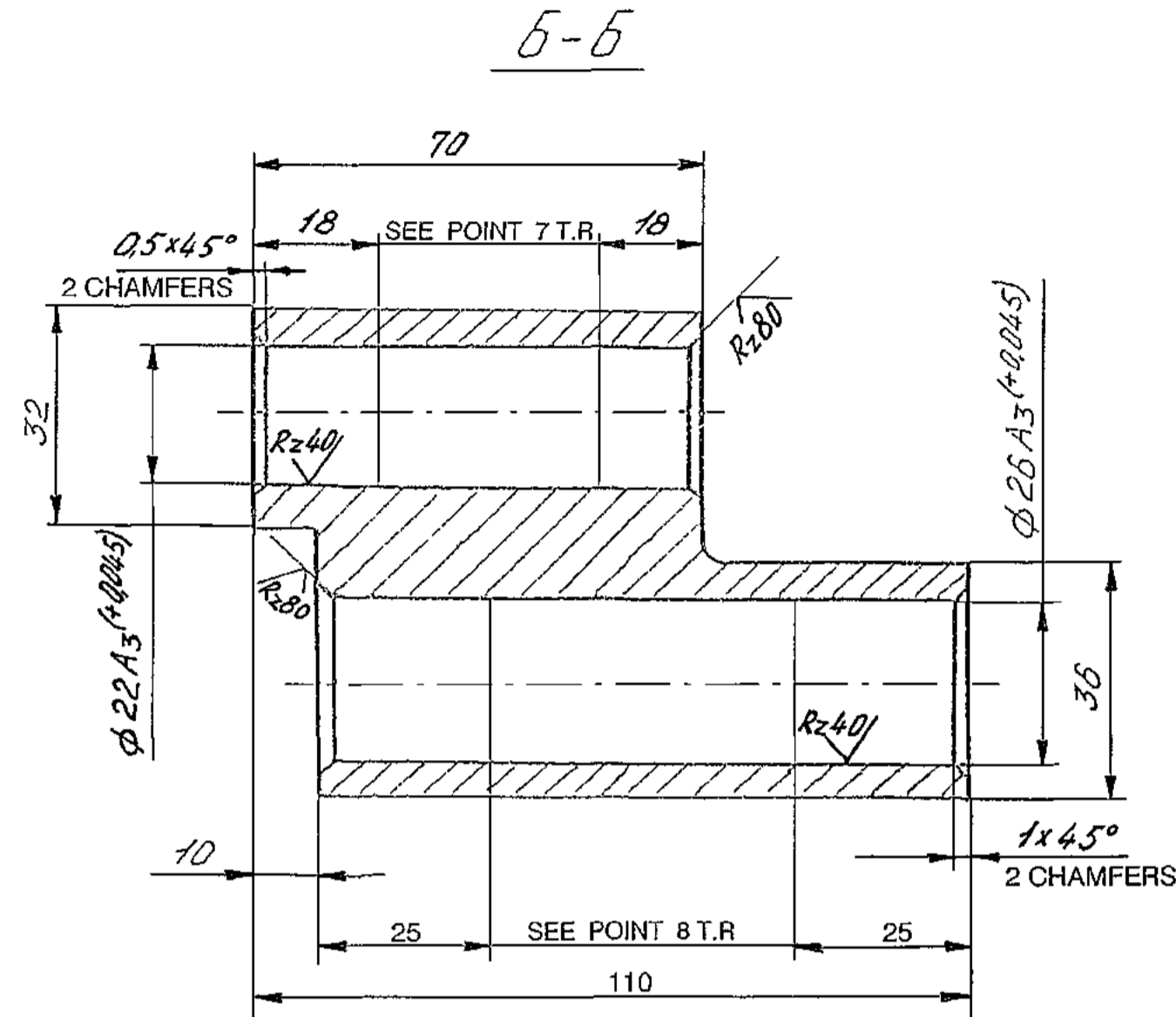
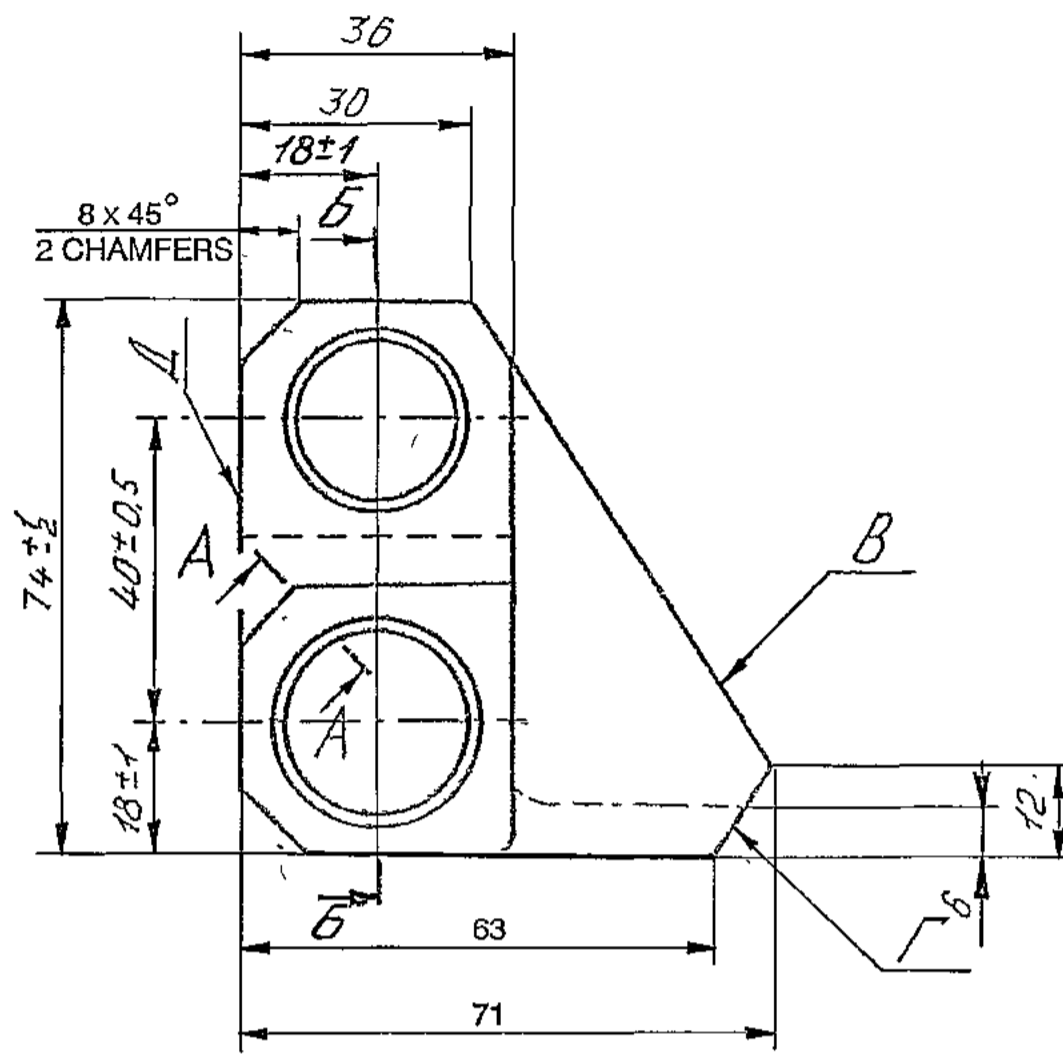


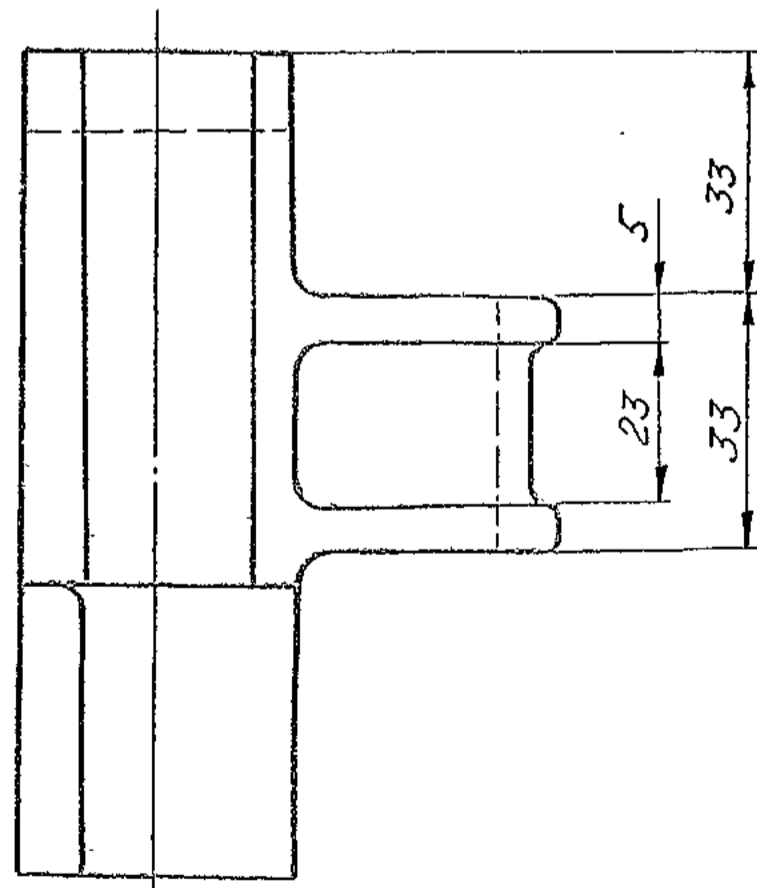
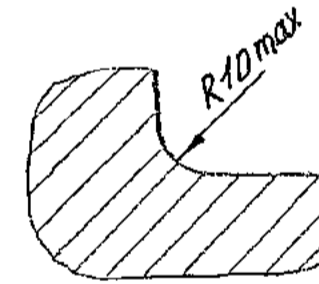
DRAWING NUMBER
175.01.178 - 2

SHEET No. 1 OF 1

✓(✓)



A-A TURNED VIEW



1. ALTERNATE MATERIAL : STEEL 20Л -1, 25Л -1, 30Л -1 GOST 977-75
2. COMPONENT SHOULD CONFORM TO 172 TY - 10.
3. SHRINKAGE UPTO 2 mm AND UNDERCUT RUNNER OF UPTO 2.5 mm HIGH ARE PERMISSIBLE ON SURFACE " A "
4. ON SURFACE OF DEPRESSION AT DIMENSION 23, RESIDUAL OF CERAMICS AND THREE PITS MEASURING UPTO 4 mm AND HAVING A DEPTH OF UPTO 1/3 OF THICKNESS OF WALL ARE PERMISSIBLE.
5. UNSPECIFIED ROUNDING - OFF RADII ARE UPTO 4 mm.
6. TECHNOLOGICAL ALLOWANCE WHICH IS SPECIFIED IN THE TECHNOLOGICAL PROCESS DOCUMENTS IS PERMISSIBLE ALONG EDGES B AND Г
7. MAY BE MACHINED TO Ø22A3 AT A LENGTH OF NOT LESS THAN 18 mm. CONCENTRICITY AND SKEWNESS OF BORES Ø22x SHOULD BE CHECKED FOR PASSAGE OF ROLLER Ø22x ON THE REST OF THE LENGTH THE BORE MAY BE MINIMUM Ø20A7 (+0.52) WITH SURFACE FINISH Rz 80/ ROUGHNESS IS ALLOWED.
8. MAY BE MACHINED TO Ø26A3 ONLY AT A LENGTH OF ATLEAST 25 mm. CONCENTRICITY AND SKEWNESS OF BORES SHOULD BE CHECKED FOR FREE PASSAGE OR ROLLER Ø26x. ON THE REST OF THE LENGTH THE BORE SHOULD BE Ø25A7 (+0.52) MINIMUM WITH SURFACE FINISH Rz 80/ ROUGHNESS IS PERMISSIBLE.

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

EST. WT. (kg) 1.26	TO BE STAMPED OR MARKED WHERE INDICATED THUS # (LETTERS)
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 15 Л - 1	175.01.106cb-3ACb (A)
APPD	Sd/=	GOST 977-75	
DATE	10.11.87	CONTROLLERATE OF QUALITY ASSURANCE (HEAVY VEHICLES) AVADI	
SCALE:- 1 : 1			
DIMENSIONS IN mm			
TOLERANCE ON DIMNS UNLESS OTHERWISE STATED IS : 2102 - 69		TITLE :-	
		GUIDE R.H.	
ALL THREADS TO CONFORM TO		D S CAT NUMBER	DRAWING NUMBER
A	28.12.87		175.01.178 - 2
ISSUE	DATE	NATURE OF AMENDMENTS	

B. JAYAVELU, JTOID
17-05-06

" COMMON TO T - 90 " & BLT
DRAWING RE - INDIANISED BASED ON RUSSIAN ORIGINAL ISSUE - NIL

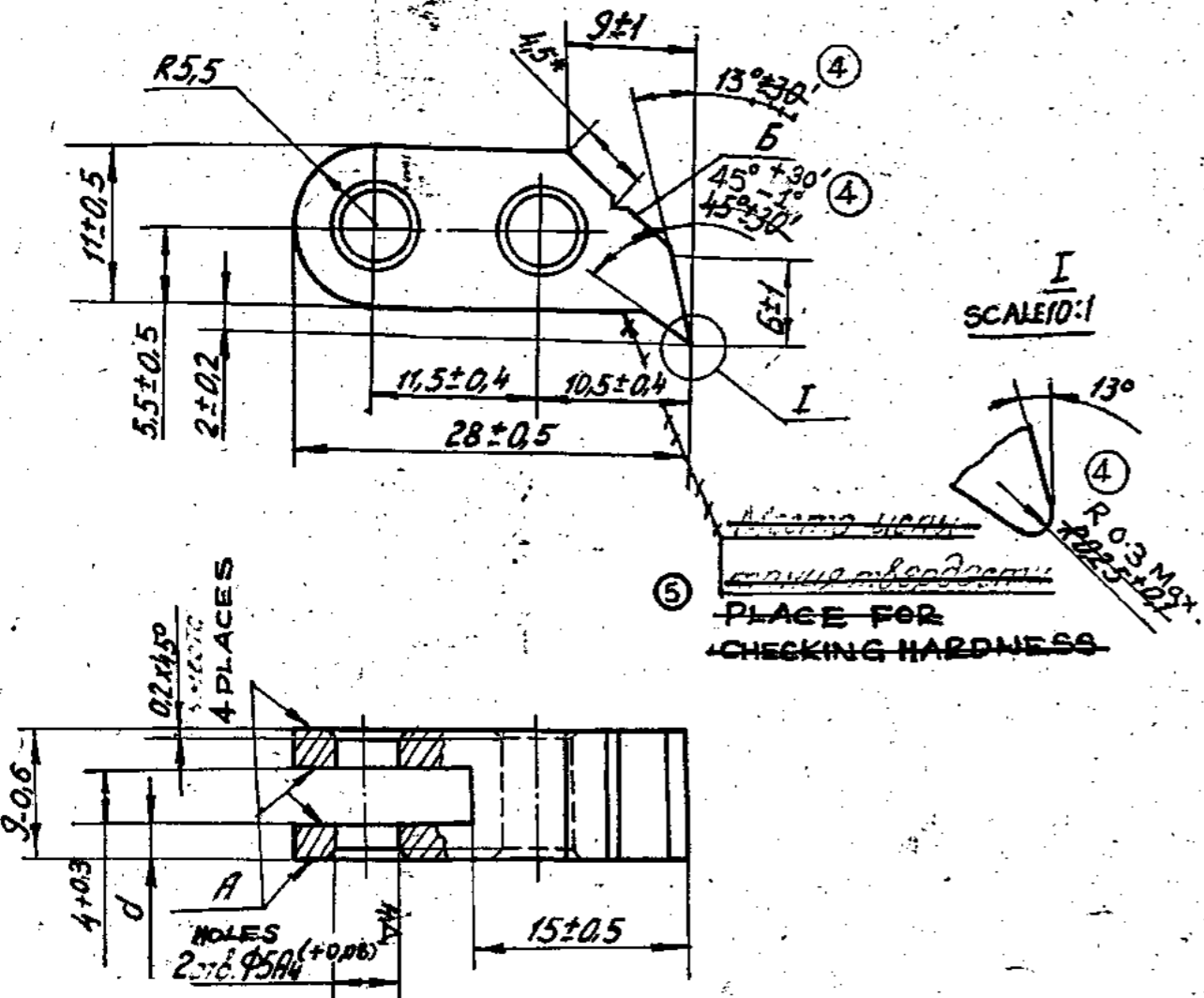
F - 7
58

SIZE A2

54.22.012B

▽ (▽)

DRG. CREATED BASED ON RUSSIAN ORIGINAL ISS. 3



- ⑤ 1. BHN 302 - 255 (INDENTATION DIA 3.6 - 3.9) TO BE CHECKED ~~IN BLANK~~ ON TEST PIECE
2. REQUIREMENTS FOR CASTING, REFER TEMPORARY (BTY) SPECIFICATIONS ON ACCEPTANCE OF INVESTMENT CAST COMPONENTS. IN THIS CASE CASTING DEFECTS ON TOOTH OF RATCHET AND ON SURFACES "A" ARE NOT ALLOWED.
3. PERMISSIBLE DEVIATIONS ON ROUGH DIMENSIONS SHOULD BE AS PER THE SECOND GROUP OF ACCURACY, GOST 2009-55.
4. UNSPECIFIED RADII TO BE DONE WITH R3 mm.
5. THICKNESS "a" SHOULD BE 2mm MINIMUM.
6. BEFORE HEAT TREATMENT ON SURFACE "6" MAKE DISTINCTIVE MARK 1mm DEEP. DIMENSIONS OF MARK ARE NOT TO BE CHECKED.
7. COATING: CHEMICAL PHOSPHATING OR CHEMICAL OXIDIZING | PHOSPHATING.
8. DIMENSION FOR REFERENCE.
- ⑤ 9. IT IS ALLOWED TO MANUFACTURE FROM STEEL ~~40A~~ ^{45 X A} GOST 977-75.
- ④ 10. TO ENSURE DIMENSIONS $45^{\circ} \pm 30'$ AND R 0.3 max MACHINING IS ALLOWED.

⑤ MATERIAL: STEEL 45 X A OST 3-4865-79 F-120

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

EST. MASS. 0,0120 Kg TO BE STAMPED OR MARKED WHERE INDICATED THUS # (LETTERS)

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

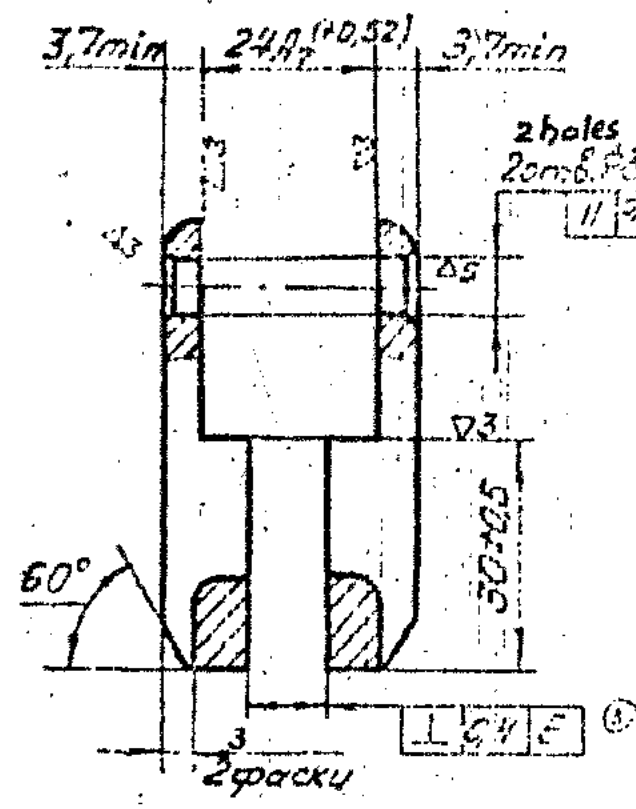
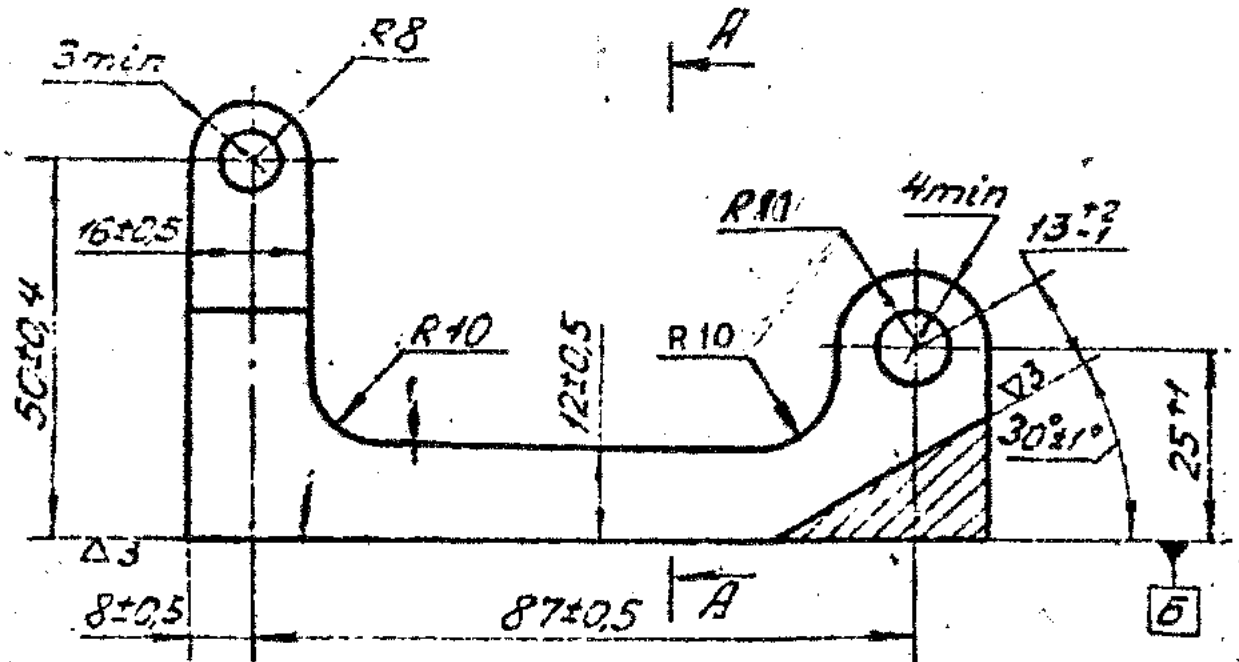
DRN		MATERIAL: - SEE ABOVE	USED ON:
CHD		STEEL 45 A -	175 61 002 CD-A
TCD		GOST 977 ⑤	
APPD		CONTROLLER OF INSPECTION (HEAVY VEHICLES) AVADI	
DATE	09.10.86	TITLE: RATCHET	
SCALE	2:1	D S CAT NUMBER	
DIMENSIONS IN mm		DRAWING NUMBER	
TOLERANCE ON DIMNS UNLESS OTHERWISE STATED.		54 22 012 B	
ALL THREADS CONFORM TO			
4, 5.	24-8-88	NATURE OF AMENDMENTS	
ISSUE	DATE		

172.28.129

FIRST ANGLE PROJECTION

A-A

1. HB 285...229 (dotted line) 3.5...4.0
2. Требования к отливке по 172.Т410.
3. Радиусы от мехобработки от 1мм.
4. Допускается изготовление по условному пунктиру.
5. Заменитель материала - сталь 40Л-I ГОСТ 977-75.



