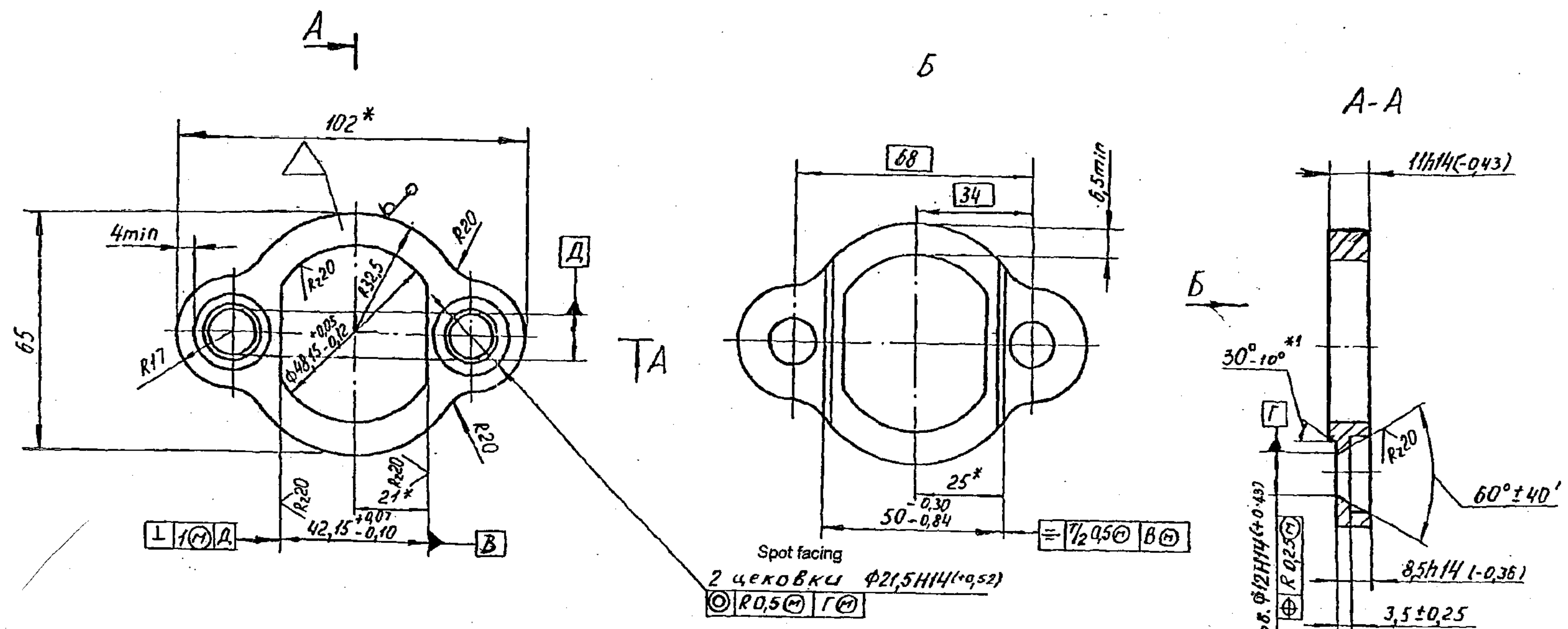


Rz80/√



- 1) 255...302BHN to be ensured in blank.
- 5) Cover is to be checked for interchangeability with gauge made as per limit dimension of mating components 172.51.015
- 6) In holes Γ cylindrical surface with height not more than 0.4 mm is allowed.
- 8) Coating: Zn 6 chromating.
- 9) Other requirements should be as per specifications 520.TY1.
- 10) *Dimensions for reference.
- 11) *¹Dimension is to be ensured by tool.

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	

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

DRN	Vovs	MATERIAL:-	USED ON:-
CHD	<i>Vovs</i>	STEEL 38XC	172.52 Cb-1AcB
APPD	<i>Chavald</i>	Gost 4543-71	INDIVIDUAL SET
DATE	27.03.04	BULK 172.52Cb-1Cb	
SCALE:- 1 : 1		CONTROLLERATE OF QUALITY ASSURANCE (HEAVY VEHICLES)	
DIMENSIONS IN mm		AVADI	
TOLERANCE ON DIMNS UNLESS OTHERWISE STATED IS: 2102-69		TITLE:-	
ALL THREADS TO CONFORM TO		COVER	
ISSUE	DATE	D S CAT NUMBER	DRAWING NUMBER
			172.52.105

DRG. INDIANISED BASED ON RUSSIAN ORIGINAL ISSUE · 6 COMMON TO T-72 & BLT

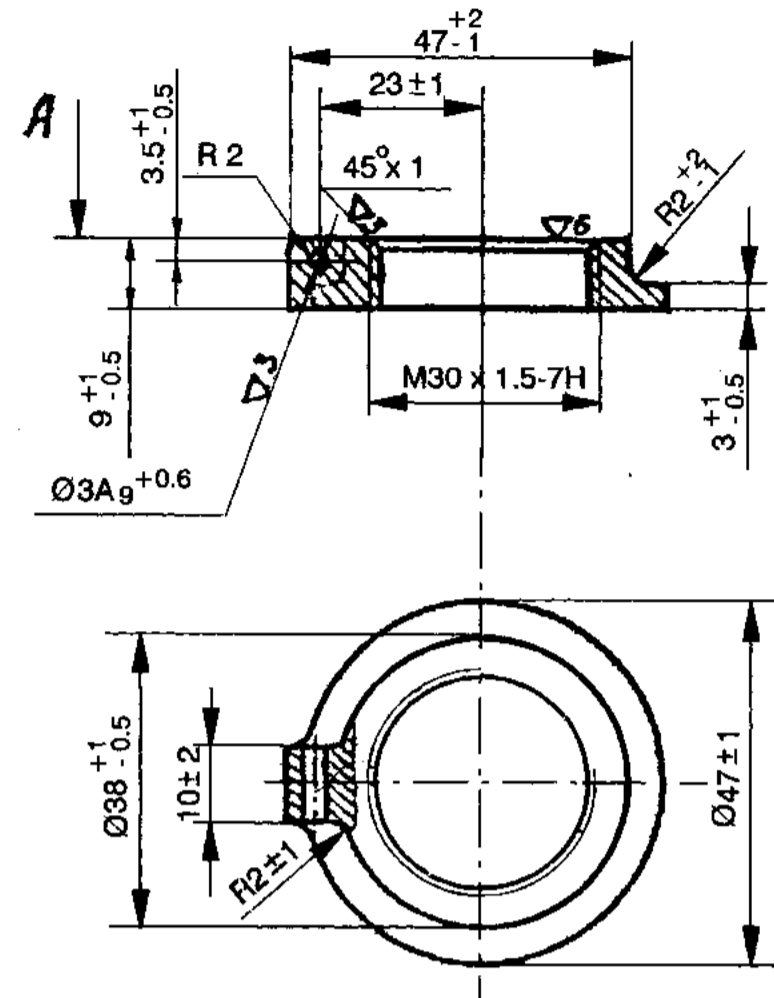
356
SUPPLY CODE
U-01-1-1
D90015
F-15
36
SIZE A4 x 4



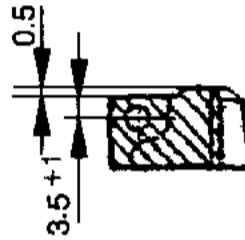
DRAWING NUMBER
54.03.003-2

SHEET No. 1 OF 1

2(V)



ALTERNATIVE MACHINING OF SURFACE "A"



- SCALE AND BURRS ARE NOT ALLOWED.
- SHIFT OF $\phi 38$ RELATIVE TO $\phi 47$ SHOULD NOT EXCEED 2mm.
- SHIFT OF THREAD RELATIVE TO $\phi 38$ SHOULD NOT EXCEED 1mm.
- NON-SQUARENESS OF THREAD AXIS RELATIVE TO SURFACE "A" SHOULD NOT EXCEED 0.3 mm WITHIN COMPONENT OVERALL DIMENSIONS.
- MAY BE MANUFACTURED FROM OPEN HEARTH STEEL GRADE 20 GOST 1050-60.
- DRAFT SHOULD NOT EXCEED 7° .
- UNSPECIFIED ROUNDING-OFF RADII SHOULD NOT EXCEED 1mm.
- NOT TO BE MARKED. DIMENSIONS WITH UNSPECIFIED TOLERANCES ARE NOT TO BE CHECKED.
- OTHER SIDE OF THE THREAD MAY BE CHAMFERED TO $1 \times 45^\circ$.
- RADIAL MARKS FROM TOOL ON SURFACE "A" ARE NOT ALLOWED.
- WHEN MACHINED AS PER ALTERNATE, SINKING OF 10mm WIDE LUG BELOW THE SURFACE "A" IS ALLOWED UPTO 0.5mm.

EXPLANATORY NOTE :-

THE COMPONENT SHOULD BE PRODUCED FROM OPEN HEARTH COLD ROLLED KILLED STEEL OF GRADE 15 AND ALTERNATIVELY GRADE 20 TO SPECN GOST 1050-74

CHEMICAL COMPOSITION % AS PER GOST 1050-74:-

GRADE OF STEEL	C	Si	Mn	Cr (MAX)
15	0.12 - 0.19	0.17 - 0.37	0.35 - 0.65	0.25
20	0.17 - 0.24	0.17 - 0.37	0.35 - 0.65	0.25

NOTE -

- CONTENTS OF SULPHUR 0.040% (MAX) & PHOSPHORUS 0.035% (MAX)
- RESIDUAL CONTENT OF COPPER & NICKEL SHOULD NOT EXCEED 0.25%

MECHANICAL PROPERTIES AS PER GOST 1050-74 -

GRADE OF STEEL	YIELD POINT Kg/mm ²	U T S Kg/mm ²	ELONGATION %	REDUCTION OF AREA %	IMPACT STRENGTH Kgm/cm ²
15	23	38	27	55	—
20	25	42	25	55	—

IR. RAHANI, JTO
(6-08-05)

"COMMON TO T-90" & BLT
DRAWING RE-INDIANISED BASED ON RUSSIAN ORIGINAL ISSUE-9
DRG. REDRAWN AND EXPLANATORY NOTE ADDED ON 17.11.90.

9D CQA(HV)5 33 010

9C PV572.0705.0010

** 176.33.004 Cb
172.2M.33.005 Cb
175.33.006 Cb-4Cb
172.33.224 Cb-2 Cb
172.33.225 Cb-2 Cb
172.33.243 CbCb
172.33.232 Cb-2 Cb

9B ALT. MATL: STEEL 070M20 (En3A) TO BS 970 Part-1:1983.

