MINISTRY OF DEFENCE (DGQA)

STANDARD QUALITY ASSURANCE PLAN

FIN STABILISER SYSTEM

FIN STABILIZER IS ACTIVE STABILIZATION EQUIPMENT FOR REDUCING THE SHIP'S ROLL BY USING FINS EXTENDED TO BOTH SIDES OF HULL. THE PRIMARY FUNCTION OF STABILIZER SYSTEM IS TO REDUCE ROLL TO A MINIMUM AT ALL FORWARD SPEEDS ABOVE 8 KNOTS. THE SECONDARY FUNCTION OF STABILISER SYSTEM IS TO INDUCE A FORCED ROLL AS REQUIRED TO FACILITATE PRE-WETTING OF SHIP FOR NUCLEAR, BIOLOGICAL AND CHEMICAL DEFENSE PURPOSES. THE FORCED ROLL MODE CAN ALSO BE USED TO SIMULATE ROLLING OF SHIP IN CALM SEA FOR THE PURPOSE OF TRAINING OF SHIP'S CREW.

STANDARD QAP NO. DGQA/DQA(WP)/STAB SYS/02/2018/REV-01
07 AUG 2018

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ISSUING AUTHORITY

DIRECTORATE OF QUALITY ASSURANCE (WARSHIP PROJECTS)
MINISTRY OF DEFENCE (DGQA)
'H' BLOCK, NIRMAN BHAWAN P.O
NEW DELHI - 110 011

RECORD OF AMENDMENTS

Sl. No.	Date of Amendment	Amendments	Authority	Remarks

MINISTRY OF DEFENCE (DGQA)

STANDARD QUALITY ASSURANCE PLAN FOR FIN STABILISER SYSTEM

STANDARD QAP NO.

DGQA/DQA(WP)/DGQA/DQA(WP)/STAB SYS/02/2017/REV01

07 AUG 2018

(SP Lal)
Rear Admiral
ADGQA (WP)

Promulgated by:-

DIRECTORATE OF QUALITY ASSURANCE (WARSHIP PROJECTS)
MINISTRY OF DEFENCE (DGQA)
'H' BLOCK, NIRMAN BHAWAN P.O
NEW DELHI - 110 011

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 SQAP 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 Fin Stabiliser System for *IN* Ships.

3. The website ***htpp://www.dgqadefence.gov.in*** may also be referred for other Quality Assurance related inputs.

4. The SQAP has been prepared on the basis of decisions made during the collegiate meeting held at DQA(WP) with leading manufacturers of Fin Stabiliser System and representatives of Professional Directorates and Production Directorates of the *IN*. Any user of this Standard QAP within DGQA / *IN* 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 specifications and standards laid out in the SQAP are indicative only. The specifications / parameters and standards 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 the SQAP is incorporated into contracts, users are responsible for their correct application while complying with contractual and other statutory requirements. Compliance with SQAP does not of itself confer immunity from legal obligations.

8. Enquiries in connection to these requirements may be made from:

Directorate of Quality Assurance (Warship Projects)
Ministry of Defence
'H' Block, Nirman Bhawan P.O
New Delhi - 110 011

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STANDARDS INVOKED

SL. NO.	SPECIFICATION	DESCRIPTION
1	AISI, SS 316	Specification for steel material.
2	ASTM E 446	RT for steel castings up to 2 inch thickness
3	ASTM E 186	RT for heavy walled steel castings
4	ASTM E 272	RT for Copper based and Nickle Copper Alloy castings
5	ASTM E 1320	Standard reference radiographs for Titanium casting
6	ASTM E 1032	Std test method for radiographic examination of weldments
7	ASTM A 743	Standard specification for castings, Iron-Chromium, Iron-Chromium-Nickle, corrosion resistant for general application
8	ASTM A 609	Std practice for performing pulse-echo ultrasonic examination
9	ASTM E 165	Standard practice for liquid penetrant examination
10	ASTM E 125	Std reference photographs for MPI in ferrous castings
11	ASTM A 148	Std specs for steel castings, high strength for structural purposes
12	ASTM A 217	Std specs for steel castings Martensitic Stainless & Alloy for pressure containing parts
13	ASTM A 216	Std specs for steel castings suitable for fusion welding
14	ASME Sec IX	Qualification Standard for welding, brazing & fusing procedures
15	ASME Sec V	Non-destructive examination
16	ASME Sec VIII	Rules for construction of pressure vessels
17	ASME Sec II Part A	Ferrous material specifications
18	ASME Sec II Part B	Non-ferrous material specifications
19	BS 1400	Copper alloy ingots and copper alloy and high conductivity copper castings
20	BS 4670	Specification for alloy steel forging
21	BS 2871:Part 2	Copper & Copper alloy tubes
22	EN 10250-2	Open die steel forging
23	SA 105	Specification for Carbon Steel Forging
24	IS 2062	Hot medium & high tensile structural steel
25	AISI SS 316	Specification for steel material
26	DMR 249/D40S	Structural steel
27	Def Stan 02-797 Part-4	Carbon steel fittings / Pipe work engineering

28	Def Stan 02-339	Requirement for steering and stabilizer system
29	Def Stan 02-477	Flexible hoses
30	Def Stan 61.5	Electric power supply system
31	EED-Q-071(R4)	Specification for AC motors and starters / control gears
32	ISO 2372	Specification for vibration test.
33	JSS 55555	Environmental test methods for electrical & electronic eqpt
34	NES 340	Stabilisers
35	NES 375	Valve design & manufacture
36	BR3021	Shock Testing
37	MIL-STD-740-2	SBN measurement & acceptance criteria of shipboard equipment
38	MIL-STD-167-1	Mechanical vibrations of shipboard equipments
39	MIL-STD-1474D	Design criteria standard, noise limits
40	MIL-STD-461F	EMI / EMC

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

SPECIFIC REQUIREMENTS

1. Testing of physical and chemical properties has to be done by NABL accredited laboratory only (including firm's NABL accredited laboratory).

2. If casting is being poured without integral test bar, then only the pouring is to be witnessed by Inspector.

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. All tubes / pipes are to be subjected to Eddy Current test unless exempted in PO / TEC.

6. Shooting sketch indicating critical test zones and test zones are to be submitted prior to testing.

7. NDT procedure to be approved by ASNT / ISNT Level III qualified person based on standards and acceptance criteria specified in SOTR / TSP / applicable standards and performed by ASNT / ISNT Level II / Level III qualified person.

8. Make of the Items should be as per approved PIL / Detailed Bill of Material (DBOM) or *IN* approved sources.

9. The outsourced components in the 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. .

10. Imported items will be accepted against following import documents:-

(a) Bill of Lading / Shipping Bill / Airway Bill
(b) Invoice by OEM or Country of Origin Certificate with Packing List
(c) Bill for entry to warehousing
(d) OEM Confirmation Certificate
(e) Firm’s Guarantee certificate as per SOs

11. ESS test (Thermal Cyling, Random Vibration and Burn in / Endurance) as per DQA(N) policy vide letters 66301/Policy-07/DQA(N)/QA-07 dated 09 Aug 16.

12. Ingress protection testing will be as per applicable IP rating.

13. TT, 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.

14. If TT, EMI/EMC and ET have already been done in earlier projects on identical units, it will not be done again & the reports of earlier tested units will have to be provided for review of Inspection Agency.

15. Conformal coating of PCBs to be done as per DQA(N) policy letter 580930/DQA(N)/EL dated 17 Feb 14.

16. Bought-out items will be subjected to normal QA inspections as per QAP.

17. Since the Fin Stabiliser System is to be subjected to IFATs, the draft Operating Instructions, Technical Documentation and firm's in-house test report is to be made available prior to raising request for conduct of the same.

ABBREVIATIONS

VI	Visual Inspection
DI	Dimensional Inspection
LTC	Lab Test Certificate
STC	Supplier Test Certificate
MTC	Material Test Certificate
CC	Conformance / Compliance Certificate
CHP	Customer Hold Point
IR	Inspection Report
NABL	National Accreditation Board for Testing and Calibration of Laboratories
P	Perform
R	Review
V	Verification
W	Witness
TC	Test Certificate
OEM	Original Equipment Manufacturer
DPT	Dye Penetrant Test
MPT	Magnetic Particle Test
SBN	Structure Borne Noise
ABN	Air Borne Noise
FATs	Factory Acceptance Trials
PQR	Procedure Qualification Record
WPS	Welding Procedure Specification
WPQ	Welder Performance Qualification
ET	Environmental Testing
EMI	Electro Magnetic Induction
EMC	Electro Magnetic Conduction
ESS	Environment Stress Screening
ASNT	American Society of Non-destructive Testing
ISNT	Indian Society of Non-destructive Testing
VME	Versa Module Europa
TT	Type Test
TSP	Technical Specifications
SOTR	Statement of Technical Requirement
DBOM	Detailed Bill of Material
QA	Quality Assurance

SCOPE

Scope of Quality Assurance. The scope of QA includes witness / review at all stages of manufacturing viz., raw material stage, in-process stage and final stage. The scope also covers witness / review of Type Testing, wherever applicable.

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

The following QA activities will be carried out for the Stabiliser System:-

(a) Visual Inspection.

(b) Dimensional Inspection.

(c) Witness of pouring in absence of integral test bar.

(d) Review of Lab Test Certificates.

(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 and Review of Shock Test and SBN & ABN reports for qualification of Type Test, as applicable.

(l) Review of ET, EMI/EMC and ESS reports, in addition to Pre / Post ET inspection, as applicable.

(m) Review of Draft documentation and witness/Stamping of final documentation, as applicable.

(n) Issue of CHP clearance.

(o) Issue of Dispatch Clearance or Issue of Form-IV, as applicable.

SYSTEM DESCRIPTION

Fin Stabiliser System comprises of electro-hydraulically operated fins extended to both sides of hull. The primary function of Stabiliser System is to reduce roll to a minimum at all forward speeds above 8 Knots below which the Stabiliser is ineffective. The secondary function of the Stabiliser is to induce forced rolls required to facilitate pre-wetting of ship for Nuclear, Biological and Chemical Defense purposes. The forced roll mode can also be used to simulate rolling of ship in calm sea for purpose of training of ship's crew.

The Stabiliser Control System consists of a roll sensor, which senses the rolling motion of the vessel. This signal is processed by the control system to generate a fin demand. The fin demand causes the Stabiliser Fins to tilt so that the lift force, generated by the virtue of the vessel forward speed, dampens the roll motion of the vessel.

