SIM
SUNG IL CO.LTD

SUNG IL CO., LTD.(SIM)

HEAD OFFICE BUSAN VENTURE TOWER 17F, 22, Mora-ro, Sasang-gu,
Busan, 46918, Rep. of KOREA
Tel : (051) 831-8800 Fax : (051) 831-5959
E-mail : adm@sungilsim.com
Website : www.sungilsim.com

SALES CONTACT Tel : (051) 950-8834
E-mail : sale1@sungilsim.com

English

TABLE
OF CONTENTS

SIM SUNG IL CO., LTD.(SIM)

Global Leader

in Shop Fabricated Piping & Induction Bending

- Established Date : 1st October, 1978
- Product item : Shop Fabricated Piping
  Induction Bending
  Induction Bending Machine
- Appricable Sector : Nuclear Power Plant, Combined Cycle Power Plant, On/Off Shore Plant, Chemical, Oil & Gas Plant

Global Leader SUNG IL (SIM)

SUNG IL(SIM) was founded in 1978 and has grown as a leading supplier of shop fabricated piping and induction bend for various infrastructure sectors. SUNG IL(SIM) has developed an induction bending machine by self effort in 1981 for the first time in Korea. Our constant focus on research and development for technology and accumulated experiences over the last 40 years have led SUNG IL(SIM) to a global leading company recognized as an Innobiz (Innovation and Business) Company in Korea.

Under our philosophy, "creativity", "sincerity" and "faith", SUNG IL(SIM) has successfully completed 1,159 projects for significant customers including 6 nuclear power plants (14 units), 202 thermal power plants, 510 on/off shore plants, 22 chemical-oil-gas plants. To meet the industrial demand for shop fabricated piping, SUNG IL(SIM) has improved capacity by operating 4 plants in Haman and 1 headquarter in Busan. Through decades of efforts for professionality, SUNG IL(SIM) has extended its business area to engineering, procurement, induction bending, shop fabrication piping, and research & development.

SUNG IL(SIM) has established the best quality and HSE management system and acquired ASME NA, NPT, S, PP cert, ISO 14001, ISO 45001, CE(DVGW), PED, CPR FPC and EN ISO 3834-2.

SUNG IL(SIM) will endeavor constantly to be your reliable and credible cooperative firm and to maintain the position of the global leading piping fabricator.

BUSINESS AREA

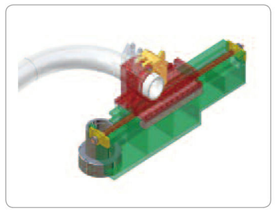
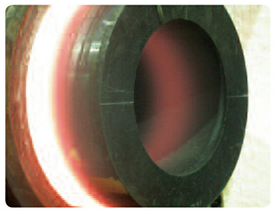
Shop Fabricated Piping

Shop fabricated piping is defined as pre-fabrication of pipe line segment that is transportable to a construction site.



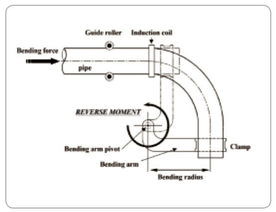

Induction Bending

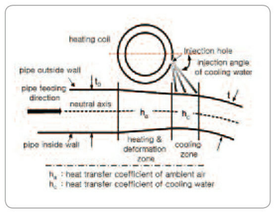
Induction bending is a controlled means of bending pipes through the application of local heating using high frequency induced electrical power.

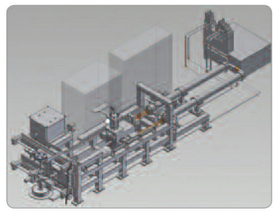



Machine Designing and Development

Induction bending machines self-designed and developed by SUNGIL (SIM) with highly advanced technology delivery excellent performance and were exported to several countries.

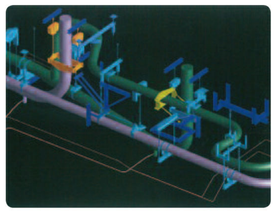
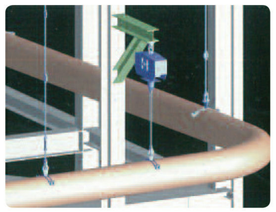
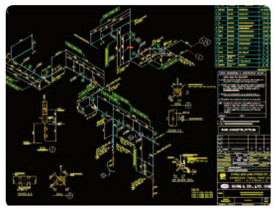
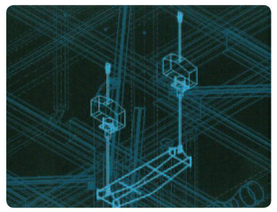







Engineering

Engineering service such as design, stress analysis and 3D modelling of piping, hanger, support, etc for various industrial sectors is provided in SUNGIL (SIM)'s full inclusive package service.

Shop Fabricated Piping

Under international code like ASME, PED, DNV, KEPIC, SUNG IL (SIM) performs engineering, procurement, fabrication, inspection and packing to make piping spools in the special shop. SUNG IL (SIM) also supplies power plant and on/off shore plant with piping spools to ease construction on site.

Customized production technology management system for the best quality

SUNG IL (SIM) has been performing quality management systematically with specific guide about working condition, pre-heating, fit-up, guideline needed for welding and make a standard and guide officialized to utilize in computer system. Through all of this, we're manufacturing high quality shop fabricated piping and induction bend product.

