VENDOR QUALIFICATION CRITERIA

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 possessed by the vendor in his premises or out sourced) (Self declaration to be submitted)	Firm Compliance (Y/N)
	7055642220 BEARING (142220 OR 14222L2) ETY: 500 (142220) (Roller)	TECHNOLOGY-1	Forging Process		Suitable Cold/ heading heading machines	
		TECHNOLOGY-2	Flash removal		Suitable Deflashing machine	
		TECHNOLOGY-3	Heat treatment		Heat treatment plant.	
		TECHNOLOGY-4	Roller grinding		Suitable Double Disc roller grinding machine Accuracy 0.005mm	
		TECHNOLOGY-5	Roller lapping		Suitable Double Disc roller lapping machine	
		TECHNOLOGY-6	Demagnetisation		Demagnetising Machine	
		INSPECTION-1	Test-1	1.Roundness Tester 2.Crack Detection Machine	1.Hardness Tester.	
		INSPECTION-2	Testing		NABL 1.Spectroscopy 2. Hardness Test 3. Macro & micro structure analysis.	
		INSPECTION-3	Surface finish		1. Surface Finish Tester	
2	*Outer Race (OR)*	TECHNOLOGY-1	Raw material Preparation		Tube Stock Machining	
		TECHNOLOGY-2	Machining	CNC Turning suitable for 180mm with 0.010mm accuracy		
		TECHNOLOGY-3	Hardening		Heat Treatment Plant	
		TECHNOLOGY-4	Face Grinding	Rotary table surface grinder or Double Disc surface grinder for Job thickness 34mm		
		TECHNOLOGY-5	O.D. Grinding	External or Centerless Grinding suitable for Dia.180mm with 0.005mm accuracy		
		TECHNOLOGY-6	Race Grinding	Internal grinding machine Suitable for race grinding with 0.005mm accuracy		
		TECHNOLOGY-7	Race Honing	Super Finish Honing Machine Suitable for roller track honing		
		TECHNOLOGY-8	Demagnetisation	Demagnetising Machine		
		INSPECTION-1	Measuring instrument	1. Vernier caliper 2. OD Micrometer. 3. Bore Dial.		
		INSPECTION-2	Metallurgical		NABL 1.Spectroscopy 2. Hardness Test 3. Macro & micro structure analysis.	
		INSPECTION-3	Testing-1	1.Axial, Radial and Side Runout Gauge/ Machine 2.Roundness Tester for Inner Race and Outer Race 3.Squareness Test		
		INSPECTION-4	Testing-2	1.Crack Detection machine 2.Profile Testing Machine		
		INSPECTION-5	Surface finish	Surface Finish Tester		
		TECHNOLOGY-1	Raw material Preparation		Tube Stock Machining	
		TECHNOLOGY-2	Machining	Suitable CNC Turning with 0.010mm accuracy		

		TECHNOLOGY-3	Hardening		Heat Treatment Plant:	
		TECHNOLOGY-4	Face Grinding	Rotary table surface grinder or Double Disc surface grinder for Job thickness 34mm		
		TECHNOLOGY-5	Bore Grinding	Internal grinding machine suitable for internal bore Dia.100mm with 0.005mm accuracy		
		TECHNOLOGY-6	Race Grinding	Internal grinding machine suitable roller race grinding with 0.005 accuracy		
		TECHNOLOGY-7	Race Honing	Super Finish Honing Machine Suitable for roller track honing		
3	*Inner Race (IR)*	TECHNOLOGY-8	Demagnetisation	Demagnetising Machine		
		INSPECTION-1	Measuring instrument	1. Vernier caliper 2. OD Micrometer. 3. Bore Dial.		
		INSPECTION-2	Metallurgical		NABL 1.Spectroscopy 2. Hardness Test 3. Macro & micro structure analysis.	
		INSPECTION-3	Testing-1	1.Axial, Radial and Side Runout Gauge/ Machine 2.Roundness Tester for Inner Race and Outer Race 3.Squareness Test		
		INSPECTION-4	Testing-2	1.Crack Detection machine 2.Profile Testing Machine		
		INSPECTION-5	Surface finish	Surface Finish Tester		
4	*Retainer*	TECHNOLOGY-1	Blank Preparation		Blanking machine suitable for atleast 3mm sheet	
		TECHNOLOGY-2	Forming		Press suitable to form required shape.	
5	*Assembly*	TECHNOLOGY-1	Rivetting	Suitable rivetting machine.		
		INSPECTION-1	Noise and Vibration testing	1.Decibel meter 2.Vibration Testing equipment.		
		INSPECTION-2	Axial and Radial Clearance testing	Axial and Radial Clearance testing equipment.		
		INSPECTION-3	Bearing life		Static and Dynamic Load Test Rig	

JWM/ TRG-II
M.SENTHIL KUMAR

JWM/ QA (RIG/GA AND OH)
M. JANARTH KUMAR

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

RESTRICTED
(DRAFT/PROVISIONAL)
QUALITY ASSURANCE PLAN

FOR

(BEARING 142220 OR 142220L2)

DRG.NO.ETY-500(142220)

(LF NO: 7055642220)

No.HVF/T-72C/QAP/ BEARING 142220 OR 142220L2 /243459-00

ISSUE No: 00 **DATE: MAR–2022**

QUALITY ASSURANCE (RIG–SUB ASSEMBLY)

HEAVY VEHICLES FACTORY

AVADI CHENNAI – 600 054

QUALITY ASSURANCE PLAN (QAP)

FOR

BEARING 142220 OR 142220L2

DRG. NO. ETY-500(142220)

PREPARED BY

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

REVIEWED BY

(AWNEESH YADAV B)
JWM/QA (RIG-ASSY)

APPROVED BY

(A.ANNACHAMY)
AWM/QA-RIG-ASSY

ISSUED BY

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

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 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 / 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 **BEARING 142220 OR 142220L2 TO DRG.NO ETY-500(142220)** 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 **BEARING 142220 OR 142220L2 TO DRG.NO:ETY-500(142220).**

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 **BEARING 142220 OR 142220L2 TO DRG. NO. ETY-500(142220)** 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 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 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. 172.50.001CB-BCB - ROAD WHEEL ASSY.

7. LIST OF DRAWINGS:

SI. NO.	DRG. NO	NOMENCLATURE	REMARKS
	BEARING 142220 OR 142220L2 TO DRG.NO: ETY-500(142220)		
1	ETY:500	Outer ring	--
2	ETY:500	Inner ring	--
3	ETY:500	Steel cage	May be Replaced with item 4
4	ETY:500	Brass cage	May be Replaced with item 3
5	ETY:500	Ball	--

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

SI. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS
	BEARING 142220 OR 142220L2 TO DRG.NO: ETY-500(142220)		
1	ETY:500	Outer ring	WX15 GOST 801
2	ETY:500	Inner ring	WX15 GOST 801
3	ETY:500	Steel cage	Grade 08КП,08ПС, 08 GOST 1050-74
4	ETY:500	Brass cage	ЛЦ40С GOST 17711-80.
5	ETY:500	Ball	WX15 GOST 801.

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

9. CONDITIONS OF USE/STORAGE INSTRUCTIONS

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

(a) The threaded parts if any should be covered with suitable plastic caps to prevent damages.

(b) If the item consists of assemblies, each assembly should be packed separately.

(c) The stores are to be suitably covered for preventing ingress of dust and Dirt/entry of sunlight / moisture.

(d) The packaging slip shall contains

(i) Certificate of testing- NABL Certificate.

(ii) Guarantee/ Warranty Certificate.

(iii) Service and maintenance instructions.

(iv) Delivery Slip with Inspector's Acceptance Mark.
(v) Undertaking letter / certificate of conformance (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 II, single sampling, Normal Inspection, AQL 1.5 functional item as per IS 2500 (Part-I)-2000
(iii)	Material Inspection	100%	1 No for each batch of raw material or heat treatment lot as required by specification.
(iv)	Crack detection	100%	General Inspection level II, single sampling, Normal Inspection, AQL 1.5 functional item as per IS 2500 (Part-I)-2000. **Firm has to perform 100% crack detection and submit the report.**
(v)	Demagnetization	100%	100%
(vi)	Radial/Axial Clearance	100%	100%
vii)	Crushing Load Test(Ball)	10 %	3 Pcs. From the batch as per GOST 3722 (Table-4)
viii)	Acceptance test	100%	100%
ix)	Machining / Fitment/ Performance trial on higher assembly / Tank	As per requirement	-------
x)	Test stand/Jigs/ Fixtures/Gauges/Mandrels/etc.	100 %	100 %
xi)	Marking/Identification	100% (As per GOST/Specification)	100% (As per GOST/Specification)
xii)	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 BEARING 142220 OR 142220L2 TO DRG.NO ETY-500(142220)

The specified

a) Inner dia. (ID): 100 mm (-0.20) as per Bearing GPZ (Page No:180).
b) Outer dia. (OD) : 180 mm (-0.025) as per Bearing GPZ (Page No:180).
c) Width (W) : outer race : 34 mm (+0.00, -0.200) as per Bearing GPZ (Page No:180)
d) Width (W) : inner race : 34 mm (+0.00,-0.200) as per Bearing GPZ (Page No:180).
e) Variable width of Races: 25 Micron (Max)
f) Side Run out: 25 microns (Max) as per GOST 520..
g) Corner Radius (r) : 3.5 mm as per Bearing GPZ (Page No:180).
h) Accuracy class "0" as per GOST 520
i) Radial run out of outer ring (microns) : **45** as per GOST 520 table-3
j) Axial run out of outer ring (microns) : **60** as per GOST 520 table-3
k) Radial run out of inner ring (microns) : **25** as per GOST 520 table-2
l) Axial run out of inner ring (microns): **50** as per GOST 520 table-2
m) Surface finish (Ra) : Fitting surface of Bearing inner race (microns) Max: 1.25 as per GOST 520 table-1
n) Surface finish (Ra) : Fitting surface of Bearing outer race (microns) Max: 1.25 as per GOST 520 table-1
o) Surface finish (Ra) : Surface of faces of bearing race (microns) Max: 2.5 as per GOST 520 table-1

p) Surface finish (Ra) : Ball bearings of class of accuracy 0 should be assembled with balls of degree of **accuracy 40 (i.e.as per ETY 500) (Ref GOST 3722 for value of Ra)**

q) Radial clearance (microns) : 70 - 115 **as per ETY 500**

r) Weight :4.00 Kg as per Bearing GPZ (Page No:180).

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 OUTER RING TO DRG.NO ETY-500, INNER RING TO DRG.NO:ETY:500 & BALL TO DRG.NO:ETY:500

a) The component should be manufactured from ШХ15 GOST 801.

b) Chemical properties: As per ШХ15 GOST 801.

Grade Of steel	Mass fraction of element, %								
	Carbon	Silicon	Manganese	Chrome	Sulphur	Phosphorus	Nickel	Copper	Nickel +Copper
					Not more than				
ШХ15	0.95 to 1.05	0.17 to 0.37	0.20 to 0.40	1.30 to 1.65	0.02	0.027	0.30	0.25	0.50

Note: For mass fraction of other elements refer GOST 801.

c) Mechanical properties: As per ШХ15 GOST 801.

For details refer GOST 801.

d) Hardness:

a. Hardness of races : **61-65 (HRC) (As per GOST 520).**

b. Hardness **63 . . . 67 HRC** – with ball diameter up to 45 mm

c. Hardness **61 . . . 67 HRC** – with ball diameter more than 45 mm

} **As per GOST .3722 (para 2.3)**

e) Alternate Material:

OUTER RING TO DRG.NO ETY-500 & INNER RING TO DRG.NO:ETY:500

1. SAE 52100 to ASTM A 295 -98 (For chemical), Mechanical properties as per OEM.
2. Grade 104Cr6 TO IS: 4398-1994.

BALL TO DRG.NO: ETY-500

1. Grade 535A99 BS:970 Pt-1 1983.
2. SAE 52100 to ASTM A 295 -98 (For chemical), Mechanical properties as per OEM.
3. EN 31 TO BS: 970.

13.2 STEEL CAGE TO DRG.NO: ETY: 500:

a) The component should be manufactured from Grade 08КП, 08ПС,08 GOST 503 & GOST 1050-74.

b) Chemical properties: As per Grade 08КП, 08ПС, 08 GOST 503 & GOST 1050-74.

