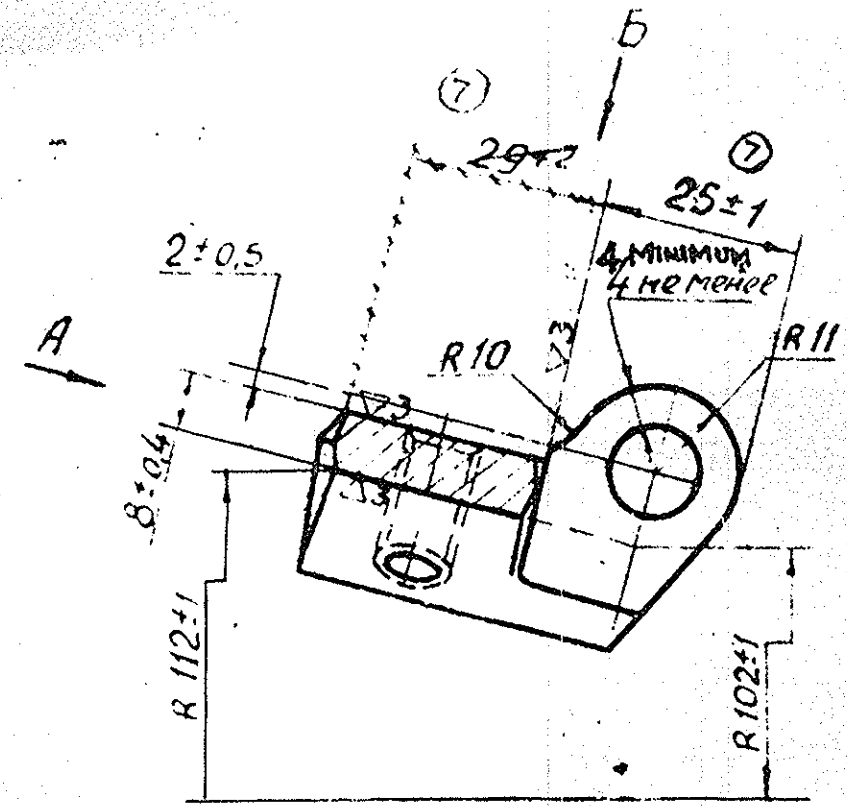
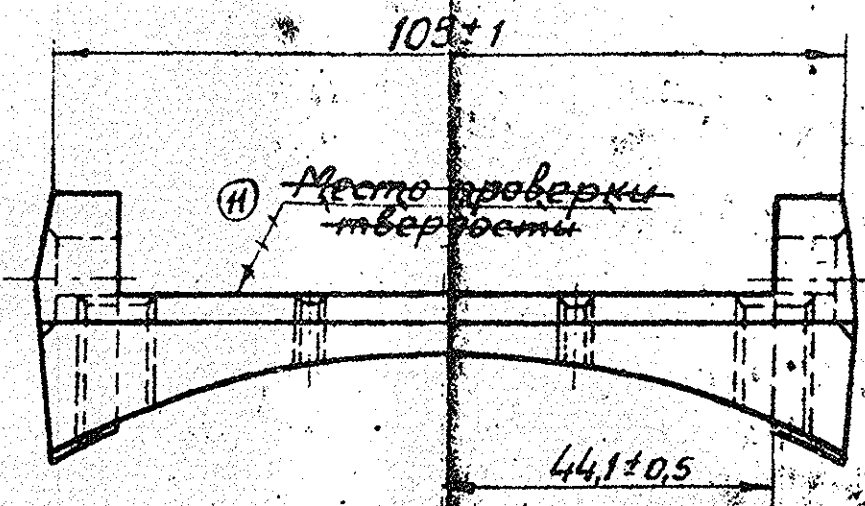


960 772.27.096

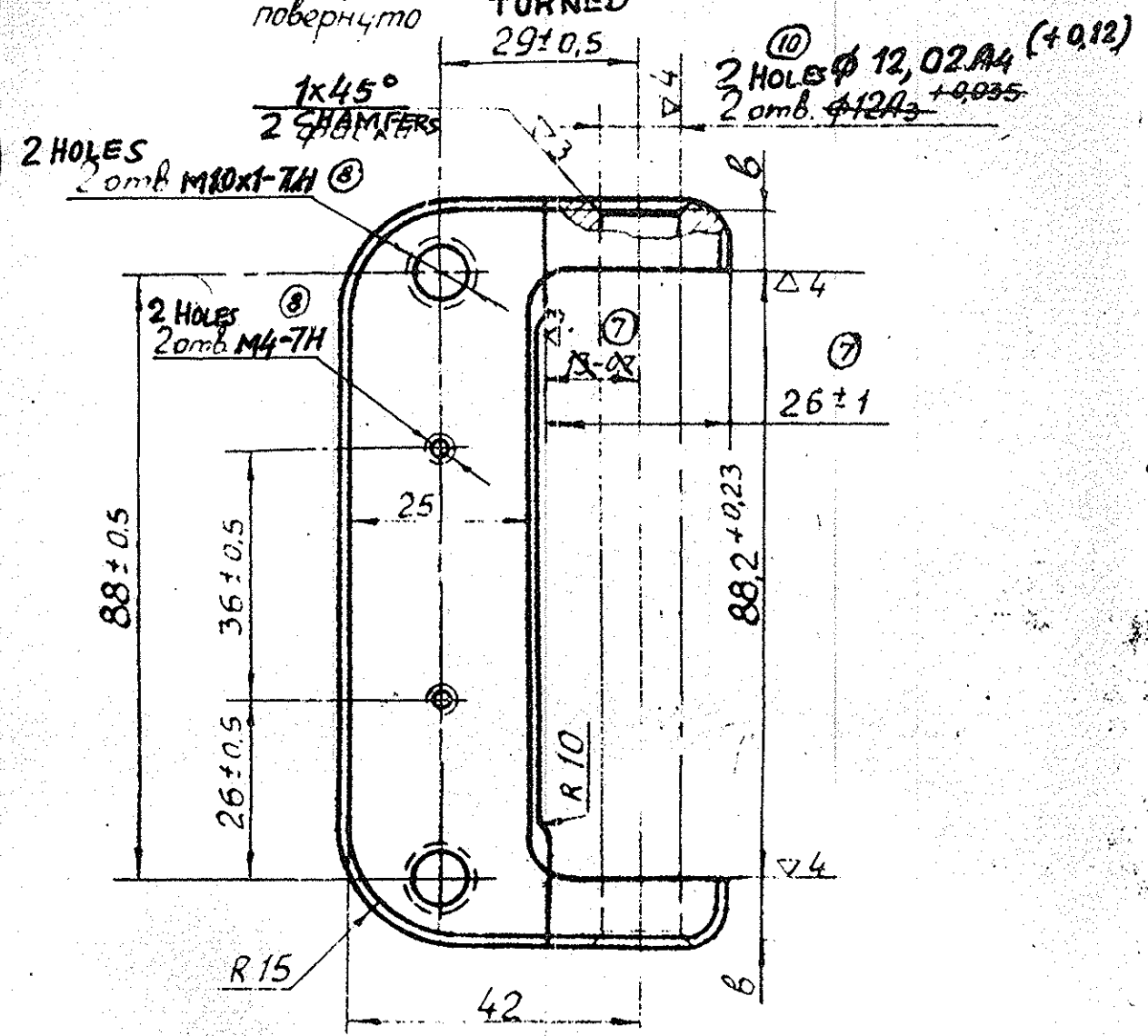
Восстановленный подлинник №1 ~ остальное



VIEW A Bug A
TURNED повернуто



Bug B VIEW B
повернуто TURNED



1. TO BE HARDENED. HARDNESS BHN 302 - 255 (DIA OF INDENTATION 3.5 - 3.8) TO BE CHECKED IN BLANK.
2. EXTERNAL DRAFTS SHOULD BE UP TO 7°.
3. UNSPECIFIED STAMPING RADII SHOULD BE UP TO 3 mm.
4. UNDERCUT FLASH ALONG DIE PARTING LINE SHOULD BE UP TO 1 mm.
5. MIS MATCH OF DIES SHOULD BE UP TO 1 mm.
6. TECHNICAL REQUIREMENTS FOR NOT TO BE MACHINED SURFACE SHOULD BE IN COMPLIANCE WITH GOST 8479-70.
7. TOLERANCES ON STAMPING DIMENSIONS SHOULD BE IN COMPLIANCE WITH GOST 7505-55 III GROUP.
8. THREADED HOLES ARE TO BE COUNTER SUNK AT AN ANGLE OF 120° UP TO THREAD MAJOR DIAMETER.
9. HOLE φ 12.02 A4 SHOULD BE CHECKED BY PASTING OF CONCENTRICITY GAUGE φ 12 X.
10. DIFFERENCE IN MEASUREMENT OF DIMENSION "B" SHOULD NOT EXCEED 1.5 mm.

ALT MATL:- STEEL, GD 709 M40 COND'T OR.
709 M40 TO BS: 970 PTI-1983, HEAT TREATMENT
TO ACHIEVE HARDNESS 255 TO 302 BHN.

जारी की गयी है
CERTIFIED CORRECT COPY
मुद्रित है
SEALED AS PER
AS ON

27/2/12

FOR CONTROL OF QUALITY
आवश्यक है कि प्रत्येक प्रतिलिपि
ASSURANCE (AVA) AND CHENNAI SAC AT NO.

11	2	172M511-81	Rev 1	10.10.81
10	2	172M519-80	Rev 1	11.09.80
9	1	172M511-78	Rev 1	26.7.78

18814-W	HINDI NOMEN	14/11
22-10-03	ADDED	
17712-W	ALT MATL	14/11/93
3.9.93	ADDED	
17088-W	DS CAT No. ADDED	14/11/93
4.7.91		
16469-W	DRG SEALED	14/11/93
8-10-86		
ISSUE	DATE	REFERENCE
APPROVED		14/11
CHECKED	INDRAMMA	6.12.93
DRAWN	UN. C	10.11.02

172.27.096

BRACKET
ब्रैकेट

STEEL 38XC
COST 4542-71

Group No. (E125)
40001 KD (34)

SHEET MASS SCALE
10F1 0.228 1:1 (135)

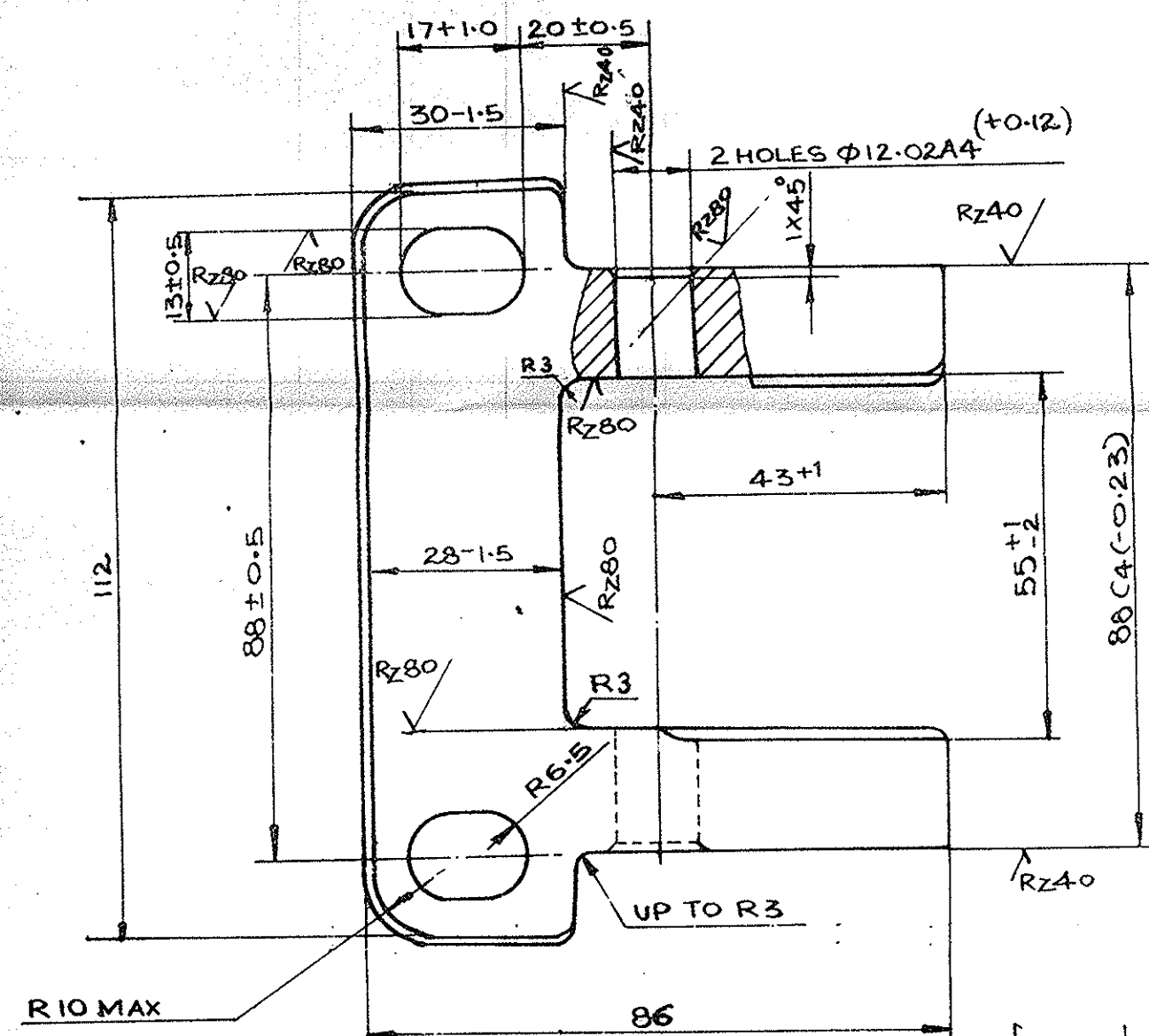
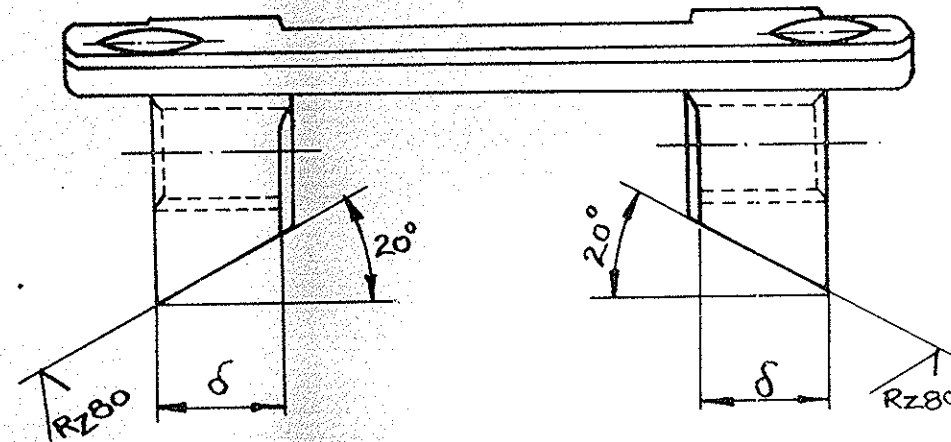
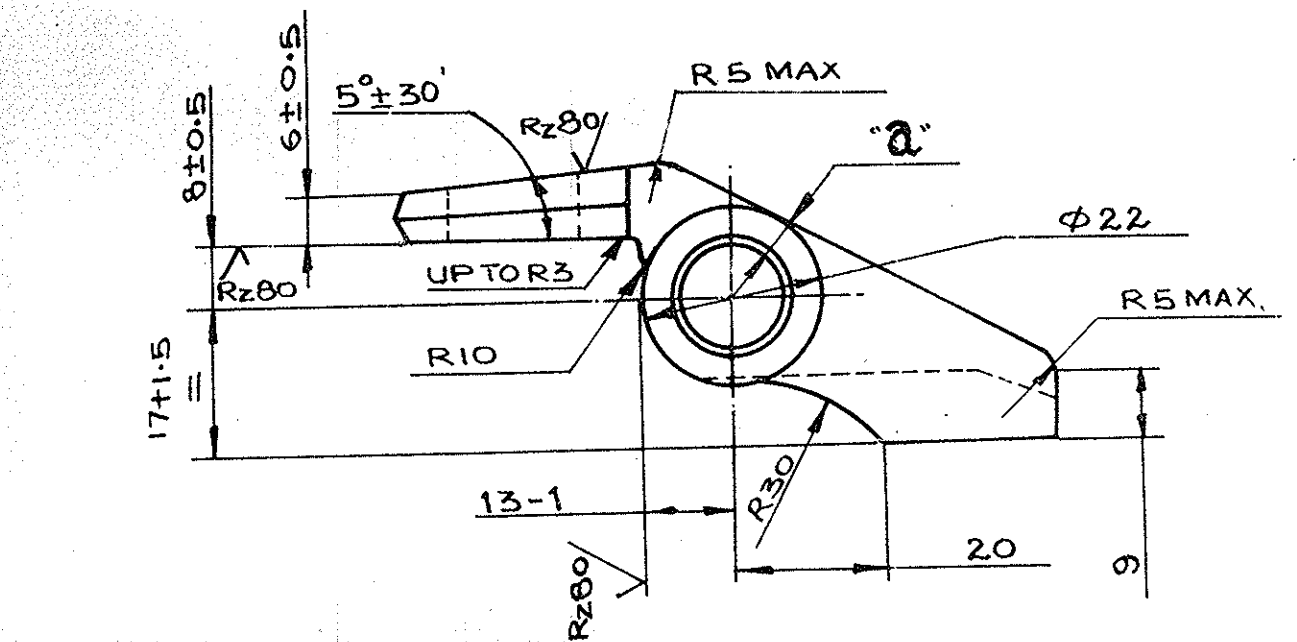
C.Q.A (AVA) AVADI

Восстановленный подлинник №1

PART NO

172-27-112

✓ (✓)



ALT MATL:- STEEL, GD 709 M40 OR 709 M40/U TO BS 970 PTI: 83
 COATING :- PHOSPHATING TO SPECN JSS 0465-01-1993, CLASS II/FINISH 13 (g).

NOTES:-

- EXTERNAL DRAFTS SHOULD BE UP TO 7°
- UNSPECIFIED FORGING RADI UP TO R5 mm.
- MISMATCH OF DIES SHOULD BE UP TO 1mm.
- FROM UNDERCUT FLASH ALONG DIE PARTING LINE SHOULD BE UP TO 1 mm.
- ON ROUGH SURFACES, SURFACE DEFECTS WITHIN LIMITS OF TOLERANCE ARE ALLOWED.
- TOLERANCES ON FORGING DIMENSIONS IN COMPLIANCE WITH GROUP 2, GOST 7505-55.
- DIMENSION "a" SHOULD NOT TO BE LESS THAN 4 mm. DIFFERENCE IN MEASUREMENTS OF DIMENSION "δ" SHOULD NOT EXCEED 1.5 mm.
- ALIGNMENT OF HOLES φ12.02 A4 TO BE CHECKED WITH CONCENTRICITY GAUGE φ12X.
- SHIFT OF SLOT 13±0.5 IN RELATION TO ONE OF PLANES ALONG SIZE 88-0.23 UP TO 0.5 mm.
- BUCKLING OF UNMACHINED SURFACES IS UP TO 2mm.
- ROUGH SPOTS ARE ALLOWED ALONG DIMENSION 28-1.5
- DIMENSION 88C4 IS TO BE CHECKED ON LENGTH 12 mm FROM THE AXIS OF HOLE φ12.02 A4. ON THE REMAINING LENGTH, INCREASE OF DIMENSION UP TO 88B7 IS ALLOWED.

