

**TianJin DeHua Petroleum Equipment
Manufacturing Co., Ltd.**

QUALITY MANUAL

QM/TDPM—2009

Document Number	QM/TDPM—2009
Issue Number	15
Control Status	Y
Edition/Revision	2/0
Effective Date	2009.07.20

Formulated By: _____

Reviewed By: _____

Approved By: _____

First Edition Issued and Implemented on 5-1-2007

Second Edition Issued and Implemented on 7-20-2009

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL	Edition:1	Page: I /VI
	Order of Issue	Revision:2	

Order of Issue

In order to adapt to market changes, promptly learn customer demand, develop new product, continually improve resource arrangement and quality management system, continually meet customer stated and potential requirements to quality, improve product and service quality, ensure that the ratio of qualified products reaches 100%, our company formulated the second edition of this quality manual as per API Spec Q1: 2007 “Specification for Quality Programs for the Petroleum, Petrochemical and Natural Gas Industry” and ISO 9001:2008 (GB/T 19001-2008) “Quality Management System—Requirements” and the practical situation of our company. Now I approve to issue this quality manual. All employees are requested to strictly stick to the quality manual and perform the post responsibilities stipulated in the quality management system to ensure the effective operation of the quality system of our company.

In order that all the contents of the quality manual can be completely implemented, I authorize Mr. Jiao Jian as the Management Representative who shall be responsible for dealing with the relevant matters relating to quality management system.

This Second edition of the quality manual shall be implemented since July 20, 2009.

General Manager: _____

July 20, 2009

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Contents	Edition:1	Page: II /IV
		Revision:2	

Contents

1 Scope	1
2. Normative References	2
3 Terms and Definitions	3
4 Quality Management System.....	4
4.1 General Requirements	4
4.2 Documentation Requirements.....	4
4.2.1 General	4
4.2.2 Quality Manual	4
4.2.3 Control of Documents.....	5
4.2.4 Control of Records.....	6
4.2.5 Applicable Documents	7
5 Management Responsibility	8
5.1 Management Commitment.....	8
5.2 Customers Focus	8
5.3 Quality Policy.....	8
5.4 Planning	8
5.4.1 Quality Objectives	8
5.4.2 Quality Management System Planning.....	9
5.5 Responsibility, Authority and Communication.....	10
5.5.1 Responsibility and Authority.....	10
5.5.2 Management Representative	11
5.5.3 Internal Communication.....	11
5.6 Management Review	12
5.6.1 General	12
5.6.2 Review Input	13
5.6.3 Review Output.....	13
5.7 Applicable Documents.....	14
6 Resource Management	15
6.1 Provision of Resources	15
6.2 Human Resources.....	15
6.2.1 General	15
6.2.2 Competence, Awareness and Training	15
6.3 Infrastructure	16
6.4 Work Environment	16
6.5 Applicable Documents.....	16
7 Product Realization	17
7.1 Planning of Product Realization.....	17
7.2 Customer-Related Processes	17
7.2.1 Determination of requirements related to the product	18

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Contents	Edition:1	Page: II /IV
		Revision:2	

7.2.2 Review of requirements related to the product.....	18
7.2.3 Customer Communication.....	19
7.3 Design and Development.....	19
7.4 Purchasing.....	20
7.4.1 Purchasing Process	20
7.4.2 Purchasing Information.....	21
7.4.3 Verification of Purchased Product	21
7.5 Production and Service Provision	22
7.5.1 Control of Production and Service Provision.....	22
7.5.2 Validation of Processes for Production and Service Provision	23
7.5.3 Identification and Tractability	23
7.5.5 Preservation of Product.....	24
7.6 Control of Monitoring and Measuring Equipment.....	26
7.7 Applicable Documents.....	27
8 Measurement, Analysis and Improvement	28
8.1 General.....	28
8.2 Monitoring and Measurement.....	28
8.2.1 Customer Satisfaction	28
8.2.2 Internal Audit.....	28
8.2.3 Monitoring and Measurement of Processes	30
8.2.4 Monitoring and Measurement of Product	30
8.3 Control of Nonconforming Product	32
8.3.1 General	32
8.3.2 Assessment and Disposition of Nonconforming Product	32
8.4 Analysis of Data	33
8.5 Improvement	34
8.5.1 Continual Improvement	34
8.5.2 Corrective Action.....	34
8.5.3 Preventive Action.....	34
8.6 Applicable Documents.....	35
9 Management and Use of API Monogram.....	36
Appendix 1 List of Quality System Documented Procedures.....	38
Appendix 2 Distribution Table of Quality Functions.....	39
Appendix 3 Table of Document Revision Status.....	41
Appendix 4 Interaction between the processes of SCS.....	42

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Scope	Edition:1	Page:1/42
		Revision:2	

1 Scope

1.1 General

This quality manual is formulated as per *API Spec Q1: 2007* “Specification for Quality Programs for the Petroleum, Petrochemical and Natural Gas Industry” and ISO 9001:2008 (GB/T 19001-2008) “Quality Management System—Requirements”.

1.2 Application

This quality manual is applicable for quality assurance of complete process of drill pipe, casing and tubing and coupling production of API and other specifications, including raw material purchasing, manufacturing, inspection, sales and servicing, for prevention and control of nonconformity in various stages as well as the continual improvement of quality management.

Our company manufactures products in accordance with API specification and does not accept customer property, therefore section 7.3 design and development and *7.5.4 customer property relevant item* will be excluded in this quality manual.

1.3 Editing Description

For this quality manual to be applicable to the certification of API monogram license and ISO 9001:2008 quality management system, it is edited on the format of ISO 9001:2008, and the requirements of *API Spec Q1: 2007* are edited into various chapters.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Normative References	Edition:1	Page:2/42
		Revision:2	

2. Normative References

The following standards contain provisions, which through reference in this text, constitute provisions of this manual. The latest editions of the referenced standards shall be applied.

- 2.1 *API Spec Q1: 2007* “Specification for Quality Programs for the Petroleum, Petrochemical and Natural Gas Industry”
- 2.2 API Spec 5CT: Specification for Casing and Tubing
- 2.3 API Spec 5B: Specification for Threading, Gauging, and Thread Inspection of Casing, Tubing and Line Pipe Threads
- 2.4 API Spec 5DP: Specification for Drill Pipe
- 2.5 ISO 9000:2008 (GB/T 19000-2008) “Quality Management System—Foundation and Vocabulary”
- 2.6 ISO 9001:2008 (GB/T 19001-2008) “Quality Management System—Requirements”

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL	Edition:1	Page:3/42
	Terms and Definitions	Revision:2	

3 Terms and Definitions

For the purposes of this quality manual, the terms and definitions given in the following standards and specifications shall be applied.

- 3.1 *API Spec Q1: 2007* “Specification for Quality Programs for the Petroleum, Petrochemical and Natural Gas Industry”
- 3.2 API Spec 5CT: Specification for Casing and tubing
- 3.3 API Spec 5B: Specification for Threading, Gauging, and Thread Inspection of Casing, Tubing and Line Pipe Threads
- 3.4 API Spec 5DP: Specification for Drill Pipe
- 3.5 ISO 9000:2008 (GB/T 19000-2008) “Quality Management System—Foundation and Vocabulary”
- 3.6 ISO 9001: 2008 (GB/T 19001-2008) “Quality Management System—Requirements”
- 3.7 Vocabulary commonly used in technical standards of related industries.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL	Edition:1	Page:4/42
	Quality Management System	Revision:2	

4 Quality Management System

4.1 General Requirements

As per the requirements of API and ISO, our company shall establish documented quality management system, determine the related quality management and control criteria and methods of coupling in the various stages of production and servicing, obtain necessary information through audit, check, inspection and analysis, adopt necessary measures, improve continually the quality system, and to ensure its fitness and effectiveness.