- 1) B.H.N.285-229 (Ind. Dia 3.4-4.0)
- 2) Casting requirements are as per 172-Ty-10.
- 3) Radii from machining should not exceed 1mm.
- 4) It is allowed to manufacture as per the dot and dash line.
- 5) Alternate material, steel 40Л-I GOST 977-75.

Место испытанная твердости
place for testing hardness

ALT MATL:- INVESTMENT CASTING STEEL TO BS: 3146 PT-1974; TYPE CL1GD 'C'
COATING: (Zn 20 Cr) Zn PLATING TO Fe Zn 20 TO IS: 1573:1970, FOLLOWED BY CHROMIUM PASSIVATION TO IS: 1340:1973..

0180-AVA 12-9-19	NSN ADDED	
0042-AVA 29-3-09	DS CAT No ADDED	
13814-W 22-10-03	HINDI NOMEN ADDED	
17923-W 12-2-94	ALT MATL AND COATING NOTE ADDED	
16752-W 25-3-89	R11 ADDED	
16498-W 24-12-86	DRG SEALED PROV.	

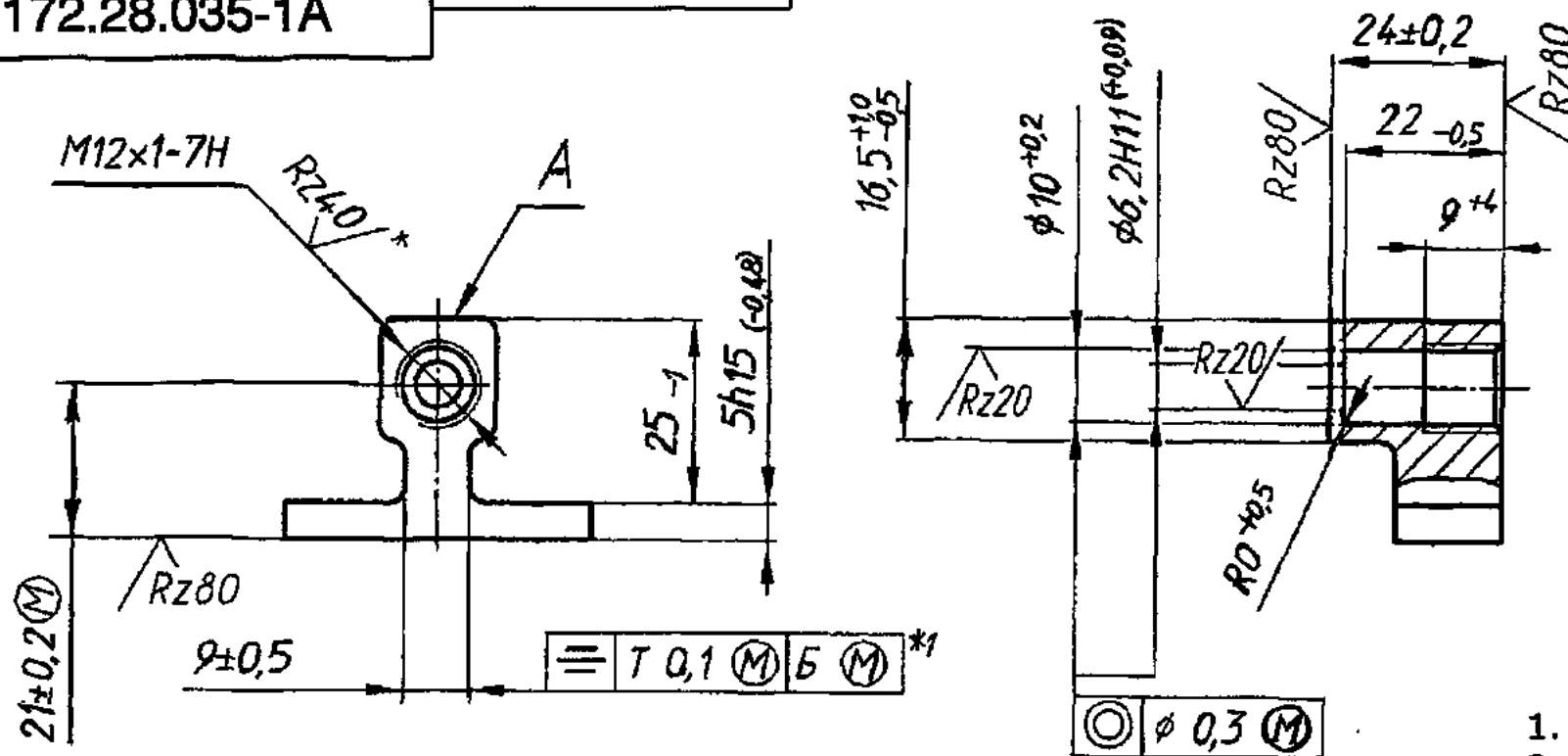
ISSUE	DATE	REFERENCE
APPROVED		
CHECKED	K. Damindan 2-7-85	
DRAWN		

DS CAT No		5340-176846	
NSN. 5340720325966		5340-176846	
172.28.129			
BRACKET		SHEET	MASS
C.A.A (AVA) AVADI			
MATERIAL: Steel 45 A-I GOST 977-75		0.53	1:1

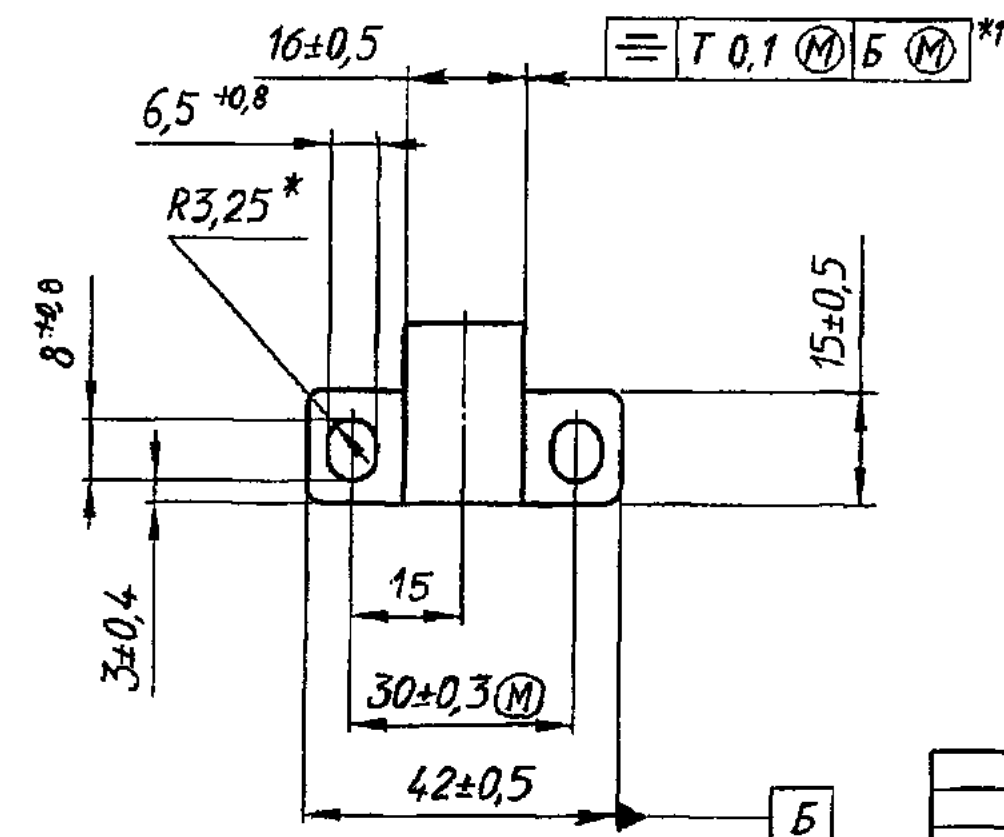
DRG. INDIANISED BASED ON RUSSIAN ORIGINAL ISSUE -1

DRAWING NUMBER
172.28.035-1A

SHEET No. 1 OF 1



1. 229...302 НВ.
2. Материал-заменитель сталь 45X// ОСТ3-4365-79.
3. Отливка I группы ГОСТ 977-88.
4. Точность отливки 9-0-0-9 ГОСТ 26645-85.
5. Требование к отливке по 172 ТУ10.
6. На поверхности А допускается остаток от питателя высотой 0^{+2} мм.
7. *Допуск симметричности и шероховатость обеспечить инструментом.
8. Покрытие Цб.хр.
9. Остальные требования по 520.ТУ1.



1. 229... 302 ВНН.
2. Alternate Material Steel 45X// OST3-4365-79.
3. Casting 1 group GOST 977-88.
4. Accuracy of casting 9-0-0-9 GOST 26645-85.
5. Requirements of casting as per 172.TY10.
6. On surface A residue from Feeder with height 0^{+2} mm is permitted.
7. *Symmetrical Tolerance and surface finishing to be ensured by tool.
8. Coating Zn.6 chromatized.
9. Other requirements as per 520.TY1.

356

SUPPLY CODE
U-01-14

D 90203

F-97
48

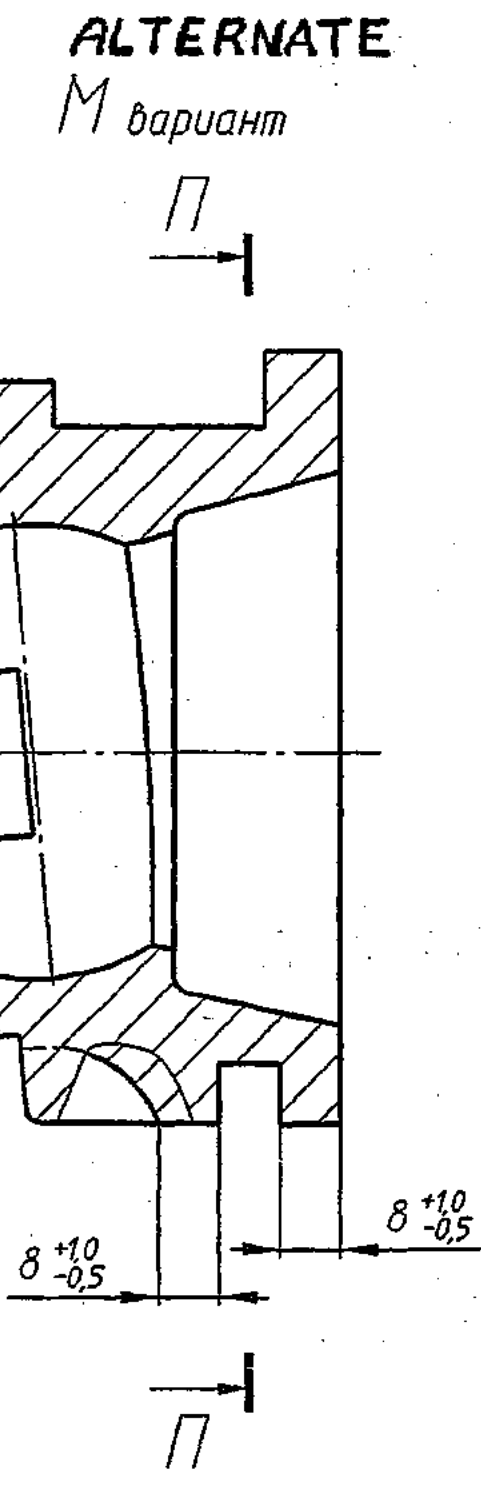
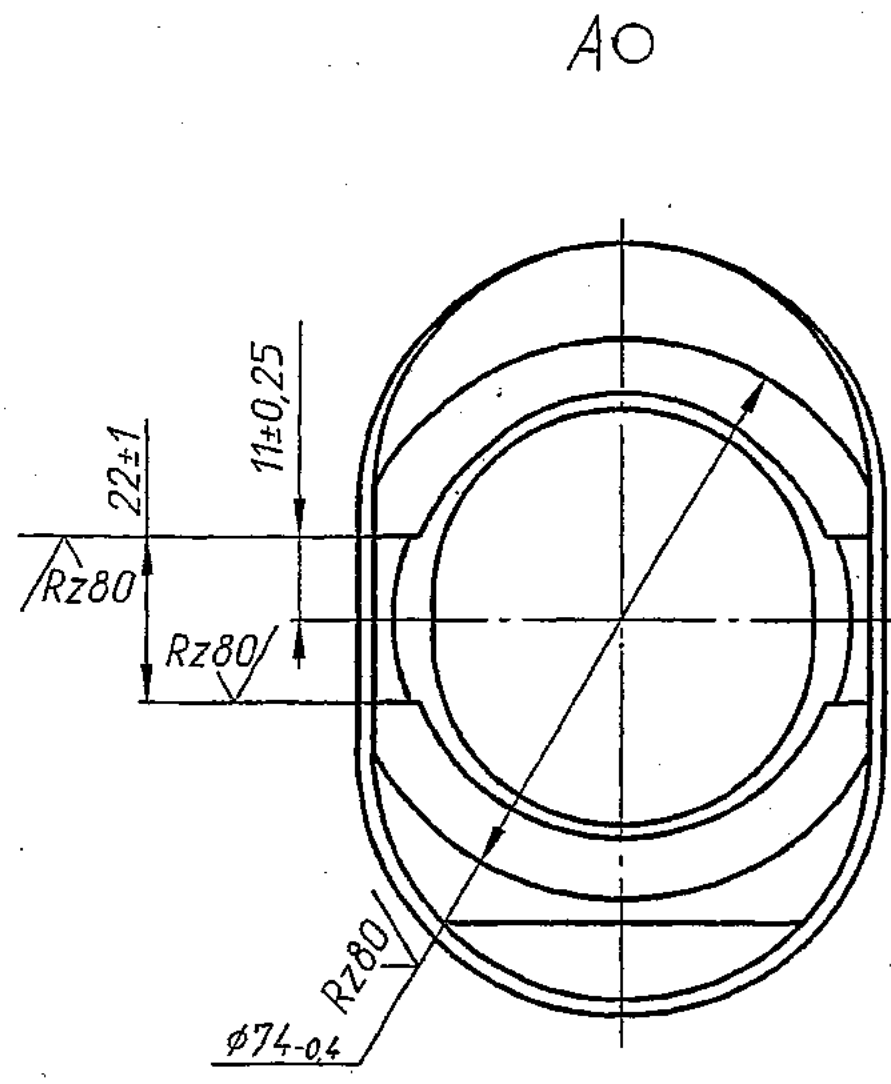
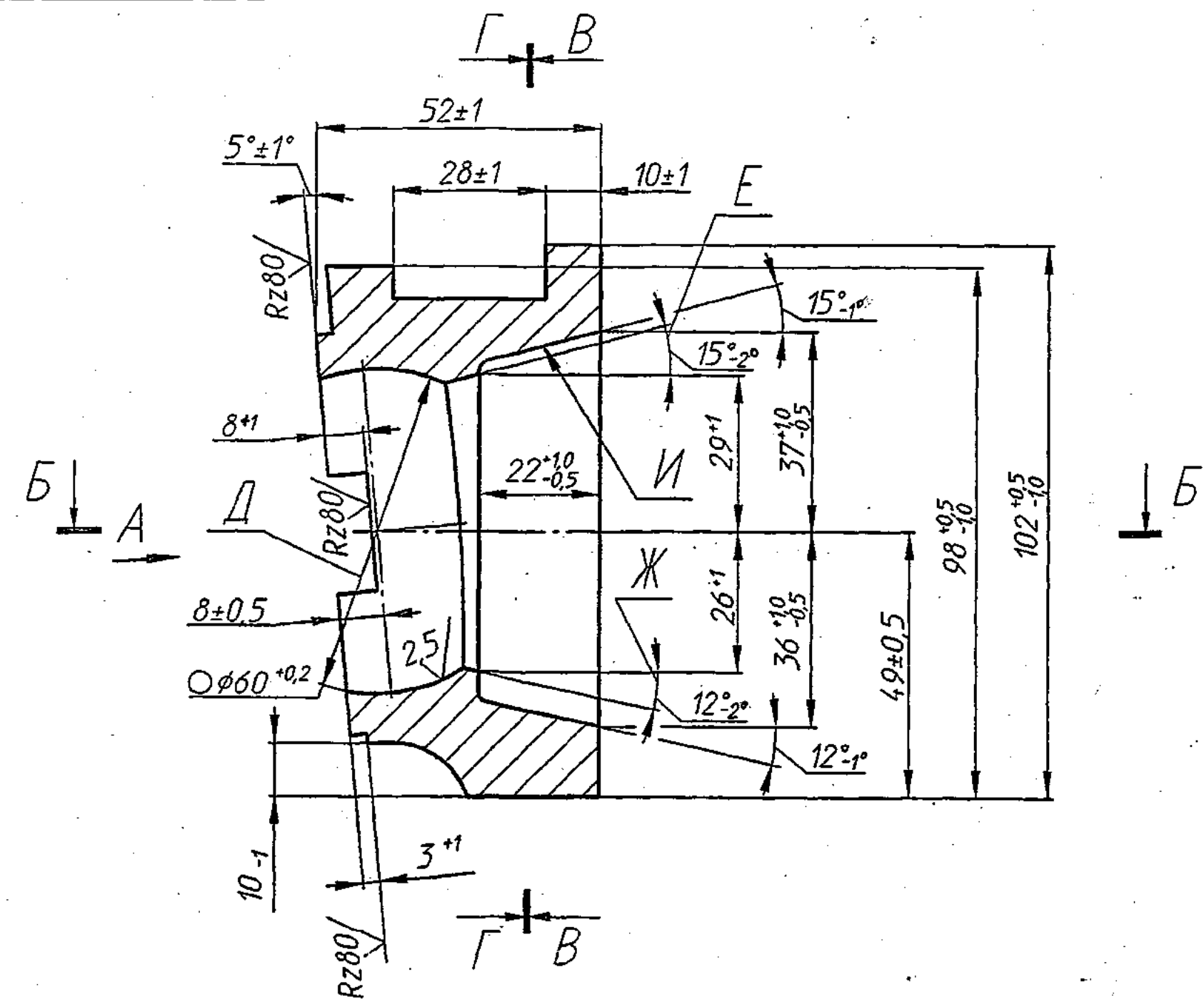
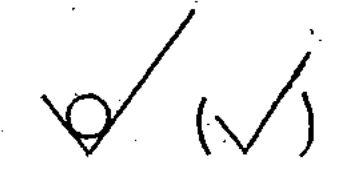
SIZE A3