Review of customer specification, drawing, application spec receipt / review →  WPQT PLAN, pWPS → Material identification, welding, surface inspection, NDE → Mechanical test →  PQR →  WPS → distribution / use as a procedure for fabrication

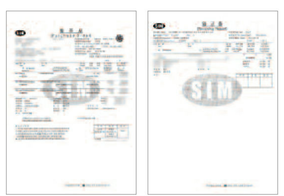
Shop Fabricated Piping Flow

Engineering

ISO DWG SPOOL DWG

Acceptance of an order for a construction work
⇩
Design pipe spools to meet layout of ISO Drawings after obtaining order
⇩
Designing section measuring of the drawings
⇩
Designing spool drawings and making MPR

Procurement



Purchase Order Receiving Report

Raw materials order
⇩
Demand and supply management of materials

Stocking raw materials /Visual Inspection

• Material inspection

Material warehouse Stocking raw material

Piling up material Receiving Inspection Application / Report

Cutting/Machining

• Cutting material & Material Fabrication

Cutting Beveling

Grinding hole fabrication

Fit-up & Welding

Fit-up

DWG & Material check Spool shape check Pre heating & Check temperature Fit up Welding bevel angle & Gap check Size check

Welding

WPS & PQR check Check temperature FCAW SMAW GTAW SAW & GMAW Interlayer temperature check

Packing & Delivery

Packing

Complete Product

Delivery

Painting (option)

Facility Image

Working Image

Painting Capacity
About
3000 SPL /Mon
800 Ton/Mon

Surface preparation (abrassive blasting)

Blasting Room - C/S

Blasting Room - S/S

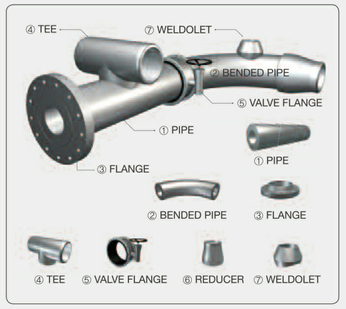
Working Image

• **Shot Room Capacity**
- Shot Room (C/S) : 21000W x 16000L x 4800H
- Shot Room (S/S) : 9000W x 16000L x 4800H

Fabrication in SUNG IL(SIM) plant

❶ High productivity
(compared to on-site assembly)

Combine & Manufacturing sample of various pipe, fitting, etc

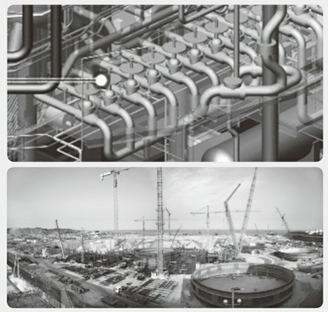


❷ Excellent quality

Packing & Delivery (Complete Product)

❸ Free from weather conditions

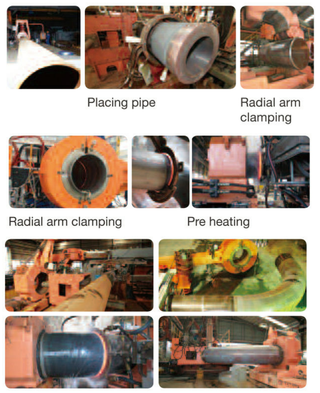
On site installation (on site construction company)



❹ Easy to manage construction period

Induction Bend

• Instead of the elbow bend in the induction Bend obtained



Placing pipe Radial arm clamping

Radial arm clamping Pre heating

Induction Bend

Other required tests(option)

Visual and dimension inspection

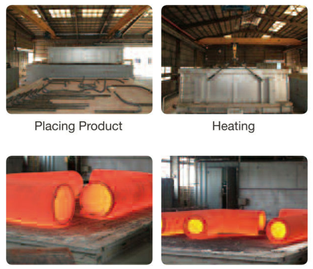
Hydro Test

NDE

RT

PT MT UT

Heat Treatment (option)



Placing Product Heating

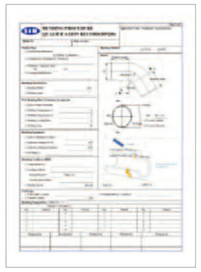
Releasing product & Cooling

Induction Bending

Induction bending process is a part of shop fabricated piping and also an independent business that provides service to fabricate customized bends.

Manufacturing Procedure Specifications and Records

pBPS
Preliminary Bending Procedure Specification

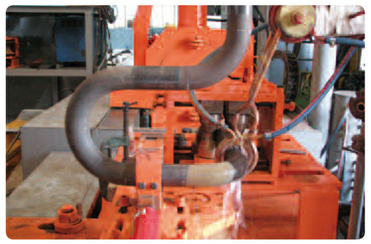


BPQR
Bending Procedure Qualification Record

BPS
Bending Procedure Specification

BPR
Bending Procedure Record

Quality



- **Enhanced Quality Soundness**
  (decrease of the number of weld joints)
- **Excellent Mechanical Properties**
  (better fatigue, tensile and elongation than raw material by TMT(Thermal-Mechanical Treatment) and phase transformation effect during induction bending flow)
- **Uniformed Quality**

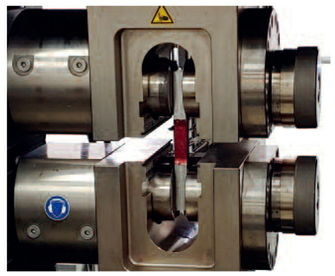
Design

- **Unessential Change of Design**
  (from elbows to small radius bends)
- **Easy to Design**
  (no restriction in size, thickness, bending radius and angles)
- **Various Types of Product**
  (3D bending and coil bending)

Expanded Application of Induction Bend

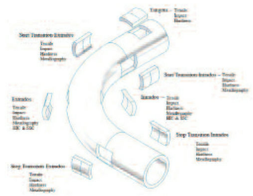
Applicability of Induction bends utilized in various industries have been being expanded by development of a small radius bending technique as a solution to replace elbow in order to reduce the number of weld-joints of pipelines. SUNGIL's inovative and unique technique so called compressive force bending has achieved a drastically minimized wall thinning rate and led to wide range of application in nuclear and thermal power generation industries.

