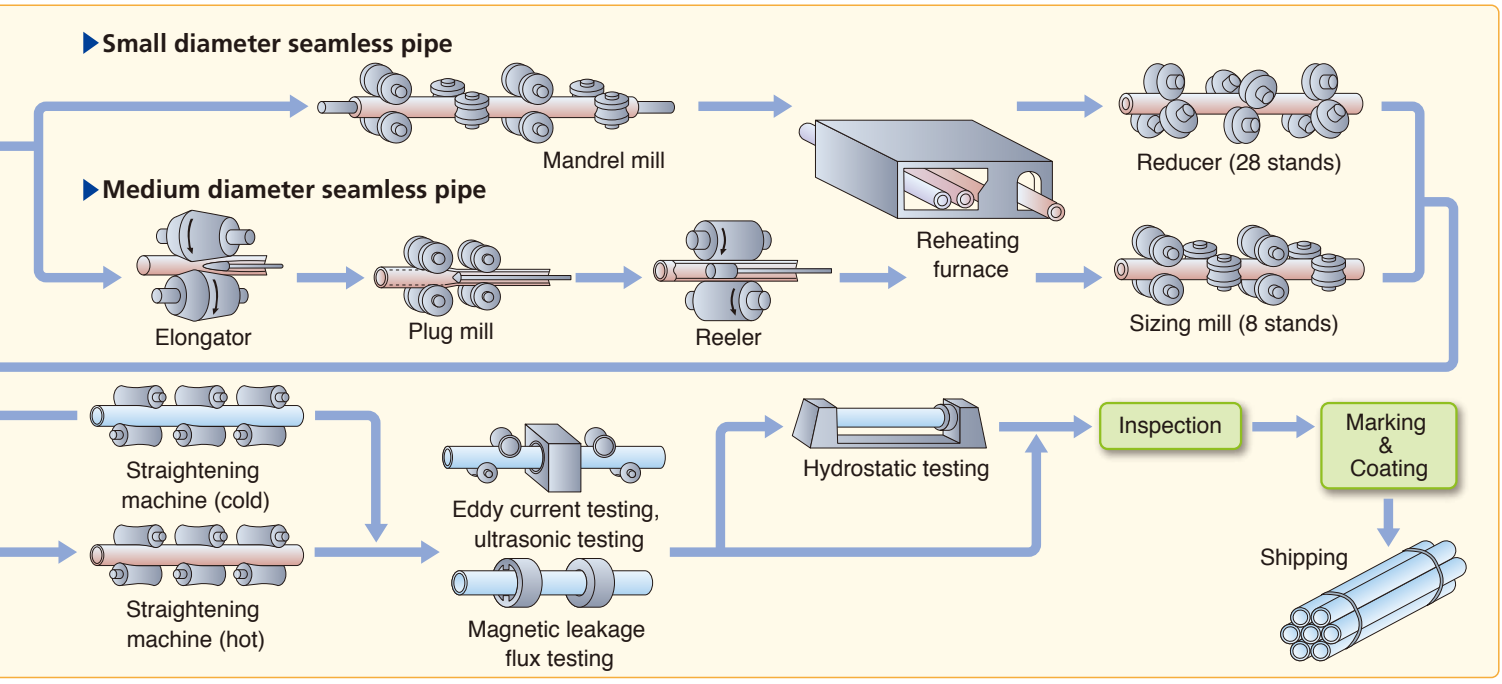




Mandrel mill

Elongator

Plug mill



Special Steel Pipe Process Equipment

In producing special steel pipes, Chita Works takes advantage of the respective material properties of carbon steel, alloy steel, and other materials, and performs heat treatment, finishing processing, and inspections as required by the intended use, making full use of leading-edge technologies.

Special steel pipe is a field that has enjoyed large demand in recent years. Among these products, Chita Works is responding to the need for Extra long boiler tubes of the 28 m, in length.

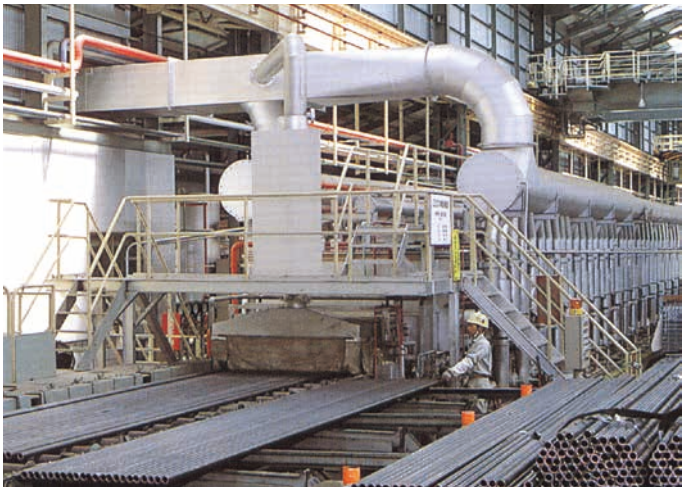
Chita Works has established a totally reliable quality assurance system in which inspections are performed using three types of non-destructive inspection devices, magnetic leakage flux testing (MLFT), ultrasonic testing (UT), and eddy current testing (ET).

Product types

Carbon steel, alloy steel pipe

Boiler tubes, steel pipes for machine structural use, pipes for various piping applications

Capacity	60,000 tons/year	
Equipment	• Non-oxidizing atmosphere heat treatment furnace ····· 2 • Non-destructive inspection equipment ····· 6 • Processing and finishing equipment ····· 2	
Product dimensions	Outside diameter Wall thickness Length	25.4-114.3 mm 2.3-13.0 mm 28.5 m

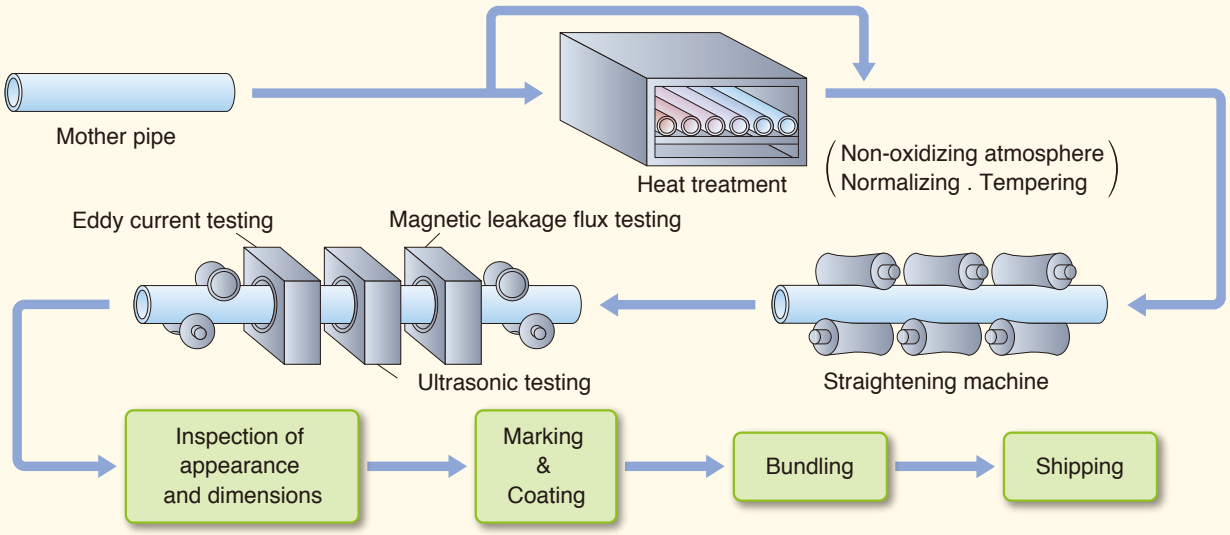


Roller hearth type non-oxidizing atmosphere heat treatment furnace

Ultrasonic test device

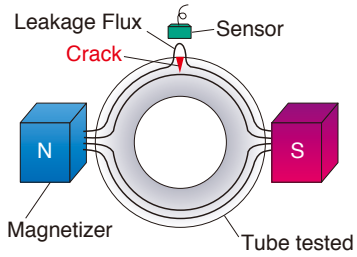
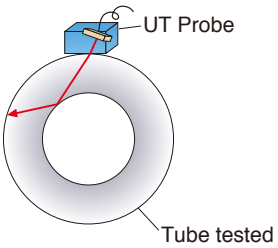
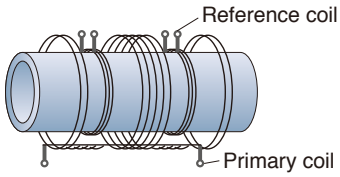
Manufacturing Flowchart