11-02-10	0055-AVA	DS CAT No. ADDED			
22/03	18814-W	HINDI NOMEN. ADDED.			
01-8-02	18692-W	DIMN. R3 mm. PROVIDED AT INSIDE (INNER) CORNERS OF BOTTOM OF THE GAP 55 mm.			
7.9.93	17712-W	ALT MATL & COATING NOTE ADDED.			
18-7-89		RETRACED WITHOUT CHANGE			
		PREV. DCs (I) No 16469-W, 16751-W DT-25-3-89			
DATE	AUTHORITY	ZONE	NATURE	SIG AHSP	SIG DO
AMENDMENTS			MATERIAL-STEEL 38XC GOST 4543-71		
DRG. SEALED- 16469-W			PROTECTIVE FINISH-		
8-10-86.			DO CQA(W)		

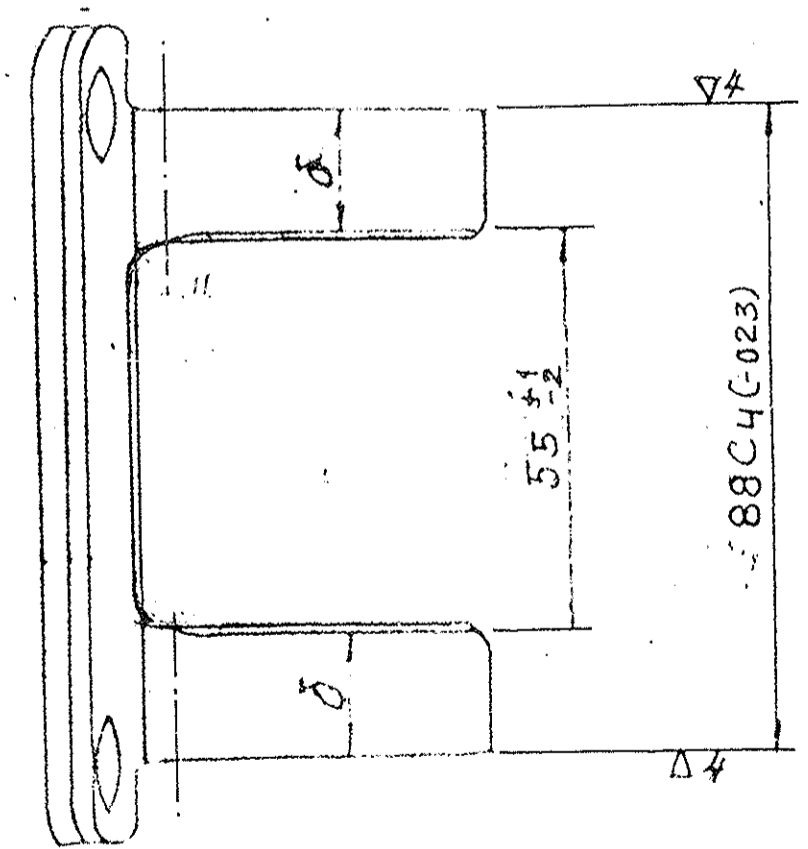
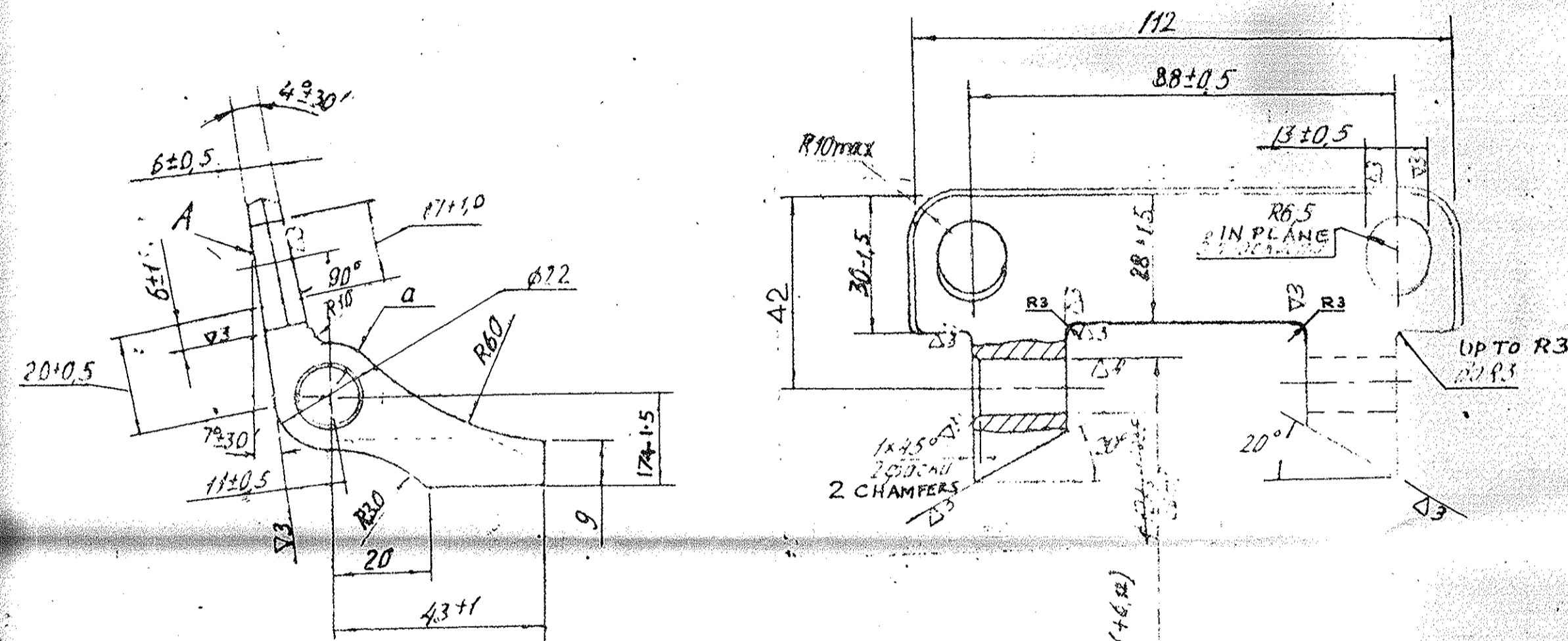
GROUP NO-	F125
40001KD	45
CQA(AVA)AVADI	
DATE-12.12.85	
SCALE- 1:1	
ESTD. MASS-0.280	
DESIGN NO-	
PART NO-	172-27-112
D.S. CAT NO-	5340-177268

जो भी यह सही प्रति
 CERTIFIED CORRECT COPY
 मुद्रित रेकार्ड की
 SEALER DRAWING AS ON
 कृते निदेशक गुणता
 FOR CONTROLLER OF QUALITY
 आभारम् (क वा जा) आवडि चेन्ने 54
 ASSURANCE (AVA) AVADI CHENNAI 54

ब्रकेट BRACKET

62

172.27.114



जो भी यह सही प्रति
CERTIFIED CORRECT COPY OF
मुद्रित रेखाचित्र को
SEALED DRAWING AS ON

27/12/11

कृते निम्न गुणक
FOR CONTROLLER OF QUALITY
आश्वासन (क या आ) आवदि चेन्ने 54
ASSURANCE (AVA) AVADI-CHENNAI. 54

- EXTERNAL DRAFTS SHOULD BE UP TO 7°.
- UNSPECIFIED RADII SHOULD BE UP TO 5 mm.
- MISMATCH OF DIES SHOULD BE UP TO 1 mm.
- UNDERCUT FLASH ALONG DIE PARTING LINE UP TO 1 mm.
- A SURFACE DEFECTS WITHIN LIMITS OF TOLERANCE ARE ALLOWED ON ROUGH SURFACES.
- TOLERANCES FOR STAMPING DIMENSIONS SHOULD BE IN COMPLIANCE WITH GOST 7505-85, GROUP 2.
- DIMENSION "a" SHOULD NOT BE LESS THAN 4 mm, DIFFERENCE IN MEASUREMENTS OF DIMENSION "f" NOT TO EXCEED 1.5 mm.
- ALIGNMENT OF HOLES φ12.02 A4 SHOULD BE CHECKED BY CONCENTRICITY GAUGE φ 12 X.
- SHIFT OF GROOVE 13 ± 0.5 RELATIVE TO ONE OF PLANES ALONG SIZE 88 - 0.23 UP TO 0.5 mm.
- ON SURFACE A, SURFACE FINISH √3 AT A WIDTH OF NOT LESS THAN 0.5 mm FROM UPPER COMPONENT EDGE IS ENSURED.
- BUCKLING OF UNMACHINED SURFACES UP TO 2 mm.
- DIMENSION "f" IS TO BE ENSURED IN COMPLIANCE WITH DRAWING 172.27.023 OF f.
- ROUGH SPOTS ON DIMENSION 28 - 1.5 ARE ALLOWED.
- DIMENSION 88 C4 IS TO BE CHECKED ON LENGTH OF 12 mm FROM THE AXIS OF HOLE φ12.02 A4; ON THE REMAINING LENGTH INCREASE OF DIMENSION UP TO 88 B7 IS ALLOWED

ALT MATL: - STEEL 308M 40, CONDITION "T" TO BS: 970 PE 1: 1983
COATING: - PHOSPHATING TO JSS-Q465-01: 93, CLASS II, FINISH 13(C)

64

DS CAT No. 5340-177265

0055-AVA 11-02-10	DS CAT No. ADDED
0002-AVA 15-12-05	DIMN 42 WAS 40 mm.
18814-W 22-10-03	HINDI NDMEN. ADDED.
18692-W 01-8-2002	DIMN. R3, mm. PROVIDED AT INSIDE (INNER) CORNERS OF BOTTOM OF THE GAP 85 mm.
5-3-74	17909-W. ALT MATL & COATING NOTE ADDED.
7.9.93	17712-W ALT MATL ADDED.

16751-W	IN FRONT VIEW:- DIMN 17±1.5 WAS
25-3-89	NOTE NO 12 BELLED & NOTE NO 14 ADDED. DO
16469-W	8-10-86 DRG SEAL
	ISSUE DATE REFERENCE
APPROVED	11/11
CHECKED	10/10/85
DRAWN	18-11-88

172.27.114	Group
BRACKET	Sheet
101	
MATERIAL: STEEL 308C	C.Q.A(AVA)AVADI
GOST 4543-71	

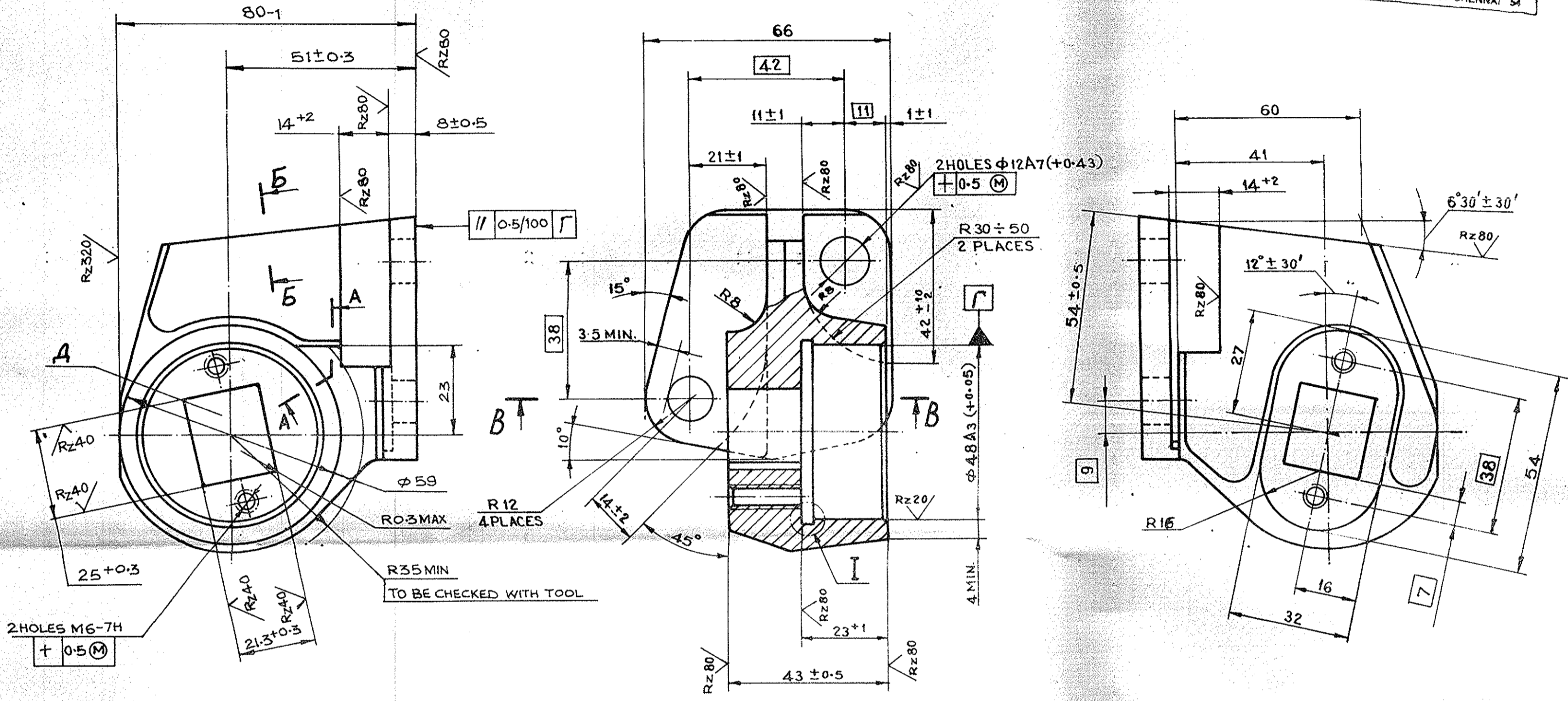
PART No.
172.27.052-2

जारी गई सही प्रति
CERTIFIED CORRECT COPY
मुद्रित रेखांकित की
SEALED DRAWING AS ON
27/2/12
कृते निदेशक गुणवत्ता
FOR CONTROLLER OF QUALITY
आश्रयाम (क वा आ) आवडि चेन्ने 54
ASSURANCE (AVA) AVADI CHENNAI 54

NOTES:-

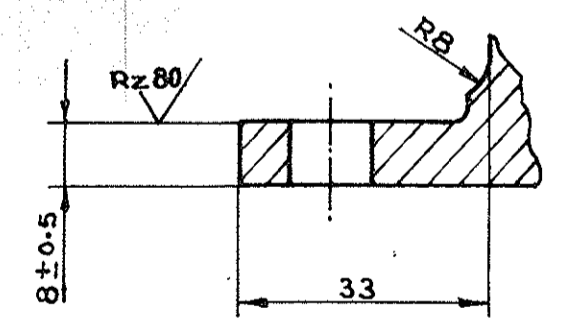
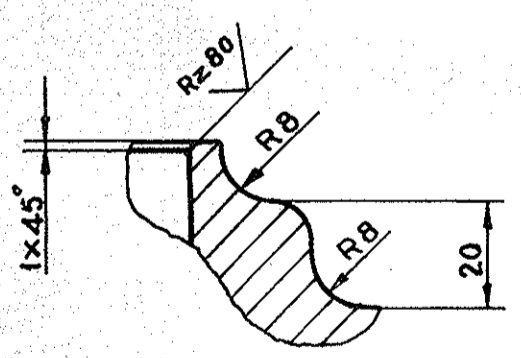
- BHN 302-255 (DIA. OF IND 3.5-3.8) MAY BE CHECKED IN BLANK.
- UNDERCUT FLASH ALONG DIE PARTING LINE UP TO 1mm. IS ALLOWED.
- MISMATCH OF DIES SHOULD BE UP TO 1mm.
- UNSPECIFIED STAMPING RADIUS SHOULD BE UP TO 5 mm.
- PARTING LINE OF DIES IS ARBITRARY.
- SURFACES $\phi 59$ MAY BE MACHINED. IN THIS CASE R8 AND SHOULDERS ALONG DIMENSIONS 23 AND 14 SHOULD NOT BE CHECKED.
- SHIFT OF RECTANGULAR HOLE \square RELATIVE TO HOLE SHOULD NOT EXCEED 0.3 mm. (TOLERANCE IN MMC)
- WHEN MACHINING ALONG DIMENSIONS 14 ON RIB WITH A THICKNESS OF 10 mm. ROUGH SPOTS ARE ALLOWED
- REST OF REQUIREMENTS SHOULD BE IN COMPLIANCE WITH SPACES 520 TY 1.

ALT MATL:- STEEL 817 M40; BS 970 PT 2; 83, COND. 'T'
WITH RESTRICTION OF % S & P TO 0.025 MAX
EACH HEAT TREATMENT TO ACHIEVE
HARDNESS 255 TO 302 BHN.



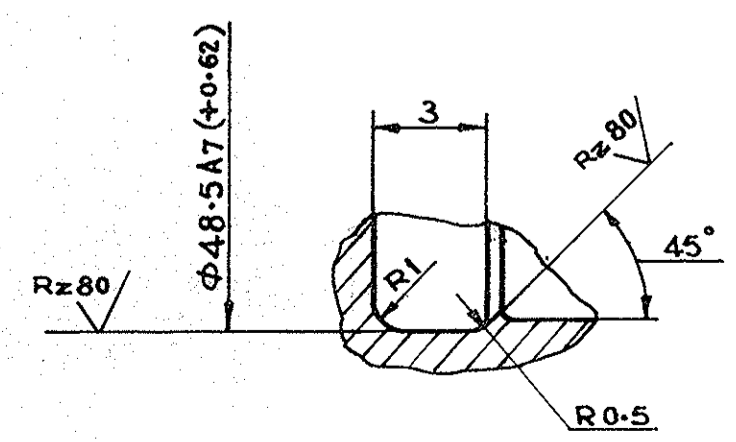
A-A TURNED

B-B TURNED



I-I TURNED

SCALE:- 5:1



11-02-10 0055-AVA	DS CAT No. ADDED	DRN.	CHD.	ASSY.DRG.
22-10-08 18914-W	HINDI NOMEN. ADDED.	TCD, S.R. Jaulkar	CHD. G.P. Shukla	DATE:- 12-12-85
7.9.93 17712-W	ALT MATL ADDED.		AHSP	SCALE:- 1:1
11-12-89	RETRACED WITHOUT CHANGE			ESTD. MASS. 0.535
DATE	AUTHORITY	ZONE	NATURE	AMENDMENTS
DRG. SEALED :- 16469-W		MATERIAL:- STEEL 30 X TCA, GOST 4543-71.		DESIGN No.
8-10-86		D.O. CQA(W)		PART No.
				172.27.052-2
				D.S. CAT. No.
				5340-177281

ब्रकेट

BRACKET

GROUP No.	F125
40001 KD	2
CQA(AVA) AVADI	
DESIGN No.	
PART No.	
172.27.052-2	
D.S. CAT. No.	
5340-177281	

PART No.
172.27.056

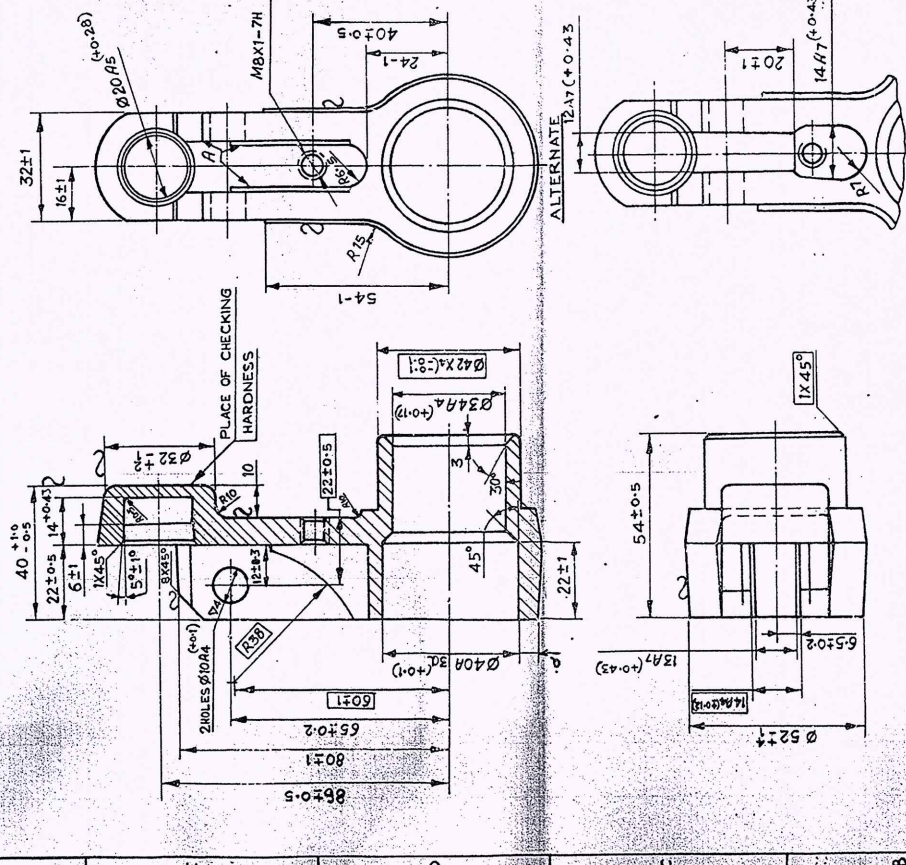
ALT. MATL:- STEEL, S30 M 40 / TOR. 700 M 40 / U TO B9-970 PL.1:1983, TO ACHIEVE HARDNESS 255 TO 302 HB

- NOTES:-
- 1- TO BE HARDENED. HARDNESS BHN 302-355 (DIA OF INDENTATION ON 3.538)
 - 2- EXTERNAL DRAFTS - UP TO 7°.
 - 3- MISMATCH OF DIE - UP TO 1mm.
 - 4- UNDERCUT FLASH SHOULD BE UP TO 1mm.
 - 5- BUCKLING OF SURFACES AFTER STAMPING UP TO 1.5mm.
 - 6- UNSPECIFIED STAMPING, RADII UP TO 3mm.
 - 7- NON PARALLELITY OF WALLS "A" OF GROOVE 13mm RELATIVE TO AXIS OF HOLE Ø 40 SHOULD NOT EXCEED 0.1mm 'A', LENGTH OF 50mm.
 - 8- NON SQUARENESS OF AXIS OF HOLE Ø 10 TO WALL "A" OF GROOVE NOT TO EXCEED 0.1mm AT GROOVE LENGTH.
 - 9- THREAD SHOULD BE CO-INTER SUNK AT AN ANGLE OF 120° UP TO THREAD MAJOR DIAMETER.
 - 10- DIFFERENCE IN MEASUREMENT OF DIMENSIONS "Q" NOT TO EXCEED 1mm.
 - 11- DIMENSIONS GIVEN IN ARE TO BE MACHINED IN COMPLIANCE WITH DRAWING 172.27.010 C.6-1.
 - 12- PARTING LINE OF DIES IS ARBITRARY.
 - 13- TECHNICAL REQUIREMENTS ON NOT TO BE MACHINED SURFACES SHOULD BE AS PER GOST 8479-70.
 - 14- SHIFT OF HOLE M8 FROM AXIS OF SLOT SHOULD BE UP TO 0.5mm.
 - 15- HOLES Ø 10 A4. MAY BE MACHINED AS PER DRAWING 172.27.010 C.6-1.
 - 16- WHEN MACHINING SLOT 13A7 AND SURFACES IN TO DIMENSION 22±0.5, SHOULDER HAVING A DEPTH UP TO 1mm IS ALLOWED.

