HWAJIN

CARBON & STAINLESS STEEL PIPE FITTINGS HIGH FREQUENCY BENDING

CARBON & STAINLESS STEEL PIPE FITTINGS HIGH FREQUENCY BENDING



HWAJIN PF CO., LTD.
(MANUFACTURING BUTT-WELDING PIPE FITTINGS)

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271,Hwanggeum-ro 23beon-gil,Yangchon-eup,
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HWAJIN PF CO., LTD.

HWAJIN realizes life ideology & humanism through perfect products.

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COMPANY PRESENTATION

We have been engaged in the manufacruring and selling of the said BUTT-WELDING PIPE FITTINGS & HIGH FREQUENCY BENDING as steel material connection for piping works use under our company's precepts "Diligence" since established our company in 1986, and we are engaging in a pivotal role and the bringing under cultivation of export market for the domestic main industries with the highest quality, the minimum price and the management concept to be realized the satisfaction toward the customers.

Thus, we promise to requite to the customer's encouragement given to us with ourself-confidence rendering our sevice to our country the customers business is made prosperous, and we are expecting for your durable love, encouragement and leadership.

Thank you.







BREIF HISTORY

1980

■**1986 :** Established Hwa Jin Metal Co., Ltd. at # 141-1, Kam-Jeo Dong, Sa-Sang Ku, Busan, Korea.

■**1987 :** Started production of Elbow among the Steel Butt-Welding Pipe Fittings.

■**1988 :** Started production of Reducer and Cap.

1990

■**1991 :** Established 2nd factory at #370-100, Sin-Pyung Dong, Sa-Ha Ku, Busan, Korea.
Moved 2nd factory at #1518-3, Sin-Pyung Dong, Sa-Ha Ku, Busan,Korea.
Designated as the company for exemption of millitary service from the office of Millitary Manpower Administration.

■**1992 :** Started production of Tee.

■**1995 :** Changed the company name to Hwa Jin Bend Co.,Ltd. Moved the head Office-factory and 2nd factory to a newly constructed at #394-1,Sam-Rak Dong, Sa-Sang Ku, Busan, Korea.

■**1996 :** Acquired the licence for trade business.
Authorized to display the Korean Industrial Standards KS-mark. Authorized Products KS B 1522.

■**1997 :** Authorized Type Approval Certification of Pipe Fittings by Korean Register of Shipping. (KR)
Authorized to display the Korean Industrial Standards KS-mark.
Authorized Products KS B 1541 & KS B 1543.
Approved ISO 9002 Quality System Certification KFQ.
Started production of High Frequency Bending.

■**1998 :** Acquired Good Quality Certification GQ-mark.

■**1999 :** A newly Constructed Inchun Factory at 13D4L,#624-5, Nam-chon Dong, Nam-Dong Ku, Inchun, Korea.

2000

■**2000 :** Authorized to display the Japanese Industrial standards JIS-mark. Authorized Products JIS B 2311.

■**2001 :** Approved to manufacture Pipe Fittings for BV Mode II Survey by Bureau Veritas. (BV)
Approved for LR Type Approved System by Lloyd Register EMEA (LR)
Approved to manufacture Pipe Fittings for GL Rule Material Chapter 2,Section 6.B. by Germanischer Lloyd.(GL)
Completed the Full Installation of the Latest Large-sized High Frequency Bending Machine.
Acquired the Qualification of Supplying Goods For Korea Gas Corporation.

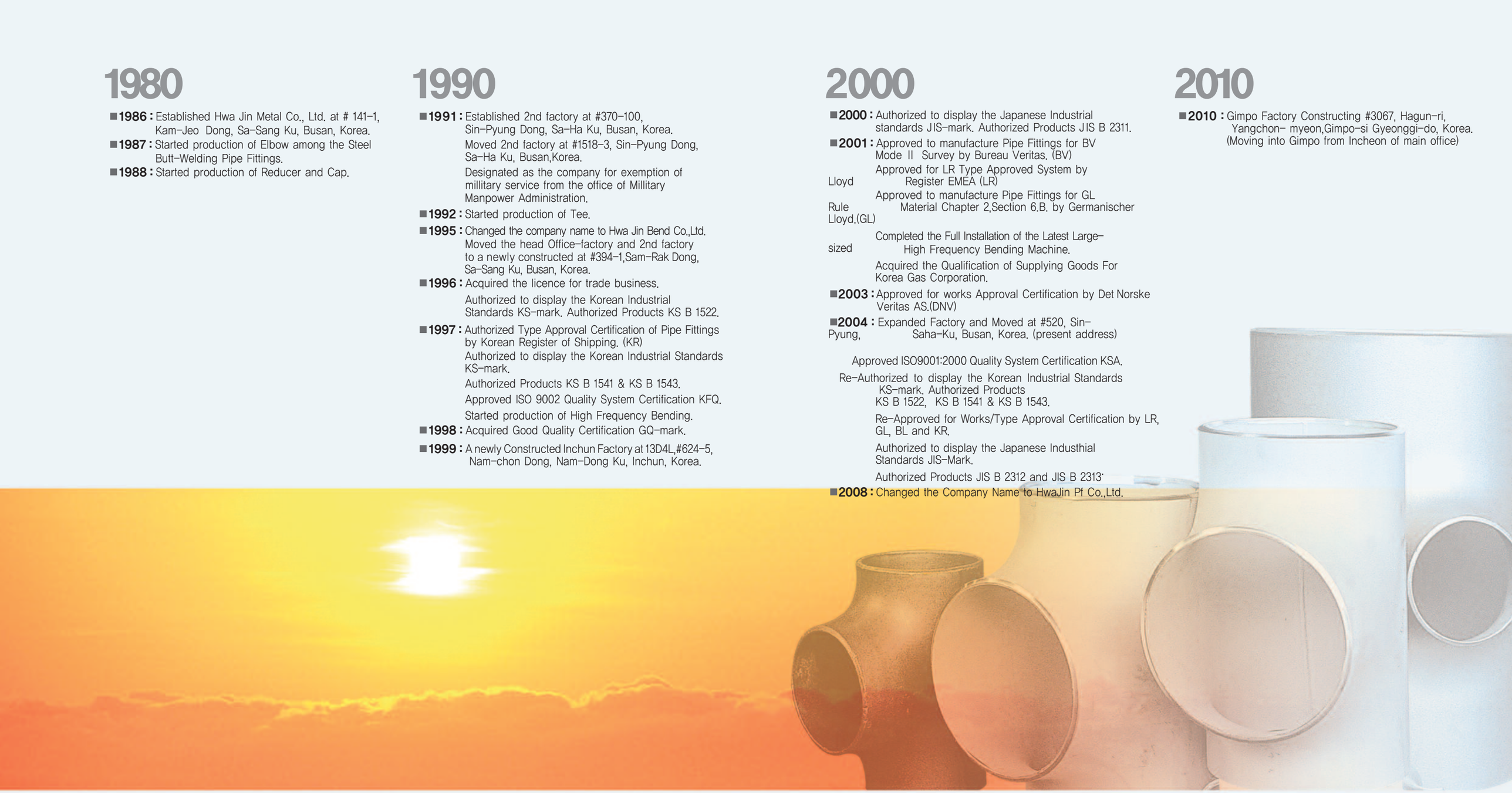
■**2003 :** Approved for works Approval Certification by Det Norske Veritas AS.(DNV)

■**2004 :** Expanded Factory and Moved at #520, Sin-Pyung, Saha-Ku, Busan, Korea. (present address)
Approved ISO9001:2000 Quality System Certification KSA.
Re-Authorized to display the Korean Industrial Standards KS-mark. Authorized Products KS B 1522, KS B 1541 & KS B 1543.
Re-Approved for Works/Type Approval Certification by LR, GL, BL and KR.
Authorized to display the Japanese Industhial Standards JIS-Mark.
Authorized Products JIS B 2312 and JIS B 2313.

■**2008 :** Changed the Company Name to HwaJin Pf Co.,Ltd.

2010

■**2010 :** Gimpo Factory Constructing #3067, Hagun-ri, Yangchon- myeon,Gimpo-si Gyeonggi-do, Korea. (Moving into Gimpo from Incheon of main office)



MAIN OFFICE & PLANT





HEAD OFFICE
71,Dadae-ro 170beon-gil,Saha-gu,Busan,Korea.
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GIMPO OFFICE & PLANT



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Gimpo-si,Gyeonggi-do,Korea.
TEL:(82-31)8048-2000 FAX:(82-31)8048-2009

MAIN FACILITIES (Cabon & Stainless Steel Pipe Fittings)



Tee Bulging Machine

Heat Treatment for Austenitic Stainless Steels

Anticipated service environment, or other reason for treatment	Suggested thermal treatment* (entered in order of decreasing preference)		
	Extra-low-carbon grades, such as 304L and 316L	Stabilized grades, such as 318, 321and 347	Unstabilized grades, such as 304 and 316
Severe stress corrosion	A, B	B, A	(a)
Moderate stress corrosion	A, B, C	B, A, C	C (a)
Mild stress corrosion	A, B, C, E, F	B, A, C, E, F	C, F
Remove peak stresses only	F	F	F
No stress corrosion	None required	None required	None required
Intergranular corrosion	A, C (b)	A, C, B (b)	C
Stress relief after severe foming	A, C	A, C	C
Relief between forming operations	A, B, C	B, A, C	C (c)
Structural soundness (d)	A, C, B	A, C, B	C
Dimensional stability	G	G	G

* Key to leter designations of treatments:

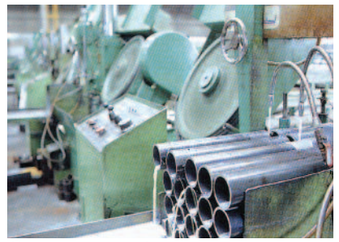
A – Anneal at 1950 to 2050 F : solw cooling
B – Stress relieve at 1650 F : slow cooling
C – Anneal at 1950 to 2050 F : quenching (e)
D – Stress relieve at 1650 F : quenching (e)
E – Stress relieve at 900 to 1200 F : solw cooling
F – Stress relieve at below 900 F : slow cooling
G – Stress relieve at 400 to 900 F : slow cooling (e)
(Usual time, 4 hr per inch of section.)

