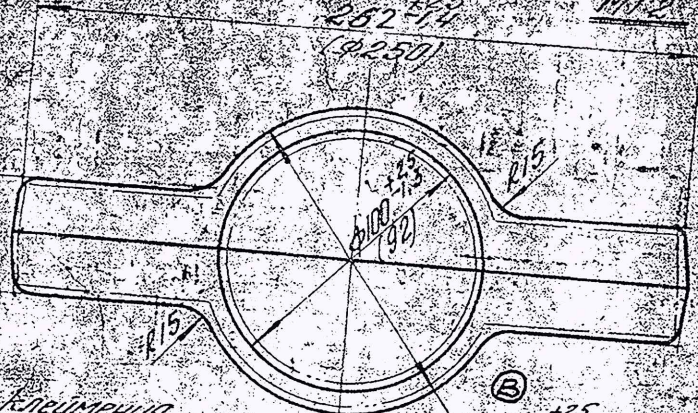


HEAT TREATMENT DETAILS ADDED 21/9/85
 ISSUE IN OF NOTIFICATION

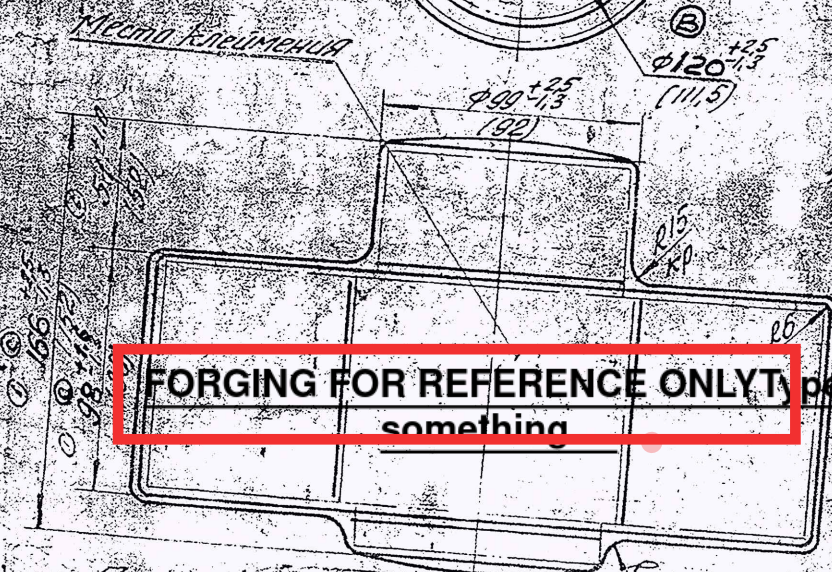
172 M

Ламинат

172-52-089



Технические требования
 1. Проверить работоспособность твердости
 2. Проверить отливки
 3. Проверить отливки



Целесообразно
 3. Проверить детали
 4. Проверить детали
 5. Проверить детали
 6. Проверить детали

FORGING FOR REFERENCE ONLY
 something

- TECHNICAL REQUIREMENTS**
- (A) NORMALISE & TEMPER
- HEAT TREAT. DIA. OF IND. 3.74 ± 0.2 MM (269-207 BHN)
 - DESCALE. ✓
 - SURFACE DEFECTS AND SCALE PITS UPTO 0.5 OF ACTUAL ALLOWANCE ARE ALLOWED.
 - MISMATCH SHOULD NOT EXCEED 1.5mm. ✓
 - RESIDUAL FIN SHOULD NOT EXCEED 2.0mm. ✓
 - BUCKLING SHOULD NOT EXCEED 1.0mm. ✓
 - UNSPECIFIED DRAFTS = 7° ✓
 - UNSPECIFIED RADII R: 4mm ✓
 - MARK PART NO. ✓
 - FIRST ANGLE PROJECTION

Примечание
 1. Штановые уклоны 7°
 2. Проверить радиусы скругления
 3. Проверить радиусы скругления
 4. Проверить радиусы скругления

