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QUALITY MANUAL

ISO 9001:2008
API Spec Q1, 9th Edition
API Spec 8C 5Th Edition

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INTRODUCTION

Texas International Oilfield Tools, LTD, hereafter known as ***TIOT,*** has developed and implemented a Quality Management System in order to document its best business practices, better satisfy the requirements and expectations of its customers, and improves the overall management system of ***TIOT***.

The Quality Management System of ***TIOT*** meets the requirements of the latest editions of international standards ISO 9001 and API Q1. This system addresses the production, installation, and servicing of our products.

The manual is divided into seven sections that correlate to the Quality Management System sections of API Q1 inclusive of Annex A.

This manual describes the Quality Management System, delineates authorities, inter-relationships, and responsibilities of the personnel responsible for performing within the system. This manual also provides procedures or references for all activities comprising the Quality Management System to ensure conformance to the necessary requirements of the standard.

This manual is used internally to guide our employees through the various requirements of the ISO 9001 and API Q1 standards that must be met and maintained in order to ensure customer satisfaction, continuous improvement, and provide the necessary instructions that create an empowered work force.

This manual is used externally to introduce our Quality Management System to our customers and other external organizations or individuals. This manual is used to familiarize them with the controls that have been implemented and to assure them that the integrity of the Quality Management System is maintained and focused on customer satisfaction and continuous improvement.

Approval: Ty Young Date: 05/24/2016
Management Representative

Approval: Ty Young Date: 05/24/2016
Chief Operating Officer

1 Scope

TIOT provides ***critical oilfield equipment and tools*** to the petroleum, petrochemical, and natural gas industries.

This Quality Manual specifies requirements for a quality management system where ***TIOT*** needs to demonstrate its ability to consistently provide product that meets customer, API Product Specification 8C and applicable legal requirements. It also aims to enhance customer satisfaction through the effective application of the system including processes for continual improvement of the system.

TIOT does not take exclusion to any section of ISO 9001 or API Specification Q1

2 Normative reference

The following referenced document is indispensable for the application of this specification. The latest edition of the referenced document (including any amendments) applies.

API Specification Q1

ISO 9001 Quality Management System Requirements

ISO 9000 Quality Management Systems — Fundamentals and Vocabulary

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this manual, the terms and definitions given in ISO 9000 and the following apply. When identical terms are defined in ISO 9000 and this API Q1l, API Specification Q1 applies.

3.2 Abbreviations

For the purposes of this manual, the following abbreviations apply.

API American Petroleum Institute

DAC design acceptance criteria

ISO International Organization for Standardization

ITP inspection test plan

KPI key performance indicator

MAC manufacturing acceptance criteria

MOC management of change

QM Quality Manual

QP Quality Plan

QMS Quality Management System

4 Quality Management System Requirements

4.1 Quality Management System

4.1.1 General

TIOT has established, documented, implemented and maintained at all times a QMS for all products and servicing provided for use in the petroleum and natural gas industry and measures and improves upon the effectiveness of the QMS in accordance with the requirements of this Quality Manual.

4.1.2 Quality Policy

TIOT's Quality Policy as stated in Appendix A of this Quality Manual has been defined, documented and approved by top management. Top management reviews as part of the Management Review process the quality policy to ensure that it is appropriate for the organization and is the basis for the development of quality objectives. This policy is communicated, understood, implemented and maintained at all relevant functions and levels within TIOT. The policy includes a commitment to comply with requirements and continually improve the effectiveness of the QMS.

4.1.3 Quality Objectives

As part of the Management Review process top management establishes measurable Quality Objectives that meet customer and product requirements consistent with the Quality Policy at relevant functions and levels within TIOT.

4.1.4 Planning

TIOT's top management ensures that

a) criteria and methods needed for the operation and control of all QMS processes are determined, managed and effective, and

b) planning of the QMS is carried out in order to meet the requirements of this Quality Manual.

4.1.5 Communication

4.1.5.1 Internal

TIOT ensures that appropriate communication processes are established within TIOT and the effectiveness of the QMS is communicated.

TIOT has established processes to ensure that the

a) importance of meeting customer, legal and other applicable requirements is communicated at relevant functions within TIOT, and that the

b) results of analysis of data (see 6.3) are communicated at relevant levels and functions within TIOT.

4.1.5.2 External

TIOT has determined and implemented a process for communicating with external organizations, including customers, to ensure requirements are understood throughout contract execution and product realization. The communication process addresses:

a) execution of customer inquiries, contracts, order handling and amendments (see 5.1),

b) provision of product information, including product nonconformities identified after delivery to the customer (see 5.10.4),

c) feedback and customer complaints (see 6.2.1), and

d) when required by contract, the provision of information required by product quality plans and subsequent changes to those plans (see 5.7.2).

4.2 Management Responsibility

4.2.1 General

TIOT ensures the availability of resources essential to establish, implement, maintain and improve the QMS.

Resources can include human resources and specialized skills, organizational infrastructure, technology and financial resources.

TIOT provides evidence of its commitment to the development and implementation of the QMS and the continual improvement of its effectiveness by

a) ensuring that quality objectives are established, including KPIs, for use in data analysis, and

b) conducting management reviews (see 6.5).

4.2.2 Responsibility and Authority

Responsibilities, authorities and accountabilities of personnel within the scope of this Quality Manual are defined in the form of organization charts and job descriptions, documented and communicated throughout TIOT.

