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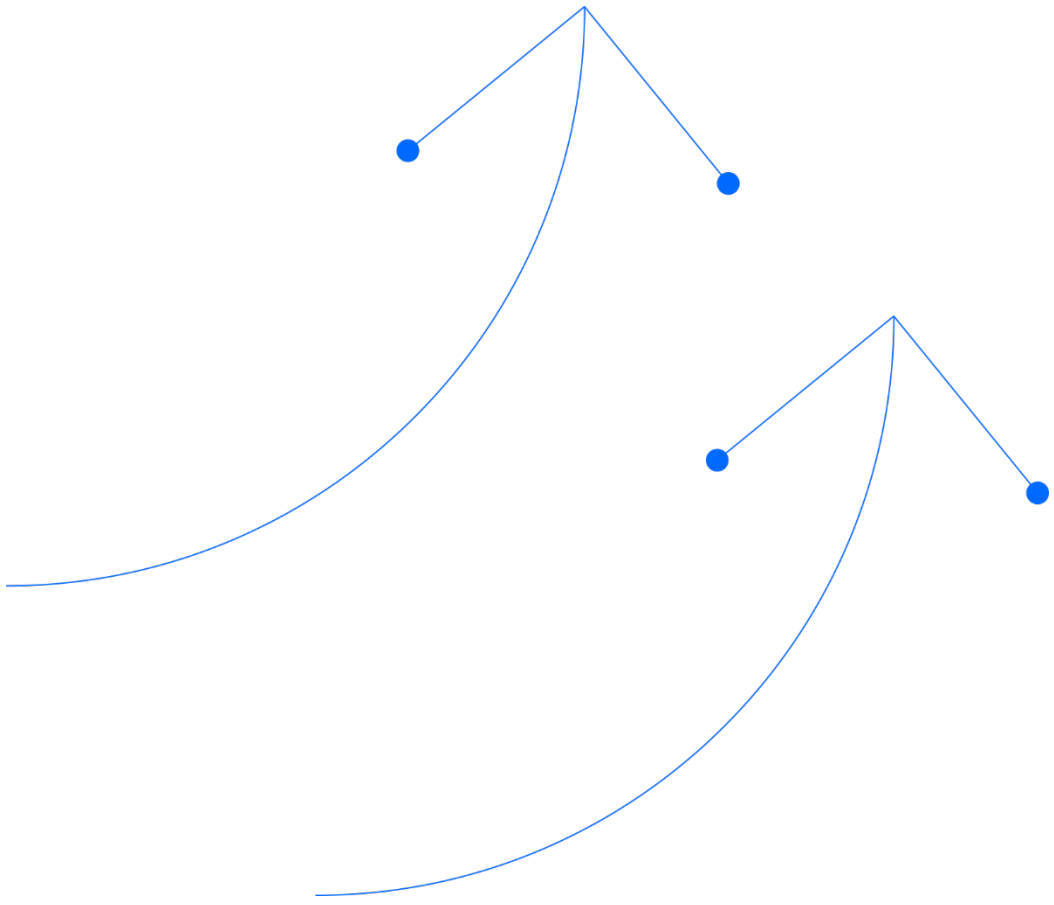
QUALITY ASSURANCE SPECIFICATION FOR EQUIPMENT/ MATERIAL MANUFACTURERS /SUPPLIERS/ DISTRIBUTORS

Document Number – NGE-QASPE-000002
Rev – 2
Revision Date – 01/12/2026
Issued for Status – IFU



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REVISION HISTORY

REV	Date	Description	Originator	Checked	Approved
1	8/2/23	Updated per project needs	JW	TW	GG
2	1/12/26	Updated to new template and logo	MS	RK	RK

CHANGE LOG

REV	CHANGE
1	Combined Quality Assurance Spec for Material and Equipment Manufacturers and Quality Assurance Specification for Material Supplier and Distributors. Title change.
2	Updated specification to new Santos template and logo. Removed reference in appendix to NGE-QATEM-000004 as it no longer a valid template

PREFACE

The use by consultants, contractors, or suppliers of this specification does not relieve them of any responsibility whatsoever for the quality of design, materials, and workmanship that they have been engaged to provide.

If Santos consultants, contractors or suppliers have any doubt as to the relevant specification to use, then they must consult Santos. However, they will always remain responsible for the use of the most appropriate specification to meet specific facility criteria or contractual requirement.

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Any requests to deviate from the requirements of this specification must be submitted in writing for resolution by Santos.

DISCLAIMER

Santos disclaims any liability of whatsoever nature for any damage (including injury or death) suffered by any company or person whomsoever as a result of or in connection with the use, application, or implementation of any specification, combination of specification or any part thereof contained in this document.

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1.0 Scope

1. This Quality Assurance Specification applies to equipment and material manufacturers, as well as material suppliers and distributors, setting forth the minimum requirements for the implementation of a comprehensive quality assurance system (QAS).
2. The specified requirements within this document are to be observed by suppliers of materials and equipment, which are procured directly by Santos and its affiliated entities or through a purchaser appointed sourcing contractor.
3. Manufacturers, material suppliers, and distributors must ensure and demonstrate that the principles and obligations stated in this specification are effectively cascaded to all parties engaged in the scope of work.

2.0 References

The following documents are referenced herein and are considered part of this specification and must be read in conjunction.

2.1 Santos Specifications

This specification shall be read in conjunction with any other documents attached to the contract. The following titles are essential for reference:

- Manufacturing Records Book Specification
- Deficiency and Non-Conformance Control
- Export Packing, Preservation, and Handling Plan

If a Santos Specification number is not explicitly listed, please refer to the equivalent specification that best aligns with the requirements.

2.2 Industry Codes and Standards

1.1.1 American Society for Nondestructive Testing (ASNT)

SNT-TC-1A Standard Topical Outlines for Qualification of Nondestructive Testing Personnel

1.1.2 International Organization for Standardization (ISO)

ISO 9001 Quality Management Systems – Requirements

ISO 19011 Guidelines for auditing quality systems – Part 1 – Auditing ISO/IEC 17025 General requirements for the competence of testing and

calibration laboratories

ISO 8501-1 Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1

ISO/DIS 10012 Part 1 Quality assurance requirements for measuring equipment.

1.1.3 American National Standard

ANSI/ISA-61511-2 Functional Safety – Safety Instrumented Systems (SIS) for the Process Industry

1.1.4 Industrial Automation and Control Systems (IACS)

IACS/IEC 62443 Security for Industrial Automation and Control Systems

1.1.5 American Society of Mechanical Engineers (ASME)

Boiler and Pressure Vessel Code (BPVC)

Section V Nondestructive Examination

Section IX Welding

1.1.6 American Petroleum Institute

RP 588 Recommended Practice for Source Inspection and Quality Surveillance of Fixed Equipment

RP 754 Process Safety Performance Indicators for the Refining and Petrochemical Industries

2.3 Conflicts and Deviations

1. Should conflicts exist between this specification and other documents, the following order of precedence shall govern:

a. Government regulations

b. Basis of Design

c. Purchaser specifications and referenced documents.

d. International, national and industry codes and standards.

3.0 English Language Requirements

All documentation and communication shall be in the English language and in Imperial units (ft, lbs., etc.).

3.1 Use of Language

1. Throughout this Specification, the words ‘will,’ ‘may,’ ‘should’ and ‘shall’, when used in the context of actions by the Purchaser or others, have specific meanings as follows:

a. 'Will' is used normally in connection with an action by the Purchaser and/or its nominated representative, rather than by a Supplier.

b. 'May' is used where alternatives are equally acceptable.

c. 'Should' is used where provision is preferred.

d. 'Shall / Must' is used where a provision is mandatory / vital.

4.0 Definitions

In general definitions associated with Inspection and Quality will be as per RP 588 Recommended Practice for Source Inspection and Quality Surveillance of Fixed Equipment.

