

**RESTRICTED
(DRAFT/PROVISIONAL)
QUALITY ASSURANCE PLAN**

FOR

(VALVE ASSY)

DRG. NO. 188.86.011CbCb ✓

(LF NO: 6201086011) ✓

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QUALITY ASSURANCE (RIG-ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI, CHENNAI – 600 054



QUALITY ASSURANCE PLAN (QAP)

FOR


VALVE ASSY

DRG. NO: 188.86.011CBCB


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1. IMPORTANT NOTES:

Note-1

This is only a provisional and will be amended from time to time according to the requirement. No addition, deletion and reproduction will be done without the permission of The Sr. General Manager, Heavy Vehicles Factory, Avadi, Chennai – 54.

Note-2

Any instruction contained in this does not prejudice the terms and conditions of the contract what so ever. In case of any contradiction between the contents of this QAP and the clause in the contract, the latter will prevail.

Note-3

The stores should be manufactured strictly as per the drawings supplied by the Inspection Authority only and not as per the samples, if any received by the manufacturer for guidance purpose.

Note-4

Any amendment issued by the Inspection Authority shall be incorporated in the QAP and the records for the amendments carried out should be maintained as per the Performa at Appendix-"A".

2. INTRODUCTION:

- 1) This quality plan lays down the inspection and testing procedure to be carried out on the **VALVE ASSY TO DRG.NO. 188.86.011CBCB** being procured indigenously. This is prepared, based on the acceptance standards and inspection parameters laid down in collaborators documents and on the inspection test standards followed in respect of similar indigenous items.
- 2) This QAP is the property of Government of India and is liable for amendments as and when required. The Sr. General Manager, Heavy Vehicles Factory, Avadi, Chennai – 600 054, is the inspecting Authority for this assembly. Any query / clarification on the content of this QAP shall be referred to this Factory. Any departure from these instructions is allowed only after written approval from the above authority. Notwithstanding the tests indicated in this QAP, the inspecting Officer has the right to carry out any test to check conformance to the paper particulars quoted in the Supply Order, which he may consider necessary to satisfy himself about the stores which he has to accept.

3. AIM:

The QAP is aimed at standardizing the Inspection procedure and acceptance norms for **VALVE ASSY TO DRG.NO. 188.86.011CBCB**. It also aims at giving adequate information to the manufacturer on the quality requirements so that the required quality control methods are established. This is also meant to guide authorized Inspection Officer in his routine inspection and to set out main points to which his attention must be drawn to ensure that the accepted stores meet the stipulated standards.

4. SCOPE:

This QAP outlines in general terms, the checks and methods to be used during inspection of **VALVE ASSY TO DRG.NO. 188.86.011CBCB** including the technical requirements of the drawings. The recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

Note:

- i. Tender enquiry (TE) and supply order (S.O) will be issued with QAP stating that inspection will be done as per QAP.
- ii. In case of TE, It is responsibility of the vendor to obtain the copy of QAP and give the statement of compliance that vendor will abide by the QAP in case supply order is placed.
- iii. In case of S.O, it is the responsibility of the vendor to obtain copy of QAP and give the statement of compliance that the vendor will follow QAP. However, GM/HVF reserves the right to revise/update the QAP from time to time.

5. DOCUMENTS:

- a) On placement of firm supply order, one set of certified drawings will be forwarded to the Contractor. One set of relevant specification and technical instructions on the subject item can be obtained from AHSP through DDO/HVF.
- b) Any clarification required on these documents should be obtained from the Inspecting Authority i.e. The Sr. General Manager, Heavy Vehicles Factory, Avadi, Chennai – 600 054. Equivalents to the collaborators specifications and standards will be decided only by the Inspecting Authority and should not be unilaterally decided.
- c) The process instruction sheets supplied by the collaborators are available with the DDO/HVF, Avadi, Chennai for reference (i.e. Forging, casting, machining, manufacturing, extrusion, forming, heat treatment and plating process etc..). Where ever applicable.
- d) The supplier after scrutiny of the concerned process sheets and connected paper particulars should establish the necessary production and inspection facilities. Particularly the inspection test rigs, stands, fixtures, templates, gauges etc should be provided as recommended in these process sheets.