(a) To allow the optimum stress-relieving treatment, the use of stadilized or extra-low-carbon grades is recommended.

(b) In most instances, no heat treatment is required, but where fabrication procedures may have sensitized the stainless steel the treatments noted, may be employed.

(c) Treatment A, B or D also may be used, if followed by treatment C when forming is completed. (d)where severe habricating stresses coupled with high service loading may cause cracking. Also, after welding heavy sections.

(e) Or cool rapidly.



① Band Sawing M/C



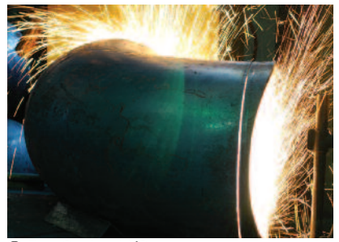
② Hot Forming M/C



③ Heat Treatment Furnace



Elbow Sizing Hydraulic Press for Large Diameter Fitting



④ End Cutting M/C



⑤ Shot Blast M/C



⑥ Beveling M/C for Elbow



⑦ Protective Coating M/C

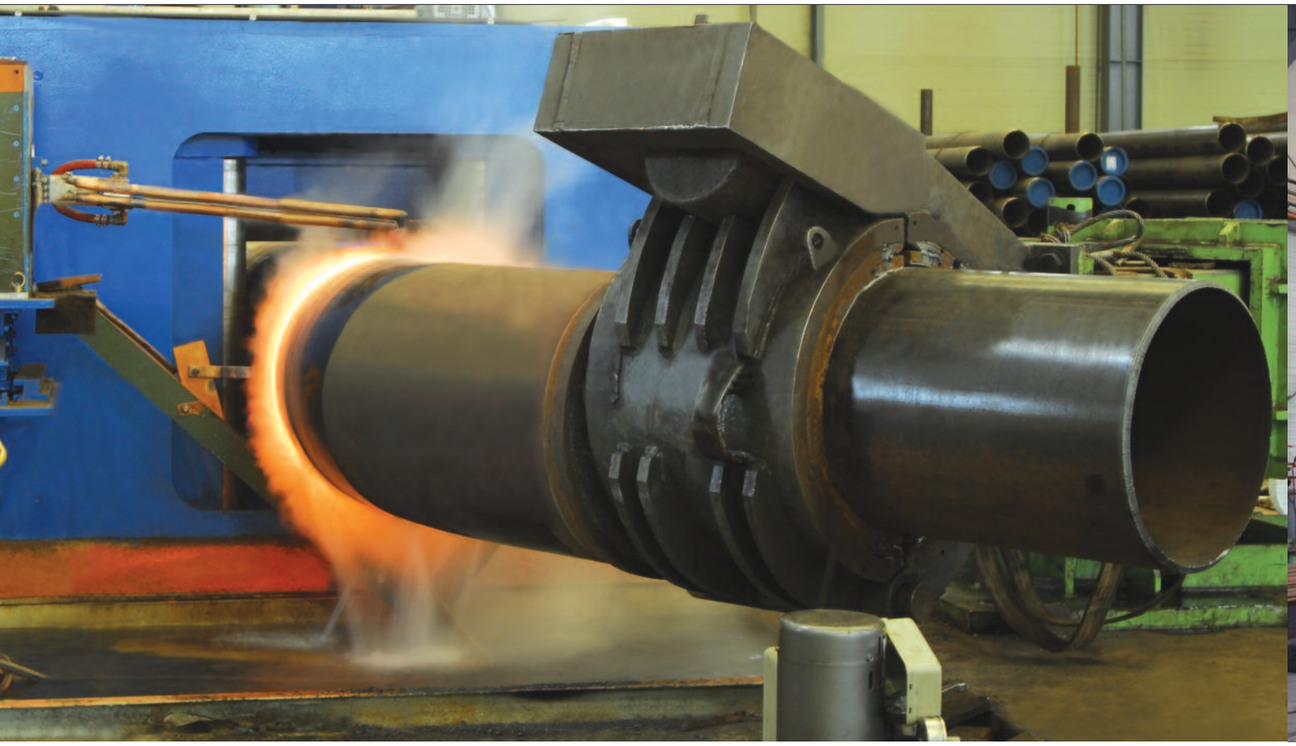


⑧ Computer Dot Marking M/C



⑨ Products Store-House

MAIN FACILITIES (High Frequency Bending)





The Special Features of High Frequency Pipe Bending

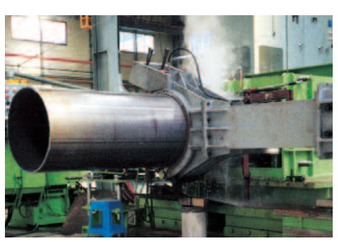
Thanks to recent installation of our latest bending machines, which can bend freely from over 2″ to 36″, we can manufacture the flawless products at customers' pleasure with no mistake and it makes our products better than any others.

THE QUALITY OF INDUCTION BENDS IS GOOD.

HWAJIN PF's induction bends being made by employing the backone bending technology, the quality of it good in such points that a pipe wall reduction rate and an ovality rate are smaller than those of other bending products.

MECHANICAL PROPERTIES EXCELLENT.

HWAJIN PF's induction bends being made by controlling such bending factors as material specification, wall thickness and outside diameter of a pipe the mechanical propeties of induction bends excellent.







ANY FORM OF INDUCTION BENDS IS AVAILABLE.

HWAJIN PF's induction bends being made without any mould, it is free in any form of which is single, double and three dimensional bending and also it is possible to select any bending radius and angle desired within the limit of the bending machine capacity.

PIPING COST CAN BE SAVED.

HWAJIN PF's induction bends can reduce the welds in pipeline, so it leads the cost savings in piping materials and installation.





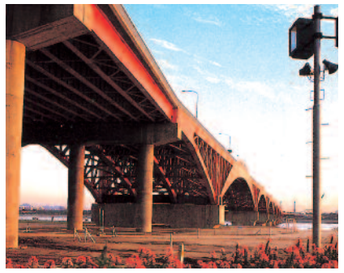


MATERIAIS UTILIZING SCORE (High Frequency Bending)







Major Manufacturing Items and Use of High Frequency Pipe Bending

■ Major Manufacturing Items

- PIPE(JIS, KS, ANSI, API)
  –CARBON STEEL, ALLOY STEEL
  –STAINLESS STEEL
- H–BEAM, I–BEAM, RAIL
- SQUARE PIPE

■ Use

- SHIP PIPE LAYING / PLANT / CONSTRUCTION PIPE LAYING / LONG BEND / STRUCTURE LAYING



PIPE DIA별 R값

N.D		O.D	1.5D	2D	2.5D	3D	3.5D	4D	5D	8D	10D
DIA	inch										
80A	3	89.1	134	178	223	267	312	356	446	713	891
100A	4	114.3	171	229	286	343	400	457	572	914	1,143
125A	5	139.8	210	280	350	419	489	559	699	1,118	1,398
150A	6	165.2	248	330	413	496	578	661	826	1,322	1,652
200A	8	216.3	324	433	541	649	757	865	1,082	1,730	2,163
250A	10	267.4	401	535	669	802	936	1,070	1,337	2,139	2,674
300A	12	318.5	478	637	796	956	1,115	1,274	1,593	2,548	3,185
350A	14	355.6	533	711	889	1,067	1,245	1,422	1,778	2,845	3,556
400A	16	406.4	610	813	1,016	1,219	1,422	1,626	2,032	3,251	4,064
450A	18	457.2	686	914	1,143	1,372	1,600	1,829	2,286	3,658	4,572
500A	20	508.0	762	1,016	1,270	1,524	1,778	2,032	2,540	4,064	5,080
550A	22	558.8	838	1,118	1,397	1,676	1,956	2,235	2,794	4,470	5,588
600A	24	609.6	914	1,219	1,524	1,829	2,134	2,438	3,048	4,877	6,096
650A	26	660.4	991	1,321	1,651	1,981	2,311	2,642	3,302	5,283	6,604
700A	28	711.2	1,067	1,422	1,778	2,134	2,489	2,845	3,556	5,690	7,112
750A	30	762.0	1,143	1,524	1,905	2,286	2,667	3,048	3,810	6,096	7,620
800A	32	812.8	1,219	1,626	2,035	2,438	2,845	3,251	4,064	6,502	8,128
850A	34	863.6	1,295	1,727	2,159	2,591	3,023	3,454	4,318	6,909	8,636
900A	36	914.4	1,372	1,829	2,286	2,743	3,200	3,658	4,572	7,315	9,114
1000A	40	1.016	1,524	2,032	2,540	3,048	3,556	4,064	5,080	8,128	

☐ CARBON STEEL & STAINLESS STEEL POSSIBLE. ☐ MANUFACTURE OF H-BEAM CHANNEL ETC.

RESEARCH & DEVELOPMENT (Quality Control System)



Throughout the manufacturing process, from cutting and forming to finished products, stringent quality control inspections and tests are carried out to ensure that product quality complies fully with customer requirements.

Final inspection generally includes, visual and dimensional control as well as chemical, physical and mechanical tests.

All test are performed in accordance with the requirements of the relevent specifications.

Additionally, **HwaJin Pf Co., Ltd.** Will effort to achieve customer's satisfaction and to maintenance competitiveness through best quality under total quality management system.

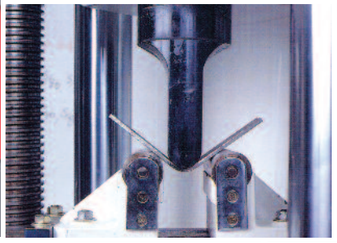


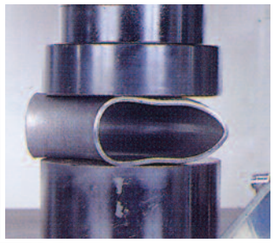
















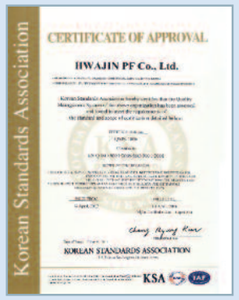


INSPECTION BY VARIOUS AUTHORITIES



Products subject to this inspection are made from raw materials stipulated by the Bureau of Shipping.
The raw materials and products are inspected for external appearance, dimensions, and conformity to designated specifications.
The Bureau of Shipping witnesses and certifies inspection, and certificates from them are in accordande with the customer's requirements.
HwaJin pipe fittings are inspected by the Bureau of Shipping. (KR, LR, GL, BV, RINA etc.)

