



**STANDARD QUALITY
ASSURANCE PLAN**

SQAP NO.DGQA/DQA (WP)/FLOWMETER/14/2018/REV 0

SQAP FOR TURBINE FLOW METER
(HYDRAULIC)

ISSUING AUTHORITY

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



MINISTRY OF DEFENCE (DGQA)

STANDARD QUALITY ASSURANCE PLAN

TURBINE FLOW METER (HYDRAULIC)

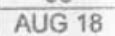
TURBINE FLOW METERS ARE USED FOR THE MEASUREMENT OF LIQUID FLOW. THE TURBINE FLOW METER TRANSLATES THE MECHANICAL ACTION OF THE TURBINE ROTATING IN THE LIQUID FLOW AROUND AN AXIS INTO A USER-READABLE RATE OF FLOW.

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Total Nos. of Pages: 21

ISSUING AUTHORITY

DIRECTORATE OF QUALITY ASSURANCE (WARSHIP PROJECT)
DGQA, 'H' BLOCK, NEW DELHI - 110 011

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MINISTRY OF DEFENCE (DGQA)

STANDARD QUALITY ASSURANCE PLAN (SQAP) FOR TURBINE FLOW METER (HYDRAULIC)

SQAP NO.
DGQA/DQA (WP)/FLOWMETER/14/2018/REV 0



(SP Lal)
Rear Admiral
ADGQA (WP)
23 Aug 2018

Promulgated by

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

1. This standard QAP has been prepared for use of the Indian Navy and of its contractors to follow the specified Quality Assurance procedure during the execution of the contracts. No alteration is to be made to this Standard QAP except by the issue of authorised amendment by DQA (WP).
2. It is to be applied as required in the Quality Assurance procedures covering manufacture of Turbine Flow Meter for IN Ships.
3. The website <http://www.dggqadefence.gov.in> may also be referred for other QA requirements.
4. The Standard QAP has been prepared on the basis of decisions made in collegiate meeting held at DQA (WP) with the manufacturer of Turbine Flow Meter for Indian Navy and representative of IHQ-MoD(N)/DME/DSP/DND. Any user of this Standard QAP either within DGQA / Indian Navy or in industry may propose an amendment to it with valid justification. Proposals not applicable to particular contract can be sent directly to DQA (WP), New Delhi, and those directly applicable to a particular contract are to be dealt with using contract procedures.
5. DQA (WP) reserves the right to amend or modify the contents of this Standard QAP without consulting or informing any holder of this document.
6. When this Standard QAP is incorporated into contracts, users are responsible for their correct application and for complying with contractual and other statutory requirements. Compliance with Standard QAP does not of itself confer immunity from legal obligations.
7. Enquiries in connection to these requirements may be made from:-

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

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STANDARDS INVOKED

1. Standards invoked as on date: -

- (a) AISI, SS 316 (Specification for Steel material).
- (b) ASTM E 446 and 1320 (Specification for Radiography test).
- (c) BR 3021(Specification for Shock Test).
- (d) ISO 2372 (Specification for Vibration test).

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SPECIFIC REQUIREMENTS

1. Testing of physical and chemical properties is to be done by NABL accredited lab. If the firm has NABL accredited lab the same can be used.
2. If casting is being poured without integral test bar, then only the pouring is to be witnessed by Inspector.
3. Radiography is to be carried out for critical regions marked in the approved drawing. Class of casting is to be mentioned in the drawing.
4. Non-Destructive Testing is to be carried out by ISNT/ ASNT level II or III qualified technician.
5. Make of the Items should be as per approved PIL/Bill of Material (BoM) or Naval approved sources
6. In case of bought out items, physical verification / function of item may be undertaken during assembly of the equipment to avoid repletion.
7. Imported items will be accepted against following import documents:
 - (a) Copy of one among Bill of Lading/Shipping Bill/ Airway Bill.
 - (b) Invoice by OEM or Country of Origin certificate of the equipment with packing list.
 - (c) Bill of Entry for Warehousing.
 - (d) The certificate of Conformity (CoC) indicating governing specifications and values to which the items are tested alongwith Original Equipment Manufacturer (OEM) test certificates/ test reports/ Catalogue/ Data sheet.
 - (e) Guarantee/ Warrantee certificate from the supplier/ OEM as per supply order.
8. Ingress protection testing will be as per applicable IP rating.
9. EMI, EMC tests and ETT will be done at Government/PSU test centers or NABL accredited labs.
10. If Type Testing 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.