Where our company chooses to outsource any process that affects product conformity with requirements, our company shall control them according to *Clause 7.4 and procedural documents* “Control Procedure of Purchasing”, and for these processes, Our Company shall maintain responsibility for product conformance.

4.2 Documentation Requirements

4.2.1 General

The quality management system documentation of our company shall include quality policy and objectives, quality manual, documented procedures, work instructions (documents needed by effective planning, operation and control of processes related to quality management system, including technical documents, standards and materials of external origin, such as customer supplied technical requirements, and drawings, and etc.), and quality records (including electronic medium), to ensure that quality management system can operate as per the effective documents of latest edition.

4.2.2 Quality Manual

4.2.2.1 Quality Assurance Department is responsible for the management of quality manual. This manual is edited on the format of ISO 9001:2008, issued to be carried out after being officially approved, and meanwhile, it conforms to the requirements of API Spec Q1: 2007 and ISO 9001:2008, and satisfies the certification of ISO quality management system and API product monogram license.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL	Edition:1	Page:5 /42
	Quality Management System	Revision:2	

4.2.2.2 The manual describes the quality policy, organizational structure, management responsibility, quality management system requirements, control process, and the main procedures of the resources, management and product realization. It stipulates the requirements, principles and procedures for necessary quality activities, surrounding the various stages of the whole process of about casing, tubing *and drill pipe* quality formation, according to PDCA circulation model and we identifies all processes and interactions of the quality management system and adopt “flowing chart”(appendix 4) to express it.

4.2.2.3 Management Representative is responsible for organizing the formulation of the quality manual, which will be reviewed by Management Representative and issued after approved by General Manager. Quality manual is revised according to the actual needs. Documented procedures are indexed in the relevant chapters of this manual.

4.2.3 Control of Documents

4.2.3.1 Our Company shall formulate the management procedure of documents and data control. Quality Assurance Department is responsible for managing the quality documents and data, and the other departments are respectively responsible for managing the documents and data of their own departments.

4.2.3.2 *Management representative shall organize top management class and all department ministers to formulate the quality manual while the top manager should approve the quality manual.* The department in charge is responsible for organizing formulating and reviewing the documented procedures, work instructions and quality record forms, which shall be approved to issue by Management Representative. Management Representative shall organize reviewing the quality documents and issue a list of effective documents annually, in which the edition and current revision status of documents shall be identified, to ensure their continual effectiveness.

4.2.3.3 The issued quality documents shall be given the clear serial numbers, identification and implementation date, and signed by formulator, reviewer and approver. Approving table of document distribution range shall be filled out when the documents are distributed, and the effective documents shall be distributed to the relevant departments, posts and

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Quality Management System	Edition:1	Page:6 /42
		Revision:2	

persons according to the stipulated quantity. The documents shall be well protected, legible and clear, and easy to be identified and used. The invalid documents shall be destroyed; and any obsolete documents retained for knowledge preservation purpose shall be sealed with “invalidation” and be strictly distinguished from the effective ones. The effective document shall be signed as “controlled version”, the document that be supplied to customer for reviewing should be signed as “uncontrolled version”. Ensure that the relevant versions of applicable documents are available at points of use.

4.2.3.4 Changes to documents and data shall be reviewed and approved by the post personnel of the same departments that performed the original formulation, review and approval. The other designated personnel shall have access to pertinent background information upon which to base their review and approval. Changes to documents and data shall ensure that all of the relevant controlled documents have been changed to keep their unity. To describe the changing status of the present documents and data, document changes shall be identified in the document or in the appropriate attachments.

4.2.3.5 The responsible departments are responsible for *identifying* and managing the documents of external origin, such as statutory and regulatory requirements related to quality, customer supplied technical conditions, product standards, and etc. The distribution of documents of external origin shall ensure that they are under control.

4.2.4 Control of Records

4.2.4.1 Our Company is responsible for establishing control procedure of quality records. Quality Assurance Department is responsible for the management of quality records.

4.2.4.2 Quality records of our company shall include:

- (1) The relevant records of quality system operation;
- (2) The relevant records of realization process of product quality;
- (3) The relevant records and reports about monitoring and measurement of product;
- (4) Quality records from suppliers;
- (5) Other records related to quality activities;

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Quality Management System	Edition:1	Page:7 /42
		Revision:2	

4.2.4.3 The determination of quality record forms is proposed by the using department according to the actual needs, reviewed by Quality Assurance Department and the relevant functions, sent to Management Representative for approval after countersign, catalogued and formulated into volumes according to the stipulations of archives, and distributed to be implemented. Electronic medium can also be used for quality records, but the form shall be reviewed and approved as well.

4.2.4.4 Quality records shall remain legible and readily identifiable, and they mustn't be daubed. They must be signed by the recorders, and noted with the date. When the records must be changed for some reasons, the original data shall be scratched, and the corrective data shall be written on the top, and the changer must sign or seal at the location.

4.2.4.5 Quality records (including floppy discs) shall be kept by the using departments, and then sent to the responsible department for pigeonhole. All quality records shall be stored and maintained in such a way that they are readily retrievable in facilities that provide a suitable environment to prevent them from damage, deterioration and loss. All kinds of quality records shall be kept for 5 years

4.2.4.6 When the customers require, *the quality records* can be provided only after being approved by Management Representative.

4.2.5 Applicable Documents

- (1) "Control Procedure of Documentation and Data"
- (2) "Control Procedure of Quality Records"

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Management Responsibility	Edition:1	Page:8/42
		Revision:2	

5 Management Responsibility

5.1 Management Commitment

Management responsibilities of our company shall mainly include determining quality policy and objectives; establishing and implementing quality management system and continually improving its effectiveness; establishing functional departments, posts and personnel, and stipulating their responsibilities and authority; transmitting the importance of satisfying the *requirements of customers* and laws to the organization; ensuring to equip the necessary resources; and implementing management review according to stipulations to ensure the continual effectiveness of quality management system.

5.2 Customers Focus

Satisfying the customers' requirements is the key point of realizing production, benefit, product quality management and continual improvement of our company. The Top Management shall pay a close attention to it, communicate with the customers, seriously comprehend the customers' requirements to ensure that the customer requirements shall be determined and met.

5.3 Quality Policy

Our company's quality policy is: *Obtaining the glorification by quality; continually improvement to QMS.*

Quality policy is one of the important elements of general management policies and the quality commitment to the customers of our company. General Manager shall be responsible for organizing its formulation and approving it and ensure quality policy provides a *framework for establishing and reviewing quality objectives*. Our company shall extensively propagate it in order that the connotation of the quality policy can be understood by all of employees and embodied in their work.

General Manager and the Top Management shall be responsible for the review of quality policy to ensure its continual suitability.

5.4 Planning

5.4.1 Quality Objectives

The quality objective of the company is that *Qualified product rate achieves 98% or*

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Management Responsibility	Edition:1	Page:9/42
		Revision:2	

over with first inspection; Customers satisfaction reaches 90%.

General Manager and the Top Management are responsible for organizing the establishment and implementation of the quality objectives, and the objectives shall be transmitted in divided articles to the departments related with quality management system.