STABILISER SYSTEM

Mechanical System	Hydraulic System	Electronic & Electrical System
Fin Stock	Hydraulic Power Pack	Stabiliser Control Panel
Fin	HPP Motor	Stabiliser Console
Cartridge	Hydraulic Pump	Field Junction Box
Tiller	Hydraulic Cylinders	Motor Starter Panel
Inboard & Outboard Nut	Diverter Manifold Block	ACOS
Inflatable Seal Housing	Pump Isolation Block	Dual Feedback Unit
Actuator Pin Assembly	Hand Pump Assembly	Vertical Gyro/Roll Sensor
Gland Packing	Overhead Tank Assembly	Transformer Rectifier Unit (TRU)
Machined Components		Interface Junction Box (IJB)

STANDARD QUALITY ASSURANCE PLAN

Part - I. General Information

The following generic information must generally be provided on each QAP as its identity:-

(a) Equipment name
(b) Equipment technical details (as applicable)
(c) Purchase Order reference
(d) Sub/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 applicable)

Part - II.

Standard QAP of Stabiliser System (Hydro-Mech)	Appendix "A"
Standard QAP of Motor	Appendix "B"
Standard QAP of AC Starter & Control Panel	Appendix "C"
Standard QAP of Control System	Appendix "D"
Standard QAP of Multipoint Lubrication Pump Assembly	Appendix "E"

APPENDIX - 'A'
Refers to Part-II of SQAP

STANDARD QUALITY ASSURANCE PLAN FOR FIN STABILISER SYSTEM

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
1.0.0	**DRAWINGS / DOCUMENTS VERIFICATION**								
1.1.0	GA Drawings along with DBOM & Binding Data		Check for availability of approved drawings and DBOM & Binding Data	100%	PO & SOTR / TNC Minutes	All approved drawings along with DBOM & Binding Data are available	List of approved drawings & Binding Data	CHP for R	Approved binding data / drawing to be verified
1.2.0	Manufacturing Drawings		Verification of manufacturing 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	Manufacturing drawings bear complete data; The data is sufficient for production and stage inspections	List of approved drawings	CHP for R	
1.3.0	Type Test / ET / EMI / EMC reports		Availability & verification	100%	PO & SOTR / TNC Minutes/ JSS 55555	Equipment should be tested in the past and relevant certificate is available	Type / Qualification test reports	CHP for R	Type/ qualification test are to be conducted, if not undertaken earlier or test certificate not held or equipment has undergone changes
2.0.0	**MATERIAL INSPECTION**								
2.1.0	**FIN UNIT ASSEMBLY & BASE FRAME ASSEMBLY (DRG. NO…)**								
2.1.1 (a)	(a) Outboard Bearing Housing / Base Plate Boss (b) Inboard Bearing Housing / Bridge Piece		(i) Pouring with integral test bar	100%	SOTR, Approved GA drawing, DBOM & manufacturing drawings	Casting to be as per specifications laid in reference documents	IR	R	If casting is without integral test bar, pouring to be witnessed by QAO
			(ii) Material identification & Stamping	100%		Conformity to specifications	IR	W	

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
	(Steel Castings)		(iii) Heat Treatment	100%		HT report should be satisfactory	HT Report	R	
			(iv) Mechanical properties & Chemical composition	01 test piece/ lot / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
			(v) U.T	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III qualified technician
			(vi) MPT / DPT	100%			NDE Report	CHP for W	
			(vii) RT	Critical Regions			NDE Report	CHP for R	
2.1.1 (b)	(a) Outboard Bearing Housing / Base Plate Boss (b) Inboard Bearing Housing / Bridge Piece (Forgings)		(i) Heat Treatment	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	HT Report should be satisfactory	HT Report	R	
			(ii) Stamping & Test Piece identification	100%		Conformity to specifications	IR	W	
			(iii) Mechanical properties & Chemical composition	01 test piece / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
			(iv) U.T	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III qualified technician
			(v) MPT / DPT	100%			NDE Report	CHP for W	
2.1.2	Gland Follower (Casting)		(i) Pouring with integral test bar	100%		Casting to be as per specifications laid in reference documents	IR	R	If casting is without integral test bar, pouring to be witnessed by QAO
			(ii) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(iii) Heat Treatment (if applicable)	100%		HT Report should be satisfactory	HT Report	R	
			(iv)Mechanical properties & Chemical composition	01 test piece/ lot / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
			(v) MPT/ DPT	100%		Defects within permissible limits as per applicable	NDE Report	CHP for W	

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
						standards / specs			
2.1.3	(a) Feedback lever (b) Feedback lever pin (c) Connecting rod (d) Gland stud (e) Gland follower stud		(i) Material identification & Stamping	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece per lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
2.1.4	Sea Gland Insert		(i) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece per heat		Conformity to specifications	LTC	CHP for R	Tests to be done at NABL accredited laboratory
			(iii) Ultrasonic Test / RT	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III qualified technician
2.2.0	**FIN SHAFT LEVER ASSEMBLY (DRG. NO.____)**								
2.2.1 (a)	Fin Shaft Lever (Tiller) (Casting)		(i) Pouring with integral test bar	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Casting to be as per specifications laid in reference documents	IR	R	If casting is without integral test bar, pouring to be witnessed by QAO
			(ii) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(iii) Heat Treatment	100%		HT Report should be satisfactory	HT Report	R	
			(iv) Mechanical properties & Chemical composition	01 test piece/ lot / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
			(v) U.T	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III qualified technician
			(vi) MPT/ DPT	100%			NDE Report	CHP for W	
			(vii) RT	Critical Regions			NDE Report	CHP for R	
2.2.1 (b)	Fin Shaft Lever (Tiller) (Forging		(i) Heat Treatment	100%		HT Report should be satisfactory	HT Report	R	
			(ii) Stamping & Test Piece	100%		Conformity to	IR	W	

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
			identification			specifications			
			(iii) Mechanical properties & Chemical composition	01 test piece / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
			(iv) U.T	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III qualified technician
			(v) MPT / DPT	100%			NDE Report	CHP for W	
2.2.2	(a) Fin Shaft Lever Pin (b) Locking Keep		(i) Material identification & Stamping	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece per heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
2.3.0	**FIN STOCK ASSEMBLY (DRG. NO. ___)**								
2.3.1	Fin Shaft / Fin stock (Forging)		(i) Heat Treatment	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	HT Report should be satisfactory	HT Report	R	
			(ii) Stamping & Test Piece identification	100%		Conformity to specifications	IR	W	
			(iii)Mechanical properties & Chemical composition	01 test piece / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
			(iv) U.T	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III qualified technician
			(v) MPT / DPT	100%			NDE Report	CHP for W	
2.3.2	Outboard Nut & Inboard Nut (Forging)		(i) Material identification & Stamping	100%		Conformity to specifications	IR	R	
			(ii) Mechanical properties & Chemical composition	01 test piece per heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
2.3.3	Location Pin		(i) Material identification & Stamping	100%		Conformity to specifications	IR	R	
			(ii) Mechanical properties & Chemical composition	01 test piece per heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
2.3.4	Keep plate		(i) Material identification & Stamping	100%		Conformity to specifications	IR	W	

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
			(ii) Mechanical properties & Chemical composition	01 test piece per heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
2.4.0	**FIN ASSEMBLY (DRG. NO. ____)**								
2.4.1 (a)	Fin Boss / Fin Hub / Fin Tip (Casting)		(i) Pouring with integral test bar	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Casting to be as per specifications laid in reference documents	IR	R	If casting is without integral test bar, pouring to be witnessed by QAO
			(ii) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(iii) Heat Treatment	100%		HT Report should be satisfactory	HT Report	R	
			(iv) Mechanical properties & Chemical composition	01 test piece/ lot / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
			(v) U.T	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III technician
			(vi) MPT/ DPT	100%			NDE Report	CHP for W	
			(vii) RT	Critical Regions			NDE Report	CHP for R	
2.4.1 (b)	Fin Boss / Fin Hub / Fin Tip (Forging)		(i) Heat Treatment	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	HT Report should be satisfactory	HT Report	R	
			(ii) Stamping & Test Piece identification	100%		Conformity to specifications	IR	W	
			(iii) Mechanical properties & Chemical composition	01 test piece / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
			(iv) U.T	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III qualified technician
			(v) MPT / DPT	100%			NDE Report	CHP for W	
2.4.2	Fin Plates		(i) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece / lot		Conformity to specifications	LTC / CQAE(NS) Report	R	Tests to be done at NABL accredited lab

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
2.4.3	Pipe for Hydraulic Oil Injection (Steel)		(i) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece / lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
2.4.4	Fin Location Pin		(i) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece /lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
2.5.0	**HULL INTERFACE STRUCTURE IWO CARTRIDGE (DRG. NO._____)**								
2.5.1	Base Frame Plates		(i) Material identification Stamping	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece per lot		Conformity to specifications	LTC / CQAE(NS) Report	R	Tests to be done at NABL accredited laboratory
2.5.2	Hull Cartridge Structure Plates (Rolled Steel for Ship building)		(i) Material identification Stamping	100%		Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece / lot		Conformity to specifications	LTC / CQAE(NS) Report	R	Tests to be done at NABL accredited lab
2.5.3 (a)	Clevis Lug Plates / Fork / Cylinder Mounting Lug (**Steel Casting**)		(i) Pouring with integral test bar	100%		Casting to be as per specifications laid in reference documents	MTC	R	If casting is without integral test bar, pouring to be witnessed by QAO
			(ii) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(iii) Heat Treatment	100%		HT Report should be satisfactory	HT Report	R	
			(iv) Mechanical properties & Chemical composition	01testpiece / lot / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
			(v) U.T	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III qualified technician
			(vi) MPT/DPT	100%			NDE Report	CHP for W	