4.2.3 Management Representative

Top management has appointed the Quality Manager as the Management Representative who has responsibility and authority that includes:

a) ensuring that processes needed for the QMS are established, implemented and maintained,

b) reporting to top management on the performance of the QMS and any need for improvement,

c) ensuring initiation of action(s) to minimize the likelihood of the occurrence of nonconformities (see 6.4.3), and

d) ensuring the promotion of awareness of customer requirements throughout TIOT.

4.3 Organization Capability

4.3.1 Provision of Resources

TIOT has determined and allocated the resources needed to implement, maintain, and improve the effectiveness of the QMS.

4.3.2 Human Resources

4.3.2.1 General

TIOT has a documented procedure **(P-4.3 Human Resources)** for defining personnel competency, identifying training requirements or other actions to achieve the necessary competency of personnel whose responsibilities fall within the scope of the QMS. This procedure includes provisions for determining and documenting the effectiveness of the training or other actions taken toward the achievement of required competency.

4.3.2.2 Personnel Competence

Personnel have been determined to be competent based on the appropriate education, training, skills and experience needed to meet product and customer requirements. Evidence of the determination of competence of personnel is recorded and maintained (see 4.5).

4.3.2.3 Training and Awareness

TIOT:

a) provides for QMS training and job training;

b) ensures that customer-specified training and/or customer-provided training, when required, is included in the training program;

c) ensures that the frequency and content of training is identified;

d) ensures that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives; and

e) maintains appropriate records of education, training, skills and experience (see 4.5).

4.3.3 Work Environment

TIOT determines, provides, manages, and maintains the work environment needed to achieve conformity to product requirements. Work environment includes:

a) buildings, workspace and associated utilities;

b) process equipment and its maintenance (both hardware and software) (see 5.7.8);

c) supporting services (for example, transport, communication, information systems); and

d) conditions under which work is performed such as physical, environmental or other factors.

4.4 Documentation Requirements

4.4.1 General

The QMS documentation includes:

a) A Quality Policy and Quality Objectives

b) This Quality Manual that includes:

   1) the scope of the QMS, including justification for any exclusions to specific QMS elements (see 1.0)

   2) a description of the sequence and interaction between the processes of the QMS (see Appendix B)

   3) identification of processes that require validation (see 5.7.1.5), and

   4) reference to documented procedures that control the QMS processes.

c) documented procedures established for the QMS;

d) documents and records to ensure the effective planning, operation and control of its processes, and conformance/compliance with specified requirements; and

e) when applicable the identification of legal, and other requirements which apply to the product.

4.4.2 Procedures

All procedures referenced within this Quality Manual are established, documented, implemented and maintained for continued suitability. A single document can address the requirements of one or more procedures. A requirement for documented procedures can be satisfied by more than one document.

4.4.3 Control of Documents

TIOT maintains a documented procedure **(P-4.4.3 Control of Documents)** for the identification, distribution and control of documents required by its QMS, including required external documents.

This procedure specifies responsibilities for approval and re-approval and identifies the controls needed to ensure that documents required by the QMS including revisions, translations and updates

a) are reviewed and approved for adequacy prior to issue and use

b) identify changes and revision status

c) remain legible and readily identifiable, and

d) are available where the activity is being performed.

Documents of external origin are controlled to ensure that the relevant versions are used and maintained.

Obsolete documents are removed from all points of issue or use, or otherwise identified to ensure against unintended use if they are retained for any purpose.

Procedures, work instructions and forms required by the QMS are controlled.

4.4.4 Use of External Documents in Product Realization

When API product or other external specification requirements, including addenda, errata and updates, are used in the design or manufacture of the product, TIOT maintains a documented procedure **(P-4.4.4 Use of External Documents in Product Realization)** for the integration of these requirements into the product realization process and any other affected processes.

4.5 Control of Records

TIOT maintains a documented procedure **(P-4.5 Control of Records)** to identify the controls and responsibilities needed for the identification, collection, storage, protection, retrieval, and retention time and disposition of records.

Records, including those originating from outsourced activities (see 5.6.1.6), are established and controlled to provide evidence of conformity to requirements and operation of TIOT's QMS.

Records remain legible, identifiable, and retrievable. Records are retained for a minimum of five years or as required by customer, legal, product specifications and other applicable requirements, whichever is longer.

5 Product Realization

5.1 Contract Review

5.1.1 General

TIOT maintains a documented procedure **(P-5.1 Contract Review)** for the review of requirements related to the provision of products and required servicing.

5.1.2 Determination of Requirements

TIOT determines

a) requirements specified by the customer

b) legal and other applicable requirements, and

c) requirements not stated by the customer but considered necessary by TIOT for the provision of the product.

Where the customer provides no documented statement of the requirements, the customer requirements are confirmed by TIOT's and records maintained (see 4.5).

5.1.3 Review of Requirements

TIOT reviews the requirements related to provision of products. This review is conducted prior to TIOT's commitment to deliver product to the customer and ensures that

a) requirements are identified and documented

b) requirements differing from those previously identified are resolved, and

c) TIOT has the capability to meet the documented requirements.

Where contract requirements are changed, TIOT ensures that relevant documents are amended and that relevant personnel are made aware of the changed requirements.

Records of the results of the review, including resulting actions, are maintained (see 4.5).