Mechanical Test of Qualification Bend



Tensile Test

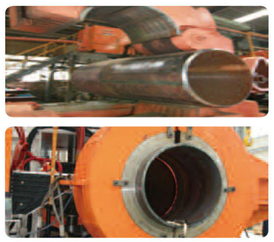
SSC Test Specimen



Location of Test Coupons

Induction Bending Flow

Placing Pipe



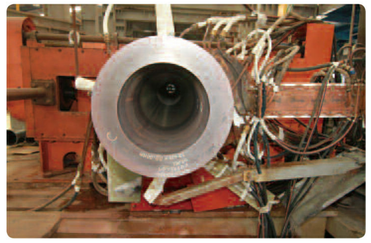
Radial Arm Clamping

Induction Bend

Cost

- **Cost Savings of Quality Control and Assurance**
  (inspection, in-service and NDE cost saving)
- **Operation Cost Saving**
  (decrease of weld inspection)
- **Material Control Cost Saving**

Delivery

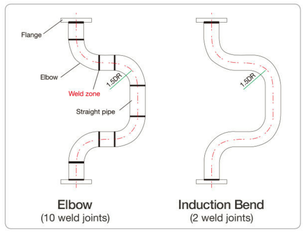


- **Shortened Manufacturing Period**
  (simplification of process)
- **Shortened Construction Period**
  (reduced welding process)

Small Radius Bend

Application

Comparison of Elbow and Induction Bend

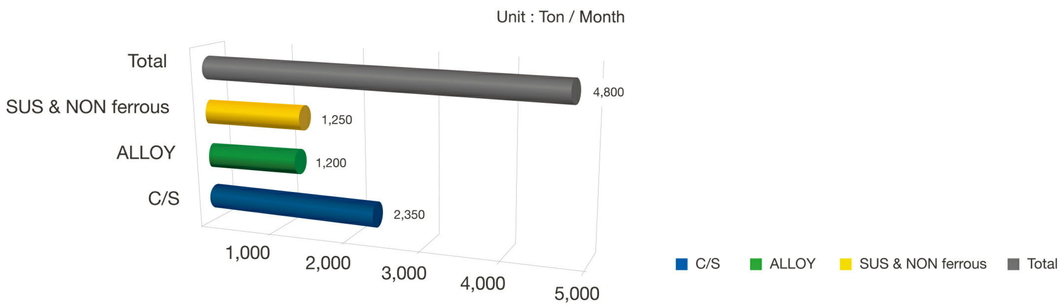


Welding joints of entire pipeline can be eliminated by replacing elbow with SUNGIL's small radius bends upto approximately 70% of the total number according to a self analysis on experiences starting from Shin-Ulchin nuclear power plant in 2012.

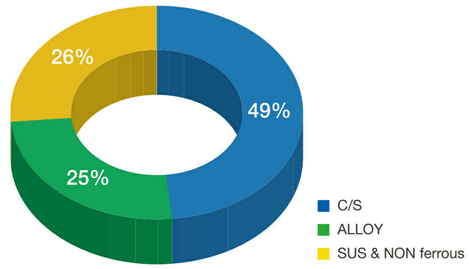
Production Capacity

Shop fabricated piping

Production capacity - per process



Production capacity - per process



Typical Applicable Materials

• CARBON STEEL

A519 Gr.4130	SA/A106 Gr.B,C	SA/A350-LF2
SA/A53 Gr.B	SA/A672 Gr.B70	SA/A134 Gr.A
SA/A134 SA 283 Gr. B	SA/A333 Gr.6	SA/A671 CC65
STPA22	SM490A	SS400
API 5L X60	API 5L X65	AH36

• STAINLESS STEEL

SA/A312 UNS31254	SA/A312 TP316(L)	SA/A312 UNS N08904
SA/A358-304(L)	SA/A376 Gr.TP304	SA/A312 TP304(L)
SA/A312 UNS N08926	SA/A312 UNS N0836	SA/A376Gr. TP316
SUS316(L)		

• ALLOY STEEL

SA/A335 P92	SA/A335 P91
SA/A335 P22	
SA/A335 P11	AISI GR.4130

• DUPLEX

SA/A790 UNS S31803	SA/A790 UNS S32750

• INCONEL

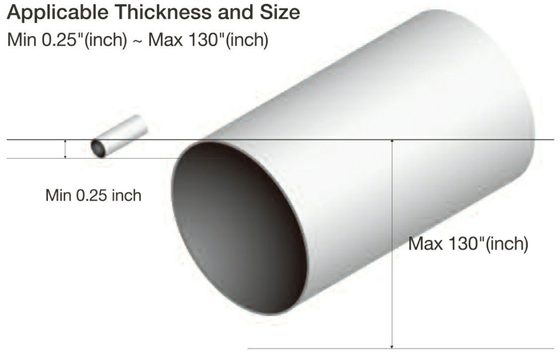
SB/B423 UNS N08825	SB/B466 UNS C70900	SB/B423 UNS N08020	SB/B165 UNS NO4400

• TITANIUM

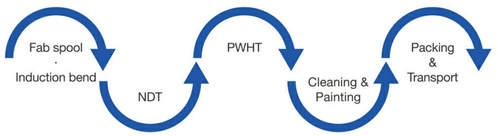
SB/B861 Gr.2

Applicable Thickness and Size

Min 0.25"(inch) ~ Max 130"(inch)



Characteristics



Major Applicable System

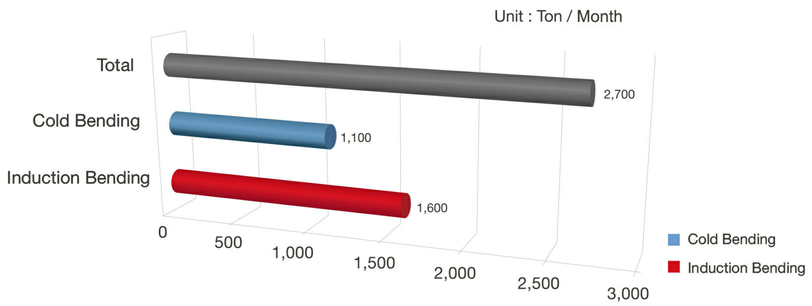
- Nuclear Power Plant
  - Stability Piping
  - General Piping
- Thermal Power Plant & Combined Cycle Power Plant
  - BLR/BOP (Main steam) (Hot reheat) (Cold reheat) (Feed water) (Hanger & Support) (etc)
  - Turbine Generator Piping
  - Heat Recovery Steam Generator Piping
- On/Off Shore Plant
  - FPSO / FSO / FPU
  - Fixed / Floating Platform
  - Drill Ship / Jack-up Rig
- Chemical & Oil & Gas Plant
  - Tanks for oil storage
  - Petroleum Refinery Piping
  - Shale Gas

※ Apart from major applicable system, we are expanding business area to many industries.