5.4.2 Quality Management System Planning

In order to realize the quality policy, quality objectives, as per the requirements of *API Spec Q1: 2007*, ISO9001: 2008 (GB/T19001: 2008), API Spec 5CT, API Spec 5DP and the other relevant technical standards, our company shall establish and improve quality management system, implement comprehensive quality management, to ensure the capability to stably produce the couplings conforming the stipulated requirements. General Manager and Top Management are responsible for the planning of quality management system.

5.4.2.1 Quality System Procedures

5.4.2.1.1 Our Company has established the organizational structure and documented quality management system for quality assurance, according to the product and management features of our company. The factors such as staff, management, technology, equipment, and etc., which influence the product quality, shall be effectively controlled to ensure the effective operation of our quality management system and to provide satisfying product and servicing to our customers.

5.4.2.1.2 The quality system documents shall mainly include:

- (1) Quality policy and Quality objectives;
- (2) Quality Manual;
- (3) Documented Procedures, **18**. A list is shown in Appendix 1 “List of Quality System Documented Procedures”.
- (4) Work Documents, several, including standards, technological regulations, work instructions, quality record forms, etc.
- (5) Quality records

5.4.2.2 Quality Planning

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Management Responsibility	Edition:1	Page:10/42
		Revision:2	

5.4.2.2.1 Our company shall establish the quality plans on important quality activities, development of new products, or the products, projects and contracts with customer special requirements.

5.4.2.2.2 Technology Department is responsible for organizing the formulation of the quality plans, which shall be implemented after being reviewed by manager of technology department and approved by Manager of Management Representative.

5.4.2.2.3 Quality plans can quote the regulations of this quality manual and it's supporting documented procedures to ensure the compatibility of design, technology, installation, servicing, inspection, test procedures and the applicable documentation.

5.4.2.2.4 According to the requirements of quality plans, the company shall confirm and equip the necessary resources of staff, finance and materials, including inspection and testing equipment. When necessary, the technology should be renewed and the equipment shall be added. The measuring instruments must meet the requirements of measurement.

5.4.2.2.5 The product acceptance criteria shall be specified and necessary verification shall be conducted during the process of product formulation.

5.4.2.2.6 The whole process of quality plan formulation shall be controlled and all records shall be maintained

5.5 Responsibility, Authority and Communication

5.5.1 Responsibility and Authority

Based on the quality activities determined by the confirmed quality management system documentation, Top Management shall establish the institutional framework, distribute their quality functions, define the responsibilities, authorities and the correlation of the departments and the posts, to ensure the internal communication within the organization, the coordination with each other, and more effective operation of the quality activities. The responsibility and authority of General Manager, Top Management and all Departments are shown in the relevant management stipulations of our company.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Management Responsibility	Edition:1	Page:11/42
		Revision:2	

5.5.2 Management Representative

General Manager shall appoint the *Vice General Manager* Jiao Jian as Management Representative, who shall have responsibility and authority that includes:

- (1) Ensuring that the processes needed for 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;
- (4) Being responsible for the liaison with external parties on matters relating to the quality system;
- (5) Having authority to deal with all kinds of the quality issues.

5.5.3 Internal Communication

To ensure the appropriate communication and exchanges, Top Management of our company shall establish proper communicating channels and program the organizational management structure and quality management system, according to the requirements of quality management system.

The Organizational Management Structure and Quality Management System are illustrated in the following figure.

Distribution of Quality Functions of our company is shown in Appendix 2 “Distribution Table of Quality Functions”

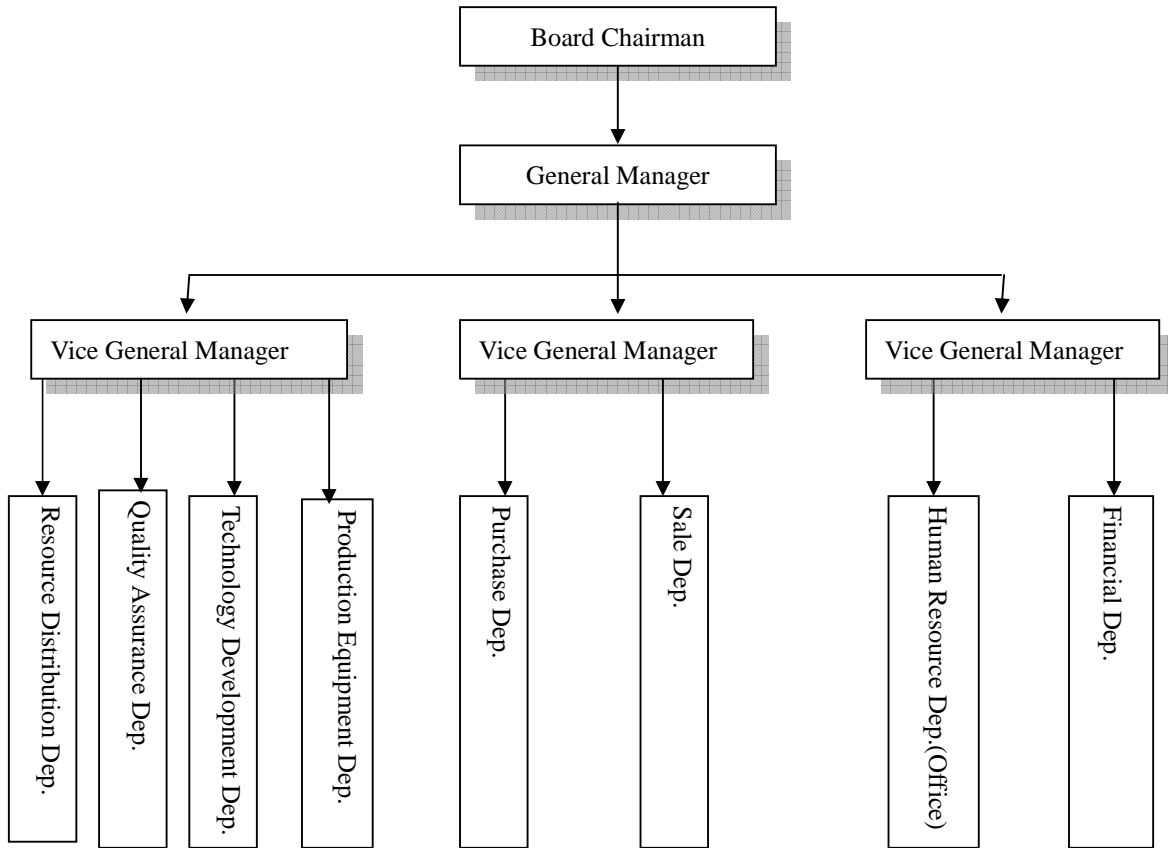


Figure 1 Organizational Management Structure

5.6 Management Review

5.6.1 General

The General Manager is responsible for organizing the quality system review to ensure its continual suitability, adequacy and effectiveness. The management review shall be performed at least once a year or at any time when necessary. The review shall be based on satisfying the requirements of ISO 9001: 2008, according to the related product standards, such as API Spec Q1, API Spec 5DP and API Spec 5CT. The management review shall cover the *chances of evaluation and improvement and the need to change*

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Management Responsibility	Edition:1	Page:13/42
		Revision:2	

quality policy and objective, including quality policy and objectives changing requirement. The review records shall be managed as per “Control Procedure of Quality Records”.

5.6.2 Review Input

Management review shall be conducted mainly on the following subjects:

- (1) *Appropriateness and changing requirements in respect of quality policy and quality objectives;*
- (2) The suitability and effectiveness of quality management system, and the suggestions for improvement;
- (3) The results of internal and external quality system audits, and the implementation effects of improvement actions;
- (4) The performance of process and the conformity of product;
- (5) The status of corrective and preventive actions;
- (6) Trends of the nonconformities;
- (7) The follow-up measures adopted from the last management review;
- (8) Marketing investigation, servicing status, and the customers’ feedback;
- (9) The changes that may influence quality management system;
- (10) The revision of relevant standards such as API Spec Q1 and API Spec 5CT, API Spec 5DP, etc.