STEEL GRADE	CONTENT OF ELEMENTS %							
	C	Si	Mn	Cr	Ni	S	P	Cu
				MAX				
08КП	0.05 to 0.12	0.03 max	0.25 to 0.50	0.10	0.25	0.040	0.035	0.25
08ПС	0.05 to 0.11	0.05 to 0.17	0.35 to 0.65	0.10	0.25	0.040	0.035	0.25
08	0.05 to 0.12	0.17 to 0.37	0.35 to 0.65	0.10	0.25	0.040	0.035	0.25

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

c) Mechanical properties: As per Grade 08КП, 08ПС, 08 GOST 503 & 1050-74.

For details refer
Grade 08КП, 08ПС, 08 GOST 503.

d) **Alternate Material:**

1. GRADE CR2/CR3 TO IS 513-2008.

13.3 BRASS CAGE TO DRG.NO: ETY: 500:

a) The component should be manufactured from Grade ЛЦ40С GOST 17711-80.

b) Chemical properties: As per Grade ЛЦ40С GOST 17711-80.

Grade of alloy	Chemical composition %									
As per GOST 17711-80	Ingredients		Impurities max							
	Cu	Pb	Si	Sn	As	Mn	Fe	Al	Ni	Total
			Max							
ЛЦ40С	57.0 - 61.0	0.8 - 2.0	0.3	0.5	0.05	0.5	0.8	0.5	1.0	2.0

Note: For mass fraction of other elements refer GOST 17711-80

c) Mechanical Properties: As per Grade ЛЦ40С GOST 17711-80.

Grade of brass	Method of Casting	Ultimate tensile strength σB, Mpa (kgf/mm^2)	Relative elongation %	Brinell hardness HB
		Not less than		

ЛЦ 40С	П (Р)	215(22)	12	70

Note: For other parameters refer GOST 17711-80.

d) Alternate Material:

1. Grade CuZn40Pb TO BS:-1400-1985.
2. GRADE 1 TO IS:319-2007.

13.4 LOAD CAPACITY:

a. Static Load Ratings(C_0) : **125.0 kN** as per Bearing GPZ (Page No:117).
b. Dynamic Load Ratings(C) : **183.0 kN** as per Bearing GPZ (Page No:117).

14) ETCH TEST

The test piece should undergo etch test for the specified value and which is free from crack.

15) CRACK DETECTION

To detect crack in bulk (100%) it should involved in magniflux test (tested as per magna flux standard pieces).Bearing races & balls should be demagnetized 100%. Balls should not cracks, corrosion and similarly burn marks.

16) DEMAGNETIZATION

a. Bearing races & balls should de-magnetize: Less than 3 gauss as per para-1.12 of GOST: 520-70. In general less than 3 Gauss is acceptable.
b. Inclusion rating for race & balls: as per GOST: 801-78 table 4 & 5.

17) FITMENT AND PERFORMANCE TEST

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

EXPLANATORY NOTE:

1) The component may be subject to endurance test, when fitted in higher assembly as specified in process / illustration /TD book.
2) All other relevant test for acceptance of the item as specified in GOST / Specification / drawing shall be carried out by the firm and the report/ certificates shall be submitted to HVF.

18) 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.

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

20) 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.

21) 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.

22) DOCUMENTATION

1. Firm has to maintain all the documents as per QAP with respect to the Sl.No.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. Pre inspection reports (PIR) of firm like, 1. Chemical properties obtained from NABL as per bill of material (BOM) with respect to material specifications, 2. Hardness report, inclusion rating, micro structure and macro structure as per races and Balls, 3. NABL Calibration reports of instruments and gauges, 4.100% Dimensional inspection reports as per bill of material, 5. Static & dynamic load test reports. 6. 100% demagnetization report. 7. Ball crushing load test report.8. Crack detection report and Other relevant reports for acceptance of the item as specified in GOST/ Specification / drawings etc,..

23) REFERENCE:

a) Drawing No: ETY-500(142220)
b) Material specification as per drawing:

Sl. NO	DRG. NO	NOMENCLATURE	MATERIAL SPECIFICATIONS
	BEARING 142220 OR 142220L2 TO DRG.NO: ETY-500(142220)		
1	ETY:500	Outer ring	WX15 GOST 801
2	ETY:500	Inner ring	WX15 GOST 801
3	ETY:500	Steel cage	Grade 08КП,08ПС, 08 GOST 1050-74
4	ETY:500	Brass cage	ЛЦ40С GOST 17711-80.
5	ETY:500	Ball	WX15 GOST 801.

c) Alternate Material:

Sl. NO	DRG. NO	NOMENCLATURE	ALTERNATE MATERIAL
	BEARING 142220 OR 142220L2 TO DRG.NO: ETY-500(142220)		
1	ETY:500	Outer ring	1. SAE 52100 to ASTM A 295 -98 (For chemical), Mechanical properties as per OEM. 2. Grade 104Cr6 TO IS: 4398-1994.
2	ETY:500	Inner ring	1. SAE 52100 to ASTM A 295 -98 (For chemical), Mechanical properties as per OEM. 2. Grade 104Cr6 TO IS: 4398-1994.
3	ETY:500	Steel cage	1. GRADE CR2/CR3 TO IS 513-2008
4	ETY:500	Brass cage	1. Grade CuZn40Pb TO BS:-1400-1985. 2. GRADE 1 TO IS:319-2007.
5	ETY:500	Ball	SAE 52100 to ASTM A 295 -98 (For chemical), Mechanical properties as per OEM

Note: Refer all material specifications like, GOST, IS & TY refer dimensional and material checks clause in this QAP.

ANNEXURE-A

SL. NO.	CATEGORY	ASSEMBLY/ SUB ASSEMBLY	TESTS/ INSPECTION PARAMETERS	STANDARDS TO BE REFERRED	ACCEPTANCE CRITERIA	INSPECTION RESPONSIBILITY			REMARKS
						Firm	HVF	DGQA	
1	BEARING 142220 OR 142220L2 TO DRG. NO ETY-500 (142220)	**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 801, GOST 503, GOST 1050-74 & GOST 17711-80	All the values to confirm with QAP (Para no:13.1 (a), (b),(c) & (d)) & 13.2 (a), (b),(c) & 13.3 (a), (b), (c)	P	W/V	R	SP followed by HVF.
4		**Hardness check**	Hardness	Refer QAP Para no: 13.1 (d).	Confirm to QAP Para no: 13.1(d).	P	V	R	SP followed by HVF.
6		**Crack detection checks**	Crack detection	Refer QAP Para no: 15	Confirm to QAP Para no: 15	P	V	R	SP followed by HVF.
7		**Demagnetization checks**	Demagnetization	Refer QAP Para no: 16	Confirm to QAP Para no: 16	P	V	R	100% by firm/ vendor.
8		**Crushing load test**	Crushing load	Refer QAP Para no: 10(vii)	Confirm to QAP Para no: 10(vii)	P	V	R	SP followed by Firm/Vendor.
9		**Radial/Axial Clearance**	Radial/Axial Clearance	Refer QAP Para no: 10(vi)	Confirm to QAP Para no: 10(vi)	P	V	R	SP followed by HVF.
10		**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.
11		**Marking / traceability**	Marking / traceability	Refer QAP Para no:19	Confirm to QAP Para no: 19	P	V	R	100% by firm/ vendor.
12		**Preservation & packing**	Preservation & packing	Refer QAP Para no: 21 & 20	Confirm to QAP Para no. 21 & 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**

APPENDIX ' A'

RECORD OF AMENDMENTS

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

BEARINGS AND OTHER PARTS FOR SPECIAL PURPOSE ARTICLES

Unified specification

ETY 500

Present unified specifications (ETУ) supplements to GOST 520 and covers ball, roller and slide bearing and also other individual parts* and establish technical requirements for the bearings delivered for assembly of products of special purpose.

The name of bearings, balls and the rollers delivered as per the present specifications is specified in appendix А, Б, В, Г and Д.

The procedure for approving the application of bearings as per the present ETУ is established according to РД ВНИПП.097.

Conventional designation (part number) of the bearings and separate parts for ordering and in the customer's documentation bearings;

- Radial roller bearing with short cylindrical rollers, accuracy class 0, with radial clearance as per 6 series, with technical requirements as per ETУ 500:

60-2214М ETУ500

- Roller, diameter 6 mm, length 12 mm with technical requirements as per ETУ 500:

Roller 6x12 ETУ 500

- Ball with nominal diameter 9 mm, degrees of accuracy 20, made of stainless steel, with technical requirements as per ETУ500;

Ball 9-20 Ю ETУ 500

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*Herein and further in the text individuals parts mean balls, rollers, needle rollers supplied as separate parts.

1. DEFINITIONS

1.1. In this unified specification (ETУ), the terminologies specified in GOST 520, GOST 3325 are used.

2 GENERAL CONDITIONS

2.1 The design procedure, application and manufacturing of bearings as per the present specifications should correspond to П ВНИПП.001.

Technical project is the initial technical documentation for development/design of new types of bearings or modernization of existing designs of bearings.

The technical project is prepared by JSC" ВНИПП " as per customers demand for bearing.

2.2 According to the technical project, the JSC " ВНИПП " develops the design documentation on the bearing.

2.3 During development of drawings on bearings as per the present ETУ, it is necessary to refer the following engineering specifications:

PTM 37.006.057, PTM 37.006.059, PTM 37.006.062, PTM 37.006.098, PTM 37.006.258, PTM 37.006.383, PTM 37.006.424, PTM 37.006.450, Н 453, Н 458, Н 461, Н 1363, РД ВНИПП.018, ОН 37, ОН 39, ОН 41.

2.4 All drawings of the bearings supplied as per present ETУ is approved by the chief designer of JSC " ВНИПП " .

2.5 The manufacturer of bearings submits the list of bearings being manufactured to the JSC " ВНИПП " for approval and matching with в/ч 93603-С. In the list, specify the designation of bearings, inventory numbers of drawings and their letter type.

In case of absence of originals of drawings in the JSC " ВНИПП, the enterprise - manufacturer offers to the JSC " ВНИПП " the complete set of drawings updated on the date of registration of the list.

2.6 The manufacturer as per the drawings of JSC " ВНИПП manufactures pilot batch (development batch) of bearings and carries out their testing on the bench (test jig) in compliance with РД 37.006.015.

As per the results of testing, a decision is taken regarding production of the bearings in compliance with РД 37.006.015.

2.7 The developed bearings should pass the operational test at least in three products.

Operational testing is carried out as per the program and methods developed by the designer of the products. As per the results of testing, prepare a report, which reflect the results of working of bearings in pilot products, including:

- Conventional designation and quantity of the tested samples of bearings;
- Modes and operating time of bearings;
- Conclusion about the condition of bearings after the testing;
- The decision about starting the mass production of the product and the service life of the bearing.

Extract from the report, signed by the technical director and the customer representative in his presence is sent to the JSC "ВНИПП" and to the customer representative (ПЗ 4).

If necessary, the manufacturers conclusion on bearings about the condition of bearings after the testing is also sent to JSC "ВНИПП" direct.

2.8 The JSC "ВНИПП", on the basis of positive results of testing carries out updating of the approval list and bearing drawings and assigns the letter type A for bearing drawings (spare parts).

The given changes of the documentation are approved by the customer representative (ПЗ 4).

Bearings (spare parts) with letter type А in agreement with the customer (П34) is entered in appendix А (Б, В) of present ЕТУ.

2.9 Changes in drawings of bearings as per appendix Г and Д, and also change in the list of bearings and separate parts as per the specified appendix are done by the JSC "ВНИИПП" without the approval of the customer representative.

2.10 The bearings, which have undergone changes, influencing the serviceability and commercial properties, should pass operational testing for the established service life.

The conclusion about the working of bearings after the testing in the products for established service life, and also results of their researches, should be sent to JSC "ВНИИПП" for realization of necessary updating of the design documentation.

2.11 All test samples necessary for manufacturing are established by the manufacturer, approved by the technical director and agreed with the customer representative.

2.12 The manufacturer of bearings should carry out quality inspection of incoming metal.

Storage and release of metal for manufacturing should be done as per the instruction manual of the bearing manufacturer, which is coordinated with the customer representative.

The chemical compound, mechanical properties and other parameters of metals and the materials used for the manufacture of bearings and spare parts, should correspond to standards, present ЕТУ or the industrial specifications and technical documentation.

TECHNICAL REQUIREMENTS.