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

EST. WT. (Kg) 0.058 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/=	OPEN HEARTH STEEL 15 GOST 1050-74	175.33.002 Cb-1 175.33.003 Cb-2 **
APPD	Sd/=	CONTROLLERATE OF QUALITY ASSURANCE (HEAVY VEHICLES) AVADI	
DATE	06.8.86	SCALE:- 1 : 1	
DIMENSIONS IN mm		TITLE :-	
TOLERANCE ON DIMNS UNLESS OTHERWISE STATED IS : 2102-69		FLANGE	
9D	4.6.15	Authy Lt.No.81233/33/DBII/AMDT Dt.27.5.15	D S CAT NUMBER
9C	26.11.12	55150/CQA(HV)/08/BLT T-72 Dt.19.07.11	
9B	23.1.06	AUTHY Lt.No.80001/CQA(HV)/GEN Dt.30.11.05	DRAWING NUMBER
9A	19.4.04	N OF A No. CQA(HV)/T90/33/001	
ISSUE	DATE	NATURE OF AMENDMENTS	54.03.003-2

F-18

SIZE A2



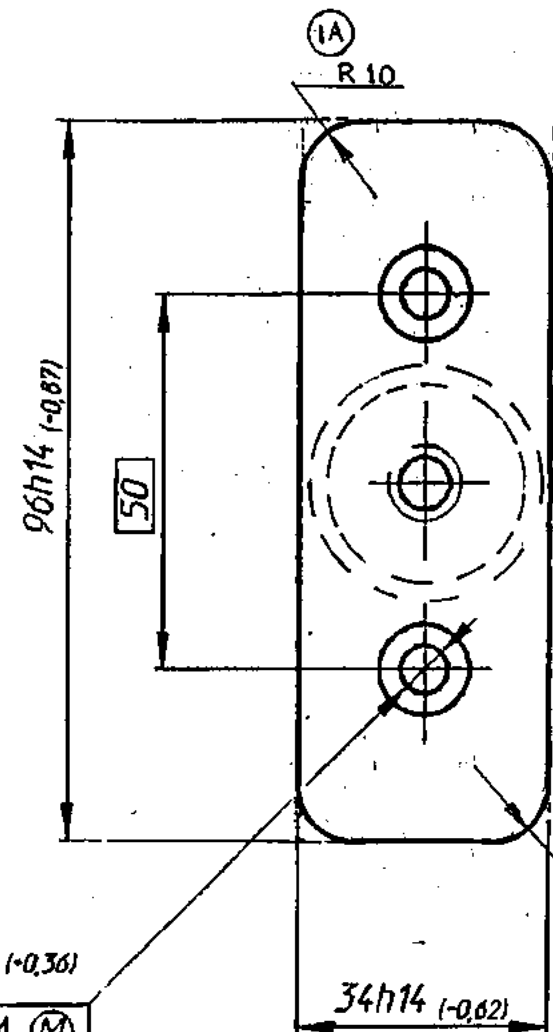
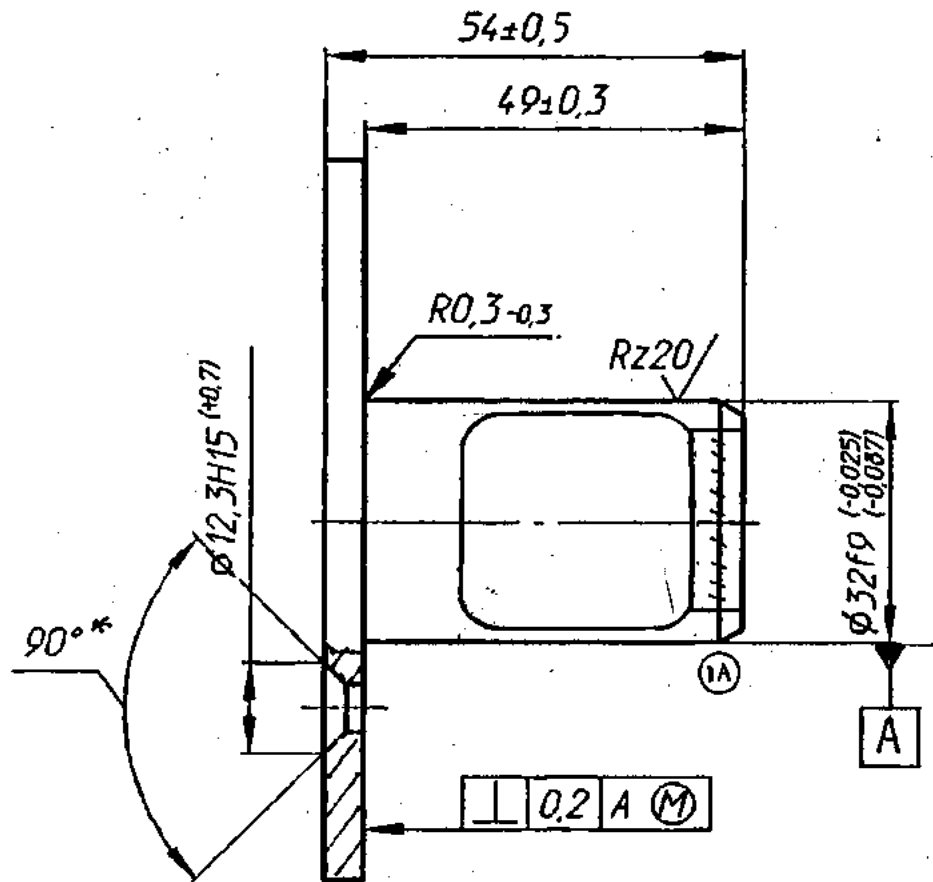
DRG. INDIANISED BASED ON RUSSIAN ORIGINAL ISSUE -1
COMMON TO T-72

DRAWING NUMBER
172.12.029

SHEET No. 1 OF 1

Alternate
Вариант

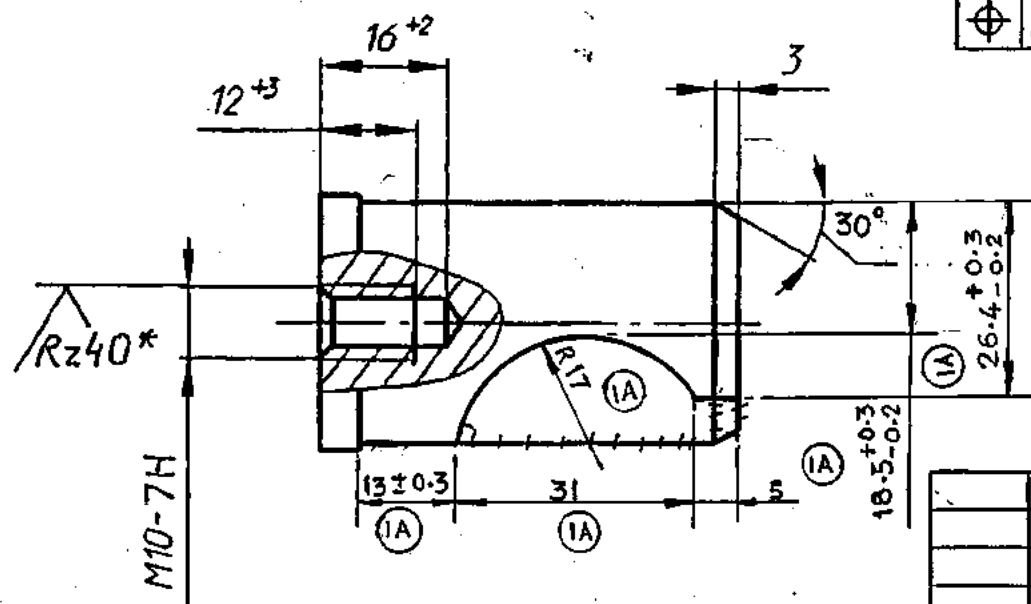
Rz80 ✓ (✓)



φ96h14 (-0.07)

- 1. 285...341 HB.
- 2. Остальные требования согласно 520.ТУ1.
- 3.*Размер и шероховатость обеспеч. инстр.

- 1.285...341BHN.
- 2. Other requirements as per 520.TY1.
- 3.*Dimension and surface finish to be ensured by tool.



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

EST. WT. (Kg) 0.253 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	V. Durr	MATERIAL :-	USED ON :-
CHD	S. Goungouane	STEEL 38XC	172.12.014cbCb
APPD	Chanchal	GOST 4543-71	188.12.006cbCb-01
DATE	8.6.04	188.12.006cbCb	
SCALE:- 1 : 1		CONTROLLERATE OF QUALITY ASSURANCE (HEAVY VEHICLES)	
DIMENSIONS IN mm		AVADI	
TOLERANCE ON DIMNS UNLESS OTHERWISE STATED IS : 2102 - 69		TITLE :-	
ALL THREADS TO CONFORM TO		PLUG	
ISSUE	DATE	D S CAT NUMBER	DRAWING NUMBER
1A	09-11-09		172.12.029
N OF A CQA(HV)/12/001			
NATURE OF AMENDMENTS			

