



MINISTRY OF DEFENCE (DGQA)

STANDARD QUALITY ASSURANCE PLAN

AIR CONDITIONING & REFRIGERATION PLANT

STANDARD QAP NO. DGQA/DQA (WP)/AC & REF PLANT/07/2021/REV 01
19 JAN 2021

Total No. of Pages: 118

ISSUING AUTHORITY

DIRECTORATE OF QUALITY ASSURANCE (WARSHIP PROJECT)
MINISTRY OF DEFENCE (DGQA)
'H' BLOCK, DHQ ZONE, NIRMAN BHAWAN PO
NEW DELHI - 110 011



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RECORD OF AMENDMENTS

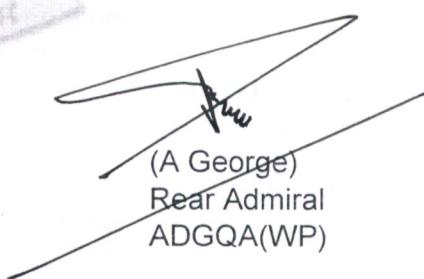
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**STANDARD QAP NO.
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19 JAN 2021**



(A George)
Rear Admiral
ADGQA(WP)

Promulgated by: -

**DIRECTORATE OF QUALITY ASSURANCE (WARSHIP PROJECT)
MINISTRY OF DEFENCE (DGQA)
'H' BLOCK, DHQ ZONE, NIRMAN BHAWAN PO
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CONDITION OF RELEASE

1. This Standard Quality Assurance Plan (SQAP) has been formulated for reference of the Order Placement Agencies, Inspection Authority, Inspection Agencies and the Industry. No alteration is to be made to this Standard QAP except by the issue of authorised amendment by DQA (WP).
2. It is to be applied, as required, for Quality Assurance during various stages of manufacture of Air Conditioning and Refrigeration Plant for IN Ships.
3. The website <http://www.dqqadefense.gov.in> may also be referred for other additional QA requirements.
4. The SQAP has been prepared on the basis of decisions made in Collegiate meeting held at DQA(WP) with leading manufacturers of Air Conditioning & Refrigeration Plant, representative of Professional and Production directorates of IN. Any user of this SQAP within DGQA / Indian Navy or in industry may propose an amendment to it with valid justification. Proposals not applicable to particular contract can be sent directly to DQA (WP), New Delhi, and those directly applicable to a particular contract are to be dealt with using contract procedures.
5. The specification and standards laid out in the SQAP are indicative only. The specifications / standards and parameters given in the Statement of Technical Requirement (SOTR) / Technical Specifications (TSP) / MoM of TNC / Approved drawings will be final and binding.
6. DQA (WP) reserves the right to amend or modify the contents of this SQAP without consulting or informing any holder of this document.
7. In case SQAP is incorporated into contracts, users are responsible for the correct application while complying with contractual and other statutory requirements. Compliance with SQAP does not itself confer immunity from legal obligations.
8. Enquiries in connection to these requirements may be made from:

**DIRECTORATE OF QUALITY ASSURANCE (WARSHIP PROJECT)
MINISTRY OF DEFENCE (DGQA)
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NEW DELHI - 110 011**

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STANDARDS INVOKED

| <u>S. No.</u> | <u>Specification No.</u> | <u>Description</u> |
|---------------|-----------------------------------|--|
| 1 | NES 102 | Requirement Air Conditioning & Ventilation in Ships |
| 2 | NES 158 | Refrigeration system |
| 3 | NES 159 | Testing and set to work of Air Condition Plant |
| 4 | NES 327 | Pumps and Eductors |
| 5 | NES 329 | Cooling Coil |
| 6 | NES 360 | Valves |
| 7 | NES 375 | Valve Design and manufacture |
| 8 | NES 596 | Heating Units |
| 9 | NES 636 | Control Panel |
| 10 | NES 723 | Tally/diagram plate |
| 11 | NES 1004 | Requirements for the Design & Testing of equipment to meet environment conditions |
| 12 | ASTM E 446 and 1320 | Specification for Radiography test. |
| 13 | BS 970 | Specification for Steel |
| 14 | BS 1400 | Copper alloy ingots and high conductivity copper castings |
| 15 | BS 2871: Part 2 | Copper & Copper Alloy Tubes |
| 16 | BR 3021 (Vol. 1 & 2) | Shock Manual |
| 17 | DGS 251 | Painting |
| 18 | DGS 252 | Electrical system design, manufacturing and testing |
| 19 | DME405(R1) | Instrumentation specifications |
| 20 | DME 452 | Documentation Specification |
| 21 | IS/IEC 60529 | Specification for Ingress Protection. |
| 22 | JSS 55555 | Environmental test methods for electrical & electronic equipment |
| 23 | MIL-STD-167-1 | Mechanical Vibrations of Shipboard Equipment |
| 24 | MIL-STD-740-2 | Structure Borne Noise measurements and acceptance criteria of shipboard Equipment |
| 25 | MIL-STD-1474E | Design Criteria Standard Noise Limit |
| 26 | MIL-STD-461-E | EMI/EMC Requirement for Electronic Equipment |
| 27 | EED-Q-071(R4) | Specification for AC Motors and Starters/Control Gears |
| 28 | ISO 14839-2 | Mechanical Vibration-Vibration of rotating machinery equipped with Active Magnetic Bearing |
| 29 | NSS II (BR3201) & IN Shock Policy | Requirement for high impact shock tests, Shipboard equipment and system |

Note: - The Standards given are indicative only. The specifications / standards and parameters given in the SOTR / Technical Specification (TSP) / MoM of TNC / Approved drawings will be final and binding.

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SPECIFIC REQUIREMENTS

1. Testing of physical, chemical properties and specific tests (wherever mentioned) has to be done by NABL accredited lab (including firm's NABL accredited lab).
2. If casting is being poured without integral test bar, then the pouring is to be witnessed by Inspector. No repair of casting whatsoever is to be undertaken without approval by QAE.
3. All castings are to be subjected to RT and / or UT, as applicable, to qualify the same in accordance with the approved class of casting, unless otherwise specified in P.O. & SOTR / TSP. The extent of RT will be as per the approved drawing. The class of casting is to be invariably mentioned in the drawing / DBOM.
4. All forgings are to undergo UT for soundness and integrity checks.
5. Tubes / pipes are to be subjected to Eddy Current Test unless exempted in P.O. / TEC.
6. Shooting sketch indicating critical test zones and test zones are to be submitted prior to testing.
7. All NDT procedures are to be approved by ASNT (ACCP) / ISNT Level III qualified NDT personnel based on standards and acceptance criteria specified in SOTR / TSP / Applicable Standards.
8. Radiographic Test (RT) & Ultrasonic Test (UT) are to be carried out by ASNT (ACCP) Level-II/III or ISNT Level-II/III qualified NDT personnel. Interpretation/sentencing of RT and UT reports are to be carried out by ASNT (ACCP) Level-III or ISNT Level-III NDT personnel only.
9. Magnetic Particle Test (MPT) & Dye Penetrant Test (DPT) are to be carried out by ASNT (ACCP/SNT-TC-1A) Level-II/III or ISNT Level-II/III qualified NDT personnel. Interpretation/sentencing of MPT and DPT reports are to be carried out by ASNT (ACCP/ SNT-TC-1A) Level-III or ISNT Level-III NDT personnel only.
10. Make of item should be as per approved PIL / Detailed Bill of Material (DBOM) or IN approved source.
11. The outsourced components in SQAP are indicative only. OEM is to categorize the outsourced components, specific to their product in the QAP as per the approved DBOM / Drawings and in accordance with Chapter-5 of QAD-01 R01, as amended from time to time.
12. ESS Test (Thermal Cycling, Random Vibration and Burn in / Endurance) is to be in accordance with DQA(N) policy (DQA(N) letter 66301/Policy-07/DQA(N)/QA-07 dated 09 Aug 16).
13. Ingress protection testing will be as per applicable IP rating.

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SPECIFIC REQUIREMENTS

14. Imported items will be inspected i.a.w DQA(N) Policy No. 66301/Policy/DQA(N)/SG dated 14 Nov 17, as amended from time to time. Normally, following documents are inspected: -

- (a) Bill of Lading / Shipping Bill / Airway bill.
- (b) Invoice by OEM or Country of Origin Certificate with Packing List
- (c) Bill of entry to warehousing
- (d) OEM confirmation Certificate
- (e) Firm's Guarantee Certificate as per SOs

15. Type Test, EMI / EMC test and ET will be done at Government/PSU test centers or NABL accredited labs. EMI / EMC Acceptance Test Plan is to be duly vetted by NEC, Mumbai.

16. If TT, EMI / EMC and ET have already been done in earlier projects on identical units, same need not be done again & the reports of earlier tested units will have to be provided for review of inspection agency.

17. Conformal Coating of PCBs to be done as per DQA(N) policy letter 580930/DQA(N)/EL dated 17 Feb 14 and revision, if any.

18. Since the Air Conditioning Plant/Refrigeration Plant is to be subjected to IFATs, the draft Operating Instructions, technical Documentation and Firm's in-house test report are to be made available prior to raising request for conduct.



MINISTRY OF DEFENCE (DGQA)

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ABBREVIATIONS

| | |
|------|--|
| ABN | Air Borne Noise |
| ASNT | American Society of Nondestructive Testing |
| CHP | Customer Hold Point |
| CoC | Certificate of Conformance/Compliance |
| DI | Dimensional Inspection |
| DPT | Dye Penetrant Test |
| EMI | Electro Magnetic Induction |
| EMC | Electro Magnetic Conduction |
| ETT | Environmental Type Test |
| FATs | Factory Acceptance Trials |
| IR | Inspection Report |
| ISNT | Indian Society of Nondestructive Testing |
| LTC | Lab Test Certificate |
| MPT | Magnetic Particle Test |
| NABL | National Accreditation Board for Testing and Calibration of Laboratories |
| OEM | Original Equipment Manufacturer |
| PQR | Procedure Qualification Record |
| R | Review |
| RT | Radiography test |
| SBN | Structure Borne Noise |
| STC | Supplier Test Certificate |
| TC | Test Certificate |
| UT | Ultrasonic Test |
| VI | Visual Inspection |
| W | Witness |
| WPQ | Welder Performance Qualification |
| WPS | Welding Procedure Specification |

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SCOPE

Scope of Quality Assurance: The scope of Quality Assurance includes witness / review at all stages of manufacturing viz. 'Raw Material Stage', 'In-process Stage' and 'Final Stage'. The scope also covers the review and witness of Type test of equipment, wherever applicable.

The SQAP contains comprehensive list of inspections and trials that is to be applicable for quality assurance of the equipment. In addition, quality assurance of equipment will also be governed by specific conditions laid down in SOTRs and 'Approved Drawings'. The inspections/trials must be contemporary to latest technology/ techniques available in the industry at the time of placement of order.

The following quality assurance activities will be carried out during the Quality Assurance of Equipment: -

- (a) Visual Inspection
- (b) Dimensional Inspection
- (c) Witness of Pouring in absence of integral test bar
- (d) Review of LTC/STC/Compliance Certificates/Calibration Certificate/ Import documents.
- (e) Witness of in-house Lab Testing, if applicable.
- (f) Witness of Non-destructive Testing viz. UT, DPT & MPT
- (g) Witness of Eddy Current Test or review of Eddy Current Test Report, as applicable
- (h) Review of RT films and reports.
- (j) Review of Heat Treatment Charts
- (k) Witness of Endurance Trials & Tilt Test, Review of Shock Test and SBN & ABN reports for qualification of Type test, as applicable
- (l) Review of ETT, EMI/EMC and ESS reports, in addition to Pre and Post ET inspection, as applicable
- (m) Review of Draft documentation and Witness/Stamping of final documentation, as applicable
- (n) Issue of CHP clearance
- (p) Issue of Dispatch Clearance or Issue of Form-IV, as applicable

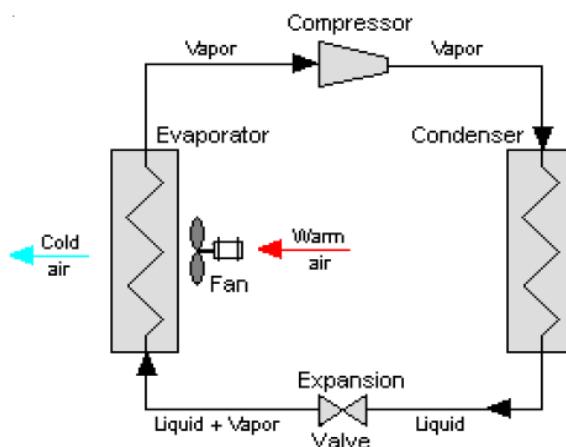


SYSTEM DESCRIPTION

Principle of Air Conditioning & Refrigeration System

The **Vapour-Compression Cycle** is the basic principle of most of the Air Conditioning and Refrigeration System used in most household as well as in many large commercial and industrial refrigeration systems.

A schematic diagram of the components of a typical vapour-compression refrigeration system is shown below: -



Vapour – Compression Refrigeration Cycle

In this cycle, a circulating refrigerant enters the compressor as a vapour. The vapour is compressed at constant entropy and exits the compressor superheated. The superheated vapour travels through the condenser which first cools and removes the superheat and then condenses the vapour into a liquid by removing additional heat at constant pressure and temperature. The liquid refrigerant goes through the expansion valve (also called a throttle valve) where its pressure abruptly decreases, causing flash evaporation and auto-refrigeration of, typically, less than half of the liquid. That results in a mixture of liquid and vapour at a lower temperature and pressure. The cold liquid-vapour mixture then travels through the evaporator coil or tubes and is completely vaporized by cooling the warm air (from the space being refrigerated) being blown by a fan across the evaporator coil or tubes. The resulting refrigerant vapour returns to the compressor inlet to complete thermodynamic cycle.

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The Ideal vapour-compression cycle does not take into account the effects like frictional pressure drop in the system, slight thermodynamic irreversibility during the compression of the refrigerant vapour or non-ideal gas behavior (if any).

Air Conditioning System

Air Conditioning (often referred as A/C or AC) is the process of altering the properties of air (primarily temperature and humidity) to more comfortable conditions, typically with the aim of distributing the conditioned air to an occupied space to improve thermal comfort and indoor air quality. The cooling is typically achieved through a refrigeration cycle, but sometimes evaporation and free cooling may also be used.

An air conditioning plant mainly consists of Compressor, Condenser, Receiver, Evaporator and expansion device. The other requisites are Starter Panels, Control panels, Sea Water Pump (SWP) and Chilled Water Pump (CWP).

Refrigeration Plant

Refrigeration is a process of moving heat from one location to another in controlled conditions. The work of heat transport is traditionally driven by mechanical work, but can also be driven by heat, magnetism, electricity, laser or other means. A marine refrigeration system is a key element onboard any vessel

A Refrigeration Plant consists of Compressor, Condenser, Receiver, Oil Separator, Evaporator and Expansion Device with accessories. The other requisites are Starter Panels, Control Panels, Sea Water Pumps.

