




Quality System Manual

ISO 9001:2008 – Quality Management System – Requirements
 API, Specification Q1 – Specification for Quality Programs for Petroleum,
 Petrochemical, and Natural Gas Industry

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	<h1>Quality System Manual</h1>		Document No.:	QSM 000
			Revision:	B
	Effective Date:	01/20/2011		
		Page:	2 of 44	

1.0 SCOPE

1.1 Organizational Identity, Quality Policy, Mission and Objectives

Organizational Identity: Texas International Oilfield Tools (TIOT) is a privately held company which manufactures and distributes the highest quality of critical oilfield equipment and tools to the petroleum, petrochemical and natural gas industry.

Quality Policy: It is the policy of Texas International Oilfield Tools to meet and/or exceed our 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.

Mission and Objectives: It is the mission of Texas International Oilfield Tools to constantly strive to provide superior oilfield equipment with outstanding value at the time the customer needs it. We will make every effort to maximize customer satisfaction by:

- Ensuring that all of our products comply with customer and industry requirements, as well as relevant safety and regulatory requirement;
- Providing the highest level of customer services before, during, and after the sale;
- Establishing manufacturing and quality objectives, and measuring our performance in order to continuously improve the product, the processes, and our service.

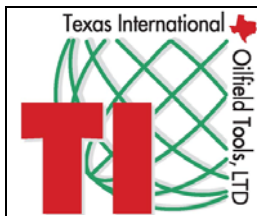
Further, it is the mission of management to ensure that our employees understand the business and take personal ownership in what they do, realizing the impact of our products and services to our customer's success. Therefore, in order to support the mission of the organization, we will to hire qualified employees and provide sufficient training to ensure that they become valuable resources with an outstanding level of knowledge and skills that will set us apart from our competition.

It is the mission of the organization to continuously improve our processes, systems, and technology to provide higher product quality, lower costs, and reduced lead time to maximize our customers' success.

1.1 Introduction

1.1.1 This TIOT Quality Management System is established and maintained in order to define and provide an overview of the Quality Management System (QMS) documented and implemented at TIOT to ensure conformance with the following industry standards:

- ANSI/API Specification Q1 – Specification for Quality Programs for the Petroleum, Petrochemical and Natural Gas Industry (8th Edition, December 2007)



Quality System Manual

Document No.: QSM 000

Revision: B

Effective Date: 01/20/2011

Page: 3 of 44


- ISO TS 29001:2007 – *Petroleum, petrochemical and natural gas industries – Sector specific requirements – Requirements for product and service supply organizations* (identical to API Q1:2007)
- ISO 9001:2008 – *Quality Management Systems – Requirements*

Therefore, this Quality System Manual, providing an overview of the TIOT Quality Management System is divided into eight (8) sections, modeled after the sectional organization of the ISO 9001:2008 and API Specification Q1 Quality Management Systems requirements. Each subsection of this Quality System Manual defines general policies and basic principles pertinent to the TIOT processes, summarizes responsibilities and methods, and references relevant SOPs and other required documents.

- 1.1.2 Further, this TIOT Quality System Manual is established and maintained to identify the processes at TIOT and define the interactions of these processes, and their management, to produce and distribute oilfield equipment which satisfy specified requirements.
- 1.1.3 This TIOT Quality System Manual is established and maintained to demonstrate Management's commitment to quality, ensuring that both the operation and control of processes are effective; ensuring the availability of resources and information necessary to support the operation and monitoring of these processes; to monitor, measure, where applicable, and analyze these processes, and implement actions necessary to achieved planned results and continually improve these processes.
- 1.1.4 This TIOT Quality System Manual is established and maintained to define and demonstrate how TIOT consistently manufacturers and/or distributes product that meets customer and applicable statutory and regulatory requirements; and aims to enhance customer satisfaction through the effective application of, and continuous improvement of the TIOT Quality Management System.

1.2 Application

- 1.2.1 This Quality Management System, including this Quality Systems Manual, all interrelated procedures (QSPs), work instructions (WIs), and associated forms and records is applicable to all TIOT to management and personnel with assigned responsibilities having the potential to affect product and/or service quality.
- 1.2.2 The Quality Management System applies to all products, manufactured or outsourced, distributed by TIOT, and includes, where applicable the design, manufacture, measurement, and distribution of all products, and is established and maintained to demonstrate the ability of TIOT to consistently provide product and

	<h1>Quality System Manual</h1>	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	4 of 44

services that meets customer requirements, as well as the ISO 9001 and API Q1 industry standards.

1.2.3 The Quality Management System is established and maintained to enhance customer satisfaction through the effective application of the system, specifically including processes for continual improvement of the system, and the assurance of conformity to customer requirements and industry standards.

1.2.4 Exclusions: TIOT does not herein claim or justify any exclusions from the subclauses of the ISO 9001 and/or API Q1 Quality Management Systems requirements.

1.3 Quality System Control

1.3.1 This Quality Manual, along with Quality System Procedures (QSPs), Work Instructions (WI), Forms, and Drawings will be maintained under document (revision) control.

1.3.2 Document Distribution: The current revision level of each controlled document will be made available to applicable TIOT staff via the TIOT intranet. Documents may be printed for reference only, and will be considered obsolete at the end of the day, unless otherwise controlled. If controlled paper copies of documents are printed and distributed, it will be the responsibility of the Quality Manger to maintain a list of the documents, along with the recipients.


1.3.2.1 Controlled documents are not distributed outside of the organization without the permission of top management. If this Quality System Manual is distributed outside of TIOT (i.e., to a customer), it will be consider uncontrolled, and will not be updated with subsequent revisions.

1.3.2.2 It is the responsibility of each individual using controlled documents to verify the correct revision level on the TIOT intranet

1.4 Quality System Changes

1.4.1 Notification of Changes (substantive changes), including Management change Organization Structure, Change of Facility, substantive changes to the Quality System Manual, will be provided in writing to API and the ISO 9001 Registrar, if required.

1.4.2 TIOT staff will be notified of changes through the formal change control process, defined in **QSP 4.2.3 – Document and Data Control**.

	<h1>Quality System Manual</h1>	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	5 of 44

2.0 NORMATIVE REFERENCES


The following referenced documents are indispensable for the application of the TIOT Quality Management System. For dated references, only the edition cited applies. In the event of an undated reference, the latest edition of the referenced document (including any amendments) applies.

2.1 Industry Standards for Quality Management Systems

- API Specification Q1 [8th Edition] – *Specification for Quality Programs for the Petroleum, Petrochemical and Natural Gas Industry*
- ISO TS 29001:2007 – *Petroleum, petrochemical and natural gas industries – Sector specific requirements – Requirements for product and service supply organizations (identical to API Specification Q1).*
- ISO 9001:2008 – *Quality Management Systems – requirements*


2.2 Guidance Standards

- ISO 9000:2005(E) – *Quality Management Systems – Fundamentals and Vocabulary*
- ISO 9004:2000 – *Quality Management Systems – Guidelines for Performance Improvements*
- ISO 19011 – *Guidelines for quality and/or environmental management systems auditing*


	<h1>Quality System Manual</h1>	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	6 of 44

3.0 TERMS AND DEFINITIONS

- 3.1** The TIOT QMS uses the same internationally recognized terms, vocabulary and definitions given in ISO 9000:2000.
- 3.2** References and definitions of MIL-I-45208, MIL-Q-9858A, ISO 8402/ANSI A3 and ISO 9000/ANSI Q90, Quality Management and Quality Assurance Standards, apply
- 3.3** The specific definitions below, from API Q1-2007 / ISO TS 29001:2007 and specifically relating to the petroleum, petrochemical, and natural gas industries:
- acceptance criteria - specified limits of acceptability applied to process or product characteristics
 - acceptance inspection - demonstration through monitoring or measurement that the product complies with specified requirements
 - calibration - comparison and adjustment to a standard of known accuracy
 - control feature - organization's documented method to perform an activity under controlled conditions to achieve conformity to specified requirements
 - delivery - point in time and physical location at which the agreed transfer of ownership takes place
 - design acceptance criteria - defined limits placed on characteristics of materials, products, or services established by the organization, customer, and/or applicable specifications to achieve conformity to the product design
 - design validation - process of proving a design by testing to demonstrate conformity of the product to design requirements
 - design verification - process of examining the result of a given design or development activity to determine conformity with specified requirements
 - field nonconformity - product nonconformity that is detected after delivery or use has started
 - manufacturing acceptance criteria - defined limits placed on characteristics of materials, products and services established by the organization to achieve conformity to the manufacturing or service requirements

	<h1>Quality System Manual</h1>		Document No.:	QSM 000
			Revision:	B
	Effective Date:	01/20/2011		
		Page:	7 of 44	

- tender - offer made by an organization in response to an invitation to provide a product

	<h1>Quality System Manual</h1>	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	8 of 44

4.0 QUALITY MANAGEMENT SYSTEM

4.1 General Requirements


4.1.1 TIOT has established and maintains a Quality Management System as a system of interrelated processes. All main activities of the system are defined as “Quality System Processes” documented in Quality System Procedures (QSPs), and are grouped into the following six (6) categories (refer to the “Quality Systems Process Map” on the following page)

- a) Customer Requirements, including requirements of Industry Standards (ISO 9001/API Q1): Identify the processes needed for the Quality Management System and their application throughout the organization.
- b) Product Realization: Determine the sequence and interaction of these processes;
- c) Outsourced Processes: The type and extent of control to be applied to outsourced processes (e.g., tissue recovery organizations, laboratories performing dose audits, infectious disease testing laboratories, irradiation facilities, etc.) shall be defined with in the Quality Management System;
- d) Measurement, Analysis and Improvement: Determine the criteria and methods needed to ensure that both the operation and control of these processes are effective;
- e) Management Responsibility: ensure the availability of resources and information necessary to support the operation and monitoring of these processes;
- f) Resource Management: Monitor and analyze these processes.
- g) Continual Improvement: Implement actions necessary to achieve planned results and continuing improvement of these processes.