3.1 GENERAL TECHNICAL REQUIREMENTS

3.1.1 Bearings and spare parts should correspond to requirements of GOST 520, GOST 3635, GOST 3722, GOST 4060, GOST 4657, GOST 5377, GOST 6870, GOST 7242, GOST 9592, GOST 22696, GOST 25255, of present ETУ and the design documents (КД) approved in established order.

Technical requirements for seating surfaces of the bearings as per GOST 3325.

3.1.2 During presence of various requirements for one and the same parameters in the standards, industrial documentation, drawings and present ETУ, the bearing and separate parts should meet the requirements stated in the present ETУ.

3.1.3 Material for manufacturing parts of bearings should correspond to requirements GOST 503, GOST 800, GOST 801, GOST 4986, GOST 5663, GOST 9045, GOST 15527, GOST 17711, GOST 19851, GOST 21022, TY 37.103.020, TY 37.103.023, TY ВНИППП.080, TY 14-167-18, TY 14-4-563, TУ14-3-939, TY 14-3-940, TY 14-1-4360.

3.1.4 Surface roughness of the races of all sizes of annular, annular contact and spherical ball bearing of accuracy class O GOST 520 should not be more than Ra 0,16 microns as per GOST 2789.

Surface roughness of the races of all sizes of taper roller bearing of accuracy class 0 GOST 520, except bearing specified in 3.2.10 of present ETУ, should not be more than Ra 0.32 microns as per GOST 2789.

The roughness of other surfaces of the specified bearings and all surfaces of bearings of other types and classes of accuracy should correspond to the drawings and РД ВНИПГТ.061.

3.1.5 The fillets (undercuts) at the sides of rings of roller bearings should correspond to РД ВНИПП.061 and should not have trimming.

3.1.6 The condition of surfaces of rings and rolling element of bearings should correspond to РД 37.006.084, РТМ ВНИПП.004 (for balls of 100, 200 degrees of accuracy), Ф ВНИПП.001, and РТМ ВНИПП.008 and РТМ 37.006.041.

3.1.7 Burn marks and soft spots on working surfaces of rings and rolling element of bearings are not permitted.

3.1.8 Cracks on parts of bearings are not permitted

3.1.9 The microstructure of the material of parts of bearings (rings and rolling elements) after hardening and tempering should correspond to: made from steel ШХ15 - РТМВНИПП.155; made from сталей 8Х4В9Ф2-Ш (ЭЙ 347-Ш) and 95Х18 - РТМ ВНИПП.007; made from steel 15Г1-РТМВНИПП.113.

3.1.10 Rings, rolling elements of all bearings and separate parts, excepting bearings as per GOST 4060 should pass additional tempering for removing grinding stress according to И 37.006.099.

Additional tempering of rings and rolling elements are noted down in the register, approved in established order at the manufacturers end, and approved by the customer.

3.1.11 Hardness of parts of bearings should correspond to requirements of GOST 520.

3.1.12 Hardness of parts of the bearings made from steel ШХ15 (ШХ15-Ш), ШХ15СГ (ШХ15СГ-Ш) and ШХ15В and intended for operation at increased temperature should correspond to РД 37.006.134.

3.1.13 Usage of rings and rolling elements after repeated hardening, in case of their overheating is forbidden.

3.1.14 Parts of bearings and separate parts should be demagnetized.

3.1.15 Ball bearings of class of accuracy 0 should be assembled with balls of degree of accuracy 40, classes of accuracy 6 and 5 with balls of degree of accuracy 20. Ball bearings with regulated level of vibration should be assembled with balls of degree of accuracy 16.

Annular bearings roller with short cylindrical rollers of class of accuracy 0 should be assembled with rollers of III degree of accuracy, classes of accuracy 6 and 5 with rollers of degree of accuracy II as per GOST 22696, and radial (annular) roller bearings with convex forming on rollers – in compliance with degrees of accuracy of TY 37.006.075.

Tapered bearing rollers of class of accuracy 0 should be assembled with rollers of degree of accuracy III, and classes of accuracy 6 and 5 - with rollers of degree of accuracy of II.

3.1.16 Radial and axial play in bearings should correspond to the values specified in appendix of this ETУ.

The minimum unit values of radial play in the bearing should be within the lower limit established by the present specifications.

During transition to upper limit of unit values, the average radial play of each bearing should be within the limits, established by the present specifications.

3.1.17 Radial roller bearings with short cylindrical (plain) rollers can be supplied with non- interchangeable rings. During this on the face of both rings, there should be a serial number marking by electrography or any other method.

3.1.18 In the ball bearings, the radius of race profile is checked.

In roller bearings, the contact of rollers to the surface of the racer and to working sides of rings is inspected.

3.1.19 Chromium plating of assembly surfaces of bearings is not permitted.

3.1.20 Depth of case hardening or nitrocarburizing layer of retainer washers for bearings with long cylindrical and helical rollers should be within the limits of 0.05…0.2 mm.

On the external end faces of cage washers (retainer washer), layer of cyaniding or nitrocarburizing is not a compulsory.

3.1.21 It is permitted, if agreed with the customer representative, to carry out phosphating or oxidation of cages and protective washers according to И 37.006.078:

3.1.22 Presence of intermetallic inclusions (dark spots) on the surfaces of cages, manufactured from brass ЛЦ40С is permitted according to the material standards established by the manufacturer as per point 2.11 of present ETУ.

3.1.23 Manufacturing of internal rings of radial/annular and annular contact single-row ball bearings with two rounded off non-assembly chamfers is permitted during initial machining. During this for differentiating the base/datum face, it is necessary to apply mechanical (or any other) marking opposite to base/datum face.

3.1.24 Difference in thickness of racer tight rings of contact ball bearings of class of accuracy 0 should not be more than the value specified in table 1.

3.1.25 Value of radial and axial play of rings of the assembled bearings, face run out of base end face of internal rings with respect to the hole, inconstancy of width of internal rings of ball and roller of annular and annular-contact bearings of class of the accuracy 0, marked in the appendix with the sign[1)] should not be more than the value specified in table 2 and 3.

Table 1 - Difference in thickness of racer tight rings of contact ball bearings.

Accuracy class 0

d, мм	S_i, in microns, not more than
Upto 50	40
Above 50 upto 120	50
Above 120 upto 250	60
Above 250 upto 315	70
Above 315 upto 500	80

3.1.26 Value of axial play of the bearings, marked with sign [2)], should not be more than the values specified in appendix.

Table 2-Value of play and inconstancy of width of internal rings of assembled bearings.

Dimensions in micrometers

d, мм	V_{Bs}	K_{ia}	S_d	S_{ia}
	Not more than			
Upto 30	16	10	16	.32
Above 30 upto 50	16	12	16	32
Above 50 upto 80	20	16	20	40
Above 80 upto 120	20	20	20	40
Above 120 upto 180	24	24	24	48
Above 180 upto 250	24	32	24	48
Above 250 upto 315	28	40	28	56
Above 315 upto 400	32	48	32	64
Note-While checking without mandrel, parameter S_{ia} should not exceed 60 % of the given Value				

Table 3 – Value of play of race of external rings of bearings in assembly

Dimensions in micrometer

D, мм	K_{ea}	S_{ea}
	Not more than	
Upto 30	12	32
Above 30 upto 50	16	32
Above 50 upto 80	20	32
Above 80 upto 120	28	36
Above 120 upto 150	32	40
Above 150 upto 180	36	48
Above 180 upto 250	40	56
Above 250 upto 315	48	64
Above 315 upto 400	50	72
Above 400 upto 500	64	80
Above 500 upto 620	80	96

3.2 ADDITIONAL TECHNICAL REQUIREMENTS

3.2.1 Felt caps used for manufacturing of seal for bearings 6-20703 and 6-20803, should correspond to PCT PCΦCP 754 and pass the preliminary test on parameters specified in table 4.

Table 4-parameters for the checking of caps.

Parameter	Permissible norms	Test method
Volumetric weight of cap, g/cm^3	0.33-0.35	GOST 314

3.2.2 Level of vibration of bearings for vibration rate should correspond to the norms specified in table 5.

Table 5-norms of level of vibration of bearings.

	Norms of vibration level, in db, Maximum			
	Frequency band, in Hz			
	50-300	300-1800	1800-10000	ОУВ
6-202Л1Ш	75	71	73	81
76-206КШ	80	76	78	86
208А	83	78	81	89
208А1	83	78	81	89
212	87	83	85	93
215Ш	90	86	88	96
220Ш	95	91	93	101

End of table 5

Conventional designation of bearing	Norms of vibration level, in db, Maximum			
	Frequency band, in Hz			
	50-300	300-1800	1800-10000	ОУВ
6-303Л1Ш	78	74	76	84
310К	87	83	85	93
315Ш1	88	84	86	94
405	84	80	82	90
406АК	85	81	83	91
407	86	82	84	92
50407	86	82	84	92
36212Е	88	84	86	94
46209Л	85	81	83	91
46212Л	88	84	86	94

3.2.3 Double row (double direction) spherical annular roller bearings.

3.2.3.1 Tolerance limits of dimensional parameters should not exceed the values specified in table 6.

Table 6-tolerance limits of dimensional parameters

Rings internal

Dimensions in micrometers

d, in мм	Eccentricity of racer	V_{Bs}	Deviation from parallelism of mid face	Deviation of dimension M and M_1 from the support surface of mid face upto the end face
	Maximum			
Upto 80	15	15	15	±40
Above 80 to120	20	15	15	±40
Above 120 to180	20	20	20	±50
Note: The permissible deviation from parallelism of the mid face with respect to the end face for internal rings of bearings: 30-3614 - not more than 17 microns, 3518 and 20-3522 - not more than 20 microns.				

3.2.3.2 During grinding from various datum, the tolerance on width of internal rings is established to minus 0.05 mm.

3.2.3.3 Distance from the end face of the roller of smaller diameter up to the middle line of Contact, l_k, in mm should correspond to:

$l_k = 0{,}5\ L_W \pm 0{,}15\ L_W$ where L_W – roller length, in мм;

3.2.3.4 Contact of generatrix of races of the internal ring and rollers should not be less than 60 % of the active length of the roller.

3.2.3.5 The area of contact of end face of rollers to spherical surface of thrust/contact sides of internal rings should not be less than 60 % of the area of contact surfaces.

3.2.3.6 The tolerance on position of the basic plane of the roller relative to base/datum end face should be within limits as given below:

For D_W upto 10 мм ± 0.03 мм

For D_W Above 10 to 30 мм ±0.04 мм

For D_W Above 30мм ±0.05 мм

3.2.4 Bearings 64706, 64805, 64903, 64904, 64905 should rotate easily and freely.

3.2.5 Rings of radial annular bearings with long cylindrical rollers should correspond to requirements of РД 37.006.024.

3.2.6 Bearings 7508У, 7511У, 7806У [1)].

3.2.6.1 Surface roughness of races of rings should not be more than R_a 0.16 microns as per GOST 2789.

3.2.7 while running the bearings with two protective washers or sealing, flow/leakage of grease between the washer or sealing and the external ring is not permitted.

Insignificant flow/leakage of grease between the washer and the internal ring is permitted.

The amount of residual grease after the running in and modes of running in are given the table 7.

3.2.8 Assembly of taper double row bearings is carried out as per PTM 37.006.353.

Table 7- Modes of running in of bearing of closed type.

Conventional designation of bearings	Grease grade	Grease quantity		Running-in mode	
		Filling mode, in grams	After running-in, grams, not less than	No.of revolutions, RPM	Time, in minutes
6-80029T2C2	TSIATIM-221	0,315-0,585	0,252	8000	5
6-80201	TSIATIM-201	0,35 - 0,65	0,28	5000	5
6-80201T2C2	TSIATIM-221	0,35 - 0,65	0,28	5000	5
6-80201C21	ЭРА	0,35 - 0,65	0,28	5000	5
76-80202T2C2	TSIATIM-221	0,7 - 1,3	0,56	5000	5
80202C9	ЛЗ-31	0,7 - 1,3	0,56	5000	5 - 10
70-80203C2	TSIATIM-221	0,9 - 1,3	0,72	5000	5
6-80204T2C2	TSIATIM-221	1,05 - 1,95	0,84	5000	5
80204C9	ЛЗ-31	1,05 - 1,95	0,84	5000	5 - 10
70-80204C2	TSIATIM-221	1,05 - 1,95	0,84	5000	5
76-80206KC2	TSIATIM-221	2,45 - 4,55	1,96	5000	5
6-180504C9	ЛЗ-31	2,4 - 3,2	2,2	5000	5
76-180506БТ2С2	TSIATIM-221	2,1 - 3,9	1,2	3200	15
76-180506E8T2C2	TSIATIM-221	2,1 - 3,9	1,2	3200	5
76-180506E8T2C2	TSIATIM-221	2,1 - 3,9	1,2	1000	10
75-180506ET2C2	TSIATIM-221	2,1 - 3,9	1,2	3200	15
75-180506E6T2C2	TSIATIM-221	2,1 - 3,9	1,2	3200	15
76-180506E6T2C2	TSIATIM-221	2,1 - 3,9	1,2	3200	15
75-180506E7T2C2	TSIATIM-221	2,1 -3,9	1,2	3200	15
76-180506E7T2C2	TSIATIM-221	2,1 -3,9	1,2	3200	15
6-530206K1	TSIATIM-201	2 - 3	0,5	2400	15
6-530206K1C9	ЛЗ-31	2 - 2,5	0,5	4000-5000	15
76-80212C2	TSIATIM-221	11 - 16	8,8	3000	5

Note: Running-in of bearings at rotational speed, differing in the same or opposite direction by 10% from the value specified in table is permitted.