Purchaser:	Purchaser is the party which purchases the materials and equipment on behalf of their organization and / or on behalf of SANTOS, which will be used for development of SANTOS facilities or to support SANTOS operations. This includes SANTOS and all its contractors engaged to supply a complete facility, package, equipment, or materials.
Stockist/Supplier:	Supplier is the party which provides materials and equipment directly to SANTOS, or its nominated / affiliated contractor, sub-contractor, and distributor to undertake such tasks.
Manufacturer:	Manufacturer is the party which owns the technological knowledge, designs and have all associated rights to develop and manufacture an equipment or produce a material. This includes primarily Original Equipment and Materials Manufacturer but excludes any party selling or representing the manufacturer or producer.
EPF/EPC:	Is the party engaged by SANTOS to undertake Engineering, Procurement & Fabrication or Engineering, Procurement & Construction of a facility or package on turn-key basis and supply. These includes all primary contractors and main suppliers directly engaged by SANTOS by virtue of a written agreement.
End User:	Oil Search Alaska (SANTOS)

5.0 Quality Management System (QMS)

1. It is mandatory for Supplier to have a Quality Management System implemented in accordance with this specification and ISO 9000 or an equivalent quality management standard.

2. Quality management system shall accomplish the following objectives:
    a. Identify processes and controls to be implemented by Supplier.
    b. Ensure that items within the project specification and scope of work meet the specified requirements.
3. Unless otherwise agreed upon with Purchaser, Supplier's proposed quality management system shall satisfy the requirements of referenced Purchaser documents and industry codes and standards (as outlined in Section 2.0) at any stage of purchase order execution and shall be fully auditable.
4. ISO 9001 or APIQ1 certifications is desirable, but it's not mandatory. However, its mandatory to maintain and demonstrate that Supplier's QMS meets the ISO 9001 Quality Management System requirements.

6.0 Quality Assurance Document Requirements

6.1 Quality Assurance Plan

1. The supplier shall prepare a Quality Assurance Plan (QAP) based on their QMS to cover the scope of work in the contract/purchase order.
2. Supplier's QAP shall detail how supplier plans to implement general quality requirements given in this document for the application of work, including controls and verifications to be put in place to ensure quality during stages of design, procurement, manufacturing, production, fabrication, assembly, testing and shipment.
3. Supplier shall clearly detail the activities and controls related to internal quality audits, audit schedule, non-conformance control, lessons learned, management reviews and sub-supplier audits in the QAP.
4. QAP shall be submitted to Purchaser for approval 30 days prior to commencement of work. When approved by Purchaser, the QAP will be the basis for assuring the quality of the equipment and materials purchased.
5. Supplier shall ensure that all requirements established by the approved QAP, are implemented by supplier personnel and its sub-suppliers and subcontractors.
6. At all times Contractor shall have primary responsibility for ensuring that its sub- suppliers' meet QAP requirements.

6.2 Inspection and Test Plan

1. After Purchase Order (PO) award, Supplier shall prepare and submit an Inspection and test Plan (ITP) for Purchaser review and approval. This ITP shall identify all manufacturing

operations requiring surveillance, controls, and inspection by Supplier, Purchaser, and by the Independent Inspection Authority (if any).

2. Supplier shall not start manufacturing unless ITP is formally reviewed/approved by Purchaser and a pre-production meeting is held.
3. Where activities are to be performed in multiple locations or at sub-supplier facilities, the supplier ITP shall list the specific location of each activity on the ITP including the details of sub-supplier involvement.
4. Separate ITPs shall be required for each sub-supplier's work and shall be submitted for Purchaser review and acceptance prior to commencement of the work.
5. ITPs shall cover all major quality-related activities in chronological order from contract review & drawing approval, through manufacturing, fabrication, assembly to final testing, preservation and preparation for shipment, documentation, and certification. Sub-supplier may elect to utilize their own ITP format provided the following information at a minimum is included:
6. For each verification activity / stage, reference shall be precisely made to:
    a. The applicable codes, standards, specifications, and procedures.
    b. The acceptance criteria.
    c. The personnel qualification.
    d. The record and certification requirements.
7. Refer to Annexure-A to this specification for ITP Template
8. Enough space shall be provided on right side of each ITP to allow putting date and signature by Supplier, Purchaser, and Independent Inspection Authority (IIA) Inspectors.
9. The nature of the inspection points shall be indicated against each activity of manufacturing and testing by means of specific letters H, W, R, I.
10. Testing activities shall be based on hold/witness/monitor/review points specified in the ITP, and shall be confirmed at the pre-inspection meeting as follows:
    a. Hold point (H)—Mandatory witness of production, inspection or testing activities by Purchaser. Purchaser shall be notified at least ten (10) working days in advance and shall be present during the specified activity.
    b. Witness point (W)—Witness of production, inspection or testing activities by Purchaser. Supplier shall notify Purchaser at least seven (7) working days in advance. If Purchaser does not elect to be present, Supplier may proceed with the intended activity with written approval from Purchaser provided test reports are compiled and made available for Purchaser review at a later date.
    c. Review point (R)—Review of documentation such as reports, testing records, procedures, qualification records, and data book (e.g., dossier/manufacturing records book (MRB).

d. In-Process Inspection Point (I): Random witnessing of the production, inspection, or testing activities. No notification by the Supplier is required.

11. ITP shall clearly indicate the special testing activities like factory acceptance test (FAT), functional test, performance test or system integration testing, as the presence of Purchaser's Operations Representative and 21 working day notice shall be required.
12. The definition of inspection points, tests, documentation related to statutory requirement in force for PO execution (PED, ATEX, CE marking, DPEM, etc.…) and the notification in due time of Statutory Bodies (or Independent Inspection Agency (IIA) acting on behalf of Statutory Bodies) remain under the full responsibility of Supplier.

6.3 Manufacturing and Testing Procedures

1. Supplier shall submit the manufacturing, welding, non-destructive evaluation (NDE), heat treatment, and coating & painting testing procedures defined in the contractual requisition to Purchaser for review.

2. Supplier NDE/NDT procedures shall be reviewed and endorsed by a person bearing appropriate and valid certification of ASNT-SNTC-1A Level III in the relevant NDE/NDT discipline.

3. No manufacturing or testing activities shall proceed unless related procedures have been reviewed by Purchaser and designated with a status "Reviewed" or "Reviewed with Comments."

6.4 Packing, Handling, Storage, Preservation and Shipping Procedures

1. Supplier shall provide procedures identifying control and implementation of equipment handling and warehousing requirements.
2. The Supplier shall develop and submit a packing, handling, storage, and / or preservation procedures in accordance with NGE-CPPLN-000003 for review and acceptance.
3. During manufacturing, all finished/partially finished equipment and materials shall be handled, stored, preserved and/or packed in accordance with purchase order specifications, original equipment manufacturer recommendations, and industry best practices.
4. Supplier shall ensure that all items are prepared and shipped in such a manner as to provide corrosion protection of all surfaces, both internal and external, for up to four (4) years unsheltered outdoor storage.
5. If not already painted, surfaces may be protected and treated by painting or as otherwise specified in the Contract.

7.0 General Quality Requirements

7.1 Contract Review

1. Supplier shall review purchaser's PO and associated specifications to ensure that the requirements are adequately defined and documented and can be met on a consistent base. In case of any conflict, it shall be immediately brought to Purchaser's attention. Supplier shall also review:
    a. The requirement not stated by the Purchaser but required for the specified or intended use.
    b. Statutory and regulatory requirements related to the product.