5.6.3 Review Output

In management review, the unfitness elements of the quality system and the quality problems shall be discussed; the relevant solutions and improving measures shall be proposed on the *effectiveness* of quality management system and its process, improving

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Management Responsibility	Edition:1	Page:14/42
		Revision:2	

requirements for product related to the customer, and the need for resources. The Management Representative shall be responsible for organizing the implementation of the actions and verifying the results.

5.7 Applicable Documents

- 1) “Control Procedure of Quality Plans”;
- 2) “Control Procedure of Documentation and Data”;
- 3) “Control Procedure of Quality Records”.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Resource Management	Edition:1	Page:15/42
		Revision:2	

6 Resource Management

6.1 Provision of Resources

According to the properties of the product and the being implemented quality activities, as per the requirements of investors, the Top Management shall establish organizational structure, equip necessary resources, review the resources annually, and confirm the resources which need adding or supplementing, to ensure the normal operation and the continual effectiveness of the quality management system, and to satisfy the customer requirements and enhance the customer satisfaction.

6.2 Human Resources

6.2.1 General

To ensure the normal operation of quality management system, and to guarantee that the product can meet the customer requirements, all personnel performing work affecting *product requirement conformance* shall be provided with appropriate quality training, post skill indoctrination and safety training.

All personnel performing work affecting *product requirement conformance* shall have appropriate education, training, skills and experience and are qualified for evaluation to ensure to be competent for post requirements.

6.2.2 Competence, Awareness and Training

6.2.2.1 Human Resources Department is responsible for determining the necessary competence for personnel performing work affecting product quality and formulating the procedure of training, indoctrination and qualification control; the requirements of post responsibility and post qualification; and the training plan, training period and training implementation.

6.2.2.2 Training includes quality training, important post training, qualification training of special process and internal auditor training. It is necessary to ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Resource Management	Edition:1	Page:16/42
		Revision:2	

6.2.2.3 According to the requirements of quality management system, the human resources shall be evaluated annually to determine the minimum requirements for education, training, skills, experience, and qualification identification of employees.

6.2.2.4 Qualification of the personnel shall be documented, and such records shall be maintained.

6.3 Infrastructure

Our company is responsible for controlling the infrastructure and providing suitable working conditions, including buildings, office facilities, energy resources, equipment and apparatus, software and hardware, transportation and communication instruments. Equipment & Power Dep. and Office are responsible for this management.

6.4 Work Environment

Our company is responsible for controlling the work environment, including suitable temperature, *moisture, lighting, noise controlling*, constructions in reasonable layout, clear roads, and qualified virescence. Workshop is responsible for this management.

6.5 Applicable Documents

- 1) “Control Procedure of Process”
- 2) “Control Procedure of Training, Indoctrination and Qualification”
- 3) “Control Procedure of Quality Records”

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Product Realization	Edition:1	Page: 17/42
		Revision:2	

7 Product Realization

7.1 Planning of Product Realization

As per the requirements of product specifications and in the range of quality management system, our company shall implement product planning and development, and organize production according to “Process Flow Chart of Tubing & Casing and Drill Pipe Production”, to ensure that product meets the requirements of product specifications and satisfies the customer requirements.

7.1.1 The Technology Department is responsible for organizing product planning required by product realization, paying special attention to the operation process of production, inspection and servicing. It is required that product planning shall be consistent with the other management elements and resources, and is suitable for the operation of our company.

In planning product realization, our company shall determine the following, as appropriate:

- (1) Quality objectives and technical requirements that the product and the project shall meet;
- (2) All of the procedures and routes of product realization;
- (3) Responsibility, authority of the relevant personnel and the necessary resources;
- (4) Technological flow, specific procedures, methods and work instructions;
- (5) Required verification, validation, monitoring and measuring activities specific to the product, and the criteria for product acceptance;
- (6) Records needed to provide evidence that the realization processes the resulting product meet the requirements.

7.1.2 The Technology Department is responsible for formulating the quality plans to a specific product, project or contract.

7.2 Customer-Related Processes

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Product Realization	Edition:1	Page: 18/42
		Revision:2	

7.2.1 Determination of requirements related to the product

Sales Department is responsible for confirming the customer requirements, including necessary, unnecessary or intangible requirements for customarily connotative and desired purposes, and the relevant requirements, such as laws, rules, and technical standards; meanwhile, it is necessary to consider other supplementary requirements of product itself, such as health, environmental protection, safety, suitability, reliability, transportation, storage and servicing. The confirmed requirements of product shall be documented.

7.2.2 Review of requirements related to the product

7.2.2.1 Sales contracts can be classified as irregular contracts (*which have requirements stricter than current API technical standards and other special requirements*) and regular contracts which shall be reviewed separately. As for the irregular contracts, the Sales Department is responsible for organizing the *vice general managers in charge of each department* to perform review in respect of product requirements. However, the regular contracts shall be reviewed by the Sales Department. At the same time, the Sales Department shall perform contract review prior to accept the tendering or product purchase order according to the product requirements during product sales.

7.2.2.2 Contract review shall be implemented as per “Control Procedure of Contract Review” to ensure that:

- (1) The requirements are adequately defined and documented;
- (2) Any differences between the contract or accepted order requirements and those in the tender are resolved;
- (3) Our company has the capability to meet the contract or accepted order requirements.

7.2.2.3 Only after the contract review, can our company sign a formal contract with the customer. Sales Department is responsible for delivering the contract to the relevant departments and carrying out the implementation of contract. The changed contract shall be reviewed once again, and the Sales Department shall be responsible for transferring the changes of the contract in written form to the relevant functional departments.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Product Realization	Edition:1	Page: 19/42
		Revision:2	

7.2.2.4 The records of contract reviews shall be maintained.

7.2.3 Customer Communication

In order to satisfy the customer requirements and keep the long business relationship with them, realize the quality commitment, and expand the market sales, Sales Department is responsible for communicating with the customers and the servicing activities so as to gain a high customer satisfaction.

7.2.3.1 Our Company pays attention to the communication with the customers, and requires to implement servicing activities in the whole process of product sales. Our company shall:

(1) Seriously treat the customer enquiries and consults by means of letter, phone call, fax, and e-mail, maintain the records, and reply in time;

(2) Establish files about contract customers, go to visit customers, investigate the customers, and continually strengthen the liaison with customers, to ensure that the customer requirements can be effectively replied in time;

(3) Other servicing requirements of the customers shall be recorded, implemented and satisfied.

7.2.3.2 Technology Department is responsible for checking out the causes of nonconformities, based on the quality records and reports upon customer complains, disposing them in time till customer satisfaction.

7.2.3.3 Management Representative is responsible for regularly organizing Quality Assurance Department, Technology Department, Sales Department and ***Production & Equipment Department*** to check the servicing and communication with the customers.

7.3 Design and Development

Our company is only a threading plant, so we exclude design and development in our quality manual.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Product Realization	Edition:1	Page: 20/42
		Revision:2	

7.4 Purchasing

7.4.1 Purchasing Process

7.4.1.1 To manufacture the product meeting the customer requirements, the purchased product and materials are classified into two types according to their affect to the product quality, i.e. the important and the common. The former primarily includes the plain pipes for casing, tubing and drill pipes while the latter refers to paint, protector, etc. For all the resources, the Purchase Department is responsible for choosing the qualified supplier and controlling the purchase.

