源泰德润



Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd

天津源泰德润钢管制造集团有限公司

天津源泰德润钢管制造集团有限公司
Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd

Tel：008622- 58951960/58951961/58951962
Fax：008622-58951959
Ad：Daqiuzhuang industrial zone Tianjin China
Email：sales@ytdrgg.com
Web：http://www.ytdrgg.com

中国生产规模最大的焊接方矩钢管制造集团
The largest manufacturer of hollow section in China

中国民营企业500强
Top 500 Private Enterprises in China

中国制造业500强
Top 500 Manufacturing Enterprises in China

中国金属材料流通协会方矩管分会会长单位
Chairman unit of Hollow Section Branch of China National Association of Metal Material Trade

Certificate of Conformity of Factory Production Control

This certificate is issued to:

Manufacturer: Tianjin Yuantaiderun Pipe Manufacturing Group Co., Ltd.
Industrial Area, Daqiuzhuang Town, Tianjin City,
Tianjin Yuantaiderun International Trade Co., Ltd.
No.2, Science and Technology Road, Industrial Area,
Daqiuzhuang Town, Jinghai Section, Tianjin City,
People's Republic of China

In compliance with *Regulation 305/2011/EU* of the European Parliament and of the *Council of 9 March 2011* (the Construction Products Regulation or CPR),
this certificate applies to the construction product:

Manufacture of Square and Rectangular Hollow Sections

This certificate attests that all provisions concerning the assessment and verification of constancy of performance and the performances described in Annex ZA of the standard(s)

EN 10210-1:2006 Hot finished structural hollow sections of non-alloy and fine grain steels- Part 1: Technical delivery conditions

under system 2+ are applied and that the product fulfils all the prescribed requirements set out above.

The attached Schedule, of the same date, details the manufacturing location(s), harmonised product standard and product parameters and shall form a part of this certificate.

This Certificate will remain valid as long as the test methods and/or factory production control requirements included in the harmonised standard, used to assess the performance of the declared characteristics, do not change, and the product, and the manufacturing conditions in the plant are not modified significantly.

Certificate Number:	0038/CPR/SHA/BJG6023851/B
Original Approval Date:	25 May 2015
Current Issue Date:	17 July 2020
Expiry Date:	29 Jun 2021
LRV Notified Body Number:	0038

Amanda Wu on behalf of Lloyd's Register Verification

Lloyd's Register Verification Limited (Reg. no. 4929226) is a limited company registered in England and Wales. Registered office: 71 Fenchurch Street, London, EC3M 4BS, UK. A subsidiary of Lloyd's Register Group Limited.
Lloyd's Register Group Limited, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the 'Lloyd's Register'. Lloyd's Register assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.

Certificate of Conformity of Factory Production Control

CERTIFICATE 0038/CPR/SHA/BJG6023851/B SCHEDULE

Manufacturer: Tianjin Yuantaiderun Pipe Manufacturing Group Co., Ltd.
Industrial Area, Daqiuzhuang Town, Tianjin City,
Tianjin Yuantaiderun International Trade Co., Ltd.
No.2, Science and Technology Road, Industrial Area,
Daqiuzhuang Town, Jinghai Section, Tianjin City,
People's Republic of China

Manufacturing Location and Products	Standard, Grade and Size
Daqiuzhuang Town, Jinghai County, Tianjin, P.R. China	EN 10210-1: 2006, EN 10210-2: 2006 S235JRH, S275J0H, S275J2H, S355J0H, S355J2H and S355K2H and S460NH
50 welded pipe line (No. 2 line) ERW production line	For square pipe, side dimension range from 20 to 50mm, thickness range from 2.0 to 5.0mm; For rectangular pipe, BXH range from 20X25 to 60X40mm thickness range from 2.0 to 5.0mm.
114 welded pipe line (No. 7 line) ERW production line	For square pipe, side dimension range from 40 to 90mm, thickness range from 2.0 to 8.0mm; For rectangular pipe, BXH range from 60X40 to 120X60mm thickness range from 2.0 to 8.0mm.
200 welded pipe line ERW production line	For square pipe, side dimension range from 90 to 200mm, thickness range from 2.0 to 16.0mm; For rectangular pipe, BXH range from 120X60 to 300X100mm thickness range from 2.0 to 16.0mm.
300 welded pipe line (new) ERW production line	For square pipe, side dimension range from 200 to 300mm, thickness range from 3.0 to 16.0mm; For rectangular pipe, BXH range from 300X100 to 350X250mm thickness range from 3.0 to 16.0mm.
500 welded pipe line ERW production line	For square pipe, side dimension range from 300 to 500mm, thickness range from 5.0 to 18.0mm; For rectangular pipe, BXH range from 300X250 to 500X450mm thickness range from 5.0 to 18.0mm.

Schedule Issue: 04
Date of Schedule Issue: 17 July 2020
LRV Notified Body Number: 0038

Amanda Wu on behalf of Lloyd's Register Verification

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Certificate of Conformity of Factory Production Control

CERTIFICATE 0038/CPR/SHA/BJG6023851/B SCHEDULE

Manufacturer: Tianjin Yuantaiderun Pipe Manufacturing Group Co., Ltd.
Industrial Area, Daqiuzhuang Town, Tianjin City,
Tianjin Yuantaiderun International Trade Co., Ltd.
No.2, Science and Technology Road, Industrial Area,
Daqiuzhuang Town, Jinghai Section, Tianjin City,
People's Republic of China

Manufacturing Location and Products	Standard, Grade and Size
Cold-drawing pipe line Including Pipes formed by ERW, Pipes formed by LSAW, and Seamless pipes.	For square pipe, side dimension range from 200 to 800mm, thickness range from 5.0 to 50.0mm; For rectangular pipe, BXH range from 300X100 to 750X500mm thickness range from 8.0 to 50.0mm.
Heat treatment line	For square pipe, side dimension range from 20 to 800mm, thickness range from 2.0 to 50.0mm; For rectangular pipe, BXH range from 20X25 to 750X500mm thickness range from 2.0 to 50.0mm.

Schedule Issue: 04
Date of Schedule Issue: 17 July 2020
LRV Notified Body Number: 0038

Amanda Wu on behalf of Lloyd's Register Verification

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Certificate of Conformity of Factory Production Control

This certificate is issued to:

Manufacturer: Tianjin Yuantaiderun Pipe Manufacturing Group Co., Ltd.
Industrial Area, Daqiuzhuang Town, Tianjin City,
Tianjin Yuantaiderun International Trade Co., Ltd.
No.2, Science and Technology Road, Industrial Area,
Daqiuzhuang Town, Jinghai Section, Tianjin City,
People's Republic of China

In compliance with *Regulation 305/2011/EU* of the European Parliament and of the *Council of 9 March 2011* (the Construction Products Regulation or CPR), this certificate applies to the construction product:

Manufacture of ERW and LSAW Square and Rectangular Hollow Sections

This certificate attests that all provisions concerning the assessment and verification of constancy of performance and the performances described in Annex ZA of the standard(s)

EN 10219-1:2006 Cold Formed Welded Structural Hollow Sections of Non-alloy and Fine Grain Steels – General Technical Delivery Conditions

under system 2+ are applied and that the product fulfils all the prescribed requirements set out above.

The attached Schedule, of the same date, details the manufacturing location(s), harmonised product standard and product parameters and shall form a part of this certificate.

This Certificate will remain valid as long as the test methods and/or factory production control requirements included in the harmonised standard, used to assess the performance of the declared characteristics, do not change, and the product, and the manufacturing conditions in the plant are not modified significantly.

Certificate Number:	0038/CPR/SHA/BJG6023851/A
Original Approval Date:	25 May 2015
Current Issue Date:	17 July 2020
Expiry Date:	24 May 2021
LRV Notified Body Number:	0038

Amanda Wu on behalf of Lloyd's Register Verification

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Certificate of Conformity of Factory Production Control

CERTIFICATE 0038/CPR/SHA/BJG6023851/A SCHEDULE

Manufacturer: Tianjin Yuantaiderun Pipe Manufacturing Group Co., Ltd.
Industrial Area, Daqiuzhuang Town, Tianjin City,
Tianjin Yuantaiderun International Trade Co., Ltd.
No.2, Science and Technology Road, Industrial Area,
Daqiuzhuang Town, Jinghai Section, Tianjin City,
People's Republic of China

Manufacturing Location and Products	Standard, Grade and Size
Daqiuzhuang Town, Jinghai County, Tianjin, P.R. China	EN 10219-1: 2006, EN 10219-2: 2006 S235JRH, S275J0H, S275J2H, S355J0H, S355J2H and S355K2H
50 welded pipe line (No. 2 line) ERW production line	For square pipe, side dimension range from 20 to 50mm, thickness range from 2.0 to 5.0mm; For rectangular pipe, BXH range from 20X25 to 60X40mm thickness range from 2.0 to 5.0mm.
114 welded pipe line (No. 7 line) ERW production line	For square pipe, side dimension range from 40 to 90mm, thickness range from 2.0 to 8.0mm; For rectangular pipe, BXH range from 60X40 to 120X60mm thickness range from 2.0 to 8.0mm.
200 welded pipe line ERW production line	For square pipe, side dimension range from 90 to 200mm, thickness range from 2.0 to 16.0mm; For rectangular pipe, BXH range from 120X60 to 300X100mm thickness range from 2.0 to 16.0mm.
300 welded pipe line (new) ERW production line	For square pipe, side dimension range from 200 to 300mm, thickness range from 3.0 to 16.0mm; For rectangular pipe, BXH range from 300X100 to 350X250mm thickness range from 3.0 to 16.0mm.
500 welded pipe line ERW production line	For square pipe, side dimension range from 300 to 500mm, thickness range from 5.0 to 18.0mm; For rectangular pipe, BXH range from 300X250 to 500X300mm thickness range from 5.0 to 18.0mm.
Cold-drawing pipe line Including Pipes formed by ERW, Pipes formed by LSAW	For square pipe, side dimension range from 200 to 500mm, thickness range from 5.0 to 40.0mm; For rectangular pipe, BXH range from 300X100 to 500X300mm thickness range from 8.0 to 40.0mm.

Schedule Issue: 04
Date of Schedule Issue: 17 July 2020
LRV Notified Body Number: 0038

Amanda Wu on behalf of Lloyd's Register Verification

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FACTORY PRODUCTION CONTROL CERTIFICATE

In compliance with the requirements of BC1:2012 and the Building and Construction Authority, Singapore

This is to certify that the Factory Production Control System of:

Tianjin Yuantaiderun Pipe Manufacturing Group Co., Ltd.
Tianjin Yuantaiderun International Trade Co., Ltd.

In the production facility located at:

Industrial area, Daqiuzhuang Town, Tianjin City,
No.2, Science and Technology Road, Industrial Area,
Daqiuzhuang Town, Jinghai Section, Tianjin City,
People's Republic of China

has been assessed against the Factory Production Control requirements of BC1:2012 and conforms to the requirements for the production of:

Manufacture of Square and Rectangular Hollow Sections

This certificate is only valid when accompanied by a current schedule with the same number detailing the product standards, material grades and other details corresponding to this approval.

Approval is subject to the continued surveillance of the management system in accordance with the requirements of BC1:2012. Unauthorised changes to the management system will render this approval invalid.

Certificate Number:	BJG6023851/A
Original Approval Date:	14 November 2019
Current Issue Date:	17 July 2020
Expiry Date:	13 November 2022

Amanda Wu on behalf of Lloyd's Register Verification

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FACTORY PRODUCTION CONTROL CERTIFICATE

In compliance with the requirements of BC1:2012 and the Building and Construction Authority, Singapore

CERTIFICATE BJG6023851/A SCHEDULE

Tianjin Yuantaiderun Pipe Manufacturing Group Co., Ltd.
Tianjin Yuantaiderun International Trade Co., Ltd.

In the production facility located at:

Industrial Area, Daqiuzhuang Town, Tianjin City,
No.2, Science and Technology Road, Industrial Area,
Daqiuzhuang Town, Jinghai Section, Tianjin City,
People's Republic of China

Mill Identification and Products	Standard, Grade and Size
Daqiuzhuang Town, Jinghai County, Tianjin, P.R. China	EN 10210-1: 2006, EN 10210-2: 2006 S235JRH, S275J0H, S275J2H, S355J0H, S355J2H and S355K2H and S460NH
50 welded pipe line (No. 2 line) ERW production line	For square pipe, side dimension range from 20 to 50mm, thickness range from 2.0 to 5.0mm; For rectangular pipe, BXH range from 20X25 to 60X40mm thickness range from 2.0 to 5.0mm.
114 welded pipe line (No. 7 line) ERW production line	For square pipe, side dimension range from 40 to 90mm, thickness range from 2.0 to 8.0mm; For rectangular pipe, BXH range from 60X40 to 120X60mm thickness range from 2.0 to 8.0mm.
200 welded pipe line ERW production line	For square pipe, side dimension range from 90 to 200mm, thickness range from 2.0 to 16.0mm; For rectangular pipe, BXH range from 120X60 to 300X100mm thickness range from 2.0 to 16.0mm.
300 welded pipe line (new) ERW production line	For square pipe, side dimension range from 200 to 300mm, thickness range from 3.0 to 16.0mm; For rectangular pipe, BXH range from 300X100 to 350X250mm thickness range from 3.0 to 16.0mm.

Schedule Issue: 02
Date of Schedule Issue: 17 July 2020

Amanda Wu on behalf of Lloyd's Register Verification

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FACTORY PRODUCTION CONTROL CERTIFICATE

In compliance with the requirements of BC1:2012 and the Building and Construction Authority, Singapore

CERTIFICATE BJG6023851/A SCHEDULE

Tianjin Yuantaiderun Pipe Manufacturing Group Co., Ltd.
Tianjin Yuantaiderun International Trade Co., Ltd.

In the production facility located at:

Industrial Area, Daqiuzhuang Town, Tianjin City,
No.2, Science and Technology Road, Industrial Area,
Daqiuzhuang Town, Jinghai Section, Tianjin City,
People's Republic of China

Mill Identification and Products	Standard, Grade and Size
500 welded pipe line ERW production line	For square pipe, side dimension range from 300 to 500mm, thickness range from 5.0 to 18.0mm; For rectangular pipe, BXH range from 300X250 to 500X450mm thickness range from 5.0 to 18.0mm.
Cold-drawing pipe line Including Pipes formed by ERW, Pipes formed by LSAW, and Seamless pipes.	For square pipe, side dimension range from 200 to 800mm, thickness range from 5.0 to 50.0mm; For rectangular pipe, BXH range from 300X100 to 750X500mm thickness range from 8.0 to 50.0mm.
Heat treatment line	For square pipe, side dimension range from 20 to 800mm, thickness range from 2.0 to 50.0mm; For rectangular pipe, BXH range from 20X25 to 750X500mm thickness range from 2.0 to 50.0mm.
Daqiuzhuang Town, Jinghai County, Tianjin, P.R. China	EN 10219-1: 2006, EN 10219-2: 2006 S235JRH, S275J0H, S275J2H, S355J0H, S355J2H and S355K2H
50 welded pipe line (No. 2 line) ERW production line	For square pipe, side dimension range from 20 to 50mm, thickness range from 2.0 to 5.0mm; For rectangular pipe, BXH range from 20X25 to 60X40mm thickness range from 2.0 to 5.0mm.

Schedule Issue: 02
Date of Schedule Issue: 17 July 2020

Amanda Wu on behalf of Lloyd's Register Verification

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FACTORY PRODUCTION CONTROL CERTIFICATE

In compliance with the requirements of BC1:2012 and the Building and Construction Authority, Singapore

CERTIFICATE BJG6023851/A SCHEDULE

Tianjin Yuantaiderun Pipe Manufacturing Group Co., Ltd.
Tianjin Yuantaiderun International Trade Co., Ltd.

In the production facility located at:

Industrial area, Daqiuzhuang town, Tianjin City,
No.2, Science and Technology Road, Industrial Area,
Daqiuzhuang Town, Jinghai Section, Tianjin City,
People's Republic of China

Mill Identification and Products	Standard, Grade and Size
114 welded pipe line (No. 7 line) ERW production line	For square pipe, side dimension range from 40 to 90mm, thickness range from 2.0 to 8.0mm; For rectangular pipe, BXH range from 60X40 to 120X60mm thickness range from 2.0 to 8.0mm.
200 welded pipe line ERW production line	For square pipe, side dimension range from 90 to 200mm, thickness range from 2.0 to 16.0mm; For rectangular pipe, BXH range from 120X60 to 300X100mm thickness range from 2.0 to 16.0mm.
300 welded pipe line (new) ERW production line	For square pipe, side dimension range from 200 to 300mm, thickness range from 3.0 to 16.0mm; For rectangular pipe, BXH range from 300X100 to 350X250mm thickness range from 3.0 to 16.0mm.
500 welded pipe line ERW production line	For square pipe, side dimension range from 300 to 500mm, thickness range from 5.0 to 18.0mm; For rectangular pipe, BXH range from 300X250 to 500X300mm thickness range from 5.0 to 18.0mm.
Cold-drawing pipe line Including Pipes formed by ERW, Pipes formed by LSAW	For square pipe, side dimension range from 200 to 500mm, thickness range from 5.0 to 40.0mm; For rectangular pipe, BXH range from 300X100 to 500X300mm thickness range from 8.0 to 40.0mm.

Schedule Issue: 02
Date of Schedule Issue: 17 July 2020

Amanda Wu on behalf of Lloyd's Register Verification

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EPD™

Environmental Product Declaration

Global GreenTag^{CertTM} EPD Program

Compliant to EN 15804:2012+A1 2013

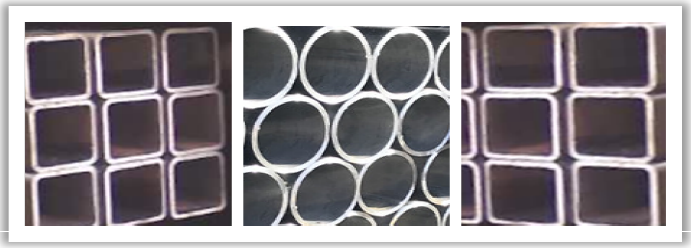
Yuantai Derun Steel Hollow Sections

Tianjin Yuantai Derun Pipe Manufacturing Group

Daqiuzhuang Industrial Zone, Jinghai, Tianjin, China

EPD Verification and LCA Details

EPD Scope	Cradle to Gate
EPD Number	TIA-001-2019
Issue Date	4th April 2019
Valid Until	4th April 2024



This EPD discloses potential environmental outcomes compliant with EN 15804:2012 + A1 2013 for business to consumer communication.

Demonstration of Verification

Standard EN 15804 serves as the core Product Category Rules (PCR)

Independent external verification of the declaration and data, according to ISO 14025:2010

☐ Internal ☒ External

Third Party Verifier [a] by Murray Jones Ecquate Pty Ltd 03-04-2019

LCA Reviewed by Omar Biaz Global GreenTag Pty Ltd 04-04-2019

EPD Reviewed by David Baggs Global GreenTag International Pty Ltd 05/04/19

a Optional for business-to-business communication; mandatory for business-to-consumer communication according to EN ISO 14025:2010, 9.4.

The EPD is property of declared manufacturer. Different program EPDs may not be comparable as e.g. Australian transport is often more than elsewhere. Comparability is further dependent on the product category rules used and the source of the data. Further explanatory information is found at info@globalgreentag.com or contact: certification1@globalgreentag.com.