7.2 Document Control

1. Supplier shall have a document control system implemented to control company, supplier, and sub-supplier documents related to the purchase order. The document control system shall ensure that the latest approved versions of all applicable documents are available at points of use and obsolete documents are removed.
2. The Supplier shall maintain a master document register listing all purchaser, supplier, and sub-supplier documents related to the purchase order, including design data, procedures, NCRs, etc. The master document register shall be submitted to Purchaser at an interval agreed between Purchaser and Supplier.
3. The document register shall list the current revision and Purchaser approval status of each document. Approval status may be one of the following or as specified in purchaser specifications:
    a. Code-1 Reviewed-No Comments: Supplier shall begin procurement, manufacturing, or fabrication. Documents shall be resubmitted to Purchaser at a higher appropriate life cycle state.
    b. Code-2 Reviewed with Comments: Supplier shall begin procurement, manufacturing or fabrication incorporating Purchaser's comments. Documents shall be revised to reflect comments and resubmitted to Purchaser at a higher appropriate life cycle state.
    c. Code-3 Revise and Resubmit: Supplier design is fundamentally unacceptable. Supplier shall modify design and reissue the document for Purchaser review. Supplier should not begin procurement, manufacturing, or fabrication until an Approval Code of 1 or 2 is achieved. Supplier delivery schedule shall not be automatically extended as a result of documents returned with this code.
    d. Code-4 Not Reviewed: Purchaser has elected not to review the document. The lack of Purchaser review of any document shall not relieve Supplier of any obligation defined in

the contract. Supplier shall begin procurement, manufacturing, or fabrication. Documents shall be resubmitted to Purchaser at a higher appropriate life cycle state.

4. Supplier documents required to be submitted to Purchaser, shall be as per the purchase order and this specification.

7.3 Resources

1. Supplier's organization shall assign a full-time Quality Assurance Lead to implement the QAP and who shall remain assigned through the purchase order completion.
2. Supplier shall ensure that personnel performing work affecting product quality are competent based on appropriate education, training, skills, and experience.
3. Competence, awareness, and training shall be outlined in accordance with the job descriptions and monitored for all welders, welding operators, welding inspectors, and NDE operators.
4. An organization chart showing personnel responsible for quality assurance & control shall be submitted for Purchaser review.
5. Supplier shall determine, provide, and maintain the infrastructure and environment needed to achieve conformity to product requirements.

7.4 Design Control

1. Supplier shall be responsible for ensuring that the equipment design meets Purchaser technical requirements, ANSI/ISA-61511-2 Functional Safety – Safety Instrumented Systems (SIS) for the Process Industry, IACS/IEC 62443 Security for Industrial Automation and Control Systems, and any requirements of applicable statutory regulations.
2. Supplier shall establish and perform design control. This includes establishing design requirements, reviewing design inputs, and reviewing/approving design outputs. Supplier design documents shall be reviewed by qualified personnel for accuracy, completeness, and fulfillment of contract/PO design criteria.
3. Supplier shall develop drawings, reports, specifications, registers, design calculations, and other associated documents required for completion of the work. All such documents shall be subjected to Purchaser's review and acceptance at times agreed by Purchaser and Supplier.

7.5 Sub-Supplier Control

1. Purchase orders for stocked inspectable materials must only be placed with Santos approved stockists/vendors. For a list of approved stockists, refer to Santos Quality Manager (QM) or Santos Contract Manager.
2. Project one-time-approval request for new stockists must be submitted to QM or its delegates on the project for review and approval.

3. All purchase order requirements are applicable, without any restriction, to all sub- suppliers. The supplier shall ensure that all purchase order requirements (including quality assurance requirements) are known, understood, and applied by its sub- suppliers for their respective scope of work.
4. The supplier shall have documented procedures for the selection, qualification, approval, audit, periodic reevaluation, and continuous improvement of its sub- suppliers.
5. Supplier shall submit to Purchaser for review, a complete list of all proposed sub- suppliers along with their qualification and approval records. Purchaser reserves the right to accept, reject, audit any or all proposed sub-suppliers.
6. Supplier and Purchaser shall conduct and document kick-off/pre-production/pre- inspection meetings, as applicable, to the work for all sub-suppliers.
7. Supplier shall develop schedules and plans for inspection and audit of sub- suppliers, and Purchaser reserves the right to attend such activities and/or request detailed reports of such activities.
8. Unless waived in writing by Purchaser, all sub-supplier documentation shall be reviewed and accepted by the Supplier to ensure compliance with purchase order requirements prior to submission to Purchaser for review and acceptance.Supplier shall effectively implement a pre-dispatch and material receiving inspection at all material storage, manufacturing, fabrication, and testing facilities of such inspections shall be made available to Purchaser for review, at all times.Materials Exclusion: Inspectable materials intended for Santos Operations or Stock within the scope of this specification must not be supplied from stockists.

7.6 Material Traceability and Control

1. The supplier and all sub-suppliers shall maintain a procedure for material traceability of all materials, parts, and components, and partially fabricated assemblies.
2. Traceability shall be maintained in accordance with the purchase order, all codes, and statutory requirements.
3. The supplier shall ensure that raw materials are identified and traceable to their related records (e.g., inspection / certification certificates) at any stage of production.
4. Identification of an item shall be addressed either by using tags, stamps, stencils, or labels as required by the purchase order documents or approved by Purchaser.
5. Permanent and non-modifiable marking shall be used as hard stamping by low stress dye, unless otherwise accepted by Purchaser.
6. Color coding of materials shall be in accordance with the stipulated Purchaser specifications and materials procedures.
7. Supplier and sub-supplier may be required to implement a Purchaser approved Positive Material Identification (PMI) program to 100% verify that all alloy materials, low-temperature materials,

and welding consumables meet the codes and specification requirements, prior to taking those into manufacturing or production process. If the material traceability maintained is found to be ineffective or not controlled at all manufacturing or fabrication or production stages, it will be quarantined until final approval by Santos.

7.7 Testing Instrument Certification Control

1. Inspection measuring and monitoring devices used for demonstrating the conformance during manufacturing and testing activities shall be tagged, controlled, calibrated, and maintained in accordance with Supplier Quality Management System based on ISO/DIS 10012 Part 1: Quality Assurance Requirements for Measuring Equipment.
2. Supplier shall provide a copy of the calibration certificate to allow Purchaser's Inspector to verify that inspection measuring and monitoring devices used are tagged and calibrated.
3. Calibrating report / certificate shall be included in Supplier MRB.

8.0 Procurement Criteria and Material Limitations

Steel Plates, Pipes, Fittings, Flanges and Valves

The purchase of steel plates, pipes, fittings, flanges, and valves from stockists shall adhere to the

Table 1

Inspectable Material	Rating	Size	Service Limitation	Material	Applicable
Pipes(1): Carbon steel seamless and straight seam	No Limitation	No Limitation	For straight seam pipe to be used for sour service, the steel shall be originally made to be HIC-resistant per PurchaserSpecifications.	Not for low temperature applications.	Refer to Purchaser Specification
Pipes(1): Alloy steels and non-ferrous	No Limitation	No Limitation	No Limitations	All materials are permitted except for low alloy steels for low temperature	Applicable ASTM standard
Fittings	No Limitation	No Limitation	All services are permitted except for materials intended for sour service.	All materials are permitted except for carbon steel and low alloy steel for low temperature service.	Refer to Purchaser Specification
Flanges	Limited to Class 300 and lower	Limited to 8" and lower	All services are permitted except materials intended for sour gas service.	All materials are permitted except for carbon steel and low alloy steel for low temperature service.	Refer to Purchaser Specification
Valves	Limited to Class 150 and lower	Limited to 8" and lower	Limited to water and utility services (non-sour & non-hydrocarbons).	No Limitation	Refer to Purchaser Specification

Note (1): ERW and Spiral welded pipe are not allowed to be purchased from other than original manufacturers.

