



Quality Management System Authorization Signatures

Signature:

Keith Hottle

Nov 9, 2009 07:58:09 AM EST Approved by: Keith Hottle






















































Title: Director - Quality and Metallurgy



ISO 9001:2008 Cross-Reference to Sandvik Materials Technology Quality Manual

POLICY:

ISO 9001:2008	Current Quality Manual Section (ISO 9001-1994)
4 Quality Management System	
4.1 General Requirements	(4.2.1)
4.2 Documentation Requirements	
4.2.1 General	(4.2.2)
4.2.2 Quality Manual	(4.2.1)
4.2.3 Control of Documents	(4.5.1)
4.2.4 Control of Records	(4.16.1+ 4.16.2)
5 Management Responsibility	
5.1 Management Commitment	(4.1.1)
5.2 Customer Focus	(4.1.1 + 4.1.3 + 4.1.5)
5.3 Quality Policy	(4.1.1)
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5.4.1 Quality Objectives	(4.1.1)
5.4.2 Quality Management System Planning	(4.2.3)
5.5 Responsibility, Authority and Communication	
5.5.1 Responsibility and Authority	(4.1.1 + 4.1.2 + 4.1.3)
5.5.2 Management Representative	(4.1.3)
5.5.3 Internal Communications	(4.1.1)
5.6 Management Review	
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5.6.2 Review Input	(4.1.3)
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6 Resource Management	
6.1 Provision of Resources	(4.1.1) (4.1.3)
6.2 Human Resources	
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6.2.2 Competence, Training, and Awareness	(4.1.3 + 4.16.2 + 4.18.1)
6.3 Infrastructure	(4.9.1) (4.2.6)
6.4 Work Environment	(4.9.1)
7 Product Realization	
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7.3.3 <i>Design and Development Outputs</i>	 (4.4.1)
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7.3.5 <i>Design and Development Verification</i>	 (4.4.1)
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7.5.1 <i>Control of Production and Service Provision</i>	    (4.9.1 + 4.9.3 + 4.9.4 + 4.15.1 + 4.19.1)
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8.5.2 <i>Corrective Action</i>	 (4.14.1)
8.5.3 <i>Preventive Action</i>	 (4.14.2)

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



Sandvik Materials Technology Quality Policy

Our key directive is complete customer satisfaction.

We provide our customers with products and services that conform to all requirements.

We develop quality objectives at appropriate levels to ensure those requirements are effectively addressed in our business.

We are fully committed to continuous improvement as a strategic approach to achieve these quality objectives.

Our policy and associated quality objectives are reviewed and communicated to all employees on a regular basis.



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Manual Revision Approval:

Keith M. Hottle

Keith M. Hottle
Director, Quality and Metallurgy

11/09/2009

Date

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



0.2 Introduction

POLICY:

The purpose of this Quality Manual is to describe and summarize the Quality Systems for the manufacturing and supplying of standard products from **Product Area Strip - Benton Harbor**, Product Area Tube and Product Area Wire and the designing, manufacturing and supplying of standard products from **Product Area Strip - Scranton** of Sandvik Materials Technology. All references to Sandvik Materials Technology shall be considered the Scranton facility, **Houston facility**, and Benton Harbor facility only. Other references to Sandvik Materials Technology other than the Scranton facility and Benton Harbor facility shall indicate the location of the facility being referenced. Changes to company name will not be indicated as revisions throughout the body of this manual.

The Benton Harbor and Houston branch activities are managed by Product Area Strip - Scranton and Product Area Tube, respectively.

The Quality System for Product Area Strip is designed to specifically meet the ISO 9001/ANSI Q9001-**2008** and MIL-I-45208A requirements.

The Quality System for Product Area Tube is designed to specifically meet the ISO 9001/ANSI Q9001-**2008** and MIL-I-45208A requirements. The Quality System to meet ASME Code Section III, Subarticle NCA-3800, 10CFR50, APPENDIX B, and ANSI N45.2 are addressed in a separate Quality Manual entitled Quality Manual (A.S.M.E. Code Section III).

The Quality System for Product Area Wire is designed to specifically meet the ISO 9001/ANSI Q9001-**2008** and MIL-I-45208A requirements. The Quality System to meet ASME Code Section III, Subarticle NCA-3800, 10CFR50, APPENDIX B, and ANSI N45.2 are addressed in a separate Quality Manual entitled Quality Manual (A.S.M.E. Code Section III).

The documented Quality System excludes the following specific elements of ISO 9001/ANSI Q9001-2008.

- Section 19 - Servicing (7.5.1 - Service Provision) is not covered by this manual. Servicing is carried out for general customer field support of the material or products as required by the customer. This support is given by sales engineers, product specialists, product managers, and other competent personnel.
- Section 4 - Design Control (7.3 - Design and Development) applies only to the **Product Areas Strip - Scranton**. The **Product Area Strip - Benton Harbor**, Product Area Tube, and Product Area Wire do not perform this activity at this site. For these products, this function is performed by the Research and Development function at Sandvik Materials Technology, Sandviken, Sweden.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



0.3 Glossary

POLICY:

Accepted Order	Agreed requirements between Sandvik Materials Technology and customer transmitted by any means.
Advanced Product	Structured method of defining and establishing the steps necessary to assure that a product meets all established
Quality Planning	requirements. The specific structure is defined in the Advanced Product Quality Planning and Control Plan reference manual.
Approval	An act of endorsing or adding positive authorization or both, indicated by stamp, initial, or employee identification number and a date of the approval.
Approved Supplier	A supplier that has been evaluated and approved per the requirements documented in the Standard Quality System.
Audit	An audit is a documented evaluation performed to verify, by examination and evaluation of objective evidence, that those selected elements of a previously approved quality program have been developed, documented, and implemented in accordance with specified requirements. An audit does not include surveillance or inspection for

	the purpose of process control or acceptance of material or items.
Certification	The act of verifying and attesting in writing that documents, processes, procedures, source material, material, products, components, or the qualification of personnel are in accordance with specified requirements.
Code	ASME Code Section III.
Component	Arbors, spring housings, clamps and other mechanical devices used in manufacturing of power springs, reels and specialized tooling assemblies.
Contamination	Foreign materials such as mill scale, dirt, oil, chemicals; any matter that renders a fluid, solid or surface impure and unclean according to preset standards of acceptable cleanness.
Continual Quality	Actions taken throughout the organization to continually increase the effectiveness and efficiency of activities and
Improvement	processes to provide added benefits to both the organization and its customers.
Contract	See Accepted Order
Continual Improvement	See Quality Improvement
Control Plan	Written descriptions of the system for

controlling parts and processes. They shall identify the manner in which important characteristics and engineering requirements of the products are maintained. The general format to be used is found in [the AIAG Advanced Product Quality Planning and Control Plan reference manual](#).

Control Procedure and Instruction	Instructions and Procedures issued and controlled by Quality Assurance. Commonly referred to as "CPI's", these instructions and procedures shall be approved by Quality Assurance. These CPI's are sometimes referred to as "Quality Assurance Procedures" and "detailed specifications written instructions and procedures".
Customer	The organization doing the buying from Sandvik Materials Technology.
Customer Order	The document issued by a customer for buying products from Sandvik Materials Technology.
Designee	Any person that performs a specific activity at the request of the person primarily responsible for the activity. The person designating the activity retains primary responsibility for the activity performed by the designee.
Documentation	Any written or pictorial information describing, defining, specifying, reporting or certifying activities, requirements,

procedures or results.

Examination	Specific actions by qualified personnel using qualified procedures to verify that source material, material, products, components and fabrication processes are in accordance with specified requirements.
Executive Management	Sandvik Materials Technology - NAFTA President and staff which includes the managers of the three operating Product Areas/ sales units and support services. (Company Top Management)
Failure Mode and Effects Analysis	An analytical technique used to assure that, to the extent possible, potential failure modes and their associated causes/ mechanisms have been considered and addressed. The specific structure is defined in the AIAG Potential Failure Mode Effects Analysis reference manual.
Final Inspection	Inspection which is performed on finished product before release for shipping or stocking.
Heat of Material (Heat Number)	Material produced from the same melt of metal.
In-Process Inspection	Inspection which is performed during the manufacturing in an effort to prevent defects from occurring.

Incoming Inspection	Inspection which is performed on material and components prior to or after being assigned to a work order before start of manufacturing.
Inspection	The actual act of verifying the conformance of material, products or components to specified requirements for the purpose of acceptance or rejection.
Inspector	A qualified employee of an organization whose duties include verification of quality-related activities such as inspection, test and/or examination.
Item Master	List of raw material and/or components used to manufacture finished product.
Lot of Covered Electrodes (Lot Number)	The quantity of electrodes produced from the same combination of heat of material and dry batch or dry blend of covering mixture. Where applicable, military lot definitions shall apply.
Material	Metallic material procured or processed to an ASTM, AWS or any other material specification permitted by the customer.
Material Certificate	See Certification.
Measurement	The analysis of the collection of operations, procedures, gauges, and

Systems Analysis	other equipment, software and personnel used to assign a number to a characteristic being measured.
Nonconformance	A deficiency in characteristics, documentation or procedure which renders the quality of an item unacceptable or indeterminate. Examples on nonconformance include: physical defects, test failures, incorrect or inadequate documentation, or deviations from prescribed processing, inspection or test procedures.
Nondestructive Examination (NDE) and Nondestructive Testing (NDT)	The use of inspection methods intended to detect surface and internal discontinuities in material that do not affect or change the items being evaluated. Nondestructive testing methods which do not affect or change an item, such as radiographic, ultrasonic, liquid penetrant, magnetic particle, eddy current and visual examination and leak testing.
Nuclear Products	Products produced under Quality System which must meet the requirements of ASME Code Section III, Subarticle NCA-3800, 10CFR50, APPENDIX B, and ANSI N45.2.
Operating Directives and Instructions	Documented work instructions prepared by Production and approved, issued and controlled by Quality Assurance.

(ODIN's)

Order See Sales Order

Acknowledgment

Package A wrapping or container including its content of material.

Procedure A document that specifies or describes how an activity is to be performed. It may include methods to be employed, equipment or materials to be used and sequence of operation.

Process Control Plan A planning tool used to summarize and document for key product and key control characteristics, the capability of process/measuring system and the plan to control the process.

Process Outline The sequential process steps to be taken for manufacture, testing and inspection of final product or material.

Procurement Contractually binding documents that identify and define the requirements which materials or services must meet in order to be considered acceptable by the purchaser.

Product Material or flat coiled mechanical power springs procured, manufactured or supplied by Sandvik Materials Technology.

Management Team of the major functional areas within each Product Area.

**Product Area Quality Individual assigned to the product
Product Area/area to maintain the operational controls of the
quality management Professional
system. Titles may include, but are
not limited to Manager - Quality Assurance, Sr. Quality
Assurance Specialist, or
Quality Assurance Specialist.**

Production Materials Materials which have been issued a production part number by the customer and are shipped directly to the customer.

Production Part The process for receiving customer approval of production parts manufactured at the production location using production tooling,

Approval Process gauging, processes, materials, operators, environment, and process parameters. The specific methodology is defined in the **AIAG** Production Part Approval Process reference manual.

Product That document prepared by Quality Assurance which is used in interpreting and specifying in detail the requirements of a

Requirements Review specification or customer order. Also referred to as "Specification and Order Review", "Specifications Review", "Spec Review" and "Technical Requirement Review" in some Quality Assurance documents and records.

Purchase Order The document issued by Sandvik Materials Technology for procurement of materials, products and services.

Quality Assurance	All those planned or systematic actions necessary to provide adequate confidence that all materials and products designed, manufactured and supplied are in accordance with the applicable rules of ISO 9001/ANSI Q9001 and customer order requirements.
Quality Control	Measurement of the characteristics of material, products or process to determine conformance to specified requirements.
Quality Control Plan	See Process Control Plan
Quality Function	The function within Sandvik Materials Technology having the overall responsibility for the Quality System. This function includes the Quality Assurance Department, Scranton Works, the Materials Laboratory, and inspection and testing personnel.
Quality Improvement	Actions taken continually throughout the organization to increase the effectiveness and efficiency of activities and processes to provide added benefits to both the organization and its customer.
Quality Plan	See Process Control Plan
Raw Material	Material such as chemicals, minerals and metallic material used for conversion to finished products.

Receiving	An act performed on raw/source material, material, products or components prior
Verification	to being assigned to a work order and on finished goods from outside suppliers to verify to the purchase order type of material, quantity, size, marking, labeling and condition of the shipment.
Rejection	The act of detecting and identifying a nonconformance.
Review	An act of looking over or studying a document. A review, resulting in acceptance, shall be indicated by stamp, initial or signature and date.
Sales Order	Those document sets issued by the Sales Department of Sandvik Materials Technology used to process a customer order. The Sales Order sets include the Order Acknowledgment set and the Shipping Order set. the Sales Order is sometimes referred to as the Order Acknowledgment in documents and records.
Sandvik AB and Sandvik Materials Technology, Sweden	Parent companies of Sandvik Materials Technology, located in Sandviken Sweden.
Sandvik Materials	The official name of this company. Sometimes referred to in this Manual as

Technology	Sandvik. Certain quality documents still refer to Sandvik Steel Company.
Shop Order	See Work Order
Special Characteristic (Process)	A process characteristic for which variation must be controlled to some target value to ensure that variation in a special product characteristic is maintained to its target value during manufacturing.
Special Characteristic (Product)	A product characteristic for which reasonably anticipated variation could significantly affect a product's safety or compliance with governmental standards or regulations, or is likely to significantly affect customer satisfaction with the product.
Special Process	A process, the results of which are highly dependent on the control of the process or skill of the operator, or both.
Specification	A concise statement of a set of requirements to be satisfied by a product, a material or process indicating whenever appropriate, the procedure for determining whether the requirements given are satisfied.
Standard Products	Products produced under Quality System which do not meet the requirements of ASME Code Section III, Subarticle NCA-3800,

10CFR50, APPENDIX B, and
ANSI N45.2.

Supplier	Any individual or organization which furnishes raw/source material, material, products, components or services in accordance with a procurement document.
Survey	A survey is a documented evaluation of an organization's ability to perform activities as verified by a determination of the adequacy of the organization's quality program and by a review of the implementation of the program at the location of the work.
Tender	Offer made by Sandvik Materials Technology in response to an invitation to satisfy a contract award to provide product.
Testing	The determination or verification of the capability of materials or products to meet specified requirements by subjecting the materials or products to a set of physical, mechanical, chemical, environmental or operating conditions.
Tool	The portion of process machinery which is specific to a component or sub-assembly. Tools are used in the process machinery to transform raw material into a finished part or assembly.
Traveler	See Work Order.
Vendor	See Supplier

Verification	A review to ensure that activities have been performed and documented in accordance with applicable requirements.
Wire Products	Wire for welding applications, spring wire and wire for medical devices and strip for welding. Wire and strip for welding applications may meet the Code, but the product as defined above is not included in ASME Code Section III.
Work Instruction	See Operating Directives and Instructions
Work Order	That document or document set used by Production which outlines the sequence of operations used in manufacturing. The Work Order is sometimes referred to as "Traveler", "Shop Order", and "Mill Order".

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



0.4 Products and Programs for Manufacture - Storage - Supply POLICY:

General

The manufacturing programs and products stored, supplied and shipped by Sandvik Materials Technology are handled by **three product areas**, namely **Product Area Tube**, **Product Area Wire**, and **Product Area Strip - Spring Products and Strip Products**.

Product Area Tube

The tubular products operations at Sandvik Materials Technology, Scranton Works, include manufacturing, stockholding, and shipping of ferrous and nonferrous seamless tubular products and the stockholding of ferrous and nonferrous welded tubular products, wire, strip, shapes and bar.

The tubular products operations at Sandvik Materials Technology, Houston, include value added services, stockholding, and shipping of ferrous and nonferrous seamless tubular products and the stockholding of ferrous and nonferrous welded tubular products, wire, strip, shapes and bar.

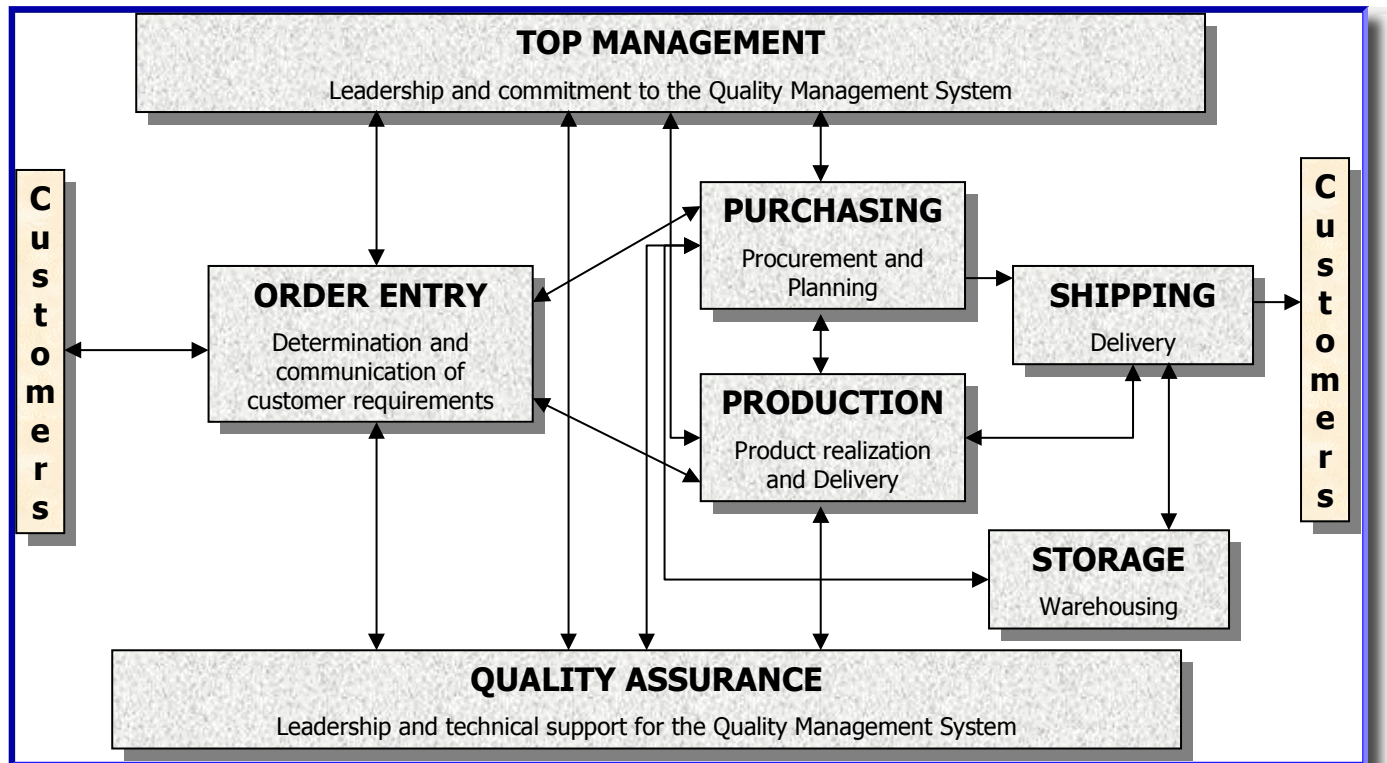
The manufacturing processes used for seamless pipe and tubes are reduction by pilgering of tube hollows received from approved suppliers of source material. Examples of other processes applied during manufacturing are degreasing, cleaning, annealing, straightening, sand blasting, belt polishing, cutting, testing, inspection, marking and packaging.