6. USED ON HIGHER ASSY

The valve assy is used on higher assy are pipe line assy to drg. No. 188.86.037cbcb & 188.86.040CBCB

7. BILL OF MATERIAL:

SL. NO	DRG.NO	NOMENCLATURE	MATERIAL SPEC	QTY	REMARKS
	188.86.011CBCB & ITEM LISTS	VALVE ASSY	--	--	
1	188.86.014	valve	Steel 08X18 H10T GOST 5949-75	1	
2	188.86.015	Packing rubber	Rubber 3825 TY 005216-99	1 0.001 Kg	W/O DRG

Note: Vendor/Contractor may use approved alternate material issued by the tender/ supply order issuing authority in writing (if available).

8. CONDITIONS OF USE/STORAGE INSTRUCTIONS:

This assy should be properly packed to protect from transit / handling damage and influence of atmospheric precipitations. In addition, the following parameters should be ensured: -

- a) Each assy shall be separately packed properly.
- b) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight and moisture.
- c) The packaging slip shall contains
 - i. Certificate of testing (NABL)
 - ii. Guarantee/ Warranty Certificate
 - iii. Service and maintenance instructions
 - iv. Delivery Slip with Inspector's Acceptance Mark.
 - v. Under taking certificate/certificate of conformance.
- d) The stores are not permitted to be stored together with oils. Petrol, acids, alkaline and other substances to avoid damage to the metal / rubber components.

9. SAMPLING PLAN:

Sl. No.	Sampling Plan	Pilot	Bulk
(i)	Visual Inspection	100%	100%
(ii)	Dimensional Check	100%	General Inspection level II, single sampling, Normal Inspection, AQL 1.5 of IS 2500 (Part-I)-2000
(iii)	Material Check	1 No	1 No For each batch of raw material or heat treatment lot as required by specification.
(iv)	Acceptance test		--Not applicable---
(v)	Fitment/ Performance test/trial	1 No	--Nil--
(vi)	Interchangeability Test	1 No	2 No's on 100 no's, except selective assy.
(vii)	Test stands/ jigs/fixtures/gauges and calibration checks.	100%	100%
(viii)	Marking/ Identification	100%	100%
(ix)	Packing/ preservation	100%	100%

Note: - A New supplier should supply bulk only after pilot sample inspection /evaluation by HVF and obtain bulk production clearance from HVF.

10. VISUAL INSPECTION [SAMPLING PLAN AS PER PARA- 9(i)]

The stores are to be visually examined on 100 % of pilot /bulk and same should be free from any defects and all the finishing requirements shall satisfy as indicated in technical conditions/requirements of the assy / components drawing respectively.

The components shall be checked for the following and should be free from the defects:

- Defects in construction
- Fitment of all components
- Dents, scratches and cracks etc
- Presence of foreign particles
- Moisture and dust
- Corrosion of metal parts
- Mechanical imperfections & distortion
- Any form of deterioration of material and finishing.
- Finished rubber item shall be free from surface imperfections, porosity, voids, inclusions, flow marks and other defects which would impair satisfactory performance.

Packing and preservation should be ensured as per drawings/relevant TY specifications (To be ensured on receipt at consignee end).

11. DIMENSIONAL CHECKS [SAMPLING PLAN AS PER PARA- 9(ii)]

The dimensions of individual component, sub assy and major assy shall be checked and ensured as per respective drawings. Dimensional checks should be carried out as per sampling plan. However, the inspecting authority/rep. may at his discretion, tighten the inspection level and acceptance quality level on the critical items and adopt check point during manufacture.

11.01) VALVE ASSY (188.86.011CBCB)

- a) All the dimensions should be confirmed as per DRG/ specifications.
- b) All Technical requirements (T.R) points to be ensured as per drawing.
- c) *Dimensions for reference.
- d) Using the glue leuconath of TY 6-14-95-85 vulcanize the package item 2.
- e) Presence of rubber on surface B is not allowed.
- f) Stepping and shrinkage of rubber on surface A $0^{+0.5}$ mm.
- g) Other requirements as per TY005216-99, code 253220.

11.02) VALVE (188.86.014)

- a) All the dimensions should be confirmed as per DRG/ specifications.
- b) All Technical requirements (T.R) points to be ensured as per drawing.
- c) Requirements for surface B as per TY005216-99.
- d) Other requirements as per 520 TY1.

12) MATERIAL CHECKS [SAMPLING PLAN AS PARA – 9 (iii)]

Material specimen /test bars of the components shall be in conformity as per the material mentioned in the relevant documents/drawings as per the bill of materials (BOM). NABL test reports for all the parameters as per relevant specifications to be submitted. Test samples to be submitted by the vendor to HVF, if required. The material check will be carried out as per sampling plan. However, if the manufacturer proposes any alternative material at the stage of tender enquiry, the same has to be approved and a written concurrence should be obtained from AHSP through DDO/HVF, before usage of such materials.