5.2 Planning

TIOT identifies and plans the processes and documents needed for product realization. Planning of product realization is consistent with the requirements of the other processes of the QMS (see 4.1.4). In planning, TIOT addresses the following

a) required resources and work environment management (see 4.3)

b) product and customer-specified requirements (see 5.1)

c) legal and other applicable requirements

d) contingencies based on risk assessment (see 5.3 and 5.5)

e) design and development requirements (see 5.4)

f) required verification, validation, monitoring, measurement, inspection and test activities specific to the product and the criteria for product acceptance

g) management of change (see 5.11), and

h) records needed to provide evidence that the product realization processes meet requirements (see 4.5).

The output of planning is documented and updated as changes occur. The plans are maintained in a structure suitable for TIOT's method of operations.

5.3 Risk Assessment and Management

TIOT maintains a documented procedure **(P-5.3 Risk Assessment and Management)** to identify and control risk associated with impact on delivery and quality of product. The procedure identifies the techniques, tools and their application for risk identification, assessment and mitigation.

Risk assessment can include consideration of severity, detection methods and probability of occurrence.

Risk assessment associated with product delivery includes:

a) facility/equipment availability and maintenance

b) supplier performance and material availability/supply

Risk assessment associated with product quality includes, as applicable

a) delivery of nonconforming product (see 5.10.1)

b) availability of competent personnel

Records of risk assessment and management including actions taken are maintained (see 4.5).

The output of risk assessment may be used in the development of contingency plans (see 5.5).

Risk assessment can be an activity associated with corrective and/or preventive action.

5.4 Design and Development

5.4.1 Design and Development Planning

TIOT maintains documented procedure **(P-5.4 Design and Development)** to plan and control the design and development of the product.

This procedure identifies the:

a) plan(s), including plan updates, used for design development;

b) design and development stages;

c) resources, responsibilities, authorities and their interfaces to ensure effective communication;

d) review, verification and validation activities necessary to complete each design and development stage;

e) requirements for a final review of the design (see 5.4.5); and

In the event that TIOT outsources any aspect of the design and development process it ensures that the supplier meets the requirements of 5.6.1.6.

5.4.2 Design and Development Inputs

Inputs are identified and reviewed for adequacy, completeness and lack of conflict.

Inputs include functional and technical requirements, and the following, as applicable:

a) customer-specified requirements (see 5.1);

b) requirements provided from external sources, including API product specifications;

c) environmental and operational conditions;

d) methodology, assumptions and formulae documentation;

e) historical performance and other information derived from previous similar designs;

f) legal requirements; and

g) results from risk assessments (see 5.3).

Records of design inputs are maintained (see 4.5).

5.4.3 Design and Development Outputs

Outputs are documented to allow verification against the design and development input requirements.

Outputs

a) meet the input requirements for design and development;

b) provide appropriate information for purchasing, production and servicing;

c) identify or reference design acceptance criteria (DAC);

d) include identification of, or reference to, products and/or components deemed critical to the design;

e) include results of applicable calculations; and

f) specify the characteristics of the product that are essential for its safe and proper use.

Records of design outputs are maintained (see 4.5).

Identification of criticality of products and/or components can be maintained outside of the design and development process.

5.4.4 Design and Development Review

At suitable stages, review(s) are performed to:

a) evaluate the suitability, adequacy and effectiveness of the results of design and development stages to meet specified requirements; and

b) identify any problems and propose necessary actions.

Participants in such review(s) include representatives of functions concerned with the design and development stage(s) being reviewed.

Records of the results of the review(s) and any necessary actions are maintained (see 4.5).

5.4.5 Design and Development Verification and Final Review

To ensure that the design and development outputs have met the design and development input requirements, design and development verification and a final design review and design verification are conducted and documented in accordance with planned arrangements (see 5.4.1).

Records of design verification and the final design review and design verification are maintained (see 4.5).

5.4.6 Design and Development Validation and Approval

Design validation is performed in accordance with planned arrangements (see 5.4.1) to ensure that the resulting product is capable of meeting the specified requirements. When possible, validation is completed prior to the delivery of the product.

After validation the completed design is approved by competent (see 4.3.2.2) individual(s) other than the person or persons who developed the design.

Records of the design validation, approval and any necessary actions are maintained (see 4.5).

5.4.7 Design and Development Changes

Design and development changes are identified, reviewed, verified and validated, as appropriate, and approved before implementation.

The review of design and development changes includes an evaluation of the effect of the changes on product and/or their constituent parts already delivered.

Design and development changes, including changes to design documents, require the same controls as the original design and development activities.

Records of design and development changes, reviews of those changes and any necessary actions are maintained (see 4.5).

5.5 Contingency Planning

5.5.1 General

TIOT maintains a documented procedure **(P-5.5 Contingency Planning)** for contingency planning needed to address risk associated with impact on delivery and quality of product.

Contingency planning is based on assessed risks (see 5.3) and output is documented and communicated to the relevant personnel and updated as required.

5.5.2 Planning Output

Contingency plans include:

a) actions required in response to significant risk scenarios to mitigate effects of disruptive incidents;

b) identification and assignment of responsibilities and authorities; and

c) internal and external communication controls (see 4.1.5).

5.6 Purchasing

5.6.1 Purchasing Control

5.6.1.1 Procedure

TIOT maintains documented procedure **(P-5.6 Purchasing Control)** to ensure that purchased products or outsourced activities conform to specified requirements.

This procedure addresses:

a) determination of the criticality of the activities or products as they are applicable to conformance to product or customer specifications;

b) initial evaluation and selection of suppliers based on their ability to supply products or activities in accordance with TIOT‘s requirements (see 5.6.1.2 and 5.6.1.3);

c) type and extent of control applied to the supplier based on the criticality of the product or activity;

d) criteria, scope, frequency and methods for re-assessment of suppliers;

e) maintaining a list of approved suppliers and scope of approval; and

f) type and extent of control to be applied to outsourced activities (see 5.6.1.6).