The operations also include activities as a material supplier for procurement, receiving verification, stockholding, testing and inspection and shipping of seamless and welded tube hollows, pipe and tube, and ferrous and nonferrous bars, shapes, wire and strip.

Tubular products manufactured and supplied by Sandvik Materials Technology are processed, tested, and inspected in accordance with

military standards and specifications, the requirements of applicable ASME Codes, ASTM and AMS specifications and other required standards or customer specifications.

The Product Area also stockholds/supplies round bar, flat bar, cannulated tube, wire and profiles for the medical device industry .



Tubular Products Division Process Flow

Product Area Wire

The manufacturing, stockholding and shipping of Welding and Wire Products at Sandvik Materials Technology, Scranton Works, include various sizes of bare welding wire, electrodes and rods, and covered welding electrodes for ferrous and nonferrous materials.

The bare welding wire, electrode, and rod operations include but are not limited to hot rod preparation, drawing, annealing, spooling, coiling, cutting, straightening, polishing, cleaning, labeling, packaging, alloy identity testing, inspection and final acceptance testing.

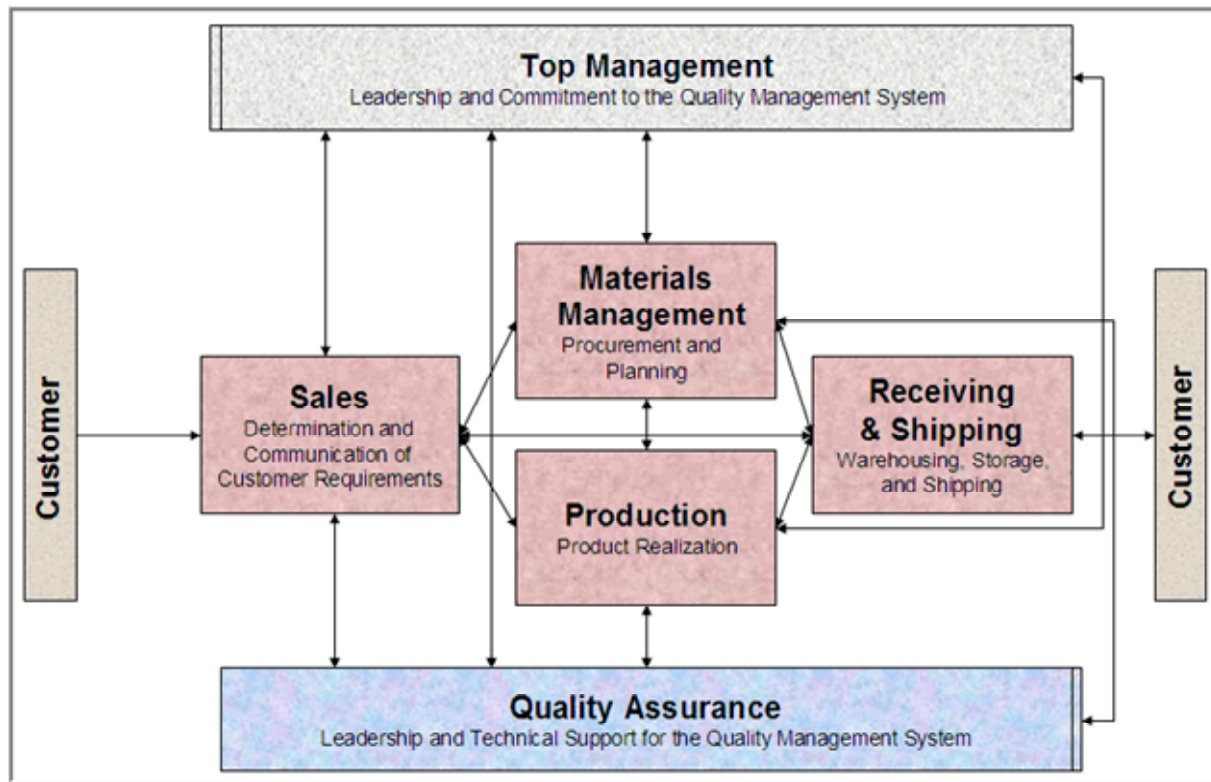
As a material stockholder, bare and covered electrodes, bare welding wire,

strip electrodes, welding flux, powdered filler metal, and hot rolled rod and wire are procured, warehoused, and shipped.

The operation includes procurement, receiving verification, stockholding, labeling, packaging, alloy identity testing as applicable, inspection and final acceptance testing as applicable.

The manufacturing, supplying, stockholding and shipping of wire products including various sizes of stainless steel wire for non-welding applications, such as spring wire, rope wire, lashing wire, brush wire, weaving wire and wire for medical devices.

Welding materials and wire products manufactured, supplied and shipped by Sandvik Materials Technology are processed and inspected according to military standards and specifications to the requirements of applicable ASME Codes, AWS and AMS specifications, and other required standard(s) or customer specification(s).

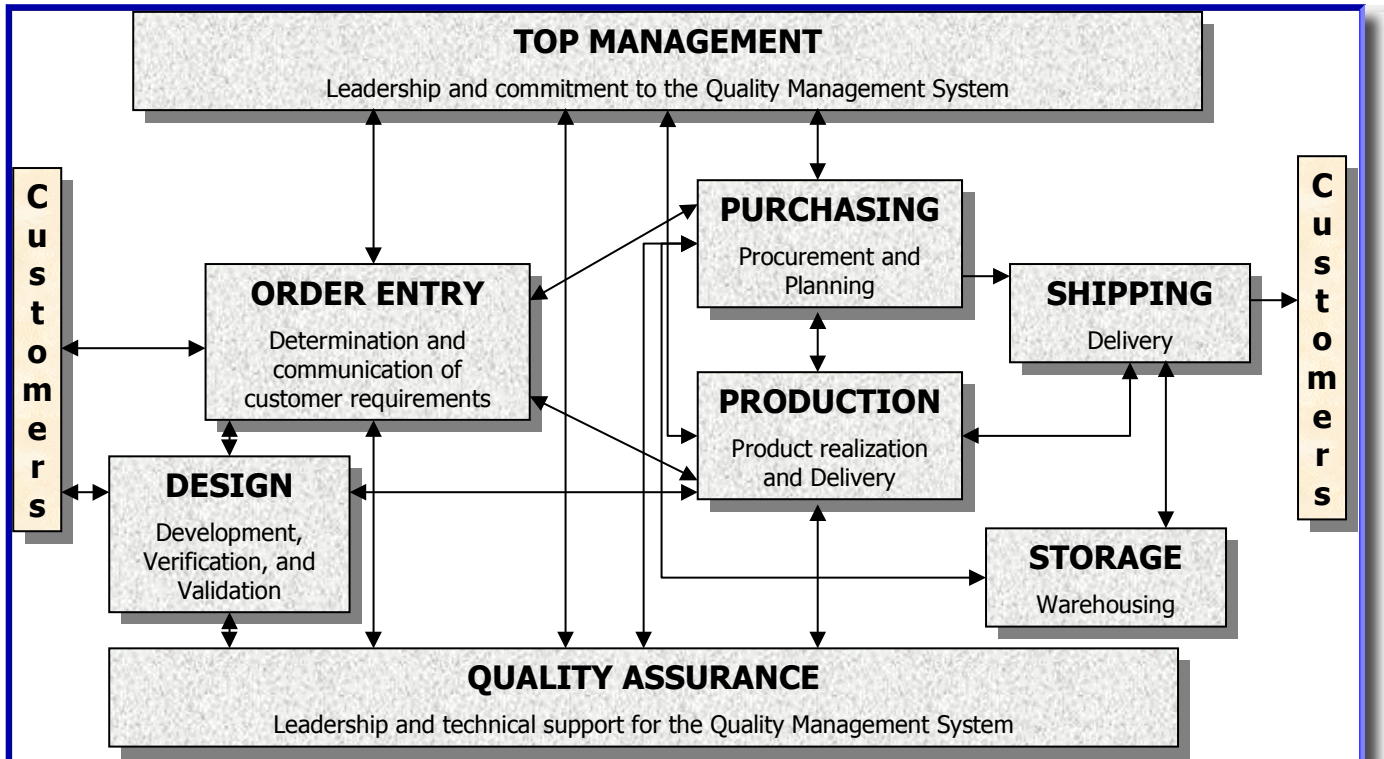


Product Area Strip Scranton

Spring products operation consists of customer-engineered design,

development, and manufacture and supply of mechanical springs made from internal or external supplied carbon and stainless steel and external supply of components such as arbors and spring housings.

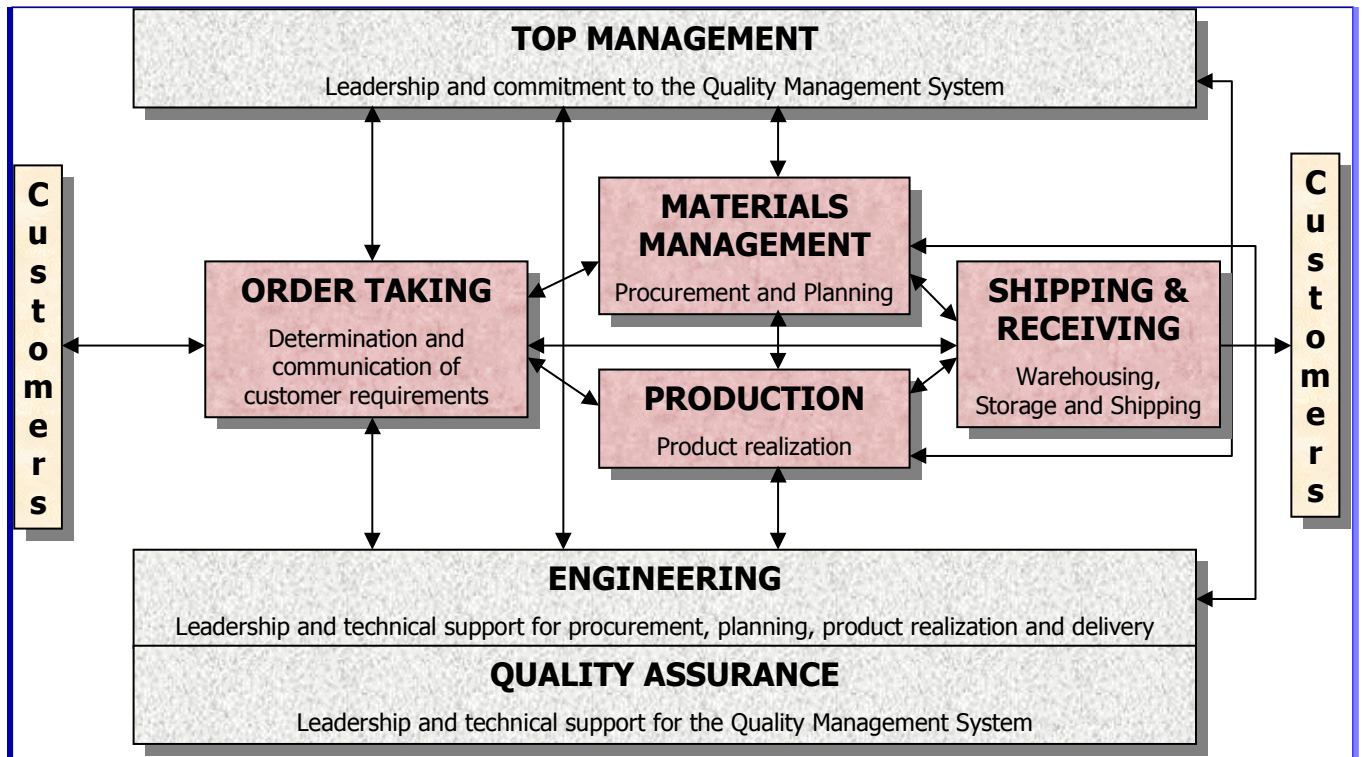
The manufacturing also includes reels and specialized tooling assemblies with a diverse range of applications.



Spring Products Division Process Flow

Benton Harbor

Strip products operation consists of the manufacture and supply of specialty strip and flat wire products made from internal or external supplied carbon and stainless steel.



Strip Products Division Process Flow

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



1.1 Quality Policy and Management Statement of Authority

POLICY:

The Quality Policy of Sandvik Materials Technology reads:

Our key directive is complete customer satisfaction.

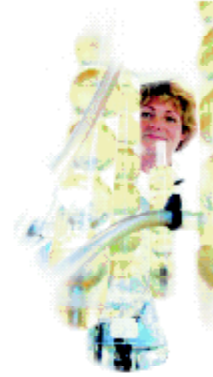
We provide our customers with products and services that conform to all requirements.

We develop quality objectives at appropriate levels to ensure those requirements are effectively addressed in our business.

We are fully committed to continuous improvement as a strategic approach to achieve these quality objectives.

Our policy and associated quality objectives are reviewed and communicated to all employees on a regular basis.

This policy mirrors in its entirety on the Sandvik Materials Technology, Sweden Corporate Quality Policy which states:



Sandvik Materials Technology Quality policy

- Our key directive is complete customer satisfaction.
 - We provide our customers with products and services that conform to all requirements.
 - We develop quality objectives at appropriate levels to ensure those requirements are effectively addressed in our business.
 - We are fully committed to continuous improvement as a strategic approach to achieve these quality objectives.
 - Our policy and associated quality objectives are reviewed and communicated to all employees on a regular basis.
-



Sandviken, May 2003

Peter Gossas
President, Sandvik Materials Technology



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The Sandvik Materials Technology Policy is defined by the Company's Executive Management and is considered relevant to Sandvik Materials Technology's organizational goals and the needs and expectations of all customers.

Sandvik Materials Technology's Executive Management shall ensure that the following requirements are effectively implemented throughout the organization. This shall be done in conjunction with the Product Area management teams in each of the operating Product Areas and support services.

- Ensure that this policy is understood, implemented and maintained at all levels of Sandvik.
- Ensuring the need to meet customer and industry requirements are clearly communicated and understood at all relevant levels and departments within Sandvik.
- Ensure that Quality Objectives are established by the operating Product Areas and authorized by Executive Management per a Controlled Procedure and Instruction.
 - Quality objectives, which are consistent with the established Quality Policy, shall be effectively deployed at all relevant levels and functions within in each Product Area.
 - Quality objectives shall be measured on a regular basis.
- Ensure that regular Management Reviews are conducted and effective action plans are undertaken.
- Ensure that an infrastructure is place to promote internal communications regarding key Company/Product Area metrics including the overall effectiveness of the quality management system.
- Ensure that the necessary resources are available to ensure compliance to all customer and industry requirements.

The system for causing quality shall be prevention rather than appraisal and defect detection. All employees are encouraged to pursue never-ending improvement in quality. To support Sandvik's quality objective and policy, quality systems and action

plans for **continual** quality improvement shall be established within each Product Area of Sandvik Materials Technology. These systems and action plans shall be commensurate with the products and services supplied by the Product Areas.

This Manual describes and summarizes Product Area Tube's Quality System for manufacturing and supplying of seamless tubular products and supply of welded tubular products, bar, strip and wire in accordance with the Quality System's requirements of MIL-I-45208A, ISO 9001/ANSI Q9001, and products requirements per ASME, ASTM, AWS, AMS, MIL specifications, and other standards **at the Scranton and Houston sites. The Manual also describes and summarizes Product Area Tube's warehousing/stockholding activities for round bar, flat bar, cannulated tube, wire and profiles for the medical device industry in accordance with ISO 9001/ANSI Q9001.**

This Manual describes and summarizes Product Area Wire's Quality System for manufacturing and supplying of wire products and welding materials in accordance with the Quality System's requirements of MIL-I-45208A, ISO 9001/ANSI Q9001, and products requirements per ASME, ASTM, AWS, AMS, MIL specifications, and other standards.

This Manual describes and summarizes Product Area Strip - Benton Harbor's Quality System for manufacturing and supplying of strip products in accordance with the Quality System's requirements of MIL-I-45208A, ISO 9001/ANSI Q9001, and products requirements per ASTM, industry standards, customer specifications, and internal specifications and requirements

The Manual also describes and summarizes the Quality System of the **Product Area Strip - Scranton** for design, development, manufacture and supply of mechanical springs in accordance with ISO 9001/ANSI Q9001, MIL-I-45208A, automotive industry standards, customer drawings and specifications, and internal

specifications and requirements.

These Quality Systems shall remain in effect as long as Sandvik Materials Technology shall manufacture and supply materials and products meeting the requirements of above identified Quality Systems standards.