ISSUE B
 DIMN $\phi 120$ WAS $\phi 118 \pm 0.25$
 RES. NO. 07271/VEH PLG/JWM/RG/GEN/35
 DT SEP-08-1995

152 D66

CHD. Ramu 10/9/85 APPD. Dushanba 10/9/85

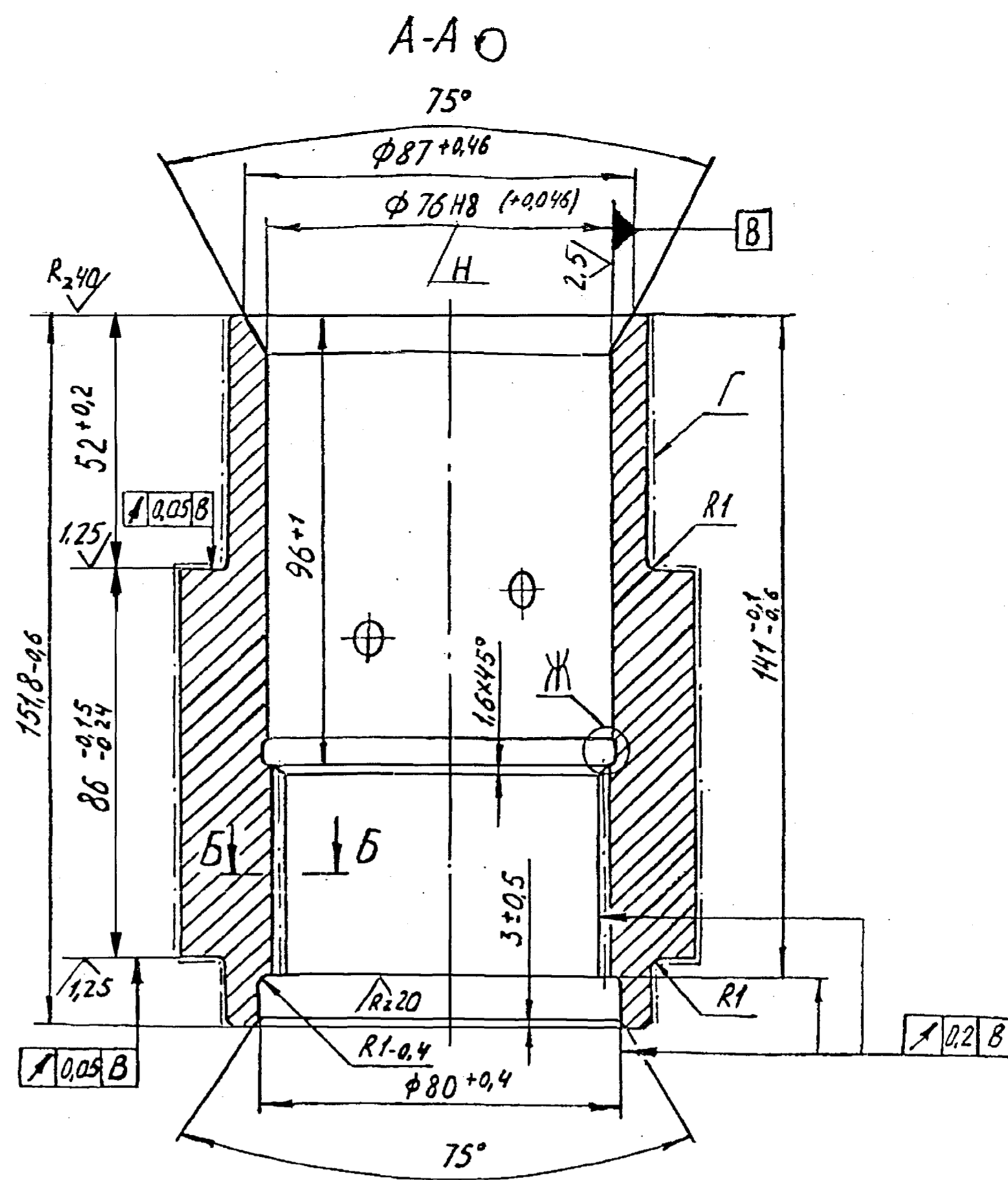
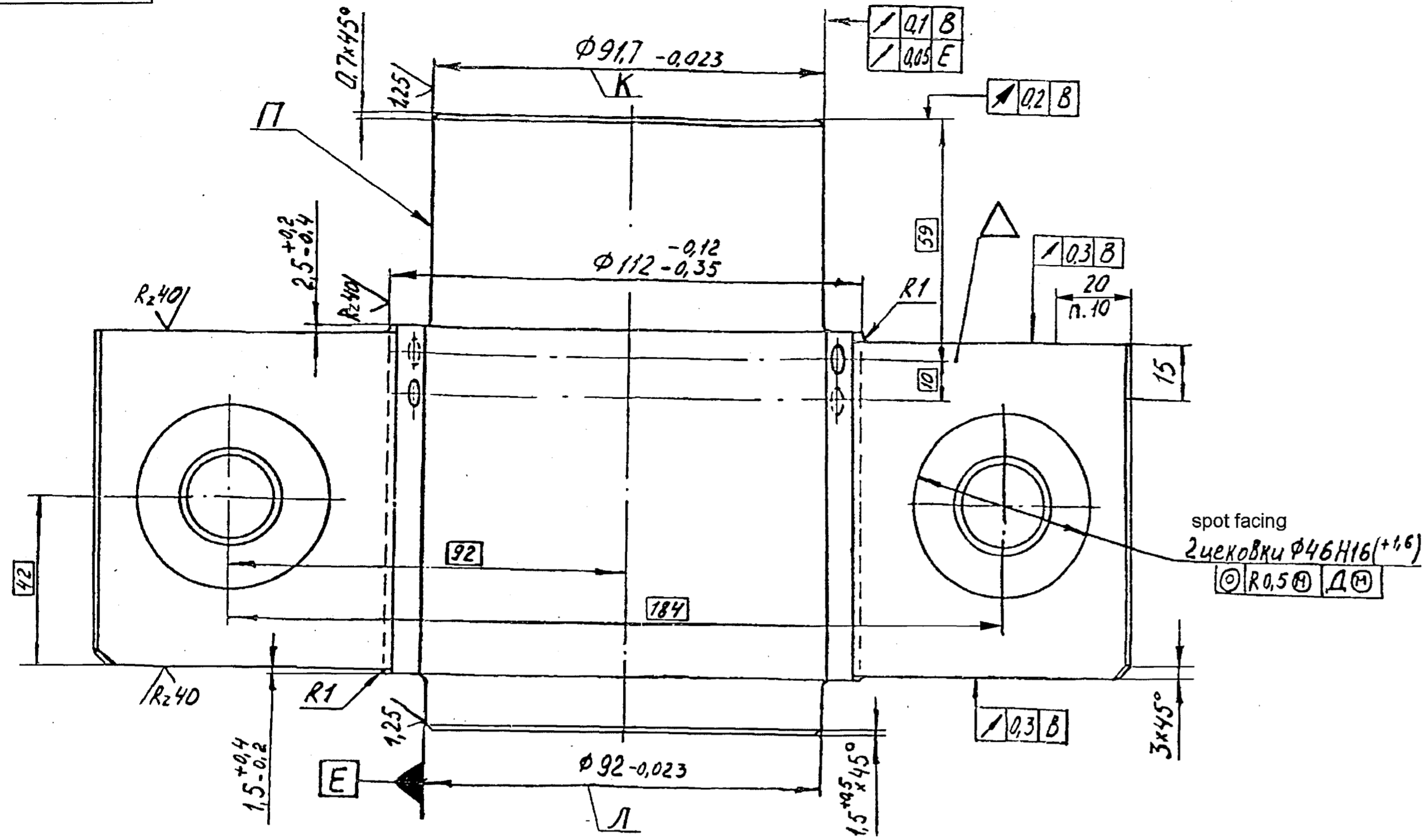
DRG. NO. 172-52-089/F

TITLE VANE

HEAVY VEHICLES FACTORY, AVADI.

