2.2 Control of In-Process and Final Inspection Measuring and Test Equipment

The procedures for the control of measuring and test equipment, including identification, handling, maintenance, recall, and storage, are outlined in STCP-2000, Calibration and Metrology Process Procedure.

A register/list of Measuring & Test Equipment is maintained in accordance with STCP-2000, Calibration and Metrology Process Procedure.

Well defined, approved and controlled calibration and verification procedures are used to train technicians who perform in house calibrations. No departures from procedures are allowed unless documented and approved by the Superior Tube Company Quality Management.

To ensure the validity and accuracy of calibrations, Superior Tube Company participates in Critical Task Assessments and independent Proficiency Tests. Results are evaluated by the Quality Department.

Calibration frequencies are established for all measuring and test equipment and may be adjusted according to STCP-2000, Calibration and Metrology Process Procedure.

Superior Tube requires that the collective uncertainty of calibration standards used for measuring and test equipment meets a 4 to 1 accuracy ratio for calibrations performed in house. When required, measurement uncertainty is calculated for in house calibrations according to STCP-2046, Calculating Measurement Uncertainty Procedure. Subcontracted calibrations must have the measurement uncertainty documented on the calibration certificate.

2.3 Calibration Standards and Reference Materials (where applicable)

Procedures for the use and maintenance of calibration standards are outlined in STCP-2000, Calibration and Metrology Process Procedure. Calibration standards and materials (when applicable) must be traceable to NIST. Qualified technical personnel review and sign-off outside measurement and test equipment calibration certificates to ensure that ANSI/NCSL Z540.1 and ISO 10012 requirements are met. NDT equipment standards are controlled by procedures outlined in the NDT procedures and STCP-3008, Procedure for Calibration of Electronic Equipment Used for Nondestructive Testing. STCP-3077, Procedure for Control of Nondestructive Testing Calibration Standards, details the inventory and physical control of such standards.

2.4 Discrepant Equipment

Procedures for controlling equipment in which discrepancies are found are outlined in STCP-2000, Calibration and Metrology Process Procedure. This document includes corrective action taken for materials examined with gages later found discrepant.

3. RESPONSIBILITY

The responsibility for the control and calibration of measuring and test equipment is described in STCP-2000, Calibration and Metrology Process Procedure.

SECTION 15

HANDLING, STORAGE, AND SHIPPING

1. SCOPE

The practices and procedures established by STC for the preservation, handling, storage, and shipping of materials vary because of the range of alloys processed and broad variation in Customer requirements.

Manufacturing route operation instructions are developed to ensure:

- Cleanliness
- Prevention and Detection of Foreign Objects,
- Special Handling Requirements (i.e. light wall, long lengths)
- Marking and Labeling,
- Storage and Identification.

2. HANDLING

2.1 The precautions to be taken regarding the handling of material will be outlined in the Process Works Order as specified by the Customer and/or by Process Engineering to meet the quality requirements. Cranes are subject to periodic inspections per STCP-9501, Operation and Maintenance of Bridge and Gantry Cranes and Slings. Metal-to-Metal contact is prevented whenever possible.

2.2 Customer-specific handling and cleaning requirements are contained in the 7000 series of STCP documentation system.

2.3 Naval Nuclear tubing, when processed or stored, shall rest in stainless steel pans, in wood lined racks or on unpainted surfaces of an approved material. Surfaces not listed must be covered with kraft paper or plastic sheeting before placing tubing on them.

3. PACKAGING AND SHIPPING

3.1 Instructions for carrying out these functions are included in the Process Works Order per the applicable procedure. Included with packaging instructions may be the final cleaning instructions, as required by Customer specifications. These are detailed in various Customer-specific STCP documentation system procedures.

4. PRESERVATION AND STORAGE

4.1 Storage areas will be audited for potential damage and product deterioration, as part of the internal audit system.

4.2 In-Process and finished material will be stored in a fashion to preserve all quality characteristics in their as-stored conditions. Periodic monitoring to ensure traceability is performed. Unacceptable conditions are evaluated and dispositioned.