Further, the Manual describes the responsibilities of the Quality Function and other functions involved in the execution of the Quality System. The intention is also to give information on the Company's policy in quality matters and describe the resources available for quality assurance, testing and inspection. For internal use, there are detailed Control Procedures and Instructions and Operating Directives and Instructions available, which deal with the distribution of responsibility of individuals in the organization as well as work functions attached to product and service quality within Sandvik Materials Technology.

The Quality Systems defined in this Manual is supported by all levels of Management within Sandvik Materials Technology. The Director/Manager, Quality and Metallurgy, has the authority and the responsibility to approve and implement the Quality Systems defined in the Manual.

All persons or groups given duties and responsibilities by this Manual or its supporting procedures shall carry out those duties and responsibilities as the Manual or procedures describe.

In the event of conflict between the Quality Function and other functions, the problem shall be referred to the next higher level of Management for resolution. The resolution shall not be in conflict with the applicable standards or this Manual.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



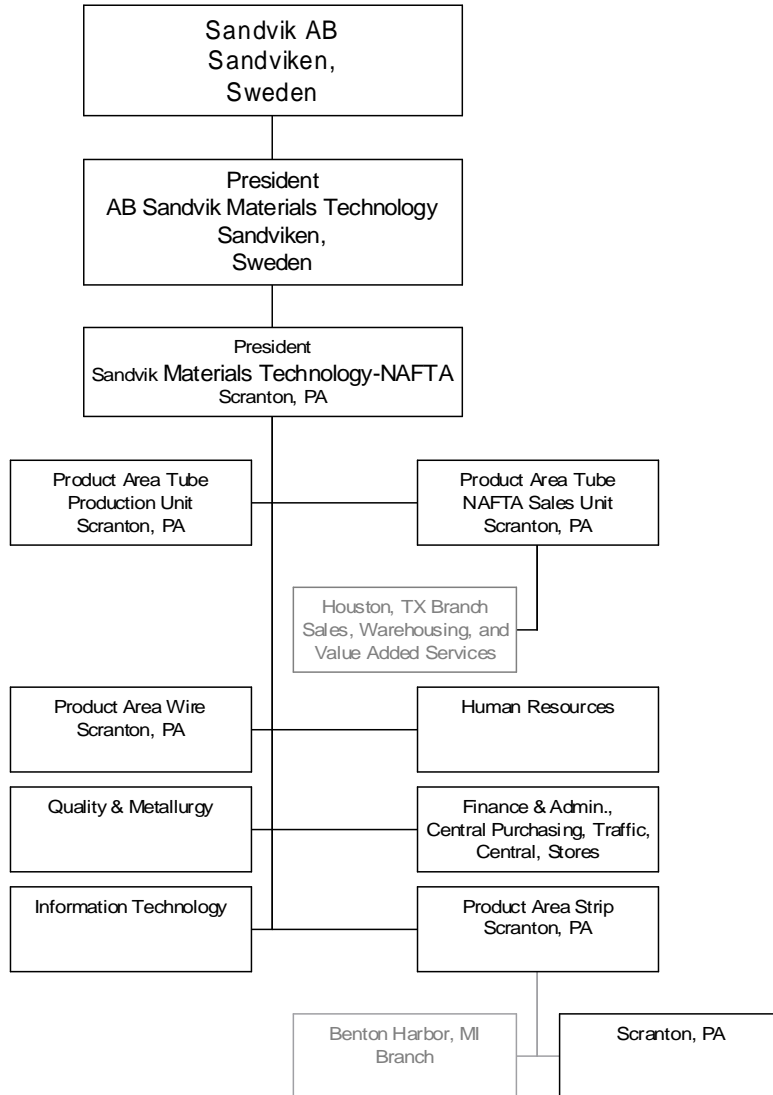
1.2 Organization

POLICY:

Sandvik Materials Technology

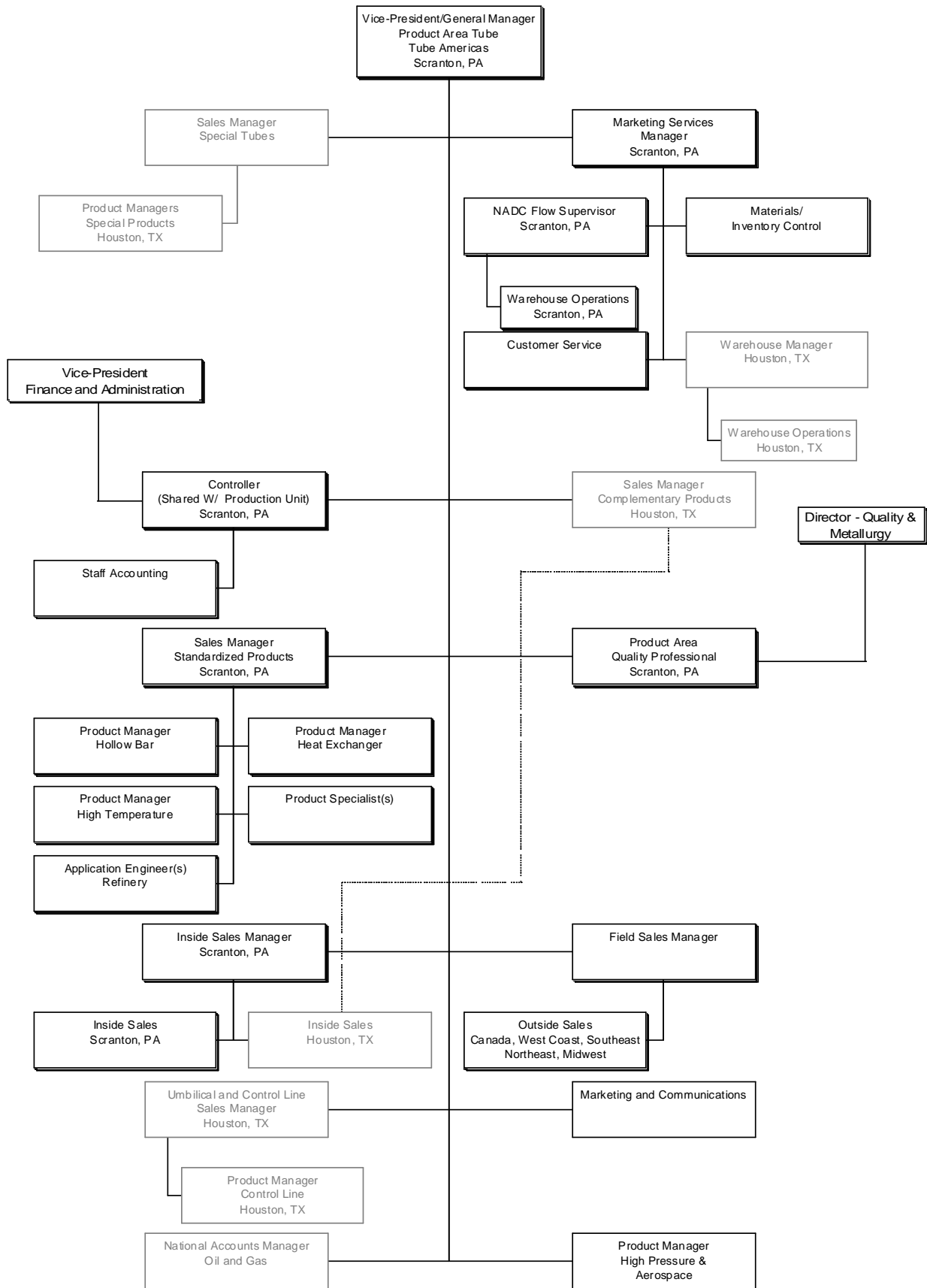
The organization of the main functions of Sandvik Materials

Technology is outlined in the organization chart below:

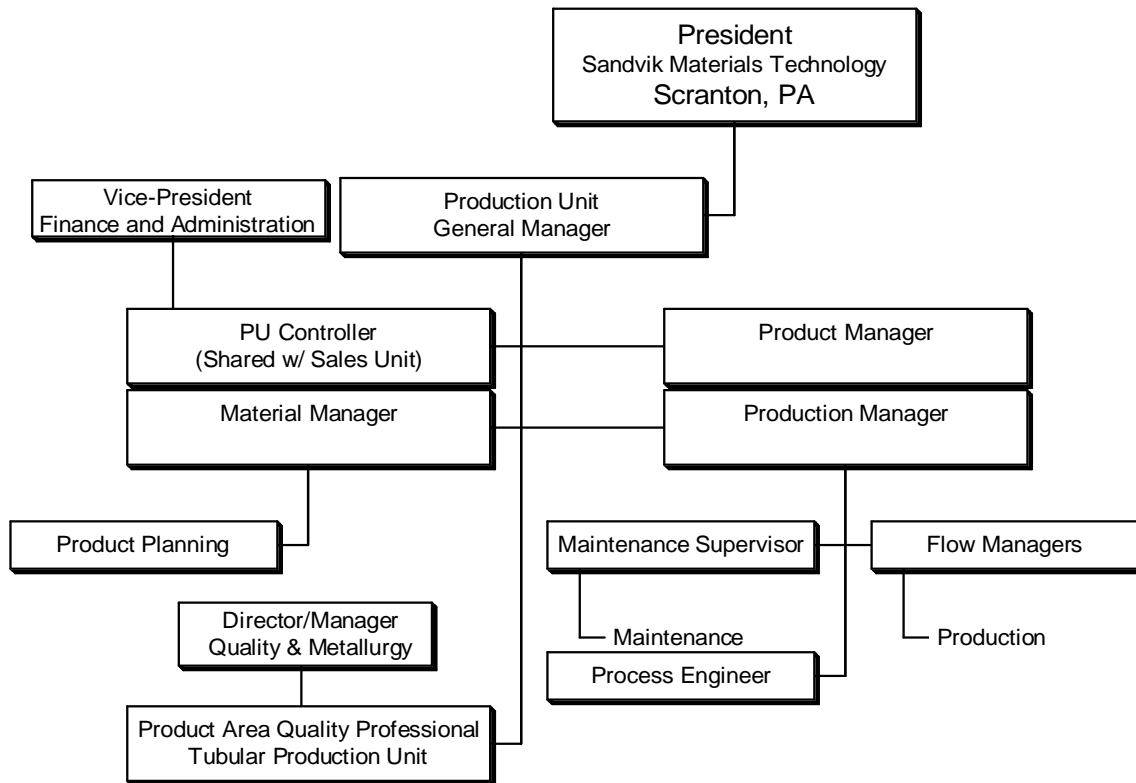


Product Area Tube

The organization of the Product Area Tube Sales Unit is outlined in the organization chart below:

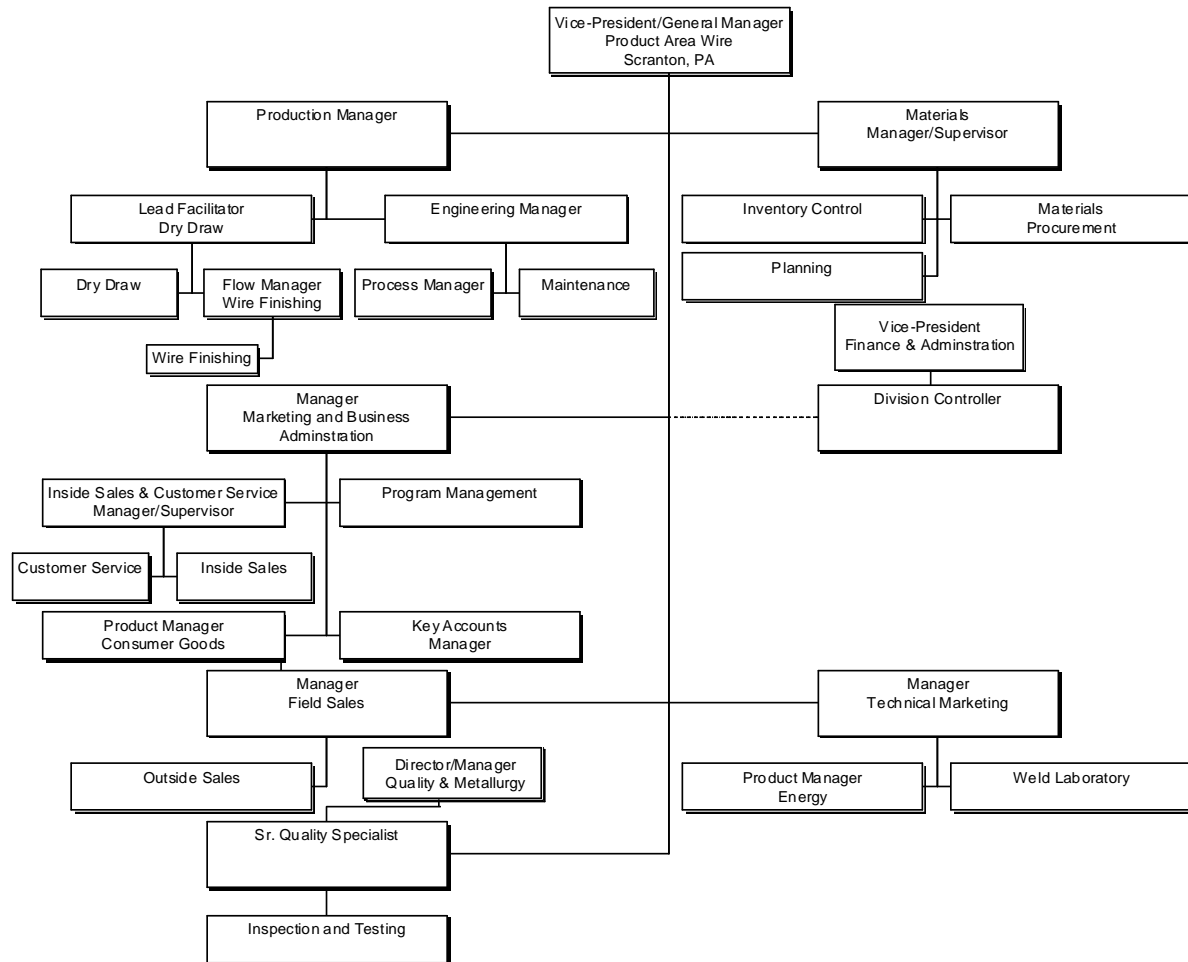


The organization of the Product Area Tube Production Unit is outlined in the organization chart below:



Product Area Wire

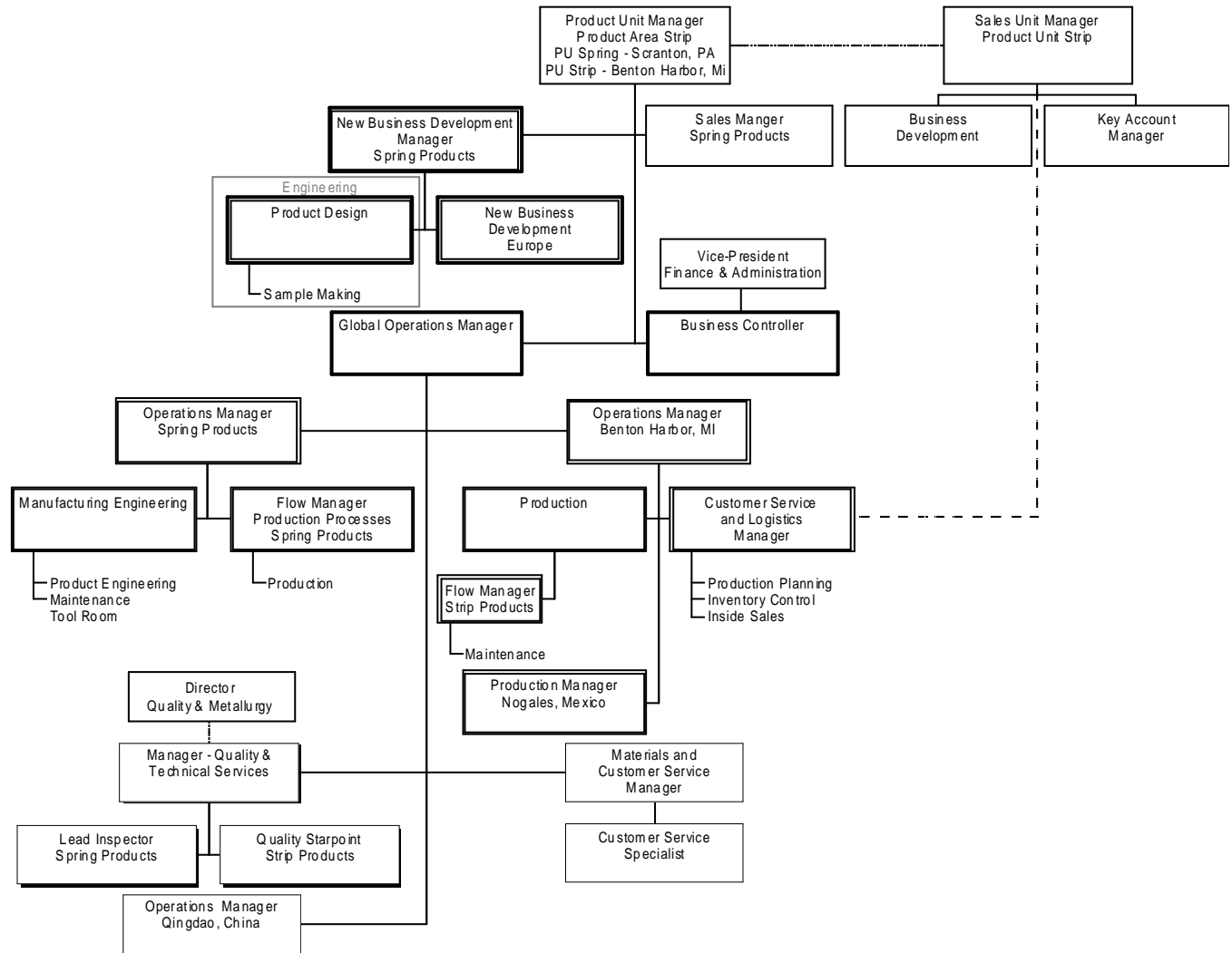
The organization of the Product Area Wire is outlined in the organization chart below:



Product Area - Strip

The organization of the Spring Products - Scranton and Strip

Products - Benton Harbor is outlined in the organization chart below:



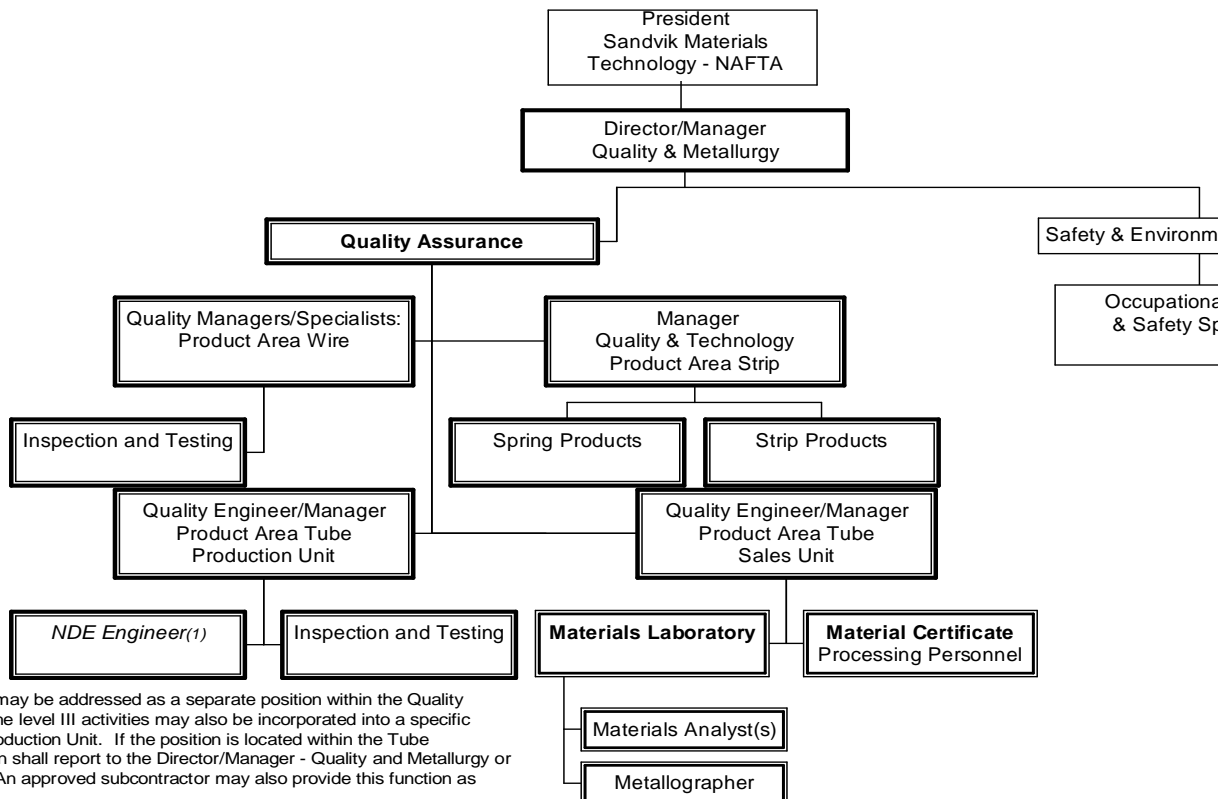
Quality Function

The Quality Function is composed of the Quality Assurance Department, the Certificate Processing group, and the Material Laboratory.

The main objective of the Quality Function is to develop, implement, and maintain Quality Systems to assure the Company's ability to manufacture and supply strip products, tubular products, wire products, welding materials, and spring products meeting applicable codes, standards and customer requirements, as well as to manage and facilitate the company's **continual** quality improvement process. The activities related to quality assurance are carried out and executed by the Director/Manager, Quality and Metallurgy, Product Area quality professionals, the Safety & Environmental Manager, **the Materials Laboratory personnel**, the material certificate processing personnel, and the testing and inspection personnel.

The organization of the Quality Function is outlined on the following page.

Quality Function Organization



(1) The Level III activities may be addressed as a separate position within the Quality Assurance Department. The level III activities may also be incorporated into a specific position within the Tube Production Unit. If the position is located within the Tube Production Unit, the position shall report to the Director/Manager - Quality and Metallurgy or designee on NDE issues. An approved subcontractor may also provide this function as necessary.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



1.3 Responsibility and Authority

POLICY:

Quality Function

All levels of management within Sandvik Materials Technology have given the Quality Function the authority, responsibility and freedom to:

- A. Initiate action which results in solutions to prevent the occurrence of any nonconformities relating to product, process and quality system.
- B. Identify and record any quality problems related to product, process and quality system.
- C. Initiate, recommend or provide solutions through designated channels.
- D. Verify the implementation of solutions.
- E. Control further processing and delivery of nonconforming product until the deficiency or unsatisfactory condition has been corrected.

The Quality function, upon notification by the inspectors or for any justifiable reason, has the authority to stop work for any production activity which may be in noncompliance with the established requirements.

The Director/Manager, Quality and Metallurgy is responsible for the Quality Function and for the overall management of the Quality Systems in an effective and economical manner. He reports to the President, Sandvik Materials Technology. In this function, he is sufficiently independent from the pressure of production. He has direct access to the management level where appropriate action can be initiated, and he reviews and reports regularly on the adequacy and effectiveness of the Quality Systems. He is also responsible for the development, issuance and implementation of quality policies, instructions and procedures necessary to comply with quality management system requirements, and any other **product** requirements.

The Director/Manager, Quality and Metallurgy is also responsible for the

issuance of quality system procedures in the form of Control Procedures and Instructions and assures that all procedures and methods comply with customer order(s) and quality system requirements and are in line with the established quality policy stated in this Manual. He is also responsible for monitoring of the inspection, testing, and examination functions and the control and issuance of Certified Material Test Reports.

It is the responsibility of the Product Area Quality Professionals to assist the Director/Manager, Quality and Metallurgy with the above functions and to investigate customer complaints, evaluate customer orders and specifications, maintain the status of rejected material, and report all discrepancies encountered to the Director/Manager, Quality and Metallurgy.

The Director/Manager, Quality and Metallurgy and the **Product Area** Quality Professionals have the right to delegate quality assurance activities to qualified individuals within the Quality Assurance function.

The Director/Manager, Quality and Metallurgy is responsible for the operation of the Materials Laboratory and the Material Certificate Processing. The Materials Laboratory Personnel establishes test methods for accurate chemical analysis and physical testing.

If a Sandvik Materials Technology employee, the Nondestructive Testing Engineering function shall be responsible for SNT-TC-1A Level III activities.

The testing and inspection personnel are responsible for the performance of tasks as defined in the Control Procedures and Instructions. This includes recording of results of all tests and examinations performed. They are also responsible for performing work in a manner as directed by the Director/Manager - Quality and Metallurgy. While testing and inspection personnel are responsible for the performance of many quality functions, The Director/Manager - Quality and Metallurgy retains the responsibility for final acceptance of the finished material and products and for auditing or otherwise verifying the execution of quality functions.

Sandvik Materials Technology Management has given the above personnel authority and freedom required to carry out the responsibilities defined per above. However, the direct responsibility for the quality of the finished material and products for individual orders lies with the Production Departments.

Non-Quality Function Personnel

It is the responsibility of persons in departments other than the Quality Function to assist in the implementation of actions required to assure compliance with the established Quality System.

It shall be the responsibility of personnel in Purchasing, Production Control and Inventory Control functions to communicate with Quality Assurance in matters pertaining to procurement of materials, services and manufacturing supplies to insure compliance with the necessary **product** requirements.

It shall be the responsibility of personnel in the Production and Traffic Departments to coordinate and communicate with Quality Assurance to insure manufacturing processes and material handling are carried out in accordance with established Control Procedures and Instructions.

It shall also be the responsibility of personnel in any function to report conditions adverse to the quality to the Director/Manager, Quality and Metallurgy, whenever such conditions exist.

Personnel assigned responsibilities within the Quality System may delegate the performance of the involved activities to qualified personnel within the same department.

Resources

Resource requirements are identified by Sandvik Materials Technology's executive management staff, who also shall provide adequate and trained resources for management, performance of work and verification activities including internal quality audits. The basis for evaluating needed resources shall include but may not be limited to the implementation and continued effectiveness of the quality management system, ongoing compliance with customer requirements, and enhanced customer satisfaction.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



1.4 Management Review

POLICY:

The Director/Manager, Quality and Metallurgy shall review yearly the adequacy of the entire Quality Systems and submit a report about this adequacy to the President, Sandvik Materials Technology. This summary report shall be based on regular cross-functional **Product Area** management review(s) performed by each **Product Area**. In addition, Sandvik's executive management is kept informed on the status, adequacy and effectiveness of the Quality Systems by:

- A. Personal communication with Director/Manager, Quality and Metallurgy, and other personnel directly involved in carrying out the Systems.
- B. Review of internal audit reports, including any trends by element.
- C. Review of the results of customer/third party audits.
- D. Review of customer feedback including complaints.
- E. Review of corrective action reports and trend analyses.
- F. Review of preventive action activities.
- G. Review of quality system elements.
- H. Process performance results and scrap and rework trends.
- I. Follow-up actions from previous management reviews.
- J. Changes that could affect the quality management system.
- K. Recommendations for improvement.

Sandvik executive management, under the direction of the President, Sandvik Materials Technology, shall annually assess the adequacy and effectiveness of the entire Quality Systems to ensure their continuing suitability and effectiveness in satisfying the requirements of **ISO 9001/ANSI Q9001** as applicable, and the Company's Quality Policy and Objectives. This assessment shall be based on the information as outlined above and documented in a separate report by the President.

At a minimum, the outcome of the management review shall include:

- Modifications/improvements of the Quality Systems and its associated processes, as needed.
- Improvements to customer-related product improvements/enhancements.
- Modifications/reevaluations of required resources.
- Action(s) to ensure compliance with customer requirements, product/process improvements, and quality management system improvements.

Any inadequacies or discrepancies found during the Management Review process may result, at the discretion of the Director/Manager, Quality and Metallurgy in the issuance of Corrective Action(s).

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



1.5 Customer Focus and Satisfaction

POLICY:

Product Area Wire, Spring Products, Product Area Tube, and Product Area Strip shall regularly track and analyze customer satisfaction and, where possible customer perception, per an approved Control Procedure and Instruction.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



2.1 Quality System - General

POLICY:

Sandvik's Quality Systems have been established and documented in this Quality Manual to verify that all **statutory and regulatory requirements of material, product specifications, and customer requirements** have been met and to provide control over these functions affecting quality during design, manufacturing, storage, handling and supply of material and products.

The Quality Systems provide for control of material and service procurement, order processing, customer order and specification review, testing and inspection equipment and procedures, as well as material and product traceability and identity. The Quality System also provides for control of nonconforming material, corrective action, quality assurance records, special processes, audits, and documents.

The Director/Manager, Quality and Metallurgy, has the responsibility to establish a quality organization and implement the Quality System described in this Quality Manual.

The Quality Manual is issued, revised and controlled by Quality Assurance in accordance with Section 5, "Document Control" of this Manual.

The following Section 2.2, "Quality System Procedures" of this Manual outlines the structure of the documentation used in Sandvik's Quality Systems.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



2.2 Quality System Procedures

POLICY:

General

The structure of quality system procedures and the documentation used in the Quality Systems is as follows:

- Quality Manual -- tier one
- Control Procedures and Instructions -- tier two
- Operating Directives and Instructions -- manufacturing work instructions -- tier three
- Laboratory Procedures and Instructions -- tier three
- Shop Orders, visual references, controlled postings, etc. – tier four
- Company Quality Policy 📄
- Quality Objectives (defined by **Product Area** top management and authorized by Company top management)

These documented procedures are prepared to be consistent with the Quality Policy and with the requirements of **ISO 9001/ANSI Q 9001** and customer order requirements.

Control Procedures and Instructions

For control of operations, materials and products, and for implementation of the Quality Systems, Control Procedures and Instructions are maintained as part of the Quality Systems. The Director/Manager, Quality and Metallurgy is responsible for issuance, revision and control of these Control Procedures and Instructions, which internally are commonly referred to as CPI's. They describe the activities affecting quality and the elements in the Quality Systems, and are issued, revised and controlled in accordance with Section 5, "Document Control" of this Manual.

Acceptance levels involved in these detailed Control Procedures and

Instructions are set by Quality Assurance in order to meet ASME Code Section II, ASTM, AWS, AMS, MIL specifications and other standards, as well as customer specifications.

Operating Directives and Instructions

Work instructions are documented in Operating Directives and Instructions. The production departments are primarily responsible for the development and revision of these documents, which internally are commonly referred to as ODIN's. Quality Assurance is responsible for issuance and for control of these documents in accordance with Section 5, "Document Control" of this Manual.

Laboratory Procedures and Instructions

Laboratory Procedures and Instructions (commonly referred to as LPI's) are issued, revised and controlled by the Materials Laboratory Personnel in accordance with Section 5, "Document Control" of this Manual.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



2.3 Quality Planning

POLICY:

General

In order to assure that **product** requirements are met, to suit Sandvik's method of operation, and to be consistent with all other requirements of the Quality Systems, the format used for Quality Planning is process outlines (shop travelers, product requirements reviews, etc.), except for those orders requiring specific methodology such as automotive. In these cases, the format used for Quality Planning shall be that detailed in the Advanced Product Quality Planning and Control Plan reference manual. A cross functional methodology shall be employed during the Advanced Product Quality Planning phase.

The process outline is a documented listing of all manufacturing, testing, inspection and other control steps, such as customer hold points. Applicable Control Procedures and Instructions (CPI's) are indicated by procedure number on the process outline.

Process Control Plans/Quality Control Plans

Process Control Plans/Quality Control Plans are prepared, revised, issued and controlled by Quality Assurance when required by the applicable Quality System, when requested by customers, or when deemed meaningful and appropriate by Quality Assurance.

Sandvik's **Continual** Quality Improvement Process

A vital part of the Quality System and Quality Planning is Sandvik's **Continual** Quality Improvement Process. The methodology is based on an initiative-driven process to achieve **continual** improvement in people, processes, products and service. The framework for many of the **continual** improvement is the SMT Business System with specific focus in the areas of Manufacturing, Procurement, Marketing and Sales, Product Development, and People

Development. The appropriate techniques shall be employed in order to ensure effective implementation of these initiatives. In the process, the Company's Vision, Values and Critical Success Factors have been defined and established. Opportunities for improvement in these areas as well as other quality and productivity related measures shall determine what company-wide and **Product Area** initiatives will be instituted. The process is guided by the SMT Leadership Team, led by the Company President, and is executed for each product area as well as the Central Services Groups (Finance and Administration, Purchasing, Traffic, Systems, Human Resources and Quality Function).

Special Characteristics

As part of the advanced product quality planning process, the necessary process controls shall be defined for those special characteristics defined by the customer or identified during the development of failure mode and effects analysis and control plans.

Feasibility Reviews

Sandvik Materials Technology shall determine that it is able to manufacture the product to customer and/or industry requirements prior to accepting the order as submitted. This determination shall be based on, but is not limited to, Sandvik's ability to meet the design and material requirements, order volume, and process capability and to employ the appropriate production methods.

Process Failure Mode and Effects Analyses (FMEAs)

Sandvik Materials Technology shall utilize Process FMEAs during the Advanced Product Quality Planning process, when required by the customer, with consideration given to all special characteristics, as defined in an approved Control Procedure and Instruction and the Failure Mode and Effects Analysis reference manual.

Control Plans

Sandvik Materials Technology shall develop control plans during the Advanced Product Quality Planning process, when required by the customer, with consideration given to all special characteristics, as defined in an approved Control Procedure and Instruction and the Advanced Product Quality Planning and Control Plan reference manual. Control plans shall be submitted for

customer approval unless the approval process is waived by the customer.

Control plans shall be reviewed on a regular basis and updated as appropriate.

Product/Process Safety

Sandvik Materials Technology shall use due care and process-related safety shall be considered in its process control policies and practices. Led by the Company's Safety Steering Committee, process related safety activities shall be undertaken. In order to promote internal awareness, the results of these activities shall be implemented and/or communicated as appropriate to all levels of the organization. Product safety as related to the products produced by Sandvik Materials Technology is not applicable.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



2.4 Mistake Proofing

POLICY:

Sandvik Materials Technology shall employ appropriate mistake proofing methods during the planning of processes and their related facilities, equipment, and tooling in order to prevent the production of nonconforming product.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



2.5 Facilities - Equipment - Infrastructure - Process Planning Effectiveness

POLICY:

Sandvik Materials Technology employs cross-functional teams for evaluating the effectiveness of existing processes and facilities. The Product Area Quality Improvement Teams/Management Teams, Safety teams and other ad hoc teams regularly evaluate the following factors as well as other key effectiveness indicators **as applicable**:

- Appropriate automation
- **Work environment including considerations to ergonomics and other human factors such as noise, temperature, and lighting.**
- Value added labor
- Inventory levels, both storage and buffer
- Line and operator balance
- Overall work plans
- **Sandvik's infrastructure; including buildings, offices, plant areas including utilities, process and manufacturing equipment and their support services such as transport, communications, or information systems are capable of ensuring product conformance to requirements.**

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



3.1 Contract Review - Product Area Tube and Product Area Wire POLICY:

Written procedures in the form of Control Procedures and Instructions (CPI's) are established and maintained for contract review and for the coordination of these activities.

The Sales Department in each **Product Area** is responsible for receipt of all requests for quotations and all customer orders and contracts. The responsible salesperson will identify and review all customer requirements associated with the request for quotation or the order. This initial review is conducted for the purpose of confirming that all requirements can be met. Order changes or amendments are subject to the same review process as a new order.

Before submission of a quotation (tender) or at the acceptance of an order, any unclear or incomplete requirements shall be resolved with the customer as soon as possible to prevent errors or delays in completing the order. If the salesperson has concerns about manufacturing capabilities, Production Management and/or Process Engineering is to be contacted and capabilities confirmed. Concerns with regard to inspection and testing requirements shall be resolved with the Quality Assurance Department. The Traffic Department, or in the case of tubular products, the North American Distribution Center are to be contacted should there be questions about handling and shipping requirements. Any exceptions to or deviations from stated written requirements shall be communicated in writing to the customer.