• Certificates



ISO:
International Organization for Standards



KS B 1522 :
Korean Industrial Standards



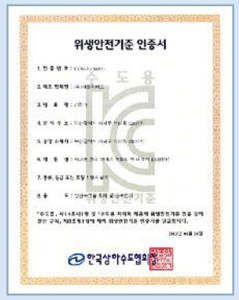
KS B 1541 :
Korean Industrial Standards



KS B 1543 :
Korean Industrial Standards



KC:
Korea Certification



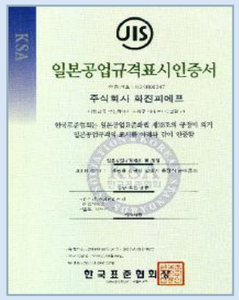
KC:
Korea Certification



JIS B 2311:
Japanese Industrial Standards



JIS B 2312:
Japanese Industrial Standards



JIS B 2313:
Japanese Industrial Standards



GL:
Germanischer Lloyd



LR:
Lloyd's Register EMEA



BV :
Bureau Veritas



RINA:
Registro Italiano Navale



KR :
Korean Register of shipping



KR :
Korean Register of shipping







•DESCRIPTION FOR CERTIFICATES

- **ISO :** International Organization for Standards
- **KS :** Korean Industrial Standards
- **KC :** Korea Certification
- **JIS :** Japanese Industrial Standards
- **GL :** Germanischer Lloyd
- **LR :** Lloyd's Register EMEA
- **KGC :** Korean Gas Corporation
- **BV :** Bureau Veritas
- **RINA:** Registro Italiano Navale
- **KR:** Korean Register of shipping

HWAJIN
CARBON & STAINLESS STEEL PIPE FITTINGS



APPLICABLE SPECIFICATIONS

KS :KOREAN INDUSTRIAL STANDARDS

KS B 1522	Steel Butt-Welding Pipe Fittings for Ordinary use.
KS B 1541	Steel Butt-Welding Pipe Fittings.
KS B 1542	Steel Socket-Welding Pipe Fittings.
KS B 1543	Steel Plate Butt-Welding Pipe Fittings.

JIS :JAPANEESE INDUSTRIAL STANDARDS

JIS B 2311	Steel Butt-Welding Pipe Fittings for Ordinary use.
JIS B 2312	Steel Butt-Welding Pipe Fittings.
JIS B 2313	Steel Plate Butt-Welding Pipe Fittings.
JIS B 2316	Steel Socket-Welding Pipe Fittings.

ANSI :AMERICAN NATIONAL STANDARDS INSTITUTE

ANSI B 16.5	Pipe Flanges and Flanged Fittings.
ANSI B 16.9	Factory Made Wrought Steel Butt-Welding Fittings.
ANSI B 16.11	Forged Steel Fittings, Socket-Welding and Threaded.
ANSI B 16.25	Butt-Welding Ends.
ANSI B 16.28	Wrouaht Steel Butt-Welding Short Radious Elbow and Returns.
ANSI B 36.10	Welded and Seamless Wrought Steel Pipe.
ANSI B 36.19	Stainless Steel Pipe.

ASTM :AMERICAN SOCIETY FOR TESTING AND METERIALS

ASTM A 105	Forging, Carbon Steel for Piping Components.
ASTM A 182	Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
ASTM A 234	Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
ASTM A 350	Forgings Carbon and Low-Alloy Steel, Requiring Notch Toughness Testing for Piping Components.
ASTM A 403	Wrought Austenitic Stainless Steel Piping Fittings.
ASTM A 420	Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-Temperature Service.
ASTM A 815	Specification for Wrought Ferritic, Ferritic/Austenitic, and Martensitic Stainless Steel Piping Fittings.

MSS :MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY

MSS SP-25	Standard Marking System for Valves, Fittings, Flanges and Unions.
MSS SP-43	Wrought Stainless Steel Butt-Welding Fittings.
MSS SP-44	Steel Pipe Line Flanges.
MSS SP-75	Specification for High Test Wrought Butt-Welding Fittings.
MSS SP-79	Socket Welding Reducer Inserts.
MSS SP-83	Carbon Steel Pipe Unions Socket-Welding and Threaded.
MSS SP-87	Factory-Made Butt-Welding Fittings for Class 1 Nuclear Piping Applications.
MSS SP-95	Swage(d) Nipples and Bull Plugs.
MSS SP-97	Integrally Reinforced Forged Branch Outlet Fittings-Socket Welding, Threaded and Butt-Welding Ends.

ASME :AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ASME SECTION II	Materials.
ASME SECTION III	Subsection NCA / Division 1 / Division 2
ASME SECTION V	Nondestructive Examination.
ASME SECTION VIII	Rules for Construction of Pressure Vessels/ Division 1, Division 2.
ASME SECTION IX	Welding and Brazing Qualifications.

KEPIC :KOREA ELECTRIC POWER INDUSTRY CODE

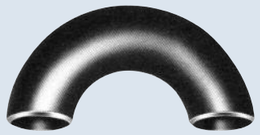
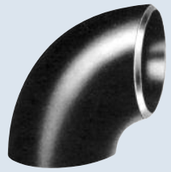
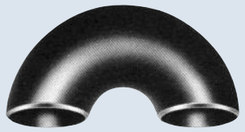
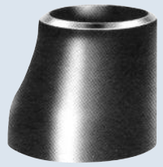
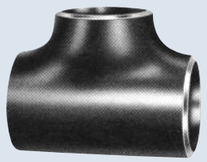
KEPIC MN	Nuclear Components.

API :AMERICAN PETROLEUM INSTITUTE

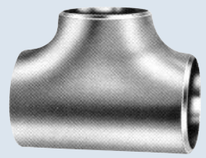
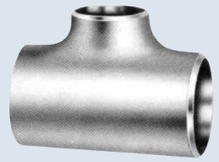
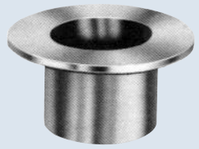
API 5L	Line Pipe.
API 5LX	High Test Line Pipe.
API 6A	Wellhead and Christmas Tree Eguipment.

GENERAL ILLUSTRATION

Wrought Steel Butt-Welding Pipe Fittings (Carbon Steel)

 90° Elbow(Long)	 180° Elbow(Long)	 Reducer(Concentric)	 Reducer(Concentric)
 90° Elbow(Short)	 180° Elbow(Short)	 Reducer(Eccenstric)	 Reducer(Eccentric)
45° Elbow(Long)	 Tee(Straight)	 Tee(Reducing)	 Cap

Stainless Steel Butt-Welding Pipe Fittings

 90° Elbow(Long)	 Reducer(Concentric)	 Tee(Straight)
 90° Elbow(Short)	 Reducer(Eccentric)	 Tee(Reducing)
 45° Elbow(Long)	 Lap Joint Stub End	 Cap

MARKING SYSTEMS

Every Hwajin's Pipe Fittings is permanently marked with all essential information:

•KS/JIS Products

Steel Butt-Welding Fittings

1.Manufacturer identification mark.
2.KS or JIS material designation-the symbol identifying the type of material from which the products.
3.Thickness designation or schedule number.
4.Nominal size.
5.Heat number (if necessary)









•ANSI Products

Steel Butt-Welding Fittings

1.Manufacturer identification mark.
2.ASTM material designation-the symbol identifying the type of material from which the products was manufactured.
3.Schedule number or nominal wall thickness designtion.
4.Nominal size.
5.Heat number (if necessary)









WROUGHT STEEL BUTT-WELDING PIPE FITTINGS



STAINLESS STEEL BUTT- WELDING PIPE FITTINGS



FABRICATION PROCEDURES FOR STEEL BUTT-WELDING PIPE FITTINGS

1.Elbow, Tee and Reducer

(1)Seamless & Welded Pipe

Receiving Materials / Receiving Innspection → Material Cutting → Bending or Forming → Heat Treatment → *Shot Blasting / **Pickling → End Machining → Visual Examination / Dimensional Examination → Coating → Marking → **Final Finished Products**

(2)Plate

Receiving Materials / Receiving Innspection → Material Cutting → Forming → Longitudinal Grooving → Welding → Non-Destrucive Examination → Heat Treatment → *Shot Blasting / **Pickling → End Machining → Visual Examination / Dimensional Examination → Coating → Marking → **Final Finished Products**

2.Cap

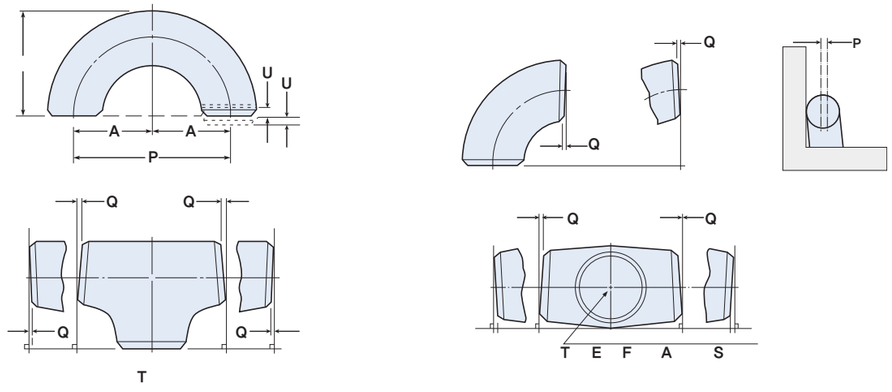
Receiving Materials / Receiving Innspection → Material Cutting → Forming → Heat Treatment → *Shot Blasting / **Pickling → End Machining → Visual Examination / Dimensional Examination → Coating → Marking → **Final Finished Products**

DIMENSIONAL TOLERANCES

1.Wrought Steel Butt Welding Fittings.