3.2.9 Cardan Bearings.

3.2.9.1 Cardan bearings should correspond to requirements of drawings, present ETУ and TУ ВЫИПП.065. Manufacturing of bearings of high accuracy is carried out as agreed with the customer representative at the manufacturer's end.

3.2.9.2 Surface roughness of the external cylindrical surface of rings of cardan bearings 704702, 704702К, 804704К5, 804805К1, 904700У, 904700К should not be more than *Ra* 0.63 microns as per GOST 2789.

3.2.9.3 Play of the internal surface of the ring bottom of cardan bearings 904700У, 904700К, 704702, 704702К with respect to the generatrix of race/path should not be more than 0.015 mm.

3.2.9.4 Play of the internal surface of the ring bottom of cardan bearings 804704К5, 804805К1, 804707К3С10 relative to generatrix of external cylindrical surface during measurement of higher bottom diameter (at a distance of 1 mm from the face edge) should not exceed 0.1 mm.

3.2.10 Bearings 27308У, 27709У.

3.2.10.1 Race of rings is finish machined by method of super finishing; the surface roughness of their surfaces should be not more than *Ra* 0.16 micron as per GOST 2789.

3.2.10.2 Contact of rollers to the surfaces of race/path and active side of the internal ring is checked by blueing before the setting of cage, during this the area of contact of datum end faces of rollers to the support side of the internal rings should not be less than 80 % of the area of support surface of each roller. The form/shape and the dimension of prints should correspond to И37.006.074.

3.2.10.3 Bearings 27308У1 which have passed contact test, are subjected to running in as per the technology of the manufacturer and approved by the customer representative at the manufacturers end.

The surface roughness of rolling surface of rollers and race/path of the internal ring after the running in should not be more than *Ra* 0.32 microns as per GOST 2789.

3.2.11 Ball bearing.

3.2.11.1 Ball bearing should correspond to requirements of GOST 3635 and РД 37.006.057.

3.2.11.2 Rings of bearing Ш8Ю5Т should be coated with molybdenum disulphide as per И37.006.045.

3.2.12 Separate needle roller.

3.2.12.1 Separate needle roller should correspond to the values given in table 8.

3.2.13.Separate balls.

3.2.13.1. Balls Б 26.988-200±25, Б 26.988-200±150; 30.162-200+200;

Б 30.162-200-200; Б 31.75-200±20; Б 34.925-200±25 should be ground, not hardened; their hardness should be 170...207 HB; permissible surface roughness of these balls not more than *Ra* 2.5 microns as per GOST 2789.

3.2.13.2. Balls 34.925-200 should be supplied in the following classification group

1 group with diameter from	34.83 to 34.85 мм
2 group with diameter from	34.85 to 34.87 мм
3 group with diameter from	34.87 to 34.89 мм
4 group with diameter from	34.89 to 34.91 мм
5 group with diameter from	34.91 to 34.93 мм
6 group with diameter from	34.93 to 34.95 мм
7 group with diameter from	34.95 to 34.97 мм
8 group with diameter from	34.97 to 34.99 мм
9 group with diameter from	34.99 to 35.01 мм

Table 8- Requirement for rollers needle.

Roller designation (Part number)	Technical requirements					Additional designation
	Basic	Additional				
		Material	V_{DwL}, in microns, maximum	Complete set, Pcs	Variation in length, in mm	
2.5x13.8 A3 2.5x13.8 A5 2.5x17.8 A3 2.5x17.8 A5	GOST 6870	ШХ15-Ш GOST 4727	2	56 56 24 24	As per drawing	К
3x21.8 A3			3	100		-
5x43.8 A5 5x49.8 A5			-	-	-0.4	-
1.5x17.8 A5 1.6x8.8A5 1.6x17.8 A5Ю 4x33.8A5 5x43.8 A5		-	-	-	-	-

3.2.13.3 The balls specified in appendix B are supplied as per the order of the customer.

3.2.13.4 Stainless steel balls.

The balls having the designation index «Ю» are manufactured from stainless steel 95Х18 GOST 5632 and 95Х18-Ш ТУ 14-1-595.

Balls should be heat-treated up to 59...63 HRC.

Surface roughness of the balls is as per РД ВНИПП.061.

Burn marks, light spots, corrosion, cavity and cracks are not permitted.

Other requirements as per GOST 3722.

3.3 Marking and packing.

3.3.2 It is permitted to mark the markings as given in the drawing on one of the ends or separately on to rings of the single piece roller bearing.

3.3.3 Single piece bearings with non-interchangeable rings should have the serial number applied by electro-graph method or other methods on the face of both the rings and on other single piece parts.

On the single piece bearing of (type 142000), the serial number should be on the face of the ring and on the cages.

The passport and the box with the packed single piece bearings and with non-interchangeable rings should have a clear inscription “non-interchangeable”.

The marking may not be done on the interchangeable contact plane internal ring of bearing 142220Л2.

3.3.4 The passport/certificate of bearing 20-782726КМ, 26-782726КМ should have the actual value of size $99.8_{-0.5}$ мм (block: rollers and rings- intermediate).

3.3.5 In special cases, if agreed with the customer representative at the manufactures end, it is permitted to mark the conventional designation of the bearing, of the manufacture and design characteristics and year of manufacturing by electro-graphic, electro-chemical or chemical method.

3.3.6 Marking of tapered double row bearing as per PTM 37.006.353.

3.3.7 It is permitted to use the stocks of marking of bearing ring, which have the marking of the old year of manufacturing for the period of 1st quarter of the subsequent year.

Transition to the marking of next year of manufacturing can be from the 4th quarter of the current year.

3.3.8 Preservation and packing of the bearings and separate parts is as per РД ВНИИП.003.

For bearings, which are supplied to the manufacturers of product, it is permitted to use other kinds of multiple use transportation container as per GOST 14861, which ensures the safety of the internal packing and does not permit moisture and does not emit corrosion active substances.

3.3.9 While packing the bearings 6-952132M, the roller set is wrapped in a paraffin paper and packed along with the rings.

3.3.10 Packing of bearings 6-322951ДМУ, 6-322951ЛМУ, 6-322948ЛМУ, 6-322948ЛМУ1 should ensure protection of the rings from transportation damages. Removable parts of the bearings are wrapped separately with paraffin paper as per GOST 9569.

Combined wrapping of removable parts is permitted under the condition that a lining of polyethylene film as per GOST 10354 of thickness 0.05-0.06 мм will be given between the block and the ring.

3.3.11 Packing of separate balls.

3.3.11.1 Number of balls 25.4-40 in one container should be multiples of 6.

3.3.11.2 Number of balls 30.162-200 in one container should be in multiples of 196. During this, 196 balls should be of the same-assortment group.

The set number, maximum and minimum actual ball diameters are specified in the packing box and in the certificate.

3.3.12 Inhibitor «АКОР» is not used while preserving the bearings, which are supplied to the customer as per present ETУ.

Bearings and other parts which are manufactured as per present ETУ can be stored at the manufacturer's store upto 6 months. After the completion of the period, the bearings and separate parts are subjected to re-preservation and the new guaranteed period of storage is indicated in the passport/certificate.

3.3.13 A certificate as per the established format should be kept in every box with the pack bearing (See appendix E).

A certificate as per format 1 as given in PTM 37.006.353 should be kept along with tapered double-row bearings.

4 ACCEPTANCE RULE

4.1 The manufacturer carries out 100% inspection of bearings in compliance with the requirements of present specification and GOST 520.

4.2 Bearings which are supplied according to the present ТУ are subjected to total inspection of radial and axial clearance.

4.3 The customer representative has the right to check the bearings and separate parts for compliance to the requirements of present ЕТУ.

4.4 For detecting the over-heating of rings, the rolling elements of the bearings and separate parts, except bearing rings as per GOST 4060 and GOST 3635 are subjected to total pickling in compliance with И 101, and the balls which have additional designation of index «Ю», in compliance with the manufacturer's manual prepared on the basis of И 111.

The percentage of inspection is established by the manufacturer in agreement with the customer's representative.

4.5 One bearing from the offered batch is sent to the laboratory for metallographic analysis and determination of the steel grade of the rings and the rolling elements.

One bearing from the batch is sent to the laboratory while offering the bearings in batches of less than 100 pcs.

For bearings with outer diameter above 300mm, it is permitted in agreement with the customers representative to send bearing parts from those which have been rejected by the inspection department for geometrical parameters while preparing the given batch for assembly and dispatch.

4.6 Chemical analysis is carried out whenever required by the inspection department of the manufacturer or by the customers representative, but not less than once in a month for every produced standard size as per the manual, which is approved by the customer's representative at the manufacturer's end.

4.7 Percentage of checking of contact of the rollers to the race surface and to the active sides of the roller bearing rings is established by the manufacturer in agreement with the customer' representative.

4.8 Percentage of inspection of the bearing vibration level is established by the manufacturer in agreement with the customer's representative.

4.9 The manufacturer carries out periodical bench test of the bearings as per the present ETУ in compliance with M37.006.086 and GOST 520 as per the schedule, agreed with the customer's representative at the manufacturers end.

In case of un-satisfactory results of periodic bench tests, careful analysis of the damages or destruction of the bearings is carried out in compliance with PTM ВНИПП.010 for establishing the reason for the failure of the bearings till the lapse of 90% of the service life. Further acceptance and dispatch of the product is stopped. Acceptance and dispatch of the product is restored after taking necessary measures for rectification of the detected defects in agreement with the customer's representative.

4.10 Rings of all bearings, except rings of bearings as per GOST 4060 and rings of intermediate remote bearings are subjected to total inspection for cracks.

Rollers, balls and steel cages are subjected to random inspection for cracks.

Results of the above inspection are noted down in a special logbook of the inspection department, format of which is agreed with the customer's representative.

4.11 If deviation from the present ETУ is detected during the acceptance of bearings and separate parts for mechanical, chemical or metalographical parameters, then the whole batch is rejected and cannot be re-offered to the customer. The batch of bearings and other parts which have been rejected for other kinds of deviation are re-offered to the customer in approved established order after the rectification of defects and re-inspection by the inspection department.

During repeat offering of the batches of bearing and separate parts, the reasons for the deviation of the rejected bearings and separate parts, the measures taken for rectification of the same and the conclusion about the acceptance of these parts for second time offering are specified.

If in case during the repeat offering, the batch does not correspond to the requirements of present ETУ, then the batch is returned back to the manufacturer and cannot be offered once more.

4.12 The customer carries out incoming inspection of bearings for radial or axial clearance as per the method applicable at the manufacturer’s end.

5 METHODS OF TESTING

5.1 Testing the quality of the metal is carried out in compliance with РД ВНИПП.014.

It is permitted to determine the steel grade of bearing parts by spectral analysis method.

5.2 Checking the parameters of accuracy of rotation of the bearings can be as per the methods, which are in force at the bearing manufacturer under the conditions that the accuracy norms established in GOST 520 is ensured.

In case of difference of opinion, the final results will be the results of measurement as per the method established in GOST 520 and the corresponding technical documentation, specified in the present ETУ.

5.3 While checking the linear dimensions, it is necessary to use PTM 37.006.270.

5.4 PTM ВНИПП.008 and PTM 37.006.304 should be used while checking the assembly and non-active surfaces of the ball and roller bearings.

5.5 Checking of quality of gas nitro-cementation of parts of needle bearings made of steel 08КП, 10КП, 08Ю is carried out in compliance with PTM ВНИПП.113.