These six process categories are organized into a “Plan-Do-Check-Act” continuous loop to ensure the implementation of a process of continuous improvement.

4.1.2 The sequence and interrelation between the six groups is illustrated in the Quality System Process Map diagram (next page).

4.1.3 QMS processes and sub-processes are defined in this Quality Manual and in

	<h1>Quality System Manual</h1>		Document No.:	QSM 000
			Revision:	B
	Effective Date:	01/20/2011		
		Page:	9 of 44	

associated Quality System Procedures (QSPs) showing both their sequence and interrelationships. QSPs further instruct on how to implement and apply them throughout the organization.

- 4.1.4 QMS documentation also defines criteria and methods required to ensure that the operations and controls of the quality system processes are effective. This includes assignment of responsibilities and allocation of resources for the process, instructions on how to carry out (or operate) the process, and definition of methods for monitoring and/or measuring the effectiveness of the process, where applicable.
- 4.1.5 **Outsourced Processes:** The TIOT Quality Management System defines how TIOT maintains responsibility for product conformance to specified requirements when processes and/or product is outsourced. See section 7.4.1 – Purchasing, of this Quality System Manual, along with the associated QSPs referenced below.

QSP 7.4.1 – *Supplier Evaluation and Selection*

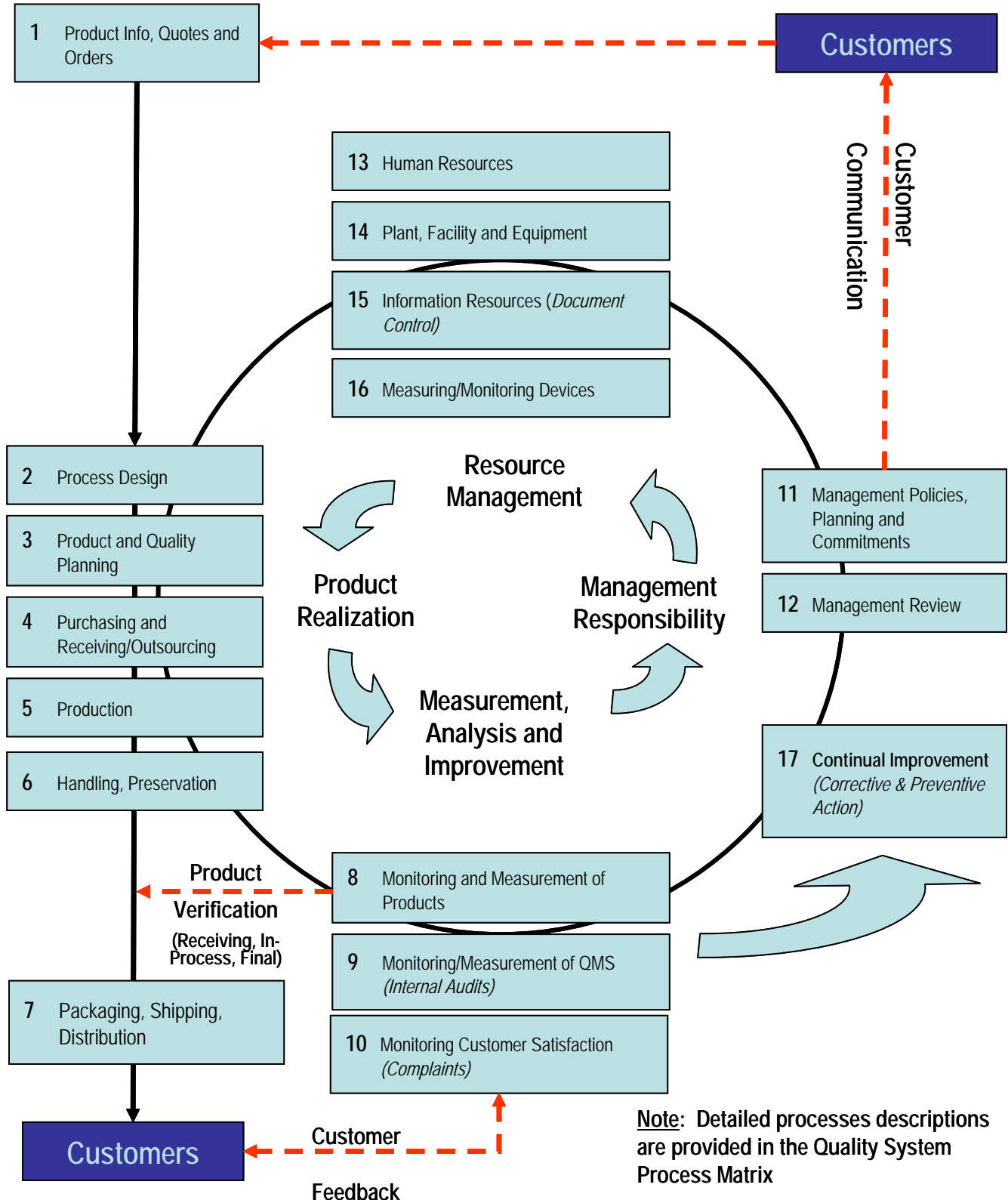
QSP 7.4.2 – *Purchasing*

QSP 8.2.4 – *Monitoring and Measurement of Product* (for receiving Inspection of Outsourced materials and/or product)

Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	10 of 44

Quality System Process Map



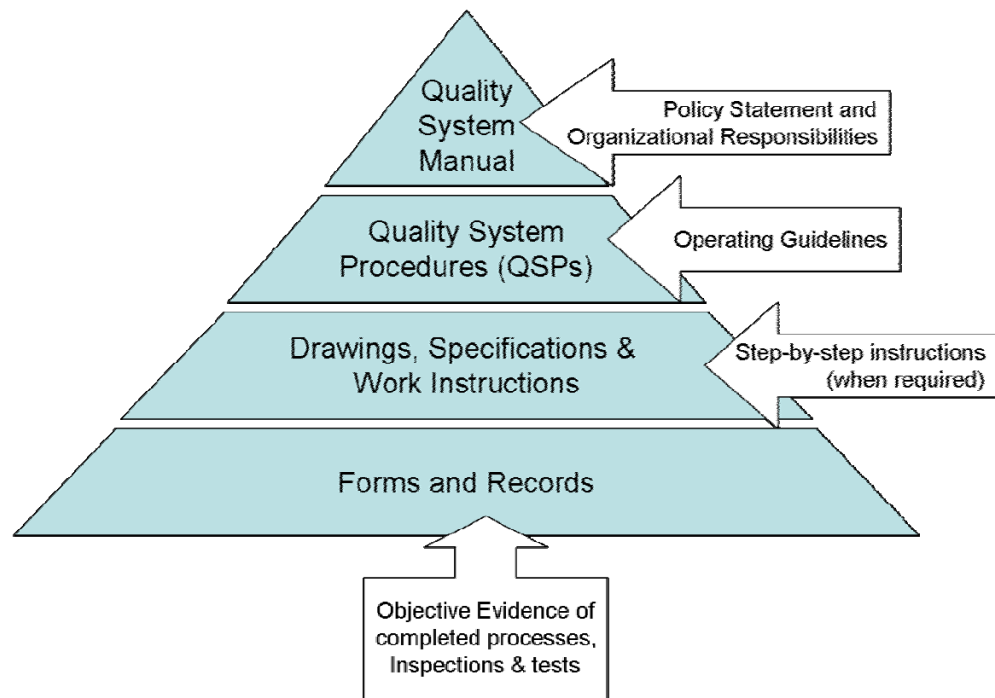
4.2 Documentation and Records

Documents and records required by ISO 9001:2008 and API Specification Q1, and those determined by TIOT to be necessary to ensure effective planning, operation, and control of processes.

4.2.1 Documentation

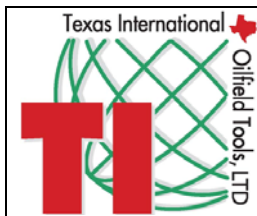
The documents and records required by the ISO 9001:2008 and API Specification Q1 Quality Management System standards, and those determined by TIOT to be necessary to ensure the effective planning, operation, and control of processes. The figure below illustrates the TIOT Documentation Structure:

Quality System Documentation Structure



4.2.2 Quality System Manual (QM): This top-level document defines TIOT’s quality policy, defines the scope of the Quality Management System; describes the overall quality system, its processes, and their sequence and interrelationships; and further references applicable Quality System Procedures (QSPs). Further, the Quality System Manual identifies the manner in which TIOT addresses each specific requirement of ISO 9001:2008 and API Specification Q1 [8th Ed.].