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ABBREVIATIONS USED IN SQAP

CHP	CUSTOMER HOLD POINT
IR	INSPECTION REPORT
NABL	NATIONAL ACCREDITATION BOARD FOR TESTING AND CALIBRATION LABORATORIES
P	PERFORM
R	REVIEW
STC	SUPPLIER TEST CERTIFICATE
TC	TEST CERTIFICATE
W	WITNESS

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SCOPE

Scope of Quality Assurance: The scope of Quality Assurance will cover witness and review of all manufacturing activities during all stages viz. Raw Material Stage including, bought-out items, In-process Stage and Final Stage.

The scope also covers the review and witness of Type test of equipment, wherever applicable. The Standardised Quality Assurance Plan contains comprehensive list of inspections and/or trials that is to be applicable for quality assurance of the equipment. In addition, quality assurance of equipment will also be governed by specific conditions laid down in SOTRs and 'Approved Drawings'. The inspections/ trials must be contemporary to latest technology/ techniques available in the industry at the time of placement of orders.

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

- (a) Visual Inspection.
- (b) Dimensional Inspection.
- (c) Witness of Pouring in absence of integral test bar.
- (d) Review of 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.
- (i) 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 ETT, EMI/EMC and ESS reports, in addition to Pre ETT-inspection and Post ETT inspection of Unit, as applicable
- (m) Review of Draft documentation and witness/Stamping of final documentation, as applicable
- (n) Issue of CHP clearance.
- (p) Issue of Dispatch Clearance as applicable.

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SYSTEM DESCRIPTION

1. A Flow meter is a device that measures volumetric flow of liquids and gases. Following types of flow meters are generally used for measurement of flow of liquids and gases:-

- (a) Diaphragm meters.
- (b) Rota meters.
- (c) Turbine meters.
- (d) Orifice meters.
- (e) Ultrasonic meters.
- (f) Coriolis meters.
- (g) Vortex meters.

2. The subject SQAP is applicable to Turbine flow meters for measuring volumetric flow of hydraulic media. It consists of a light rotor with radial blades for measuring rotation velocity (proportional to fluid speed).

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STANDARD QUALITY ASSURANCE PLAN

Part – I: General Information

1. The following generic information must be indicated 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)

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Part – II: Technical Inspections / Trials(As per Appendix "A").

1. This part of SQAP will generally consist of following sections as given below:-
 - (a) **Section – I:** Drawings/Documents/Type Test Certificate.
 - (b) **Section – II:** Raw Material Inspection.
 - (c) **Section – III:** In-process Inspection.
 - (d) **Section – IV:**Pre-requisite to Final Inspection.
 - (e) **Section – V:** Final Inspection.

2. The technical section would normally be in a tabulated format with following columns: -
 - (a) Sl. No.
 - (b) Component details
 - (c) Characteristics / Type of Checks – **list of all applicable checks for that family of equipment.**
 - (d) Quantum of check – Sample/100% etc.
 - (e) Class of check – critical/major/minor etc.
 - (f) Reference Documents / Acceptance standards – for each check as applicable.
 - (g) Format/ Type of Record – CHP/Firm's QA Report etc.
 - (h) Remarks (Inspection details i.e. P – Perform, W – Witness, V/R – Verification / Review, CHP – Customer Hold Point etc.

3. Any additional information as 'Note' may also be included in each section for amplification of requisite tests/trials.