EPD Program Operator	LCA and EPD Producer	Declaration Owner
Global GreenTag International Pty Ltd., PO Box 311 Cannon Hill, QLD 4170 Phone: +61 (0)7 33 999 686 http://www. globalgreentag.com	The Evah Institute PO Box 123 Thirroul NSW Phone: +61 (0)7 5545 0998 http://www.evah.com.au/	Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd Daqiuzhuang Industrial Zone, Jinghai, Tianjin, China Phone: +86-022-58951960 http://www.ytdrintl.com/ http://www.ytdrgg.com/

Product Information

Product Name	Yuantai Derun Steel Hollow Sections
Product code	Chinese grade low carbon steels: • Q195 and • Q215A/B. Chinese grade mild steels: • Q235GJB/C/D • Q345GJC/D/E, Q345B & Q345GJB • Q390GJC/D/E and • Q460GJE/D/E. Chinese grade low alloy steels: • Q420GJC/D/E and • Q460GJE/D/E. EN-grade mild steels: • S235JRH/JOH/J2H • S275JRH/JOH/J2H,S275NH and • S355JRH/JOH/J2H, S355NH. Japanese Grade mild steels: • SS490 and SS400 American grade mild steels: • A500GA/GB, A500GC • A501GR.A and • A501 GR.B. EN-grade low alloy steels: • S420JOH and • S460NH/S460JOH.
Manufacturing Site	Tianjin Yuantai Derun Pipe Manufacturing Group Factory in Tianjin
Site Representation and Geography	Daqiuzhuang Industrial Zone, Jinghai, Tianjin, China
Manufacturer warranty	Not Applicable
Service Life	The reference service life is unspecified for cradle to gate scope
Standards	ASTMA500, ASTMA501, AS1163, EN10219, EN10210, BS1387, JISG3466, DIN2240
Product Specifications	Hollow sections 50 ±5mm thick wall exterior: • Square 1100*1100mm linear mass density 1627kg/m, • Rectangular 1000*1100mm linear mass density 1548kg/m and • Round 2032mm dia linear mass density 2440kg/m.
Functional & Technical Performance	Low carbon steel yield strengths of: • 195MPa • 215MPa. Mild steel yield strengths of: • 235MPa, • 345MPa, • 390 MPa or • 460 Mpa Low alloy steel yield strength of: • 420MPa or • 460MPa
Functional Performance in building	Hollow Structural sections can be circular (CHS), square (SHS) or rectangular (RHS). As well as welded steel frames RHS steel is commonly used for beams while SHS and CHS are more often used for columns.
No Very High Concern	Contains no substances in the “Candidate List of Substances of Very High Concern for authorisation” registration with the European Chemicals Agency

Program Description

PCR	This declaration is based on Structural Steel Products PCR SS: 2019 V1
PCR Review Chair	Murray Jones of Ecquate Pty Ltd
EPD type	Cradle to gate (A1 to A3) as defined by EN 15804 and depicted in Figure 1
Declared Unit	Each declared product per kilogram
Comparability	Construction product EPDs may not be comparable if not EN15804 compliant
Range and variability	Significant differences of average LCIA results are declared
Cut-off criteria and Data quality	Complies with the EN 15804 + A1 2013
Primary Data	Data was collected in accordance with EN ISO 14044:2006, 4.3.2, from primary sources including the manufacturer, suppliers and their publications on standards locations, logistics, technology, market share, management system, and commitment to improved environmental performance.
System boundary	The system boundary with nature includes material and energy system input processing plus manufacture and transport to factory gate plus waste arising.
Product stages included	A1, A2, A3 as depicted and denoted by x in Figure 1 Stages are included from • A1 raw material acquisition, extraction, refining and processing plus reuse of scrap or material from previous systems; electricity generated from all sources with extraction, refining & transport; plus secondary fuel energy and recovery processes, and • A2 transport internal and to the factory gate as well as • A3 manufacture of product packaging, inputs and ancillary material and system flows leaving at end-of-waste boundary allocated as coproducts.
Stages excluded	A4-5, B1-7, C1-1& D as depicted and denoted by MND in Figure 1

Information Modules

As Figure 1 shows an x marking LCA and EPD results to be shown summed for modules A1-3. Modules A4 to C4 and D are not declared marked MND which does not indicate zero inventory or impact.

Model	Actual					Scenarios										Potential		
Phase	Produce			Construct		Building Fabric					Building Use		End of life				Beyond Boundary	
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D1, D2	D3
Unit Operations	Resource supply	Transport	Manufacturing	Transport	Construction	Use	Maintain	Repair	Replace	Refurbish	Operating Energy	Operating Water	Demolish	Transport	Process Waste	Disposal	Reuse	Recovery	Recycling
Cradle to Gate	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Figure 1 EPD Life Cycle Phases and Stages Cradle to Gate or Grave

Base Material Origin and Detail

Table 1 lists the low carbon, mild and low alloy steel hollow section product components, function, source and amount in mass percent.

Table 1 Base Material Chemical Analysis

Function	Component	Source of Input Flow	Low Carbon Steel % w/w		Mild steel % w/w	Low Alloy Steel % w/w
Steel Substrate	Iron	Australian and Brazilian iron ore charge for iron making	>98.00	>98.00	>97.00	>97.00
Strength & Hardness	Carbon	Australian and Chinese coking coal charge for iron making	≤0.12	≤0.15	≤0.20	≤0.20
Deoxidiser & Strength	Manganese	Chinese pyrolusite ore to make ferromanganese alloy for steel making	≤0.50	≤1.20	≤1.40	≤1.70
Deoxidiser & Strength	Silicon	Iron making charge and Chinese quartzite ore to make ferrosilicon steel making alloy	≤0.30	≤0.35	≤0.35	≤0.55
Hardenability	Chromium	South African chromite ore to make ferrochrome alloy for steel making				≤0.40
Ductility	Nickel	New Caledonian goethite ore to make ferronickel alloy for steel making				≤0.40
Machinability	Sulphur	Australian and Chinese iron ore & coal charge for iron making	≤0.04	≤0.05	≤0.035	≤0.035
Machinability & Durability	Phosphor-us	Australian and Brazilian iron ore charge for iron making	≤0.035	≤0.045	≤0.030	≤0.035
Deoxidiser	Aluminium	Chinese post industrial scrap to Aluminium for steel making	≥0.015	≥0.015	≥0.015	≥0.015
Hardness	Nitrogen	Australian and Chinese coke and gas charge for iron & steel making	≤0.009	≤0.009	≤0.009	≤0.009
Toughness	Titanium	Chinese scrap for ferrotitanium alloy for steel making				0.02-0.2
Toughness	Vanadium	Chinese magnetite ore to make ferrovanadium alloy for steel making				0.02-0.2
Toughness	Niobium	Brazilian & Canadian pyrochlore ore to make ferroniobium alloy for steel				0.015-0.06

Figure 2 shows included processes for making steel products in a lilac cradle to gate system boundary. Such processes require input flows from and generate output flows to air, land, water and communities.

Alongside, within the dashed lines, are depicted many excluded scenarios outside the EPD scope. These processes are from the factory gate to end of life grave.

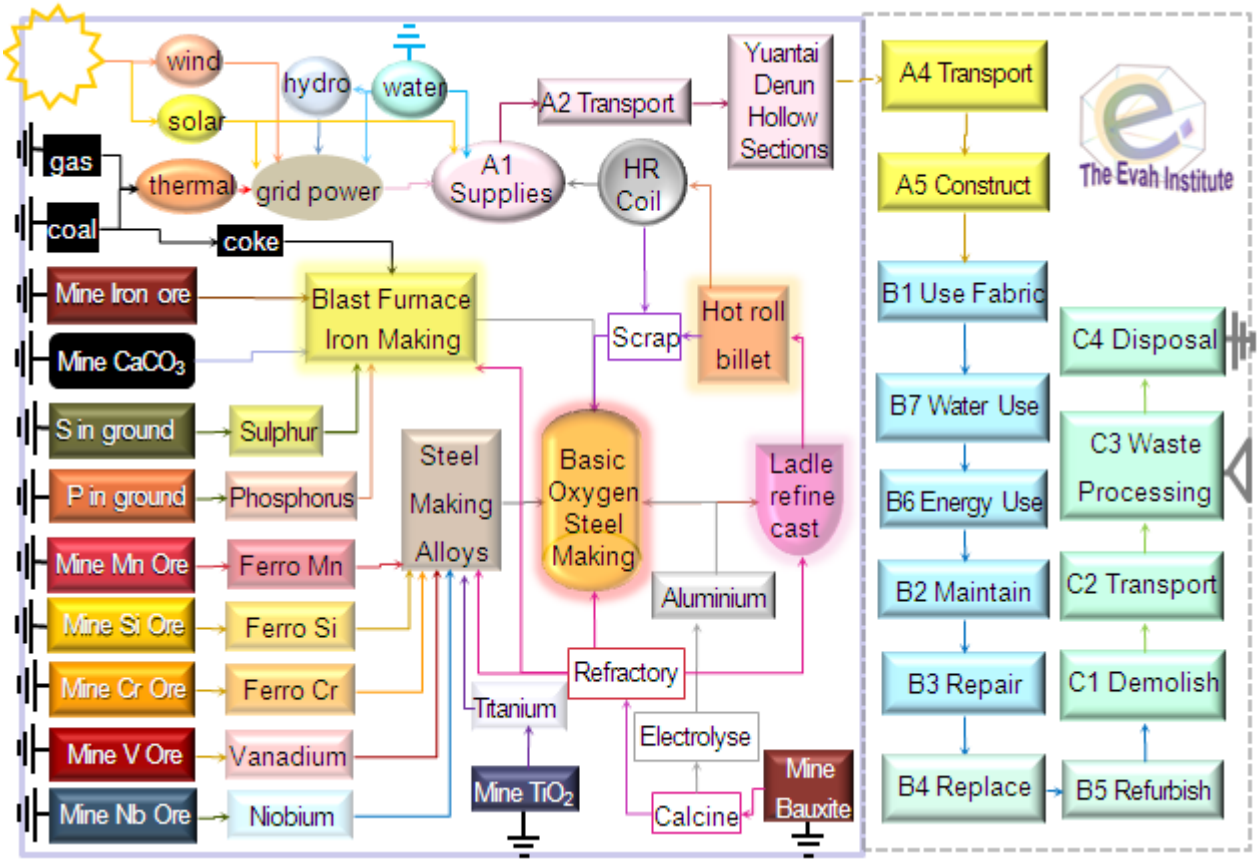


Figure 2 Steel Hollow Section Process Flow Chart Cradle to Gate

Processes include those of:

- Mining, extracting and refining resources to make commodities and packaging;
- Acquiring, cultivating, harvesting, extracting, refining produce and biomass;
- Fuel production to supply power and process energy and freight;
- Chemicals use in processing resources, intermediates and ancillaries;
- Process energy, fuel and freight of resources, intermediates and ancillaries;
- Infrastructure process energy transformed and material wear loss e.g. tyres.

Cradle to Gate Inventory and Potential Impact Results

Table 2 shows the low carbon steel product resource inputs plus waste and output flows per declared unit.

Table 2 Resource Inputs and Outputs A1-A3/kg

INPUTS	Unit	Q195	Q215A/B
Net Fresh Water	m^3	0.014	0.014
Secondary Water	m^3	0.008	0.008
Secondary Material	kg	0.004	0.004
Primary Renewable Energy Not Feedstock	MJ	0.327	0.322
Renewable Secondary Fuels	MJ	0.021	0.021
Primary Energy Renewable Feedstock Material	MJ	0.034	0.034
Total Primary Renewable Energy Resources	MJ	0.361	0.356
Non-Renewable Secondary Fuels	MJ	0.005	0.005
Primary Energy Non-Renewable Not Feedstock	MJ	29.67	29.57
Non-Renewable Primary Energy Feedstock	MJ	5.433	5.418
Total Non-Renewable Primary Energy Resources	MJ	35.10	34.99
OUTPUTS	**Unit**	**Q195**	**Q215A/B**
Hazardous waste disposed	kg	3.18E-05	3.18E-05
Non- Hazardous waste disposed	kg	8.44E-06	8.44E-06
Radio Active Waste disposed	kg	3.40E-12	3.40E-06
Components for reuse	kg	0.047	0.045
Material for recycling	kg	0.108	0.105
Material for Energy recovery	kg	<0.01	<0.01
Exported electrical energy	MJ	<0.01	<0.01
Exported Thermal Energy	MJ	<0.01	<0.01

Table 3 lists potential impact results per kg declared unit cradle to gate.

Table 3 Potential Impacts/kg

CATEGORIES	Factor	Q195	Q215A/B
Global Warming Potential	kg CO_{2e}	2.408	2.400
Stratospheric Ozone Depletion Potential	kg $R11_e$	3.25E-08	3.19E-08
Acidification of Land and Water Potential	kg SO_{2e}	8.00E-03	8.00E-03
Eutrophication Potential	kg PO_{4e}^3	1.50E-03	1.40E-03
Photochemical Ozone Creation Potential	kg C_2H_{4e}	1.37E-04	1.36E-04
Elements Abiotic Depletion Potential	kg Sb_e	2.28E-07	2.28E-07
Fossil Fuel Abiotic Depletion Potential	MJ_{ncv}	31.40	31.3

Table 4 shows the mild steel product inputs plus waste and output flows per kilogram declared unit.

Table 4 Resource Inputs and Outputs A1-A3/kg

INPUTS	Unit	Q235	Q345	Q390	Q460
Net Fresh Water	m^3	0.014	0.014	0.014	0.014
Secondary Water	m^3	0.008	0.008	0.008	0.008
Secondary Material	kg	0.004	0.004	0.004	0.004
Primary Renewable Energy Not Feedstock	MJ	0.313	0.312	0.331	0.313
Renewable Secondary Fuels	MJ	0.020	0.020	0.022	0.020
Primary Energy Renewable Feedstock Material	MJ	0.029	0.029	0.041	0.029
Total Primary Renewable Energy Resources	MJ	0.342	0.341	0.372	0.341
Non-Renewable Secondary Fuels	MJ	0.004	0.004	0.007	0.004
Primary Energy Non-Renewable Not Feedstock	MJ	28.38	28.46	30.29	28.29
Non-Renewable Primary Energy Feedstock	MJ	5.132	5.191	5.714	5.391
Total Non-Renewable Primary Energy Resources	MJ	33.51	33.625	35.959	33.681
OUTPUTS	**Unit**	**Q235**	**Q345**	**Q390**	**Q460**
Hazardous waste disposed	kg	3.18E-05	3.18E-05	3.18E-05	3.18E-05
Non- Hazardous waste disposed	kg	8.44E-06	8.44E-06	8.44E-06	8.44E-06
Radio Active Waste disposed	kg	3.47E-06	2.93E-04	3.46E-06	3.46E-06
Components for reuse	kg	0.047	0.047	0.058	0.044
Material for recycling	kg	0.135	0.133	0.120	0.131
Material for Energy recovery	kg	<0.01	<0.01	<0.01	<0.01
Exported electrical energy	MJ	<0.01	<0.01	<0.01	<0.01
Exported Thermal Energy	MJ	<0.01	<0.01	<0.01	<0.01

Table 5 lists potential impact results per kg declared unit cradle to gate.

Table 5 Potential Impacts/kg

CATEGORIES	Factor	Q235	Q345	Q390	Q460
Global Warming Potential	kg CO_{2e}	2.037	2.284	2.463	2.269
Stratospheric Ozone Depletion Potential	kg $R11_e$	3.11E-08	3.09E-08	3.27E-08	3.11E-08
Acidification of Land and Water Potential	kg SO_{2e}	7.00E-03	7.00E-03	8.00E-03	7.00E-03
Eutrophication Potential	kg PO_{4e}^3	1.40E-03	1.40E-03	1.50E-03	1.40E-03
Photochemical Ozone Creation Potential	kg C_2H_{4e}	1.28E-04	1.29E-04	1.40E-04	1.30E-04
Elements Abiotic Depletion Potential	kg Sb_e	2.17E-07	2.17E-07	2.35E-07	2.16E-07
Fossil Fuel Abiotic Depletion Potential	MJ_{ncv}	29.9	30.0	32.2	29.8

Table 6 shows low alloy steel products resource inputs plus waste and output flows per declared unit.

Table 6 Resource Inputs and Outputs A1-A3/kg

INPUTS	Units	Q420	Q460
Net Fresh Water	m^3	0.014	0.014
Secondary Water	m^3	0.008	0.008
Secondary Material	kg	0.002	0.002
Primary Renewable Energy Not Feedstock	MJ	0.320	0.320
Renewable Secondary Fuels	MJ	0.021	0.021
Primary Energy Renewable Feedstock Material	MJ	0.025	0.025
Total Primary Renewable Energy Resources	MJ	0.348	0.345
Non-Renewable Secondary Fuels	MJ	0.004	0.004
Primary Energy Non-Renewable Not Feedstock	MJ	30.01	30.01
Non-Renewable Primary Energy Feedstock	MJ	5.336	5.337
Total Non-Renewable Primary Energy Resources	MJ	35.348	35.348
OUTPUTS	**Units**	**Q420**	**Q460**
Hazardous waste disposed	kg	3.18E-05	3.18E-05
Non- Hazardous waste disposed	kg	8.44E-06	8.44E-06
Radio Active Waste disposed	kg	3.51E-06	3.51E-06
Components for reuse	kg	0.047	0.050
Material for recycling	kg	0.122	0.122
Material for Energy recovery	kg	<0.01	<0.01
Exported electrical energy	MJ	<0.01	<0.01
Exported Thermal Energy	MJ	<0.01	<0.01

Table 7 lists potential impact results per kg declared unit cradle to gate.

Table 7 Potential Impacts/kg

CATEGORIES	Factors	Q420	Q460
Global Warming Potential	kg CO_{2e}	2.417	2.417
Stratospheric Ozone Depletion Potential	kg $R11_e$	3.15E-08	3.15E-08
Acidification of Land and Water Potential	kg SO_{2e}	8.00E-03	8.00E-03
Eutrophication Potential	kg PO_{4e}^3	1.50E-03	1.50E-03
Photochemical Ozone Creation Potential	kg C_2H_{4e}	1.40E-04	1.40E-04
Elements Abiotic Depletion Potential	kg Sb_e	5.95E-7	5.95E-7
Fossil Fuel Abiotic Depletion Potential	MJ	31.6	31.6

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EN 10210:2006, hot finished structural hollow sections of non-alloy and fine grain steels, part 1: Technical delivery requirements, part 2: Tolerances, dimensions and sectional properties

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ISO 15686-1:2011 Buildings & constructed assets Service life planning Part 1: General principles

ISO 15686-2:2012 Buildings & constructed assets Service life (SL) planning Part 2: prediction

ISO 15686-8:2008 Buildings & constructed assets SL planning Part 8: Reference & estimation

ISO 21929-1:2011 Sustainability in building construction Sustainability indicators Part 1 Framework

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ISO 21932:2013 Sustainability in buildings and civil engineering works -- A review of terminology

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KSA

日本工業規格表示認証書

認証番号 ： KSCN18029

天津源泰德潤鋼管製造集団有限公司

中国天津大邱庄工業区

韓国標準協会は日本工業標準化法の第23条の規定により
日本工業規格の表示について下記のように認証する。

日本工業規格の番号及び名称

JIS G 3466 ： 一般構造用角形鋼管

等級又は種類

STKR400, STKR490

その他の事項

・有効期間：2018年10月13日 ~ 2021年10月12日

・最初認證日：2018年10月13日

・發行日：2018年10月13日

韓国標準協会長

大韓民国ソウル特別市江南区テヘラン路305

KSA

JIS MARK CERTIFICATE

Certification No. KSCN18029

TIANJIN YUANTAIDERUN PIPE GROUP Co., Ltd.

Da Qiu Zhuang Industrial Area, Tianjin, China

Korean Standards Association hereby certifies the JIS Mark factory
in accordance with the provision of Article 23
of the Japanese Industrial Standardization Law as follows

JIS NUMBER & TITLE

JIS G 3466 : Carbon steel square and rectangular tubes for general structure

GRADE OR TYPE

STKR400, STKR490

OTHERS

· Certificate Valid Date : 13 October, 2018 ~ 12 October, 2021

· Original Certification Date : 13 October, 2018

· Date of Issue : 13 October, 2018

CHAIRMAN OF KSA

KOREAN STANDARDS ASSOCIATION

305, Teheran-Ro, Gangnam-Gu, Seoul, Korea

Marine & Offshore

Certificate number: SMS.W.II./112027/A.0

www.veristar.com

RECOGNITION FOR

BV MODE II SCHEME

Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd.

TIANJIN - CHINA

Summary of the range of the recognition which is detailed in the subsequent page(s):

PIPE / TUBE AND FITTINGS - G0479 Welded Hollow Section

Welded carbon steel pipe-square(SHS) and rectangular(RHS)
Grade:STKR490 according to JIS-G3466-2006
Max.dimension: 500 x 500 x 16 mm

Steel plate purchase from BV approval manufacturer
Surveyor will witness sample & mechanical property test according to quality plan(YTDY-BV-CP1701 REV0) after the welded pipe has been finished the quality inspection oneself.

This certificate is issued to attest that Bureau Veritas Marine & Offshore has performed, at the above company's request and in compliance with the requirements of NR320, a satisfactory assessment of the manufacturing facilities and associated quality procedures related to the range of the recognition.

This certificate will expire on: 25 Oct 2021

For BUREAU VERITAS,

At BV SHANGHAI, on 16 Nov 2017,

George Qiao

BUREAU VERITAS SURVEYORS AT PARIS 1828 SHANGHAI INTERNATIONAL REGISTER

This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

Certificate number: SMS.W.II./112027/A.0

THE SCHEDULE OF RECOGNITION

1. RANGE OF THE RECOGNITION

The products corresponding to the categories listed in the table below are to be certified individually or per batch by Bureau Veritas Marine & Offshore in compliance with the applicable requirements (IBV products as defined in NR320).

Generic product	Description
PIPE / TUBE AND FITTINGS	Welded carbon steel pipe-square(SHS) and rectangular(RHS)

2. LIMITATIONS

The certificates listed in the range of recognition are to be valid, as applicable.

Bureau Veritas Marine & Offshore is to be informed immediately of any modification to manufacturing facilities and associated quality procedures in order to agree on appropriate actions.

Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd. has to apply for the periodical audits as agreed with Bureau Veritas Marine & Offshore.

3. PERIMETER OF CERTIFICATION

Quality system of following site(s) has been assessed:

Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd. - TIANJIN - CHINA

4. REMARKS

Address: Daqiuzhuang Industrial Zone, Jinghai District, Tianjin City(China)
Annual Audit: 1 time/every year

***** END OF CERTIFICATE *****

ISO 9001

ISO 9001

Certificate of Approval

Certificate No.: 10118Q16196ROM

Awarded to

Tianjin YuantaiDerun PipeGroup CO.，LTD.