5. FOREIGN OBJECT DEBRIS (FOD) DETECTION

5.1 STC program for FOD detection is promoted utilizing various methods:

- 5S posters and visual aids
- 5S blitz endeavor
- Daily cleaning and work routines
- Company policy outlining the consumption of food or beverages in work or prohibited areas.
- Employee expectation posting
- Employee awareness notifications and training

5.2 Manufacturing routes include proactive instructions for the removal of debris from the surfaces of tubing such as final cleaning procedures, blowing compressed air through the inside diameter, wiping of the outside diameter surface, and various inspection / verification techniques, etc.

5.3 Prior to boxing, all material is subject to final inspection to verify the visual appearance conforms to requirements.

5.4 STC document 5S.001, General 5S Requirements for Housekeeping, provides general housekeeping guidance in support of STC's FOD prevention program.

SECTION 16

INSPECTION, TEST, AND OPERATING STATUS

1. SCOPE

This section defines the methods employed to indicate the performance of inspection or testing and the status of the material following an inspection or test.

2. PERFORMANCE

The completion of a test or inspection shall be indicated on the Process Works Order, and indicated electronically in ShopVue. Additionally, the inspection report form or stamp used shall contain the inspector's name and/or clock number and date. Technicians and Management personnel may use signatures or initials, along with the date, at that particular step of the Process Works Order or Lab Card.

3. STATUS

3.1 Use of status tags is detailed in STCP-27, Inspection, Test and Operating Status.

3.2 Product dispositioned for scrap is controlled per the requirements of GEN.004, Scrap Disposal Instructions. The provisions in this process ensure scrapped product cannot be used in a fraudulent scheme or counterfeit application.

SECTION 17

NONCONFORMING MATERIAL

1. SCOPE

Superior Tube Company, Inc. has established and documented procedures for the control and disposition of in-house nonconforming material. These procedures include the identification, disposition, documentation, evaluation and segregation of nonconforming material.

2. MATERIAL NONCONFORMANCE

2.1 Throughout processing and inspection, any nonconforming material is identified to prevent its use until a satisfactory disposition is made. The identification process is defined in Section 16.

2.1.1 Product dispositioned for scrap shall be conspicuously and permanently marked until physically rendered unusable. The process addressing counterfeit material is contained in GEN.004.

2.2 STC documents and reports in a timely manner to affected customers and interested parties nonconformances regarding delivered products including, as appropriate to their impacts, corrective actions.

2.3 STCP-3, Authority, Disposition, Recording and Corrective Action of Nonconforming Product, is used to handle the classification, review and disposition of nonconforming material.

2.4 STCP-33, Authorized Authority for PWO Sign-Off, Change Control and Rework" further documents authority for review, and the personnel approval process.

SECTION 18

CORRECTIVE AND PREVENTIVE ACTION

1. SCOPE

The Corrective and Preventive Action System is detailed in STCP-23, Corrective and Preventive Action System. This procedure covers material complaints, audits findings, raw material and other corrective and preventative action methods.

1.1 Responsibility for the Corrective and Preventive Action program is a function of Quality Assurance.

1.2 Changes to appropriate documents will be implemented and recorded when resulting from any corrective or preventive action.

1.3 Nonconformance trends identified by analysis of quality data are captured in the Corrective and Preventive database.

1.4 STC Management will assess corrective and preventive actions to ensure that the identified actions are commensurate with the risk and magnitude of each problem or deficiency, in order that the condition does not recur or occur elsewhere, by:

- Reviewing and analyzing trends and data,
- Determine cause, including as applicable, human factors,
- Similar conditions, or potential similar conditions,
- The effectiveness of corrective actions
- Update risks and opportunities during planning,
- Implement changes to the Quality Management System,
- Flow down corrective actions to suppliers,
- Ensure timely and effective corrective actions are achieved.

