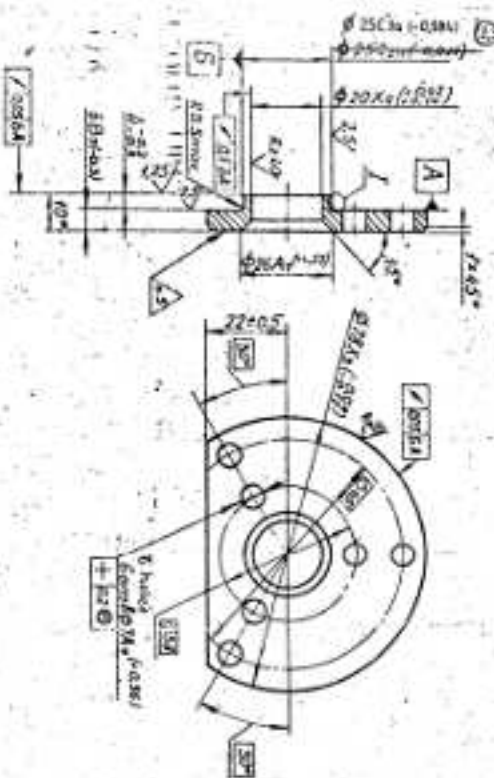


DRAWING NUMBER
172.46.081



R280
V/M

1. HB 144... 341 (DA OF MONITORING 29 TO 34) SHOULD BE CHECKED ON TEST PIECE.
2. BLINDING OF SURFACE 'X' SHOULD NOT BE LESS THAN 75% IF NECESSARY, SURFACE MAY BE LAPPED.
3. COATING: CHEMICAL OXIDIZING, OR FINISHING, ABSENCE OF COATING ON SURFACES 'X' AND 'B' IS ALLOWED.
4. TRACE FROM CUTTING TOOL IS ALLOWED ON SURFACE 'X' AT RADII R 0.5 MAX WITH WIDTH UP TO 0.10 AND DEPTH UP TO 0.20 MM.
5. TO BE MARKED.
6. OTHER REQUIREMENTS SHOULD COMPLY WITH S10 T1.1.
7. * DIMENSION FOR REFERENCE.

EXPLANATORY NOTE:-

8. REFERENCE MATERIAL QUOTED:- CHROME SECTION STEEL BAR TO GOST 4543-71 (G86 30XC)
9. CHEMICAL COMPOSITION:-

STEEL GRADE	CONTENT OF ELEMENTS %					
	C	Si	Mn	Cr	Ni	P
30XC	0.34	1.00	0.30	1.30	0.3	0.035
	0.42	1.40	0.40	1.40	0.40	0.035
						0.20

10. MECHANICAL PROPERTIES:-

STEEL GRADE	HEAT TREATMENT		COOLANT	TEMPERATURE °C	COOLANT	YIELD POINT Kgf/mm ²	UTS Kgf/mm ²	ELONGATION % (min)	REDUCTION IN AREA %	IMPACT STRENGTH Kgm/cm ²	LIMITING RULING SECTION mm
	1st HARDENING °C	2nd HARDENING °C									
30XC	940	—	OIL	150	WATER	75	95	12	50	7	25

ALUMINATE, 817M40 (EN 24)
TO BS 970 Pt. 1-1905



PLAT SAMPLE SHOULD BE APPROVED BY A H.S.P. BEFORE
BULK PRODUCTION.
TO BE STAMPED ON MARKED WHERE
INDICATED THIS * LETTERS
ALL SHARP EDGES AND CORNERS TO BE ROUNDED UNLESS
OTHERWISE STATED. MACHINED CORNERS TO HAVE A DIST.
OF 0.5. MORE FAVORABLE CORNERS ARE PREFERABLE.

NO.	REV.	DATE	ISSUE	BY	CHKD.	REASON FOR AMENDMENT	DATE	BY	CHKD.	REASON FOR AMENDMENT
24	1	10-10-78	ISSUE							
23	1	10-10-78	ISSUE							

NO.	REV.	DATE	ISSUE	BY	CHKD.	REASON FOR AMENDMENT	DATE	BY	CHKD.	REASON FOR AMENDMENT
24	1	10-10-78	ISSUE							
23	1	10-10-78	ISSUE							

NO.	REV.	DATE	ISSUE	BY	CHKD.	REASON FOR AMENDMENT	DATE	BY	CHKD.	REASON FOR AMENDMENT
24	1	10-10-78	ISSUE							
23	1	10-10-78	ISSUE							