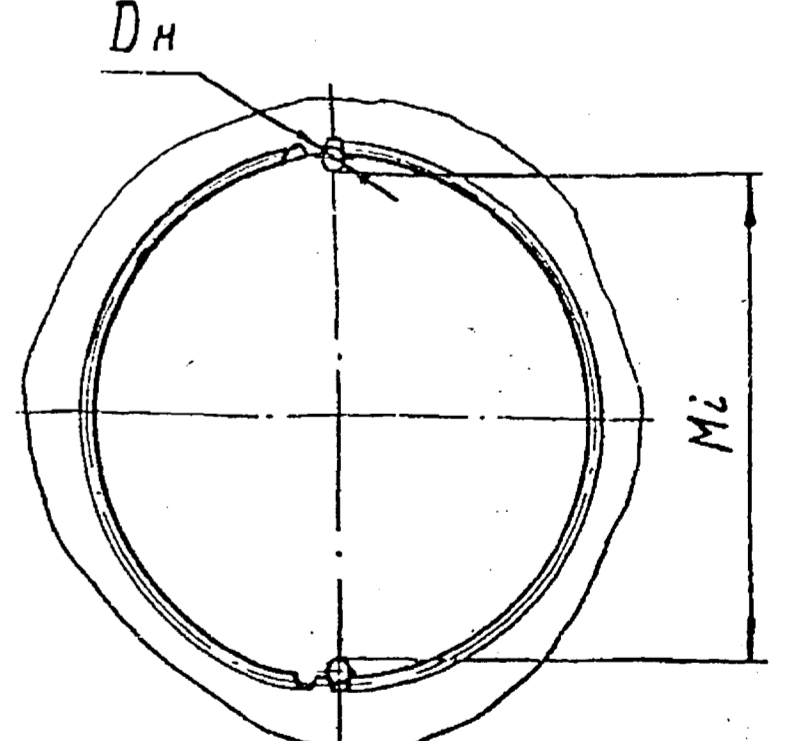
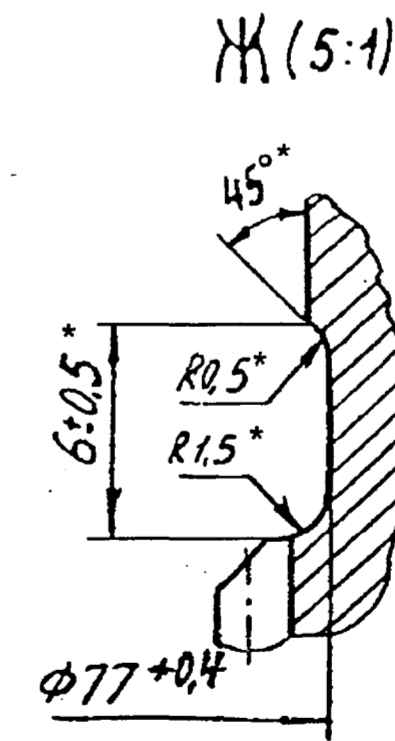
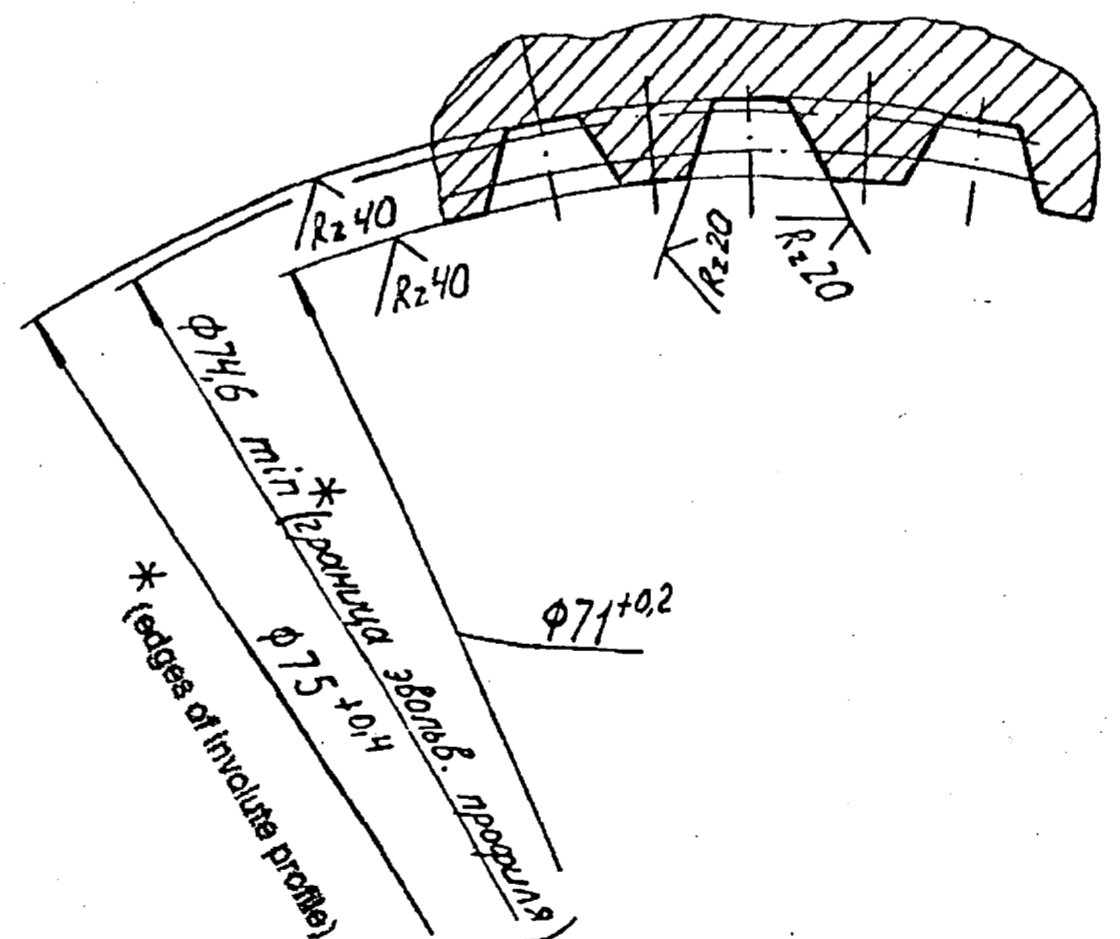