The salesperson is responsible for determining if the customer order conforms to one or more of the following conditions which require additional review by the Quality Assurance Department per applicable Control Procedure Instruction (CPI):

Orders for nuclear material to be manufactured to ASME Section III

requirements, where class, edition and addenda are specified.

1. Orders having additions to, or invoking specific provisions of the ASME Code Section III.
2. Orders intended to fulfill any government contract shipping directly to a government facility from Sandvik Scranton.
3. Orders requiring source inspection of any kind to be performed at Sandvik Scranton.
4. Orders having unique requirements or product specifications written by the customer or end user.
5. Orders requiring additions or exceptions to, or deviations from, established product specifications or standards, and/or internal procedures.

If the order meets any of the conditions defined above, copies of the customer purchase order, government contract (as applicable), and all supporting documentation are submitted to the Quality Assurance Department for further review before continuing.

Documents reviewed or approved by the **Product Area** quality professional are customer orders, sales orders and work orders. For orders with high integrity requirements, a customer order and specification review is performed by the **Product Area** quality professional, and a Product Requirements Review is issued by the **Product Area** quality professional. Special order requirements which have been spelled out in the Product Requirements Review which Quality Assurance has performed on the original customer order are also indicated or referenced on the sales order.

If a customer requires special instructions or procedures, they shall be documented in a Control Procedure and Instruction or a Product Requirements Review issued by the Quality Assurance Department.

When a Sales Order has additional requirements for destructive testing on material to be performed in the Materials Laboratory, the required test is requested on a Laboratory Test Request Form by Sales.

Any changes or amendments to the order or technical specification

shall be processed and controlled in the same manner as the original customer order.

When orders are received by verbal means, the salesperson shall ensure that the order requirements are agreed upon before their acceptance.

All contract review records shall be maintained per Section 16.1, "Retention of Records", per this Manual.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



3.2 Contract Review - Product Area Strip Scranton

POLICY:

Written procedures in the form of Control Procedures and Instructions (CPI's are established and maintained for contract review and for the coordination of these activities.

Provisions are established for the review of requests for quotations, customer orders and related documents to identify and evaluate design requirements and insure their inclusion in engineering, quality and manufacturing documents.

Upon receipt of a customer order, the Sales Department performs a review to determine if the order contains any unique quality or technical requirements beyond those for existing Sandvik product codes. Orders which do not contain unique requirements are entered.

For spring products, Sales forwards all related specifications and documents for orders with unique or special requirements to the Quality, Manufacturing and Product Design functions for review. If the requirements can be met, Sales is notified and the order entered. Order requirements are documented by necessary functions via work orders, Quality Control Plans and Item Master notes.

Sales shall notify the customer of existing drawing/specification exceptions requesting that the customer revise their documents to comply with the deviation, accepting the exceptions. If the customer accepts the exceptions, Sales will then enter the order.

For spring products, if the customer does not accept the deviations, all related documents shall be forwarded to Quality, Engineering and Manufacturing for final review. If the special customer requirements cannot be met, Sales shall notify the

customer and the order will be returned.

Any changes or amendments to the customer order or technical specification shall be processed and controlled in the same manner as the original customer order.

The results of the contract review shall be documented via the order acknowledgment. Order acknowledgments are reviewed and approved regularly by all functional areas to insure continued compliance with all customer requirements and specifications. These records shall be maintained per Section 16.1, "Retention of Records" per this Manual.

When orders are received by verbal means, the salesperson shall ensure that order requirements are agreed upon before their acceptance.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



3.3 Contract Review - Product Area Strip Benton Harbor

POLICY:

Provisions are established for the review of tenders or customer orders and related documents to identify and evaluate requirements and insure their inclusion in quality and manufacturing documents.

When orders are received by verbal means, Sales shall ensure that the requirements are agreed prior to their acceptance.

Upon receipt of a customer order, the Sales Department performs a review to determine if the order contains any unique quality or technical requirements beyond those for existing Sandvik Product codes.

For orders with unique or special requirements, Sales forwards all related specifications and documents to the Quality and Manufacturing functions for review. If the requirements can be met, Sales is notified and the order can be entered.

Order requirements are documented via shop orders, Internal Specifications and Item Master notes.

Any requirements differing with those in the contract shall be resolved with the customer before processing or shipment.

Records of contract reviews shall be maintained.

Amendments and changes to customer orders are handled in the same manner as original orders.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



4.1 Design Control

POLICY:

Policies and methods are applied to insure that the requirements of the applicable design bases are identified and correctly translated into drawings, reports, instructions, procedures and specifications. These planned design activities shall include the review of customer documents to insure their translation into Sandvik documents (Design Planning).

The **New Business Development** Department shall have primary responsibility for ensuring that the necessary technical input is received from each department as required. These interfaces and organizational responsibilities shall be defined by and the required information documented, transmitted, and reviewed per the relevant Control Procedures and Instructions during each phase of the design cycle.

The **New Business Development** Department shall have overall responsibility for translating customer expectations and requirements (including applicable statutory and regulatory requirements), communicated by the Sales Department, into detailed technical designs and specifications which will enable the **Product Area Strip - Scranton** to manufacture products that comply with the customer's and/or contractual **product** requirements (Design Input).

All product designs and specifications and their associated processes (Design Output) shall be adequately reviewed, tested and verified prior to production as an integral part of the quality system (Design Verification).

Qualification and validation of design shall include evaluation of product performance, durability and reliability following successful design verification (Design Validation).

While design and development review, verification and validation have distinct purposes and goals, they may be conducted and recorded separately or in any combination.

The **New Business Development** Department shall have the overall responsibility for new and/or improved product design. All changes and/or modifications to design and specifications shall be controlled and approved prior to implementation.

Based on the design, **New Business Development**, with concurrence from Quality Assurance and Production, shall develop and issue detailed instructions for all work affecting quality. Such instructions shall provide criteria for performing quality work and shall establish acceptable standards.

The results of the design process shall be reviewed and documented in the New Product Start-Up Form or Product Engineering Change Request. Additional documentation may include work orders, Item Master notes, and Quality Control Plans (Design Review).

These records shall be maintained per Section 16.1, "Retention of Records"

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



5.1 General - Document Control

POLICY:

Documents issued and controlled by Quality Assurance are: this Quality Manual, Control Procedures and Instructions (CPI), Materials Specifications (MS), Laboratory Procedures and Instructions (LPI), Operating Directives and Instructions (ODIN), Process Control Plans and Process Outlines.

Documents are distributed to and used at the location where the activity is performed, and invalid and/or obsolete documents are promptly removed from all points of issue or use.

The Director/Manager, Quality and Metallurgy, is responsible for the preparation, issuance, revision and approval of this Manual.

The Quality Manual is issued on a controlled basis to persons in the Sandvik Materials Technology organization and to the ISO 9001 registrar. Distribution of the Manual to other persons outside Sandvik Materials Technology will be on an uncontrolled copy basis unless a controlled copy is specifically requested and the request is approved by Director/Manager, Quality and Metallurgy or his designee.

When revisions are required to this Manual, they shall be made by subsection. When a change is made, the change shall be highlighted by the use of bold, blue text.

When a major change is made to a subsection, this shall be indicated by a statement at the beginning of the section or highlighting the entire section in bold, blue text. When changes are explained in Section 0.2 "Introduction and General" of this manual, the use of bold, blue text may not be required if so indicated in Section 0.2. The entire subsection shall carry the next higher revision number. The Manual table of contents shall show the current revision number, the date, and the approval of the Director/Manager, Quality and Metallurgy.

Issuance of controlled copies internally shall be maintained through computer security and access rights. Issuance of hard copies of the Manual

will be recorded in a Manual distribution log, which will be maintained by Quality Assurance. This distribution log shall show the Manual number, to who issued, revision number, issuance date and date of acknowledgment.

Uncontrolled copies of the Manual may be issued outside the Sandvik Materials Technology. An uncontrolled copy shall be current as of the date of issuance, but shall not be maintained nor shall such issuance be logged unless required by Quality Assurance.

Controlled Manuals and revisions will be issued through electronic notification. Hard copies of the controlled manual and revisions will be issued through the use of letter of transmittal, which shall require acknowledgment of receipt of the Manual or the revised pages. For Manuals held by persons outside of Sandvik Materials Technology, revisions may be mailed with postal return receipt requested. Acknowledgment and return receipts shall be filed by Quality Assurance. For Manuals held by Sandvik Materials Technology personnel, acknowledgment must be received within seven (7) days or a personal follow-up shall be made by the Product Area quality professional (or his/her designee), which shall result in a corrective action requirement per Section 14, "Corrective Action", of this Manual.

The Control Procedures and Instructions (CPI) are always approved by the Director/Manager, Quality and Metallurgy, and issued and controlled by the Product Area quality professional. Revisions or changes are approved and controlled in the same manner as the initial procedure. Hard copies of these CPI's shall be issued to numbered controlled books assigned to individuals, or as partial books assigned to specific work stations, controlled by the CPI Holders List and Table of Contents for each book. The CPI Table of Contents lists all Control Procedures and Instructions by CPI number, revision level and issue date. When partial books are issued, the number of the partial book from the Holders List shall be referenced next to those Control Procedures and Instructions which are to be present in the particular partial books. Hard copies of all Control Procedures and Instructions are stamped with a "Controlled Document" stamp with the following text: "Controlled document only if this stamp is in original red ink". New and revised Control Procedures and Instructions are hand delivered by the Product Area quality professional and superseded revisions and

obsolete copies are deleted and destroyed by the Product Area quality professional. If the CPI distribution and control is maintained through electronic means, access to specific documents will be done through system security and access controls designated by Quality Assurance. The Quality Assurance person making the distribution shall sign and date the master CPI index to indicate the distribution has been completed. If the CPI distribution and control is maintained through electronic means, the signing and dating of the master index is not required.

Material Specifications (MS) for procurement of raw material and finished products for tubular products and for welding and wire products, are written by the Product Area quality professional or Wire Technical Services personnel and reviewed and approved by the Director/Manager, Quality and Metallurgy or his/her designee. They must also be approved by managers of all departments affected by the specification. MS's are issued and controlled by the Product Area quality professional. These MS's are issued on a controlled basis only, and any revisions are issued solely by the Product Area quality professional. They shall be issued to numbered controlled books assigned to individuals and are controlled by the MS index and Table of Contents. If the MS distribution and control is maintained through electronic means, access to specific documents will be done through system security and access controls designated by Quality Assurance. The Quality Assurance person making the distribution shall sign and date the master MS index to indicate the distribution has been completed. If the MS distribution and control is maintained through electronic means, the signing and dating of the master index is not required.

Laboratory Procedures and Instructions (LPI) and changes are written and approved by the Materials Laboratory Personnel. They are issued and controlled by the Materials Laboratory Personnel. They cover in detail the work to be performed in the Materials Laboratory for chemical analysis and acceptance testing of raw material and finished goods. These LPI's shall be issued to numbered controlled books to individuals and are controlled by the LPI index and table of contents. The Materials Laboratory Personnel shall sign and date the master LPI index to indicate the distribution has been completed.

Operating Directives and Instructions (ODIN) and their changes are written by any responsible employee. They are reviewed and approved by the Product Area quality professional and by managers of all departments affected by the ODIN. The control, issuance and distribution of ODIN's are made by Quality Assurance in the same way as for CPI's.

Process Control Plans/Quality Control Plans and their changes are prepared by the Product Area quality professional and issued by Quality Assurance to those functions affected by the documents.

National and international standards such as ASTM, ASME, and AWS specifications and **ISO 9001** quality system standards shall be controlled per applicable Control Procedures and Instructions. Quality Assurance shall be responsible for review of applicable parts of these standards, for availability of these standards where needed, and for assuring that superseded standards are not used for product inspection, testing and acceptance.

When customer drawings, specifications, or purchase orders reference other documents, the current revision/edition of these documents must be secured and controlled per the approved Control Procedure and Instruction.

When the customer identifies special characteristics on their specification, drawing, or purchase order; internal documents such as control plans, shop travelers, quality plans, and specification reviews shall indicate those operations which affect the special characteristic(s) when required by the customer.

Customer engineering specifications and standards shall be reviewed, distributed, and implemented per the approved Control Procedure and Instruction.

Any obsolete documents retained for legal and/or knowledge-preservation purposes shall be suitably identified. Documents and data can be in the form of hard copies or electronic media. When electronic media is used, Control Procedures and Instructions (CPI's) shall be established to control

all electronic media documents.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



6.1 Assessment and Approval of Suppliers

POLICY:

Suppliers of material, components, products and services shall be selected on the basis of their ability to meet Sandvik's requirements. The criteria used to select and evaluate suppliers of material, components, products and services shall be defined in a Control Procedure and Instruction. Approved Suppliers List(s) shall be established and maintained by the organizations responsible for procurement activities.

Suppliers of calibration and outside testing services shall be audited/evaluated by competent persons qualified and designated as lead auditors by the Director/Manager, Quality and Metallurgy, to verify the supplier's performance and that reference standards used are traceable to National Standards where such exist, or to the equipment manufacturer's standards. This audit/evaluation shall be documented and approved by the Director/Manager, Quality and Metallurgy. When the calibration service is supplied by the manufacturer of the measuring and test equipment, the audit/evaluation may be limited to verification of reference standards only, at the discretion of the Director/Manager, Quality and Metallurgy.

The audit frequency of calibration services and outside testing services shall be every three (3) years, with a yearly evaluation.

Suppliers of survey and audit services shall be approved by the Director/Manager, Quality and Metallurgy, based on his evaluation of their performance and experience.

The evaluation frequency of suppliers of survey and audit services shall be every three (3) years.

Records of surveys, audits and evaluations indicating their acceptability and approval status shall be maintained by Quality Assurance.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



6.2 Procurement Data

POLICY:

Material, components, products and services for Strip, Tubular, Welding and Wire, and Spring products are purchased from approved suppliers and in accordance with specific requirements, included in or referenced on the procurement documents.

When the requirements for procurement of materials and services are specified in Control Procedures and Instructions, or in Sandvik internal Material Specifications, the procedure or specification is referenced on the purchase order. The applicable Control Procedure and Instruction or Material Specifications shall contain, as applicable, requirements of chemical composition, mechanical properties, production, service activities to be performed, and the quality system approved by Sandvik and listed on the applicable Approved Suppliers List. The Control Procedure and Instruction or Material Specification is approved by the Director/Manager, Quality and Metallurgy, per Section 5, "Document Control" of this Manual.

When the Sandvik internal specification is not sufficient to procure material or services, the additional procurement information shall be stated on the purchase order.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



6.3 Verification of Purchased Materials, Products, and Services

POLICY:

For Sandvik Materials Technology manufactured product, customers shall be offered the right to access Sandvik's facilities or approved subcontractors' facilities when so specified in the contract.

When Sandvik Materials Technology intends to verify, approve or release material at its supplier or supplier of subcontracted services, it must indicate the arrangements and methods for doing so in the purchase order requirements.

When the customer or customer's representative elects to carry out source inspection/verification at Sandvik's facilities, or at Sandvik's approved subcontractor's facility, such inspection/verification shall not absolve Sandvik from the responsibility to provide acceptable product, nor shall it preclude subsequent rejection. Furthermore, the customer's inspection/verification shall not be used by Sandvik as effective control of quality by the subcontractor.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



7.1 Control of Customer Supplied Product

POLICY:

Sandvik may from time to time undertake to provide activities involving customer's material, products, tooling and returnable packing. If customer owned tooling or equipment is employed by Sandvik Materials Technology, it shall be permanently marked as to clearly indicate (visually apparent) its ownership.

Customer property can include intellectual property and personal data. If used, Sandvik shall associate this property directly to the customer and its associated products.

Verification, storage, processing, inspection and testing are performed in accordance with the Quality System per this Manual, and per applicable procedures and instructions used for Sandvik-owned material and products.

Any such material or product that is lost, damaged or is otherwise unsuitable for use, shall be recorded and reported to the customer.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



8.1 General - Product Identification and Traceability

POLICY:

Throughout all processing at Sandvik Materials Technology material identification shall be accomplished in such manner that any material can be traced to work order and, when applicable, heat origin at any point in the processing.

Test material for final acceptance testing and examination is identified by tagging the material or identifying the sample container with (as a minimum) the work order and/or lot number by the individual assigned that duty by approved Control Procedure and Instruction or instructions on the work order. The identification is verified by inspectors or laboratory personnel.

If material or products are suspected to be nonconforming to applicable requirements anytime during the processing, a yellow hold tag, a reject tag, or a nonconforming material report shall be applied to the suspect material by the inspector. Removal of tags shall be by the inspector.

When material or products are found to be nonconforming, the material or products is labeled by inspectors with the reject tag or nonconforming material report . All material bearing reject tags or nonconforming material reports shall be segregated by the inspector. Material is not processed until material disposition is received from the Quality Assurance Department, per Section 13, "Control of Nonconforming Product and Material" of this Manual.

When there are several units included on a rejection tag, such as several skids of material, a red rejection tag or nonconforming material report will be attached by the inspector to each individual unit.

Identification and control are performed by utilizing a work order system and shop travelers. All material is identified by tagging with work order number during all steps of manufacturing. The work order number is traceable to the heat number, grade and size of material or description of product. Unless otherwise allowed, material assigned to each work order must be from one heat and must be of the same starting size. Each work order must be for one final size and for the same material or product specification.

The shop travelers list each operating step in sequence. Listed also, as appropriate, are applicable material specifications, Control Procedures and Instructions, to be used during operations. After completion of each manufacturing step for tubular products and welding and wire products (set-up steps are excluded), the operator signs and dates the traveler, and after completion of each inspection step, the traveler is signed off and dated by the inspector. Completion of testing steps is signed off by the foreman for tubular products, and by the inspector for welding and wire products. Each work order is represented by one traveler, which accompanies the material during all processing steps.