5.6 Inspection of rings of bearings, rollers and balls after the hardening and tempering should be carried-out as per PTM ВНИПП.155 -for steel grades ШХ15, ШХ15СГ, ШХ15В and ШХ15СГВ, as per PTMВНИПП.007 - for steel grade 8Х4В9Ф2-Ш (ЭИ347-Ш) and 95Х18, as per PTM ВНИПП.113- for steel grade 15Г1.

5.7 Surface roughness of the bearing parts is checked by method of comparison with the specimen. In controversial case, decision of the laboratory of the bearing manufacturer is final. The result is based on the measurement of the surface roughness on the device taking into account the methods of РД 37.006.088 in compliance with GOST 2789 and GOST 25142.

5.8 Inspection of the rings for cracks is carried out by magnetic method or fluorescent magnetic particle inspection or luminescent crack detection method as per ИВНИППП.003 or И 37.006.031.

It is permitted to carryout the inspection of cracks of outer rings of taper roller bearings and inner rings of annular ball bearings of diameter upto 100mm on automatic crack detectors of types ДТ-201, ДТ-201М and ДТ- 202 with subsequent random inspection by magnetic-powder method.

Inspection of cracks of rollers, balls and heavy steel cages is carried out on magnetic crack detector or on devices which do not violates the inspection method and is approved by ОАО "ВНИППП", in compliance with the established technology.

5.9 Hardness of short cylindrical rollers is carried-out in 3 points on the cylindrical surface and in 3 points on one of the faces as per ИВНИППП.007.

5.10 Inspection of oxidation, cyanidation, phosphatizing, thickness and quality of plating should be carried-out as per the instruction manual of the manufacturer, which is approved by the customer's representative at the manufacturers end.

5.11 Inspection of residual de-magnetization of parts of bearings and separate parts and also of assembled bearings is as per И 37.006.032.

5.12 Measurement of geometric parameters and testing of the surface roughness is carried out by the inspection department at the work place and if required by the inspection department and customer's representative- every standard size is sent to the corresponding laboratory in the factory for testing not less than once in a month.

5.13 Instruction of the radial clearance of ball bearings is carried out on devices specified in the appendix. It is permitted to carryout the inspection of radial clearance on

devices AM-107M, AM-108M, M-525M and M-444

5.14 Inspection of radial clearance of roller bearings with short cylindrical roller is carried out on devices specified in the appendix. It is permitted to carry out the checking of radial clearance on device C-1, M-866.

5.15 Value of the radial clearance in the bearing is determined as the mean arithmetic value of three measurements by turning one of the rings at 120 °. During assembly and checking, the minimum values of the radial clearance in the bearing should be within the lower limit established by the present specifications.

5.16 It is permitted to carry out the checking of radial clearance in spherical roller bearings with the help of feeler/probe, as per the procedure/method at the manufacturing premises – in agreement with the customer representative.

5.17 Checking of the axial clearance of radial ball bearings is carried out on devices specified in appendix. It is permitted to carry out the checking of axial clearance on device A - 123.

5.18 In one-piece radial ball bearings, the datum face should be from one side.

During non-datum machining, the inspection of position of the seating/groove axis should be from any end face

5.19 Inspection of radius race profile of ball bearings, except for one-piece rings with complex profile, rings having seating radius less than 3 mm, and rings of double row spherical radial ball bearings, is carried out with reference/standard (limiting) spherical gauge by blueing method according to И 37.006.074 or as per the instruction manual of the manufacturer in agreement with customer representative.

Checking of radius of race profile of ball bearings with seating radius less than 3mm and rings of double row radial ball is carried out with limiting disk gauges; checking of radius of race profile of one-piece rings of ball bearing with complex profile is carried

out with limiting template of complex profile.

5.20 Position of mean line of contact of rollers to the external ring (position of contact) of double row spherical roller bearings in assembled form is checked by blueing method.

Before introduction of the device for checking of the of radius of race of internal rings of double row spherical roller bearings, the checking of race is carried out by blue contact method by means of reference roller or specially made profile disk with nominal radius as per drawing.

5.21 Contact of the roller to the race surface and to active sides of rings of roller bearings is checked by blueing method according to И 37.006.074.

5.22 Checking of radial shift in bearings 6-97520У and 6-97520АУ is carried out as per М 37.006.074.

5.23 Free rotation of bearings 64706, 64805, 64903, 64904, 64905 is checked by the technique developed by the manufacturer and approved by ОАО “ ВНИПП ".

5.24 Checking of bearings with two protective - washers or sealing for absence of flow/leakage of grease is carried out by checking the bearings by running-in method as per the technique of the manufacturer in agreement with the customer representative at the manufacturer’s end.

5.25 Vibration level of bearing is checked as per М ВНИПП.003.

5.26 Checking of axial clearance of tapered double row bearing is carried out as per РТМ 37.006.353.

6 GUARANTEE OF THE SUPPLIER

6.1 The manufacturer guarantees the working of 100 % of bearings in mass production products for the full service life as determined in the established order and as specified in the part list on application of bearings.

6.2.While supplying the bearings as per the contracts 93603-С, it is permitted to store them in supply condition in a non-heated warehouse which does not permit direct exposure to moisture, during this the warranty period of storage of bearings is 24months, and of bearings and separate parts preserved as per РДВНИПП.003 - 5 years.

6.3 Preservation and packing of the bearings, which are supplied as per present ETУ should guarantee protection of bearings against corrosion for 24 months from the date of dispatch if the rules of storage are adhered to.

6.4 The manufacturer guarantees serviceability of bearings 20-2308Б1Т2 in products ГДЛ-10Б for 11.5 years, from this 1 year is storage period in the warehouse in supply condition, 6 months prior to assembly (set making) of the product as per the instructions of the manufacturer and 10 years in finally assembled products by meeting the rules of storage as established in the instruction of the developer of products, during adherence of the following requirements by the customer:

1) The manufacturers of products should meet the requirements of РД ВНИПП.004 on storage, de-preservation and handling of bearings before mounting the bearings in the products;

Assembly of the products should be carried out as per the engineering specifications approved by the designer of the product, which is developed considering the requirements of РДВНИПП.004 regarding storage and protection of bearings from corrosion and observance of requirements of assembly, disassembly and operation of bearings.

3) While assembling the bearings in products, apply grease, which ensures preservation of the serviceability and protection from corrosion during the period of storage and operation of the product as stipulated in the engineering specifications on these products.

6.5 The manufacturer guarantees serviceability of bearings 20-308ЛТ and 20-2308Б1Т2 in products СГ-21, supplied to the main customer as spare parts and also in finally mounted products, for 10.5 years if requirements of sub-clause 1), 2), 3) point 6.4. of present ЕТУ are adhered to by the customer.

7 REFERENCE STANDARD DOCUMENTS

Designation and name of the document	Point number
GOST 314-72 Felts, parts made from felt, single piece felt products. Acceptance procedures and test methods.	3.2.1
GOST 503-81 Low carbon steel cold rolled strip. Specifications.	3.1.3
GOST 520-89 Anti-friction (roller element) bearing. General specifications	Introductory part, 1.1, 3.1.1, 3.1.4, 3.1.11, 4.1, 4.9, 5.2
GOST 800-78 Bearing tubes. Specifications.	3.1.3
GOST 801-78 Steel for bearing. Specifications.	3.1.3
GOST 2789-73 Surface roughness. Parameters and characteristics.	3.1.4, 3.2.6.1, 3.2.9.2, 3.2.10.1, 3.2.10.3, 3.2.13.1, 5.7
GOST 3325-85 Anti-friction (roller element) bearing. Tolerance zones and technical requirements for seating/fit surfaces of shaft and housings. Fits.	1.1, 3.1.1
GOST 3635-78 ball bearings. Specifications	3.1.1, 3.2.11.1, 4.4
GOST 3722-81 Anti-friction (roller element) bearing. Balls. Specifications.	3.1.1, 3.2.13.4
GOST 4060-78 Roller needle bearing with single external casting ring. Technical requirements.	3.1.1, 3.1.10, 4.4, 4.10
GOST 4657-82 Single row needle radial roller bearing. Basic parameters. Technical requirements.	3.1.1
GOST 4727-83 Bearing wires. Specifications.	3.2.12.1
GOST 4986-79 Corrosion resistant and heat resistant steel cold rolled strip. Specifications.	3.1.3

Designation and name of the document	Point number
GOST 5377-79 Radial roller bearing with short cylindrical rollers without internal or external rings. Types and basic parameters.	3.1.1
GOST 5632-72 High alloyed steel and anti-corrosion, heat resistant and heat stable alloys. Grades.	3.2.13.4
GOST 5663-79 Carbon steel wire for cold up-setting. Specifications.	3.1.3
GOST 6870-81 Anti-friction bearings. Needle rollers. Specifications.	3.1.1, 3.2.12.1
GOST 7242-81 Single row radial ball bearing with protective washers. Types and basic parameters. Specifications.	3.1.1
GOST 9045-93 Cold rolled sheet of low carbon steel for cold stamping.	3.1.3
GOST 9569-79 Paraffin paper	3.3.10
GOST 9592-75 Single row radial ball bearing with two protective washers and projecting inner ring. Basic parameters.	3.1.1
GOST 10354-82 Polyethylene film.	3.3.10
GOST 14861-91 Industrial containers/trays. Types.	3.3.8
GOST 15527-70 Copper-zinc (bronze) alloys processed by pressure. Grades.	3.1.3
GOST 17711-93 Copper-zinc (bronze) alloys. Grades.	3.1.3
GOST 19851-74 Carbon steel strips. Cold rolled cut.	3.1.3
GOST 21022-75 Chrome steel for precision bearings. Specifications.	3.1.3

Designation and name of the document	Point number
GOST 22696-77 Anti-friction bearings. Cylindrical rollers. Specifications.	3.1.1, 3.1.15
GOST 25142-82 Surface roughness. Terminology and definitions.	5.7
GOST 25255-82 Lengthy cylindrical rollers. Specifications.	3.1.1
РСТ РСФСР 754-89 Female felt cap. General Specifications.	3.2.1
ТУ 14-1-4360-87 Superior quality bearing steel of continuous casting blanks. Specifications.	3.1.3
ТУ-14-1-595-73 Stainless steel rods Grades 95Х18Ш smelted in electroslag furnace.	3.2.13.4
ТУ 14-167-18-75 Superior quality steel wire for rivets of special bearings. Specifications.	3.1.3
ТУ-14-3-939-80 Cold shaped bearing tubes of good quality.	3.1.3
ТУ-14-3-940-80 Hot shaped bearing tubes of good quality	3.1.3
ТУ 14-4-563-74 Round wire of steel ШХ15-ШД for highly precision devices of bearing. Specifications.	3.1.3
ТУ 37.103.020-88 Steel wire for rivets and cross piece of cages of anti-friction bearing	3.1.3
ТУ 37.103.023-87 Cold rolled strip of low alloyed structural steel. Specifications.	3.1.3

Designation and name of the document	Point number
ТУ 37.006.075-87 Anti-friction bearings. Short cylindrical rollers. Specifications.	3.1.15
ТУ ВНИПП.080-00 Anti-friction bearings. Stainless. Specifications.	3.1.3
ТУ ВНИПП.065-99 Cardan needle roller bearings . Specifications.	3.2.9.1
Ф ВНИПП.001-00 Surface condition of the race and the balls of the bearings of special purpose. Photo standards.	3.1.6
РД ВНИПП.014-00 Inspection of metal quality, meant for anti-friction bearing parts. Manuals.	5.1
РД 37.006.015-88 instruction manual. Development and release of anti-friction bearings for manufacturing. Manuals.	2.5
РД 37.006.024-88 Radial roller bearing single row with lengthy cylindrical rollers. Rings. Manual.	3.2.5
РД 37.006.057-88 Ball bearings. Rings. Manual.	3.2.11.1
РД ВНИПП.061-99 Surface roughness of antifriction bearing parts. Manual.	3.1.4, 3.1.5, 3.2.13.4
РД 37.006.084-89 Roller bearings. Inspection of condition of surfaces of race and rollers. Manual.	3.1.6
РД 37.006.088-89 Methods. Inspection of roughness of accurate surfaces of bearing device parts. Manual.	5.7
РД ВНИПП.097-00 Procedure for approval of application of anti-friction bearings for special engineering products. Manual.	Introductory part