NO.	REV.	DATE	ISSUE	BY	CHKD.	REASON FOR AMENDMENT	DATE	BY	CHKD.	REASON FOR AMENDMENT
24	1	10-10-78	ISSUE							
23	1	10-10-78	ISSUE							

TITLE:
FLANGE THRUST

DRAWING NUMBER
172.46.081

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

FOR

(THRUST FLANGE)

DRG. NO. 172.46.081

(LF NO: 6206407050)

No.HVF/T-72C/QAP/46/THRUST FLANGE/240018 - 00

ISSUE No:00

DATE: Jan - 2021

QUALITY ASSURANCE (RIG – SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054


QUALITY ASSURANCE PLAN (QAP)

FOR


THRUST FLANGE

DRG. NO. 172.46.081

PREPARED BY

()
JWM/QA (RIG-SA)

REVIEWED BY

()
JWM/QA (RIG-SA / TA)

APPROVED / REVIEWED BY

()
DGM/QA-RIG-(SA)

ISSUED BY

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

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4.	SCOPE	5
5.	DOCUMENTS	5
6.	ITEM USED ON	6
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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”.

2. INTRODUCTION

1. This quality plan lays down the inspection and testing procedure to be carried out on the **THRUST FLANGE TO DRG. NO 172.46.081** 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 **THRUST FLANGE TO DRG. NO 172.46.081**. 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 **THRUST FLANGE TO DRG. NO 172.46.081** including the technical requirements as per the drawings/ specifications. The recommended Quality Plan stipulated herein is mandatory and should be strictly adhered to.

Note:

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

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.

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

5. DOCUMENTS:

- a) On placement of firm supply order, One set of relevant specification and technical instructions on the subject item can be obtained by the contractor from AHSP through DDO/HVF
- b) Any clarification required on these documents should be obtained from the Inspecting Authority i.e. The Sr. General Manager, Heavy Vehicles Factory, Avadi, Chennai – 600 054. Equivalents to the collaborators specifications and standards will be decided only by the Inspecting Authority and should not be unilaterally decided. For any change in the specifications, standards or written approval, any alterations in specification can be affected and not otherwise.
- c) The process instruction sheets supplied by the collaborators are available with the Authority Holding Sealed Particulars, i.e. The Controllerate of Quality Assurance (Heavy Vehicles), Avadi, Chennai for the reference. The relevant

process sheets may be studied at the premises of the AHSP after obtaining necessary permission.

- d) The supplier after scrutiny of the concerned process sheets and connected paper particulars should establish the necessary production and inspection facilities. Particularly the inspection test rigs, stands, fixtures, template, gauges etc should be provided as recommended in these process sheets. If process sheet / Process Book is not available the details particulars/parameters available in the drawings to be strictly adhered.

6. ITEM USED ON:

1. 172.46.019 Cb – Drive Gear
2. 172.46.020 Cb – Drive Gear

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.46.081	THRUST FLANGE	-

8. BILL OF MATERIALS:

SI. NO.	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS	QTY
1	172.46.081	THRUST FLANGE	STEEL 38XC GOST 4543-71	1

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

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

(e) The stores are not permitted to be stored together with oils. Petrol, acids, alkaline and other substances to avoid damage to the metal / rubber components.

10. SAMPLING PLAN:

SI. 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% as per drawing/Relevant specification
(v)	Pressure testing	-----	-----
(vi)	Fitment/ Performance trial on higher assembly / Tank	2 Nos.	-----
vii)	Interchangeability Test	02 Nos.	02 Nos. on randomly basis, except selective assy.
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 assy / 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 assy and major assy 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

Sl. No.	Drawing Dimension
1	6 B ₇ (- 0.3 mm)
2	10 *
3	∇ 0.05 Б А
4	4 (-0.2 / - 0.3) mm
5	R0.5 max
6	ϕ 26 A ₇ (+ 0.52) mm
7	1 x 45°
8	45°
9	ϕ 20 X ₅ (+ 0.42 / + 0.14) mm
10	ϕ 25 C3a (-0. 084) mm
11	∇ 0.1 Б А
12	22 ± 0.5 mm
13	+ 0.2 (M)
14	ϕ 38
15	ϕ 65
16	ϕ 7 A ₇ (+ 0.36) mm (6 Holes)
17	ϕ 78 X3 (^{-0.04/-0.12}) mm
18	∇ 0.03 Б А
19	30°
20	30°
21	Surface finish/Roughness of items should be ensured as per drawing and specification