Production Capacity

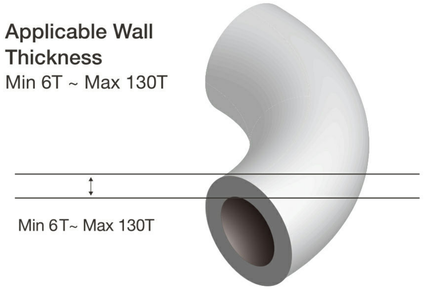
Induction Bending

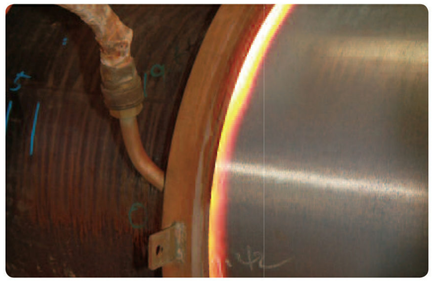
Production Capacity - per process

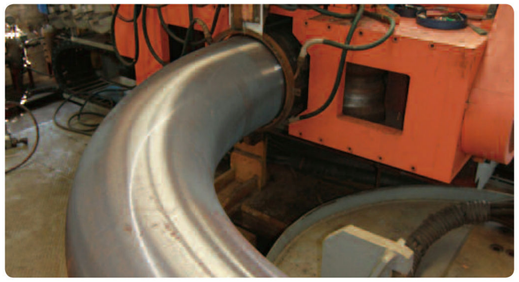


Applicable Wall Thickness

Min 6T ~ Max 130T







Typical Applicable Materials

• CARBON STEEL

SA/A106 Gr. B	SA/A106 Gr. C	SA/A516 70N	SA/A53 Gr. A
SA/A53 Gr. B	SA/A53 Gr. C	STPG370	API 5L

• STAINLESS STEEL

SA/A312 TP304(L)	SA/A312 TP316(L)	SA/A312 TP347
SA/A790 S31803	SA/A790 32750	SA/A358

• STAINLESS / INCONEL OVERLAYED CARBON STEEL

• ALLOY STEEL

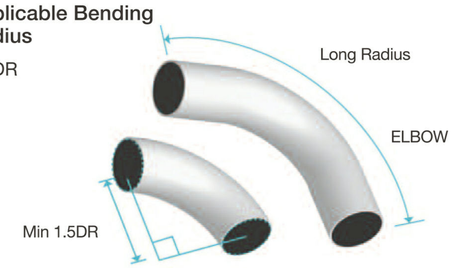
SA/A335 P92	SA/A335 P12	SA/A335 P22	SA/A335 P91
SA/A335 P11	SM490	SM520	

• TMCP(Thermo Mechanical Control Process) Steel

API 5L X42	API 5L X46	API 5L X52	API 5L X56
API 5L X60	SA/API 5L X65	API 5L X70	API 5L A
API 5L B	EN10225 S335G1	EN10225 S420G1	EN10225 S460G2

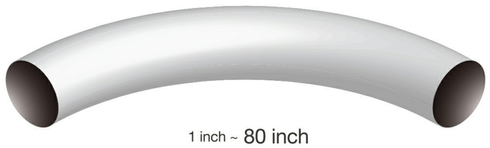
Applicable Bending Radius

1.5DR

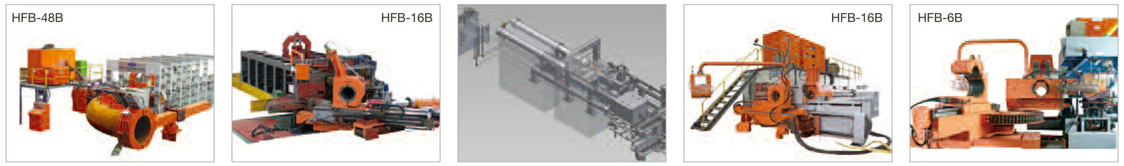


Applicable External Diameter

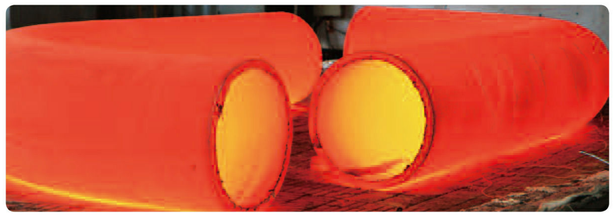
1"(inch) ~ 80"(inch)



1 inch ~ 80 inch
special



• Induction Bending Machine Models



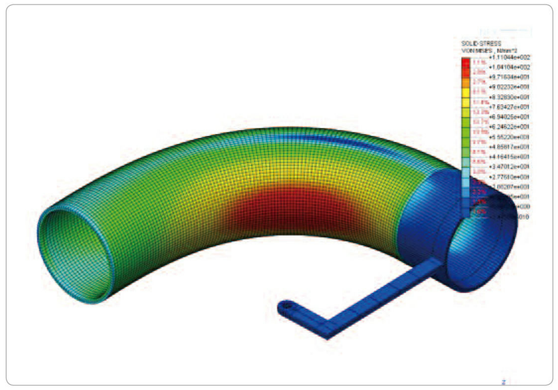
Major Applicable System

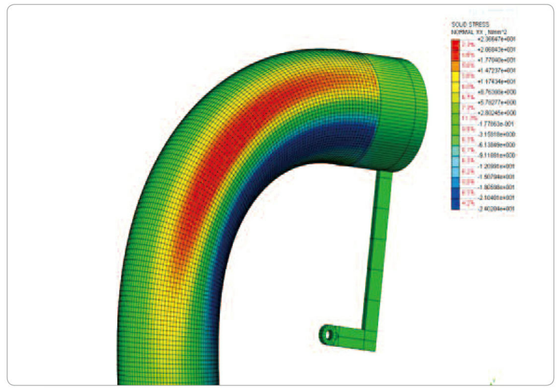
- Nuclear Power Plant
  - Stability Piping
  - General Piping
- Thermal Power Plant & Combined Cycle Power Plant
  - BLR/BOP (Main steam) (Hot reheat) (Cold reheat) (Feed water) (Hanger & Support) (etc)
  - Boiler Piping
  - Turbine Generator Piping
- On/Off Shore Plant
  - FPSO / FSO /FPU
  - Fixed/Floating Platform
  - Drill Ship / Jack-up Rig
- Chemical & Oil & Gas Plant
  - Tanks for oil storage
  - Petroleum Refinery Piping
  - Shale Gas

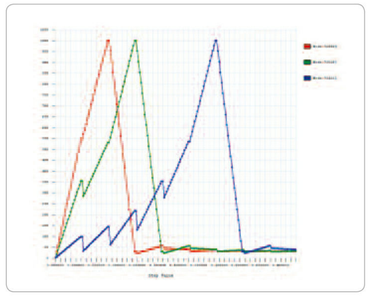
※ Apart from major applicable system, we are expanding business area to many industries.