356
SUPPLY CODE
U-01-1-4
D90196

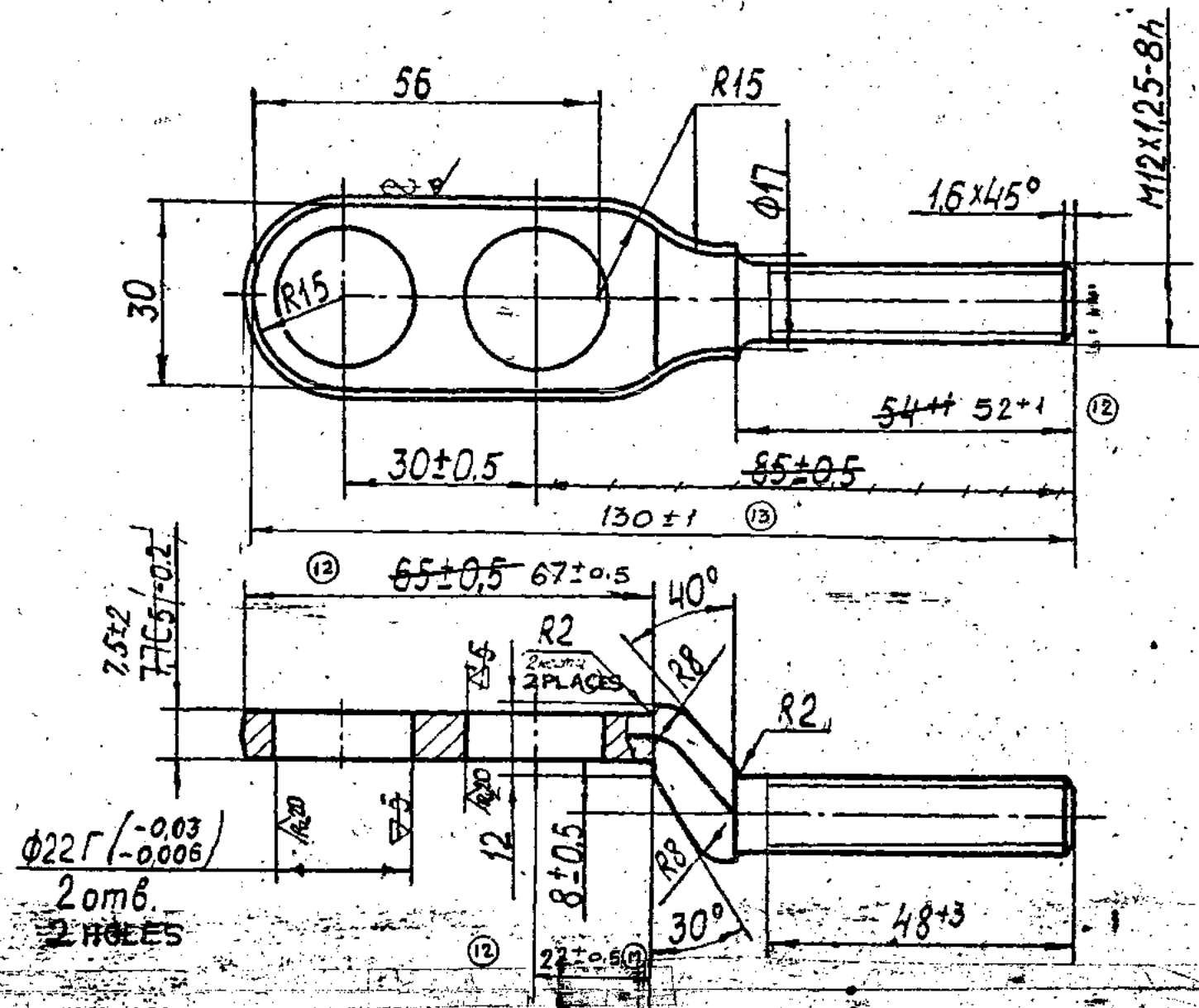
F-90
89
SIZE A3



175.63.041

Rz⁸⁰ ✓ (V)

DRG. INDIA NISED BASED ON RUSSIAN ORIGINAL ISSUE - II



1. BHN 302 - 255 (IND. DIA. 3,5 TO 3.8). TO BE CHECKED ON BLANK.
2. EXTERNAL DRAFT SHOULD NOT EXCEED 7°.
3. PERMISSIBLE DEVIATIONS ON ROUGH DIMENSIONS SHOULD BE AS PER ACCURACY GROUP 2 OF GOST 7505-55.
4. UNSPECIFIED RADII NOT TO EXCEED R 2.
5. MISMATCH OF DIES SHOULD NOT EXCEED 1 mm.
6. UNDERTRIMMED FIN ALONG PARTING LINE SHOULD NOT EXCEED 1 mm.
7. MINIMUM THICKNESS OF WALLS AT HOLES ϕ 22 γ SHOULD BE 2.5 mm.
8. NON-PARALLELISM OF THREADED SHANK RELATIVE TO THE COMPONENT AXIS SHOULD NOT EXCEED 0.5 mm OVER A LENGTH OF 50 mm.
10. THREAD IS TO BE CHECKED AT A LENGTH OF 45 mm, min.
11. COATING : CHEMICAL OXIDIZING, PHOSPHATING, OIL FINISHING.
12. REQUIREMENTS FOR SURFACES NOT TO BE MACHINED AS PER

GOST 8479-70

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

EST. MASS 0.1Kg TO BE STAMPED OR MARKED WHERE INDICATED THIS # 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	CHD	TCD	APPD	DATE	SCALE	DIMENSIONS IN mm	TOLERANCE ON DIMS UNLESS OTHERWISE STATED.	ALL THREADS CONFORM TO
MATERIAL: STEEL 38XG GOST 4543-71			USED ON: 175.63.040C			CONTROLLER OF INSPECTION (HEAVY VEHICLES) AVADI		
TITLE: SHACKLE			D S CAT NUMBER			DRAWING NUMBER 175.63.041		
12.13	15.01.87	AMDT LIST No. 6/2, Book-9						
ISSUE	DATE	NATURE OF AMENDMENTS						

E-402



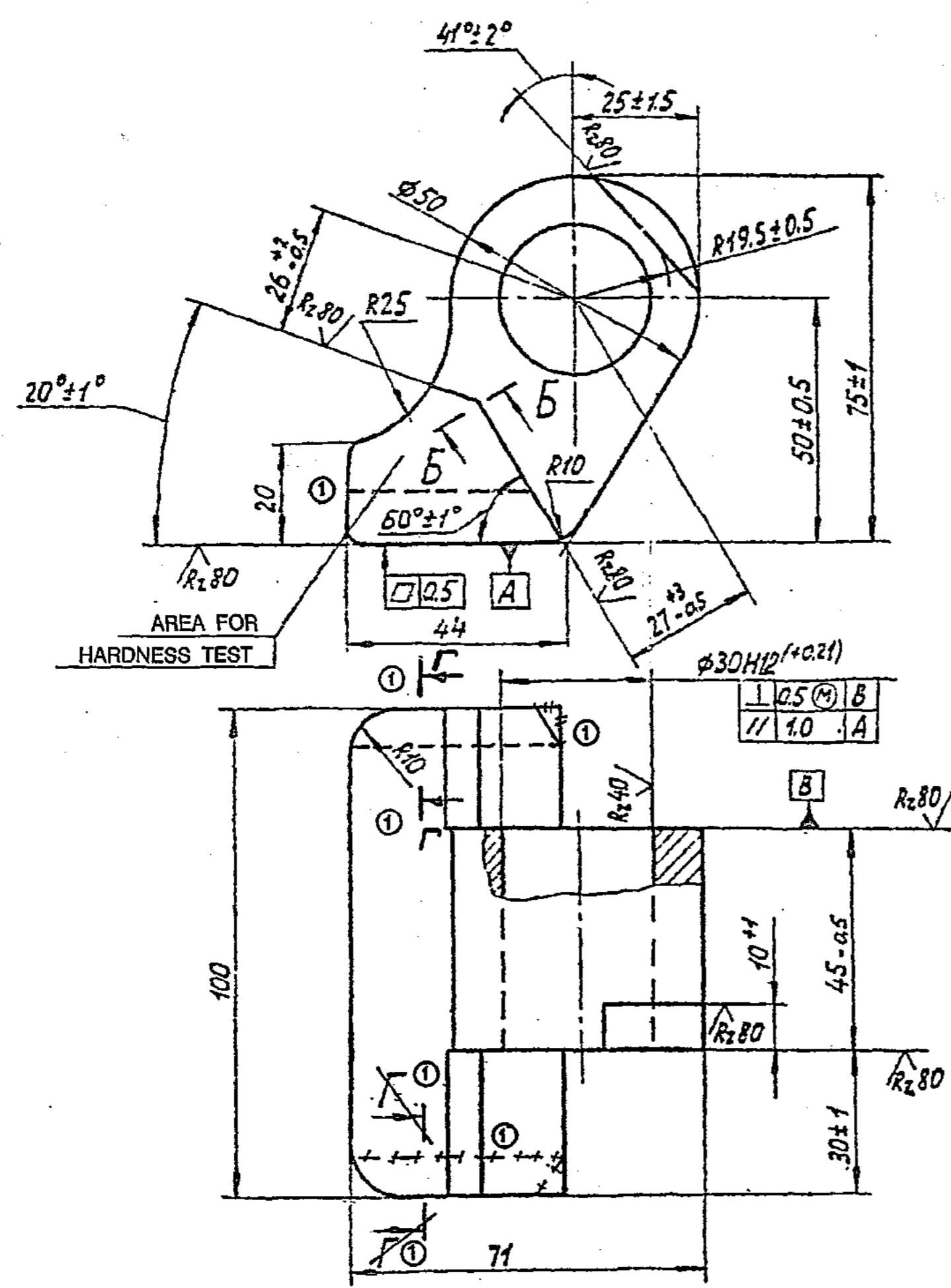
DRAWING NUMBER
172.02.688-1

SHEET No. 1 OF 1

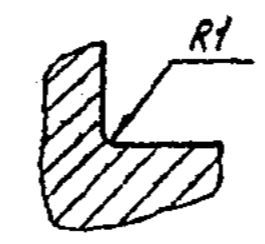
✓(✓)

G. THIRUGANAM, JTOID
17-04-88

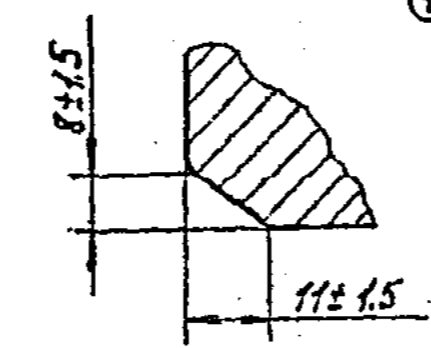
"COMMON TO T-90" & BLT
DRG. RE. INDIANISED BASED ON RUSSIAN ORIGINAL ISSUE - NIL



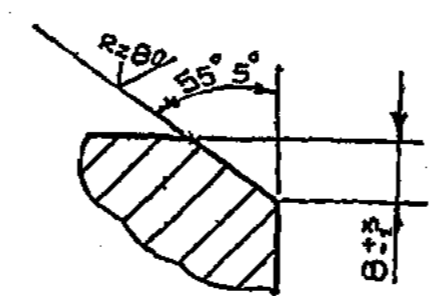
B-B TURNED



Γ-Γ TURNED



Γ-Γ ALTERNATE



1. BHN 255...302 (DIA OF INDENTATION 3.8... 3.5 mm).
2. DIE FLASH LINE - ARBITRARY.
3. ON THE SIDE SURFACES ALONG THE DIMENSION 45±0.5 SHOULDER AGAINST MILLING IS ALLOWED TO A DEPTH OF 0.2 mm.
4. CHAMFER 8x11 (SEE Γ-Γ) MAY BE MADE BY MACHINING. CHAMFER ON OPPOSITE END FACE IS ALLOWED IN DIE ITSELF DURING MANUFACTURE.
5. OTHER REQUIREMENTS ACCORDING TO 520. Ty 1.