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

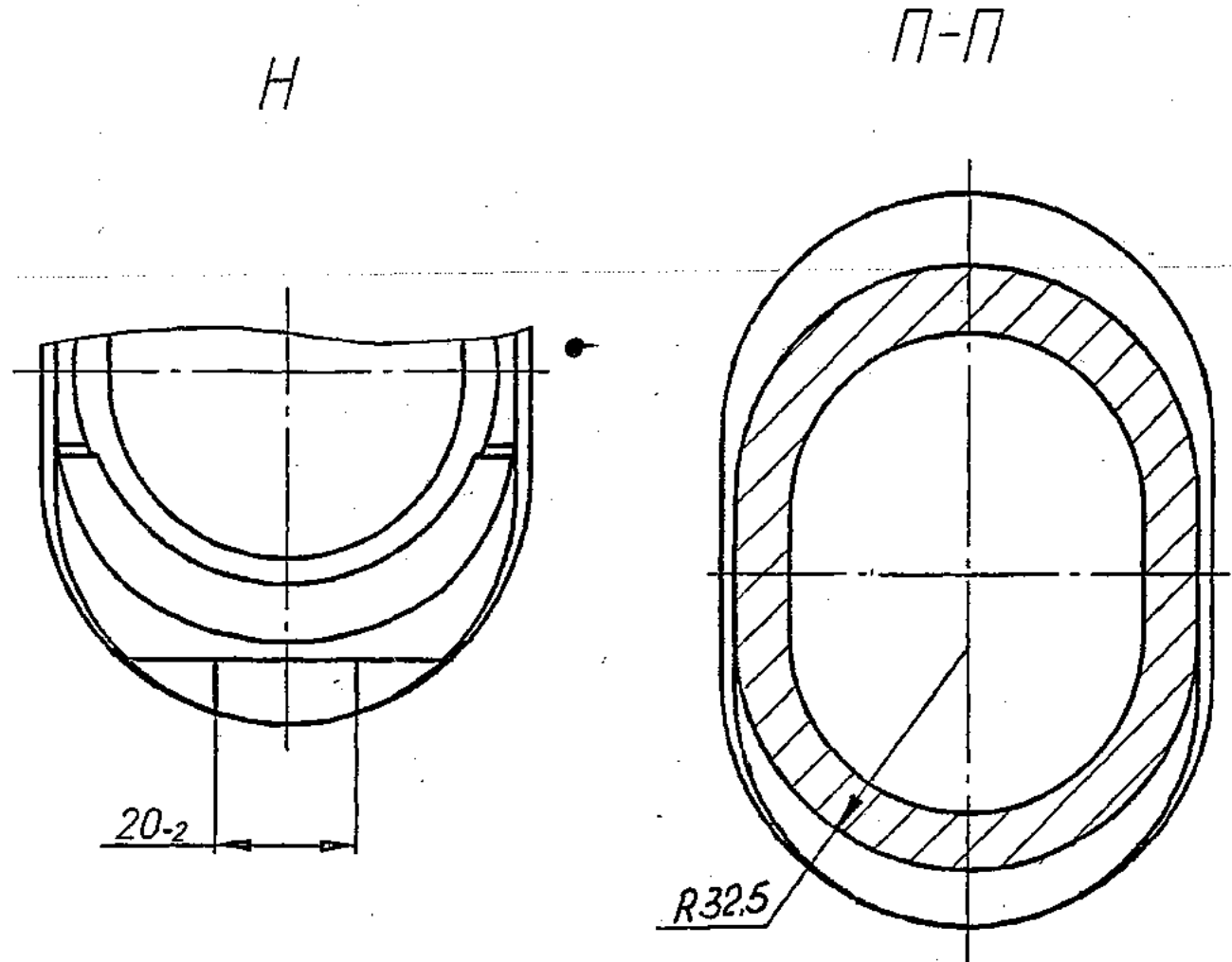
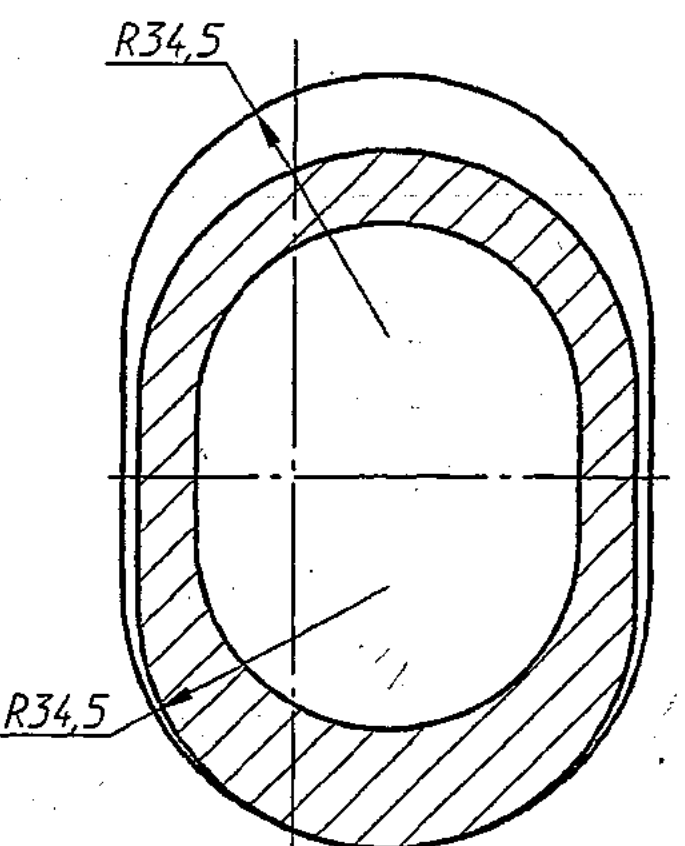
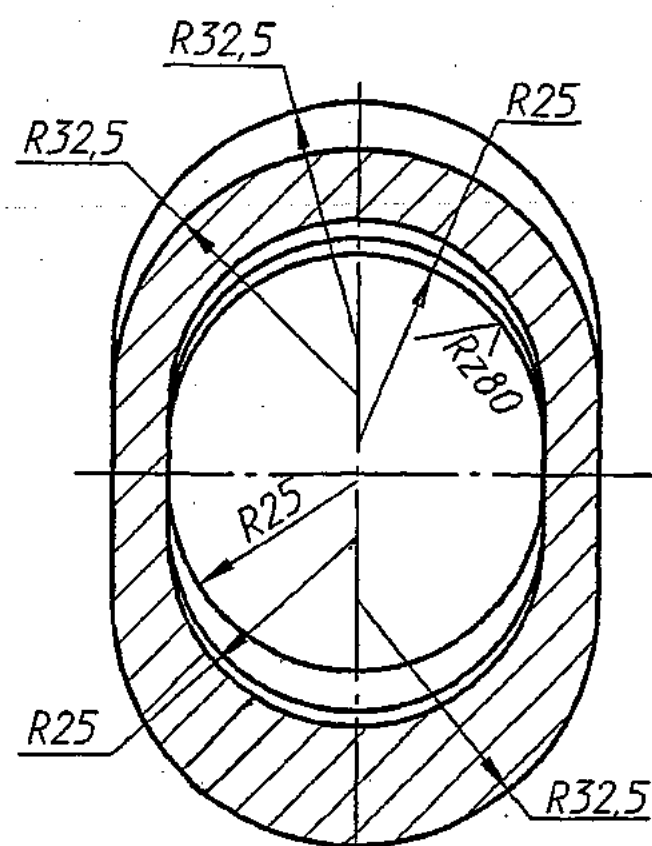
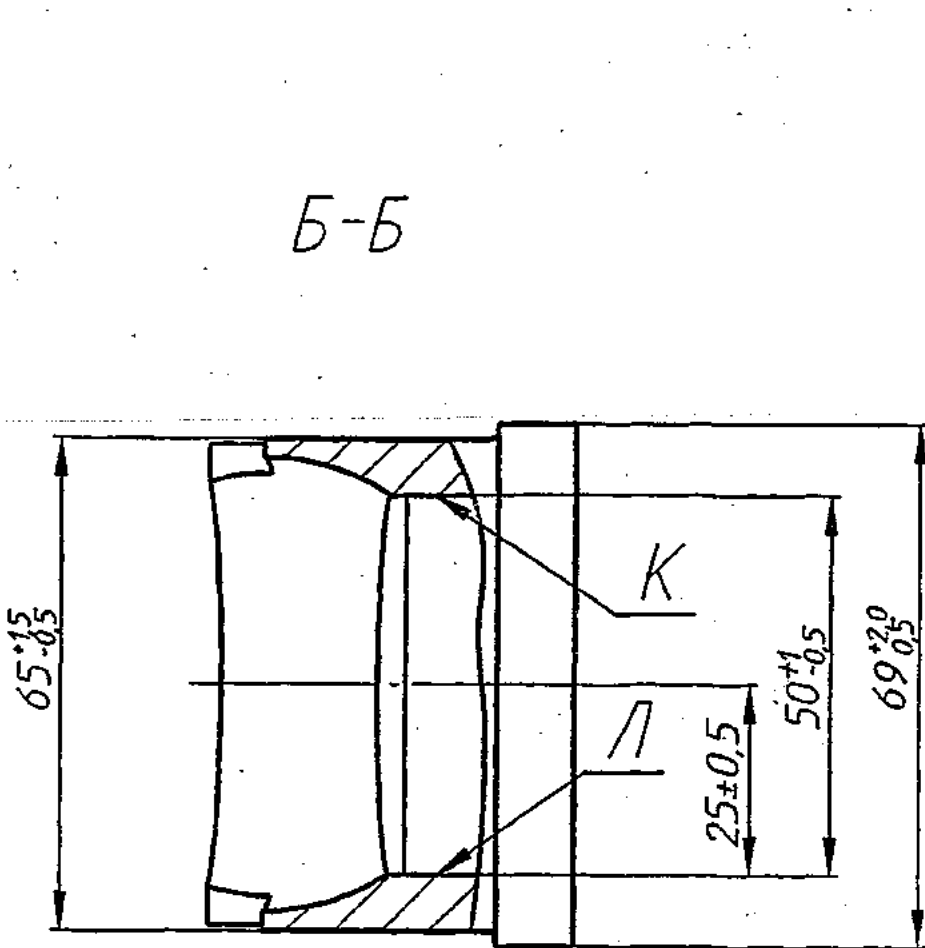
EST. WT. (Kg) 0.054 TO BE STAMPED OR MARKED WHERE INDICATED THUS # (LETTERS)

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

		DRN	Radw	MATERIAL :-	USED ON :-
		CHD	B. D.	Steel 40X//	172.28.010cb-2Cb
		APPD	Rhanchal	GOST 977-88	
		DATE	31.7.04	CONTROLLERATE OF QUALITY ASSURANCE (HEAVY VEHICLES)	
				AVADI	
				SCALE:- 1 : 1	
				DIMENSIONS IN mm	
				TOLERANCE ON DIMNS UNLESS OTHERWISE STATED IS : 2102 - 69	
				ALL THREADS TO CONFORM TO	
				D S CAT NUMBER	DRAWING NUMBER
					172.28.035-1A
ISSUE	DATE	NATURE OF AMENDMENTS			



1. Alternative material steel 40XII GOST 977-88.
2. BHN 255...302.
3. Casting - as per group1 as per GOST 977-88.
4. Accuracy of casting 9-0-0-9 GOST 26645-85.
5. Requirement for casting are as per 172.TY10.
6. Defects of casting in surface Д are not allowed.
7. Unspecified casting radii – not exceeding 5 mm.
8. When machining along dimension E and Ж cutting in surface И, К, Л may not exceed 2 mm.
9. Unspecified radii 1 mm.
10. Coating: chemical phosphotising oxidation with oil finish or chemical oxidation with oil finishing.
11. Other requirements are as per 520.TY1.



DRG. INDIANISED BASED ON RUSSIAN ORIGINAL ISSUE-3
COMMON TO T-72

356
SUPPLY CODE
U-01-1-2
D 99069

F-70
89
SIZE A3x3

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

EST. WT (kg) 1.1 TO BE STAMPED OR MARKED WHERE INDICATED THUS # (LETTERS)

ALL SHARP EDGES AND CORNERS TO BE REMOVED UNLESS OTHERWISE STATED MACHINED CORNERS TO HAVE R OUTSIDE R INSIDE EQUIVALENT CHAMFERS ARE PERMISSIBLE

DRN	<i>Chandil</i>	MATERIAL:-	STEEL 45 X II GOST 977-88	USED ON:-	172.10.016Cb-3 188.10.177cbCb
CHD	<i>Chandil</i>	CONTROLLERATE OF QUALITY ASSURANCE (HEAVY VEHICLES) AVADI			
APPD	<i>Chandil</i>	TITLE:- SEAT			
DATE	29.11.04	D S CAT NUMBER			
SCALE:	1:1	DRAWING NUMBER 172.10.122-1			
DIMENSIONS IN mm		ALL THREADS TO CONFORM TO			
TOLERANCE ON DIMNS UNLESS OTHERWISE STATED IS: 2102-69		ISSUE DATE NATURE OF AMENDMENTS			

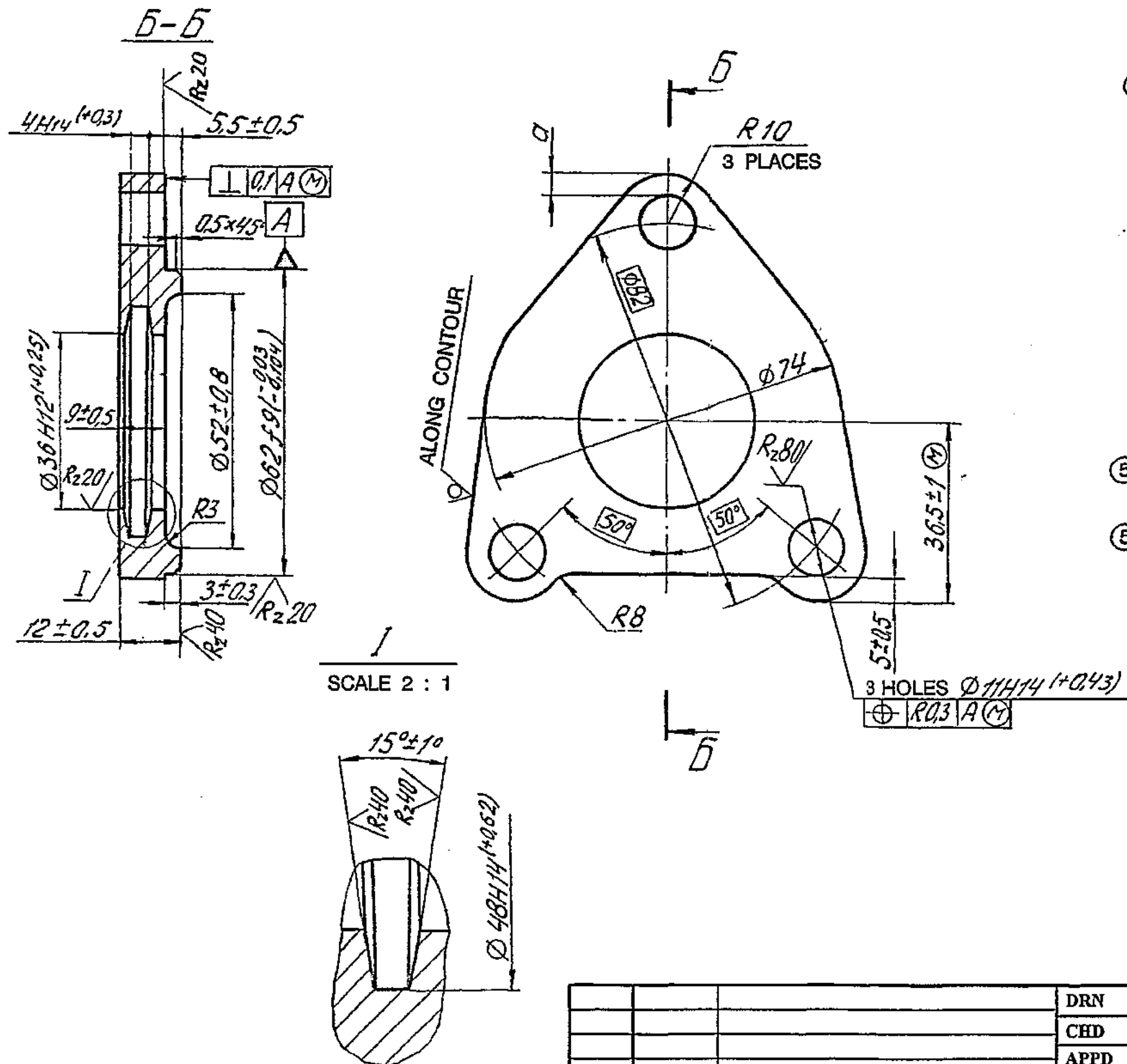
DRAWING NUMBER
176.23.054-1

SHEET No. 1 OF 1

✓(✓)

IR. RAMANI, JTO
16-01-06

COMMON TO T-90
DRG REINDIANISED BASED ON RUSSIAN ORIGINAL ISSUE - 3 VIDE AMDT LIST 6/II BOOK - 4
DRG REPLACES 434 28 046-1 VIDE AMDT LIST 6/II BOOK - 4



SCALE 2 : 1

- ④ 1. MAY BE MANUFACTURED FROM STEEL 40X1 - I GOST 977 - 75, OR STEEL 45X1 OST 3 - 4365 - 79.
2. THE COMPONENT SHOULD CORRESPOND TO 172 TY - 10 FOR INVESTMENT CASTING.
3. UNSPECIFIED ROUGH DIMENSIONS ARE AS PER CLASS 2 GOST 2009 - 55.
4. EXTERNAL DRAFTS 1 : 50.
5. ON THE OUTER SURFACE REMAINDER FROM FEEDER WITH A HEIGHT NOT EXCEEDING 2 mm IS ALLOWED.
6. DIMENSION "α" 4 MIN.
- ⑤ 7. ~~VARNISH COATING IS TO BE DONE AS PER EXISTING SPECIFICATION.~~
- ⑤ 7. COATING OF EXTERNAL UNMACHINED SURFACES BROWN PRIMER $\sigma_{\text{PI}} - 03K$ WHITE ENAMEL $\Pi \sigma_{\text{B}} - 115$ OR $\Pi \sigma_{\text{B}} 223 - 02$ REQUIREMENTS AS PER 520 TY 5.
8. COATING : CHEMICAL OXIDIZING OIL FINISH OR CHEMICAL OXIDOPHOSPHATIZING, OIL FINISH.

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)
0.18 Kg

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

DRN	Sd/=	MATERIAL :-	USED ON :-
CHD	Sd/=	STEEL 45A - 1	172 23 012 C5
APPD	Sd/=	GOST 977 - 75	176.23cb-3Cb 5A
DATE	05-12-2002	CONTROLLERATE OF QUALITY ASSURANCE (HEAVY VEHICLES) AVADI	
SCALE:- 1:1		TITLE :-	
DIMENSIONS IN mm			
TOLERANCE ON DIMNS UNLESS OTHERWISE STATED IS: 2102-69			
5A	20.1.04	N OF A No.CQA(HV)/T90/23/001	D S CAT NUMBER
5	22.3.91	NOTN. 172 M 28 "A" 89 AL 12/3	DRAWING NUMBER
4	28.6.89	9/BOOK b -172 M-563 "A" 87	176.23.054-1
ISSUE	DATE	NATURE OF AMENDMENTS	

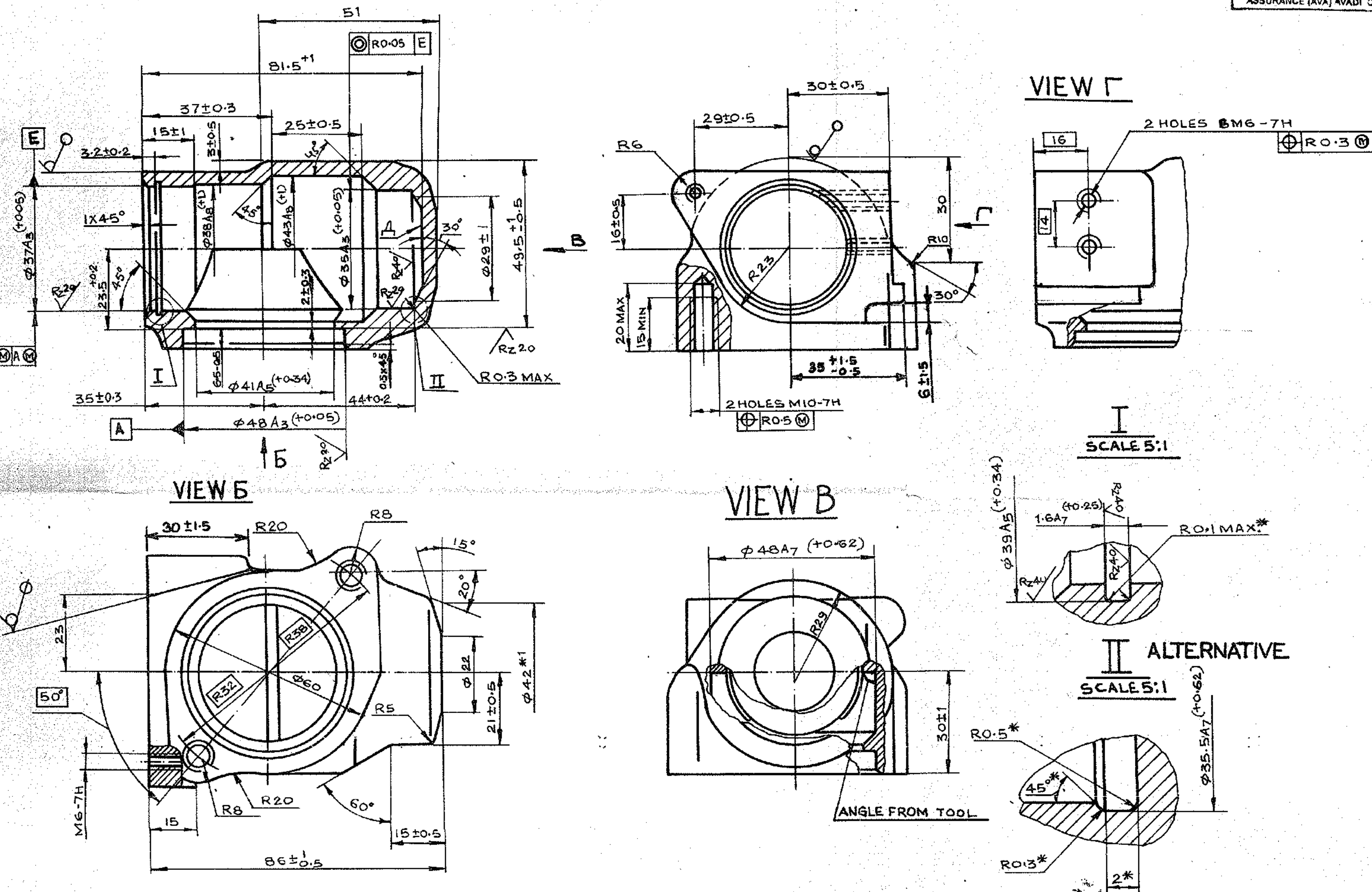
F5B
50
SIZE A3

PART NO-

172.25.087

जारी की गयी प्रति
 CERTIFIED CORRECT COPY OF
 मुद्रित प्रमाणित की
 SEALED DRAWING AS ON

FOR CONTROLLER OF QUALITY
 आश्विन (के.वा.आ.) आवडि चेन्ना
 ASSURANCE (AVA) AVADI CHENNAI 54



- NOTES:-
1. ALTERNATE MATERIAL- STEEL GRADES FROM 20M-1 TO 35M-1 GOST 977-75.
 2. EXTERNAL DRAFTS SHOULD NOT EXCEED 1:20.
 3. UNSPECIFIED CASTING RADII UP TO R 5 mm.
 4. REQUIREMENTS FOR CASTING AS PER SPECIFICATIONS 172-TY 10 FOR ACCEPTANCE OF INVESTMENT CASTING COMPONENTS.
 5. SHRINKAGE POROSITY ON SURFACE $\phi 37A3$ (NEAR THE LUG) WITH DIMENSIONS R6 AND 15mm IS ALLOWED.
 6. TAPER FROM DRILLING, NOT EXCEEDING 1mm IN DEPTH IS ALLOWED ON FACE.
 7. COATING CHEMICAL OXIDIZING, OIL FINISHING OR CHEMICAL OXIDIZING/ PHOSPHATING, OIL FINISHING.
 8. DIMENSIONS TO BE ENSURED BY TOOL.
 9. THE REST OF THE REQUIREMENTS ARE AS PER 520 TY-1
 10. *1 DIMENSION FOR CONSTRUCTION OF TOOL.