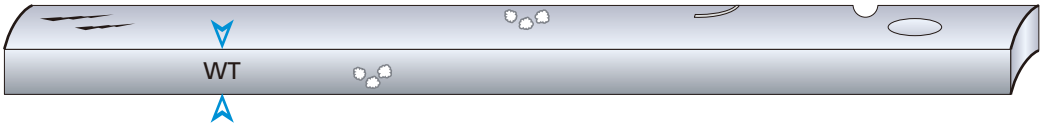
Special steel pipe production process



Boiler Tubes

Principles of non-destructive inspection (For Boiler tubes)

	Magnetic Leakage Flux Tester (MLFT)	Ultrasonic tester (UT)	Eddy current tester (ET)
Principle of detection			 Self-comparative method by using a difference of impedance between an induced current and an excited current
Object	• Outside crack and scratch in L direction Depth ≧ 0.20mm Length ≧ 8mm	• Inside / outside / internal crack in L direction • Inside / outside / internal crack in T direction • Lamination check • Wall thickness	• Defect having spatial volume



◎: Stable detection
○: Unstable detection

			Crack	WT	Inside pit	Outside pit	Scab	Dent/Rolled in material
Detect Ability	UT	Outside	◎	◎		○	○	○
		Internal	◎					
		Inside	◎		○		○	○
	ET	Outside	◎			◎	○	○
		Internal	◎					
		Inside	◎		◎			
	MLFT	Outside	◎			◎	◎	◎
		Inside	◎					

ERW Pipe Process Equipment

At the electric resistance welded (ERW) pipe mills, steel strip are formed into a pipe shape by roll forming, and then welded continuously by a high frequency electric resistance welder or high frequency or medium frequency induction heating welder to produce uniform, high strength steel pipes. The 26" mill manufactures ERW pipes with the world's largest outside diameter, at 700 mm and largest wall thickness, at 25.4 mm (1 inch).

Product types

- Water line pipe
- Line pipe
- Boiler tubes
- OCTG
- Coated pipes
- Pipe piles
- Square columns
- Pipes for general structural use
- Pipes for machine structural use

etc

Line pipe

Square columns

Small diameter ERW pipe mill (6"mill)

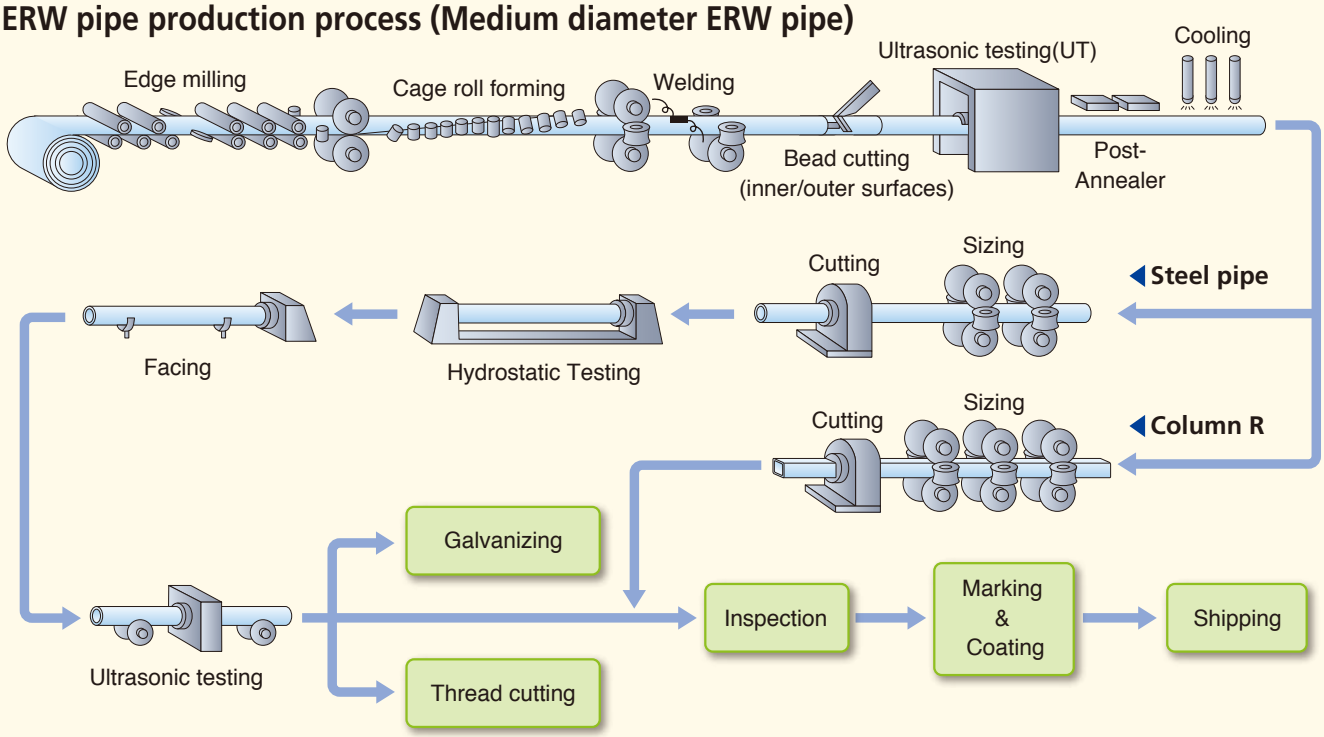
Capacity	190,000 tons/year	
Equipment	Pipemaking mill ····· 1 Maximum pipemaking speed: 100 m/min Welding method: Automatic heat input controlled high frequency or medium frequency induction heating welding Forming method: CBR forming Breakdown roll forming	
Product dimensions	Outside diameter Wall thickness Length	60.3-165.2 mm 2.0-12.7 mm 4-15 m