- **Quality System Procedures (QSPs):** The purpose of QSPs is to guide personnel in the performance of TIOT processes, such as carrying out and



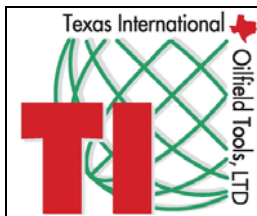
Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	12 of 44

controlling processes, handling products, maintaining and calibrating IM&TE, conducting tests and inspections, etc. SOPs are numbered in accordance with the corresponding number in the API Q1 and ISO 9001 standards, as illustrated in the table below:

QSP Category	Document Description
QSP 4.2.3	<i>Document and Data Control</i>
QSP 4.2.4	<i>Control of Records</i>
QSP 5.6	<i>Management Review of the Quality Management System</i>
QSP 6.2.2	<i>Competence, Training, and Awareness</i>
QSP 6.3	<i>Facilities and Equipment Maintenance</i>
QSP 7.1	<i>Product Quality Planning</i>
QSP 7.2.2	<i>Identification and Review of Product Requirements</i>
QSP 7.3	<i>Design and Development</i>
QSP 7.4.1	<i>Supplier Evaluation and Selection</i>
QSP 7.4.2	<i>Purchasing</i>
QSP 7.5.1	<i>Job Planning</i>
QSP 7.5.3	<i>Product Identification and Traceability</i>
QSP 7.5.5	<i>Product Handling, Storage, Packaging, Preservation, & Delivery</i>
QSP 7.6	<i>Control of Inspection, Measuring, and Test Equipment</i>
QSP 8.1	<i>Statistical Techniques</i>
QSP 8.2.1	<i>Customer Satisfaction and Complaint Handling</i>
QSP 8.2.2	<i>Internal Audit</i>
QSP 8.2.4	<i>Monitoring and Measurement of Product</i>
QSP 8.3	<i>Control of Nonconforming Materials</i>
QSP 8.5	<i>Continual Improvement (CPAR)</i>

- **Work Instructions (WIs):** When necessary, TIOT develops Work Instructions to provide specific instructions to ensure that all steps required in a process are carried out in strict accordance with the process requirements. Where WIs relate to Quality System Procedures, they will be numbered corresponding to the procedure, followed by “WI” and a sequential number. Example: A specific Inspection Work Instruction (WI) relating to QSP 8.2.4 – Monitoring and Measurement of Product, would be numbered 8.2.4-WI-XXX.
- **Forms:** Form numbers are associated with the related QSP or WI followed by the letter “F” and a sequential number. Example: QSP 8.2.4 – *Monitoring and Measurement of Product* references the following associated forms:
 - ✓ TIOT Form 8.2.4-F01 – *Inspection Report Form – Purchased Materials & WIP*
 - ✓ TIOT Form 8.2.4-F02 – *End Item Final Inspection Report (EIFR)*



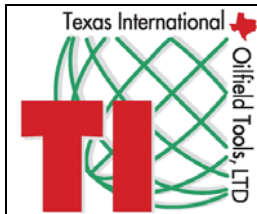
Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	13 of 44

- **Deployment Flow Charts (DFCs):** TIOT has developed DFCs in order to articulate the steps and identify the process owners of many of their internal processes. In most cases the DFCs have been imbedded within the associated procedure for use in conjunction with the procedure in order to provide clarity to the process. As with other documents, the numbering of DFCs corresponds to the QSP.
Example: QSP 8.2.4 – *Monitoring and Measurement of Product* has three (3) associated DFCs:
 - ✓ DFC 8.2.4.01 – *Receiving Inspection Process*
 - ✓ DFC 8.2.4.02 – *In-Process Inspection Process*
 - ✓ DFC 8.2.4.03 – *Final Inspection Process*
- **Process Assessment Worksheets (PAWs):** TIOT has established and maintains Process Assessment Worksheets, which may be used by managers and internal auditors to document, assess, manage, measure and improve key QMS processes. Each PAW defines the key process inputs/outputs, controls, measures and improvement objectives associate with the process. The PAWs correspond to the processes/systems depicted in our DFCs, and defined in our QSPs:
- **External Standards and Guidelines:** These documents are often referred to as “documents of external origin” and include industry standards (i.e., ISO 9001:2008 and API Q1) and guidance documents that are indispensable for the application of the TIOT Quality Management System.

4.2.3 Control of Documents [Document and Data Control]

- 4.2.3.1 TIOT has established and maintains **QSP 4.2.3 – Document and Data Control** to define the controls needed to:
 - a) Define a standardized process for the development of new documents required by the QMS [i.e., QSPs, WIs, Drawings, DFCs, and Forms]
 - b) Review and approved documents for adequacy prior to issue;
 - c) Review and up-date, as necessary, and re-approve documents;
 - d) To ensure that changes and the current revision status of documents are identified;
 - e) To ensure that the relevant revisions of applicable documents are available at the point of use;
 - f) To ensure that documents remain legible and readily identifiable;
 - g) To ensure that “documents of external origin” [*documents such as industry standards and guidance documents indispensable for the*



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	14 of 44


application of the TIOT Quality Management System] are identified, their distribution is controlled, and there is an internal process to ensure that the organization’s quality management system addresses all required elements of the most current revision of these standards.

- h) To prevent the unintended use of “obsolete” documents, and to apply suitable identification to them if they are retained for any purpose.

4.2.3.2 TIOT maintains a Document Master List to identify the documents required by the Quality Management System, and their current revision status.

4.2.4 Control of Records

TIOT documents activities/processes in records that are established and maintained to provide objective evidence of conformity to requirements and of the effective operation of the QMS. TIOT has established and maintains **QSP 4.2.4 – Control of Records** to define the system utilized at Texas International Oilfield Tools, Ltd. for the identification, maintenance, indexing, storage and control of quality records to ensure that they are retained for not less than the period of time specified by the API Q1 Standard or five years, whichever is longer.

	<h1>Quality System Manual</h1>	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	15 of 44

5.0 MANAGEMENT RESPONSIBILITY

5.1 Management Commitment

At TIOT, Top Management’s commitment to the highest quality of products and services to our customers is evidenced in the development and implementation of the Quality Management System in conformance with the requirements of ISO 9001:2008 and API Specification Q1 – Quality Management System Requirements, as well the establishment of processes to monitor, measure, and continuously improve it’s effectiveness by:


- a) Communicating to the organization the importance of meeting customer, as well as statutory and regulatory requirements;
- b) Establishing the Quality Policy [see Section 1.1 of this Quality System Manual];
- c) Ensuring that quality objectives are established;
- d) Conducting management reviews to routinely evaluate the suitability, effectiveness, and degree of implementation of the QMS;
- e) Ensuring an annual internal audit of the QMS to verify that the organization continually follows the requirements of the QMS and implement corrective action to continuously improve the system;
- f) Ensuring the availability of resources.

5.2 Customer Focus

5.2.1 The principle objective of the TIOT Quality Management System is to identify customers and to focus our organization on the customer, and in particular customer satisfaction. To that end TIOT Top Management is committed to achieving high customer satisfaction through an accurate determination and understanding of customer requirements and effective verification that the requirements are met.

5.2.2 **Product Customers:** The goal of the QMS is stated in the TIOT Quality Policy “to meet and/or exceed our customer’s requirements...” We will accomplish this objective by carefully listening to the “voice of the customer” through complaints and customer satisfaction survey reports, and other means of feedback regarding our products and services. We will routinely communicate with our customers, as possible, to understand our customer’s stated and implied requirements. We will establish and maintain processes that are reliable to ensure that products are outsourced and/or manufactured in strict accordance with specifications and drawings.

5.2.3 **Industry Customers:** TIOT recognizes the long-standing and valuable role of API and the ISO Registrar. It is therefore the goal and commitment of TIOT to

	Quality System Manual	
	Document No.:	QSM 000
	Revision:	B
	Effective Date:	01/20/2011
	Page:	16 of 44

meet and exceed this customer’s requirements by maintaining compliance with the API Q1 and ISO 9001:2008 Quality Management Systems Requirements.

5.3 Quality Policy

“It is the policy of Texas International Oilfield Tools to meet and/or exceed our 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.”

- 5.3.1 Top Management shall annually review the Quality Policy for continued appropriateness and suitability to the mission and objectives of TIOT. This annual review of the Quality Policy shall be documented in accordance with **QSP 5.6 – Management Review of the Quality Management System**.
- 5.3.2 The TIOT Quality Policy provides an overall framework for establishing specific quality objectives, and provides direction for the goal of continual improvement.
- 5.3.3 Top Management shall ensure that the Quality Policy is known and understood by all TIOT employees, is prominently displayed throughout the TIOT facility, and is distributed to customers and other interested parties.

5.4 Planning

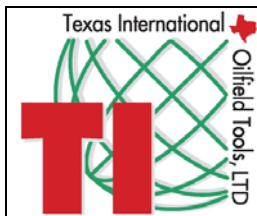
5.4.1 Quality Objectives

Quality Objectives, consistent with the Quality Policy, are established throughout TIOT in order to meet requirements for products and processes, and to improve the quality system and quality performance. Top Management is responsible for establishing and communicating Quality Objectives to relevant functions within TIOT. Quality objectives are:

- a) Quantitative and measurable;
- b) Attainable and realistic;
- c) Consistent with the Quality Policy
- d) Controlled by the relevant functions
- e) Monitored and measured.

Inputs into the process of establishing Quality Objectives may include relevant findings from management reviews, current product results, customer satisfaction ratings, customer complaints, and process monitoring results.

5.4.2 Quality Management System Planning



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	17 of 44

- 5.4.2.1 The ISO 9001:2008 and API Q1 Quality Management System Requirements are the primary in-puts in determining the requirements of the Quality Management System. Quality Management System processes are planned to ensure that the QMS is appropriate for its intended purpose, and that it is effectively implemented and managed.
- 5.4.2.2 The Quality Assurance Manager is responsible for ensuring that the QMS process required are implemented, and that the sequence and interaction of these processes are identified. Processes are documented and controlled and monitored through:
- a) Quality System Procedures
 - b) Work Instructions, where specified
 - c) Deployment Flow Charts (DFCs)
 - d) Product Quality Planning (identified on the Job Traveler)
 - e) Manufacturing Drawings
 - f) Process Assessment Worksheets
- 5.4.2.3 The output of Quality System Planning is documented in this Quality Manual, in Quality System Procedures (QSPs), and on Quality Records designed to provide a complete history of activities.
- 5.4.2.4 Changes to the Quality Management System are planned and controlled in accordance with **QSP 4.2.3 – Document and Data Control**, and are reviewed for adequacy before implementation.