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STANDARD QUALITY ASSURANCE PLAN

FOR

AIR CONDITIONING & REFRIGERATION PLANT

Part – I General Information

1. The following generic information must generally be indicated on each QAP: -
 - (a) Equipment Name
 - (b) Equipment Technical Details (as applicable)
 - (c) Purchase Order Reference
 - (d) Sub/Sub-Orders reference (as applicable)
 - (e) Name of Main Indenter/ Ordering Authority
 - (f) Name of end user
 - (g) Name of Firm / Manufacturer
 - (h) SOTRs Reference
 - (j) Yard No./ Name of Ship where to be fitted (if available)/End User
 - (k) References of relevant Drawings
 - (l) QAP No. & Date (as indicated by the firm)
 - (m) Contractual Delivery Date
 - (n) Inspection Authority
 - (p) Inspection Agency
 - (q) Quantity (as per PO)

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Part-II

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| 5 | EVAPORATOR (SHELL & TUBE TYPE) | 61 |
| 6 | COOLING SYSTEM FOR STARTER AND CONTROL PANEL | 73 |
| 7 | EXPANSION TANK | 79 |
| 8 | RECEIVER | 85 |
| 9 | OIL SEPARATOR | 91 |
| 10 | BASE FRAME | 101 |
| 11 | ASSEMBLED PACKAGE | 107 |

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SECTION 1

COMPRESSOR (RECIPROCATING)

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| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|--|------------------|--|---|--|---------------|--|
| 1.1.0.0 | DRAWINGS/DOCUMENTS/TYPE TEST | | | | | | | | |
| 1.1.1.0 | GA Drawings along with DBOM & Binding Data | | Check for availability of approved drawings and DBOM & Binding data | 100% | Purchase Order & SOTR/TNC Minutes | All approved drawings along with DBOM & Binding data are available. | List of Approved Binding Drawings | CHP for R | Approved binding data/drawing to be verified. |
| 1.1.2.0 | Component drawings as per DBOM | | Verification of drawings with reference to approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections. | 100% | SOTR, GA Drawings along with DBOM | Drawings shall bear complete dimensional data which can be used for stage inspections | List of Components drawings | R | The component level drawings are to be validated by the QAO staff during inspection of component. |
| 1.1.3.0 | Type Test/ ETT/ EMI/ EMC reports | | Verification of Type Test / Qualification test reports. | 100% | Purchase Order, GA drawings, Component drawings& SOTR/TNC Minutes/ JSS 55555 | Equipment should have successfully undergone Type Test, EMI/EMC and ETT (as applicable) | Type Test / Qualification Test reports | CHP for R | <p>Shipyard orders. Type/qualification tests are to be conducted if new induction or not undertaken earlier or test certificate not held or equipment has undergone changes.</p> <p>MO orders. Type/qualification tests undertaken only, if mentioned in PO.</p> |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|--|-----------------|--|------------------|---|---|------------------|---------------|---|
| 1.2.0.0 | RAW MATERIAL INSPECTION | | | | | | | | |
| 1.2.1.0 | Compressor Body Assembly (Drawing No. _____) | | | | | | | | |
| 1.2.1.1 | Compressor Body (Casting) | | (i) Pouring with integral test bar | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | If casting is without integral test bar, pouring to be witnessed by QAO staff |
| | | | (ii) Material Identification & Stamping | 100% | | Conformity to specifications | IR | W | |
| | | | (iii) Heat Treatment (If applicable) | 100% | | Conformity to specifications | HT Reports | R | |
| | | | (iv) Physical, Mechanical & Chemical properties (Applicable as per Drg. / Spec.) | One sample/ lot | | Conformity to specifications | NABL LTC | R | As per approved DBOM. |
| | | | (v) DPT (Applicable as per Drg. / spec.) | 100% | | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for W | DPT to be carried out by certified ASNT (ACCP/SNT-TC-1A) Level-II/III or ISNT Level-II/III NDT personnel. |
| | | | (vi) RT (Applicable as per Drg. / spec.) | Critical Region | | | NDE Report | CHP for R | RT to be carried out by certified ASNT (ACCP) Level-II/III or ISNT Level-II/III NDT personnel. |
| 1.2.1.2 | Side Cover air cooled with oil level Glass (LH & RH)(Castings) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|--|-----------------|---------------------------------|------------------|---|------------------------------|------------------|---------------|---------|
| 1.2.1.3 | Bushing Std.& Bushing with detachable collar (Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.1.4 | Bearing Cover at Pump (Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.1.5 | Top Cover Air Cooled (LH & RH) (Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.1.6 | Suction and Discharge Stop Valve (Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.1.7 | Cover for oil pump (Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.1.8 | Oil Pump Housing (Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---|--|-----------------|--|------------------|---|---|------------------|---------------|--|
| 1.2.1.9 | Intermediate Plate for oil pump (Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.1.10 | End Cover for oil pump (Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.2.0 Cylinder Liner with Suction & Discharge Line Assembly (Drawing No.) | | | | | | | | | |
| 1.2.2.1 | Cylinder Liner | | (i)Physical, Mechanical & Chemical properties (Applicable as per Drg./spec.) | One sample/ lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | NABL LTC | R | Test report to be submitted by firm |
| | | | (ii) DPT (Applicable as per Drg./Spec.) | 100% | | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for W | Refer to Sl. No. 15 & 16 of important notes on last page of this document. |
| | | | (iii) RT (Applicable as per Drg. /spec.) | Critical regions | | | NDE Report | CHP for R | |
| 1.2.2.2 | Suction and Discharge Valve Ring Plate (Forging) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.2.3 | Guide for discharge valve (Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|---|------------------|--|---|------------------|---------------|---|
| 1.2.2.4 | Suction and Discharge Valve retaining plate | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.2.5 | Discharge Valve seat | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drg | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.2.6 | Discharge valve guide for ring plate | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drg | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.3.0 | Crank Shaft Assembly (Drawing No._____) | | | | | | | | |
| 1.2.3.1 | Crank Shaft (Casting) | | (i) Pouring with integral test bar | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | If casting is without integral test bar, pouring to be witnessed by QAO staff |
| | | | (ii) Material Identification & Stamping | 100% | | Conformity to specifications | IR | W | |
| | | | (iii) Heat Treatment (As applicable) | 100% | | Conformity to specifications | HT Reports | R | |
| | | | (iv) Physical, Mechanical & Chemical properties (Applicable as per Drg./ Specification) | One sample/ heat | | Conformity to specifications | NABL LTC | R | Test to be done at NABL approved Test Lab subject to tractability. |
| | | | (v) DPT (Applicable as per Drg./ Specification) | 100% | | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for W | Refer to Sl. No. 15 & 16 of important notes on last page of this document. |
| | | | (vi) RT (Applicable as per Drg./Specification) | Critical regions | | | NDE Report | CHP for R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|---------------------------------|--------------------|---|------------------------------|------------------|---------------|---------|
| 1.2.3.2 | Key (Machining) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.3.3 | Connecting Rod (Forging/Casting) | | Chemical properties | One sample per lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | NABL LTC | R | |
| 1.2.3.4 | Half Section of Bearing (Forging) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.3.5 | Bush for Piston Pin (Forging) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.3.6 | Piston (Forging/Casting) | | Chemical properties | One sample per lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.3.7 | Piston Ring (Forging/Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |

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|----------------|--|-----------------|---------------------------------|------------------|---|------------------------------|------------------|---------------|---------|
| 1.2.3.8 | Piston Pin | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.3.9 | Scraper Ring (Forging/Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.4.0 | Unloading frame with unloading cylinder (Drawing No. _____) | | | | | | | | |
| 1.2.4.1 | Unloading Cylinder Housing | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.4.2 | Piston for Unloading cylinder (Forging) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.4.3 | Piston Rods (Machining) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.2.4.4 | Bracket (Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |

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|----------------|---|-----------------|---------------------------------|------------------|---|------------------------------|-------------------|---------------|--|
| 1.2.4.5 | Rocker for Unloading Mechanism (Forging) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC / STC / CoC | R | |
| 1.2.5.0 | Shaft Seal Assembly (Drawing No. _____) | | | | | | | | |
| 1.2.5.1 | Shaft Seal Cover (Casting) | | Chemical properties | Specific lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | |
| 1.3.0.0 | OUTSOURCED COMPONENTS | | | | | | | | |
| 1.3.1.0 | BOUGHT OUT ITEMS | | | | | | | | |
| 1.3.1.1 | Oil Strainer | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | OEM TC/ STC / CoC | R | (i) Physical verification as feasible. (ii) Certificates to include specification of items. |
| 1.3.1.2 | Suction and Discharge Manifold | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC / CoC | R | |
| 1.3.1.3 | Filter | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC / CoC | R | |
| 1.3.1.4 | Single frame for unloading mechanism | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 1.3.2.0 | COTS ITEMS | | | | | | | | |
| 1.3.2.1 | Crank Case Heating Element/Tape Heater | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | OEM TC/ STC/CoC | R | (i) Physical verification as feasible. (ii) Certificates to include specification of items. |
| 1.3.2.2 | Hardware items (Gasket, Nut, Bolt, Washer, 'O' Ring, Ring, Spring, Spring Retainer, Collar, Plug, Nipple, Seal) | | Product Identification | 100% | | Conformity to specifications | OEMTC/ STC /CoC | R | |

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|----------------|---|-----------------|-------------------------------------|------------------|---|--|------------------|---------------|-------------------------------------|
| 1.4.0.0 | IN-PROCESS INSPECTION | | | | | | | | |
| 1.4.1.0 | Compressor Body Assembly (Drawing No. _____) | | | | | | | | |
| 1.4.1.1 | Compressor Body | | (i) Visual & Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings& specifications | IR | R | |
| | | | (ii) Leak Test | 100% | | Nil leakage | IR | R | |
| | Side Cover air cooled with oil level Glass (LH & RH) (Castings) | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| | Bushing Std.& Bushing with detachable collar | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| | Bearing Cover at Pump | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| | Top Cover Air Cooled (LH & RH) (Casting) | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| | Suction & Discharge Stop Valve | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| | Cover for oil pump | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| | Oil pump Housing | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|---|-----------------|---------------------------------|------------------|---|--|------------------|---------------|-------------------------------------|
| 1.4.1.9 | Intermediate Plate for oil pump | | Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.1.10 | End Cover for oil pump | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.2.0 | Cylinder Liner with Suction & Discharge Line Assembly (Drawing No.) | | | | | | | | |
| 1.4.2.1 | Cylinder Liner | | Visual & Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | |
| 1.4.2.2 | Suction & Discharge Valve Ring Plate | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.2.3 | Guide for discharge valve | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.2.4 | Suction & Discharge Valve retaining plate | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.2.5 | Discharge Valve retaining plate | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.2.6 | Discharge Valve seat | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.2.7 | Discharge valve guide for ring plate | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|--|-----------------|-------------------------------------|------------------|---|--|------------------|---------------|--|
| 1.4.2.8 | Assembly of Cylinder Liner with Suction & Discharge Line | | Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.3.0 | Crank Shaft Assembly (Drawing No.) | | | | | | | | |
| 1.4.3.1 | Crank shaft | | (i) Visual & Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | If the compressor manufacturers have data logger for dynamic balancing machine, then reports for dynamic balancing be "Reviewed" instead of "Witness". |
| | | | (ii) Dynamic Balancing | 100% | | Conformity to approved drawings & specifications | IR | W | |
| 1.4.3.2 | Key | | Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.3.3 | Connecting Rod | | Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | |
| 1.4.3.4 | Half Section of Bearing | | Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.3.5 | Bush for Piston Pin | | Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.3.6 | Piston | | Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |

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|----------------|--|-----------------|---------------------------------|------------------|---|--|------------------|-------------------------------------|-------------------------------------|
| 1.4.3.7 | Piston Pin | | Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.3.8 | Scraper Ring | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.3.9 | Piston Ring | | Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.4.0 | Unloading Frame with Unloading Cylinder Assembly (Drawing No.) | | | | | | | | |
| 1.4.4.1 | Unloading Cylinder Housing | | Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |
| 1.4.4.2 | Piston for unloading cylinder | | Dimensional Inspection | 100% | | CoC | R | Firm's CoC to approved drawing/DBOM | |
| 1.4.4.3 | Piston Rod | | Dimensional Inspection | 100% | | CoC | R | Firm's CoC to approved drawing/DBOM | |
| 1.4.4.4 | Bracket with pin for unloading mechanism | | Dimensional Inspection | 100% | | CoC | R | Firm's CoC to approved drawing/DBOM | |
| 1.4.4.5 | Rocker for unloading Mechanism | | Dimensional Inspection | 100% | | CoC | R | Firm's CoC to approved drawing/DBOM | |
| 1.4.5.0 | Shaft Seal Assembly (Drawing No.) | | | | | | | | |
| 1.4.5.1 | Shaft Seal Cover | | Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | CoC | R | Firm's CoC to approved drawing/DBOM |

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|---------|---|----------------------|---|------------------|--|---|------------------|---------------|---|
| 1.5.0.0 | PRE-REQUISITE- FINAL INSPECTION | | | | | | | | |
| 1.5.1.0 | TYPE TESTING OF COMPRESSOR | | | | | | | | |
| 1.5.1.1 | Endurance Run | | All functional parameters to be recorded | One Unit | SOTR, Approved GA drawing, DBOM, component drawing and approved ATP / FATs documents | All parameters are satisfactory | Type test report | CHP for W | Test on assembled plant is also acceptable. |
| 1.5.1.2 | Shock & Vibrations | | Compliance to Shock grade NSS-II/IN Shock Grade 'B' | One Unit | SOTR / NSS-II/ Applicable Standard | Equipment meets NSS-II / IN Shock Grade 'B' requirement | NSTL Report | CHP for R | |
| 1.5.1.3 | Tilt test | | All functional parameters to be recorded | One Unit | SOTR /TNC Minutes/ATP, Applicable Standard | All parameters are satisfactory | Type test report | CHP for W | |
| 1.5.1.4 | Noise & Vibration | | (i) Mechanical Vibration of Compressor | One Unit | | Vibration amplitude within limits specified in SOTR | LTC | CHP for R | (i) ABN, SBN & Vibration trials are to be conducted by nominated agencies. |
| | | | (ii) Air Borne Noise emitted by Unit | One Unit | | ABN meeting the limits specified in SOTR | LTC | CHP for R | (ii) Test on assembled plant is also acceptable when compressor supplied along with plant. In case of stand-alone compressors which are accepted by running air-to-air without Shock & Vibration mounts, ABN, SBN & Vibration Trials shall not be applicable. |
| | | | (iii) Structure Borne Noise emitted by Unit | One Unit | | SBN meeting the limits specified in SOTR | LTC | CHP for R | |
| 1.5.1.5 | Motor (Compressor) | As per SQAP of Motor | | | | | | | |

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|----------------|---|-----------------|---|------------------|---|--|--------------------|---------------|---|--|
| 1.6.0.0 | FINAL INSPECTON | | | | | | | | | |
| 1.6.1.0 | Compressor in assembled condition | | Visual Inspection to check completeness of assembly and overall dimension | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specification | IR | CHP for W | | |
| 1.6.2.0 | Functional Testing | | (i) Mech. test | 100% | SOTR, Approved GA drawing, DBOM and component drawings/ As per approved ATP | Functional test is satisfactory | IR | CHP for W | (i) For ABN, SBN & Vibration trials are to be conducted by nominated agencies. | |
| | | | (ii) Safety valve setting | 100% | | | | | (ii) Test on assembled plant is also acceptable when compressor supplied along with plant. In case of stand-alone compressors which are accepted by running air-to-air without Shock & Vibration mounts, ABN, SBN & Vibration Trials shall not be applicable. | |
| | | | (iii) Leak tight test | 100% | | ABN & SBN meeting the limits specified in SOTR | IR | | | |
| | | | (iv) Oil pressure regulation | 100% | | | | | | |
| | | | (v) ABN & SBN | | | Vibration amplitude within limits specified in SOTR / Standard | IR | | | |
| | | | (vi) Mechanical Vibration | | | | | | | |
| 1.6.3.0 | Weight | | Weight Recording | 100% | SOTR, Approved GA drawing, DBOM and component drg | Conformity to approved drawings | Weight Certificate | W | | |
| 1.6.4.0 | Painting & Preservation | | Visual Inspection | 100% | SOTR, Approved GA drg, DBOM and component drg/ Approved painting and preservation scheme/ Procedure | Conformity to approved drawings/ specification | IR | R | | |