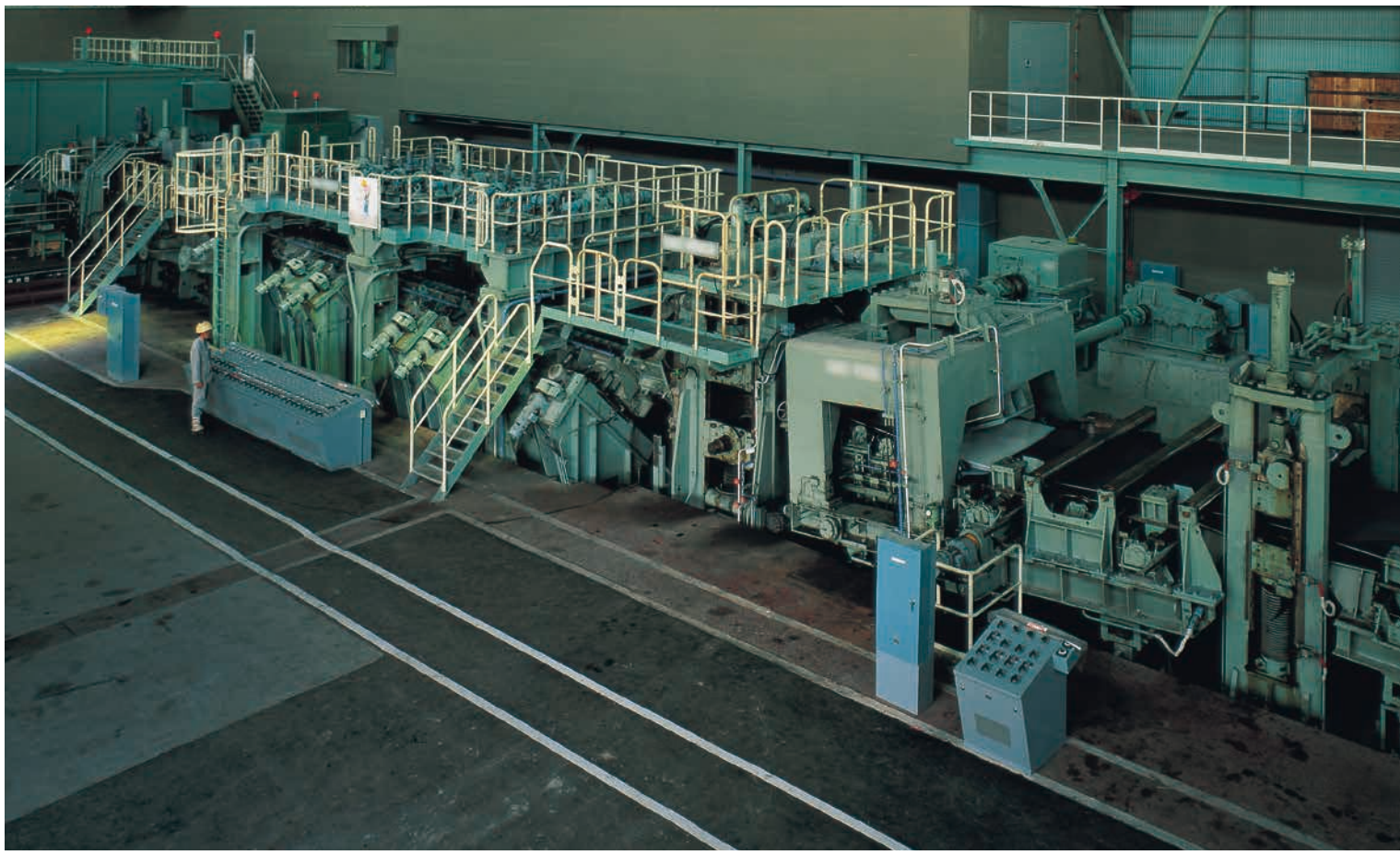
Medium diameter ERW pipe mill (26"mill)

Capacity	480,000 tons/year	
Equipment	Pipemaking mill ····· 1 Maximum pipemaking speed: 45 m/min Welding method: Automatic heat input controlled high frequency electric resistance welding (300KHz) Forming method: Cage roll forming Breakdown roll forming	
Product dimensions (pipe)	Outside diameter Wall Thickness Length	318.5-700 mm 4.0-28.0 mm 5-20 m
Product dimensions (square column)	Outside diameter Wall thickness Length	250-550sq. mm 6.0-28.0 mm 6-14 m

Manufacturing Flowchart

ERW pipe production process (Medium diameter ERW pipe)





World's largest outer diameter/heaviest wall full cage roll forming (26 inch) mill (Medium diameter ERW pipe mill)

Quality Assurance System

In 1993, Chita Works was certified under the international standard for quality assurance, ISO 9001. The works is carrying out activities to implement a quality system which ensures even higher levels of customer satisfaction.

1 Integrated Quality Control System by Independent Division

The inspection system has been firmly established at Chita Works as well as at the East Japan and West Japan Works for the purpose of assuring product quality and maintaining quality levels.

2 Manufacturing and Inspection System

Manufacture and inspection are performed by employing the latest techniques and superb inspection facilities to meet the highly sophisticated needs of users. The following special quality control systems have been established for both seamless and welded pipe.

For seamless pipe :

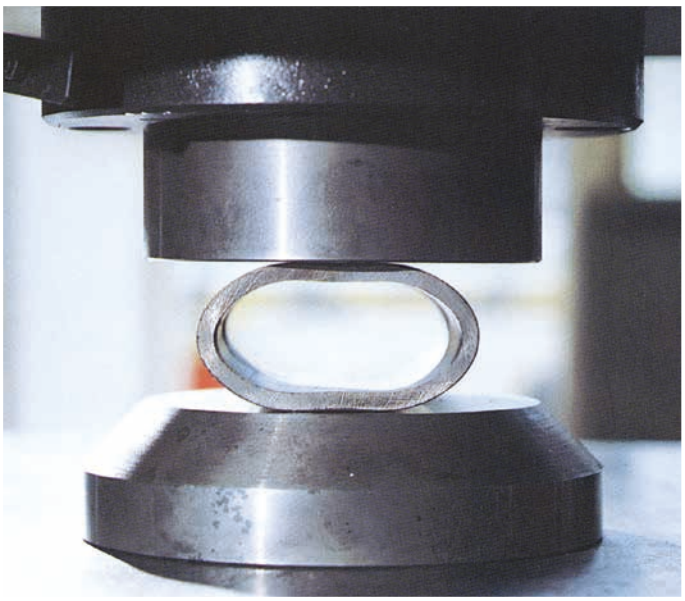
(1) Employment of the hot dimensional measuring device for improving dimensional accuracy.
(2) Total length dimensional inspection by using an ultrasonic automatic outside diameter and wall thickness measuring device.
(3) Computerization extending from the pipe making line to product inspection and shipping.

For welded pipe :

(1) Employment of the automatic welding temperature control system.
(2) Employment of the medium frequency induction welding process.
(3) Development of the inert gas sealed welding process.
(4) The weld shape microscopic investigation system.

3 Application of Various Non-destructive Inspections

Intermediate and product inspection steps are taken at each steel pipe mill. There are various facilities for eddy current detection, magnetic particle detection, ultrasonic detection, magnetic leakage flux testing, fluoroscopic inspection, spark tests, etc. These non-destructive inspections are conducted from time to time on specifications and dimensions of steel pipe, or in compliance with requests from the users, therefore making quality assurance guaranteed.



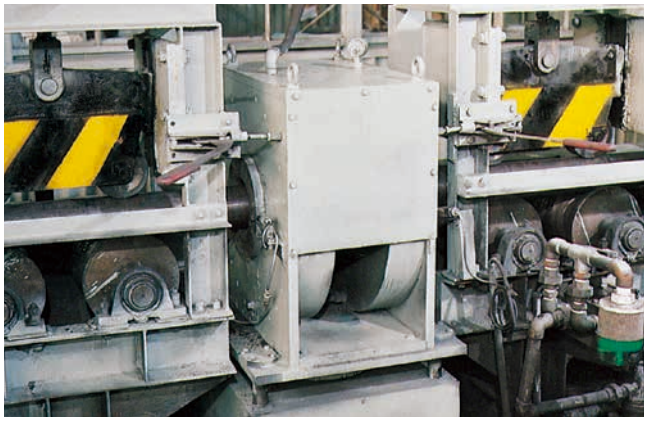
Flattening test

Ultrasonic automatic outside diameter and wall thickness measuring device

Non-Destructive Inspection Facility

1 — Eddy Current Testing

In the eddy current flaw detector, scratches are detected by using a penetrating excitation coil and a detection coil. For electric resistance welded steel pipes, welds and base metal parts are simultaneously inspected. Flaw detection inspection is automatically recorded and marking is given to the defect indication part.



2 — Ultrasonic Testing

"Rotating Ultrasonic Flaw Detector" A rotating ultrasonic flaw detector consists of a rotor with a large number of probes rotated and running at high speed for flaw detection. Therefore, in the case of an electric resistance welded steel pipe, it is possible to inspect not only the welded portion but also the base material portion. In this case, the probe mainly has a bevel probe for the purpose of flaw detection of weld defects and a vertical probe for flaw detection of base material part defects. In addition, flaw detection results are automatically recorded for both seamless steel pipes and electric resistance welded steel pipes, and marking is given to the defect indication part.

3 — Magnetic Leakage Flux Testing, Ultrasonic Wall Thickness Gauge

The leakage magnetic flux flaw detector is a surface flaw detector based on a leakage magnetic flux developed for high speed. After rolling, the surface flaw of a long steel pipe with crop will be inspected. The ultrasonic wall thickness meter automatically measures the outer diameter and wall thickness of the steel pipe by ultrasonic method. The leakage magnetic flux flaw detector and the ultrasonic outer diameter / wall thickness meter are arranged in series, the flaw detection result is automatically recorded, and the defect indication part is marked.