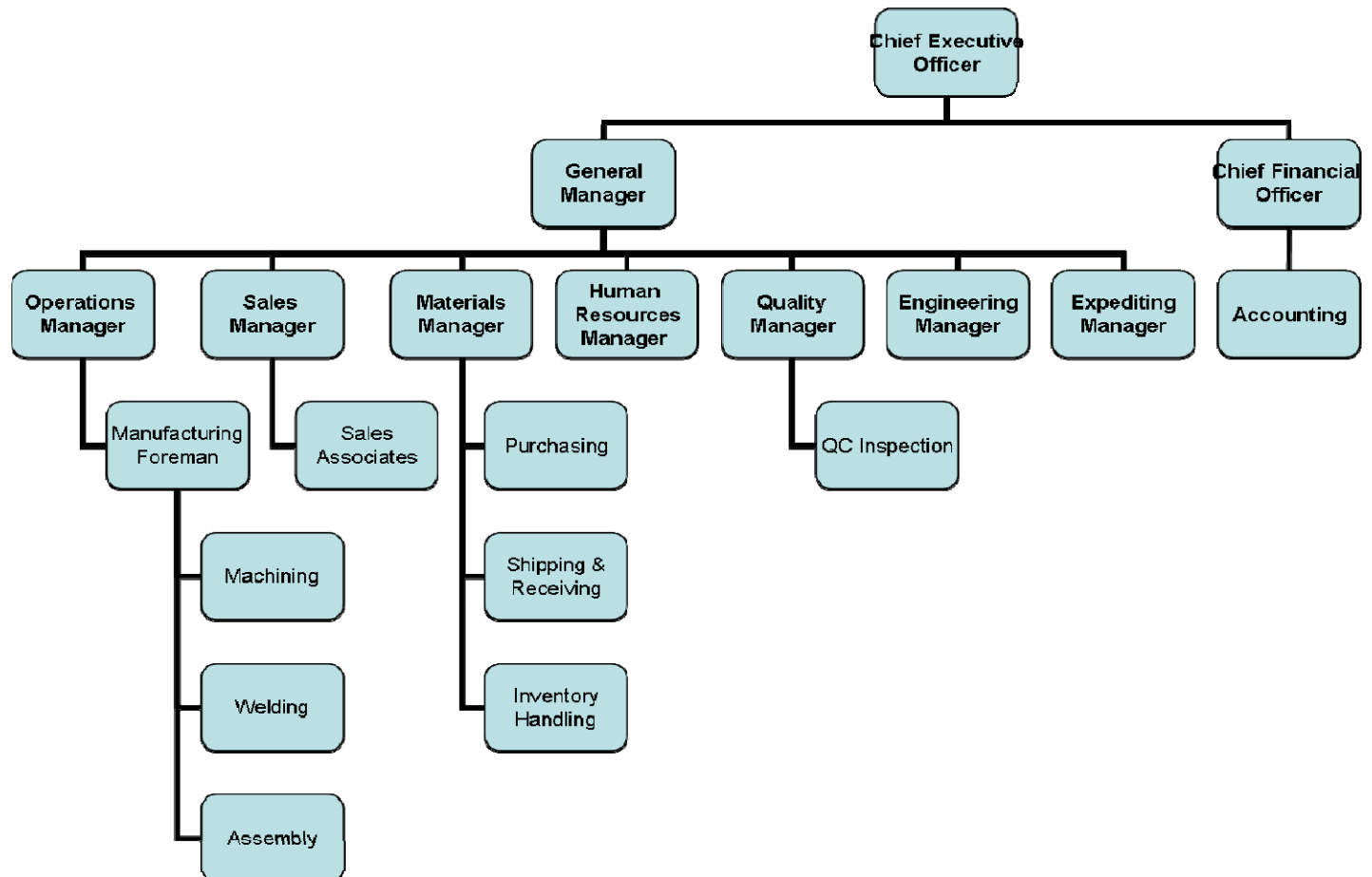
5.5 Planning

5.5.1 Responsibility and Authority

- 5.5.1.1 Interrelationship of all personnel who manage, perform and verify work affecting product quality is identified in an Organizational Chart (see below).

Quality System Manual


Texas International Oilfield Tools, Ltd. Organizational Chart



5.5.1.2 All departments and functions in the company are responsible for implementing, maintaining and improving the Quality Management System.

5.5.1.3 Authorities and responsibilities for specific processes of the QMS are defined:

- Throughout this Quality Manual and in every Standard Operating Procedure where the specific quality system process or activity is documented
- In Job Travelers
- In job descriptions, where applicable.

	Quality System Manual	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	19 of 44

5.5.2 Management Representative of the QMS

TIOT Top Management has appointed the Quality Manager to be the Management Representative of the QMS, who irrespective of other responsibilities has responsibility and authority which includes:

- Ensuring that the QMS is established, implemented, maintained, and continually improved;
- Ensuring that processes needed for the QMS are established, implemented and maintained;
- Promoting quality, regulatory and customer awareness throughout the organization;
- Reporting to top management on the performance of the QMS, including recommendations for improvement;
- Generating, in conjunction with personnel concerned, procedures and instructions defining the organization's general processes, and where necessary;
- Controlling, updating and issuing the organization's QSPs;
- Ensuring that there is a system of verification and audits independent of the person or authority carrying out the functions;
- Analyzing all reported quality problems and ensuring corrective action(s) are taken;
- Coordinating communication with external parties on matters relating to the QMS, and ISO 9001:2008 / API Q1 registration.
- Ensuring the promotion of awareness of customer requirements throughout the organization.

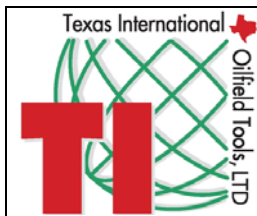
5.5.3 Internal Communication

5.5.3.1 Internal communication at TIOT flows two ways:

- Management communicates to the organization the Quality Policy and Quality Objectives; customer and regulatory requirements; product and process specifications; verification and validation requirements; and instructions on how to implement and maintain the QMS.
- The organization communicates to Management information and data regarding quality performance and effectiveness of the QMS.

5.5.3.2 Information is communicated as follows:

- Paper or electronic documents, such as the Quality Manual, SOPs instructions, specifications, quality records, reports, etc.



Quality System Manual

Document No.: QSM 000

Revision: B

Effective Date: 01/20/2011

Page: 20 of 44

- Emails, memos and meetings
- Verbal communication
- Training and awareness programs
- Staff Meetings
- All employee meetings
- Special notices provided when there are significant changes to documentation
- Performance evaluations
- Employee suggestions and feedback

5.5.3.2 Management Review meetings have a special role in ensuring proper communication between the Quality Council and the organization. The meeting provides a framework for the organization to report on the status of quality-related issues and activities, and for Management to formulate and communicate policies and directives to improve the QMS, as defined in *QM Section 4.0*.

5.5.3.3 Employees are encouraged to provide constructive suggestions and feedback to Management.

5.6 Management Review

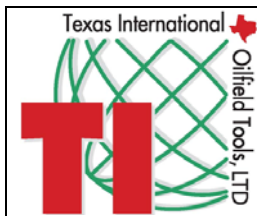
5.6.1 General

5.6.1.1 Management reviews of the QMS are conducted annually, as a minimum, in order to ensure the continuing suitability, adequacy and effectiveness of the QMS in accordance with **QSP 5.6 – Management Review of the Quality Management System**, and as illustrated in **DFC 5.6 – Management Review Process**.

5.6.2 Management Review Input

5.6.2.1 The purpose of Management Reviews is to evaluate collected data from the following sources:

- Results of audits (internal, 3rd party, and 2nd party customer audits)
- Customer feedback (Customer complaints, Customer satisfaction reports, reports and analysis of field nonconformities, and other feedback)
- Process performance and product conformity (NCR trends)
- Product delivery performance
- Status of Corrective and Preventive Actions
- Follow-Up actions from previous management reviews
- Changes that could affect the QMS



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	21 of 44


- Recommendations for improvement
- Supplier performance
- Evaluation of changes to documents of external origin [i.e., ISO 9001:2008; API Specification Q1]
- Future training requirements
- Evaluation of resource requirements
- Facilities and equipment review

5.6.3 Management Review Output

5.6.3.1 The output from Management Review includes decisions and actions relating to:

- a) Improvement of the effectiveness of the QMS and its processes
- b) Improvement of product related to customer requirements;
- c) Resource needs
- d) Establishment of Quality Objectives

5.6.3.2 Management Review meetings are documented in minutes and retained as Quality Records.

	<h1>Quality System Manual</h1>		Document No.:	QSM 000
			Revision:	B
	Effective Date:	01/20/2011		
		Page:	22 of 44	

6.0 RESOURCE REQUIREMENTS

6.1 Provision of Resources

Top management determines and provides the resources necessary to implement and maintain the quality management system and for its continuous improvement, as well as for the resources necessary for enhancing customer satisfaction through meeting or exceeding customer requirements [including human resources, infrastructure, work environment, process equipment, IM&T equipment, and supplies].

6.2 Human Resources

6.2.1 General


6.2.1.1 TIOT has established and maintains **QSP 6.2.2 – Competence Awareness and Training** to guide the process of determining and providing sufficient personnel of the appropriate education, skills, experience and training to perform work affecting conformity to product requirements.

6.2.1.2 TIOT has established and maintains job descriptions for each position affecting product quality, which identify appropriate education, skills, experience and training for the position.

6.2.2 Competence, Training and Awareness

6.2.2.1 TIOT has established and maintains **QSP 6.2.2 – Competence Awareness and Training** to define the process for:

- a) Determining the necessary competence for personnel performing work affecting conformity to product requirements, or any other
- b) Identifying the training needs, and provide training, including on-the-job training, where necessary for personnel in any new or modified job affecting product quality, including contract or agency personnel;
- c) Evaluating the effectiveness of training, or other actions taken;
- d) Ensuring that TIOT’s personnel are aware of the relevance and importance of their assigned responsibilities and tasks, and how they contribute to the achievement of the quality objectives of the organization;
- e) Ensuring that personnel whose work can affect quality are informed about the consequences to the customer of nonconformity to quality requirements;

	<h1>Quality System Manual</h1>	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	23 of 44

- f) Documenting training and maintaining records of education, training, skills and experience.