ALT MATL :- STEEL GDE A1 TO BS: 3100-1976

308-89	RETRACED WITHOUT CHANGE	DRN-	CHD-	ASSY.DRG-	GROUP NO 40001 KD-D1						
	PREV DCs(1) NO- 16480-W & 16722-W DT 12-1-89	TCD-	CHD- <i>YAS</i>	DATE - 23-1-86							
DATE	AUTHORITY	ZONE	NATURE	SIG AHSP	SIG DO	C/D'MAN	DO	FOR CQA(W)	ESTD.MASS- 0.52	SCALE - 1:1	DESIGN NO-
DRG. SEALED-			16480-W 28-10-86	AMENDMENTS		MATERIAL- STEEL 15J-1 GOST 977-75		PROTECTIVE FINISH-			
DOCQA(W)											PART NO-
UPPER HOUSING											172.25.087
अपर हाउसिंग											DS CAT NO-
											3040-023428

4-7-77	0079-AVA	DS CAT No. ADDED	
18814-W	28-10-03	HINDI NOMEN. ADDED.	
5-3-94	17912-W	ALTMATL ADDED.	
6-2-92	17218-W	VIEW B, F & SIDE VIEW AMENDED	
7.3.90	16870-W	IN VIEW B ANGLE FROM TOOL ADDED	

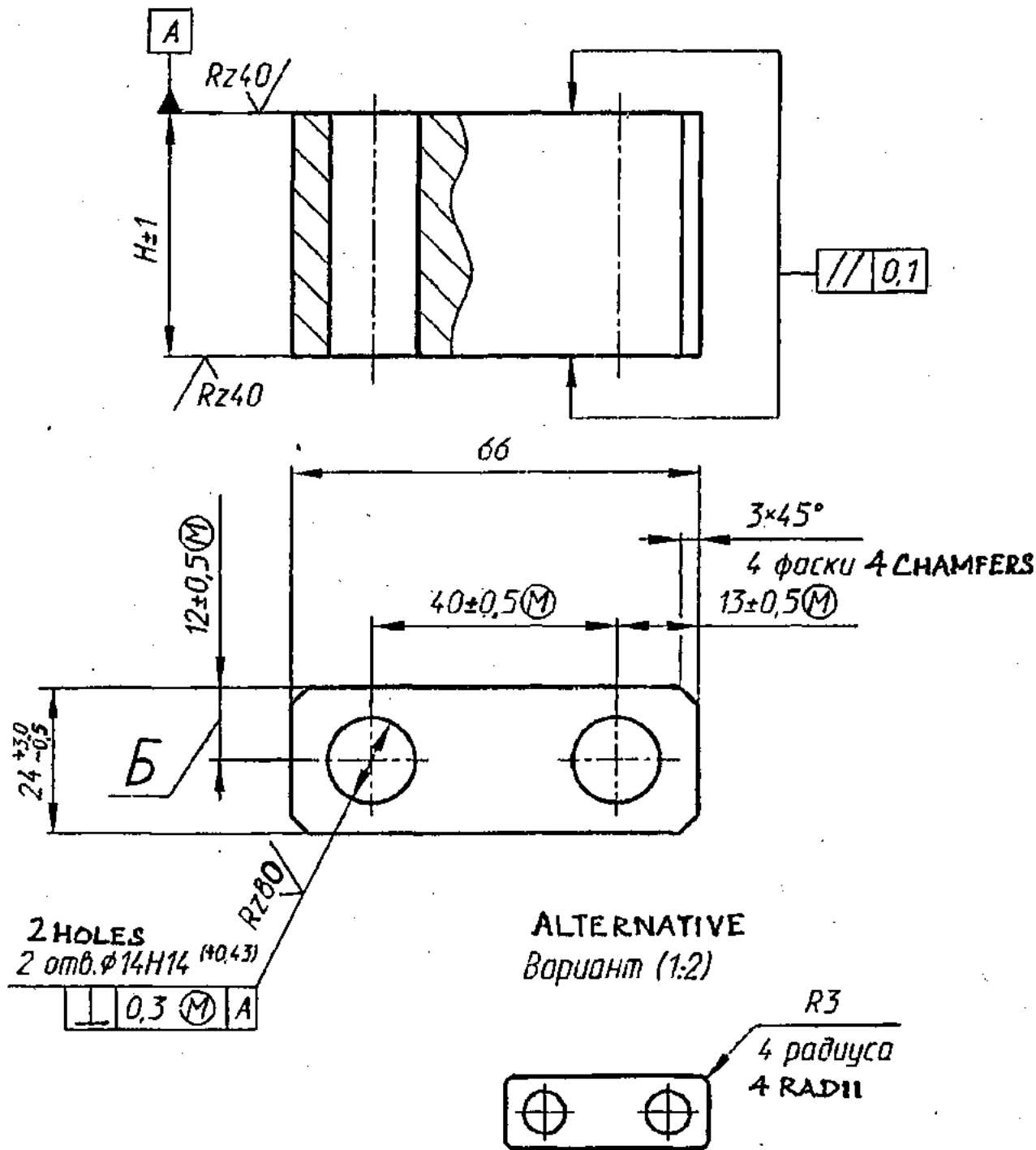
35

A2

25

DRAWING NUMBER
172.64.079

SHEET No. 1 OF 1



PART NO	H, mm	WEIGHT, Kg
Обозначение	Н, мм	Масса, кг
172.64.079	40	0,385
-01	40,5	0,396
-02	41	0,406
-03	41,5	0,416
✓ -04	42	0,426
-05	42,5	0,436
-06	43	0,446
-07	43,5	0,456
-08	44	0,467

1. Alternate material; Steel 25Л, 30Л, 35Л GOST 977-88.
2. Casting of 1st group GOST 977-88.
3. Accuracy of casting 9-0-0-8 GOST 26645-85.
4. Requirements for casting are as per 172-TY-10.
5. For ensuring dimension B machining may be done, in this case, presence of rough spots is not to be checked.
6. Blow holes and non-metallic inclusions with maximum size not exceeding 3mm, depth up to 1/10 of wall thickness, by not exceeding four Nos per surface are permitted.
7. Coating: chemical phosphating, oxidizing oil finish or chemical phosphating, oil finish.
8. Remaining requirements are as per 520TY1.

DRG. INDIANISED BASED ON RUSSIAN ORIGINAL ISSUE - 2
COMMON TO T-72 & BLT

356

SUPPLY CODE
U-01-1-1
D 90018

F-18
57

SIZE A3

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

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

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

ISSUE	DATE	NATURE OF AMENDMENTS	DRN	CHD	APPD	DATE	SCALE	DIMENSIONS IN mm	TOLERANCE ON DIMNS UNLESS OTHERWISE STATED IS : 2102-69	ALL THREADS TO CONFORM TO	MATERIAL :-	USED ON :-	CONTROLLERATE OF QUALITY ASSURANCE (HEAVY VEHICLES) AVADI	TITLE :-	D S CAT NUMBER	DRAWING NUMBER
							1:1				STEEL 20Л GOST 977-88	172.64cb-4Cb ✓		INSERT		172.64.079

187.21.084



Перопримен.

Справ. №

DICI-2409-I(P)

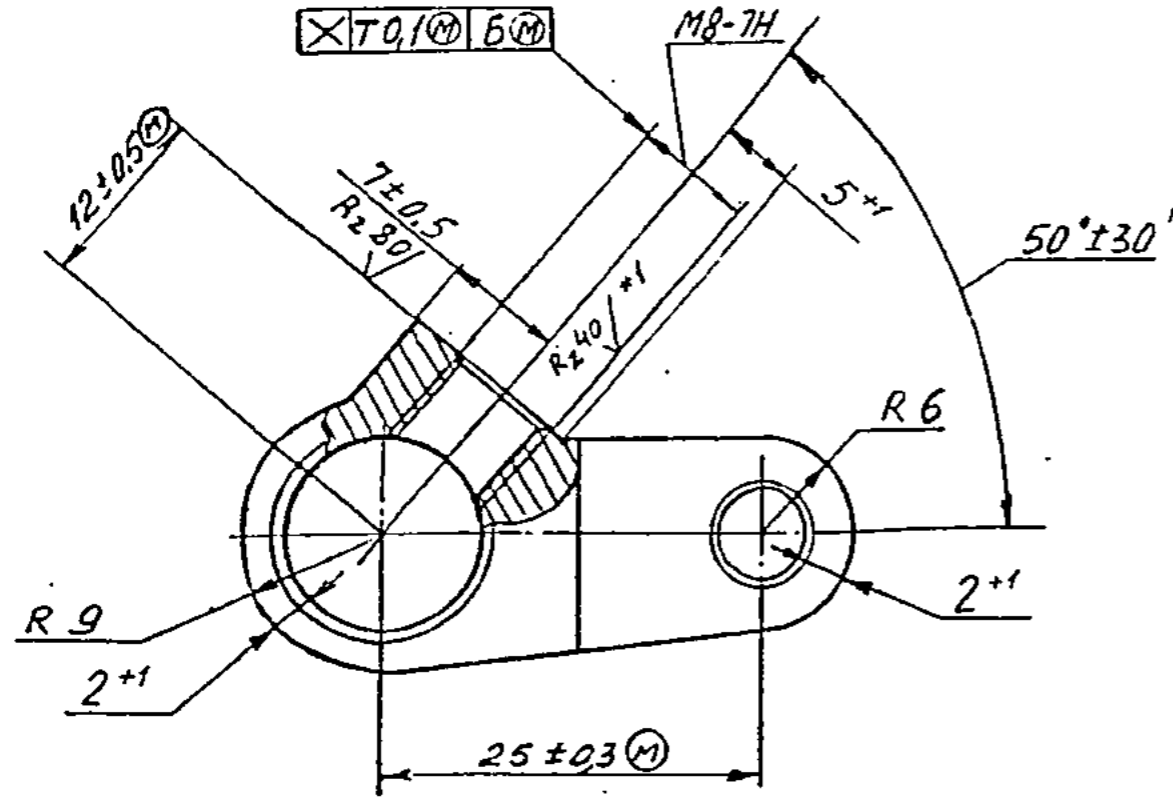
Подп и дата

Взам инд №

Подп и дата

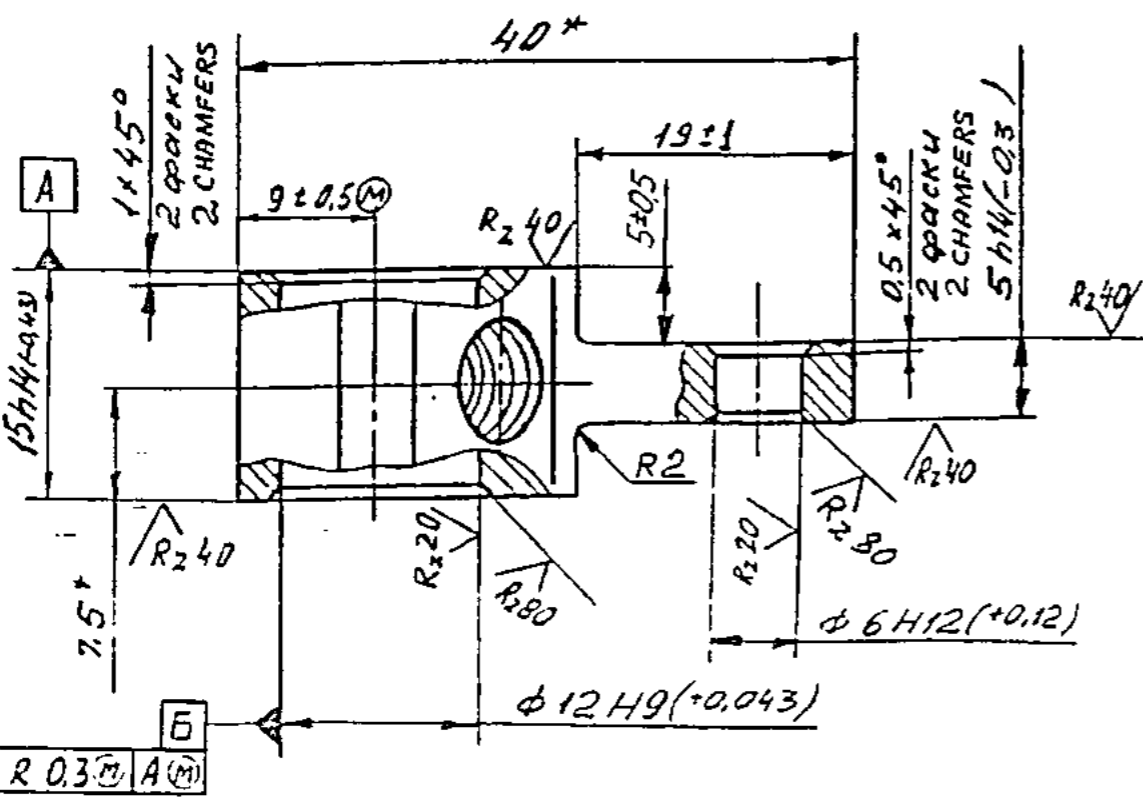
Подп и дата

Инд. № подл



1. ALTERNATE MATERIAL – STEEL 25П, 46П GOST 977-88.
2. CASTING OF 1ST GROUP AS PER GOST 977-88.
3. ACCURACY OF CASTING 9m-0-0-9 GOST 26645-88.
4. REQUIREMENTS FOR CASTING SHOULD BE AS PER SPECIFICATION 172.T910
5. *DIMENSIONS FOR REFERENCE.
6. *1 SURFACE FINISH IS TO BE ENSURED BY TOOL.
7. COATING Zn 6, CHROMATIZING.
8. OTHER REQUIREMENTS SHOULD BE AS PER SPECIFICATIONS 520 TY1.

इति नियन्त्रक
 भारता गणराज्यस्य निगन्त्रणालय
 ई.सं. (आई) 2409-I(P) दिनांक 25.11.06



DICI-2409-I(P) DRG. PROV. SEALED.	25.11.06
- AMENDMENTS	CHD SIG DATE

TRIPPLICATE

187.21.084

LEVER ✓

Sub. Code	Fold. No.	Sl. No.
3-01-1*	6	65
Weight (Kgs)	Scale	
0.025	0.1	
Page	Page total	

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STEEL 20П GOST 977-83

HEAVY VEHICLES FACTORY AVADI

Копировать

Содержит

81

Insert - 172-64,079-04 & Level 187-21,084

COMPLETING ARTICLES SHOP (69)
Vendor Qualification Criteria (VQC)

NOMENCLATURE & DRAWING No. Components as per enclosed list Annexure-I
(Note: This VQC is applicable for 5 Types of Steel Castings)

1	2	3	4	5	6
	MANUFACTURING TECHNOLOGY & TESTING /INSPECTION FACILITIES REQUIRED TO PRODUCE THE ITEM	MUST BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES - (P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (3) THAT ARE AVAILABLE IN-HOUSE (SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of machine/Year of Manufacturing of machine) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) ALSO TO BE SUBMITTED)	MAY BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES OR OUT SOURCED - (MOU/TIE-UP WITH THE OUTSOURCING VENDOR/SUB-VENDOR AND THEIR P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (5) THAT ARE AVAILABLE IN-HOUSE OR OUT-SOURCED FIRMS (NAME AND ADDRESS OF THE OUTSOURCING VENDOR TO BE DECLARED BY THE FIRM IN FIRM'S LETTERHEAD, SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of machine/Year of Manufacturing of machine) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) AND MOU/TIE-UP ALSO TO BE SUBMITTED)
Technology 1	STEEL CASTING			Casting Requirement as per drawing.	
Technology 2	HEAT TREATMENT			Normalizing, Hardening as per drawing requirements.	
Technology 3	SURFACE CLEANING			Shot Blasting	
Technology 4	*MACHINING	Suitable Radial drilling machine, Conventional/ CNC VMC/HMC, Conventional/ CNC VTL Required as per drawing.			
Technology 5	SURFACE COATING			Coating as per drawing.	
Test/ Inspection 1	MEASURING INSTRUMENTS/GAUGES	Measuring Instruments required as per drawing.			
Test/ Inspection 2	MEASURING GEOMETRICAL ACCURACY			Suitable 3D/CMM as per drawing dimensions	

Test/ Inspection 3	METAL TESTING			The firm should submit Material test report from NABL accredited lab as per drawing.	
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Note: (1) Facilities must be available with vendors own premises - including facilities available with Sister / Parent Concerns / Strategic Partners shall be considered for Capacity Verification subjected to documentary evidence to prove the relationship / ownership.

- (2) Casting shall be accord as per Specifications 172-TY-5 & 172-TY-10.
- (3) *The firm may indicate the alternate machines/process by which the component can be manufactured as per technological process/drawing.
- (4) Firm should give undertaking that they will develop the all the fixture/testing facility if they get order.
- (5) Dimension given in Brackets to be maintained after Hull assy. For Machining refer Technological process book.


GNANASEKARAN M
DGM/CA&SMS


ANURAYAMI PRADHAN
JWM/QA(OE/CA)


LAKSHMINARAYANAN C
JWM/CA

Flange-176.23.05A + Upper Housing-172.25.087

40

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) Total Items - 114 Nos	TECHNOLOGY-1	Turning	CNC Turning machine suitable to accommodate components upto dia 100mm diameter with 0.010mm accuracy		
		TECHNOLOGY-2	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		
			Heat Treatment		Carburising, Hardening, Induction Hardening & Tempering furnace with Oil quenching facility suitable to the components	
		TECHNOLOGY-3	Protection coating		Oxidising , Phosphating, Zinc chromatising, Hard Chromium Plant suitable to the components	
			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 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.

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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

**COMPLETING ARTICLES SHOP (69)
Vendor Qualification Criteria (VQC)**

NOMENCLATURE & DRAWING No.: SEAT toDrg. No. 172.10.122-1, LF No. 6206807075

1	2	3	4	5	6
	MANUFACTURING TECHNOLOGY & TESTING /INSPECTION FACILITIES REQUIRED TO PRODUCE THE ITEM	MUST BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES - (P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (3) THAT ARE AVAILABLE IN-HOUSE (SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of machine/Year of Manufacturing of machine) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) /ALSO TO BE SUBMITTED)	MAY BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES OR OUT SOURCED - (MOUT/IE-I-P WITH THE OUTSOURCING VENDOR/SUB-VENDOR AND THEIR P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (5) THAT ARE AVAILABLE IN-HOUSE OR OUT-SOURCED FIRMS (NAME AND ADDRESS OF THE OUTSOURCING VENDOR TO BE DECLARED BY THE FIRM IN FIRM'S LETTERHEAD, SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of machine) Year of Manufacturing of machine) AND TESTING/ INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) AND MOUT/IE-I-P ALSO TO BE SUBMITTED)
Technology 1	STEEL CASTINGS			Invest. Casting: 172.10.122-1 as per drawing	
Technology 2	HEAT TREATMENT			Hardness as per drawing	
Technology 3	*MACHINING	Suitable CNC Turning & VMC/HMC required as per drawing.			
Technology 4	SURFACE COATING			Chemical oxidizing/ phosphating, oil finish as per drawing	
Test/ Inspection 1	TESTING MACHINE			Brinell Hardness Tester	
Test/ Inspection 2	MEASURING INSTRUMENTS/ GAUGES	Required Measuring Instruments/Suitable Standard Gauges.			
Test/ Inspection 3	METAL TESTING			The firm should submit Material test report from NABL accredited lab as per drawing.	