7.4.1.2 Selection of Suppliers

Purchase Department is responsible for selection of suppliers on the basis of the effect degree of supplied product on the quality of final product of the company or on the quality audit reports and/or quality records of the previously demonstrated capability and performance of the suppliers.

7.4.1.3 Evaluation of Suppliers

Production, Safety & Environment department is responsible for organizing the relevant departments to adopt the suitable methods to evaluate the suppliers of different types:

- (1) Investigation and evaluation of suppliers' quality audit qualification, production capability and servicing;
- (2) Investigation and evaluation of the application of suppliers' final products;
- (3) Inspection of suppliers' final products at suppliers' facilities;
- (4) Inspection of supplied product upon delivery;
- (5) Audit of suppliers' quality system, where necessary;
- (6) The manufacturer who has certificate of API, ISO or equivalent quality system can be directly listed in the list of qualified suppliers.

7.4.1.4 After the evaluation of suppliers, a list of acceptable suppliers shall be established according to the results of comprehensive evaluation, and these suppliers shall be

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Product Realization	Edition:1	Page: 21/42
		Revision:2	

preferentially selected during purchasing process. Records of selection and evaluation of suppliers shall be maintained. The qualified suppliers shall be reevaluated according to their performance once a year.

7.4.2 Purchasing Information

Purchasing information shall describe the product to be purchased, including where appropriate:

- (1) The specification, type, grade (group) and quality requirements of product;
- (2) Product specifications, inspection standards, and other relevant technical information;
- (3) Applicable quality management system.

Formed purchase documents must be reviewed and approved by the relevant personnel prior to release to ensure their adequacy.

7.4.3 Verification of Purchased Product

7.4.3.1 Verification at Supplier's Premises

As to the product with special requirements, our company shall state the intended verification arrangements and the method of product release at the suppliers' premises in purchasing information.

7.4.3.2 Verification of Purchased Product in Our Company

When the purchased product shall be inspected, tested and measured in our company, the qualification documents from suppliers shall be checked.

7.4.3.3 Customer Verification on Supplier Product

Where specified in the contract, the customer or the customer's representative shall be allowed to verify the product in our company or at the supplier's premises for ensuring that supplier product meets specified requirements. The persons of our company can assist the customers or their representatives to conduct the verification. However, our company shall not use such verification as evidence of effective control of quality by the suppliers.

Verification by the customer shall not absolve our company of the responsibility to

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Product Realization	Edition:1	Page: 22/42
		Revision:2	

provide acceptable product or preclude subsequent rejection by the customers.

The records of verification actions shall be managed as per “Control Procedure of Records”.

7.5 Production and Service Provision

7.5.1 Control of Production and Service Provision

7.5.1.1 As per the requirements of product properties, our company is responsible for supplying suitable working and servicing conditions, periodically transmitting the production plans to all levels, reasonably organizing production; formulating the relevant control procedure and working instructions. The Production & Equipment Department is responsible for continually monitoring the suitable process parameters and product properties, periodically implementing the suitable inspection and maintenance of production equipments, and keeping the process capability. Quality Assurance Department is responsible for inspection and testing process control and approval of production processes. *Production & Equipment Dep.* is responsible for the recognition of production and equipments while the Human Resource Department is responsible for acquisition of the operators with certain qualification.

7.5.1.2 The control of production and servicing processes shall be conducted as per “Control Procedure of Process” to ensure that product meets the requirements of relevant standards and customers. Process controls shall be documented in routings, travelers, checklists, technical specifications or graphic media, which shall be implemented after being approved to ensure that they conform to relevant product specifications, quality plans, design and inspection plans.

7.5.1.3 According to the characteristics of product, Quality Assurance Department is responsible for determining the technological processes of production, which directly affect the product quality; Production & Equipment Department is responsible for formulating production plans and arranging production.

7.5.1.4 Our Company shall control the product release, delivery and post delivery activities.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Product Realization	Edition:1	Page: 23/42
		Revision:2	

7.5.2 Validation of Processes for Production and Service Provision

The *non-destructive test, weld and heat treatment during the production of casing, tubing and drill pipes* are special processes in our company. Production & Equipment Department, Quality Assurance Department and Technology Department shall adopt self-inspection and specific-inspection and adjust at any moment to ensure the quality of the special processes. The following requirements shall be met:

(1) It shall be guaranteed that the special process operation, manufacturing equipment, fixtures, inspection instruments, and measurement tools are all qualified and calibrated according to the relevant requirements. The calibration records shall be maintained properly.

(2) Establish the defined criteria for review and approval of processes;

(3) The operational procedures and working instructions shall be established for all of the special processes, and the process shall be operated only after technological assessment.

(4) The operators shall have professional training and hold a relevant qualification Certificate or a certificate of the company. The Human Resource Department is responsible for the necessary regular technical training for the special process operators and inspectors.

(5) All of the processes shall be revalidated according to the specified time and conditions;

(6) The personnel of special processes shall put down the quality records of every process, and the relevant records shall be maintained.

7.5.3 Identification and Tractability

Our company establishes and maintains procedures for identifying the product by suitable means from material receipt, product production, and delivery to prevent from mixing the serial numbers. Where necessary, our company shall establish and maintain documented procedures for unique identification of individual product or batch to ensure the tractability of product.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Product Realization	Edition:1	Page: 24/42
		Revision:2	

Note: The use and management of API 5CT and API 5DP Monogram is specified in Section 9.

7.5.3.2 Quality Assurance Department is responsible for the management of product identification and tractability. The relevant departments and the mills are responsible for implementation of identification.

7.5.3.3 Our Company adopts the following methods for identification, such as hard die, painting and nameplates. The unique identification of our company’s product is the serial number of each product, and it can be traced to the number of batch. Other methods shall be determined by consulting with the customers. Appropriate action for preservation and transferring of identification shall be taken during production process of product to ensure that the identification is clear and accurate, and relevant records shall be made, The records of product identification and trace ability shall be managed according to “Control Procedure of Quality Records”.

7.5.3.4 The monitoring and inspection status of raw materials, semi-product and finished product shall be identified by suitable means, which indicate the conformance or nonconformance of product with regard to inspection and tests performed. The monitoring and inspection status in our company are classified as “Hold”, “Accepted” and “Not accepted”. Our company identifies the monitoring and measurement status of product in inspection records and travelers.

7.5.5 Preservation of Product

7.5.5.1 General

Our company establishes and maintains the documented procedure for product preservation: “Control Procedure of Product Preservation” to ensure that product quality meets the requirements of customers. The *Resource Distribution Department* (Export Department) is responsible for management of identification, handling, packaging, storage, protection and delivery of product.

7.5.5.2 Handling

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Product Realization	Edition:1	Page: 25/42
		Revision:2	

According to the characteristics of the product, our company shall provide the suitable methods and means of handling such as rollers, cranes, etc., and put the damping substrates on easily being bumped spots to protect the product from damage and deterioration.

7.5.5.3 Storage

Our company shall use designated storage areas or stock rooms to prevent damage or deterioration of product, pending use or delivery. Appropriate methods for authorizing receipt and the dispatch to and from such areas shall be stipulated. In order to detect deterioration, the condition of product or constituent parts in stock shall be assessed at specified intervals. Records shall be maintained properly.

7.5.5.4 Package

Our company's *casing, tubing and drill pipe* product shall be packaged according to the relevant product specifications. Special package can be used if required by customers.