6.3 Infrastructure

TIOT has established and **maintains QSP 6.3 – *Facilities and Equipment Maintenance***, in order to assign responsibility and define the process at TIOT for the identification, maintenance and control of all facilities, machines and equipment, including material handling equipment, used in support of TIOT’s product realization processes.

Infrastructure includes, as applicable:

- a) Buildings, workspace and associated facilities;
- b) Process equipment (both hardware and software); and
- c) Supporting services (such as information systems).

6.3.0 Top management is responsible to ensure that TIOT facilities are of suitable size, construction, and location with adequate control systems to facilitate operations.

6.3.1.2 Top management is responsible to ensure that facilities are maintained in a good state of repair.

6.3.1.3 Preventive Maintenance of essential facilities and equipment is planned, implemented and documented.


6.3.1.4 Department managers/supervisors are responsible for identifying the need and requirements for new and/or modification or repair to existing infrastructure and facilities. Requests for changes are submitted to the General Manager for review and approval.

6.3.1.5 Maintenance of facilities and equipment is performed by internal personnel, where specified, and by outside contracted services.

6.3.1.6 Infrastructure requirements are evaluated as a component of Management Review (see **QSP 5.6 – *Management Review of the Quality Management System***).

6.4 Work Environment

It is the responsibility of top management to determine and manage the work environment needed to achieve conformity to product requirements, which includes ensuring that the facility is maintained in a good state of repair, organization, and cleanliness consistent with the product and manufacturing requirements.

	<h1>Quality System Manual</h1>		Document No.:	QSM 000
			Revision:	B
	Effective Date:	01/20/2011		
		Page:	24 of 44	

7.0 PRODUCT REALIZATION

7.1 Planning of Product Realization

In order to establish processes and responsibilities at TIOT for performing quality planning in order to ensure all applicable customer and other external and internal product requirements are identified and satisfied, TIOT has established and maintains QSP 7.0 – Product Quality Planning, which defines how TIOT determines the following:

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

7.1.1 The output of this planning shall be the Product Quality Plan, documented on the Job Traveler, which specifies the processes and resources to be applied to a specific product.

7.1.2 See §7.2.1 – *Determination of Requirements Related to the Product* of this Quality System Manual for processes for an evaluation of how TIOT defines the methods and establishes control features when product requirements are provided from the customer, or from other external sources.

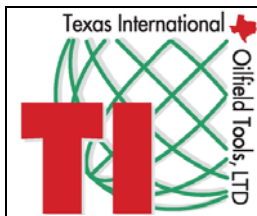
7.1.3 See §7.3 – *Design and Development*, of this Quality System Manual for verification how TIOT determines how and when Design and Development requirements apply to specific products.

7.1.4 Quality Plans (Job Travelers) are defined in the TIOT Quality Management System as “quality records” which are maintained and retained in accordance with QSP 4.2.4 – *Control of Records*.

7.2 Customer-related Processes

7.2.1 Determination of Requirements Related to the Product – TIOT has established and maintains QSP 7.2.2 – *Identification and Review of Product Requirements* to define how TIOT determines the following:

- a) When product requirements are provided by the customer, or any other external source, TIOT will review the specified requirements for completeness



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	25 of 44


and correctness in order to establish quality objectives and requirements for the product, as applicable.

- b) Requirements not stated by the customer, but necessary for specified or intended use are determined. Undefined features, characteristics or other requirements are resolved with the customer. Requirements for delivery and post-delivery activities are documented in the quality plan.
- c) Statutory and regulatory requirements, as applicable to the product are documented on the quality plan.
- d) As required, design drawings, stress analyses and new specifications are created and reviewed. Processing steps are planned and estimated. Primary process instructions are given in routings. Where needed, TIOT process drawings are prepared to clearly indicate processing steps. All necessary standards, specifications and codes are provided, as well as details of any special quality plan requirements not met by the standard TIOT quality plan.

7.2.2 Review of Requirements Related to the Product – TIOT has established and maintains **QSP 7.2.2 – Identification and Review of Product Requirements** to define how TIOT reviews requirement related to the product, to ensure that a review is conducted prior to the organization’s commitment to supply a product to the customer. This procedure ensures the following:

- a) Product requirements are appropriately defined;
- b) Contract, or order requirements, differing from those previously expressed are resolved; and
- c) TIOT has the ability to meet the defined requirements;
- d) Contract review is documented and retained as a quality record, in accordance with **QSP 4.2.4 – Control of Records**;
- e) There is a method to ensure that where the customer provides no documented statement of requirement (i.e., verbal orders), to confirm the order before acceptance;
- f) When product requirements are changed, TIOT has established a method to ensure that relevant documents are amended and that relevant personnel are made aware of the changed requirements.

7.2.3 Customer Communication - **QSP 7.2.2 – Identification and Review of Product Requirements** defines how TIOT has determined and implemented effective

	<h1>Quality System Manual</h1>	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	26 of 44

arrangements for communicating with customers in relation to product information, inquiries, contracts or order handling, including amendments. Further, TIOT has established and maintains **QSP 8.2.1 – Customer Satisfaction and Complaint Handling** to define customer communication relating to customer feedback and customer complaints.

7.3 Design and Development

7.3.1 Design and Development Planning

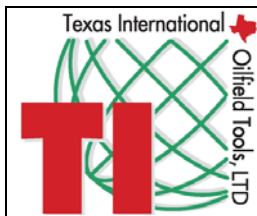
TIOT has established and maintains QSP 7.3 – Design and Development. This Quality system procedure defines the process for Design and Development Planning, including the process at TIOT for determining:

- a) Required design and development stages;
- b) Requirements for design review, verification, and validation appropriate to each design and the development stage;
- c) The responsibilities and authorities for design and development.

7.3.1.1 TIOT provides equipment and tool solutions to our customers. Some customers describe, in purchase orders, drawings and specifications, the exact characteristics of their designs. In those cases we do not perform design and development activities as described in the standard, and such customer designs are not within the scope of section 7.3 of the TIOT Quality Management System.

7.3.1.2 Texas International Oilfield Tools also furnishes equipment produced by manufacturers other than TIOT. Such items are not within the scope of section 7.3 of the TIOT Quality Management System. The following system of controls, as further defined in **§7.4 – Purchasing of this Quality System Manual** has been established at TIOT to ensure that outsourced products conform to specified requirements:

- a) **QSP 7.4.1 – Supplier Evaluation** to evaluate and ensure that TIOT Approved Suppliers are capable of producing products that conform to specifications.
- b) **QSP 8.2.4 – Monitoring and Measurement of Product**, which defines how TIOT performs incoming inspection on all outsourced products.
- c) TIOT requires that Approved Suppliers of products manufactured and distributed by TIOT provide a **Certificate of Conformance**, documenting how the Supplier has ensured that the product has been manufactured and verified to conform to specified requirements.



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	27 of 44

- d) When required, TIOT may elect to perform a *site audit* of Suppliers to verify that they are capable of supplying products that conform to specifications

7.3.1.3 Texas International Oilfield Tools also designs, manufactures and delivers equipment and tool solutions to our customers that fall wholly within the requirements of this section. **QSP 7.3 – Design and Development**, details the requirements for design and development activities.

7.3.1.4 Design Documentation: The output of the design planning process will vary depending upon the complexity of the design and its intended use, but shall include the methods, assumptions, drawings and calculations required. Documentation will be updated as needed during the design and development process, which will be reviewed for adequacy.

7.3.2 Design and Development Inputs

The process for determining the required design and development inputs is defined in **QSP 7.3 – Design and Development**, including, but not limited to:

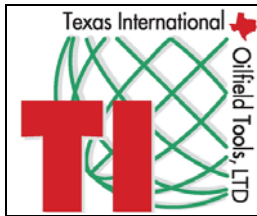
- functional and performance requirements;
- applicable regulatory and legal requirements;
- applicable information derived from similar designs;
- any other requirements essential for design and development;
- customer-specified requirements.

Inputs will be reviewed for adequacy to ensure that they are complete unambiguous, and not conflicting with other requirements.

7.3.3 Design and Development Outputs

The process for determining the required design and development outputs, as verifiable against the design inputs, is defined in **QSP 7.3 – Design and Development**. Design outputs are developed to ensure that they:

- meet the input requirements for design and development;
- provide appropriate information for purchasing, production, and materials;
- contain product acceptance criteria;
- define the characteristics of the product that are essential to its safe and proper use.



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	28 of 44

7.3.3.1 Design outputs will be documented, and usually result in a manufacturing drawings or specifications.

7.3.4 Design and Development Review

QSP 7.3 – Design and Development defines the process for determining and conducting and documenting Design Reviews at appropriate stages, and in accordance with planned arrangements, as determined by Engineering:

- a) To evaluate the ability of the results of design and development to meet requirements;
- b) To identify any problems and propose necessary changes

7.3.4.1 Engineering will be responsible to identify the appropriate representatives of functions concerned with the design and development stage being reviewed.

7.3.4.2 A final design review shall be conducted and documented.

7.3.4.3 The final design shall be reviewed and approved by top management, other than the Engineer who developed the design.

7.3.5 Design and Development Verification

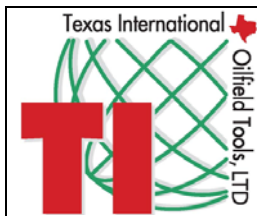
Design verification activities are conducted by Engineering in accordance with **QSP 7.3 – Design and Development**, to ensure that design output meets the design input requirements. Records of the verification activities and any necessary actions will be maintained.