SECTION 2

COMPRESSOR (SCREW)

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| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|---|-----------------|--|------------------|---|---|--|---------------|--|
| 2.1.0.0 | DRAWINGS/DOCUMENTS/TYPE TEST | | | | | | | | |
| 2.1.1.0 | GA Drawings along with DBOM & Binding Data | | Check for availability of approved drawings and DBOM & Binding data | 100% | Purchase Order & SOTR/TNC Minutes | All approved drawings along with DBOM & Binding data are available. | List of Approved Binding Drawings | CHP for R | Approved binding data/drawing to be verified |
| 2.1.2.0 | Component drawings as per DBOM | | Verification of drawings with reference to approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections. | 100% | SOTR, GA Drawings along with DBOM | Drawings shall bear complete dimensional data which can be used for stage inspections | List of Components drawings | R | The component level drawings are to be validated by the QAO staff during inspection of component. |
| 2.1.3.0 | Type Test / ETT / EMI/EMC reports | | Availability & Verification | 100% | Purchase Order & SOTR/TNC Minutes/ JSS 55555 | Purchase Order & SOTR/TNC Minutes and JSS 55555 | Type Test / Qualification Test reports | CHP for R | <p>Shipyard orders. Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes.</p> <p>MO orders. Type / qualification tests undertaken only, if mentioned in PO.</p> |
| 2.2.0.0 | RAW MATERIAL INSPECTION | | | | | | | | |
| 2.2.1.0 | Compressor Body | | (i) Pouring with integral test bar | 100% | SOTR, Approved GA drawing, DBOM and manufacturing drawing | Conformity to specifications | IR | R | If casting is without integral test bar, pouring to be witnessed by QAO staff |
| | | | (ii) Material Identification & Stamping | 100% | | Conformity to specifications | IR | W | |

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|---------|---|-----------------|---|------------------|---|---|------------------|---------------|---|
| 2.2.2.0 | Rotor | | (iii) Heat Treatment (If applicable) | 100% | SOTR, Approved GA drawing, DBOM and manufacturing drawing | Conformity to specifications | HT Reports/ STC | R | |
| | | | (iv) Physical, Mechanical & Chemical properties | One sample/ Heat | | Conformity to specifications | LTC | R | Test to be done at NABL approved Test Lab |
| | | | (v) DPT (Applicable as per Drg./specification) | 100% | | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for W | Refer to Sl. No. 15 & 16 of important notes on last page of this document. |
| | | | (vi) RT (Applicable as per Drg./specification) | Critical regions | | | NDE Report | CHP for R | |
| | | | (i) Pouring with integral test bar | 100% | | Conformity to specifications | IR | R | If casting is without integral test bar, pouring to be witnessed by QAO staff |
| | | | (ii) Material Identification & Stamping | 100% | | Conformity to specifications | IR | W | |
| 2.3.0.0 | OUT SOURCED COMPONENTS | | (iii) Heat Treatment (If applicable) | 100% | SOTR, Approved GA drawing, DBOM and manufacturing drawing | Conformity to specifications | HT Reports | R | |
| | | | (iv) Phy., Mech.& Chemical properties | One sample/ Heat | | Conformity to specifications | LTC | R | |
| | | | (v) DPT (Applicable as per Drg./specification) | 100% | | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for W | Refer to Sl. No. 15 & 16 of important notes on last page of this document. |
| | | | (vi) RT (Applicable as per Drg./specification) | Critical regions | | | NDE Report | CHP for R | |
| | | | 2.3.1.0 BOUGHT OUT ITEMS | | | | | | |
| | | | (i) Product Identification | 100% | Approved Drawing, SOTR & separately approved QAP | Conformity to specifications | IR | W | Since the item is critical, item to be inspected on the basis of separate approved QAP/ATP. |
| 2.3.1.1 | Oil Cooler | | (ii) QAP /ATP Compliance | 100% | | Conformity to specifications | IR/ OEM TC | R | |

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|----------------|---|-----------------|-------------------------------------|------------------|---|--|------------------|---------------|--|
| 2.3.2.0 | COTS ITEMS | | | | | | | | |
| 2.3.2.1 | Non-return Valve | | Product Identification | 100% | Approved drawing, SOTR/ Catalogue / OEM Specification | Conformity to specifications | OEM TC/ CoC | R | (i) Physical verification as feasible. (ii) Certificates to include specification of items. |
| 2.3.2.2 | Suction Shut-off Valve | | Product Identification | 100% | | | OEM TC/ CoC | R | |
| 2.3.2.3 | Discharge Shut-off Valve | | Product Identification | 100% | | | OEM TC/ CoC | R | |
| 2.3.2.4 | Oil Fill/Drain Valve | | Product Identification | 100% | | | OEM TC/ CoC | R | |
| 2.3.2.5 | Oil Sight Glass | | Product Identification | 100% | | | OEM TC/ CoC | R | |
| 2.3.2.6 | Solenoid valve for Part-Load operation | | Product Identification | 100% | | | OEM TC/ CoC | R | |
| 2.3.2.7 | Discharge Temperature Sensor | | Product Identification | 100% | | | OEM TC/ CoC | R | |
| 2.3.2.8 | Crankcase Heater | | Product Identification | 100% | | | OEM TC/ CoC | R | |
| 2.3.2.9 | Oil Filter | | Product Identification | 100% | | | OEM TC/ CoC | R | |
| 2.4.0.0 | IN-PROCESS INSPECTION | | | | | | | | |
| 2.4.1.0 | Compressor Body | | (i) Visual & Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and manufacturing drawing/ Approved ATP | Conformity to approved drawings & specifications | IR | W | |
| | | | (ii) Leak Test | 100% | | | Nil Leakage | IR | W |
| 2.4.2.0 | Rotor | | (i) Visual & Dimensional Inspection | 100% | Approved drawing / component drawing/ SOTR/ Applicable standard | Conformity to approved drawings & specifications | IR | W | If the compressor manufacturers have data logger for dynamic balancing machine, then reports for dynamic balancing be "Reviewed" instead of "Witness". |
| | | | (ii) Dynamic Balancing | 100% | | | IR | W | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | | | |
|--|--|-----------------|---|------------------|---|---|----------------------|------------------|--|--|--|--|
| 2.4.3.0 | Compressor assembly | | (i) Visual & Dimensional Inspection | 100% | Approved drawing / SOTR | Conformity to approved drawings & specifications | IR | R | | | | |
| | | | (ii) Functional Testing | 100% | | Functional Test is satisfactory | IR | R | | | | |
| 2.5.0.0 PRE-REQUISITE- FINAL INSPECTION | | | | | | | | | | | | |
| 2.5.1.0 TYPE TESTING OF COMPRESSOR | | | | | | | | | | | | |
| 2.5.1.1 | Endurance Run | | All Functions & Parameters | One Unit | SOTR /TNC Minutes/ Approved Test Procedure | SOTR /TNC Minutes/ Approved Test Procedure | Type test report | CHP for W | (i) ABN, SBN & Vibration trials are to be conducted by nominated agencies. (ii) Test on assembled plant is also acceptable when compressor supplied along with plant. In case of stand-alone compressors which are accepted by running air-to-air without Shock & Vibration mounts, ABN, SBN & Vibration Trials shall not be applicable. | | | |
| 2.5.1.2 | Shock & Vibrations Analysis | | Shock & Vibrations Analysis | One Unit | SOTR/NSS-II/ BR 3021 /Applicable Standard | SOTR/NSS-II/ BR 3021 /Applicable Standard | NSTL Report | CHP for R | | | | |
| 2.5.1.3 | Tilt test | | As per SOTR | One Unit | SOTR /TNC Minutes/ Approved Test Procedure | SOTR /TNC Minutes/ Approved Test Procedure | Type test report | CHP for W | | | | |
| 2.5.1.4 | Noise & Vibration | | (i) Mechanical Vibration of Compressor | One Unit | SOTR / TNC Minutes, Applicable Standard | Vibration amplitude within limits specified in SOTR | LTC | CHP for R | | | | |
| | | | (ii) Air Borne Noise emitted by Unit | One Unit | | ABN & SBN meeting the limits specified in SOTR | LTC | CHP for R | | | | |
| | | | (iii) Structure Borne Noise emitted by Unit | One Unit | | | LTC | CHP for R | | | | |
| 2.5.1.5 | ETT and EMI/EMC of Semi- Hermetic Compressor Motor | | ETT and EMI/EMC | One Unit | SOTR /TNC Minutes / EMI/EMC approved Plan & JSS 55555 | SOTR /TNC Minutes / EMI/EMC approved Plan & JSS 55555 | ETT & EMI/EMC Report | CHP for R | | | | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|---|-----------------|---|------------------|--|--|--------------------|---------------|---|
| 2.6.0.0 | FINAL INSPECTON | | | | | | | | |
| 2.6.1.0 | Compressor in assembled condition | | Visual Inspection to check completeness of assembly | 100% | Approved drawing/ SOTR | Approved Drawing | IR | CHP for W | |
| 2.6.2.0 | Functional Testing | | (i) Mechanical test | 100% | As per approved Test procedure | As per approved Test procedure | IR | CHP for W | (i) ABN, SBN & Vibration trials are to be conducted by nominated agencies. |
| | | | (ii) Safety valve setting | 100% | | | IR | | (ii) Test on assembled plant is also acceptable when compressor supplied along with plant. In case of stand-alone compressors which are accepted by running air-to-air without Shock & Vibration mounts, ABN, SBN & Vibration Trials shall not be applicable. |
| | | | (iii) Leak tight test | 100% | | | IR | | |
| | | | (iv) Oil pressure regulation | 100% | | | IR | | |
| | | | (v) ABN & SBN | 100% | SOTR /TNC Minutes, Applicable Standard | ABN & SBN meeting the limits specified in SOTR / Standard | IR | | |
| | | | (vi) Mechanical Vibration | 100% | SOTR /TNC Minutes, Applicable Standard | Vibration amplitude within limits specified in SOTR/ Standard | IR | | |
| 2.6.3.0 | Weight | | Weight Recording | 100% | Approved drawing/ SOTR | Approved Drawing | Weight Certificate | W | |
| 2.6.4.0 | Painting & Preservation | | Visual Inspection | 100% | Approved drawing/ SOTR/ Approved painting and preservation scheme/ Procedure | Approved drawing/ Approved painting and preservation scheme/ Procedure | IR | R | |

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SECTION 3

CONDENSOR (SHELL & TUBE TYPE)