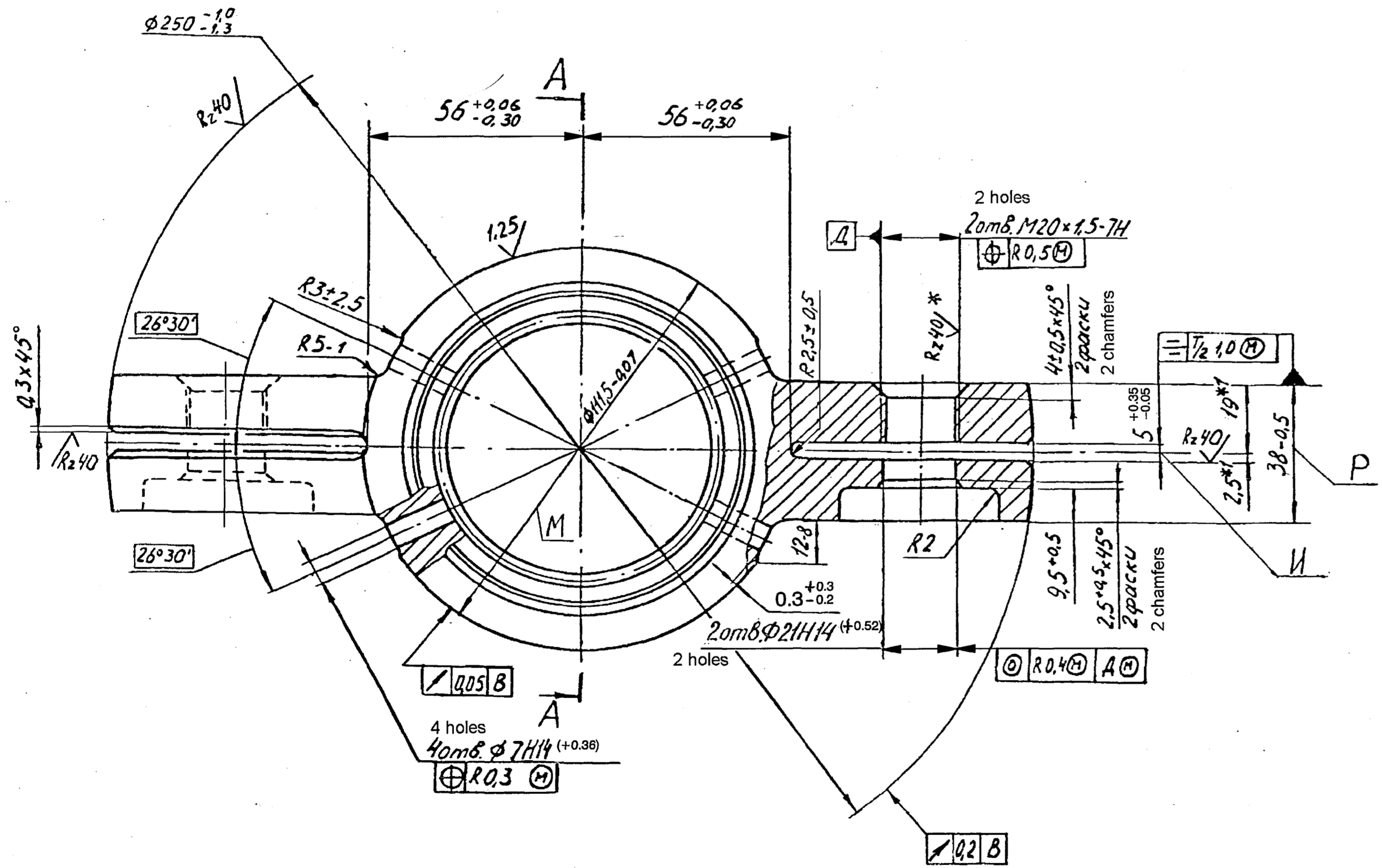
Dim 26	was 255	255	519
Dim 16	was 158	158	
Dim 98	was 94	94	