{ANSI B16.9 / ANSI 16.28}

All Fittings				90° and 45° Elbows · Tees	Reducers	Caps	180 Deg Returns		
Nominal Pipe Size(NPS)	Outside Diameter at Bevel, D [Notes (1), and (2)]	Inside Diameter at End [Notes (1)(3), and (4)]	Wall Thickness, T [Notes (3)]	Center-to-End Dimensions of 90 Deg and 45 Deg Elbows and Tees, A,B,C,M	Overall Length of Reducers and Lap Joint Stub Ends, F,H	Overall Length of Caps, E	Center-to-Center Dimension, O	Back-to-Face Dimension, K	Alignment of Ends, U
	+1.6 −0.8	0.8	Not Less Than 87.5% of Nominal Thickness	2	2	3	6	6	1
3 - 4	+1.6	1.6		2	2	3	6	6	1
5 - 8	+2.4 −1.6	1.6		2	2	6	6	6	1
10 - 18	+4.0 −3.2	3.2		2	2	6	10	6	2
20 - 24	+6.4 −4.8	4.8		2	2	6	10	6	2
26 - 30	+6.4 −4.8	4.8		3	5	10	—	—	—
37 - 48	+6.4 −4.8	4.8		5	5	10	—	—	—



Nominal Pipe Size (NPS)	Angularity Tolerances	
	Off Angle,Q	Off Angle,Q
½ - 4	1	2
5 - 8	2	4
10 - 12	2	5
14 - 16	3	6
18 - 24	4	10
26 - 30	5	10
32 - 42	5	13
44 - 48	5	19

• Dimensions are in inches.

{MSS SP-43}

Nominal Pipe Size	All Fittings		90° Elbow 45° Elbow Tee	Reducer Lap Joint Stub End	180° Return			Cap
	Outside (1) Diameter at Wedling End	Wall Thickness	Center-to-End Dimension A.B.C.M	Overall Length F.H	Center-to-Center Dimension O	Center-to-Center Dimension K	Alignment of Ends U	Overall Length E
½-1½	± 0.03	Not Less Than 87½% of Nominal Thickness	± 0.06	± 0.06	± 0.25	± 0.25	± 0.03	± 0.12
2-3½	± 0.03		± 0.06	± 0.06	± 0.25	± 0.25	± 0.03	± 0.12
4	± 0.03		± 0.06	± 0.06	± 0.25	± 0.25	± 0.03	± 0.12
5 - 8	+0.06 −0.03		± 0.06	± 0.06	± 0.25	± 0.25	± 0.03	± 0.25
10 - 18	+0.09 −0.03		± 0.09	± 0.09	± 0.38	± 0.25	± 0.06	± 0.25
20 - 24	+0.12 −0.03		± 0.09	± 0.09	± 0.38	± 0.25	± 0.06	± 0.25

Nominal Pipe Size	All Fittings		Lap Joint Stub End	
	Outside (1) Diameter at Wedling End	Wall Thickness	Fillte (2) Radius of Lap A	Outside Diameter at of Lap G
½-1½	± 0.03	Not Less Than 87½% of Nominal Thickness	+0 −0.03	+0 −0.03
2-3½	± 0.03		+0 −0.03	+0 −0.03
4	± 0.03		+0 −0.06	+0 −0.03
5 - 8	+0.06 −0.03		+0 −0.06	+0 −0.03
10 - 18	+0.09 −0.03		+0 −0.06	+0 −0.06
20 - 24	+0.12 −0.03		+0 −0.06	+0 −0.06

DIMENSIONAL TOLERANCES

1.Steel Butt-Welding Pipe Fittings for Ordinary Use.

{KS B 1522 / JIS B 2311}

Item	Type of Pipe Fitting	Nominal Diameter				
		½-2½	3–4	5–8	10–18	20
		Tolerance				
Outside Dia, at end face (OD)	All pipe Fitting	±2	±2.5	±3.5	+5 -4.5	+6.4 -4.8
Inside Dia, at end face (ID)		±2	±2.5	±3.5	±4.5	±4.8
Wall thickness (T)		+ Not specified - 15%				
Center-to-end dimension (A,B)	90°Elbow 45°Elbow	±2.0		±3.2		±4.8
Center-to-center dimension (P)	180°Elbow	±6.4		±9.5		—
Back-to-face dimension (K)		±6.4				—
Alignment of ends (Max.) (U)		1.6		3.2		—
End-to-end dimension (H)	Reducer	±2.0		±3.2		
Center-to-end dimension (C.M)	Tee	±2.0		±3.2		
Back-to-face dimension (E)	CAP	±3.2		±6.4		

2.Steel Butt-Welding Pipe Fittings for Special Use. and Steel Plate Butt-Welding Pipe Fittings.

{KS B 1541, JIS B 2312 / KS B 1543, JIS B 2313}

Item	Type of Pipe Fitting	Nominal Diameter						
		½-2½	3–4	5–8	10–18	20–24	26–30	32–36
		Tolerance						
Outside Dia, at end face (OD)	All pipe Fitting	+1.6 -0.8	±1.6	+2.4 -1.6	+4 -3.2	+6.4 -4.8		
Inside Dia, at end face (ID)		±0.8	±1.6		±3.2	±4.8		
Thickness (T)		+ Not specified - 12.5%						
Center-to-end dimension (A,B)	90°Elbow 45°Elbow	±1.6			±2.4		±3.2	±4.8
Center-to-centre dimension (P)	180°Elbow	±6.4			±9.5			
Back-to-face dimension (K)		±6.4						
Alignment of ends (U)		*±0.8 **±1.6			*±1.6 **±3.2		—	
End-to-end dimension (H)	Reducer	±1.6			±2.4		±4.8	
Center-to-end dimension (C.M)	Tee	±1.6			±2.4		±3.2	±4.8
Back-to-face dimension (E)	CAP	±3.2			±6.4			
Outside of end Peripheral length	All Pipe Fitting	—					±0.5	

*Application of KS B1541, JIS B2312
**Application of KS B1543, JIS B2313
•Dimensions are in millimeters.

3.Steel Socket-Wedling Pipe Fittings for Special.

{KS B 1542 / JIS B 2316}

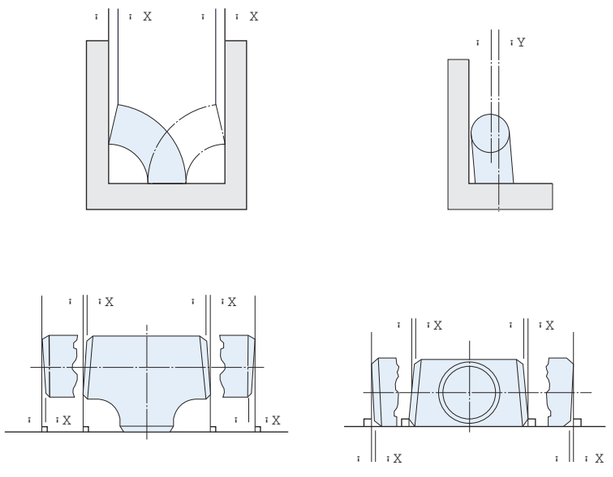
Item	Type of Pipe Fitting	Nominal Diameter			
		and ¼	⅜ to ¾	1 to 2	2½ and 3
		Tolerance			
Inside Diameter of Socket	All Pipe Fittings	+0.3 0			+0.4 0
Bore diameter		±0.4			±0.8
Eccentricity of inside Diameter of socket to bore diameter		±0.8			
Inclination of socket hole to fitting bore axis		1.5/300 Max			
Distance from center to bottom of socket	45°Elbow 90°Elbow cross	±0.8	±1.5	±2	±2.5
Laying length	Full Coupling	±1.5	±3	±4	±5
Laying length	Half Coupling	±0.8	±1.5	±2	±2.5

4.Right Angle for Shaft-Center of Pipe Fittings.

{KS B 1522, JIS B 2311 / KS B 1541, JIS B 2312 / KS B 1543, JIS B 2313}

Item	Type of Pipe Fitting	Nominal Diameter							
		½-4	5-8	10-12	14-16	18-24	26-30	32-42	44-48
		Tolerance							
Off Angle (X)	All Pipe Fittings	0.8	1.6	2.4		3.2	4.8		
Off Plane (Y)		1.6	3.2	4.8	6.4	9.5		12.7	19.1

●Dimensions are in millimeters.