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| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|---|-----------------|--|----------------------|--|---|--|---------------|--|
| 3.1.0.0 | DRAWINGS/DOCUMENTS/TYPE TEST | | | | | | | | |
| 3.1.1.0 | GA Drawings along with DBOM & Binding Data | | Check for availability of approved drawings and DBOM & Binding data | 100% | Purchase Order & SOTR/TNC Minutes | All approved drawings along with DBOM & Binding data are available. | List of Approved Binding Drawings | CHP for R | Approved binding data/drawing to be verified |
| 3.1.2.0 | Component drawings as per DBOM | | Verification of drawings with reference to approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections. | 100% | SOTR, GA Drawings along with DBOM | Drawings bear complete dimensional data which can be used for stage inspection | List of Components drawings | R | The component level drawings are to be validated by the QAO staff during inspection of component. |
| 3.1.3.0 | Type Test / ETT / EMI/EMC reports | | Verification of Type Test / Qualification test reports. | 100% | Purchase Order, GA drawings, Component drawings& SOTR /TNC Minutes and JSS 55555 | Equipment should have successfully undergone Type Test, EMI/EMC and ETT (as applicable) | Type Test / Qualification Test reports | CHP for R | <p>Shipyard orders: Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes.</p> <p>MO orders: Type / qualification tests undertaken only, if mentioned in PO.</p> |
| 3.2.0.0 | RAW MATERIAL INSPECTION | | | | | | | | |
| 3.2.1.0 | Shell | | (i) Material Identification& Stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | W | |
| | | | (ii) Physical, Mechanical & Chemical Properties | 01 Sample / heat/lot | | | LTC | R | Test to be done at NABL approved Lab |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|--|----------------------|---|---|------------------|---------------|--|
| 3.2.2.0 | Tube Sheet / Plate (LHS & RHS) | | (ii) Heat Treatment (If applicable) | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | HT Reports | R | |
| | | | (iii) MPT (Applicable as per Drawing. / specification) | 100% | | | NDE Report | CHP for W | Refer to Sl. No. 15 & 16 of important notes on last page of this document. |
| | | | (iv) UT, (Applicable as per Drawing/ specification) | 100% | | | NDE Report | CHP for W | |
| 3.2.2.0 | Tube Sheet / Plate (LHS & RHS) | | (i) Material Identification & Stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | W | |
| | | | (ii) Physical, Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC | R | Test to be done at NABL approved Lab |
| 3.2.3.0 | End Covers (LHS & RHS) (Casting) | | (i) Pouring with integral test bar | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | If casting is without integral test bar, pouring to be witnessed by QAO staff. |
| | | | (ii) Material Identification & Stamping | 100% | | Conformity to specifications | IR | W | |
| | | | (iii) Heat Treatment (if applicable) | 100% | | Conformity to specifications | HT Reports | R | |
| | | | (iv) Physical, Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC | R | Test to be done at NABL approved Lab |
| | | | (v) DPT (Applicable as per Drawing/ specification) | 100% | | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for W | |
| | | | (vi) RT (Applicable as per Drawing/ specification) | Critical regions | | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|--|-----------------|---|----------------------|---|------------------------------|------------------|---------------|----------------------|
| 3.2.4.0 | Baffle Plate | | Chemical Properties | 01 Sample / heat/lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 3.2.5.0 | Impingement Plate / Stiffening Plate (if applicable) | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 3.2.6.0 | Pipe for Nozzle | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties (Applicable as per Drg/ specification) | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 3.2.7.0 | Socket & Plug for Nozzle | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 3.2.8.0 | Cathodic Bolt/ Cathodic Protector | | (i) Material Identification | 100% | SOTR, Approved GA drg, DBOM and component drawing | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 3.2.9.0 | Socket/Nozzle for Cathodic Bolt | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/ STC/CoC | R | As per approved DBOM |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | | |
|----------|---|-----------------|---|----------------------|---|------------------------------|------------------|---------------|--|--|--|
| 3.2.10.0 | Bracket for Name Plate | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | | | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/ STC/CoC | R | As per approved DBOM | | |
| 3.2.11.0 | Saddle (Support Plate, Base Plate, Rib Plate& Pad for Saddle) | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | | | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/ STC/CoC | R | As per approved DBOM | | |
| 3.2.12.0 | Partition Plate (if applicable) | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | | | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/ STC/CoC | R | As per approved DBOM | | |
| 3.2.13.0 | Support Plate for Tube Sheet | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | | | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/ STC/CoC | R | As per approved DBOM | | |
| 3.3.0.0 | OUTSOURCED COMPONENTS | | | | | | | | | | |
| 3.3.1.0 | BOUGHT OUT ITEMS | | | | | | | | | | |
| 3.3.1.1 | Condenser Tube/ Finned Tube | | (i) Product Identification | 100% | SOTR, Apprvd GA drg, DBOM and component drg | Conformity to specifications | OEM TC/ STC/CoC | R | | | |
| | | | (ii) Physical, Mechanical & Chemical Properties | 01 Sample / heat/Lot | | Conformity to specifications | LTC | R | Test to be done at NABL approved Lab | | |
| | | | (iii) Hydraulic Pressure Test | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Nil leakage | STC | R | | | |
| | | | (iv) Eddy current Test on plain tubes | 100% | | Tubes are free from defects | NDE Report/ STC | R | Testing to be done by ISNT/ ASNT level II or III qualified technician or at NABL approved lab. | | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|---|----------------------|---|------------------------------|------------------|---------------|---|
| 3.3.1.2 | Tie Rod (if applicable) | | (i) Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | OEM TC/ STC/CoC | R | (i) Physical Verification as feasible (ii) Certificates to include specification of items. |
| | | | (ii) Physical, Mechanical & Chemical Properties | 01 Sample / heat/Lot | | Conformity to specifications | LTC /STC/ CoC | R | |
| 3.3.1.3 | Pipes | | (i) Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | OEM TC/ STC/CoC | R | |
| | | | (ii) Chemical Properties | 01 Sample / heat/Lot | | Conformity to specifications | LTC/STC/ CoC | R | |
| 3.3.1.4 | Earthing Boss | | (i) Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | OEM TC/ STC/CoC | R | |
| | | | (ii) Chemical Properties | 01 Sample / heat/Lot | | Conformity to specifications | STC/ CoC | R | |
| 3.3.1.5 | Pad for lifting Lung | | (i) Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | OEM TC/ STC/CoC | R | |
| | | | (ii) Chemical Properties | 01 Sample / heat/Lot | | Conformity to specifications | STC/CoC | R | |
| 3.3.1.6 | Lifting Lung | | (i) Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | OEM TC/ STC/CoC | R | |
| | | | (ii) Chemical Properties | 01 Sample / heat/Lot | | Conformity to specifications | STC/CoC | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|---|-----------------|-------------------------------------|------------------|---|---|-------------------|---------------|--|
| 3.3.2.0 | COTS ITEMS | | | | | | | | |
| 3.3.2.1 | Flanges | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing/ Catalogue/ OEM Spec. | Conformity to specifications | OEM TC/ STC/CoC | R | (i) Physical Verification as feasible (ii) Certificates to include specification of items |
| 3.3.2.2 | Gusset Plate | | Product Identification | 100% | | Conformity to specifications | OEM TC / STC/CoC | R | |
| 3.3.2.3 | Coupling | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 3.3.2.4 | Socket | | Product Identification | 100% | | Conformity to specifications | OEM TC / STC/CoC | R | |
| 3.3.2.5 | Spacer/Spacer Tube | | Product Identification | 100% | | Conformity to specifications | OEM TC / STC/CoC | R | |
| 3.3.2.6 | Name Plate with Rivet | | Product Identification | 100% | | Conformity to specifications | OEM TC / STC/CoC | R | |
| 3.3.2.7 | Gaskets | | Product Identification | 100% | | Conformity to specifications | OEM TC / STC/CoC | R | |
| 3.3.2.8 | Fasteners | | Product Identification | 100% | | Conformity to specifications | OEM TC / STC/CoC | R | |
| 3.3.2.9 | Elbow | | Product Identification | 100% | | Conformity to specifications | OEM TC / STC/ CoC | R | |
| 3.3.2.10 | Dished End | | Product Identification | 100% | | Conformity to specifications | OEM TC / STC/ CoC | R | |
| 3.4.0.0 | IN-PROCESS INSPECTION | | | | | | | | |
| 3.4.1.0 | (i) WPS & PQR | | Suitability of welding Procedure | 100% | SOTR, Approved GA drawing, DBOM and component drawing, ASME SEC. IX | Welding specification & procedure confirms to specified standards | WPS and PQR | R | |
| | (ii) WPQ | | Suitability of Welder Qualification | 100% | | Welder performance qualification confirms to specified standards | WPQ | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|---|------------------|--|---|-------------------------|---------------|--|
| 3.4.2.0 | Shell | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | W | |
| | | | (ii) Dimensional Inspection | 100% | | Conformity to approved drawings & specifications | IR | R | |
| | | | (iii) RT on Welds | 100% | Approved GA drawing, Component drawing, ASTM E 390, Lev-2/ASME Sec VIII Div. 1 | Defects within permissible limits as per applicable standards/specs | NDE Report with RT Film | CHP for R | (i) RT is not applicable for seamless Shell. (ii) Refer to Sl. No. 15 of important notes on last page of this document. |
| 3.4.3.0 | Tube Sheet / Plate (LHS & RHS) | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | |
| | | | (iii) DPT on Shell to Tube Sheet weldment | 100% | | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for W | Refer to Sl. No. 16 of important notes on last page of this document. |
| 3.4.4.0 | End Covers (LHS & RHS) | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | |
| 3.4.5.0 | Baffle Plate | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawing & specifications | IR | R | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------|---|-----------------|---------------------------------|----------------------|---|--|------------------|---------------|---------|
| 3.4.6.0 | Impingement Plate / Stiffening Plate | | (i)Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional inspection | 01 Sample / heat/lot | | | IR | R | |
| 3.4.7.0 | Pipe for Nozzle | | (i)Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional inspection | 01 sample/ Heat/ lot | | | IR | R | |
| 3.4.8.0 | Plug & Socket for Nozzle | | (i)Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii)Dimensional Inspection | 01 sample/ Heat/ lot | | | IR | R | |
| 3.4.9.0 | Cathodic Bolt/ Cathodic Protector | | (i)Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii)Dimensional Inspection | 01 sample/ Heat/ lot | | | IR | R | |
| 3.4.10.0 | Socket/Nozzle for Cathodic Bolt | | (i)Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii)Dimensional Inspection | 01 sample/ Heat/ lot | | | IR | R | |
| 3.4.11.0 | Bracket for Name Plate | | (i)Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii)Dimensional Inspection | 01 sample/ Heat/ lot | | | IR | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | | | |
|----------|--|-----------------|---------------------------------|----------------------|--|--|-------------------------------|---------------|---|--|--|--|
| 3.4.12.0 | Saddle (Support Plate, Base Plate, Rib Plate & Pad for Saddle) | | (i)Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | | | | |
| | | | (ii)Dimensional Inspection | 01 sample/ Heat/ lot | | | IR | R | | | | |
| 3.4.13.0 | Partition Plate | | (i)Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | | | | |
| | | | (ii)Dimensional Inspection | 01 sample/ Heat/ lot | | | IR | R | | | | |
| 3.4.14.0 | Support Plate for Tube Sheet | | (i)Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | R | | | | |
| | | | (ii)Dimensional Inspection | 01 sample/ Heat/ lot | | | IR | R | | | | |
| 3.4.15.0 | Tube Bundle assembly | | (i)Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | W | | | | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | | | | |
| 3.5.0.0 | PRE-REQUISITE FINAL INSPECTION | | | | | | | | | | | |
| 3.5.1.0 | TYPE TEST OF CONDENSER | | | | | | | | | | | |
| 3.5.1.1 | Shock & Vibration | | Shock & Vibrations Analysis | One Unit | Approved Drawing/ SOTR/TNC Minutes/ PO Applicable Standard | Conformity to specifications | NSTL Report/ Type Test report | CHP for R | Test on assembled Plant is also acceptable. | | | |
| 3.5.1.2 | Tilt Test | | As per SOTR | One Unit | Approved Drawing/ SOTR/TNC Minutes/ PO/ Apprvd FATs | Conformity to specifications | Type Test Report | CHP for W | | | | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|---|-----------------|---|------------------|---|--|--------------------|---------------|---------|
| 3.6.0.0 | FINAL INSPECTION | | | | | | | | |
| 3.6.1.0 | Condenser Assembly | | (i) Visual & Overall Dimensional Checks | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | W | |
| | | | (ii) Cleaning, Nitrogen purging & Flushing | 100% | | Conformity to specifications | IR | W | |
| | | | (iii) Hydraulic /Pneumatic Pressure Test on Tube side | 100% | | Pressure test is satisfactory | IR | W | |
| | | | (iv) Hydraulic/ Pneumatic Press Test on Shell Side | 100% | | Pressure test is satisfactory | IR | W | |
| 3.6.2.0 | Weight | | Weight (dry/empty) | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to Approved Drawings. | Weight Certificate | W | |
| 3.6.3.0 | Painting | | Visual Inspection & DFT | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |
| 3.6.4.0 | Preservation & Packing | | Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |

SECTION 4

EVAPORATOR (COIL TYPE)

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| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---|---|-----------------|--|----------------------|--|---|--|---------------|---|
| 4.1.0.0 DRAWINGS/DOCUMENTS/TYPE TEST | | | | | | | | | |
| 4.1.1.0 | GA Drawings along with DBOM & Binding Data | | Check for availability of approved drawings and DBOM & Binding data | 100% | Purchase Order & SOTR/TNC Minutes | All approved drawings along with DBOM & Binding data are available. | List of Approved Binding Drawings | CHP for R | Approved binding data/drawing to be verified |
| 4.1.2.0 | Component Drawings as per DBOM | | Verification of drawings with reference to approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections. | 100% | SOTR, GA Drawings along with DBOM | Drawings bear complete dimensional data which can be used for stage inspection | List of Components drawings | R | The component level drawings are to be validated by the inspection rep during inspection of component. |
| 4.1.3.0 | Type Test/ETT/ EMI/EMC reports | | Verification of Type Test / Qualification test reports. | 100% | Purchase Order, GA drawings, Component drawings& SOTR/TNC Minutes/ JSS 55555 | Equipment should have successfully undergone Type Test, EMI/EMC and ETT (as applicable) | Type Test / Qualification Test reports | CHP for R | Shipyard orders. Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes. MO orders. Type / qualification tests undertaken only, if mentioned in PO. |
| 4.2.0.0 RAW MATERIAL INSPECTION | | | | | | | | | |
| 4.2.1.0 | Copper Fins/Strip | | (i) Material Identification& Stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | W | |
| | | | (ii)Physical, Mechanical & Chemical properties (As per applicable Drg. & Standard) | 01 sample/ Heat/ lot | | Conformity to specifications | LTC | R | As per approved DBOM |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|---|-----------------|---|----------------------|--|------------------------------|------------------|---------------|--|
| 4.2.2.0 | Casing (Fabrication) | | (i) Material Identification & Stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | W | |
| | | | (ii) Physical, Mechanical & Chemical properties | 01 sample/ Heat/ lot | | Conformity to specifications | LTC | R | As per approved DBOM |
| 4.2.3.0 | Drain Pan (Fabrication) | | Chemical properties | 01 sample/ Heat/ lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | LTC/STC/ CoC | R | |
| 4.2.4.0 | Mounting Channels | | Chemical properties | 01 sample/ Heat/ lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | LTC/STC/ CoC | R | |
| 4.3.0.0 | OUT SOURCED COMPONENTS | | | | | | | | |
| 4.3.1.0 | BOUGHT OUT ITEMS | | | | | | | | |
| 4.3.1.1 | Motor | | As per SQAP of motor | | | | | | |
| 4.3.1.2 | Shock Mounts | | As per SQAP of Shock Mounts | | | | | | |
| 4.3.1.3 | Copper Tube | | (i) Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | OEM TC/ STC/CoC | R | |
| | | | (ii) Physical, Mechanical & Chemical properties | 01 sample/ Heat/Lot | | Conformity to specifications | LTC | R | Test to be done at NABL approved Lab |
| | | | (iii) Hydraulic Pressure Test | 100% | | Nil leakage | STC | R | |
| | | | (iv) Eddy current Test on plain tubes | 100% | | Test is satisfactory | NDE Report/ STC | R | Testing to be done by ISNT/ ASNT level II or III qualified technician or at NABL approved lab. |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | |
|----------------|---|-----------------|---------------------------------|------------------|--|---------------------------------|-------------------------------|---------------|---|--|
| 4.3.1.4 | Defrost Heater-Coil | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | OEM TC/ STC/CoC | R | (i) Physical as feasible (ii) Certificates to include specification of the item. | |
| 4.3.1.5 | Defrost Heater -Drain Pan | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 4.3.1.6 | Propeller Fan | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 4.3.2.0 | COTS ITEMS: As applicable | | | | | | | | | |
| 4.4.0.0 | IN -PROCESS INSPECTION | | | | | | | | | |
| 4.4.1.0 | Fabrication of Casing | | Visual & Dimensional Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings | IR | R | | |
| 4.4.2.0 | Fabrication of Drain Pan | | Visual & Dimensional Inspection | 100% | | Conformity to approved drawings | IR | R | | |
| 4.5.0.0 | PRE-REQUISITE FINAL INSPECTION | | | | | | | | | |
| 4.5.1.0 | TYPE TEST OF EVAPORATOR (COIL TYPE) | | | | | | | | | |
| 4.5.1.1 | Shock & Vibration | | Shock & Vibrations Analysis | One Unit | SOTR, Approved GA drg, Applicable Standard | Conformity to specifications | NSTL Report/ Type test report | CHP for R | Test on assembled Plant is also acceptable. | |
| 4.5.1.2 | Tilt Test | | As per SOTR | One Unit | SOTR, Approved GA drg, Approved FATs | Conformity to specifications | Type Test Report | CHP for W | | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------------------------------|---|-----------------|---|------------------|---|---|-------------------|---------------|--|
| 4.5.1.3 | Noise and Vibration | | (i) Mechanical Vibration | One Unit | SOTR / TNC Minutes, Applicable Standard | Vibration amplitude within limits specified in SOTR | LTC | CHP for R | (i) ABN, SBN & Vibration trials are to be conducted by nominated agencies. |
| | | | (ii) Air Borne Noise emitted by Unit | One Unit | SOTR /TNC Minutes, Applicable Standard | ABN meeting the limits specified in SOTR | LTC | CHP for R | (ii) Test on assembled Plant is also acceptable where evaporator is assembled on skid. |
| | | | (iii) Structure Borne Noise emitted by Unit | One Unit | SOTR /TNC Minutes, Applicable Standard | SBN meeting the limits specified in SOTR | LTC | CHP for R | |
| 4.6.0.0 FINAL INSPECTION | | | | | | | | | |
| 4.6.1.0 | Evaporator Assembly | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings / Approved FATs document | Conformity to specifications | IR | W | |
| | | | (ii) Overall Dimensional Inspection | 100% | | Approved Drawings | IR | W | |
| | | | (iii) Pressure Test | 100% | | Pressure test is satisfactory | IR | CHP for W | |
| | | | (iv) Air Flow Test | 100% | SOTR, Approved GA drawing, DBOM and component drawings / Approved FATs document | Air flow test is satisfactory | IR | CHP for W | Integrated Trial with Plant as per IHQ MoD (N) approved FATs procedure. |
| 4.6.2.0 | Weight of assembly | | Weight Measurement | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | Approved Drawings | W | |
| 4.6.3.0 | Painting | | Visual Inspection & DFT | 100% | | Conformity to specifications | IR | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|---------------------------------|------------------|---|------------------------------|------------------|---------------|---------|
| 4.6.4.0 | Preservation & Packing | | Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |

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SECTION 5

EVAPORATOR (SHELL & TUBE TYPE)