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

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

13.1 THRUST FLANGE TO DRG. NO 172.46.081

a) The component should be manufactured from Chrome silicon Steel Bar to GOST 4543-71 Grade 38XC.

b) Chemical properties: as per Steel 38XC GOST 4543-71

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

c) Mechanical properties: as per STEEL GRADE 38XC GOST 4543-71

Yield point, (kgf/mm ²)	Ultimate strength, (Kgf/mm ²)	Relative elongation % min	Reduction of area %	Impact strength kgf.m/cm ²	Limiting ruling section mm	Heat Treatment				
						Hardening			Tempering	
						I st Hardening °c	II nd Hardening °c	Coolant	Temperature ° c	Coolant
75	95	12	50	7	25	900	--	oil	630	Water or oil

14) PERFORMANCES/ ACCEPTANCE TEST: THRUST FLANGE TO DRG. NO 172.46.081

1. HB 444 to 341 (Dia of intention 2.9 to 3.4) should be checked on test piece.
2. Bluing surface 'A' should not be less than 75%. If necessary surface may be lapped.
3. Coating: chemical oxidizing, oil finishing. Absence of coating on surfaces A and B is allowed.
4. Traces from cutting tool are allowed on surface "A" at radius R0.5 max with width 1 mm and depth 0.2 mm

5. To be marked
6. Other requirements should comply with 520 TY 1.
7. * Dimensions for reference

15) FITMENT AND PERFORMANCE TEST:

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

16) INTERCHANGEABILITY:

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

17) CALIBRATION CHECKS

(TEST STANDS/JIGS/FIXTUERS/GAUGESINSTRUMENTS):

The supplier / Contractor should have a 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

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 of marking can be adopted, provided that the above parameters are legible.

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

Inscription if any as called for in the relevant drawing is to be carried out as per the drawing/T.R points.

19) PRESERVATION CHECK

Preservative coatings are to be strictly adhered to as called for in the drawing/specification. However, equivalent BIS Standards can also be followed,

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

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

20) PACKING CHECK

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

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

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

21) DOCUMENTATION

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

22) REFERENCE:

- a) Drawing 172.46.081.
- b) Relevant material specification as per drawing - (STEEL 38 XC to GOST 4543-71).
- c) Alternate material : Steel 817 M 40 (En 24) TO BS 970 (PART – I – 1983)
- d) Specification 520 TY 1.

SL. NO.	CATEGORY	ASSEMBLY / SUB ASSY	TESTS / INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	THRUST FLANGE TO DRG. NO 172.46.081	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	W/V	R	100% should be ensured.
2		Bill of material (BOM)	Firm has to prepare the BOM as per QAP	Refer QAP Para no: 8 or item list.	Confirm to QAP.	P	W/V	R	100% should be ensured.
3		Material tests	Chemical composition & Mechanical / Physical Properties	As per - GOST 4543-71 Grade 38XC.	All the values to confirm with QAP (Para no:13.1 (a), (b), (c))	P	W/V	R	100% should be ensured.
4		Hardness check	HB 444 to 321	Refer QAP Para no: 14 (1)	All the values to confirm with QAP	P	W/V	R	100% should be ensured
5		Coating	chemical oxidizing, oil finishing	Refer QAP Para no: 14 (3)	All the values to confirm with QAP	P	W/V	R	100% should be ensured
6		Marking / traceability	Firm has to make marking / traceability records.	Refer QAP Para no 18	Confirm to QAP Para no 18	P	W/V	R	100% to be done
7		Preservation & packing	Firm has to make Preservation & packing records	Refer QAP Para no 19 & 20	Confirm to QAP Para no 19 & 20	P	W/V	R	100% to be done

Note:

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

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

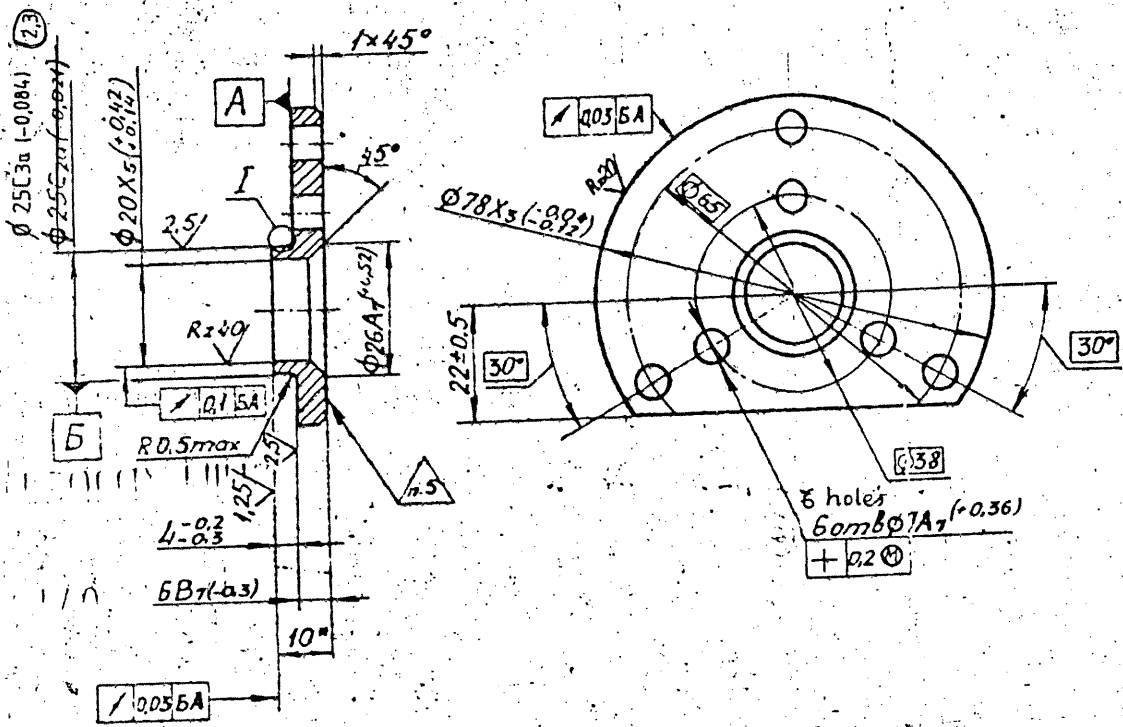
2. For cross conformation of material, manufacturer has to submit test sample pieces for the items used / test slab and button for rubber items / HVF will draw samples from supplied lot for Witnessing (W) at HVF premises. In case of non-compliance to standards entire lot will be rejected.

P- Perform

W- Witness

V-Verify

R-Review



I
 ALTERNATIVE *Вариант*
 M5:1 Scale S:1

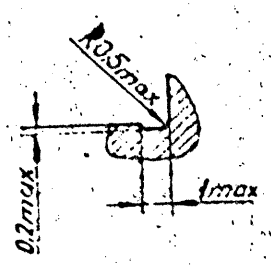


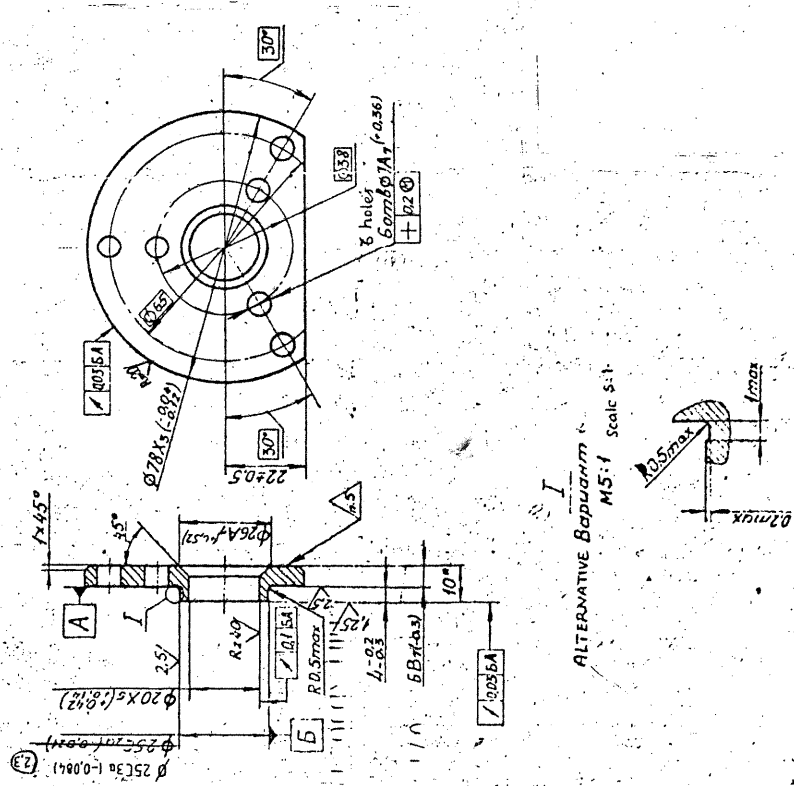
FIG: THRUST FLANGE TO DRG. NO 172.46.081