For spring products and **strip products**, after completion of each manufacturing and inspection/testing step, the operator and inspector respectively enters his/her unique badge number

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



8.2 Tubular Products - Product Identification and Traceability

POLICY:

Identification and control of incoming raw material in the form of tube hollows is accomplished through the use of legible tags or linemarking containing the heat number, lot number, grade and size. After receiving verification per Section 6, "Purchasing" of this Manual, material can be assigned for production.

Identification and control of material during production is accomplished through the use of heat number and work order number. This control is established from the time raw material is assigned to a work order until shipment of finished product.

Processing and handling of pipe and tube during manufacturing is done in the form of bundles. Each bundle is identified by bundle identification tags, showing the work order number.

The bundle identification tags are attached to each bundle by operators when raw material in the form of hollows is assigned to a work order of pipe and tube.

It is the responsibility of operators and/or inspectors as applicable to attach one tag to the first piece going through any given operation or testing step, or to the container where the accepted pieces are being collected, and to attach the second tag to the bundle immediately after the last piece is processed. During processing, the second tag shall remain at a designated spot at the process station.

The second tag will note the amount of pieces processed at the following steps: hydrostatic testing, ultrasonic testing; eddy current testing when line marking is not combined with this test, and final inspection.

At any operation resulting in an intentional change of the number of pieces (such as cutting) the number of pieces shall be determined and recorded on the bundle identification tag by the operator.

The piece count from the bundles for each work order shall be summarized on the traveler for each of the above mentioned operational steps.

For a given work order, the number of pieces rejected or scrapped, if any, at an operational step, shall be summarized and recorded on the traveler.

If a discrepancy has occurred in the piece count, Quality Assurance shall be notified immediately to investigate and resolve the discrepancy. The work order shall go on hold (hold tags applied), and will be released only by Quality Assurance when the discrepancy is satisfactorily resolved.

The in-process identification system and the use and control of the bundle identification tag is detailed in an approved Control Procedure and Instruction.

As a final check that all processing steps have been performed in accordance with the work order, each traveler is given a final review by inspectors at the completion of final inspection. This review is a part of final inspection and is recorded by inspectors on the final inspection form and by inspectors signing and dating the traveler opposite the final inspection step.

Final marking of pipe and tube is performed in accordance with applicable specifications and with (as a minimum) the following information: Sandvik's identification mark, work order number, grade, heat number, size and specification. The heat number and the work order number identify the material with the material

certification. The method of marking, which is normally line marking, shall not result in harmful contamination or sharp discontinuities.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



8.3 Welding & Wire Products - Product Identification and Traceability

POLICY:

General

Identification of material is established through the use of travelers, work-in-process cards or material identification tags, green "OK TO PROCESS" tags, and yellow hold tags.

Identification and control of material for bare electrodes, rods, and wire products is accomplished through the use of heat number and work order number. This control is established from the time that raw material is assigned to a work order until shipment of finished product. When it is established through the receiving verification per Section 6, "Purchasing" of this Manual that the material, hot-rolled rod or cold drawn wire, conforms to the procurement order requirements, and the material has been released by the **Product Area** quality professional following receiving verification, Production may apply the material to the work order. Material will be located and held in storage until applied to work orders for processing.

Hot Rolled Rod and Cold Drawn Wire

Hot rolled rod to be drawn to wire by Sandvik Materials Technology will be examined by Sandvik personnel and verified against work order for correctness when removed from inventory by the material handler and again by the operator when the rod is conditioned. The **durable** identification tags placed on the hot rolled rod by the supplier of materials contain purchase order number, heat number and material specification or grade. The tags will remain with the material until the first drawing operation. The inspector will verify the correctness of the material identity, including size, grade and quantity and the collection of the correct number of test samples for each work order for alloy identity testing. See Section 9, "Process Control" of this Manual.

At this stage, the material will be identified by a work-in-process card or material identification tags. After Quality Assurance has verified that everything is correct, the material will be tagged with a green "OK TO PROCESS" tag by the operator and moved for further processing.

Wire being further processed through the drawing, annealing and cleaning operations will, at each stage during processing, be identified with work-in-process cards or material identification tags.

Splicing by welding may be done between wire coils from the same work order (i.e., the same heat and size of material) when allowed by the applicable material specification. An alloy identity test per Section 10, "Inspection and Testing" of this Manual shall be performed for welding material on each end to be spliced in accordance with established Control Procedure and Instruction, except where material is spliced to repair a break during manufacturing. The alloy identity test is documented on the traveler or the in-process/final inspection form by the inspector.

Splicing by welding is done between work orders when the splice can be positively identified by crimping or coloring by the operator. The splice shall be removed after the processing operation. Removal of the splice shall be verified by the inspector who signs and dates the traveler. In-process inspection of the removal of the splice may take place in parallel with subsequent operations as described in traveler.

If the processing is the drawing operation, confirmation of weld removal will be done as established in Control Procedure and Instruction for alloy identity testing. See Section 10.2, "Testing", of this Manual.

When requested and specified, Sandvik applies 100% metal monitoring through the use of a metal alloy comparator in-line during spooling or coiling.

Bare Electrodes and Rods

Cold drawn wire to be processed to bare welding electrodes and welding

rods is given an incoming inspection by the inspector to verify identity prior to processing and to confirm that the wire conforms to the work order requirements. Green "OK TO PROCESS" tags containing the work order number, are affixed to the material by the inspector.

The identification tags placed on the cold drawn wire by Sandvik or the supplier of materials are examined by inspectors along with the material at incoming inspection and remain on the wire and follow it right up to the time the wire is placed on the processing machine, at which time the tags are disposed of by the operators.

As the material is processed, further identification tags and labels are applied to the material by operators. In the case of cut straight length rods, the material is placed into containers having identification labels attached by the operators. In the case of spooled electrodes, labels with the appropriate information are placed by the operators on the spools as they are moved from the spooling machines. These identification labels remain on the spools and are not removed by Sandvik.

The final identity of material is accomplished by final labeling of the material by operators when all processing is completed.

The final labeling is performed in accordance with applicable material specifications listed on the traveler, and with (as a minimum) the following information: Sandvik's identification name, grade, heat, size, work order number, specification and weight. The heat number and the work order number or lot number identify the material with certification.

The inspector verifies by signing and dating the traveler that the material receives the proper identification at the final labeling stage. He also verifies that the traveler operation has been signed off. When the inspector is satisfied that the material is acceptable and the labels contain the proper information, he signs off and dates and attaches to the traveler and forwards to Quality Assurance one copy of the final labels for each work order.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



8.4 Product Area Strip - Scranton - Product Identification and Traceability

POLICY:

Provisions for the identification and control of materials and components throughout the manufacturing and storage operation are in place.

Identification of material is established through work orders, material identification tags, (Material Issue Tags, Finished Goods Tags, Bar Code Labels, and Material Identification Labels, yellow HOLD tags and REJECT tags/**nonconforming material reports**).

Specific traceability from raw materials to finished goods is provided for when required by customer contract, by heat number.

All materials assigned to work orders shall be identified as to status of acceptance (tags, stamps, etc.) and the work order from which they are being manufactured.

All raw material and component parts in inventory shall be identified. To the extent possible, the date code shall identify the date which the material was received.

All finished goods in inventory shall be identified. The information shall identify the date that the work order was completed and the work order number.

All finished goods released shall be identified and date coded by a material identification label and, when required, stenciling. The material identification label shall identify the date that the work order was inspected and the work order number. The stenciling shall contain the customer/Sandvik part number.

Inspection records shall permit positive evidence of raw materials, components and product acceptance.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:



8.5 Product Area Strip - Benton Harbor - Product Identification and Traceability

POLICY:

Throughout all processing at **Product Area Strip - Benton Harbor** to the finished product, material identification shall be accomplished in such a manner that any material can be traced to shop order and heat origin at any point where the identity may be required.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



9.1 Process Control - General

POLICY:

The manufacturing of strip, pipes, tubes, bare electrodes, rods, wire, and mechanical springs is performed under a controlled system, utilizing Operating Directives and Instructions, work orders and travelers, as well as approved Control Procedures and Instructions for control of special processes, examinations and tests. The controlled system utilizes the work orders and travelers to assure that all processes and production steps are controlled in accordance with applicable material, customer, and military specifications.

Sandvik shall ensure that the company's infrastructure; including buildings, offices, plant areas, process and manufacturing equipment and their support services are capable of ensuring product conformance to requirements. The overall work environment shall be conducive to ensuring the overall product conformance is achieved. The facilities shall be maintained in a state of order, cleanliness, and repair appropriate for the products being manufactured.

Work orders are prepared and issued by Product Area Production Control to Production to cover the manufacturing of tubular products, welding and wire products, and spring products. The work order will detail material grade, size, heat number, lot number, method and sequence of manufacture and any special production, inspection or testing requirements per the Customer Order or applicable level of the same. Job set-ups shall be performed per appropriate instructions. The results of the set-up must be able to produce parts that meet all documented requirements prior to beginning production. The setup shall be verified, using statistical methods where applicable.

When Production Part Approval is required, any changes to the documented process, part revision, or material sources shall be approved per the requirements of the Production Part Approval Process reference manual. The effectivity date for all process changes must be documented.

When material is obtained from a customer for specific use, material assigned to a work order shall be only material accepted per Section 7, "Customer-Supplied

Material and Products" of this Manual.

Production Control identifies on the work order the specific purchase order number (source number) and heat number of material to be used.

The work order set includes several copies. The hard copy is used as the traveler copy. Other copies **may be** used for Inspection, Production Control, Warehouse, Quality Assurance, **Flow Managers**, Accounting Department and for other departments as needed.

Special characteristics shall be controlled during the production process. These special characteristics will be clearly identified to production personnel. Evidence of this control will be made available to the customer upon request.

Rework of material or products during manufacturing is limited to allowances in applicable material or product specifications and customer orders. When rework is performed after testing or inspection activities, the reworked material or product shall be re-tested or re-inspected, as applicable, per the same acceptance criteria used for the initial testing or inspection. Rework or repair by welding shall not be performed on any tubular products and welding material.

When deemed meaningful or when required by customer orders, process control plans and statistical process control methods shall be developed and implemented and used for monitoring of certain products or processes as specified in applicable Control Procedures and Instructions or Operating Directives and Instructions.

Criteria for workmanship when practical is defined in applicable Control Procedures and Instructions, in Operating Directives and Instructions, or by means of representative samples.

Material and products, which are found to be nonconforming after rework, re-testing and re-inspection, shall be handled per Section 13, "Control of Nonconforming Product and Material" per this Manual.

Sandvik Materials Technology complies with all local, state, and federal safety and environmental regulations including the handling and disposing of hazardous

waste material. The Safety and Environmental Manager with cooperation from the Product Area Production Managers is responsible for ensuring continued compliance to all applicable environmental regulations. Measures are in place to track performance. The company's Safety Steering Committee and Product Area Safety teams are responsible for ensuring continued compliance to all applicable safety regulations. Material Safety Data Sheets are reviewed and maintained for applicable production materials.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



9.2 Special Processes

POLICY:

Special processes are those of which the process result cannot be fully verified by subsequent inspection and testing of the material or product. They shall be qualified and carried out under controlled conditions per Section 9.1, "Process Control, General" of this Manual.

Heat treating and nondestructive examination are special processes used by Sandvik.

Heat treating is a requirement for tubular products and spring products, based on standard material and product specifications as well as special customer requirements.

Nondestructive examination is used for tubular products (ultrasonic testing and eddy current testing) and for welding products (radiography).

Heat treating and nondestructive examination of tubular products are controlled by Control Procedures and Instructions, approved by the Director/Manager, Quality and Metallurgy, and by specific instructions given on travelers, and are performed by personnel who are trained and qualified by the **Product Area quality professional** per applicable specifications and internal requirements.

Heat treating of pipe and tube is performed in continuous-type furnaces per a Control Procedure and Instruction and revision referenced on the traveler. Heat treat data in the form of time, temperature, travel speed, date, pieces per load and operator are recorded by the furnace operator on the traveler. Inspectors verify that the operation was performed by reviewing and signing and dating the traveler at final inspection. Time-temperature furnace charts showing time, temperature and date are filed.

Heat treating of spring products is performed in either batch ovens or continuous conveyor-type ovens. Heat treatment is done per applicable Control Procedures and Instructions, Operating Directives and Instructions and work order requirements.

Heat treating of strip products is performed in continuous furnace. Heat treatment is done per applicable Control Procedures and Instructions, Operating Directives and Instructions and work order requirements.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



9.3 Maintenance of Equipment

POLICY:

In order to ensure continuing process capability, suitable maintenance shall be performed on equipment and machines where material or product quality can be detrimentally affected.

Suitable maintenance shall include preventative, **predictive, as applicable**, and scheduled maintenance. Only preventative, predictive, and scheduled maintenance, which directly affects product quality, shall be addressed by the Quality System.

Replacement and repair parts inventory must be available for the equipment and machines where material or product quality can be detrimentally affected.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



10.1 Inspection

POLICY:

The overall inspection system for material and product examination utilizes Control Procedures and Instructions and is designed in order to comply with requirements per ISO 9001/ANSI Q9001, military specification MIL-I-45208A, ASME, ASTM, AWS and AMS specifications, as well as requirements as specified in customer orders and drawings.

Inspection shall be performed by personnel trained and qualified in accordance with Section 18, "Training and Indoctrination", of this Manual and per approved Control Procedures and Instructions. It is the responsibility of personnel performing inspection function to report as specified in appropriate Control Procedures and Instructions and also as directed by the Product Area quality professional and the Director/Manager, Quality and Metallurgy.

Control of purchased material and product is accomplished by receiving verification activities in accordance with approved Control Procedures and Instructions applicable to each Product Area.

The receiving verification includes verification of packing list to be in accordance with purchase order and verification of material to be in accordance with packing list. When applicable, the material verification includes product marking and identification. The verifications are documented by responsible personnel by signing and dating applicable documents or by controlled entry and exit when electronic storage of data and records is used.

Certified Material Test Reports and Material Certificates for tubular products and welding and wire products are reviewed and approved by the appropriate Product Area quality professional or his/her designee. When electronic storage of data and records is used for Certified Material Test Reports and Material Certificates, controls shall be specified in an approved Control Procedure and Instruction.

All suppliers of raw material, finished goods and services are required to supply material certificates with the material as requested.

No material received is placed in inventory or applied to a work order or customer order until receiving verification is completed and documented. All inventoried material shall be identified and traceable to the procurement documents by heat number and purchase order number.

Any material not conforming to the requirements per purchase order and material specifications will be rejected and so identified. It will be segregated to await Product Area quality professional disposition in accordance with the nonconforming material handling procedure per Section 13, "Control of Nonconforming Product and Material", of this Manual.

For medical products, any material not conforming to the requirements of the purchase order and material specifications will be not be released for shipment. It will be held to await final disposition by [Bioline Sales/Customer Service](#).

The identify of material assigned to a work order shall be verified by personnel per applicable approved Control Procedure and Instruction, Process Outline, or Process Control Plan/Quality Control Plan.

When incoming inspection is required, it is performed by inspectors per approved Control Procedures and Instructions referenced on the traveler. When determining the level and nature of incoming inspection to be performed, the amount of control placed on the supplier at its facility and the supplier's conformance to Sandvik Materials Technology's requirements shall be considered.

Where incoming product is released prior to incoming verification for urgent production purposes, it shall be positively identified and recorded in order to permit immediate recall and replacement in the event of nonconformance to specified requirements. This release shall not occur without prior approval from Quality Assurance.

Sampling of pipe and tube is done per MIL-STD-105E and ANSI Z1.4.

Sampling of semi-finished and finished material for bare electrodes, rods and welding inserts is done per Specification MIL-E-19933 for stainless grades and MIL-E-21562 for nickel alloys, copper-nickel and copper alloys.

Sampling and AQL is established in approved Control Procedures and Instructions.

Sampling for covered electrodes is done per MIL-E-22200, MIL-E-22200/2, MIL-E-22200/3 and MIL-E-22200/4 for military applications. This sampling system is specified in approved Control Procedure and Instruction. Acceptance of covered electrodes per Code requirements is based on inspection by Quality Assurance per approved Control Procedure and Instruction.

Sampling of wire products: When specified by customer/contract requirements, the specific sampling plan is documented in the Product Requirements Review. When a sampling plan is not specified by customer/contract, it is the discretion of the Product Area quality professional to determine an acceptable sampling method to insure product quality.

In-process and final inspection of wire products: In-process inspection and final inspection are performed per approved Control Procedures and Instructions and Specification Reviews for each work order and documented. When applicable, in-process and final inspection shall be performed per the requirements of the documented Control Plan.

Sampling of spring products: When specified by customer/contract requirements, the specific sampling plan is documented in Quality Control Plan for the particular product code. When a sampling plan is not specified by customer/contract, it is the discretion of the Product Area quality professional to determine an acceptable sampling method to insure product quality.

In-process and final inspection of spring products: In-process inspection is performed on a regular basis for each work order and documented. When required by customer/contract requirements, final inspection is performed for each work order and documented.

Customer inspection hold points are not normally used in the manufacturing process; however, upon request from a customer, such hold points could be established for the purpose of customer review and observation of final inspection and testing operations.

If material or products, at any stage in the process of manufacturing or during examination and testing, is found to be nonconforming, and not capable to be re-worked, the material or product will be handled in accordance with Section 13, "Nonconforming Product and Material" of this Manual.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



10.2 Testing

POLICY:

General

All testing is done in accordance with approved Control Procedures and Instructions, Laboratory Procedures and Instructions, Control Plans, and customer requirements. The **Product Area** quality professional or Materials Laboratory Personnel reviews test procedures and documents and verifies by signing and dating that all test results meet the applicable requirements. No material or products will receive final approval and certification from the Quality Assurance Department unless the required tests are performed and the results are documented and within acceptable limits.

Test samples are identified as a minimum by work order or lot number, which is traceable to specification, size and heat number. Identification is done by the individual responsible for collecting samples and is maintained by laboratory personnel.