4 — Magnetic Particle Testing

The fluorescent magnetic powder flaw detector magnetizes the tube, applies magnetic powder on tube surface, and detects defects close to the outer surface or the surface with high accuracy. The defect indication part is marked visually.

Quality Assurance System

4 Facility Examination and Inspector Qualification Systems

A system of periodical facility examination has been established for maintaining accuracy of manufacturing and inspection facilities. Special inspections such as nondestructive inspections and grade identification tests are conducted only by inspectors who have been specially trained and qualified to perform such inspections. A system is enforced to conduct periodical training and examination of such inspectors in order to maintain and improve their technical levels.

5 Enhancement of Operational Accuracy by Facility Computerization

Development of various kinds of sensors, system development, and computerization, which are related to manufacturing and inspection facilities, maintain the high level operational conditions. The analysis of various kinds of data is utilized for further enhancement of operational and inspection technique levels. JFE Steel's medium diameter seamless steel pipe manufacturing facility is one of the most automated mills in the world.

Sizing Mill Operator Room

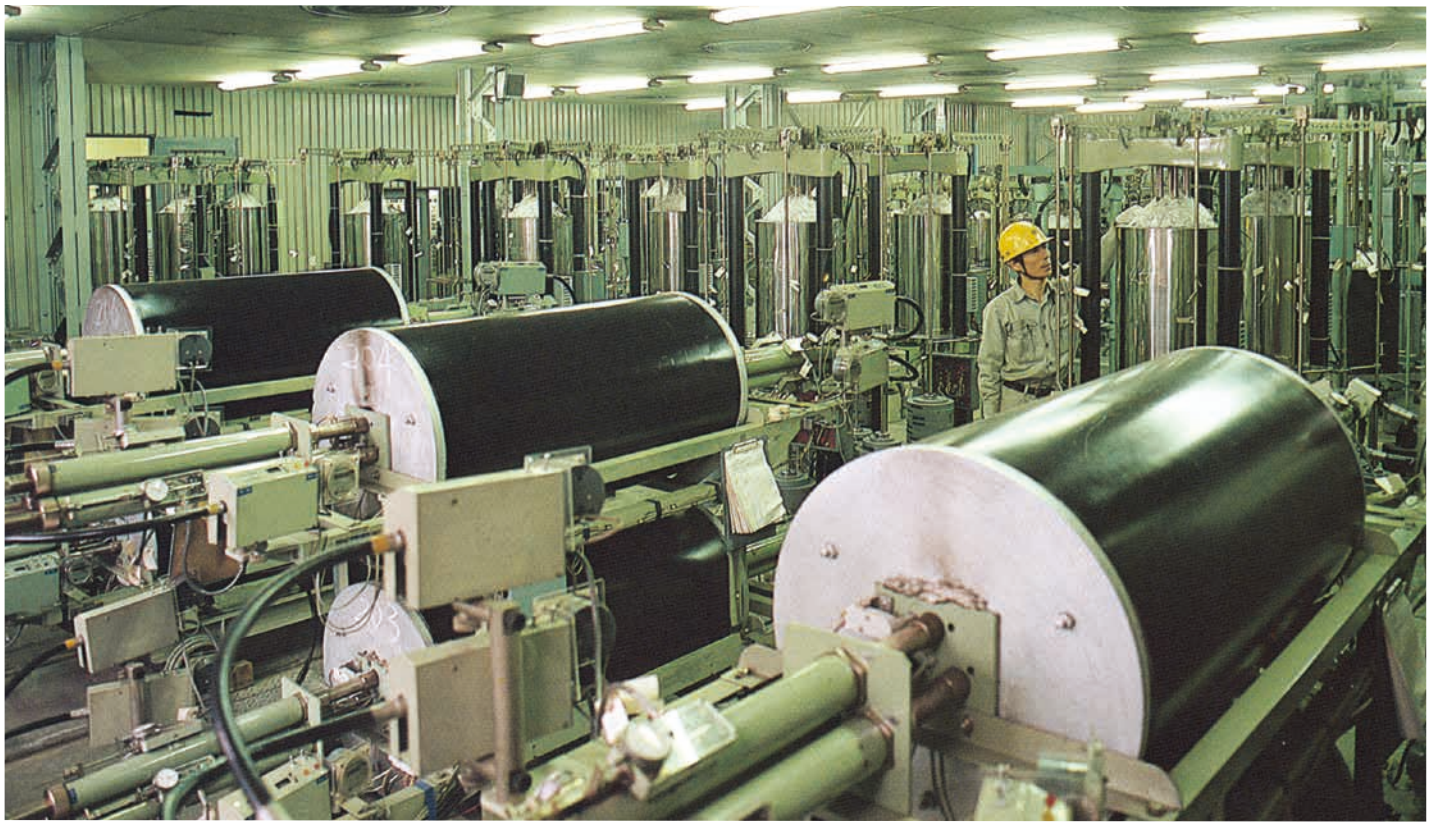
Automatic Rack System

Research and Development

The Chita Research Laboratory at the Chita Works is pursuing research and development directly connected to pipe making techniques and pipe products. Our Research Laboratories at the East Works (Chiba) are conducting basic studies as well as consolidated investigations, while working on research and development in cooperation with the Chita Works. The research staff and facilities constitute the foundation of manufacturing high quality steel pipes at JFE Steel.