BLANK

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|---|-----------------|--|----------------------|--|--|-----------------------------------|---------------|---|
| 5.1.0.0 | DRAWINGS/DOCUMENTS/TYPE TEST | | | | | | | | |
| 5.1.1.0 | GA Drawings along with DBOM & Binding Data | | Check for availability of approved drawings and DBOM & Binding data | 100% | Purchase Order & SOTR/TNC Minutes | All approved drawings along with DBOM & Binding data are available. | List of Approved Binding Drawings | CHP for R | Approved binding data/drawing to be verified |
| 5.1.2.0 | Component Drawings as per DBOM | | Verification of drawings with reference to approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections. | 100% | SOTR, GA Drawings along with DBOM | Drawings bear complete dimensional data which can be used for stage inspection | List of Components drawings | R | The component level drawings are to be validated by the QAO staff during inspection of component. |
| 5.1.3.0 | Type Test/ETT/ EMI/EMC reports | | Availability & Verification | 100% | Purchase Order & SOTR/TNC Minutes and JSS 55555 | Purchase Order & SOTR/TNC Minutes | Type Test reports | CHP for R | Shipyard orders. Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes. MO orders. Type / qualification tests undertaken only, if mentioned in PO. |
| 5.2.0.0 | RAW MATERIAL INSPECTION | | | | | | | | |
| 5.2.1.0 | Shell | | (i) Material Identification& Stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | W | |
| | | | (ii) Physical, Mechanical & Chemical Properties | 01 Sample / heat/lot | | | LTC | R | Test to be done at NABL approved Lab |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|--|----------------------|---|---|------------------|---------------|---|
| | | | (iii) RT on Weldment | 100% | Approved Drawing/ ASTM E 390, Lev-2/ ASME Sec VIII Div. 1 | Defects within permissible limits as per applicable standards/specs | RT Film | CHP for R | (i) RT is not applicable for seamless Shell. (ii) Refer to Sl. No. 15 & 16 of important notes on last page of this document. |
| 5.2.2.0 | End Covers (LHS & RHS) | | (i) Pouring with integral test bar (if casting) | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | If casting is without integral test bar, pouring to be witnessed by QAO staff |
| | | | (ii) Material Identification & Stamping | 100% | | Conformity to specifications | IR | W | |
| | | | (iii) Heat Treatment (Applicable as per Drg/Specification) | 100% | | Conformity to specifications | HT Reports | R | |
| | | | (iv) Physical, Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC | R | |
| | | | (v) DPT (Applicable as per Drg/Specification) | 100% | | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for W | Refer to Sl. No. 15 & 16 of important notes on last page of this document. |
| | | | (vi) RT (Applicable as per Drg/ Specification) | Critical regions | | | NDE Report | CHP for R | |
| 5.2.3.0 | Tube Sheet / Plate (LHS & RHS) | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical, Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | NABL LTC | R | Test to be done at NABL approved Lab |
| | | | (iii) DPT on Shell to Tube Sheet weldment. | 100% | | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for W | Refer to Sl. No. 15 & 16 of important notes on last page of this document. |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|--|----------------------|---|------------------------------|------------------|---------------|----------------------|
| 5.2.4.0 | Baffle Plate | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 5.2.5.0 | Pipe for Nozzle | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 5.2.6.0 | Impingement Plate (if applicable) | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 5.2.7.0 | Plug & Socket for Nozzle | | (i) Material Identification | 100% | SOTR, Approved GA drawings, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 5.2.8.0 | Bracket for Name plate | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 5.2.9.0 | Saddle | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------|---|-----------------|--|----------------------|--|------------------------------|------------------|---------------|----------------------|
| 5.2.10.0 | Compressor Mounting Bracket | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 5.2.11.0 | Pass Partition Plate (if applicable) | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 5.2.12.0 | Lifting lungs with pad | | (i) Material Identification & Stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 5.2.13.0 | Pad for Saddle | | (i) Material Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |
| 5.2.14.0 | Support Plate for Tube Sheet | | (i) Material Identification & Stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | R | |
| | | | (ii) Physical Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC/STC/ CoC | R | As per approved DBOM |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|--------------------------------------|---|-----------------|---|----------------------|--|------------------------------|-------------------|---------------|--|
| 5.3.0.0 OUTSOURCED COMPONENTS | | | | | | | | | |
| 5.3.1.0 BOUGHT OUT ITEMS | | | | | | | | | |
| 5.3.1.1 | Evaporator Tube/ Finned Tube | | (i) Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | OEM TC/ STC/ CoC | R | |
| | | | (ii) Physical Mechanical & Chemical Properties on plain tubes | 01 Sample / heat/lot | | Conformity to specifications | LTC | R | Test to be done at NABL approved Lab |
| | | | (iii) Hydraulic Pressure Test | 100% | | Nil leakage | STC | R | |
| | | | (iv) Eddy current Test on plain tubes | 100% | | Tubes are free from defects | NDE Report/ STC | R | Testing to be done by ISNT/ ASNT level II or III qualified technician or at NABL approved lab. |
| 5.3.1.2 | Gasket | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | OEM TC/ STC/ CoC | R | (i) Physical as feasible |
| 5.3.1.3 | Tie Rod (if applicable) | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/ CoC | R | (ii) Certificates to include specification of the item. |
| 5.3.1.4 | Spacer Tube (if applicable) | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC / CoC | R | |
| 5.3.1.5 | Flange | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC / CoC | R | |
| 5.3.1.6 | Elbow | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC / CoC | R | |
| 5.3.1.7 | Name Plate | | Product Identification | 100% | | Conformity to specifications | CoC | R | |
| 5.4.2.0 COTS ITEMS | | | | | | | | | |
| 5.4.2.1 | Fasteners (Hex / Sq Nut, HT Stud Bolt etc & Plain Washer) | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | OEM TC/ STC/ CoC | R | (i) Physical as feasible (ii) Certificates to include spec. of the item. |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|--------------------------------------|---|-----------------|-------------------------------------|------------------|--|---|------------------|---------------|--|
| 5.4.0.0 IN-PROCESS INSPECTION | | | | | | | | | |
| 5.4.1.0 | (i) WPS & PQR | | Suitability of welding Procedure | 100% | SOTR, Approved GA drawing, DBOM and component drawings, ASME SEC. IX | Welding specification & procedure confirms specified standards to | WPS and PQR | R | |
| | (ii) WPQ | | Suitability of Welder Qualification | 100% | | Welder performance qualification confirms specified standards to | WPQ | R | |
| 5.4.2.0 | Shell | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM & component drawing | Conformity approved drawings &specifications to | IR | W | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | |
| | | | (iii) RT on Welds | 100% | | Defects within permissible limits as per applicable standards/specs | RT Film | CHP for W | (i) RT is not applicable for seamless Shell. (ii) Refer to Sl. No. 15 of important notes on last page of this document. |
| 5.4.3.0 | End Covers (LHS & RHS) | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM & component drawing | Conformity approved drawings & specifications to & | IR | R | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | |
| 5.4.4.0 | Tube Sheet / Plate (LHS & RHS) | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM & component drawing | Conformity approved drawings & specifications to & | IR | R | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|---------------------------------|------------------|--|---|------------------|---------------|---|
| | | | (iii) DPT on Welds | 100% | SOTR, Approved GA drg, DBOM &component drg | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for W | (i) Applicable to Tube sheet to Shell Joint. (ii). Refer to Sl. No. 16 of important notes on last page of this document. |
| 5.4.5.0 | Baffle Plate | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | |
| 5.4.6.0 | Pipe for Nozzle | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional inspection | 100% | | | IR | R | |
| 5.4.7.0 | Impingement Plate | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional inspection | 100% | | | IR | R | |
| 5.4.8.0 | Plug &Socket for Nozzle | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional inspection | 100% | | | IR | R | |
| 5.4.9.0 | Bracket for Name Plate | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------|---|-----------------|---------------------------------|------------------|--|--|------------------|---------------|---------|
| 5.4.10.0 | Saddle | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | |
| 5.4.11.0 | Compressor Mounting Bracket | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional inspection | 100% | | | IR | R | |
| 5.4.12.0 | Pass Partition Plate | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional inspection | 100% | | | IR | R | |
| 5.4.13.0 | Lifting Lugs with Pad | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional inspection | 100% | | | IR | R | |
| 5.4.14.0 | Pad for Saddle | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional inspection | 100% | | | IR | R | |
| 5.4.15.0 | Support Plate for Tube Sheet | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to approved drawings & specifications | IR | R | |
| | | | (ii) Dimensional inspection | 100% | | | IR | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | | | |
|----------------|---|-----------------|--|------------------|---|--|-------------------------------|---------------|--|--|--|--|
| 5.4.16.0 | Tube Bundle assembly | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawings & specifications | IR | W | | | | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | | | | |
| 5.5.0.0 | PRE-REQUISITE FINAL INSPECTION | | | | | | | | | | | |
| 5.5.1.0 | TYPE TEST OF EVAPORATOR | | | | | | | | | | | |
| 5.5.1.1 | Shock & Vibration Analysis | | Shock & Vibrations Analysis | One Unit | Apprvd Drg/ SOTR/TNC Minutes/ PO /NSS-II / IN Shock policy/ Applicable Standard | Conformity to specifications | NSTL Report/ Type Test report | CHP for R | Test on assembled Plant is also acceptable. | | | |
| 5.5.1.2 | Tilt Test | | As per SOTR | One Unit | Approved Drawing/ SOTR/TNC Minutes/ PO | Conformity to specifications | Type Test Report | CHP for W | Test on assembled Plant is also acceptable. | | | |
| 5.6.0.0 | FINAL INSPECTION | | | | | | | | | | | |
| 5.6.1.0 | Evaporator Assembly | | (i) Visual checks: - (a) Expansion of tubes (b) Pass Partition (c) Surface evenness of Base Plate | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | CHP for W | Performance Trials to be witnessed during Integrated Trials of Assembled Plant as per approved FATs. | | | |
| | | | (ii) Overall Dimensional Checks | 100% | | Conformity to specifications | IR | W | | | | |
| | | | (iii) Cleaning, Nitrogen purging & Flushing | 100% | | Conformity to specifications | IR | W | | | | |
| | | | (iv) Hydraulic /Pneumatic Pressure Test on Tube side | 100% | | Pressure test is satisfactory | IR | CHP for W | | | | |
| | | | (v) Hydraulic/ Pneumatic Pressure Test on Shell Side | 100% | | Pressure test is satisfactory | IR | CHP for W | | | | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|---------------------------------|------------------|---|------------------------------|--------------------|---------------|---------|
| 5.6.2.0 | Weight | | Weight (dry/empty) | 100% | SOTR, Approved GA drawing, DBOM and component drg | Conformity to specifications | Weight certificate | W | |
| 5.6.3.0 | Painting | | Visual Inspection & DFT | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |
| 5.6.4.0 | Preservation & Packing | | Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |

SECTION 6

COOLING SYSTEM FOR STARTER AND CONTROL PANEL

BLANK

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|---|-----------------|--|----------------------|--|---|--|---------------|--|
| 6.1.0.0 | DRAWINGS/DOCUMENTS/TYPE TEST | | | | | | | | |
| 6.1.1.0 | GA Drawings along with DBOM & Binding Data | | Check for availability of approved drawings and DBOM & Binding data | 100% | Purchase Order & SOTR/TNC Minutes | All approved drawings along with DBOM & Binding data are available. | List of Approved Binding Drawings | CHP for R | Approved data/drawing to be verified |
| 6.1.2.0 | Component Drawings as per DBOM | | Verification of drawings with reference to approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections. | 100% | SOTR, GA Drawings along with DBOM | Drawings bear complete dimensional data which can be used for stage inspection | List of Components drawings | R | The component level drawings are to be validated by the QAO staff during inspection of component. |
| 6.1.3.0 | Type Test/ETT/ EMI/EMC reports | | Verification of Type Test / Qualification test reports. | 100% | Purchase Order, GA drawings, Component drawings& SOTR /TNC Minutes and JSS 55555 | Equipment should have successfully undergone Type Test, EMI/EMC and ETT (as applicable) | Type Test / Qualification Test reports | CHP for R | <p>Shipyard orders. Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes.</p> <p>MO orders. Type / qualification tests undertaken only, if mentioned in PO.</p> |
| 6.2.0.0 | RAW MATERIAL INSPECTION | | | | | | | | |
| 6.2.1.0 | Base frame, Saddle - Plates | | (i) Material Identification& Stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | W | |
| | | | (ii) Physical, Mechanical & Chemical Properties | 01 Sample / heat/lot | | Conformity to specifications | LTC | R | Test to be done at NABL approved Lab |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | |
|--------------------------------------|---|-----------------|---|------------------|---|------------------------------|------------------|---------------|--|--|
| | | | (ii) Heat Treatment (If applicable) | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | HT Reports | R | | |
| 6.3.0.0 OUTSOURCED COMPONENTS | | | | | | | | | | |
| 6.3.1.0 BOUGHT OUT ITEMS | | | | | | | | | | |
| 6.3.1.1 | Expansion Tank with Bladder | | (i) Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings, Catalogue | Conformity to specifications | OEM TC/ STC | W | | |
| | | | (ii) Leak Test @ 1.5 times working pressure | 100% | | No leakage observed | IR | W | (i) As per approved DBOM (ii) Leak test after complete assembly of Cooling Unit is also acceptable. | |
| 6.3.1.2 | Plate Heat Exchanger | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC | R | (i) Physical as feasible | |
| 6.3.1.3 | Pipes | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | (ii) Certificates to include specification of the item. | |
| 6.3.1.4 | Pump for cooling Starter & Control Panel | | As per SQAP for Pump | | | | | | | |
| 6.3.1.5 | Motor for Pump | | As per SQAP of Motor | | | | | | | |
| 6.3.2.0 COTS ITEMS | | | | | | | | | | |
| 6.3.2.1 | Three-way Valve | | (i) Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings, Catalogue | Conformity to specifications | OEM TC/ STC/CoC | R | (i) Physical as feasible | |
| 6.3.2.2 | Isolation Valve | | (i) Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | (ii) Certificates to include specification of the item. | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | |
|----------------|--|-----------------|-------------------------------------|------------------|---|---|-------------------------------|---------------|---|--|
| 6.4.0.0 | IN-PROCESS INSPECTION | | | | | | | | | |
| 6.4.1.0 | (i) WPS & PQR | | Suitability of welding Procedure | 100% | SOTR, Approved GA drawing, DBOM and component drawings ASME SEC. IX | Welding specification & procedure confirms to specified standards | WPS and PQR | R | | |
| | (ii) WPQ | | Suitability of Welder Qualification | 100% | | Welder performance qualification confirms to specified standards | WPQ | R | | |
| 6.4.2.0 | Base frame, Saddle-Plates | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to approved drawing & specifications | IR | R | | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | | |
| | | | (iii) DPT on Welds | 100% | Approved Drg/ ASTM E 390, Lev-2/ASME Sec VIII Div. 1 | Defects within permissible limits as per applicable standards/specs | NDE Report | W | Refer to Sl. No. 16 of important notes on last page of this document. | |
| 6.5.0.0 | PRE-REQUISITE FINAL INSPECTION | | | | | | | | | |
| 6.5.1.0 | TYPE TEST OF COOLING SYSTEM FOR STARTER AND CONTROL PANEL | | | | | | | | | |
| 6.5.1.1 | Shock & Vibration Analysis | | Shock & Vibrations Analysis | One Unit | Approved Drawing/ SOTR/TNC Minutes/ PO / NSS-II / IN Shock Policy / Applicable Standard | Conformity to specifications | NSTL Report/ Type Test report | CHP for R | Test on assembled Plant is also acceptable | |
| 6.5.1.2 | Tilt Test | | As per SOTR | One Unit | Approved Drg/ SOTR/TNC Minutes/ PO | Conformity to specifications | Type Test Report | CHP for W | | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|--|-----------------|---------------------------------|------------------|---|--|--------------------|---------------|---|
| 6.6.0.0 | FINAL INSPECTION | | | | | | | | |
| 6.6.1.0 | Assembly of Cooling system for Starter & Control Panel | | (i) Visual checks | 100% | SOTR, Approved GA drawing, DBOM and Component drawings | Conformity to approved Drawing and specifications | IR | CHP for W | Performance Trials may be witnessed during Integrated Trials of Assembled Plant as per approved FATs |
| | | | (ii) Overall Dimensional Check | 100% | | IR | CHP for W | | |
| | | | (iii) Functional Check | 100% | | Conformity to specification / FATs | IR | CHP for W | |
| | | | (iv) ABN & SBN | 100% | SOTR /TNC Minutes, Applicable Standard | ABN & SBN meeting the limits specified in SOTR | IR | CHP for W | (i) ABN & SBN are to be conducted by nominated agencies. (ii) Test on assembled Plant is also acceptable |
| 6.6.2.0 | Weight | | Weight (dry/empty) | 100% | SOTR, Approved GA drg, DBOM and Component drg | Conformity to approved drawing and specifications | Weight certificate | W | |
| 6.6.3.0 | Painting | | Visual Inspection & DFT | 100% | SOTR, Approved GA drg, DBOM and Component drawings& PO | Conformity to approved drawing and relevant specifications | IR | R | |
| 6.6.4.0 | Preservation & Packing | | Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and Component drawings & PO | Conformity to approved drg and relevant specifications | IR | R | |