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

EST. WT. (Kg)	TO BE STAMPED OR MARKED WHERE INDICATED THUS # (LETTERS)
1.38	

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 30XΓCA	175.02.036cbCb
APPD	Sd / =	GOST 4543 - 71	
DATE	30 - 06 - 88	CONTROLLERATE OF QUALITY ASSURANCE (HEAVY VEHICLES) AVADI	
SCALE:- 1 : 1		TITLE :-	
DIMENSIONS IN mm		HINGE DOOR	
TOLERANCE ON DIMNS UNLESS OTHERWISE STATED IS : 2102 - 69		D S CAT NUMBER	
1	5.12.89	172M. 120 "A" - 88, AMDT. 10/1	DRAWING NUMBER 172.02.688-1
ISSUE	DATE	NATURE OF AMENDMENTS	

F-2B
32
SIZE A2



VQC FOR COVER TO DRG NO 172.52.105

DATE:30/10/2023

SL. NO	NOMENCLATURE & DRAWING NO	MANUFACTURING TECHNOLOGY & TESTING/INSPECTION FACILITIES REQUIRED TO PRODUCED THE ITEM	MUST BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES - (LIST OF PLANT AND MACHINERY AND TESTING/INSPECTION FACILITY TO BE SUBMITTED)	MAY BE POSSESSED BY THE VENDOR IN HIS OWN PREMISES OR MAY BE OBTAINED FROM SUB-CONTRACTOR, LIST OF PLANT & MACHINERY AND TESTING/INSPECTION FACILITY TO BE SUBMITTED)	FIRM COMPLIANCE (Y/N)	REMARKS
1	COVER TO DRG. NO. 172.52.105	TECHNOLOGY - 1		MIN 1TON CAPACITY BELT DROP OR PNEUMATIC OR HYDRAULIC HAMMER. TRIMMING USING SUITABLE POWER PRESS	✓	
		TECHNOLOGY - 2	FORGING	HARDENING 870 °c TEMPERING 580 °c		
		TECHNOLOGY - 3	HEAT TREATMENT	SUITABLE MECHANICAL TESTING - ROCKWELL, BHN, UTM AND IMPACT		
		TECHNOLOGY - 3	MATERIAL TESTING	BROACHING M/C : 20 TON		
		TEST/INSPECTION 1	MACHINING	SUITABLE 3D CMM		
		TECHNOLOGY - 5	DIMENSIONAL CHECKING	ZINC PLATING BATH (6 - 12 MICRON)		
		ELECTRO PLATING				

NOTE:

- 1 If the firm is not having any particular facility as mentioned in VQC, but able to meet the requirement as per drawing with alternative methods, the details of the alternative methods has to be provided with proper justification.
- 2 Firm has to develop all essential jigs, fixtures and gauges as per manufacturing process books of OEM, undertaking to be given.


MURUGAN V
JWM/QA(OE) RG


MANISH KUMAR YADAV
AWM/RG


K JAISHANKAR
HOS/RG


J. J. J.

**COMPLETING ARTICLES SHOP (09)
Vendor Qualification Criteria (VQC)**

NOMENCLATURE & DRAWING No.: FLANGE to Drg. No. 54.03.003-2, LF No. 6206305643

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 (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 FIRMS 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 FORGING			54.03.003-2 as per drawing	
Technology 2	SURFACE CLEANING			Shot blasting as per drawing	
Technology 3	*MACHINING	Suitable CNC Turning & Radial drilling machine required as per drawing.			
Test/ Inspection 1	MEASURING INSTRUMENTS/ GAUGES	Required Measuring Instruments/Suitable Standard Gauges.			
Test/ Inspection 2	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 Forging as per drawing.

M. GNANASEKARAN
DGM/CA&SMS


ANTARYAMI PRADHAN
JWM/QA(OE)(CA)


LAKSHMINARAYANAN, C
JWM/CA

10

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

SYMBOLIC Nomenclature & Drawing No.: As per Annexure-A *Phy-172.12.029, Shackle - 175.63.041,*

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) 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 OBTAINED THROUGH THE-UP WITH THE MANUFACTURING VENDOR(SUBMITTER) 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 OBTAINED THROUGH THE MANUFACTURING 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) AND TESTING/INSPECTION EQUIPMENT LIST (Nomenclature of the Testing/Inspection Equipment, Make/Model, Size & Range, Date of calibration) AND VENDOR'S-UP ALSO TO BE SUBMITTED)
Technology 1	STEEL FORGING			Suitable Forging as per drawing	
Technology 2	HEAT TREATMENT			Hardness & Tempering as per drawing	
Technology 3	*MACHINING	Suitable Conventional Turning/milling/Drilling /CNC Turning Centre/VMC /HMC required as per drawing.			
Technology 4	BROACHING			Suitable Broach as per drawing	
Technology 5	THREAD ROLLING			Thread rolling as per drawing	
Technology 6	SURFACE COATING	Suitable Primer, Enamel as per drawing		Suitable Coating as per drawing	
Test/ Inspection 1	TESTING MACHINE			Brinell Hardness Tester	
Test/ Inspection 2	MEASURING INSTRUMENTS/ GAUGES	Required Measuring Instruments/Suitable Standard Gauges.		Coating Thickness Meter	
Test/ Inspection 3	GEOMETRICAL ACCURACIES			3D/CMM required as per drawing	

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

NOMENCLATURE & DRAWING No.: As per Annexure-B *Hinge Door-172.02.688-1*

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 - (MOI/THE-UP WITH THE OUTSOURCING VENDOR/SI B-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 FIRM(S) 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 MOI/THE-UP ALSO TO BE SUBMITTED)
Technology 1	RAW MATERIAL			Suitable Forging/Flame Cutting as per drawing	
Technology 2	HEAT TREATMENT			Hardness & Tempering as per drawing	
Technology 3	BENDING/FORMING			Suitable bending/Forming facility as per drawing	
Technology 4	WELDING			Welding facility as per drawing	
Technology 3	*MACHINING	Suitable Conventional Milling/Drilling/CNC VTL /VMC/HMC required as per drawing.			
Technology 4	BROACHING			Suitable Broach as per drawing	
Technology 6	SURFACE COATING	Suitable Primer, Enamel as per drawing		Suitable 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	GEOMETRICAL ACCURACIES			3D/CMM required as per drawing	

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

FOR

(COVER)

DRG.NO.172.52.105

(LF NO: 6206412042)

No.HVF/T-72/QAP/2/COVER/243438-00

ISSUE No: 00

DATE: OCT - 2023

QUALITY ASSURANCE (RIG-OP)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

COVER

DRG. NO. 172.52.105

PREPARED BY


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

REVIEWED BY


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

APPROVED BY


(NEERAJ KUMAR)
JT.GM/QA (RIG-OP)

ISSUED BY

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

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20.	PACKING CHECK	10
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25.	APPENDIX-A	14

1. IMPORTANT NOTES

Note-1

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

Note –2

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

Note-3

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

Note-4

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

Note-5

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

2. INTRODUCTION

1. This quality plan lays down the inspection and testing procedure to be carried out on the component **COVER TO DRG.NO.172.52.105** being procured indigenously. This is prepared, based on the acceptance standards and inspection parameters laid down in collaborators documents and on the inspection test standards followed in respect of similar indigenous items.
2. This QAP is the property of Government of India and is liable for amendments as and when required. The Chief General Manager, Heavy Vehicles Factory, Avadi, Chennai – 600 054, is the inspecting Authority for this assembly. Any query / clarification on the content of this QAP shall be referred to this Factory. Any departure from these instructions is allowed only after written approval from the above authority. Notwithstanding the tests indicated in this QAP, the inspecting Officer has the right to carry out any test to check conformance to the paper particulars quoted in the Supply Order, which he may consider necessary to satisfy himself about the stores which he has to accept.

3. AIM

This QAP is aimed at standardizing the Inspection procedure and acceptance norm for **COVER TO DRG.NO:172.52.105**.

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 **COVER TO DRG.NO.172.52.105** including the technical requirements of the drawings. The recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

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

Note:

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

5. DOCUMENTS:

- a) On placement of firm supply order, One set of relevant technical documents for manufacturing (includes details about material, casting/forging, machining, heat processes, etc. and up to final inspection) the components like GOST/Drawing/Specification, Technical data book, process sheet etc., and technical instructions on the subject item is to be obtained by the contractor from AHSP through DDO/HVF.
- b) Any clarification required on these documents to be obtained from the Inspecting Authority i.e. The Chief General Manager, Heavy Vehicles Factory, Avadi, Chennai – 600 054. 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:

172.52CB-1ACB - INDIVIDUAL SET BULK.

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.52.105	COVER	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.52.105	COVER	STEEL 38XC GOST 4543-71	1

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

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

- (a) The threaded parts if any should be covered with suitable plastic caps to prevent damages.
- (b) If the item consists of assemblies, each assembly should be packed separately.
- (c) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight / moisture.
- (d) The packaging slip shall contains
 - (i) Certificate of testing- NABL Certificate.
 - (ii) Guarantee/ Warranty Certificate.
 - (iii) Service and maintenance instructions. (If applicable).
 - (iv) Delivery Slip with Inspector's Acceptance Mark.
 - (v) Undertaking letter / Certificate of conformance (As applicable).
- (e) The stores are not permitted to be stored together with oils. Petrol, acids, alkaline and other substances to avoid damage to the metal / rubber components.

10. SAMPLING PLAN:

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

Note:- * 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 including geometrical parameters of individual component, sub assembly and major assembly shall be checked and ensured as per respective drawing. Dimensional check should be carried out as per sampling plan. However, the inspecting authority/rep. may at his discretion, tighten the inspection level and acceptance quality level on the critical items and adopt check point during manufacture.

12.1. COVER TO DRG.NO:172.52.105

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

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

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

13.1 COVER TO DRG.NO:172.52.105

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

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

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

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

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

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

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

14) PERFORMANCES/ACCEPTANCE TEST/TR POINTS OF COVER TO DRG.NO: 172.52.105

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

- 1) 255...302BHN to be ensured in blank.
- 5) Cover is to be checked for interchangeability with gauge made as per limit dimension of mating components 172.51.015
- 6) In holes Γ cylindrical surface with height not more than 0.4 mm is allowed.
- 8) Coating: Zn 6 chromating.
- 9) Other requirements should be as per specifications 520.TY1.
- 10) *Dimensions for reference.
- 11) *¹Dimension is to be ensured by tool.

15) FITMENT AND PERFORMANCE TEST:

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

16) INTERCHANGEABILITY:

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

17) CALIBRATION CHECKS

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

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

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

18) MARKING / IDENTIFICATION.

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

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

For traceability, marking of part No., Manufacturer name, supply order No, Serial No/Qty., batch No. and manufacture date & year are to be carried out. Suitable method can be adopted, provided that the above parameters are legible and considering the parameters mentioned in the drawing and specification.

19) PRESERVATION CHECK

- a) Preservative coatings are to be strictly adhered to as called for in the drawing. However, equivalent BIS/ IS Standards can also be followed, subject to the thickness of the coating/preservative is maintained as per the drawing/specification.
- b) Other preservations as necessary to prevent damages due to moisture and dust during process, storage and transit are to be carried out. Conventional Methods can also be resorted to.

20) PACKING CHECK

Components / Assemblies are to be packed separately to avoid damages during transit / handling of the same. Part No. and No. of sets are to be marked on the packing.

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

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

21) DOCUMENTATION.