Internal Pressure Creep Tester

Elevated Temperature Tensile Tester



Creep Rupture Tester

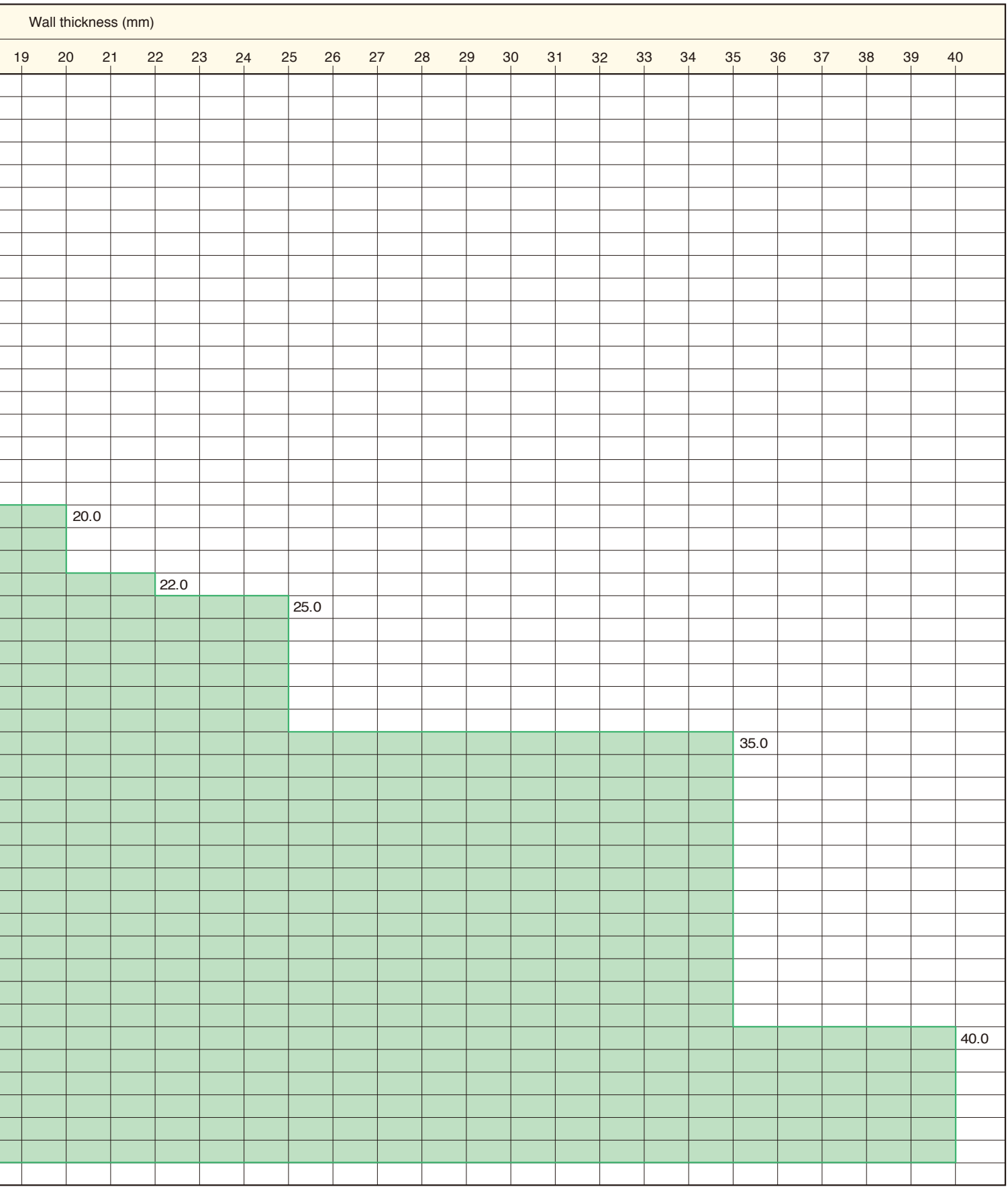
Size Availability

1 Hot Finished Seamless Pipe and Tube

Small Diameter

O.D.			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
N.P.S.	In	mm																		
		25.4		2.3					7.0											
3/4		26.7								8.0										
		27.2																		
	1-1/4"	31.8									9.0									
1		33.4		2.5									11.0							
		34.0																		
	1-1/2"	38.1		2.6										12.0						
		40.0		2.7																
1-1/4		42.7															15.0			
		45.0																	18.0	
		47.0																		
1-1/2		48.3																		
	2"	50.8																		
		52.0		2.9																
		54.0																		
		57.1																		
2		60.3																		
	2-1/2"	63.5			3.3															
		65.0																		
		68.1																		
		70.0																		
2-1/2		73.0																		
	3"	76.2																		
		80.0			3.4															
		82.6																		
		85.0																		
3	3-1/2"	88.9																		
		95.0			3.5															
3-1/2	4"	101.6																		
		105.6																		
		108.0																		
		110.0																		
4	4-1/2"	114.3																		
		120.0																		
	5"	127.0																		
		130.0																		
		133.0																		
		135.0																		
	5-1/2"	139.8																		
5		141.3				4.0														
		146.0																		
	6"	152.4																		
		153.7																		
		159.0																		
		165.2																		
6		168.3																		
	7"	177.8																		

Above is reference chart based on Carbon pipe. Please consult for detail.

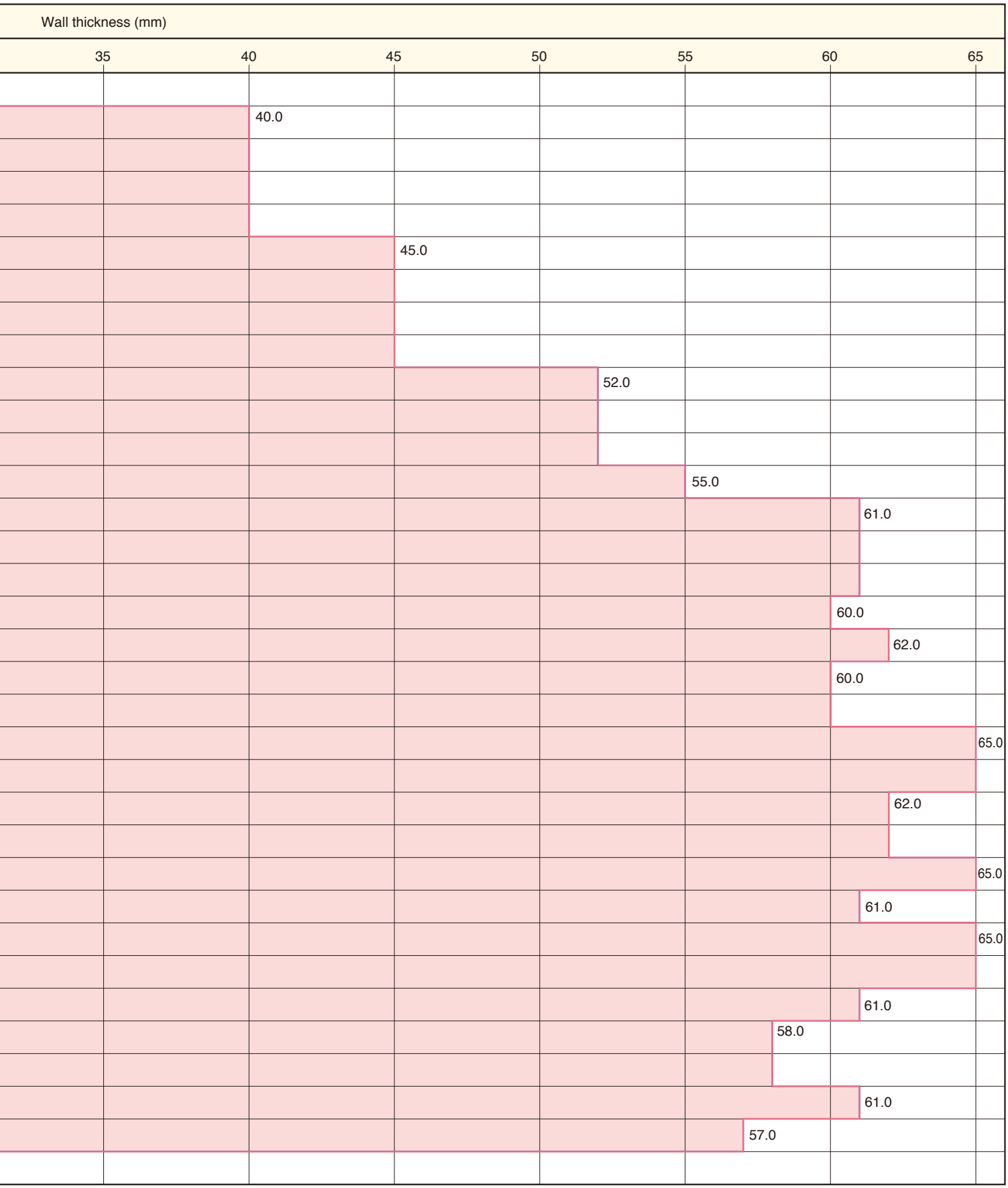

Wall thickness (mm)
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
20.0
22.0
25.0
35.0
40.0

Size Availability

Medium Diameter

O.D.			5	10	15	20	25	30
N.P.S.	In	mm						
	7"	177.8	5.1					
		180.0						
		185.0						
		187.7						
		190.7						
		193.7						
		194.5						
		203.0	6.0					
		215.0						
		216.3						
8	8-5/8"	219.1						
		232.0						
		241.8						
		244.5						
		245.0						
		250.0						
		267.4						
		269.9						
12	12-3/4"	273.0						
		298.5	6.35					
		318.5						
		323.8						
		325.0						
		339.7	7.0					
		351.0						
14	14"	355.6						
		365.1						
		377.0						
		400.0						
		402.0						
16	16"	406.4						
		426.0	9.0					

Above is reference chart based on Carbon pipe. Please consult for detail.