Designation and name of the document	Point number
РД 37.006.134-92 Heat treatment technology of bearing parts, working at temperature above 100°C. Manual.	3.1.12
РД ВНИПП.003-99 Washing, preservation and packing and handling of bearings and separate details. Manual.	3.3.8, 6.2
РД ВНИПП.004-99 Storage, de-preservation and handling of bearings and separate details. Manual.	6.4
РТМ ВНИПП.010-00 Anti-friction bearings. Damages and destructions. Terminology, special features and reasons. Manual.	4.9
PTM 37.006.041-81 Ball bearing. Condition of the race surface of bearings. Technical manual.	3.1.6
PTM 37.006.057-73 Technical manual. Ball bearing- single row radial and radial-thrust, double row radial spherical, single and double row thrust bearings. Rings. Technical manual.	2.3
PTM 37.006.059-73 Technical manual. Radial roller bearing with short cylindrical and needle rollers. Rings. Technical manual.	2.3
PTM 37.006.062-73 Single row tapered roller bearings. Internal and external rings. Technical manual.	2.3
PTM 37.006.098-74 two and four row tapered roller bearings with internal holes up to 400 мм and their parts. Technical manual.	2.3
PTM 37.006.258-79 Tapered roller bearings. Cages. Specifications. Technical manual.	2.3

Designation and name of the document	Point number
PTM 37.006.270-79 Determination of compliance of assembled bearings and their parts to the requirements of technical documents during checking of linear dimensions. Technical manual.	5.3
PTM 37.006.304-80 Technical manual. Photo standards on grinding line of secondary tempering of non-active surfaces of ring and rollers of anti-friction bearing. Technical manual.	5.4
PTM 37.006.353-82 Two and four row tapered roller bearings. Assembly and alignment. Technical manual.	3.2.8, 3.3.6, 3.3.13, 5.26
PTM 37.006.383-83 Two row spherical radial roller bearing with symmetrical and asymmetrical rollers. Specifications for parts. Technical manual.	2.3
PTM 37.006.424-85 Needle roller bearings with single casted ring of general purpose. Rings and needle rollers with journals. Technical manual.	2.3
PTM 37.006.450-86 Anti-friction bearings. Inconstancy of race diameter. Technical manual.	2.3
PTM ВНИПП.004-99 Ball bearing. Surface condition of balls of chrome steel for bearing ШХ15. Technical manual.	3.1.6
PTM ВНИПП.007-99 norms and methods of metallographic method of inspection of forging quality and heat treatment of anti-friction bearing parts made of steel 8Х4В9Ф2 (ЭИ 347), 95Х18 and 110Х18М. Technical manual.	3.1.9, 5.6
PTM ВНИПП.008-99 Anti-friction bearings. Condition of the assembly and non-active surfaces of ball and roller bearings. Technical manual.	3.1.6, 5.4

Designation and name of the document	Point number
РТМ ВНИГШ.113-99 Typical technological modes, norms and inspection method of quality of chemical-thermal processing of parts of bearings of the general and special purpose made from casehardened steels. Manual.	3.1.9, 5.5, 5.6
РТМ ВНИПП.155-99 norms and inspection method of quality of heat treatment of parts of bearings of the general and special purpose made from steel ШХ. Technical manual.	3.1.9, 5.6
М 37.006.074-78 Measurement technique of radial movement of the cage in bearings 6-97520У and 6-520АУ, manufactured as per ЕТУ500.	5.22
М 37.006.086-80 Bearings of special application. Bench tests on ГПЗ. Procedure.	4.9
М ВНИПП.003-99 Checking and norming of vibration of anti- friction bearings of special purpose. Procedure.	5.25
Н 453-59 Industrial norms. Specifications for final inspection of parts of ball bearing. Balls	2.3
Н 458-56 Departmental norms. Specifications for final inspection of parts of roller bearing. Tapered rollers. Tapered roller with convex generatrix of anti-friction surface (Addition № 1).	2.3
Н 461-56 Departmental norms. Specifications for final inspection of parts of roller bearing. Rings of radial roller bearings with single row short cylindrical rollers.	2.3
Н 1363 Departmental norms. Marking of anti-friction bearing parts.	2.3
РД ВНИПП.018-00 Ball bearing and roller bearings. Bulky cages. Manual.	2.3

Designation and name of the document	Point number
И37.006.099-80 Tempering of bearing parts of special application made from steel of type ШХ15 and ШХ15СГ for reducing the grinding stress. Instruction manual.	3.1.10
И ВНИПП.003-99 Inspection of bearing parts made from ferro-magnetic materials by magnetic and magnetic-luminescence flaw detection method. Instruction manual.	5.8
П ВНИПП.001-00 Regulations about the parent organization for preparation and introduction of the design and reference standard documents on Anti-friction bearings of special application.	2.1

Designation and name of the document	Point number
ОН 37-61 Industrial standards. Ball bearings, additional Specifications.	2.3
ОН 39-61 Industrial standards. Forged coil type stamped cages for single row radial ball bearing. Specifications.	2.3
ОН 41-62 Industrial standards. Roller bearings. Additional Specifications.	2.3
И 101-74 Instruction for detection of light spots and burns on the parts of bearings made from steel of type ШХ15, 15Г1, 15Х, 15Н2М-Ш(15НМ), 18ХГТ, 20Х, 20Н2М-Ш(20НМ), 20Х2Н4А, ШХ15СМ-Ш, 55СМ5ФА by pickling method.	4.4
И 111-74 Instruction for detection of light spots and burns on the parts of bearings made from special steel by pickling method.	4.4
И ВНИПП.007-00 Hardness testing of anti-friction bearing parts. Instruction.	5.9
И 37.006.031-80 Inspection of bearing parts made from non-magnetic material by luminescence and color flaw detector. Instruction.	5.8
И 37.006.032-80 De-magnetization and checking of residual magnetization of bearing parts and assembled bearings. Instruction.	5.11
И 37.006.045-86 Application of molybdenum disulphide and hard lubricant coating on the basis of molybdenum disulphide on the bearing parts. The instruction.	3.2.11.2
И 37.006.074-77 Blue contact method of testing of parts and assembled bearings. Instructions.	3.2.10.2, 5.19, 5.21,
И 37.006.078-87 Phosphating of bearing parts. Instruction manual.	3.1.21

Designation and name of the document	Point number
И37.006.099-80 Tempering of bearing parts of special application made from steel of type ШХ15 and ШХ15СГ for reducing the grinding stress. Instruction manual.	3.1.10
И ВНИПП.003-99 Inspection of bearing parts made from ferro-magnetic materials by magnetic and magnetic-luminescence flaw detection method. Instruction manual.	5.8
П ВНИПП.001-00 Regulations about the parent organization for preparation and introduction of the design and reference standard documents on Anti-friction bearings of special application.	2.1

APPENDIX A

(Mandatory)