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

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

22) REFERENCE:

- a) Drawing No: 172.52.105 & 172.51.015.
- b) Material specification as per drawing: STEEL 38XC GOST 4543-71.
- c) GOST 4543-71.
- d) Specification 520 TY1.

ANNEXURE-A

SL. NO.	CATEGORY	ASSEMBLY/ SUB ASSEMBLY	TESTS/ INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DQA	
1		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.
2		Pre inspection reports (PIR) of firm	Firm has to produce all the document as per QAP	As per the relevant drawing/specification/TD book/process book and QAP.	Confirm to relevant drawing/specification/ TD book/process book and QAP as per bill of material	P	V	R	100% by firm/ vendor.
3		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no: 12.1	Confirm to drawing and QAP Para no: 12.1	P	W/P	R	100% by firm/ vendor & SP followed by HVF.
4	COVER TO DRG. NO 172.52.105	Material tests	Chemical composition & Mechanical / Physical Properties	As per-GOST 4543-71.	All the values to confirm with QAP (Para no: 13.1 (a), (b) & (g))	P	W/V/ P	R	As per SP of HVF by firm and SP followed by HVF
5		Hardness Checks	Hardness 255.... 302 BHN	Refer QAP Para no: 14(1)	Confirm to QAP Para no:14(1)	P	W/V/ P	R	As per SP of HVF by firm and SP followed by HVF
6		Coating Checks	Zn 6 Chromating.	Refer QAP Para no: 14(8)	Confirm to QAP Para no:14(8)	P	W/V/ P	R	100% by firm/ vendor & SP followed by HVF
7		Marking / traceability	Marking / traceability	Refer QAP Para no: 18	Confirm to QAP Para no: 18	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).
- 1. One sample per heat / batch shall be tested under NABL Lab/Govt. Approved lab by firm. In case of non-compliance to standards entire lot shall be rejected and shall not be used in production further.
- 2. For cross 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/Verify/Perform(WV/P) at HVF premises. In case of non-compliance to standards, entire lot will be rejected as per the Terms and Conditions.
- 3. All other relevant tests as specified in GOST/specification/drawing is to be carried out by firm and to be confirmed.

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

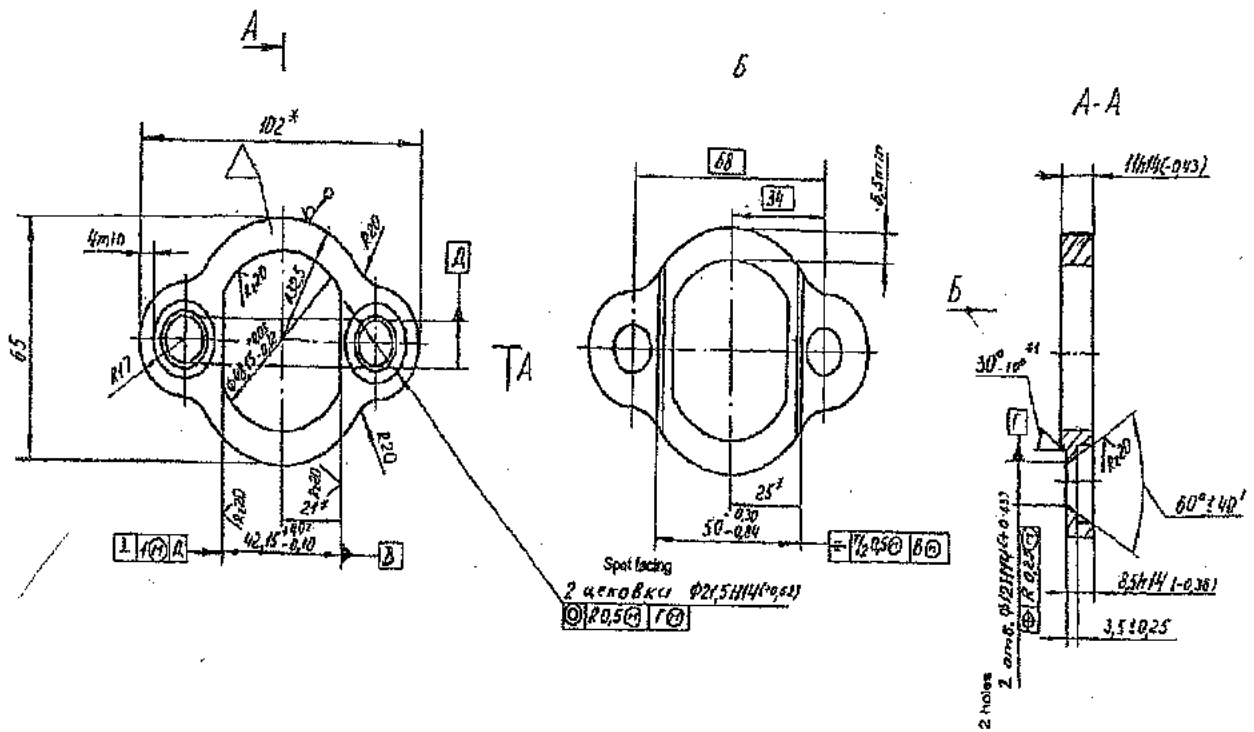


FIG: COVER TO DRG.NO.172.52.105.
 (For reference only)

RECORD OF AMENDMENTS

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

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

FOR

(FLANGE)

DRG.NO.54.03.003-2

(LF NO: 6206305643)

No.HVF/T-72C/QAP/03/FLANGE/243368-00

ISSUE No:00

DATE:JAN-2022

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

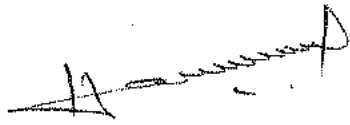
FLANGE

DRG. NO. 54.03.003-2

PREPARED BY


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

REVIEWED BY


(HANUMANTHA RAO GOLLA)
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APPROVED BY


(SUBHAM BIJLWAN)
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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 54.03.003-2** 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 **FLANGE TO DRG.NO:54.03.003-2**.

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 **FLANGE TO DRG. NO. 54.03.003-2** including the technical requirements of the drawings. The recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

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

Note:

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

5. DOCUMENTS:

- a) On placement of firm supply order, One set of relevant specification and technical instructions on the subject item can be obtained by the contractor from AHSP through DDO/HVF
- b) Any clarification required on these documents should be obtained from the Inspecting Authority i.e. The Sr. General Manager, Heavy Vehicles Factory, Avadi, Chennai – 600 054. Equivalentents to the collaborators specifications and standards will be decided only by the Inspecting Authority and should not be unilaterally decided. For any change in the specifications, standards or written approval, any alterations in specification can be affected and not otherwise.
- c) The process instruction sheets supplied by the collaborators are available with the Authority Holding Sealed Particulars, i.e. The Controllerate of Quality Assurance (Heavy Vehicles), Avadi, Chennai for the reference. The relevant process sheets may be studied at the premises of the AHSP after obtaining necessary permission.
- d) The supplier after scrutiny of the concerned process sheets and connected paper particulars should establish the necessary production and inspection facilities. Particularly the inspection test rigs, stands, fixtures, template, gauges etc should

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

6. ITEM USED ON:

- 1. 175.32.002CB-1 -
- 2. 175.33.003CB-2 -
- 3. 176.33.004CB -
- 4. 172.2M.33.005CB -
- 5. 175.33.006CB-4CB -
- 6.172.33.224CB-2CB -
- 7. 172.33.225CB-2CB -
- 8. 172.33.243CBCB -
- 9. 172.33.232CB-2CB -
- 10. PV572.0705.0010 -
- 11. CQA(HV)5.33.010 -

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	54.03.003-2	FLANGE	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	54.03.003-2	FLANGE	OPEN HEARTH STEEL 15GOST 1050-74.	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 andDirt/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	100%	100%
(v)	Pressure testing	-----	-----
(vi)	Machining / Fitment/ Performance trial on higher assembly / Tank	---	-----
vii)	Interchangeability Test	02 Nos.	02 Nos. per batch on randomly basis, except selective assembly.
viii)	Test stand/Jigs/ Fixtures/Gauges/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.

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 FLANGETO DRG.NO 54.03.003-2

All dimensions should be confirmed as per drawing.

Sl. No.	Drawing Dimension
1.	47 (+2 / -1) mm
2.	23±1 mm
3.	45°x1
4.	R2 (+2 / -1)
5.	3 (+1 / -0.5) mm
6.	M30x1.5-7H
7.	3.5 (+1 / -0.5) mm
8.	R2
9.	9 (+1 / -0.5) mm
10.	Φ3A _g ^{+0.6} mm
11.	φ38 (+1 / -0.5) mm
12.	10±2 mm
13.	Φ47±1 mm
14.	R2±1 mm
15.	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 FLANGE TO DRG.NO 54.03.003-2

a) The component should be manufactured from
OPEN HEARTH STEEL 15 GOST 1050-74.

b) Chemical properties: As per Steel Grade 15 to GOST 1050-74.

GRADE OF STEEL	C	Si	Mn	Cr (MAX)
15	0.12 - 0.19	0.17 - 0.37	0.35 - 0.65	0.25
20	0.17 - 0.24	0.17 - 0.37	0.35 - 0.65	0.25

NOTE -

a) CONTENTS OF SULPHUR 0.040% (MAX) & PHOSPHORUS 0.035% (MAX)

b) RESIDUAL CONTENT OF COPPER & NICKEL SHOULD NOT EXCEED 0.25%

Note: For mass fraction of other elements refer GOST 1050-74.

c) Mechanical properties: As per Steel Grade 15 to GOST 1050-74.

GRADE OF STEEL	YIELD POINT Kg/mm ²	U T S Kg/mm ²	ELONGATION %	REDUCTION OF AREA %	IMPACT STRENGTH Kgm/cm ²
	MINIMUM				
15	23	38	27	55	—
20	25	42	25	55	—

Note: For other parameters refer GOST 1050-74.

14) PERFORMANCES/ACCEPTANCE TEST: FLANGETO DRG. NO: 54.03.003-2.

1. SCALE AND BURRS ARE NOT ALLOWED.
2. SHIFT OF $\phi 38$ RELATIVE TO $\phi 47$ SHOULD NOT EXCEED 2mm.
3. SHIFT OF THREAD RELATIVE TO $\phi 38$ SHOULD NOT EXCEED 1mm.
4. NON-SQUARENESS OF THREAD AXIS RELATIVE TO SURFACE "A" SHOULD NOT EXCEED 0.3 mm WITHIN COMPONENT OVERALL DIMENSIONS.
5. MAY BE MANUFACTURED FROM OPEN HEARTH STEEL GRADE 20 GOST 1050-60.
6. DRAFT SHOULD NOT EXCEED 7° .
7. UNSPECIFIED ROUNDING-OFF RADII SHOULD NOT EXCEED 1mm.
8. NOT TO BE MARKED. DIMENSIONS WITH UNSPECIFIED TOLERANCES ARE NOT TO BE CHECKED.
9. OTHER SIDE OF THE THREAD MAY BE CHAMFERED TO $1 \times 45^\circ$.
10. RADIAL MARKS FROM TOOL ON SURFACE "A" ARE NOT ALLOWED.
11. WHEN MACHINED AS PER ALTERNATE, SINKING OF 10mm WIDE LUG BELOW THE SURFACE "A" IS ALLOWED UPTO 0.5mm.