BUTT-WELDING FITTINGS APPROX WEIGHT

● 90。ELBOWS

Unit : Kg

Nominal Pipe Size	Long							Short							Nominal Pipe Size
	SGP	STD	S40	X-S	S80	XX-S	S160	SGP	STD	S40	X-S	S80	XX-S	S160	
½	0.08	0.08	0.08	0.10	0.10	0.15	0.12	-	-	-	-	-	-	-	½
¾	0.10	0.11	0.11	0.14	0.14	0.22	0.13	-	-	-	-	-	-	-	¾
1	0.15	0.16	0.16	0.20	0.20	0.36	0.25	0.10	0.11	0.11	0.14	0.14	0.22	0.17	1
1¼	0.26	0.26	0.26	0.35	0.35	0.64	0.42	0.17	0.18	0.18	0.23	0.23	0.39	0.28	1¼
1½	0.35	0.37	0.37	0.50	0.50	0.93	0.65	0.24	0.25	0.25	0.33	0.33	0.57	0.43	1½
2	0.64	0.66	0.66	0.90	0.90	1.69	1.33	0.43	0.44	0.44	0.60	0.60	1.13	0.89	2
2½	1.12	1.29	1.29	1.79	1.79	3.43	2.33	0.75	0.91	0.91	1.19	1.19	2.19	1.49	2½
3	1.58	2.04	2.04	2.74	2.74	5.25	3.83	1.05	1.36	1.36	1.83	1.83	3.49	2.55	3
4	2.91	3.84	3.84	5.36	5.36	10.20	8.02	1.94	2.56	2.56	3.58	3.58	6.79	5.35	4
5	4.49	6.48	6.48	9.13	9.13	17.60	14.70	2.99	4.32	4.32	6.09	6.09	11.80	9.79	5
6	7.09	9.94	9.94	15.00	15.00	29.10	24.20	4.73	6.63	6.63	10.00	10.00	19.50	16.20	6
8	14.40	20.10	20.10	30.50	30.50	51.40	53.20	9.61	13.40	13.40	20.30	20.30	34.30	35.50	8
10	25.40	35.40	35.40	47.70	57.00	92.80	103.00	16.90	23.60	23.60	31.80	38.00	61.00	68.60	10
12	38.10	52.00	57.00	68.70	94.00	134.00	171.00	25.40	34.60	38.00	45.80	63.00	89.50	114.00	12
14	56.70	67.90	79.10	89.90	133.00	-	236.00	37.80	45.30	53.00	60.00	89.00	-	158.00	14
16	74.30	89.00	118.00	118.00	195.00	-	350.00	49.50	59.10	79.00	78.30	130.30	-	234.00	16
18	94.20	113.00	169.00	150.00	275.00	-	495.00	62.80	75.30	113.00	99.90	183.90	-	330.00	18
20	116.00	140.00	220.00	186.00	373.00	-	676.00	77.70	93.10	147.00	124.00	249.00	-	451.00	20
22	141.00	169.00	267.00	225.00	493.00	-	886.00	94.10	113.00	178.00	150.00	329.00	-	591.00	22
24	168.00	202.00	366.00	268.00	636.00	-	1160.00	112.00	135.00	244.00	179.00	424.00	-	773.00	24
26	198.00	237.00	430.00	315.00	-	-	-	132.00	158.00	287.00	210.00	-	-	-	26
28	230.00	276.00	500.00	367.00	-	-	-	154.00	184.00	334.00	245.00	-	-	-	28
30	264.00	316.00	575.00	421.00	-	-	-	176.00	211.00	383.00	281.00	-	-	-	30
32	301.00	361.00	654.00	480.00	-	-	-	201.00	**241.00**	436.00	320.00	-	-	-	32
34	340.00	408.00	739.00	543.00	-	-	-	227.00	**272.00**	493.00	362.00	-	-	-	34
36	380.00	457.00	904.00	608.00	-	-	-	253.00	**304.00**	603.00	405.00	-	-	-	36
38	425.00	510.00	-	679.00	-	-	-	283.00	**340.00**	-	453.00	-	-	-	38
40	471.00	565.00	-	753.00	-	-	-	314.00	**377.00**	-	502.00	-	-	-	40
42	518.00	622.00	-	828.00	-	-	-	346.00	416.00	-	554.00	-	-	-	42
44	570.00	684.00	-	912.00	-	-	-	380.00	456.00	-	608.00	-	-	-	44
46	623.00	748.00	-	997.00	-	-	-	415.00	499.00	-	665.00	-	-	-	46
48	677.00	814.00	-	1085.00	-	-	-	452.00	543.00	-	724.00	-	-	-	48
50	735.00	884.00	-	1178.00	-	-	-	490.00	589.00	-	786.00	-	-	-	50
52	796.00	956.00	-	1305.00	-	-	-	530.00	637.00	-	870.00	-	-	-	52
54	857.00	1031.00	-	1375.00	-	-	-	572.00	688.00	-	917.00	-	-	-	54
56	926.00	1109.00	-	1480.00	-	-	-	616.00	740.00	-	976.00	-	-	-	56
58	991.00	1190.00	-	1588.00	-	-	-	661.00	794.00	-	1059.00	-	-	-	58
60	1060.00	1274.00	-	1700.00	-	-	-	707.00	849.00	-	1133.00	-	-	-	60

● STAINLESS STEEL FITTINGS

Unit : Kg

Nominal Pipe Size	90。ELBOW (L)			90。ELBOW (S)			Tee			Reducer			Cap		
	S5s	S10s	S20s	S5s	S10s	S20s	S5s	S10s	S20s	S5s	S10s	S20s	S5s	S10s	S20s
½	0.05	0.06	0.07	-	-	-	0.05	0.07	0.08	-	-	-	0.02	0.03	0.03
¾	0.05	0.06	0.09	-	-	-	0.07	0.10	0.11	0.03	0.04	0.05	0.03	0.04	0.04
1	0.08	0.13	0.14	0.05	0.08	0.09	0.12	0.20	0.22	0.06	0.09	0.10	0.05	0.09	0.10
1¼	0.12	0.20	0.22	0.08	0.13	0.15	0.20	0.33	0.36	0.07	0.12	0.13	0.07	0.11	0.12
1½	0.17	0.28	0.30	0.11	0.19	0.20	0.30	0.46	0.50	0.11	0.18	0.20	0.08	0.13	0.14
2	0.29	0.47	0.59	0.19	0.31	0.39	0.38	0.63	0.79	0.16	0.27	0.34	0.10	0.17	0.21
2½	0.55	0.79	0.94	0.37	0.52	0.63	0.71	1.00	1.18	0.30	0.43	0.50	0.16	0.23	0.28
3	0.81	1.16	1.51	0.54	0.77	1.00	0.96	1.38	1.78	0.37	0.52	0.69	0.25	0.37	0.48
4	1.40	2.00	2.60	0.93	1.33	1.74	1.50	2.15	2.80	0.56	0.80	1.04	0.41	0.59	0.78
5	2.83	3.46	4.97	1.89	2.31	3.31	2.85	3.48	5.01	1.09	1.33	1.92	0.81	0.99	1.44
6	4.06	4.96	7.09	2.71	3.31	4.73	3.89	4.75	6.83	1.46	1.78	2.55	1.13	1.39	1.99
8	7.07	9.55	15.90	4.71	6.37	10.70	6.26	8.43	14.30	2.01	2.72	4.56	1.76	2.38	4.05
10	13.50	16.60	25.00	9.01	11.10	16.70	11.50	14.20	21.50	3.66	4.49	6.77	3.35	4.13	6.23
12	22.40	25.80	35.70	15.00	17.20	23.90	18.80	21.60	30.20	5.88	6.78	9.40	5.54	6.39	8.89
14	28.80	34.60	56.90	19.20	23.10	37.80	22.70	27.30	44.80	10.80	13.00	21.20	6.62	7.99	13.20
16	39.80	45.30	74.50	26.50	30.20	49.50	29.60	33.70	55.20	13.90	15.80	25.90	8.82	10.10	16.70
18	50.40	57.40	94.50	33.60	38.30	62.80	37.40	42.70	70.00	17.20	19.20	29.80	11.30	12.90	21.30
20	71.00	82.10	142.00	47.30	54.70	95.00	52.80	61.00	104.00	28.60	33.10	56.00	16.00	18.50	31.80
22	85.90	99.50	170.00	57.30	66.30	114.00	63.80	74.10	126.20	31.70	36.70	62.50	19.50	22.60	38.80
24	118.00	136.00	202.00	79.00	90.40	135.00	81.40	93.90	139.40	40.20	46.00	68.60	26.20	30.10	45.10

● 45。ELBOW

Unit : Kg

Nominal Pipe Size	Long						
	SGP	STD	S40	X-S	S80	XX-S	S160
½	0.04	0.04	0.04	0.05	0.05	-	-
¾	0.05	0.06	0.06	0.07	0.07	-	-
1	0.08	0.08	0.08	0.10	0.10	0.18	0.13
1¼	0.13	0.13	0.13	0.18	0.18	0.32	0.21
1½	0.18	0.19	0.19	0.25	0.25	0.47	0.33
2	0.32	0.33	0.33	0.45	0.45	0.85	0.67
2½	0.60	0.69	0.69	0.90	0.90	1.72	1.17
3	0.79	1.02	1.02	1.37	1.37	2.63	1.92
4	1.46	1.92	1.92	2.68	2.68	5.09	4.01
5	2.25	3.24	3.24	4.57	4.57	8.80	7.35
6	3.55	4.97	4.97	7.50	7.50	14.50	12.10
8	7.20	10.10	10.10	15.30	15.30	25.70	26.60
10	12.70	17.70	17.70	23.90	28.50	41.00	51.50
12	19.00	26.00	28.50	34.40	47.00	65.00	85.50
14	28.40	34.00	40.10	45.00	66.50	-	118.00
16	37.20	44.50	59.00	59.00	97.50	-	175.00
18	47.10	56.50	84.50	75.50	138.00	-	247.00
20	58.30	70.00	110.00	93.00	187.00	-	338.00
22	70.50	84.50	-	113.00	257.00	-	443.00
24	84.10	101.00	183.00	134.00	318.00	-	580.00
26	99.00	119.00	-	158.00	-	-	-
28	115.00	138.00	-	184.00	-	-	-
30	132.00	158.00	-	211.00	-	-	-
32	150.00	180.00	327.00	240.00	-	-	-
34	170.00	204.00	369.00	272.00	-	-	-
36	190.00	228.00	452.00	304.00	-	-	-
38	212.00	255.00	-	339.00	-	-	-
40	235.00	282.00	-	376.00	-	-	-
42	259.00	311.00	-	414.00	-	-	-
44	285.00	342.00	-	456.00	-	-	-
46	312.00	374.00	-	498.00	-	-	-
48	339.00	407.00	-	542.00	-	-	-