8.1 Quality Assurance Requirements

1. In procurement of materials, the stockist shall ensure direct purchasing from Santos approved manufacturers for Santos direct purchases and contractually approved manufacturers for project contractor purchases.
2. Non-HIC resistant or pseudo-HIC resistant steel, such as plate or seam welded pipe, must not be supplied for sour service applications; HIC-resistant steel for this purpose shall be procured from Santos approved steel mills and pipe manufacturers.
3. The stockist is prohibited from supplying used or recycled materials to Santos through direct or project contractor's purchase. Furthermore, the stockist shall refrain from performing any modifications or fabrication processes to the supplied or stocked materials unless specifically requested by Santos.
4. All materials must be accompanied by Original Material Test Certificates or Certified True Copies from the original manufacturer. Additionally, the stockist must demonstrate how their suppliers are evaluated and monitored.
5. Regarding Purchase Requisition Review (Request for Quotation), the stockist must thoroughly review the purchase requisition requirements for the material before accepting the order. Any deviations from the purchase requisition requirements must be disclosed in writing to the purchaser’s representative, and Santos's approval of such deviations is necessary prior to the stockist accepting the purchase order.
6. Stockists should submit a written acknowledgment, specifying the name and plant location of the approved manufacturer, and confirm their capability to comply with all applicable material specifications and inspection & test requirements referenced within the PO.
7. All inspection and testing requirements specified in this document are at the stockist’s cost.
8. Personnel performing work affecting material quality must be competent based on appropriate education, training, skills, and experience.
9. Inspectable materials intended for installation within a Santos project and facility must be inspected by qualified stockist QC personnel.
10. Material identification and traceability should be ensured through appropriate marking and inventory management. Additionally, calibration and verification of measuring and testing devices must be performed at specified intervals, with records maintained for Santos’ review at all times.

8.2 Section Inspection and Testing Requirements

1. In the procurement of materials, Santos ensures that all materials undergo a satisfactory review and witnessing of the requirements by Stockist, Purchaser, and Santos's representative(s). Deviations to these requirements are strictly prohibited for any pressure containing equipment or part.

2. The Stockist is responsible for arranging additional quantities of items, including destructive testing, if necessary, to verify required performance characteristics. Sampling criteria for materials encompass Mechanical Testing, Chemical Analysis, Hardness Testing, and special testing like Ferrite Testing for Austenitic Steel and Charpy Impact testing for low temperature applications. Non-destructive testing (NDT) for piping materials is also specified.
3. Regarding sampling, inspection/testing criteria, testing of primary steel plates from a Stockist involves testing one plate from each heat, followed by spot checking of 10 percent, if satisfactory. Defective results require 100 percent inspection until satisfactory performance is achieved. Sampling criteria for other materials from a Stockist are outlined in Table-2, with exceptions for valves used for hydrotest, as indicated in Table-3, subject to written agreement by Santos' Quality Manager. The acceptance of a lot is dependent on the fulfillment of specified acceptance criteria for the inspection/test carried out. If any items do not meet the requirements, additional inspection shall be conducted on double the original number. Acceptable additional items lead to acceptance of the total lot, excluding the initially rejected items. If additionally inspected items fail, a 100% inspection of the total lot is necessary.
4. For valves, visual inspection and witnessing are based on Table-3 sampling plan. The entire lot shall be rejected if a discrepancy is found, requiring re-inspection and re-testing by the vendor before presenting them again for inspection to purchaser's representation. In case of a hydrostatic test failure witnessed by purchaser's representative, all valves in the lot shall be re-tested and 100% witnessed, with the Stockist investigating and reporting the cause of failure.
5. These requirements apply to piping components procurement from vendors other than the original manufacturer, limited to Table-1, for the fabrication of piping systems. Non-ferrous metals are excluded, except for valves. Piping materials comply with applicable international industry codes and material standards. Extent of inspection, testing, certification, and material acceptance criteria are covered in project specifications and certificates shall comply with project requirements, stipulated in technical specifications, requisitions, and POs.
6. As a standard requirement, type 3.1 material certificate shall be required for all services, and other material certificates may be specified in related technical specifications, requisitions, or POs.

Table-2: Sampling Criteria

Total Quantity (Lot/Batch)	No. of Test Pieces (unit)
Up to 20	1
21 to 50	2
51 to 100	3
101 to 200	4
201 to 500	5
501 to 1000	6
1001 to 1500	8
1501 to 2000	10

Table-3: Sampling Plan

Size and Rating	Minimum Sample Size
All valves NPS 2 and smaller, all ratings	10%
Valves 2< NPS < 14 and less than ASME Class 600	25%
All valves NPS 14 and above	100%
All valves >2" and ANSI Class 600 and above	100%
All valves >2" and API rating 2000 psi and above	100%

Table-4: Minimum Inspection Extent for Piping Material (1)

Item	Type of Examination	Type of Material	General Service	Special Service (9)
All Components	Visual	Carbon Steel	100%	100%
		Austenitic Steel	100%	100%
Casting (Pressure Parts) (12)	MT PT	Carbon Steel	10%	100%
		Austenitic Steel	10%	100%
	RT (5), (6)	Carbon Steel	10%	10%
		Austenitic Steel	10%	100%
Tubular Fittings:	Visual	Carbon Steel	100%	100%
	RT (11)	Austenitic Steel	100%	100%
Forged Flanges and Fittings:				
• 20 < T	MT PT UT	Carbon Steel	10%	100%
		Austenitic Steel	---	100%
• 30mm (2)	MT PT UT (10)	Carbon Steel	100%	100%
		Austenitic Steel	100%	100%
• T > 30mm (2)	MT PT UT (10)	Carbon Steel	NA	100%
		Austenitic Steel	NA	100%
Other Welds (3)	MT PT	Carbon Steel	10%	100%
		Austenitic Steel	10%	100%
All Items	PMI		---	(4)
	Hardness test (7)		(7)	(7)

1) The table specifies the minimum extent of inspection for piping materials based on type of examination and material type for both general and special services.

(2) T stands for Thickness.

(3) For other welds, MT refers to Magnetic Particle Testing, and PT refers to Penetrant Testing.

(4) PMI stands for Positive Material Identification.

(5) RT stands for Radiographic Testing.

(6) Items in the "General Service" column apply to both carbon steel and austenitic steel.

(7) Hardness testing is applicable for all items.

(9) Special Service refers to specific conditions or applications that require additional examination.

(10) NA means Not Applicable.

(11) RT for Tubular Fittings applies to Austenitic Steel.

(12) Casting for Pressure Parts applies to Carbon Steel and Austenitic Steel, with different inspection extents.

9.0 Inspection Management

9.1 Pre-Production Meeting

1. Unless waived by Purchaser in writing, a Pre-Production Meeting (PPM) shall be held to confirm that the purchase order requirements, requisitioning documents, and the Supplier's plan to fulfill them are understood and agreed by all parties.
2. The PPM will only be held when following Supplier documents have been submitted and are in status "Reviewed" or "Reviewed with comments" equivalent to Code-2 as defined in section 7.2-3b of this specification, by Purchaser:
    a. ITPs
    b. Preliminary detailed design documents (drawings, data sheets, schematics, etc.)
    c. Production schedule is updated and confirmed.
    d. Sub-Supplier list
3. Production shall not commence prior to completion of the PPM and approval of documents as specified in section 2 above.