EXPLANATORY NOTE :-

THE COMPONENT SHOULD BE PRODUCED FROM OPEN HEARTH COLD ROLLED KILLED STEEL OF GRADE 15 AND ALTERNATIVELY GRADE 20 TO SPECN GOST 1050-74

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(8).

19) PRESERVATION CHECK

- a) Preservative coatings are to be strictly adhered to as called for in the drawing. However, equivalent BIS Standards can also be followed, subject to the thickness of the coating/preservative is maintained as per the drawing/specification.
- b) Other preservations as necessary to prevent damages due to moisture and dust during process, storage and transit are to be carried out. Conventional Methods can also be resorted to.

20) PACKING CHECK

Components / Assemblies are to be packed separately to avoid damages during transit / handling of the same. Part No. and No. of sets are to be marked on the packing.

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

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

21) DOCUMENTATION

- i. Firm has to maintain all the documents as per QAP with respect to the SI.No.to have traceability.
- ii. Vendor has to submit Bill of materials, Material test reports, Class 'C' /Endurance test reports (wherever specified in drawing/TY specification/QAP) and Complete PIR (pre-inspection report)at the time of

offering the item for inspection. HVF will commence inspection only after scrutiny of these documents.

- iii. The testing/inspection responsibility to test all the parameters as per QAP and drawing specifications as mentioned in Annexure -A (enclosed).
- iv. Pre inspection reports (PIR) of firm like, 1. Chemical analysis (NABL Certificate), 2.Mechanical properties (NABL Certificate), 3. Pre-forming process, 4. Coating certification (Wherever applicable), 5. Calibration reports of instruments and 6. 100 % Dimensional inspection reports.

22) REFERENCE:

- a) Drawing No:54.03.003-2.
- b) Material specification as per drawing:
OPEN HEARTH STEEL 15 GOST 1050-74.
- c) GOST 1050-74.
- d) Alternate Material:
 - 1. OPEN HEARTH STEEL GRADE 20 GOST 1050-60.
 - 2. STEEL 070M20(En 3A) to BS 970 Part-1: 1983.

SL. NO.	CATEGORY	ASSEMBLY/ SUB ASSEMBLY	TESTS/ INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	FLANGE TO DRG. NO 54.03.003-2	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 1050-74.	All the values to confirm with QAP (Para no:13.1 (a), (b) &(c))	P	W/V	R	SP followed by HVF.
4		Dimensional checks	Dimensions as per the drawing	Refer drawing / QAP Para no: 12.1	Confirm to drawing and QAP	P	W/P	R	100% by firm/ vendor SP followed by HVF.
5		Marking / traceability	Marking / traceability	Refer QAP Para no:18 & 14(b)	Confirm to QAP Para no: 18 & 14(8)	P	V	R	100% by firm/ vendor.
6		Preservation & packing	Preservation & packing	Refer QAP Para no 19&20	Confirm to QAP Para no 19 & 20	P	V	R	100% by firm/ vendor.

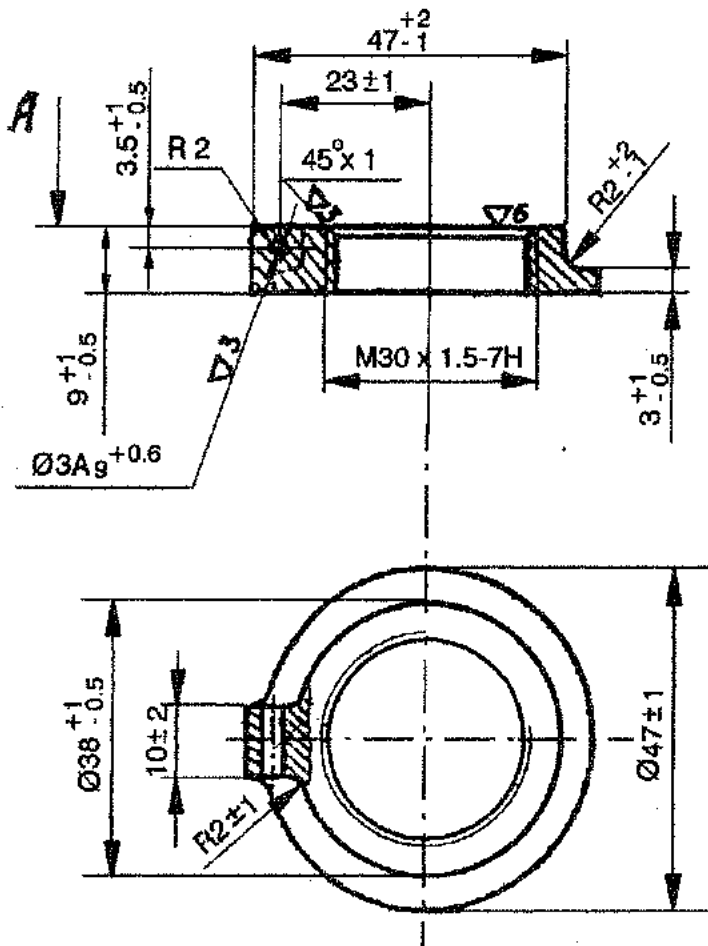
Note:

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

1. One sample per heat / batch shall be tested under NABL Lab/Govt. Approved lab by firm. In case of non-compliance to standards entire lot shall be rejected or not to use in production further.

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

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



ALTERNATIVE MACHINING OF SURFACE "A"

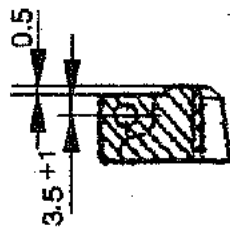


FIG: FLANGETO DRG.NO.54.03.003-2.

RECORD OF AMENDMENTS

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

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

FOR

(PLUG)

DRG.NO. 172.12.029

(LF NO: 6206111454)

No HVF/T-72C/QAP/12/PLUG/241610- 00

ISSUE No:00

DATE:FEB-2022

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR


PLUG

DRG. NO. 172.12.029

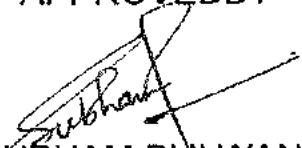
PREPARED BY


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

REVIEWED BY


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

APPROVED BY


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

ISSUED BY

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

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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 **PLUG TO DRG.NO 172.12.029** being procured indigenously. This is prepared, based on the acceptance standards and inspection parameters laid down in collaborators documents and on the inspection test standards followed in respect of similar indigenous items.
2. This QAP is the property of Government of India and is liable for amendments as and when required. The Sr. General Manager, Heavy Vehicles Factory, Avadi, Chennai – 600 054, is the inspecting Authority for this assembly. Any query / clarification on the content of this QAP shall be referred to this Factory. Any departure from these instructions is allowed only after written approval from the above authority. Notwithstanding the tests indicated in this QAP, the inspecting Officer has the right to carry out any test to check conformance to the paper particulars quoted in the Supply Order, which he may consider necessary to satisfy himself about the stores which he has to accept.

3.AIM

The QAP is aimed at standardizing the Inspection procedure and acceptance norm for **PLUG TO DRG.NO:172.12.029**.

It also aims at giving adequate information to the manufacturer on the quality requirements so that the required quality control methods are

established. This is also meant to guide authorized Inspection Officer in his routine inspection and to set out main points to which his attention must be drawn to ensure that the accepted stores meet the stipulated standards.

4. SCOPE:

This QAP outlines in general terms, the checks and methods to be used during inspection of **PLUG TO DRG. NO. 172.12.029** including the technical requirements of the drawings. The recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

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

NOTE-I:

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

5. DOCUMENTS:

- a) On placement of firm supply order, One set of relevant specification and technical instructions on the subject item can be obtained by the contractor from AHSP through DDO/HVF
- b) Any clarification required on these documents should be obtained from the Inspecting Authority i.e. The Sr. General Manager, Heavy Vehicles Factory, Avadi, Chennai – 600 054. 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. 172.12.014cbCb
2. 188.12.006cbCb-01
3. 188.12.006cbCb

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.12.029	PLUG	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.12.029	PLUG	STEEL 38XC GOST 4543-71	1

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

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

- (a) The threaded parts if any should be covered with suitable plastic caps to prevent damages.
- (b) If the item consists of assemblies, each assembly should be packed separately.
- (c) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight / moisture.
- (d) The packaging slip shall contains
 - (i) Certificate of testing- NABL Certificate.
 - (ii) Guarantee/ Warranty Certificate
 - (iii) Service and maintenance instructions
 - (iv) Delivery Slip with Inspector's Acceptance Mark
 - (v) Undertaking letter / certificate of conformance (As applicable).
- (e) The stores are not permitted to be stored together with oils. Petrol, acids, alkaline and other substances to avoid damage to the metal / rubber components.

10. SAMPLING PLAN:

Sl. No.	Sampling Plan	Pilot	Bulk
(i)	Visual Inspection	100%	100%
(ii)	Dimensional Inspection	100%	General Inspection level III, single sampling, Normal Inspection, AQL 2.5 of IS 2500 (Part-I)-2000
(iii)	Material Inspection	1 No	1 No. for each batch of raw material or heat treatment lot as required by specifications.
(iv)	Acceptance test	100%	100%
(v)	Pressure testing	-----	-----
(vi)	Machining/Fitment/ Performance trial on higher assembly / Tank	1 Nos.	1 Nos. 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:-

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

11. VISUAL INSPECTION [Sampling plan as per Para- 10 (i)]

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

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

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

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


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

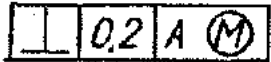
12. DIMENSIONAL CHECK[Sampling plan as per Para- 10(ii)]

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

12.1 PLUG TO DRG.NO172.12.029

All dimensions should be confirmed as per drawing.

Sl. No.	Drawing Dimension
1.	90°*
2.	Φ12.3 H15 ^(+0.7) mm
3.	R0.3 _(-0.3)
4.	54 ±0.5 mm
5.	49 ±0.3 mm
6.	Φ32f9 (-0.025 / -0.087) mm
7.	96h14 _(-0.87) mm
8.	50 mm
9.	R10
10.	R10
11.	34h14 _(-0.62) mm
12.	Φ6.5H14 ^(+0.36) mm (2 Holes)
13.	
14.	Φ96h14 _(-0.87) mm
15.	M10-7H
16.	12 ⁺³ mm
17.	16 ⁺² mm
18.	3 mm
19.	30°

20.	26.4 (+0.3 / -0.2) mm
21.	18.5 (+0.3 / -0.2) mm
22.	R17
23.	5 mm
24.	31 mm
25.	13 ±0.3 mm
26.	
27.	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 **PLUG TO DRG.NO.172.12.029**

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

b)Chemical properties: As per STEEL 38XCGOST 4543-71.