5.6.1.2 Initial Supplier Evaluation – Critical Purchases

For purchase of critical products, components or activities that impact product realization or the final product, the criteria for the initial evaluation of suppliers is site-specific for each supplier and include the following:

a) verification that the supplier’s QMS conforms to TIOT’s specified quality system requirements, and

b) assessment of the supplier to ensure its capability to meet TIOT's purchasing requirements by:

   i performing an on-site evaluation of relevant activities, or

   ii performing first article inspection to ensure conformance to stated requirements, or

   iii identifying how the supplied product conforms to stated requirements when limited by proprietary, legal and/or contractual arrangements.

5.6.1.3 Initial Supplier Evaluation – Noncritical Purchases

For purchase of noncritical products, components or activities that impact product realization or the final product, the criteria for evaluation of suppliers meet the requirements of 5.6.1.2 or satisfy one or more of the following:

a) verification that the supplier's QMS conforms to TIOT's specified quality system requirements, or

b) assessment of the supplier to meet TIOT's purchasing requirements, or

c) assessment of the product upon delivery or activity upon completion.

5.6.1.4 Supplier Re-evaluation

For re-evaluation of all suppliers (critical and noncritical), the requirements of 5.6.1.3 apply.

5.6.1.5 Supplier Evaluation – Records

Records of the results of all evaluations and any necessary actions arising from the evaluations are maintained (see 4.5).

5.6.1.6 Outsourcing

When TIOT chooses to outsource any activity within the scope of its QMS, it ensures that all applicable elements of its QMS are satisfied and maintains responsibility for product conformance to specified requirements, including applicable API product specifications, associated with product realization.

Records of outsourced activities are maintained (see 4.5).

5.6.2 Purchasing Information

TIOT ensures the adequacy of specified purchasing information prior to their communication to the supplier. Purchasing information provided to the supplier is documented and adequately describes the product or activity to be purchased, including acceptance criteria, and where appropriate:

a) requirements for approval of supplier's procedures, processes and equipment;

b) applicable version of specifications, drawings, process requirements, inspection instructions, traceability and other relevant technical data;

c) requirements for qualification of supplier's personnel; and

d) QMS requirements.

5.6.3 Verification of Purchased Products or Activities

TIOT maintains a documented procedure **(P-5.6.3 Verification of Purchased Products or Activities)** for the verification or other activities necessary for ensuring that purchased products or activities meet specified purchase requirements.

When TIOT or its customer intends to perform verification at the supplier‘s premises, it states the intended verification arrangements and method of product release in the purchasing information.

TIOT ensures and provides evidence that purchased products and activities conform to specified requirements.

Records of verification activities are maintained (see 4.5).

5.7 Production and Servicing Provision

5.7.1 Control of Production and Servicing

5.7.1.1 Production

TIOT maintains a documented procedure **(P-5.7.1.1 Production)** that describes controls associated with the production of products. The procedure addresses the following:

a) availability of information that describes the characteristics of the product;

b) implementation of the product quality plan, when applicable (see 5.7.2);

c) ensuring design requirements and related changes are satisfied, when applicable (see 5.4);

d) availability and use of suitable production, testing, monitoring and measurement equipment;

e) availability of work instructions when applicable;

f) process control documents (see 5.7.1.3);

g) implementation of monitoring and measurement activities; and

h) implementation of product release (see 5.9), including applicable delivery and post-delivery activities

5.7.1.2 Servicing

TIOT maintains a documented procedure **(P-5.7.1.2 Servicing)** that describes the controls associated with the servicing (see 3.1.20) of products. This procedure addresses the following:

a) review and implementation of TIOT, customer-specific, product servicing and other servicing requirements

b) the availability and use of suitable servicing, testing, monitoring and measurement equipment

c) the availability of procedures when applicable

d) maintenance of identification and traceability requirements throughout the servicing process

e) the implementation of monitoring and measurement activities,

f) process control documents (see 5.7.1.3), and

g) requirements for release of the product that was serviced (see 5.9).

5.7.1.3 Process Control Documents

Process controls are documented on routers, travelers, checklists, process sheets or equivalent controls required by TIOT and include requirements for verifying conformance with applicable product quality plans (see 5.7.2). These controls include requirements for API product specifications, customer requirements and/or other product standards/codes when applicable.

The process control documents include or reference instructions and acceptance criteria for processes, tests, inspections, and when applicable, customer's inspection, hold or witness points.

5.7.1.4 Product Realization Capability Documentation

TIOT develops and maintains documentation that includes but is not limited to product realization plans (see 5.2) and records of review/verification, validation, monitoring, measurement, inspection and test activities, including criteria for product acceptance that demonstrate its capability to satisfy specified product and/or servicing requirements.

Product realization documentation is evidence of the capability of the organization to manufacture products or families of products and does not extend to every work order or individual product manufactured.

5.7.1.5 Validation of Processes for Production and Servicing

TIOT validates processes for production and servicing where the resulting output cannot be verified by subsequent monitoring or measurement and as a consequence, deficiencies become apparent only after the product is in use or the servicing has been delivered. Validation demonstrates the ability of these processes to achieve planned results.

Where it chooses to outsource a process that requires validation, TIOT requires that the supplier conform to these requirements (see 5.6.1.6).