APPENDIX 'A'

RECORD OF AMENDMENTS

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

DRAWING NUMBER
172.46.081



1. HB 444.....341 (DIA OF INDENTATION) 2.9 TO 3.4) SHOULD BE CHECKED ON TEST PIECE.
2. BLUEING OF SURFACE 'A' SHOULD NOT BE LESS THAN 75% IF NECESSARY, SURFACE MAY BE LAPPED.
3. COATING: CHEMICAL OXIDIZING, OIL FINISHING. ABSENCE OF COATING ON SURFACES 'A' AND 'B' IS ALLOWED.
4. TRACE FROM CUTTING TOOL IS ALLOWED ON SURFACE 'A' AT RADIUS R 0.5 MAX. WITH WIDTH UPTO 1mm AND DEPTH UPTO 0.2mm.
5. TO BE MARKED.
6. OTHER REQUIREMENTS SHOULD COMPLY WITH 520 TY, 1.
7. * DIMENSION FOR REFERENCE.

EXPLANATORY NOTE:-

8. REFERENCE MATERIAL QUOTED:- CHROME SILICON STEEL BAR TO GOST 4543-71 Gde 38XC.

a) CHEMICAL COMPOSITION:-

STEEL Gde	CONTENT OF ELEMENTS %						
	C	Si	Mn	Cr	Ni	S	P
38XC	0.34	1.00	0.30	1.30	0.3	0.035	0.035
	0.42	1.40	0.60	1.60	(max)		0.30

b) MECHANICAL PROPERTIES:-

STEEL Gde	HEAT TREATMENT		YIELD POINT Kgf/mm ²	UTS Kgf/mm ²	ELONGATION % (min)	REDUCTION IN AREA %	IMPACT STRENGTH Kgm/cm ²	LIMITING RULING SECTION mm
	HARDENING	TEMPERING						
38XC	900	630	75	95	12	50	7	25
	Oil	Water						

⊙ ALT.MATL:- 817 M&G (En 24)
TO BS.970 Pt.1-1983

DRN	APPROVED	USED ON:-	172.46.019 C6
CRD	DESIGNED	STEEL:-	172.46.020 C6
TCO	CHECKED	GOST	4543-71
APPO	DATE: 11-11-88	CONTROLLERATE OF INSPECTION (HEAVY VEHICLES)	
SCALE: 1:1	AVADI		
DIMENSIONS IN mm			
TOLERANCE ON DIMS UNLESS OTHERWISE STATED.			
TITLE: FLANGE THRUST			
D S CAT NUMBER			DRAWING NUMBER
			172.46.081

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

EST. WT. 0.214

TO BE STAMPED OR MARKED WHERE INDICATED THUS #

LETTERS:

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

MACHINED COMPONENTS (GROUP -I)


Sl No	Drawing No	Nomenclature
1	172.17.010	COVER
2	54.08.135A	OIL DEFLECTOR
3	432.17.018-1	AXLE
4	432.17.033-2	UPPER BODY
5	434.17.007	SHAFT
6	434.17.010	COVER
7	434.17.024	DRIVEN SHAFT
8	434.23.042	ROD
9	434.23.061-1	PLUG
10	172.23.010CBCB	DRUM PRESSURE ASSY.
11	172.23.021	DRUM PRESSURE
12	172.25.067	PLUG
13	172.25.069	CUP
14	172.27.002-1	HOOK.L.H.
15	172.27.010-1	AXLE
16	172.27.030CB-1	HOUSING
17	172.27.046	BRACKET
18	172.27.055	BRACKET
19	172.27.056	BRACKET
20	172.27.066	TIE ROD
21	172.27.074-A	BUSHING
22	172.27.082	TRUNNION
23	172.27.161	COVER
24	172.28.021-1A	CAP OIL SEAL
25	172.28.186	SLEEVE
26	172.28.203	SPINDLE
27	172.40.019-1	GEAR SHAFT H
28	172.40.042	BUSH
29	172.40.044	BUSH
30	172.40.151	CLAMPING DEVICE AXLE
31	172.40.152	CLAMPING DEVICE AXLE
32	172.40.153	CLAMPING DEVICE AXLE
33	172.40.211	BOSS (STEEL 30XGCA GOST:4543-71)
34	172.40.223	STUD
35	172.40.227	STUD
36	172.40.241	GEAR AXLE RIGHT
37	172.40.242	GEAR AXLE L.H.
38	172.40.248	PIN
39	172.40.254	AXLE OF CLAMPING DEVICES
40	172.40.343	PLANET PINION SPINDLE OF 1ST AND 2ND
41	172.40.346	BUSHING
42	172.40.353	LOCK PIN
43	172.40.374	HOUSING
44	175.40.002	PLUG
45	175.40.038	CLAMPING DEVICE AXLE
46	175.40.039	CLAMPING DEVICE AXLE
47	175.40.047-1A	BRACKET R.H.