2. CORRECTIVE ACTION

2.1 Corrective Action procedures are in place to identify, document, evaluate and eliminate the cause of nonconformances and prevent recurrence in products and systems. A review is performed to verify the effectiveness of the actions taken.

2.2 Preventive practices and processes are in place to use sources of information (business indicators, quality and productivity trends, scrap and yield loss, rework data, nonconforming product analysis, human factors, etc.) to define and direct actions to detect, analyze and eliminate root causes and drive continual improvement. Reviews will be performed to ensure actions taken are effective at eliminating the root cause for the defined problem as well as similar problems.

4. IMPROVEMENT INITIATIVES

4.1 Areas of improvement include but are not limited to:

- Safety - Utilize a proactive approach by identifying and eliminating hazards before they cause incidents and accidents.
- Environmental – Minimize environmental risks to the community by employing safe and environmentally sound technologies and operating procedures sound environmental controls.
- Quality Improvement Projects
- Facility and Machinery Improvement Plans
- 5S initiatives and clean-as-you-go standard work practices
- Support of FOD program
- Incorporation of Lessons Learned
- Utilization of Best Practices
- Information Technology Initiatives
- Organizational Development / Employee Empowerment
- Health and Wellness of employees through efforts such as biometric screenings
- Mentoring Programs

Implementation of improvement initiative activities are monitored and evaluated by organizational managers for the effectiveness of the results.

SECTION 19

QUALITY ASSURANCE RECORDS

1. SCOPE

This procedure is established to outline the methods for the control, preparation, and retention of quality-related records.

2. PREPARATION OF CERTIFICATE OF TEST

2.1 Certificates of Test are prepared in accordance with STCP-5500, Procedure for the Preparation of Certification of Tubing.

2.2 Each activity shall generate the required records needed for certification of the product being offered for acceptance. Where appropriate, a record of Accept or Reject will be noted on quality records.

2.3 The Certificate of Test shall report actual results, heat treatments (including time and temperature), attestment to accuracy, forwarding of approved subtier certificates, conformance to dimensional requirements, compliance with applicable specifications and codes, traceability of products to certification, and documenting of Manual Revision and date, as required by Customer purchase order requirements.

2.4 Electronic signature may be used on product certificates provided they are controlled by Quality Assurance and allowed by the Customer. When required, an original signature will be used on certificates. STCP-5502, Approved Electronic Signatures, details the controls used at STC.

3. RETENTION

3.1 Quality Record Files

Data protection processes for documented information monitored electronically includes server back-ups daily and electronic storage off site.

STCP-56, Retention of Quality Records details the retention activities at Superior Tube Company, Inc.

QUALITY ASSURANCE RECORDS SECTION 19

4. GENERAL

4 1 Archive samples required to be kept by the contract will be gathered by Quality Assurance and retained for the length of time specified and agreed to between the Customer and STC.

4.2 Quality records shall be legible, stored and retained in such a way that they are readily retrievable in facilities that provide a suitable environment to minimize deterioration or damage and to prevent loss.

4.3 The records are available to authorized representatives of the Customer, Management, or other authorized personnel.

4.4 The control of the material storage as dictated by customers. The scope of this process is documented in STCP-5.

SECTION 20

AUDITS

1. SCOPE

1.1 The scope of the audit program is to assess the STC activities affecting the quality of product shipped. The purpose of audits is to:

- Verify the conformance of the Quality Management System with applicable customer, statutory, regulatory, and third-party standards and requirements;
- Verify the effectiveness of QMS implementation;
- Verify appropriate controls are effectively implemented by suppliers.

1.1.1 Periodic and systematic audits are planned, scheduled, and supervised by the designated Audit Manager. These audits are performed every calendar year.

1.1.2 Additional, unplanned audits may be conducted if the need is indicated through nonconformance trends, Management reviews, etc.

1.2 Process Effectiveness Assessment Reports (PEAR) – Information from the PEAR's may be used to influence the scope of internal audits.