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

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

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

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

Note: For other properties refer GOST 4543-71.

14) PERFORMANCES/ACCEPTANCE TEST:PLUG TO DRG.NO:172.12.029

- 1.285...341BHN.
- 2.Other requirements as per 520.TY1.
- 3.*Dimension and surface finish to be ensured by tool.

15) FITMENT AND PERFORMANCE TEST:

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

16) INTERCHANGEABILITY:

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

17) CALIBRATION CHECKS

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

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

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

18) MARKING/IDENTIFICATION

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

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

For traceability, marking of part No., Manufacturer name, supply order No, Serial No/Qty, batch No. and manufacture date & year are to be carried out. Suitable method can be adopted, provided that the above parameters are legible and considering the parameters mentioned in the drawing and specification.

19) PRESERVATION CHECK

- a) Preservative coatings are to be strictly adhered to as called for in the drawing. However, equivalent BIS Standards can also be followed, subject

to the thickness of the coating/preservative is maintained as per the drawing/specification.

- b) Other preservations as necessary to prevent damages due to moisture and dust during process, storage and transit are to be carried out. Conventional Methods can also be resorted to.

20) PACKING CHECK

Components / Assemblies are to be packed separately to avoid damages during transit / handling of the same. Part No. and No. of sets are to be marked on the packing.

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

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

21) DOCUMENTATION

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

22) REFERENCE:

1. Drawing No:172.12.029
2. Material specification as per drawing:
STEEL 38XC GOST 4543-71.
3. GOST 4543-71.
4. Specification: 520 TY 1

ANNEXURE-A

SL. NO.	CATEGORY	ASSEMBLY/SUB ASSEMBLY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	PLUG TO DRG. NO 172.12.029	Pre inspection reports (PIR) of firm	Firm has to produced all the document as per Para 21 (iv)	As per the relevant drawing and QAP.	Confirm to drawing and QAP as per bill of material	P	V	R	100% by firm/ vendor.
2		Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 8 or item list.	Confirm to QAP.	P	V	R	100% by firm/ vendor.
3		Material tests	Chemical composition & Mechanical / Physical Properties	As per-GOST 4543-71.	All the values to confirm with QAP (Para no:13.1 (a), (b) & (c))	P	W/V	R	SP followed by HVF.
4		Hardness checks	Hardness (BHN 285 – 341)	Refer QAP Para no: 14(1)	Confirm to QAP Para no:14(1)	P	W/V	R	SP followed by HVF.
5		Dimensional checks	Dimensions as per the drawing	Refer drawing /QAP Para no: 12.1	Confirm to drawing and QAP	P	W/P	R	100% by firm/ vendor SP followed by HVF.
6		Marking / traceability	Firm has to make marking / traceability records.	Refer QAP Para no: 18	Confirm to QAP Para no: 18	P	V	R	100% by firm/ vendor.
7		Preservation & packing	Firm has to make Preservation & packing records	Refer QAP Para no: 19 & 20	Confirm to QAP Para no: 19 & 20	P	V	R	100% by firm/ vendor.

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

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

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

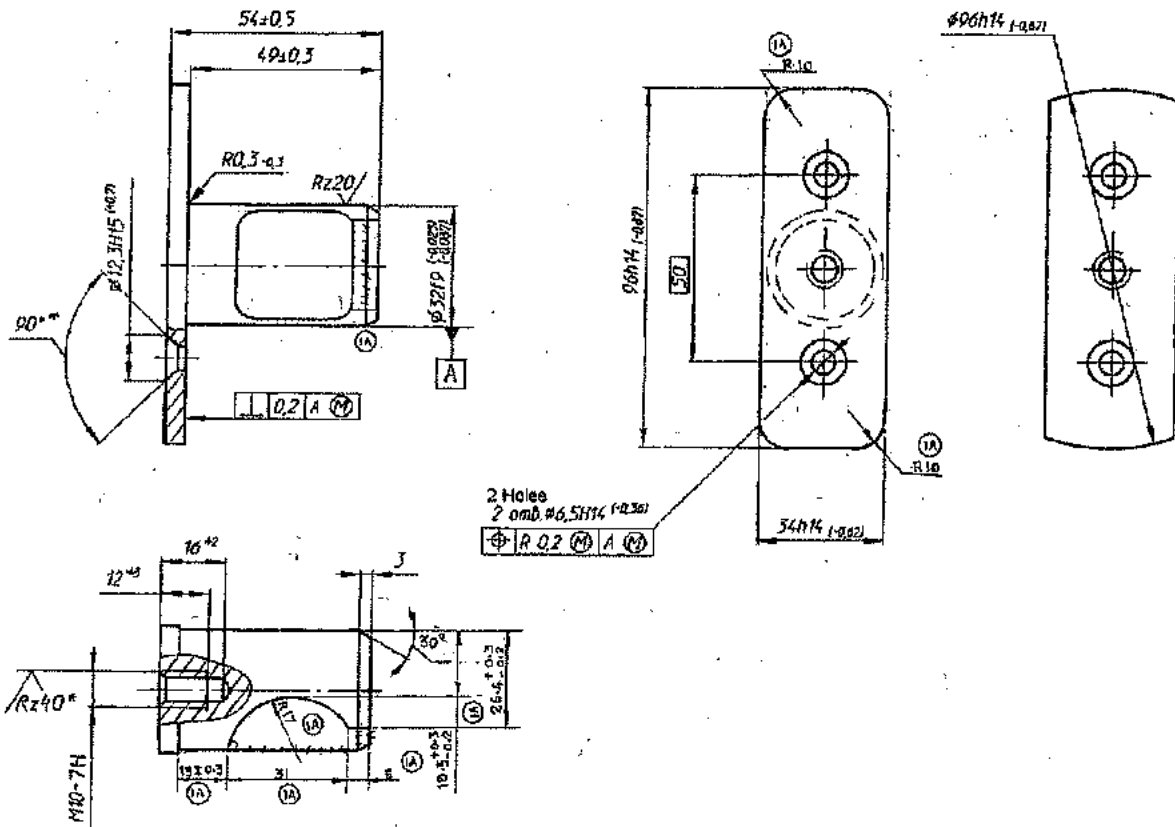


FIG: PLUGTO DRG. NO 172.12.029
(For reference only)

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

FOR

(SHACKLE)

DRG.NO. 175.63.041

(LF NO: 6206419152)

No: HVF/T-72C/QAP/63/SHACKLE/242670 - 00

ISSUE No: 00

DATE: NOV- 2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR


SHACKLE

DRG. NO. 175.63.041


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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 **SHACKLE TO DRG.NO 175.63.041** 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 **SHACKLE TO DRG.NO:175.63.041**.

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 **SHACKLE TO DRG. NO. 175.63.041** including the technical requirements of the drawings. The recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

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

NOTE-I:

i. Tender enquiry (TE) and supply order (S.O) will be issued with QAP stating that inspection will be done as per QAP.

ii. In case of TE, It is responsibility of the vendor to obtain the copy of QAP and give the statement of compliance that vendor will abide by the QAP in case supply order is placed.

iii. In case of S.O, it is the responsible of the vendor to obtained copy of QAP and give the statement of compliance that the vendor will follow QAP. However, GM/HVF reserves the right to revise/update the QAP from time to time.

5. DOCUMENTS:

- a) On placement of firm supply order, One set of relevant specification and technical instructions on the subject item can be obtained by the contractor from AHSP through DDO/HVF
- b) Any clarification required on these documents should be obtained from the Inspecting Authority i.e. The Sr. General Manager, Heavy Vehicles Factory, Avadi, Chennai – 600 054. Equivalent to the collaborators specifications and standards will be decided only by the Inspecting Authority and should not be unilaterally decided. For any change in the specifications, standards or written approval, any alterations in specification can be affected and not otherwise.
- c) The process instruction sheets supplied by the collaborators are available with the Authority Holding Sealed Particulars, i.e. The Controllerate of Quality Assurance (Heavy Vehicles), Avadi, Chennai for the reference. The relevant process sheets may be studied at the premises of the AHSP after obtaining necessary permission.
- d) The supplier after scrutiny of the concerned process sheets and connected paper particulars should establish the necessary production and inspection facilities. Particularly the inspection test rigs, stands, fixtures, template, gauges

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

6. ITEM USED ON:

1. 175.63.040CB - SHACKLE ASSY.

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	175.63.041	SHACKLE	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	175.63.041	SHACKLE	STEEL 38XC GOST 4543-71	1

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

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

- (a) The threaded parts if any should be covered with suitable plastic caps to prevent damages.
- (b) If the item consists of assemblies, each assembly should be packed separately.
- (c) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight / moisture.
- (d) The packaging slip shall contains
 - (i) Certificate of testing- NABL Certificate.
 - (ii) Guarantee/ Warranty Certificate
 - (iii) Service and maintenance instructions
 - (iv) Delivery Slip with Inspector's Acceptance Mark
 - (v) Undertaking letter / certificate of conformance.
- (e) The stores are not permitted to be stored together with oils. Petrol, acids, alkaline and other substances to avoid damage to the metal / rubber components.

10. SAMPLING PLAN:

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

Note:-

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

11. VISUAL INSPECTION[Sampling plan as per Para- 10 (i)]

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

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

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

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

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

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

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

12.1 SHACKLE TO DRG.NO 175.63.041

All dimensions should be confirmed as per drawing.

Sl. No.	Drawing Dimensions
1.	48 ⁺³ mm
2.	R2
3.	30°
4.	R8
5.	40°
6.	R8
7.	67±0.5 mm
8.	R2 (2 Places)
9.	8±0.5 mm
10.	22±0.5 mm
11.	12 mm
12.	φ22 _H (-0.03 / -0.006) mm (2 Holes)
13.	7.5±2 mm
14.	130±1 mm
15.	30±0.5 mm
16.	52 ⁺¹ mm
17.	M12X1.25-8h
18.	1.6X45°
19.	φ17 mm

20.	R15
21.	56 mm
22.	R15
23.	30 mm
24.	Surface finish/Roughness should be confirmed 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 SHACKLE TO DRG.NO.175.63.041

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

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

Grade	CONTENT OF ELEMENTS%							
	C	Si	Mn	Cr	S	P	Cu	Ni
	MAX							
38XC	0.34 to 0.42	1.00 to 1.40	0.30 to 0.60	1.30 to 1.60	0.035	0.03 5	0.30	0.30

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

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

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

Note: For other properties refer GOST 4543-71.