Design verification activities include one or more of the following:

- a) Conforming the accuracy of design results through the performance of alternative calculations;
- b) Review of design output documents independent of activities documented during Design Review;
- c) Comparing new designs to similar proven designs.

7.3.6 Design and Development Validation

In accordance with **QSP 7.3 – Design and Development**, the Engineering Manager is responsible to ensure that design validation is planned, performed and results recorded to document that product conforms to defined user needs and/or requirements, and yields the desired results.



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	29 of 44

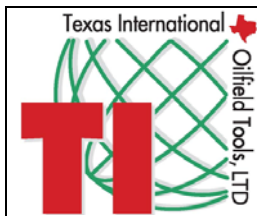
- 7.3.6.1 The results of all design validation will be documented and reviewed throughout the validation cycle.
- 7.3.6.2 Review of results will include nonconformity and failure analysis. Multiple validations may be required if there are different intended uses. Design validation activities may include:
 - a) Prototype tests;
 - b) Functional and/or operational tests of product products which include evaluation of performance, durability, safety, reliability, and maintainability under expected storage and operational conditions;
 - c) Tests specified by industry standards and/or regulatory requirements;
 - d) Inspections to verify that design features conform to defined user needs and that authorized design changes have been accomplished and recorded.
 - e) Field performance tests.

7.3.7 Control of Design and Development Changes

- 7.3.7.1 In accordance with requirements documented in **QSP 7.3 – Design and Development**, each design project will document the specific procedures and responsibilities needed to control the release, change, and use of documents and data that define the design input and the design baseline (output), and for authorizing the necessary work to be performed to implement changes and modifications.
- 7.3.7.2 The Engineering Manager is responsible to ensure that all design changes and modifications are identified, documented, reviewed, and approved by authorized personnel before their implementation.
- 7.3.7.3 Records of the reviews and needed corrective actions will be maintained. Changes require the same control as the original design and design documentation.

7.4 Purchasing

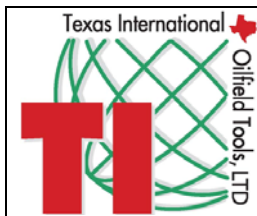
- 7.4.1 TIOT ensures that purchased product conforms to specified purchase requirements. The type and extent of control applied to the supplier and the purchased product Procedures have been developed to evaluate the effect of the purchased product on subsequent product realization or the final product. Procedures have also been established and maintained to evaluate and select supplies based on their ability to supply product in accordance with specified requirements.



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	30 of 44

- 7.4.1.1 TIOT has established and maintains **QSP 7.4.2 – Purchasing** to control the purchasing process to ensure that purchased product that affects product quality conforms to specified purchased requirements.
- 7.4.1.2 TIOT has established and maintains **QSP 7.4.1 – Supplier Evaluation and Selection** to define the process and establish criteria for the selection, evaluation, and re-evaluation of suppliers. TIOT suppliers are evaluated for adequacy in one or more of the following ways:
- a) Inspection of the supplier’s final product at the supplier’s facility;
 - b) Inspection of the supplier’s final product by TIOT upon delivery;
 - c) Completion and evaluation of the TIOT Supplier Quality System Self Evaluation Survey;
 - d) The supplier’s quality assurance program is registered or certified to compliance with
 - International Quality Management System Standards (i.e., applicable ISO standards)
 - Applicable military requirements (i.e. MIL-I, MIL-Q, or MIL-STD) requirements
 - ANSI/API Specification Q1 Quality Management System Standards;
 - Other appropriate specifications (ASME e.g.)
 - e) The supplier possesses appropriate process and/or personnel certifications, or
 - f) the supplier has previously satisfactorily furnished identical or similar products / services to TIOT (grandfathered), or
 - g) the supplier is customer approved or specified on a source-controlled drawing.
 - h) On occasion, as determined by the Materials Manager or the ISO Management Representative, the initial qualification of new suppliers may require an on-site audit, or submission of quality manuals, evidence of personnel qualifications, samples of similar products, etc. or other such verifications of supplier performance or capability; verification activities and results are documented on the QSCS and retained in the supplier’s file.
- 7.4.1.3 Materials Management shall maintain a list of Approved Suppliers
- 7.4.1.4 Supplier provided products or processes that require validation will be required to be in compliance with the requirements specified in **§7.5.2** of this Quality System Manual.



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	31 of 44

7.4.1.5 Supplier's may be provisionally used pending an audit, completion of the *Supplier Quality System Self Survey (TIOT Form 7.4.1-F01)*, and/or the accumulation of historical data, as described in **QSP 8.2.4 – Monitoring and Measurement of Product**.

7.4.1.6 **QSP 7.4.1 – Supplier Evaluation and Selection** defines the process for removing a supplier from the TIOT Approved Supplier List.

7.4.2 Purchasing Information

TIOT has established and maintains **QSP 7.4.2 – Purchasing** to describe the product being purchased, including where appropriate:

- a) Requirements for approval of product, procedures, processes, and equipment;
- b) Requirements for qualification of personnel;
- c) Quality Management System requirements

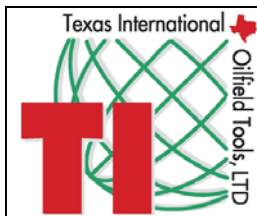
7.4.2.1 **QSP 7.4.2 – Purchasing** describes how the purchasing information provided to the Approved Supplier is documented in the Purchase Order, including where appropriate, the type, class, grade, or other precise identification, and the title or other positive identification of the product being purchased, including applicable specifications drawings, process requirements, inspection instructions, and other technical data.

7.4.2.2 Purchase Orders for calibration services shall: specifically state the accuracy required, either directly or by citation of a specification; include a requirement for reporting out of tolerance conditions; include a requirement that calibrations be traceable to NIST; include a requirement that a calibration certificate be provided.

7.4.2.3 Purchase orders shall be reviewed and approved for accuracy and completeness by Materials Management. Submission of the purchase order to the supplier shall constitute evidence of review and approval, as that activity is restricted to only Materials Management.

7.4.3 Verification of Purchased Product

7.4.3.1 TIOT has established and maintains **QSP 8.2.4 – Monitoring and Measurement of Product; §7.1 – Receiving Inspection** to document and define the process of verification of initial product, to ensure that purchased product meets specified purchase requirements.



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	32 of 44

- 7.4.3.2 TIOT documents verification of purchased product on **TIOT Form 8.2.4-F01 – Inspection Report – Purchased Materials and Work in Progress**.
- 7.4.3.3 Procedures ensure that “customer verification” shall not absolve TIOT of the responsibility for providing an acceptable product, or the responsibility for subsequent rejection, or the responsibility for effective quality control at TIOT and its subcontractors.
- 7.4.3.4 Where TIOT, or its customer, intends to perform verification at the supplier’s premises, TIOT will state the intended verification arrangements, and method of product release on the Purchase Order.

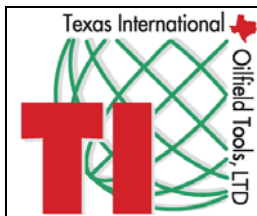
7.5 Production and Service Provision

7.5.1 Control of Production and Service Provision

- 7.5.1.1 TIOT has established and maintains **QSP 7.5.1 – Job Planning** to define the process and responsibilities at TIOT for planning, scheduling, and carrying out product processes under controlled conditions, including, as applicable:
 - a) The availability of information that describes the characteristics of the product (i.e., drawing or specification);
 - b) The availability of work instructions, as necessary;
 - c) The identification and use of suitable equipment required for manufacture;
 - d) The availability and use of appropriate monitoring and measuring equipment;
 - e) The identification and implementation of appropriate inspections (including first article inspection when required, in-process inspections, and final inspection (as defined in **QSP 8.2.4 – Monitoring and Measurement of Product**)).
 - f) The implementation of product release, delivery, and post-delivery requirements.

7.5.2 Validation of Processes for Production and Service Provision

- 7.5.2.1 Processes identified as “special process” where the resulting output cannot be verified by subsequent inspections and tests, and as a consequence, deficiencies become apparent only after the product is in use, will be validated. Validation shall be conducted to demonstrate the ability of such processes to achieved planned results. Validation arrangements for such processes include, as applicable:
 - a) Defined criteria for review and approval of the process;



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	33 of 44

- b) Approval of equipment and qualification of personnel;
- c) Use of specific methods and procedures (to recognized standards);
- d) Requirements for records maintained in accordance with §4.2.4 of this Quality System Manual;
- e) Re-validation, when required

7.5.2.2 When special processes are not identified by applicable product specifications, the processes at TIOT shall include, as a minimum, non-destructive examination such as Magnetic Particle Inspection (MPI), welding and heat treating, if applicable to the product.

7.5.2.3 Welding and overlay is primarily performed in compliance with internal specifications and specific customer requirements for process and verification. Requirements may include physical testing, metallurgical evaluation, magnetic particle inspection, process reporting and pressure and/or performance testing. Records are as required by the customer or maintained in accordance with **QSP 4.2.4 – Quality Records**.

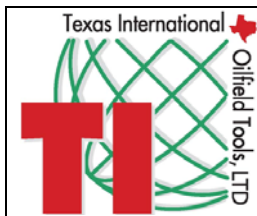
NOTE: Texas International Oilfield Tools has developed its processes through thousands of hours of testing and analysis of the tools and equipment we provide. Every aspect of each process has been qualified and approved through extensive testing and development.

Every individual application is reviewed and approved by competent personnel, and is controlled by routings, procedures and industry standards. Personnel are qualified through training and experience, and only qualified personnel perform critical processes.

7.5.3 Identification and Traceability

7.5.3.1 TIOT has established and maintains **QSP 7.5.3 – Product Identification and Traceability** to define the process for identifying product by suitable means throughout all phases of product realization, from design...through acquisition...through manufacturing...through storage and delivery.