9.2 General Inspection Requirements

1. The level or amount of Inspection and testing shall be commensurate with the criticality of the work activity, or the equipment /material manufactured. The Inspection levels are defined as follows:
    a. Inspection Level-1: Full-time resident inspection. An Inspection Engineer conducts progressive monitoring and examination of the work from commencement of manufacturing to final acceptance at supplier's facility in-line with approved ITPs. This shall include performance of all in-process inspection activities required every day that the supplier is manufacturing equipment for the referenced order including:
        i. Review of Supplier's quality control system.
        ii. Approval of ITPs of major suppliers of every tier.
        iii. Attend pre-inspection meetings.
        iv. Scrutinize raw material test certificates and physical verification of major raw Materials i.e., castings, plates etc.
        v. Witness / monitor fit-ups, alignment, and assembly.
        vi. Verify the use of qualified welders and welding procedures.
        vii. Witness of major manufacturing stages and repairs.
        viii. Witness, monitor, and review of NDE tests and results.
        ix. Final visual and dimensional inspection of equipment.

x. Witnessing of pressure, FAT(s), leak, and performance tests followed by inspection of disassembled equipment, as applicable.
xi. Review final tagging and preparation for shipment, packing, marking, and preservation.
xii. Review the manufacturing record book, material certifications, weld procedures and qualifications, fit-up and dimensional inspections, non-destructive and destructive examinations, final testing (hydrostatic, pneumatic, etc.) records, coating and paint inspections, code data reports, and data packages.
xiii. Issue of Inspection and Shipping Release Notes.

b. Inspection Level-2: In-process surveillance inspection on a regular basis as specified/required (e.g., weekly, monthly) in the approved ITPs. Participation in a pre-inspection meeting and surveillance inspection of equipment prior to shipment and shall include all activities from 1) to 13) of Section 9.2 1. a.
c. Inspection Level-3: This inspection includes a pre-inspection meeting, one or more progress surveillance visits, scrutiny of manufacturer's quality system, final condition or as-built examinations/tests, and surveillance inspection of equipment prior to shipment. This includes the following activities as minimum:
    i. Reviewing all quality control records for conformance.
    ii. Check on materials and material traceability.
    iii. Final visual and dimensional inspections.
    iv. Witnessing of pressure, FAT(s), leak, and performance tests followed by inspection of disassembled equipment, as applicable.
    v. Painting and insulation inspections.
    vi. Verification of packing and marking identification.
    vii. Review the manufacturing record book and approved MRB index.
    viii. Issue of Inspection and Shipping Release Notes.
d. Inspection Level-4: Consists of a pre-inspection meeting and a final inspection visit prior to packing and shipment. Inspection is limited to the following: review of mill test reports, material certifications and traceability, code data reports, data packages, weld procedures, final visual/ dimensional inspections, and Inspection /Shipping Release Notes.

2. Purchaser also reserves the right to communicate with Supplier's Inspector directly and make joint visits for inspection, witnessing tests, and evaluating the Supplier Inspector's performance.
3. For purchase orders with multiple pieces of equipment or batches of material governed by the same ITP, a unique copy of the ITP shall be maintained for each piece of equipment or batch of material.
4. The supplier shall sign and date each ITP step as it occurs and is accepted.

5. Each inspecting party shall sign and date each inspection point on the ITP as it occurs and is accepted.
6. Supplier shall conduct receiving, in-process, and final inspections in accordance with purchaser-accepted QAP, ITPs, and procedures. Supplier inspections shall also cover the material and services provided by sub-suppliers.

9.3 Inspections by Supplier

1. The Supplier shall conduct inspections in accordance with the purchaser approved QAP, ITPs, and related procedures.
2. The Supplier shall identify the inspection and test status of materials, equipment, or prefabricated items by using markings, labels, inspection records, or any other suitable means which indicate the conformance or non-conformance of the materials.
3. The Supplier shall maintain the inspection and test status identification system throughout production, NDE, and testing to the completion of the purchase order.
4. Supplier shall date, stamp and sign each ITP step according to effective progress of the work.

9.4 Inspections by Purchaser

1. Purchaser shall be permitted unrestricted access to inspect any item, process, procedure, or part of the supplier’s facilities associated with the scope of work, including documenting inspection observations via reporting, photography, etc.
2. The Supplier shall ensure that all quality-related documentation, applicable codes and standards, calibrated instruments, and measuring tools are always readily available to Purchaser’s Inspector at supplier and sub-supplier facilities.
3. Company reserves the right to communicate with any Supplier’s Inspector in order to make joint visits for inspection, witnessing tests, and the evaluation of the supplier inspector's performance.
4. Inspection by Purchaser shall neither relieve the supplier of complying with the purchase order requirements nor affect the supplier’s warranty of the equipment and/ or materials being provided.
5. No change arising out of inspection shall be made on the purchase order until such change has been approved by Purchaser.
6. Supplier shall provide office accommodation with communication facilities to purchaser’s representatives in supplier's or sub-supplier's premises where the work is carried out.

9.5 Inspection by Independent Inspection Authority (IIA)

1. If the materials and equipment purchased are subject to certification by an Independent Inspection Authority, it is the supplier’s responsibility to ensure that such requirements are fully understood and that equipment, documentation, and IIA inspections are completed accordingly.

2. All necessary documentation (from preliminary to final dossiers), the notifications for inspection, the certificates issued, must be correctly scheduled in order to achieve regular certification in due time

10.0 Special Processes Control

1. Special processes are those for which required product characteristics cannot be determined by final inspection alone, if the characteristics of a product cannot be 100% verified without destroying the product, this classification applies.
2. Special processes may require qualification of procedure, personnel, equipment, and other factors as part of process validation. Appropriate “special process” records of supplier/sub-supplier for Purchaser review.

10.1 Welding

1. All welding shall be performed as per purchaser-approved Welding Procedure Specifications (WPS) and supporting Procedure Qualification Records (PQR).
2. Supplier, sub-supplier performing welding, shall have documented procedures for the control of its welding operations. Supplier’s welding control procedures shall address the requirements of welding qualifications, welding consumable control, process control, calibration of welding equipment, production welding, weld repairs control, and welder performance.
3. WPSs shall be qualified in accordance with the governing industry codes and applicable project specifications. These specifications may have requirements for additional essential variables. Prior to any welding operations, WPS with supporting PQR (Procedure Qualification Record) shall be submitted to Purchaser for review and approval.
4. Only qualified welders shall be used for purchaser’s work involving welding. Welder Qualification WPQ records (Welder Performance Qualification) shall be submitted to Purchaser prior to commencement of any welding.
5. Supplier and sub-supplier shall maintain an index or log of all approved WPS with their revision & approval status.
6. Repair welds shall be performed in accordance with a purchaser accepted repair procedure that details defect removal and verification.
7. Supplier shall implement a purchaser accepted procedure that ensures welding consumables are fully traceable to their source and in compliance with the material specification.
8. Supplier's welding control and documentation procedures shall provide an auditable trail to show compliance with codes/standards specified. This system shall permit positive identification of welds, traceability of welds to welder operators and traceability to the applicable non-destructive testing (NDT) report.

9. Trend analysis shall be performed on individual welder performance to ensure unsatisfactory personnel are removed or re-trained to ensure consistent quality levels are maintained.
10. Supplier shall update the daily welding information with a daily welding report form in an agreed format.
11. If sub-suppliers are providing components fabricated by welding, they shall also comply with the above welding requirements.
12. All welding procedure qualification activities shall be conducted in the presence of a purchaser's representative. Supplier shall have direct responsibility for the welding procedure qualification process as defined in the applicable specification, code, standard, and statutory requirement.
13. 100% PMI shall be carried out on all welding consumables prior to their use. Welding consumables shall be analyzed for the following elements as a minimum: Mn, Ni, Cr, and Mo and acceptance criteria for the material shall be within the specified value in applicable material specification.