dog in me with: *average body*

2911

403122



DRAWN:-		CHD:-		ASSY DRG:-	
TRACED:- L.S.		CHD:- G.P. 1/200		DATE:-	
C/P MAN		DO FOR CQA(W)		ESTD MASS:- 0.550	
MATERIAL:- STEEL 30XC GOST 4543-71		PROTECTIVE FINISH:-		DESIGN No.	
PART No.		172.27.056		DS CAT No.	
5340-177266					
DS CAT No.		5340-177266			

DS CAT No. ADDED	1702-10055-AVA
H/4 DI. NUMBER: 40040	18914-4
ALT. MATL ADDED	11-3-94 (7921-W)
RETRACED WITHOUT CHANGE	6-789
NATURE	
AMENDMENTS	
DO CQA(W)	
DATE	8-10-86

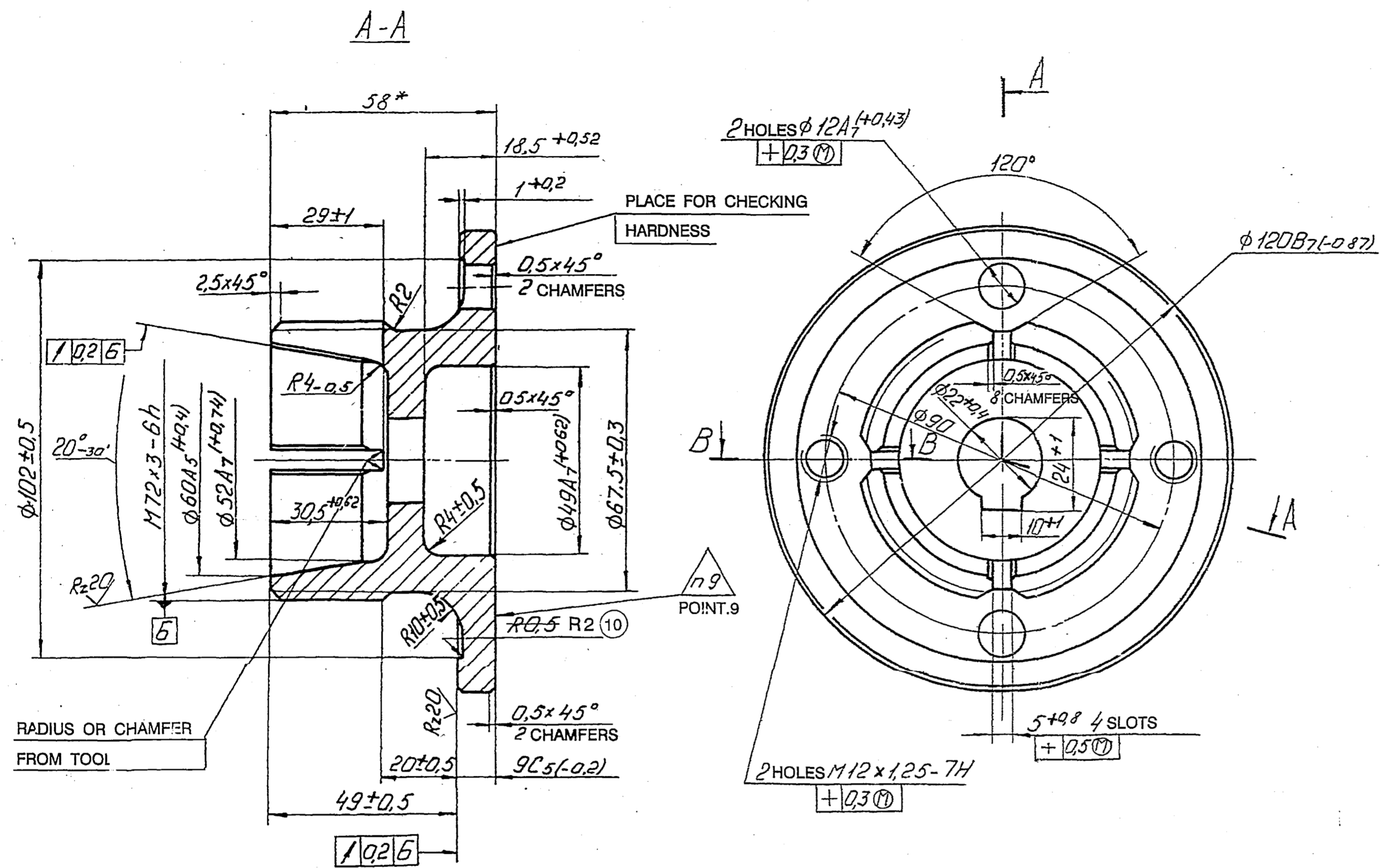
GROUP No.	F125
4-0001 KD	5

CQA(AVA)AVADI	
SCALE:- 1:1	

BRACKET

श्री श्री जी
 CERTIFIED CORRECT COPY
 श्री श्री श्री
 SEALING DRAWING NO. ON
 172.27.056
 FOR CONTROLLER OF QUALITY
 ASSURANCE (CQA) UNIT
 ASSURANCE (AVA) AVADI, CHENNAI. 54

Rz 80 $\sqrt{\text{▽}}$



- BHN 30₂ --- 255 (DIA. OF INDENTATION 3.5 --- 3.8)
- THREAD M72x3 AND THE RUN OUT IN RELATION TO THREAD ARE TO BE CHECKED BEFORE MILLING OF SLOTS.
- AT PLACES OF CUTS, THREAD M72x3 IS TO BE COUNTERSUNK AT AN ANGLE OF 120° UPTO THE MINOR DIAMETER OF THREAD AND DRESSED.
- RELATIVE POSITION OF SLOT 10⁺¹, CUTTINGS AND HOLES IS ARBITRARY.
- THE CONE SURFACE OF THE PLUG IS TO BE FITTED TO SUIT THE GAUGE. PROPER FITTING OF THE TAPER GAUGE AND THE PLUG IS TO BE CHECKED BY BLUEING BEFORE CUTTING. THE IMPRINT SHOULD COVER ATLEAST 50% OF THE WORKING SURFACE AND BE POSITIONED IN THE MIDDLE OR AT THE LARGER BASE OF THE CONE.
- CUTS ARE TO BE MADE AFTER TAPPING THREAD AND FITTING THE TAPER TO SUIT THE GAUGE.
- THREADED HOLES ON THE SIDE OF FACE "Γ" ARE TO BE COUNTERSUNK AT AN ANGLE OF 90° TO 120° UPTO THE MAJOR DIAMETER OF THREAD.
- SPOT FACING φ13A7 x 0.5 MAXIMUM MAY BE MADE ON THE SIDE OF GROOVE 1+0.2 IN HOLES φ12A7.
- TO BE MARKED.
- COATING : CHEMICAL OXIDIZING / PHOSPHATING OIL FINISHING. THE DIMENSIONS OF THE COMPONENT AND ITS TECHNICAL REQUIREMENTS ARE TO BE CHECKED BEFORE COATING.
- * DIMENSION FOR REFERENCE.
- OTHER REQUIREMENTS ARE ACCORDING TO 520 Ty 1.

"COMMON TO T-90" & BLT
 DRG. RE INDIANISED BASED ON RUSSIAN ORIGINAL ISSUE - 8
 15-09-06
 (B. JAYAVELU, JT01D)

** PV572.0711.0094 (10C)

(10A) 188.45cb-3Cb (10B)

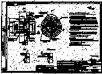
F-86
11
SIZE A2

PILOT SAMPLE SHOULD BE APPROVED BY A H S P BEFORE BULK PRODUCTION.

EST. WT. (Kg)	TO BE STAMPED OR MARKED WHERE INDICATED THUS # (LETTERS)
1.37/	

ALL SHARP EDGES AND CORNERS TO BE REMOVED UNLESS OTHERWISE STATED MACHINED CORNERS TO HAVE R OUT-SIDE R INSIDE EQUIVALENT CHAMFERS ARE PERMISSIBLE.

DRN	Sd / =	MATERIAL:-	USED ON :-
CHD	Sd / =	STEEL 38XC	188.30.001Cb-1Cb
APPD	Sd / =	GOST 4543-71	175.45cb- 172.45cb-8Cb **
DATE	21-02-88.	CONTROLLERATE OF QUALITY ASSURANCE (HEAVY VEHICLES) AVADI	
SCALE:- 1:1 /		TITLE:-	
DIMENSIONS IN mm		PLUG	
TOLERANCE ON DIMNS UNLESS OTHERWISE STATED IS : 2102-69		D S CAT NUMBER	
10C	06.05.12	55150/CQA(HV)/DB/BLT T-72 Dt. 19.07.11	DRAWING NUMBER
10 B.	25.02.08	AUTHORITY NOTIFICATION 188-35.03	172.45.011-1
10A	25.10.04	N OF A No.CQA(HV)/T90/45/001.	
10	28.11.88	AMDT. LIST No.7 /	
9	25.11.88	AMDT. LIST No.6 / II BOOK - 7 /	
ISSUE	DATE	NATURE OF AMENDMENTS	IS : 4218 Pt.IV



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

FOR

(BRACKET)

DRG.NO.172.27.096

(LF NO: 6206210089)

No: HVF/T-72C/QAP/27/BRACKET/241226- 00

ISSUE No: 00

DATE: OCT-2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR


BRACKET

DRG. NO. 172.27.096


PREPARED BY

REVIEWED BY


(C.NANDA KUMAR)
JWM/QA (RIG-SA)


(HANUMANTHA RAO GOLLA)
JWM/QA (RIG-SA /TA)

APPROVED BY


(SUBHAM BIJLWAN)
AWM/QA-RIG-(SA)

ISSUED BY

QUALITY ASSURANCE (RIG- SUB ASSEMBLY)
HEAVY VEHICLES FACTORY
AVADI CHENNAI – 600 054

Sl. no	CONTENTS	PAGE .No.
1.	IMPORTANT NOTES	4
2.	INTRODUCTION	4
3.	AIM	4
4.	SCOPE	5
5.	DOCUMENTS	5
6.	ITEM USED ON	6
7.	LIST OF DRAWINGS	6
8.	BILL OF MATERIAL	6
9.	CONDITIONS OF USE/ STORAGE INSTRUCTIONS	6
10.	SAMPLING PLAN	7
11.	VISUAL INSPECTION	7
12.	DIMENSIONAL CHECKS	8
13.	MATERIAL CHECKS	8
14.	ACCEPTANCE / PERFORMANCE TESTS	9
15.	FITMENT AND PERFORMANCE TEST	9
16.	INTERCHANGEABILITY	10
17.	CALIBRATION CHECKS	10
18.	MARKING/IDENTIFICATION	10
19.	PRESERVATION CHECK	10
20.	PACKING CHECK	10
21.	DOCUMENTATION	11
22.	REFERENCE	11
23.	ANNEXURE-A	12
24.	FIGURE	13
25.	APPENDIX-A	14

1. IMPORTANT NOTE

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 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 only as per the drawings supplied by the Inspection Authority 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".

Note-5

In case of any contradiction between the contents of this QAP and drawings issued along with the contract, the latter will prevail.

2. INTRODUCTION

1. This quality plan lays down the inspection and testing procedure to be carried out on the component **BRACKET TO DRG.NO 172.27.096** 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 norm for **BRACKET TO DRG.NO:172.27.096**

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 **BRACKET TO DRG. NO.172.27.096** including the technical requirements of the drawings. The recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

For inspection purpose, only the latest issue of this QAP will be made applicable and copies of this QAP can be obtained from the issuing authority i.e. The Sr. General Manager, Heavy Vehicles Factory, Avadi, and Chennai.

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 responsible of the vendor to obtained 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 relevant specification and technical instructions on the subject item can be obtained by the contractor 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. Equivalentents to the collaborators specifications and standards will be decided only by the Inspecting Authority and should not be unilaterally decided. For any change in the specifications, standards or written approval, any alterations in specification can be affected and not otherwise.
- c) The process instruction sheets supplied by the collaborators are available with the Authority Holding Sealed Particulars, i.e. The Controllerate of Quality Assurance (Heavy Vehicles), Avadi, Chennai for the reference. The relevant process sheets may be studied at the premises of the AHSP after obtaining necessary permission.
- 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, template, gauges etc should be provided as recommended in these process sheets. If process

sheet / Process Book is not available the details particulars/parameters available in the drawings to be strictly adhered.

6. ITEM USED ON:

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.27.096	BRACKET	-

8. BILL OF MATERIALS: (Individual items as mentioned in table to Para 7).

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.27.096	BRACKET	STEEL 38XC GOST 4543-71.	1

Note: Vendor/Contractor may use approved alternate material if any specified in drawing/ specification. *Also refer Para 13.

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

- (a) The threaded parts if any should be covered with suitable plastic caps to prevent damages.
- (b) If the item consists of assemblies, each assembly should be packed separately.
- (c) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight / moisture.
- (d) The packaging slip shall contains
 - (i) Certificate of testing- NABL Certificate.
 - (ii) Guarantee/ Warranty Certificate.
 - (iii) Service and maintenance instructions.
 - (iv) Delivery Slip with Inspector's Acceptance Mark.
 - (v) Undertaking letter / certificate of conformance.
- (e) 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.

10. SAMPLING PLAN:

Sl. No.	Sampling Plan	Pilot *	Bulk
(i)	Visual Inspection	100%	100%
(ii)	Dimensional Inspection	100%	General Inspection level III, single sampling, Normal Inspection, AQL 2.5 of IS 2500 (Part-I)-2000
(iii)	Material Inspection	1 No	1 No. for each batch of raw material or heat treatment lot as required by specifications.
(iv)	Acceptance test	100%	100%
(v)	Pressure testing	-----	-----
(vi)	Machining / Fitment/ Performance trial on higher assembly / Tank	02 Nos.	-----
(vii)	Interchangeability Test	02 Nos.	02 Nos. per batch on randomly basis, except selective assembly.
(viii)	Test stand/Jigs/ Fixtures/Gauges/Man drels/etc.	100 %	100 %
(ix)	Marking/Identification	100%	100%
(x)	Packing/ Preservation	100%	100%

Note:-

* This clause is applicable if mentioned in supply order or project sanction order.

A New (First time supplier of this item) supplier should obtain clearance from HVF for bulk production which will be issued only after inspection/evaluation of pilot samples by HVF.

11. VISUAL INSPECTION[Sampling plan as per Para- 10 (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 of the assembly / component drawing.

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

- Defects in construction
- Cracks/Dents/Scratches.
- Fitment of all components
- Presence of foreign particles
- Moisture and dust

- Corrosion of metal parts
- Mechanical imperfections & distortion
- Any form of deterioration of material and finishing.

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

12. DIMENSIONAL CHECK [Sampling plan as per Para- 10(ii)]

The dimensions of individual component, sub assembly and major assembly shall be checked and ensured as per respective drawing. Dimensional check 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.

12.1 BRACKET TO DRG. 172.27.096

1. All dimensions shall be confirmed as per drawing/specification
2. Surface finish/Roughness should be confirmed as per drawing and specification.
3. For admissible alternate method for manufacture in dimensions/material if any, refer drawing/specification.

13) MATERIAL CHECKS [SAMPLING PLAN AS PARA – 10 (iii)]

Material specimen /test bars of the components shall be in conformity as per the material mentioned in the relevant documents/drawing. 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.

13.1 BRACKET TO DRG.NO 172.27.096

- a) The component should be manufactured from STEEL 38XC GOST 4543-71.
- b) **Chemical properties:** As per STEEL 38XC GOST 4543 –71.

Grade	CONTENT OF ELEMENTS%							
	C	Si	Mn	Cr	S	P	Cu	Ni
					MAX			
38XC	0.34 to 0.42	1.00 to 1.40	0.30 to 0.60	1.30 to 1.60	0.035	0.035	0.30	0.30

Note: For mass fraction of other elements refer GOST 4543-71.

- c) **Mechanical properties:** As per STEEL 38XC GOST 4543 –71.

Grade	Yield point, N/mm ² / (kgf/mm ²)	Ultimate strength, N/mm ² (Kgf/mm ²)	Elongation %	Relative reduction of area %	Impact strength KCU / (Kgm/cm ²)
	Not less than				
38XC	75	95	12	50	7

Note: For other properties refer GOST 4543-71.

14) PERFORMANCES/ACCEPTANCE TEST: BRACKET TO DRG.NO.172.27.096

1. TO BE HARDENED. HARDNESS BHN 302 - 255 (DIA OF INDENTATION 3.5 - 3.8) TO BE CHECKED IN BLANK.
2. EXTERNAL DRAFTS SHOULD BE UP TO 7°.
3. UNSPECIFIED STAMPING RADII SHOULD BE UP TO 5 mm.
4. UNDERCUT FLASH ALONG DIE PARTING LINE SHOULD BE UP TO 1 mm.
5. MIS MATCH OF DIES SHOULD BE UP TO 1 mm.
6. TECHNICAL REQUIREMENTS FOR NOT TO BE MACHINED SURFACE SHOULD BE IN COMPLIANCE WITH GOST 8479-70.
7. TOLERANCES ON STAMPING DIMENSIONS SHOULD BE IN COMPLIANCE WITH GOST 7505-55 III GROUP.
8. THREADED HOLES ARE TO BE COUNTER SUNK AT AN ANGLE OF 120° UP TO THREAD MAJOR DIAMETER.
9. HOLE ϕ 12.02 A4 SHOULD BE CHECKED BY PASTING OF CONCENTRICITY GAUGE ϕ 12 X.
10. DIFFERENCE IN MEASUREMENT OF DIMENSION "B" SHOULD NOT EXCEED 1.5 mm.

15) FITMENT AND PERFORMANCE TEST:

- a. Pilot samples should be checked for fitment and Performance test to ascertain the efficacy of the system under different operating conditions by fitting in higher assembly and repeating it for functional checks, wherever required.
- b. Items of Bulk supplies may be subjected to performance trial in tank in case of repeated failure/defects during exploitation.

16) INTERCHANGEABILITY:

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

17) CALIBRATION CHECKS

(TEST STANDS/JIGS/FIXTUERS/GAUGES/INSTRUMENTS):

The supplier / Contractor should have suitable Instruments, Test Stand, jigs, fixture, mandrels and gauges to carry out quality checks, to ensure conformance of components/assembly as per drawing and Specification /T.R points.

The supplier/contractor should submit calibration reports for instruments/fixtures/gauges/mandrels etc., which are used during process of inspection activities.

18) MARKING/IDENTIFICATION.

Marking of the items is to be carried out as called for in the relevant drawing, drawing/T.R points.

Inscription if any on the components is to be carried out as called for in the drawing/T.R points. Unless otherwise specified in the drawing/ specification, marking should not be carried out over the components.

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. Suitable method can be adopted, provided that the above parameters are legible and considering the parameters mentioned in the drawing and specification.

19) PRESERVATION CHECK

- 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/preservative is maintained as per the drawing/specification.
- 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.

20) PACKING CHECK

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.

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

Finished products shall be wrapped / packed using black and opaque polyethylene sheet or bags.

21) DOCUMENTATION

- i. Firm has to maintain all the documents as per QAP with respect to the SI.No.to have traceability.
- ii. Vendor has to submit Bill of materials, Material test reports, Class 'C' /Endurance test reports (wherever specified in drawing/TY specification/QAP) and Complete PIR (pre-inspection report)at the time of offering the item for inspection. HVF will commence inspection only after scrutiny of these documents.
- iii. The testing/inspection responsibility to test all the parameters as per QAP and drawing specifications as mentioned in Annexure -A (enclosed).
- iv. Pre inspection reports (PIR) of firm like, 1. Chemical analysis (NABL Certificate), 2.Mechanical properties (NABL Certificate), 3. Pre-forming process, 4. Coating certification (wherever applicable), 5. Calibration reports of instruments and 6. 100 % Dimensional inspection reports.

22) REFERENCE:

- a) Drawing No: 172.27.096.
- b) Material specification as per drawing:
STEEL38XC GOST 4543-71.
- c) GOST 4543-71, GOST 7505-55, GOST 8479-70.
- d) Alternate material:

STEEL, GD 709 M40 COND'T. OR.
709 M40 TO BS: 970 PT I-1983, HEAT TREATMENT
TO ACHIEVE HARDNESS 255 TO 302 BHN.