TIOT maintains a documented procedure **(P-5.7.1.5 Validation of Special Processes)** to address methods for review and approval of special processes

including:

a) required equipment

b) qualification of personnel

c) use of specific methods, including identified operating parameters

d) identification of acceptance criteria

e) requirements for records (see 4.5), and

f) revalidation.

For TIOT the processes requiring validation are NDE, Welding and Heat Treat.

5.7.2 Product Quality Plans

When required by contract, TIOT develops a product quality plan that specifies the processes of the QMS (including the product realization processes) and the resources to be applied to a product.

When required by contract the product quality plan addresses each of the following:

a) description of the product to be manufactured,

b) required processes and documentation, including required inspections, tests and records, for conformance with requirements,

c) identification and reference to control of outsourced activities,

d) identification of each procedure, specification or other document referenced or used in each activity, and

e) identification of the required hold, witness, monitor and document review points.

Product quality plans and any revisions to them are documented and approved by TIOT to ensure customer requirements are met. Product quality plans and any revisions are communicated to the customer.

5.7.3 Identification and Traceability

TIOT maintains a documented procedure **(P-5.7.3 Identification and Traceability)** for identification and traceability while the product is under its control throughout the product realization process, including applicable delivery and post-delivery activities. This procedure includes requirements for maintenance or replacement of identification and/or traceability marks.

Records of identification and traceability are maintained (See 4.5).

5.7.4 Product Inspection / Test Status

TIOT maintains a documented procedure **(P-5.7.7 Inspection and Testing)** for the identification of product inspection and/or test status throughout the product realization process which indicates the conformity or nonconformity of product with respect to inspections and/or tests performed. It ensures that only product that meets requirements or is authorized under concession (see 5.10.3) is released.

5.7.5 Customer-Supplied Property

TIOT maintains a documented procedure **(P-5.7.5 Customer-Supplied Property)** for the identification, verification, safeguarding, preservation, maintenance and control of customer-supplied property, including intellectual property and data, while under its control. This

procedure includes requirements for reporting to the customer any loss, damage or unsuitability for use of customer-supplied property.

Records for the control and disposition of customer-supplied property are maintained (see 4.5).

5.7.6 Preservation of Product

5.7.6.1 General

TIOT maintains a documented procedure **(P-5.7.6 Preservation of Product)** describing the methods used to preserve the product and constituent parts throughout product realization and delivery to the intended destination in order to maintain conformity to requirements. As applicable, preservation includes identification and traceability marks, transportation, handling, packaging and protection.

5.7.6.2 Storage and Assessment

This procedure identifies the requirements for storage and assessment. Designated storage areas or stock rooms are used to prevent damage or deterioration of product, pending use or delivery.

In order to detect deterioration, the condition of product or constituent parts in stock is assessed at specified intervals identified by the procedure. The interval is appropriate to the products or constituent parts being assessed.

Records of the results of assessments are maintained (see 4.5).

5.7.7 Inspection and Testing

5.7.7.1 General

TIOT maintains a documented procedure **(P-5.7.7 Inspection and Testing)** for inspection and testing to verify that product requirements have been met. This procedure includes requirements for in-process, and final inspection and testing.

Records of required inspection and testing are maintained (see 4.5).

5.7.7.2 In-process Inspection and Testing

TIOT inspects and tests the product at planned stages as required by the product quality plan (see 5.7.2), process control documents (see 5.7.1.3) and/or documented procedures. Evidence of conformity with the acceptance criteria is maintained.

5.7.7.3 Final Inspection and Testing

TIOT conducts final inspection and testing in accordance with the product quality plan and/or other production control documents to validate and document conformity of the finished product to the specified requirements.

Personnel other than those who performed or directly supervised the production of the product perform final acceptance inspection at planned stages of the product realization process.

5.7.8 Preventive Maintenance

TIOT maintains a documented procedure **(P-5.7.8 Preventive Maintenance)** for the establishment of preventive maintenance for equipment used in product realization. This procedure identifies requirements for:

a) type of equipment to be maintained,

b) frequency, and

c) responsible personnel.

Records of preventive maintenance are maintained (see 4.5).

Preventive maintenance can be based on risk, system reliability, usage history, experience, industry recommended practices, relevant codes and standards, original equipment manufacturer's guidelines, or other applicable requirements.

5.8 Control of Testing, Measuring and Monitoring Equipment

TIOT determines the testing, monitoring and measurement requirements and the associated equipment needed to provide evidence of conformity to those requirements, and maintains a documented procedure **(P-5.8 Control of Testing, Measuring and Monitoring Equipment)** in order to ensure that testing, measurement and monitoring equipment is calibrated and maintained and that the equipment is used in a manner that is consistent with monitoring and measurement requirements.

This procedure includes requirements for the specific equipment type that addresses:

a) unique identifier;

b) calibration status;

c) traceability of calibration standards used to international or national measurement standards;

d) frequency of calibration, at specific intervals or prior to use

e) calibration or verification method, including adjustments and readjustments as necessary; and

f) acceptance criteria.

g) the control of equipment identified as out-of-calibration in order to prevent unintended use;

h) when the equipment if found to be out of calibration, and assessment of the validity of previous measurements and actions to be taken on the equipment and product, including maintaining records and evidence of notification to the customer (see 4.1.5.2) if suspect product has been shipped.