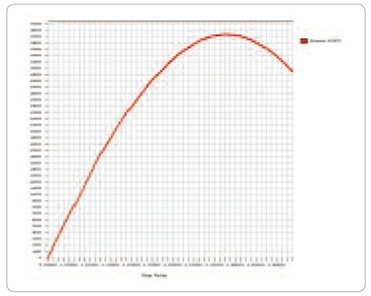
Research & Development _____ Bending Standardization

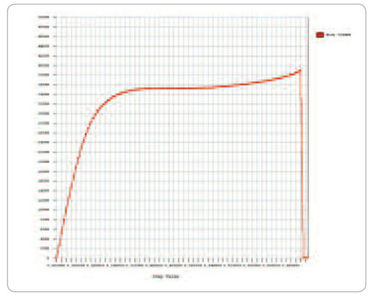
The technique for induction bend has been constantly researched for improvements and is incorporated back into the production. When we search for a new process factor for new material and size, our experience will play a huge role in defining a high quality product.
The technical team comprised of experienced researchers, provide valuable technical data to clients through careful measurements and experiments. Based on the results, we select the products with the highest quality.











FEM software is used in SUNG IL(SIM), as Midas NFX, processes simulation of difficult test bending or national assignment and aims to achieve 0% in fraction defective through Study of predictable value.

1. Operation process through interpretation

Setting Interpretation condition → Running interpretation → Analysis of interpretation result → Setting condition of bending operation → Bending → Quality test → Production

- Pre-interpretation before the bending test minimizes the error in accordance with improvement of operation condition and prediction of results.
- Clear database building and used as a basis for technology development as the need to take advantage of this emerging
- To stimulate the actual condition when interpreting, we set back pressure, adjust speed of motion, and bend the temperature

2. Conventional bending operation process

Inquiry of existing similar operation → Setting of operation condition → Bending → Quality test → Production

Research & Development _____ ASME(American Society of Mechanical Engineers) Code revision

SUNG IL(SIM) secured its technological application as ASME amended one of its clauses
that allows application of small radius bend of nuclear power (Sec. III) and thermal power BOP pipe (B31.1)

Conventional : recommendation of minimal radius of 3DR,
and of more than 30% of thickening before bending.

Amended : Least radius of 1.5DR,
Recommendation of 14% thickening before bending

- Thickness before bending being thickened in accordance with degree of technology of producer.
- The technology of SUNG IL(SIM) produces with 9% of thickness decrease by application of pressed bending in case of 1.5DR ▶ saving expense to purchase materials
- Expecting application of small radius bend along with amendment of related code revision

Domestic production of regulator

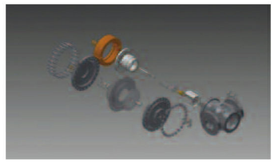
With success of domestic production of static pressure facility for natural gas, SUNG IL(SIM) supplies natural gas to urban gas company and power plant by reducing pressed of high pressured gas being supplied in main pipes and regulating to certain pressure.

1. Purpose - Stable supply of natural gas by regulating high pressed gas into certain level of pressure

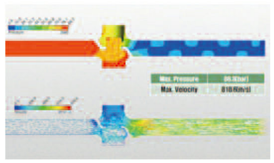
2. Expected effects - Reduction of foreign currency, Securing price competitiveness, Stable supply of parts and Stabilization of price of parts, Decrease of price of foreign item