SL. NO.	CATEGORY	ASSEMBLY/ SUB ASSEMBLY	TESTS/ INSPECTIONPARAM ETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	BRACKET TO DRG. NO 172.27.096	Pre inspection reports (PIR) of firm	Firm has to produce all the document as per QAP	As per the relevant drawing and QAP.	Confirm 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: 8 or item list.	Confirm to QAP	P	V	R	100% by firm/ vendor.
3		Material tests	Chemical composition & Mechanical / Physical Properties	As per- GOST 4543-71.	All the values to confirm with QAP Para no: 13, 1 (a), (b) & (c).	P	W/V	R	SP followed by HVF.
4		Hardness check	Hardness (BHN) 302-255 (Dia of Ind. 3.5 to 3.8)	Refer QAP Para no: 14(1).	Confirm to QAP Para no: 14(1).	P	W/V	R	SP followed by HVF.
5		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no: 12, 1	Confirm to drawing and QAP	P	W/P	R	100% by firm/ vendor. SP followed by HVF.
6		Marking / traceability	Marking / traceability	Refer QAP Para no: 18.	Confirm to QAP Para no: 18.	P	V	R	100% by firm/ vendor.
7		Preservation & packing	Preservation & packing	Refer QAP Para no 19 & 20	Confirm to QAP Para no 19 & 20	P	V	R	100% by firm/ vendor.

Note:

For conformity of the items (Chemical/Physical/Mechanical properties).

1. 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 shall be rejected or not to use in production further.

2. For cross conformation of material, manufacturer has to submit test sample pieces for the items used / test slab and button for rubber items / HVF will draw samples from supplied lot for Witnessing (W) at HVF premises. In case of non-compliance to standards entire lot will be rejected.

P-Perform**W-Witness****V-Verify****R-Review****SP-Sampling Plan**

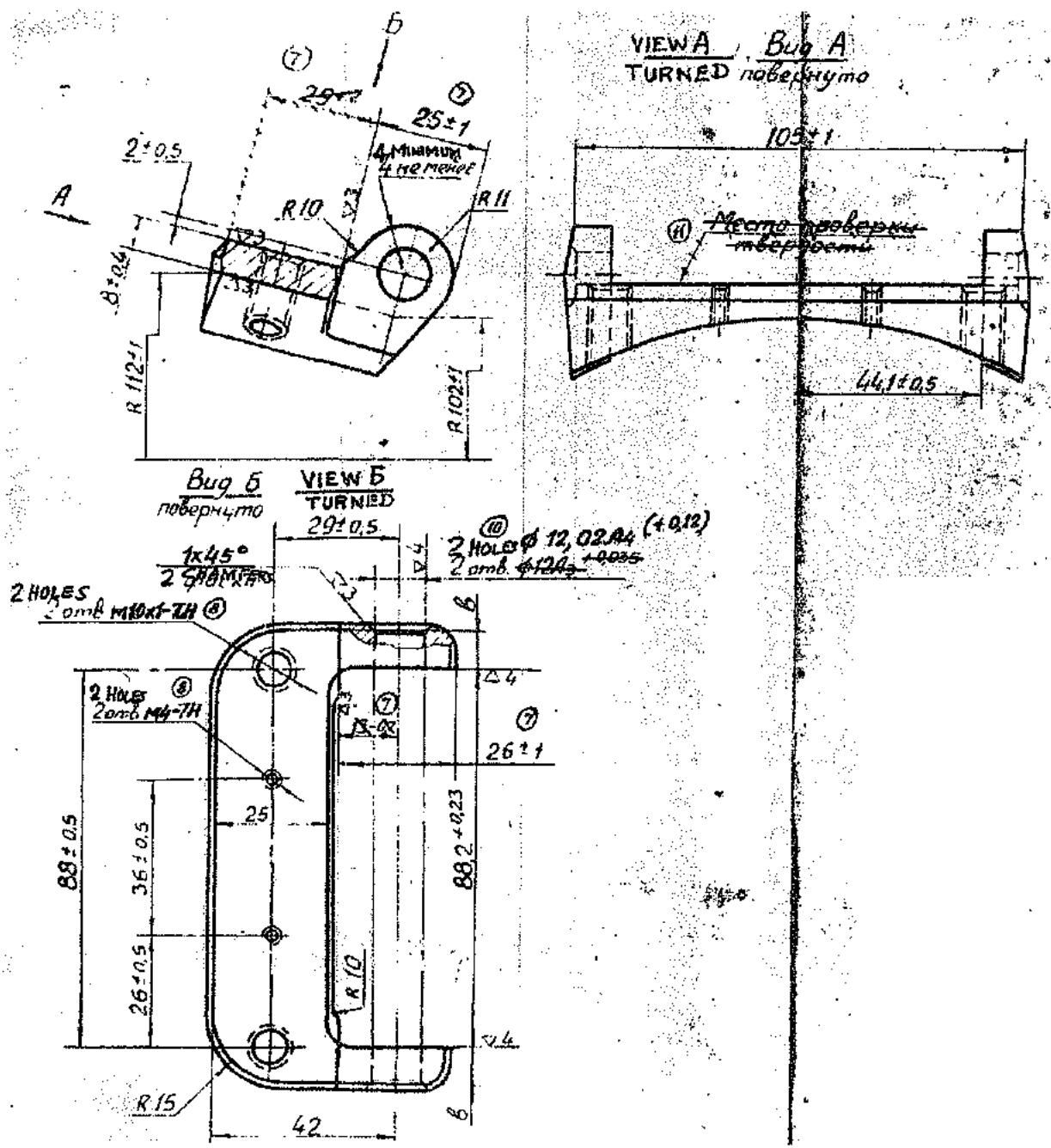


FIG: BRACKET TO DRG. NO 172.27.096
 (For reference only)

RECORD OF AMENDMENTS

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

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

FOR

(BRACKET)

DRG.NO.172.27.112

(LF NO: 6206210100)

No: HVF/T-72C/QAP/27/ BRACKET/241239- 00

ISSUE No: 00

DATE: OCT – 2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR


BRACKET

DRG. NO. 172.27.112

PREPARED BY

REVIEWED BY


(C.NANDA KUMAR)
JWM/QA (RIG-SA)


(HANUMANTHA RAO GOLLA)
JWM/QA (RIG-SA /TA)

APPROVED BY


(SUBHAM BIJLWAN)
AWM/QA-RIG-(SA)

ISSUED BY

QUALITY ASSURANCE (RIG- SUB ASSEMBLY)
HEAVY VEHICLES FACTORY
AVADI CHENNAI – 600 054

Sl. no	CONTENTS	PAGE .No.
1.	IMPORTANT NOTES	4
2.	INTRODUCTION	4
3.	AIM	4
4.	SCOPE	5
5.	DOCUMENTS	5
6.	ITEM USED ON	6
7.	LIST OF DRAWINGS	6
8.	BILL OF MATERIAL	6
9.	CONDITIONS OF USE/ STORAGE INSTRUCTIONS	6
10.	SAMPLING PLAN	7
11.	VISUAL INSPECTION	7
12.	DIMENSIONAL CHECKS	8
13.	MATERIAL CHECKS	8
14.	ACCEPTANCE / PERFORMANCE TESTS	9
15.	FITMENT AND PERFORMANCE TEST	10
16.	INTERCHANGEABILITY	10
17.	CALIBRATION CHECKS	10
18.	MARKING/IDENTIFICATION	10
19.	PRESERVATION CHECK	11
20.	PACKING CHECK	11
21.	DOCUMENTATION	11
22.	REFERENCE	12
23.	ANNEXURE-A	13
24.	FIGURE	14
25.	APPENDIX-A	15

1. IMPORTANT NOTE

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 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 only as per the drawings supplied by the Inspection Authority 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 component **BRACKET TO DRG.NO 172.27.112** 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 norm for **BRACKET TO DRG.NO: 172.27.112**.

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 **BRACKET TO DRG. NO.172.27.112** including the technical requirements of the drawings, the recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

For inspection purpose, only the latest issue of this QAP will be made applicable and copies of this QAP can be obtained from the issuing authority i.e. The Sr. General Manager, Heavy Vehicles Factory, Avadi, and Chennai.

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 responsible of the vendor to obtained 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 relevant specification and technical instructions on the subject item can be obtained by the contractor 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. Equivalentents to the collaborators specifications and standards will be decided only by the Inspecting Authority and should not be unilaterally decided. For any change in the specifications, standards or written approval, any alterations in specification can be affected and not otherwise.
- c) The process instruction sheets supplied by the collaborators are available with the Authority Holding Sealed Particulars, i.e. The Controllorate of Quality Assurance (Heavy Vehicles), Avadi, Chennai for the reference. The relevant process sheets may be studied at the premises of the AHSP after obtaining necessary permission.

- 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, template, gauges etc should be provided as recommended in these process sheets. If process sheet / Process Book is not available the details particulars/parameters available in the drawings to be strictly adhered.

6. ITEM USED ON:

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.27.112	BRACKET	-

8. BILL OF MATERIALS: (Individual items as mentioned in table to Para 7)

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.27.112	BRACKET	STEEL 38XC GOST 4543-71	1

Note: Vendor/Contractor may use approved alternate material if any specified in drawing/ specification. *Also refer Para 13.

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

- (a) The threaded parts if any should be covered with suitable plastic caps to prevent damages.
- (b) If the item consists of assemblies, each assembly should be packed separately.
- (c) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight / moisture.
- (d) The packaging slip shall contains
 - (i) Certificate of testing- NABL Certificate.
 - (ii) Guarantee/ Warranty Certificate.
 - (iii) Service and maintenance instructions.
 - (iv) Delivery Slip with Inspector's Acceptance Mark.

(v) Undertaking letter/ certificate of conformance.

(e) 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.

10. SAMPLING PLAN:

Sl. No.	Sampling Plan	Pilot*	Bulk
(i)	Visual Inspection	100%	100%
(ii)	Dimensional Inspection	100%	General Inspection level III, single sampling, Normal Inspection, AQL 2.5 of IS 2500 (Part-I)-2000
(iii)	Material Inspection	1 No	1 No. for each batch of raw material or heat treatment lot as required by specifications.
(iv)	Acceptance test	100%	100%
(v)	Pressure testing	-----	-----
(vi)	Machining / Fitment / Performance trial on higher assembly / Tank	02 Nos.	----
vii)	Interchangeability Test	02 Nos.	02 Nos. per batch on randomly basis, except selective assembly.
viii)	Test stand/Jigs/ Fixtures/Gauges/Man drels/etc.	100 %	100 %
ix)	Marking/Identification	100%	100%
x)	Packing/ Preservation	100%	100%

Note:-

*This clause is applicable if mentioned in supply order or project sanction order.

A New (First time supplier of this item) supplier should obtain clearance from HVF for bulk production which will be issued only after inspection/evaluation of pilot samples by HVF.

11. VISUAL INSPECTION [Sampling plan as per Para- 10 (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 of the assembly / component drawing.

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

- Defects in construction
- Cracks/Dents/Scratches
- Fitment of all components
- Presence of foreign particles
- Moisture and dust
- Corrosion of metal parts
- Mechanical imperfections & distortion
- Any form of deterioration of material and finishing.

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

12. DIMENSIONAL CHECK [Sampling plan as per Para- 10(ii)]

The dimensions of individual component, sub assembly and major assembly shall be checked and ensured as per respective drawing. Dimensional check 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.

12.1 BRACKET TO DRG.NO 172.27.112

1. All dimensions shall be confirmed as per drawing/specification
2. Surface finish/Roughness should be confirmed as per drawing and specification.
3. For admissible alternate method for manufacture in dimensions/material if any, refer drawing/specification.

13) MATERIAL CHECKS [SAMPLING PLAN AS PARA – 10 (iii)]

Material specimen / test bars of the components shall be in conformity as per the material mentioned in the relevant documents/drawing. 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.

13.1 BRACKET TO DRG.NO 172.27.112

a) The component should be manufactured from STEEL 38XC GOST 4543-71.

b) **Chemical properties:** As per STEEL 38XC GOST 4543 –71.

Grade	CONTENT OF ELEMENTS%							
	C	Si	Mn	Cr	S	P	Cu	Ni
					MAX			
38XC	0.34 to 0.42	1.00 to 1.40	0.30 to 0.60	1.30 to 1.60	0.035	0.035	0.30	0.30

Note: For mass fraction of other elements refer GOST 4543-71.

c) **Mechanical properties:** As per STEEL 38XC GOST 4543 –71.

Grade	Yield point, N/mm ² / (kgf/mm ²)	Ultimate strength, N/mm ² (Kgf/mm ²)	Elongation %	Relative reduction of area %	Impact strength KCU / (Kgm/cm ²)
	Not less than				
38XC	75	95	12	50	7

Note: For other properties refer GOST 4543-71.

14) PERFORMANCES/ACCEPTANCE TEST: BRACKET TO DRG.NO.172.27.112

1. External drafts should be up to 7°.
2. Unspecified radii should be up to R5 mm.
3. Mismatch of dies should be up to 1 mm.
4. From undercut flash along die parting line up to 1 mm.
5. On rough surfaces, surface defects within limits of tolerance are allowed.
6. Tolerances on forging dimensions in compliance with Group 2, GOST 7505-55.
7. Dimension "a" should not be less than 4mm, Difference in measurements of dimensions "δ" not to exceed 1.5mm.
8. Alignment of holes Ø12.02 A₄ should be checked by concentricity gauge Ø12 X.
9. Shift of slot 13±0.5 in relation to one of planes along size 88^{-0.23} up to 0.5mm.
10. Buckling of unmachined surfaces up to 2 mm.
11. Rough spot are allowed on dimension 28^{-1.5}.

12. Dimension 88C₄ is to be checked on length of 12 mm from the axis of hole Ø12.02A₄; On the remaining length increase of dimension up to 88B₇ is allowed.

15) FITMENT AND PERFORMANCE TEST:

- a. Pilot samples should be checked for fitment and Performance test to ascertain the efficacy of the system under different operating conditions by fitting in higher assembly and repeating it for functional checks, wherever required.
- b. Items of Bulk supplies may be subjected to performance trial in tank in case of repeated failure/defects during exploitation.

16) 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 as per sampling plan.

17) CALIBRATION CHECKS

(TEST STANDS/JIGS/FIXTUERS/GAUGES/INSTRUMENTS):

The supplier / Contractor should have suitable Instruments, Test Stand, jigs, fixture, mandrels and gauges to carry out quality checks, to ensure conformance of components/assembly as per drawing and Specification /T.R points.

The supplier / contractor should submit calibration reports for instruments/fixtures/gauges/mandrels etc., which are used during process of inspection activities.

18) MARKING / IDENTIFICATION.

Marking of the items is to be carried out as called for in the relevant drawing, drawing/T.R points.

Inscription if any on the components is to be carried out as called for in the drawing/T.R points. Unless otherwise specified in the drawing/ specification, marking should not be carried out over the components.

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. Suitable method can be adopted, provided that the above parameters are

legible and considering the parameters mentioned in the drawing and specification.

19) PRESERVATION CHECK

- 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/preservative is maintained as per the drawing/specification.
- 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.

20) PACKING CHECK

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.

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

Finished products shall be wrapped / packed using black and opaque polyethylene sheet or bags.

21) DOCUMENTATION

- i. Firm has to maintain all the documents as per QAP with respect to the Sl.No.to have traceability.
- ii. Vendor has to submit Bill of materials, Material test reports, Class 'C' /Endurance test reports (wherever specified in drawing/TY specification/QAP) and Complete PIR (pre-inspection report)at the time of offering the item for inspection. HVF will commence inspection only after scrutiny of these documents.
- iii. The testing/inspection responsibility to test all the parameters as per QAP and drawing specifications as mentioned in Annexure –A (enclosed).
- iv. Pre inspection reports (PIR) of firm like, 1. Chemical analysis (NABL Certificate), 2.Mechanical properties (NABL Certificate), 3. Pre-forming

process, 4. Coating certification (wherever applicable), 5. Calibration reports of instruments and 6. 100 % Dimensional inspection reports.

22) REFERENCE:

a) Drawing No: 172.27.112.

b) Material specification as per drawing:

STEEL 38XC GOST 4543-71

c) GOST 4543-71, GOST 7505-55.

d) Alternate Material:

ALT MATL:- STEEL, GD 709 M40 OR 709 M40/U TO
BS 970 PT I: B3

COATING :- PHOSPHATING TO SPECN JSS 0465-01-1993,
CLASS II/III FINISH 13 (8).

ANNEXURE-A

SL. NO.	CATEGORY	ASSEMBLY/ SUB ASSEMBLY	TESTS/ INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	BRACKET TO DRG. NO 172.27.112.	Pre inspection reports (PIR) of firm	Firm has to produce all the document as per QAP	As per the relevant drawing and QAP.	Confirm 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: 8 or item list.	Confirm to QAP	P	V	R	100% by firm/ vendor.
3		Material tests	Chemical composition & Mechanical / Physical Properties	As per- GOST 4543- 71	All the values to confirm with QAP Para no. 13.1 (a), (b) & (c).	P	W/V	R	SP followed by HVF.
4		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no: 12.1	Confirm to drawing and QAP	P	W/P	R	100% by firm/ vendor SP followed by HVF.
5		Marking / traceability	Marking / traceability	Refer QAP Para no: 18.	Confirm to QAP Para no: 18.	P	V	R	100% by firm/ vendor.
6		Preservation & packing	Preservation & packing	Refer QAP Para no 19 & 20	Confirm to QAP Para no 19 & 20	P	V	R	100% by firm/ vendor.

Note:

For conformity of the items (Chemical/Physical/Mechanical properties).

1. 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 shall be rejected or not to use in production further.

2. For cross conformation of material, manufacturer has to submit test sample pieces for the items used / test slab and button for rubber items / HVF will draw samples from supplied lot for Witnessing (W) at HVF premises. In case of non-compliance to standards entire lot will be rejected.

P-Perform W-Witness V-Verify R-Review SP-Sampling Plan

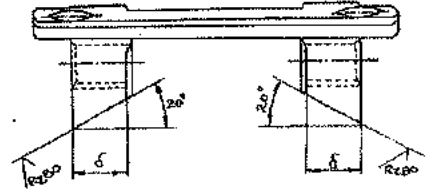
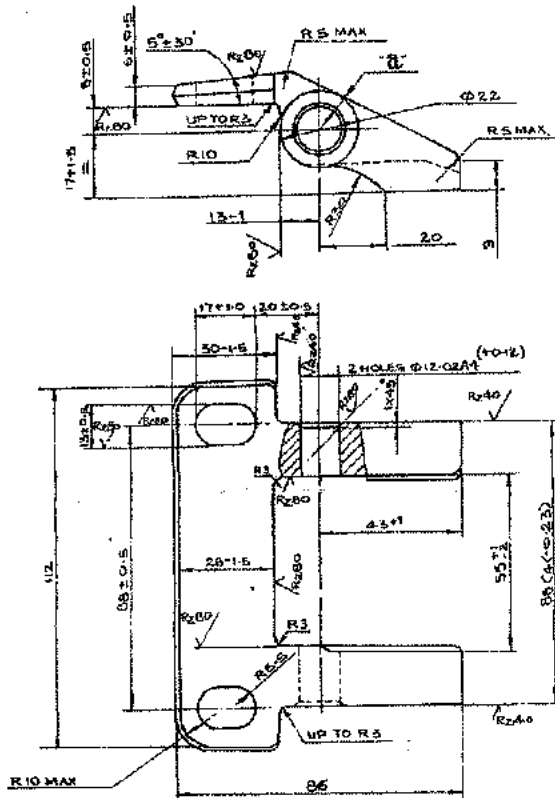


FIG: BRACKET TO DRG. NO 172.27.112

RECORD OF AMENDMENTS

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

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

FOR

(BRACKET)

DRG.NO.172.27.114

(LF NO: 6206210102)

No: HVF/T-72C/QAP/27/BRACKET/241240- 00

ISSUE No: 00

DATE: OCT – 2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

BRACKET

DRG. NO. 172.27.114

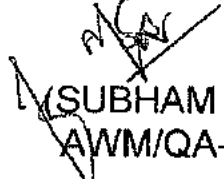
PREPARED BY

REVIEWED BY


(C.NANDA KUMAR)
JWM/QA (RIG-SA)


(HANUMANTHA RAO GOLLA)
JWM/QA (RIG-SA /TA)

APPROVED BY


(SUBHAM BIJLWAN)
AWM/QA-RIG-(SA)

ISSUED BY

QUALITY ASSURANCE (RIG- SUB ASSEMBLY)
HEAVY VEHICLES FACTORY
AVADI CHENNAI – 600 054

Sl. no	CONTENTS	PAGE .No.
1.	IMPORTANT NOTES	4
2.	INTRODUCTION	4
3.	AIM	4
4.	SCOPE	5
5.	DOCUMENTS	5
6.	ITEM USED ON	6
7.	LIST OF DRAWINGS	6
8.	BILL OF MATERIAL	6
9.	CONDITIONS OF USE/ STORAGE INSTRUCTIONS	6
10.	SAMPLING PLAN	7
11.	VISUAL INSPECTION	7
12.	DIMENSIONAL CHECKS	8
13.	MATERIAL CHECKS	8
14.	ACCEPTANCE / PERFORMANCE TESTS	9
15.	FITMENT AND PERFORMANCE TEST	10
16.	INTERCHANGEABILITY	10
17.	CALIBRATION CHECKS	10
18.	MARKING/IDENTIFICATION	10
19.	PRESERVATION CHECK	11
20.	PACKING CHECK	11
21.	DOCUMENTATION	11
22.	REFERENCE	12
23.	ANNEXURE-A	13
24.	FIGURE	14
25.	APPENDIX-A	15

1. IMPORTANT NOTE

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 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 only as per the drawings supplied by the Inspection Authority 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 component **BRACKET TO DRG.NO 172.27.114** 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 norm for **BRACKET TO DRG.NO: 172.27.114**.