Testing, measuring, monitoring equipment is

1) calibrated or verified, or both, against measurement standards, (Verification against identified acceptance criteria is performed on non-adjustable equipment.)
2) identifiable by the user as to its calibration status for the activities being performed at all times;
3) safeguarded from adjustments that would invalidate the measurement result or the calibration status;
4) protected from damage and deterioration during handling, maintenance and storage; and
5) used under environmental conditions that are suitable for the calibrations, inspections, measurements and tests being carried out.

When used in the testing, monitoring or measurement of specified requirements, the ability of computer software to satisfy the intended application is confirmed prior to initial use and reconfirmed as necessary.

When equipment is provided from an external source, including third party, proprietary, employee and customer-owned equipment, TIOT verifies that the equipment is suitable and provides evidence of conformity to the requirements of this section 5.8.

TIOT maintains a list of the required testing, measurement and monitoring equipment used to determine product conformity to requirements that includes a unique identifier specific to each piece of equipment.

Records of the results of calibration and verification are maintained (see 4.5).

5.9 Product Release

TIOT ensures that release of product to the customer does not proceed until the planned arrangements (see 5.7) have been satisfactorily completed, unless otherwise approved by a relevant authority and, where applicable, by the customer as identified in documented procedure (DP-5.7.7 Inspection & Testing).

Records are maintained to enable identification of the individual releasing the product (see 4.5).

5.10 Control of Nonconforming Product

5.10.1 General

TIOT maintains a documented procedure **(P-5.10 Control of Nonconforming Product)** to identify the controls and related responsibilities and authorities for addressing nonconforming product.

The procedures for addressing nonconforming product identified during product realization include controls for:

a) product identification to prevent unintended use or delivery;
b) addressing the detected nonconformity (see 5.10.2);

c) taking action to preclude its original intended use or delivery; and

d) authorizing its use, release or acceptance under concession by relevant authority and, where applicable, by the customer.

The procedures for addressing nonconforming product identified after delivery include controls for:

a) identifying, documenting and reporting nonconformances or product failure identified after delivery;

b) ensuring the analysis of product nonconformance or failure, provided the product or documented evidence supporting the nonconformity is available to facilitate the determination of the cause (see 6.4.2); and

c) taking action appropriate to the effects, or potential effects, of the nonconformance when nonconforming product is detected after delivery.

5.10.2 Nonconforming Product

TIOT addresses nonconforming product by performing one or more of the following:

a) repair or rework with subsequent inspection to meet specified requirements;

b) re-grade for alternative applications;

c) release under concession (see 5.10.3); and/or

d) reject or scrap.

5.10.3 Release of Nonconforming Product under Concession

The evaluation and release under concession of nonconforming product that does not satisfy manufacturing acceptance criteria (MAC) is permitted when TIOT Engineering and the customer (where applicable) have authorized the release provided that:

a) products continue to satisfy the applicable design acceptance criteria (DAC) and/or customer criteria; or

b) the violated MAC are categorized as unnecessary to satisfy the applicable DAC and/or customer criteria; or

c) the DAC are changed and the products satisfy the revised DAC and associated MAC requirements.

Concession against API product specification requirements is not allowed for Monogram product.

5.10.4 Customer Notification

TIOT notifies customers of product not conforming to DAC or contract requirements that has been delivered. It also notifies API in the event that the nonconforming product was monogrammed and does not conform to product spec requirements.

Records of any such notifications are maintained (see 4.5).

5.10.5 Records

Records of the nature of nonconformities and any subsequent actions taken, including concessions obtained, are maintained (see 4.5).

5.11 Management of Change (MOC)

5.11.1 General

TIOT maintains a process **(see P-5.11 Management of Change)** for management of change (MOC). It ensures that the integrity of the QMS is maintained when changes to the QMS are planned and implemented.

It identifies the potential risks (see 5.3) associated with the change and any required approvals prior to the introduction of such changes.

Records of MOC activities are maintained (see 4.5).

5.11.2 MOC Implementation

TIOT uses the MOC process for any of the following that may negatively impact the quality of the product:

a) changes in TIOT structure (see 4.3.2);

b) changes in key or essential personnel (see 4.3.2);

c) changes in critical suppliers (see 5.6.1);

d) changes to the management system procedures, including changes resulting from corrective and preventive actions (see 6.4).

5.11.3 MOC Notification

TIOT notifies relevant personnel, including the customer when required by contract, of the change and residual or new risk due to changes that have either been initiated by it or requested by the customer.

6 Quality Management System Monitoring, Measurement, Analysis and Improvement

6.1 General

TIOT plans and implements the monitoring, measurement, analysis and improvement processes needed to ensure conformity of the QMS to the requirements of this Quality Manual and to continually improve the effectiveness of the QMS.

QMS monitoring, measurement, analysis and improvement include determination of applicable methods, including techniques for the analysis of data, and the extent of their use.

6.2 Monitoring, Measuring and Improving

6.2.1 Customer Satisfaction

TIOT maintains a documented procedure **(P-6.2.1 Customer Satisfaction)** to measure customer satisfaction. This procedure addresses the frequency of measurement, method of obtaining customer feedback, key performance indicators (KPIs), and other information that it uses to determine whether it has satisfied customers in meeting identified requirements.

Records of the results of customer satisfaction information are maintained (see 4.5).

6.2.2 Internal Audit

6.2.2.1 General

TIOT maintains a documented procedure **(P-6.2.2 Internal Audit)** to define responsibilities for planning, conducting and documenting internal audits. These audits verify that the QMS is effectively implemented and maintained and conforms to the requirements of this Quality Manual, API Specification 8C and supporting QMS documentation. The planning of internal audits takes into consideration the results of previous audits and criticality of the process being audited.