14) PERFORMANCES / ACCEPTANCE TEST: SHACKLE TO DRG.NO:175.63.041

1. BHN 302 - 255 (IND. DIA. 3.5 TO 3.8). TO BE CHECKED ON BLANK.
2. EXTERNAL DRAFT SHOULD NOT EXCEED 7° .
3. PERMISSIBLE DEVIATIONS ON ROUGH DIMENSIONS SHOULD BE AS PER ACCURACY GROUP 2 OF GOST 7505-55.
4. UNSPECIFIED RADII NOT TO EXCEED R 2.
5. MISMATCH OF DIES SHOULD NOT EXCEED 1 mm.
6. UNDERTRIMMED FIN, ALONG PARTING LINE SHOULD NOT EXCEED 1 mm.
7. MINIMUM THICKNESS OF WALLS AT HOLES $\phi 22$ SHOULD BE 2.5 mm.
8. NON-PARALLELISM OF THREADED SHANK RELATIVE TO THE COMPONENT AXIS SHOULD NOT EXCEED 0.5 mm OVER A LENGTH OF 50 mm.
10. THREAD IS TO BE CHECKED AT A LENGTH OF 45 mm, min.
11. COATING : CHEMICAL OXIDIZING, PHOSPHATING, OIL FINISHING.
12. REQUIREMENTS FOR SURFACES NOT TO BE MACHINED AS PER

GOST 8479-70

15) FITMENT AND PERFORMANCE TEST:

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

16) INTERCHANGEABILITY:

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

17) CALIBRATION CHECKS

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

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

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

18) MARKING/IDENTIFICATION

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

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

For traceability, marking of part No., Manufacturer name, supply order No, Serial No/Qty, batch No. and manufacture date & year are to be carried out. Suitable method can be adopted, provided that the above parameters are legible and considering the parameters mentioned in the drawing and specification.

19) PRESERVATION CHECK

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

b) Other preservations as necessary to prevent damages due to moisture and dust during process, storage and transit are to be carried out. Conventional Methods can also be resorted to.

20) PACKING CHECK

Components / Assemblies are to be packed separately to avoid damages during transit / handling of the same. Part No. and No. of sets are to be marked on the packing.

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

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

21) DOCUMENTATION

- i. Firm has to maintain all the documents as per QAP with respect to the 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. 100 % Dimensional inspection reports.

22) REFERENCE:

1. Drawing No: 175.63.041
2. Material specification as per drawing:
STEEL 38XC GOST 4543-71.
3. GOST 4543-71, GOST 7505-55 & GOST 8479-70.

Sl. NO.	CATEGORY	ASSEMBLY/SU B ASSEMBLY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	SHACKLE TO DRG. NO 175.63.041	Pre inspection reports (PIR) of firm	Firm has to produced all the document as per Para 21 (iv)	As per the relevant drawing and QAP.	Confirm to drawing and QAP as per bill of material	P	V	R	100% by firm/ vendor.
2		Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 8 or item list.	Confirm to QAP.	P	V	R	100% by firm/ vendor.
3		Material tests	Chemical composition & Mechanical / Physical Properties	As per-GOST 4543-71.	All the values to confirm with QAP (Para no:13.1 (a), (b) & (c))	P	WNV	R	SP followed by HVF.
4		Hardness checks	Hardness 302...255 BHN (Dia of Ind 3.5 to 3.8)	Refer QAP Para no: 14(1)	Confirm to QAP Para no: 14(1)	P	WNV	R	SP followed by HVF.
5		Coating checks	Chemical Oxidizing, Phosphating, Oil finishing.	Refer QAP Para no: 14(11)	Confirm to QAP Para no: 14(11)	P	WNV	R	SP followed by HVF.
6		Dimensional checks	Dimensions as per the drawing	Refer drawing /QAP Para no: 12.1	Confirm to drawing and QAP	P	W/P	R	100% by firm/ vendor SP followed by HVF.
7		Marking / traceability	Firm has to make marking / traceability records.	Refer QAP Para no: 18	Confirm to QAP Para no: 18	P	V	R	100% by firm/ vendor.
8		Preservation & packing	Firm has to make Preservation & packing records	Refer QAP Para no: 19 & 20	Confirm to QAP Para no: 19 & 20	P	V	R	100% by firm/ vendor.

Note:

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

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

P- Perform

W- Witness

V-Verify

R-Review

RECORD OF AMENDMENTS

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

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

FOR

(HINGE DOOR)

DRG.NO. 172.02.688-1

(LF NO: 6206102622)

No HVF/T-72C/QAP/02/HINGE DOOR/243315 - 00

ISSUE No: 00

DATE: – DEC 2021

QUALITY ASSURANCE (RIG-SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

HINGE DOOR

DRG. NO. 172.02.688-1

PREPARED BY

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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.

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2.INTRODUCTION

1. This quality plan lays down the inspection and testing procedure to be carried out on the component **HINGE DOOR TO DRG.NO 172.02.688-1** 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 **HINGE DOOR TO DRG.NO:172.02.688-1**.

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 **HINGE DOOR TO DRG. NO. 172.02.688-1** including the technical requirements of the drawings. The recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

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

NOTE-I:

- i. Tender enquiry (TE) and supply order (S.O) will be issued with QAP stating that inspection will be done as per QAP.
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sheet / Process Book is not available the details particulars/parameters available in the drawings to be strictly adhered.

6. ITEM USED ON:

1. 175.02.036CBCB

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.02.688-1	HINGE DOOR	-

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	Qty
1	172.02.688-1	HINGE DOOR	STEEL 30XГCA GOST 4543-71	1

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

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

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- 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).

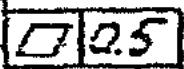

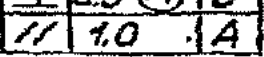
12. DIMENSIONAL CHECK [Sampling plan as per Para- 10(ii)]

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 HINGE DOOR TO DRG.NO 172.02.688-1

All dimensions should be confirmed as per drawing.

Sl. No.	Drawing Dimensions
1.	R1
2.	8±1.5 mm
3.	11±1.5 mm
4.	71 mm
5.	100 mm
6.	R10
7.	10 ⁺¹ mm
8.	30±1 mm
9.	45 _{-0.5} mm
10.	41°±2°
11.	20°±1°
12.	20 mm
13.	26 (+2 / -0.5) mm
14.	R25
15.	Φ50 mm
16.	25±1.5 mm
17.	R19.5±0.5 mm
18.	50±0.5 mm
19.	75±1 mm
20.	R10

21.	60°±1°
22.	27 (+3 / -0.5) mm
23.	
24.	Φ30H12 (+0.21) mm
25.	 
26.	Area for hardness test refer drawing.
27.	Surface finish/Roughness should be confirmed 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 HINGE DOOR TO DRG.NO.172.02.688-1

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

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

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

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

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

Note: For other parameters refer GOST 4543-71.

**14) PERFORMANCES / ACCEPTANCE TEST: HINGE DOOR TO
DRG.NO:172.02.688-1**

1. BHN 255 ... 302 (DIA OF INDENTATION 3.8 ... 3.5 mm).
2. DIE FLASH LINE - ARBITRARY.
3. ON THE SIDE SURFACES ALONG THE DIMENSION 45-0.5 SHOULDER AGAINST MILLING IS ALLOWED TO A DEPTH OF 0.2 mm.
4. CHAMFER 8 x 11 (SEE Γ - Γ) MAY BE MADE BY MACHINING. CHAMFER ON OPPOSITE END FACE IS ALLOWED IN DIE ITSELF DURING MANUFACTURE.
5. OTHER REQUIREMENTS ACCORDING TO 520. Ty 1.

15) FITMENT AND PERFORMANCE TEST:

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

16) INTERCHANGEABILITY:

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

17) CALIBRATION CHECKS

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

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

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

18) MARKING/IDENTIFICATION

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

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

For traceability, marking of part No., Manufacturer name, supply order No, Serial No/Qty, batch No. and manufacture date & year are to be carried out. Suitable method can be adopted, provided that the above parameters are legible and considering the parameters mentioned in the drawing and specification.

19) PRESERVATION CHECK

- a) Preservative coatings are to be strictly adhered to as called for in the drawing. However, equivalent BIS Standards can also be followed, subject to the thickness of the coating/preservative is maintained as per the drawing/specification.
- b) Other preservations as necessary to prevent damages due to moisture and dust during process, storage and transit are to be carried out. Conventional Methods can also be resorted to.

20) PACKING CHECK

Components / Assemblies are to be packed separately to avoid damages during transit / handling of the same. Part No. and No. of sets are to be marked on the packing.

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

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

21) DOCUMENTATION

- i. Firm has to maintain all the documents as per QAP with respect to the Sl.No.to have traceability.
- ii. Vendor has to submit Bill of materials, Material test reports, Class 'C' /Endurance test reports (wherever specified in drawing/TY specification/QAP) and Complete PIR (pre-inspection report)at the time of offering the item for inspection. HVF will commence inspection only after scrutiny of these documents.

- iii. The testing/inspection responsibility to test all the parameters as per QAP and drawing specifications as mentioned in Annexure -A (enclosed).
- iv. Pre inspection reports (PIR) of firm like, 1. Chemical analysis (NABL Certificate), 2. Mechanical properties (NABL Certificate), 3. Pre-forming process, 4. Coating certification. 5. Calibration reports of instruments and 6. 100 % Dimensional inspection reports.

22) REFERENCE:

- a) Drawing No: 172.02.688-1
- b) Material specification as per drawing:
STEEL 30XГCA GOST 4543-71.
- c) GOST 4543-71.
- d) Specification 520 TY1.

SL. NO.	CATEGORY	ASSEMBLY/SU B ASSEMBLY	TESTS/INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGGA	
1	HINGE DOOR TO DRG. NO 172.02.688-1	Pre inspection reports (PIR) of firm	Firm has to produced all the document as per Para 21 (iv)	As per the relevant drawing and QAP.	Confirm to drawing and QAP as per bill of material	P	V	R	100% by firm/ vendor.
2		Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 8 or item list.	Confirm to QAP.	P	V	R	100% by firm/ vendor.
3		Material tests	Chemical composition & Mechanical / Physical Properties	As per--GOST 4543-71.	All the values to confirm with QAP (Para no:13.1 (a), (b) & (c))	P	W/V	R	SP followed by HVF.
4		Hardness checks	Hardness 255 - 302 BHN (Dia of Ind. 3.8 - 3.5)	Refer QAP Para no: 14(1)	Confirm to QAP Para no: 14(1)	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	Firm has to make marking / traceability records	Refer QAP Para no: 18	Confirm to QAP Para no: 18	P	V	R	100% by firm/ vendor.
7		Preservation & packing	Firm has to make Preservation & packing records	Refer QAP Para no: 19 & 20	Confirm to QAP Para no: 19 & 20	P	V	R	100% by firm/ vendor.

Note:

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

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

P-Perform

W-Witness

V-Verify

R-Review

RECORD OF AMENDMENTS

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