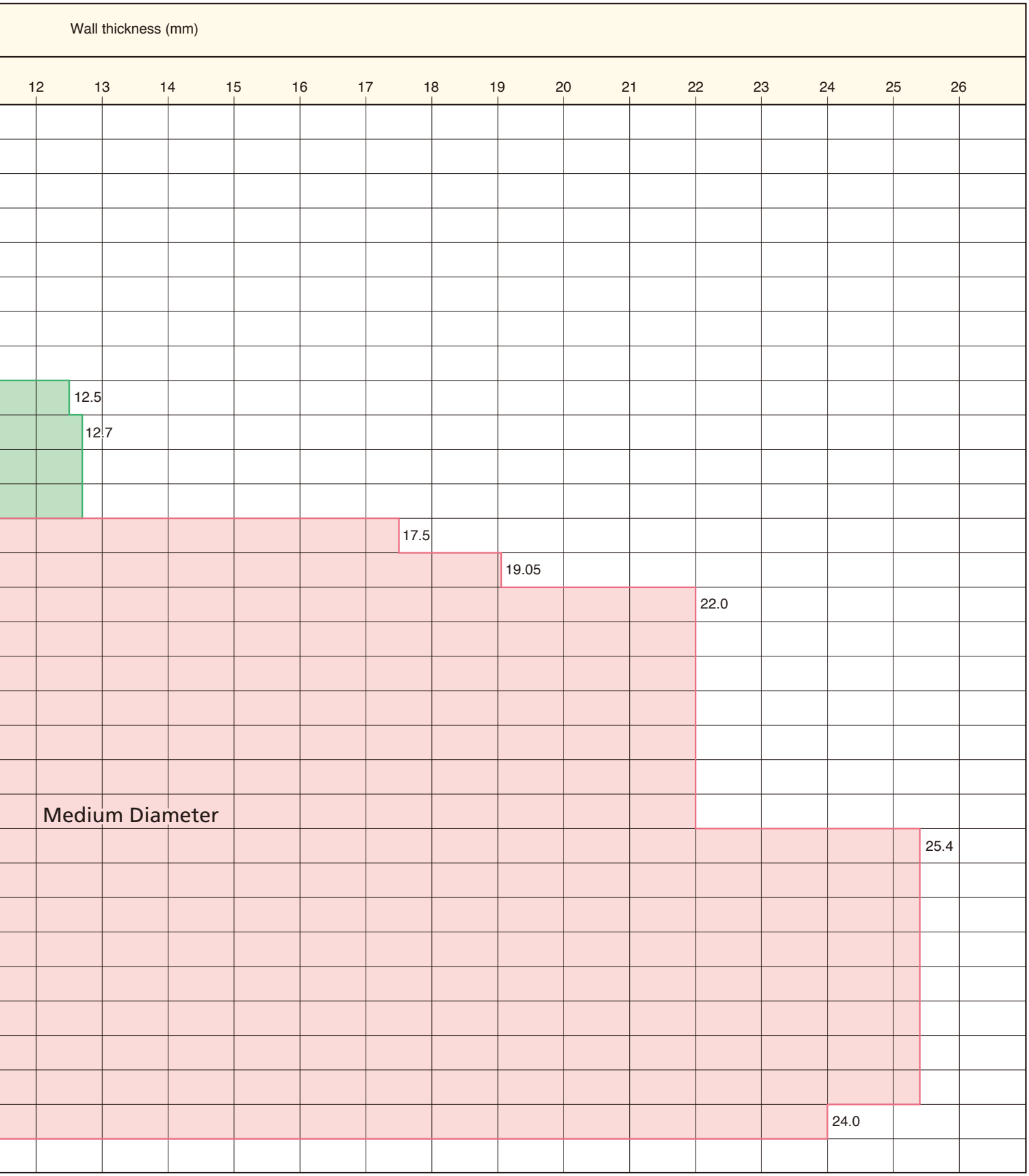

Wall thickness (mm)
35
40
45
50
55
60
65
40.0
45.0
52.0
55.0
61.0
60.0
62.0
60.0
65.0
62.0
65.0
61.0
65.0
61.0
58.0
61.0
57.0

Size Availability

2 Electric-Resistance-Welded Pipe and Tube

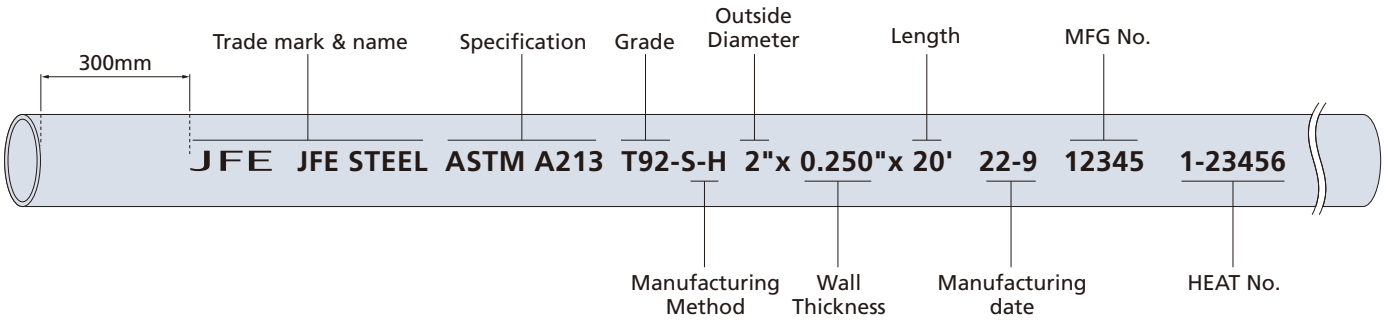
O.D.			1	2	3	4	5	6	7	8	9	10	11
N.P.S.	In	mm											
2	2-3/8	60.3		2.0								10.0	
	2-1/2	63.5			2.3								
		65.0											
		70.0											
		76.2											
		82.6			3.2			Small Diameter					
3	3-1/2	88.9										11.0	
3-1/2	4	101.6				3.5							
4	4-1/2	114.3				4.0							
	5	127.0											
		139.8					5.5						
		318.5				4.37							
12	12-3/4	323.8				4.78							
14	14	355.6											
		400.0											
16	16	406.4											
		450.0											
18	18	457.2											
		473.1											
		475.0											
		500.0					5.65						
20	20	508.0											
		530.0						6.35					
		550.0											
22	22	558.8											
		600.0											
24	24	609.6											
26	26	660.4											
		700.0								9.0			

Above is reference chart based on Carbon pipe. Please consult for detail.

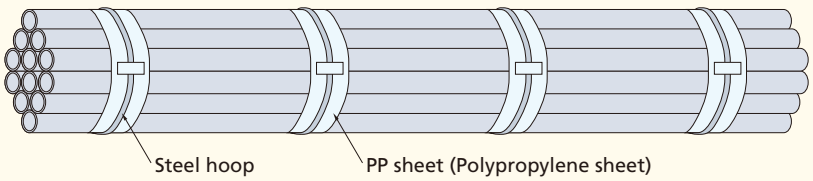
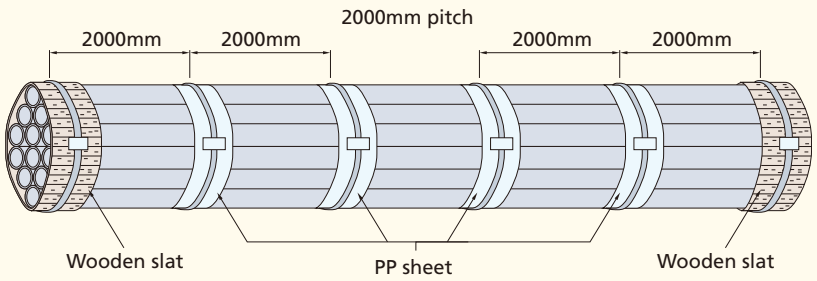

Wall thickness (mm)
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
12.5
12.7
17.5
19.05
22.0
25.4
24.0
Medium Diameter

Marking and Packaging

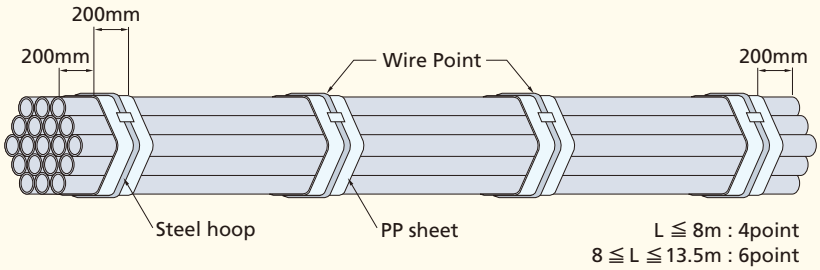
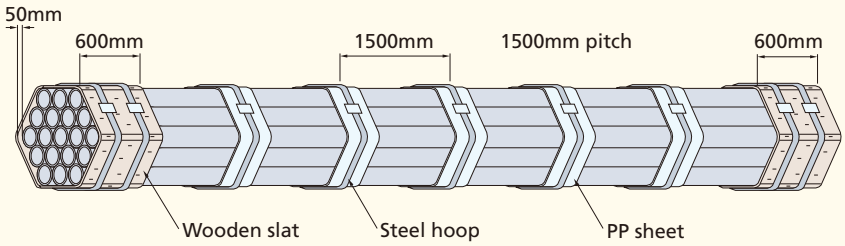
1 Standard Marking



2 Standard Packaging

Standard Package	Appearance of Package
Bare in bundle with steel hoops OD ≦ 168.3mm L ≦ 13.5m	 L ≦ 8m : 4point 8 ≦ L ≦ 13.5m : 6point
Protect under steel hoops OD ≦ 168.3mm L > 13.5m	

Note : The package shall be perform at the option of the manufacturer, unless otherwise specified in the purchase order.