TIOT identifies the audit criteria, scope, frequency and methods to ensure that all processes of the QMS are audited at least every twelve months.

Outsourced activities that impact the quality of the product and that are performed at the organization’s facility are included as a part of the international audit of the organization.

6.2.2.2 Performance of Internal Audit

Audits are performed by competent personnel (see 4.3.2.2) independent of those who performed or directly supervised the activity being audited to ensure objectivity and impartiality of the audit process. Records of the audits provide objective evidence that the QMS is implemented and maintained (see 4.5).

Product specification requirements may be embedded throughout the QMS processes and audited in conjunction with one or more QMS processes.

6.2.2.3 Audit Review and Closure

TIOT identifies response times for addressing detected nonconformities in accordance with the corrective action documented procedure. The management responsible for the area being audited ensures that any necessary corrections and corrective actions follow the requirements of 6.4.2. The results of internal audits and status of corrective actions are reported in the management review (see 6.5). Records of internal audits are maintained (see 4.5).

6.2.3 Process Evaluation

TIOT uses the internal audit and management review processes to evaluate the ability of the QMS processes to achieve planned results, including conformity to product requirements. When planned results are not achieved, corrective action is taken (see 6.4.2), as appropriate.

6.3 Analysis of Data

TIOT maintains a documented procedure **(P-6.3 Analysis of Data)** for the identification, collection and analysis of data to demonstrate the suitability and effectiveness of the QMS. The analysis includes data generated from monitoring and measurement, internal audits (see 6.2.2), management reviews (see 6.5) and other relevant sources.

The data analysis output provides information relating to

a) customer satisfaction (see 6.2.1);

b) conformity to product requirements;

c) nonconformities and product failures identified after delivery or use, provided the product or documented evidence is available to facilitate the determination of the cause (see 5.10);

d) characteristics and trends of processes and products including opportunities for preventive action (see 6.4.3);

e) supplier performance (see 5.6); and

f) quality objectives (see 4.1.3).

TIOT uses data to evaluate where continual improvement of the effectiveness of the QMS can be made.

6.4 Improvement

6.4.1 General

TIOT continually improves the effectiveness of the QMS through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review.

6.4.2 Corrective Action

TIOT maintains a documented procedure **(P-6.4.2 Corrective Action)** to correct nonconformities and to take corrective actions, both internally and within the supply chain, to eliminate the causes of nonconformities in order to minimize the likelihood of its recurrence. Corrective actions are appropriate to the effect(s) of the nonconformity encountered.

Corrective action can apply to both QMS processes and nonconforming product trends.

This procedure identifies requirements for:

a) reviewing a process nonconformity (including customer complaints);

b) determining and implement corrections;

c) identifying the root cause of the nonconformity and evaluating the need for corrective actions;

d) implementing corrective action to reduce the likelihood that a nonconformity recurs;

e) identifying the timeframe and responsible person(s) for addressing immediate correction, root cause analysis and corrective action plan;

f) verification of the effectiveness of the corrections and corrective action taken; and

g) MOC (see 5.11) when the corrective actions require new or changed controls within the QMS.

Records of the activities for control of a nonconforming process are maintained (see 4.5). Records identify the objective evidence used to reach a conclusion of effectiveness of the corrective actions taken.

6.4.3 Preventive Action

TIOT maintains a documented procedure **(P-6.4.3 Preventive Action)** to determine and implement preventive actions, both internally and within the supply chain, to eliminate the causes of potential nonconformities in order to minimize the likelihood of their occurrence. Preventive actions are appropriate to the effect(s) of the potential problems.

Preventive action can apply to both QMS processes and product analysis.

This procedure identifies requirements for:

a) Identifying opportunities for improvements;

b) identifying a potential nonconformity and its potential cause(s);

c) evaluating the need for preventive action, including any immediate or short term action required, to prevent occurrence of a nonconformity;

d) identifying the timeframe and responsible person(s) for addressing the immediate containment, root cause analysis and preventive action plan;

e) reviewing the effectiveness of the preventive action taken; and

f) MOC (see 5.11) when the preventive action requires new or changed controls within the QMS.

Records of the activities for control of potential process nonconformities are maintained (see 4.5).

6.5 Management Review

6.5.1 General

TIOT's QMS is reviewed at least every twelve months by its management to evaluate the QMS's continuing suitability, adequacy and effectiveness. This review includes assessing opportunities for improvement and the need for changes to the QMS, including the quality policy and quality objectives.

6.5.2 Input Requirements

The input to management review includes:

a) effectiveness of actions resulting from previous management reviews;

b) results of audits (see 6.2.2);

c) changes that could affect the QMS, including changes to legal and other applicable requirements (such as industry standards);

d) analysis of customer satisfaction, including customer feedback (see 6.2.1);

e) process performance;

f) results of risk assessment (see 5.3);

g) status of corrective and preventive actions (see 6.4.2 and 6.4.3);

h) analysis of supplier performance (see 5.6);

i) review of the analysis of product conformity, including nonconformities identified after delivery or use (see 5.10); and

j) recommendations for improvement.

6.5.3 Output Requirements

The output from the management review includes a summary assessment of the effectiveness of the QMS. The assessment also includes any required changes to the processes and any decisions and actions, required resources and improvement to products in meeting customer requirements (see 5.11).

Top management reviews and approves the output of management reviews. Management reviews are documented and records of these reviews are maintained (see 4.5).