1.3 The Objective Evidence Report (OER) process is an informal tool used to monitor tube processing and the overall condition of the shop floor, identify deficiencies, and implement change.

2. QUALIFICATION OF PERSONNEL

2.1 Personnel performing internal and vendor audits will be trained per STCP-2500, Quality System Audit Program.

2.2 Personnel who lead audits are qualified on the basis of education, experience, training, audit participation and examination.

2.3 Audits are performed by individuals who are not directly responsible for the area to be audited.

2.4 The use of third party auditors/lead auditors is allowed, provided that they meet the applicable qualification criteria.

3. PROCEDURE

3.1 The process for auditing and evaluating the Program is detailed in STCP-2500, Quality System Audit Program.

4. REPORTING AND RECORDS

4.1 At the end of each internal audit, a closing meeting is held with Management. The results of the internal audit will be reviewed at that meeting.

4.2 The Audit Manager shall prepare a Quality System Audit Report to management, which becomes a part of the Management Review.

4.3 Records of internal audits are maintained by Quality Assurance.

SECTION 21

TRAINING

1. SCOPE

All employees receive appropriate training in order to properly perform their jobs and to meet internal and external Customer requirements.

2. GENERAL

2.1 STC's training programs ensure that personnel performing work affecting quality conform to product requirements by addressing the following:

- competence,
- training to achieve the necessary competence,
- evaluation of training effectiveness,
- awareness and relevance of training activities, and
- maintenance of records of education, training, skills and experience.

3. TRAINING REQUIREMENTS

3.1 General training requirements are documented in STCP-9500 which details the Guidelines Governing Superior Tube Company, Inc. Training Requirements.

3.2 Special qualification training is defined in STCP-9500.

4. RECORDS

4.1 Records of training are maintained by the appropriate cognizant trainer, or by the Human Resources Department.

SECTION 22

SERVICE PROVISION

1. SCOPE

Superior Tube Company, Inc. continually strives to improve our products and services to our Customers through product and process developments aimed at providing improved material performance and delivery service.

Information is monitored to ensure Customer satisfaction includes, but is not limited to, on-time delivery performance, customer complaints, corrective actions, product conformity and post delivery support. STC addresses deficiencies and assesses the effectiveness with resulting actions to improve customer satisfaction.

2. CUSTOMER COMMUNICATION

2.1 SAP-5, Customer Communication, details the means by which STC will communicate with our Customers.

2.2 STC will work with individual Customers to solicit ideas for improvement in product and processes. Ideas for improvement may be generated by the Customer or by STC personnel. Outputs are generally oriented at improved material and delivery performance, reduced cost and increased profitability. Records of such improvements are proprietary when specific Customer requirements are invoked.

2.3 STCP-11, Industry Change Management, defines the change notification process as it applies to industrial change requirements.

2.4 SAP-6, Customer Satisfaction Procedure, details intent, methods, resources, and frequency that Superior Tube Company, Inc. will use to measure customer satisfaction. These techniques will be used to identify new market opportunities.

2.5 Post Delivery Support is provided to customers to address material concerns or discrepancies. Sales is responsible for communication to the customer, either proactively, or when a concern is presented by the customer.

2.5.1 Sales proactively track and communicate on-time target completion per SAP-10, Communication of Late Orders to the Customer.

2.5.2 Product discrepancies are addressed by Sales from the time information received by the customer, through disposition, rework or remake operations, and final disposition and resolution. SAP-70, Complaint Order Entry provides the process of internal communication. Material discrepancies requiring corrective actions will handling per the requirements of STCP-23, Corrective and Preventive Action System.

SECTION 23

STATISTICAL TECHNIQUES

1. SCOPE

The Superior Tube Company, Inc. SPC program is committed to the philosophy of continual improvement through the use of process controls, including statistical methods, in order to reduce scrap, rework, and variability, and to improve Customer satisfaction. Management is committed to provide resources and support necessary to make this program a success. Measures may include process capabilities, business indicators, nonconformance trending, etc.