● CAP

Unit : Kg

Nominal Pipe Size	SGP	STD	S40	X-S	S80	XX-S	S160
½	0.03	0.04	0.04	0.05	0.05	0.10	0.06
¾	0.04	0.05	0.05	0.07	0.07	0.13	0.09
1	0.08	0.11	0.11	0.15	0.15	0.29	0.20
1¼	0.11	0.14	1.14	0.20	0.20	0.39	0.25
1½	0.15	0.17	0.17	0.24	0.24	0.50	0.35
2	0.23	0.24	0.24	0.33	0.33	0.68	0.54
2½	0.34	0.42	0.42	0.57	0.57	1.33	0.77
3	0.51	0.67	0.67	0.92	0.92	2.18	1.40
4	0.88	1.17	1.17	1.68	1.68	3.80	2.76
5	1.29	1.90	1.90	2.73	2.73	6.22	4.85
6	1.99	2.83	2.83	4.38	4.38	9.85	7.81
8	3.61	5.11	5.11	7.91	7.91	16.40	15.20
10	6.33	8.92	8.92	12.20	16.40	28.35	28.90
12	9.43	13.10	13.10	17.40	26.40	39.40	47.70
14	13.20	15.90	18.60	21.20	34.90	-	61.20
16	16.60	20.00	26.70	26.70	49.00	-	92.80
18	21.20	25.50	41.50	34.10	69.00	-	131.00
20	26.40	31.80	54.10	42.50	93.70	-	179.00
22	31.50	38.80	61.40	51.70	116.00	-	219.00
24	36.60	45.10	90.10	60.10	160.00	-	307.00
26	41.00	50.50	92.3	67.30	-	-	-
28	45.50	56.20	103.00	74.90	-	-	-
30	50.30	62.10	114.00	82.80	-	-	-
32	55.40	68.40	126.00	91.20	-	-	-
34	62.30	75.40	138.00	100.00	-	-	-
36	68.00	81.90	164.00	109.00	-	-	-
38	79.00	94.70	-	126.00	-	-	-
40	95.00	102.00	-	137.00	-	-	-
42	92.00	110.00	-	147.00	-	-	-
44	103.00	126.00	-	167.00	-	-	-
46	111.00	134.00	-	179.00	-	-	-
48	118.00	143.00	-	191.00	-	-	-

● LAP JOINT STUB-END

Unit : Kg

Type / Thick / Size	ANSI			MSS			JIS				JPI			
	S5s	S10s	S40s	S5s	S10s	S40s	S5s	S10s	S20s	S40s	S5s	S10s	S20s	S40s
½	0.06	0.08	0.11	0.04	0.06	0.07	0.04	0.05	0.07	0.07	0.04	0.06	0.06	0.07
¾	0.09	0.11	0.15	0.06	0.08	0.10	0.05	0.07	0.08	0.09	0.06	0.08	0.09	0.10
1	0.14	0.24	0.29	0.08	0.13	0.16	0.10	0.17	0.18	0.20	0.08	0.13	0.14	0.16
1¼	0.19	0.31	0.40	0.10	0.17	0.22	0.13	0.21	0.23	0.27	0.10	0.17	0.19	0.22
1½	0.22	0.37	0.48	0.12	0.21	0.27	0.14	0.24	0.25	0.31	0.12	0.21	0.23	0.27
2	0.41	0.68	0.95	0.20	0.33	0.47	0.18	0.30	0.38	0.42	0.20	0.33	0.43	0.47
2½	0.60	0.86	1.41	0.31	0.44	0.74	0.30	0.43	0.49	0.73	0.31	0.44	0.53	0.74
3	0.80	0.96	2.02	0.40	0.57	1.01	0.34	0.48	0.64	0.87	0.40	0.57	0.76	1.01
4	1.05	1.51	2.91	0.60	0.87	1.68	0.43	0.61	0.81	1.21	0.60	0.87	1.12	1.68
5	2.20	2.69	5.09	0.98	1.21	2.28	0.72	0.87	1.28	1.68	0.98	1.21	1.73	2.28
6	2.64	3.23	6.12	1.34	1.64	3.37	0.88	1.07	1.57	2.21	1.34	1.64	2.41	3.37
8	3.47	4.69	10.00	1.96	2.65	5.67	1.36	1.94	3.12	3.92	1.95	2.78	4.47	5.61
10	6.47	7.95	17.30	3.57	4.38	9.55	2.15	2.53	4.08	5.80	3.51	4.13	6.65	9.45
12	9.13	10.40	21.30	5.85	6.74	13.80	2.89	3.25	4.67	7.34	5.81	6.52	9.38	14.70
14	11.70	14.10	-	6.42	7.73	-	-	-	-	-	-	-	-	-
16	14.30	16.30	-	7.91	9.00	-	-	-	-	-	-	-	-	-
18	16.40	18.70	-	9.24	10.50	-	-	-	-	-	-	-	-	-
20	20.80	24.10	-	11.70	13.50	-	-	-	-	-	-	-	-	-
22	23.10	26.70	-	16.50	18.90	-	-	-	-	-	-	-	-	-
24	29.00	33.40	-	16.50	18.90	-	-	-	-	-	-	-	-	-

BUTT-WELDING FITTINGS APPROX WEIGHT

● TEE

Unit : Kg

Normal Pipe Size	SGP	STD	S40	X-S	S80	XX-S	S160
½ × ½	0.09	0.09	0.09	0.11	0.11	0.17	0.12
¾ × ¾	0.13	0.13	0.13	0.17	0.17	0.26	0.21
¾ × ½	0.12	0.12	0.12	0.16	0.16	0.24	0.19
1 × 1	0.24	0.25	0.25	0.32	0.32	0.53	0.41
1 × ¾	0.23	0.24	0.24	0.30	0.30	0.49	0.38
1 × ½	0.22	0.23	0.23	0.29	0.29	0.47	0.37
1¼ × 1¼	0.42	0.43	0.43	0.56	0.56	0.95	0.69
1¼ × 1	0.39	0.40	0.40	0.53	0.53	0.89	0.65
1¼ × ¾	0.37	0.37	0.37	0.48	0.48	0.84	0.62
1¼ × ½	0.36	0.36	0.36	0.47	0.47	0.81	0.59
1½ × 1½	0.58	0.61	0.61	0.81	0.81	1.40	1.07
1½ × 1¼	0.56	0.59	0.59	0.78	0.78	1.35	1.01
1½ × 1	0.53	0.56	0.56	0.74	0.74	1.28	0.97
1½ × ¾	0.51	0.53	0.53	0.70	0.70	1.21	0.92
1½ × ½	0.49	0.51	0.51	0.67	0.67	1.17	0.90
2 × 2	0.86	0.88	0.88	1.20	1.20	2.16	1.78
2 × 1½	0.80	0.82	0.82	1.11	1.11	2.00	1.63
2 × 1¼	0.77	0.79	0.79	1.07	1.07	1.91	1.56
2 × 1	0.73	0.75	0.75	1.01	1.01	1.81	1.50
2 × ¾	0.70	0.71	0.71	0.98	0.98	1.76	1.45
2½ × 2½	1.42	1.74	1.74	2.28	2.28	3.92	2.86
2½ × 2	1.31	1.56	1.56	2.06	2.06	3.56	2.64
2½ × 1½	1.25	1.51	1.51	1.98	1.98	3.40	2.48
2½ × 1¼	1.22	1.48	1.48	1.94	1.94	3.32	2.42
2½ × 1	1.18	1.36	1.36	1.80	1.80	3.22	2.36
3 × 3	1.87	2.41	2.41	3.25	3.25	5.90	4.55
3 × 2½	1.79	2.29	2.29	3.07	3.07	5.53	4.23
3 × 2	1.68	2.12	2.12	2.85	2.85	5.18	4.02
3 × 1½	1.62	2.06	2.06	2.77	2.77	5.03	3.87
3 × 1¼	1.60	2.02	2.02	2.74	2.74	4.95	3.80
4 × 4	3.13	4.12	4.12	5.77	5.77	10.60	8.50
4 × 3	2.92	3.83	3.83	5.33	5.33	9.76	7.92
4 × 2½	2.84	3.71	3.71	5.15	5.15	9.39	7.56
4 × 2	2.72	3.53	3.53	4.94	4.94	9.02	7.34
4 × 1½	2.66	3.48	3.48	4.83	4.83	8.87	7.23
5 × 5	4.53	6.54	6.54	9.20	9.20	17.30	14.80
5 × 4	4.30	6.13	6.13	8.63	8.63	16.10	13.70
5 × 3	4.08	5.83	5.83	8.19	8.19	15.30	13.00
5 × 2½	4.00	5.71	5.71	8.01	8.01	15.00	12.80
5 × 2	3.90	5.58	5.58	7.92	7.92	14.70	12.50
6 × 6	6.84	9.58	9.58	14.50	14.50	27.20	23.30
6 × 5	6.45	9.08	9.08	13.60	13.60	25.60	21.90
6 × 4	6.23	8.67	8.67	13.00	13.00	24.50	20.80
6 × 3	6.01	8.38	8.38	12.60	12.60	23.70	20.10
6 × 2½	5.92	8.36	8.36	12.50	12.50	23.30	19.80
8 × 8	12.80	17.90	**17.90**	27.10	27.10	45.70	47.20
8 × 6	11.90	16.60	**16.60**	25.20	25.20	43.00	43.50
8 × 5	11.50	16.10	**16.10**	24.30	24.30	41.40	42.10
8 × 4	11.30	15.70	**15.70**	23.70	23.70	41.00	40.30
10 × 10	21.80	30.40	30.40	41.00	49.00	79.20	88.00
10 × 8	20.40	28.50	28.50	38.90	45.80	54.40	81.40
10 × 6	19.50	27.20	27.20	37.00	43.90	71.50	78.50
10 × 5	19.20	26.80	26.80	36.20	43.10	70.00	77.00
10 × 4	18.90	26.80	26.80	36.20	42.50	68.90	76.30
12 × 12	32.00	43.60	48.70	57.70	79.20	113.00	143.00
12 × 10	30.40	41.60	45.30	55.20	74.80	107.00	135.00
12 × 8	29.00	39.70	42.50	53.10	71.40	102.00	128.00
12 × 6	28.10	38.40	42.00	51.20	69.50	100.00	125.00
12 × 5	27.80	38.70	41.70	51.20	68.70	98.30	124.00
14 × 14	44.70	53.50	62.40	70.90	104.00	-	186.00
14 × 12	42.70	51.90	60.20	68.80	100.00	-	179.00
14 × 10	41.20	49.90	57.60	66.30	95.90	-	174.00
14 × 8	40.00	48.20	55.80	64.50	92.90	-	168.00
14 × 6	39.00	47.10	54.50	62.60	91.00	-	164.00
16 × 16	55.20	66.10	88.10	87.70	145.00	-	260.00
16 × 14	54.20	64.90	86.00	86.10	140.00	-	255.00
16 × 12	52.70	63.10	84.00	83.60	136.00	-	248.00
16 × 10	51.20	61.30	82.00	81.20	132.00	-	241.00
16 × 8	49.40	59.80	79.00	80.00	129.00	-	235.00
16 × 6	48.50	58.50	77.00	77.80	127.00	-	230.00
18×18	70.00	83.90	125.00	111.00	204.00	-	356.00
18×16	67.90	81.40	121.00	108.00	197.00	-	352.00
18×14	66.90	80.20	119.00	106.00	194.00	-	344.00
18×12	65.40	78.30	117.00	104.00	189.00	-	337.00
18×10	63.40	76.90	114.00	102.00	186.00	-	329.00
20×20	86.60	104.00	163.00	138.00	277.00	-	502.00
20×18	84.20	101.40	158.00	134.00	268.00	-	488.00
20×16	82.10	98.40	154.00	131.00	262.00	-	475.00
20×14	81.10	97.20	152.00	129.00	258.00	-	469.00
20×12	79.20	96.00	150.00	127.00	254.00	-	462.00
20×10	77.60	94.00	147.00	125.00	250.00	-	452.00
20×8	76.30	92.10	145.00	123.00	245.00	-	444.00
22×22	106.00	126.00	198.00	167.00	365.00	-	657.00
22×20	103.00	123.00	193.00	163.00	356.00	-	640.00
22×18	101.00	120.00	188.00	159.00	347.00	-	624.00
22×16	98.90	117.90	183.00	156.00	340.00	-	610.00
24×24	116.00	139.00	252.00	185.00	438.00	-	800.00
24×22	115.00	138.00	249.00	183.00	432.00	-	790.00
24×20	114.00	136.00	247.00	181.00	427.00	-	782.00
24×18	111.90	133.00	241.00	177.00	418.00	-	764.00
26×26	147.00	176.00	319.00	234.00	-	-	-
26×24	144.00	172.00	312.00	229.00	-	-	-
26×22	141.00	169.00	308.00	225.00	-	-	-
26×20	138.00	166.00	302.00	221.00	-	-	-
28×28	165.00	198.00	359.00	264.00	-	-	-
28×26	163.00	197.00	356.00	261.00	-	-	-
28×24	160.00	193.00	350.00	256.00	-	-	-
28×22	157.00	190.00	347.00	252.00	-	-	-
30×30	190.00	228.00	414.00	304.00	-	-	-
30×28	188.00	226.00	406.00	301.00	-	-	-
30×26	185.00	222.00	356.00	296.00	-	-	-
30×24	182.00	218.00	350.00	291.00	-	-	-
32×32	217.00	259.00	474.00	347.00	-	-	-
32×30	213.00	256.00	466.00	341.00	-	-	-
32×28	209.00	252.00	458.00	335.00	-	-	-
32×26	208.00	250.00	455.00	333.00	-	-	-
34×34	246.00	295.00	535.00	393.00	-	-	-
34×32	243.00	292.00	526.00	389.00	-	-	-
34×30	238.00	290.00	518.00	380.00	-	-	-
34×28	236.00	288.00	511.00	377.00	-	-	-
36×36	276.00	331.00	656.00	441.00	-	-	-
36×34	271.00	329.00	645.00	434.00	-	-	-
36×32	269.00	326.00	636.00	431.00	-	-	-
36×30	264.00	323.00	627.00	422.00	-	-	-
38×38	308.00	370.00	-	493.00	-	-	-
38×36	306.00	367.00	-	489.00	-	-	-
38×34	302.00	362.00	-	481.00	-	-	-
38×32	298.00	357.00	-	476.00	-	-	-
40×40	342.00	411.00	-	547.00	-	-	-
40×38	340.00	408.00	-	543.00	-	-	-
40×36	335.00	402.00	-	536.00	-	-	-
40×34	331.00	397.00	-	529.00	-	-	-
42×42	352.00	422.00	-	562.00	-	-	-
42×40	350.00	420.00	-	559.00	-	-	-
42×38	348.00	418.00	-	557.00	-	-	-
42×36	346.00	416.00	-	554.00	-	-	-
44×44	396.00	475.00	-	633.00	-	-	-
44×42	394.00	473.00	-	630.00	-	-	-
44×40	389.00	467.00	-	623.00	-	-	-
44×38	385.00	462.00	-	616.00	-	-	-
46×46	434.00	521.00	-	695.00	-	-	-
46×44	432.00	519.00	-	691.00	-	-	-
46×42	427.00	513.00	-	683.00	-	-	-
46×40	423.00	507.00	-	676.00	-	-	-
48×48	474.00	569.00	-	759.00	-	-	-
48×46	472.00	566.00	-	755.00	-	-	-
48×44	470.00	564.00	-	751.00	-	-	-
48×42	462.00	555.00	-	739.00	-	-	-