7.5.5.5 Preservation

According to the characteristics of product, our company shall adopt suitable methods to protect the products from corrosion and damage, such as stock rooms, installing protectors, etc.

7.5.5.6 Delivery

The visual quality inspection of product shall be conducted on dispatch. The qualification certificate shall be given to the acceptable product and delivered at the same time with finished product. To ensure that the customer can get the product, which meets the requirements, the suitable delivery methods are adopted: self-picking, delivery by car, by train, by ship and so on. The appropriate protective actions shall be adopted, and when contractually specified, this protection shall be extended to include delivery to destination.

7.5.5.7 Marking

In the processes of handling, package, storage and delivery, product marking shall be carefully protected to prevent from being damaged, scribbled or lost.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Product Realization	Edition:1	Page: 26/42
		Revision:2	

7.6 Control of Monitoring and Measuring Equipment

7.6.1 Our Company shall determine the monitoring and measurement to be undertaken and monitoring and measuring equipments needed to ensure that the product meets the determined requirements, according to “Control Procedure of Product Monitoring and Measuring *Equipment*”.

7.6.2 Quality Assurance Department is responsible for the control and management of monitoring and measuring *equipments*, and establishing the table account, definitely recording the type, amount, accuracy, applicable scope and calibrated records of monitoring and measuring equipments.

7.6.3 Quality Assurance Department is responsible for selecting suitable monitoring and measuring equipments, whose performance and accuracy meet the requirements of product specifications; and for calibrating or verifying these devices at specified intervals, or prior to use, against measurements standards traceable to international or national measurement standards. As to the self-made measuring and inspection tools, our company shall conduct calibration or adjustment according to specified self-inspection regulations. Calibration and adjustment intervals shall be stipulated and meet the requirements.

7.6.4 Only the qualified monitoring and measuring equipments after calibration can be used for production, inspection and tests. *All the equipments shall have calibration certificates and corresponding marking on them*, which specifies the following contents if necessary title, serial number, accuracy, calibration agency or staff, validity period of calibration, etc. Unqualified after calibration shall be repaired or discarded.

7.6.5 When used in the monitoring and measurement of specified requirements, the ability of computer software to satisfy the intended application shall be confirmed. This shall be undertaken prior to initial use and reconfirmed as necessary.

7.6.6 Monitoring and measuring equipments shall be used in specified environmental conditions; meanwhile, our company shall provide suitable environmental conditions for handling of monitoring and measuring equipments to prevent collision and vibration, and be protected from damage and deterioration during handling, maintenance and storage, so

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Product Realization	Edition:1	Page: 27/42
		Revision:2	

that the accuracy and fitness for use are maintained.

7.6.7 Quality Assurance Department shall examine the status of monitoring and measuring equipments (including both test hardware and software) at any time and safeguard them from adjustments, which would invalidate the calibration setting. When there are any malfunctions or found beyond specified calibration period, our company shall review the relevant inspection results according to specified procedures, judge and dispose them.

7.6.8 Quality Assurance Department shall assess and record the validity of the previous measuring results. When the equipment is found not to conform to requirements, take appropriate measures on the equipment and any product affected.

7.6.9 Quality Assurance Department is responsible for maintaining the calibration records of monitoring and measuring equipments for future reference. The control records of monitoring and measuring equipments shall be made available to customers according to specified procedures when required by customers.

7.7 Applicable Documents

- 1) “Control Procedure of Contract Review”
- 2) “Control Procedure of Documents and Data”
- 3) “Control Procedure of Purchasing”
- 4) “Control Procedure of Product Identification and Trace ability”
- 5) “Control Procedure of Process”
- 6) “Control Procedure of Monitoring and Measuring *Equipments*”
- 7) “Control Procedure of Monitoring and Measuring Status of Product”
- 8) “Control Procedure of Nonconforming Product”
- 9) “Control Procedure of Product Preservation”
- 10) “Control Procedure of Quality Records”
- 11) “Control Procedure of Training, Indoctination and Certification”
- 12) “Control Procedure of Servicing”

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Measurement, Analysis and Improvement	Edition:1	Page:28/42
		Revision:2	

8 Measurement, Analysis and Improvement

8.1 General

Our company shall plan and implement the monitoring, measurement, analysis and improvement processes, and adopt the methods of inspection, testing and statistical analysis, to control the whole process from raw materials to finished product, to approve the conformance of *product requirements* to the standards and specifications, and to ensure the conformance of quality system and its continual improvement.

8.2 Monitoring and Measurement

8.2.1 Customer Satisfaction

8.2.1.1 Sales Department is responsible for adopting appropriate methods and measures to collect the information in respect of customer requirement satisfaction (such as investigation form, paying a return visit to customers) to collect the advice from the customer and relevant parties, such as customer suggestion feedback, complaints, quality data of delivered product, appraise, claim, agent's report, product agent, industrial association or governmental bodies as well as news and media, etc. By analyzing the collected information in respect of product satisfaction from the customer and relevant parties as well as change of customer quantity, it shall be regarded as one evaluating basis for quality management system achievement of our company.

8.2.1.2 Sales Department shall regulate the information of customer satisfaction in time, learn about how our product or service satisfies the customer requirements and expectation, analyze the changing trends of customer requirements and expectation, and the aspects needed for improvement, and transfer it to Quality Assurance Department, which shall organize taking the corrective, preventive or improving actions. Improvement is regarded as one evaluation to the performance of our company's quality management system.

8.2.2 Internal Audit

8.2.2.1 General

Our company shall conduct internal audits at planned intervals to validate whether the

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Measurement, Analysis and Improvement	Edition:1	Page:29/42
		Revision:2	

quality activities and the relevant results meet the requirements of quality management system, and to determine that the quality management system is effectively implemented and maintained.

8.2.2.2 Responsibility

Internal quality audits shall be approved by Management Representative. Quality Assurance Department is responsible for organizing the implementation.

8.2.2.3 The Procedure of Internal Quality Audits

Internal quality audits shall be implemented on “Control Procedure of Internal Quality Audits”

8.2.2.4 Audit Planning

Internal quality audit shall be planned and conducted on all elements of the quality system and the results of previous audits. The audit shall cover all of the relevant departments, and be conducted at least once a year. When necessary, the extra audit shall be implemented after being approved by Management Representative.

8.2.2.5 Audit Implementation

Audit plans shall be established annually and documented, and the audit plan and check lists shall be formulated as the auxiliary means. Internal quality audit shall be carried out by the personnel with qualification of internal auditor and independent from those having directly responsibility for the activity being audited.

8.2.2.6 Reports of Audit Results

The results of every internal audit shall be compiled into audit reports. The reports include the basic situation of the audited items and the report on nonconformities, and they shall be distributed to the audited departments and kept in the archives.

Our company shall identify the response times for addressing detected nonconformity.

8.2.2.7 Follow-up and Verification

The responsible person of the department is responsible for taking timely corrective actions against the nonconformities found during the audit. In the follow-up audit activities, Review group shall verify

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Measurement, Analysis and Improvement	Edition:1	Page:30/42
		Revision:2	

and record the implementation and effectiveness of the corrective actions taken.

8.2.3 Monitoring and Measurement of Processes

8.2.3.1 Technology & Research Dep., Quality Assurance Department and *Production & Equipment Department* is responsible for the monitoring and measurement of the processes, and confirming the capability and the results of every process, especially special processes, to continually meet the expectations. *The other departments which are related to quality system shall monitor the quality system processes of this department to ensure of the effectiveness of the quality system.*

8.2.3.2 According to the characteristics of each process and its effecting degree to the whole production or servicing process, our company shall monitor and control the process by individually adopting the following methods: process capability analysis, statistics of product one-time acceptance ratio and qualification ratio, equipment integrity ratio, and so on.