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
			(vii) RT	Critical region			NDE Report	CHP for R	
2.5.3 (b)	Clevis Lug Plates / Fork / Cylinder Mounting Lug (**Forging**)		(i) Heat Treatment	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	HT Report should be satisfactory	HT Report	R	
			(ii) Stamping & Test Piece identification	100%		Conformity to specifications	IR	W	
			(iii) Mechanical properties & Chemical composition	01 test piece / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
			(iv) U.T	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III qualified technician
			(v) MPT / DPT	100%			NDE Report	CHP for W	
2.6.0	**TRANSMITTER DRIVE ASSEMBLY (SUB COMPONENT OF BASE PLATE ASSEMBLY) (DRG NO___)**								
2.6.1	Transmitter Unit Pillar / Support Plate (Feed Back Unit Mounting Plate)		(i) Material identification & Stamping	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece per heat / lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
2.6.2	Transmitter lever		(i) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece per heat / lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
2.6.3	Transmitter Lever Pin		(i) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece per heat / lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
2.7.0	**DISTRIBUTION BLOCK ASSEMBLY (DRG. NO. _____)**								
2.7.1	Material for Distribution Block (Steel Forging)		(i) Material Identification &Stamping	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	One test piece / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
			(iii) MPT/DPT	100%		Defects within permissible limits	NDE Report	CHP for W	Testing to be do done by ISNT/

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						as per applicable standards / specs			ASNT Level II qualified technician
			(iv) UT	100%			NDE Report	CHP for W	
2.8.0	**ACTUATOR ASSEMBLY (DRG. NO. ____)**								
2.8.1	Tubes for Hydraulic Cylinder		(i) Material Identification & Stamping	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	One test piece / lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
			(iii) Pressure Test 1.5 times working pressure 30 mins			Pressure test is satisfactory	IR	CHP for W	
2.8.2 (a)	Cylinder body (Casting)		(i) Pouring with integral test bar	100%		Casting to be as per specifications laid in reference documents	IR	R	If casting is without integral test bar, pouring to be witnessed by QAO
			(ii) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(iii) Heat Treatment	100%		HT Report should be satisfactory	HT Report	R	
			(iv) Mechanical properties & Chemical composition	01 test piece/ lot / heat		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
			(v) U.T	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III technician
			(vi) MPT/ DPT	100%			NDE Report	CHP for W	
			(vii) RT	Critical Region			NDE Report	CHP for R	
2.8.2 (b)	Cylinder body (Manufactured from Piping)		(i)Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 test piece/ lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
			(iii) U.T	100%		Defects within permissible limits	NDE Report	CHP for W	Testing to be do done by ISNT/

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						as per applicable standards / specs			ASNT Level II or III technician
			(iv) Pressure Test at 1.5 times working pressure 30 mins	100%		Pressure testing is satisfactory	IR	CHP for W	
2.8.3	Piston Rod		(i) Material Identification & Stamping	100%	Conformity to applicable standard / specifications	Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	One test piece per lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
2.8.4	Piston		(i) Material Identification & Stamping	100%		Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	One test piece / lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
2.9.0	**POWER UNIT ASSY (DRG. NO._____)**								
2.9.1	(a) Pump / Motor Bracket (b) Sole Plate		(i) Material Identification & Stamping	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	One test piece per lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
2.9.2	Manifold Block (Forging)		(i) Material identification & Stamping	100%		Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	One test piece per lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
			(iii) MPT/ DPT	100%		Defects within permissible limits as per applicable standards / specs	NDE Report	W	
			(iv) UT	100%			NDE Report	CHP forW	Testing to be do done by ISNT/ ASNT Level II or III technician
2.10.0	**LUBRICATION ASSEMBLY (DRAWING NO. ___)**								
2.10.1	Brass / Copper Tubes		(i) Material Identification & Stamping	100%	SOTR, Approved GA drawing,	Conformity to specifications	IR	W	

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			(ii) Mechanical properties & Chemical composition	One test piece per lot	DBOM and manufacturing drawings	Conformity to specifications	LTC	R	Tests to be done at NABL accredited laboratory
			(iii) Pressure Test at 1.5 times working pressure 30 mins	100%		Pressure test is satisfactory	IR	CHP for W	
2.11.0	**HAND PUMP PANEL ASSEMBLY (DRG. NO._____)**								
2.11.1	Plates for Hand Pump Panel		(i) Material identification & Stamping	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	One test piece / lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
2.12.0	**SUPPLY TANK ASSEMBLY (DRG. NO. _____)**								
2.12.1	Structural Material (Plates)		(i) Material Identification & Stamping	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	One test piece / lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
2.13.0	**PIPES & FITTINGS (DRG. NO. _____)**								
2.13.1	Cupro-Nickel Pipes		(i) Material Identification & Stamping	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawing	Conformity to specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	One test piece / lot		Conformity to specifications	LTC	R	Tests to be done at NABL accredited lab
			(iii) Eddy Current test	100%		Tubes are free from defects	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III technician
			(iv)Pressure testing at 1.5 times working pressure ,30 mins	100%		Pressure test is satisfactory	IR	W	
			(v) Annealing	100%		HT Report should be satisfactory	HT Report	R	
3.0.0	**OUTSOURCED COMPONENTS / ITEMS**								
3.1.0	**FIN UNIT ASSEMBLY (DRG. NO._____)**								

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3.1.1	(a) Out Board Bearing (b) Inboard Bearing (Spherical Type) (c) Gland Packing (d) Lantern Ring		(i) Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	OEM TC / CC	R	
			(ii) Visual Inspection and Dimensional Inspection	100%		Conformity to relevant drawings	IR	R	
3.1.2	Inflatable Seal		(i)Product identification	100%		Conformity to specifications	OEM TC/ CC	R	
			(ii) Polymer Identification & Properties like Hardness, Tensile strength, % Elongation at break, Compression set, Volume change & accelerated ageing.	One test piece per lot		Constituents meet laid down specifications	LTC	R	Testing to be done at NABL approved laboratory
			(iii) Visual Inspection and Dimensional Inspection	100%		Conformity to relevant drawings	IR	R	
3.1.3	'O' Rings & Bonded Seals	'	(i) Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacuring drawings / Catalogue	Conformity to specifications	OEM TC/ CC	R	
			(ii) Polymer Identification accelerated ageing.	One test piece per lot		Constituents meet laid down specifications	LTC	R	Testing to be done at NABL approved laboratory
			(iii) Visual Inspection and Dimensional Inspection	One test piece per lot		Conformity to relevant drawings	IR	R	
3.2.0	**TRANSMITTER DRIVE ASSEMBLY (DRG. NO._____)**								
3.2.1	Limit Switch		(i) Product identification	Random	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	OEM TC / CC	R	
			(ii) Functional Check on Assembly	100%		Functional check is satisfactory	IR	W	
3.2.2	Rod End Bearing		(i) Product identification	100%		Conformity to specifications	OEM TC/ CC	R	
			(ii) Visual Inspection and	One test		Conformity to	IR	R	

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			Dimensional Inspection	piece per lot		relevant drawings			
3.3.0	**DISTRIBUTION BLOCK ASSEMBLY (DRG. NO.____)**								
3.3.1	(a) Throttle valve (b) Equal union (c) Pilot operated pressure relief valve (d) Self-sealing coupling (e) Banjo coupling		Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	OEM TC / CC / STC	R	
3.3.2	O' Rings & Bonded Seals		(i). Product identification	100%		Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Polymer Identification accelerated ageing.	One test piece per lot		Constituents meet laid down specifications	LTC	R	Testing to be done at NABL approved laboratory
3.4.0	**ACTUATOR ASSEMBLY- (DRG. NO. _____)**								
3.4.1	(a) Piston seals (b) Chevron packing (c) Actuator bearings spherical type (d) Male stud coupling (e)Stud stand pipe adopter (f) Blanking cap (g)Self-cleaning coupling		Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	OEM TC / CC / STC	R	
3.4.2	'O' Rings & Bonded Seals		(i) Product identification	100%		Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Polymer Identification accelerated ageing.	One test piece per lot		Constituents meet laid down specifications	LTC	R	Testing to be done at NABL approved laboratory
3.5.0	**POWER UNIT ASSEMBLY (DRG. NO_____)**								
3.5.1	(a) Couplings / Flexible Coupling (b) P11P Pump		Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing	Conformity to specifications	OEM TC / CC / STC	R	

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3.5.2	Hydraulic Fittings		(i)Product identification	100%	drawings / Catalogue	Conformity to specification	OEM TC / CC / STC	R	
			(ii) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	R	
			(iii) Pressure Test at 1.5 times working pressure 30 mins	10%		Pressure Test is satisfactory	IR	W	
			(iv) Coating Thickness (other than passivated)	One test piece / lot		Test is satisfactory	IR	R	
3.5.3	Flexible Hoses (If applicable)		(i)Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	IR	R	OEM TC to indicate details of Ozone test, Oil resistance test & Burst Test for Hoses. Hose register to reflect hose size and shelf life.
			(ii) Pressure Testing at 1.5 times of working pressure for 30 mins	100%		Pressure Test is be satisfactory	IR	CHP for W	
3.5.4	'O' Rings & Bonded Seals	'	(i). Product identification	100%		Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Polymer Identification	100%		Constituents meet laid down specifications	LTC	R	Testing to be done at NABL approved laboratory
3.5.5	Oil Cooler		Inspection	100%	As per separately approved QAP		Form IV / I-note	R	
3.5.6	Accumulator Unit / Hydraulic Accumulator		(i) Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Functional Test on assembly	100%		Functional check should be satisfactory	IR	W	
3.5.7	(a) Servo Filter (b) Boost Filter (c) Suction Filter		Product identification	100%		Conformity to specifications	OEM TC / CC / STC	R	

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3.5.8	Pressure Switch		Product identification	100%		Conformity to specifications	OEM TC / CC / STC & Calibration Certificate	R	
3.5.9	Shock & Vibration Mounts		Inspection	100%	As per SQAP		Form IV / I-note	**R**	
3.5.10	Ball Valve		(i)Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Functional Checks & Pressure Test	100%		Functional checks are satisfactory	IR	W	
3.5.11	(a) Cartridge Valve (b) Cartridge cover (c) Relief valve (d) Check valve (e) Bulkhead coupling (f) Solenoid Operated D.C. valve (g) Quick change coupling (h) Self-sealing coupling with blanking cap (j) Male stud coupling (k) Stud stand pipe adopter		Product identification.	100%		Conformity to specifications	OEM TC / CC / STC	R	
3.5.12	(a) Accumulator Pressure Gauge (b) Suction Filter Pressure Gauge (c) Pressure gauge		Product identification.	100%		Conformity to specifications	OEM TC / CC / STC & Calibration Certificate	R	
3.5.13	(a) Protective Cover (b) Junction Box		(i) Product Identification	100%		Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Visual Inspection and Dimensional Inspection	100%		Item / component confirms to relevant drawings	IR	R	