Rz80/√J



- Dimension I (width of slot), dimensions K, Л, M, H and run out of surfaces, given in drawings, relative to surfaces B, and E should be checked during pressed condition of blades of vane and when technological washer $\phi 32_{-0.5}$ mm are set. Dimension of thickness of washer should differ from the width of slot in the area of setting the washer by not exceeding 0.1 mm. Torque for tightening the bolt, holding blade, is 260^{+40} N.m (26^{+4} kgf.m).
- Along surfaces E and П groove for exit of grinding wheel with 0^{+1} mm width and $0^{+0.15}$ mm depth is permitted.
- Surface Г to be case hardened h 1.8 mm maximum. Depth of case hardened layer after grinding on surface П and E h 1 mm minimum. Hardness 58 HRC minimum. On remaining surfaces h 0.5 mm minimum. Case hardening on all surfaces, except threads and spline, may be done. Checking the depth of case hardened layer is to be carried out on test piece.
- Traces of stretching with a depth $0^{+0.1}$ mm are permitted.
- After heat treatment of spline, check inter-changeability with spline gauge with its centering along surface B. Distance over pins in gauge should be $M=80.322_{-0.011}$ mm, during this, reference dimension of thickness of tooth along the arc of reference circles $s=3.634$ mm.
- Shift of blade axes along dimension P relative to axis of two diametrically positioned tooth width spaces by not more than $30'$ in any side is allowed.
- Coating: Chemical oxidizing, phosphating and oil finish.
- On sections, restricted by dimension 15 mm and 20 mm, on all corners of blades, increase of width of slot upto 5.4 mm is allowed.
- *Dimensions and surface finishing are to be ensured by tool.
- Machining, checking dimensions and runout of surfaces, specified in para 1 carried out after assembly of blades as per drawing 172.52.021cbCb (without fitting the spacer rings), after which carry out instructions of para 9.
- *Dimensions for reference.
- Other requirements are as per 520.TY1.

Module	m	2
No. of teeth	Z	36
Profile angle of tooth	α	30°
Diameter of pin	D_M	4.091 ± 0.001
Distance over pins	M_f	$66.090^{+0.390}_{+0.237}$
Tooth width space along reference circle	e	$3.719^{+0.207}_{+0.126}$
Reference diameter	d	72



356
SUPPLY CODE
U-01-1-4
D 90212
F-106
18
SIZE A1

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

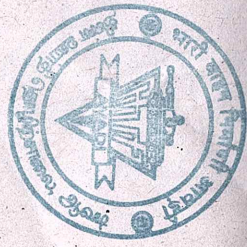
EST. WT. (kg)	TO BE STAMPED OR MARKED WHERE INDICATED THUS # (LETTERS)
7.15	

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

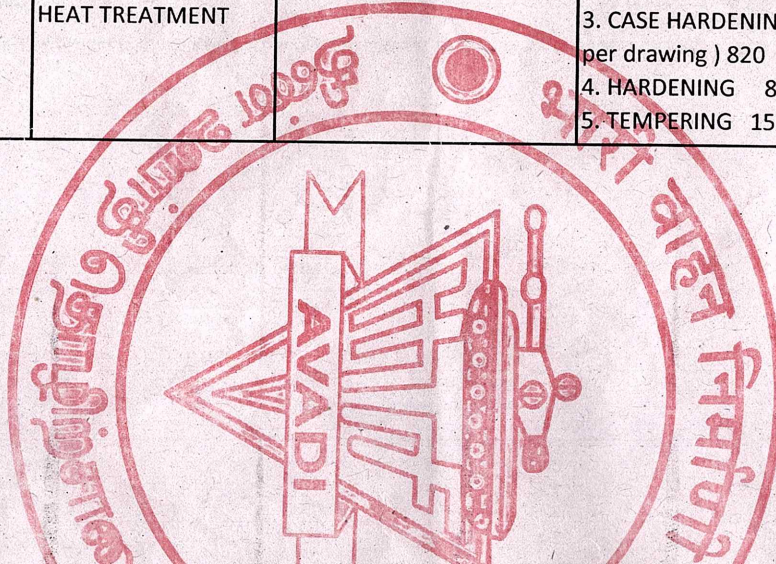
DRN	CHD	APPD	DATE	SCALE: 1 : 1	DIMENSIONS IN mm	TOLERANCE ON DIMNS UNLESS OTHERWISE STATED IS: 2102-69	ALL THREADS TO CONFORM TO
MATERIAL: STEEL 20X2H4A GOST 4543-71				USED ON: 172.52.021cbCb			
CONTROLLERATE OF QUALITY ASSURANCE (HEAVY VEHICLES) AVADI				TITLE: BLADE			
D/S CAT NUMBER				DRAWING NUMBER 172.52.089			
ISSUE DATE		NATURE OF AMENDMENTS					

6	✓ 172.52.089	BLADE	STEEL 20X2H4A GOST 4543-71	Specification IS:4432-1988 Designation: 13Ni13Cr3 Note: Material to be suitably case hardened to achieve drawing specified case hardness and case depth.
7	172.52.125	AXLE	STEEL 20X2H4A GOST 4543-71	Specification IS:4367-1991 Designation: 15Ni16Cr5 Note : Material to be suitably heat treated to achieve drawing specified hardness.
8	172.2M.52.004	INNER BUSH	STEEL 20X2H4A GOST 4543-71	Specification IS:4432-1998 Designation: 13Ni13Cr3 Note : Material to be suitably case hardened & boronised to achieve drawing specified case hardness & case depth.
9	175.54.012	PLUG	STEEL 20X2H4A GOST 4543-71	Specification IS:4367-1991 Designation: 15Ni6Cr5 Note : Material to be suitably heat treated to achieve drawing specified hardness.
10	172.25.091	SHAFT		Alternate material already endorsed in the drawing
11	172.25.090	Bevel GEAR		Alternate material already endorsed in the drawing
12	172.45.018-3	SHAFT	STEEL 45XH2MΦA TY 14-1-1725-76	No indigenous equivalent material found. OEM material to be used.
13	179.47.001	TORSION BAR	STEEL 45XH2MΦA TY 14-1-1725-76	No indigenous equivalent material found. OEM material to be used.
14	175.41.075	DRIVING FLANGE	STEEL 20X2H4A GOST 4543-71.	Specn: BS: 970 Pt-1-1983 Grade: 835M15 Note : Matl to be suitably heat treated to achieve specified hardness as per drg
15	172.40.315-1	Secondary Shaft	steel 18X2H4BA GOST 4543-71	specification:BS:970-(pt-1) 1983; GRADE: 835M15 Note: Material to be suitable heat treated & case hardened to achieve drawing specified core & case hardness