SECTION 7

EXPANSION TANK

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| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTIC S / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|-----------------|--|---------------------|---|---|-----------------------------------|---------------|--|
| 7.1.0.0 | DRAWINGS/DOCUMENTS/TYPE TEST | | | | | | | | |
| 7.1.1.0 | GA Drawings along with DBOM & Binding Data | | Check for availability of approved drawing and DBOM & Binding data | 100% | Purchase Order & SOTR/TNC Minutes | All approved drawing along with DBOM & Binding data are available. | List of Approved Binding Drawings | CHP for R | Approved binding data/drawing to be verified. |
| 7.1.2.0 | Component drawings as per DBOM | | Verification of drawings with reference to approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections. | 100% | SOTR, GA Drawings along with DBOM | Drawings bear complete dimensional data which can be used for stage inspection. | List of Components drawings | R | The component level drawings are to be validated by the QAO staff during inspection of component. |
| 7.1.3.0 | Type Test/ETT/ EMI/EMC reports | | Verification of Type Test / Qualification test reports. | 100% | Purchase Order, GA drawings, Component drawings & SOTR /TNC Minutes and JSS 55555 | Equipment should have successfully undergone Type Test | Type Test | CHP for R | <p>Shipyard orders. Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes.</p> <p>MO orders. Type / qualification tests undertaken only, if mentioned in PO.</p> |
| 7.2.0.0 | RAW MATERIAL INSPECTION | | | | | | | | |
| 7.2.1.0 | Plates for Shell & Dish End | | (i) Material Identification & stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawings/ Relevant Specifications | Conformity to specification | IR | W | |
| | | | (ii) Physical, Mechanical & Chemical properties | 01 sample/ Heat/lot | | | NABL LTC | R | Test to be done at NABL approved Lab |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTIC S / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | | | |
|----------------|---|-----------------|---|---------------------|---|-----------------------------|------------------|---------------|--|--|--|--|
| 7.2.2.0 | Leg Support / Pad Plate | | (i) Material Identification | 100% | SOTR, Approved GA drg, DBOM and component drg/ Relevant Specifications | Conformity to specification | IR | R | | | | |
| | | | (ii) Physical, Mechanical & Chemical properties | 01 sample/ Heat/lot | | | LTC/STC/ CoC | R | As per approved DBOM | | | |
| 7.2.3.0 | Leg Support / Base Plate | | (i) Material Identification | 100% | SOTR, Approved GA drg, DBOM and component drg/ Relevant Specifications | Conformity to specification | IR | R | | | | |
| | | | (ii) Physical, Mechanical & Chemical properties | 01 sample/ Heat/lot | | | LTC /STC/ CoC | R | As per approved DBOM | | | |
| 7.3.0.0 | OUTSOURCED COMPONENTS | | | | | | | | | | | |
| 7.3.1.0 | BOUGHT OUT ITEMS | | | | | | | | | | | |
| 7.3.1.1 | Flanges & Blinds | | (i) Product identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings/ Relevant Specifications | Conformity to specification | IR | R | (i) Physical verification as feasible (ii) Certificates to include specification of the item. | | | |
| | | | (ii) Physical, Mechanical & Chemical properties | 01 sample/ Heat/lot | | | STC/CoC | R | | | | |
| 7.3.1.2 | Plug & Socket | | (i) Product identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings/ Relevant Specifications | Conformity to specification | IR | R | | | | |
| | | | (ii) Physical, Mechanical & Chemical properties | 01 sample/ Heat/lot | | | STC/CoC | R | | | | |
| 7.3.1.3 | Nozzle Neck / Nozzle Pipe | | (i) Product identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings/ Relevant Specifications | Conformity to specification | IR | R | | | | |
| | | | (ii) Physical, Mechanical & Chemical properties | 01 sample/ Heat/lot | | | STC/CoC | R | | | | |
| 7.3.1.4 | Name Plate | | (i) Product identification | 100% | SOTR, Approved GA drawing, DBOM and component drawings/ Relevant Specifications | Conformity to specification | IR | R | | | | |
| | | | (ii) Physical, Mechanical & Chemical properties (As applicable) | 01 sample/ Heat/lot | | | STC/CoC | R | | | | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTIC S / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|--------------------------------------|---|-----------------|---|---------------------|--|---|------------------|---------------|---|
| 7.3.1.5 | Name Plate Bracket | | (i) Product identification | 100% | Apprvd GA drawing, DBOM and Component drg/ Relevant Specifications | Conformity to specification | IR | R | (i) Physical verification as feasible (ii) Certificates to include specification of the item. |
| | | | (ii) Physical, Mechanical & Chemical properties (As applicable) | 01 sample/ Heat/lot | | | STC/CoC | R | |
| 7.3.2.0 COTS ITEMS | | | | | | | | | |
| 7.3.2.1 | Bladder | | Product Identification | 100% | SOTR, Apprvd GA drg, DBOM and Component drg/ OEM Tech. Specifications | Conformity to specification | OEM TC/ STC/CoC | R | (i) Physical verification as feasible (ii) Certificates to include specification of the item. |
| 7.3.2.2 | Pressure relief valve | | Product Identification | 100% | | Conformity to specification | OEM TC/ STC/CoC | R | |
| 7.3.2.3 | Fasteners | | Product Identification | 100% | | Conformity to specification | OEM TC/ STC/CoC | R | |
| 7.4.0.0 IN-PROCESS INSPECTION | | | | | | | | | |
| 7.4.1.0 | (i) WPS& PQR | | Suitability of welding Procedure | 100% | SOTR, Approved GA drawing, DBOM and Component drawings/ OEM Tech. Specifications | Welding specification & procedure confirms to specified standards | WPS and PQR | R | |
| | (ii) WPQ | | Suitability of Welder Qualification | 100% | | Welder performance qualification confirms to specified standards | WPQ | R | |
| 7.4.2.0 | Shell | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and Component drawings/ Relevant Specifications | Conformity to specification | IR | R | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | |
| | | | (iii) RT on weldment | 100% | | | NDE Reports | CHP for R | (I) RT is not applicable for seamless Shell. (ii) Refer to Sl. No. 15 of important notes on last page of this document |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTIC S / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | | | |
|---------|---|-----------------|--|------------------|---|-----------------------------|--------------------|---------------|--|--|--|--|
| 7.4.3.0 | Shell & Dish assembled | | (i) Visual inspection | 100% | SOTR, Approved GA drawing, DBOM and Component drawings/ Relevant Specifications | Conformity to specification | IR | W | | | | |
| | | | (ii) Layout of holes | 100% | | | IR | R | | | | |
| | | | (iii) Dimensional inspection. | 100% | | | IR | R | | | | |
| | | | (iv) DPT on Shell to Dished End Butt weld joints | 100% | | | NDE Report | CHP for W | Refer to Sl. No. 16 of important notes on last page of this document | | | |
| 7.5.0.0 | PRE-REQUISITE FINAL INSPECTION: Nil | | | | | | | | | | | |
| 7.6.0.0 | FINAL INSPECTION | | | | | | | | | | | |
| 7.6.1.0 | Final Assembly | | (i) Visual & Overall Dimensional inspection | 100% | SOTR, Approved GA drawing, DBOM and Component drawings/ Relevant Specifications | Conformity to specification | IR | W | | | | |
| | | | (ii) Hydraulic/ Pneumatic Test | 100% | | | IR | CHP for W | | | | |
| | | | (iii) Pressure Retention Test | 100% | | | IR | CHP for W | As per DBOM | | | |
| 7.6.2.0 | Weight of assembly | | Weight Measurement | 100% | SOTR, Approved GA drawing, DBOM and Component drawings | Conformity to specification | Weight certificate | W | | | | |
| 7.6.3.0 | Painting | | Visual Inspection & DFT | 100% | SOTR, Approved GA drawing, DBOM and Component drawings/ Relevant Specifications | Conformity to specification | IR | R | | | | |
| 7.6.4.0 | Preservation & Packing | | Visual Inspection | 100% | | Conformity to specification | IR | R | Packing Procedure is to be mentioned by firm which shall be cleared by QAO staff | | | |

SECTION 8

RECEIVER

BLANK

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY. AS PER P.O. | CHARACTERISTIC / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|------------------|--|------------------|--|--|--|---------------|--|
| 8.1.0.0 | DRAWING/DOCUMENTS/TYPE TEST | | | | | | | | |
| 8.1.1.0 | GA Drawings along with DBOM & Binding Data | | Check for availability of approved drawings and DBOM & Binding data | 100% | Purchase Order & SOTR/TNC Minutes | All approved drawings along with DBOM & Binding data are available. | List of Approved Binding Drawings | CHP for R | Approved binding data/drawing to be verified |
| 8.1.2.0 | Component drawings as per DBOM | | Verification of drawings with reference to approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections. | 100% | SOTR, GA Drawings along with DBOM | Drawings bear complete dimensional data which can be used for stage inspection. | List of Components drawings | R | The component level drawings are to be validated by the QAO staff during inspection of component. |
| 8.1.3.0 | Type Test/ETT/ EMI/EMC reports | | Verification of Type Test / Qualification test reports. | 100% | Purchase Order, GA drawings, Component drawings& SOTR/TNC Minutes/ JSS 55555 | Equipment should have successfully undergone Type Test/EMI/EMC and ETT (as applicable) | Type Test / Qualification Test reports | CHP for R | <p>Shipyard orders. Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes.</p> <p>MO orders. Type / qualification tests undertaken only, if mentioned in PO.</p> |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY. AS PER P.O. | CHARACTERISTIC / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | | | |
|--|---|------------------|---|---------------------|--|---|------------------|---------------|--|--|--|--|
| 8.2.0.0 RAW MATERIAL INSPECTION | | | | | | | | | | | | |
| 8.2.1.0 | Shell | | (i) Material Identification & Stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | W | | | | |
| | | | (ii) Physical, Mechanical & Chemical properties | 01 sample/ Heat/lot | | Conformity to specifications | LTC | R | Test to be done at NABL approved Lab | | | |
| 8.2.2.0 | Nozzle Pipe | | Physical, Mechanical & Chemical properties | 01 sample/ Heat/lot | | Conformity to specifications | STC/CoC | R | As per approved DBOM | | | |
| 8.2.3.0 | Pad Plate | | Chemical properties | 01 sample/ Heat/Lot | | Conformity to specifications | STC/CoC | R | As per approved DBOM | | | |
| 8.2.4.0 | Saddle Support | | Chemical properties | 01 sample/ Heat/Lot | | Conformity to specifications | STC/CoC | R | As per approved DBOM | | | |
| 8.3.0.0 OUTSOURCED ITEMS | | | | | | | | | | | | |
| 8.3.1.0 BOUGHT OUT ITEM | | | | | | | | | | | | |
| 8.3.1.1 | Pipe Cap | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing, Catalogue | Conformity to specifications | STC/CoC | R | (i) Physical verification as feasible. (ii) Certificate to include the specification of item. | | | |
| 8.3.1.2 | Studs, Bolts & Nuts | | Product Identification | 100% | | | STC/CoC | R | | | | |
| 8.3.1.3 | Safety Valve | | Product Identification | 100% | | | OEM TC/ CoC | R | | | | |
| 8.3.1.4 | Sight Glass/Level Gauge | | Product Identification | 100% | | | OEM TC/ CoC | R | | | | |
| 8.3.2.0 COTS ITEMS: As applicable | | | | | | | | | | | | |
| 8.4.0.0 IN PROCESS INSPECTION | | | | | | | | | | | | |
| 8.4.1.0 | (i) WPS& PQR | | Suitability of welding Procedure | 100% | SOTR, Approved GA drawing, DBOM and component drawings, ASME SEC. IX | Welding specification & procedure confirms to specified standards | WPS and PQR | R | | | | |
| | (ii) WPQ | | Suitability of Welder Qualification | 100% | | | WPQ | R | | | | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY. AS PER P.O. | CHARACTERISTIC / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | | | |
|----------------|---|------------------|--|------------------|--|--|-------------------------------|---------------|---|--|--|--|
| 8.4.2.0 | Fabrication of Receiver | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing/ Applicable Standard | Conformity to specifications | IR | W | Refer to Sl. No. 15 & 16 of important notes on last page of this document | | | |
| | | | (ii) Dimensional Inspection | 100% | | Conformity to specifications | IR | R | | | | |
| | | | (iii) DPT on Shell to Dished End Butt Weldment (Applicable as per approved drawing and specification) | 100% | | NDE is satisfactory | NDE Report | CHP for W | | | | |
| | | | (iv) RT on Shell to Dished End Butt Weldment (Applicable as per approved drawing and specification) | 100% | | NDE is satisfactory | NDE Report | CHP for R | | | | |
| 8.5.0.0 | PRE-REQUISITE FINAL INSPECTION: | | | | | | | | | | | |
| 8.5.1.0 | TYPE TEST OF RECEIVER | | | | | | | | | | | |
| 8.5.1.1 | Shock & Vibration | One Unit | Shock & Vibrations analysis | One Unit | Approved Drawing/ SOTR/TNC Minutes/ PO/ NSS-II / Applicable Standard | Conform to Shock & Vibration specification | NSTL Report/ Type test report | CHP for R | Test on assembled plant is also acceptable | | | |
| 8.6.0.0 | FINAL INSPECTION | | | | | | | | | | | |
| 8.6.1.0 | Receiver assembly | | (i) VI & DI | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | W | | | | |
| | | | (ii) Hydraulic/ Pneumatic Test of Shell side | 100% | | No leakage | IR | CHP for W | | | | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY. AS PER P.O. | CHARACTERISTIC / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|------------------|--------------------------------|------------------|---|------------------------------|--------------------|---------------|---------|
| 8.6.2.0 | Weight | | Weight Measurement | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | Weight certificate | W | |
| 8.6.3.0 | Painting | | Visual Inspection & DFT | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |
| 8.6.4.0 | Preservation & Packing | | Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |

SECTION 9

OIL SEPARATOR

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| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY. AS PER P.O. | CHARACTERISTIC/ TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|------------------|--|------------------|---|---|-----------------------------------|---------------|--|
| 9.1.0.0 | DRAWINGS/DOCUMENTS/TYPE TEST | | | | | | | | |
| 9.1.1.0 | GA Drawings along with DBOM & Binding Data | | Check for availability of approved drawings and DBOM & Binding data | 100% | Purchase Order & SOTR/TNC Minutes | All approved drawings along with DBOM & Binding data are available. | List of Approved Binding Drawings | CHP for R | Approved binding data/ drawing to be verified. |
| 9.1.2.0 | Component Drawings as per DBOM | | Verification of drawings with reference to approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections. | 100% | SOTR, Drawings along with DBOM | GA Drawings bear complete dimensional data which can be used for stage inspection | List of Components drawings | R | The component level drawings are to be validated by the QAO staff during inspection of component. |
| 9.1.3.0 | Type Test/ETT/ EMI/EMC reports | | Verification of Type Test / Qualification test reports. | 100% | Purchase Order, GA drawings, Component drawings& SOTR/TNC Minutes/JSS 55555 | Equipment should have successfully undergone Type Test | Type Test | CHP for R | <p>Shipyard Orders. Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes.</p> <p>MO Orders. Type / qualification tests undertaken only, if mentioned in PO.</p> |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY. AS PER P.O. | CHARACTERISTIC/ TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|------------------|---|-----------------------------|--|------------------------------|------------------|---------------|--------------------------------------|
| 9.2.0.0 | RAW MATERIAL INSPECTION | | | | | | | | |
| 9.2.1.0 | Shell (Pipe/Plate) | | (i) Material Identification & Stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | W | |
| | | | (ii) Physical, Mechanical & Chemical properties | 01 sample/ Heat/lot | | Conformity to specifications | NABL LTC | R | Test to be done at NABL approved Lab |
| 9.2.2.0 | Dish Ends LH & RH Side | | (i) Material Identification & Stamping | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | IR | W | |
| | | | (ii) Physical, Mechanical & Chemical prop. | 01 sample/ Heat/lot | | Conformity to specifications | NABL LTC | R | Test to be done at NABL approved Lab |
| 9.2.3.0 | Pipe for Nozzles | | Chemical properties | 01 sample/ Heat/lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | LTC/STC/ CoC | R | |
| 9.2.4.0 | Perforated plate | | Chemical properties | 100% 01 sample/ Heat/lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | LTC/STC/ CoC | R | |
| 9.2.5.0 | Stiffening plate | | Chemical properties | 01 sample/ Heat/lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | STC/CoC | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY. AS PER P.O. | CHARACTERISTIC/ TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------|---|------------------|--|---------------------|--|------------------------------|------------------|---------------|----------------------|
| 9.2.6.0 | Vertical Plate | | Chemical properties | 01 sample/ Heat/lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | STC/CoC | R | |
| 9.2.7.0 | Mounting Bracket Assembly for base Plate | | Chemical Properties. | 01 sample/ Heat/lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | STC/CoC | R | |
| 9.2.8.0 | Lifting lug with pad | | Physical, Mechanical & Chemical properties | 01 sample/ Heat/lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | STC/CoC | R | As per approved DBOM |
| 9.2.9.0 | Support plate | | Chemical properties | 01 sample/ Heat/lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | STC/CoC | R | |
| 9.2.10.0 | Pad plates | | Chemical properties | 01 sample/ Heat/lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | STC/CoC | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY. AS PER P.O. | CHARACTERISTIC/ TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|---|------------------|-------------------------------|---------------------|---|------------------------------|------------------|---------------|---|
| 9.2.11.0 | Demister pad fitment | | Chemical properties | 01 sample/ Heat/lot | SOTR, Approved GA drawing, DBOM and component drawings | Conformity to specifications | STC/CoC | R | |
| 9.3.0.0 | OUTSOURCED ITEMS | | | | | | | | |
| 9.3.1.0 | BOUGHT OUT ITEMS | | | | | | | | |
| 9.3.1.1 | Flanges for Nozzles | | Product identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing, Catalogue, OEM specification | Conformity to specifications | STC/CoC | R | (i) Physical verification as feasible (ii) Certificate to include the specification of item. |
| 9.3.1.2 | Fittings | | Product identification | 100% | | Conformity to specifications | STC/CoC | R | |
| 9.3.1.3 | Sockets | | Product identification | 100% | | Conformity to specifications | STC/CoC | R | |
| 9.3.1.4 | Elbow | | Product identification | 100% | | Conformity to specifications | STC / CoC | R | |
| 9.3.1.5 | Earthing Boss | | Product identification | 100% | | Conformity to specifications | STC/CoC | R | |
| 9.3.1.6 | Demister pad | | Product identification | 100% | | Conformity to specifications | STC/CoC | R | |
| 9.3.1.7 | Gaskets | | Product Identification | 100% | | Conformity to specifications | STC/CoC | R | |
| 9.3.1.8 | Fasteners | | Product Identification | 100% | | Conformity to specifications | STC/CoC | R | |
| 9.3.2.0 | COTS ITEMS: As applicable | | | | | | | | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY. AS PER P.O. | CHARACTERISTIC/ TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|------------------|---|------------------|--|---|------------------|---------------|---|
| 9.4.0.0 | IN PROCESS INSPECTION | | | | | | | | |
| 9.4.1.0 | (i) WPS & PQR | | Suitability of welding procedure | 100% | SOTR, Approved GA drawing, DBOM and component drg ASME SEC. IX | Welding specification & procedure confirms to specified standards | WPS and PQR | R | |
| | (ii) WPQ | | Suitability of Welder Qualification | 100% | | Welder performance qualification confirms to specified standards | WPQ | R | |
| 9.4.2.0 | Shell (Pipe/Plate) | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conforms to approved drawings / specifications | IR | W | |
| | | | (ii) Dimensional Inspection | 100% | | | IR | R | |
| | | | (iii) RT on Welds (As per approved Drawing and specification) | 100% | | NDE conforms to specification | NDE Report | CHP for R | (i) Not applicable for seamless Pipe (ii) Refer to Sl. No. 15 of important notes on last page of this document |
| 9.4.3.0 | Dish Ends | | Dimensional inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conforms to approved drawings / specifications | IR | R | |
| 9.4.4.0 | Perforated Plate | | Dimensional inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conforms to approved drawings / specifications | IR | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY. AS PER P.O. | CHARACTERISTIC/ TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---------|---|------------------|-------------------------------|------------------|--|--|------------------|---------------|---------|
| 9.4.5.0 | Stiffening Plate | | Dimensional inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conforms to approved drawings / specifications | IR | R | |
| 9.4.6.0 | Vertical Plate | | Dimensional inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conforms to approved drawings / specifications | IR | R | |
| 9.4.7.0 | Mounting Bracket Assembly for base Plate | | Dimensional inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawings | Conforms to approved drawings / specifications | IR | R | |
| 9.4.8.0 | Lifting Lug with Pad | | Dimensional inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |
| 9.4.9.0 | Support Plate | | Dimensional inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | IR | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY. AS PER P.O. | CHARACTERISTIC/ TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------------|---|------------------|--|------------------|---|--|-------------------------------|---------------|--|
| 9.4.10.0 | Pad Plate | | Dimensional inspection | 100% | SOTR, Approved GA drawing, DBOM and component drg | Conformity to specifications | IR | R | |
| 9.4.11.0 | Demister pad fitment | | Dimensional inspection | 100% | SOTR, Approved GA drawing, DBOM and component drg | Conformity to specifications | IR | R | |
| 9.5.0.0 | PRE-REQUISITE FINAL INSPECTION | | | | | | | | |
| 9.5.1.0 | Shock & Vibration | One Unit- | Shock & Vibrations analysis | One Unit | SOTR, Approved GA drawing, DBOM and component drg/ PO/ NSS-II / Applicable Standard | Conformity to shock specifications | NSTL Report/ Type test report | CHP for R | Test on assembled plant is also acceptable |
| 9.6.0.0 | FINAL INSPECTION | | | | | | | | |
| 9.6.1.0 | Assembly | | (i) Visual & Dimensional inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conforms to approved drawings and specifications | IR | W | |
| | | | (ii) Hydraulic/ Pneumatic Test of Shell side | 100% | | No leakage observed | IR | CHP for W | |
| 9.6.2.0 | Weight of assembly | | Weight Measurement | 100% | Approved Drg/SOTR/PO | | IR | W | |
| 9.6.3.0 | Painting | | Visual Inspection & DFT | 100% | | | IR | R | |
| 9.6.4.0 | Preservation & Packing | | Visual Inspection | 100% | | | IR | R | |

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SECTION 10

BASE FRAME

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| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTIC / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACOCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|-----------------|---|-----------------|--|---------------------|---|---|--|---------------|--|
| 10.1.0.0 | DRAWINGS/DOCUMENTS/TYPE TEST | | | | | | | | |
| 10.1.1.0 | GA Drawings along with DBOM & Binding Data | | Check for availability of approved drawings and DBOM & Binding data | 100% | Purchase Order & SOTR/TNC Minutes | All approved drawings along with DBOM & Binding data are available. | List of Approved Binding Drawings | CHP for R | Approved data/drawing to be verified |
| 10.1.2.0 | Component Drawings as per DBOM | | Verification of drawings with reference to approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections. | 100% | SOTR, GA Drawings along with DBOM | Drawings bear complete dimensional data which can be used for stage inspections | List of Components drawings | R | The component level drawings are to be validated by the QAO staff during inspection of component. |
| 10.1.3.0 | Type Test/ETT/ EMI/EMC reports | | Verification of Type Test / Qualification test reports. | 100% | Purchase Order, GA drawings, Component drawings & SOTR /TNC Minutes | Equipment should have successfully undergone Type Test | Type Test / Qualification Test reports | CHP for R | Shipyard orders. Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes. MO orders. Type / qualification tests only, if mentioned in PO. |
| 10.2.0.0 | RAW MATERIAL INSPECTION | | | | | | | | |
| 10.2.1.0 | Plates | | Physical, Mechanical & Chemical properties | 01 sample/ heat/lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specification | STC | R | As per approved DBOM |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTIC / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACOCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|---|---|-----------------|--|---------------------|--|---|------------------|---------------|--------------------------------------|
| 10.2.2.0 | Channels | | Physical, Mechanical & Chemical properties | 01 sample/ heat/lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specification | STC | R | As per approved DBOM |
| 10.2.3.0 | Angles | | Physical, Mechanical & Chemical properties | 01 sample/ heat/lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specification | STC | R | As per approved DBOM |
| 10.2.4.0 | Slide Rail / Slide Rail Bracket | | Physical, Mechanical & Chemical properties | 01 sample/ heat/lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specification | STC | R | As per approved DBOM |
| 10.3.0.0 OUT SOURCED COMPOMENTS | | | | | | | | | |
| 10.3.1.0 BOUGHT OUT ITEMS: As applicable | | | | | | | | | |
| 10.3.2.0 COTS ITEMS | | | | | | | | | |
| 10.3.2.1 | Fasteners | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specification | STC/CoC | R | Material Test report may be exempted |
| 10.4.0.0 IN-PROCESS INSPECTION | | | | | | | | | |
| 10.4.1.0 | (i) WPS & PQR | | Suitability of welding Procedure | 100% | SOTR, Approved GA drawing, DBOM and component drawing, ASME SEC-IX | Welding specification & procedure confirms to specified standards | WPS and PQR | R | |
| | | | Suitability of Welder Qualification | 100% | | | WPQ | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTIC / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACOCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|-----------------|---|-----------------|--|------------------|--|--|-------------------------------|---------------|--|
| 10.4.2.0 | Fabrication of Base Frame | | (i) Visual Inspection | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specification | IR | W | |
| | | | (ii) Dimensional Inspection | 100% | | Conformity to specification | IR | R | |
| | | | (iii) DP Test on Welds | 100% | | Defects within permissible limits as per applicable standards/specs | NDE Report | CHP for W | Refer to Sl. No. 16 of important notes on last page of this document |
| | | | (iv) Stress relieving of Structure (If applicable) | 100% | | Conformity to specification | HT Reports | R | |
| | | | (v) Shot Blasting (If applicable) | 100% | | Conformity to specification | IR | R | |
| 10.5.0.0 | PRE-REQUISITE FINAL INSPECTION | | | | | | | | |
| 10.5.1.0 | Shock & Vibration | One Unit | Shock & Vibrations Analysis | One Unit | Approved Drawing/ SOTR/TNC Minutes/ PO/ NSS-II / Applicable Standard | Approved Drawing/ SOTR/TNC Minutes/ PO/ NSS-II / Applicable Standard | NSTL Report/ Type test report | CHP for R | Test on assembled plant is also acceptable. |
| 10.6.0.0 | FINAL INSPECTION | | | | | | | | |
| 10.6.1.0 | Base Frame | | (i) Visual Checks | 100% | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specification | IR | W | |
| | | | (ii) Overall Dimensions | 100% | | IR | CHP for W | | |
| 10.6.2.0 | Weight | | Weight Measurement | 100% | | Approved Drawings | Weight certificate | W | |
| 10.6.3.0 | Painting | | Visual Inspection &DFT | 100% | | Conformity to specification | IR | R | |
| 10.6.4.0 | Preservation & Packing | | Visual Inspection | 100% | Approved Drawing, SOTR, OEM Preservation Plan | Conformity to specification | IR | R | Packing Procedure is to be mentioned by firm which shall be cleared by QAO staff |

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SECTION 11

ASSEMBLED PACKAGE

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| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|-----------------|---|-----------------|--|----------------------|--|---|---------------------------------------|------------------|---|
| 11.1.0.0 | DRAWINGS/DOCUMENTS/TYPE TEST | | | | | | | | |
| 11.1.1.0 | GA Drawings along with DBOM & Binding Data | | Check for availability of approved drawings and DBOM & Binding data | 100% | Purchase Order & SOTR/TNC Minutes | All approved drawings along with DBOM & Binding data are available. | List of Approved Binding Drawings | CHP for R | Approved binding data/drawing to be verified |
| 11.1.2.0 | Component Drawings as per DBOM | | Verification of drawings with reference to approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections. | 100% | SOTR, Drawings along with DBOM | GA Drawings bear complete dimensional data which can be used for stage inspection | List of Components drawings | R | The component level drawings are to be validated by the QAO staff during inspection of component. |
| 11.1.3.0 | Type Test/ETT/ EMI/EMC reports | | Verification of Type Test / Qualification test reports. | 100% | Purchase Order, GA drawings, Component drawings & SOTR/ TNC Minutes/ JSS 55555 | Equipment should have successfully undergone Type Test, EMI/EMC and ETT (as applicable) | Type Test/ Qualification Test reports | CHP for R | Shipyard Orders. Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes. MO Orders. Type / qualification tests undertaken only, if mentioned in PO. |
| 11.2.0.0 | RAW MATERIAL INSPECTION | | | | | | | | |
| 11.2.1.0 | Pipe (Copper) | | (i) Physical, Mechanical & Chemical Properties | One sample/ Heat/Lot | SOTR, Approved GA drawing, DBOM and component drawing | Conformity to specifications | STC/CoC | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTIC S / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|-----------|---|-----------------|----------------------------------|------------------|---|------------------------------|--|---------------|--|
| 11.3.0.0 | OUT SOURCED COMPONENTS | | | | | | | | |
| 11.3.1.0 | BOUGHT OUT ITEMS: As applicable | | | | | | | | |
| 11.3.2.0 | COTS ITEMS | | | | | | | | |
| 11.3.2.1 | Pressure / Temp Gauges | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing/ Catalogue /OEM Specification | Conformity to specifications | OEM TC/ STC/CoC& Calibration Certificate | R | <p>(i) Physical verification as feasible may be undertaken during plant performance testing/ Type Testing</p> <p>(ii) Certificate to include the specification of item</p> |
| 11.3.2.2 | Pressure / Temp Transmitter | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC& Calibration Certificate | R | |
| 11.3.2.3 | Pressure Cut off | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.4 | Thermostat | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.5 | Limit Switch | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.6 | Man Lock | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.7 | Globe Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.8 | Check Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.9 | Angle Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.10 | Solenoid Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.11 | Pressure Safety Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.12 | Unloading Solenoid Valve for capacity control | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.13 | Back Pressure Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.14 | Hand Shut off valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTIC S / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|-----------|---|-----------------|----------------------------------|------------------|---|------------------------------|------------------|---------------|---|
| 11.3.2.15 | Three-way valve | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing/ Catalogue /OEM Specification | Conformity to specifications | OEM TC/ STC/CoC | R | (i) Physical verification as feasible may be undertaken during plant performance testing/ Type Testing (ii) Certificate to include the specification of item |
| 11.3.2.16 | Thermostatic Expansion Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.17 | Filter Drier | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.18 | Oil Separator | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.19 | Ref. Strainer | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.20 | Vent Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.21 | Drain Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.22 | Flow Indicator | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.23 | Differential Pressure Gauge | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.24 | Magnetic Flow Meter | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.25 | Ball Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.26 | Pressure Reducing Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.27 | Flow Regulator | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.28 | Strainer-Mud Type | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.29 | Reducer | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.30 | Tap Heater | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.31 | Pan Coil Heater | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |
| 11.3.2.32 | Insulation Material | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTIC S / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS | |
|-----------------|---|-----------------|---|--------------------|---|---|---|---------------|---|--|
| 11.3.2.33 | Flexible/ Expansion Bellow | | Product Identification | 100% | SOTR, Approved GA drawing, DBOM and component drawing/ Catalogue /OEM Specification | Conformity to specifications | OEM TC/ STC/CoC | R | (i) Physical verification as feasible may be undertaken during plant performance testing/ Type Testing (ii) Certificate to include the specification of item | |
| 11.3.2.34 | Schrader Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.3.2.35 | Electronic Expansion Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.3.2.36 | Electric Regulating Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.3.2.37 | Oval/Round Flange | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.3.2.38 | Level Transmitter | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.3.2.39 | Rotolock Valve Liquid Indicator Line | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.3.2.40 | Flow Switch | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.3.2.41 | Manifold | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.3.2.42 | Butterfly Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.3.2.43 | Isolation Valve | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.3.2.44 | Flexible Hose | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.3.2.45 | Refrigerant/ Refrigerant Bottle | | Product Identification | 100% | | Conformity to specifications | OEM TC/ STC/CoC | R | | |
| 11.4.0.0 | PRE-REQUISITE FINAL INSPECTION | | | | | | | | | |
| 11.4.1.0 | SUB-ASSEMBLIES/COMPONENTS-MECHANICAL | | | | | | | | | |
| 11.4.1.1 | Compressor | | (i) Product identification (ii) SQAP Compliance* (iii) Dispatch Clearance | 100% 100% -- | Approved Drawings, Component Drg, SOTR & SQAP | Conformity to approved Drawings/ DBOM/ SOTR/ Tech Specs/ relevant QAP /Import Documents | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W R R | *SQAP compliance as per section 1 or 2. | |