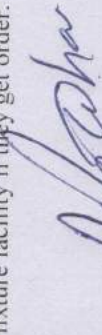
Note: (1) Facilities must be available with vendors own premises - including facilities available with **Sister / Parent Concerns / Strategic Partners** shall be Considered for Capacity Verification subjected to documentary evidence to prove the relationship / ownership.

(2) *The firm may indicate the alternate machines/process by which the component can be manufactured as per technical specification/drawing.

(3) Firm should give undertaking that they will develop the all the fixture facility if they get order.

(4) Requirements of Investment Castings as per 172 TY 10.

M. GNANASEKARAN
DGM/CA&SMS


ANTARYAMI PRADHAN
JWM/QA(OE)(CA)


LAKSHMINARAYANAN. C
JWM/CA

COMPLETING ARTICLES SHOP (69)
Vendor Qualification Criteria (VQC)

NOMENCLATURE & DRAWING No.: BODYDrg. No. 172.28.035-1A, LF No. 6206211081

1	2	3	4	5	6
	MANUFACTURING TECHNOLOGY & TESTING / INSPECTION FACILITIES REQUIRED TO PRODUCE THE ITEM	MUST BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES - (P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (3) THAT ARE AVAILABLE IN-HOUSE (SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of machine/year of Manufacturing of machine) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) ALSO TO BE SUBMITTED)	MAY BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES OR OUT SOURCED - (MOU/TIE-UP WITH THE OUTSOURCING VENDOR/SUB-VENDOR AND THEIR P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (5) THAT ARE AVAILABLE IN-HOUSE OR OUT-SOURCED FIRMS (NAME AND ADDRESS OF THE OUTSOURCING VENDOR TO BE DECLARED BY THE FIRM IN FIRM'S LETTERHEAD, SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of machine/year of Manufacturing of machine) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) AND MOU/TIE-UP ALSO TO BE SUBMITTED)
Technology 1	STEEL CASTINGS			Invest. Casting: 172.28.035-1A as per drawing	
Technology 2	HEAT TREATMENT			Hardness as per drawing	
Technology 3	*MACHINING	Suitable Conventional Milling/CNC VMC/HMC required as per drawing.			
Technology 4	SURFACE COATING			Coating as per drawing	
Test/ Inspection 1	TESTING MACHINE			Brinell Hardness Tester	
Test/ Inspection 2	MEASURING INSTRUMENTS/ GAUGES	Required Measuring Instruments/Suitable Standard Gauges.			
Test/ Inspection 3	METAL TESTING			The firm should submit Material test report from NABL accredited lab as per drawing.	

Note: (1) Facilities must be available with vendors own premises - including facilities available with **Sister / Parent Concerns / Strategic Partners** shall be Considered for Capacity Verification subjected to documentary evidence to prove the relationship / ownership.

(2) *The firm may indicate the alternate machines/process by which the component can be manufactured as per technical specification/drawing.

(3) Firm should give undertaking that they will develop the all the fixture facility if they get order.

(4) Requirements of Investment Castings requirements as per 172 TY 10

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Lakshminarayanan.C
LAKSHMINARAYANAN.C
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**COMPLETING ARTICLES SHOP (69)
Vendor Qualification Criteria (VQC)**

NOMENCLATURE & DRAWING No.: BRACKET STEEL s45Ls-I, Drg. No. 172.28.129, LF No. 6206211137

1	2	3	4	5	6
MANUFACTURING TECHNOLOGY & TESTING /INSPECTION FACILITIES REQUIRED TO PRODUCE THE ITEM		MUST BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES - (P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (3) THAT ARE AVAILABLE IN-HOUSE (SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of machine/Year of Manufacturing of machine) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) ALSO TO BE SUBMITTED)	MAY BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES OR OUT SOURCED - (MOU/TIE-UP WITH THE OUTSOURCING VENDOR/SUB-VENDOR AND THEIR P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (5) THAT ARE AVAILABLE IN-HOUSE OR OUT-SOURCED FIRMS (NAME AND ADDRESS OF THE OUTSOURCING VENDOR TO BE DECLARED BY THE FIRMS) FIRM'S LETTERHEAD, SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of machine/Year of Manufacturing of machine) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) AND MOU/TIE-UP ALSO TO BE SUBMITTED)
Technology 1	STEEL CASTINGS			Invest. Casting: 172.28.129, Est. Wt: 0.53kg	
Technology 2	HEAT TREATMENT			Hardness as per drawing	
Technology 3	*MACHINING	Suitable CNC VMC/HMC required as per drawing.			
Test/ Inspection 1	TESTING MACHINE			Brinell Hardness Tester	
Test/ Inspection 2	MEASURING INSTRUMENTS/ GAUGES	Required Measuring Instruments/Suitable Standard Gauges.			
Test/ Inspection 3	MEASURING GEOMETRICAL ACCURACY			Suitable 3D/CMM as per drawing	
Test/ Inspection 4	METAL TESTING			The firm should submit Material test report from NABL accredited lab as per drawing.	

Note: (1) Facilities must be available with vendors own premises - including facilities available with **Sister / Parent Concerns / Strategic Partners** shall be Considered for Capacity Verification subjected to documentary evidence to prove the relationship / ownership.

(2) *The firm may indicate the alternate machines/process by which the component can be manufactured as per technical specification/drawing.

(3) Firm should give undertaking that they will develop the all the fixture facility if they get order.

(4) Requirements of Investment Castings requirements as per 172. TY 10.

41
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Lakshminarayanan.C
LAKSHMINARAYANAN.C
JWM/CA

**COMPLETING ARTICLES SHOP (69)
Vendor Qualification Criteria (VQC)**

NOMENCLATURE & DRAWING No.: RATCHET toDrg. No. 54.22.012B, LF No. 6206417106

1	2	3	4	5	6
	MANUFACTURING TECHNOLOGY & TESTING/INSPECTION FACILITIES REQUIRED TO PRODUCE THE ITEM	MUST BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES - (P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (3) THAT ARE AVAILABLE IN-HOUSE (SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of manufacturing of machine) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) ALSO TO BE SUBMITTED)	MAY BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES OR OUT SOURCED - (MOU/TIE-UP WITH THE OUTSOURCING VENDOR/SUB-VENDOR AND THEIR P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (5) THAT ARE AVAILABLE IN-HOUSE OR OUT-SOURCED FIRMS (NAME AND ADDRESS OF THE OUTSOURCING VENDOR TO BE DECLARED BY THE FIRM IN FIRM'S LETTERHEAD, SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of machine/Year of Manufacturing of machine) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) AND MOU/TIE-UP ALSO TO BE SUBMITTED)
Technology 1	STEEL CASTINGS			Invest. Casting: 54.22.012B as per drawing	
Technology 2	HEAT TREATMENT			Hardness as per drawing.	
Technology 3	*MACHINING	Suitable Conventional Milling/CNC VMC/HMC required as per drawing.			
Technology 4	SURFACE COATING			Coating as per drawing	
Test/Inspection 1	TESTING MACHINE			Brinell Hardness Tester	
Test/Inspection 2	MEASURING INSTRUMENTS/ GAUGES	Required Measuring Instruments/Suitable Standard Gauges.			
Test/Inspection 3	METAL TESTING			The firm should submit Material test report from NABL accredited lab as per drawing.	

- Note:** (1) Facilities must be available with vendors own premises - including facilities available with **Sister / Parent Concerns / Strategic Partners** shall be Considered for Capacity Verification subjected to documentary evidence to prove the relationship / ownership.
- (2) *The firm may indicate the alternate machines/process by which the component can be manufactured as per technical specification/drawing.
- (3) Firm should give undertaking that they will develop the all the fixture facility if they get order.
- (4) Requirements of Investment Castings requirements as per I 72 TY 10.

M. GNANASEKARAN
DGM/CA&SMS

A. Pradhan
ANVYAMI PRADHAN
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Lakshminarayan
LAKSHMINARAYANAN. C
JWM/CA

SA-03
4
(12)

COMPLETING ARTICLES SHOP (69)
Vendor Qualification Criteria (VQC)

NOMENCLATURE & DRAWING No. GUIDE, RH to Drg. No. 175.01.178-2, LF No. 6206801355

1	2	3	4	5	6
	MANUFACTURING TECHNOLOGY & TESTING / INSPECTION FACILITIES REQUIRED TO PRODUCE THE ITEM	MUST BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES - (P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (3) THAT ARE AVAILABLE IN-HOUSE (SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of machine/Year of Manufacturing of machine) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) ALSO TO BE SUBMITTED)	MAY BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES OR OUT SOURCED - (MOU/TIE-UP WITH THE OUTSOURCING VENDOR/SUB-VENDOR AND THEIR P&M LIST & TESTING/INSPECTION EQUIPMENT LIST TO BE SUBMITTED)	PROVIDE DETAILS OF THE FACILITIES ASKED IN COLUMN (5) THAT ARE AVAILABLE IN-HOUSE OR OUT-SOURCED FIRMS (NAME AND ADDRESS OF THE OUTSOURCING VENDOR TO BE DECLARED BY THE FIRM IN FIRM'S LETTERHEAD, SELF-DECLARED P&M LIST (Nomenclature of machine, Make/Model, Capacity/Size & accuracy, Date of Installation, Vintage of machine/Year of Manufacturing of machine) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) AND MOU/TIE-UP ALSO TO BE SUBMITTED)
Technology 1	STEEL CASTINGS			Investment Casting: Est. Wt: 1.6 kg Approx.	
Technology 2	HEAT TREATMENT			Normalizing,	
Technology 3	SURFACE CLEANING			Shot blasting	
Technology 4	*MACHINING	Conventional Milling/ CNC VMC/HMC Bed Cap. 310x271 mm min.			
Test/ Inspection 1	MEASURING INSTRUMENTS/ GAUGES	Required measuring Instruments/Suitable standard Gauges.			


Test/ Inspection 2	TESTING MACHINE			Ultrasonic testing, Spectroscope/NABL Certified lab report for Chemical composition, Mechanical properties specified as per material Specification to be produced	
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Note: (1) Facilities must be available with vendors own premises - including facilities available with **Sister / Parent Concerns / Strategic Partners** shall be Considered for Capacity Verification subjected to documentary evidence to prove the relationship / ownership.


- (2) *The firm may indicate the alternate machines/process by which the component can be manufactured as per technical specification/drawing.
** Firm should give undertaking that they will develop the all the testing facility if they get order.
- (3) Firm should be capable to arrange the raw material Investment Casting as per drawing/specification.
- (4) Firm should be capable to arrange Suitable Furnace for carrying out Normalizing.


M. GNANASEKARAN
WM/CA-I


NEERAJ KUMAR
DGM/QA-RIG (OE)


SUBHAM BILWAN
AWM/QA-RIG(OE)


ANIMESH PAIK
DGM/CA, TRG & RG


SUCHEETH AGARWAL
WM/CA-II


J.P.SINGH
GM/SBU-I (OE)

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

FOR

(GUIDE R.H)

DRG.NO.175.01.178-2.

(LF NO: 6206801355)

No: HVF/T-72C/QAP/01/GUIDE R.H/243265-00

ISSUE No: 00

DATE: DEC-2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

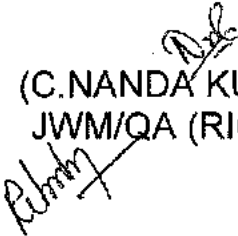
FOR

GUIDE R.H

DRG. NO. 175.01.178-2


PREPARED BY

REVIEWED BY


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


(HANUMANTH 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

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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 **GUIDE R.H TO DRG.NO 175.01.178-2** 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 **GUIDE R.H TO DRG.NO: 175.01.178-2**.

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 **GUIDE R.H TO DRG.NO.175.01.178-2** 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:

1. Tender enquiry (TE) and supply order (S.O) will be issued with QAP stating that inspection will be done as per QAP.
2. 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.
3. 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, GUIDE R.H, 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. 175.01..106Cb-3ACb

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	175.01.178-2	GUIDE R.H	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	175.01.178-2	GUIDE R.H	STEEL 15Л-I GOST 977-75	1

Note: Vendor/Contractor may use approved alternate material as per drawing if any as specified in drawing / specification / GOST 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	-----	-----
(v)	Pressure testing	-----	-----
(vi)	Machining / Fitment / Performance trial on higher assembly / Tank	01 No.	01 No. per batch / as required
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.

During acceptance of castings, the following are to be checked as per Specification: (For details refer Specification 172 TY 10 & GOST 977-75).

- chemical composition of steel;
- mechanical properties of steel;

- external view (absence of defects) and quality welding of casting defects;
- dimensions;
- hardness;
- absence of internal defects;
- macro/micro structure if any as per specification/GOST
- wear, tear and other checks if any as per specification 172 TY10 & GOST 977-75.

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 GUIDE R.H TO DRG.NO 175.01.178-2:

1. All dimensions should be confirmed as per drawing.
2. Surface finish / Roughness should be confirmed as per drawing and specification.
3. Refer drawing / specification for admissible alternate manufacture in dimensions/material if any specified for the component.

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. 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 GUIDE R.H TO DRG.NO 175.01.178-2

- a) The component should be manufactured from STEEL 15Л-I GOST 977-75.
- b) Chemical properties: As per STEEL 15Л-I GOST 977-75.

CONTENT OF ELEMENTS%							
C	Si	Mn	Cr	S	P	Cu	Ni
			MAX				
0.12 to 0.20	0.20 to 0.52	0.30 to 0.90	0.30	0.050	0.050	0.30	0.30

Note: For mass fraction of other elements refer GOST 977-75.

- c) Mechanical properties: As per STEEL 15Л-I GOST 977-75.

Yield point, N/mm ² / (kgf/mm)	Ultimate strength, N/mm ² (Kgf/mm)	Elongation %	Relative reduction of area %	Impact strength (Kgf/cm ²)
Not less than				
200 (20)	400 (40)	24	35	5.0

Note: For other parameters refer GOST 977-75.

14) PERFORMANCES / ACCEPTANCE TEST: GUIDE R.H TO DRG.NO: 175.01.178-2.

1. ALTERNATE MATERIAL : STEEL 20Л -I, 25Л -I, 30Л-I GOST 977-75
2. COMPONENT SHOULD CONFORM TO 172 TY - 10.
3. SHRINKAGE UPTO 2 mm AND UNDERCUT RUNNER OF UPTO 2.5 mm HIGH ARE PERMISSIBLE ON SURFACE " A "
4. ON SURFACE OF DEPRESSION AT DIMENSION 23, RESIDUAL OF CERAMICES AND THREE PITS MEASURING UPTO 4 mm AND HAVING A DEPTH OF UPTO 1/3 OF THICKNESS OF WALL ARE PERMISSIBLE.
5. UNSPECIFIED ROUNDING - OFF RADII ARE UPTO 4 mm.
6. TECHNOLOGICAL ALLOWANCE WHICH IS SPECIFIED IN THE TECHNOLOGICAL PROCESS DOCUMENTS IS PERMISSIBLE ALONG EDGES B AND Г
7. MAY BE MACHINED TO Ø22A3 AT A LENGTH OF NOT LESS THAN 18 mm. CONCENTRICITY AND SKEWNESS OF BORES Ø22 A3

SHOULD BE CHECKED FOR PASSAGE OF ROLLER Ø22x ON THE REST OF THE LENGTH THE BORE MAY BE MINIMUM Ø20A7 (+0.52) WITH SURFACE FINISH Rz 80/ ROUGHNESS IS ALLOWED.

8. MAY BE MACHINED TO Ø26A3 ONLY AT A LENGTH OF ATLEAST 25 mm. CONCENTRICITY AND SKEWNESS OF BORES SHOULD BE CHECKED FOR FREE PASSAGE OR ROLLER Ø26 x. ON THE REST OF THE LENGTH THE BORE SHOULD BE Ø25A7 (+0.52) MINIMUM WITH SURFACE FINISH Rz 80/ ROUGHNESS IS PERMISSIBLE.

Explanatory Note

1. Stage wise inspection and process of the component as specified in TD Book / Process Book / illustration book is to be confirmed by the supplier during manufacturing the components.
2. Firm shall submit the inspection process details/reports 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.

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

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.

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, 2.Mechanical properties, 3. Pre-forming process, 4. Coating certification (wherever applicable), 5. Calibration reports of instruments and 6. 100% Dimensional inspection reports. 7. Pressure test (leakage test) if applicable, 8. Hardness checks, 9. Certificates for Macro/Micro structure (wherever applicable), 10. Fracture test (if applicable) and other relevant test reports for acceptance of the Casting, etc

22) REFERENCE:

- a) Drawing No: 175.01.178-2-GUIDE R.H.
- b) Material specification as per drawing:
STEEL 15Л-I GOST 977-75.
- c) GOST 977-75.
- d) 172 TY10.
- e) Alternate material: STEEL 20Л-I, 25Л-I, 30Л-I GOST 977-75.

ANNEXURE-A

SL. NO	ITEM/ SUB ASSY/ ASSEMBLY	CATEGORY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	GUIDE R.H to DRG.NO: 175.01.178-2	Pre inspection reports (PIR) of firm	Firm has to produced all the document as per QAP	As per the relevant drawing and QAP.	Confirm to drawing and QAP as per bill of material	P	W/V	R	100% should be ensured.
2		Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 8	Confirm to QAP.	P	W/V	R	100% should be ensured.
3		Material Checks	Chemical composition & Physical, Mechanical Properties	As per the GOST 977-75	All the values to confirm with QAP (Para no: 13.1(a),(b),(c))	P	W/V	R	100% should be ensured.
4		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no: 12.1	Confirm to drawing and QAP. 12.1	P	W/V	R	100% should be ensured.
5		Marking / traceability	Firm has to make marking / traceability records.	Refer QAP Para no: 18	Confirm to QAP Para no: 18	P	W/V	R	100% to be done
6		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% to be done

Note:

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

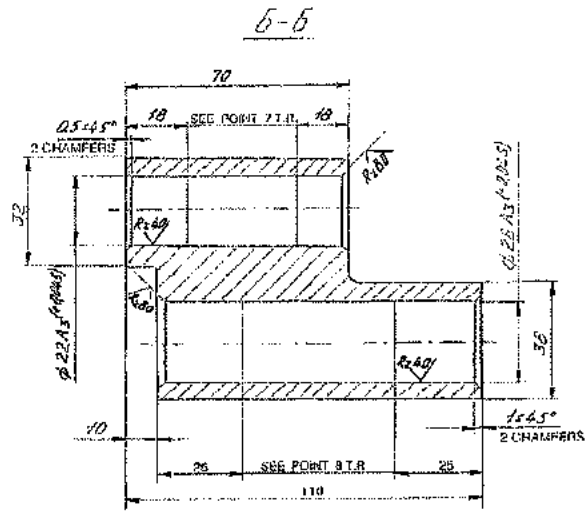
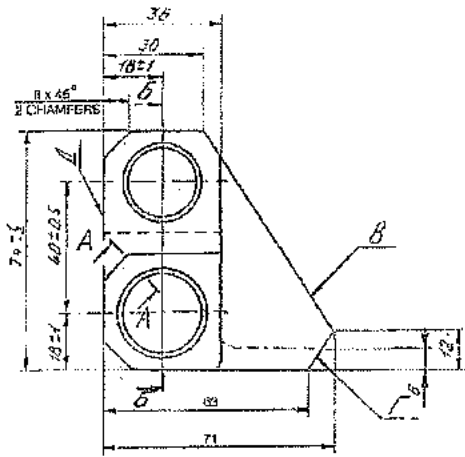
1. One sample per heat / batch shall be tested under NABL Lab/Govt. Approved lab by firm. In case of non-compliance to standards entire lot shall be rejected or not to use in production further.
2. For cross conformation of material, manufacturer has to submit test sample pieces for the items used / 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



A-A TURNED VIEW

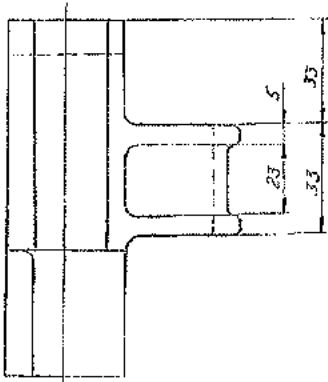


FIG: GUIDE R.H TO DRG. NO 175.01.178-2

RECORD OF AMENDMENTS

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

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

FOR

(RATCHET)

DRG.NO.54.22.012B

(LF NO: 6206417106)

No.HVF/T-72C/QAP/22/RATCHET/242779-00

ISSUE No: 00

DATE: NOV-2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)


FOR

RATCHET

DRG. NO. 54.22.012B


PREPARED BY

REVIEWED BY


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


(SITA RAMAYYA MVSS)
JWM/QA (RIG-SA /SASO)

APPROVED BY


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

ISSUED BY

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

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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 **RATCHET TO DRG.NO 54.22.012B** 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 **RATCHET TO DRG.NO:54.22.012B**.

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 **RATCHET TO DRG. NO. 54.22.012B** 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:

1. 175.61.002CB-A - MANUAL CONTROL ASSY.

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	54.22.012B	RATCHET	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	54.22.012B	RATCHET	STEEL 45XП OST 3-4365-79	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.
- (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	-----	-----
(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/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 RATCHET TO DRG.NO 54.22.012B

All dimensions should be confirmed as per drawing.