10.2 Heat Treatment (Post-Weld Heat Treatment or Stress Relieving)

1. Supplier and sub-supplier performing heat treatment, reheating, and quenching on the work, shall have documented procedures meeting API Standard 20H requirements for the control of its heat treatment operations.
2. Heat treatment procedures shall be submitted for purchaser acceptance, prior to any post-weld heat treatment (PWHT).
3. Heat treatment including reheating and quenching shall be performed in accordance with the requirements of purchase order-specified standards and ASME BPVC, as applicable.
4. The procedures shall include as a minimum the description of equipment, method of heating, location and type of heating elements and insulation (as applicable), temperature measurement, thermocouple locations, type of attachment, and furnace loading diagram.
5. Heat treatment method shall require complete temperature control and digital chart recording capabilities.
6. Applicable standards for heat treatment shall be referenced on the weld map.
7. Maximum and minimum holding temperatures and times shall be included in the WPS.
8. Heat treatment method shall require temperature control and digital chart recording capabilities.
9. After PWHT, the weld shall be re-examined by an appropriate NDE method. (See ASME BPVC Section V for additional information.). Any previously undetected i.e., post PW defect shall only be repaired and locally heat treated with written approval by Purchaser.
10. No welding, grinding, or cutting shall be performed on heat-treated welds, unless otherwise permitted in writing by Purchaser.

11. Heat treatment results shall be recorded and charted in PWHT report which shall be submitted to Purchaser for review.

10.3 Non-Destructive Examination Requirements (NDE)

1. Non-destructive examination (NDE) requirements shall be as per the applicable industry code and purchaser's specifications.
2. Supplier shall establish detailed NDE procedures to cover all NDE requirements. Written NDE procedures shall be submitted for Purchaser acceptance for all proposed NDE methods and techniques prior to commencement of work.
3. As a minimum, procedures shall contain NDE map or drawing(s). In case of simple components such as piping, an NDE procedure summary shall be acceptable.
4. When NDE operations are sub-contracted, supplier and sub supplier shall utilize only accredited companies and testing laboratories for all NDE and testing services. The selection of companies shall be subject to purchaser's acceptance prior to commencement of the work.
5. Only qualified personnel shall be performing NDE operations and evaluation of results. Qualification of personnel performing NDE shall be as per the written practices of the applicable industry standard. Records of qualification shall be submitted to Purchaser for review.
6. All NDE reports shall be reviewed and approved by supplier's NDE Level-III Personnel, prior to submission to Purchaser for review.

10.4 Painting and Coating

1. Supplier shall submit for Purchaser review and acceptance, a documented painting and coating process meeting project technical specification requirements, minimum thirty (30) Days prior to start of any painting or coating work activity.
2. All personnel engaged in supervision and execution of painting and coating processes shall be qualified in accordance with purchaser's technical specifications for qualification testing and performance monitoring of coating personnel, prior to start of any such activity.
3. Supplier shall organize the inspection and shall record data on weather conditions, surface preparation, and paint preparation prior to starting blasting and painting work.
4. Supplier shall perform the quality inspection of blasting and painting work. The surface preparation inspection activities shall include:
    a. Abrasives used for surface blasting are visually inspected according to the technical requirements and supplier's mill certificate prior to use.
    b. Identify steel surface roughness (Rz) and ensure steel surface roughness measurement conforms to the technical requirements.
    c. Surface cleanliness conforms to the technical requirements and surface is visually inspected and compared with the relevant standard samples in ISO 8501-1 part 1.

5. Supplier, at a minimum, shall perform the following coating inspections:
    a. Coating and painting inspection equipment shall be calibrated prior to inspection.
    b. Coating and painting shall be visually inspected to assess the general quality of work and detect technical defects such as remains, runs, swelling, and air bubbles. Special attention shall be paid to corners, edges, and welds.
    c. At least 20 points, uniformly distributed over a 108 ft.2 (10 m2) area, shall be measured.
    d. Dry film thickness measurement results shall not be less than 10 percent of the specified thickness.
    e. Adhesion tests shall not be allowed on the product.
6. For quality inspections, as a minimum, following shall be inspected and recorded:
    a. Environmental conditions.
    b. Surface blasting profile verification by “Test O Tape”.
    c. Visual inspection for each application.
    d. Dry film thickness (DFT)
    e. Paint adhesion testing.
7. Supplier shall determine subsequent steps based on inspection results.
8. The following records for coating and painting work shall be maintained by Supplier for Purchaser review:
    a. Paint adhesion testing report.
    b. Painting and coating quality record.

10.5 Additional Material Testing Requirements

1. Purchaser may require additional verification testing, as specified in the PO package. The additional verifications provide added assurance that all materials and components of the finished product meet purchaser’s requirements. The additional verification testing may be required as listed below or could take a different form.
2. To minimize the amount of testing required, all of the same materials or components shall have the same source (manufacturer, mill run, heat number, etc.). For example, all plate for a pressure vessel must be supplied from the same mill and be of the same mill run, heat number, etc., Similarly for all flanges, all heat exchanger tubes, bolts, pipe, bar, or any other component of the finished product.
3. The primary manufacturer shall obtain suitable samples of the materials or components and deliver it to the test lab, along with the instructions for the required tests. Note: the additional test samples may require the purchase of more material or components than are required for fabrication.
4. Testing shall be blind; the test lab shall not be informed of the expected results.

5. The cost of the additional materials required for testing and the cost of obtaining the samples shall be included in the bid price.
6. The cost of any additional testing requested shall be paid by the purchaser.
7. All test results shall be promptly transmitted to the purchaser (or other third party as directed to by the PO) for review and analysis.
8. Fabrication/manufacture may proceed while tests are being performed. If test results do not conform to requirements, the cost of any re-work shall be endured by the manufacturer.
   Example: structural steel plate additional testing may include:
   a. Microstructure
   b. Cleanliness
   c. Charpy at -50 degrees F
   d. Chemical analysis
   e. Hardness

   Note: Example: Heat exchanger tube verification tests may require additional nondestructive and destructive testing to verify material properties and chemistry and would require taking a sample tube from each heat of material.
9. Non-destructive tests that confirm the material manufacturing was performed without defects may include:
   a. ID Electric Test (ECT) or IRIS inspection.
   b. Random hydrostatic test per SA-450 supplemental requirements.
   c. Chemical analysis (XRF or analyzer).
   d. Destructive tests may include mechanical test required by SA-450.
10. Where the manufacturer is already performing similar verification testing of sub- supplied materials or components, Purchaser requests access to those test results in lieu of the above additional testing.
11. Where supplier plan to procure the materials from stockist, additional material quantity must be purchased to perform the material testing to verify the conformance to material specification requirements.
12. All mechanical and chemical composition testing shall be performed by laboratories accredited to ISO/IEC 17025 general requirements for the competence of testing and calibration laboratories, or an equivalent national or international standard. Evidence of current certification for testing laboratories shall be submitted to Purchaser for acceptance.

11.0 Quality Assurance Audits

1. Supplier shall periodically perform quality assurance audits on its QA system as per ISO 19011 Guidelines for auditing quality systems – Part 1 –Auditing. These audits shall be extended to

include all sub-suppliers participating in the manufacturing or supply of the equipment and materials required by the purchase order.

2. Purchaser reserves the right to perform quality audits on suppliers and sub-suppliers at any time including participation in supplier audits of its sub-suppliers.
3. Supplier shall provide its proposed audit schedule within 30 days of contract award. Supplier shall provide minimum of a 10-day notice to Purchaser prior to the commencement of any agreed audit.
4. Supplier shall provide all internal and sub-supplier audit reports along with any attachments for purchaser's review within 7 days of the audit.