Destructive testing such as physical testing and corrosion testing is performed by Quality Assurance in Sandvik's Materials Laboratory or on the production floor in accordance with applicable specifications and customer requirements. Test material is identified as a minimum by work order number, which is traceable to specification, size and heat number. Identification is verified by Quality Assurance when collecting samples and is maintained by Quality Assurance personnel during testing.

When a customer requires that chemical, physical or corrosion testing be performed by an accredited laboratory (American Association for Laboratory Accreditation), Sandvik Materials Technology will perform these tests at an approved subcontractor which meets these requirements.

Nondestructive examinations are performed by Sandvik or by an approved supplier of testing services. Approved procedures, which

assure compliance with applicable material specifications and customer requirements, are issued and maintained on a controlled copy basis by the Quality Assurance Department, along with applicable personnel qualifications.

The Sandvik Level III person prepares the written practice in the form of a Control Procedure and Instruction, which shall comply with the applicable edition of SNT-TC-1A. The written practice is approved by the Director/Manager, Quality and Metallurgy.

When nondestructive examination is performed by suppliers of outside services in accordance with product specifications or customer order requirements (not Code requirements), a Sandvik Control Procedure and Instruction shall be prepared by the **Product Area** quality professional for the subcontracting of this service, or the requirements shall be specified on the purchase order to the vendor.

Pipe and Tube

Testing is scheduled in the production operation sequence. Detailed Control Procedures and Instructions for testing are listed on the traveler and are available at each test station and maintained on a controlled copy basis by Quality Assurance. They are available for review and approval by customers upon request.

Welding Materials

Testing is performed to assure compliance with applicable materials specifications, MIL and customer requirements. These requirements are specified on Specification Review Sheet listed on the traveler. Tests performed by Sandvik on welding materials are chemical analysis, ferrite determinations, all-weld metal tensile tests, fillet weld tests, groove weld usability tests and bend tests.

Test welding is performed in the Welding Laboratory by the test welder and the Materials Analysts/Plant Chemist performs the chemical analysis and physical testing as specified on the product requirements review.

In order to meet the requirements of certain MIL Specifications for welding materials, weld metal material for MIL applications is subjected to alloy identity testing during incoming inspection. This alloy identity testing is performed by inspectors and/or Materials Laboratory on each coil of hot rod and each coil, capstan or spool of cold drawn wire and on samples from each tote box of cut length core wire. It involves the use of an optical emission spectrometer or chemical analysis or other approved methods as specified in approved Control Procedure and Instruction for alloy identity testing. Alloy identity testing is documented by the inspector signature and date on the traveler.

Such controls of welding materials identity for MIL applications are also applied at the time of splicing by welding during further processing by Sandvik Materials Technology or its vendor.

Wire Products

Testing is performed to assure compliance with applicable materials specifications and customer requirements. Chemical analysis and physical testing is performed by Quality Assurance or Inspection personnel.

Spring Products

Testing of spring products is performed to insure compliance with product/contract requirements. Testing is performed in accordance with applicable Control Procedures and Instructions, Operating Directives and Instructions, and/or Quality Control Plans. When required by product/contract, torque and cycle testing may be performed by the Quality Department.

Strip Products

Testing of strip products is performed to insure compliance with product/contract requirements. Testing is performed in accordance with applicable Control Procedures and Instructions, Operating Directives and Instructions, and/or Quality Control Plans.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



10.3 Inspection and Test Records

POLICY:

General

Records for inspection, examinations and tests are signed and dated by the individual who performed the activity to verify that the activity was performed and that the result of the activity was acceptable.

Test results related to sales orders involving only destructive tests of inventoried material are recorded on the Laboratory Test Request Form. This form is signed and dated by the **Product Area quality professional** (or designee).

Records are traceable through sales order, work order and/or lot number as applicable to material specification and to procedure and revision to which inspection and testing is to be performed, including acceptance criteria.

Pipe and Tube

Separate inspection forms are used for each work order indicating the status of eddy current testing, ultrasonic testing, and final inspection. Results from destructive testing performed in the Materials Laboratory are recorded on the Laboratory Test Report for each work order. This report is signed and dated by the **Product Area quality professional** (or designee).

Welding Material

Different forms are used for each work order to indicate the status and to record the results of inspection and testing and with space for recording results.

Wire Products

Different forms are used for each work order to indicate the status and to

record the results of inspection and testing and with space for recording results.

Spring Products

Separate inspection and test forms/reports are used for each work order indicating the first-piece and in-process inspection, and (when required customer/contract) Final Inspection Reports. Inspection records are traceable to material by the work order number.

Testing required by customer/contract such as cycle testing and torque testing is recorded by work order or heat number.

Strip Products

Different forms are used for each work order to indicate the status and to record the results of inspection and testing and with space for recording results.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



10.4 Certified Material Test Reports

POLICY:

Tubular Products and Welding and Wire Products Material Certificates

When required by the material specification or the customer order, a Certified Material Test Report shall be furnished, certifying conformance to specification or customer requirements.

Material Certificates for Code material and MIL specification material shall be prepared and signed by the Director/Manager, Quality and Metallurgy, or his **designee**. A prior review by him or his **designee** of the material purchase and production records shall have been made to assure the Director/Manager, Quality and Metallurgy or his **designee**, that all requirements of the customer's purchase order have been met.

The certification shall identify the applicable material by heat and/or lot number and shall include the test results and operations performed by Sandvik and identify those performed by its subcontractors.

Sandvik will supply upon request any additional records of any subcontracted service, plus a statement of compliance with all materials.

Product Area Strip - **Scranton and Benton Harbor**

When required by customer and/or contract requirements, a Certified Material Test Report shall be furnished, certifying conformance to specification or customer requirements.

Material Test Reports **for Spring Products** shall be prepared and approved by the Quality Assurance Department. Signing of the Material Test Report by the **Manager - Quality & Technology**, or his designee shall be done only when required by customer/contract requirements.

Material Test Reports for Strip Products shall be prepared by the Customer Service and Logistics Department.

The certificate shall certify that the contents are correct and accurate as contained in Sandvik records and are in conformance with the requirements of the material specification. As a minimum, the Material Test Report shall include the customer name, customer order number, customer part number, Sandvik order number, work order number, heat number and chemical analysis and quantity shipped.

A copy of each Certified Material Test Report shall be maintained.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



10.5 Laboratory Requirements

POLICY:

Sandvik Materials Technology's test laboratories shall have defined scopes. Their policies, systems, programs, procedures, instructions, and findings shall be documented in Laboratory Procedures and Instructions, Controlled Procedures and Instructions, and Operating Directives and Instructions, laboratory test records as appropriate.

The personnel making judgment with reference to testing and/or calibration shall have appropriate background and experience. Those performing these activities shall have the basis for their qualification maintained in Quality Assurance.

Methods for receipt, identification, handling, protection and retention or disposal of test samples and/or calibration equipment including provisions to ensure the integrity of the items shall be documented in Laboratory Procedures and Instructions, Controlled Procedures and Instructions, and Operating Directives and Instructions as appropriate. The items/test samples shall be retained until the integrity of the final data is ensured, enabling traceability from final data to raw data.

The laboratories shall monitor, control, and record the environmental conditions as required by relevant specifications or when they may impact the quality and integrity of the results. Environmental condition requirements shall be established and maintained as appropriate for the activities being performed.

The laboratories shall use test and/or calibration methods, including sampling, which meets the customers' needs and are appropriate for the testing and/or calibrations being performed. These methods should reflect the current published applicable national or international standards or accepted recommended practices. Before work outside of the current documented scope is undertaken, the laboratories shall verify its capability to perform the work to the standard specifications and/or practices. When

it becomes necessary to employ methods not covered by standard specifications or practices, these methods shall be agreed upon with the customers as appropriate.

Appropriate statistical methods should be applied to verification activities whose output is test data.

When required by the customer, accredited commercial or independent laboratories shall be used to perform the required testing.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



11.1 Inspection - Measuring - Test Equipment

POLICY:

Measuring and test equipment must be calibrated, used and properly maintained to assure accuracy within necessary limits.

The calibration program is documented in a Control Procedure and Instruction. The program, based on MIL-STD-45662A and ISO 10012, provides for the control of the accuracy of the measuring and test equipment which is used to assure that supplies and services presented to the government or a customer representative for acceptance, are in conformance with prescribed technical requirements.

Calibration of inspection, measuring or test equipment is performed by Quality Assurance, by a qualified subcontractor of calibration services, or a customer-recognized agency. The qualification of qualified subcontractors of calibration services should, whenever possible, be based on:

- **Accreditation to ISO 17025 or a national equivalent by American Association for Laboratory Accreditation, National Voluntary Laboratory Accreditation Program, or other accrediting body recognized by NAVLAP through the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement;**
- Where a qualified lab does not exist for a piece of equipment, the original equipment manufacturer or the original manufacturer's recommended calibration provider may be qualified;
- Customers recognized certificates to ISO Guide 25 and ISO 17025 that have been issued by registration/certification bodies that are compliant to ISO Guide 58;
- By special arrangement - some testing may be done by the customer's lab facility; or
- A combination of any or all of the above

The defined scope for the laboratory performing the calibration should, whenever possible, include the inspection, measuring and test equipment, which it calibrates. New and repaired measuring and test equipment is calibrated and/or

verified prior to use by the Quality Assurance.

All measuring and test equipment shall be identified, serialized and a calibration record file maintained by Quality Assurance. All measuring and test equipment records shall identify the equipment and show the frequency of calibration requirements, tolerances, pre-calibration and post-calibration results including statements of conformance to requirements, gauge condition if adverse to functionality, procedure and revision used, traceability to the standard used, the name of the person performing the calibration, and the date of calibration. Where appropriate, steps shall be taken to prevent possible adjustments to measuring equipment which would invalidate the calibration and subsequent measurement results. This may include, but is not limited to, removing wrenches from the storage boxes and sealing adjustment screws with wax.

The calibration and use of measuring and test equipment shall occur under environmental conditions, which are suitable for the calibrations, inspections, measurements, and tests being performed.

The handling, preservation, and storage of measuring and test equipment shall ensure that continued accuracy and fitness for use are maintained.

Where appropriate, the necessary safeguards shall be taken to prevent adjustments to measuring, inspection, and test facilities, including both test hardware and test software, which would invalidate calibration settings.

Records may consist of electronically maintained records (SEE SECTION 16.1 FOR COMPUTER SECURITY) or certifications from supplier of sub-contracted services.

The boxes or receptacles where the instruments and gauges are stored shall be properly identified with the identification traceable to the instruments, and any defective and obsolete gauges shall be immediately withdrawn from use and records shall be noted accordingly. Calibration stickers are used to indicate date of calibration and next calibration due date and the initials of the person performing the calibration.

All measuring and test equipment shall be calibrated utilizing reference

standards whose calibration is certified as being traceable to national standards, where such standards exist, or the equipment manufacturer's recommended standards. Reference standards requiring calibration by a high level standards laboratory shall be calibrated by an approved commercial facility capable of providing the required service, a government laboratory or by the National Institute of Standards and Technology (NIST). All reference standards used in the calibration system shall be supported by certificates, reports, instrumentation identification and data sheets attesting to the date, accuracy and conditions under which the results furnished were obtained.

The calibration source (internal or external) shall notify the Product Area quality professional in writing of measuring and test equipment found out-of-tolerance. Measuring and test equipment damaged is considered out-of-tolerance.

The Product Area quality professional shall determine what corrective action is required for the material or products on which the defective measuring and test equipment could have been used on since the last valid calibration of the measuring and test equipment. Since Sandvik does not record the use of specific measuring and test equipment, all material or products of the size, condition or process applicable to the use of the measuring and test equipment is considered suspect. If a review determines that not all-applicable material or product requirements have been met, the Product Area quality professional shall prepare a Nonconforming Material Report identifying the involved material or product by work order number and heat number. The Nonconforming Material Report shall be processed in accordance with Section 13, "Control of Nonconforming Product and Material" of this Manual. When nonconforming material already has been shipped, the customer shall be notified in writing of the condition. This notification shall be noted in the calibration record for the suspect measuring or test equipment.

Equipment for mechanical testing, such as tensile testing machines, equipment for temperature control, pressure gauges, are calibrated at the established intervals by approved outside supplier of calibration services.

Calibration records will include the certification of equipment from the supplier. The certification shall be checked by Quality Assurance to see that the certification is signed and dated and that all relevant information on the supplier

certification appears correct. When it is determined that the certification is in compliance with the above, the gauge records will be updated accordingly.

Tape and rules (supplied from reliable sources), Sandvik-made GO/NO GO gauges, radius gauges, gauge pins and protractors are checked periodically for proper condition by Quality Assurance. They are not traceable to N.I.S.T.

Standard nondestructive examination equipment is calibrated per approved Control Procedure and Instruction, and calibration records and controls shall be in accordance with this section of the Manual.

Chemical analysis equipment calibration is performed and maintained by laboratory personnel. Calibration records for this kind of equipment is maintained and stored by the laboratory personnel and shall be traceable to the equipment serial number.

Statistical studies should, whenever possible, be performed on each type of measurement and test equipment system that is referenced in a control plan. These studies shall be used to determine the variation caused by the measurement and test system, itself. The methodology and acceptance criteria employed shall comply with those referenced in the Measurement Systems Analysis reference manual or be approved by the customer.

When computer software is used in the monitoring and measurement of specified requirements, its ability to satisfy its intended application shall be confirmed. This confirmation shall be done prior to its use and reconfirmed as necessary. Such confirmation and reconfirmation would typically include its verification and configuration management.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:



12.1 Inspection and Test Status

POLICY:

Throughout the entire manufacturing operation sequence, the inspection and test status is identified by a series of recording and labeling activities.

The system is designed to ensure that no material or product is dispatched until all the specified inspection and testing activities have been satisfactorily completed and the associated data and documentation have been reviewed and approved by authorized personnel.

Verification of compliance to customer orders, work orders and Product Requirements Review is accomplished prior to shipping or stocking, and when the material or product is ready to be certified. At the time of certification, Quality Assurance is responsible for having compiled information to assure that the detailed requirements are met. This is accomplished by Quality Assurance's review of inspection and test reports, material certificates for raw material, laboratory test reports and any other special document(s) generated during manufacturing.

When required by the customer, supplementary verification and identification requirements shall be addressed. These requirements shall be documented on shop travelers, specification reviews, control plans or quality plans as appropriate.

The status of tests performed upon individual work orders of material is indicated on the traveler by operation sign-off or wand reading of operation bar code. Testing and inspection reports are issued by inspectors for nondestructive testing and final inspection in accordance with Control Procedures and Instructions. See Section 10, "Inspection and Testing" of this Manual.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



13.1 Control of Non-Conforming Product and Material - Scranton Facility

POLICY:

If material or product is suspected to be nonconforming to any applicable requirements anytime during the processing, including receiving verification and incoming inspection, the suspect material or product shall have a yellow hold tag, a uniquely numbered NCMR, or a red reject tag referencing the NCMR number applied or shall be scrapped immediately using the scrap bins/hoppers throughout the facility. The yellow hold tag shall contain the work order number as a minimum, and shall remain on the material or product until it has been established by the Product Area quality professional or designee whether a nonconformance exists or if the material or product can be reworked or reprocessed. If the material or product is found to be nonconforming, the inspector shall remove the yellow hold tag, create an NCMR and tag the material or product with a copy of the NCMR or a red reject tag. The nonconforming or suspect material and its quarantine area, when applicable, shall be visually identifiable. When the material or product is scrapped immediately, the quantity and reason for the scrapping shall be recorded on the traveller by the inspector or production supervisors.

All material or product which has been rejected (regardless of reason) is segregated by the inspector. The inspector administers the use of the reject tags and is responsible for the recording of the necessary information from the nonconformance to the tags. He is also responsible for the distribution of the reject information. The hard copy of the tag is attached to the material or product, and all relevant information is electronically transmitted to the Product Area quality professional for disposition of the material. When there are several loose units included on rejection tag, such as several skids of material, additional red reject tag or copies of the nonconforming material reports will be attached by the inspector to each individual item. The red reject tag shall be marked with the number of the original NCMR.

The Product Area quality professional maintains a Nonconforming Material Report as the permanent record of all rejections and dispositions of reject material or product.

The Product Area quality professional or his designee issues the disposition of all nonconforming material or product. When deemed necessary by Product Area quality professional, the disposition will be made by representatives of Quality Assurance, Sales, Materials, and Production.

When material or products received from outside suppliers is found to be rejectable during receiving verification, incoming inspection or any later stage of manufacturing or processing, the supplier will be notified when necessary by the Product Area quality professional or his designee of the reason for rejection.

All rework performed shall be done so per established rework instructions which are accessible by those responsible for performing and verifying the rework.

To insure that the disposition is carried out, when the material or product is disposed of per instructions, the hard copy of the reject tag which was physically attached to the material or product is removed by the person verifying the disposition. This person shall remove the tag and write the disposition on the tag when the disposition of the material or product is satisfactorily carried out. He will also date and sign the tag, which is then returned to the Product Area quality professional or designee. The Product Area quality professional or designee will then use this information to generate the necessary objective evidence of proper material or product disposition.

When disposition of nonconforming material or products is complete, the Product Area quality professional shall review the nonconformance for possible corrective action in accordance with Section 14, "Corrective Action" of this Manual.

Nonconforming material or product that cannot be used for further

processing and must be scrapped shall be segregated and identified as scrapped material or product(s). The identification can be made by tags, marking by paint, cutting up to short lengths or collected in scrap bins prior to disposal.

Whenever the process or product varies from that approved by the customer, prior written authorization is required prior to shipment. This applies to both Sandvik Materials Technology and its subcontractors. This authorization shall include the quantity authorized or the expiration date of the authorization. Material shipped under this authorization shall be properly identified.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



13.2 Control of Non-Conforming Product and Material - Benton Harbor Facility

POLICY:

Routines are established to prevent inadvertent use or delivery of products that do not meet specified requirements. Nonconforming and suspect material is specially marked and, when practical, segregated.

For certain types of deviations, standard rework operations are applied and recorded. Reworked material is re-inspected in accordance with applicable procedures. Nonconforming material may be re-graded for alternative applications.