Sl. No.	Drawing Dimension
1.	15±0.5 mm ✓
2.	φ5A ₄ ^(+0.08) mm (2 Holes) ✓
3.	4 ^{+0.3} mm ✓
4.	9 _{-0.6} mm ✓
5.	0.2X45° (4 Places) ✓
6.	R0.3 Max ✓
7.	13° ✓
8.	28±0.5 mm ✓
9.	10.5±0.4 mm ✓
10.	11.5±0.4 mm ✓
11.	2±0.2 mm ✓
12.	5.5±0.5 mm ✓
13.	11±0.5 mm ✓
14.	R5.5 ✓
15.	4.5* mm ✓
16.	9±1 mm ✓
17.	13° ✓
18.	45° (+30' / -1°) ✓
19.	6±1 mm ✓
20.	'a' mm ✓

21.	Surface finish / Roughness of items should be ensured as per drawing and specification.
-----	---

Refer drawing/specification for admissible alternate manufacture in dimensions/material if any specified for the component.

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 RATCHET TO DRG.NO 54.22.012B

a) The component should be manufactured from 45XII OST 3-4365-79.

b) **Chemical properties:** As per STEEL 45XII OST 3-4365-79.

CONTENT OF ELEMENTS %							
C	Si	Mn	Cr	Ni	S	P	V
0.40 to 0.50	0.17 to 0.37	0.50 to 0.80	0.80 to 1.10	---	0.040	0.040	---
				MAX			

Note: For mass fraction of other elements refer OST 3-4365-79.

c) **Mechanical properties:** As per STEEL 45XII OST 3-4365-79.

Grade of steel	Strength category	Yield stress, M Pa	Ultimate strength M pa	Elongation %	Reduction of area %	Impact strength (Kgf.m/ Cm2)
Not less than						
45XII	KT65	637 (65)	835 (85)	7	---	290 (3.0)

Note: For other parameters refer OST 3-4365-79.

14)PERFORMANCES / ACCEPTANCETEST: RATCHET TO DRG.NO:54.22.012B

1. BHN 302-255 (Indentation of Dia 3.6-3.9) to be checked on test piece.
2. Requirements for casting refer temporary (BTY) specifications on acceptance of investment cast components. In this case casting defects on tooth of ratchet and on surfaces "A" are not allowed.

3. Permissible deviations on rough dimensions should be as per the second group of accuracy, GOST 2009-55.
4. Unspecified radii to be done with R3mm.
5. Thickness "a" should be 2mm minimum.
6. Before heat treatment on surface "B" make distinctive mark 1mm deep. Dimension of mark are not to be checked.
7. Coating: Chemical Phosphating or Chemical Oxidizing/Phosphating.
8. Dimension for reference.
9. It is allowed to manufacture from steel 45XП GOST 977-75.
10. To ensure dimensions $45^\circ (+30' / -1^\circ)$ and R0.3 max machining 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/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(6)).

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: 54.22.012B
- b) Material specification as per drawing:
STEEL 45XЛ OST 3-4365-79
- c) OST 3-4365-79.
- d) GOST 2009-55.
- e) Alternate Material:
 - a. STEEL 45XЛ GOST 977-75.

SL. NO.	CATEGORY	ASSEMBLY/ SUB ASSEMBLY	TESTS/ INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGOA	
1	RATCHET TO DRG. NO 54.22.012B	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 OST 3-4365-79	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) 255...302	Refer QAP Para no.14(1)	Confirm to QAP Para no:14(1)	P	W/V	R	SP followed by HVF.
5		Coating check	Chemical Phosphating or Chemical Oxidizing/Phosphating	Refer QAP Para no.14(7)	Confirm to QAP Para no:14(7)	P	W/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	Marking / traceability	Refer QAP Para no:18 & 14(6)	Confirm to QAP Para no:18 & 14(6)	P	V	R	100% by firm/ vendor.
8		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).
- 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**

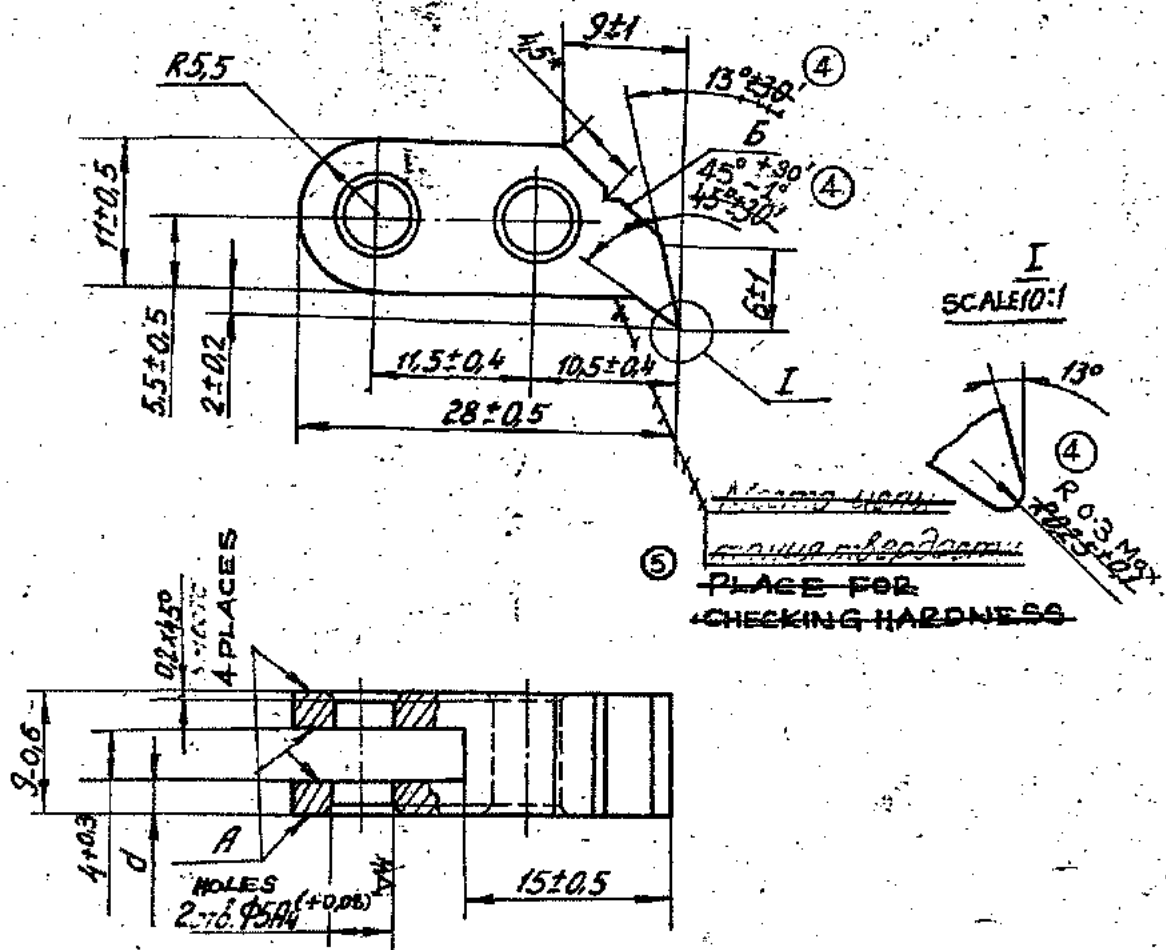


FIG: RATCHET TO DRG.NO.54.22.012B.

APPENDIX 'A'

RECORD OF AMENDMENTS

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

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

FOR

(BRACKET)

DRG.NO.172.28.129.

(LF NO: 6206211137)

No: HVF/T-72C/QAP/28/BRACKET/243267-00

ISSUE No: 00

DATE: DEC-2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

BRACKET

DRG. NO. 172.28.129

PREPARED BY

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ISSUED BY

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HEAVY VEHICLES FACTORY
AVADI CHENNAI – 600 054

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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 172.28.129** 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: 172.28.129**.

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.172.28.129** 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:

1. Tender enquiry (TE) and supply order (S.O) will be issued with QAP stating that inspection will be done as per QAP.
2. 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.
3. 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, BRACKET, 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	172.28.129	BRACKET	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.28.129	BRACKET	STEEL 45П-I GOST 977-75	1

Note: Vendor/Contractor may use approved alternate material as per drawing if any as specified in drawing / specification / GOST 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	-----	-----
(v)	Pressure testing	-----	-----
(vi)	Machining / Fitment / Performance trial on higher assembly / Tank	01 No.	-----
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.

During acceptance of castings, the following are to be checked as per Specification: (For details refer Specification 172 TY10 & GOST 977-75).

- chemical composition of steel;
- mechanical properties of steel;
- external view (absence of defects) and quality welding of casting defects;
- dimensions;
- hardness;
- absence of internal defects;
- macro/micro structure if any as per specification/GOST

- wear, tear and other checks if any as per specification 172 TY10 & GOST 977-75.

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 172.28.129:

1. All dimensions should be confirmed as per drawing.
2. Surface finish / Roughness should be confirmed as per drawing and specification.
3. Refer drawing / specification for admissible alternate manufacture in dimensions/material if any specified for the component.

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. 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 172.28.129

- a) The component should be manufactured from STEEL 45Л-I GOST 977-75.
- b) **Chemical properties:** As per STEEL 45Л-I GOST 977-75.

CONTENT OF ELEMENTS%							
C	Si	Mn	Cr	S	P	Cu	Ni
MAX							
0.42 to 0.50	0.20 to 0.52	0.40 to 0.90	0.30	0.050	0.050	0.30	0.30

Note: For mass fraction of other elements refer GOST 977-75.

- c) **Mechanical properties:** As per STEEL 45Л-I GOST 977-75.

Yield point, N/mm ² / (kgf/mm)	Ultimate strength, N/mm ² (Kgf/mm)	Elongation %	Relative reduction of area %	Impact strength (Kgf/cm ²)
Not less than				
320 (32)	550 (55)	12	20	3.0

Note: For other parameters refer GOST 977-75.

14) PERFORMANCES / ACCEPTANCE TEST: BRACKET TO DRG.NO: 172.28.129.

- 1) B.H.N.285-229 (Ind. Dia: 3.4-4.0)
- 2) Casting requirements are as per 172-Ty-10.
- 3) Radii from machining should not exceed 1mm.
- 4) It is allowed to manufacture as per the dot and dash line.
- 5) Alternate material, steel 40Л-I GOST 977-75.

6. **COATING:-** (Zn 20 Cr) Zn PLATING TO FeZn 20 TO IS: 1573: 1970, FOLLOWED BY CHROMIUM PASSIVATION TO IS: 1340: 1973.

Explanatory Note

1. Stage wise inspection and process of the component as specified in TD Book / Process Book / illustration book is to be confirmed by the supplier during manufacturing the components.
2. Firm shall submit the inspection process details/reports 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.

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

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.

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).
- i. Pre inspection reports (PIR) of firm like, 1. Chemical analysis, 2.Mechanical properties, 3. Pre-forming process, 4. Coating certification (wherever applicable), 5. Calibration reports of instruments and 6. 100% Dimensional inspection reports. 7. Pressure test (leakage test) if applicable, 8. Hardness checks, 9. Certificates for Macro/Micro structure (wherever applicable), 10. Fracture test (if applicable) and other relevant test reports for acceptance of the Casting, etc.

22) REFERENCE:

- a) Drawing No: 172.28.129-BRACKET.
- b) Material specification as per drawing: STEEL 45П-I GOST 977-75.
- c) GOST 977-75.
- d) 172 TY10.
- e) Alternate material: Investment casting steel BS: 3146 PT1-1974
TYPE CLA-1GD'C'.

ANNEXURE-A

SL. NO	ITEM/ SUB ASSY/ ASSEMBLY	CATEGORY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	BRACKET to DRG.NO: 172.28.129	Pre inspection reports (PIR) of firm	Firm has to produced all the document as per QAP	As per the relevant drawing and QAP.	Confirm to drawing and QAP as per bill of material	P	WV	R	100% should be ensured.
2		Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 8	Confirm to QAP.	P	WV	R	100% should be ensured.
3		Material Checks	Chemical composition & Physical, Mechanical Properties	As per the GOST 977-75	All the values to confirm with QAP (Para no.13.1(a),(b),(c))	P	WV	R	100% should be ensured.
4		Hardness checks	Hardness 229-285 BHN (Dia of indh 3.4-4.0)	Refer QAP Para no 14(1)	Confirm to QAP Para no 14(1)	P	V	R	100% should be ensured.
5		Coating checks	Zn 20 Cr	Refer QAP Para no 14(6)	Confirm to QAP Para no 14(6)	P	V	R	100% should be ensured.
6		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no. 12.1	Confirm to drawing and QAP.12.1	P	WV	R	100% should be ensured.
7		Marking / traceability	Firm has to make marking / traceability records.	Refer QAP Para no: 18	Confirm to QAP Para no.18	P	WV	R	100% to be done
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% to be done

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

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

FOR

(BODY)

DRG.NO.172.28.035-1A.

(LF NO: 6206211081)

No: HVF/T-72C/QAP/28/BODY/243266-00

ISSUE No: 00

DATE: DEC-2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

BODY

DRG. NO. 172.28.035-1A

PREPARED BY

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21.	DOCUMENTATION	11
22.	REFERENCE	11
23.	ANNEXURE-A	12
24.	FIGURE	13
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1. IMPORTANT NOTE

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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 **BODY TO DRG.NO 172.28.035-1A** 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 **BODY TO DRG.NO: 172.28.035-1A**.

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 **BODY TO DRG.NO.172.28.035-1A** 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:

1. Tender enquiry (TE) and supply order (S.O) will be issued with QAP stating that inspection will be done as per QAP.
2. 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.
3. 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, BODY, 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	172.28.035-1A	BODY	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.28.035-1A	BODY	STEEL 45Л-I GOST 977-75	1

Note: Vendor/Contractor may use approved alternate material as per drawing if any as specified in drawing / specification / GOST 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	-----	-----
(v)	Pressure testing	-----	-----
(vi)	Machining / Fitment / Performance trial on higher assembly / Tank	01 No.	01 No. per batch / as required
(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.

During acceptance of castings, the following are to be checked as per Specification: (For details refer Specification 172 TY 10 & GOST 977-75).

- chemical composition of steel;
- mechanical properties of steel;
- external view (absence of defects) and quality welding of casting defects;
- dimensions;
- hardness;
- absence of internal defects;
- macro/micro structure if any as per specification/GOST
- wear, tear and other checks if any as per specification 172 TY10 & GOST 977-75.

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 BODY TO DRG.NO 172.28.035-1A:

1. All dimensions should be confirmed as per drawing.
2. Surface finish / Roughness should be confirmed as per drawing and specification.
3. Refer drawing / specification for admissible alternate manufacture in dimensions/material if any specified for the component.

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. 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 BODY TO DRG.NO 172.28.035-1A

- a) The component should be manufactured from STEEL 45Л-I GOST 977-75.
- b) Chemical properties: As per STEEL 45Л-I GOST 977-75.

CONTENT OF ELEMENTS%							
C	Si	Mn	Cr	S	P	Cu	Ni
MAX							
0.42 to 0.50	0.20 to 0.52	0.40 to 0.90	0.30	0.050	0.050	0.30	0.30

Note: For mass fraction of other elements refer GOST 977-75.

- c) Mechanical properties: As per STEEL 45Л-I GOST 977-75.

Yield point, N/mm ² / (kgf/mm)	Ultimate strength, N/mm ² (Kgf/mm)	Elongation %	Relative reduction of area %	Impact strength (Kgf/cm ²)
Not less than				
320 (32)	550 (55)	12	20	3.0

Note: For other parameters refer GOST 977-75.

14) PERFORMANCES / ACCEPTANCE TEST: BODY TO DRG.NO: 172.28.035-1A.

1. TO BE HEAT-TREATED TO BHN 285-229 (IND: DIA 3.6-4.0)
2. INTERNAL DRAFTS SHOULD NOT EXCEED 1:50 UN-SPECIFIED CASTING RADII SHOULD NOT EXCEED R2.
3. FOR CASTING REQUIREMENTS, 172 TY-10 ON THE ACCEPTANCE OF INVESTMENT-CAST COMPONENTS IS TO BE REFERRED TO.
4. SHIFT OF HOLES Ø 10 AND Ø 6.2 IN RELATION TO EACH OTHER SHOULD NOT EXCEED 0.15 mm
5. VARIATION IN MEASUREMENTS OF DIMENSIONS "α" SHOULD NOT EXCEED 1 mm.
6. TO BE ZINC COATED 6-12 MICRONS WITH THE EXCEPTION OF HOLES Ø 6.2 ON THE REMAINING INTERNAL SURFACES, COATING NEED NOT BE CHECKED.
7. ALTERNATE MATERIAL STEEL 50 Л-I, GOST 977-75 40 А-1 GOST 977-75
8. COATING :- TO BE ZINC COATED 6-12 MICRONS WITH THE EXCEPTION OF HOLES Ø 6.2 (IS-1573-70) FOLLOWED BY CHROMIUM PASSIVATION TO IS: 1340-73

Explanatory Note

1. Stage wise inspection and process of the component as specified in TD Book / Process Book / illustration book is to be confirmed by the supplier during manufacturing the components.
2. Firm shall submit the inspection process details/reports 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.

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/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

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.

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, 2.Mechanical properties, 3. Pre-forming process, 4. Coating certification (wherever applicable), 5. Calibration reports of instruments and 6. 100% Dimensional inspection reports, 7. Pressure test (leakage test) if applicable, 8. Hardness checks, 9. Certificates for Macro/Micro structure (wherever applicable), 10. Fracture test (if applicable) and other relevant test reports for acceptance of the Casting, etc.

22) REFERENCE:

- a) Drawing No: 172.28.035-1A-BODY.
- b) Material specification as per drawing: STEEL 45Л-I GOST 977-75.
- c) GOST 977-75.
- d) 172 TY10.
- e) Alternate material: STEEL 45Л-I, 50Л-I GOST 977-75.
- f) Alt. material: STEEL BS3100-1976, AW2

ANNEXURE-A

SL. NO	ITEM/ SUB ASSY/ ASSEMBLY	CATEGORY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	BODY to DRG.NO: 172.28.035-1A	Pre inspection reports (PIR) of firm	Firm has to produced all the document as per QAP	As per the relevant drawing and QAP.	Confirm to drawing and QAP as per bill of material	P	W/V	R	100% should be ensured.
2		Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 8	Confirm to QAP.	P	W/V	R	100% should be ensured.
3		Material Checks	Chemical composition & Physical, Mechanical Properties	As per the GOST 977-75	All the values to confirm with QAP (Para no:13.1(a),(b),(c))	P	W/V	R	100% should be ensured.
4		Hardness checks	Hardness 229-285 BHN (Dia of indh 3.6-4.0)	Refer QAP Para no 14(1)	Confirm to QAP Para no 14(1)	P	V	R	100% should be ensured.
5		Coating checks	Zinc coating followed by chromium	Refer QAP Para no 14(8)	Confirm to QAP Para no 14(8)	P	V	R	100% should be ensured.
6		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no: 12.1	Confirm to drawing and QAP.12.1	P	W/V	R	100% should be ensured.
7		Marking / traceability	Firm has to make marking / traceability records.	Refer QAP Para no: 18	Confirm to QAP Para no:18	P	W/V	R	100% to be done
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% to be done

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

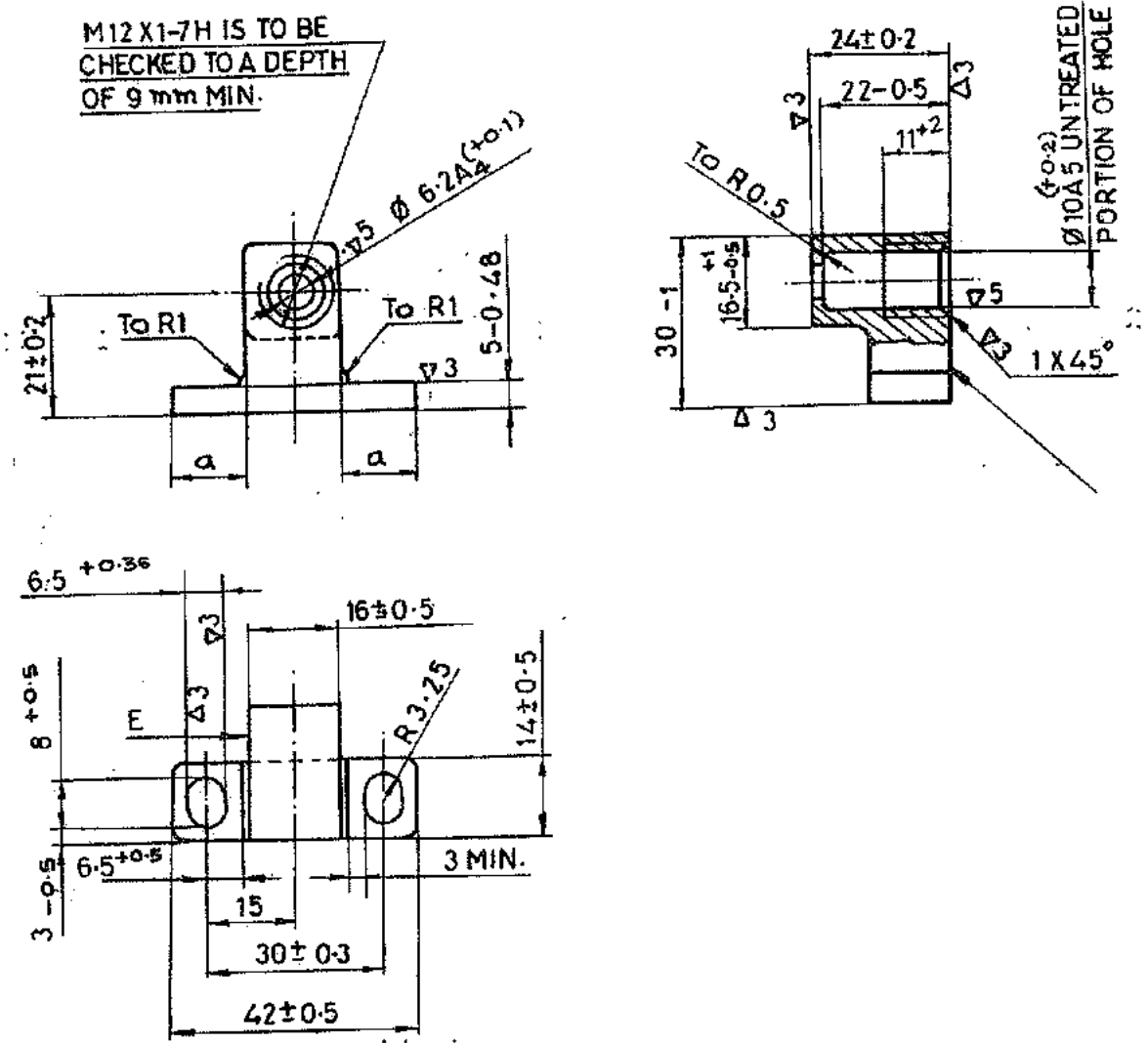


FIG: BODY TO DRG. NO 172.28.035-1A

APPENDIX ' A '

RECORD OF AMENDMENTS

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

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

FOR

(SEAT)

DRG.NO.172.10.122-1.