11.1 Non-Conformance Management

1. Supplier shall have a documented non-conformance management system for controlling non-conforming product to prevent its unintended use or delivery according to Santos' specification "Control and Reporting of Non-Conforming Product." The procedure shall address:
2. Identification, segregation, evaluation, disposition, and reverification of the non-conformity at all stages of the purchase order or contract.
   Supplier shall submit copies of all NCR (Non-Conformity Report) associated with the purchase order or contract to Purchaser for review. Purchaser reserves the right to reject the supplier's NCR disposition if the supplier is unable to provide satisfactory justification. All non-conformance reports shall include:
   a. Details of the non-conformance.
   b. Possible causes.
   c. Supporting documents (where required).
   d. Proposed corrective action.
   e. Estimated time to perform the corrective action.
3. Supplier shall maintain an up-to-date NCR log, showing current status of all the non-conformities related to purchase order or contract. The NCR log shall be submitted to the purchaser in a periodic manner as agreed.
4. Supplier shall determine and implement the action necessary to eliminate the cause of a detected non-conformity or other undesirable situation to prevent its recurrence. Supplier shall review NCR log to identify root causes, trends, or patterns requiring attention, and take action for improvement.

12.0 Final Inspection

1. Final Inspection shall be performed in accordance with ITP at the completion of the manufacturing and the testing of Material and Equipment and before they are packed. If

successful, Final Inspection is concluded by issuance by Purchaser of an Inspection Release Note (IRN).

2. Final Inspection activities and tests include (but not limited to):
    a. Checking that the scope of supply of the PO is completed.
    b. Accuracy of quantities.
    c. Overall geometrical, dimensional, and visual inspection of material & equipment, painting, and finishes.
    d. Identifications and labelling (tag number, name plate, control panels, color coding).
    e. Interfaces and connections (type, identification, geometry, location/ dimension, color coding, and electrical continuity).
    f. All removable parts are mounted and secured.
    g. All NCRs are closed and documented.
    h. All punch lists are completed.
    i. Assuring that all steps of ITP are completed effectively.
    j. Checking that ITP format is signed off by Supplier, Sub-Suppliers and by other relevant Parties (Purchaser, IIA) for each activity / step and each batch / lot.
    k. Checking that all tests are formalized in test reports / certificates, satisfactorily filled, and endorsed by Purchaser and relevant parties (Purchaser, IIA).
    l. Checking that Manufacturing Records Book (MRB) is ready and available for final check by Purchaser.
3. Supplier is requested to prepare and to have available all the necessary documentation (ITP format, MTR, certificates, reports, MRB, etc.) ready for Purchaser review where the final inspection takes place.
4. Upon successful completion of the inspection activities, the purchaser's inspector will issue an Inspection Release to the supplier.

13.0 Manufacturing Records Book (MRB)

1. Supplier shall submit to Purchaser within four weeks of receipt of purchase order, a detailed description of the content of the Manufacturing Records Book (MRB) for review and acceptance. MRB content shall be in accordance with PO and NGE-QASPE-000004 Manufacturing Records Book Specification.
2. The records for MRB shall be progressively compiled and available for Purchaser or its nominated inspector's review, at all times.
3. Before submission of MRB to Purchaser all documentation shall be checked and verified against the purchase order or contract requirements, by the manufacturer and supplier's independent quality representative.

4. Supplier shall retain all records including hard copies, electronic and films (including radiographs), for a period of 5 years from the date of work completion, unless otherwise specified elsewhere in the contract or purchase order.

14.0 Punch Lists

1. End user's quality objective is to have zero punch list items when equipment is shipped. Where it is agreed a punch list is required, Supplier is responsible for its generation, maintenance, and for its subsequent closeout.
2. Punch lists shall be agreed in writing with Santos before any items can be shipped or moved. The punch list shall accompany inspection release note.

15.0 Final Release for Shipment

1. After the Inspection Release Note is issued, the Purchaser shall contact End User to obtain a Shipping Release.

2. No IRN can be issued by Purchaser, and no delay may be claimed by Supplier in case of lack of time or lack of availability of documentation for End User's review and checks.

3. Equipment and/or materials shall not be shipped until the Supplier has received a Shipping Release from End User's Quality Manager. This release must be in writing but can be via an email.

4. The End User's release shall only be issued upon written confirmation that:

a. The equipment and materials have been accepted by both Purchaser and Supplier's Quality Inspectors.

b. Manufacturer's Record Books (MRB) have been reviewed and accepted by both Inspectors.

c. Punch list, if any, have been agreed by both receiving and shipping parties.

16.0 Supplier Specialists

Supplier shall provide specialist to assist Purchaser to supervise installation, final adjustments, calibration, and testing. This individual shall also: advise during system testing, commissioning, start-up and running-in, of supplied materials and equipment, to maintain the integrity of manufacturer's warranties, quality, and to maximize installation accuracy and efficiency.

17.0 Quality Assurance for Material Suppliers and Distributors - Other than Original Manufacturers

Note--Suppliers and distributors are still required to follow applicable requirements listed throughout this specification in its entirety.

17.1 Stockists Qualification Requirements

- Quality System Alignment: Stockist must maintain an effective quality system in line with ISO 9001:2015. Although ISO 9001 certification is not mandatory, demonstrating alignment with ISO 9001 will be important and verified by the purchaser.
- Compliance with Specifications: Stockist must adhere to the Quality Assurance Requirements stated in both this specification and other purchaser specifications.
- Approval by Santos Quality Manager (QM): The Santos Quality Manager (QM) is the primary authority responsible for approving stockists. No purchase order shall be placed without the QM's approval.

17.2 Purchasing Requirements

- General
  Purchase orders for stocked inspectable materials must only be placed with Santos approved stockists/vendors.
- Approved Stockist List
  For a list of approved stockists, refer to Santos Quality Manager (QM) or Santos Contract Manager.
- New Stockist Approval
  Project one-time-approval request for new stockists must be submitted to QM or its delegates on the project for review and approval.
- Approved Manufacturer/Vendor List
  Contractors must provide the stockist with the list of Santos approved manufacturer plants and/or vendors for each specific inspectable material along with the purchase requisition (request for quotation).
- Materials Exclusion
  Inspectable materials intended for Santos Operations or Stock within the scope of this specification must not be supplied from stockists.

17.3 Procurement Criteria and Material Limitations

- Steel Plates, Pipes, Fittings, Flanges, and Valves-The purchase of steel plates, pipes, fittings, flanges, and valves from stockists shall adhere to the limitations specified in Table-1 of Section 8.

17.4 Quality Assurance Requirements

- In procurement of materials, the stockist shall ensure direct purchasing from Santos approved manufacturers for Santos direct purchases and contractually approved manufacturers for project contractor purchases.
- Non-HIC resistant or pseudo-HIC resistant steel, such as plate or seam welded pipe, must not be supplied for sour service applications; HIC-resistant steel for this purpose shall be procured from Santos approved steel mills and pipe manufacturers.
- The stockist is prohibited from supplying used or recycled materials to Santos through direct or project contractor's purchase. Furthermore, the stockist shall refrain from performing any modifications or fabrication processes to the supplied or stocked materials unless specifically requested by Santos.
- All materials must be accompanied by Original Material Test Certificates or Certified True Copies from the original manufacturer. Additionally, the stockist must demonstrate how their suppliers are evaluated and monitored.
- Regarding Purchase Requisition Review (Request for Quotation), the stockist must thoroughly review the purchase requisition requirements for the material before accepting the order. Any deviations from the purchase requisition requirements must be disclosed in writing to the purchaser’s representative, and Santos's approval of such deviations is necessary prior to the stockist accepting the purchase order.
- Stockists should submit a written acknowledgment, specifying the name and plant location of the approved manufacturer, and confirm their capability to comply with all applicable material specifications and inspection & test requirements referenced within the PO.
- All inspection and testing requirements specified in this document are at the stockist’s cost.
- Personnel performing work affecting material quality must be competent based on appropriate education, training, skills, and experience.
- Inspectable materials intended for installation within a Santos project and facility must be inspected by qualified stockist QC personnel.
- Material identification and traceability should be ensured through appropriate marking and inventory management. Additionally, calibration and verification of measuring and testing devices must be performed at specified intervals, with records maintained for Santos’ review at all times.