Standard Quality Assurance Plan – Turbine Flow Meters(for Hydraulic Application) (Part II)

SL. NO	MATERIALS COMPONENTS AS PER SOTR/ TNC/ QA ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS/ TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
1.0.0	DRAWINGS/DOCUMENTS/TYPE TEST CERTIFICATE								
1.1.0	Drawings & Documents		Approved GA drawings along with Detailed Bill of Material(DBOM) & Documents	100%	Purchase Order &SOTR/ TNC Minutes	Purchase Order &SOTR/ TNC Minutes	List of Approved Binding Drawings	R	Binding Drawing & Binding Data, duly approved by Design authority, shipyard & Inspection Authority (or by Command for MO orders) to be verified. CHP
1.2.0	Type Test Reports		Availability & Verification	One Per Type	Purchase Order &SOTR/ TNC Minutes	Purchase Order &SOTR/ TNC Minutes	Type Test reports	R	Equipment is to be Type Tested as per SI. No. 4.0.0 of this SQAPCHP
2.0.0	RAW MATERIAL INSPECTION								
2.1.0	Flow Meter Body with flange (Casting)		(a) Pouring	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	IR	W	Sample to be drawn in presence of representative of QAE for testing at NABL Lab CHP
2.1.1			(b) Chemical Properties & Mechanical properties *	One Sample per Heat			TC from NABL acc. Lab	R	* Three test specimens per batch/lot for mechanical properties shall be made. Retest to be carried out on two further specimens in the event of failure of initial specimen

SL. NO	MATERIALS COMPONENTS AS PER SOTR/ TNC/ QA ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS/ TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
2.1.2			(c) Heat Treatment (if applicable)	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	IR	R	Firm should submit HT charts for every heat/ lot
2.1.3			(d) Stress Relieving (if applicable)	100%			IR	R	Firm should submit HT charts for every heat/ lot
2.1.4			(e) Permanent marking of flow direction on Body	100%			IR	R	
2.1.5			(f) Radiography	100%			Radiography report	R	Testing to be done by ISNT/ ASNT level II or III qualified Technician. CHP
2.1.6			(g) Hydraulic Pressure Testing of Body at 1.5 times max allowable operating pressure for 10 minutes minimum	100%			IR	R	
OR									
2.1.7	Flow Meter Body with flange (Forging)		(a) Flow lines for forging (if applicable)	1 Sample per Heat is to be tested.	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	TC from NABL acc. Lab	R	
2.1.8			(b) Heat Treatment (if applicable)	100%	HT Charts		IR	R	Firm should submit HT charts for every heat/ lot
2.1.9			(c) Stress Relieving (if applicable)	100%	HT Charts		IR	R	Firm should submit HT charts for every heat/ lot

APPENDIX 'A'
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SL. NO	MATERIALS COMPONENTS AS PER SOTR/ TNC/ QA ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS/ TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
2.1.10			(d) Chemical Analysis & Mechanical Properties	1 Sample per Heat is to be tested. *	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	TC from NABL acc. Lab	R	* Three test specimens per batch/lot for mechanical properties shall be made. Retest to be carried out on two further specimens in the event of failure of initial specimen
2.1.11			(e) Permanent marking of flow direction on Body	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	IR	R	
2.1.12			(f) Hydraulic Pressure Testing of Body at 1.5 times max allowable operating pressure for 10 minutes minimum	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	IR	R	
2.1.13	Flange (Forging)		(a) Flow lines for forging (if applicable)	1 Sample per Heat is to be tested.	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	TC from NABL acc. Lab	R	
2.1.14			(b) Heat Treatment (if applicable)	100%	HT Charts		IR	R	Firm should submit HT charts for every heat/ lot.
2.1.15			(c) Stress Relieving (if applicable)	100%	HT Charts		IR	R	Firm should submit HT charts for every heat/ lot