12.01) VALVE(188.86.014)

- a) The component should be manufactured from Steel 08X18H10T GOST 5949-75.
- b) Alternate material Steel 12X18H9T, 12X18H10T GOST 5949-75.

- c) The mechanical properties of steel grades 08X18 H10T, 12X18H9T, 12X18H10T as per GOST 5949-75 is mentioned below. For other requirements refer GOST 5949-75.

Grade of steel	Ultimate tensile strength σ_B , N/mm ² (kgf/mm ²)	Yield point	Relative elongation δ_5 , %	Relative reduction in area ψ	Impact strength KCU, joules/cm ² (kgfm/cm ²)
	Not less than				
08X18H10	470 (48)	196 (20)	40	55	-
12X18H9T	540 (55)	196 (20)	40	55	-
12X18H10T	510 (52)	196 (20)	40	55	-

12.02) PACKING RUBBER 188.86.015

- a) The component should be manufactured from Rubber 3825 TY 005216-99.
 b) Physico mechanical properties for Rubber grade 3825 as per specification TY005216-99 is mentioned below. For other requirements refer TY005216-99

Rubber grade	Raw rubber	Relative tensile strength MPa (Kgf/cm ²) not less than	Relative elongation at rupture %, not less than	Relative residual deformation after breaking %, not more than	Hardness unit in Shore A, within the limits	Temperature limit of fragility °C, not more than	Density Kg/M ³ .10 ³ (Limit deviation ± 0.05)
3825	CKH-40C	9.8 (100)	120	10	80-95	Minus 25	1.31

- c) Polymer identification as per the rubber grade 3825 TY 005216-99 is Acrylonitrile Butadiene Rubber (NBR).

13) FITMENT AND PERFORMANCE TEST/TRIAL;

- a) Pilot samples should be checked for fitment and Performance test to ascertain the efficacy of the item or component by fitting in higher assembly and repeating it for functional checks, wherever required.
- b) Bulk supply may be subjected to performance trial in higher assembly in case of repeated failure/defects during exploitation

14) INTERCHANGEABILITY;

The assemblies should be interchangeable component wise and assembly wise, except the Component are to be supplied as a set and to be assembled selectively.

15) TEST STANDS/JIGS/FIXTURE/GAUGES AND CALIBRATION CHECKS;

- a) The supplier / Contractor should device a suitable Test Stand, jigs, fixtures & mandrels and gauges to carry out quality checks and to ensure conformance of components/assy as per drg. Specification / T.R points.
- b) The supplier/contractor should submit calibration reports for instruments/fixtures/gauges etc., which are used during inspection activities.

16) MARKING/IDENTIFICATION CHECKS;

For traceability, marking of part No., Manufacturer name, supply order No, Serial No/Qty, batch No. and manufacture date & year are to be carried out in all components. Suitable method of marking can be adopted, provided the above details are legible. Inscription if any as called for in the relevant drawing is also to be carried out.

17) PRESERVATION CHECKS;

- a) Preservative coatings are to be strictly adhered to as called for in the drawing. However, equivalent BIS Standards can also be followed, subject to the thickness of the coating is maintained as per the drawing.
- b) Other preservations as necessary to prevent damages due to moisture and dust during process, storage and transit are to be carried out. Conventional methods can also be resorted to.
- c) Finished rubber items, prior to being put into use, should be stored in accordance with recommendations given in BS 3574/ ISO 2230 / BS 3F-69. Items should have minimum 3 years of shelf life if stored in accordance with BS 3F-69.

18) PACKING CHECKS:

- a) Components / Assemblies are to be packed separately to avoid damages during transit / handling of the same. Part No. and No. of sets are to be marked on the packing.
- b) Packing and preservation should be ensured as per drawings/relevant TY specifications (To be ensured on receipt at consignee end).
- c) Finished products shall be wrapped / packed using black and opaque polyethylene sheet or bags.