3. Development - Increase of durability, Decrease of assembly team, Decrease of noise

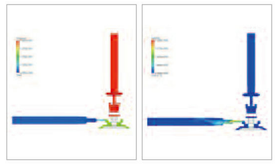
4. Points of improvement



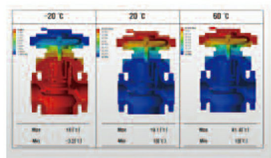
Regulator assembly



Floating analysis



Floating analysis



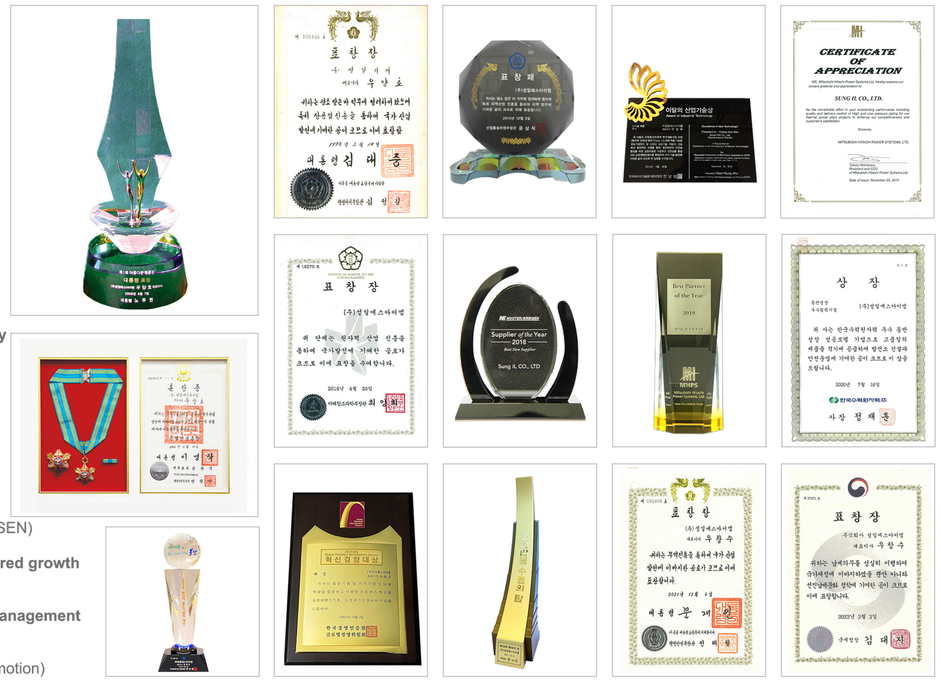
Thermal analysis

Award & Certification

Certification

01. ASME 'S'
02. ASME 'PP'
03. ASME 'NA'
04. ASME 'NPT'
05. Achilles JQS
06. Leading Company(Busan)
07. ISO 9001
08. ISO 14001
09. ISO 45001
10. KEPIC-MN
11. INNOBIZ
12. Root Technology Specialized Company
13. Small Giant Company of Korea
14. CE(DVGW)
15. PED
16. EN ISO 3834-2
17. CPR FPC
18. AEO (Authorized Economic Operator)

Award



01. Presidential prize (beautiful companionship)
02. Presidential prize (commerce and industry development)
03. Develop region & logal industry (MOTIE)
04. Excellence in new technology (MOTIE)
05. Appreciation plaque (MHPS)
06. Presidential prize (the silver tower of new technology for practical use)
07. Korea nuclear technology prize (Minisrty of science, ICT and future planning)
08. Best Partner (NOOTER ERIKSEN)
09. Best Partner (MHPS)
10. Best enterprise model of shared growth (KHNP)
11. Best C.E.O (Busan mayor)
12. Grand Prize for Innovation Management (KMR)
13. The 50 Million Export Tower
14. Presidential prize (Trade Promotion)
15. Model taxpayer (NTS)

Experience Nuclear Power Plant

Shop Fabricated Piping(major experience)

TOTAL-6 Projects, 6 Site, 2 Customers, 38,300 TON

NO.	PROJECT	SITE	CUSTOMER	DESCRIPTION	CAPACITY	Q'TY (TON)	DELIVERY
1	SHIN-GORI NPP #5,6	KOREA	Korea Hydro Nuclear Power Co., Ltd.	SHOP FAERICATED POWER PIPING (SAFETY RELATED, 12"* & SMALLER BENDING)	1,400MW x 2UNITS	4,730	2018.02 ~2022.01
2	SHIN-HANUL NPP #1,2	KOREA	Korea Hydro Nuclear Power Co., Ltd.	SHOP FAERICATED POWER PIPING (SAFETY RELATED, 14"* & LARGER BENDING)	1,400MW x 2UNITS	7,500	2012.12 ~2017.12
3	BARAKAH NPP #1,2,3,4	UAE	Korea Electric Power Corporation	SAFETY RELATED SHOP FABRICATED POWER PIPING	1,400MW x 4UNITS	9,000	2012.12 ~2016.12
4	SHIN-KORI NPP #3,4	KOREA	Korea Hydro Nuclear Power Co., Ltd.	SHOP FAERICATED POWER PIPING (SAFETY RELATED, 14"* & LARGER)	1,400MW x 2UNITS	7,000	2008.10 ~2011.10
5	SHIN-WOLSUNG NPP #1,2	KOREA	Korea Hydro Nuclear Power Co., Ltd.	SHOP FAERICATED POWER PIPING (14"* & LARGER, 12"* & SMALLER)	1,000MW x 2UNITS	5,100	2003.12 ~2010.10
6	SHIN-KORI NPP #1,2	KOREA	Korea Hydro Nuclear Power Co., Ltd.	SHOP FAERICATED POWER PIPING (14"* & LARGER, 12"* & SMALLER)	1,000MW x 2UNITS	5,100	2003.12 ~2009.12

Induction Bend(major experience)

TOTAL-5 Projects, 5 Customers, 1.5DR~75DR, 38,297EA

No	PROJECT	SITE	CUSTOMER	MATERIAL	DESCRIPTION	RADIUS	Q'TY (EA)	DELIVERY
1	SIN-GORI NPP #5,6	KOREA	Korea Hydro Nuclear Power Co., Ltd.	A106-B A312-TP304 A312-TP316 A335-P11	NPS8 x 8.18T x 90° etc NPS12 x 9.53T x 21.7° etc NPS8 x 8.18T x 90° etc	1.5~2DR	3,481 703 19	2018.02 ~ 2022.01
2	BARAKAH NPP #1,2,3,4	UAE	Emirates Nuclear Energy Corporation Korea Electric Power Coporation	SA312-TP304 SA312-TP316 SA335-P22	NPS12 x 9.53T x 21.7° etc NPS6 x 18.26T x 18.8° NPS4 x 13.49T x 19.8°	22,657R 11,329R 7,552R	374 3 3	2013.10 ~ 2015.10
3	SHIN-HANUL NPP #1,2	KOREA	Korea Hydro Nuclear Power Co., Ltd.	A106-B A672-B60 A312-TP304 A312-TP316	NPS24 x 9.53T x 90° etc 13 types NPS28 x 9.53T x 90° etc 2 types NPS12 x 9.53T x 90° etc 8 types NPS8 x 8.18T x 90° etc 3 types	1.5~2DR	13,056 44 1,792 76	2012.04 ~ 2015.12
4	BARAKAH NPP #1,2,3,4	UAE	Emirates Nuclear Energy Corporation Hyundai Heavy Industries	Channel H-Beam T-Bar Angle	CH125/65 x 6/8T X13m etc H100/100 x 6/8T x 12m T200/200 x 12T x 12m L100/75 x 10T x 13m etc	22,941R 22,866R 22,866R 22,866R	4,167 48 2,856 3,618	2012.02 ~ 2015.10
5	SIN-WOLSUNG NPP #1,2	KOREA	Korea Hydro Nuclear Power Co., Ltd. DOOSAN	SA106-B	OD12.7 x 1.25T x 90/90° etc NPS6 x 10.97T x 167° etc NPS2.5 x 5.16 x 45/45° etc	1.5DR 2,384R 120.7R	1,116 24 104	2005.07 ~ 2007.05
6	SIN-GORI NPP #1,2	KOREA	Korea Hydro Nuclear Power Co., Ltd. DOOSAN	SA106-B	OD12.7 x 1.25T x 90/90° etc NPS2.5 x 5.16 x 45/45° etc	1.5DR 120.7R	1,116 120	2005.07 ~ 2006.03