7 API Marking Procedure

TIOT maintains a documented API marking procedure **(P-7.0 API Monogram Process)** which incorporates the marking requirements of API Specification Q1 Annex A, section A.5 and the applicable specification 8C requirements.

QUALITY MANUAL REVISION HISTORY

Section #	Multiple
Date	7/10/12
Description of changes	Updated location, footer, approver and organization chart
Approved by	Ty Young
New Revision	1

Section #	Cover Page and Appendix C
Date	01/03/14
Description of changes	Updated Location and Organization Chart
Approved by	Ty Young
New Revision	2

Section #	All
Date	05/30/14
Description of changes	Entire Manual Rewritten to meet 9th Edition Requirements
Approved by	Ty Young
New Revision	3

Section #	5.7.1.5
Date	05/20/15
Description of changes	Corrected special process requiring validation to NDE, Welding and Heat treat
Approved by	Ty Young
New Revision	4

Section #	Appendix C
Date	02/22/16
Description of changes	Updated organizational chart
Approved by	Ty Young
New Revision	5

Section #	Appendix C
Date	5/24/16
Description of changes	Updated Organization Chart
Approved by	Ty Young
New Revision	6

Appendix A

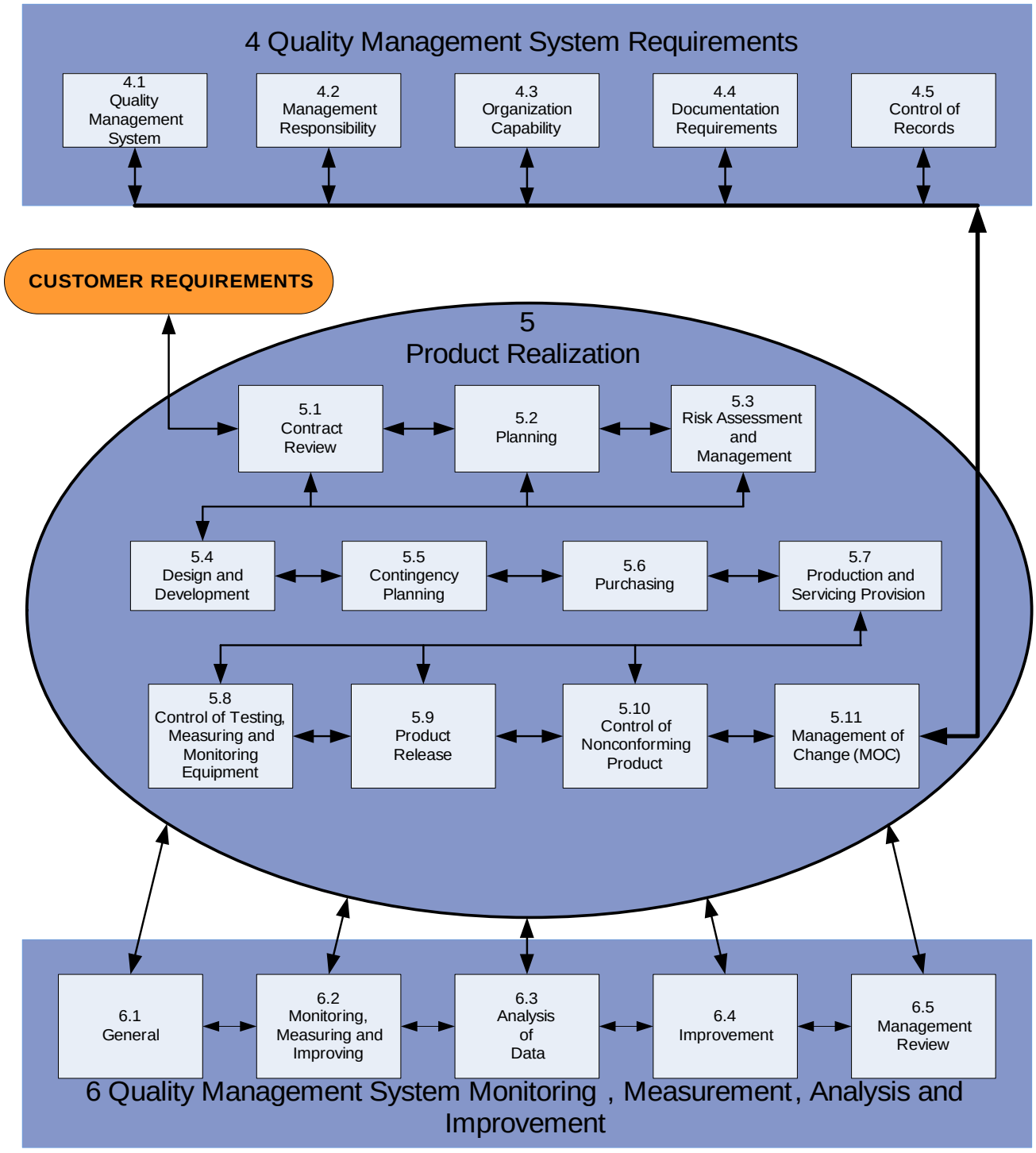
Quality Policy

"It is the policy of Texas International Oilfield Tools to meet and/or exceed customer requirements by on-time delivery of the highest quality of oilfield equipment, in strict compliance with safety and regulatory requirements, while providing maximum value and superior customer service during and after the sale of products, and to continually improve the effectiveness of our quality management system."

Approved by: **Ty Young** Date: **07/10/12**
Chief Operating Officer

Appendix B

QMS Process Flow and Interaction



Appendix C

Organization Chart