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3.6.0	**HAND PUMP PANEL ASSEMBLY (DRG. NO_____)**								
3.6.1	(a) Hand Pump with 4-way control valve (b) Needle & Ball valves		(i)Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	R	
			(iii)Functional Test	100%		Functional checks are satisfactory	IR	W	
3.6.2	Hydraulic Fittings		(i)Product identification	100%		Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	R	
			(iii) Pressure Test at 1.5 times working pressure 30 mins	10%		Pressure Test is satisfactory	IR	W	
			(iv) Coating Thickness (other than passivated)	One test piece / lot		Test is satisfactory	IR	R	
3.6.3	O' Rings & Bonded Seals	'	(i). Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Polymer Identification	100%		Constituents meet laid down specifications	LTC	R	Testing to be done at NABL approved laboratory
3.6.4	Pressure Gauges		(i)Product identification	100%		Conformity to specifications	OEM TC / CC / STC & Calibration Certificate	R	
			(ii)Functional Test on assembly	100%		Conformity to specifications	IR	W	
3.6.5	(a) Stud Stand Pipe Adopter (b) Male Stud Coupling (c) Banjo Coupling		Product identification	100%		Conformity to specifications	OEM TC / CC / STC	R	

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3.7.0	**SUPPLY OIL TANK ASSEMBLY (DRG. NO. _____)**								
3.7.1	Ball Valve		(i)Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Functional Checks & Pressure Test	100%		Functional checks are satisfactory	IR	W	
3.7.2	(a) Thermostat (b) Magnetic level switch (c) Level gauges		(i)Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	OEM TC / CC / STC & Calibration Certificate	R	
			(ii)Functional Test	100%		Functional checks are satisfactory	IR	W	
3.7.3	'O' Rings & Bonded seals		(i)Product Identification	100%		Conformity to specifications	OEM TC / CC / STC	R	
			(ii)Polymer Identification	100%		Constituents meet laid down specifications	LTC	R	Testing to be done at NABL approved laboratory
3.7.4	(a) Charging Pump (b) Three-way valve (c) Check Valve (d) Filters (e) Quick change coupling (f) Hardware items (g) Air Breather (h) Junction Box (j) Male Stud Coupling		Product identification.	100%		Conformity to specifications	OEM TC / CC / STC	R	
3.7.5	Hydraulic MS Fittings		(i)Product identification	100%		Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	R	
			(iii) Pressure Test at 1.5 times working pressure 30 mins	10%		Test is satisfactory	IR	W	

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			(iv) Coating Thickness (other than passivated)	One test piece per lot		Test is satisfactory	IR	R	
3.8.0	**PIPES & FITTINGS (DRG. NO. ___)**								
3.8.1	'O' Rings & Bonded Seals		(i) Product identification	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings / Catalogue	Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Polymer Identification	One test piece per lot		Constituents meet laid down specifications	LTC	R	Testing to be done at NABL approved laboratory
3.8.2	Hydraulic MS Fittings		(i)Product identification	100%		Conformity to specifications	OEM TC / CC / STC	R	
			(ii) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	R	
			(iii) Pressure Test at 1.5 times working pressure 30 mins	10%		Test is satisfactory	IR	W	
			(iv) Coating Thickness (other than passivated)	One test piece / lot		Test is satisfactory	IR	R	
3.8.3	(a)Male stud coupling (b) Unequal union (c) Bulkhead coupling		Product identification	100%		Conformity to specifications	OEM TC / CC / STC	R	
3.9.0	**LUBRICATION ASSEMBLY (DRG NO. _____)**								
3.9.1	Lubrication Pump		Inspection	100%	As per QAP at Appendix-E		Form IV / I-note	R	
3.9.2	Shock Mounts		Inspection	100%	As per SQAP		Form IV / I-note	R	
3.10.0	**PORTABLE FLUSHING UNIT (DRG. NO_____)**								
3.10.1	Flushing Unit Assembly		Inspection	100%	As per separately approved QAP		Form IV / I-note	R	
3.11.0	**Note:**	1. Make of the items should be as per approved DBOM. 2. For imported components, following documents to be submitted:- (a) Bill of Lading / Shipping Bill / Airway Bill (b) Invoice by OEM or Country of Origin Certificate with Packing List							

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		(c) Bill for entry to warehousing (d) OEM Confirmation Certificate (e) Firm's Guarantee certificate as per SOs 3. The inclusion of outsourced components / items under various categories viz. Imported, COTs, Bought-out & Sub-Contracted is to be as per Chapter 5 of QAD (available at DGQA website www.dgqadefence.gov.in) 4. Physical verification / Testing of all outsourced components may be undertaken during assembly.							
4.0.0	**IN -PROCESS / SUB-ASSEMBLY INSPECTION**								
	WELDING INSPECTION								
4.1.1	WPS & PQR		Qualification of Procedure for various processes	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings, ASME Section IX	Welding confirms to standards specified in reference documents	WPS PQR	R	
4.1.2	WPQ		Performance Qualifications	100%			WPQ Record	R	
4.2.0	**FIN UNIT ASSEMBLY (DRG. NO._____)**								
4.2.1	(a) Outboard Bearing Housing (Base Plate Boss) (b) Inboard Bearing Housing (Bridge Piece) (Steel Castings)		(i) Visual Inspection and Dimensional Inspection of Proof Machining	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	R	
			(ii) Visual Inspection and Dimensional Inspection of Finish Machining	100%		Conformity to specifications	IR	R	
4.2.2	(a) Gland Follower (b) Feed Back Lever (c)Feed Back Lever Pin (d) Connecting Rod (e) Gland Stud (f) Gland follower Stud (Steel EN3A/EN 8)		Visual Inspection and Dimensional Inspection post machining	100%		Conformity to specifications	IR	R	
4.2.3	Sea Gland Inserts		(i) Visual Inspection and Dimensional Inspection	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	R	
			(ii) DPT	100%		DPT is satisfactory	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III technician

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4.2.4	Base Plate Assembly		(i) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	R	
			(ii) DPT on weld joints	100%		DPT is satisfactory	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III technician
4.3.0	**FIN SHAFT LEVER ASSEMBLY (DRG. NO.____)**								
4.3.1	(a) Fin Shaft Lever (Tiller) (b) Locking Keep (c) Fin Shaft Lever PIn		Visual Inspection and Dimensional Inspection	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	R	
4.3.4	Final Fin Shaft Lever Assembly		Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	W	
4.4.0	**FIN STOCK ASSEMBLY (DRG. NO. ___)**								
4.4.1	Fin Shaft / Fin stock		Visual Inspection and Dimensional Inspection after final machining	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	W	
4.4.2	(a) Outboard & Inboard nuts (b) Location pin (c)Keep plate		Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	R	
4.4.3	Final Fin stock assembly		Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	W	
4.5.0	**FIN ASSEMBLY (DRG.NO. _____)**								
4.5.1	(a) Fin Boss (b) Fin Location Pin		Visual Inspection and Dimensional Inspection	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	R	
4.5.2	Pipe for Hydraulic Oil Injection (Steel)		(i) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	R	
			(ii) Pressure Test at 1.5 times working pressure	100%		Test is satisfactory	IR	W	
4.5.3	Fin Fabrication		(i) Stamp Transfer	100%		Inspection is satisfactory	IR	W	
			(ii) DPT on Weld Joints	Weld joints		DPT is satisfactory	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
									technician
4.5.4	Final Fin Assembly		Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	W	
4.6.0	**FIN UNIT ASSEMBLY (DRG. NO._____)**								
4.6.1	(i) Bedding contact of Tiller to Fin shaft		Bedding Contact	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications. 80% bedding contact.	IR	CHP for W	
	(ii)Bedding contact of Fin to Fin shaft		Bedding Contact			Conformity to specifications. 80% bedding contact.	IR	CHP for W	
4.6.2	Final Fin Unit Assembly		Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	CHP for W	
4.7.0	**HULL INTERFACE STRUCTURE IWO CARTRIDGE (DRG. NO._____)**								
4.7.1	Structure IWO Cartridge		(i) Stamp Transfer	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	W	
			(ii) DPT on weld Joints	100%		DPT is satisfactory	IR	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III technician
			(iii) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	CHP for W	
4.8.0	**TRANSMITTER DRIVE ASSEMBLY (DRG NO._____)**								
4.8.1	(a) Transmitter lever pin (b) Transmitter lever (c) Final Transmitter Drive assembly		Visual Inspection and Dimensional Inspection	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	R	
4.9.0	**DISTRIBUTION BLOCK ASSEMBLY (DRG. NO._____)**								
4.9.1	Distribution Block		(i) Visual Inspection and Dimensional Inspection post machining	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	R	
			(ii) Pressure Test at 1.5 times working pressure 30	100%		Pressure Test is satisfactory	IR	W	

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
			mins						
4.9.2	Distribution Block Final Assembly		(i) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	W	
			(ii)Functional test (Procedure to be submitted)	100%		Functional checks are satisfactory	IR	CHP for W	
4.10.0	**ACTUATOR ASSEMBLY (DRG. NO. _____)**								
4.10.1	Tube with Weld Flanges (Cylinder)		(i) Visual Inspection and Dimensional Inspection	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	R	
			(ii) UT on weld joints	100%		UT is satisfactory	NDE Report	W	Testing to be do done by ISNT/ ASNT Level II or III technician
4.10.2	Piston		Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	R	
4.10.3	Piston Rod		(i) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	R	
			(ii) Surface Roughness	100%		Surface finish is satisfactory	IR	R	
4.10.4	Actuator Final Assembly		(i) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	CHP for W	
			(ii) Check for movement & stroke length	100%		Movement should be free in either direction & satisfactory	IR	CHP for W	
			(iii) Pressure Test at 1.5 times working pressure 30 mins	100%		Pressure test is satisfactory	IR	CHP for W	
4.11.0	**POWER UNIT ASSEMBLY (DRG. NO._____)**								
4.11.1	(a) Pump / Motor Bracket (b) Manifold block		Visual Inspection and Dimensional Inspection after final machining	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	R	
4.11.2	Sole Plate		(i) DPT of weld joints	On Weld Joints		DPT is satisfactory	IR	W	Testing to be do done by ISNT/ ASNT Level II or III