Shin Kori Nuclear Power Plant 1, 2 – Korea Hydro & Nuclear Power offers

Experience Thermal Power Plant

Shop Fabricated Piping (major experience)

TOTAL-202 Projects, 39 Customers, 111,869 ton

NO.	PROJECT	SITE	CUSTOMER	MATERIAL	DESCRIPTION	CAPACITY	Q'TY (TON)	DELIVERY
1	DATAN(BOP,HRSG)	TAIWAN	GE Power	CS / SUS / ALLOY(P11,22,91,92)	OD 0.5" to 40"(S30 to 71T)	2,000MW	3,040	2020.03~2021.08
2	Anegasaki & Saijo(BOP)	JAPAN	Mitsubishi Power, Ltd.	CS / SUS / ALLOY(P11,22)	OD 2.5" to 22" (S40 to S160)	1950MW 500MW	834	2021.02~2022.05
3	JAWA-1(BOP,HRSG)	INDONESIA	GE Power SAMSUNG C&T	CS / SUS / ALLOY(P11,22,91,92)	OD 0.5" to 32" (S40 to 70T)	1,760MW	2,212	2019.12~2020.07
4	Melaka(HRSG)	MALAYSIA	GE Power	CS / ALLOY(P11,22,91,92)	OD 0.5" to 28" (S40 to 24T)	2,242MW	794	2020.05~2020.01
5	SHIN SEOCHEON(BOP,BOILER)	KOREA	KOMIPO DEALIM	CS / SUS / ALLOY(P11,12,22,92)	OD 2.5" to 40" (S10S to 113T)	1,000MW	2,958	2018.05~2019.03
6	Fadhili (BOP)	SAUDI	DOOSAN GE Power	CS / SUS / ALLOY(P22,91)	OD 3" to 64" (S40 to S160)	1,519MW	2,552	2017.08~2018.05
7	JIJEL&BISKRA	ALGERIA	HEC	CS / SUS / ALLOY(P11,22,91)	OD 0.5" to 52" (S10S to 45T)	1,398MW 1,338MW	6,407	2016.05~2017.04

Induction Bend (major experience)

Total-52 Projects, 1.5~30DR, 19,769 EA

NO.	PROJECT	SITE	CUSTOMER	MATERIAL	DESCRIPTION	RADIUS	Q'TY (TON)	DELIVERY
1	DATAN(BOP, HRSG)	TAIWAN	GE Power	SA335-P92 SA335-P22	NPS20 x 71T x 89.4° etc NPS32 x 24T x 89.4° etc	3~5DR	156 54	2020.03~2021.08
2	SIN SEOCHEON #1	KOREA	KOMIPO	SA335-P92 SA335-P12 SA335-P11 A106-B A106-C	SA335-P92 SA335-P12 SA335-P11 A106-B A106-C	1.5~3DR	270	2018.12
3	SIN BORYEONG #1,2	KOREA	KOMIPO	A335-P92 A335-P92	OD645 x 125T x 90° OD973 x 61.2T x 90° etc	1.5~3DR	241	2014.12
4	SAMCHEOK GREEN POWER #1,2	KOREA	KOSPO	SA335-P92	OD604 x 109T x 90° etc 10	1.5~5DR	248	2014.08
				A35-P92	NPS20 x 118T x 90° etc	3~5DR	162	

Yonghung Thermal Power Plant 5, 6

Experience On/Off Shore Plant

Shop Fabricated Piping (major experience)

Total-127 Project, 115 Site, 8 Customer, 59,547 Ton

NO	PROJECT	SITE	CUSTOMER	MATERIAL	DESCRIPTION	CAPACITY	Q'TY (TON)	DELIVERY
1	SN7115 Martin Linge	NORWAY	SHI/TOTAL	CS/LTCSDSS/SDSS/TITANIUM	0.5" to 36" (S10~XXS)		3,58	2015.03 ~ 2017.04
2	7108 ICHTHYS FPSO	AUSTRALIA	SHI/INPEX	A106Gr.B/A333 Gr.6/DSS TITANIUM/Hastelloy clad inconel-625	0.5" to 52" (S10~78T)		2,095	2013.09 ~ 2017.02
3	3305 Maersk Jack-up RIG	NORWAY	DSME/MAERSK	A106Gr.B/A333 Gr.6	0.5" to 36" (S10~38T)		1,380	2014.11 ~ 2016.09
4	6054 ICHTHYS FPSO	AUSTRALIA	DSME/INPEX	A106Gr.B/A333 Gr.6/DSS TITANIUM/Hastelloy	0.5" to 44" (S10~48T)		1,683	2013.10 ~ 2016.09
5	GORGON	AUSTRALIA	HHI/CHEVRON	A106 GR.B/A333GR.6 SS/SDSS/DSS	0.5" to 56" (STD~44.45T)		3,206	2011.04 ~ 2014.02
6	MARAFIQ	SAUDI	HHI/ARAMCO	A106 GR.B/A333GR.6 A312 TP316L	1"to36"(S40~XXS)		1,646	2008.01 ~ 2008.12

Induction Bend (major experience)