Rework instructions shall be accessible and utilized by the appropriate personnel in their work areas.

Nonconforming product may be approved for shipment to a customer by concession.

In all other cases the deviation is regarded as a formal nonconformity and handled in accordance with specific procedures. In serious cases a Review Committee will decide the disposition.

Customer complaints are handled with high priority to be resolved to the customer's satisfaction. Separate instructions apply.

Prior written customer authorization is required whenever the product or process is different from that currently approved. This applies equally to products or services purchased from subcontractors. A record of the expiration date or quantity authorized shall be maintained. Compliance with the original or superseding specifications and requirements when the authorization expires shall be assured. Material shipped on an authorization shall be properly identified on each shipping container.

All nonconformances, including customer complaints are documented.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



14.1 Corrective Action

POLICY:

A corrective action program is established and documented in a Control Procedure and Instruction to assure prompt identification of discrepancies and conditions adverse to quality. The Product Area quality professional is responsible for reporting these conditions to the management of the area where the discrepancies are found on a Corrective Action Report. These areas include but are not limited to: Production Departments, Sales Departments, Purchasing, Traffic, Quality Assurance, suppliers of materials and products, subcontracted services, customer complaints and reports of product nonconformities.

When internal or external nonconformances occur, an appropriate problem solving approach is used to identify the root cause and subsequent appropriate course of action. The approach used shall be based on such factors as the severity, frequency, and type of nonconformance. Sandvik Materials Technology will respond to the customer as required by the customer when external noncompliances occur.

When appropriate, mistake proofing methodologies shall be employed within the corrective action system. The appropriateness for implementing mistake proofing methods shall be commensurate with the magnitude of the problem and the potential risks encountered.

When noncompliant product is returned from the customer, Sandvik Materials Technology shall use appropriate methods to determine the validity and, if valid, the cause of the noncompliance. Corrective action shall be taken, as appropriate.

The corrective action taken and the controls implemented to prevent recurrence of problems shall be applied to similar processes and products as applicable.

Quality Assurance shall use the Corrective Action Report to identify the discrepancy, the requirement and may provide a recommendation. The Report

will be sent to the responsible individual requesting the cause of discrepancy, action taken to correct the discrepancy, action taken to prevent recurrence, and to eliminate the root cause of nonconformities. The responsible individual shall also indicate the timing required for completion. The Corrective Action Report is used by Quality Assurance for documentation and for reporting corrective action to appropriate levels of management within Sandvik Materials Technology.

A time limit shall be specified for the reply. When the response indicates that the corrective action has been implemented promptly, the Product Area quality professional shall ensure that corrective action was taken and that it is effective. When the corrective action can not be immediately implemented, the Product Area quality professional shall follow up, verify, and document the implementation of the corrective action within an appropriate time frame, based on the estimated completion date, to ensure that it is effective and in place. If the response is found to be inadequate or ineffective, a second Corrective Action shall be issued to a higher level by the Product Area quality professional.

Trend analysis shall include major areas of quality and shall be performed by the Product Area quality professional. The analysis shall be reported to and actions taken when necessary by the **Product Area** Quality Improvement Teams or **Management Teams**. For repetitive nonconformances as determined by the trend analysis, a separate Corrective Action Report shall be issued by the Product Area quality professional. The analysis shall be reported to and actions followed up by the **Product Area** Quality Improvement Teams or **Management Teams**.

Based on the results of corrective actions and trend analysis, changes to documented procedures shall be made as needed.

When defective material or products or conditions adverse to quality are identified as resulting from material supplier or subcontractor nonconformance and requiring corrective action as determined by the Product Area quality professional, a "Rejection Report" which refers to a Corrective Action Report shall be issued by the Product Area quality professional.

Vendors and subcontractors not providing adequate corrective action shall be removed from the Approved Supplier Lists.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



14.2 Preventive Action

POLICY:

A preventive action program is established and documented in a Control Procedure in order to detect, analyze and eliminate potential causes of nonconformance(s). Certain areas shall be analyzed such as customer complaints and credits given to customers, internal process performance, vendor performance, and corrective actions. Based on the results, appropriate actions shall be taken to initiate preventive action.

The following shall be considered as part of the Preventive Action process:

- **Determination of the potential nonconformities and their associated causes.**
- **Necessity of actions to prevent the occurrence of nonconformities.**
- **Determination and implementation of required actions.**
- **Records of implemented actions.**
- **Review of the effectiveness of the implemented actions.**

When appropriate, mistake proofing methodologies shall be employed within the preventive action system. The appropriateness for implementing mistake proofing methods shall be commensurate with the magnitude of the problem and the potential risks encountered.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



15.1 Handling - Storage - Packaging - Preservation - Delivery POLICY:

Sandvik makes every effort to maintain high levels of cleanliness in its manufacturing and warehouse operations through good housekeeping, which is encouraged by Sandvik management.

The procedures for handling, protection, preservation and storage of materials and products to prevent damage and deterioration as well as procedures for packing, marking, labeling, and shipping, are written in the form of Control Procedures and Instructions as required. They regulate in detail the special procedures to be followed by Production and Quality Assurance personnel, as well as special requirements regulated by specific customer requirements. When special procedures are required, they are specified on the traveler.

Standard practices meeting ANSI, ASME, ASTM, AWS, AMS and MIL specifications are used for packing of tubular product and welding and wire products. When additional customer requirements apply, they shall be indicated in the work order.

Handling, protection and storage is performed to minimize contamination of pipe and tubes after final cleaning. Clean slings are used for carrying tube bundles with overhead cranes; plastic sheets are also used as lining in shipping containers when so specified. When specified by the customer, plastic end caps are used on each length of pipe and tube.

All inventory shall be managed to ensure that inventory turns are optimized, stock is rotated as appropriate, and proper inventory levels are maintained.

Sandvik Materials Technology shall establish systems to support **company-wide delivery security goals**. Performance against this goal shall be regularly monitored. Corrective action shall be taken as necessary to improve delivery security including communication of

delivery related problems to the customer.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



16.1 Retention of Quality Records

POLICY:

Records are prepared to furnish documentary evidence of the quality of material and products and of activities affecting quality. It is Sandvik's policy to maintain these records for a certain period of time, established by an approved Control Procedure and Instruction.

Records to be maintained and the retention time for each type of record are specified in a Control Procedure and Instruction.

Inspection and test records are maintained and are traceable to the original material or product. These records include but are not limited to: receiving, in-process and final inspection and testing records.

Test reports submitted by subcontractors, independent testing laboratories and all material manufacturers are compiled and maintained traceable to the original material.

Quality records shall be retrievable and be stored and maintained in a suitable environment to minimize deterioration or damage to prevent loss. Quality records shall be disposed of per an established schedule.

Certain quality documents, such as quality system documentation, nonconforming material reports and corrective actions, are created by restricted access to a computer system.

Computer security features include the following controls:

- **Access to the system is controlled by user identification in conjunction with a user maintained password.**
- **Access to each system menu is restricted by user identification.**

- **Resource security restricts access to individual files. Various access levels are defined by user identification.**
- **Access to the system is established by the System Manager in conjunction with Management.**
- **The Systems Manager is the only individual who has access to the system security file.**
- **The Systems Department is protected by a door lock security code system.**

Certain quality documents, such as calibration records, are maintained on personal computers. Where possible, security will be maintained by limiting access through password protection. Otherwise, security will be maintained by limiting access to the personal computers, themselves. Data will be backed upped at regular intervals to ensure integrity and history is maintained.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



16.2 Training and Personnel Records

POLICY:

Quality Assurance shall also maintain personnel records for qualification of personnel within Sandvik in matters pertaining to product quality and the Quality System.

Personnel records are available for review within the Quality Assurance Department and Human Resource Department.

Records for training in the Quality System are maintained by Quality Assurance and these records shall show subject covered, duration of training session, attendee, name of instructor and date.

The Human Resources Department maintains personnel records related to job content and job descriptions. The majority of these records are maintained electronically.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



17.1 Internal Quality Audits

POLICY:

In order to have independent internal control and provide timely feedback information on the effectiveness of the entire Quality Management System and its identified processes, planned and periodic audits will be performed per a Control Procedure and Instructions by an audit team such that the entire program its identified processes are audited annually. The timing shall be established by a schedule maintained by the Director/Manager, Quality and Metallurgy for such audits. When internal or external nonconformances or customer complaints occur, the audit frequency and/or scope shall be adjusted appropriately. It will be the responsibility of the audit team by the use of checklists approved by the Director/Manager, Quality and Metallurgy or his designee to determine that the quality activities as documented in the Quality Assurance Manual, Control Procedures and Instructions, and Operating Directives and Instructions are effective and being followed correctly. In addition, general housekeeping and cleanliness shall be audited to ensure that they are conducive to the production of a quality product. It is also their responsibility to identify problem areas and initiate corrective action. The audit shall also determine that the document control system for Quality System documents per Section 5, "Document Control" of this Manual is effective.

Internal audits are directed by an internal audit leader whose qualification shall be based on education, experience, training, audit participation and per examination per an approved Control Procedure and Instruction, and designated as a lead auditor by the Director/Manager, Quality and Metallurgy, and are performed by persons knowledgeable in the area being audited. Qualification of internal audit team members is covered in separate Control Procedures and Instructions and shall be accomplished by the audit team leader through a pre-audit briefing. This briefing will consist of the following topics:

1. Description of basic Quality System and review of Manual.
2. Review of present Control Procedures and Instructions. This review is done to enable the audit team to know what guidelines should be

used in auditing specific areas.

3. Review of audit checklist development and areas to be audited.
4. Manner in which the audit is to be performed.
5. Review of findings and concerns from last internal audit report.

Written evidence of the briefing shall be placed in the internal audit file.

The audit team shall consist of representatives drawn from various functions within the organization, as appointed by the audit team leader. The audit shall be designed so that when a particular area is being audited, the person(s) performing the investigation in this specific area shall not have direct responsibility for the activity being performed. This specifically includes the Quality Assurance Department. Audit results shall be recorded on the audit checklist.

Formal audit reports shall be issued by the audit team leader within seven days and submitted to responsible Product Area management for review including the President, Sandvik Materials Technology Company, the Vice President, Product Area Tube and the Product Unit Manager - Product Area Tube, the Vice President, Product Area Wire , the **Product Unit Manager, Product Area Strip (Scranton and Benton Harbor)**, and the Director/Manager, Quality and Metallurgy. For Product Areas Tube and Wire, the Director - Quality & Metallurgy shall also be provided a copy of the audit checklists. It shall be the responsibility of the audit team leader to initiate corrective action per Section 14, "Corrective Action" of this Manual for the audit findings. The Director/Manager, Quality and Metallurgy shall cause follow-up of audit findings to assure adequate resolution. The completed Corrective Action Report shall be reviewed for objective evidence of corrections of the findings. A follow-up audit may be required when considered necessary by the Director/Manager, Quality and Metallurgy.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:



18.1 Training and Indoctrination - General

POLICY:

Quality Management is responsible for **identifying and** assuring that the personnel in the Quality Assurance Department, the Materials Laboratory, and Certificate Processing Group are properly trained and qualified. It shall be the responsibility of the Director/Manager, Quality and Metallurgy to see to it that adequate training in the Quality System is provided to Sandvik personnel.

Quality Assurance personnel are selected by Quality Management on the basis of their qualifications and their capabilities of maintaining acceptable level of performance.

In processing of tubular and wire products, welding materials, spring products and strip products, it has been observed that, for newly-employed personnel, on-the-job training is very effective. Newly-employed personnel also undergo a formal orientation program developed and conducted by an internal orientation-training group.

The managers of other departments responsible for the execution of functions affecting product quality will be responsible **for identifying the relevant personnel and assuring that those relevant personnel in these functions are properly trained including indoctrination. This training shall be documented.** These operations and techniques will be subject to internal audit review to assure the functions are executed in an effective manner.

Personnel responsible for nondestructive examination are qualified and certified by the Level III person and the Director/Manager, Quality and Metallurgy, per the approved Written Practice in accordance with SNT-TC-1A. The Written Practice is documented in a Control Procedure and Instruction.

The Sandvik Level III is certified by the Director/Manager, Quality and

Metallurgy in accordance with the requirements of the Written Practice. The Level III is appointed by letter, signed by Director/Manager, Quality and Metallurgy.

The Level III shall certify Level I and Level II examiners. Record of qualification/certification of nondestructive examination personnel are specified in the Written Practice and maintained by the Director/Manager, Quality and Metallurgy.

The Director/Manager, Quality and Metallurgy is responsible for the periodic training of non-quality assurance personnel in matters relating to product quality and the Quality System. The training is performed in the form of meetings and seminars.

Training needs shall be identified by all management within each **Product Area**. Specific needs shall be identified for quality-related training, technical training, skills training and personal development.

Scheduled training of all employees in subjects related to Sandvik Materials Technology's **Continual** Quality Improvement Process is performed by qualified and certified internal trainers.

The effectiveness of the training given to all employees shall be regularly evaluated per an established Control Procedure and Instruction.

Training and indoctrination records shall be maintained per Section 16, "Quality Records" of this Manual.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:



19.1 Servicing

POLICY:

This element is not applicable to Sandvik Materials Technology.

Servicing is carried out for general customer field support of the material or products as required by the customer. This support is given by sales engineers, product specialists, product managers, and other competent personnel.

Procedures shall be established and maintained for performing and verifying that servicing meets the specified requirements only when servicing is specified by the customer.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



20.1 Statistical Techniques

POLICY:

The need for applying statistical techniques shall be identified by each product **area**.

Where appropriate, written procedures shall be established to identify adequate statistical techniques required for controlling and verifying process capability and product characteristics.

As part of **continual** quality improvement efforts, process capability indices shall be established for critical process and product characteristics as determined by the responsible process engineering function for each product **area**.

PURPOSE:

RESPONSIBILITIES:

DESCRIPTION:

REFERENCE DOCUMENTATION:



Quality Manual Revision History

Manual Revision:	Document, Section, Paragraph Changed	Page	Change Made	Date	Editor
1	All Policy Manual Documents	All	Initial Issue of Document - Moved from Hard Copy to QSI, Updated Functional Titles, Added Electronic Distribution of Quality System Documents.	04/20/01	Keith M. Hottle
1	Quality System Certificates Updated (Manual Revision Not Changed)		Updated Combined ISO 9001-1994 and QS 9000 3rd Edition Certificates	09/10/01	Keith M. Hottle
2	0.1, 1.2, 1.3, 5.1, 10.1, 10.2, 10.4, 11.1, 13.1, 14.1		Updated Spring Division Organizational Chart, Added Manager - Quality & Tech. Serv. References	11/14/01	Keith M. Hottle
3	0.1, 0.2, 0.4, 1.2, 1.3, 8.3, 9.1, 10.2, 15.1 2.3, ISO9001-2000 Cross Reference		Updates to the various functional organizations in the Tubular Products Division, Welding and Wire Division, and Quality Assurance and the removal of the manufacturing of covered electrodes from the manufacturing scope for the Welding and Wire Division. Per ISO 9001-2000, specific exclusions added to section 0.2. No Content Change - Corrected Formatting Problems	03/04/02	Keith M. Hottle
3	0.1, 5.01 (No Content Change-Corrected Link to Section 1.2 in Table of Contents)		No Content Change - Updated Links and Corrected Affected Dates in ToFC	03/06/02	Keith M. Hottle
4	3.01 00.3 01.2		Quality Policy Reformatted (No Content Change) Revised definition for Work Order Revised Tube SU Organization	06/13/02	Keith M. Hottle
5	Major Rewrite		Incorporated requirements of ISO 9001-2000 and included Strip Products Division into this manual	02/06/03	Keith M. Hottle
6	0.1, 0.3, 0.4, 1.2, 1.3, 1.4, 2.2, 3.1, 5.1, 8.3,9.2, 10.1, 10.2, 10.3, 11.1, 13.1, 14.1 3.2, 10.1 17.1		Updated Division Organizational Charts, updated positions and titles for Q.A. organization. Added medical products. Added auditing of processes.	10/01/03	Keith M. Hottle
6	8.1		Update ISO 9001-2000 Certificate for Scranton - Medical Products Added - No Substantive Change Done to Require New Manual Revision	12/08/03	Keith M. Hottle
7	0.4 01.2 08.3 8.1, 8.2, 8.3		Modified manufacturing capabilities of tube mill. Updated Strip organization. Modified identification and traceability methods for hot rod and cold drawn wire. Updated site certificates.	09/07/04	Keith M. Hottle
8	2.01, 01.2 01.3 02.2, 05.1,10.2		Repaired links. Updated all organizational charts. Reinstalled section. Replaced "Manager-QA Tech. Serv." Position w/ "Materials Laboratory Personnel".	08/17/05	Keith M. Hottle
9	0.1 0.3 01.2 8.2 13.1 17.1 18.1		Updated Table of Contents Replaced division with Product Area Updated all organizational charts. Revised tube hollow ID.* Immediate scrapping of material requires use of scrap bins/hoppers.* Audit reporting requirements modified for Tube/Wire.* Modified to include identification of training requirements.* * Align with Section III QAM.	05/01/06	Keith M. Hottle
10	0.1		Updated Table of Contents.	05/29/07	Keith M. Hottle

	Various 1.1 1.2		Change reference from Division to Product Area. Remove applicable QS9000 references/sections. Aligned SMT NAFTA Quality Policy with AB SMT Updated organizational charts.		
11	1.2 00.1, 00.2, 00.3, 00.4, 01.1, 01.2, 01.3, 01.4, 02.01, 02.2, 02.3, 02.5, 03.2, 04.1, 05.1, 07.1, 08.4, 08.5, 09.1, 09.2, 10.1, 10.3, 10.4, 11.1, 14.1, 14.2, 16.2, 17.1, 18.1, 20.1		Updated organizational charts. Remainder of sections updated to delete QS9000 references, change division to product area, change continuous to continual, delete Bioline SU activities, merge Strip and Spring activities, and incorporate the necessary changes from ISO 9001:2008	11/09/09	Keith M. Hottle

Last Revision Date: 11/09/2009 Revision Number: 11