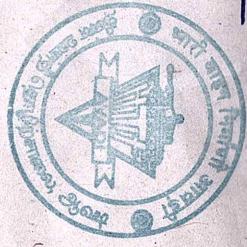
1X34601



VQC FOR BLADE TO DRG NO 172.52.089				DATE:17/01/2024			
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 OUT SOURCED (NAME AND ADDRESS OF SUB-CONTRACTOR, LIST OF PLANT & MACHINERY AND TESTING/INSPECTION FACILITY TO BE SUBMITTED)	FIRM COMPLIANCE (Y/N)	REMARKS
		TECHNOLOGY - 1	FORGING		1. MIN 1TON CAPACITY BELT DROP OR PNEUMATIC OR HYDRAULIC HAMMER. 2. TRIMMING USING SUITABLE POWER PRESS		
		TECHNOLOGY - 2	HEAT TREATMENT		SUITABLE FURNACE 1. NORMALIZING 2. CARBURISING 940 °c 3. CASE HARDENING (Depth as per drawing) 820 °c 4. HARDENING 850 °c 5. TEMPERING 150 °c		



4601



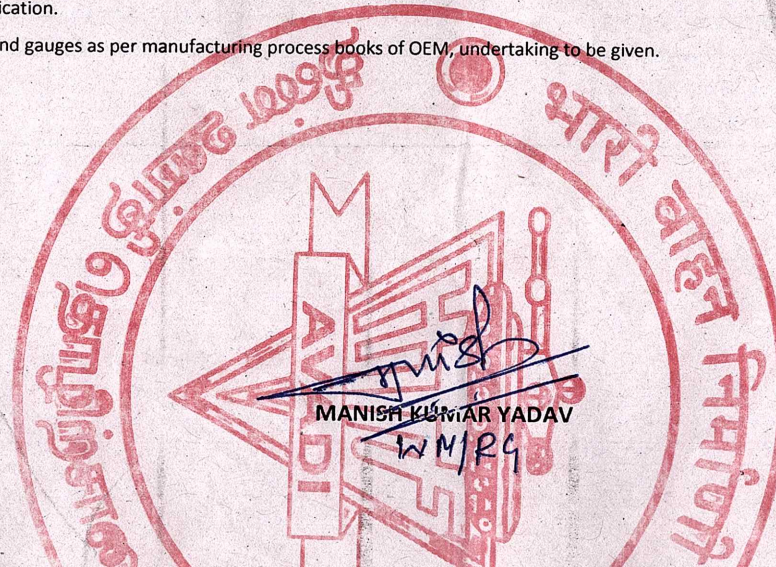
1	172.52.089 BLADE	TECHNOLOGY -4	MACHINING	1.TURNING CENTRE DIA 250 MM : 2. HMC MILLING 400 X 400 MM OR MORE. 3. SURFACE GRINDING or PROFILE GRINDING DIA 111.5 mm OR MORE. 4.EXTRNAL CYLINDRICAL GRINDING DIA 250 AND DIA 91.7 MM. 5.CYLINDRICAL INTERNAL GRINDING DIA 76 mm.	SUITABLE BROACHING MACHINE WITH CAPACITY OF BROACH DIA 75mm , m = 3 , Z = 36 (As per drawing)		
		TECHNOLOGY - 3	ELECTRO PLATING		OXIDISING OR PHOSPATING (15 - 20 MICRON)		
		TEST / INSPECTION - 5	DIMENSIONAL CHECKING HARDNESS TEST CRACK TEST	SUITABLE STANDARD CALIBRATED GAUGES AND INSTRUMENTS	SUITABLE 3D CMM CRACK TESTING MACHINE ROCKWELL HARDNESS TESTER & DIGITAL PORTABLE HARDNESS TESTER.		

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(COE)-R9



MANISH KUMAR YADAV

JWM/R9

K JAISHANKAR

Handwritten signature and initials of K. Jaishankar.

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

FOR

(BLADE)

DRG.NO.172.52.089

(LF NO: 6206412034)

No. HVF/T-72C/QAP/52/BLADE/243931-00

ISSUE No: 00

DATE: NOV-2023

QUALITY ASSURANCE (RIG-OP)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

BLADE

DRG. NO. 172.52.089

PREPARED BY

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

REVIEWED BY

Yada
(AWNEESH YADAV)
JWM/QA (RIG-OP/TA)

APPROVED BY

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

ISSUED BY

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

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1. IMPORTANT NOTES

Note-1

This is only a provisional and will be amended from time to time according to the requirement. No addition, deletion and reproduction will be done without 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 /specification/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 **BLADE TO DRG.NO 172.52.089** 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 **BLADE TO DRG.NO:172.52.089**

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 **BLADE TO DRG. NO. 172.52.089** 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, QAP against relevant items of this assembly, etc. and up to final inspection) the components like GOST/Drawing/Specification, Technical data book, process sheet etc., and technical instructions on the subject item is to be obtained by the contractor from AHSP through DDO/HVF.
- b) Any clarification required on these documents to be obtained from the Inspecting Authority i.e. The Chief General Manager, Heavy Vehicles Factory, Avadi, Chennai – 600 054. Equivalent to the collaborators specifications and standards will be decided only by the Inspecting Authority and should not be unilaterally decided. For any change in the specifications, standards or written approval, any alterations in specification can be affected and not otherwise.
- c) The process instruction sheets supplied by the collaborators are available with the Authority Holding Sealed Particulars, i.e. The Controller 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. 172.52.021CBCB - BLADE.