Organization Code Certificate No. / Unified Social Credit Code:55038238-1
Add.:Daqiuzhuang Industrial Zone Tianjin P.O. :301606

Beijing ZhongLianTianRun Certification Center (ZLTR) certify that the Quality Management System of the above organization has been assessed and found to be in accordance with the requirements of the standard:

GB/T19001-2016 / ISO9001:2015

SCOPE OF CERTIFICATION/REGISTRATION

STEEL PLATE ROLLING ,DEALING WITH SQUARE & RECTANGULAR PIPE , HOT –DIPPED GALVANIZED PIPE ,METALIC MATERIALS AND AFTER-SALES SERVICE (EXCLUDING THE SCOPE OF MANDATORY REGULATIONS)

This certificate is made valid when used with certification scopes and the requirements of applicable laws and regulations. These requirements include, but are not limited to, administrative permits, scopes of qualifications, and CCC requirements.
Subject to operation conditions in requirements conformity with Quality Management System, This Certificate is valid for a period of three years only,

Date from: Jul 20th,2018 To: Jul 19th,2021

The effectiveness of this Certificate shall be Validated by periodic surveillance audit of ZLTR for maintenance.

The time limit of the certificate is to Jun 10th,2019, please conducting the surveillance or re-certification assessment before Jun 10th,2019. If the assessment is overdue , the certificate is invalid.

Information of this certificate can be found on the official website of Beijing Zhonglian Tianrun Certification center (http://www.zltr.com.cn)

SCC Accredited CB-MS
OCSM Accrédité CCN
Accredited CB-MS
(Certification Body – Management Systems)

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

Beijing Zhongliantianrun Certification Center
ISSUED BY

Beijing Zhongliantianrun Certification Center

Room2603, 22nd Floor, 2nd Unit, Block 1, No.4 Yard, Qiyang Road, Chaoyang District, Beijing, P.R. China 100102

Information of this certificate can be found on the official website of Certification and Accreditation Administration of the People's Republic of China (http://www.cnca.gov.cn)

CERTIFICATE

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM CERTIFICATE

Certificate No.：SDCB19S10021R0M

This is to certify that

Tianjin Yuantai Derun Pipe Manufacturing Group Co.,Ltd.

Organization Code: 911200005503823816

Registration Add.: Daqiuzhuang Industrial Zone, Tianjin , P.R.China

Certication Add.: Daqiuzhuang Industrial Zone, Jinghai District, Tianjin City, P.R.China

is in conformity with:

GB/T 28001-2011/OHSAS 18001:2007

This certificate is covering the following scope:

Production and sales of square rectangular pipe and hot galvanized pipe

Issue Date: 2019-03-15 Expiry Date: 2021-03-11

Registration No.: SDCB-2019-0030

于志忠

山东诚标认证技术有限公司 2019-03-15 3701027155344

SDCB

GB/T 28001

Shandong ChengBiao Certification Technology Co.,Ltd.
Registration Add:Room 407 Jiaxin Business Building, No.154,Huayuan Road,Licheng District,Jinan City, Shandong,P.R. China
Website:Http://www.sdcbrz.com

CERTIFICATE

ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE

Certificate No.：SDCB19E20023R0M

This is to certify that

Tianjin Yuantai Derun Pipe Manufacturing Group Co.,Ltd.

Organization Code: 911200005503823816

Registration Add.: Daqiuzhuang Industrial Zone, Tianjin , P.R.China

Certication Add.: Daqiuzhuang Industrial Zone, Jinghai District, Tianjin City, P.R.China

is in conformity with:

GB/T 24001-2016/ISO 14001:2015

This certificate is covering the following scope:

Sales of square rectangular pipe and hot galvanized pipe

Issue Date: 2019-03-15 Expiry Date: 2022-03-14

Registration No.: SDCB-2019-0030

于志忠

山东诚标认证技术有限公司 2019-03-15 3701027155344

SDCB

GB/T 24001

Shandong ChengBiao Certification Technology Co.,Ltd.
Registration Add:Room 407 Jiaxin Business Building, No.154,Huayuan Road,Licheng District,Jinan City, Shandong,P.R. China
Website:Http://www.sdcbrz.com

天津源泰德润钢管制造集团有限公司
TIANJIN YUANTAI DERUN PIPE MANUFACTURING GROUP CO., LTD.
Daqiuzhuang Industrial Zone Tianjin China. Tel:00862259791518 Fax:00862286434961
Email: sales@ytdrgg.com

Major Projects recent 10 years

2007

Project	Provided Product	Qty Ton
National Grand Theater	Hollow Section	7200
Beijing Yuhua Apartment	Hollow Section	1800

2008

Project	Provided Product	Qty Ton
The Birds Nest	Hollow Section	15800
Water Cube	Hollow Section	5420

2009

Project	Provided Product	Qty Ton
Tianjin Tower	Hollow Section	3900
FuXin Building	Hollow Section	2900

2010

Project	Provided Product	Qty Ton
MingShan Garden building	Hollow Section	4100
Tianjin Haihe Bridge	Hollow Section	1300

2011

Project	Provided Product	Qty Ton
Beijing Shengmao Plaza	Hollow Section	3300
Guangzhou Huayou Building	Hollow Section	6200

2012

Project	Provided Product	Qty Ton
Shang Mingde Building	Hollow Section	2400
Hangzhou Xingfu Apartment	Hollow Section	1900

天津源泰德润钢管制造集团有限公司
TIANJIN YUANTAI DERUN PIPE MANUFACTURING GROUP CO., LTD.
Daqiuzhuang Industrial Zone Tianjin China. Tel:00862259791518 Fax:00862286434961
Email: sales@ytdrgg.com

Major Customer list recent 5 years

2013.

1. **China Construction Steel Structure Corp Ltd.(CSCEC)**
2. **China State Construction.(CSCEC)**
3. **China State International Holdings Limited.(CSCEC)**
4. **China Machinery Industry Construction Group Inc.(SINOMACH)**
5. **China Shipbuilding Industry Company Limited.(CSIC)**
6. **China Nuclear E&C Group.**
7. **China Huanqiu Contracting & Engineering Corp.**
8. **China Minmetal Corporation.**
9. **China Railway Group Limited. (CRRC)**
10. **China Power Construction Corporation.**
11. **China Communication Construction Corporation.**
12. **China Energy Engineering Corporation Limited.**
13. **ZheJiang Material Industry**
14. **TEWOO Group Co., Ltd**
15. **Beijing Construction Engineering Group Co., Ltd.**
16. **ZheJiang Construction Engineering Group Co., Ltd.**
17. **Shanghai Construction Group (SCG)**
18. **Shanxi Construction Engineering Group Corporation., Limited.**
19. **Tianjin Construction Engineering Group Corporation., Limited.**
20. **YouFa International Trade Co.,Ltd**
21. **Asia (Tianjin) Steel Co., Ltd.**
22. **Tangshan Lianchuang Industrial Co., Ltd**
23. **Tianjin Huilai international trade Co., Ltd**
24. **Tianjin TYT Steel Pipe Co., Ltd**
25. **Tianjin Baolai International Trade Co., Ltd**
26. **Tianjin Helong International Trade Co., Ltd**
27. **Hebei Hengxinlibang Commercial Trade Co., Ltd**
28. **BEIJING HISENUNION IMPORT AND EXPORT CO., Ltd**
29. **Tianjin Fulaixin International Trade Co., Ltd**
30. **Tianjin Zhaochi Steel Trade Co., Ltd**
31. **HU LUDAO CITY STEEL PIPE INDUSTRIAL CO.,Ltd**
32. **Benxi Northern Steel Pipes Co., Ltd**
33. **Manuchar**
34. **CNBM International**
35. **Tianjin Uniglory International Trade Co., Ltd**

2014

1. **China Construction Steel Structure Corp Ltd.(CSCEC)**
2. **China State Construction.(CSCEC)**
3. **China State International Holdings Limited.(CSCEC)**
4. **China Machinery Industry Construction Group Inc.(SINOMACH)**
5. **China Shipbuilding Industry Company Limited.(CSIC)**
6. **China Nuclear E&C Group.**
7. **China Huanqiu Contracting & Engineering Corp.**
8. **China Minmetal Corporation.**
9. **China Railway Group Limited. (CRRC)**
10. **China Power Construction Corporation.**
11. **China Communication Construction Corporation.**
12. **China Energy Engineering Corporation Limited.**
13. **ZheJiang Material Industry**
14. **TEWOO Group Co., Ltd**
15. **Beijing Construction Engineering Group Co., Ltd.**
16. **ZheJiang Construction Engineering Group Co., Ltd.**
17. **Shanghai Construction Group (SCG)**
18. **Shanxi Construction Engineering Group Corporation., Limited.**
19. **Tianjin Construction Engineering Group Corporation., Limited.**
20. **YouFa International Trade Co.,Ltd**
21. **Asia (Tianjin) Steel Co., Ltd.**
22. **Tangshan Lianchuang Industrial Co., Ltd**
23. **Tianjin Huilai international trade Co., Ltd**
24. **Tianjin TYT Steel Pipe Co., Ltd**
25. **Tianjin Baolai International Trade Co., Ltd**
26. **Tianjin Helong International Trade Co., Ltd**
27. **Hebei Hengxinlibang Commercial Trade Co., Ltd**
28. **BEIJING HISENUNION IMPORT AND EXPORT CO., Ltd**
29. **Tianjin Fulaixin International Trade Co., Ltd**
30. **Tianjin Zhaochi Steel Trade Co., Ltd**
31. **HU LUDAO CITY STEEL PIPE INDUSTRIAL CO.,Ltd**
32. **Benxi Northern Steel Pipes Co., Ltd**
33. **Manuchar**
34. **CNBM International**
35. **Tianjin Uniglory International Trade Co., Ltd**

2015.

1. **China Construction Steel Structure Corp Ltd.(CSCEC)**
2. **China State Construction.(CSCEC)**
3. **China State International Holdings Limited.(CSCEC)**

4. China Machinery Industry Construction Group Inc.(SINOMACH)
5. China Shipbuilding Industry Company Limited.(CSIC)
6. China Nuclear E&C Group.
7. China Huanqiu Contracting & Engineering Corp.
8. China Minmetal Corporation.
9. China Railway Group Limited. (CRRC)
10. China Power Construction Corporation.
11. China Communication Construction Corporation.
12. China Energy Engineering Corporation Limited.
13. ZheJiang Material Industry
14. TEWOO Group Co., Ltd
15. Beijing Construction Engineering Group Co., Ltd.
16. ZheJiang Construction Engineering Group Co., Ltd.
17. Shanghai Construction Group (SCG)
18. Shanxi Construction Engineering Group Corporation., Limited.
19. Tianjin Construction Engineering Group Corporation., Limited.
20. ZOOMLION
21. YouFa International Trade Co.,Ltd
22. Asia (Tianjin) Steel Co., Ltd.
23. Tangshan Lianchuang Industrial Co., Ltd
24. Tianjin Huilai international trade Co., Ltd
25. Tianjin TYT Steel Pipe Co., Ltd
26. Tianjin Baolai International Trade Co., Ltd
27. Tianjin Helong International Trade Co., Ltd
28. Hebei Hengxinlibang Commercial Trade Co., Ltd
29. BEIJING HISENUNION IMPORT AND EXPORT CO., Ltd
30. Tianjin Fulaixin International Trade Co., Ltd
31. Tianjin Zhaochi Steel Trade Co., Ltd
32. HU LUDAO CITY STEEL PIPE INDUSTRIAL CO.,Ltd
33. Benxi Northern Steel Pipes Co., Ltd
34. Manuchar
35. CNBM International
36. Tianjin Uniglory International Trade Co., Ltd

2016.

1. China Construction Steel Structure Corp Ltd.(CSCEC)
2. China State Construction.(CSCEC)
3. China State International Holdings Limited.(CSCEC)
4. China Machinery Industry Construction Group Inc.(SINOMACH)
5. China Shipbuilding Industry Company Limited.(CSIC)
6. China Nuclear E&C Group.

7. China Huanqiu Contracting & Engineering Corp.
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20. ZOOMLION
21. SANY.
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23. Asia (Tianjin) Steel Co., Ltd.
24. Tangshan Lianchuang Industrial Co., Ltd
25. Tianjin Huilai international trade Co., Ltd
26. Tianjin TYT Steel Pipe Co., Ltd
27. Tianjin Baolai International Trade Co., Ltd
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2017.

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12. China Energy Engineering Corporation Limited.
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16. ZheJiang Construction Engineering Group Co., Ltd.
17. Shanghai Construction Group (SCG)
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19. Tianjin Construction Engineering Group Corporation., Limited.
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21. SANY.
22. SamSung
23. Daewoo
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27. Tianjin Huilai international trade Co., Ltd
28. Tianjin TYT Steel Pipe Co., Ltd
29. Tianjin Baolai International Trade Co., Ltd
30. Tianjin Helong International Trade Co., Ltd
31. Hebei Hengxinlibang Commercial Trade Co., Ltd
32. BEIJING HISENUNION IMPORT AND EXPORT CO., Ltd
33. Tianjin Fulaixin International Trade Co., Ltd
34. Tianjin Zhaochi Steel Trade Co., Ltd
35. HU LUDAO CITY STEEL PIPE INDUSTRIAL CO.,Ltd
36. Benxi Northern Steel Pipes Co., Ltd
37. Manuchar
38. CNBM International
39. Tianjin Uniglory International Trade Co., Ltd

2018.

1. China Construction Steel Structure Corp Ltd.(CSCEC)
2. China State Construction.(CSCEC)
3. China State International Holdings Limited.(CSCEC)
4. China Machinery Industry Construction Group Inc.(SINOMACH)
5. China Shipbuilding Industry Company Limited.(CSIC)
6. China Nuclear E&C Group.(CNEC)
7. China Huanqiu Contracting & Engineering Corp.
8. China Minmetal Corporation.
9. China Railway Group Limited. (CRRC)

10. China Power Construction Corporation.(CPCC)
11. China Communication Construction Corporation.
12. China Energy Engineering Corporation Limited.
13. ZheJiang Material Industry
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16. ZheJiang Construction Engineering Group Co., Ltd.
17. Shanghai Construction Group (SCG)
18. Shanxi Construction Engineering Group Corporation., Limited.
19. Tianjin Construction Engineering Group Corporation., Limited.
20. ZOOMLION
21. SANY.
22. SamSung
23. Daewoo
24. COMASA
25. IMEL
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38. Benxi Northern Steel Pipes Co., Ltd
39. Manuchar
40. CNBM International
41. Tianjin Uniglory International Trade Co., Ltd
42. DBMCS
43. DBMT

天津源泰德润钢管制造集团有限公司
TIANJIN YUANTAI DERUN PIPE MANUFACTURING GROUP CO., LTD.
Daqiuzhuang Industrial Zone Tianjin China. Tel:00862259791518 Fax:00862286434961
Email: sales@ytdrgg.com

2013

Project	Provided Product	Qty Ton
Beijing International Airport	Hollow Section	6500
Shandong Yongguang Equp.	Hollow Section	2700

2014

Project	Provided Product	Qty Ton
Tianjin Binhai Airport	Hollow Section	3900
Capital Plaza	Hollow Section	4600

2015

Project	Provided Product	Qty Ton
Nanjing Fulong building	Hollow Section	6200
Xingjiang Green House	Hollow Section	8900

2016

Project	Provided Product	Qty Ton
Hongkong-Maocao-Zhuhai Bridge	Hollow Section	5500
Tianjin 117 Building	Hollow Section	3900

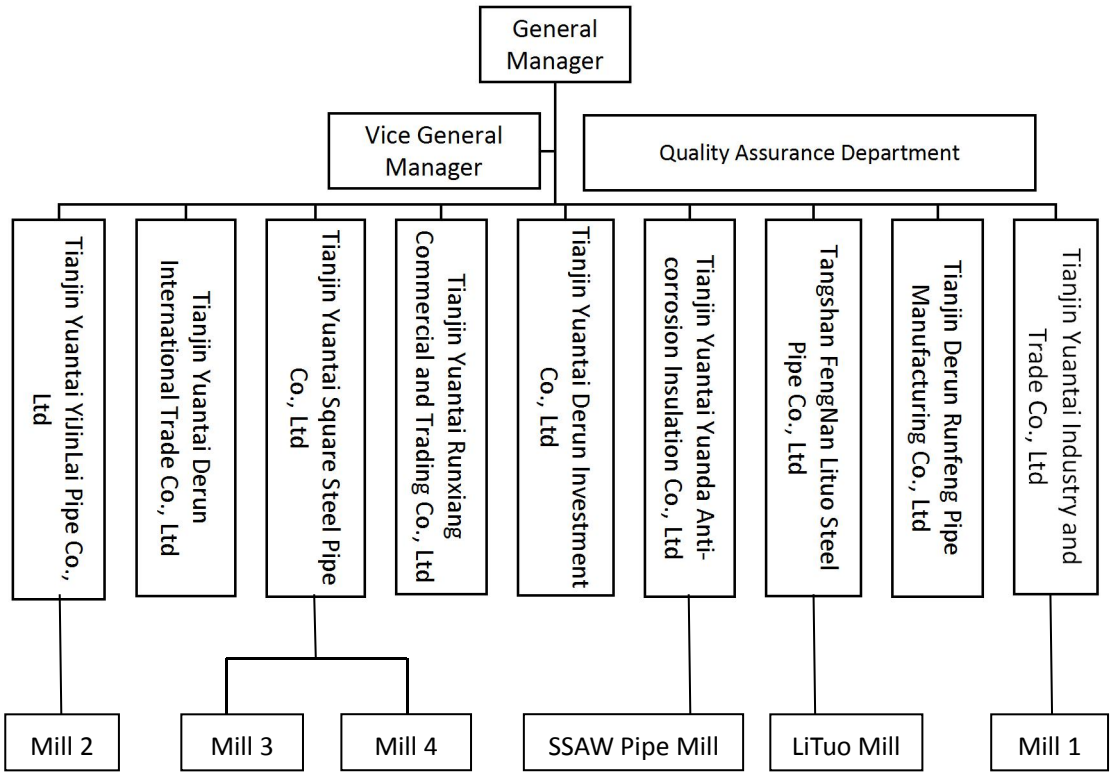
2017

Project	Provided Product	Qty Ton
Egypt Green House	Hollow Section	62000
HaiNan Haihua building	Hollow Section	20000
Hanjin Shipping	Hollow Section	1200

2018

Project	Provided Product	Qty Ton
DUBAI HILL PROJECT	Hollow Section	4000
Dubai 2020 Expo	Hollow Section	6000
Kuwait airport	Hollow Section	4000
Singapore google building	Hollow Section	4000

Implementation Date	Dec 12 2017	**Organization Diagram**
Edition:1	Amendment:0	



源泰德润



Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd

天津源泰德润钢管制造集团有限公司

天津源泰德润钢管制造集团有限公司
Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd

Tel：008622- 58951960/58951961/58951962
Fax：008622-58951959
Ad：Daqiuzhuang industrial zone Tianjin China
Email：sales@ytdrgg.com
Web：http://www.ytdrgg.com

中国生产规模最大的焊接方矩钢管制造集团
The largest manufacturer of hollow section in China

中国民营企业500强
Top 500 Private Enterprises in China

中国制造业500强
Top 500 Manufacturing Enterprises in China

中国金属材料流通协会方矩管分会会长单位
Chairman unit of Hollow Section Branch of China National Association of Metal Material Trade

Enterprise character Dedicated	Diliget Gratitude Return
Enterprise philosphy	People-oriented,Pioneering spirit, Realistic and Pragmatic,Fighting for excellence
Administration tenet	Quality and credit first,Mutual benefit
Enterprise spirit	Integriy,Innovation,Development,Dedication

Inegrity:Rely on faith and trust to be achievements,make friends and be on the way all the time

Innovation: Be low key but ambitious,look forward to the Era of Smart Production with intelligence,information and precision

Development: Create a century brand by the way of forging ahead and pursuing excellence

Dedication:Realize our vision and task,be valuable and feedback

源泰德润

Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd

Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd., established in March 2002 and stemmed from Tianjin Yuantai Industrial and Trading Co., Ltd, is located in the biggest pipes-manufacturing base—Daqiuzhuang industrial zone in Jinghai Tianjin which is close to the China National Highway 104 and 205 and is only 40 km far away from the Tianjin Xingang Port. The excellent geographical location supports the convenience to both inland and out-land transportation.

Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd.(below shorted as YUANTAI) is the biggest manufacturer of ERW square, rectangular and galvanized hollow section in China. Annual maximum production capacity reaches 5 million tons. YUANTAI has 10 subsidiaries and 7 production plants. Total factories area covers 900 acres. YUANTAI is a large united enterprise group with a registered fund of USD 65 million and fixed assets of USD 200 million.

YUANTAI has 59 production lines of High Frequency welding pipe, 10 production lines of galvanized pipe and 3 production lines of spiral welding pipe. Square hollow section from 19*19*1mm to 800*800*40mm, rectangular hollow section from 20*30*1mm to 600*800*40mm, spiral pipe from Ø219—1420mm can be manufactured.. YUANTAI can manufacture hollow sections as per standards of ASTM A500, JIS G3466, EN10219, EN10210, BS1387, DIN2240, AS1163, GB/T6728-2002, GB/T6725-2002, GB/T3094-2000. YUANTAI has the biggest hollow section and coil stock(100,000 Ton/Month) in China which can meet customer's direct procurement requirement.