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
									technician
			(ii) Visual Inspection and Dimensional Inspection after final machining	100%		Conformity to specifications	IR	R	
4.11.3	Final assembly of power unit		(i)Check for completeness	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	CHP for W	
			(ii) Visual Inspection and Dimensional Inspection after final machining	100%		Conformity to specifications	IR	CHP for W	
			(iii)Shop Trials / Functional Trials	100%		Functional checks are satisfactory	IR	CHP for W	
			(iv) Pressure Test at 1.5 times working pressure 30 mins	100%		Pressure checks are satisfactory	IR	CHP for W	
			(v)Noise and Vibration Test	100%		Vibration amplitude within limits specified in SOTR	IR	CHP for W	
4.12.0	**HAND PUMP ASSEMBLY (DRG. NO._____)**								
4.12.1	Hand pump Panel		Visual Inspection and Dimensional Inspection	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	R	
4.12.2	Final Assembly		(i)Check for completeness	100%		Conformity to specifications	IR	CHP for W	
			(ii) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	CHP for W	
			(iii) Functional Test	100%		Functional checks are satisfactory	IR	CHP for W	
4.13.0	**SUPPLY TANK ASSEMBLY (DRG. NO._____)**								
4.13.1	Fabrication of Supply Tank		(i) Visual Inspection and Dimensional Inspection	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Conformity to specifications	IR	CHP for R	
			(ii) DPT on Weld Joints	100%		DPT is satisfactory	NDE Report	CHP for W	Testing to be do done by ISNT/ ASNT Level II or III qualified technician
4.13.2	Supply Tank Final Assembly		(i) Visual Inspection and Dimensional Inspection	100%		Conformity to specifications	IR	CHP for W	

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
			(ii) Leakage Test per FATs	100%		Leakage Test is satisfactory	IR	CHP for W	
5.0.0	**PRE- REQUISITES TO FINAL INSPECTION**								
5.1.0	**TYPE TESTING OF HYDRAULIC SYSTEM (Actuators, Distributors, Valves, Power Pack, Pipe Lines and Other Hyd Components)**								
5.1.1	Endurance Run of Hydraulic System for 100 Hrs uninterrupted		All functional Parameters to be checked & recorded	One Unit	SOTR, Approved GA drawing, DBOM, manufacturing drawings and approved ATP	All parameters are satisfactory	Type test Report	CHP for W	
5.1.2	Tilt Test (Unit is to run for01 Hr with 20° tilt in each direction)		All functional Parameters to be checked & recorded	One Unit		All parameters are satisfactory	Type test report	CHP for W	
5.1.3	Shock Analysis of Hydraulic System		Compliance to Shock Grade IN Shock Grade A / NSS II, as applicable, is to be proved	One Unit		Equipment meets IN Shock Grade A / NSS II, as applicable	NSTL(V) Test report	CHP for R	
5.1.4	Noise and Vibration								
	(a)Structure Borne Noise of Hydraulic system		Structure borne sound radiated by unit	One Unit	SOTR, Approved GA drawing, DBOM and manufacturing drawings	SBN meeting the limits specified in SOTR	LTC	CHP for R	Test to be carried out by approved Lab/Agency
	(b)Vibration of Hydraulic system		Equipment to withstand environmental vibrations without any reduction of reliability & performance.			Vibration amplitude within limits specified in SOTR	LTC	CHP for R	
	(c) Air Borne Noise of Hydraulic System		Air borne sound power radiated by the system			ABN meeting the limits specified in SOTR	LTC	R	
5.2.0	**HYDRAULIC FATS**								
5.2.1	Test bed Facility		Suitability as per FATs requirements	100%	SOTR, Approved GA drawing, DBOM, manufacturing drawings and approved ATP / FATs document	Test bed should be suitable for FATs	IR	W	
5.2.2.	Internal FATs Report		All QA checks including functional & safety parameters	100%		Internal FATs completed satisfactorily	Internal FATs Report	CHP for R	
5.2.3	FATs of Hydraulic		(i) Verification of type test	100%		Type Test Report is available	Type Test Report	CHP for R	

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
	System (Power Packs) - Proving Run 24 Hrs		(ii) Visual Inspection and Dimensional Inspection	100%		Inspection is satisfactory	IR	CHP for W	
			(iii) Functional & Safety Checks	100%		Functional & Safety Checks are satisfactory	FATs Report	CHP for W	
			(iv) Noise & vibration checks	100%		Noise & Vibration checks are satisfactory	IR / LTC	CHP for W	
			(v) Dispatch Clearance / Form IV (if manufactured by sub- vendor)	100%				R	
5.3.0	**ELECTRICAL & ELECTRONICS COMPONENTS**								
5.3.1	Motor		Product identification	100%	As per SQAP		Form IV / I-note / Dispatch clearance / Test Report	R	
5.3.2	Motor Starter Panel		Product identification	100%	As per SQAP		Form IV / I-note / Dispatch clearance / Test Report	R	
5.3.3	Control Panel		Product identification	100%	As per SQAP		Form IV / I-note / Dispatch clearance / Test Report	R	
5.3.4	ESS Test (for PWAs)		PWAs Testing	100%	SOTR, Approved GA drawing, DBOM, manufacturing drawings and approved ATP / FATs document	ESS Tests are satisfactory	ESS Report	R	
5.3.5	Final Functional Test (For PWAs-DIP, DOP, AIP, AOP)		Functional Checks	100%		Final functional tests are satisfactory	Test report	W	
5.3.6	Inter Unit Wiring Checks		Wiring Checks	Random		Checks are satisfactory	Check Wire Report	R	

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
6.0.0	**MISCELLANEOUS REQUIREMENTS**								
6.1.1	Submission of Draft Documentation		As per SOTR	100%	SOTR / PO	Draft should be available	Documentation	CHP for R	To be forwarded to IHQ MoD(N) for approval
6.1.2	Software Quality Assurance		Software Quality checks	One ship set	Separately approved Software QAP	Software testing is satisfactory	IR	R	
6.1.3	Inspection of the test bed setup & Integrated System		As per IFT document.	100%	SOTR, Approved GA drawing, DBOM, manufacturing drawings and approved ATP / FATs document	Checks are satisfactory	IR	R	
6.1.4	TSP / TNC Compliance		Compliance	100%	SOTR, Approved GA drg, DBOM, manufacturing drawings, TSP / TNC minutes	Compliance to TSP / TNC minutes	Compliance Matrix	CHP for R	
7.0.0	**FINAL INSPECTION - IFT (MECHANICAL HYDRAULIC & CONTROL SYSTEM)**								
7.1.1	Integrated Functional Trials of Mechanica , Hydraulic & Control System on OEM Test Bed / Stand		All functional & safety parameters to be checked	100 Hrs for one set 24 Hrs Production run for rema-ining sets	SOTR, Approved GA drawing, DBOM, manufacturing drawings and approved ATP / IFATs document	Satisfactory completion of all trials. Liquidation of all defects / shortcomings observed during IFATs	IFT Report	CHP for W	
8.0.0	**PRE-REQUISITE-ISSUE OF I & T CERTIFICATE-FORM-IV**								
8.1.1	OBS Items as per Purchase Order		Product Identification and Visual Inspection	100%	SOTR, Approved GA drawing, DBOM, manufacturing drawings and approved ATP / IFATs document	OBS are supplied as per PO	MTC / CC / IR	W	
8.1.2	Submission of As Built Drawing		Verification	100%		As built drawings are complete and satisfactory	As built drawings	R	
8.1.3	Submission of approved documents for stamping		Verification & Stamping	100%		Documentation is complete	Documentation	CHP for W	

SL. NO.	MATERIAL / COMPONENT/ QUALITY ACTIVITY	QTY. AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
8.1.4	Liquidation of observation during IFT (If any)		Liquidation of Defects	100%		All defects liquidated	IR	W	
8.1.5	Weight Recording		Weight	100%		To be within limits	Weight Certificate	W	
8.1.6	Painting & Preservation		(i) VI (ii) Dry film Thickness	100%		Painting and DFT meets the specifications	IR	W	
8.1.7	Submission of FORM 4 (I & T Certificate)		Correctness	100%	SOTR, Purchase Order	SOTR, Purchase Order	FORM-4	P	

NOTE:-

1. Equipment & accessories to be supplied should conform to specifications.
2. If Type Testing, EMI/EMC and ETT have already been done in earlier projects on identical units, it will not be done again & the reports of earlier tested units will be provided for review of Inspection Agency.
3. EMI / EMC test and ETT will 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 III qualified person based on standards and acceptance criteria specified in SOTR / TSP and performed by ASNT / ISNT Level II / Level III qualified person. For RT, the shooting sketch indicating Critical Test Regions and Test Regions to be submitted prior to testing.
6. 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 drawings. Items will be categorized as bought out or COTs in the QAP 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.
7. The QAP does not apply to items not in the scope of supply of the firm. Inspection of assemblies / sub-assemblies and other items which have not been included in the SQAP but form an important part of the system will also be undertaken.
8. Pressure testing of hydraulic fittings will be undertaken on assembly. All pressure testings will be as per the approved ATP / FATs document.
9. Shooting sketch indicating critical test zones and test zones are to be submitted prior to testing.
10. 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.
11. Software QAP is to be approved by IHQ MoD(Navy).
12. The Functional Checks on assembly are to be undertaken at the earliest available opportunity (FATs / IFATs).
13. The defects observed during NDT of castings and forgings should be within the acceptable limits specified in the applicable standards.