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
1	172.52.089	BLADE	-

8. BILL OF MATERIALS:

SI. NO.	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATION	QTY
1	172.52.089	BLADE	STEEL 20X2H4A GOST 4543-71	1

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

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

- (a) The threaded parts if any should be covered with suitable plastic caps to prevent damages.
- (b) If the item consists of assemblies, each assembly should be packed separately.
- (c) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight / moisture.
- (d) The packaging slip shall contains
 - (i) Certificate of testing- NABL Certificate.
 - (ii) Guarantee/ Warranty Certificate.
 - (iii) Service and maintenance instructions (if applicable).
 - (iv) Delivery Slip with Inspector's Acceptance Mark.
 - (v) Undertaking and 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(including Hardness)	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	1 No	1 No per batch / As required by HVF.
(vi)	Interchangeability Test	2 Nos.	2 Nos. per batch / As required by HVF. (Refer QAP Para No: 14(6)).
(vii)	Calibration Reports/Certificates of Test stand/Jigs/ Equipment's/Fixtures/ Gauges/Mandrels/etc.	100 %	100 %
(viii)	Marking/Identification	100%	100%
(ix)	Packing/ Preservation	100%	100%

Note:-

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

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 BLADE TO DRG.NO:172.52.089

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

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

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

13.1 BLADE TO DRG.NO: 172.52.089

a) The component should be manufactured from STEEL 20X2H4A GOST 4543 - 71.

b) Chemical properties: As per STEEL 20X2H4A GOST 4543 - 71.

CONTENT OF ELEMENTS%							
C	Si	Mn	Cr	Ni	P	Cu	Ni
					MAX		
0.16-0.22	0.17-0.37	0.30-0.60	1.25-1.65	3.25-3.65	0.025	0.30	0.025

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

c) Mechanical properties: As per STEEL 20X2H4A 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)	Cross section al dimension of blank for heat treatment (Diameter of round or side of square), mm
Not less than					

1080 (110)	1270 (130)	9	45	78 (8)	15
---------------	---------------	---	----	-----------	----

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

14) PERFORMANCES/ACCEPTANCE TEST/ TR POINTS OF BLADE TO DRG NO:

172.52.089

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

1. Dimension *И* (width of slot), dimensions *K, Л, M, H* and run out of surfaces, given in drawings, relative to surfaces *B, and E* should be checked during pressed condition of blades of vane and when technological washer $\varnothing 32_{-0.5}$ mm are set.

Dimension of thickness of washer should differ from the width of slot in the area of setting the washer by not exceeding 0.1 mm. Torque for tightening the bolt, holding blade, is 260^{+40} N.m (26^{+4} kgf .m).

2. Along surfaces *E* and Π groove for exit of grinding wheel with 0^{+1} mm width and $0^{+0,15}$ mm depth is permitted.

3. Surface Γ . to be case hardened $h 1,8$ mm maximum . Depth of case hardened layer after grinding on surface Π and *E* $h 1$ mm minimum . Hardness 58 HRC minimum .

On remaining surfaces $h 0.5$ mm minimum. Case hardening on all surfaces, except threads and spline, may be done.

Checking the depth of case hardened layer is to be carried out on test piece.

5. Traces of stretching with a depth $0^{+0.1}$ mm are permitted.
6. After heat treatment of spline, check inter-changeability with spline guage with its centering along surface *B*. Distance over pins in gauge should be $M=80.322_{-0.011}$ mm, during this, reference dimension of thickness of tooth along the arc of reference circles $s=3.634$ mm.
7. Shift of blade axes along dimension *P* relative to axis of two diametrically positioned tooth width spaces by not more than $30'$ in any side is allowed.
9. Coating: Chemical oxidizing, phosphotizing and oil finish.
10. On sections, restricted by dimension 15 mm and 20 mm, on all corners of blades, increase of width of slot upto 5.4 mm is allowed.
11. *Dimensions and surface finishing are to be ensured by tool.
12. Machining, checking dimensions and runout of surfaces, specified in para 1 carried out after assembly of blades as per drawing 172.52.021cbCb (without fitting the spacer rings), after which carry out instuctions of para 9.
13. *1Dimensions for reference.
14. Other requirements are as per 520.TY1.