(LF NO: 6206807075)

No: HVF/T-72C/QAP/21/SEAT/240853-00

ISSUE No: 00

DATE: DEC-2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

SEAT

DRG. NO. 172.10.122-1


PREPARED BY

REVIEWED BY


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


(V RAJA)
JWM/QA (RIG-SA/ST)

APPROVED BY


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

ISSUED BY

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

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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 **SEAT TO DRG.NO 172.10.122-1** 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 **SEAT TO DRG.NO: 172.10.122-1**.

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 **SEAT TO DRG.NO.172.10.122-1** 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:

1. Tender enquiry (TE) and supply order (S.O) will be issued with QAP stating that inspection will be done as per QAP.
2. 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.
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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. Equivalents 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.
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- 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, SEAT, 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. 172.10.014Cb-3
2. 188.10.177CbCb

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.10.122-1	SEAT	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.10.122-1	SEAT	STEEL 45XЛ GOST 977-88	1

Note: Vendor/Contractor may use approved alternate material as per drawing if any as specified in drawing / specification / GOST 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.
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 - (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	-----	-----
(v)	Pressure testing	-----	-----
(vi)	Machining / Fitment / Performance trial on higher assembly / Tank	01 No.	01 No. per batch / as required
(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.

During acceptance of castings, the following are to be checked as per Specification: (For details refer Specification 172 TY 10 & GOST 977-88).

- chemical composition of steel;
- mechanical properties of steel;
- external view (absence of defects) and quality welding of casting defects;
- dimensions;
- hardness;
- absence of internal defects;
- macro/micro structure if any as per specification/GOST
- wear, tear and other checks if any as per specification 172 TY10 & GOST 977-88.

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 SEAT TO DRG.NO 172.10.122-1:

1. All dimensions should be confirmed as per drawing.
2. Surface finish / Roughness should be confirmed as per drawing and specification.
3. Refer drawing / specification for admissible alternate manufacture in dimensions/material if any specified for the component.

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. 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 SEAT TO DRG.NO 172.10.122-1

- a) The component should be manufactured from STEEL 45XЛ GOST 977-88
 b) **Chemical properties:** As per STEEL 45XЛ GOST 977-88.

Fraction of total mass of element, %					
Carbon	Manganese	Silicon	Phosphor	Sulphur	Chromium
			Not more than		
Refer GOST 977-88					

Note: For mass fraction of other elements refer GOST 977-88.

- c) **Mechanical properties:** As per STEEL 45XЛ GOST 977-88.

Yield point, N/mm ² / (kgf/mm)	Ultimate strength, N/mm ² (Kgf/mm)	Elongation %	Relative reduction of area %	Impact strength (Kgf/cm ²)
Refer GOST 977-88				

Note: For other parameters refer GOST 977-88.

14) PERFORMANCES / ACCEPTANCE TEST: SEAT TO DRG.NO: 172.10.122-1.

1. Alternative material steel 40XЛ GOST 977-88.
2. BHN 255...302.
3. Casting - as per group1 as per GOST 977-88.
4. Accuracy of casting 9-0-0-9 GOST 26645-85.
5. Requirement for casting are as per 172.TY10.
6. Defects of casting in surface Д are not allowed.
7. Unspecified casting radii – not exceeding 5 mm.
8. When machining along dimension E and Ж cutting in surface И, К, Л may not exceed 2 mm.
9. Unspecified radii 1 mm.
10. Coating: chemical phosphatising oxidation with oil finish or chemical oxidation with oil finishing.
11. Other requirements are as per 520.TY1.

Explanatory Note

1. Stage wise inspection and process of the component as specified in TD Book / Process Book / illustration book is to be confirmed by the supplier during manufacturing the components.
2. Firm shall submit the inspection process details/reports 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.

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/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

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.

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, 5. Calibration reports of instruments and 6. Dimensional inspection reports.

22) REFERENCE:

- a) Drawing No: 172.10.122-1-SEAT.
- b) Material specification as per drawing:
STEEL 45XЛ GOST 977-88.
- c) GOST 977-88, GOST 26645-85.
- d) 172 TY10.
- e) 520 TY1.
- f) Alternate material: STEEL 40XЛ GOST 977-88.

SL. NO	ITEM/ SUB ASSY/ ASSEMBLY	CATEGORY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	SEAT to DRG.NO: 172.10.122-1	Pre inspection reports (PIR) of firm	Firm has to produced all the document as per QAP	As per the relevant drawing and QAP.	Confirm to drawing and QAP as per bill of material	P	W/V	R	100% should be ensured.
2		Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 8	Confirm to QAP.	P	W/V	R	100% should be ensured.
3		Material Checks	Chemical composition & Physical, Mechanical Properties	As per the GOST 977-88	All the values to confirm with QAP (Para no:13.1(a),(b),(c))	P	W/V	R	100% should be ensured.
4		Hardness checks	BHN 255...302	Refer drawing / QAP Para no: 14.2	Confirm to drawing and QAP.14.2	P	V	R	100% should be ensured.
5		Coating checks	Chemical phosphating or chemical oxidation with oil finish	Refer drawing / QAP Para no: 14.10	Confirm to drawing and QAP.14.10	P	V	R	100% should be ensured.
6		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no: 12.1	Confirm to drawing and QAP.12.1	P	W/V	R	100% should be ensured.
7		Marking / traceability	Firm has to make marking / traceability records.	Refer QAP Para no: 18	Confirm to QAP Para no.18	P	W/V	R	100% to be done
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% to be done

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

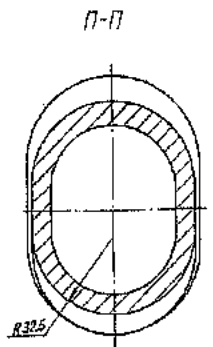
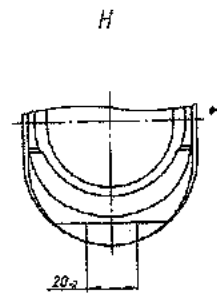
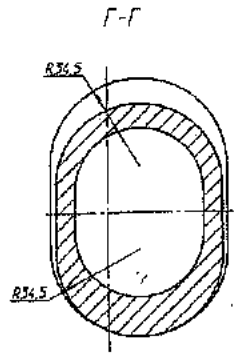
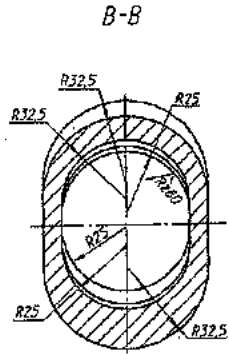
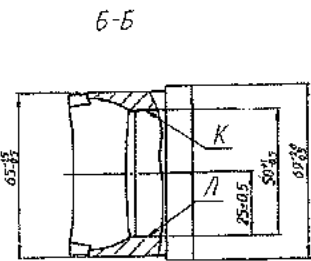
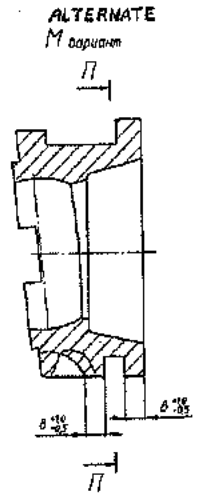
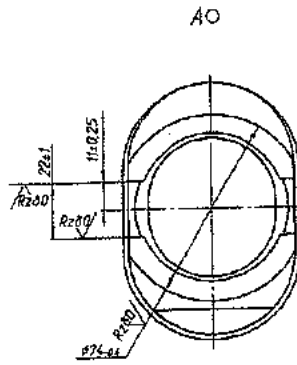
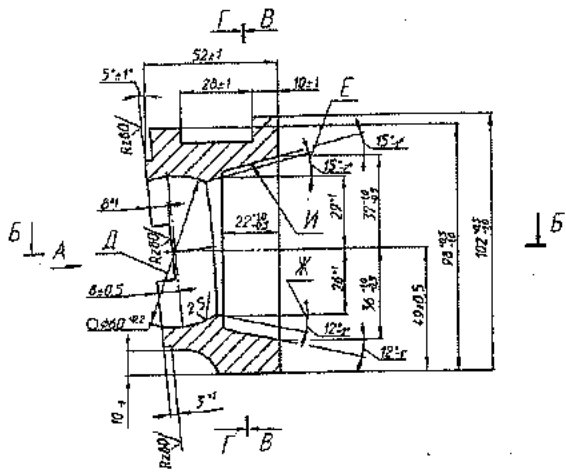


FIG: SEAT TO DRG. NO 172.10.122-1

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

FOR

(FLANGE)

DRG.NO.176.23.054-1.

(LF NO: 6206113255)

No: HVF/T-90/QAP/23/FLANGE/243263-00

ISSUE No: 00

DATE: DEC-2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR


FLANGE

DRG. NO. 176.23.054-1


PREPARED BY


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

REVIEWED BY


(HANUMANTH 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

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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 **FLANGE TO DRG.NO 176.23.054-1** 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 **FLANGE TO DRG.NO: 176.23.054-1**.

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 **FLANGE TO DRG.NO.176.23.054-1** 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:

1. Tender enquiry (TE) and supply order (S.O) will be issued with QAP stating that inspection will be done as per QAP.
2. 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.
3. 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. Equivalents 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, FLANGE, 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. 172.23.012Cb
2. 176.23Cb-3Cb

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	176.23.054-1	FLANGE	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	176.23.054-1	FLANGE	STEEL 45Л-I GOST 977-88	1

Note: Vendor/Contractor may use approved alternate material as per drawing if any as specified in drawing / specification / GOST 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	-----	-----
(v)	Pressure testing	-----	-----
(vi)	Machining / Fitment / Performance trial on higher assembly / Tank	01 No.	01 No. per batch / as required
(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.

During acceptance of castings, the following are to be checked as per Specification: (For details refer Specification 172 TY 10 & GOST 977-75).

- chemical composition of steel;
- mechanical properties of steel;
- external view (absence of defects) and quality welding of casting defects;
- dimensions;
- hardness;
- absence of internal defects;
- macro/micro structure if any as per specification/GOST
- wear, tear and other checks if any as per specification 172 TY10 & GOST 977-75.

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 FLANGE TO DRG.NO 176.23.054-1:

1. All dimensions should be confirmed as per drawing.
2. Surface finish / Roughness should be confirmed as per drawing and specification.
3. Refer drawing / specification for admissible alternate manufacture in dimensions/material if any specified for the component.

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. 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 FLANGE TO DRG.NO 176.23.054-1

- a) The component should be manufactured from STEEL 45Л-I GOST 977-88.

b) Chemical properties: As per STEEL 45Л-I GOST 977-88.

CONTENT OF ELEMENTS%					
Grade of steel	C	Mn	Si	S	P
				MAX	
45Л-I	0.42 – 0.50	0.45 – 0.90	0.20 – 0.52	0.050	0.050

Note: For mass fraction of other elements refer GOST 977-88.

c) Mechanical properties: As per STEEL 45Л-I GOST 977-88.

Yield stress, σ_r , M Pa	Ultimate strength, σ_b , M pa	Elongation δ , %	Reduction of area ψ , %	Impact strength KCU k J / m ²
Not less than				
314	540	12	20	294

Note: For other parameters refer GOST 977-88.

14) PERFORMANCES / ACCEPTANCE TEST: FLANGE TO DRG.NO: 176.23.054-1.

1. MAY BE MANUFACTURED FROM STEEL 40XА-I GOST 977-75, OR STEEL 45XА OST 3-4365-79.
2. THE COMPONENT SHOULD CORRESPOND TO 172 TY-10 FOR INVESTMENT CASTING.
3. UNSPECIFIED ROUGH DIMENSIONS ARE AS PER CLASS 2 GOST 2009-55.
4. EXTERNAL DRAFTS 1:50.
5. ON THE OUTER SURFACE REMAINDER FROM FEEDER WITH A HEIGHT NOT EXCEEDING 2mm IS ALLOWED.
6. DIMENSION "α" 4 MIN.
7. COATING OF EXTERNAL UNMACHINED SURFACES BROWN PRIMER *sp.1-03K* WHITE ENAMEL П *sp-115* OR П *sp-223-02* REQUIREMENTS AS PER 520 TY 5.
8. COATING: CHEMICAL OXIDIZING OIL FINISH OR CHEMICAL OXIDOPHOSPHATIZING, OIL FINISH.

Explanatory Note

1. Stage wise inspection and process of the component as specified in TD Book / Process Book / illustration book is to be confirmed by the supplier during manufacturing the components.

2. Firm shall submit the inspection process details/reports 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.

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

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.

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, 2.Mechanical properties, 3. Pre-forming process, 4. Coating certification (wherever applicable), 5. Calibration reports of instruments and 6. 100% Dimensional inspection reports. 7. Pressure test (leakage test) if applicable, 8. Hardness checks, 9. Certificates for Macro/Micro structure (wherever applicable), 10. Fracture test (if applicable) and other relevant test reports for acceptance of the Casting, etc.

22) REFERENCE:

- a) Drawing No: 176.23.054-1-FLANGE.
- b) Material specification as per drawing:
STEEL 45Л-I GOST 977-88.
- c) GOST 977-88, GOST 2009-55.
- d) 172 TY10.
- e) 520 TY5.
- f) Alternate material: STEEL 25Л, 30Л GOST 977-88.

ANNEXURE-A

SL. NO	ITEM/ SUB ASSY/ ASSEMBLY	CATEGORY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	FLANGE to DRG.NO: 176.23.054-1	Pre inspection reports (PIR) of firm	Firm has to produced all the document as per QAP	As per the relevant drawing and QAP.	Confirm to drawing and QAP as per bill of material	P	WV	R	100% should be ensured.
2		Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 8	Confirm to QAP.	P	WV	R	100% should be ensured.
3		Material Checks	Chemical composition & Physical, Mechanical Properties	As per the GOST 977-88	All the values to confirm with QAP (Para no:13.1(a),(b),(c))	P	WV	R	100% should be ensured.
4		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no: 12.1	Confirm to drawing and QAP.12.1	P	WV	R	100% should be ensured.
5		Coating checks	Chemical oxidizing oil finish or chemical oxidophosphating oil finish	Refer drawing / QAP Para no: 14.7 & 14.8	Confirm to drawing and QAP. Para no: 14.7 & 14.8	P	V	R	100% should be ensured.
6		Marking / traceability	Firm has to make marking / traceability records.	Refer QAP Para no: 18	Confirm to QAP Para no:18	P	WV	R	100% to be done
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% to be done

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

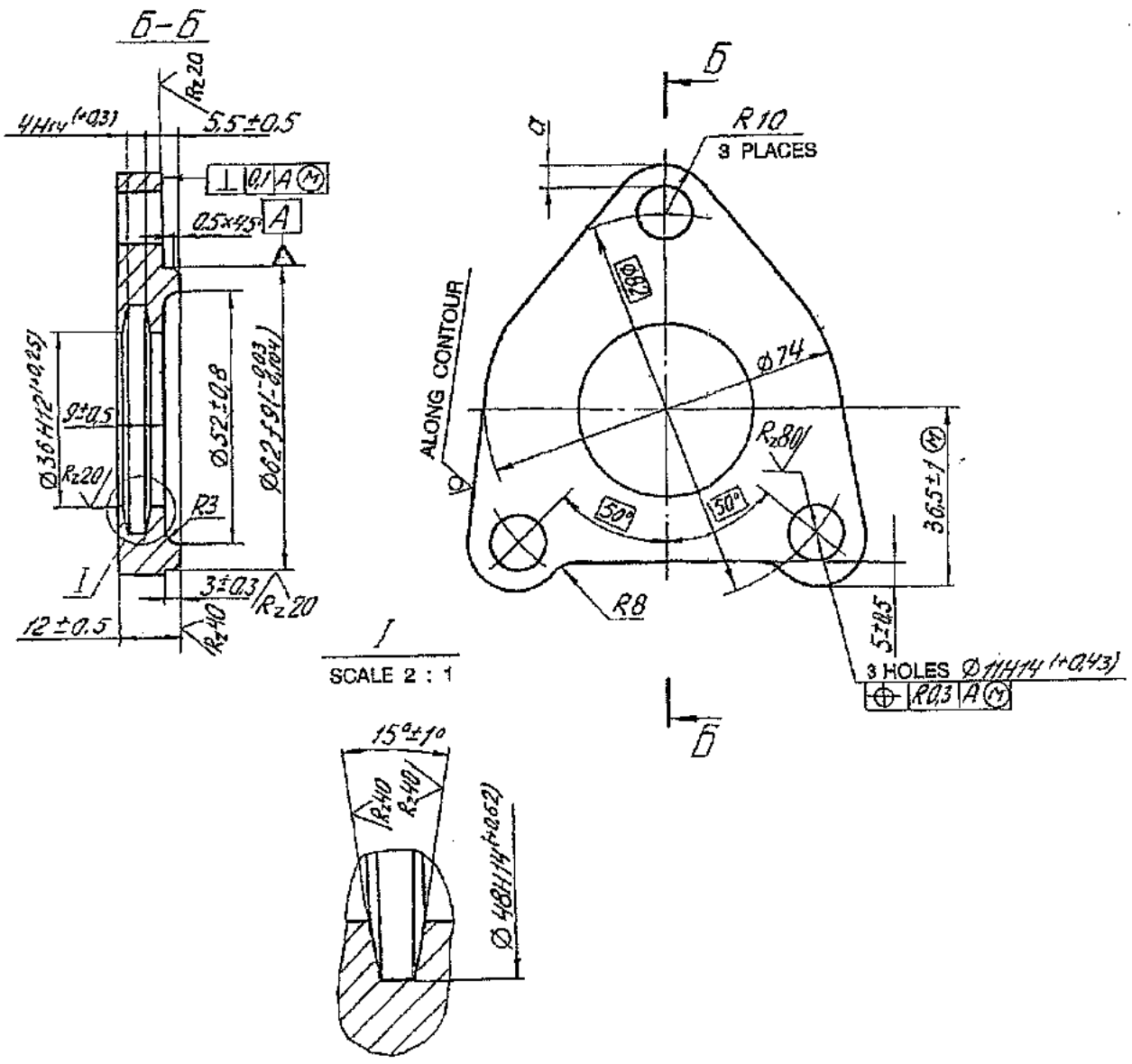


FIG: FLANGE TO DRG. NO 176.23.054-1

APPENDIX ' A'

RECORD OF AMENDMENTS

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

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

FOR

(UPPER HOUSING)

DRG.NO. 172.25.087

(LF NO: 6206851033)

No.HVF/T-72C/QAP/25/UPPER HOUSING/241174-00

ISSUE No: 00

DATE: JAN -2022

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

UPPER HOUSING

172.25.087

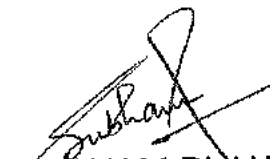
PREPARED BY


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JWM/QA (RIG-SA)

REVIEWED BY


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JWM/QA (RIG-SA/ST&CT)

APPROVED BY


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

ISSUED BY

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

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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 **UPPER HOUSING TO DRG NO. 172.25.087** 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 **UPPER HOUSING TO DRG NO. 172.25.087**.

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 **UPPER HOUSING TO DRG NO. 172.25.087** 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. Equivalents 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:

Single (individual) item

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.25.087	UPPER HOUSING	-

8. BILL OF MATERIALS:

Single (individual) items, details as below,

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.25.087	UPPER HOUSING	STEEL 15Л-I GOST 977-75.	1

Note: Vendor/Contractor may use approved alternate material as per drawing. 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)
 - (ii) Guarantee/ Warranty Certificate
 - (iii) Service and maintenance instructions
 - (iv) Delivery Slip with Inspector's Acceptance Mark
- (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	01 No.	01 No. per batch / As required.
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:-

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 castings, the following are to be checked as per Specification: (For details refer Specification 172 TY 10 and GOST 977-75).

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/Flaws/blowholes/shrinkage/porosities
- 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 UPPER HOUSING TO DRG.NO: 172.25.087

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. 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.

For each heat code/batch the test bars/test samples as specified in GOST/specification is to be submitted for testing chemical, mechanical, physical properties and other parameters of the casting and also the test certificates for the same tested by the supplier is to be submitted.