Appendix - 'B'
Refers to Part-II of SQAP

STANDARD QUALITY ASSURANCE PLAN FOR MOTORS

SL. NO	MATERIAL/COMPONENT / DRG.NO/ QUALITY ACTIVITY	QTY	CHARACTERISTIS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	QAE	REMARKS
1.0	**DRAWINGS/DOCUMENTS/TYPE TESTS**								
1.01	Drawings & Documents		Approved drawings & Documentation	100%	PO, SOTR, TNC Minutes & EED-Q-071 (R4) (whichever is relevant)	Same as reference documents	List of approved binding drawings	CHP for R	Approval by Design Authority, Prof. Dte, Shipyard and Insp. Authority / Command HQ to be verified.
2.0	**MATERIAL INSPECTION**								
2.01	(a) SS Shaft (b) CS Plate		Mechanical properties & Chemical composition	Sample	Approved Drawings	Material grade as per approved drawings	LTC (NABL Lab)	CHP for R	Sample to be drawn in presence of QA rep
2.02	(a) SS Shaft (b) CS Plate		UT	100%	-do-	-do-	Certified by ASNT level - II Personnel	R	
2.03	(a) Stamping (b) Copper Wire		(i) Visual Inspection (ii) Dimensional Inspection (iii) Mechanical, Chemical, Thermal and Electrical Properties	Sample	-do-	-do-	STC	R	
2.04	(a) Bearing Make / Type Shaft Seal (b) Misc items viz., Cable Gland, Cooling Fan etc. As per PO / Appd Drgs		(i) Visual Inspection (ii) Dimensional Inspection	100%	-do-	-do-	STC	R	
3.0	**STAGE INSPECTION**								
3.01	Rotor & Stator		(i) Visual Inspection (ii) Dimensional Inspection (iii)Calculation of air gap	100%	-do-	Approved drawings	Firm's QA Report / STC	R	
3.02	Rotor		Balancing	100%	-do-	-do-	IR	R	
4.0	**ASSEMBLY**								
4.01	Motor Assembly		Bill of Material	100%	Approved drawings	Firm Report	IR	W	

SL. NO	MATERIAL/COMPONENT / DRG.NO/ QUALITY ACTIVITY	QTY	CHARACTERISTIS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	QAE	REMARKS
5.0	**TEST AND TRIALS**								
5.01	Type Tests		(a) Insulation Resistance (Ambient & Hot) (b)Winding Resistance (Hot & Cold) (c) Temperature rise (d) Load test at 100%, 75% and 50 %. (e)Determine Efficiency & Performance (f) Starting Torque (g) Pull Out Torque (h) Starting Current and Run up Time (j) Reduced Voltage Test (k) Over Speed at 115% for15 minutes (l) Withstand Voltage (m) Oscilographic records of Starting Current at Full Load / No Load at Normal / Reduced Voltage (n) Phase Balance at Full Load / No Load Conditions. (p) Momentary Over-load Test at 110% for 15 sec. (q) Thermister Resistance (Ambient, Hot & Cold) (r) Hot Spot Sensing (s) IP (as applicable) (t) Earth Bonding (u)Protection Under Stall Condition	One motor of each frame size per lot	Major	EED-Q-071-(R4) and approved drawing	Type test report	W	

SL. NO	MATERIAL/COMPONENT / DRG.NO/ QUALITY ACTIVITY	QTY	CHARACTERISTIS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	QAE	REMARKS
5.02	Routine Tests		(a) No load test (b) Over speed test at 115 % for 15 minutes (c)Short circuit test (d)Thermister resistance (ambient, hot and Cold) (e) Phase balance at no load (f)Starting torque (g)Winding resistance (Hot & Cold) (h)Space heater (where ever applicable) (j) IP (as applicable) (k)Direction of Rotation	Balance motors	Major	EED-Q-071(R4) and approved drawing	Routine Test Report	W	
5.03	General for all motors		(a) Insulation test (ambient & hot) (b) High voltage test (c)Noise level test (d)Vibration test (e)Bearing check / SPM (f)Dimensional check (g)Weight check (h)Terminal / name plate check (j)Earth bond test. (k)Space heater (wherever applicable) (l)Withstood voltage	All motors	Major	EED-Q-071(R4) and approved drawing	Routine Test Report	W	
5.04	Integration Trial		As per DEE Policy	One motor of each type with respective starter / control panel	Major	DEE Policy	IR	W	

SL. NO	MATERIAL/COMPONENT / DRG.NO/ QUALITY ACTIVITY	QTY	CHARACTERISTIS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	QAE	REMARKS
5.05	Type tests, ETT & EMI/EMC reports		Verification	Prototype sample	PO	PO	Type test reports	CHP for R	EMI / EMC Acceptance Test Plan duly vetted by NEC Mumbai 6.0
6.0	**DOCUMENTATION**								
6.01	Documents for operation, maintenance and repair		Availability & verification	100%	PO	PO	-	CHP for R	
7.0	**PAINTING, PACKING AND PRESERVATION**								
7.01	Painting, Packing, Preservation and Marking		As per SOTR/PO	100%	Critical	As per SOTR / PO		CHP for W	

NOTE:-

1. Type Test, EMI/EMC and Environmental test in accordance with EED-Q-071-(R4) / JSS-55555.2012(Rev. 3) is to be carried out after QA agencies, clearance and sealing of equipment. Post ET and EMI/EMC, checks will also be conducted by QA agencies. If Type Testing, EMI/EMC and ET has already been done in earlier projects on identical units, it will not be done again & the reports of earlier tested units will be provided for review of Inspection Agency. In case of any difficulty/discrepancy in carrying out the above, matter be referred to IHQ MoD(N)/DEE within 10 days of receipt of approved QAP under intimation to HQ DQA(WP).
2. EMI EMC test and ET will be done at NABL Lab. EMI/EMC Acceptance Test Plan is to be duly vetted by NEC Mumbai.
3. Equipment & Accessories to be supplied should conform to specifications.
4. Starter cum control panel is to be procured / manufactured only from Naval approved vendor as mentioned in IHQ MoD (N)/DEE Compendium of Vendors 2015 No. EE-50-30(REV-2) dated 29 Jun 15.

APPENDIX - 'C'
Refers to Part-II of SQAP

STANDARD QUALITY ASSURANCE PLAN FOR AC STARTERS AND CONTROL PANELS

SL. NO	MATERIAL/ COMPONENT/ DRG.NO/ QUALITY ACTIVITY	QTY	CHARACTERISTCS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	QAE	REMARKS
1.0.0	**DRAWINGS/DOCUMENTS/TYPE TESTS**								
1.01	Drawings & Documents		Approved drawings	100%	PO, SOTR, TNC Minutes andEED-Q-071(R4) (whichever is relevant)	Same as reference document	List of approved drawings	CHP for R	Approval by design authority, Prof Dte, Shipyard and Insp. Authority / Command HQ to be verified.
2.0.0	**MATERIAL INSPECTION**								
2.01	Steel for fabrication		Dimensions	Measurement	Approved Drawings	Material grade std. as per approved drawings	IR	CHP for R	Sample to be drawn in presence of QA rep
			Surface finish	Visual			IR		
			Physical & Chemical Properties	Sample			LTC (NABL Lab)		
	COTS ITEMS								
2.02	Air Break Switch		Type No.	Verification	Make / Type as per Approved Drawings	Standard as per approved drawings	STC	R	
			Current Rating						
			Voltage Rating						
2.03	Air Circuit Breaker		Type No.	Verification	-do-	-do-	STC	R	
			Current Rating						
			Voltage Rating						
2.04	Air Break Contactor		Type No	Verification	-do-	-do-	STC	R	
			Current Rating						
			Coil Voltage						
			Auxiliary Contacts						
2.05	Bus Bar		Cross Section	Verification	-do-	-do-	STC	R	
			Conductivity						
			Bend Test						
			Tensile Test						
			Chemical composition						

SL. NO	MATERIAL/ COMPONENT/ DRG.NO/ QUALITY ACTIVITY	QTY	CHARACTERISTCS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	QAE	REMARKS
2.06	Cable		Voltage Grade	Verifications	-do-	-do-	STC	R	
			Colour						
			Nominal cross section area						
			Thickness of insulation						
			IR Value						
			Cond. Resistance						
2.07	Current Transformer		Type of CT (Insul-ation material used)	Verification	-do-	-do-	STC	R	
			Terminal Markings						
			Polarity						
			Ratio						
			Burden (Not applicable for special purpose CTs)						
			Knee pt. (Applicable for special purpose CTs Voltage)						
			ALF (Applicable for special purpose CTs)						
			ISF (Applicable for special purpose CTs)						
			Dimensions						
2.08	Control Transformer		Ratio	Verification	-do-	-do-	STC	R	
			Tapping						
			Rating						
			Terminal Markings						
2.09	Busbar Support		Flammability	Verification	-do-	-do-	STC	R	
			Water absorption						
			Density						
			Tensile Strength						
			Compressive st.						
			Flexural Strength						
			Impact Strength						
			Breakdown Voltage						

SL. NO	MATERIAL/ COMPONENT/ DRG.NO/ QUALITY ACTIVITY	QTY	CHARACTERISTCS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	QAE	REMARKS
			Arc Resistance Dimension						
2.10	HRC Fuse & Fuse Base		Type No Current Rating Voltage Rating Continuity	Verification	-do-	-do-	STC	R	
2.11	MCCB		Type No. Current Rating Voltage Rating	Verification	-do-	-do-	STC	R	
2.12	MCB		Type No. Current Rating Voltage Rating	Verification	-do-	-do-	STC	R	
2.13	Meters (Voltmeters, Ammeter, Frquency meter, KWH meter, Transducer etc.)		Range CTR/PTR/Shunt Type of Movement Calibration/ Accuracy	Verification	-do-	-do-	STC	R	
2.14	Neoprene Gasket/Conductive gasket/EMI shielding as applicable		Dimensions Hardness Flame Test	Verification	-do-	-do-	STC	R	
2.15	Voltage Transformer / Potential Transformer		Ratio Burden Accuracy Class Polarity No of Phases Voltage factor Insulation Level Functional checks	Verification	-do-	-do-	STC	R	
2.16	Relays		Model /Type No. Relay Details	Verification	-do-	-do	STC	R	

SL. NO	MATERIAL/ COMPONENT/ DRG.NO/ QUALITY ACTIVITY	QTY	CHARACTERISTCS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	QAE	REMARKS
			Auxiliary contacts						
			Operational Checks						
2.17	Space Heater		Rating	Verification	-do-	-do-	STC	R	
			Wattage						
2.18	Thermostat		Range	Verification	-do-	-do-	STC	R	
			Rating						
2.19	Timer		Type No	Verification	-do-	-do-	STC	R	
			Voltage Rating						
			Aux. Contacts						
2.20	Miscellaneous Electrical items (Bulbs, Lamp Holder, Resistors, PB, Actuators, Diodes, Bridge Rectifiers, Switch)		Make	Verification	-do-	-do-	STC	R	
			Rating						
2.21	Core Balanced CTs		Make	Verification	-do-	-do-	STC	R	
			Type						
			Rating						
			Primary Operating Current						
			CT Secondary Current						
			Tripping Time						
			Tripping Range						
2.22	Starter		Make	Verification	-do-	-do-	STC	R	
			Type						
2.23	Cable Glands		Dimensional	Verification	-do-	-do-	STC	R	
2.24	Bare PCBs / PWBs		ESS Test	100%	-do-	As per extant policy (para 3 of footnote relevant)	STC / NABL Report	R	
3.0	**INPROCESS INSPECTION**								
3.01.	Fabrication/		Visual	Visual Check	Approved Drgs	Standard as per	IR	CHP	CHP could be carried out