SL. NO	MATERIALS COMPONENTS AS PER SOTR/ TNC/ QA ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS/ TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
2.1.16			(d) Chemical Analysis & Mechanical Properties	1 Sample per Heat is to be tested. *	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	TC from NABL acc. Lab	R	* Three test specimens per batch/lot for mechanical properties shall be made. Retest to be carried out on two further specimens in the event of failure of initial specimen
OR									
2.1.17	Flow Meter Body (Pipe/ Bar)		Chemical Analysis & Mechanical Properties	1 Sample per Heat is to be tested. *	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	TC from NABL acc. Lab	R	* Three test specimens per batch/lot for mechanical properties shall be made. Retest to be carried out on two further specimens in the event of failure of initial specimen
2.1.18	Flange #		(a) Visual Check (b) Verification of STC	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	(a) IR (b) STC/CC	R	# If the items are Bought out/ imported/ COTS/ Sub-contracted items, QA procedure will be as per chapter 5 of QAD 01R01.
2.1.19	Rotor #		(a) Chemical Analysis (b) Visual Inspection	1 Sample per lot	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	(a) TC from NABL acc. Lab (b) IR	R	# If the items are Bought out/ imported/ COTS/ Sub-contracted items, QA procedure will be as per chapter 5 of QAD 01R01.
2.1.20	Pre-amplifier Unit #		(a) Visual & Functional Check (b) Verification of STC/CC	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	(a) IR (b) STC/CC	R	# If the items are Bought out/ imported/ COTS/ Sub-contracted items, QA procedure will be as per chapter 5 of QAD 01R01.

SL. NO	MATERIALS COMPONENTS AS PER SOTR/ TNC/ QA ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS/ TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
2.1.21	Pickup Sensor #		(a) Visual & Functional Check (b) Verification of STC/CC	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	(a) IR (b)STC/CC	R	# If the items are Bought out/ imported/ COTS/ Sub-contracted items, QA procedure will be as per chapter 5 of QAD 01R01
2.1.22	Bearing with make & model #		(a) Visual Check (b) Verification of STC/CC	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	(a) IR (b)STC/CC	R	
2.1.23	Circlip #		(a) Visual Check (b) Verification of STC/CC	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	(a) IR (b)STC/CC	R	
2.1.24	Remote Indicator #		(a) Visual Check (b) Verification of STC/CC	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	(a) IR (b)STC/CC	R	
2.1.25	Local Indicator #		(a) Visual Check (b) Verification of STC/CC	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	(a) IR (b)STC/CC	R	
2.1.26	Inter Connecting Cable with Gland #		(a) Visual Check (b) Proper Fitment (c) Verification of STC/CC	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	(a) IR (c) STC/CC	R	

Sl. No.	MATERIALS COMPONENTS AS PER SOTR/ TNC/ QA ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS/ TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
3.0.0	IN PROCESS INSPECTION								
3.1.0	Flow Meter Body with flange (Forging)		UT on finished body	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	UT Report	R	Testing to be done by ISNT/ ASNT level II or III qualified Technician. CHP
OR									
3.2.0	Flow Meter Body with flange (Fabrication)		(a) Permanent marking of flow direction on Body	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	IR	R	
3.2.1			(b) DP test on welding areas	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	DP Test report	R	Testing to be done by ISNT/ ASNT level II or III qualified Technician. CHP
3.2.2			(c) Hydraulic Pressure Testing of Body at 1.5 times max allowable operating pressure for 10 minutes minimum	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	IR	R	
3.3.0	Assemblies and Final assembly		Dimensional, Visual inspection, Workmanship and Finishing	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	IR	R	