48	175.40.048-1A	BRACKET L.H
49	175.40.142	AXLE PLANET I & II ROW
50	432.40.023	PLANET PINION SPINDLE OF 3RD PLANETARY
51	432.40.032-1	PLANET PINION SPINDLE OF 4TH
52	54.41.017-4A	SPRING PIN
53	172.41.004-1	COVER
54	172.41.130	UNIVERSAL JOINT CENTRE CROSS
55	175.41.010	NUT
56	175.41.041	OIL SLINGER
57	175.41.065	TUBE
58	175.41.076A	PIPE UNION
59	172.42.009A	ROCKER ARM
60	172.42.021	ROUND NUT
61	172.42.032	OUTER CUP
62	172.42.033	INNER CUP
63	172.42.034	SPHERICAL BUSHING
64	175.42.002	RIGHT-HAND LEVER
65	175.42.003	PIN LEVER
66	175.42.006	COVER
67	432.42.007-3	ROCKER ARM
68	172.43.003-1	SHAFT,PINION,PLANET
69	172.43.020	PLANET PINION SHAFT
70	172.43.023	LOCK PIN
71	432.43.013-1	RING
72	172.45.015-A	CLAMP
73	172.46.004-1	FRONT BUSHING L.H.
74	172.46.038-2.	STOP STEEL 38XS
75	172.46.052-1	THRUST FLANGE
76	172.46.055	DRIVEN SHAFT
77	172.46.079	SHAFT,DRIVEN SUCTION PUMP
78	172.46.081	FLANGE THRUST
79	172.46.082	FRONT BUSHING RIGHT HAND
80	172.46.083	FRONT BUSHING L.H.
81	172.46.084	REAR BUSHING, R.H.
82	172.46.085	REAR BUSHING L.H.
83	172.46.086	FLANGE, THRUST
84	172.46.093	PIN
85	175.46.004	BOLT
86	172.62.136	RIGHT HAND CARRIER
87	172.65.045	RING
88	172.98.002	COVER PLATE
89	175.65.029	PIPE

MACHINED COMPONENTS (GROUP -1)

Sl no.	Nomenclature & drawing No.	Manufacturing technology & Testing / Inspection Facilities required to produce the item	Essential (To be possessed by the vendor in his premises)(P&M list and testing / Inspection equipment list to be submitted)	Desirable (May be posses by the vendor in his premises or out sourced)(Self declaration to be submitted)	FIRM Compliance (Y/N)	Remarks	
1	Components as per enclosed list of Machined Components (Group 1) (Note: This VOC is applicable if all the 89 items as per enclosed list is to be tendered in one batch)	TECHNOLOGY-1	Turning	CNC Turning machine suitable to accommodate components upto dia 100mm diameter with 0.010mm accuracy			
			Milling & Drilling	HMC/VMC machine suitable to component requirement with 0.010mm accuracy			
			Grinding	Internal/ External /Surface grinding machine as per component requirement upto 0.010mm accuracy			
		TECHNOLOGY-2	Heat Treatment		Carburising, Hardening, Induction Hardening & Tempering furnace with Oil quenching facility suitable to the components		
			Protection coating		Oxidising , Phosphating, Zinc chromatising, Hard Chromium Plant suitable to the components		
		TECHNOLOGY-3	Raw material		Firm should be capable to arrange the raw material like forging, casting, bar material etc as per drawing specification and standard.		


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

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

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The vac is only if applicable only if all 87 items are returned together

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