Years of technology accumulation makes YUANTAI possessing a wealth of production experience which can greatly shorten the development the production cycle and speed up the delivery time. At the same time YUANTAI also pays attention to advanced technology research and invest much on updating equipment. Theproduction lines of 500*500mm, 300*300mm and 200*200mm are the most advanced equipment-lines in China which can realize the electronic-controlling automation from the forming to the finishing entirely.

Advanced production equipment, superb technical force, excellent managing talents and solid financial strength guarantee the excellent pipe manufacturing. YUANTAI products are widely used in many fields, including steel structure of building, automobile manufacture, shipbuilding, machinery manufacturing, bridge construction, container keel construction, stadiums construction, and large airport constructions. YUANTAI products were used in many Chinese famous projects such as the National Stadium (The Bird's Nest), the National Grand Theater and the ZhuHai-HongKong-Macao Bridge. At same time YUANTAI products are widely exported to Middle East, Southeast Asia, European Union, Africa, Latin America, USA etc.

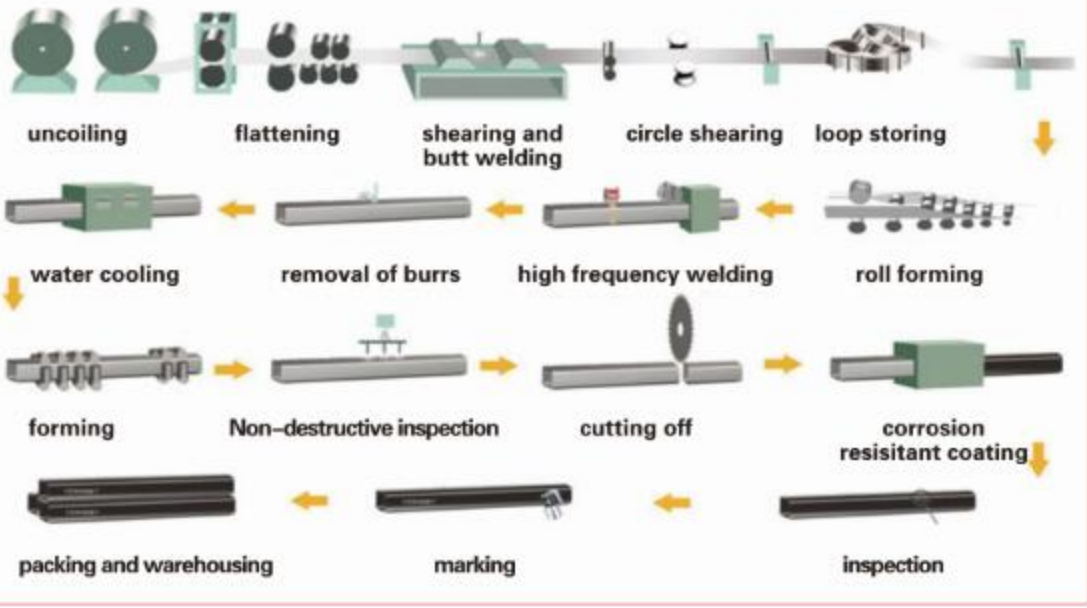
YUANTAI obtained the certificates of ISO9001-2008 International Quality Management System and EU CE10219 system. Now Yuantai Derun is striving to apply for "National Well-known Trademark".

源泰德润

Raw materials

plent of material supplying

Square welded pipe manufacturing flow chart



Quality first,Customers foremost!
Warmly service,Continuous improvement!

源泰德润

Production equipment

Advanced equipment ensure the best quality of our product.

We put great premium on the quality of our products as well as the quality of our service, we are committed to the building of a better world with our products of superior quality and we are passionate about delivering real to our clients with our quality products and service.

Products

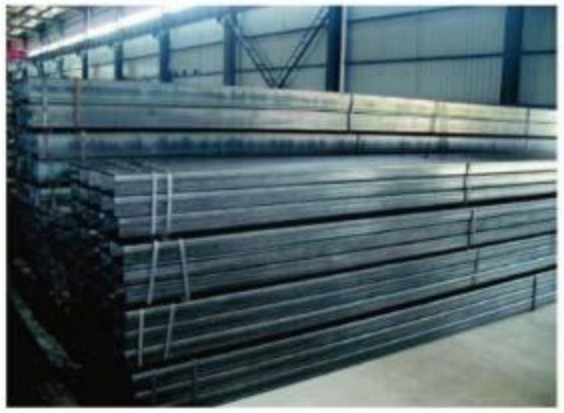
源泰德润

We always put users and customers firstly,try to provide the first-class products,quality assurance and service system according to various of requirement from customers. The products truly reflect the most economical, practical,safest and durable principle.

rectangular pipe

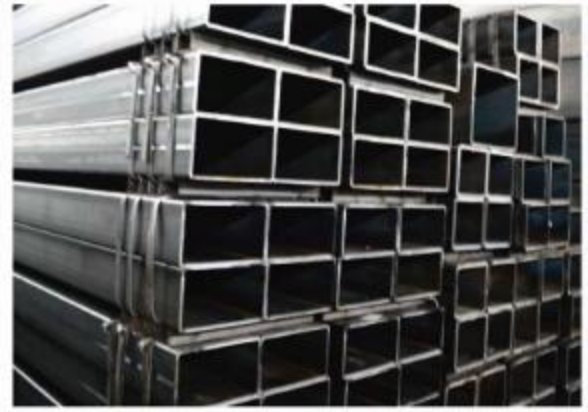
square pipe

galvanized square pipe



square tube

rectangular tube



hollow section pipe

black square pipe

New Idea · Excellent Quality

Controlling Product Quality
perusing the perfect

Square Hollow Section summary

源泰德润

Black square rectangular pipe/tube

Spec.(mm)	Spec.(mm)	W.T.(mm)	Spec.(mm)	Spec.(mm)	W.T.(mm)
19*19	20*20	1.0 1.2 1.3 1.4 1.5 1.7 2.0	40*135 50*140 60*130 75*125	50*150 60*140 80*120 100*100	1.5 1.7 2.0 2.2 2.5~5.0 5.25~6.0 6.5~9.75 11.5~16
	25*25 20*30	1.0 1.2 1.3 1.4 1.5 1.7 1.8 2.0 2.2 2.5~3.0	50*160 60*150 60*180 65*180 70*150 90*150 90*160 100*120 100*125 100*140	60*160 80*140 80*160 100*150 120*120 110*110 120*180 125*125	2.5 2.75 3.0~4.0 4.25~4.75 5.25~6.0 6.5~7.75 9.5~9.75 10.5~11.75 12.5~15.75 16~~40
32*32 35*35 20*50 25*40	20*40 30*30 30*40	1.0 1.2 1.3 1.4 1.5 1.7 1.8 2.0 2.2 2.5~3.0 3.5~3.75	60*170 70*160 75*150 80*150 80*180 127*127 60*200 60*220 80*200 80*220	100*200 140*140 150*150 130*130 100*250 160*160 180*180 140*180	2.5 2.75 3.0~5.75 7.5~9.75 10.5~11.75 12.5~15 2.5 2.75~3.25 3.5~5.0 5.25~7.75
20*60 20*80 25*65 30*70 35*60 38*38 40*50 45*45	25*50 30*50 30*60 40*40 40*60 50*50	1.2 1.3 1.4 1.5 1.7 1.8 2.0 2.2 2.5~4.0 4.25~5.0 5.25~5.75 5.75~6.0	100*180 120*160 120*200 100*350 125*250 130*250 135*135 140*240 150*220 225*225 100*400 130*300	150*170 150*180 150*200 100*300 150*250 200*200 200*250 150*300 200*300	9.5~11.75 12.5~15.75 16~~40 2.75 3.0~3.25 3.5~9.75 11.5~11.75 12.5~14.75 15.5~15.75 16~~40 3.5~4.0 4.5~7.75
30*100 40*70 40*90 50*60 50*75 50*80 50*90 55*55 65*65	40*80 40*100 50*70 60*60 60*80 70*70	1.3 1.4 1.5 1.7 1.8 2.0 2.2 2.5~4.0 4.25~5.0 5.25~5.75 5.75~6.0	150*350 200*280 220*220 200*350 250*350 200*500 250*450 300*320 300*350	250*250 180*300 200*400 300*300 300*400 350*350	9.5~11.75 12.5~14.75 15.5~17.75 4.75~11.75 12.5~14.75 15.5~17.75 4.75~11.75 12.5~14.75 15.5~17.75
40*120 40*140 50*110 50*120 50*125 60*90 70*100 85*85 90*90	50*100 60*100 60*120 75*75 80*80 80*100	1.3 1.5 1.7 1.8 2.0 2.2 2.5~4.0 4.25~5.0 5.25~5.75 7.5~9.75	150*450 200*450 200*600 250*400 250*500 300*600 300*700 300*650 320*320 400*500 400*600	300*500 400*400 280*280 300*450 350*400 500*500 450*450	4.5~5.75 6.5~11.75 12.5~14.75 15.5~17.75 18~~40 4.5~7.75 9.5~9.75 11.5~13.75 14.5~15.75 16.5~17.75 18~~40

Standard : ASTM A500,JIS G3466,EN10219,EN10210,BS1387,DIN2440,AS1163

Length: 6m & 12m or customized.

Galvanized square rectangular pipe/tube

Specification (mm)	Wall Thickness(mm)	Specification (mm)	Wall Thickness(mm)
20*20	1.50 1.70 2.00 2.5-2.75	75*75 80*80 50*100 60*100 80*100 60*120 40*100	1.50 1.70 1.80 2.00 2.20 2.50 2.75 3.00 3.5-3.75 4.50 4.75-5.75
20*30 25*25	1.50 1.70 1.80 2.00 2.20 2.50 2.75		
30*30 20*40 30*40	1.50 1.70 1.80 2.00 2.20 2.50 2.75 3.00	80*120 100*100	1.70 2.00 2.20 2.50 2.75 3.00 3.5~4.0 4.25~6.0
25*50 30*60	1.50 1.70 1.80 2.00 2.20 2.50 2.75 3.00 3.5~3.75 4.00	80*140	2.50 2.75 3.00 3.25 3.5 3.75 4.0 4.25 4.5 4.75~6.0
30*50 40*40	1.50 1.70 2.00 2.20 2.50 2.75 3.00 3.5 3.75~4.0 4.5~4.75	120*120	2.50 2.75 3.00 3.25 3.5 3.75 4.0 4.25 4.5 4.75~6.0
40*50 40*60 50*50	1.50 1.70 2.00 2.20 2.50 2.75 3.00 3.5 3.5~4.0 4.5~4.75	80*160 75*150 100*150	2.50 2.75 3.00 3.5~4.0 4.25~6.0
		150*150 140*140 200*100	2.50 2.75 3.00 3.5~4.0 4.25~6.0
40*80 50*70 50*80 60*80 60*90 60*60 70*70	1.50 1.70 1.80 2.00 2.20 2.50 2.75 3.00 3.5-4.0 4.5~5.75	200*200	3.5 3.75 4.5 4.75 5.5 5.75 7.5 7.75 9.5 9.75~10.0

Standard : ASTM A500,JIS G3466,EN10219,EN10210,BS1387,DIN2440,AS1163

Length: 6m & 12m or customized.

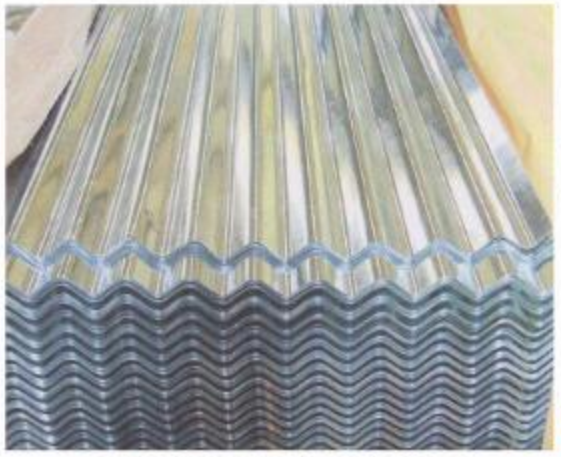
源泰德润

Product package

Test and QC Center

源泰德润

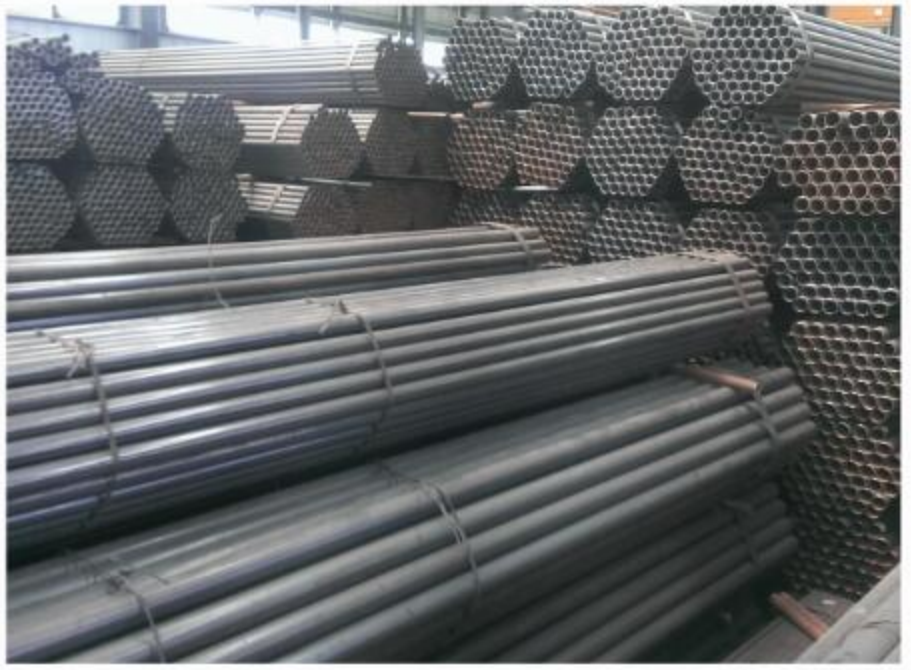
Various Types Of Products



corrugated sheets

steel coils

galvanized steel pipe

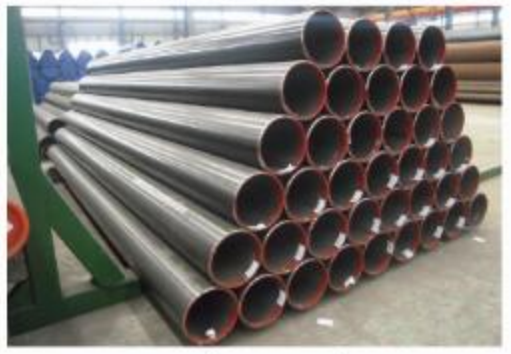


ERW pipe

PPGI/PPGL

hot rolled steel plate

angle bar

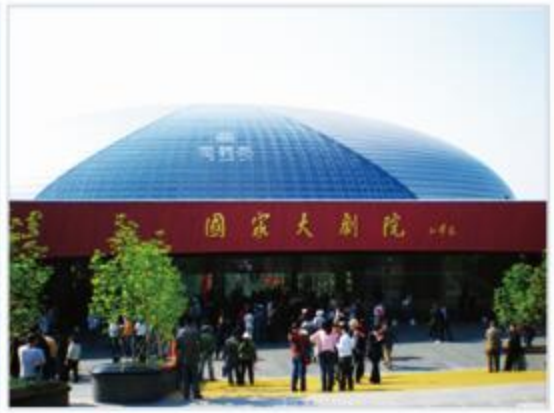


seamless pipe

Project cases

源泰德润

The Bird's Nest



National Grand Theater

Water Cube

Capital International Airport

Cars

Tianjin Tower

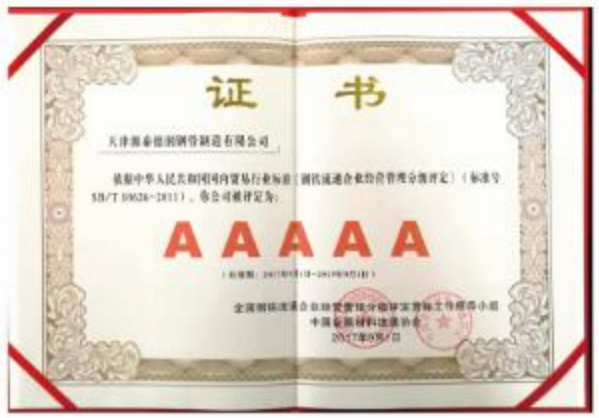
Hongkong–Zhuhai–Macao Bridge

Main Customers

BILFINGER · ACS · CSIC 中船重工 · BECHTEL · ZOOMLION · CRCC 中国铁建 · ATKINS · HOCHTIEF · DAEWOO · 国家核电 SNPTC · 中国核建 China Nuclear E&C Group · CSSC · 国机集团 SINOMACH · SKANSKA · SAMSUNG · CSCEC · SANY · 中国建筑 · 中国五矿集团公司 CHINA MINMETALS CORPORATION · VINCI · STRABAG · AECOM · Technip · FLUOR · HYUNDAI HEAVY INDUSTRIES CO.,LTD

Honors and Certificates

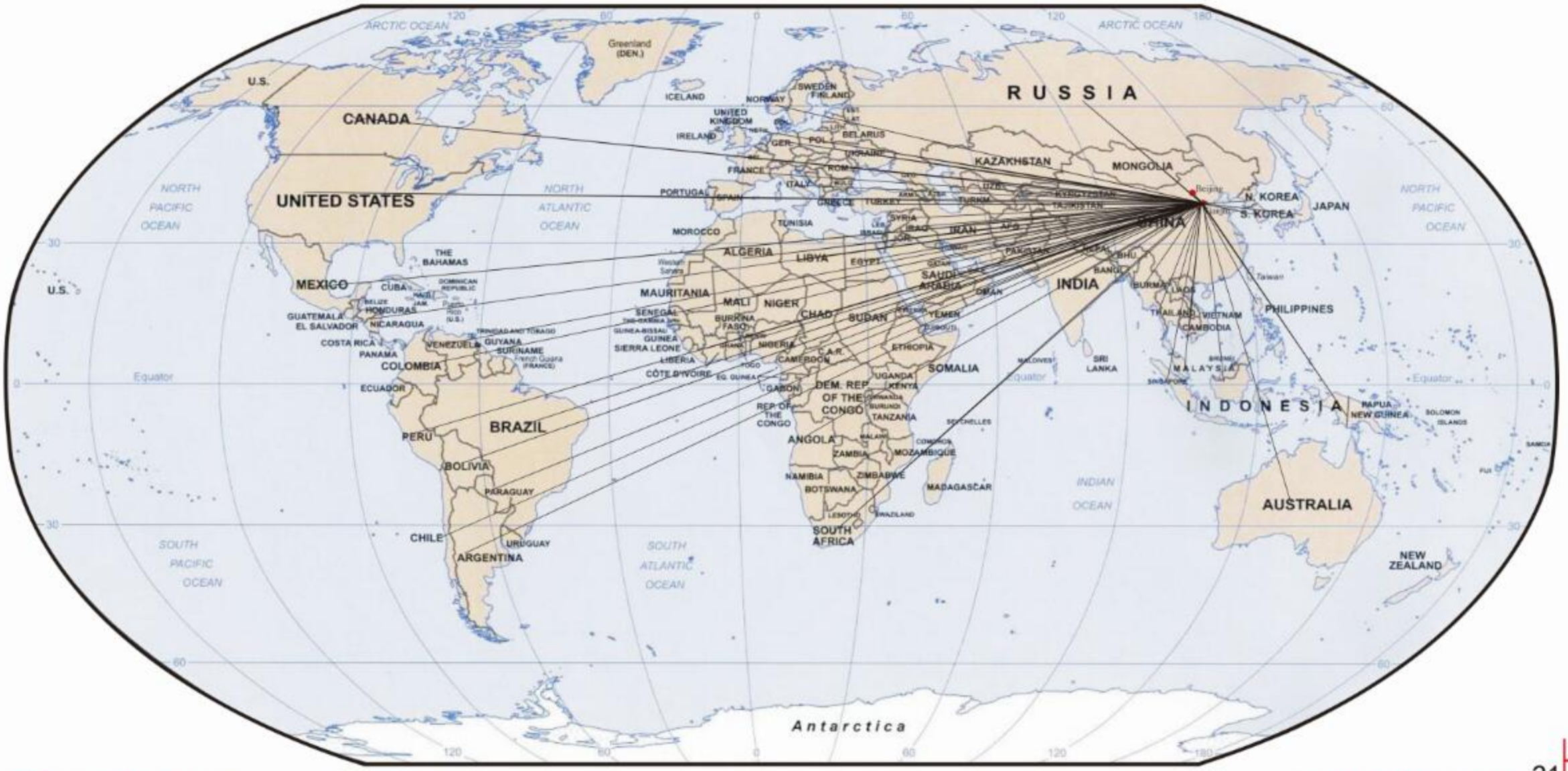
源泰德润



Products Cover All Over The Word

Tianjin Yuantai Derun International Trade Co., Ltd

Tianjin Yuantai Derun International Trade Co., Ltd(YTDRINTL) is a wholly owned subsidiary of Tianjin Yuantai Derun Pipe Manufacturing Group Co., Ltd. YTDRINTL is responsible for the import and export business of Yuantai oversea market. YTDRINTL is also responsible for the procurement of raw materials, spare parts and equipments from overseas for Yuantai and other domestic customers. Several overseas subsidiaries and representative offices have been set up in U.A.E, Southeast and Latin America to bring us closer to customers keeping in perspective our goal to provide the best products and service to our clients. The sales representatives and distributors have also been appointed in more than 20 countries and regions to render better service to our customers.