● REDUCER

Unit : Kg

Normal Pipe Size	SGP	STD	S40	X-S	S80	XX-S	S160
¾ × ½	0.06	0.06	0.06	0.08	0.08	-	-
1 × ¾	0.11	0.12	0.12	0.15	0.15	0.25	0.19
1 × ½	0.10	0.11	0.11	0.14	0.14	0.22	0.17
1¼ × 1	0.16	0.16	0.16	0.21	0.21	0.35	0.25
1¼ × ¾	0.15	0.15	0.15	0.19	0.19	0.31	0.23
1¼ × ½	0.13	0.14	0.14	0.18	0.18	-	-
1½ × 1¼	0.24	0.25	0.25	0.33	0.33	0.57	0.43
1½ × 1	0.21	0.22	0.22	0.30	0.30	0.50	0.38
1½ × ¾	0.20	0.21	0.21	0.27	0.27	0.45	0.35
1½ × ½	0.18	0.18	0.18	0.24	0.24	0.40	0.32
2 × 1½	0.37	0.38	0.38	0.51	0.51	0.91	0.75
2 × 1¼	0.35	0.36	0.36	0.48	0.48	0.85	0.70
2 × 1	0.31	0.33	0.33	0.44	0.44	0.77	0.64
2 × ¾	0.29	0.30	0.30	0.40	0.40	0.69	0.58
2½ × 2	0.60	0.73	0.73	0.95	0.95	1.68	1.20
2½ × 1½	0.55	0.67	0.67	0.87	0.87	1.51	1.08
2½ × 1¼	0.52	0.64	0.64	0.83	0.83	1.42	1.02
2½ × 1	0.48	0.56	0.56	0.73	0.73	1.23	0.93
3 × 2½	0.73	0.94	0.94	1.25	1.25	2.25	1.71
3 × 2	0.66	0.85	0.85	1.13	1.13	2.01	1.57
3 × 1½	0.62	0.79	0.79	1.04	1.04	1.83	1.44
3 × 1¼	0.59	0.75	0.75	1.00	1.00	1.74	1.37
4 × 3	1.10	1.45	1.45	2.02	2.02	3.65	3.00
4 × 2½	1.04	1.37	1.37	1.90	1.90	3.41	2.76
4 × 2	0.97	1.27	1.27	1.76	1.76	3.11	2.58
4 × 1½	0.91	1.19	1.19	1.64	1.64	2.89	2.41
5 × 4	1.74	2.50	2.50	3.52	3.52	6.47	5.59
5 × 3	1.58	2.27	2.27	3.18	3.18	5.78	5.30
5 × 2½	1.50	2.16	2.16	3.02	3.02	5.46	4.70
5 × 2	1.41	2.03	2.03	2.85	2.85	5.12	4.43
6 × 5	2.55	3.57	3.57	5.38	5.38	9.89	8.63
6 × 4	2.36	3.30	3.30	4.96	4.96	8.98	7.88
6 × 3	2.18	3.04	3.04	4.56	4.56	8.21	7.21
6 × 2½	2.09	2.94	2.94	4.38	4.38	7.88	6.80
8 × 6	4.17	5.71	5.71	8.63	8.63	14.30	15.00
8 × 5	3.87	5.40	5.40	8.14	8.14	13.40	14.00
8 × 4	3.67	5.10	5.10	7.68	7.68	12.60	13.10
10 × 8	6.87	9.58	9.58	12.90	15.40	24.30	27.50
10 × 6	6.32	8.78	8.78	11.80	14.20	22.10	25.10
10 × 5	6.06	8.42	8.42	11.30	14.50	21.10	23.90
10 × 4	5.80	8.20	8.20	11.00	14.00	20.50	22.60
12 × 10	9.97	13.60	14.70	18.00	24.80	35.00	44.60
12 × 6	9.29	12.70	13.70	16.70	22.70	33.00	41.00
12 × 8	8.69	11.80	12.80	15.60	21.40	32.00	38.00
12 × 5	8.39	11.70	12.60	15.30	20.60	31.00	36.40
14 × 12	21.20	25.40	29.50	33.60	49.80	-	88.50
14 × 10	19.70	23.60	27.40	31.20	46.10	-	81.60
14 × 8	18.30	21.80	25.40	28.90	42.20	-	74.70
14 × 6	16.90	20.30	23.60	26.80	39.10	-	68.30
16 × 14	25.90	31.00	41.10	41.10	67.70	-	121.00
16 × 12	24.10	29.60	39.20	39.20	65.00	-	116.00
16 × 10	22.40	27.80	36.80	36.80	60.80	-	108.00
16 × 8	21.70	26.20	34.50	34.50	56.60	-	99.90
18 × 16	31.50	37.80	56.20	50.10	91.40	-	165.00
18 × 14	29.80	35.70	53.00	47.40	88.40	-	155.00
18 × 12	27.70	33.20	51.70	44.00	83.00	-	149.00
18 × 10	27.10	32.70	48.40	43.20	78.50	-	140.00
20×18	47.00	56.40	88.40	74.90	150.00	-	-
20×16	44.70	53.50	83.90	71.10	142.00	-	-
20×14	42.40	50.80	79.60	67.40	136.00	-	233.00
20×12	40.80	49.20	76.90	65.10	130.00	-	-
22×20	52.10	62.40	98.00	82.90	181.00	-	-
22×18	49.50	59.40	93.20	78.90	172.00	-	-
22×16	47.00	56.40	88.40	74.80	164.00	-	-
22×14	45.30	54.30	83.60	72.10	156.00	-	-
24×22	57.10	68.40	124.00	91.00	215.00	-	-
24×20	54.80	65.70	119.00	87.30	206.00	-	-
24×18	52.60	63.00	114.00	83.80	197.00	-	-
24×16	50.40	60.50	109.00	80.30	185.00	-	-
26×24	74.50	89.40	162.00	119.00	-	-	-
26×22	71.50	85.80	155.00	114.00	-	-	-
26×20	68.50	82.10	148.00	109.00	-	-	-
26×18	66.30	79.50	142.00	106.00	-	-	-
28×26	80.60	96.60	175.00	129.00	-	-	-
28×24	77.50	93.00	168.00	124.00	-	-	-
28×22	74.50	89.40	162.00	119.00	-	-	-
28×20	72.40	86.80	155.00	115.00	-	-	-
30×28	86.60	104.00	188.00	138.00	-	-	-
30×26	83.60	100.00	182.00	133.00	-	-	-
30×24	80.60	96.60	175.00	129.00	-	-	-
30×22	78.50	94.20	168.00	125.00	-	-	-
32×30	92.60	111.00	202.00	148.00	-	-	-
32×28	89.60	108.00	195.00	143.00	-	-	-
32×26	86.60	104.00	188.00	138.00	-	-	-
32×24	84.60	102.00	184.00	135.00	-	-	-
34×32	98.60	118.00	215.00	158.00	-	-	-
34×30	95.60	115.00	208.00	153.00	-	-	-
34×28	92.60	111.00	205.00	148.00	-	-	-
34×26	90.70	109.00	200.00	145.00	-	-	-
36×34	104.60	125.60	250.00	167.30	-	-	-
36×32	101.60	122.00	243.00	162.40	-	-	-
36×30	98.60	118.40	238.00	157.60	-	-	-
36×28	95.60	114.70	234.00	152.80	-	-	-
38×36	112.00	133.00	-	177.00	-	-	-
38×34	108.00	129.00	-	172.00	-	-	-
38×32	105.00	126.40	-	167.00	-	-	-
38×30	103.00	124.00	-	165.00	-	-	-
40×38	117.00	140.00	-	187.00	-	-	-
40×36	114.00	137.00	-	182.00	-	-	-
40×34	111.00	133.40	-	177.00	-	-	-
40×32	109.00	131.00	-	174.00	-	-	-
42×40	123.00	147.00	-	196.00	-	-	-
42×38	120.00	144.00	-	192.00	-	-	-
42×36	117.00	140.00	-	187.00	-	-	-
42×34	115.00	138.00	-	184.00	-	-	-
44×42	129.00	155.00	-	206.00	-	-	-
44×40	126.00	151.00	-	201.00	-	-	-
44×38	123.00	147.00	-	196.00	-	-	-
44×36	121.00	146.00	-	194.00	-	-	-
46×44	157.00	189.00	-	252.00	-	-	-
46×42	154.00	185.00	-	246.00	-	-	-
46×40	150.00	180.00	-	241.00	-	-	-
46×38	148.00	178.00	-	237.00	-	-	-
48×46	164.00	197.00	-	263.00	-	-	-
48×44	161.00	193.00	-	257.00	-	-	-
48×42	157.00	189.00	-	252.00	-	-	-
48×40	155.00	186.00	-	248.00	-	-	-