8.2.3.3 As to the abnormality or scarcity of process capability, Production & Equipment Dep. shall propose the improving application, and responsible for establishing improving plans, which shall be implemented after being approved by the leader in charge. The improvement actions can include adjusting technology and maintenance period, increasing the times of maintenance or overhaul, replacing or improving equipment, and so on.

8.2.4 Monitoring and Measurement of Product

8.2.4.1 Quality Assurance Department shall monitor and measure the characteristics of the product, and be responsible for the implementation.

8.2.4.2 Receiving Monitoring and Measurement

8.2.4.2.1 The product shall not be used or processed until it has been monitored and measured.

8.2.4.2.2 Receiving monitoring and measurement shall adopt different controls, based on the quality grade and standards, quality control degree of supplier's product, and the qualification certificate supplied, and determines the amount and nature of receiving monitoring and measurement.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Measurement, Analysis and Improvement	Edition:1	Page:31/42
		Revision:2	

8.2.4.2.3 Where incoming product is released for urgent production purposes prior to verification, it shall be applied by the related department, approved by Management Representative, and positively identified and recorded to permit immediate recall and replacement in the event of nonconformity to specified requirements.

8.2.4.3 In-Process Monitoring and Measurement

8.2.4.3.1 Monitoring and measurement shall be conducted according to the stipulations of inspection and testing technology and documented procedures.

8.2.4.3.2 Hold product until the required monitoring and measurement have been completed or necessary reports have been received and verified. Our company shall not conduct release for exception.

8.2.4.4 Final Monitoring and Measurement

8.2.4.4.1 The qualified identification for finished product shall be made and recorded only after all specified monitoring and measurement have been carried out and that the results meet specified requirements.

8.2.4.4.2 Final monitoring and measurement in our company shall be performed or controlled by personnel other than those who performed or directly supervised the manufacture of materials or products.

8.2.4.5 Monitoring and measuring records

The product monitoring and measurement records shall show clearly whether the product meets the intended requirements and be maintained. These records shall be signed by authorized inspector and reviewer.

8.2.4.6 No product shall be released or delivered to customers for use until all the monitoring and measuring activities have been satisfactorily completed, unless approved by the related authorized personnel, or the customers where appropriate.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Measurement, Analysis and Improvement	Edition:1	Page:32/42
		Revision:2	

8.3 Control of Nonconforming Product

8.3.1 General

In order to prevent nonconforming product from unintended use or installation, our Company shall establish and maintain documented procedures to provide control for identification, documentation, evaluation, segregation and disposition of nonconforming products, which are found in receiving inspection, in-process inspection, final inspection, in the fields and during production process.

8.3.2 Assessment and Disposition of Nonconforming Product

8.3.2.1 Control of nonconforming product shall be conducted on “Control Procedure of Nonconforming Product”.

8.3.2.2 Nonconforming product after being assessed shall be individually disposed, and it may be:

- a) Repaired or reworked to meet the specified requirements;
- b) Accepted with or without repair by concession (customer permission when applicable);
- c) Degraded for alternative applications;
- d) Rejected or scrapped.

8.3.2.3 Nonconforming products found in inspection, which don't satisfy manufacturing acceptance criteria, while satisfy the design acceptance criteria or API specification requirements shall be accepted; and reworked of repaired product satisfying the design or manufacturing acceptance criteria or API specification requirements shall be accepted.

8.3.2.4 Nonconforming products found in inspection, which don't satisfy the original design acceptance criteria shall be accepted provided: the original design acceptance criteria is changed as per the related stipulations, and the nonconforming products satisfy the new design acceptance criteria.

8.3.2.5 Reworked or repaired product shall be re-inspected, and the inspection records shall be maintained.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Measurement, Analysis and Improvement	Edition:1	Page:33/42
		Revision:2	

8.3.3 Sales Department is responsible for dealing with nonconforming product found during the delivery and in the fields, filling in a report of field nonconforming product on specified procedures, and reporting to our company’s Management Representative. Management Representative organizes relevant departments and persons to conduct discussion and analysis to find out the causes of field nonconforming product. The causes found to be induced by the customers shall be fed back to them immediately, and if it is our problem, the company shall investigate the responsibility, propose corrective and preventive actions and correct it in specified time period. If there is the concession in the product, our company shall explain the situation to the customers.

8.3.4 If field nonconforming products were found on products with API monogram, Sales Department should assign appointed persons to remove the API monogram from the nonconforming product.

8.3.5 *In the event that the product delivered fails to meet the design acceptance criteria, our company shall notify customers and maintain records of customer notification.*

8.4 Analysis of Data

8.4.1 *Our Company shall collect and analyze data to demonstrate the effectiveness of the quality management system and to evaluate where continual improvement of the effectiveness of the quality management system can be made.* Production & Equipment Department is responsible for the application and management of statistical technologies while the Quality Assurance Department for the confirmation of the statistical technologies selected by the functional departments.

8.4.2 The statistical technologies in our company mainly include: investigation form, cause and effect chart, flow chart, control chart and bar chart, and are applied in the following fields: analysis and research of customer satisfaction, product conformance, suppliers, process monitoring and control, corrective and preventive actions, measurement, data analysis, process capability analysis, product characteristics and product quality trend analysis, etc. It shall be conducted on “Control Procedure of data analyses”.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Measurement, Analysis and Improvement	Edition:1	Page:34/42
		Revision:2	

8.5 Improvement

8.5.1 Continual Improvement

8.5.1.1 Our company shall take the actions, such as internal quality audit, management review, statistical analysis and relevant corrective and preventive actions, to eliminate the causes of actual or potential nonconformities, to avoid the potential trend of nonconformities, to update quality policy and objectives, and to accelerate the normal operation of quality system and its continual improvement.

8.5.1.2 Quality Assurance Department is responsible for management of corrective and preventive actions.

8.5.2 Corrective Action

8.5.2.1 According to the related quality records and reports of product inspection, our company shall investigate and find out the causes of nonconformities and dispose them on time.

8.5.2.2 *Based on the quality records and reports of customer complaints on product quality, our company shall investigate and find out the causes of nonconformities, formulate corrective measures if appropriate and evaluate the effectiveness of the corrective measures to ensure that nonconformities are prevented from re-occurrence.*

8.5.2.3 *Aiming at the importance of nonconformity, our Company shall formulate corrective measures, evaluate the effectiveness of the corrective measures and identify the response time of corrective measures and plans.*

8.5.2.4 Quality Assurance Department is responsible for organizing the tracing and verification of implementation and effectiveness of corrective actions.

8.5.2.5 The record on Corrective action would be controlled as "Control Procedure of record".

8.5.3 Preventive Action

8.5.3.1 Our Company shall take many kinds of methods to find out analyze and eliminate the potential causes of nonconformities.

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Measurement, Analysis and Improvement	Edition:1	Page:35/42
		Revision:2	

8.5.3.2 According to the risk degree of the potential causes, define the disposal procedures and measures required. Then, define the requirements of evaluating the preventive measures and *evaluate its effectiveness* to prevent the occurrence of nonconformities.

8.5.3.3 Quality Assurance Department is responsible for tracing the implementation effects of adopted preventive actions, and report all preventive actions and effects for the management review.