List of bearings supplied as per ETY 500 for mass production articles

Table A.1 – Single row angular ball bearing

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
6- 18	6	5	16		110*	C-30	
6- 24	6	5	16		125*	C-23	
6- 25	6	5	16			C-23	
6- 26	6	5	16		110*	C-30	
6- 27	6	5	16		110*	C-30	
5- 29	5	5	16			C-30	
5- 29Г	5	5	16			C-30	
6- 100Л	6	5	16			C-30	
6- 101	6	8	22			C-30	
6- 104	6	10	24		180*	P-123	
106АК	0	10	24			P-123	
6- 106	6	10	24			P-123	
106	0	10	24			P-123	
107	0	12	26			P-123	
107А	0	12	26			P-123	
6- 107	6	12	26			P-123	
109	0	12	29			P-123	
110К	0	12	29			P-123	
110	0	12	29			P-123	
6- 111Л	6	13	33			P-123	
6- 112	6	13	33		270*	P-123	
6- 112Л	6	13	33		270*	P-123	
6- 113Л	6	13	33		270*	P-123	
114	0	14	34			P-124	
115Л	0	14	34		280*	P-123	
6- 115Л	6	14	34		280*	P-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
116Л	0	14	34			P-123	
6- 116Л	6	14	34			P-123	
6- 116АЛ	6	14	34			P-123	
6- 118	6	16	40			P-124	
120	0	16	40			P-124	
6- 120АЛ1	6	16	40			P-124	
120А	0	16	40			P-124	
6- 124	6	20	46		400*	P-124	
6- 126Л	6	23	53		450*	P-124	
128	0	23	53			P-124	
134Л	0	24	65		560*	P-124	
200	0	5	16		150*	P-123	
5- 201К1	5	8	22		170*	P-123	
5- 201	5	8	22		170*	P-123	
5- 201К2	5	8	22			P-123	
202	0	8	22		180*	P-123	
202АК4	0	8	22			P-123	
6- 202	6	8	22			P-123	
6- 202Л1Ш	6	8	22			P-123	3.2.1
6- 202АК4	6	8	22			P-123	
203	0	8	22		190*	P-123	
203А	0	8	22			P-123	
203АК	0	8	22			P-123	
203У	0	8	22		150*	P-123	
6- 204	6	10	24		210*	P-123	
204К	0	10	24		210*	P-123	
204А	0	10	24		210*	P-123	
204АК	0	10	24		210*	P-123	
70- 205АК	0	18	33			P-123	
205К	0	10	24		210*	P-123	
6- 205АК	6	10	24			P-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
205АК	0	10	24		210*	Р-123	
206А	0	10	24			Р-123	
206К[1)]	0	10	24			Р-123	
6- 206К	6	10	24		210*	Р-123	
6- 206А	6	10	24			Р-123	
6- 206АК	6	10	24			Р-123	
76- 206К	6	18	33			Р-123	
76- 206АШ	6	18	33			Р-123	
76- 206КШ	6	18	33			Р-123	3.2.1
76- 206А	6	18	33			Р-123	
207К5	0	12	26		240*	Р-123	
6- 207К5	6	12	26		240*	Р-123	
25- 207БТ1	5	20	32		270*	Р-123	
207К5У	0	12	26		200*	Р-123	
6- 207К5У	6	12	26		200*	Р-123	
208А1	0	12	26		260*	Р-123	3.2.1
208А	0	12	26		260*	Р-123	3.2.1
208У	0	12	26		220*	Р-123	
25- 208Б1	5	20	32		280*	Р-123	
76- 208Б1	6	21	39			Р-123	
75- 208Б1	5	21	39			Р-123	
209	0	12	29		270*	Р-123	
209А	0	12	29		270*	Р-123	
6- 209	6	12	29		270*	Р-123	
6- 209А	6	12	29		270*	Р-123	
76- 209Е	6	24	42			Р-123	
210АК	0	12	29		270*	Р-123	
210	0	12	29		270*	Р-123	
211	0	8	20		230*	Р-123	
211А	0	8	20		230*	Р-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
6- 211Л	6	8	20		230*	Р-123	
212	0	13	33		310*	Р-123	
212ГТ1	0	13	33		310*	Р-123	
70- 212	0	28	48		370*	Р-123	
213	0	13	33		320*	Р-123	
70- 214К	0	30	56			Р-123	
214К	0	14	34		330*	Р-123	
214А	0	14	34		330*	Р-123	
215	0	14	34		330*	Р-123	
215А.	0	14	34		330*	Р-123	
215Ш	0	14	34		330*	Р-123	3.2.1
215АШ	0	14	34		330*	Р-123	
216К[2)]	0	8*		150	240	003	
217	0	16	40		390*	Р-123	
6- 217	6	16	40		390*	Р-123	
218У[2)]	0	8*		150	240	А-123	
6- 218У[2)]	6	8*		150	240	А-123	
218	0	18	42			Р-124	
6- 218	6	18	42			Р-124	
218Л1[2)]	0	8*		150	240	А-123	
219	0	16	40			Р-124	
6- 219	6	16	40			Р-124	
220	0	16	40		430*	Р-124	
220Ш[2)]	0	8*		150	240	003	3.2.1
221	0	20	46		470*	Р-124	
222	0	20	46		490*	Р-124	
224	0	20	46		500*	Р-124	
224Л1	0	20	46		500*	Р-124	
226[2)]	0	8*		250	350	003	
226АК[2)]	0	8*		250	350	003	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
226Л1[2)]	0	8*		250	350	003	
228Л[2)]	0	8*		300	400	003	
228АКЛ[2)]	0	8*		300	400	А-123	
230Л[2)]	0	8*		300	400	003	
230АКЛ[2)]	0	8*		300	400	А-123	
244[2)]	0	8*		400	500	003	
301	0	8	22		200*	Р-123	
302	0	8	22		200*	Р-123	
303	0	8	22		210*	Р-123	
303А	0	8	22		210*	Р-123	
6- 303Л1Ш	6	8	22			Р-123	3.2.1
303К	0	8	22		210*	Р-123	
304АК	0	10	24			Р-123	
304К	0	10	24		210*	Р-123	
305[1)]	0	10	24		220*	Р-123	3.1.25
60- 305	0	5	16		200*	Р-123	
6- 305	6	10	24			Р-123	
306А[1)]	0	10	24		250*	Р-123	3.1.25
306К[1)]	0	10	24		250*	Р-123	3.1.25
76- 306Е	6	18	33			Р-123	
307	0	12	26		270*	Р-123	
307АК	0	12	26			Р-123	
307У	0	12	26		170*	Р-123	
308	0	12	26		270*	Р-123	
6- 308	6	12	26		270*	Р-123	
309	0	12	29		300*	Р-123	
309К	0	12	29		300*	Р-123	
309Л	0	12	29		300*	Р-123	
310	0	12	29		320*	Р-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
310К	0	12	29		320*	Р-123	
6- 310	6	12	29		320*	Р-123	
6- 310АК	6	12	29			Р-123	
76- 310АК	6	24	42			Р-123	
311	0	13	33		350*	Р-123	
70- 311	0	28	48		430*	Р-123	
312	0	13	33		370*	Р-123	
313	0	13	33		370*	Р-123	
313АК	0	13	33		370*	Р-123	
314	0	14	34		390*	Р-123	
315	0	16	36		410*	Р-124	
315Ш1	0	16	36		410*	Р-124	3.2.1
316К5	0	14	34				
60- 316	0	8	20		320*	Р-124	
60- 316К5	0	8	20		320*	Р-124	
317	0	18	42		470*	Р-124	
76- 317	6	39	63			Р-124	
318АК	0	16	40		480*	Р-124	
318	0	16	40		480*	Р-124	
319К5	0	16	40			Р-124	
60- 319Л5	0	8	23			Р-124	
320Л	0	16	40		520*	Р-124	
70- 320	0	34	62			Р-124	
322	0	20	46		580*	Р-124	
405	0	10	24			Р-123	
405А	0	10	24			Р-123	
407	0	12	26			Р-123	
407АК	0	12	26			Р-123	
408	0	12	26		350*	Р-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
408AK	0	12	26		350*	P-123	
409	0	12	29			P-123	
409AK	0	12	29			P-123	
410	0	12	29			P-123	
411	0	13	33		400*	P-123	
412	0	13	33		410*	P-123	
412AK	0	13	33		410*	P-123	
413	0	13	33		430*	P-124	
414	0	14	34			P-124	
416A	0	14	34			P-124	
417	0	16	40		530*	P-124	
733JIT	0	24	65		580*	P-123	
802	0	8	22		180*	P-123	
6- 20703	6	8	22		175*	P-123	3.2.1
6- 20703K	6	8	22		100*	P-123	
6- 20803	6	8	22		100*	P-123	3.2.1
6- 20803K	6	8	22			P-123	
50205K	0	10	24			P-123	
50205AK	0	10	24			P-123	
50207	0	12	26		200*	P-123	
6- 50209A2	6	12	29			P-123	
50210	0	12	29		270*	M-525M	
50210AK	0	12	29		270*	M-525M	
50307	0	12	26		270*	P-123	
6- 50307A1	6	12	26			P-123	
50308	0	15	26			P-123	
50308A	0	12	26			P-123	
50309	0	12	29			P-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
50310	0	12	29			P-123	
50311	0	13	33		350*	P-123	
50407	0	12	26		320*	P-123	
50407АК	0	12	26			P-123	
50411	0	13	33		400*	P-123	
6- 60018	6	5	16			C-30	
60200	0	5	16		150*	P-123	
60202	0	8	22		180*	P-123	
60202АК4	0	8	22			P-123	
60203	0	8	22		190*	P-123	
60203У	0	8	22		150*	P-123	
6- 60204	6	10	24			P-123	
60205К	0	10	24			P-123	
60205АК	0	10	24			P-123	
60206К	0	10	24			P-123	
60206А1	0	10	24			P-123	
60208	0	12	26		260*	P-123	
60208К	0	12	26		260*	P-123	
60212	0	13	33		310*	P-123	
60214	0	14	34		330*	P-123	
60214К	0	14	34		330*	P-123	
26- 60220	6	27	48		430*	P-123	
60307	0	12	26		270*	P-123	
60722	0	60	90		570*	P-123	
60208А	0	12	26			P-123	
6- 80018	6	5	16			C-30	
6- 80018С21	6	5	16			C-30	
6- 80029С21	6	5	16		130*	C-30	
6- 80029Т2С2	6	5	16		130*	C-30	3.2.7
80106Б	0	10	24		170*	P-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
80200	0	5	16		150*	P-123	
6- 80200	6	5	16		150*	P-123	
5- 80200C21	5	5	16		150*	P-123	
6- 80201	6	8	22			P-123	
6- 80201C21	6	8	22			P-123	
6- 80201T2C2	6	8	22			P-123	
80202	0	8	22		180*	P-123	
80202C9[1)]	0	8	22			P-123	3.2.7, 3.1.25
76- 80202T2C2	6	16	30			P-123	3.2.7
80203	0	8	22		190*	P-123	
70- 80203C2	0	16	30			P-123	3.2.7
80204	0	10	24		210*	P-123	
70- 80204C2	0	18	33			P-123	3.2.7
6- 80204T2C2	6	10	24			P-123	3.2.7
80204C9	0	10	24			P-123	3.2.7
80205	0	10	24		210*	P-123	
6- 80205	6	10	24		210*	P-123	
6- 80205C21	6	10	24		210*	P-123	
76- 80206KC2	6	18	33			P-123	3.2.7
80208K	0	12	26			P-123	
80208A	0	12	26			P-123	
80212	0	13	33		310*	P-123	
76- 80212C2	6	28	48		310*	P-123	3.2.7
100704	0	10	24		180*	P-123	
6- 100704Б	6	10	24		180*	P-123	
6- 100704	6	10	24		180*	P-123	
5- 100704	5	10	24		180*	P-123	
6- 100720[2)]	6	8		150	240	003	
150212	0	13	33			P-123	
150213	0	11	23			P-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
150308К	0	12	26			Р-123	
6- 160707	6	12	26		240*	Р-123	
6- 180504С9	6	10	24			Р-123	3.2.7
76- 180506БТ2С2	6	18	33			Р-123	3.2.7
76- 180506Е8Т2С2	6	18	33			Р-123	3.2.7
6- 180508К2С9	6	12	26			Р-123	
270310	0	12	26			Р-123	
360710УС9	0	12	29			Р-123	
6- 360710УС9	6	12	29			Р-123	
370208[1)]	0	12	26		250*	Р-123	3.1.25
6- 370208	6	12	26		250*	Р-123	
6- 530206К1	6	10	24		210*	Р-123	3.2.7
6- 530206К1С9	6	10	24		100*	Р-123	3.2.7
6- 950118Л	6	16	40		330	Р-123	
970208	0	12	26		260	Р-123	
970711[1)]	0	13	33		220*	Р-123	3.1.25
970921	0	20	46		320	Р-123	
980067Ю	0	5	16			Р-130	
6- 1000095	6	5	16		80*	С-23	
6- 1000096	6	5	16		100	С-23	
6- 1000818Б	6	16	40		240*	Р-123	
6- 1000828Л	6	23	53			Р-124	
6- 1000832ЛТ1	6	23	58		370*	Р-124	
6- 1000900	6	5	16			С-30	
1000902	0	8	22			С-30	
6- 1000902	6	8	22			С-30	
6- 1000906	6	10	24			Р-123	
6- 1000907	6	12	26			Р-123	
1000907	0	12	26			Р-123	

End of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
1000915	0	14	34			P-123	
6- 1000916	6	14	34			P-123	
1000918Л	0	16	40		300*	P-123	
6- 1000918Л	6	16	40		300*	P-123	
1000922Л	0	20	46		330*	P-123	
6- 1000924Д	6	20	46		330*	P-123	
6- 1000926Л	6	23	53		380*	P-123	
76- 1000930Д	6	51	96			C-32	
6- 7000101	6	8	22		145*	P-123	
6- 7000102	6	8	22		145*	P-123	
6- 7000105	6	10	24		160*	P-123	
7000106Б	0	10	24		170*	P-123	
7000107	0	12	26		170*	P-123	
7000108	0	12	26		190*	P-123	
6- 7000108	6	12	26		190*	P-123	
7000110	0	12	29		200*	P-123	
7000111Б	0	13	33		220*	P-123	
7000112Б	0	13	33			P-123	
6- 7000114Л	6	14	34			P-123	

* Indicated for reference

Table A.2 – Double row tapered angular ball bearing

Conventional Designation	Accuracy as per GOST 520	Internal axial clearance, in microns		Device for measuring the clearance	Load, N (kgf)	Remarks
		min.	max.			
1006	0	60	120	A-121	±20 (±2)	
1201	0	60	120	A-122	±40 (±4)	
1202	0	60	120	A-122	±40 (±4)	
1203	0	60	120	A-122	±40 (±4)	
1204	0	60	120	A-122	±40 (±4)	
1205	0	110	200	A-122	±100(±10)	
1207	0	120	220	A-122	±100(±10)	
1209	0	120	240	A-122	±100(±10)	
1210	0	120	240	A-122	±100(±10)	
1212	0	100	300	A-122	±100(±10)	
1308	0	60	150	A-122	±100(±10)	
1412	0	90	180	MA1516	±100(±10)	
1605	0	60	120	A-122	±40 (±4)	
1610	0	80	160	A-122	±100(±10)	
1730Л	0	90	170	003		

Note: In the absence of device A-122, it is permitted to take measurements on device 202 at the same load.

Table A.3 – Angular roller bearing with short cylindrical rollers

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
2207Л1	0	30	45		
2207ЛМ	0	30	45		
2211М	0	35	55		
2212Л	0	35	55	Р3Р-1	
60- 2214М	0	30	70		
30- 2214ЛМ	0	80	120		
30- 2214М	0	80	120		
2216Л1	0	30	70		
2217М	0	45	65		
2218Л1У	0	70	115		
2220Л1	0	70	115		
2222М	0	50	75		
2224ЛМ	0	50	75		
2226М	0	90	145		
2306Л2Т[1)]	0	30	60		3.1.25
20- 2308Б1Т2	0	40	75		
2309М1	0	40	75		
2309ЛМ	0	40	75		
2311КМ	0	35	55		
2311К1М	0	35	55		
20- 2312М1	0	50	90		
2313М	0	50	90		
2313М1	0	50	90		
2315М	0	40	60		
2316М	0	30	70		
2317Л1	0	70	115		

Continuation of table A.3

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
2318M	0	45	65		
2322Л1	0	80	130		
2505АЛ	0	25	35		
2609M	0	30	45		
2609ЛМ	0	30	45		
2609M1	0	30	45		
2612КМ	0	35	55		
2712	0	50	90		
2746M	0	90	165		
12302Б1	0	20	30		
12307КМ	0	30	45		
12308M	0	30	45		
12308ЛМ	0	30	45		
12309КМ	0	30	45		
12318M	0	45	65	002	
12320M	0	70	115		
12609M	0	30	45		
12609M1	0	30	45		
12609ЛМ	0	30	45		
6- 32118Д1Т	6	45	65		
32124Л1	0	50	75		
32130Д[1)]	0	70	105		3.1.25
5- 32206Б3	5	25	35		
55- 32207Б2Т	5	15	30		
5- 32208Б2Т	5	30	45		
32210Л1	0	20	55		
20- 32215ЛМ[1)]	0	40	75		3.1.25
60- 32216К1	0	30	70		
76- 32220Д1	6	85	105		

Continuation of table A.3

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
20- 32308ЛМТ2	0	40	75		
32310Л1	0	30	45		
32310М1	0	30	45		
32314М1	0	40	60		
70- 32412Л2	0	55	75	Р3Р-1	
32613	0	50	90		
32617М	0	45	65		
20- 42202Д	0	30	60		
42204Д1 [1)]	0	20	30		3.1.25
42205Д1 [1)]	0	25	35		3.1.25
42206Д1	0	25	35		
6- 42207ЛМ	6	30	45		
42207ЛМ [1)]	0	30	45		3.1.25
20- 42207ЛМ [1)]	0	40	75		3.1.25
60- 42207КМ	0	20	55		
42212Л2	0	35	50		
60- 42216Л1	0	30	70		
20- 42217М	0	65	115		
42219Д1Т	0	35	80		
20- 42305М [1)]	0	30	60		
42305ЛМ	0	25	35		
6- 42305ЛМ	6	25	35		
42306Д1	0	25	35		
6- 42307ЛМ	6	30	45		
42307ЛМ	0	30	45		
42307КМ	0	30	45		
42312М	0	35	55		
42312М1	0	35	55		
42412Л2	0	35	55	Р3Р-1	
20- 42413М	0	50	90	С-1	
42506Б1	0	25	35		3.1.25

