




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**

	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	02
	DIRECTORATE OF QUALITY ASSURANCE (WP)	STANDARD QAP NO.	REV. NO.	01
	NEW DELHI - 110 011	DGQA / DQA(WP) /AC & REF PLANT / 07 /2021 / REV 01	DATE	JAN 21

RECORD OF AMENDMENTS

<u>Sl. No.</u>	<u>Date of Amendment</u>	<u>Amendments</u>	<u>Authority</u>	<u>Remarks</u>


	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	03
	DIRECTORATE OF QUALITY ASSURANCE (WP)	STANDARD QAP NO.	REV. NO.	01
	NEW DELHI - 110 011	DGQA / DQA(WP) / AC & REF PLANT / 07 / 2021 / REV 01	DATE	JAN 21

MINISTRY OF DEFENCE (DGQA)

STANDARD QUALITY ASSURANCE PLAN AIR CONDITIONING & REFRIGERATION PLANT




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)
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	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	04
	DIRECTORATE OF QUALITY ASSURANCE (WP)	STANDARD QAP NO.	REV. NO.	01
	NEW DELHI - 110 011	DGQA / DQA(WP) / AC & REF PLANT / 07 / 2021 / REV 01	DATE	JAN 21

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.dggadefence.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)
'H' BLOCK, NIRMAN BHAWAN PO
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	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	05
	DIRECTORATE OF QUALITY ASSURANCE (WP) NEW DELHI - 110 011	STANDARD QAP NO. DGQA / DQA(WP) / AC & REF PLANT / 07 / 2021 / REV 01	REV. NO.	01
			DATE	JAN 21

CONTENTS


<u>Sl. No.</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
1.	Standard Invoked	06
2.	Specific Requirements	07
3.	Abbreviations	09
4.	Scope	10
5.	System Description	11
6.	Part-I: General Information	13
App.'A'	Part-II: SQAP for Air Conditioning and Refrigeration Plant	15

	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	06
	DIRECTORATE OF QUALITY ASSURANCE (WP)	STANDARD QAP NO.	REV. NO.	01
	NEW DELHI - 110 011	DGQA / DQA(WP) / AC & REF PLANT / 07 / 2021 / REV 01	DATE	JAN 21

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.

	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	07
	DIRECTORATE OF QUALITY ASSURANCE (WP)	STANDARD QAP NO.	REV. NO.	01
	NEW DELHI - 110 011	DGQA / DQA(WP) / AC & REF PLANT / 07 /2021 / REV 01	DATE	JAN 21

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.

	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	08
	DIRECTORATE OF QUALITY ASSURANCE (WP)	STANDARD QAP NO.	REV. NO.	01
	NEW DELHI - 110 011	DGQA / DQA(WP) /AC & REF PLANT / 07 /2021 / REV 01	DATE	JAN 21

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)	AC & REFRIGERATION PLANT	PAGE	09
	DIRECTORATE OF QUALITY ASSURANCE (WP) NEW DELHI - 110 011	STANDARD QAP NO. DGQA / DQA(WP) /AC & REF PLANT / 07 /2021 / REV 01	REV. NO.	01
			DATE	JAN 21

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

	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	10
	DIRECTORATE OF QUALITY ASSURANCE (WP)	STANDARD QAP NO.	REV. NO.	01
	NEW DELHI - 110 011	DGQA / DQA(WP) /AC & REF PLANT / 07 /2021 / REV 01	DATE	JAN 21


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

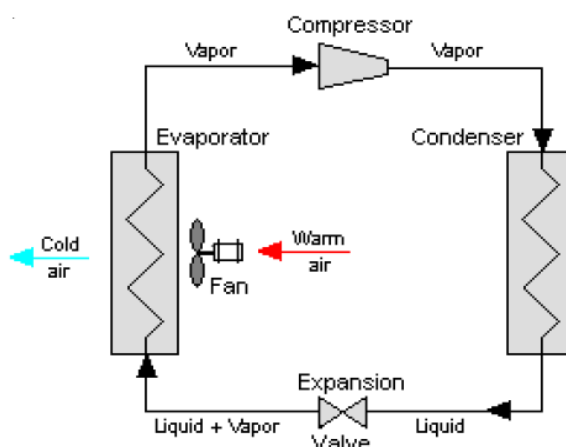
	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	11
	DIRECTORATE OF QUALITY ASSURANCE (WP) NEW DELHI - 110 011	STANDARD QAP NO. DGQA / DQA(WP) /AC & REF PLANT / 07 /2021 / REV 01	REV. NO.	01
			DATE	JAN 21

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.

	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	12
	DIRECTORATE OF QUALITY ASSURANCE (WP) NEW DELHI - 110 011	STANDARD QAP NO. DGQA / DQA(WP) /AC & REF PLANT / 07 /2021 / REV 01	REV. NO.	01
			DATE	JAN 21

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.