7.5.3.2 **QSP 7.5.3 – Product Identification and Traceability** defines the means implemented at TIOT for identifying “inspection status” of components and product throughout all stages of product realization, indicating acceptance or rejection for further processing or shipment, using either a stamp or inspection authority initials. The required “inspection status” tags or markings are specified in **QSP 8.2.4 – Monitoring and**



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	34 of 44

Measurement of Product; §7.1 – Receiving Inspection; §7.2 – In-Process Inspection; and §7.3 – Final Inspection.

7.5.3.3 Control features include requirements for maintenance or replacement of identification status and traceability marks, and record.

7.5.4 Customer Property

7.5.4.1 TIOT has established and maintains **QSP 7.5.4 – Control of Customer Property** to define the process to identify, verify, store, maintain and control customer property delivered to the organization for re-work, repair, re-furbishing, or any other specified activity.

7.5.4.2 QSP 8.3 – Control of Nonconforming Materials describes how TIOT will document in the event customer property is lost, damaged, or otherwise found to be unsuitable for use.

7.5.5 Preservation of Product

7.5.5.1 TIOT has established and maintains **QSP 7.5.5 – Product Handling, Storage, Packaging, Preservation and Delivery** to define the process at TIOT for handling, storage, packaging, preservation and delivery of products to customer

7.5.5.2 Periodic Assessment of Stock: **QSP 7.5.5 – Product Handling, Storage, Packaging, Preservation and Delivery** defines how TIOT periodically assesses inventory to identify inventory discrepancies, as well as any deterioration or degradation of stock. At a minimum stock assessments will identify any damaged or suspect material, and any expired or expiring age-dated materials. This procedure also defines how nonconforming, or suspect inventory, is immediately segregated, reported and processed in accordance with **QSP 8.3 – Control of Nonconforming Materials**.

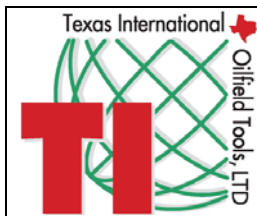
7.5.5.3 **QSP 7.5.5 – Product Handling, Storage, Packaging, Preservation and Delivery** defines the system at TIOT for packaging and marking of products in a manner that will preclude damage or deterioration during storage or shipment.

7.5.5.4 **QSP 7.5.5 – Product Handling, Storage, Packaging, Preservation and Delivery** defines the system at TIOT for shipping of product to the customer in a manner that will prevent damage during shipment.

	<h1>Quality System Manual</h1>	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	35 of 44

7.6 Control of Monitoring and Measuring Equipment

- 7.6.1 TIOT has established and maintains **QSP 7.6 – Control of Inspection, Measuring, and Test Equipment (IM&TE)** to define the control systems for identification, maintenance, and control of inspection, measuring, and test equipment (IM&TE). **QSP 7.6** defines the control features, including identification of equipment type, unique identification of each instrument, location, frequency of calibration, methods of calibration, and acceptance criteria.
- 7.6.1.1 During the process of Job Planning, as defined in **QSP 7.5.1 – Job Planning**, TIOT determines the monitoring and measurement to be undertaken, and identifies the monitoring measuring equipment needed to provide evidence of conformity of product to specified requirements.
- 7.6.1.2 **QSP 8.2.4 – Monitoring and Measurement of Product** has been established and maintained to define the processes for ensuring that monitoring and measurement can be carried out in a manner that is consistent with the specified monitoring and measurement requirements.
- 7.6.1.3 **QSP 7.6 – Control of Inspection, Measuring, and Test Equipment (IM&TE)** is established and maintained to ensure that IM&TE is capable of rendering valid results. **QSP 7.6** ensures that IM&TE shall:
- a) Be calibrated or verified...or both...at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards (i.e., N.I.S.T.); where no such standards exist, the basis used for calibration or verification shall be recorded;
 - b) Be adjusted, or re-adjusted, as necessary;
 - c) Have identification in order to determine it's calibration status (i.e., calibration stickers applied to the instrument, or instrument case);
 - d) Be safeguarded from adjustments that would invalidate the measurement result;
 - e) Be protected from damage and deterioration during handling, maintenance and storage;
- 7.6.1.4 **QSP 7.6 – Control of Inspection, Measuring, and Test Equipment (IM&TE)** defines how TIOT will assess and record the validity of the previous measuring results when the equipment is found not to conform to requirements. **QSP 7.6** also defines how TIOT will take corrective action on the equipment, and any product affected;




Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	36 of 44

7.6.1.5 **QSP 7.6 – Control of Inspection, Measuring, and Test Equipment (IM&TE)** defines how TIOT records and maintains the results of calibration. Calibration records are defined as “quality records” and are maintained and retained in accordance with **QSP 4.2.4 – Control of Records**. Records of calibrations shall be maintained in such a manner as to ensure that QC Inspectors can always verify the inspection status of the instrument.

7.6.1.6 **QSP 7.6 – Control of Inspection, Measuring, and Test Equipment (IM&TE)** also defines the systems at TIOT for controlling employee-owned and customer-owned gages.

7.6.2 Environmental Conditions for IM&TE: **QSP 7.6 – Control of Inspection, Measuring, and Test Equipment (IM&TE)** defines the systems at TIOT for ensuring that environmental conditions are suitable for the calibrations, inspections, measurements, and tests being carried out.

	<h1>Quality System Manual</h1>		Document No.:	QSM 000
			Revision:	B
	Effective Date:	01/20/2011		
		Page:	37 of 44	

8.0 MEASUREMENT, ANALYSIS, AND IMPROVEMENT

8.1 General

The sections following in this Quality System Manual, and the referenced Quality System Procedures (QSPs) define how TIOT has planned and implemented monitoring, measurement, analysis, and improvement processes in order to:

- a) Demonstrate conformity to product requirements;
- b) Ensure conformity of the QMS; and
- c) Continually improve the effectiveness of the QMS

8.1.1 **Statistical Techniques** – TIOT has established and maintains **QSP 8.1 – Statistical Techniques**, governing the selection and use of statistical techniques, when required, to carry out planned inspection and other product and process monitoring activities.

8.2 Monitoring and Measurement

8.2.1 Customer Satisfaction

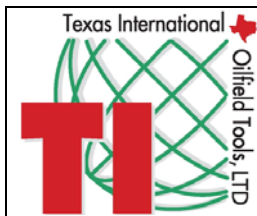
As one of the measurements of performance of the QMS, TIOT has established and maintains **QSP 8.2.1 – Customer Satisfaction and Complaint Handling** to monitor information relating to customer perception as to whether the organization has met customer requirements. This procedure identifies the methods for obtaining and analyzing customer feedback, and for implementing corrective action to continuously improve customer satisfaction by not only meeting customer requirement, but exceeding them.

8.2.1.1 Customer Complaints are documented and investigated on **TIOT Form 8.2.1-F01 – Complaint Handling and Investigation**.

8.2.1.2 TIOT seeks customer feedback by periodically requesting customers to complete **TIOT Form 8.2.1-F02 – Customer Satisfaction Form**, rating TIOT’s performance in a number of pertinent categories.

8.2.2 Internal Audit

TIOT has established and maintains **QSP 8.2.2 – Internal Audit**, in order to define the systems and assign responsibilities at TIOT for conducting, documenting, and reporting to management the results of internal audits at planned intervals to determine whether the QMS:



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	38 of 44

- a) Conforms to the planned arrangements, as specified in §7.1 – Planning of Product Realization of this Quality System Manual, and the specified requirements of ISO 9001:2008 and API Specification Q1; and
- b) Is effectively implemented and maintained.

8.2.2.1 **Internal Audit Schedule - QSP 8.2.2 – Internal Audit** defines how Internal audits are scheduled to ensure that all elements of the QMS are audited annually by personnel independent of those activities being audited, or directly supervised by the activity subject to audit.

8.2.2.2 **Timely Response - QSP 8.2.2 – Internal Audit** defines the requirement for TIOT to identify timely response times for addressing detected nonconformances.

8.2.2.3 **QSP 8.2.2 – Internal Audit** defines how audits are to be documented. Documented audit results are identified as “quality records” and are maintained and retained in accordance with **QSP 4.2.4 – Control of Records**.

8.2.3 Monitoring and Measurement of Processes

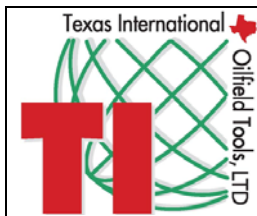
Every documented procedure established and maintained in the TIOT Quality Management System contains a section which identifies how TIOT shall apply suitable methods for monitoring and, where applicable, measurement of the QMS processes.

Additionally, TIOT has established and maintains **Process Assessment Worksheets (PAWs)**, referenced in each specific procedure, to assist Quality and the Functional Managers in assessing the effectiveness of the processes to achieve planned results.

8.2.4 Monitoring and Measurement of Product

TIOT has established and maintains **QSP 8.2.4 – Monitoring and Measurement of Product** to define the processes at TIOT for monitoring and measuring the characteristics of product to verify that the product requirements have been met.

8.2.4.1 **QSP 8.2.4 – Monitoring and Measurement of Product** defines the processes of Receiving Inspection, First Article Inspection, In-Process Inspection, Final Inspection and Test in order to ensure verify that product requirements have been met at appropriate stages of the product



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	39 of 44

realization process, as defined in §7.1 – *Planning of Product Realization* of this Quality System Manual.


- 8.2.4.2 **QSP 8.2.4 – Monitoring and Measurement of Product** defines the methods and identifies the records on which inspections and tests are to be documented, and maintained in accordance with **QSP 4.2.4 – Control of Records**, and how TIOT indicates the personnel authorized to release product for delivery to the customer (*Inspections and final release of product must be performed by personnel other than those who performed, or directly supervised the production of the product*).
- 8.2.4.3 **QSP 8.2.4 – Monitoring and Measurement of Product** defines the process for ensuring that the release of product for delivery to the customer shall not proceed until planned arrangements, as specified in §7.1 – *Planning of Product Realization* of this Quality Manual have been satisfactorily completed, unless otherwise approved by a relevant authority, or the customer.