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 **BRACKET TO DRG. NO.172.27.114** including the technical requirements of the drawings, the recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

For inspection purpose, only the latest issue of this QAP will be made applicable and copies of this QAP can be obtained from the issuing authority i.e. The Sr. General Manager, Heavy Vehicles Factory, Avadi, and Chennai.

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 responsible of the vendor to obtained 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 relevant specification and technical instructions on the subject item can be obtained by the contractor 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. Equivalentents to the collaborators specifications and standards will be decided only by the Inspecting Authority and should not be unilaterally decided. For any change in the specifications, standards or written approval, any alterations in specification can be affected and not otherwise.
- c) The process instruction sheets supplied by the collaborators are available with the Authority Holding Sealed Particulars, i.e. The Controllerate of Quality Assurance (Heavy Vehicles), Avadi, Chennai for the reference. The relevant process sheets may be studied at the premises of the AHSP after obtaining necessary permission.

- 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, template, gauges etc should be provided as recommended in these process sheets. If process sheet / Process Book is not available the details particulars/parameters available in the drawings to be strictly adhered.

6. ITEM USED ON:

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.27.114	BRACKET	-

8. BILL OF MATERIALS: (Individual items as mentioned in table to Para 7)

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.27.114	BRACKET	STEEL 38XC GOST 4543-71	1

Note: Vendor/Contractor may use approved alternate material if any specified in drawing/ specification. *Also refer Para 13.

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

- (a) The threaded parts if any should be covered with suitable plastic caps to prevent damages.
- (b) If the item consists of assemblies, each assembly should be packed separately.
- (c) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight / moisture.
- (d) The packaging slip shall contains
 - (i) Certificate of testing- NABL Certificate.
 - (ii) Guarantee/ Warranty Certificate.
 - (iii) Service and maintenance instructions.
 - (iv) Delivery Slip with Inspector's Acceptance Mark.

(v) Undertaking letter/ certificate of conformance.

(e) 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.

10. SAMPLING PLAN:

Sl. No.	Sampling Plan	Pilot*	Bulk
(i)	Visual Inspection	100%	100%
(ii)	Dimensional Inspection	100%	General Inspection level III, single sampling, Normal Inspection, AQL 2.5 of IS 2500 (Part-I)-2000
(iii)	Material Inspection	1 No	1 No. for each batch of raw material or heat treatment lot as required by specifications.
(iv)	Acceptance test	100%	100%
(v)	Pressure testing	-----	-----
(vi)	Machining / Fitment / Performance trial on higher assembly / Tank	02 Nos.	-----
(vii)	Interchangeability Test	02 Nos.	02 Nos. per batch on randomly basis, except selective assembly.
(viii)	Test stand/Jigs/ Fixtures/Gauges/Mandrels/etc.	100 %	100 %
(ix)	Marking/Identification	100%	100%
(x)	Packing/ Preservation	100%	100%

Note:-

*This clause is applicable if mentioned in supply order or project sanction order.

A New (First time supplier of this item) supplier should obtain clearance from HVF for bulk production which will be issued only after inspection/evaluation of pilot samples by HVF.

11. VISUAL INSPECTION [Sampling plan as per Para- 10 (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 of the assembly / component drawing.

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

- Defects in construction
- Cracks/Dents/Scratches
- Fitment of all components
- Presence of foreign particles
- Moisture and dust
- Corrosion of metal parts
- Mechanical imperfections & distortion
- Any form of deterioration of material and finishing.

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

12. DIMENSIONAL CHECK [Sampling plan as per Para- 10(ii)]

The dimensions of individual component, sub assembly and major assembly shall be checked and ensured as per respective drawing. Dimensional check 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.

12.1 BRACKET TO DRG.NO 172.27.114

1. All dimensions shall be confirmed as per drawing/specification
2. Surface finish/Roughness should be confirmed as per drawing and specification.
3. For admissible alternate method for manufacture in dimensions/material if any, refer drawing/specification.

13) MATERIAL CHECKS [SAMPLING PLAN AS PARA – 10 (iii)]

Material specimen / test bars of the components shall be in conformity as per the material mentioned in the relevant documents/drawing. 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.

13.1 BRACKET TO DRG.NO 172.27.114

a) The component should be manufactured from STEEL 38XC GOST 4543-71.

b) **Chemical properties:** As per STEEL 38XC GOST 4543 –71.

Grade	CONTENT OF ELEMENTS%							
	C	Si	Mn	Cr	S	P	Cu	Ni
					MAX			
38XC	0.34 to 0.42	1.00 to 1.40	0.30 to 0.60	1.30 to 1.60	0.035	0.035	0.30	0.30

Note: For mass fraction of other elements refer GOST 4543-71.

c) **Mechanical properties:** As per STEEL 38XC GOST 4543 –71.

Grade	Yield point, N/mm ² / (kgf/mm ²)	Ultimate strength, N/mm ² (Kgf/mm ²)	Elongation %	Relative reduction of area %	Impact strength KCU / (Kgm/cm ²)
	Not less than				
38XC	75	95	12	50	7

Note: For other properties refer GOST 4543-71.

14) PERFORMANCES/ACCEPTANCE TEST: BRACKET TO DRG.NO.172.27.114

- External drafts should be up to 7°.
- Unspecified radii should be up to 5 mm.
- Mismatch of dies should be up to 1 mm.
- Undercut flash along die pattern line up to 1 mm.
- A surface defects within limits of tolerance are allowed on rough surfaces.
- Tolerances for stamping dimensions should be in compliance with GOST 7505-55, Group 2.
- Dimension "a" should not be less than 4mm, Difference in measurements of dimensions "δ" not to exceed 1.5mm.
- Alignment of holes Ø12.02 A₄ should be checked by concentricity gauge Ø12 X.
- Shift of groove 13±0.5 relative to one of planes along size 88^{-0.23} up to 0.5mm.
- On surface 'A', surface finish √3 at a width of not less than 0.5 mm from upper component edge is ensured.

11. Buckling of unmachined surfaces up to 2 mm.
12. Rough spot on dimension $28^{-1.5}$ are allowed.
13. Dimension 88C₄ is to be checked on length of 12 min from the axis of hole $\varnothing 12.02A_4$; On the remaining length increase of dimension up to 88B₇ is allowed.

15) FITMENT AND PERFORMANCE TEST:

- a. Pilot samples should be checked for fitment and Performance test to ascertain the efficacy of the system under different operating conditions by fitting in higher assembly and repeating it for functional checks, wherever required.
- b. Items of Bulk supplies may be subjected to performance trial in tank in case of repeated failure/defects during exploitation.

16) 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 as per sampling plan.

17) CALIBRATION CHECKS

(TEST STANDS/JIGS/FIXTUERS/GAUGES/INSTRUMENTS):

The supplier / Contractor should have suitable Instruments, Test Stand, jigs, fixture, mandrels and gauges to carry out quality checks, to ensure conformance of components/assembly as per drawing and Specification /T.R points.

The supplier / contractor should submit calibration reports for instruments/fixtures/gauges/mandrels etc., which are used during process of inspection activities.

18) MARKING / IDENTIFICATION.

Marking of the items is to be carried out as called for in the relevant drawing, drawing/T.R points.

Inscription if any on the components is to be carried out as called for in the drawing/T.R points. Unless otherwise specified in the drawing/ specification, marking should not be carried out over the components.

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.

Suitable method can be adopted, provided that the above parameters are legible and considering the parameters mentioned in the drawing and specification.

19) PRESERVATION CHECK

- 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/preservative is maintained as per the drawing/specification.
- 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.

20) PACKING CHECK

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.

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

Finished products shall be wrapped / packed using black and opaque polyethylene sheet or bags.

21) DOCUMENTATION

- i. Firm has to maintain all the documents as per QAP with respect to the Sl.No.to have traceability.
- ii. Vendor has to submit Bill of materials, Material test reports, Class 'C' /Endurance test reports (wherever specified in drawing/TY specification/QAP) and Complete PIR (pre-inspection report)at the time of offering the item for inspection. HVF will commence inspection only after scrutiny of these documents.
- iii. The testing/inspection responsibility to test all the parameters as per QAP and drawing specifications as mentioned in Annexure –A (enclosed).
- iv. Pre inspection reports (PIR) of firm like, 1. Chemical analysis (NABL Certificate), 2.Mechanical properties (NABL Certificate), 3. Pre-forming

process, 4. Coating certification (wherever applicable), 5. Calibration reports of instruments and 6. 100 % Dimensional inspection reports.

22) REFERENCE:

a) Drawing No: 172.27.114.

b) Material specification as per drawing:

STEEL 38XC GOST 4543-71

c) GOST 4543-71, GOST 7505-55.

d) Alternate Material:

a. STEEL 708M40, Condition 'T' to BS: 970 Pt 1:1983.

Coating: Phosphating to ISS – 0465-01: 93 CLASS II, Finish 13(g).

SL. NO.	CATEGORY	ASSEMBLY/ SUB ASSEMBLY	TESTS/ INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGOA	
1		Pre inspection reports (PIR) of firm	Firm has to produce all the document as per QAP	As per the relevant drawing and QAP.	Confirm 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: 8 or item list.	Confirm to QAP	P	V	R	100% by firm/ vendor.
3	BRACKET TO DRG. NO 172.27.114.	Material tests	Chemical composition & Mechanical / Physical Properties	As per- GOST 4543-71	All the values to confirm with QAP Para no: 13.1 (a),(b),(c).	P	W/V	R	SP followed by HVF.
4		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no: 12.1	Confirm to drawing and QAP	P	W/P	R	100% by firm/ vendor SP followed by HVF.
5		Marking / traceability	Marking / traceability	Refer QAP Para no: 18.	Confirm to QAP Para no: 18.	P	V	R	100% by firm/ vendor.
6		Preservation & packing	Preservation & packing	Refer QAP Para no 19 & 20	Confirm to QAP Para no 19 & 20	P	V	R	100% by firm/ vendor.

Note:

For conformity of the items (Chemical/Physical/Mechanical properties).

1. 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 shall be rejected or not to use in production further.

2. For cross conformation of material, manufacturer has to submit test sample pieces for the items used / test slab and button for rubber items / HVF will draw samples from supplied lot for Witnessing (W) at HVF premises. In case of non-compliance to standards entire lot will be rejected.

P-Perform W-Witness V-Verify R-Review SP-Sampling Plan

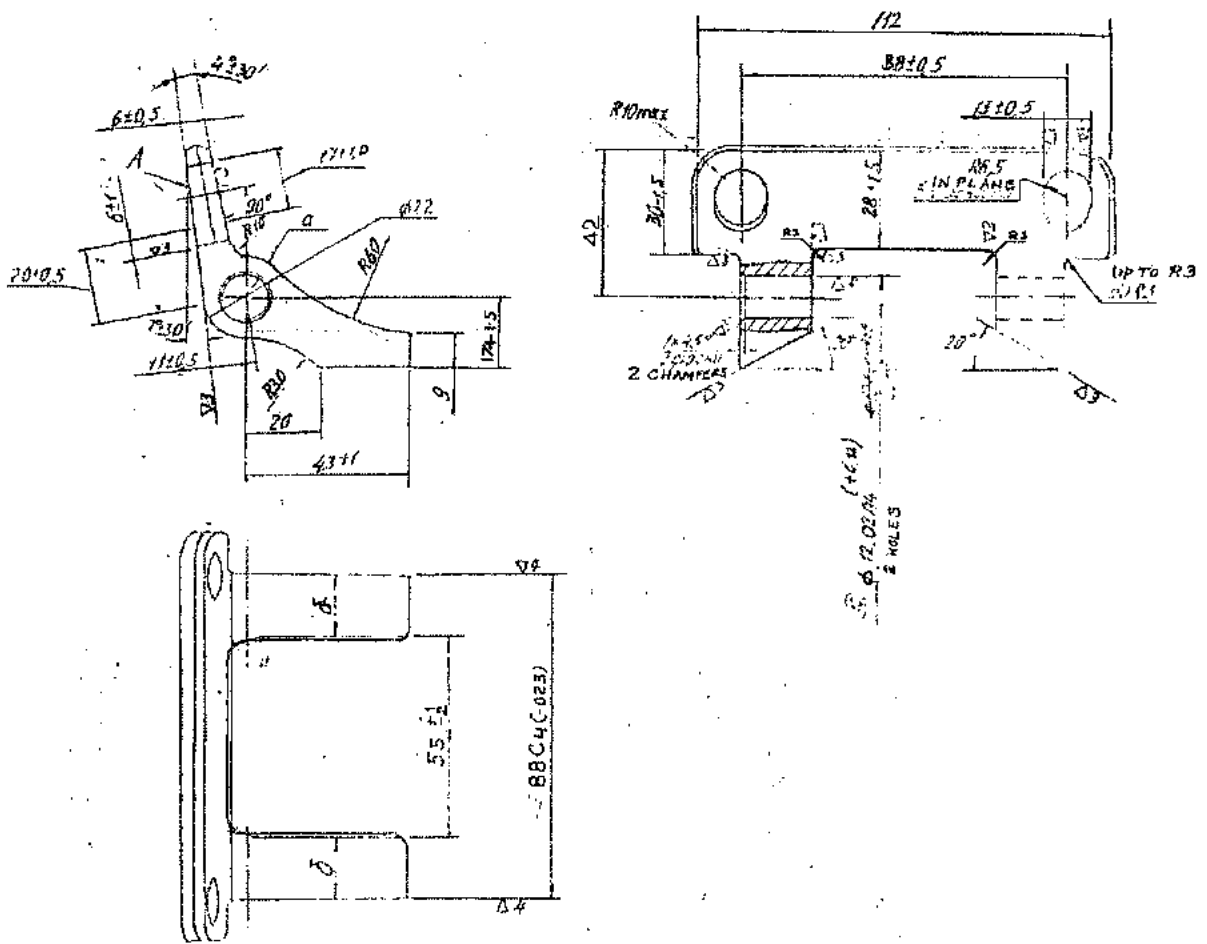


FIG: BRACKET TO DRG. NO 172.27.114

RECORD OF AMENDMENTS

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

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

FOR

(BRACKET)

DRG.NO. 172.27.052-2

(LF NO: 6206210055)

No HVF/T-72C/QAP/27/BRACKET/241219 - 00

ISSUE No: 00

DATE: OCT- 2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

BRACKET

DRG. NO. 172.27.052-2

PREPARED BY


(C.NANDA KUMAR)
JWM/QA (RIG-SA)

REVIEWED BY


(HANUMANTHA RAO GOLLA)
JWM/QA (RIG-SA / TA)

APPROVED BY


(SUBHAM BIJLWAN)
AWM/QA-RIG-(SA)

ISSUED BY

QUALITY ASSURANCE (RIG- SUB ASSEMBLY)
HEAVY VEHICLES FACTORY
AVADI CHENNAI – 600 054

Sl. no	CONTENTS	PAGE .No.
1.	IMPORTANT NOTES	4
2.	INTRODUCTION	4
3.	AIM	4
4.	SCOPE	5
5.	DOCUMENTS	5
6.	ITEM USED ON	6
7.	LIST OF DRAWINGS	6
8.	BILL OF MATERIAL	6
9.	CONDITIONS OF USE/ STORAGE INSTRUCTIONS	6
10.	SAMPLING PLAN	7
11.	VISUAL INSPECTION	7
12.	DIMENSIONAL CHECKS	8
13.	MATERIAL CHECKS	8
14.	ACCEPTANCE / PERFORMANCE TESTS	9
15.	FITMENT AND PERFORMANCE TEST	10
16.	INTERCHANGEABILITY	10
17.	CALIBRATION CHECKS	10
18.	MARKING/IDENTIFICATION	10
19.	PRESERVATION CHECK	10
20.	PACKING CHECK	11
21.	DOCUMENTATION	11
22.	REFERENCE	11
23.	ANNEXURE-A	12
24.	FIGURE	13
25.	APPENDIX-A	14

1.IMPORTANT NOTE

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 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 only as per the drawings supplied by the Inspection Authority 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”.

Note-5

In case of any contradiction between the contents of this QAP and drawings issued along with the contract, the latter will prevail.

2.INTRODUCTION

1. This quality plan lays down the inspection and testing procedure to be carried out on the component **BRACKET TO DRG.NO 172.27.052-2** 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 norm for **BRACKET TO DRG.NO:172.27.052-2**.

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 **BRACKET TO DRG. NO. 172.27.052-2** including the technical requirements of the drawings. The recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

For inspection purpose, only the latest issue of this QAP will be made applicable and copies of this QAP can be obtained from the issuing authority i.e. The Sr. General Manager, Heavy Vehicles Factory, Avadi, and Chennai.

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 responsible of the vendor to obtained 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 relevant specification and technical instructions on the subject item can be obtained by the contractor 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. Equivalentents to the collaborators specifications and standards will be decided only by the Inspecting Authority and should not be unilaterally decided. For any change in the specifications, standards or written approval, any alterations in specification can be affected and not otherwise.
- c) The process instruction sheets supplied by the collaborators are available with the Authority Holding Sealed Particulars, i.e. The Controllerate of Quality Assurance (Heavy Vehicles), Avadi, Chennai for the reference. The relevant process sheets may be studied at the premises of the AHSP after obtaining necessary permission.

- 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, template, gauges etc should be provided as recommended in these process sheets. If process sheet / Process Book is not available the details particulars/parameters available in the drawings to be strictly adhered.

6. ITEM USED ON:

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.27.052-2	BRACKET	-

8. BILL OF MATERIALS: (Individual items as mentioned in table to Para 7)

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.27.052-2	BRACKET	STEEL 30XГСА GOST 4543-71	1

Note: Vendor / Contractor may use approved alternate material if any specified in drawing/ specification.* Also refer Para no.13.

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

- (a) The threaded parts if any should be covered with suitable plastic caps to prevent damages.
- (b) If the item consists of assemblies, each assembly should be packed separately.
- (c) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight / moisture.
- (d) The packaging slip shall contains
 - (i) Certificate of testing- NABL Certificate.
 - (ii) Guarantee/ Warranty Certificate
 - (iii) Service and maintenance instructions
 - (iv) Delivery Slip with Inspector's Acceptance Mark
 - (v) Undertaking letter / certificate of conformance.

- (e) 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.

10. SAMPLING PLAN:

Sl. No.	Sampling Plan	Pilot*	Bulk
(i)	Visual Inspection	100%	100%
(ii)	Dimensional Inspection	100%	General Inspection level III, single sampling, Normal Inspection, AQL 2.5 of IS 2500 (Part-I)-2000
(iii)	Material Inspection	1 No	1 No. for each batch of raw material or heat treatment lot as required by specifications.
(iv)	Acceptance test	100%	100%
(v)	Pressure testing	-----	-----
(vi)	Machining/Fitment/ Performance trial on higher assembly / Tank	02 Nos.	-----
vii)	Interchangeability Test	02 Nos.	02 Nos. per batch on randomly basis, except selective assembly.
viii)	Test stand/Jigs/ Fixtures/Gauges/Man drels/etc.	100 %	100 %
ix)	Marking/Identification	100%	100%
x)	Packing/ Preservation	100%	100%

Note:-

* This clause is applicable if mentioned in supply order or project sanction order.

A New (First time supplier of this item) supplier should obtain clearance from HVF for bulk production which will be issued only after inspection/evaluation of pilot samples by HVF.

11. VISUAL INSPECTION[Sampling plan as per Para- 10 (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 of the assembly / component drawing.

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

- Defects in construction
- Cracks/Dents/Scratches
- Fitment of all components
- Presence of foreign particles
- Moisture and dust
- Corrosion of metal parts
- Mechanical imperfections & distortion
- Any form of deterioration of material and finishing.

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

12. DIMENSIONAL CHECK [Sampling plan as per Para- 10(ii)]

The dimensions of individual component, sub assembly and major assembly shall be checked and ensured as per respective drawing. Dimensional check 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.

12.1 BRACKET TO DRG.NO 172.27.052-2

1. All dimensions shall be confirmed as per drawing/specification
2. Surface finish/Roughness should be confirmed as per drawing and specification.
3. For admissible alternate method for manufacture in dimensions/material if any, refer drawing/specification.

13) MATERIAL CHECKS [SAMPLING PLAN AS PARA – 10 (iii)]

Material specimen /test bars of the components shall be in conformity as per the material mentioned in the relevant documents/drawing. 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.

13.1 BRACKET TO DRG.NO 172.27.052-2

- a) The component should be manufactured from STEEL 30XГCA GOST 4543-71.
- b) **Chemical properties:** As per Steel 30XГCA to GOST 4543-71.