	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	13
	DIRECTORATE OF QUALITY ASSURANCE (WP)	STANDARD QAP NO.	REV. NO.	01
	NEW DELHI - 110 011	DGQA / DQA(WP) / AC & REF PLANT / 07 / 2021 / REV 01	DATE	JAN 21

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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	MINISTRY OF DEFENCE (DGQA)	AC & REFRIGERATION PLANT	PAGE	14
	DIRECTORATE OF QUALITY ASSURANCE (WP)	STANDARD QAP NO.	REV. NO.	01
	NEW DELHI - 110 011	DGQA / DQA(WP) / AC & REF PLANT / 07 / 2021 / REV 01	DATE	JAN 21

STANDARD QUALITY ASSURANCE PLAN

FOR

AIR CONDITIONING & REFRIGERATION PLANT

Part-II

<u>Section No.</u>	<u>SQAP-EQUIPMENT WISE DESCRIPTION</u>	<u>PAGE NO.</u>
1	COMPRESSOR (RECIPROCATING)	17
2	COMPRESSOR (SCREW)	33
3	CONDENSOR (SHELL & TUBE TYPE)	41
4	EVAPORATOR (COIL TYPE)	53
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	<u>Shipyard orders.</u> Type/ qualification tests are to be conducted if new induction or not undertaken earlier or test certificate not held or equipment has undergone changes. <u>MO orders.</u> Type/ qualification tests undertaken only, if mentioned in PO.

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	

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
1.2.3.8	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	

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
1.2.4.5	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.
1.3.1.2	Suction and Discharge Manifold		Product Identification	100%		Conformity to specifications	OEM TC/ STC / CoC	R	(ii) Certificates to include specification of items.
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.
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	(ii) Certificates to include specification of items. Test certificate may be exempted

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
1.4.0.0	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	
1.4.1.2	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
1.4.1.3	Bushing Std.& Bushing with detachable collar		Dimensional Inspection	100%		Conformity to approved drawings & specifications	CoC	R	Firm's CoC to approved drawing/DBOM
1.4.1.4	Bearing Cover at Pump		Dimensional Inspection	100%		Conformity to approved drawings & specifications	CoC	R	Firm's CoC to approved drawing/DBOM
1.4.1.5	Top Cover Air Cooled (LH & RH) (Casting)		Dimensional Inspection	100%		Conformity to approved drawings & specifications	CoC	R	Firm's CoC to approved drawing/DBOM
1.4.1.6	Suction & Discharge Stop Valve		Dimensional Inspection	100%		Conformity to approved drawings & specifications	CoC	R	Firm's CoC to approved drawing/DBOM
1.4.1.7	Cover for oil pump		Dimensional Inspection	100%		Conformity to approved drawings & specifications	CoC	R	Firm's CoC to approved drawing/DBOM
1.4.1.8	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%		Conformity to approved drawings & specifications	CoC	R	Firm's CoC to approved drawing/DBOM
1.4.3.3	Connecting Rod		Dimensional Inspection	100%		Conformity to approved drawings & specifications	IR	R	
1.4.3.4	Half Section of Bearing		Dimensional Inspection	100%		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%		Conformity to approved drawings & specifications	CoC	R	Firm's CoC to approved drawing/DBOM
1.4.3.6	Piston		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
1.4.3.7	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

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
1.5.0.0	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) 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.
			(ii) Air Borne Noise emitted by Unit	One Unit		ABN meeting the limits specified in SOTR	LTC	CHP for R	
			(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							

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
1.6.0.0	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) 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.
			(ii) Safety valve setting	100%					
			(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	<u>Shipyard orders.</u> Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes. <u>MO orders.</u> Type / qualification tests undertaken only, if mentioned in PO.
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	

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) Heat Treatment (If applicable)	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawing	Conformity to specifications	HT Reports/ STC	R	Test to be done at NABL approved Test Lab Refer to Sl. No. 15 & 16 of important notes on last page of this document.
			(iv) Physical, Mechanical & 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	
			(vi) RT (Applicable as per Drg./specification)	Critical regions		NDE Report	CHP for R		
2.2.2.0	Rotor		(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	
			(iii) Heat Treatment (If applicable)	100%		Conformity to specifications	HT Reports	R	
			(iv)Phy., Mech.& 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		
			2.3.0.0 OUT SOURCED COMPONENTS						
2.3.1.0 BOUGHT OUT ITEMS									
2.3.1.1	Oil Cooler		(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.
			(ii) QAP /ATP Compliance	100%		Conformity to specifications	IR/ OEM TC	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
2.3.2.0	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) 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.
			(ii) Safety valve setting	100%			IR		
			(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	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.
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
			(ii) Heat Treatment (If applicable)	100%	SOTR, Approved GA drawing, DBOM and component drawing	Conformity to specifications	HT Reports	R	Refer to Sl. No. 15 & 16 of important notes on last page of this document.
			(iii) MPT (Applicable as per Drawing. / specification)	100%			NDE Report	CHP for W	
			(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	Refer to Sl. No. 15 & 16 of important notes on last page of this document.
			(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
3.3.2.2	Gusset Plate		Product Identification	100%		Conformity to specifications	OEM TC / STC/CoC	R	(ii) Certificates to include specification of items
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%		Conformity to approved drawings & specifications	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%		Conformity to approved drawings & specifications	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%		Conformity to approved drawing & 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
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)