Contents

Chapter 0.1 Company Introduction

Tianjin Yuantai Runde Pipe Manufacturing Group Co., Ltd ("the Company"), established in March 2012, is a manufacturer specialized in high frequency welded pipes and hot galvanized pipes. With high technical strength, its products are widely sold and welcome throughout the country. Now the Company has fixed assets of RMB 300 million and an annual output value of more than RMB 800 million. It supplies high-quality products of various specs, such as square pipes of 20-500mm and rectangular pipes of 20*30 to 400*600mm.

Since the Company formally became an enterprise group in March 2012, its production scale has been increasing continuously. Now the Company has 24 high frequency welded pipe production lines and 6 galvanization lines, and produces 800,000 tons of welded pipes each year. All the lines used by the Company are domestically leading modernized production lines, and by virtue of such lines together with a sound quality management system, strict quality control, complete monitoring system and brand new management manners, its products have top-grade quality and are well accepted by customers.

To further standardize the quality management of the Company and to integrate with the international market, the Company draws up this *Quality Manual* (Revision A/0) according to ISO9001:2008 and in combination with the particular conditions of the Company.

Company name: Tianjin Yuantai Runde Pipe Manufacturing Group Co., Ltd
Company address: Daqiuzhuang Industrial Area, Tianjin
General Manager: Gao Shucheng
Management Representative: Cao Enshuo
Postal code: 301606
Tel: 022-68667256
Fax: 022-59791599
Website: www.ytdrgg.cn
E-mail: yuantaigongmao@126.com

Chapter 0.2 Order of Issuance

The Company has drawn up the first revision of the *Quality Manual* according to GB/T19001---ISO9001:2008, and it is hereby approved and issued for implementation.

The Quality Manual is a regulatory document of the quality management system of the Company, and a guideline and operative norm for the establishment and implementation of the quality management system. All employees of the Company must comply with the Quality Manual.

General Manager: Gao Shucheng
January 1, 2015

Chapter 0.3 Letter of Appointment of Management Representative

In order to implement ISO9001:2008 *Quality Management Systems – Requirements* and to strengthen leadership over the operation of the quality management system, Cao Enshuo, Deputy General Manager of the Company, is hereby appointed as Management Representative of the Company.

The authorities and responsibilities of the Management Representative include:

1) Ensuring that processes needed for the quality management system are established, implemented and maintained;
2) Reporting to top management on the performance of the quality management system and any need for improvement;
3) Ensuring the promotion of awareness of customer requirements throughout the organization; and
4) Liaison with external parties on matters relating to the quality management system.

General Manager: Gao Shucheng
January 1, 2015

Chapter 0.4 Quality Policy and Objectives

According to the particular conditions and operating tenet of the Company, the Company establishes the following quality policy: **top quality, top service, good faith and continual improvement.**

The meanings of the quality policy are as follows:

1. To focus on customers and to always persist in the policy of quality first and user first.
2. To abide by national laws and regulations, to be a company of good faith trusted by customers, and to provide satisfactory services for customers.
3. To persist in the concept of continual improvement, and to continuously improve various aspects of the Company.

This quality policy shall be communicated to, fully understood by and carried through by all the employees.

Taking the quality policy as a framework, the Company establishes the following quality objectives:

- **Customer satisfaction ≥95%, with an annual increase of 1%;**
- **One-time inspection conformity rate of product ≥98%.**

General Manager: Gao Shucheng
January 1, 2015

Chapter 0.5 Management of the Quality Manual

0.5.1 Contents of the Manual

The Quality Manual ("the Manual") is drawn up according to ISO9001:2008 *Quality Management System ---- Requirements* and in combination with the particular conditions of the Company, and covers:

(1) The scope of the quality management system of the Company, which includes all the requirements of ISO9001:2008 except Section 7.3 Design and Development;
(2) The documented procedures established for the quality management system, or reference to them; and
(3) A description of the interaction between the processes of the quality management system.

0.5.2 Issue of the Manual

1) The Manual is prepared by the quality management system documentation team of the Company, reviewed by the Management Representative, and approved by the General Manager before issue. The Manual has controlled and non-controlled versions. The version used in the Company and provided to certification organizations is controlled version, which is centrally issued by the Office of the Company. Issue number and the stamp of "Controlled Document" are marked/affixed on the cover of such version.

2) When the Manual is used for the purpose of contract, bidding, publicity, exchange, and the like, uncontrolled version of the Manual may be used and provided upon approval from the Management Representative. No "Controlled" mark is made on the cover of such version, the Company is not responsible for revision, version control and callback of such document.

0.5.3 Keeping of the Manual

1) The Office is responsible for all matters relating to management of the Manual. Without approval from the Management Representative, anybody shall not provide the Manual to any external personnel. Where a holder of the Manual leaves the Company, he/she shall hand over the manual held by him/her to Office and handle registration procedures.

2) Holders of the Manual shall keep it properly, and shall not damage, lose or alter it.

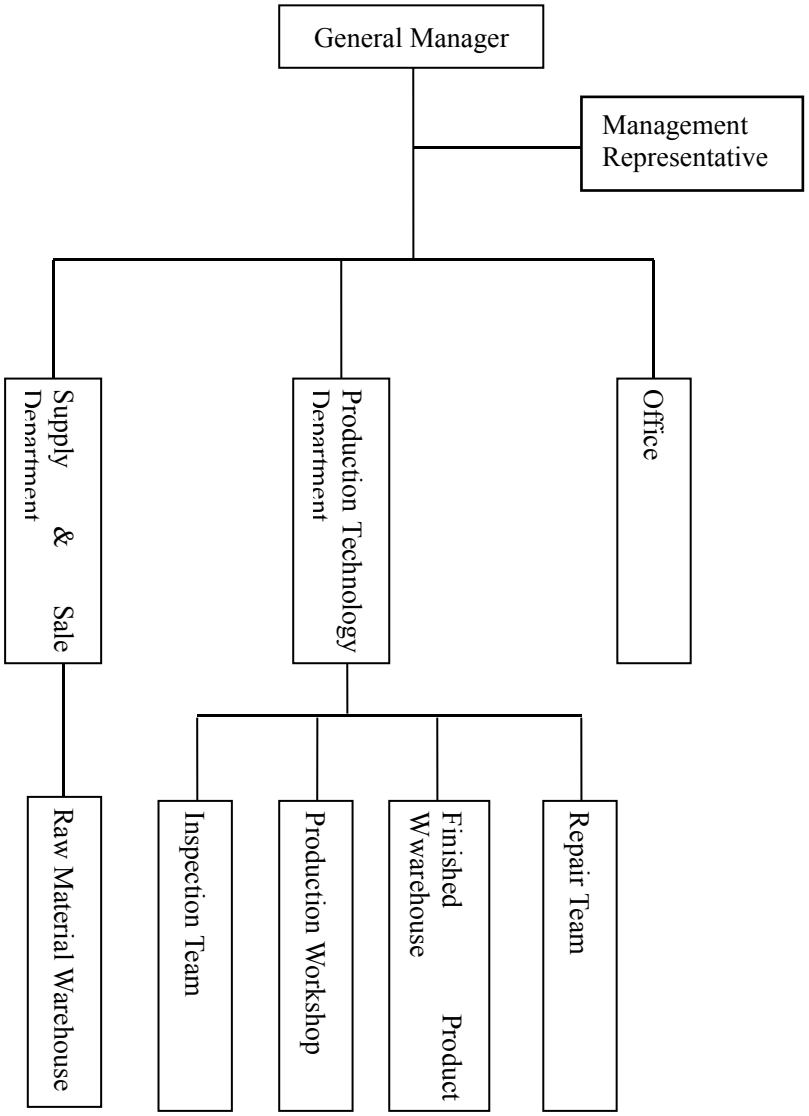
0.5.4 Revision of the Manual

During use of the Manual, if employees have suggestions on revision of the Manual, relevant departmental heads shall collect such suggestions and timely report them to the Office. The Office shall regularly organize relevant departments to review the appropriateness and effectiveness of the Manual and to revise the Manual according to relevant regulations when necessary.

Chapter 0.6 Revision Control Sheet of the Quality Manual

Revision no.	No. of revised section	Contents of revision	Revised by	Date of revision

Chapter 0.7 Organizational Chart of the Quality Management System



Chapter 0.8 Process Responsibility Form of the Quality Management System

Function / System requirements	General Manager	Management Representative	Office	Supply & Sale Department	Production Technology Department	Production Workshop
4.1 Quality management system – general requirements	▲	△	△	△	△	△
4.2.1 General	▲	△	△	△	△	△
4.2.2 Quality manual	△	▲	▲	△	△	△
4.2.3 Control of documents	△	△	▲	△	△	△
4.2.4 Control of records	△	△	▲	△	△	△
5.1 Management commitment	▲	△	△	△	△	△
5.2 Customer focus	▲	△	△	▲	△	△
5.3 Quality policy	▲	△	△	△	△	△
5.4 Planning	▲	▲	△	△	△	△
5.5 Responsibility, authority and communication	▲	△	△	△	△	△
5.6 Management review	▲	△	▲	△	△	△
6.1 Provision of resources	▲	△	△	△	△	△
6.2 Human resources	△	△	▲	△	△	△
6.3 Infrastructure	△	△	△	△	▲	▲
6.4 Work environment	△	△	△	△	▲	▲
7.1 Planning of product realization	△	△	△	△	▲	△
7.2 Customer-related processes	△	△	△	▲	△	△
7.4 Purchasing	△	△	△	▲	△	△
7.5 Production and service provision	△	△	△	△	▲	▲
7.6 Control of monitoring and measuring equipment	△	△	△	△	▲	△
8.1 General	▲	▲	△	△	△	△
8.2.1 Customer satisfaction	△	△	△	▲	△	△
8.2.2 Internal audit	△	▲	▲	△	△	△
8.2.3 Monitoring and measurement of processes	△	△	△	△	▲	△
8.2.4 Monitoring and measurement of product	△	△	△	△	▲	△
8.3 Control of nonconforming product	△	△	△	△	▲	▲
8.4 Analysis of data	△	△	△	△	▲	△
8.5 Improvement	▲	△	△	△	▲	△

Note: ▲— responsible person/department Δ— assisting person/department

Chapter 1. Scope

1.1 General

The Manual specifies the detailed requirements of the quality management system according to ISO9001:2008 and in combination with the particular conditions of the Company so as to enhance customer satisfaction by means of effective operation of the quality management system. The Manual is applicable to internal quality management activities of the Company, and is also used to prove to customer or third party certification organizations that the quality management system of the Company conforms to the requirements of ISO9001:2008 quality management system.

1.2 Application

The Manual is applicable to **steel rolling and processing, rectangular pipe manufacturing, hot galvanized pipe and metal material sale, and after service** of the Company.

1.3 Explanation on exclusion

The Company produces in accordance with national standards or customer requirements, and its products are approved products. Thus, Section 7.3 “Design and Development” is deleted. Such exclusion does not affect the ability or liability of the Company to provide products that meet customer requirements and requirements of applicable laws and regulations.

Chapter 2. Normative References

2.1 GB/T19001-2008 idt ISO9001:2008 *Quality Management System – Requirements*.

2.2 GB/T19000-2008 idt ISO9000:2005 *Quality Management System – Fundamentals and Vocabulary*.

2.3 Q/12JH4573-2007 *Cold Formed Steel Hollow Sections for General Structure.*

2.4 GB/T3640-1988 *Plain Carbon Steel Pipes for Electric Wire.*

Chapter 3. Terms and Definitions

The Manual uses the terms and definitions in ISO9000:2008 *Quality Management System – Fundamentals and Vocabulary*.

1. Quality policy: intensions and direction related to quality of an organization as formally expressed by its top management.

2. Quality objectives: result to be achieved related to quality.

3. Process: set of interrelated or interacting activities that use inputs to delivery an intended result.

4. Procedure: specified way to carry out an activity or a process.

5. Verification: confirmation, through the provision of objective evidence, that the specified requirements have been met.

6. Inspection: conformity evaluation by observation and judgment accompanied as appropriate by measurement, testing or gauging.

Chapter 4. Quality Management System

Section 1. 4.1 General requirements

4.1.1 The Company establishes, documents, implements and maintains a quality management system and continually improves its effectiveness in accordance with the requirements of ISO9001:2008 and based on the product characteristics of the Company.

4.1.2 The main processes in the quality management system include management responsibilities, resource provision, product realization and measurement related process. To ensure effectiveness of the quality management system, the Company manages these processes according to the requirements of ISO9001:2008, including:

a) Determining inputs and outputs of processes, resources and activities needed for the quality management system and their application throughout the Company using process approach;
b) Determining the sequence and interaction of these processes;
c) Determining criteria and methods needed to ensure that both the operation and control of these processes are effective;
d) Ensuring the availability of resources and information necessary to support the operation and monitoring of these processes, including fund, human resource and necessary equipment;
e) Monitoring, measuring where applicable, and analyzing these processes to know the trend of the processes and the extent of realization of the planned results; and
f) Implementing actions necessary to achieve planned results and continual improvement of these processes based on the analysis results.

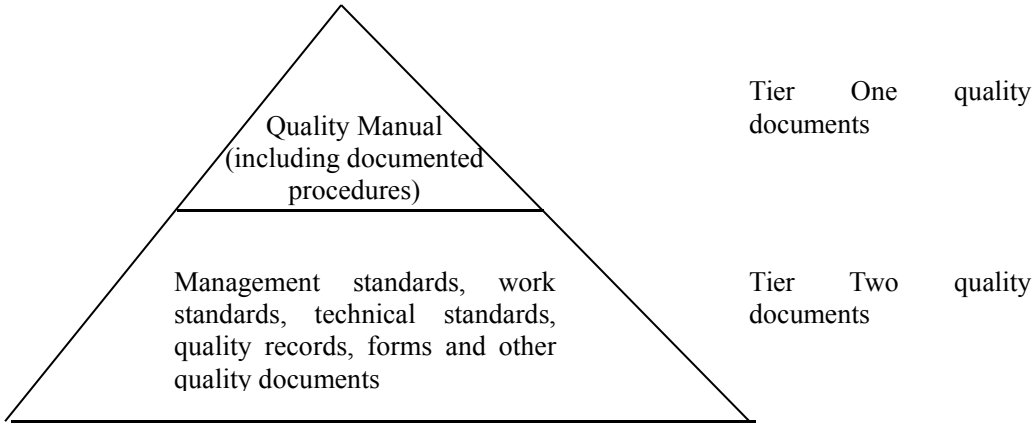
In the product realization process of the Company, the cold rolling process and transportation process are outsourced, and are controlled by the Company according to the requirements of Section 7.4 Purchasing.

Section 2. 4.2 Documentation requirements

4.2.1 General

4.2.1.1 The Company draws up appropriate documents according to ISO9001:2008 and the particular conditions of the Company to ensure effectiveness of the quality management system.

Documentation structure of the quality management system of the Company is as follows:



4.2.1.2 Tier Two documents can be divided into two types:

a) Work manuals used during product realization: including work standards (job description, qualification requirements, and so on), management standards (various rules and regulations) and technical standards (national standards, industrial standards, corporate standards, process specifications, inspection specifications, and so on).
b) Other quality documents: product, project or contract specific quality plans, records and reports made during product realization, and so on.

4.2.1.3 Documentation requirements shall be consistent with requirements of relevant standards in consideration of actual operability. Along with the change in the quality management system, the quality policy and the quality objectives, the quality management system documents shall be timely revised and regularly reviewed to ensure effectiveness, adequacy and appropriateness. For this purpose, the requirements of *Document Control Procedures* shall apply.

4.2.1.4 Documents prepared shall be consistent with the scale, product type, process complexity and employee competence of the Company, and shall be feasible and easily understandable.

4.2.1.5 Documents can be presented in any form or type of medium such as paper, disk, CD, photo, sample, and the like. All these forms of documents shall be managed according to the *Document Control Procedures*.

4.2.2 Quality manual

The Quality Manual is a regulatory document of the quality management system of the Company, and a guideline for the quality commitment made to the users and the quality related affairs of the Company. All employees of the Company must strictly comply with the Quality Manual.

The Quality Manual is prepared under the organization of the Management Representative, managed by the Office, and approved by the General Manager for issue.

The Quality Manual includes:

a) The scope of the quality management system, including details of and justification for any exclusions;
b) The documented procedures established for the quality management system, or reference to them; and
c) A description of the interaction between the processes of the quality management system.

The Manual is managed in two ways, respectively a controlled and a non-controlled way. Controlled copies of the Manual are issued to management and in-charge persons of functions and production units of the Company, and their issue, change and callback are subject to the *Document Control Procedures*. When the Manual is used for the purpose of contract, bidding, publicity, exchange, and the like, uncontrolled copies of the Manual may be used. No “Controlled” mark is made on the uncontrolled copies, the Company is not responsible for revision, version control and callback of such copies.

4.2.3 Document control procedures

1. Purpose

To control the documents relating to the quality management system and to ensure all documents used in relevant places are effective versions.

2. Scope of application

These procedures are applicable to control of documents relating to the quality management system.

3. Responsibilities

3.1 The General Manager is responsible for approval and issue of the Quality Manual.

3.2 The Management Representative is responsible for approval and regular review of various quality documents other than the Quality Manual.

3.3 The Office is responsible for management of various quality system documents.

3.4 The Office is responsible for issue, filing and control of the documents.

3.5 Document holders are responsible for use and keeping of the documents.

4. Work procedures

4.1 Classification and keeping of controlled documents

4.1.1 Tier One documents ---- Quality Manual: documented procedures including all process control.

4.1.2 Tier Two documents are divided into two types:

a) Work manuals used during product realization: including work standards (job description, qualification requirements, and so on), management standards (various rules and regulations) and technical standards (national standards, industrial standards, corporate standards, process specifications, inspection specifications, and so on).
b) Other quality documents: product, project or contract specific quality plans, records and reports made during product realization, and so on.

4.1.3 Various documents of the Company and documents of external origin, including policies, regulations and standards relating to the quality system and documents provided by customers, are

kept by the Office.

4.2 Document numbering

a) Quality Manual: composed of "designation code of the Company YT/SC – year number", for example "YT/SC-2009". The version numbers are A, B, C … and the revision numbers are 0, 1, 2…..

b) Other quality documents: composed of "department – document serial number – year number", for example "Gongxiaobu-05-2009" indicates No. 5 document issued by Supply & Sale Department in 2009.

c) Records: to be numbered by the record owners based on particular needs.

4.3 Preparation, review, approval and issue of documents

Documents shall be approved before issue to ensure adequacy and appropriateness:

a) The Quality Manual shall be prepared under the organization of the Management Representative, reviewed by the Management Representative, approved for issue by the General Manager, and registered and issued by the Office;
b) Other quality system documents shall be prepared and collected by relevant departments, approved by the Management Representative, and registered and issued by the Office;
c) To ensure effective versions of documents are available in all places, controlled documents shall be approved by the Management Representative before issue and other documents shall be approved by departmental managers before issue. Issue and callback of documents shall be recorded in the *Document Issue and Callback Records*.

4.4 Controlling status of documents

Copies of documents include controlled ones and non-controlled ones. Non-controlled ones will not be revised once issued. Controlled copies are used within the quality management system of the Company. Manner of control: affixing a stamp of "Controlled" on the cover at the top right corner, and marking the issue number.

4.5 Change of documents

a) Proposer of document change shall fill in the *Document Change/Destruction Request*, which shall be submitted to the Office after approval. Any change of the Quality Manual shall be approved by the General Manager, and change of other documents shall be approved by the Management Representative.
b) The Office shall notify the document holders based on the scope of issue of the document, so that the changes may be made on the documents either by page change or by alteration of words. The change shall be recorded on the revision page after it is made.

c) On the end of each year, the Management Representative shall organize regular review of the documents, and revision of the documents shall be discussed about in management review.

4.6 Issue and status of documents

a) The Office shall issue documents based on approved scope of issue, and the receivers shall sign on the *Document Issue/Callback Record*.
b) For new documents reissued due to damage, their issue numbers shall be kept unchanged, and the old ones shall be called back; for documents reissued to loss of the former ones, new issue numbers shall be assigned, and statement shall be made that the issue number of the former one has become invalid. The Office shall keep records of document issue and receiving.
c) The Office shall maintain a *List of Controlled Documents*, and publish it each year. Document holders may check the current versions and revisions of the documents against the list from time to time.

4.7 Keeping, obsoleting and destruction of documents

a) Anyone shall not scratch controlled documents or lend it to others without permission, and shall keep the documents legible, readily identifiable and retrievable.
b) Documents relating to the quality management system shall be kept in a dry, well-ventilated and safe place.
c) All invalid or obsolete documents shall be timely withdrawn from the place of issue or use by the Office, and affixed with the stamp of "Obsolete" to ensure no unintended use.
d) Any obsolete documents kept for some reason shall be affixed with the stamp of "Obsolete Document Kept" on the cover upon approval for the purpose of identification.
e) For expired and obsolete documents, the Office shall fill in the *Document Change/Destruction Request*, and then destroy such documents upon approval by the Management Representative.