8.5.3.4 The record on preventive action would be controlled as “Control Procedure of Record”.

8.6 Applicable Documents

- 1) “Control Procedure of Product Monitoring and Measurement”
- 2) “Control Procedure of Product Monitoring and Measurement Status”
- 3) “Control Procedure of Nonconforming Product”
- 4) “Control Procedure of Corrective and Preventive Action”
- 5) “Control Procedure of Quality Records”
- 6) “Control Procedure of Internal Quality Audit”
- 7) “Control Procedure of Data Analyses”

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Management and Use of API Monogram	Edition:1	Page:36/42
		Revision:2	

9 Management and Use of API Monogram

9.1 Our company formulates “Control Procedure of API Monogram Use and Management”, and carries it through in the whole company.

9.2 During implementing quality management system, our company shall use API Spec Q1, API Spec 5CT, API SPEC 5DP and our company’s relevant procedures and stipulations to ensure that our company’s product meets the requirements of API specifications and satisfies our customers’ needs.

9.3 After getting API production license, our company guarantees that we only mark the API monogram, *licensee number and manufacturing date* on the products meeting API specifications.

9.4 Our company shall apply the monogram, license number, and date of manufacture to monogrammed products in accordance with a marking procedure as specified by the applicable API product specification.

9.5 Quality Assurance Department is responsible for the application and management of API monogram; the Quality Assurance Department shall appoint the special persons to mark the monogram, *licensee number and manufacturing date* on the products meeting API specifications; and Quality Assurance Department appoints the special person for supervision and checking.

9.6 If the problems are found during the production process at any time, Quality Assurance Department shall organize the persons to strictly check the related semi-products and finished products immediately. The unqualified products mustn’t be marked with API monogram, and the ones marked by API monogram, *licensee number and manufacturing date* shall be removed by the personnel appointed by the Production & Equipment Department; and Quality Assurance Department shall appoint persons for supervision and checking. The products accepted with concession after being approved mustn’t be marked with API monogram, *licensee number and manufacturing date*, if they don’t meet API specifications. If the product is found to be in nonconformance with API specified

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Management and Use of API Monogram	Edition:1	Page:37/42
		Revision:2	

requirements in the application fields, the Sales Department of our company shall appoint persons to remove the monogram.

9.7 Quality Assurance Department is responsible for recording the application and removal of API monogram, and the records shall be maintained for the period of time specified by the management procedure of documents and materials. Records demonstrating the performance of the effective operation of the quality management system shall be maintained for a minimum of 5 years.

9.8 Quality Assurance Department is responsible for keeping in touch with API on application and management of API monogram, and reporting all of the problems encountered with API monogrammed products to the API.

9.9 Applicable Document

“Control Procedure of API Monogram Use and Management”

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Appendix 1	Edition:1	Page:38/42
		Revision:2	

Appendix 1 List of Quality System Documented Procedures

No.	Document No.	Document Title	Formulating Dept.
1	TDPM/ZC01-2007	Control Procedure of Document and Data	Quality Assurance Dep.
2	TDPM/ZC02-2007	Control Procedure of Quality Record	Quality Assurance Dep.
3	TDPM/ZC03-2007	Control Procedure of Training, Indoctrination and Data Control	Human Resource Dep.
4	TDPM/ZC04-2007	Control Procedure of Contract Review	Sales Dep.
5	TDPM/ZC05-2007	Control Procedure of Quality Planning	Technology Dep.
6	TDPM/ZC06-2007	Control Procedure of Purchasing	Purchase Dep.
7	TDPM/ZC07-2007	Control Procedure of Process	Production & Equipment Dep.
8	TDPM/ZC08-2007	Control Procedure of Servicing	Sales Dep.
9	TDPM/ZC09-2007	Control Procedure of Product Identification and Trace ability	Production & Equipment Dep.
10	TDPM/ZC10-2007	Control Procedure of Monitoring and Measurement Status	Quality Assurance Dep.
11	TDPM/ZC12-2007	Control Procedure of Product Preservation	Resource Distribution Dep.
12	TDPM/ZC13-2007	Control Procedure of Product Monitoring and Measuring Equipments	Quality Assurance Dep.
13	TDPM/ZC14-2007	Control Procedure of Internal Quality Audit	Quality Assurance Dep.
14	TDPM/ZC15-2007	Control Procedure of Monitoring and Measurement	Quality Assurance Dep.
15	TDPM/ZC16-2007	Control Procedure of Nonconformity	Quality Assurance Dep.
16	TDPM/ZC17-2007	Control Procedure of Data Analyses	Production & Equipment Dep.
17	TDPM/ZC18-2007	Control Procedure of Corrective and Preventive Action	Quality Assurance Dep.
18	TDPM/ZC19-2007	Control Procedure of Use and Management API Monogram	Quality Assurance Dep.

Appendix 2 Distribution Table of Quality Functions

Quality Department Elements of Quality Management System	General Manager	Management Representative	Production Vice General Manager	Human Resource Vice General Manager	Sale Vice General Manager	Technology Dep.	Sales Department	Purchase Dep.	Human Resource Dep.	Quality Assurance Department	Resource Distribution Dep.	Production & Equipment Dep.
	4 Quality Management System	▲	△	△	△	△	△	△	△	△	△	△
4.2.2 Quality Manual	▲	△	△	△	△	△	△	△	△	▲	△	△
4.2.3 Control of Document		▲	△	△	△	△	△	△	△	▲	△	△
4.2.4 Control of Quality Records		▲	△	△	△	△	△	△	△	▲	△	△
5.1 Management Commitment	▲	△										
5.2 Customer Focus	▲	△	△	△	▲	△	▲	△	△	△	△	△
5.3 Quality Policy	▲	△	△	△	△	△	△	△	△	△	△	△
5.4.1 Quality Objectives	▲	△	△	△	△	△	△	△	△	△	△	△
5.4.2 Planning of Quality Management System	▲	▲								△		
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		△			▲			▲		△	△	

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Appendix 2	Edition:1	Page:40/42
		Revision:2	

7.5.1 Control of Production and Service Provision		△	▲			△						▲
7.5.2 Validation of Processes for Production and Service Provision		△	▲									▲
7.5.3 Identification and Trace ability		△	▲					△	△	△		▲
7.5.4 Product Preservation		△	▲					△	△		▲	△
7.6 Control of Monitoring and measuring equipments			▲					△		▲		
8 Measurement, Analysis and Improvement			▲					△		▲		
8.2.1 Customer Satisfaction	▲	▲			▲		▲	△	△	△		△
8.2.2 Internal Quality Audit	△	▲	△	△	△	△	△	△	△	▲	△	△
8.2.3 Process Monitoring and Measurement		▲	△	△	△	△	△	△	△	▲	△	△
8.2.4 Product Monitoring and Measurement			▲							▲		△
8.3 Control of Nonconforming Product			▲				△	△		▲		△
8.4 Analysis of Data		△	▲	△	△	△	△	△	△	▲	△	△
8.5.1 Continual Improvement	▲	▲	△	△	△	▲	△	△	△	△	△	△
8.5.2 Corrective Action	△	▲	△	△	△	△	△	△	△	▲	△	△
8.5.3 Preventive Action	△	▲	△	△	△	△	△	△	△	▲	△	△
9 API Monogram Use and Management			▲							▲		△

▲ : Main Responsible Department

△: Relevant Executing Department

TianJin DeHua Petroleum Equipment Manufacturing Co., Ltd.	QUALITY MANUAL Appendix 3	Edition:1	Page:41/42
		Revision:2	

Appendix 3 Table of Document Revision Status

Number	Page with Revision	Revised Item	Revision	Review	Approval	Implementation Date
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Appendix 4 Interaction between the processes of SCS