Classification	Standard Package	Appearance of Package
Tubes & Pipes	Hexagonal Form OD ≦ 168.3mm L ≦ 13.5m	 
	Hexagonal Form OD ≦ 168.3mm L > 13.5m	 
Tubes & Pipes	Bare in loose (OD > 168.3mm)	

Available Grades

Please recheck the original specification in advance of the order.

	JIS G 3454	ASTM/ASME	EN	NK	LR	ABS
Carbon Steel Pipes for Pressure Service		A/SA53A				ABS2
	STPG370			KSTPG38		
	STPG410	A/SA53B		KSTPG42		ABS3
	JIS G 3455	ASTM/ASME	EN	NK	LR	ABS
Carbon Steel Pipes for High Pressure Service	STS370			KSTS38		
	STS410			KSTS42		
	STS480					
			P265GH			
	JIS G 3456	ASTM/ASME	EN	NK	LR	ABS
Carbon Steel Pipes for High Temperature service		A/SA106A				ABS4
	STPT370			KSTPT38	LR-SEC2-360C1,2	
	STPT410	A/SA106B		KSTPT42	LR-SEC2-410C1,2	ABS5
	STPT480	A/SA106C		KSTPT49		
	JIS G 3458	ASTM/ASME	EN	NK	LR	ABS
Alloy Steel Pipes for High Temperature Service	STPA12	A/SA335P1				
	STPA20	A/SA335P2				
	STPA22	A/SA335P12				
	STPA23	A/SA335P11				
	STPA24	A/SA335P22				
	STPA25	A/SA335P5				
	STPA26	A/SA335P9				
	Japanese METI code	ASTM/ASME	EN	NK	LR	ABS
Alloy Steel Pipes for Generator piping	KA-STPA24J1	A/SA335P23				
	KA-STPA28	A/SA335P91-Type1/Type2	X10CRMOVNB9-1			
	KA-STPA29	A/SA335P92	X10CRWMOVNB9-2			
	JIS G 3460	ASTM/ASME	EN	NK	LR	ABS
Steel Pipes for Low Temperature Service	STPL380	A/SA333-1		KLPB		
		A/SA333-6				
	JIS	ASTM/ASME	EN	NK	LR	ABS
Header				KBH-1		
	JIS G 3461	ASTM/ASME	EN	NK	LR	ABS
Carbon Steel Boiler and Heat Exchanger Tubes	STB340	A/SA192		KSTB35	Sec.6-360	ABS H
	STB410	A/SA210A1			Sec.6-410	
		A/SA210C				
	STB510					
			P265GH			
	JIS G 3462	ASTM/ASME	EN	NK	LR	ABS
Alloy Steel Boiler and Heat Exchanger Tubes	STBA12	A/SA209T1				
	STBA22	A/SA213T12				
	STBA23	A/SA213T11				
	STBA24	A/SA213T22				
	STBA25	A/SA213T5				
	STBA26	A/SA213T9				
	Japanese METI code	ASTM/ASME	EN	NK	LR	ABS
	KA-STBA24J1	A/SA213T23				
	KA-STBA28	A/SA213T91-Type1/Type2	X10CRMOVNB9-1			
	KA-STBA29	A/SA213T92	X10CRWMOVNB9-2			

For Inquiring and Ordering

All inquiries and orders should contain the following information.

1. Designation
Specification, edition, grade, type and part No. Purchaser's own specification covering requirements not included in the referenced specification, and/or those that replace, (or supersede) valid specification should be attached to first inquiry and/or given at revision.

2. Specific requirements
(1) Method of manufacture
(Seamless, electric-resistance welded)
(2) "Type of end finish
Square-cut or beveled*
(*Special requirements on bevel angle and root face stipulated other than the specification should be mentioned in the inquiry.)
Threaded & coupled*
(*Requirements different from the specification should be mentioned.)

3. Dimensions
(1) Outside diameter [O.D] or nominal pipe size [NPS] with abbreviation.
(2) Wall thickness
Nominal or minimum wall thickness, nominal weight or schedule number.
(3) Length
Specific* or random
(*In case of specific length, length tolerance should be specified if necessary.)

4. Quantity
Feet, meters or number of lengths
*Delivery allowance should be specified.

5. Inspection
Specify the name of an inspection agent when the inspector representing the purchaser should inspect.

6. Finish and coating
Mill's standard varnish coating. *
(*Consult with us if there is other requirement)

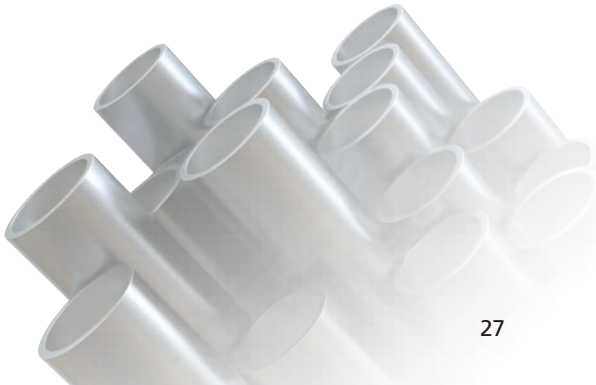
7. Marking requirement
When a marking other than that stipulated in the specification is required, give a detailed description of such marking.

8. Packaging requirement
Bundled or loose*
(*Any special packaging should be so instructed if specified other than the specification.)

9. Delivery requirements
Time, place and shipping instructions

10. End use
Commodities to be transported, location, on-land or off-shore, operation pressure and temperature, when available.