4.8 Control of documents of external origin

a) Relevant departments shall be responsible for collecting the latest versions of national standards and industrial standards. The Office shall report the standards collected to the Management Representative for applicability approval, and shall control the issue of such documents to ensure effectiveness.
b) The Office shall register the documents of external origin on the *List of Controlled Documents*, affix the stamp of "Controlled" on such documents, and issue them to users.

4.9 Borrowing of documents

Employees may borrow documents from the Office. The Manual Quality shall be lent upon approval from the Management Representative, and other documents shall be lent upon approval from the director of the Office. For the purpose of such lending, the material clerk of the Office shall fill in the *Document Borrowing Registration Form*.

4.10 Documents in any form other than paper shall also be controlled according to the regulations above.

4.11 Documents used as quality records shall be subject to the *Record Control Procedures*.

5. Related documents

5.1 *Record Control Procedures*.

6. Quality records

6.1 *List of Controlled Documents*
6.2 *Document Issue and Callback Record*
6.3 *Document Change Request*
6.5 *Document Borrowing Registration Form*
6.6 *Document Destruction Request*

4.2.4 Record control procedures

1. Purpose

To control the records required by the quality management system.

2. Scope of application

These procedures are applicable to the records kept to prove conformity of products and effectiveness of the quality management system.

3. Responsibilities

3.1 Document preparing departments shall be responsible for setting of formats of quality records.

3.2 The Management Representative shall be responsible for approval of formats of quality records.

3.3 The Office shall be responsible for collecting, arranging, keeping and filing quality records of the Company.

4. Work procedures

4.1 Identification of records

Quality records shall be identified through titles of the forms.

4.2 Filing of records

The Office shall prepare a *List of Records*, which shall include titles of records and term of keeping. After such list is approved by the Management Representative, the Office shall gather and keep the formats of all records. Records may be made in various forms or types of medium.

4.3 Filling of records

4.3.1 Quality records shall be filled in timely, accurately, completely and legibly, and shall not be altered at will. For items that cannot be filled up for some reasons, a slash shall be used to indicate voidness of the item. Signature positions shall not be left blank.

4.3.2 Where it is necessary to alter the original data due to error, a slash shall be used to cancel the original data, the new data shall be written above the original data, and the signature of the altering person and the date of alteration shall be provided.

4.4 Collection, retrieval, storage and preservation of records

4.4.1 For various records formed during work, the Office shall regularly, at the end of each month, quarter or year, collect and put them in order, bind them, and write the titles, numbers and dates of formation on the covers.

4.4.2 Records shall be collected and arranged in certain sequence, for example time or process sequence, to ensure easy retrieval and searching.

4.4.3 Records shall be stored in a dry, well-ventilated and mothproof place to ensure good preservation. All quality records shall be kept clean and legible.

4.5 Filing and disposal of quality records

Records to be filed shall be kept for a specified period. Where such records need to be destroyed due to expiration or other reasons, the Office shall fill in the *Document Destruction Request* and submit it to the Management Representative for approval. After that, the documents shall be destroyed by authorized personnel.

5. Related documents

Document Control Procedures.

6. Quality records

6.1 *List of Records*
6.2 *Document Destruction Request*

Chapter 5. Management Responsibilities

5.1 Management commitment

The General Manager of the Company provides evidence of the commitment to the development and implementation of the quality management system and continually improving its effectiveness by:

5.1.1 Communicating to the organization the importance of meeting customer as well as statutory and regulatory requirements.

a) The General Manager shall build up the quality awareness throughout the Company to make every employee realize that it is a fundamental requirement to meet customer as well as statutory and regulatory requirements. Product quality of the Company is closely related to the quality awareness of each member. The General Manager shall continuously enhance the quality awareness of employees by means of trainings or meetings, so that they can actively participate in quality related activities.

5.1.2 The General Manager is responsible for establishing and approving the quality policy and quality objectives of the Company.

5.1.3 The General Manager shall chair the management review at planned interval, and implement the *Management Review Control Procedures*.

5.1.4 The General Manager shall ensure availability of resources needed by the quality management system of the Company, and shall implement the *Resource Management.*

5.2 Customer focus

Success of the Company depends on identification, understanding and satisfaction of current and future needs and expectations of customers and related parties. The General Manager shall take the aim of enhancing customer satisfaction and thus shall:

5.2.1 Identify needs and expectations of customers

This shall be achieved by market investigation and forecasting, or direct contact with the customers, and the *Customer Related Process Control Procedures* shall be implemented.

5.2.2 Convert customer needs and expectations to requirements

Such requirements include requirements on products, processes and the quality management system. Customers can be fully satisfied only if all their needs and expectations are met.

5.2.3 Meet the requirements

a) The Company must meet the statutory and regulatory requirements and the requirements of compulsory national and industrial standards.
b) As the needs and expectations of customers as well as the statutory and regulatory requirements and the requirements of compulsory national and industrial standards are changing with time, the requirements converted and the quality management system of the Company shall be updated accordingly. In this aspect, the *Management Review Control Procedures* and the *Document Control Procedures* shall be implemented.

5.3 Quality policy

5.3.1 The General Manager shall be responsible for setting, issue and implementation of the quality policy.

5.3.2 The General Manager shall fully consider the following when setting the quality policy: consistency with the overall tenet of the Company; inclusion of requirements on customer satisfaction, compliance with statutory and regulatory requirements and continual improvement; provision of basis for setting of quality objectives.

5.3.3 The Company communicates its quality policy to the employees by means of training, information exchange, notice board, and so on to ensure adequate communication and consistent understanding.

5.3.4 The General Manager and the Management Representative shall review the adequacy and effectiveness of the quality policy at the time of management review, and revise it when necessary.

5.4 Planning

5.4.1 Quality objective

5.4.1.1 At the end of each year, the General Manager shall determine the quality objective for the next year during communication with the managers based on the results of management review and the operation results of the Company in the year.

5.4.1.2 The Management Representative shall break down the quality objective of the Company, convert it to detailed work objectives for product realization processes and supporting processes, prepare a *Quality Objective and Detailed Objectives for the Year of* **, and issue it after approval by the General Manager.

5.4.2 Quality management system planning

5.4.2.1 To ensure adequacy, appropriateness and effectiveness of the quality management system, the top management and the production department shall plan the quality management system

after setting of quality policy and quality objectives. Such planning may be conducted at the time of:

a) Establishment of the quality management system;
b) Improvement or updating of the existing quality management system, for example revision of standards adopted and revision of quality policy to enhance customer satisfaction; or
c) Adjustment or supplement of the existing quality management system to meet new requirements, for example change in organizational structure of the Company or change in regulations.

5.4.2.2 Inputs of quality management system planning include:

a) Quality policy and quality objectives;
b) Customer needs and expectations;
c) Product requirements specified in relevant laws, regulations, standards and contracts; and
d) Performance and problems of the existing system, and any opportunity of improvement.

5.4.2.3 Contents and tasks of quality management system planning include:

a) Determining the processes needed by the quality management system based on the quality objectives;
b) Determining the sequences and interactions of the processes, and evaluating and determining allowable exclusions against the requirements of the quality management system standard;
c) Determining the rules and methods needed by the processes;
d) Determining the resources needed to realize the quality objectives, and running the processes under appropriate resource and information supports;
e) Monitoring, measuring and analyzing effectiveness of the processes; and
f) Taking improvement actions.

5.4.2.4 To ensure operability and long-term appropriateness of the planning results, the outputs of the quality management system planning shall include:

a) Processes and relevant clauses of the system (Quality Manual);
b) Documents and records needed (documented procedures and records);
c) Resources needed;
d) Personnel, responsibilities, authorities and trainings;
e) Need for continued planning.

Outputs of quality management system planning shall be documented and issued for implementation by the Management Representative when necessary. In addition, the Management Representative shall inspect the implementation conditions of such outputs.

5.5 Responsibility, authority and communication

5.5.1 Responsibility and authority

The General Manager and the management of the Company have established organizations and set down responsibilities, authorities and interrelations of such organizations to ensure effective operation of the quality management system, and have communicated such information to the employees to ensure adequate communication throughout the Company.

Refer to Chapter 0.8 for the organizational structure of the quality management system of the Company.

The following responsibilities and authorities are set for the following personnel and departments (refer to Chapter 0.9 for the functional distribution of the quality management system):

-- General Manager

a) Comprehensively managing the daily affairs of the Company, and communicating the importance of meeting customers as well as statutory and regulatory requirements throughout the Company;
b) Setting the quality policy and the quality objectives;
c) Chairing the management review;
d) Ensuring availability of resources needed by the quality management system; and
e) Approving the Quality Manual and other important documents.

-- Office

a) Being responsible for management of the quality management system documents;
b) Being responsible for management of the quality management system records;
c) Being responsible for working out management review plans, organizing management review, and preparing management review reports;
d) Being responsible for human resource management;
e) Being responsible for organization, management and implementation of internal audit; and
f) Being responsible for statistic analysis of achievement of quality objectives.

-- Supply & Sale Department

a) Being responsible for market information collection, signing of contract with customers and management of associated processes;
b) Being responsible for investigation and management of customer satisfaction;
c) Being responsible for provision of services after delivery;
d) Being responsible for purchasing of raw materials and auxiliary materials, and evaluation and selection of suppliers;
e) Being responsible for purchasing of raw materials and auxiliary materials; and
f) Being responsible for management of raw material and auxiliary material warehouses.

-- Production Technology Department

a) Being responsible for management of infrastructures and work environment;
b) Being responsible for management of product realization processes;
c) Being responsible for control and management of production processes;
d) Being responsible for management of monitoring and measuring equipment;
e) Being responsible for monitoring and management of quality management system related processes;
f) Being responsible for inspection of raw materials, semi-finished products and finished products;
g) Being responsible for review of nonconforming products;
h) Being responsible for overall management of data analysis; and
i) Being responsible for control of improvement process.

5.5.2 Management Representative

The Management Representative is appointed by the General Manager of the Company.

In addition to his/her own responsibilities and authorities, the Management Representative also has the following responsibilities and authorities:

a) Ensuring that processes needed for the quality management system are established, implemented and maintained;
b) Reporting to top management on the performance of the quality management system and any need for improvement;
c) Ensuring the promotion of awareness of customer requirements throughout the organization; and
d) Liaison with external parties on matters relating to the quality management system.

5.5.3 Internal communication

The Company ensures good communication among different levels and functions on the processes of the quality management system and its implementation effectiveness, including quality requirements, quality objectives and their achievement conditions, so as to achieve mutual understanding and trust as well as engagement of the whole staff.

The Management Representative shall be responsible for building of smooth communication channels in the Company to ensure effectiveness of the quality management system.

Internal communication is conducted in many forms, such as corporate dispatch conference, various meetings, documents and trainings.

The contents of the communication include quality policy, quality objectives, responsibilities and authorities, internal audit, management review, customer satisfaction, and other information relating to effectiveness of the quality management system.

- The quality policy is communicated through trainings and publicity activities in the Company;
- The quality objectives are broken down by the Management Representative to the responsible departments, which report to the Office about the achievement of the objectives by the specified deadline;
- Responsibilities and authorities are issued by the General Manager, and daily personnel change is communicated by the Office by means of notice;
- Communication between superiors and subordinates is conducted according to the organizational chart;
- Internal audit related information is communicated by means of notices and internal audit reports;
- Management review related information is communicated by means of notices and meetings;
- External audit related information is communicated by means of notices and meetings;
- Customer satisfaction related information is collected by sales department through investigation;
- Customer complaint related information is transferred to the Supply & Sale Department by the receiving department, and the Supply & Sale Department makes report to relevant managers based on the seriousness of the problem.

By means of internal communication, employees can timely know the operation conditions of the Company and actively participate in implementation and improvement of the quality management system.

5.6 Management Review Control Procedures

1. Purpose

To review the quality management system at planned interval to ensure its appropriateness, adequacy and effectiveness.

Management review includes evaluation of improvement opportunities and needs for change of the quality management system, including the quality policy and quality objectives.

2. Scope of application

These procedures are applicable to review of the quality management system of the Company.

3. Responsibilities

3.1 The General Manager shall chair the management review.

3.2 The Management Representative shall report to the General Manager about the operation of the quality management system and propose improvement suggestions.

3.3 The Office shall work out management review plans, collect and provide information and

materials needed for the management review, prepare management review reports, and follow up and verify the corrective and preventive actions after the review.

3.4 All managers shall prepare and provide department specific information and materials needed for the management review, and implement the corrective and preventive actions proposed in the management review.

4. Work procedures

4.1 Management review planning

4.1.1 Management review shall be conducted at least annually, with an interval not longer than 12 months. It may be conducted in combination with the results of internal audit, or be arranged whenever needed.

4.1.2 The Office shall work out the *Management Review Plan* before each management review. The main contents of such plan include: a) purpose; b) time; c) personnel; d) basis; e) contents; f) agenda; and g) preparatory materials of the review.

4.1.3 In any of the following circumstances, the frequency of the management review may be increased:

a) There is significant change in the organizational structure, product scope and resource configuration of the Company;
b) There is significant quality accident or serious user complaint, or user complaints occur repeatedly;
c) There is change in statutory, regulatory, standard or other requirements;
d) There is significant change in market demand; or
e) A second party or third party audit or other audit required by laws and regulations is coming.

4.2 Review input

Inputs of management review shall include current performance and improvement opportunities in the following aspects:

a) Results of audits, including internal and external quality management system audits, product quality audits, and so on;
b) Customer feedback, including customer satisfaction measurement results and customer communication results;
c) Process performance and product conformity, including results of process and product measuring and monitoring;
d) Status of improving, preventive and corrective actions, including implementation of corrective and preventive actions taken for nonconformities identified in internal audit and daily operation, and the monitoring results of the effectiveness of these actions;

e) Follow-up actions from previous management reviews and their effectiveness;
f) Changes that could affect the quality management system, including changes in internal and external environment such as change in laws and regulations, development of new technology, new process and new equipment, and so on;
g) Operation status of the quality management system and recommendations for improvement, including those on appropriateness and effectiveness of the quality policy and quality objectives.

4.3 Preparation for the review

4.3.1 The Office shall submit a review plan to the General Manager for approval ten days prior to a management review.

4.3.2 The Office shall organize collection of the materials needed for the management review according to relevant requirements, and prepare necessary documents and evidences.

4.4 Management review meeting

a) The General Manager shall chair the management review meeting, the Management Representative shall report about the operation of the quality management system, and the participating managers shall discuss about the contents of the review and evaluate the review inputs according to their roles and functions.
b) The General Manager shall make conclusion for the contents of the review (including further investigation, verification, and the like), and propose improvement recommendations for existing or potential problems after discussion.
c) When necessary, the Management Representative shall organize proposing of corrective and preventive actions according to the *Improvement Control Procedures*, and determine the responsible person and deadline for the actions.

4.5 Review output

4.5.1 The output from the management review shall include any decisions and actions related to:

a) Improvement of the effectiveness of the quality management system and its processes, including evaluation of quality policy, quality objectives, organizational structure, process control and so on;
b) Improvement of product related to customer requirements, and evaluation of product conformity, including requirements on management review such as whether to perform product and process review; and
c) Appropriateness of resources in consideration of the change in internal and external environment, and resource need arising from improvement, taking into consideration not only current resource needs but also future resource needs.

4.5.2 After the end of management review meeting, the Office shall summarize the outputs from the management review according to relevant requirements, prepare a *Management Review Report*,

have the report reviewed by the Management Representative, submit it to the General Manager for approval, send it to relevant departments for implementation, and monitor its implementation.

4.6 Implementation and verification of improving, corrective and preventive actions

The Office shall follow up and verify the implementation effects of the improving, corrective and preventive actions according to the *Improvement Control Procedures*.

4.7 If the results of management review cause document change, the *Document Control Procedures* shall apply.

4.8 Quality records arising from management review shall be kept by the Office according to the *Record Control Procedures*, including management review plan, review information prepared by each department before the review, review meeting records, management review report, and so on.

5. Related documents

5.1 *Internal Audit Procedures*
5.2 *Improvement Control Procedures*
5.3 *Document Control Procedures*
5.4 *Record Control Procedures*

6. Quality records

6.1 *Management Review Plan*
6.2 *Management Review Report*
6.3 *Management Review Meeting Records*
6.4 *Corrective and Preventive Action Sheet*

Chapter 6. Resource Management

Section 1. 6.1 Provision of resources

1. The top management shall determine and provide the resources needed:

a) To implement and maintain the quality management system and continually improve its effectiveness; and
b) To enhance customer satisfaction by meeting customer requirements.

2. Resource management may include human resource, infrastructures, work environment, and so on.

3. For the purpose of customer satisfaction, the Company sets down requirements on human resource, infrastructures and work environment and draws up the following documented procedures:

Human Resource Control Procedures;
Infrastructure and Work Environment Control Procedures.

Section 2. 6.2 Human resource control procedures

1. Purpose

To specify competence requirements for personnel performing work relating to the quality management system, and to meet the requirements by means of trainings or other means.

2. Scope of application

These procedures are applicable to all personnel performing work affecting conformity to product requirements and relating to quality management.

3. Responsibilities

3.1 The Office shall prepare the *Employee Qualification Requirements*, work out and organize implementation of annual training plans, keep training records, and evaluate the effects of trainings or other means used.

3.2 The General Manager shall approve the annual training plans of the Company as well as the *Employee Qualification Requirements*.

4. Work procedures

4.1 Determination of employee competence

4.1.1 Personnel taking responsibilities specified in the quality management system shall be competent on the basis of appropriate education, training, skills and experience.

4.1.2 The Office shall prepare the *Employee Qualification Requirements*, have it approved by the General Manager, and use it as main basis for personnel selection, recruitment, training and arrangement.

4.1.3 Actions such as training, post adjustment and recruitment shall be taken according to competent requirements for employees.

4.2 Training plan and implementation

4.2.1 The Office shall work out the *Training Plan* for the next in each December based on the needs of the Company, and implement it after approval by the General Manager. For the purpose of trainings beyond the plan, the implementation department shall fill in the *Training Request* and have it approved by the General Manager.

4.2.2 Training contents

Competence requirements of personnel performing quality affected work shall be determined, and training plans for new employees, in-service employees, employees subject to post adjustment, various specialists, special workers and internal auditors shall be worked out and implemented according to their duties and responsibilities.

A. New employee training

a) Orientation: trainings on company introduction, employee disciplines, quality policy, quality objectives, awareness of quality, safety and environmental protection, relevant laws and regulations, fundamentals on quality management system standards, and so on. Such trainings shall be organized by the Office within one month after entry of the new employee.
b) Post specific trainings: trainings on work instructions, performance and operation of equipment to be used, safety instructions, emergency actions, and so on, to be organized by the person responsible for the post.

B. Trainings for in-service employees and employees subject to post adjustment

A comprehensive post specific skill training and assessment shall be performed for each employee at least once a year according to the training plan. Skill training specific to the new post shall be provided for employees subject to post adjustment.

C. Trainings for special workers

a) Employees engaged in special processes or key processes shall start work only after training. These personnel shall be assessed each year.
b) Electricians and electric welders shall obtain training certificates issued by national authorities.
c) Internal auditors of quality management system shall be trained and assessed by certified consulting agencies, and shall perform internal audit with relevant competence certificate.

4.2.3 Education and training shall be used to make the employees realize:

a) Importance of meeting customer as well as statutory and regulatory requirements;
b) Consequences of failure to comply with the requirements; and
c) Relevance of their activities to the development of the Company.

The Company encourages the employees to participate in quality management and make contribution to achievement of the quality objectives.

4.3 Training effectiveness evaluation

4.3.1 The Office shall organize evaluation of training effectiveness each year to evaluate the effectiveness and competence of the trainees by means of theoretical assessment, operation assessment, performance appraisal, observation and the like. The contents of the evaluation may

include:

a) Education background;
b) Training conditions;
c) Work competence;
d) Work experience; and/or
e) Work attitude.

4.3.2 Results of training effectiveness evaluation shall be recorded on the *Employee Evaluation Form*.

4.3.3 For employees who are incompetent even after training, the Office may adjust their posts based on their specialties and needs of the Company. If they are still incompetent after the post adjustment, they will be dismissed upon approval from the General Manager.

4.4 Training records

4.4.1 After each training, relevant departments shall fill in the *Training Record Form* to record the trainees, time of training, trainers, training contents, assessment results, and so on.

4.4.2 The training records to be collected by the Office include *Training Record Form, Employee Evaluation Form* and qualification certificates of the trainees to prove the competence of the employees.

5. Related documents

5.1 *Employee Qualification Requirements*

6. Quality records

6.1 *Training Record Form*
6.2 *Training Request*
6.3 *Annual Training Plan*
6.4 *Employee Evaluation Form*
6.5 *Human Resource Need Request*

Section 3. 6.3/6.4 Infrastructures and work environment control procedures

1. Purpose

To determine, provide and maintain infrastructures needed to achieve conformity to product requirements, and to determine and manage work environment needed to achieve conformity to product requirements.

2. Scope of application

These procedures are applicable to control of infrastructures and work environment needed to achieve conformity to product requirements.