GEAR/SPLINE DETAILS

Module	<i>m</i>	2
No. of teeth	<i>Z</i>	36
Profile angle of tooth	α	30°
Diameter of pin	<i>D_M</i>	4.091±0.001
Distance over pins	<i>M_L</i>	66.096 ^{+0.390} _{+0.237}
Tooth width space along reference circle	<i>e</i>	3.719 ^{+0.207} _{+0.126}
Reference diameter	<i>d</i>	72

15) FITMENT AND PERFORMANCE TEST:

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

EXPLANATORY NOTES:

- 1) Stage wise process and inspection of the component as specified in TD Book/ Process Book/ illustration book/specification is to be confirmed by the supplier during manufacturing the components.
- 2) Firm shall submit details of manufacturing process, inspection process and also reports for the same to HVF.
- 3) If required/applicable HVF shall witness/verify stage wise inspection /process details during manufacturing of the components.
- 4) The component may be subject to endurance test, when fitted in higher assembly as specified in process / illustration /TD book.
- 5) Apart from above, all other relevant test for acceptance of the component, (i.e. casting/forging, machining, heat treatment process, heat treatment cycles, etc and up to final inspection) of the item as specified in GOST / Specification / drawing / TD book shall be carried out by the firm and the report/ certificates shall be submitted to HVF.
- 6) Firm has to follow the manufacturing details/parameters for producing the component as specified in the technical data / process book and confirm as per the TD/Process Book. The inspection reports carried out for the same is to be submitted to HVF. HVF will carry out verification for cross confirmation if required.

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.

17) CALIBRATION CHECKS

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

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

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

18) MARKING/IDENTIFICATION.

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

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

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

19) PRESERVATION CHECK

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

20) PACKING CHECK

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

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

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

21) DOCUMENTATION

1. Firm has to maintain all the documents as per QAP with respect to the SI. 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) against relevant items 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 against the individual / Sub Assembly / Assembly.

Sl. No	Documents
1	Chemical analysis (NABL)
2	Mechanical properties (NABL)
3	Pre-forming process
4	Coating/Varnish certification (wherever applicable),

5	Calibration reports of instruments and gauges etc.
6	100% Dimensional (Including geometrical features) inspection reports including reports of spline and gear profiles
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. 172.52.089 & 172.52.021CBCB.

b) Material Specification as per drawing :

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATION
1	172.52.089	BLADE	STEEL 20X2H4A GOST 4543-71

c) GOST 4543-71.

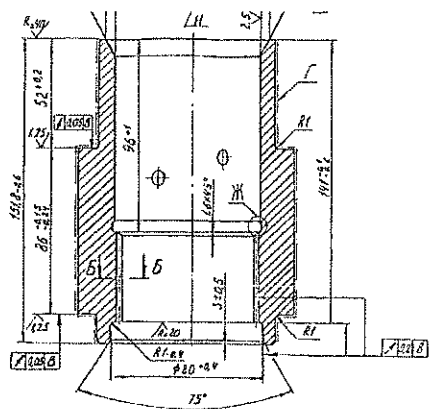
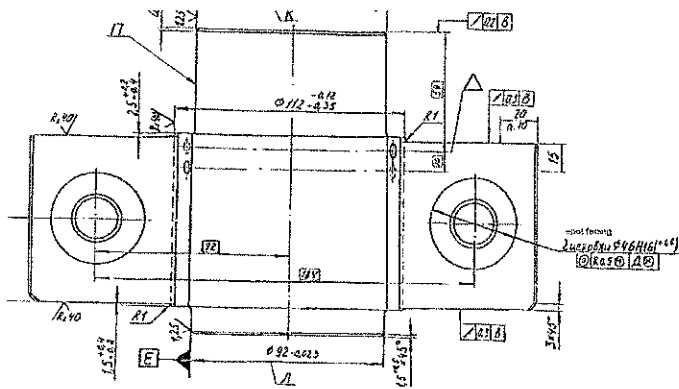
d) Specification: 520 TY 1.

SL. NO.	CATEGORY	ASSEMBLY/ SUB ASSEMBLY	TESTS/ INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
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/V	R	100% by firm/ vendor & SP followed by HVF.
4	BLADE TO DRG. NO 172.52.089	Material tests	Chemical composition & Mechanical / Physical Properties	As per - GOST 4535-71	All the values to confirm with QAP Para no:13.1 (a), (b), (c)	P	W/V/P	R	As per SP of HVF by firm and SP followed by HVF.
5		Hardness Check	Hardness with case hardened depth.	Refer QAP Para no:14(3)	Confirm to QAP Para no: 14(3).	P	W/V/P	R	As per SP of HVF by firm and SP followed by HVF.
6		Coating check	Chemical Oxidizing, Phosphatizing and oil finish.	Refer QAP Para no:14(9)	Confirm to QAP Para no: 14(9).	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).

- 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.
- 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/VP) at HV premises. In case of non-compliance to standards, entire lot will be rejected as per the Terms and Conditions.
- 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**



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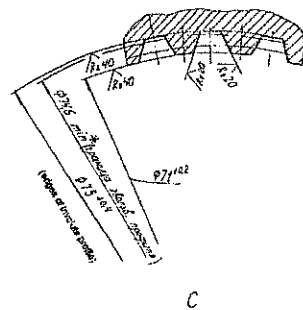
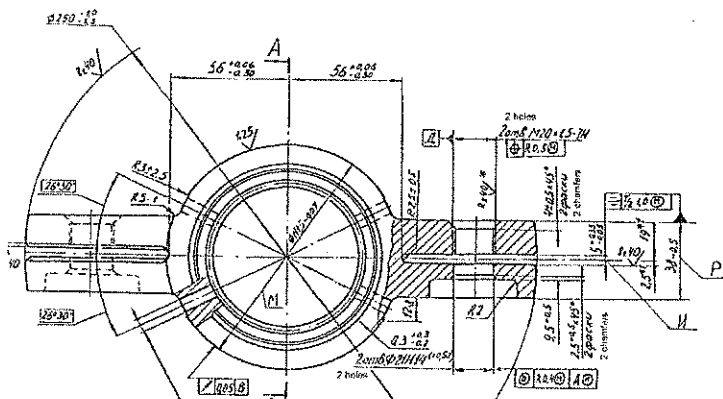


FIG: BLADE TO DRG.NO.172.52.089
(For reference only)

RECORD OF AMENDMENTS

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