SL. NO	MATERIAL/ COMPONENT/ DRG.NO/ QUALITY ACTIVITY	QTY	CHARACTERISTCS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	QAE	REMARKS
	bending Shearing / cut-outs welding		Dimension	Physical verification		approved drawings		for R	at the time of Panel assembly checks.
			For welding distance b/n welding Sports.	Physical verification					
3.02	Surface preparation & painting		Visual	VI	-do-	Same as reference document	IR	CHP for R	-do-
			Shade	VI					
			Coating thickness	Conduct					
			Adhesion	Conduct					
3.03	Wiring		Wiring Size	Visual (Verification)	-do-	-do-	IR	CHP for R	-do-
	Continuity		Ckt Health	By Test					
4.0	**ASSEMBLY**								
4.01	Panel Assembly		Dimension	VI	Approved Drgs	Same as reference document	IR	W	
			Gland Plate assembly						
			Base Plate assembly						
			Panel Coupling						
4.01	Visual Inspection		Overall Dimension and weight	Verification	-do-	-do-	IR	W	
			Mounting arrangement of components						
			Wiring arrangement and ferruling, Gasket fixing,						
5.0	**TEST & TRIALS**								
5.01	Functional checks		Functional checks at No load & Full Load	By Test	EED-Q-071(R4)	Same as reference document	IR	W	Full load test by Current Injection method
			IR Test before and after HV Test						
			HV Test						
			Milivolt drop test on Power Circuit I excess of 100A, Earth bond and Temperature rise (applicable for Panels with Busbar)						

SL. NO	MATERIAL/ COMPONENT/ DRG.NO/ QUALITY ACTIVITY	QTY	CHARACTERISTCS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	QAE	REMARKS
5.02	Type tests, ETT & EMI/EMC reports		Availability & verification	Prototype sample	PO, Approved drawings, EED-Q-071(R4)	Same as reference document	Type test reports	CHP for R	As per para 2 of footnote
6.0	**DOCUMENTATION**								
6.01	Documents for Operation, Maintenance & Repair		Availability & verification	100%	PO	PO	-	CHP for R	
7.0	**PAINTING, PACKING AND PRESERVATION**								
7.01	Packing, Preservation and Marking		As per SOTR/PO	100%	Critical	Visual	PO	CHP for W	

NOTE:-

1. Type Test, EMI/EMC and Environmental test in accordance with EED-Q-071-(R4)/JSS-55555.2012(Rev. 3) is to be carried out after QA agencies, clearance and sealing of equipment. Post ET and EMI/EMC, checks will also be conducted by QA agencies. If Type Testing, EMI/EMC and ET have already been done in earlier projects on identical units, it will not be done again & the reports of earlier tested units will be provided for review of Inspection Agency. In case of any difficulty/discrepancy in carrying out the above, matter be referred to IHQ MoD(N)/DEE within 10 days of receipt of approved QAP under intimation to HQ DQA(WP).
2. EMI EMC test and ETT will be done at NABL Lab. EMI/EMC Acceptance Test Plan is to be duly vetted by NEC Mumbai.
3. ESS test (Thermal Cyling, Random Vibration and Burn in / Endurance) as per DQA(N) policy vide letters 66301/Policy-07/DQA(N)/QA-07 dated 09 Aug 16.
4. Equipment & Accessories to be supplied should conform to specifications.
5. Starter cum Control Panel is to be procured /manufactured only Naval approved vendor as mentioned in IHQ MoD(N) / DEE Compendium of Vendors 2015 No. EE-50-30(Rev 2) dated 29 Jun 15.
6. Conformal coating of PCBs to be done as per DQA(N) policy letter 580930/DQA(N)/EL dated 17 Feb 14.

APPENDIX - 'D'
Refers to Part-II of SQAP

STANDARD QUALITY ASSURANCE PLAN FOR STABILISER ELECTRONICS AND CONTROL SYSTEM

SR. NO	COMPONENTS	QTY AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORDS	ACTION BY QAE	REMARKS
1.0	**DRAWINGS / DOCUMENTS VERIFICATION**								
1.1	GA Drawings along with DBOM & Binding Data		Check for availability of approved drawings and DBOM & Binding Data	100%	PO & SOTR/ TNC Minutes	All approved drawings along with DBOM & Binding Data are available	List of approved drawings & Binding Data	CHP for R	Approved binding data / drawing to be verified
1.2	Manufacturing Drawings		Verification of manufacturing drawings with reference to the approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections.	100%	SOTR, GA Drawings along with DBOM	Manufacturing drawings bear complete data; The data is sufficient for production and stage inspections	List of approved drawings	CHP for R	
2.0	**RAW MATERIAL INSPECTION**								
2.1	Steel plates for fabrication of all Panels/ Consoles:- • Local Control Unit • Central Control Unit • MCR Operator Control Panel • Roll sensor Unit • ACOS panel (Port / Stbd) • Junction Boxes		(i)Material Identification & Stamping	100%	SOTR, Approved GA drawings, DBOM & manufacturing drawings	Raw material confirm to given specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 sample per lot		Physical, mechanical and chemical properties meet the laid down specifications	LTC	R	Testing to be done at NABL approved laboratory.

SR. NO	COMPONENTS	QTY AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORDS	ACTION BY QAE	REMARKS
	(Port / Stbd) • Control Transformer (Port / Stbd) • Any other panel not included in the list								
3.0	**INCOMING INSPECTION FOR MAJOR BOUGHT OUT ITEMS**								
3.1	Shock Mounts (Not part of IFT)		Inspection	100%	As per SQAP & drawing		Form IV / I-note / Dispatch clearance / Test Report	R	
3.2	Motor Starter Panels		Inspection	100%	As per SQAP & drawing		Form IV / I-note / Dispatch clearance / Test Report	R	
3.3	Motors		Inspection	100%	As per SQAP & drawing		Form IV / I-note / Dispatch clearance / Test Report	R	
3.4	Fin Feedback Unit		(i) Product Identification	100%	SOTR, Approved GA drawings, DBOM & manufacturing drg	Material confirms to approved drg	IR	R	
			(ii) Functional test	100%		Functional tests are satisfactory	OEM TC / CC and IR	W	
3.5	Electronic units / Components / PCBs / Modules - Imported / COTS		Environment Screen Testing (a) PCB level (b) Module / sub-unit level (c) Unit / cabinet level	100%	SOTR, Approved GA drawing, DBOM, manufacturing drawings & approved ESS Programme	OEM CCs clearly endorse standards to which items comply and physical values of the test conditions	OEM TC / CC / STC	R	
4.0	**IN-PROCESS/SUB-ASSEMBLY INSPECTION**								
4.1	All Panels and Consoles		(i) Visual & Dimensional Inspection	100%	SOTR, Approved GA drawings,	No visible damages;	IR	W	

SR. NO	COMPONENTS	QTY AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORDS	ACTION BY QAE	REMARKS
	• Local Control Unit • Central Control Unit • MCR Operator Control Panel • Roll sensor Unit • ACOS panel (Port / Stbd) • Junction Boxes (Port / Stbd) • Control Transformer (Port / Stbd) • Any other panel not included in the list				DBOM & manufacturing drawings	Dimensions are as per the drawing			
			(ii) Painting (DFT)	100%		Compliance to specifications	IR	W	
4.2	Electronic units / Components / PCBs / Modules - Indigenously manufactured / assembled		Environment Screen Testing (a) PCB level (b) Module / sub-unit level (c) Unit / cabinet level	100%	SOTR, Approved GA drawings, DBOM, manufacturing drawings & approved ESS Programme	Electronics items should clear ESS	IR	CHP for R	ESS programme is to be drawn up by vendor based on the equipment design and approved by DQA(WP)
5.0	**ENVIRONMENTAL TYPE TEST AND EMI/EMCTEST**								
5.1	Assemblies and Sub-assemblies of the Stabiliser Electronics and Controls System		Pre-type test functional checks (applicable for units to undergo type testing)	01 unit of each type	SOTR, Approved GA drawings, DBOM & manufacturing drawings	Functional test is satisfactory	Type Test Report	CHP for W	
			Environmental Tests	01 unit of each type	SOTR, Approved GA drawing, DBOM, manufacturing drawings, JSS55555 and	ET is satisfactory	ET Report	CHP for R	
			EMI/EMC Test	01 unit of each type		EMI/EMC test is satisfactory	EMI/EMC Test Report	CHP for R	EMI/EMC Test plan to be approved by NEC, Mumbai & IHQ/MOD(N) /DEE

SR. NO	COMPONENTS	QTY AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORDS	ACTION BY QAE	REMARKS
			Post-type test functional checks (applicable for units to undergo type testing)	01 unit of each type	approved test plan	Functional test is satisfactory	Type Test Report	CHP for W	
6.0	**FUNCTIONAL TEST OF SUB- ASSEMBLIES (FACTORY ACCEPTANCE TEST (FAT) OF ELECTRICAL UNITS)**								
6.1	(a) Local Control Unit (b) ACOS (c) Lub Pump Starter Panel (With Motor)		Visual Inspection	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Compliance to specifications	IR	W	
			Completeness of the panel	100%		All hardware as per approved drawings & DBOM are installed	IR	W	
			Overall connection, installation & dimensions	100%		Compliance to approved drawings & DBOM	IR	W	
			Functional Checks at No Load & Full Load	100%		Functional checks is satisfactory	IR	W	Full load test by current injection method or with motor at motor manufacturer's premises as per DEE Policy
			Ingress protection check	Sample		Required degree of protection is achieved	IR	W	
			IR Test before and after HV Test	100 %		Insulation resistance is satisfactory	IR	W	
			HV Test	100%		HV test is satisfactory	IR	W	
			Milivolt drop test if power circuit is in excess of 100A	100%		Test is satisfactory	IR	W	
			Earth bond test and temperature rise test	100%		Tests are satisfactory	IR	W	Applicable for panels with bus bar
			Painting - Visual Inspection and DFT	100%		Tests are satisfactory	IR	W	
			Weight measurement	100%		Weight as per	IR	W	