3. Responsibilities

3.1 Production Technology Department shall be responsible for control of infrastructures and work environment needed to achieve conformity to product requirements.

3.2 Users shall be responsible for use and maintenance of production equipment.

4. Work procedures

4.1 Determination, provision and maintenance of infrastructures

4.1.1 Determination of infrastructures

Infrastructures needed for production realization as determined by the Company include work place (workshop, office space, and so on), equipment and tools (including tools, instruments and gauges), utilities (water, power and gas supply), communication system, transport system, information system, and so on.

4.1.2 Provision of infrastructures

Production Technology Department shall fill in the *Production Infrastructure Configuration Request* according to the production requirements when production infrastructure configuration is needed. The name, use, type, specs, technical parameters and quantity of the infrastructures shall be indicated in the request, and such request shall be approved by the General Manager. The General Manager shall organize and arrange purchasing or construction related affairs, and be responsible for the purchasing of the infrastructures. Suppliers shall be chosen after evaluation based on information check or field investigation.

4.1.3 Acceptance of infrastructures

a) Infrastructures purchased or constructed by the Company itself shall be installed and tested under the organization of Production Technology Department. After confirmation of their conformity to relevant requirements, in-charge person of Production Technology Department shall sign the *Infrastructure Acceptance Sheet*, which shall be kept by the Production Technology Department.
b) The Production Technology Department shall number the infrastructures accepted, and establish and maintain a *Production Infrastructure Register*.

4.1.4 Use and maintenance of infrastructures

4.1.4.1 Purchasing of spare parts of equipment

The Production Technology Department shall issue a *Raw Material Purchasing Notice* to the Supply & Sale department for spare parts of equipment needed, and the Supply & Sale Department shall purchase such spare parts upon approval from the General Manager.

4.1.4.2 Infrastructure maintenance

Infrastructure using departments shall be responsible for use and maintenance of the infrastructures, shall perform inspection and maintenance for the infrastructures before and after work each day, and shall timely solve any problems identified. Where the problems cannot be solved, they shall notify the Repair Team of the Production Technology Department for repair. The Repair Team shall fill in the *Infrastructure Inspection and Repair Sheet* at the time of inspection and repair. Infrastructures under inspection or repair shall be tagged out with a red tag, and repaired infrastructures shall not be used before signature and acceptance of the in-charge person of the using department.

4.1.5 Retirement of infrastructures

For infrastructures that cannot be repaired or have no value of use, the Production Technology Department shall fill in the *Infrastructure Retirement Sheet*, and have it approved by the General Manager so that such infrastructures can be retired. Retirement of infrastructures shall be recorded in infrastructure register.

4.2 Work environment

The Production Technology Department shall determine and manage the work environment needed to achieve conformity to product requirements, which relates to those conditions under which work is performed including physical, environmental and other factors such as noise, temperature, humidity, lighting or weather. This department shall determine and provide all infrastructures needed in work place and create a good work environment.

5. Related documents

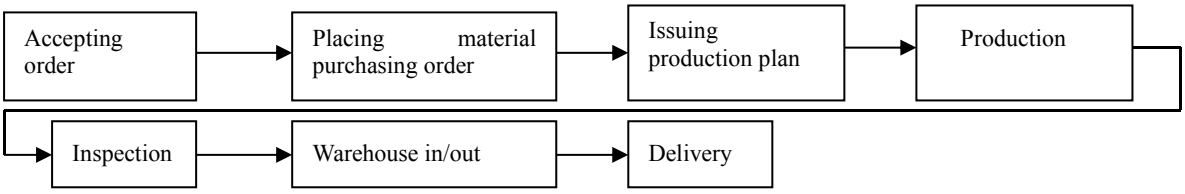
6. Quality records

6.1 *Production Infrastructure Configuration Request*
6.2 *Infrastructure Acceptance Sheet*
6.3 *Production Infrastructure Register*
6.4 *Infrastructure Retirement Sheet*
6.5 *Infrastructure Inspection and Repair Sheet*

Chapter 7. Product Realization

Section 1. 7.1 Planning of product realization

The planned product realization processes of the Company are shown below:



Quality management system documents of the Company are overall planning of the Company for general products, and must be strictly complied with during production. To ensure product quality, the Company performs quality planning and works out quality plans for special processing projects, contracts or orders, plans and develops processes needed for product realization, and ensures consistency with the requirements of other processes in the quality management system.

The Production Technology Department shall manage the product realization planning, plan product realization processes for special projects, contracts or orders, and work out quality plans. In planning product realization, the following aspects shall be determined:

a) Quality objectives and requirements for the product;
b) The need to establish processes and documents, and to provide resources specific to the product;
c) Required verification, validation, monitoring, measurement, inspection and test activities specific to the product and the criteria for product acceptance;
d) Records needed to provide evidence that the realization processes and resulting product meet requirements.

The above contents are outputs from product realization planning, made in the form of product quality plan.

Section 2. 7.2 Customer-related process control procedures

1. Purpose

To control customer-related processes and to ensure customer satisfaction.

2. Scope of application

These procedures are applicable to determination of customer requirements, review of requirements related to products, and customer communication.

3. Responsibilities

3.1 The Supply & Sale Department shall determine the needs and expectations of customers, organize relevant departments to review bids and contracts, and be responsible for communication with customers.

3.2 The General Manager shall be responsible for approval of bids and contracts.

4. Work procedures

4.1 Classification of contracts

Contracts of the Company include spot contracts and non-spot contracts.

4.2 Determination of requirements related to products

When consulting with customers, the Supply & Sale Department shall determine:

a) Requirements specified by the customers, including requirements on delivery period and post-delivery activities (such as product warranty clauses, contractual obligations, additional services, and so on);
b) Product requirements not specified by the customers, but necessary for intended and specified use;
c) Requirements not specified by the customers, but specified in national compulsory standards or relevant laws and regulations; or
d) Any additional requirements and commitments that are deemed necessary by the Company.

4.3 Contract review

4.3.1 The Supply & Sale Department issues *Stock and Price Form* and *Current Price Form* to distributors across the country each day. As offers of the Company, the *Stock and Price Form* and *Current Price Form* shall be reviewed before issue by means of approval by the General Manager

after preparation by the Supply & Sale Department.

4.3.2 For feedbacks from local distributors, sales personnel shall record them into the *Stock and Price Form*, and notify the warehouse about the delivery requirements of the customers.

4.3.3 Spot contract

The Supply & Sale Department issues a *Delivery Notice* to the warehouse based on the requirements of the customer, and the warehouse shall arrange delivery.

4.3.4 Non-spot contract

Before execution of a non-spot contract, it shall be reviewed by in-charge persons of relevant departments under the organization of the Supply & Sale Department. Such review shall include whether the raw materials are available, whether the products can be delivered on time, and so on. Then, the *Contract Review Form* shall be signed, and the following shall be ensured:

a) All clauses are consistent with each other, and the product requirements have been confirmed;
b) Clauses different from previous requirements have been agreed upon with the customer; and
c) The Company is able to meet the requirements specified in the contract.

The contract shall become effective upon signature of the General Manager or an authorized representative as well as contract seal of the Company.

4.4 Execution and performance of contract

4.4.1 After execution of contract, the Supply & Sale Department shall notify relevant departments about the requirements specified in the contract, which shall be used as a basis for production, purchasing, inspection and delivery.

4.4.2 During performance of contract, the Supply & Sale Department shall timely communicate with the customer based on actual needs.

4.5 Change in product requirements

In case of any change in product requirements, the corresponding documents shall be changed accordingly, and relevant departments shall be notified. When necessary, the contents of the change shall be further reviewed.

4.6 Customer communication

4.6.1 The Supply & Sale Department issues *Stock and Price Form* and *Current Price Form* to distributors across the country each day for communication with them.

4.6.2 Customers shall be notified about the contract performance and progress based on actual needs.

4.6.3 Customer complaints shall be dealt with properly to achieve sustained customer satisfaction. The *Customer Satisfaction Measurement Procedures* shall be followed.

4.7 Control of records related to product requirements

The Supply & Sale Department shall be responsible for keeping the *Contract Review Form*, the contracts and contract revision related documents, as well as the records on problem solving during contract review and on follow-up of review results.

5. Related documents

Customer Satisfaction Measurement Procedures

6. Quality records

6.1 *Contract Review Form*
6.2 *Oral and Telephone Based Order Review Form*
6.3 *Stock and Price Form*
6.4 *Current Price Form*

Section 3. 7.4 Purchasing process control procedures

1. Purpose

To control the purchasing process and the suppliers, and to ensure that the purchased products conform to specified requirements.

2. Scope of application

These procedures are applicable to purchasing and outsourcing of raw materials needed for production, and selection, evaluation and control of suppliers.

3. Responsibilities

3.1 The Supply & Sale Department shall organize evaluation of raw material suppliers, work out a list of qualified suppliers, build and manage supplier files, and perform purchasing activities.

3.2 The Supply & Sale Department shall be responsible for selection and evaluation of outsourcing manufacturers.

3.3 The General Manager shall be responsible for approval of qualified suppliers.

4. Work procedures

4.1 Supplier evaluation

4.1.1 Suppliers of raw materials and auxiliary materials shall be chosen and used after evaluation by the Supply & Sale Department. For auxiliary substances purchased on a sporadic basis, manufacturers or distributors commonly used shall be chosen with priority, and their incoming verification records shall be used as evaluation information of such suppliers.

4.1.2 Contents of supplier evaluation include: corporate qualification, product quality, warranty, supply capacity, after service, and so on.

4.1.3 The Supply & Sale Department shall be responsible for evaluation of outsourcing manufactures, and the contents of the evaluation include: corporate qualification, production capacity, warranty, service, price, and so on.

4.2 Determination of qualified suppliers

Relevant departments shall submit the supplier evaluation records to the General Manager for approval, and prepare a *List of Qualified Suppliers*.

4.3 Management of qualified suppliers

4.3.1 The Supply & Sale Department shall build files for qualified suppliers, and record the supply quality and delivery information to the *Material Arrival Register*.

4.3.2 For important materials purchased, the suppliers are required to provide pre-delivery quality inspection and conformity evidences.

4.3.3 In each December, the Supply & Sale Department shall review the annual supply performance of each supplier, and fill in the *Supplier Evaluation Record Form*.

4.3.4 Nonconforming suppliers shall be disqualified upon approval from the General Manager.

4.4 Purchasing process control

4.4.1 Purchasing information documentation

The Supply & Sale Department shall prepare a *Raw Material Purchasing Notice* according to the contractual requirements of the customers to specify:

a) Product specs, type and quality requirements (various standards may be directly referenced or technical documents such as specifications and sample drawings may be provided);
b) Product acceptance requirements where applicable;
c) Other requirements such as price, quantity, date of delivery, manner of delivery, and so on.

Such notice shall be issued to the Supply & Sale Department upon approval from the General Manager.

4.5 Implementation of purchasing

4.5.1 The Supply & Sale Department shall choose suppliers from the *List of Qualified Suppliers* based on the approved *Raw Material Purchasing Notice*.

4.5.2 The Supply & Sale Department shall arrange outsourced processing based on stock and market conditions.

4.5.3 When it is necessary to sign a *Purchase Contract*, the product name, specs, quantity, quality requirements, technical standards, specifications, acceptance, liabilities for breach of contract, and period of delivery shall be specified in the contract.

4.6 Verification of purchased products

4.6.1 After arrival of raw materials, auxiliary materials or outsourced products, warehouse keepers of the Production Technology Department shall notify the Inspection Team of the Production

Technology Department to perform inspection or verification. The process of inspection or verification shall be recorded by filling in the *Raw Material Inspection Sheet*.

4.6.2 Where verification at the site of the supplier is required by the Company or the customer, the Supply & Sale Department shall specify the arrangement and product release method of such verification in the purchasing documents. However, verification of customer does not represent verification conclusions of the Company.

4.6.3 Verification records shall be kept by the Production Technology Department.

5. Related documents

Purchasing Contract.

6. Quality records

Supplier Evaluation Record Form
List of Qualified Suppliers
Raw Material Purchasing Notice
Material Arrival Register
Raw Material Inspection Sheet

Section 4. 7.5 Production and service provision control procedures

1. Purpose

To effective control the production and service provision processes so as to meet customer needs and expectations.

2. Scope of application

These procedures are applicable to control of production forming, process verification, product preservation and release, product delivery and post-delivery service, identification and traceability, and customer property.

3. Responsibilities

3.1 The Production Technology Department shall be responsible for production process control, identification management, and management and control of product preservation.

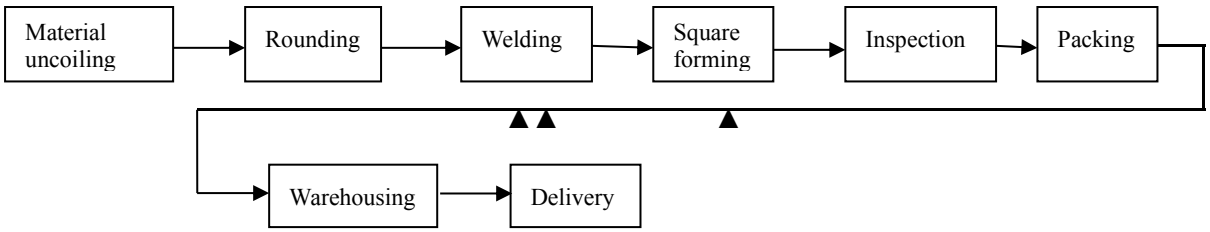
3.2 The Supply & Sale Department shall be responsible for provision of post-delivery service.

3.4 The Production Technology Department shall be responsible for control of infrastructure and work environment needed for product realization.

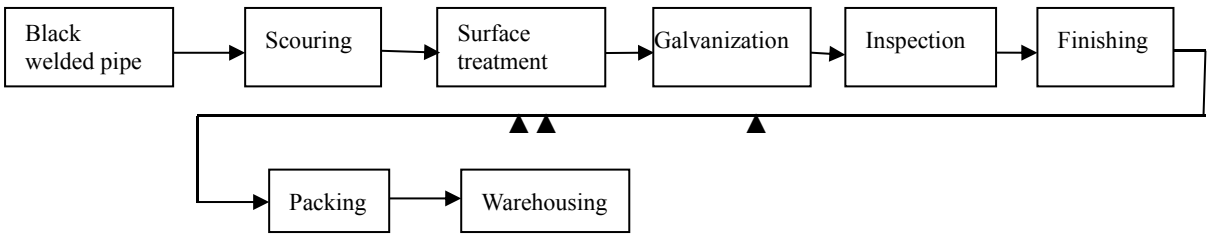
4. Work procedures

4.1 Production process flows

1) Square and rectangular pipe processing flows:



2) Hot galvanized pipe processing flows:



▲ indicates point of inspection; ▲▲ indicates special process.

4.2 Obtaining information on product characteristics

4.2.1 After contract execution, the Supply & Sale department shall work out the *Production Plan* and issue it to the Production Technology Department according to the stock condition, the market demands and the contractual requirements.

4.2.2 The Production Technology Department shall collect information on production completion each day, fill in the *Production Log* and submit it to the Supply & Sale Department and the General Manager.

4.3 Obtaining work instructions

The Production Technology Department shall work out post specific operating specifications and issue them to the workshops.

4.4 Using appropriate equipment

The Product Technology Department shall determine, choose and maintain production infrastructures according to the *Infrastructure and Work Environment Control Procedures*, and ensure the equipment used is appropriate and properly maintained.

4.5 The Production Technology Department shall allocate appropriate monitoring and measuring equipment to production and inspection personnel based on production needs. The operators shall inspect the products made by them. The *Monitoring and Measuring Equipment Control Procedures* shall be followed.

4.5 Inspection personnel in production shall perform inspection properly to ensure product conformity, and shall keep relevant records well.

4.6 Special production processes of the Company are high frequency welding, repair welding and butt welding. These special processes are controlled by the following means:

a) The Production Technology Department shall work out operating specifications to ensure operation according to documentation;
b) Operators shall start work only after training.

4.7 Control of product identification and traceability

4.7.1 The Production Technology Department shall specify identification methods, properly place or identify products of different statuses, and be responsible for maintenance of all identifications. It shall monitor the effectiveness of the identification, and organize tracing in case of significant

quality problems.

4.7.2 Where there is traceability requirement, the products shall be properly identified for traceability. Where the products will not be mixed up even without identification or there is no traceability requirement, it is allowed not to identify the products.

4.7.3 Where there is traceability requirement in contractual, statutory or regulatory requirements or the requirements of the Company itself (for example due to the risk of customer complaint for quality problems), unique identifications of products shall be recorded.

4.7.4 Inspection status identifications of products include:

Conforming, nonconforming, to-be-inspected, and inspected but to-be-determined; these statuses shall be recorded on inspection records as inspection status identification; on production site, products shall be marked with identification plates or be placed by area.

4.8 Control of customer property

Customer property shall be identified, verified, protected, maintained and properly used. In case of loss, damage or problem of customer property, the customer shall be notified timely. Customer property may include intellectual property and individual information.

4.9 Product preservation

4.9.1 Product damage and misuse shall be prevented in all phases from product receiving, internal processing, release, delivery till arrival at intended destination.

4.9.2 Finished welded pipe products shall be packed in bundles, and attention shall be paid to preservation of such products during handling.

4.9.3 Storage preservation

Products shall be stored in warehouses according to appropriate preservation requirements.

4.10 Post-delivery activities

The Supply & Sale Department shall be responsible for communication with the customers after delivery to collect information from customers and deal with issues proposed by customers.

5. Related documents

Customer Satisfaction Measurement Procedures
Post Specific Operating Practice

6. Quality records

Production Plan
Product Log

Section 5. 7.6 Monitoring and measuring equipment control procedures

1. Purpose

To control the monitoring and measuring equipment used to ensure product conformity to specified requirements and to ensure effectiveness of the monitoring and measuring results.

2. Scope of application

These procedures are applicable to the equipment and software used to monitor and measure products and processes.

3. Responsibilities

3.1 The Production Technology Department shall establish and maintain a register of monitoring and measuring equipment, organize periodical calibration, and keep calibration records.

3.2 Users shall be responsible for use and maintenance of the monitoring and measuring equipment.

4. Work procedures

4.1 Purchasing and acceptance of monitoring and measuring equipment

Monitoring and measuring equipment shall be configured based on the measuring capacity needed and the measuring requirements. The management regulations on equipment purchasing in the *Infrastructure and Work Environment Control Procedures* shall be followed.

4.2 Initial calibration of monitoring and measuring equipment

a) Accepted monitoring and measuring equipment shall be sent by the Production Technology Department to national metrological service departments for calibration, and shall not be used before calibration. Conforming monitoring and measuring equipment shall be affixed with unique identification to indicate its status. The Production Technology Department shall number the equipment and establish a *Monitoring and Measuring Equipment Register*, in which the equipment number, name, specs, type, accuracy, manufacturer, calibration cycle, calibration date and placement position shall be recorded.
b) The Production Technology Department shall be responsible for distribution of measuring and monitoring equipment.

4.3 Periodic calibration of measuring and monitoring equipment

4.3.1 In each December the Production Technology Department shall work out the *Metrological*

Calibration Plan for the next year.

4.3.2 For well calibrated equipment, the Production Technology Department shall affix a *Conformity Label* onto it, on which the effective term of the calibration shall be indicted. For equipment only passing partial functional calibration or range calibration, a *Limited Use Label* shall be affixed to indicate the range of limitation. For equipment failing to pass the calibration, a *Nonconformity Label* shall be affixed, and such equipment shall be recalibrated after repair. Where it is inconvenient to affix a label on the equipment, the label may be affixed on a label case or be kept properly by the user.

4.4 Use, handling, maintenance and storage of measuring and monitoring equipment

4.4.1 Users shall use the equipment strictly according to the instructions or operating specifications, ensure consistency between the monitoring and measuring capacity of the equipment and relevant requirements, and prevent adjustment that may affect the calibration accuracy. After use, the equipment shall be properly maintained.

4.4.2 Before using measuring and monitoring equipment, it shall be checked according to relevant regulations to ensure normal functioning and effective calibration.

4.4.3 During handling, maintenance and storage of measuring and monitoring equipment, the users shall comply with the operation instructions and operation specifications to prevent its damage or failure.

4.5 Control of out-of-calibration of measuring and monitoring equipment

4.5.1 Where any testing equipment is found out of calibration, testing shall be suspended and the Production Technology Department shall be timely reported. Then, the Production Technology Department shall organize analysis, repair and recalibration of the equipment, trace the flows of the products tested using the equipment, evaluate the effectiveness of the past testing results, determine the range of retesting, arrange retesting, and take appropriate corrective actions.

4.5.2 Equipment that cannot be repaired shall be retired or disposed properly after confirmation by the manager of the Production Technology Department and approval by the General Manager.

4.6 Environmental requirements for measuring and monitoring equipment

Service and calibration environment of measuring and monitoring equipment shall conform to relevant documents. The Production Technology Department shall be responsible for supervision over such conformity.

4.7 Where computer software is used for monitoring and measurement, its capacity to meet intended use shall be verified. Such verification shall be performed before initial use of the software, and shall be performed again when necessary.