19) DOCUMENTATION:

- a) Firm has to maintain all the documents as per QAP with respect to the SI.No.to have traceability.
- b) Vendor has to submit Bill of materials, Material test reports, Class 'C' /Endurance test reports (wherever specified in drg/TY specification/QAP) and Complete PIR (pre-inspection report)at the time of offering the item for inspection. HVF will commence the inspection only after scrutiny of these documents.
- c) Pre inspection reports (PIR) of firm like, 1. Chemical analysis & Mechanical and Physico-Mechanical properties obtain from NABL as per bill of material (BOM) with respect to material specification, 2.Pre-forming process report as per process sheet, 3. Calibration reports of instruments, 4. Dimensional inspection reports as per drg./T.R specification.
- d) The testing/inspection responsibility to test all the parameters as per QAP and drawing specifications as mentioned in Annexure -A (enclosed).

20) REFERENCE:

- a. Refer all drawings to 188.86.011cbcb. (Drawing dated 14.10.2004).
- b. Refer all material specification (GOST 5949-75)
- c. TY Specifications: TY6-14-95-85, TY005216-99, 520TY1, and TY 005216-99, code 253220.

SL. NO	CATEGORY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
					Firm	HVF	DGQA	
1	Pre inspection reports (PIR) of firm	Firm has to produce all the document as per QAP	As per the relevant drawing and QAP.	Conform to drawing and QAP as per bill of material	P	V	R	100% by firm/ vendor.
2	Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 7 or item list.	Conform to QAP	P	V	R	100% by firm/ vendor.
3	Dimensional checks	Dimensions as per the drawing	Refer drawing/QAP Para no: 11	Conform to drawing and QAP	P	PW	R	100% by firm/ vendor, SP followed by HVF.
4	Material tests	Chemical composition & Mechanical Properties	As per the relevant drawing and QAP	All the values to conform with QAP and Drawings	P	W/V	R	SP followed by HVF.
5	Marking / traceability checks	Marking / traceability	Refer QAP Para no 16	Conform to QAP Para no 16	P	V	R	100% by firm/ vendor.
6	Preservation & packing checks	Preservation & packing	Refer QAP Para no 17 & 18	Conform to QAP Para no 17 & 18	P	V	R	100% by firm/ vendor.

Note:

- One sample per heat/batch shall be tested under NABL Lab/Govt. Approved lab by firm. In case of non-compliance to standards entire lot will be rejected or not to use in production further.
- For cross conformation, manufacturer has to submit test samples for metals and rubber parts /HVF will draw samples from supplied lot on receipt for Witnessing (W) at HVF premises. In case of non-compliance to standards entire lot will be rejected.

SP-Sampling Plan

R-Review

V-Verified

W- Witness

P- Perform

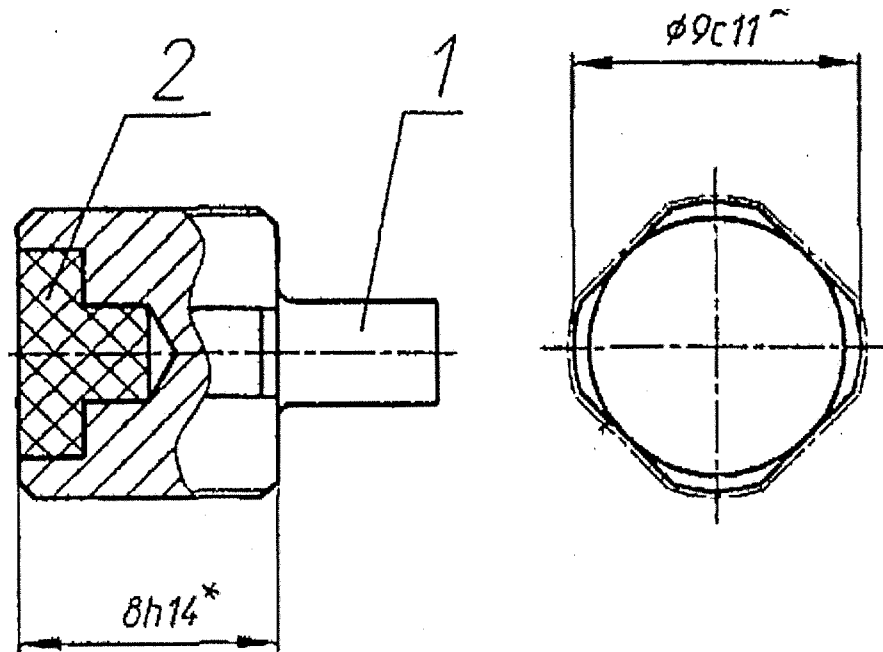


FIG: VALVE ASSY (188.86.011CBCB)

(For reference only)

1) Valve 2) Packing Rubber

RECORD OF AMENDMENTS

Sl. No	Amendment No. & date	Amended by	Date of Insertion	Initial