SR. NO	COMPONENTS	QTY AS PER P.O	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORDS	ACTION BY QAE	REMARKS
						specifications			
6.2	(a) Central Control Unit (b) MCR Operator Control Panel (c) Roll sensor Unit (d) Junction Boxes (Port / Stbd) (e) Control Transformer (Port / Stbd) (without motor)		Visual Inspection	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Compliance to specifications	IR	W	
			Completeness of the panel	100%		All hardware as per approved drawings & DBOM are installed	IR	W	
			Overall connection, installation & dimensions	100%		Compliance to approved drawings & DBOM	IR	W	
			Functional Checks at No Load & Full Load	100%		Functional checks is satisfactory	IR	W	Full load test by current injection method
			Ingress protection check	Sample		Required degree of protection is achieved	IR	W	To be done at NABL accredited lab
			IR Test before and after HV Test	100 %		Insulation resistance is satisfactory	IR	W	
			HV Test	100%		HV test is satisfactory	IR	W	
			Painting - Visual Inspection and DFT	100%		Tests are satisfactory	IR	W	
			Weight measurement	100%		Weight as per specifications	IR	W	
7.0	Software Quality Assurance		Refer SQAP for integrated electronics system of steering gear system						
8.0	Documentation		Verification	100%	As per SOTR and PO	As per SOTR and PO	IR	CHP for R	
9.0	Packing & Preservation		Visual Inspection	100%	As per SOTR and PO	As per SOTR and PO	IR	CHP for W	
10.0	Submission of FORM4 / DGS&D(S)-84		Correctness	100%			FORM-4/ DGS&D(S)-84	P	

NOTES:-

1. Type Test, EMI/EMC and Environmental test in accordance with EED-Q-071-(R4)/JSS-55555.2012(Rev. 3) is to be carried out after QA agencies, clearance and sealing of equipment. Post ET and EMI/EMC, checks will also be conducted by QA agencies. If Type Testing, EMI/EMC and ET have already been done in earlier projects on identical units, it will not be done again & the reports of earlier tested units will be provided for review of Inspection Agency. In case of any difficulty/discrepancy in carrying out the above, matter be referred to IHQ MoD(N)/DEE within 10 days of receipt of approved QAP under intimation to HQ DQA(WP).
2. EMI / EMC test and ET will be done at NABL Lab. EMI/EMC Acceptance Test Plan is to be duly vetted by NEC Mumbai.
3. ESS test (Thermal Cyling, Random Vibration and Burn in / Endurance) as per DQA(N) policy vide letters 66301/Policy-07/DQA(N)/QA-07 dated 09 Aug 16. ESS to be undertaken in NABL accredited Lab.
4. Equipment & Accessories to be supplied should conform to specifications.
5. Conformal coating of PCBs to be done as per DQA(N) policy letter 580930/DQA(N)/EL dated 17 Feb 14.

APPENDIX - 'E'
Refers to Part-II of SQAP

STANDARD QUALITY ASSURANCE PLAN FOR MULTIPOINT LUBRICATING PUMP ASSEMBLY

SL. NO.	MATERIAL / COMPONENT / DRG.NO / QUALITY ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
1.0.0	**DRAWINGS / DOCUMENTS VERIFICATION**								
1.1.0	GA Drawings along with DBOM & Binding Data		Check for availability of approved drawings and DBOM & Binding Data	100%	PO & SOTR/ TNC Minutes	All approved drawings along with DBOM & Binding Data are available	List of approved drawings & Binding Data	CHP for R	Approved binding data / drawing to be verified
1.2.0	Manufacturing Drawings		Verification of manufacturing drawings with reference to the approved GA drawings and DBOM for completeness and sufficiency of data to undertake production and process inspections.	100%	SOTR, GA Drawings along with DBOM	Manufacturing drawings bear complete data; The data is sufficient for production and stage inspections	List of approved drawings	CHP for R	--
1.3.0	Type test / ET / EMI / EMC reports		Availability & verification	100%	PO & SOTR / TNC Minutes/ JSS 55555	Equipment should be tested in the past and relevant certificate is available	Type/ Qualification test reports	CHP for R	Type / qualification test are to be conducted if not undertaken earlier or test certificate not held or equipment has undergone changes
2.0.0	**SECTION I - RAW MATERIAL INSPECTION**								
2.1.0	**MANUFACTURED ITEMS**								
2.1.1	1. Pump body		(i) Material Identification &	100%	SOTR, Approved	Raw material	IR	W	

SL. NO.	MATERIAL / COMPONENT / DRG.NO / QUALITY ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
	2. Pump element 3. Reservoir 4. Base plate		Stamping		GA drawings, DBOM and manufacturing drawings	confirm to given specifications			
			(ii) Mechanical properties & Chemical composition	01 sample/ heat / lot		Physical, mechanical and chemical properties meet the laid down specifications	LTC	R	Testing to be done at NABL approved laboratory.
2.2.0	**BOUGHTOUT ITEMS**								
2.2.1	Gear box		Product Identification	100%	SOTR, Approved GA drawings, DBOM, manufacturing drawings and catalogue	Material confirm to specifications	OEM TC / CC	R	
2.2.2	Motor		Inspection	100%	As per SQAP		Form IV / I-note	R	
2.2.3	Motor Starter Panel		Inspection	100%	As per SQAP		Form IV / I-note	R	
2.2.4	Brass Tubes		(i) Material Identification & Stamping	100%	SOTR, Approved GA drawing, DBOM, manufacturing drawings and catalogue	Raw material confirm to given specifications	IR	W	
			(ii) Mechanical properties & Chemical composition	01 sample/ lot		Physical, mechanical and chemical properties meet the laid down specs	LTC	R	Testing to be done at NABL approved laboratory.
			(iii)Pressure testing	100%		Pressure testing is satisfactory	IR	W	
2.2.5	1. Grease Nipple 2. Limit Switch		Product Identification	100%	SOTR, Approved GA drawing,	Material confirm to	STC	R	

SL. NO.	MATERIAL / COMPONENT / DRG.NO / QUALITY ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
	3. Tale Tell Rod				DBOM, manufacturing drawings and catalogue	specifications			
3.0.0	**IN PROCESS INSPECTION**								
3.1.0	1. Pump body 2. Pump element 3. Reservoir 4. Base plate		Visual and Dimensional Inspection	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Inspection is satisfactory	IR	R	
3.2.0	Plunger Pump Assembly on Body		Leak tightness and Dimensional Inspection	100%		Inspection is satisfactory	IR	R	
3.3.0	Plunger Pump Alignment		Alignment checks and Dimensional Inspection	100%		Inspection is satisfactory	IR	R	
4.0.0	**PRE-REQUISITE FINAL INSPECTION**								
4.1.0	**TYPE TESTING**								
4.1.1	Endurance Test - 24 hrs		Record all functional parameters	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	All parameters satisfactory. No leakages in system	IR	W	
4.1.2	Tilt Test - 30 mins at 15^{o} tilt on both side		Record all functional parameters	01 unit		All parameters satisfactory. No leakages in system	IR	W	
4.1.3	Vibration Test		Record vibration signatures	01 unit		To be within specified limts			
4.1.4	Shock Test		Environmental Shock Test	01 unit		Test is satisfactory	NSTL Report	R	
4.1.5	SBN Test, if applicable		Record SBN	01 unit		To be within specified limts	IR	W	
5.0.0	**FINAL INSPECTION / FACTORY ACCEPTANCE TRIALS**								
5.1.0	Preliminary Test		(i) Visual and Overall Dimensional Inspection	100%	SOTR, Approved GA drawing, DBOM and manufacturing drawings	Inspection is satisfactory	IR	W	
			(ii) Functioning of tell-tale hole	100%		Inspection is satisfactory	IR	W	
			(iii) Functioning of limit switch	100%		Inspection is satisfactory	IR	W	

SL. NO.	MATERIAL / COMPONENT / DRG.NO / QUALITY ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
			(iv) Functioning of grease filling valve	100%		Inspection is satisfactory	IR	W	
			(v) Preliminary run to check following:- • Motor / cam speed • Abnormal noise • Excessive vibration • Abnormal heating • Leakages	100%		Inspection is satisfactory. No abnormal noise, excessive vibration and leakages observed	IR	W	
5.2.0	Test without load		(i) Measure Discharge	100%	SOTR, Approved GA drawing, DBOM, manufacturing drawings and app. FATs document	Discharge is satisfactory	IR	CHP for W	
			(ii) Leakage from joints	100%		No leakages	IR	CHP for W	
			(iii)Noise and vibration test	100%		To be within limits	IR	CHP for W	
5.3.0	Full Load Test		(i) Measure Discharge	100%		Discharge is satisfactory	IR	CHP for W	
			(ii) Leakage from joints	100%		No leakages	IR	CHP for W	
			(iii)Noise and vibration test	100%		To be within limits	IR	CHP for W	
5.4.0	Proving Run Test - 06 hrs		(i) Measure Discharge	100%		Discharge is satisfactory	IR	CHP for W	
			(ii) Leakage from joints	100%		No leakages	IR	CHP for W	
			(iii)Noise and vibration test	100%		To be within limits	IR	CHP for W	
6.0.0	Weight Recording		Weighing	100%	SOTR, Approved GA drawing	To be within limits	Weight Certificate	W	
7.0.0	Painting		Visual Inspection	100%	SOTR & PO	Painted as per specifications	IR	R	
8.0.0	Packing, Preservation and Marking		Visual Inspection	100%	SOTR & PO	Preserved, Marked and Packed as per specifications	IR	R	

SL. NO.	MATERIAL / COMPONENT / DRG.NO / QUALITY ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS / TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
9.0.0	Submission of FORM4 / DGS&D(S)-84		Correctness	100%			FORM-4/ DGS&D(S)-84	P	

NOTE:-

1. Equipment & accessories to be supplied should conform to specifications.
2. If Type Testing, EMI/EMC and ETT has already been done in earlier projects on identical units, it will not be done again & the reports of earlier tested units will be provided for review of Inspection Agency.
3. EMI / EMC test and ETT will 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. All NDT to be performed by ASNT/ISNT Level II or Level III qualified person.
6. 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 drawings. Items will be categorized as bought out or COTs in the QAP 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.
7. The QAP does not apply to items not in the scope of supply of the firm.
8. Inspection of assemblies / sub-assemblies and other items which have not been included in the SQAP but form an important part of the system will also be undertaken.
9. 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.