CONTENT OF ELEMENTS%							
C	Si	Mn	Cr	S	P	Cu	Ni
MAX							
0.28 to 0.34	0.9 to 1.2	0.8 to 1.10	0.8 to 1.10	0.025	0.025	0.30	0.30

Note: For mass fraction of other elements refer GOST 4543-71.

c) **Mechanical properties:** As per STEEL GRADE 30XГCA to GOST 4543-71.

Yield point, N/mm ² / (kgf/mm ²)	Ultimate strength, N/mm ² (Kgf/mm ²)	Elongation %	Relative reduction of area %	Impact strength KCU / (Kgm/cm ²)
Not less than				
(835) 85	1080 (110)	10	45	(49) 5

Note: For other parameters refer GOST 4543-71.

14) PERFORMANCES / ACCEPTANCE TEST: BRACKET TO DRG.NO:

172.27.052-2

1. BHN 302-255 (DIA. OF IND 3.5-3.8)
MAY BE CHECKED IN BLANK.
2. UNDERCUT FLASH ALONG DIE PARTING
LINE UP TO 1mm. IS ALLOWED.
3. MISMATCH OF DIES SHOULD BE UP TO 1mm.
4. UNSPECIFIED STAMPING RADII SHOULD BE
UP TO 5mm.
5. PARTING LINE OF DIES IS ARBITRARY.
6. SURFACES $\phi 59$ MAY BE MACHINED. IN THIS
CASE R8 AND SHOULDERS ALONG DIMENSIONS
23 AND 14 SHOULD NOT BE CHECKED.
7. SHIFT OF RECTANGULAR HOLE ϕ RELATIVE
TO HOLE SHOULD NOT EXCEED 0.3mm.
(TOLERANCE IN MMC)
8. WHEN MACHINING ALONG DIMENSIONS
14 ON RIB WITH A THICKNESS OF 10mm.
ROUGH SPOTS ARE ALLOWED
9. REST OF REQUIREMENTS SHOULD BE IN
COMPLIANCE WITH SPACES 520 TY I.

15) FITMENT AND PERFORMANCE TEST:

- a. Pilot samples should be checked for fitment and Performance test to ascertain the efficacy of the system under different operating conditions by fitting in higher assembly and repeating it for functional checks, wherever required.
- b. Items of Bulk supplies may be subjected to performance trial in tank in case of repeated failure/defects during exploitation.

16) INTERCHANGEABILITY:

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

17) CALIBRATION CHECKS

(TEST STANDS/JIGS/FIXTURES/GAUGES/INSTRUMENTS):

The supplier / Contractor should have suitable Instruments, Test Stand, jigs, fixture, mandrels and gauges to carry out quality checks, to ensure conformance of components/assembly as per drawing and Specification /T.R points.

The supplier/contractor should submit calibration reports for instruments/fixtures/gauges/mandrels etc., which are used during process of inspection activities.

18) MARKING/IDENTIFICATION

Marking of the items is to be carried out as called for in the relevant drawing, drawing/T.R points.

Inscription if any on the components is to be carried out as called for in the drawing/T.R points. Unless otherwise specified in the drawing/ specification, marking should not be carried out over the components.

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. Suitable method can be adopted, provided that the above parameters are legible and considering the parameters mentioned in the drawing and specification.

19) PRESERVATION CHECK

- 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/preservative is maintained as per the drawing/specification.
- 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.

20) PACKING CHECK

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.

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

Finished products shall be wrapped / packed using black and opaque polyethylene sheet or bags.

21) DOCUMENTATION

- i. Firm has to maintain all the documents as per QAP with respect to the Sl.No.to have traceability.
- ii. Vendor has to submit Bill of materials, Material test reports, Class 'C' /Endurance test reports (wherever specified in drawing/TY specification/QAP) and Complete PIR (pre-inspection report)at the time of offering the item for inspection. HVF will commence inspection only after scrutiny of these documents.
- iii. The testing/inspection responsibility to test all the parameters as per QAP and drawing specifications as mentioned in Annexure -A (enclosed).
- iv. Pre inspection reports (PIR) of firm like, 1. Chemical analysis (NABL Certificate), 2.Mechanical properties (NABL Certificate), 3. Pre-forming process, 4. Coating certification. 5. Calibration reports of instruments and 6. 100 % Dimensional inspection reports.

22) REFERENCE:

- a) Drawing No: 172.27.052-2
- b) Material specification as per drawing:
STEEL 30XFCA GOST 4543-71.
- c) GOST 4543-71.
- d) Specification 520 TY1.
- e) Alternate Material:

ALT MATL:- STEEL,817 M40:BS 970 PT I: 83, COND 'T'
WITH RESTRICTION OF% S & P TO 0.025 MAX
EACH, HEAT TREATMENT TO ACHIEVE
HARDNESS 255 TO 302 BHN.

SL. NO.	CATEGORY	ASSEMBLY/SUB ASSEMBLY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGOA	
1	BRACKET TO DRG. NO 172.27.052-2	Pre inspection reports (PIR) of firm	Firm has to produced all the document as per Para 21 (iv)	As per the relevant drawing and QAP.	Confirm 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: 8 or Item list	Confirm to QAP.	P	V	R	100% by firm/ vendor.
3		Material tests	Chemical composition & Mechanical / Physical Properties	As per-GOST 4543-71.	All the values to confirm with QAP (Para no:13.1 (a), (b) & (c))	P	W/V	R	SP followed by HVF.
4		Hardness checks	Hardness BHN 302 - 255	Refer QAP Para no: 14(1)	Confirm to QAP Para no: 14(1)	P	W/V	R	SP followed by HVF.
5		Dimensional checks	Dimensions as per the drawing	Refer drawing /QAP Para no: 12.1	Confirm to drawing and QAP	P	W/P	R	100% by firm/ vendor SP followed by HVF.
6		Marking / traceability	Firm has to make marking / traceability records.	Refer QAP Para no: 18	Confirm to QAP Para no: 18	P	V	R	100% by firm/ vendor.
7		Preservation & packing	Firm has to make Preservation & packing records	Refer QAP Para no: 19 & 20	Confirm to QAP Para no: 19 & 20	P	V	R	100% by firm/ vendor.

Note:

For conformity of the items (Chemical/Physical/Mechanical properties).

- 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 shall be rejected or not to use in production further.
- For cross conformation of material, manufacturer has to submit test sample pieces for the items used / test slab and button for rubber items / HVF will draw samples from supplied lot for Witnessing (W) at HVF premises. In case of non-compliance to standards entire lot will be rejected.

P-Perform

W-Witness

V-Verify

R-Review

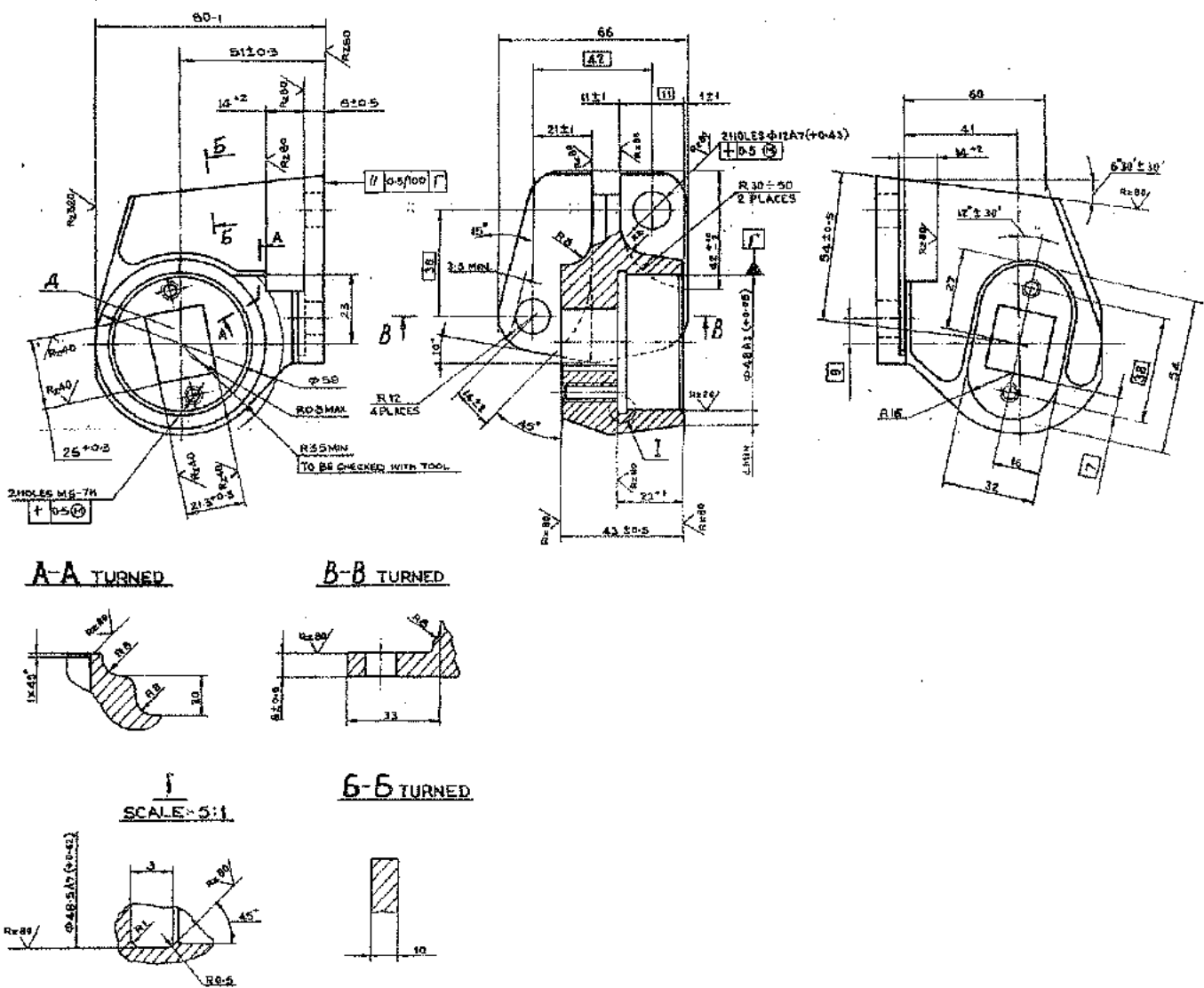


FIG: BRACKET TO DRG. NO 172.27.052-2
 (For reference only)

RECORD OF AMENDMENTS

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

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

FOR

(BRACKET)

DRG.NO.172.27.056

(LF NO.6206210058)

No.HVF/T-72C/QAP/27/BRACKET/245104-00

ISSUE No: 00

DATE: FEB-2024

QUALITY ASSURANCE (RIG-OP)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

BRACKET

DRG. NO. 172.27.056


PREPARED BY


(C.NANDA KUMAR)
JWM/QA (RIG-OE&OH)

REVIEWED BY


(AWNESH YADAV)
JWM/QA (RIG-OP/TA)

APPROVED BY


(NEERAJ KUMAR) *JWM (SGP)*
JT.GM/QA (RIG-OP&ODC) *CSIR Ramayya*

ISSUED BY

QUALITY ASSURANCE (RIG-OP)
HEAVY VEHICLES FACTORY
AVADI CHENNAI – 600 054

Sl. no	CONTENTS	PAGE .No.
1.	IMPORTANT NOTES	4
2.	INTRODUCTION	4
3.	AIM	4
4.	SCOPE	5
5.	DOCUMENTS	5
6.	ITEM USED ON	6
7.	LIST OF DRAWINGS	6
8.	BILL OF MATERIAL	6
9.	CONDITIONS OF USE/ STORAGE INSTRUCTIONS	6
10.	SAMPLING PLAN	6
11.	VISUAL INSPECTION	7
12.	DIMENSIONAL CHECKS	8
13.	MATERIAL CHECKS	8-9
14.	ACCEPTANCE / PERFORMANCE TESTS	10
15.	FITMENT AND PERFORMANCE TEST	11
16.	INTERCHANGEABILITY	11
17.	CALIBRATION CHECKS	11
18.	MARKING/IDENTIFICATION	11
19.	PRESERVATION CHECK	11
20.	PACKING CHECK	11
21.	DOCUMENTATION	12
22.	REFERENCE	12
23.	ANNEXURE-A	13
24.	FIGURE	14
25.	APPENDIX-A	15

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 permission of The Chief 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 only as per the drawings supplied by the Inspection Authority 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".

Note-5

In case of any **contradiction** between the contents of this QAP and **drawings/specifications/GOST** issued along with the contract, **the latter only will prevail.**

2. INTRODUCTION

1. This quality plan lays down the inspection and testing procedure to be carried out on the component **BRACKET TO DRGNO.172.27.056** 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 Chief 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

This QAP is aimed at standardizing the Inspection procedure and acceptance norm for **BRACKET TO DRGNO: 172.27.056**.

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 **BRACKET TO DRG.NO.172.27.056** including the technical requirements of the drawings. The recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

For inspection purpose, only the latest issue of this QAP will be made applicable and copies of this QAP can be obtained from the issuing authority i.e. The Chief General Manager, Heavy Vehicles Factory, Avadi, and Chennai.

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, CGM/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 relevant technical documents for manufacturing (includes details about material, casting/forging, welding, machining, heat processes, QAP against relevant items/process of this component etc. and up to final inspection) the components like GOST/Drawing/Specification, Technical data book, process sheet etc., and technical instructions on the subject item is to be obtained by the contractor from AHSP through DDO/HVF.
- b) Any clarification required on these documents to be obtained from the Inspecting Authority i.e. The Chief General Manager, Heavy Vehicles Factory, Avadi, Chennai – 600 054. Equivalent to the collaborators specifications and standards will be decided only by the Inspecting Authority and should not be unilaterally decided. For any change in the specifications, standards or written approval, any alterations in specification can be affected and not otherwise.
- c) The process instruction sheets supplied by the collaborators are available with the Authority Holding Sealed Particulars, i.e. The Controllerate of Quality Assurance (Heavy Vehicles), Avadi, Chennai for the reference. The relevant process sheets may be studied at the premises of the AHSP after obtaining necessary permission.
- 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, template, gauges etc.,

should be provided as recommended in these process sheets. If process sheet / Process Book is not available the details particulars/parameters available in the drawings to be strictly adhered.

6. ITEM USED ON/ TO MANUFACTURE

1. 172.27.010CB-1 - Gripper

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.27.056	BRACKET	-

8. BILL OF MATERIALS :(Individual items as mentioned in table to Para 7)

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.27.056	BRACKET	STEEL 38XC GOST 4543-71	1

Note: Vendor/Contractor may use approved alternate material, if any specified in drawing/specification.* also refer Para no: 13.

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

- (a) The threaded parts if any should be covered with suitable plastic caps to prevent damages.
- (b) If the item consists of assemblies, each assembly should be packed separately.
- (c) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight / moisture.
- (d) The packaging slip shall contains
 - (i) Certificate of testing- NABL Certificate.
 - (ii) Guarantee/ Warranty Certificate.
 - (iii) Service and maintenance instructions. (If applicable).
 - (iv) Delivery Slip with Inspector's Acceptance Mark.
 - (v) Undertaking letter / Certificate of conformance (As applicable).
- (e) 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.

10. SAMPLING PLAN:

Sl. No.	Sampling Plan	Pilot*	Bulk
Acceptance test (as below)			
(i)	Visual Inspection	100%	100%
(ii)	Dimensional	100%	General Inspection level III, single

	Inspection Including Hardness Inspection		sampling, Normal Inspection, AQL 2.5 of IS 2500 (Part-I)-2000
(iii)	Material Inspection (including Chemical, Mechanical & Physical properties)	1 No	1 No. or qty as specified in specification, GOST for each batch of raw material or heat treatment lot / As required for confirmation of material.
(iv)	Pressure testing	----	-----
(v)	Machining/Fitment/ Performance trial on higher assembly / Tank	01 No.	1 No. per batch / As Required by HVF
vi)	Interchangeability Test	----	-----
vii)	Calibration Reports/Certificates of Test stand/Jigs/ Equipment's/Fixtures/ Gauges/Mandrels/etc.	100 %	100 %
viii)	Marking/Identification	100%	100%
ix)	Packing/ Preservation	100%	100%

Note:-

A New (First time supplier of this item) supplier should obtain clearance from HVF for bulk production which will be issued only after inspection/evaluation of pilot samples by HVF. During acceptance of Forgings, the following are to be checked as per Specification:

1. Chemical composition of steel;
2. Mechanical properties of steel;
3. External view (absence of defects) and quality welding of casting defects;
4. Dimensions;
5. Hardness;
6. Absence of internal defects
7. Macrostructure/Microstructure.

11. VISUAL INSPECTION [Sampling plan as per Para- 10 (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 of the assembly / component drawing.

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

- Defects in construction
- Cracks/Dents/Scratches

- Fitment of all components
- Presence of foreign particles
- Moisture and dust
- Corrosion of metal parts
- Mechanical imperfections & distortion
- Any form of deterioration of material and finishing.

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

12. DIMENSIONAL CHECK[Sampling plan as per Para- 10(ii)]

The dimensions including geometrical parameters of individual component, sub assembly and major assembly shall be checked and ensured as per respective drawing. Dimensional check 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.

12.1. BRACKET TO DRG.NO: 172.27.056

1. All dimensions including geometrical parameters shall be confirmed as per drawing/specification.
2. Surface finish/Roughness should be confirmed as per drawing and specification.
3. For admissible alternate method for manufacture in dimensions/material if any, refer drawing/specification.
4. Care should be taken on the dimensions of components as indicated in the components, which are to be maintained at the time of machining/assembly.

13) MATERIAL CHECKS [SAMPLING PLAN AS PARA – 10 (iii)].

Material specimen /test bars of the components shall be in conformity as per the material mentioned in the relevant documents/drawing. 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 shall be obtained from AHSP through DDO/HVF, before usage of such materials.

13.1 BRACKET TO DRG.NO:172.27.056

a) The component should be manufactured from STEEL 38XC TO GOST 4543-

71.

b) **Chemical properties:** As per STEEL GRADE 38XC TO GOST 4543-71.

Grade	CONTENT OF ELEMENTS%							
	C	Si	Mn	Cr	S	P	Cu	Ni
					MAX			
38XC	0.34 to 0.42	1.00 to 1.40	0.30 to 0.60	1.30 to 1.60	0.035	0.035	0.30	0.30

Note: For mass fraction of other elements refer GOST 4543-71.

c) **Mechanical properties:** As per STEEL GRADE 38XC TO GOST 4543 –71.

Yield point, N/mm ² / (kgf/mm ²)	Ultimate strength, N/mm ² (Kgf/mm ²)	Elongation %	Relative reduction of area %	Impact strength KCU / (Kgm/cm ²)
Not less than				
735 (75)	930 (95)	12	50	69 (7)

Note: For details of other properties & parameters refer GOST 4543-71.

Explanatory Note

1. The components and assemblies undergo many manufacturing processes such as Casting/Forging, machining, welding, heat treatment processes painting, coatings, assembling, inspection process and other applicable parameters as indicated in the relevant Documents such as process/TD Books/Drawings/Specifications/GOST related manufacturing this component/Assembly.
2. Stage wise process and inspection of the component as specified in TD Book/ Process Book/ illustration book/specification is to be confirmed by the supplier during manufacturing the components.
3. Firm shall submit details of manufacturing process and inspection details of the components individually/sub-assemblies/assemblies to HVF.
4. If required/applicable HVF shall witness/verify stage wise inspection /process details during manufacturing of the components.
5. The component may be subject to endurance test, when fitted in higher assembly as specified in process / illustration /TD book.
6. Apart from above, all other relevant test for acceptance of the component(i.e. heat treatment process, heat treatment cycles, etc.) as specified in GOST / Specification / drawing / TD book shall be carried out by the firm and the report/ certificates shall be submitted to HVF.
7. Firm has to follow the manufacturing details/parameters for producing the component as specified in the technical data / process book and confirm as per the TD/Process Book. The inspection reports carried out for the same is to be submitted to HVF. HVF will carry out verification for cross confirmation if required.

8. Forging of component


During forging of component the instructions of manufacturing should be strictly followed.

- a) All billets/blooms should be used for manufacturing forgings should be melt wise. The forgings made should be clearly marked to avoid mix up with those melts from other melts.

- b) Copies of all test certificates of chemistry, grain size, inclusion, microstructure and physical properties etc. as obtained from steel suppliers along with the test certificates are to be submitted.
- c) The forging should satisfy the required chemical and physical properties, microstructure, grain size, inclusions rating, hardenability, etc.
- d) After normalizing or hardening & tempering, as the case may be, the firms are advised in their own interest to check the microstructure and satisfy themselves for its correctness.
- e) In case of normalized forgings, it has been observed that sometimes microstructure is having banded structure and difficulties are experienced in machining the components, hence banded structure will not be accepted and firms are advised to ensure proper microstructure free from banding.
- f) The forging should be free from any cracks, firm should ensure the same.