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
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	<u>Shipyard orders.</u> Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes. <u>MO orders.</u> 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%	SOTR, Approved GA drawing, DBOM and component drawings	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)

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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
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	<u>Shipyard orders.</u> Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes. <u>MO orders.</u> 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	Test to be done at NABL approved 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	
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 lugs 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	Test to be done at NABL approved Lab
			(ii) Physical Mechanical & Chemical Properties on plain tubes	01 Sample / heat/lot		Conformity to specifications	LTC	R	
			(iii) Hydraulic Pressure Test	100%		Nil leakage	STC	R	Testing to be done by ISNT/ ASNT level II or III qualified technician or at NABL approved lab.
			(iv) Eddy current Test on plain tubes	100%		Tubes are free from defects	NDE Report/ STC	R	
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 (ii) Certificates to include specification of the item.
5.3.1.3	Tie Rod (if applicable)		Product Identification	100%		Conformity to specifications	OEM TC/ STC/ CoC	R	
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,	Welding specification & procedure confirms specified standards to	WPS and PQR	R	
	(ii) WPQ		Suitability of Welder Qualification	100%	ASME SEC. IX	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%	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 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

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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
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 binding 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	<u>Shipyard orders.</u> Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes. <u>MO orders.</u> Type / qualification tests undertaken only, if mentioned in PO.
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	(i) As per approved DBOM (ii) Leak test after complete assembly of Cooling Unit is also acceptable.
			(ii) Leak Test @ 1.5 times working pressure	100%		No leakage observed	IR	W	
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	
			(ii) Overall Dimensional Check	100%			IR	CHP for W	
			(iii) Functional Check	100%		Conformity to specification / FATs	IR	CHP for W	Performance Trials may be witnessed during Integrated Trials of Assembled Plant as per approved FATs
			(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.	CHARACTERISTICS / 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	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.
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.	CHARACTERISTICS / 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	As per approved DBOM
			(ii) Physical, Mechanical & Chemical properties	01 sample/ Heat/lot			LTC/STC/ CoC	R	
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	As per approved DBOM
			(ii) Physical, Mechanical & Chemical properties	01 sample/ Heat/lot			LTC /STC/ CoC	R	
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%		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%		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%		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.	CHARACTERISTICS / 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) Physical, Mechanical & Chemical properties (As applicable)	01 sample/ Heat/lot			STC/CoC	R	(ii) Certificates to include specification of the item.
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
7.3.2.2	Pressure relief valve		Product Identification	100%		Conformity to specification	OEM TC/ STC/CoC	R	(ii) Certificates to include specification of the item.
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.	CHARACTERISTICS / 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%	Component drawings/ Relevant Specifications	Conformity to specification	IR	R	Packing Procedure is to be mentioned by firm which shall be cleared by QAO staff

SECTION 8

RECEIVER

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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
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.
8.3.1.2	Studs, Bolts & Nuts		Product Identification	100%			STC/CoC	R	(ii) Certificate to include the specification of item.
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, 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.
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	ACOEPTANCE 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 binding 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	ACOEPTANCE 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 COMPONENTS								
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	
	(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 DOCUMENT	ACOEPTANCE 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.	CHARACTERISTIC S / 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, 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.
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	(i) Physical verification as feasible may be undertaken during plant performance testing/ Type Testing (ii) Certificate to include the specification of item
11.3.2.2	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.	CHARACTERISTICS / 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	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	*SQAP compliance as per section 1 or 2.
			(ii) SQAP Compliance*	100%				R	
			(iii) Dispatch Clearance	--				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
11.4.1.2	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	

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
11.4.1.7	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	

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
11.4.2.2	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	

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
11.5.0.0	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	ABN, SBN & Vibration Trials are to be conducted by nominated agencies.
			(ii) Pneumatic Pr. Test of Assembly	100%		Satisfactory Pressure Test	IR	W	
			(iii) Air Borne Noise	100%		Conformity to Specification	IR	R	
			(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	

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
11.6.6.0	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