8.3 Control of Nonconforming Product

TIOT has established and maintains **QSP 8.3 – Control of Nonconforming Materials** to define the processes at TIOT for recording, evaluation, release and disposition of nonconforming product, including:

- a) When possible, segregating nonconforming product to prevent it’s inadvertent use;
- b) Taking action to correct, repair, or re-work the detected nonconformity (remedial action to address the immediate problem);
- c) Authorizing its use, release or acceptance under concession by a relevant authority and/or the customer, as applicable;
- d) Taking action to preclude its original intended use or application;
- e) When feasible, taking appropriate action to identify the root cause of the nonconformity, and implementing corrective action to prevent it’s recurrence, effects, or potential effects;
- f) Re-inspect all repaired or re-worked nonconforming product to demonstrate conformity to requirements.

QSP 8.3 – Control of Nonconforming Materials defines how Nonconforming Materials are documented (**TIOT Form 8.3.1 – Nonconformance Report**), and how records of nonconforming materials are considered “quality records” that are maintained and retained in accordance with **QSP 4.2.4 – Control of Records**.

	<h1>Quality System Manual</h1>	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	40 of 44

8.3.1 Release or Acceptance of Nonconforming Product

QSP 8.2.4 – *Monitoring and Measurement of Product* defines the requirements for release or acceptance of nonconforming product, including:

- a) Accepting products that do not satisfy all manufacturing criteria, provided that,
 - ✓ Products satisfy the design acceptance criteria;
 - ✓ The nonconforming manufacturing acceptance criteria are categorized as unnecessary to satisfy the design acceptance criteria; or
 - ✓ Products are repaired or reworked to satisfy the design acceptance criteria, or manufacturing acceptance criteria.

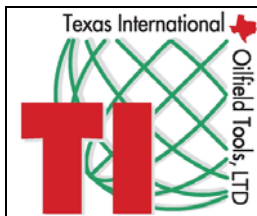
- b) Accepting products that do not satisfy the original design acceptance criteria, provided that,
 - ✓ The original design acceptance criteria are changed in accordance with **§7.3.7 – *Control of Design and Development Changes*** of this Quality System Manual and **QSP 7.3 – *Design and Development***.
 - ✓ The materials or products satisfy new design acceptance criteria

8.3.2 **Field Nonconformity Analysis - QSP 8.3 – *Control of Nonconforming Materials*** defines the process for identifying, documenting, and reporting incidents of field nonconformities or product failures. In most cases “field nonconformities” will be reported to TIOT as a “complaint,” and be documented and investigated in accordance with **QSP 8.2.1 – *Customer Satisfaction and Complaint Handling***.

8.3.3 **Customer Notification** – TIOT Customer Services is responsible for notifying customers in the event that product which does not conform to design acceptance criteria has been delivered. Records of such notifications are identified as “quality records” and are maintained and retained in accordance with **QSP 4.2.4 – *Control of Records***.

8.4 Analysis of Data

- 8.4.1 Each Quality System Procedure (QSP) developed by TIOT for defining specific processes also defines how TIOT will determine, collect, and analyze appropriate data to demonstrate the suitability and effectiveness of the QMS, and to evaluate where continual improvement of the effectiveness of the QMS can be made. **Process Assessment Work Sheets (PAWs)** have been developed for each process to assist Managers and Internal Auditors in the analysis of data generated as a result of monitoring and measurement from relevant sources relating to:
- a) Customer satisfaction, as specified in §8.2.1 of this Quality System Manual;



Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	41 of 44

- b) Conformity to product requirements, as specified in §8.2.4 of this Quality System Manual;
- c) Characteristics and trends of processes and products, including opportunities for preventive action specified in § 8.2.3 – *Monitoring and Measurement of Processes* and §8.2.4 – *Monitoring and Measurement of Products* of this Quality System Manual.
- d) Performance of suppliers, as specified in §7.4 – *Purchasing*, of this Quality System Manual.

8.5 Improvement

8.5.1 Continual Improvement

TIOT has established and maintains **QSP 8.5 – Continual Improvement** to guide the process of continually improving the QMS through the use of the Quality Policy, quality objectives, audit results (internal, 2nd and 3rd Party audits), analysis of data, corrective and preventive actions, and management review of the QMS.

8.5.2 Corrective Action

QSP 8.5 – Continual Improvement defines the process at TIOT for taking action to eliminate the causes of existing nonconformities to prevent recurrence. This procedure has been established to define the requirements for:

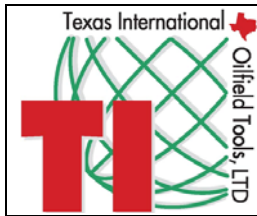
- a) Reviewing nonconformities (including customer complaints);
- b) Determining the causes of nonconformities;
- c) Evaluating the need for action to ensure that nonconformities do not recur;
- d) Determining and implementing actions required;
- e) Documenting the results of actions taking;
- f) Reviewing the effectiveness of corrective action(s) implemented.

8.5.2.1 All documentation relating to corrective action is considered “quality records” which must be maintained and retained in accordance with **QSP 4.2.4 – Control of Records**.

8.5.2.2 **Response time:** **QSP 8.5 – Continual Improvement** defines the system to ensure timely response to requests for corrective action and implementation of actions to prevent the problem’s recurrence.

8.5.3 Preventive Action

QSP 8.5 – Continual Improvement defines the process at TIOT for determining action(s) to eliminate the causes of potential nonconformities in order to prevent




Quality System Manual

Document No.:	QSM 000
Revision:	B
Effective Date:	01/20/2011
Page:	42 of 44


their occurrence. This procedure has been established to define the requirements for:

- a) Identifying potential nonconformities and their causes;
- b) Evaluating the need for action to prevent occurrence of nonconformity;
- c) Determining and implementing action needed;
- d) Recording the results of actions taken
- e) Reviewing the effectiveness of preventive action(s) implemented.

8.5.3.1 All documentation relating to preventive action is considered “quality records” which must be maintained and retained in accordance with **QSP 4.2.4 – Control of Records**.

	<h1>Quality System Manual</h1>	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	43 of 44

Appendix 1		
Document No.	Document Title and Associated Forms	Current Revision
QSP 4.2.3	Document and Data Control	A
	<i>Form No. 4.2.3 – Engineering/Document Change Request</i>	A
QSP 4.2.4	Control of Records	A
QSP 5.6	Management Review of the Quality Management System	A
QSP 6.2.2	Competence, Training, and Awareness	A
	<i>Form No. 6.2.2-F01 – Training Course Report Form</i>	A
	<i>Form No. 6.2.2-F02 – On-The-Job Training Record</i>	A
	<i>Form No. 6.2.2-F03 – Employee Evaluation Report</i>	A
QSP 6.3	Facilities and Equipment Maintenance	A
	<i>Form No. 6.3-F01 – Facilities and Equipment Work Request</i>	A
QSP 7.1	Product Quality Planning	A
	<i>Form 7.1.1-F01 – Quality Planning – Job Traveler</i>	A
QSP 7.2.2	Identification and Review of Product Requirements	A
QSP 7.3	Design and Development	A
QSP 7.4.1	Supplier Evaluation and Selection	A
	<i>Form 7.4.1-F01 – New Supplier Evaluation and Selection</i>	A
	<i>Form 7.4.1-F02 – Supplier Quality System Self-Survey</i>	A
	<i>Form 7.4.1-F03 – Supplier Corrective Action Request</i>	A
	<i>Form 7.4.1-F04 – Supplier Removal Form</i>	A
QSP 7.4.2	Purchasing	A
	<i>Form 7.4.2-F01 – Purchase Requisition</i>	A
	<i>Purchase Order (computer generated)</i>	N/A
QSP 7.5.1	Job Planning	A
QSP 7.5.3	Product Identification and Traceability	A
QSP 7.5.4	Control of Customer Property	A
QSP 7.5.5	Product Handling, Storage, Packaging, Preservation, and Delivery	A
QSP 7.6	Control of Inspection, Measuring and Test Equipment	A
	<i>Form 7.6.1 – IM&TE Calibration Record</i>	A
QSP 8.1	Statistical Techniques	A
QSP 8.2.1	Customer Satisfaction and Complaint Handling	A

	<h1>Quality System Manual</h1>	Document No.:	QSM 000
		Revision:	B
		Effective Date:	01/20/2011
		Page:	44 of 44

Document No.	Document Title and Associated Forms	Current Revision
	<i>Form 8.2.1-F01 – Complaint Handling & Investigation Form</i>	A
	<i>Form 8.2.1-F02 – Customer Satisfaction Form</i>	A
QSP 8.2.2	Internal Audit	A
	<i>Form 8.2.2-F01 – Annual Internal Audit Schedule</i>	A
	<i>Form 8.2.2-F02 – Internal Audit Summary Report</i>	A
	<i>Form 8.2.2-F03 – Audit Checklist (ISO 9001:2008 & API</i>	A
QSP 8.2.4	Monitoring and Measurement of Product	A
	<i>Form 8.2.4-F02 – Inspection Report – Purchased Materials & WIP</i>	A
	<i>Form 8.2.4-F02 – End Item Final Inspection Report (EIFR)</i>	A
QSP 8.3	Control of Nonconforming Materials	A
	<i>Form 8.3.1-F02 – Nonconformance Report</i>	A
QSP 8.5	Continual Improvement – Corrective and Preventive Action (CPAR)	A
	<i>Form 8.5.1-F01 – Corrective and Preventive Action Request</i>	A