14) PERFORMANCES/ACCEPTANCE TEST/TR POINTS OF BRACKET TO DRG.NO: 172.27.056

(The following shall be ensured/followed during manufacturing the components)

- 1- TO BE HARDENED. HARDNESS BHN 302-295 (DIA OF INDENTATION ON 3.5-3.8)
- 2- EXTERNAL DRAFTS - UP TO 7°.
- 3- MISMATCH OF DIE - UP TO 1mm.
- 4- UNDERCUT FLASH SHOULD BE UP TO 1mm.
- 5- BUCKLING OF SURFACES AFTER STAMPING UP TO 1.5mm.
- 6- UNSPECIFIED STAMPING RADII UP TO 3mm.
- 7- NON PARALLELITY OF WALLS "A" OF GROOVE 13mm RELATIVE TO AXIS OF HOLE Ø 40 SHOULD NOT EXCEED 0.1mm AT LENGTH OF 50mm.
- 8- NON SQUARENESS OF AXIS OF HOLE Ø 10 TO WALL "A" OF GROOVE NOT TO EXCEED 0.1mm AT GROOVE LENGTH.
- 9- THREAD SHOULD BE COUNTER SUNK AT AN ANGLE OF 120° UP TO THREAD MAJOR DIAMETER.
- 10- DIFFERENCE IN MEASUREMENT OF DIMENSIONS "Q" NOT TO EXCEED 1mm.
- 11- DIMENSIONS GIVEN IN  ARE TO BE MACHINED IN COMPLIANCE WITH DRAWING 172.27.010 C6-1.
- 12- PARTING LINE OF DIES IS ARBITRARY.
- 13- TECHNICAL REQUIREMENTS ON NOT TO BE MACHINED SURFACES SHOULD BE AS PER GOST 8479-70.
- 14- SHIFT OF HOLE M8 FROM AXIS OF SLOT SHOULD BE UP TO 0.5mm.
- 15- HOLES Ø 10 A4 MAY BE MACHINED AS PER DRAWING 172.27.010.C6-1.
- 16- WHEN MACHINING SLOT 13A7 AND SURFACES IN TO DIMENSION 22+0.5, SHOULDER HAVING A DEPTH UP TO 1mm IS ALLOWED.

15) FITMENT AND PERFORMANCE TEST:

- a. Pilot samples should be checked for fitment Performance trial at HVF and Performance test to ascertain the efficacy of the system under different operating conditions by fitting in higher assembly and repeating it for functional checks, wherever required.
- b. Items of Bulk supplies may be subjected to performance trial in tank in case of repeated failure/defects during exploitation.
- c. The component should be clean, free from distortion, cracks and other harmful defects.

16) INTERCHANGEABILITY:

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

17) CALIBRATION CHECKS

(TEST STANDS/JIGS/FIXTURES/GAUGES/INSTRUMENTS):

The supplier / Contractor should have suitable Instruments, Equipments, Test Stand, jigs, fixture, mandrels and gauges to carry out quality checks, to ensure conformance of components/assembly as per drawing and Specification /T.R points.

The supplier/contractor should submit calibration reports for instruments/fixtures/gauges/mandrels etc., which are used during process of inspection activities.

18) MARKING/IDENTIFICATION.

Marking of the items is to be carried out as called for in the relevant drawing, drawing/T.R points.

Inscription if any on the components is to be carried out as called for in the drawing/T.R points. Unless otherwise specified in the drawing/ specification, marking should not be carried out over the components.

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. Suitable method can be adopted, provided that the above parameters are legible and considering the parameters mentioned in the drawing and specification.

19) PRESERVATION CHECK

- a) Preservative coatings are to be strictly adhered to as called for in the drawing. However, equivalent BIS/ IS Standards can also be followed, subject to the thickness of the coating/preservative is maintained as per the drawing/specification.
- 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.

20) PACKING CHECK

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.

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

Finished products shall be wrapped / packed using black and opaque sheet or bags.

21) DOCUMENTATION

1. Firm has to maintain all the documents as per QAP with respect to the Sl.No. Of components to have traceability.
2. Vendor has to submit Bill of materials, Material test reports, Class 'C' /Endurance test reports (wherever specified in drawing/TY specification/QAP) and Complete PIR (pre-inspection report)at the time of offering the item for inspection. HVF will commence inspection only after scrutiny of these documents.
3. The testing/inspection responsibility to test all the parameters as per QAP and drawing specifications as mentioned in Annexure -A (enclosed).
4. Documents to be submitted as Pre inspection reports (PIR) by firm.

Sl. No	Documents
1	Chemical analysis (NABL)
2	Mechanical properties (NABL)
3	Pre-forming process
4	Coating certification (wherever applicable),
5	Calibration reports of instruments and gauges etc.
6	100% Dimensional (Including geometrical features)inspection reports
7	Pressure test (leakage test) if applicable,
8	Hardness checks reports
9	Guarantee/ Warranty Certificate (Final)
10	Service and maintenance instructions (If applicable). (Final)
11	Undertaking letter / certificate of Conformance (As applicable).(Final)
12	Other relevant reports for acceptance of the item as specified in GOST/specification/drawings, etc.

22) REFERENCE:

- a) Drawing No: 172.27.056
- b) Material specification as per drawing: STEEL 38XC GOST 4543-71
- c) Alternate material:
 - a. Steel 530 M40/T or
 - b. 708 M40/U to BS 970 Part-1 1983 to achieve Hardness 255 to 302 BHN .
- d) Drawing 172.27.010Cb-1
- e) All other relevant Documents (process/TD Books/Drawings/Specifications/GOST related manufacturing this component/Assembly.

SL. NO.	CATEGORY	ASSEMBLY/ SUB ASSEMBLY	TESTS/ INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQ	
1	BRACKET TO DRG. NO 172.27.056	Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 8 or item list.	Confirm to QAP	P	V	A	100% by firm/ vendor.
2		Pre inspection reports (PIR) of firm	Firm has to produce all the document as per QAP	As per the relevant drawing/specification/TD book/process book and QAP.	Confirm to relevant drawing/specification/ TD book/process book and QAP as per bill of material	P	V	R	100% by firm/ vendor.
3		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no: 12.1	Confirm to drawing and QAP Para no: 12.1	P	W/P	R	100% by firm/ vendor & SP followed by HVF.
4		Material tests	Chemical composition & Mechanical / Physical Properties	As per-GOST 4543-71.	All the values to confirm with QAP (Para no:13.1 (a), (b)& (c))	P	W/W/P	R	As per SP of HVF by firm and SP followed by HVF
5		Hardness Checks	Hardness BHN 302 TO 255 (Dia of impression 3.5..3.8)	Refer QAP Para no: 14(1)	Confirm to QAP Para no: 14(1)	P	W/W/P	R	100% by firm/ vendor & SP followed by HVF.
6		Marking / traceability	Marking / Iraceability	Refer QAP Para no: 18	Confirm to QAP Para no. 18	P	V	R	100% by firm/ vendor.
7		Preservation & packing	Preservation & packing	Refer QAP Para no 19 & 20	Confirm to QAP Para no 19 & 20	P	V	R	100% by firm/ vendor.
8		Other testing Parameters for acceptance	As per drawing/specification/TD book/ Process Book GOST	Refer drawing/specification TD book/ Process Book GOST	Confirm to specification/GOST/Rel evant document	P	W/W/P	R	As per SP of HVF by firm and SP followed by HVF.
Note: For conformity of the items (Chemical/Physical/Mechanical properties). 1. 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 shall be rejected and shall not be used in production further. 2. For cross confirmation of material, manufacturer has to submit sufficient quantity (as specified in GOST/Specification/supply order) test sample pieces for the items used / test slab and button for rubber items / HVF will draw samples from supplied lot for Witnessing/Verify/Perform(W/W/P) at HVF premises. In case of non-compliance to standards, entire lot will be rejected as per the Terms and Conditions. 3. All other relevant tests as specified in GOST/specification/drawing is to be carried out by firm and to be confirmed.									

P- Perform W- Witness V-Verify R-Review SP-Sampling Plan

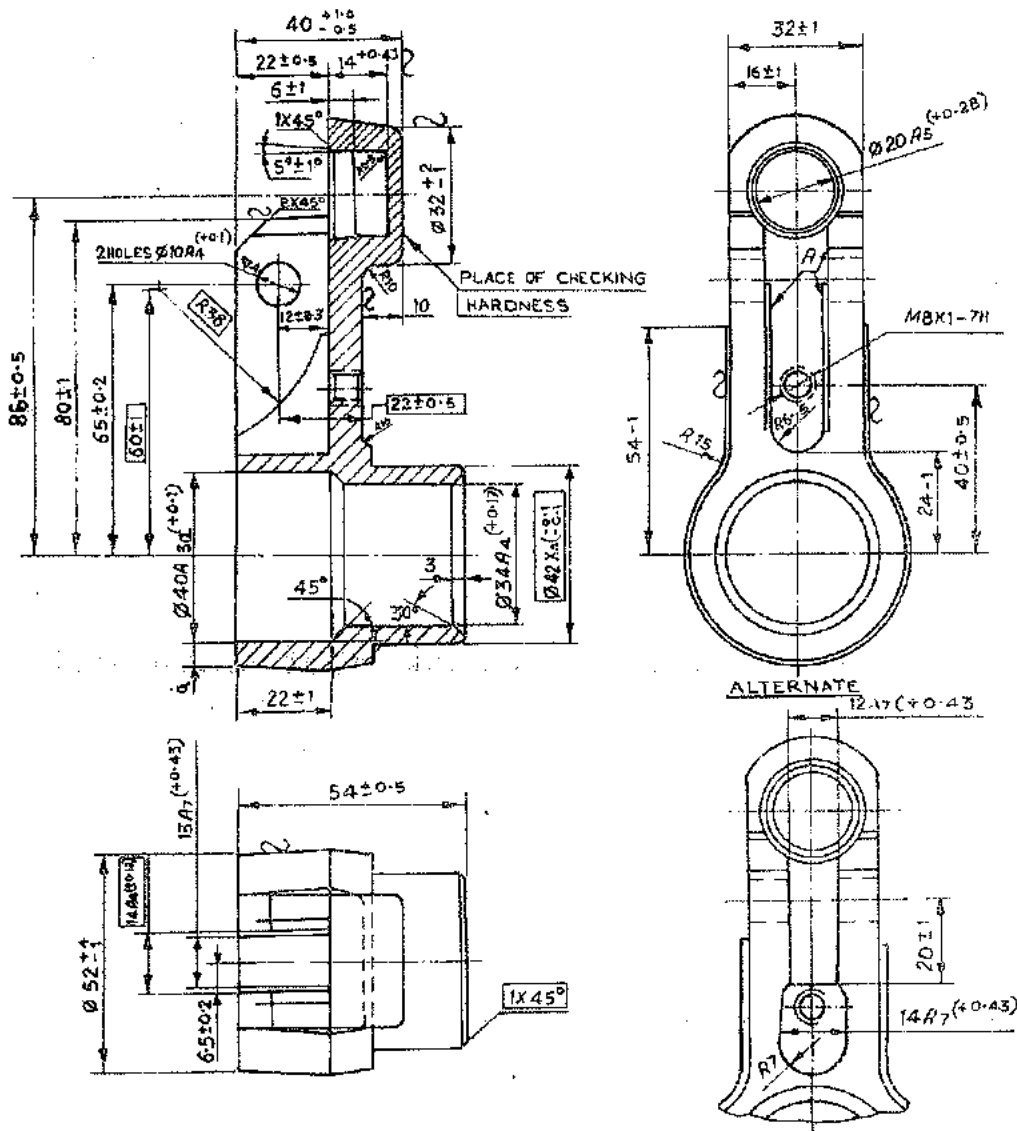


FIG: BRACKET TO DRG.NO.172.27.056.

(For reference only – Refer original drawing for manufacturing)

RECORD OF AMENDMENTS

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

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

FOR

(PLUG)

DRG.NO. 172.45.011-1

(LF NO: 6206406031)

No HVF/T-72C/QAP/45/PLUG/243212 - 00

ISSUE No: 00

DATE: DEC- 2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI - 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

PLUG

DRG. NO. 172.45.011-1

PREPARED BY

R.K.
(C.NANDA KUMAR)
JWM/QA (RIG-SA)

Richy

REVIEWED BY

H. Golla
(HANUMANTHA RAO GOLLA)
JWM/QA (RIG-SA / TA)

APPROVED BY

Subham
(SUBHAM BIJLWAN)
AWM/QA-RIG-(SA)

ISSUED BY

QUALITY ASSURANCE (RIG- SUB ASSEMBLY)
HEAVY VEHICLES FACTORY
AVADI CHENNAI - 600 054

Sl. no	CONTENTS	PAGE .No.
1.	IMPORTANT NOTES	4
2.	INTRODUCTION	4
3.	AIM	4
4.	SCOPE	5
5.	DOCUMENTS	5
6.	ITEM USED ON	6
7.	LIST OF DRAWINGS	6
8.	BILL OF MATERIAL	6
9.	CONDITIONS OF USE/ STORAGE INSTRUCTIONS	6
10.	SAMPLING PLAN	7
11.	VISUAL INSPECTION	7
12.	DIMENSIONAL CHECKS	8
13.	MATERIAL CHECKS	8
14.	ACCEPTANCE / PERFORMANCE TESTS	9
15.	FITMENT AND PERFORMANCE TEST	10
16.	INTERCHANGEABILITY	10
17.	CALIBRATION CHECKS	10
18.	MARKING/IDENTIFICATION	10
19.	PRESERVATION CHECK	11
20.	PACKING CHECK	11
21.	DOCUMENTATION	11
22.	REFERENCE	11
23.	ANNEXURE-A	12
24.	FIGURE	13
25.	APPENDIX-A	14

1.IMPORTANT NOTE

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 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 only as per the drawings supplied by the Inspection Authority 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".

Note-5

In case of any contradiction between the contents of this QAP and drawings issued along with the contract, the latter will prevail.

2.INTRODUCTION

1. This quality plan lays down the inspection and testing procedure to be carried out on the component **PLUG TO DRG.NO 172.45.011-1** 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 norm for **PLUG TO DRG.NO:172.45.011-1**.

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 **PLUG TO DRG. NO. 172.45.011-1** including the technical requirements of the drawings. The recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

For inspection purpose, only the latest issue of this QAP will be made applicable and copies of this QAP can be obtained from the issuing authority i.e. The Sr. General Manager, Heavy Vehicles Factory, Avadi, and Chennai.

NOTE-I:

- 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 responsible of the vendor to obtained 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 relevant specification and technical instructions on the subject item can be obtained by the contractor 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. Equivalent to the collaborators specifications and standards will be decided only by the Inspecting Authority and should not be unilaterally decided. For any change in the specifications, standards or written approval, any alterations in specification can be affected and not otherwise.
- c) The process instruction sheets supplied by the collaborators are available with the Authority Holding Sealed Particulars, i.e. The Controllerate of Quality Assurance (Heavy Vehicles), Avadi, Chennai for the reference. The relevant process sheets may be studied at the premises of the AHSP after obtaining necessary permission.
- 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, template, gauges

etc should be provided as recommended in these process sheets. If process sheet / Process Book is not available the details particulars/parameters available in the drawings to be strictly adhered.

6. ITEM USED ON:

- 1. PV572.0711.0094 -
- 2. 188.30.001CB-1CB -
- 3. 172.45CB-8CB -

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.45.011-1	PLUG	-

8. BILL OF MATERIALS: (Individual items as mentioned in table to Para 7)

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.45.011-1	PLUG	STEEL 38XC GOST 4543-71	1

Note: Vendor / Contractor may use approved alternate material if any specified in drawing/ specification.* Also refer Para no.13.

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

- (a) The threaded parts if any should be covered with suitable plastic caps to prevent damages.
- (b) If the item consists of assemblies, each assembly should be packed separately.
- (c) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight / moisture.
- (d) The packaging slip shall contains
 - (i) Certificate of testing- NABL Certificate.
 - (ii) Guarantee/ Warranty Certificate
 - (iii) Service and maintenance instructions
 - (iv) Delivery Slip with Inspector's Acceptance Mark
 - (v) Undertaking letter / certificate of conformance (As applicable).
- (e) 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.

10. SAMPLING PLAN:

Sl. No.	Sampling Plan	Pilot	Bulk
(i)	Visual Inspection	100%	100%
(ii)	Dimensional Inspection	100%	General Inspection level III, single sampling, Normal Inspection, AQL 2.5 of IS 2500 (Part-I)-2000
(iii)	Material Inspection	1 No	1 No. for each batch of raw material or heat treatment lot as required by specifications.
(iv)	Acceptance test	100%	100%
(v)	Pressure testing	-----	-----
(vi)	Machining/Fitment/ Performance trial on higher assembly / Tank	---	---
vii)	Interchangeability Test	02 Nos.	02 Nos. per batch on randomly basis, except selective assembly.
viii)	Test stand/Jigs/ Fixtures/Gauges/Man drels/etc.	100 %	100 %
ix)	Marking/Identification	100%	100%
x)	Packing/ Preservation	100%	100%

Note:-

A New (First time supplier of this item) supplier should obtain clearance from HVF for bulk production which will be issued only after inspection/evaluation of pilot samples by HVF.

11. VISUAL INSPECTION[Sampling plan as per Para- 10 (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 of the assembly / component drawing.

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

- Defects in construction
- Cracks/Dents/Scratches
- Fitment of all components
- Presence of foreign particles

- Moisture and dust
- Corrosion of metal parts
- Mechanical imperfections & distortion
- Any form of deterioration of material and finishing.

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

12. DIMENSIONAL CHECK [Sampling plan as per Para- 10(ii)]

The dimensions of individual component, sub assembly and major assembly shall be checked and ensured as per respective drawing. Dimensional check 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.

12.1 PLUG TO DRG.NO 172.45.011-1

1. All dimensions shall be confirmed as per drawing/specification
2. Surface finish/Roughness should be confirmed as per drawing and specification.
3. For admissible alternate method for manufacture in dimensions/material if any, refer drawing/specification.
4. Place for checking Hardness refer drawing.
5. Radius or chamfer from tool refers drawing.

13) MATERIAL CHECKS [SAMPLING PLAN AS PARA – 10 (iii)]

Material specimen /test bars of the components shall be in conformity as per the material mentioned in the relevant documents/drawing. 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.

13.1 PLUG TO DRG.NO.172.45.011-1

- a) The component should be manufactured from STEEL 38XC GOST 4543-71.
- b) **Chemical properties:** As per STEEL 38XC GOST 4543-71.

Grade	CONTENT OF ELEMENTS%							
	C	Si	Mn	Cr	S	P	Cu	Ni
	MAX							
38XC	0.34 to 0.42	1.00 to 1.40	0.30 to 0.60	1.30 to 1.60	0.035	0.035	0.30	0.30

Note: For mass fraction of other elements refer GOST 4543-71.

c) Mechanical properties: As per STEEL 38XC GOST 4543-71.

Grade	Yield point, (kgf/mm ²)	Ultimate strength, (Kgf/mm ²)	Elongation %	Relative reduction of area %	Impact strength (Kgm/cm ²)
	Not less than				
38XC	75	95	12	50	7

Note: For other properties refer GOST 4543-71.

14) PERFORMANCES / ACCEPTANCE TEST: PLUG TO DRG.NO:172.45.011-1

- BHN 30₂ --- 255 (DIA. OF INDENTATION 3.5 --- 3.8)
- THREAD M72x3 AND THE RUN OUT IN RELATION TO THREAD ARE TO BE CHECKED BEFORE MILLING OF SLOTS.
- AT PLACES OF CUTS, THREAD M72x3 IS TO BE COUNTERSUNK AT AN ANGLE OF 120° UPTO THE MINOR DIAMETER OF THREAD AND DRESSED.
- RELATIVE POSITION OF SLOT 10^{+1} , CUTTINGS AND HOLES IS ARBITRARY.
- THE CONE SURFACE OF THE PLUG IS TO BE FITTED TO SUIT THE GAUGE. PROPER FITTING OF THE TAPER GAUGE AND THE PLUG IS TO BE CHECKED BY BLUEING BEFORE CUTTING. THE IMPRINT SHOULD COVER ATLEAST 50 % OF THE WORKING SURFACE AND BE POSITIONED IN THE MIDDLE OR AT THE LARGER BASE OF THE CONE.
- CUTS ARE TO BE MADE AFTER TAPPING THREAD AND FITTING THE TAPER TO SUIT THE GAUGE.
- THREADED HOLES ON THE SIDE OF FACE "I" ARE TO BE COUNTERSUNK AT AN ANGLE OF 90° TO 120° UPTO THE MAJOR DIAMETER OF THREAD.
- SPOT FACING $\varnothing 13 A_7 \times 0.5$ MAXIMUM MAY BE MADE ON THE SIDE OF GROOVE $1^{+0.2}$ IN HOLES $\varnothing 12 A_7$.
- TO BE MARKED.
- COATING : CHEMICAL OXIDIZING / PHOSPHATING OIL FINISHING.
THE DIMENSIONS OF THE COMPONENT AND ITS TECHNICAL REQUIREMENTS ARE TO BE CHECKED BEFORE COATING.
- * DIMENSION FOR REFERENCE.
- OTHER REQUIREMENTS ARE ACCORDING TO 520 Ty 1.

15) FITMENT AND PERFORMANCE TEST:

- a. Pilot samples should be checked for fitment and Performance test to ascertain the efficacy of the system under different operating conditions by fitting in higher assembly and repeating it for functional checks, wherever required.
- b. Items of Bulk supplies may be subjected to performance trial in tank in case of repeated failure/defects during exploitation.