APPENDIX 'A'
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<u>SL. NO</u>	<u>MATERIALS COMPONENTS AS PER SOTR/ TNC/ QA ACTIVITY</u>	<u>QTY AS PER P.O.</u>	<u>CHARACTERISTICS/ TYPE OF CHECK</u>	<u>QUANTUM OF CHECK</u>	<u>REFERENCE DOCUMENT</u>	<u>ACCEPTANCE CRITERIA</u>	<u>FORMAT OF RECORD</u>	<u>ACTION BY QAE</u>	<u>REMARKS</u>
3.4.0	DP Test of welding		DP Test of welding	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	DT Test Report	R	Testing to be done by ISNT/ ASNT level II or III qualified Technician
3.5.0	ESS test on PCBs		ESS test on PCBs	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	TC from NABL acc. Lab	R	
4.0.0	PRE-REQUISITE TO FINAL INSPECTION								
4.1.0	Type Test of one no. for each size and type of turbine flowmeter		(a) Visual & Dimensional Inspection	One no. from each size and each type of Turbine Flowmeter	PO, TSP/ SOTR/ TNC Minutes, JSS 55555/ IS 12063/ MIL-STD-461E Approved Drawings	PO, TSP/ SOTR/ TNC Minutes, JSS 55555/ IS 12063/ MIL-STD-461E Approved Drawings	Type Test reports	W	(a) If Type Test is undertaken at NABL Acc Lab, Witness by QA Agency not required.
4.2.0			(b) Functional Checks					W	
4.3.0			(c) Hydraulic Pressure Testing of Body at 1.5 times max allowable operating pressure for 10 minutes minimum					W	(b) Approved drawing No. with Rev No. should be shown in Type test report.
4.4.0			(d) Shock Test					W	(c) Vibration test is not necessary for those components being subjected/ tested for ESS test.
4.5.0			(e) Vibration Test					W	
4.6.0			(f) Bump Test					W	
4.7.0			(g) Mould Growth					W	
4.8.0			(h) High Temp. Test					W	
4.9.0			(i) Low Temp. Test					W	(d) Approved ATP to be provided for each component and for system/ equipment
4.10.0			(k) Ingress Protection Test for Pre-Amplifier					W	

SL. NO	MATERIALS COMPONENTS AS PER SOTR/ TNC/ QA ACTIVITY	QTY AS PER P.O.	CHARACTERISTICS/ TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORD	ACTION BY QAE	REMARKS
4.11.0			(l) Ingress Protection Test for Local Indicator	One no. from each size and each type of Turbine Flowmeter	PO, TSP/ SOTR/ TNC Minutes, JSS 5555/ IS 12063/ MIL-STD-461E Approved Drawings	PO, TSP/ SOTR/ TNC Minutes, JSS 5555/ IS 12063/ MIL-STD-461E Approved Drawings	Type Test reports	W	
4.12.0			(m) Ingress Protection Test for Remote Indicator					W	
4.13.0			(n) EMI/ EMC Test					W	
5.0.0	FINAL INSPECTION								
5.1.0	Flow Meter with Pre-Amplifier, Local Indicator and Remote Indicator		(a) Visual & Dimensional Check	100%	TSP/ SOTR/ TNC Minutes, Approved Drawings	TSP/ SOTR/ TNC Minutes, Approved Drawings	IR	W	Approved ATP to be provided for each component and for system/ equipment
5.2.0			(b) Hydraulic Pressure Testing of Body at 1.5 times max allowable operating pressure for 10minutes minimum	100%			IR	W	
5.3.0			(c) Functional Checks	100%			IR	W	
5.4.0			(d) Calibration including 'K' Factor & Linearity	100%			TC from NABL acc. Lab	W	
5.5.0			(e) Painting	100%				IR	
5.6.0			(f) Marking, Preservation & Packing	100%			IR	R	

Note

- (1) Item containing PCBs/ Modules will have to undergo 100% ESS test as per QAD-01 R01 document promulgated by HQ, DQA(WP) which is available at DGQA website www.dggadefence.gov.in/dir-link/qad-01-2017.pdf.
- (2) Drawings should be made/ approved as per chapter 3 of QAD 01 R01.
- (3) Latest Technical specifications to be followed in all cases or as specified by user.
- (4) Packing material should not contain environment hazardous material prohibited by law/ regulation.

Legends

IR - INSPECTION REPORT, STC - SUPPLIER TEST CERTIFICATE, TC - TEST CERTIFICATE, CC - CONFORMITY CERTIFICATE, R- REVIEW,
W- WITNESS, CHP - CUSTOMER HOLD POINT