5. Related documents

5.1 *Infrastructure and Work Environment Control Procedures*

6. Quality records

6.1 *Monitoring and Measuring Equipment Register*
6.2 *Metrological Calibration Plan*

Chapter 8.0 Measurement, Analysis and Improvement

Section 1. 8.1 General

The Management Representative shall plan and implement the monitoring, measurement, analysis and improvement processes needed, and the functions shall be responsible for their own areas of duties and form a network to:

a) Demonstrate conformity to product requirements;
b) Ensure conformity of the quality management system; and
c) Continually improve the effectiveness of the quality management system and enhance customer satisfaction.

Section 2. 8.2 Monitoring and measurement

8.2.1 Customer satisfaction measurement procedures

1. Purpose

To take customer satisfaction measurement as one of the measurements of the performance of the quality management system**.**

2. Scope of application

These procedures are applicable to measurement of customer satisfaction.

3. Responsibilities

The Supply & Sale Department shall organize measurement of customer satisfaction and identify needs and potential needs of customers. It shall also analyze feedbacks from customers, determine responsible departments and supervise the implementation of corresponding actions.

4. Work procedures

4.1 Customer satisfaction investigation channels:

A. Direct communication with the customers: customer visit, telephone inquiry records, and ordering meeting;
B. Question based investigation: questionnaire and online inquiry;
C. Information collection and data analysis by external agencies engaged;
D. Collection of information from media and industrial organizations.

4.2 Customer satisfaction investigation and evaluation rules

4.2.1 The Supply & Sale Department shall organize preparation of the *Customer Satisfaction Investigation Form* each year to collect information such as delivered product quality, user comments, analysis of business loss, customer commendation, claim and dealer report. Such information shall be submitted to the Management Representative as an important input used to monitor customer feelings. In addition, questionnaire shall be used to collect information such as product characteristics which the customer pay attention to, characteristics on which the Company realizes potential need, product quality, service quality, product price, customer suggestions, complaints, and so on.

4.2.2 The Supply & Sale Department shall set customer satisfaction score for each question based on the importance of the question, which shall be reflected on the questionnaire. It shall also work out the customer satisfaction evaluation criterions used to analyze the questionnaires, which can

also be reflected on the questionnaires.

4.3 Evaluation by means of questionnaire

4.3.1 The Supply & Sale Department shall choose representative major and new customers from customer files, and issue questionnaires to them in writing or via Internet according to sampling requirements twice a year.

4.3.2 After callback of the questionnaires, the Supply & Sale Department shall analyze the results using customer satisfaction evaluation criterions to get a quantitative value of customer satisfaction. The formula used to calculate customer satisfaction is as follows:

Customer satisfaction = Number of satisfied questionnaires / total number of questionnaires called back x 100%

4.4 Information collected through direct communication with customers and through external agencies shall also be used as reference for customer satisfaction investigation.

4.5 The Supply & Sale Department shall take the customer satisfaction results collected by various means as a measurement of corporate performance, and submit them to the management review at the end of the year. Such information shall be used as basis for the quality objectives of the next year.

4.6 For issues with low customer satisfaction, corrective and preventive actions shall be worked out according to the *Corrective and Preventive Action Control Procedures*.

5. Related documents

Corrective and Preventive Action Control Procedures

6. Quality records

6.1 *Customer Satisfaction Investigation Form*
6.2 *Customer Information Feedback Form*

8.2.2 Internal audit control procedures

1. Purpose

To determine whether the quality management system conforms to the requirements of the quality management system standards and whether it is effectively maintained, implemented and improved.

2. Scope of application

These procedures are applicable to internal audits of all areas and requirements covered by the quality management system of the Company.

3. Responsibilities

3.1 The Management Representative shall lead the internal audit, appoint internal auditors, choose internal audit team leader, approve internal audit plans, reports and corrective actions, and implement improvement of the quality management system.

3.2 The Office shall organize internal audits, prepare the *Annual Internal Audit Plan*, and keep internal audit records.

3.3 The General Manager shall be responsible for approval of the *Annual Internal Audit Plan*.

3.4 Audit team leader shall work out internal audit implementation plan, prepare internal audit report, and organize follow-up and verification of the implementation effects of nonconformance correction actions.

3.5 The departments audited shall provide assistance for the internal audit, and timely work out and implement corrective actions for audit findings.

4. Work procedures

4.1 Audit planning

4.1.1 The Office shall, under the leadership of the Management Representative, work out the *Annual Internal Audit Plan*, and submit it to the General Manager for approval in each January. The audit criterions, frequency, scope and methods shall be considered when working out the plan.

4.1.2 Audit method, frequency and scope

The audit shall be performed on a centralized basis. Comprehensive internal quality audit shall be performed once or twice each year (with an interval not longer than 12 months), and such audit

shall cover all departments, areas, activities, products and elements of the standard adopted, taking into consideration the status and importance of the processes and areas to be audited as well as the results of the previous audits. In any of the following circumstances, additional out-of-plan audits may be performed:

- In case of change in statutory, regulatory or other external requirements;
- When required by interested parties;
- In case of significant accident; or
- In case of significant change in the management system.

Additional audits shall be organized by the Management Representative, and be implemented by the Office in appropriate range based on particular conditions.

4.1.3 Audit criterions: A) ISO9001:2008 standard; B) Quality system documents of the Company, including the Quality Manual, operation documents and other Tier Three documents; C) Relevant laws and regulations.

4.2 Audit preparation

4.2.1 Composition of the audit team

A. The Management Representative shall appoint the leader of the audit team, who shall be a person qualified as internal auditor and having strong organization and working ability;
B. The auditors shall be persons who have accepted internal auditor trainings and who are appointed by the Management Representative;
C. The members of the audit team must be independent of the departments to be audited.

4.2.2 Preparation of audit implementation plan

The audit team leader shall prepare an *Internal Audit Implementation Plan*, which shall include:

A. Purpose, scope and basis of the audit;
B. Members of the audit team;
C. Date and agenda of the audit;
D. Departments to be audited and contents of the audit.

4.2.3 After the *Internal Audit Implementation Plan* is approved by the Management Representative, the Office shall issue the plan in writing to the departments to be audited 5 days prior to the audit.

4.2.4 After receiving the plan, the departments to be audited shall get prepared for the audit. If they have any objection against the items and date of the audit, they shall notify the audit team within 3 days, and further arrangement shall be made upon agreement.

4.2.5 The audit team leader shall convene an audit team meeting 3 days before the audit to assign the audit tasks. The internal auditors shall collect relevant information and prepare an *Internal Audit Checklist*.

4.3 Implementation of internal audit

4.3.1 Initial meeting

The audit team leader shall chair the initial meeting, and the in-charge persons of the departments audited, the Management Representative and other managers concerned shall attend the meeting. The participants shall register their attendance. At the meeting, the purpose, scope, basis and agenda of the audit shall be determined, any unclear issues shall be clarified, assisting personnel shall be determined, and the time and place of the last meeting shall be notified.

4.3.2 Document and material check

A. The auditors shall check whether the documented procedures, work instructions and other documents relating to the quality activities of the departments audited conform to the requirements of the standard and the Quality Manual and whether they are effective controlled versions, and shall check their implementation conditions.
B. The auditors shall check whether the original records of the departments audited are complete and conform to relevant requirements.

4.3.3 Field audit

A. Sampling audit shall be used, and the auditors shall choose typical samples and require the departments audited to provide effective evidences.
B. The auditors shall perform field check for the departments audited according to the audit basis and the internal audit checklist.
C. The auditors shall collect objective evidences by means of interview, document consulting, field inspection, and the like, and shall keep records about the audit.
D. Where any problem is found during field audit, the auditors shall make further investigation, and study the objectiveness of the problems on the principle of impartiality.

4.3.4 Where any nonconformance is identified during the audit, the auditors shall record it into the *Nonconformance Report*, and have such report signed by the in-charge person of the department audited.

4.3.5 After completion of audit of a department, the auditors shall make oral summarization on the implementation conditions of such department and propose corresponding suggestions.

4.3.6 At the end of the audit each day, the audit team leaders shall convene an internal meeting of the audit team to communicate about the audit on that day. Before the last meeting, the team leader shall gather all the team members, summarize the *Nonconformance Distribution Form*,

evaluate the system operation conditions, and make conclusion on the audit.

4.3.7 Last meeting

The audit team leader shall chair the last meeting, and the in-charge persons of the departments audited, the Management Representative and other managers concerned shall attend the meeting. The participants shall register their attendance. At the meeting, the purpose, scope and basis of the audit shall be confirmed again, the nonconformance report and distribution statement shall be read, the overall system operation conditions shall be evaluated and summarized, and corrective actions for the nonconformances shall be proposed.

4.4 Audit report

4.4.1 The audit team leader shall prepare an *Internal Audit Report* within one week after completion of the internal audit, which shall be issued to the interested departments after approva by the Management Representative.

4.4.2 Contents of the audit report shall include:

A. Purpose, scope and basis of the audit;
B. List of the audit team members;
C. Date of the audit and implementation conditions of the audit plan;
D. Quantity, distribution and seriousness of the nonconformances;
E. Main problems;
F. Conclusion on the effectiveness, adequacy and conformity of the system.

4.5 Correction of nonconformance

4.5.1 After the last meeting, the audit team shall issue a *Nonconformance Report*, and shall, under the leadership of the Management Representative, organize the interested departments to analyze the causes and determine the responsible departments.

4.5.2 Based on the recommendations of the internal auditors, the responsible departments shall evaluate the need for corrective actions, work out corrective actions, record the corrective actions on the *Nonconformance Report*, estimate the completion date of correction, and have the corrective actions approved by the Management Representative.

4.5.3 The interested departments shall implement the approved corrective actions. At the estimated completion time, the internal auditors shall follow up and verify the effects of the corrective actions, and record the same on the *Nonconformance Report*. Where the corrective actions are ineffective, additional actions shall be worked out.

4.6 All records arising from internal audit shall be kept by the Office. The Office shall summarize the information on the internal audits performed in the current year, and submit an *Internal Audit*

Report to the General Manager as basis for management review.

5. Related documents

Corrective and Preventive Action Control Procedures

6. Quality records

6.1 *Annual Internal Audit Plan*
6.2 *Internal Audit Implementation Plan*
6.3 *Internal Audit Checklist*
6.4 *Nonconformance Report*
6.5 *Internal Audit Report*
6.6 *Nonconformance Distribution Form*

8.2.3/4 Process and product monitoring and measurement procedures

1. Purpose

To measure and monitor process and product characteristics so as to verify that process and product requirements have been met.

2. Scope of application

These procedures are applicable to measurement and monitoring of raw materials used for product realization, the semi-finished products and the finished products.

3. Responsibilities

The Production Technology Department shall be responsible for the monitoring and measurement of processes and products under the quality management system.

4. Work procedures

4.1 Processes of the quality management system are monitored and measured by the Company by means of internal audit and management review.

4.2 Incoming verification

Materials purchased shall be placed into to-be-inspected area by warehouse keeper, and be inspected and verified by inspection personnel, with the *Raw Material Inspection Sheet* filled up accordingly. For the conforming materials, the warehouse keeper shall handle warehouse-in procedures. For the nonconforming materials, the inspection personnel shall hang a tag of "Nonconforming" on them, and they shall be disposed according to the *Nonconforming Product Control Procedures*.

4.3 Product monitoring and measurement

The Company implements initial piece inspection system. The first piece produced each day or the first piece produced after change of product specs shall be inspected by the operators, and batch production shall not be started unless the initial pieces pass the inspections made by the operators themselves and by dedicated inspectors. The inspectors shall inspect the products according relevant inspection standards and fill in the *Product Inspection Sheet*.

4.4 Inspection

During processing, inspectors shall supervise the operators, and carefully inspect the operation practice, equipment use and tool use of the operators. The inspectors shall perform sampling

inspection of products if needed, and inform the operators about the inspection results. Where any nonconforming products are found, the *Nonconforming Product Control Procedures* shall be followed.

4.5 Measurement and monitoring records

Measurement and monitoring records shall clearly indicate whether the products have been measured and monitored according to specified standards, and indicate the responsible person for product release. For nonconforming products, the *Nonconforming Product Control Procedures* shall apply. The measurement and monitoring records shall be kept by the inspection team of the Production Technology Department.

5. Related documents

5.1 *Improvement Control Procedures*
5.2 *Nonconforming Product Control Procedures*

6. Quality records

6.1 *Raw Material Inspection Sheet*
6.2 *Product Inspection Sheet*

Section 3. 8.3 Nonconforming product control procedures

1. Purpose

To identify and control nonconforming products and to prevent unintended use or delivery of nonconforming products.

2. Scope of application

These procedures are applicable to control of nonconformities in raw materials, semi-finished products, finished products and delivered products.

3. Responsibilities

3.1 Inspectors shall identify nonconforming products and follow up the disposition results of nonconforming products.

3.2 The production workshop shall propose nonconforming product review requirements, and dispose the nonconforming products according to the review conclusions.

3.3 The Supply & Sale Department shall propose nonconforming raw material and auxiliary material review requirements.

3.4 The Production Technology Department shall review the nonconforming products and propose disposal recommendations.

4. Work procedures

4.1 Identification and disposition of nonconforming incoming products

Nonconforming incoming products may be dealt with by means of sorting, degraded use and returning. Where any nonconformity is found in incoming products after inspection or verification, the Supply & Sale Department shall decide whether to organize a review based on the usability of such products. Where the quality problem is serious, the products may be returned to the supplier without review. Where the Supply & Sale Department determines that the products are usable, it shall fill in the *Nonconforming Product Review Sheet* and submit it to the Production Technology Department. Then, the Production Technology Department shall make decisions of sorting, degraded use or returning based on the nonconformity and usability conditions of the products.

4.2 Identification and disposition of nonconforming finished products

Such products may be used on a degraded basis or for other purpose.

4.2.1 Where any products are identified as nonconforming products by inspectors, the workshop where the nonconformity occurs shall fill in the *Nonconforming Product Review Sheet*, and submit it to the Production Technology Department. Then, the Production Technology Department shall organize a review and make a decision of degrade use or use for other purpose. Such products shall be further processed by the Production Technology Department, and the products shall be inspected again after the processing.

4.3 Nonconforming products identified after delivery or start of use shall be treated as significant quality problem. In this case, in addition to the actions specified by Clause 4.2 above, the Management Representative shall organize implementation of corrective actions according to the *Improvement Control Procedures*, and the Supply & Sale Department shall timely consult with the customer about the solution to meet reasonable requirements of the customer.

5. Related documents

5.1 *Process and Product Monitoring and Measurement Procedures*
5.2 *Improvement Control Procedures*

6. Quality records

Nonconforming Product Review Sheet

Section 4. 8.4 Data analysis control procedures

1. Purpose

To collect and analyze appropriate data so as to demonstrate the suitability and effectiveness of the quality management system and identify improvement opportunities.

2. Scope of application

These procedures are applicable to analysis of data from monitoring and measuring activities and other sources.

3. Responsibilities

3.1 The Production Technology Department shall plan as a whole the internal and external transfer, analysis and treatment of relevant data, and promote application of statistic techniques.

3.2 Relevant personnel shall be responsible for data collection, transfer and exchange within their scope of duties.

4. Work procedures

4.1 Contents of data analysis include:

a) Customer satisfaction and/or dissatisfaction information;
b) Conformity of products to customer requirements;
c) Characteristics and trend of processes and products; and
d) Information on suppliers.

4.2 Data analysis method

4.2.1 Basic statistic techniques used by the Company in include:

a) Customer satisfaction investigation and quality analysis is generally performed by means of questionnaire;
b) For product monitoring and measurement, when the conformity rate is lower than the quality objective, pareto diagram, cause-effect diagram, and stratification may be used to find out the main nonconformance and analyze the main causes and countermeasures;
c) For process monitoring and measurement, line chart and column diagram may be used.

4.2.2 Implementation requirements for statistic techniques

4.2.2.1 The Production Technology Department shall organize trainings for personnel relating to

application of statistic techniques.

4.2.2.2 The Production Technology Department shall monitor and check the application of statistic techniques on an annual basis to verify:

a) Whether the nonconforming product rate is reduced and whether the processing loss is reduced;
b) Whether relevant process capacity can be effectively judged for quality improvement;
c) Whether the production output, profitability and work efficiency are improved;
d) Whether the cost is reduced and the quality level and economic benefits are enhanced.

5. Related documents

5.1 *Process and Product Monitoring and Measurement Procedures*
5.2 *Document Control Procedures*
5.3 *Improvement Control Procedures*

6. Quality records

6.1 *Statistic Diagrams and Charts*

Section 5. 8.5 Improvement control procedures

1. Purpose

To continually improve the effectiveness of the quality management system by means of effective improving, corrective and preventive actions.

2. Scope of application

These procedures are applicable to determination, implementation and verification of improving, corrective and preventive actions.

3. Responsibilities

3.1 The Production Technology Department shall organize planning of continual improvement of system and products, propose requirements on corrective and preventive actions, and follow up the implementation effects of the actions.

3.2 Relevant departments shall implement the improving, corrective and preventive actions.

3.3 The Management Representative shall supervise and coordinate approval of the improving, corrective and preventive actions.

3.4 The Supply & Sale Department shall effectively deal with customer opinions.

4. Work procedures

4.1 Planning of continual improvement

4.1.1 To achieve continual improvement, the Company must continually improve the effectiveness and efficiency of the quality management system and continually improve all processes in the quality management system.

4.1.2 Daily improvement

Daily improvements are planned and managed according to Clause 4.2 and Clause 4.3.

4.1.3 Significant improvement

When planning and managing change in current processes and products and change in resource needs,, the following shall be considered:

a) Objectives and overall requirements for the improvement project;

b) Analysis on the status of existing processes and determination of improvement schemes; and
c) Implementation of the improvement and evaluation of the improvement results.

4.2 Information source and principles of corrective and preventive actions

4.2.1 Sources of nonconformance and potential nonconformance information

a) Batch nonconformity or significant accident in process and product quality;
b) Nonconformance identified by management review;
c) Customer complaint relating to product quality;
d) Nonconformance identified in internal and external audits;
e) Significant nonconformity in products or services of suppliers;
f) Achievement conditions of quality policy and quality objectives, and implementation conditions of quality system documents; and/or
g) Statistic information on supply quality, product quality, market analysis and customer satisfaction, implementation effects of improving actions, and so on.

4.2.2 Principles and timing of corrective and preventive actions

Corrective and preventive actions shall be consistent with the impact of the nonconformities or potential nonconformities identified:

a) In case of quality accident, significant nonconformance, significant complaint, repeated occurrence of general nonconformance, or system nonconformance, corrective actions shall be worked out; in case of occasional and isolated individual problems, corrective disposition may be taken immediately.
b) Where any potential nonconformance may cause a loss greater than the cost of preventive actions or cause adverse impact on the system, preventive actions shall be worked out.

4.3 Procedures to work out corrective actions

4.3.1 In case of nonconformances specified in a), b), c), d) or e) above, the Production Technology Department shall review the nonconformance. Where corrective actions are required, it shall fill in the “fact of nonconformance” column in the *Corrective/Preventive Action Sheet*, and determine the responsible department.

4.3.2 The Production Technology Department shall organize relevant responsible departments to analyze the causes for the nonconformance, and fill in the “cause” column in the *Corrective/Preventive Action Sheet*.

4.3.3 The Production Technology Department shall assist the in-charge persons of the responsible departments in working out corrective actions, evaluating the needs for actions, filling in the *Corrective/Preventive Action Sheet*, and having it approved by the Management Representative.

4.3.4 The responsible departments shall implement the approved actions, and record the implementation results on the *Corrective/Preventive Action Sheet*.

4.3.5 The Production Technology Department shall follow up the implementation effects of the corrective actions, evaluate their effectiveness, and fill up the *Corrective/Preventive Action Sheet*.

4.4 Preventive actions

Where any potential nonconformance is identified, the Production Technology Department shall gather the interested departments to discuss the causes, evaluate the needs for preventive actions, work out preventive actions and determine the responsible departments based on the seriousness of the potential problem. Then, it shall fill up the *Corrective/Preventive Action Sheet*, and have it implemented by relevant departments after approval by the Management Representative. After completion of implementation, the Production Technology Department shall follow up the implementation effects and evaluate its effectiveness, and sign the *Corrective/Preventive Action Sheet*.

4.5 In case of nonconformance in the quality management system identified in internal audit and management review, the *Management Review Procedures* and the *Internal Audit Procedures* shall be followed.

4.6 Implementation control and recording of improving, corrective and preventive actions

4.6.1 During implementation of improving, corrective and preventive actions, the Management Representative shall configure necessary resources, assist in cause analysis and determination of responsible departments, and supervise the implementation of the actions .

4.6.2 The Production Technology Department shall clearly specify and record the implementation time, responsible departments, completion time and follow-up results of the actions on the *Corrective/Preventive Action Sheet*. In case of failure to complete the actions within the specified period, the Production Technology Department shall report the Management Representative, organize the responsible departments to analyze the causes, and specify further completion period.

4.6.3 In case of any change in the quality system documents caused by improving, corrective and preventive actions, the *Document Control Procedures* shall be followed.

4.6.4 Records of important improving, corrective and preventive actions shall be used as an input for the next management review.

5. Related documents

5.1 *Data Analysis Control Procedures*
5.2 *Nonconforming Product Control Procedures*
5.3 *Document Control Procedures*

6. Quality records

6.1 *Corrective/Preventive Action Sheet*