EXPLANATORY NOTE:

- 1) Stage wise process and inspection of the component as specified in TD Book/ Process Book/ illustration book/specification is to be confirmed by the supplier during manufacturing the components.
- 2) Firm shall submit details of manufacturing process, inspection process and also reports for the same to HVF.
- 3) If required/applicable HVF shall witness/verify stage wise inspection /process details during manufacturing of the components.
- 4) The component may be subject to endurance test, when fitted in higher assembly as specified in process / illustration /TD book.

16) INTERCHANGEABILITY:

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

17) CALIBRATION CHECKS

(TEST STANDS/JIGS/FIXTUERS/GAUGES/INSTRUMENTS):

The supplier / Contractor should have suitable Instruments, Test Stand, jigs, fixture, mandrels and gauges to carry out quality checks, to ensure conformance of components/assembly as per drawing and Specification /T.R points.

The supplier/contractor should submit calibration reports for instruments/fixtures/gauges/mandrels etc., which are used during process of inspection activities.

18) MARKING/IDENTIFICATION

Marking of the items is to be carried out as called for in the relevant drawing, drawing/T.R points.

Inscription if any on the components is to be carried out as called for in the drawing/T.R points. Unless otherwise specified in the drawing/ specification, marking should not be carried out over the components.

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. Suitable method can be adopted, provided that the above parameters are

legible and considering the parameters mentioned in the drawing and specification (Refer QAP Para No: 14(9)).

19) PRESERVATION CHECK

- 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/preservative is maintained as per the drawing/specification.
- 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.

20) PACKING CHECK

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.

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

Finished products shall be wrapped / packed using black and opaque polyethylene sheet or bags.

21) DOCUMENTATION

- i. Firm has to maintain all the documents as per QAP with respect to the Sl.No.to have traceability.
- ii. Vendor has to submit Bill of materials, Material test reports, Class 'C' /Endurance test reports (wherever specified in drawing/TY specification/QAP) and Complete PIR (pre-inspection report)at the time of offering the item for inspection. HVF will commence inspection only after scrutiny of these documents.
- iii. The testing/inspection responsibility to test all the parameters as per QAP and drawing specifications as mentioned in Annexure -A (enclosed).
- iv. Pre inspection reports (PIR) of firm like, 1. Chemical analysis (NABL Certificate), 2.Mechanical properties (NABL Certificate), 3. Pre-forming process, 4. Coating certification. 5. Calibration reports of instruments and 6. 100 % Dimensional inspection reports.

22) REFERENCE:

1. Drawing No: 172.45.011-1
2. Material specification as per drawing:
STEEL 38XC GOST 4543-71.
3. GOST 4543-71.
4. Specification: 520 TY1.

SL. NO.	CATEGORY	ASSEMBLY/SU B ASSEMBLY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	PLUG TO DRG. NO 172.45.011-1	Pre inspection reports (PIR) of firm	Firm has to produced all the document as per Para 21 (iv)	As per the relevant drawing and QAP.	Confirm 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: 8 or item list.	Confirm to QAP.	P	V	R	100% by firm/ vendor.
3		Material tests	Chemical composition & Mechanical / Physical Properties	As per--GOST 4543-71.	All the values to confirm with QAP (Para no:13.1 (a), (b) & (c))	P	W/V	R	SP followed by HVF.
4		Hardness checks	Hardness 302 – 255 BHN (Dia. Of Indentation 3.5 3.8)	Refer QAP Para no: 14(1)	Confirm to QAP Para no: 14(1)	P	V	R	SP followed by HVF.
5		Coating checks	Chemical Oxidizing/Phosphating oil Finishing.	Refer QAP Para no: 14(10)	Confirm to QAP Para no: 14(10)	P	V	R	SP followed by HVF.
6		Dimensional checks	Dimensions as per the drawing	Refer drawing/QAP Para no: 12.1	Confirm to drawing and QAP	P	W/P	R	100% by firm/ vendor SP followed by HVF.
7		Marking / traceability	Firm has to make marking / traceability records.	Refer QAP Para no: 18 & 14(9).	Confirm to QAP Para no: 18 & 14(9).	P	V	R	100% by firm/ vendor.
8		Preservation & packing	Firm has to make Preservation & packing records	Refer QAP Para no: 19 & 20	Confirm to QAP Para no: 19 & 20	P	V	R	100% by firm/ vendor.

Note:

For conformity of the items (Chemical/Physical/Mechanical properties).

- 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 shall be rejected or not to use in production further.
- For cross conformation of material, manufacturer has to submit test sample pieces for the items used / test slab and button for rubber items / HVF will draw samples from supplied lot for Witnessing (W) at HVF premises. In case of non-compliance to standards entire lot will be rejected.

P-Perform W-Witness V-Verify R-Review SP-Sampling Plan

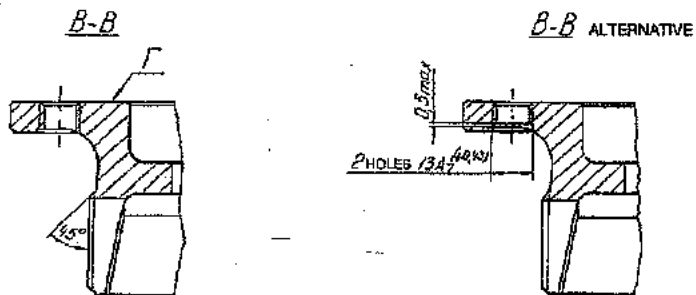
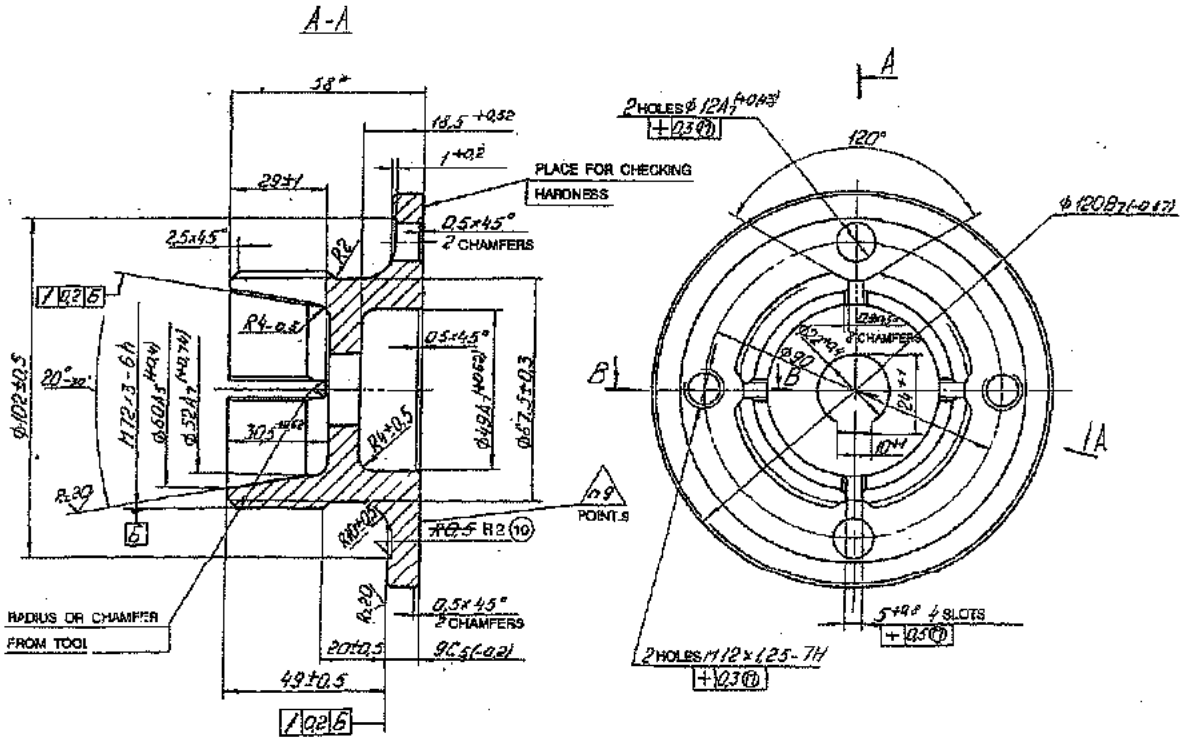


FIG: PLUG TO DRG. NO 172.45.011-1
(For reference only)

RECORD OF AMENDMENTS

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

MACHINED COMPONENTS (GROUP -VI)

SI No	LF No	Drawing No	Nomenclature
1	6106202004	172.17.004CB	BODY, DRIVE
2	6106208022	172.25.001-1	HOUSING, LOWER
3	6106208023	172.25.002-3	CRANK CASE UPPER
4	6101025004	188.25.001	LOWER HOUSING
5	6101025005	188.25.002	UPPER HOUSING
6	6106209015	172.26.011-5	HOUSING
7	6106210032	172.27.001-1	HOOK,R.H.
8	6106210033	172.27.002-1	HOOK.L.H.
9	6106210019	172.27.030CB-1	HOUSING
10	6106210100	172.27.112	BRACKET
11	6106210102	172.27.114	BRACKET
12	6106210114	172.27.126-1	HOUSING
13	6106210149	172.27.168	TIE-ROD
14	6106211057	172.28.002-1	CASE
15	6101028038	172.28.002-5	HOUSING
16	6106211058	172.28.003-1	CASE(CASTING)
17	6106211070	172.28.019	COVER
18	6106402074	172.41.004-1	COVER
19	6106402002	175.41.031	CASE
20	6106402062	175.41.086	UNIVERSAL JOINT YOKE
21	6106407032	172.46.050-1	BODY OF DELIVERY PUMP
22	6106407040	172.46.066	BODY OF LH SUCTION PUMP
23	6106407046	172.46.077	BODY OF SUCTION PUMP R.H.



MACHINED COMPONENTS (GROUP -VI)

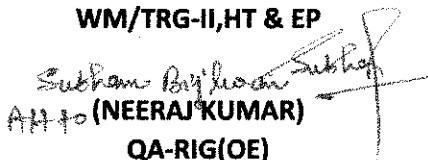
Sl no.	Nomenclature & drawing No.	Manufacturing technology & Testing / Inspection Facilities required to produce the item		Must be possessed by the vendor in his premises (P&M list and testing / inspection equipment list to be submitted)	May be possessed by the vendor in his premises or out sourced (Self declaration to be submitted)	FIRM Compliance (Y/N)	Remarks
1	Components as per enclosed list of Machined Components (Group VI) <i>Total items = 23 Nos</i>	TECHNOLOGY-1	Milling & Drilling	HMC and/or VMC suitable to the components upto the size 250mm x 450mm x 250mm height with 0.010 accuracy			
		TECHNOLOGY-2	Raw material		Firm should be capable to arrange the raw material defect free Aluminium Castings/ sheet metal as per drawing specification and standard.		
		TEST / INSPECTION-1	3D CMM	3D CMM 500 x 500mm.			
			Surface Roughness Tester	Surface Roughness Tester for Ra & Rz values			
			Gauges	Standard Gauges for checking Holes and threads suitable to the requirement of the components. Firm should submit the undertaking in this regard that they will create the facilities within 6 months from the date of receipt of order.			
Measuring Instruments	Vernier Caliper, Groove Vernier, Radius gauge, Feeler Gauge etc. suitable to the requirement of the components						

Note : Justification for alternate facilities may be shared to prove that alternate facilities can be utilised to manufacture the item wherever the facilities are mentioned above are not available, but vendor has alternate facilities.


(D.SATHISH KUMAR)
WM/QA(NF& QMSC)


(J.P.SINGH)
GM-OPERATIONS I


(LUXMAN SINGH)
WM/TRG-II,HT & EP


Subham Bijlwan Subham
AH to (NEERAJ KUMAR)
QA-RIG(OE)


(K.DURAIRAJ)
JWM/Trans -II


(ANIMESH PAIK)
DGM/CA,TRG & RG

MACHINED COMPONENTS (GROUP -I)

SI No	LF No	Drawing No	Nomenclature
1	6106202014	172.17.010	COVER
2	6106113013	172.23.010CBCB	DRUM PRESSURE ASSY.
3	6106113048	172.23.021	DRUM PRESSURE
4	6101023024	172.23.078-1	THRUST DISK
5	6101023089	172.23.112	NUT
6	6106208038	172.25.066	BUSHING DRIVING (25P&28RG)
7	6106208039	172.25.067	PLUG
8	6106208041	172.25.069	CUP
9	6106851033	172.25.087	UPPER HOUSING
10	6101025013	172.25.106	FLANGE
* 11	6106210038	172.27.010-1	AXLE
12	6106210048	172.27.046	BRACKET
13	6106210055	172.27.052-2	BRACKET
14	6106210057	172.27.055	BRACKET
15	6106210058	172.27.056	BRACKET
16	6106210059	172.27.057	BRACKET
17	6106210067	172.27.066	TIE ROD
18	6106210074	172.27.074-A	BUSHING
19	6106210076	172.27.082	TRUNNION
20	6106210089	172.27.096	BRACKET
21	6106210120	172.27.132/PL	COVER
22	6106210144	172.27.161	COVER
23	6106211072	172.28.021-1A	CAP OIL SEAL
24	6106211073	172.28.022-2	STOP
25	6106211173	172.28.186	SLEEVE
26	6106211185	172.28.203	SPINDLE
27	6106401031	172.40.019-1	GEAR SHAFT H
28	6106401042	172.40.042	BUSH
29	6106401037	172.40.044	BUSH
30	6106401055	172.40.151	CLAMPING DEVICE AXLE
31	6106401056	172.40.152	CLAMPING DEVICE AXLE
32	6106401057	172.40.153	CLAMPING DEVICE AXLE
33	6106401061	172.40.211	BOSS (STEEL 30XGCA GOST:4543-71)
34	6106401063	172.40.223	STUD
35	6106401066	172.40.227	STUD
36	6106401069	172.40.230	STUD
37	6106401075	172.40.241	GEAR AXLE RIGHT
38	6106401076	172.40.242	GEAR AXLE L.H.


SI No	LF No	Drawing No	Nomenclature
39	6106401086	172.40.248	PIN
40	6106401087	172.40.254	AXLE OF CLAMPING DEVICES
41	6101040087	172.40.343	PLANET PINION SPINDLE OF 1ST AND 2ND
42	6101040089	172.40.346	BUSHING
43	6101040094	172.40.353	LOCK PIN
44	6106401099	172.40.374	HOUSING
45	6101040119	172.40.379	THROW-OUT DEVICE SHAFT
46	6106402082	172.41.130	UNIVERSAL JOINT CENTRE CROSS
47	6106403010	172.42.009A	ROCKER ARM
48	6106403011	172.42.012	RING
49	6106403012	172.42.013	DISTANCE RING
* 50	6106403018	172.42.021	ROUND NUT
51	6106403068	172.42.031	ROD
52	6106403069	172.42.032	OUTER CUP
53	6106403070	172.42.033	INNER CUP
54	6106403071	172.42.034	SPHERICAL BUSHING
55	6106404051	172.43.003-1	SHAFT,PINION,PLANET
56	6101043010	172.43.020	PLANET PINION SHAFT
57	6101043013	172.43.023	LOCK PIN
58	6106406028	172.45.008	CONE REAR
59	6106406029	172.45.009	CONE FRONT
60	6106406030	172.45.010	THRUST CONE
61	6106406031	172.45.011-1	PLUG
62	6106407017	172.46.004-1	FRONT BUSHING L.H.
63	6106407029	172.46.038-2	STOP STEEL 38XS
64	6106407034	172.46.052-1	THRUST FLANGE
65	6106407037	172.46.055	DRIVEN SHAFT
66	6106407048	172.46.079	SHAFT,DRIVEN SUCTION PUMP
67	6106407050	172.46.081	FLANGE THRUST
68	6106407051	172.46.082	FRONT BUSHING RIGHT HAND
69	6106407052	172.46.083	FRONT BUSHING L.H.
70	6106407053	172.46.084	REAR BUSHING, R.H.
71	6106407054	172.46.085	REAR BUSHING L.H.
72	6106407055	172.46.086	FLANGE, THRUST
73	6106407060	172.46.093	PIN
74	6106418089	172.62.136	RIGHT HAND CARRIER
75	6106214057	172.65.045	RING
76	6106407066	172.98.002	COVER PLATE
77	6106401135	175.40.038	CLAMPING DEVICE AXLE

SI No	LF No	Drawing No	Nomenclature
78	6106401136	175.40.039	CLAMPING DEVICE AXLE
79	6106401140	175.40.047-1A	BRACKET R.H.
80	6106401141	175.40.048-1A	BRACKET L.H
81	6106401168	175.40.142	AXLE PLANET I & II ROW
82	6106402012	175.41.010	NUT
83	6106402031	175.41.041	OIL SLINGER
84	6106402047	175.41.064	COVER
85	6106402048	175.41.065	TUBE
86	6106402054	175.41.076A	PIPE UNION
87	6106402071	175.41.099	STOPPER
88	6106403027	175.42.002	RIGHT-HAND LEVER
* 89	6106403028	175.42.003	PIN LEVER
90	6106403031	175.42.006	COVER
91	6106403033	175.42.009	STOP
92	6106409023	175.46.004	BOLT
93	6106214082	175.65.029	PIPE
94	6106113255	176.23.054-1	FLANGE
95	6106113262	176.23.122	SLEEVE
96	6101023066	176.23.135	ROD
97	6106202045	432.17.018-1	AXLE
98	6106202050	432.17.033-2	UPPER BODY
99	6106202054	432.17.040	DISC. THRUST
100	6106202009	432.17.076SB	COVER
101	6106401169	432.40.023	PLANET PINION SPINDLE OF 3RD PLANETARY
102	6106401170	432.40.032-1	PLANET PINION SPINDLE OF 4TH
103	6106401206	432.40.213	BUSHING
104	6106403039	432.42.007-3	ROCKER ARM
105	6106404027	432.43.013-1	RING
106	6106202023	434.17.007	SHAFT
107	6106202025	434.17.010	COVER
108	6106113053	434.23.040-1	SPINDLE
109	6106113055	434.23.042	ROD
110	6106113056	434.23.046-1	FLANGE
111	6106113057	434.23.050-1	PLUG
112	6106113065	434.23.061-1	PLUG
113	6106406250	54.08.135A	OIL DEFLECTOR
114	6106402109	54.41.017-4A	SPRING PIN




MACHINED COMPONENTS (GROUP -I)

Sl no.	Nomenclature & drawing No.	Manufacturing technology & Testing / Inspection Facilities required to produce the item		Must be possessed by the vendor in his premises (P&M list and testing / inspection equipment list to be submitted)	May be possessed by the vendor in his premises or out sourced (Self declaration to be submitted)	FIRM Compliance (Y/N)	Remarks	
1	Components as per enclosed list of Machined Components (Group I) <i>Total items = 114 Nos</i>	TECHNOLOGY-I	Turning	CNC Turning machine suitable to accommodate components upto dia 100mm diameter with 0.010mm accuracy				
			Milling & Drilling	HMC/VMC machine suitable to component requirement with 0.010mm accuracy				
			Grinding	Internal/ External /Surface grinding machine as per component requirement upto 0.010mm accuracy				
		TECHNOLOGY-2	Heat Treatment		Carburising, Hardening, Induction Hardening & Tempering furnace with Oil quenching facility suitable to the components			
			Protection coating		Oxidising , Phosphating, Zinc chromatising, Hard Chromium Plant suitable to the components			
		TECHNOLOGY-3	Raw material		Firm should be capable to arrange the raw material like forging, casting, bar material etc as per drawing specification and standard.			


(D.SATHISH KUMAR)
 WM/QA(NF& QMSC)


(LUXMAN SINGH)
 WM/TRG-II,HT & EP


(K.DURAIRAJ)
 JWM/Trans -II


Sl no.	Nomenclature & drawing No.	Manufacturing technology & Testing / Inspection Facilities required to produce the item	Must be possessed by the vendor in his premises (P&M list and testing / inspection equipment list to be submitted)	May be possessed by the vendor in his premises or out sourced (Self declaration to be submitted)	FIRM Compliance (Y/N)	Remarks
1	Components as per enclosed list of Machined Components (Group I)	TEST / INSPECTION-1	3D CMM	3D CMM 300 x 300 mm		
			Surface Roughness Tester		Surface Roughness Tester for Ra & Rz values	
			Gauges	Standard Gauges for checking Holes and threads suitable to the requirement of the components. Firm should submit the undertaking in this regard that they will create the facilities within 6 months from the date of receipt of order.		
			Measuring Instruments	* Vernier Caliper, Groove Vernier, Radius gauge, Feeler Gauge etc. suitable to the requirement of the components		
		TEST / INSPECTION-2	Hardness measurement		Brinell / Rockwell Hardness Tester	

Note : Justification for alternate facilities may be shared to prove that alternate facilities can be utilised to manufacture the item wherever the facilities are mentioned above are not available, but vendor has alternate facilities.


(D.SATHISH KUMAR)
WM/QA(NF& QMSC)


(LUXMAN SINGH)
WM/TRG-II, HT & EP


(K.DURAIRAJ)
JWM/Trans -II


(J.P.SINGH)
GM-OPERATIONS I


(NEERAJ KUMAR)
QA-RIG(OE)


(ANIMESH PAIK)
DGM/CA, TRG & RG