2. STATISTICAL PROCESS CONTROL

2.1 The Statistical Process Control process is guided by STCP-5000, Statistical Process Control (SPC).

2.2 According to the nature of the product and depending on the specified requirements, statistical techniques are used to support:

- Verification (e.g., reliability, maintainability, safety),
- Process Control,
- Inspection,
- Failure mode, effect and criticality analysis.

2.3 Quality tools that may be employed to evaluate controls:

- Yield, Scrap and Rework Summaries
- Run Charts
- Histograms
- Cause and Effect Diagrams
- Pareto Diagrams
- Graph and Control Charts
- Check Sheets
- Stratifications
- Scatter Diagrams
- X Bar/R Charts
- Electronic Data Collection
- Gage R+R Studies
- Capability Studies, Cp and CpK

STATISTICAL TECHNIQUES SECTION 23

3. ANALYSIS OF DATA

3.1 Superior Tube Company, Inc. Management periodically reviews certain statistical data to determine the effectiveness of the Quality Management System.

3.2 Data reviewed includes Customer satisfaction, Supplier performance, nonconformances, Cost of Poor Quality (layout scrap, rework, yield loss, customer returns-RMAs), and others as deemed appropriate by management.

3.3 The data analysis is used to identify continuous improvement and preventative action opportunities.

Revision History:

REVISION NUMBER	DATE	COMMENTS
1	10/02/73	STCP-31
2	02/03/75	STCP-31
3	01/30/76	STCP-31
4	05/02/77	STCP-31
5	05/25/78	STCP-31
6	05/25/79	STCP-31
7	06/04/80	STCP-31
8	05/01/82	STCP-31
9	05/08/83	STCP-31
10	10/23/87	STCP-31
11	10/25/89	STCP-31 Last of the 31 Series
0	07/01/94	STCP-1

Note: STCP-1 was removed from the STC procedure system and converted into a stand-alone document, the Quality Manual. As of February 2006 it has now been identified again as STCP-1, Rev. 0

QA Manual, Rev. 0	07/01/95	
QA Manual, Rev. 1	11/24/97	
QA Manual, Rev. 2	11/16/98	
QA Manual, Rev. 3	01/24/00	
QMS Manual, Rev. 4	08/10/02	Internally audited, not issued.
QMS Manual, Rev. 5	10/11/02	
QMS Manual, Rev. 6	06/06/03	ISO Audit Responses
QMS Manual, Rev. 7	06/04/04	Various Audit Responses
STCP-1, Rev. 0,	03/14/06	Numerous updates to reflect correct procedures. No substantial change to philosophy or commitment to quality.
STCP-1, Rev. 1,	04/10/07	
STCP-1, Rev. 2,	03/14/08	
STCP-1, Rev. 3,	08/31/09	
STCP-1, Rev. 4,	02/01/11	
STCP-1, Rev. 5	05/01/12	This revision was not issued.
STCP-1, Rev. 6	08/01/12	
STCP-1, Rev. 7	12/01/13	
STCP-1, Rev. 8	04/15/14	
STCP-1, Rev. 9	05/15/14	
STCP-1, Rev. 10	07/15/14	
STCP-1, Rev. 11	06/30/16	
STCP-1, Rev. 12	07/30/17	

Revision History Table

Revision	Date	Description	Reason
13	**7/31/2020**	1.) **Revision** History: Moved to the back of the QAM. 2.) **Introduction**: Modified first sentence of Scope to match AS9100D accreditation certificate. 3.) **Introduction**: Added 7.2.6 and 7.2.7. **4.) Process Control (Sec 11)**: Added the following to 2.4: *When a conflict exists between PWO instructions and a procedure instruction, the former shall take precedence.* **5.) Section 23, 3.2**: Replaced quality loss with Cost of Poor Quality.	**Audit #2020-5** **CAPA #A-C1224** **Clarification** **Clarification**