17.5 Section Inspection and Testing Requirements

- In the procurement of materials, Santos ensures that all materials undergo a satisfactory review and witnessing of the requirements by Stockist, Purchaser, and Santos's representative(s). Deviations to these requirements are strictly prohibited for any pressure containing equipment or part.
- The Stockist is responsible for arranging additional quantities of items, including destructive testing, if necessary, to verify required performance characteristics. Sampling criteria for materials encompass Mechanical Testing, Chemical Analysis, Hardness Testing, and special testing like Ferrite Testing for Austenitic Steel and Charpy Impact testing for low temperature applications. Non-destructive testing (NDT) for piping materials is also specified.
- Regarding Sampling, Inspection & Testing criteria, testing of primary steel plates from a Stockist involves testing one plate from each heat, followed by spot checking of 10 percent if satisfactory. Defective results require 100 percent inspection until satisfactory performance is achieved. Sampling criteria for other materials from a Stockist are outlined in Table-2, with exceptions for valves used for hydrotest, as indicated in Table-3, subject to written agreement by Santos Quality Manager. The acceptance of a lot is dependent on the fulfillment of specified acceptance criteria for the inspection/test carried out. If any items do not meet the requirements, additional inspection shall be conducted on double the original number. Acceptable additional items lead to acceptance of the total lot, excluding the initially rejected items. If additionally inspected items fail, a 100% inspection of the total lot is necessary.
- For Valves, visual inspection and witnessing are based on Table-3 sampling plan. The entire lot shall be rejected if a discrepancy is found, requiring re-inspection and re-testing by the Vendor before presenting them again for inspection to Purchaser's representation. In case of a hydrostatic test failure witnessed by Purchaser’s Representative, all valves in the lot shall be re-tested and 100% witnessed, with the Stockist investigating and reporting the cause of failure.
- These requirements apply to piping components procurement from vendors other than the original manufacturer, limited to Table-1, for the fabrication of piping systems. Non-ferrous metals are excluded, except for valves. Piping materials comply with applicable international industry codes and material standards. Extent of inspection, testing, certification, and material acceptance criteria are covered in project specifications and certificates shall comply with project requirements, specified in Technical Specifications, Requisitions, and Purchase Orders. As a standard requirement, type 3.1 material certificate shall be required for all services, and other material certificates may be specified in related Technical Specifications, Requisitions, or Purchase Orders.

Table-2: Sampling Criteria

Total Quantity (Lot/Batch)	No. of Test Pieces (unit)
Up to 20	1
21 to 50	2
51 to 100	3
101 to 200	4
201 to 500	5
501 to 1000	6
1001 to 1500	8
1501 to 2000	10

Table-3: Sampling Plan

Size and Rating	Minimum Sample Size
All valves NPS 2 and smaller, all ratings	10%
Valves 2< NPS < 14 and less than ASME Class 600	25%
All valves NPS 14 and above	100%
All valves >2" and ANSI Class 600 and above	100%
All valves >2" and API rating 2000 psi and above	100%

Table-4: Minimum Inspection Extent for Piping Material (1)

Item	Type of Examination	Type of Material	General Service	Special Service (9)
All Components	Visual	Carbon Steel	100%	100%
		Austenitic Steel	100%	100%
Casting (Pressure Parts) (12)	MT PT	Carbon Steel	10%	100%
		Austenitic Steel	10%	100%
	RT (5), (6)	Carbon Steel	10%	10%
		Austenitic Steel	10%	100%
Tubular Fittings:	Visual	Carbon Steel	100%	100%
	RT (11)	Austenitic Steel	100%	100%
Forged Flanges and Fittings:				
• 20 < T	MT PT UT	Carbon Steel	10%	100%
		Austenitic Steel	---	100%
• 30mm (2)	MT PT UT (10)	Carbon Steel	100%	100%
		Austenitic Steel	100%	100%
• T > 30mm (2)	MT PT UT (10)	Carbon Steel	NA	100%
		Austenitic Steel	NA	100%
Other Welds (3)	MT PT	Carbon Steel	10%	100%
		Austenitic Steel	10%	100%
All Items	PMI		---	(4)
	Hardness test (7)		(7)	(7)

1) The table specifies the minimum extent of inspection for piping materials based on type of examination and material type for both general and special services.

(2) T stands for Thickness.

(3) For other welds, MT refers to Magnetic Particle Testing, and PT refers to Penetrant Testing.

(4) PMI stands for Positive Material Identification.

(5) RT stands for Radiographic Testing.

(6) Items in the "General Service" column apply to both carbon steel and austenitic steel.

(7) Hardness testing is applicable for all items.

(9) Special Service refers to specific conditions or applications that require additional examination.

(10) NA means Not Applicable.

(11) RT for Tubular Fittings applies to Austenitic Steel.

(12) Casting for Pressure Parts applies to Carbon Steel and Austenitic Steel, with different inspection extents.

18.0 Appendix A: QA Forms

18.1 Notification for Inspection - NGE-QATEM-000002

NOTIFICATION OF INSPECTION

Procurement Details:

NOI No.:	NOI Revision:	NOI Date:
Purchase Order No (& Rev.):	Vendor / Supplier Name:	

Material Inspection Details:

Inspector's Name: (To be filled by Contractor)	Date of Inspection/Period:	No of Days of Inspection:
Place of Inspection: (Please give completed address where material will be inspected, attach route map if required)	Name of Contact Person for this Inspection:	
	Contact No and email of Person for this Inspection:	

Type of Inspection:

☐ Pre-Inspection Meeting ☐ Initial ☐ In-process ☐ Doc Review ☐ Final ☐ Pre-Shipment

Remarks:(any specific inspection, test or review needed) _____

ITP No & Rev:

Sr. No	ITP Activity No	Inspection Date	ITP Activity Description

(Extend this Table for additional entries)

Material Offered Details:

PO Item numbers / Tag Nos. and Quantity to be inspected:

PO Item No	Quantity (*Unit XXX*)			Material Description (Include Tag No for Tagged Items)
	PO Qty	Offered in this NOI	Previously Released	

(Extend this Table for additional entries)

PO Completion Status (Considering this NOI quantities)	☐ Partial; If partial _____ % ☐ Complete

To be completed by STO

Check Appropriate Box	☐ Will Attend ☐ Waived
Accepted by:	Date:

Santos

18.2 Inspection and Test Plan - NGE-QATEM-000003

Inspection and Test Plan (ITP)			
Purchaser:		QC/ITP No.:	
Purchaser Order No.:		Revision:	
Supplier Order No.:		Date:	
Project Name:			
Tag/Item No.:		Location:	
Description:			

Item No.	Item/Component Under Inspection	Inspection/Test Activity Description	Reference Procedures/Standard	Quality Characteristic to be Verified	Acceptance Criteria	Recording Document	Type of Inspection Point		
							Supplier	Purchaser Inspector	End User
12	Q125 Plain End Pipe	Hydrostatic test	API 5CT	Hydrotest Pressure Hold Time	API 5CT Sec 10.12	Hydrotest Report 23.43	H	W	

Inspection Point Legend: H = Hold; W = Witness; M = Monitor; R = Review

R = Document Review: Review of documentation such as reports, testing records, procedures, qualification records, and data book (e.g., dossier/manufacturing records book [MRB]).

In-Process Inspection Point (I): Random witnessing of the production, inspection, or testing activities. No notification by the Supplier is required.

W = Witness: Witness of production, inspection or testing activities by Purchaser. Supplier shall notify Purchaser at least seven (7) working days in advance. If Purchaser does not elect to be present, Supplier may proceed with the intended activity with written approval from Purchaser provided test reports are compiled and made available for Purchaser review at a later date.

H = Mandatory witness of production, inspection or testing activities by Purchaser. Purchaser shall be notified at least ten (10) working days in advance and shall be present during the specified activity.