13.1 UPPER HOUSING TO 172.25.087.

- a) The component should be manufactured from STEEL 15Л-1 GOST 977-75.
- b) **Chemical properties:** As per STEEL 15Л-1 GOST 977-75.

CONTENT OF ELEMENTS %							
C	Si	Mn	Cr	Ni	S	P	V
MAX							
0.12 to 0.20	0.20 to 0.52	0.45 to 0.90	---	---	0.040	0.040	---

Note: For mass fraction of other elements refer GOST 977-75.

c) Mechanical properties: As per STEEL 15Л-I GOST 977-75.

Grade of steel	Strength category	Yield stress, M Pa	Ultimate strength M pa	Elongation %	Reduction of area %	Impact strength KCU k J / m ²
Not less than						
Normalization or normalization with tempering						
Structural						
15Л	K20	196	392	24	35	491

Note: For other properties refer GOST 977-75.

14) PERFORMANCES/ACCEPTANCE TEST: UPPER HOUSING to Drg. No. 172.25.087.

1. ALTERNATE MATERIAL- STEEL GRADES FROM 20Л-1 TO 35Л-1 GOST 977-75.
2. EXTERNAL DRAFTS SHOULD NOT EXCEED 1.20.
3. UNSPECIFIED CASTING RADII UP TO R 5 mm.
4. REQUIREMENTS FOR CASTING AS PER SPECIFICATIONS 172 TY 10 FOR ACCEPTANCE OF INVESTMENT CASTING COMPONENTS.
5. SHRINKAGE POROSITY ON SURFACE Ø37A3 (NEAR THE LUG) WITH DIMENSIONS R6 AND 15mm IS ALLOWED.
6. TAPER FROM DRILLING, NOT EXCEEDING 1mm IN DEPTH IS ALLOWED ON FACE.
7. COATING CHEMICAL OXIDIZING, OIL FINISHING OR CHEMICAL OXIDIZING/ PHOSPHATING, OIL FINISHING.
8. *DIMENSIONS TO BE ENSURED BY TOOL.
9. THE REST OF THE REQUIREMENTS ARE AS PER 520 TY 1.
10. *1 DIMENSION FOR CONSTRUCTION OF TOOL.

Note:

The Casting Manufacturers are required to follow the instructions strictly so far as supply of castings (Refer Specification 172 TY 10 & GOST 977-75)

Explanatory Note

1. Stage wise inspection and process of the component as specified in TD Book / Process Book / illustration book is to be confirmed by the supplier during manufacturing the components.
2. Firm shall submit the inspection process details/reports 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.

15) FITMENT / MACHINING AND PERFORMANCE TEST:

- a. Pilot samples should be checked for fitment/machining trials 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. The item should possess appropriate material for machining as indicated in the drawing and should be supplied in such a way that the components to suit in machine/fixtures/Jigs etc to carry out machining.
- c. The component should be free from any defects after machining in trial and the casting should be in line with the parameters as specified in the GOST and Specification.
- d. The casting shall be clean, free from porosity blowholes, hard spots, Cold shut, distortion, cracks and other harmful defects as per the specification.
- e. The casting shall be well dressed and fettled and shall be readily machinable.
- f. Casting shall be cleaned / shot blasted and preservation coating is to be done after heat treatment as called for in the specification.
- g. No weld/repair should be carried out without prior permission from HVF.
- h. Testing methods for acceptance of the casting refer Specification 172 TY 10 & GOST 977-75.

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, templates 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/certificates 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, 2.Mechanical properties, 3. Pre-forming process, 4. Coating certification (wherever applicable), 5. Calibration reports of instruments and 6. 100% Dimensional inspection reports. 7. Pressure test (leakage test) if applicable, 8. Hardness checks, 9. Certificates for Macro/micro structure (wherever applicable), 10. Fracture test (if applicable) and other relevant test reports for acceptance of the Casting, etc.

22) REFERENCE:

- a) Drawing No: 172.25.087
- b) Material specification as per drawing:
STEEL 15Л-I GOST 977-75.
- c) GOST 977-75.
- d) Specification 172.TY 10 & 520 TY 10.
- e) Alternate Material:
 - a. Steel 20Л-I to 35Л-I GOST 977-75.
 - b. STEEL GRADE 'A1' to BS: 3100-1976.

ANNEXURE-A

SL. NO.	CATEGORY	ASSEMBLY/ SUB ASSEMBLY	TESTS/ INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	UPPER HOUSING TO DRG. NO 172.25.087	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 977-75.	All the values to confirm with QAP (Para no.13.1(a) (b), (c))	P	WV	R	SP followed by HVF.
4		Coating check	Coating	Refer QAP Para no:14(7)	Confirm to QAP Para no:14(7)	P	WV	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. SP followed by HVF.
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 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 (WV) 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

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

FOR

(INSERT)

**DRG.NO. 172.64.079-01, 172.64.079-02, 172.64.079-03,
172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-
07 & 172.64.079-08**

**(LF NO: 6206420253, 6206420254, 6206420255,
6206420249, 6206420256, 6206420257, 6206420258 &
6206420259)**

No.HVF/T-72C/QAP/64/INSERT/242563-00

ISSUE No: 00

DATE: FEB -2022

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

INSERT

172.64.079-01, 172.64.079-02, 172.64.079-03, 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08

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JWM/QA (RIG-SA/TA)

APPROVED BY


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

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AVADI CHENNAI – 600 054

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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.

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2. INTRODUCTION

1. This quality plan lays down the inspection and testing procedure to be carried out on the component **INSERT TO DRG NO. 172.64.079-01, 172.64.079-02, 172.64.079-03, 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08** 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 **INSERT TO DRG NO. 172.64.079-01, 172.64.079-02, 172.64.079-03, 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08.**

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 **INSERT TO DRG NO. 172.64.079-01, 172.64.079-02, 172.64.079-03, 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08** 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.
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- 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. Equivalents 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.
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6. ITEM USED ON:

1. 172.64CB-4CB -

7. LIST OF DRAWINGS:

Single (individual) item

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.64.079-01, 172.64.079-02, 172.64.079-03, 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08	INSERT	-

8. BILL OF MATERIALS:

Single (individual) items, details as below,

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.64.079-01, 172.64.079-02, 172.64.079-03, 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08	INSERT	STEEL 20Л GOST 977-88.	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)

- (ii) Guarantee/ Warranty Certificate
- (iii) Service and maintenance instructions
- (iv) Delivery Slip with Inspector's Acceptance Mark

(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	01 No.	01 No. per batch / As required.
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:-

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 castings, the following are to be checked as per Specification: (For details refer Specification 172.TY 10 & GOST 977-88).

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/Flaws/blowholes/shrinkage/porosities
- 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 INSERT TO DRG.NO: 172.64.079-01, 172.64.079-02, 172.64.079-03, 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08

All dimensions should be confirmed as per drawing.

Sl. No.	Drawing Dimensions
1.	H±1 mm
2.	
3.	66 mm
4.	3X45° (Chamfers)
5.	13±0.5 

6.	40±0.5 $\text{\textcircled{M}}$
7.	12±0.5 $\text{\textcircled{M}}$
8.	24 (+3.0 / -0.5) mm
9.	Φ14H14 (+0.43) mm (2 Holes)
10.	\perp 0,3 $\text{\textcircled{M}}$ A
11.	R3 (4 Radii)
12.	Refer Table – 1 and drawing for dimensions of respective items.
13.	Surface finish / Roughness of items as per drawing and specification.

Refer drawing/specification for admissible alternate manufacture in dimensions / material if any specified for the component.

TABLE-1

PART NO		WEIGHT, Kg
ОБОЗНАЧЕНИЕ	H, MM	Масса, кг
172.64.079	40	0,385
-01	40,5	0,396
-02	41	0,406
-03	41,5	0,416
✓ -04	42	0,426
-05	42,5	0,436
-06	43	0,446
-07	43,5	0,456
-08	44	0,467

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. 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.

For each heat code/batch the test bars/test samples as specified in GOST/specification is to be submitted for testing chemical, mechanical, physical properties and other parameters of the casting and also the test certificates for the same tested by the supplier is to be submitted.

13.1 INSERT TO 172.64.079-01, 172.64.079-02, 172.64.079-03, 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08.

a) The component should be manufactured from STEEL 20Л GOST 977- 88.

b) **Chemical properties:** As per STEEL 20Л GOST 977- 88.

CONTENT OF ELEMENTS %							
C	Si	Mn	Cr	Ni	S	P	V
MAX							
0.17 to 0.25	0.20 to 0.52	0.45 to 0.90	---	---	0.040	0.040	---

Note: For mass fraction of other elements refer GOST 977-88.

c) **Mechanical properties:** As per STEEL 20Л GOST 977-88.

Grade of steel	Strength category	Yield stress, M Pa	Ultimate strength M pa	Elong ation %	Reduction of area %	Impact strength KCU k J / m ²
Not less than						
Normalization or normalization with tempering						
Structural						
20Л	K20	216	412	22	35	491

Note: For other properties refer GOST 977-88.

14) PERFORMANCES/ACCEPTANCETEST: INSERT to Drg. No. 172.64.079-01, 172.64.079-02, 172.64.079-03, 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08.

1. Alternate material; Steel 25Л, 30Л, 35Л GOST 977-88.
2. Casting of 1st group GOST 977-88.
3. Accuracy of casting 9-0-0-8 GOST 26645-85.
4. Requirements for casting are as per 172-TY-10.
5. For ensuring dimension B machining may be done, in this case, presence of rough spots is not to be checked.
6. Blow holes and non-metallic inclusions with maximum size not exceeding 3mm, depth up to 1/10 of wall thickness, by not exceeding four Nos per surface are permitted.
7. **Coating:**chemical phosphating, oxidizing oil finish or chemical phosphating, oil finish.
8. Remaining requirements are as per 520TY1.

Note:

The Casting Manufacturers are required to follow the instructions strictly so far as supply of castings (Refer Specification 172 TY 10 & GOST 977-88).

15) FITMENT / MACHINING AND PERFORMANCE TEST:

- a. Pilot samples should be checked for fitment/machining trials 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. The item should possess appropriate material for machining as indicated in the drawing and should be supplied in such a way that the components to suit in machine/fixtures/Jigs etc to carry out machining.
- c. The component should be free from any defects after machining in trial and the casting should be in line with the parameters as specified in the GOST and Specification.
- d. The casting shall be clean, free from porosity blowholes, hard spots, Cold shut, distortion, cracks and other harmful defects as per the specification.
- e. The casting shall be well dressed and fettled and shall be readily machinable.
- f. Casting shall be cleaned / shot blasted and preservation coating is to be done after heat treatment as called for in the specification.
- g. No weld/repair should be carried out without prior permission from HVF.
- h. Testing methods for acceptance of the casting refer Specification 172 TY 10 & GOST 977-88.

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, templates 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/certificates 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, 2.Mechanical properties, 3. Pre-forming process, 4. Coating certification (wherever applicable), 5. Calibration reports of instruments and 6. 100% Dimensional inspection reports. 7. Pressure test (leakage test) if applicable, 8. Hardness checks, 9. Certificates for Macro/micro structure (wherever applicable), 10.

Fracture test (if applicable) and other relevant test reports for acceptance of the Casting, etc.

22) REFERENCE:

- a) Drawing No: 172.64.079-01, 172.64.079-02, 172.64.079-03, 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08
- b) Material specification as per drawing:
STEEL 20Л GOST 977-88.
- c) GOST 977-88 & GOST 26645-85.
- d) Specification 172.TY 10 & 520 TY1.
- e) Alternate Material:
 - a. Steel 25Л, 30Л, 35Л GOST 977-88.

ANNEXURE-A

SL. NO.	CATEGORY	ASSEMBLY/ SUB ASSEMBLY	TESTS/ INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1		Pre inspection reports (PIR) of firm	Firm has to produce all the document as per QAP	As per the relevant drawing and QAP.	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	INSERT TO DRG. NO	Material tests	Chemical composition & Mechanical / Physical Properties	As per GOST 977-88.	All the values to confirm with QAP (Para no:13.1(a) & (b),(c))	P	W/V	R	SP followed by HVF.
4	172.64.079-01, 172.64.079-02, 172.64.079-03, 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08	Coating checks	Coating	Refer QAP Para no:14(7)	Confirm to QAP Para no:14(7)	P	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. SP followed by HVF.
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).

- 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 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 (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

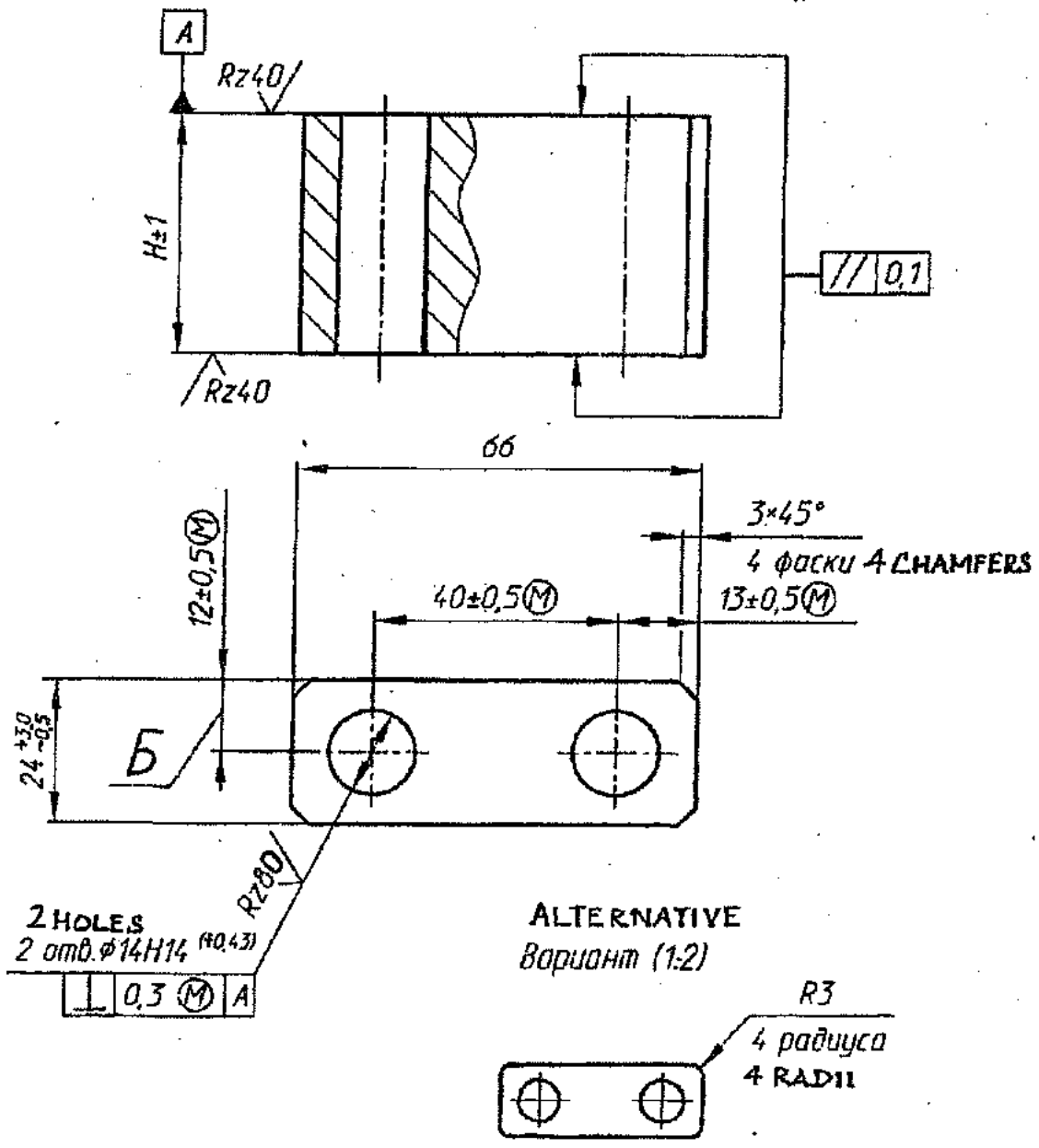


FIG: INSERT TO DRG. NO :172.64.079-01, 172.64.079-02, 172.64.079-03,
 172.64.079-04, 172.64.079-05, 172.64.079-06, 172.64.079-07 & 172.64.079-08

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

FOR

(LEVER) ✓

DRG.NO.187.21.084. ✓

(LF NO: 6201021014)

No: HVF/T-90/QAP/21/LEVER/243278-00 ✓

ISSUE No: 00 ✓

DATE: JAN-2022

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

LEVER

DRG. NO. 187.21.084

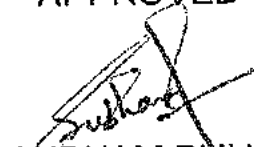
PREPARED BY


(C.NANDA KUMAR)
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APPROVED BY


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

ISSUED BY

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

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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 **LEVER TO DRG.NO 187.21.084** 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 **LEVER TO DRG.NO: 187.21.084**.

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 **LEVER TO DRG.NO.187.21.084** 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:

1. Tender enquiry (TE) and supply order (S.O) will be issued with QAP stating that inspection will be done as per QAP.
2. 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.
3. 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, LEVER, 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	187.21.084	LEVER	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	187.21.084	LEVER	STEEL 20Л GOST 977-88	1

Note: Vendor/Contractor may use approved alternate material as per drawing if any as specified in drawing / specification / GOST 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	-----	-----
(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/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.

During acceptance of castings, the following are to be checked as per Specification: (For details refer Specification 172 TY 10 & GOST 977-88).

- chemical composition of steel;
- mechanical properties of steel;
- external view (absence of defects) and quality welding of casting defects;
- dimensions;
- hardness;
- absence of internal defects;
- macro/micro structure if any as per specification/GOST
- wear, tear and other checks if any as per specification 172 TY10 & GOST 977-88.

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 LEVER TO DRG.NO 187.21.084:

1. All dimensions should be confirmed as per drawing.
2. Surface finish / Roughness should be confirmed as per drawing and specification.
3. Refer drawing / specification for admissible alternate manufacture in dimensions/material if any specified for the component.

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. 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 LEVER TO DRG.NO 187.21.084

- a) The component should be manufactured from STEEL 20Л GOST 977-88.
- b) **Chemical properties:** As per STEEL 20Л GOST 977-88.

CONTENT OF ELEMENTS%					
Grade of steel	C	Si	Mn	S	P
				MAX	
20Л	0.17 to 0.25	0.20 to 0.52	0.45 to 0.90	0.040	0.040

Note: For mass fraction of other elements refer GOST 977-88.

- c) **Mechanical properties:** As per STEEL 20Л GOST 977-88.

Yield stress, σ_T , M Pa	Ultimate strength, δ_t , M pa	Elongation δ , %	Reduction of area ψ , %	Impact strength KCU k J / m ²
Not less than				
216	412	22	35	491

Note: For other parameters refer GOST 977-88.

14) PERFORMANCES / ACCEPTANCE TEST: LEVER TO DRG.NO: 187.21.084.

1. ALTERNATE MATERIAL – STEEL 25Л, 46Л GOST 977-88.
2. CASTING OF 1ST GROUP AS PER GOST 977-88.
3. ACCURACY OF CASTING 9m-0-0-9 GOST 26645-88.
4. REQUIREMENTS FOR CASTING SHOULD BE AS PER SPECIFICATION 172.T910
5. *DIMENSIONS FOR REFERENCE.
6. *1SURFACE FINISH IS TO BE ENSURED BY TOOL.
7. COATING Zn 6, CHROMATIZING.
8. OTHER REQUIREMENTS SHOULD BE AS PER SPECIFICATIONS 520 TY1.

Explanatory Note

1. Stage wise inspection and process of the component as specified in TD Book / Process Book / illustration book is to be confirmed by the supplier during manufacturing the components.

2. Firm shall submit the inspection process details/reports 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.

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

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.

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, 2.Mechanical properties, 3. Pre-forming process, 4. Coating certification (wherever applicable), 5. Calibration reports of instruments and 6. 100% Dimensional inspection reports. 7. Pressure test (leakage test) if applicable, 8. Hardness checks, 9. Certificates for Macro/Micro structure (wherever applicable), 10. Fracture test (if applicable) and other relevant test reports for acceptance of the Casting, etc

22) REFERENCE:

- a) Drawing No: 187.21.084-LEVER.
- b) Material specification as per drawing: STEEL 20Л GOST 977-88.
- c) 172 TY10.
- d) 520 TY1.
- e) GOST 977-88, GOST 26645,88.
- f) Alternate material: STEEL 25Л, 45Л GOST 977-88.

ANNEXURE-A

SL. NO	ITEM/ SUB ASSY/ ASSEMBLY	CATEGORY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1		Pre inspection reports (PIR) of firm	Firm has to produced all the document as per QAP	As per the relevant drawing and QAP.	Confirm to drawing and QAP as per bill of material	P	W/W	R	100% should be ensured.
2		Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 8	Confirm to QAP.	P	W/W	R	100% should be ensured.
3		Material Checks	Chemical composition & Physical, Mechanical Properties	As per the GOST 977-88	All the values to confirm with QAP (Para no:13.1(a),(b),(c))	P	W/W	R	100% should be ensured.
4	LEVER to DRG.NO: 187.21.084	Coating checks	Zinc 6, chromating	Refer QAP Para no 14(7)	Confirm to QAP Para no 14(7)	P	V	R	100% should be ensured.
5		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no: 12.1	Confirm to drawing and QAP. 12.1	P	W/W	R	100% should be ensured.
6		Marking / traceability	Firm has to make marking / traceability records.	Refer QAP Para no: 18	Confirm to QAP Para no: 18	P	W/W	R	100% to be done
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% to be done

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