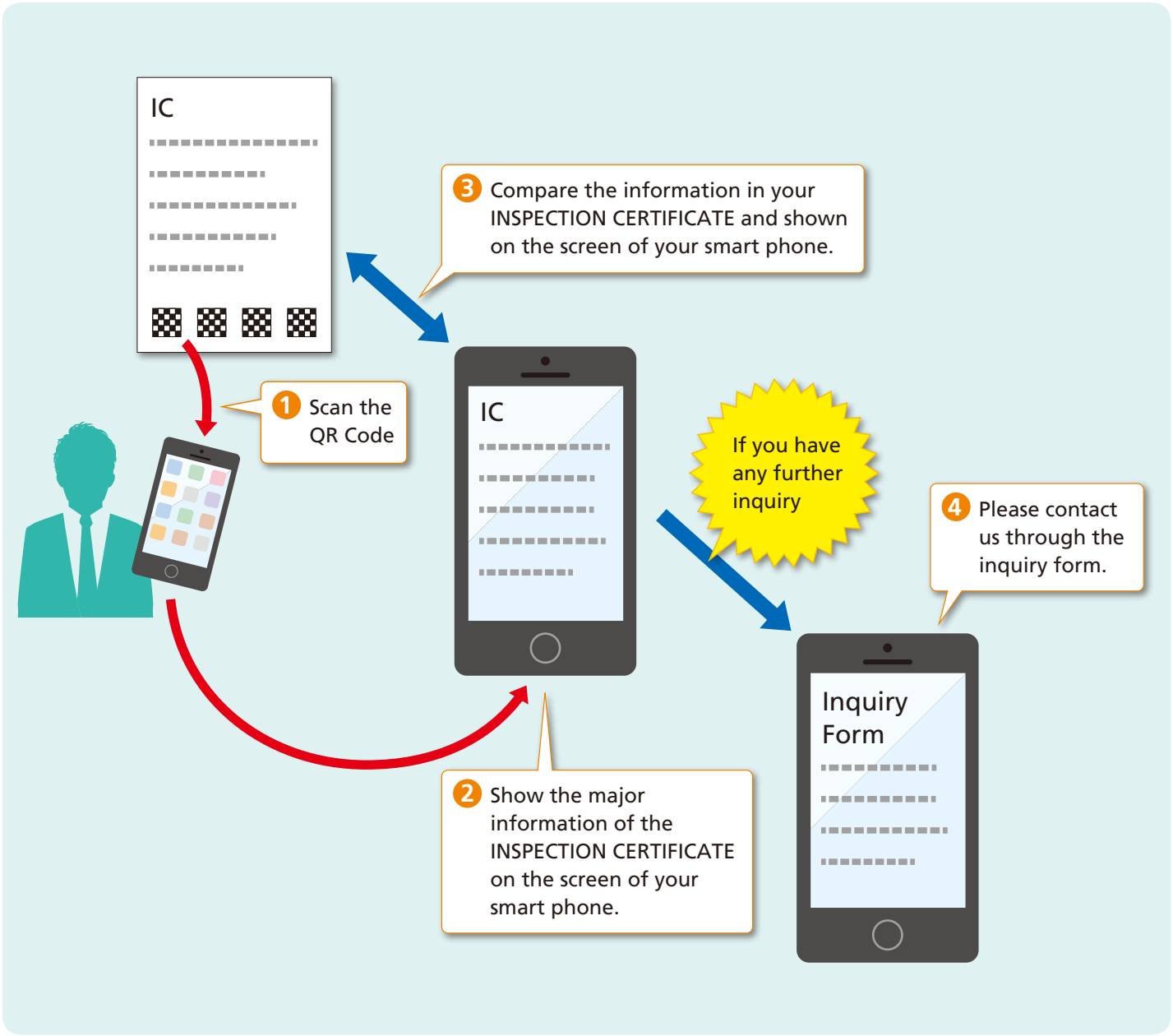
11. Consult with us before placing an order or at an inquiry, when any of the following items are required.
(1) Intermediate grade, wall thickness
(2) Special and/or supplemental requirements in chemistry
(3) Special and/or supplemental mechanical properties
(4) Special or alternative hydrostatic pressure
(5) Closer tolerance on sizes
(6) Additional and/or alternative nondestructive inspection
(7) Any alternative and/or additional conditions



Customer Service

Operating manual of Confirmation check of INSPECTION CERTIFICATE

What is the Confirmation check of INSPECTION CERTIFICATE ?
It is the system which allows you to check if the INSPECTION CERTIFICATE is genuine or not by using your smart phone.
Pertinent information of the Inspection certificate is encrypted and included in the QR Code.

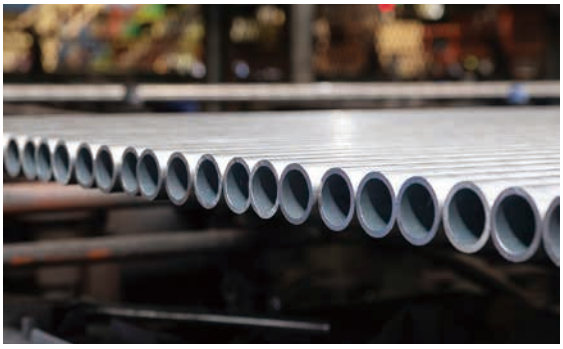


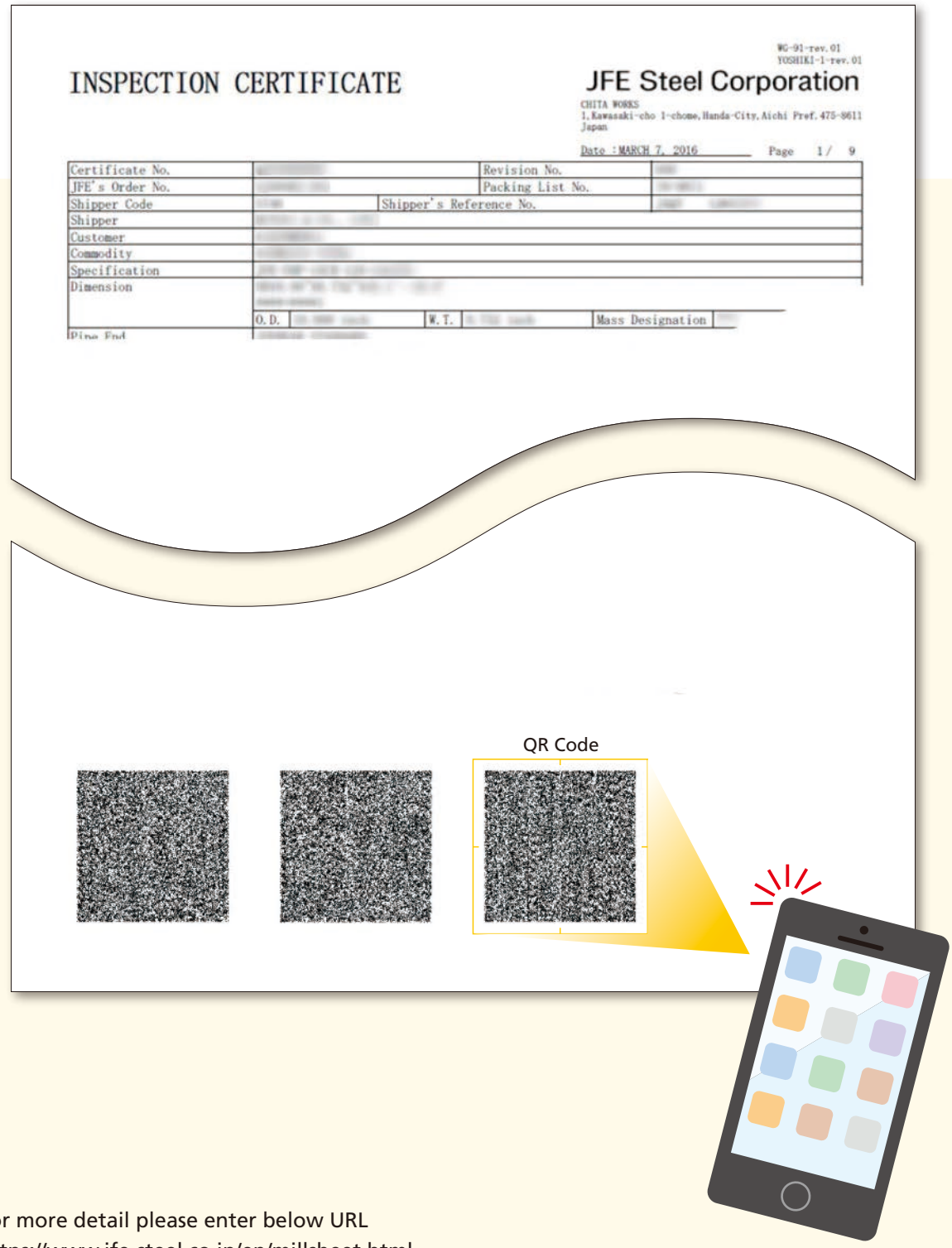
1. Please scan the QR Code shown in the last page of the INSPECTION CERTIFICATE using the application software of your smart phone.

▶ Recommended application software for QR Code scanning (App) and web browser (Browser)

iPhone ➡ App : DENSO Q (ver.1.7.4 or higher), Qrafter (ver.12.4 or higher)
Browser : Safari (ver.600.1.4 1or higher)

Android ➡ App : DENSO Q (ver.1.7.4 or higher), ICONIT (ver.4.1.3P2 or higher)
Browser : Chrome (ver.18.0.1025469 or higher)





For more detail please enter below URL
https://www.jfe-steel.co.jp/en/millsheet.html

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