WALL THICKNESS OF WELDED AND SEAMLESS PIPE

Normial Pipe Size		Outside Diameter		Nominal Wall Thickness								Nominal Wall Thickness										Nominal Pipe Size Inch
A	B	KS/JIS	ANSI	SPP SGP	Sch 5s	Sch 10s	Sch10	Sch20s	Sch20	Sch30	Sch40s	STD	Sch 40	Sch 60	Sch 80s	X-S	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XX-S	
6	1/8	10.50	10.29	-	-	1.24	-	1.5	-	-	1.73	1.73	1.73	2.20	2.41	2.41	2.41	-	-	-	3.15	4.83	1/8
8	1/4	13.80	13.72	-	-	1.65	-	2.0	-	-	2.24	2.24	2.24	2.40	3.02	3.02	3.02	-	-	-	3.68	6.05	1/4
10	3/8	17.30	17.14	-	-	1.65	-	2.0	-	-	2.31	2.31	2.31	2.80	3.20	3.20	3.20	-	-	-	4.01	6.40	3/8
15	1/2	21.70	21.34	2.8	1.65	2.11	-	2.5	-	-	2.77	2.77	2.77	3.20	3.73	3.73	3.73	-	-	-	4.78	7.47	1/2
20	3/4	27.20	26.67	2.8	1.65	2.11	-	2.5	-	-	2.87	2.87	2.87	3.40	3.91	3.91	3.91	-	-	-	5.56	7.82	3/4
25	1	34.00	33.40	3.2	1.65	2.77	-	3.0	-	-	3.38	3.38	3.38	3.90	4.55	4.55	4.55	-	-	-	6.35	9.09	1
32	1 1/4	42.70	42.16	3.5	1.65	2.77	-	3.0	-	-	3.56	3.56	3.56	4.50	4.85	4.85	4.85	-	-	-	6.35	9.70	1 1/4
40	1 1/2	48.60	48.26	3.5	1.65	2.77	-	3.0	-	-	3.68	3.68	3.68	4.50	5.08	5.08	5.08	-	-	-	7.14	10.16	1 1/2
50	2	60.50	60.32	3.8	1.65	2.77	-	3.5	3.20	-	3.91	3.91	3.91	4.90	5.54	5.54	5.54	-	-	-	8.74	11.07	2
65	2 1/2	76.30	73.02	4.2	2.11	3.05	-	3.5	4.50	-	5.16	5.16	5.16	6.00	7.01	7.01	7.01	-	-	-	9.52	14.02	2 1/2
80	3	89.10	88.90	4.2	2.11	3.05	-	4.0	4.50	-	5.49	5.49	5.49	6.60	7.62	7.62	7.62	-	-	-	11.12	15.24	3
90	3 1/2	101.60	101.60	4.2	2.11	3.05	-	4.0	4.50	-	5.74	5.74	5.74	7.00	8.08	8.08	8.08	-	-	-	-	-	3 1/2
100	4	114.30	114.30	4.5	2.11	3.05	-	4.0	4.90	-	6.02	6.02	6.02	7.10	8.56	8.56	8.56	-	11.12	-	13.49	17.12	4
125	5	139.80	141.30	4.5	2.77	3.40	-	5.0	5.10	-	6.55	6.55	6.55	8.10	9.53	9.53	9.53	-	12.70	-	15.88	19.05	5
150	6	165.20	168.30	5.0	2.77	3.40	-	5.0	5.50	-	7.11	7.11	7.11	9.30	10.97	10.97	10.97	-	14.27	-	18.26	21.94	6
200	8	216.30	219.08	5.8	2.77	3.76	-	6.5	6.35	7.04	8.18	8.18	8.18	10.31	12.70	12.70	12.70	15.09	18.26	20.62	23.01	22.22	8
250	10	267.40	273.05	6.6	3.40	4.19	-	6.5	6.35	7.80	9.27	9.27	9.27	12.70	12.70	12.70	15.09	18.26	21.44	25.40	28.58	25.40	10
300	12	318.50	323.80	6.9	3.96	4.57	-	6.5	6.35	8.38	9.52	9.52	10.31	14.27	12.70	12.70	17.48	21.44	25.40	28.58	33.32	25.40	12
350	14	355.60	355.60	7.9	3.96	4.78	6.35	8.0	7.92	9.52	*9.52	9.52	11.13	15.09	*12.70	12.70	19.05	23.83	27.79	31.75	35.71	-	14
400	16	406.40	406.40	7.9	4.19	4.78	6.35	8.0	7.92	9.52	*9.52	9.52	12.70	16.66	*12.70	12.70	21.44	26.19	30.96	36.52	40.49	-	16
450	18	457.20	457.20	7.9	4.19	4.78	6.35	8.0	7.92	11.12	*9.52	9.52	14.27	19.05	*12.70	12.70	23.82	29.36	34.92	39.67	45.24	-	18
500	20	508.00	508.00	7.9	4.78	5.54	6.35	9.5	9.52	12.70	*9.52	9.52	15.09	20.62	*12.70	12.70	26.19	32.54	38.10	44.45	50.01	-	20
550	22	558.80	558.80	-	4.78	5.54	6.35	-	9.52	12.70	*9.52	9.52	-	22.22	*12.70	12.70	28.58	34.92	41.28	47.62	53.98	-	22
600	24	609.60	609.60	-	5.54	6.35	6.35	-	9.52	14.27	*9.52	9.52	17.48	24.61	*12.70	12.70	30.96	38.89	46.02	52.37	59.54	-	24
650	26	660.40	660.40	-	-	*7.92	7.92	-	12.70	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	26
700	28	711.20	711.20	-	-	*7.92	7.92	-	12.70	15.88	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	28
750	30	762.00	762.00	-	6.35	*7.92	7.92	-	12.70	15.88	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	30
800	32	812.80	812.80	-	-	*7.92	7.92	-	12.70	15.88	*9.52	9.52	17.48	-	*12.70	12.70	-	-	-	-	-	-	32
850	34	863.60	863.60	-	-	*7.92	7.92	-	12.70	15.88	*9.52	9.52	17.48	-	*12.70	12.70	-	-	-	-	-	-	34
900	36	914.40	914.40	-	-	*7.92	7.92	-	12.70	15.88	*9.52	9.52	19.05	-	*12.70	12.70	-	-	-	-	-	-	36
950	38	965.20	965.20	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	38
1000	40	1016.00	1016.00	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	40
1050	42	1066.80	1066.80	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	42
1100	44	1117.60	1117.60	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	44
1150	46	1168.40	1168.40	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	46
1200	48	1219.20	1219.20	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	48

●Asterisks(*) denote HWAJIN Standards as no internationally Recognized Standards for these wall thickness have been established.