Total - 362 Project, 168 Site, 64 Customer 1.5DR~200DR, 42,723EA

NO	PROJECT	SITE	CUSTOMER	MATERIAL	DESCRIPTION	RADIUS	Q'TY (EA)	DELIVERY
1	MERO 2 - FPSO EPCI	BRAZIL	Petrobras / SBM Offshore	ASTM A694-F65 NACE + Inconel 625 Overlay ASTM A694-F65 NACE ASTM A694-F52 NACE ASTM A182-F51 NACE ASTM A182-F53 NACE ASTM A182-F316/316L NACE	ID158.7 x 61.88+3.6T x 90˚ etc ID152.36 x 68.94T x 90˚ etc ID104.80 x 36.29T x 90˚ etc ID212.68 x 34.47T x 90˚ etc ID165.12 x 30.85T x 90˚ etc ID114.32 x 30.85T x 90˚ etc	60 34 13 156 144 136	3DR	2021. 01
2	LIZA Unity - FPSO EPCI	GUYANA	ExxonMobil / SBM Offshore	ASTM A694-F65 NACE + Inconel 625 Overlay ASTM A182-F51 NACE ASTM A694-F65 NACE ASTM A694-F52 NACE	ID256 x 54.63+3.6T x 62˚ etc ID254 x 58.23T x 90˚ etc ID210 x 65.31T x 90˚ etc ID254 x 38.08T x 90˚ etc	17 86 26 10	3DR	2020. 02
3	LIZA Destiny - FPSO EPCI	GUYANA	ExxonMobil / SBM Offshore	ASTM A694-F65 NACE + Inconel 625 Overlay ASTM A182-F51 NACE ASTM A694-F65 NACE ASTM A694-F52 NACE	ID256 x 54.63+3.6T x 90˚ etc ID254 x 58.23T x 90˚ etc ID210 x 65.31T x 90˚ etc ID254 x 38.08T x 90˚ etc	14 45 21 15	3DR	2019. 04
4	BP Mad dog 2 FPU	MEXICO	BP / SHI	API5L-X65 PSL2 NACE	NPS10 x 42.15T x 90˚ etc NPS16 x 27.43T x 90˚ etc	189	3DR 5DR	2019. 04
5	Appomattox FPS	USA	SHELL / SHI	GR414B(GR345B)TM	NPS36 x 51T x 47˚ etc	84	2.2DR	2016. 04
6	AASTA Hansteen	NORWAY	STATOIL / HHI	EN10225 S420G1M EN10225 S460G2M	OD740 x 30T x 32˚ etc OD660 x 19T x 5.5˚ etc	17 144	143,235R 128,016R	2015. 07
7	MOHO Nord FPU	CONGO	TOTAL / HHI	API5L-X65 PSL2 NACE A790 UNS S31803 NACE	NPS16 x 21.4T x 90˚ etc NPS6 x 18.24T x 90˚ etc	74 13	3DR	2015. 04
8	Ichthys FPSO	AUSTRALIA	INPEX / DSME	A106-B	NPS6 x 10.97T x 90˚ etc	1,650	2DR	2014. 05

Experience

Chemical · Oil · Gas / KOGAS

Chemical · Oil · Gas (major experience)

Total - 85 Project, 64 site, 21 Customer, 3DR~200DR, 10,881EA

NO	PROJECT	SITE	CUSTOMER	MATERIAL	DESCRIPTION	RADIUS	Q'TY (EA)	DELIVERY
1	Sao Vang and Dai Nguyet Development	VIETNAM	Idemitsu / PTSC, Velocity	DNV L450F	NPS26 x 27.61T x 90° etc	5DR	26	2019. 01
2	GC-32 New Gathering Centre	KUWAIT	KOC / Petrofac	API5L-X52 PSL2 NACE	NPS20 x 12.70T x 90° etc	5DR	590	2019. 01
3	RA6 Rachaburi Pipeline	THAILAND	PTT Public Company / Timex	API5L-X65 PSL2 NACE	NPS30 x 19.05T x 90° etc	5DR	92	2018. 03
4	Chittagong-Bakhabad Gas Pipeline	BANGLADESH	GTCL / Tech System Enterprise	API5L-X70 PSL2	NPS36 x 19.05T x 90° etc	8DR	1,066	2017. 11
5	Al-Zour LNG Import	KUWAIT	KIPIC, KOC / Hyundai Engineering	API5L-X65 PSL2	NPS52 x 26.11T x 90° etc	5DR	96	2017. 11
6	Pipe Bending (SN-3549/16)	PAKISTAN	Sui Northern Gas Pipelines Limitted	API5L-X52 PSL1 API5L-X60 PSL2	NPS16 x 7.92T x 90° etc	5DR	145	2017. 04

KOGAS (major experience)

Total - 508 Project, 13 Site, 1 Customer, 3DR, 70,212EA

NO	PROJECT	SITE	CLIENT	MATERIAL	DESCRIPTION	RADIUS	Q'TY (EA)	DELIVERY
1	LNG Transmission & Distribution	KOREA	KOGAS	API5L-X70 PSL1	NPS30 x 20.6T x 90° etc	3DR	1,014	2019. 12
2	LNG Transmission & Distribution	KOREA	KOGAS	API5L-X70 PSL1	NPS30 x 20.6T x 90° etc	3DR	987	2018. 12
3	LNG Transmission & Distribution	KOREA	KOGAS	API5L-X70 PSL1	NPS30 x 20.6T x 90° etc	3DR	1,337	2017. 12
4	LNG Transmission & Distribution	KOREA	KOGAS	API5L-X70 PSL1	NPS30 x 20.6T x 90° etc	3DR	4,955	2014. 12
5	LNG Transmission & Distribution	KOREA	KOGAS	API5L-X70 PSL1	NPS30 x 20.6T x 90° etc	3DR	5,930	2010. 12

Haman 1 Plant Gunbuk-myeon, Haman-gun, Gyeongsangnam-do, Korea

Capacity
Total_4,700Ton / Month
FAB. Spools_C/S : 750 Ton/Month,
Alloy : 500 Ton/Month, SUS : 150 Ton/Month
Painting : Alloy : 600 Ton/Month
Induction Bend : 1,600Ton/Month
Cold Bend : 1,100Ton/Month

New Haman Plant Gunbuk-myeon, Haman-gun, Gyeongsangnam-do, Korea

Capacity
Total_2,500Ton/Month
FAB. Spools_C/S : 850Ton/Month,
Alloy_450Ton/Month
Non-ferrous 600Ton/Month
Painting : 600 Ton/Month

Uiryeong Plant (material storage)
Uiryeong-eup, Uiryeong-gun, Gyeongsangnam-do, Korea

Haman 3 Plant Beopsu-myeon, Haman-gun, Gyeongsangnam-do, Korea

Capacity
Total_120Ton/Month
FAB. Spools_C/S : 120Ton/Month

Head Office
BUSAN VENTURE TOWER 17F, 22, Mora-ro, Sasang-gu, Busan, 46918, Rep. of Korea