| SL. NO. | MATERIALS / COMPONENTS AS PER SOTR/ QA ACTIVITY | QTY AS PER P.O. | CHARACTERISTICS / TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE CRITERIA | FORMAT OF RECORD | ACTION BY QAE | REMARKS |
|----------|---|-----------------|---------------------------------|------------------|---|--|---|---------------|---|
| 11.4.1.2 | Condenser | | (i) Product Identification | 100% | Approved Drawings, Component Drg, SOTR & SQAP | Conformity to approved Drgs/ DBOM/ SOTR/ Tech Specs/ relevant QAP / Import Documents | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W | *SQAP compliance as per section 3. |
| | | | (ii) SQAP Compliance* | 100% | | | | R | |
| | | | (iii) Dispatch clearance | -- | | | | R | |
| 11.4.1.3 | Evaporator | | (i) Product Identification | 100% | Approved Drawings, Component Drg, SOTR & SQAP | Conformity to approved Drgs/ DBOM/ SOTR/ Tech Specs/ relevant QAP / Import Documents | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W | *SQAP compliance as per section 4 or 5. |
| | | | (ii) SQAP Compliance* | 100% | | | | R | |
| | | | (iii) Dispatch clearance | -- | | | | R | |
| 11.4.1.4 | Cooling system for Starter and Control Panel | | (i) Product Identification | 100% | Approved Drawings, Component Drg, SOTR & SQAP | Conformity to approved Drgs/ DBOM/ SOTR/ Tech Specs/ relevant QAP | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W | *SQAP compliance as per section 6. |
| | | | (ii) SQAP Compliance* | 100% | | | | R | |
| | | | (iii) Dispatch clearance | -- | | | | R | |
| 11.4.1.5 | Expansion Tank | | (i) Product Identification | 100% | Approved Drawings, Component Drg, SOTR & SQAP | Conformity to approved Drgs/ DBOM/ SOTR/ Tech Specs/ relevant QAP / Import Documents | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W | *SQAP compliance as per section 7. |
| | | | (ii) SQAP Compliance* | 100% | | | | R | |
| | | | (iii) Dispatch clearance | -- | | | | R | |
| 11.4.1.6 | Receiver | | (i) Product Identification | 100% | Approved Drawings, Component Drg, SOTR & SQAP | Conformity to approved Drgs/ DBOM/ SOTR/ Tech Specs/ relevant QAP / Import Documents | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W | *SQAP compliance as per section 8. |
| | | | (ii) SQAP Compliance* | 100% | | | | R | |
| | | | (iii) Dispatch clearance | -- | | | | R | |

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|--|--|-----------------|---------------------------------|------------------|---|--|---|---------------|---|
| 11.4.1.7 | Oil separator | | (i) Product Identification | 100% | Approved Drawings, Component Drg, SOTR & SQAP | Conformity to approved Drgs/ DBOM/ SOTR/ Tech Specs/ relevant QAP /Import Documents | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W | *SQAP compliance as per section 9. |
| | | | (ii) SQAP Compliance* | 100% | | | | R | |
| | | | (iii) Dispatch clearance | -- | | | | R | |
| 11.4.1.8 | Base Frame | | (i) Product Identification | 100% | Approved Drawings, Component Drg, SOTR & SQAP | Conformity to approved Drgs/ DBOM/ SOTR/ Tech Specs/ relevant QAP / Import Documents | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W | *SQAP compliance as per section 10. |
| | | | (ii) SQAP Compliance* | 100% | | | | R | |
| | | | (iii) Dispatch clearance | -- | | | | R | |
| 11.4.1.9 | Sea Water Pump & Cooling Water Pump (Loose supply item) | | (i) Product Identification | 100% | Approved Drawings, Component Drawing, SOTR & SQAP | Conformity to approved Drgs/ DBOM/ SOTR/ Tech Specs/ relevant QAP / Import Documents | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W | *SQAP compliance as per latest SQAP of Pump |
| | | | (ii) SQAP Compliance* | 100% | | | | R | |
| | | | (iii) Dispatch clearance | | | | | R | |
| 11.4.1.10 | Shock Mounts | | (i) Product Identification | 100% | Approved Drawings, Component Drawing, SOTR & SQAP | Conformity to approved Drgs/ DBOM/ SOTR/ Tech Specs/ relevant QAP / Import Documents | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W | *SQAP compliance as per latest SQAP of Shock & Vibration Mounts |
| | | | (ii) SQAP Compliance* | 100% | | | | R | |
| | | | (iii) Dispatch clearance | -- | | | | R | |
| 11.4.2.0 SUB-ASSEMBLIES/COMPONENTS-ELECTRICAL | | | | | | | | | |
| 11.4.2.1 | Local Control Panel/Starter Panel | | (i) Identification | 100% | Approved Drawings, SOTR & SQAP | Conformity to approved Drgs/ DBOM/ SOTR/ Tech Specs/ relevant QAP / Import Documents | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W | *SQAP compliance as per latest SQAP of AC Starter/Control Gear |
| | | | (ii) SQAP Compliance* | 100% | | | | R | |
| | | | (iii) Dispatch clearance | 100% | | | | R | |

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|----------|---|-----------------|---|------------------|--|--|---|---------------|--|
| 11.4.2.2 | Motor | | (i) Identification | 100% | Approved Drawings, SOTR & SQAP | Conformity to approved Drgs/ DBOM/ SOTR/ Tech Specs/ relevant QAP / Import Documents | IR/I-note/ Form-4/ Dispatch Certificate (as applicable) | W | *SQAP compliance as per latest SQAP of AC Motor |
| | | | (ii) SQAP Compliance* | 100% | | | | R | |
| | | | (iii) Dispatch clearance | 100% | | | | R | |
| 11.4.3.0 | TYPE TEST | | | | | | | | |
| 11.4.3.1 | Endurance test of Assembled Package (100 Hrs) | | Functional & Safety Checks | One Plant | SOTR /TNC Minutes/ Approved Test Procedure | Conform to Approved Test Procedure | Type Test Report | CHP for W | |
| 11.4.3.2 | Tilt test of Assembled Package | | As per SOTR | One Plant | | Conform to Approved Test Procedure | Type Test Report | CHP for W | |
| 11.4.3.3 | Noise & Vibration | | (i) Air Borne Noise radiated by the unit | One Plant | SOTR /TNC Minutes / Applicable Standard | ABN & SBN meeting the limits specified in SOTR | ABN Report | CHP for R | ABN & SBN are to be conducted by nominated agencies |
| | | | (ii) Structure Borne Noise radiated by the unit | One Plant | | | SBN Report | CHP for R | |
| 11.4.3.4 | Shock & Vibration Testing | | Shock & Vibration Analysis | One Plant | SOTR/NSS-II/ BR 3012/ Applicable Standard | Equipment meets the NSS-II requirements & Vibration amplitude specified in SOTR | NSTL Test Report | R | Shock calculations to demonstrate the ability of equipment to withstand the specified standard duly vetted by NSTL and IHQ MoD (N) is also acceptable. |
| 11.4.4.0 | MISCELLANEOUS REQUIREMENT | | | | | | | | |
| 11.4.4.1 | Submission of Draft Documentation | No. of sets | Verification of submission | 100% | PO/SOTR/ TNC Minutes/ DME 452 | PO/SOTR/ TNC Minutes/ DME 452 | Documentation | R | |
| 11.4.4.2 | SOTR/TNC compliance | | Compliance | 100% | SOTR/TNC Minutes | SOTR/TNC Minutes | Compliance matrix | R | |
| 11.4.4.3 | Internal FAT Report | | Verification | 100% | Approved FATs Document | Approved FATs Document | FAT Report | R | |

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|-----------------|--|-----------------|---|------------------|--|--|---|---------------|--|
| 11.5.0.0 | FINAL INSPECTION | | | | | | | | |
| 11.5.1.0 | Assembled package- Factory Acceptance Trials (FATs) | | (i) Visual & Overall Dimensional insp. | 100% | Approved Drawings / PO/ SOTR/ Approved FAT document/ Applicable Standard | Conformity to Specification | IR | CHP for W | |
| | | | (ii) Pneumatic Pr. Test of Assembly | 100% | | Satisfactory Pressure Test | IR | W | |
| | | | (iii) Air Borne Noise | 100% | | Conformity to Specification | IR | R | ABN, SBN & Vibration Trials are to be conducted by nominated agencies. |
| | | | (iv) Structure Borne Noise | 100% | | Conformity to Specification | IR | R | |
| | | | (v) Vibration Analysis | 100% | | Conformity to Specification | IR | R | |
| | | | (vi) Performance Testing (As per approved FATs) | 100% | | Performance Test is satisfactory | IR | CHP for W | |
| 11.6.0.0 | PRE-REQUISITE-ISSUE OF FORM-4 (I & T CERTIFICATE) | | | | | | | | |
| 11.6.1.0 | OBS Items as per Purchase Order | | (i) Product identification | 100% | PO, SOTR, Approved Drawings/ PIL / OEM Specification | OBS supplied as per PO | IR | W | |
| | | | (ii) VI/DI | 100% | | | OEM TC, CoC & IR | R | |
| 11.6.2.0 | Submission of As Built Drawings | | Verification | 100% | Approved Drawings, Concessions & Deviations | As built drawings are approved and complete | As built drawings are approved and complete | CHP for W | |
| 11.6.3.0 | Submission of Approved Documentation for Stamping | No. of sets | Verification & Stamping | 100% | PO, SOTR, Approved Drawings | Documentation is complete & confirm to specification | Documentation | CHP for W | |
| 11.6.4.0 | Liquidation of observation during FATs, if any | | Defect rectification | 100% | Approved Drawing, SOTR & FAT document | All defects liquidated | IR | CHP for W | |
| 11.6.5.0 | Weight | | Weight recording | 100% | Approved Drawing, SOTR& PO | To be within specified limits | Weight certificate | W | |

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|----------|---|-----------------|---------------------------------|------------------|---|---|------------------|---------------|--|
| 11.6.6.0 | Painting | | Visual Inspection & DFT | 100% | Approved Drawing, SOTR, Paint Plan | Confirms to specification / Painting Plan | IR | W | |
| 11.6.7.0 | Preservation & Packing | | Visual Inspection | 100% | Approved Drawing, SOTR, OEM Preservation Plan | Confirms to specifications | IR | W | Packing Procedure is to be mentioned by firm which shall be cleared by QAO staff |
| 11.6.8.0 | Submission of Form -4 (I&T Certificate) | | Correctness | 100% | SOTR, PO | SOTR, PO | Form-4 | P | |

Important Notes: -

1. Each type of Equipment & accessories to be supplied shall confirm to specification acceptable to the TYPE APPROVAL AUTHORITY.
2. Motor to be procured only from Naval approved vendors.
3. EMI/EMC and ETT tests to be done at Government/PSU test centers or firm's Lab if NABL accredited.
4. Material Testing to be done at NABL approved Lab.
5. NDT procedure to be approved by ASNT / ISNT Level II or III qualified person based on standards and acceptance criteria specified in SOTR / TSP and performed by ASNT / ISNT Level II / Level III qualified person or at NABL accredited labs for those tests.
6. For Casting: No repair of casting whatsoever is to be undertaken without approval by QAE.
7. RT shooting sketches indicating Critical test regions and Test regions to be submitted prior to testing.
8. A copy of WPS & PQR, with trade sensitive information blanked (if any), be provided to QAE for reference & record.
9. Imported items to be accepted on the basis of review of Import documents detailed in latest edition of QAD.
10. The 'Bought out' items in the QAP are indicative only. The firm is required to categorically define the 'Bought out'/COTS items specific to their products in the DBOM of GA drawings. Items will be categorized as bought out or COTS in the SQAP on the basis of approved drawings. Further, only finished products will be accepted as COTS and no raw material for manufacturing will be acceptable as a COTS item.
11. The SQAP does not apply to items not in the scope of supply of the firm.
12. Inspection of assemblies/sub-assemblies and other items which have not been included in SQAP but form an important part of the system will also be undertaken
13. The column 'Quantity as per P.O' has been left blank which has to be filled by the firm as per P.O while submitting QAP for approval.
14. Item specification should indicate in CoC by firm.
15. RT & UT are to be carried out by ASNT (ACCP) Level-II/III or ISNT Level-II/III qualified NDT personnel. Interpretation/sentencing of RT and UT reports are to be carried out by ASNT (ACCP) Level-III or ISNT Level-III NDT personnel only.
16. MPT & DPT are to be carried out by certified ASNT (ACCP/SNT-TC-1A) Level-II/III or ISNT Level-II/III NDT personnel. Interpretation/sentencing of MPT and DPT reports are to be carried out by ASNT (ACCP) Level-III or ISNT Level-III NDT personnel only.
17. Witnessing of inspections can be done in remote mode, wherever feasible. The modalities of remote inspection are to be worked out jointly by the firm and QAO.

Legends:

| | | | |
|------------|--|--------------------|--|
| CHP | Customer holds point- a point beyond which the vendor will not proceed without a written authority from QAO. The process / activity will be inspected by QAO | | |
| R | Review of certificate and records by QAO- a point at which client will review documentation records at an agreed time after completion of activity. | | |
| ATP | Approved Test Plan. | P | Performed By |
| Coc | Certificate of Compliance | RT | Radiography Tests. |
| HT | Heat Treatment. | SOTR | Statement of Technical Requirements |
| IR | Inspection Reports/records of vendors. | STC | Supplier's test certificate. |
| LPT | Liquid Penetrant Test. | TNC | Technical Negotiation Committee |
| LTC | Lab Test certificate from NABL accredited laboratory. | UT | Ultrasonic Test. |
| MPT | Magnetic Particles Test. | VI & DI | Visual Inspection & Dimension Inspection |
| OEM | Original Equipment Manufacturer | W | Witness By |