Continuation of table A.3

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
42607Л1	0	30	45		
42612КМ	0	35	55		
62310М1	0	20	55		
92218Л2	0	45	65		
92220Л2Т	0	45	65		
30- 92224ЛМТ[1)]	0	100	150		3.1.25
92305ЛМ	0	25	35		
92312М	0	35	55		
92312М1	0	35	55		
92412Л1	0	50	90		
60- 102209К	0	20	55		
102305М	0	25	35		
102407М	0	30	45		
20- 102605М	0	30	60		
56- 112741ДТ1	6	45	90		
142220Л2	0	70	115		
142313Л1	0	50	90		
142314М1	0	40	60		
142318М	0	45	65		
20- 142320М	0	70	115		
252906Б	0				
6- 292124Л1	6				
292202Д	0				
6- 292203К	6				
292207Л	0				
292208М	0				
292211Л2	0				
292228МТ[1)]	0				3.1.25
292607Л1	0				
292617М	0				
292830ЛМТ	0				

End of table A.3

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
292919	0				
402310КМ	0	20	55		
20- 402312М	0	50	90		
20- 402312М1	0	50	90		
402313Л1	0	35	55		
402318М	0	45	65		
60- 402319М	0	35	80		
502207	0				
502207ЛМ	0				
502218Л1	0				
502220Л1	0				
502309М	0				
502309М1	0				
502309ЛМ	0				
502310КМ	0				
502312М	0				
502312М1	0				
512729У1	0	50	115		
752412Л1	0				
26- 782726М	6	90	145		
20- 782726М	0	90	145		
26- 782726КМ	6	90	145		3.3.4
20- 782726КМ	0	90	145		3.3.4
822707Д1	0				
922205К	0				
922906	0				
1002916ЛМ	0	40	60		
7502724М	0				

Table A.4 – Double row spherical radial roller bearing

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
3508	0	25	40		
3514	0	50	80		
30- 3516	0	80	110		3.2.3
3518	0	70	100		3.2.3
3520[1)]	0	60	100		3.2.3, 3.1.25
30- 3522	0	110	150		3.2.3
3526	0	90	120		3.2.3
3608	0	25	40		3.2.3
40- 3610	0	75	100		3.2.3
3611	0	30	50		3.2.3
3612	0	50	70		3.2.3
30- 3614	0	80	110		3.2.3
30- 3616	0	80	110		3.2.3

Table A.5 – Roller bearings with long cylindrical needle and helix rollers

Conventional designation of bearings	Designation of normative technical document	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
54707	ETY 500	35	75		
54708	ETY 500	35	75		
54810	ETY 500	30	75		
64704	ETY 500				
64706	ETY 500				3.2.4
64805	ETY 500				3.2.4
64903	ETY 500				3.2.4
64904	ETY 500				3.2.4
64905	ETY 500				3.2.4
64907K	ETY 500				
74716K	ETY 500				
94980	ETY 500				
654728	ETY 500				
704702	TY VNIIP.065				3.2.8
704702K	TY VNIIP.065				3.2.8
704702K2	TY VNIIP.065				3.2.8
804704K5	TY VNIIP.065				3.2.8
804707K3C10	TY VNIIP.065				3.2.8
804805K1	TY VNIIP.065				3.2.8
804906K1	TY VNIIP.065				
804907K3	TY VNIIP.065				3.2.8
864904	ETY 500				
864915	ETY 500				
904700U	TY VNIIP.065				3.2.8
904700K	TY VNIIP.065				3.2.8

End of table A.5

Conventional designation of bearings	Designation of normative technical document	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
4024104У	GOST 4657				
4024106	GOST 4657				
4024107	GOST 4657				
4074104	GOST 4657				
4074114	GOST 4657				
4074116	GOST 4657				
941/12	GOST 4060				
941/15	GOST 4060				
942/8	GOST 4060				
942/20	GOST 4060				
942/30	GOST 4060				
943/20	GOST 4060				
943/25	GOST 4060				
943/30	GOST 4060				
943/40	GOST 4060				
943/45	GOST 4060				
НК222812	GOST 4060				
65911	ЕТУ 500				

Table A.6 – Radial thrust ball bearings

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
26216	0						
36204Л	0						
6- 36207Л	6						
36208Л	0						
36214Л	0						
36214АЛ	0						
6- 36214Л	6						
36318Л	0						
36318АКЛ	0						
6- 36318Л	6						
46114Л	0						
6- 46114Л	6						
46115Л	0						
6- 46115Л	6						
6- 46117Л	6						
5- 46117Л	5						
5- 46122Л	5						
6- 46122Л	6						
46205Л	0						
5- 46206Л	5						
46209Л	0						3.2.1
6- 46209Л	6						
46211Е	0						
6- 46211Е	6						
6- 46212Л	6						
46216Л	0						
5- 46305Л	5						
6- 46305Л	6						
6- 46306Л	6						
46309Е	0						

End of table A.6

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
6- 46312Л	6						
46318Л	0						
46318АКЛ	0						
6- 46318Л	6						
6- 66128Л	6						
6- 66221Л	6						
66221Л	0						
66409Д	0						
6- 116126Л	6						
6- 126825ЛТ	6	23	53			Р-123	
85- 176211Д1	5						
6- 246213Л	6						
25- 276207Б1Т	5						
25- 276207Б2Т2	5						
636905	0						
776702Х	0						
776801Х	0						
836906	0						
876707	0						
926722	0						
926722К1	0						
986711С1	0						
6- 1146832Л	6			250	370	003	
3056206	0						

Table A.7 – Tapered roller bearings

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
7202	0						
7204	0						
5- 7204A	5						
7205A	0						
5- 7205A	5						
7206	0						
6- 7206A	6						
7208	0						
7209	0						
7210	0						
7212A	0						
7214A	0						
7216	0						
7218[1)]	0						3.1.25
7304	0						
7305	0						
7307	0						
7308[1)]	0						3.1.25
7308A	0						
7309	0						
7310[1)]	0						3.1.25
7311K	0						
7312A	0						
7312M	0						
7313K1	0						
7314A	0						
7315K	0						
7507[1)]	0						3.1.25
6- 7507	6						
7508У	0						

Continuation of table A.7

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
7510	0						
7510A	0						
7511	0						
7511У	0						
7512[1)]	0						3.1.25
7512A	0						
6- 7512	6						
7513	0						
7513К	0						
7514К1[1)]	0						3.1.25
7514А1	0						
7515А	0						
7516[1)]	0						3.1.25
7516А	0						
7518К	0						
7522А	0						
7522К[1)]	0						3.1.25
7526	0						
7607А	0						
7608А	0						
7614А	0						
7615А	0						
7616А	0						
7718К	0						
7806У[1)]	0						3.1.25
7806А	0						
7821	0						
27307	0						
27308У	0						
27308У1[1)]	0						3.1.25, 3.2.9

End of table A.7

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
27308АКУ[1)]	0						3.1.25
27706	0						
27709У	0						3.2.9
6- 97518	6			200	300		5.19
6- 97520У	6			50	150		5.19
807813К2[1)]	0						3.1.25
У- 807813А[1)]	0						
977908К	0						
977909	0						
987910К	0						
6- 20007109	6						
2007118К1	0						
20007118А	0						

Table A.8 – Thrust ball bearing

Conventional designation of bearings	Accuracy class as per GOST 520	Remarks
8100	0	
8102	0	
8103	0	
8104	0	
8105	0	
8106	0	
8109	0	
8111	0	
8118	0	
8120Л1	0	
8122Д	0	
8148Л	0	
8201	0	
8204	0	
8205	0	
8206	0	
8207	0	
6- 8207	6	
8208	0	
8209	0	
8218Л	0	
8222Л	0	
8305	0	
8306	0	
8307	0	
8320Л	0	
38204	0	
38205	0	
38207	0	
38209	0	

End of table A.8

Conventional designation of bearings	Accuracy class as per GOST 520	Remarks
98206	0	
208109	0	
308109	0	
688911С9	0	
808209	0	
808320Л	0	

Table A.9 – Slide bearing

Conventional designation of bearings	Designation of normative technical document	Internal axial clearance, in microns		Device for measuring the clearance	Remarks
		min.	max.		
Ш8	GOST 3635	30	100		
ШС8	GOST 3635	30	100		
ШМ8	GOST 3635	0	30		
НУШС8	GOST 3635	0	30		
Ш8Ю5Т	GOST 3635	20	50		3.2.10
Ш10	GOST 3635	30	100		
ШС10	GOST 3635	30	100		
Ш12	GOST 3635	30	100		
ШС12	GOST 3635	30	100		
Ш15	GOST 3635	30	100		
ШС15	GOST 3635	30	100		
Ш17	GOST 3635	30	100		
ШС17	GOST 3635	30	100		
Ш20	GOST 3635	30	100		
ШС20	GOST 3635	50	150		
ШМ20	GOST 3635	0	30		
Ш25	GOST 3635	30	100		
ШС25	GOST 3635	30	100		
Ш30	GOST 3635	30	100		
ШМ30	GOST 3635	0	30		
ШМ35	GOST 3635	0	30		
ШС35	GOST 3635	30	100		
Ш40	GOST 3635	30	100		
ШС40	GOST 3635	30	100		
Ш40У1	GOST 3635	200	300		

End of table A.9

Conventional designation of bearings	Designation of normative technical document	Internal axial clearance, in microns		Device for measuring the clearance	Remarks
		min.	max.		
ШС50	GOST 3635	50	150		
ШС55	GOST 3635	150	300		
ШСЛ60К	as per drawing	50	150		
2ШСЛ60	GOST 3635	150	300		

APPENDIX A
(Mandatory)

List of bearings supplied as per ETY 500 for mass production articles

Table A.1 – Single row angular ball bearing

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
6- 18	6	5	16		110*	C-30	
6- 24	6	5	16		125*	C-23	
6- 25	6	5	16			C-23	
6- 26	6	5	16		110*	C-30	
6- 27	6	5	16		110*	C-30	
5- 29	5	5	16			C-30	
5- 29Г	5	5	16			C-30	
6- 100Л	6	5	16			C-30	
6- 101	6	8	22			C-30	
6- 104	6	10	24		180*	P-123	
106АК	0	10	24			P-123	
6- 106	6	10	24			P-123	
106	0	10	24			P-123	
107	0	12	26			P-123	
107А	0	12	26			P-123	
6- 107	6	12	26			P-123	
109	0	12	29			P-123	
110К	0	12	29			P-123	
110	0	12	29			P-123	
6- 111Л	6	13	33			P-123	
6- 112	6	13	33		270*	P-123	
6- 112Л	6	13	33		270*	P-123	
6- 113Л	6	13	33		270*	P-123	
114	0	14	34			P-124	
115Л	0	14	34		280*	P-123	
6- 115Л	6	14	34		280*	P-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
116Л	0	14	34			P-123	
6- 116Л	6	14	34			P-123	
6- 116АЛ	6	14	34			P-123	
6- 118	6	16	40			P-124	
120	0	16	40			P-124	
6- 120АЛ1	6	16	40			P-124	
120А	0	16	40			P-124	
6- 124	6	20	46		400*	P-124	
6- 126Л	6	23	53		450*	P-124	
128	0	23	53			P-124	
134Л	0	24	65		560*	P-124	
200	0	5	16		150*	P-123	
5- 201К1	5	8	22		170*	P-123	
5- 201	5	8	22		170*	P-123	
5- 201К2	5	8	22			P-123	
202	0	8	22		180*	P-123	
202АК4	0	8	22			P-123	
6- 202	6	8	22			P-123	
6- 202Л1Ш	6	8	22			P-123	3.2.1
6- 202АК4	6	8	22			P-123	
203	0	8	22		190*	P-123	
203А	0	8	22			P-123	
203АК	0	8	22			P-123	
203У	0	8	22		150*	P-123	
6- 204	6	10	24		210*	P-123	
204К	0	10	24		210*	P-123	
204А	0	10	24		210*	P-123	
204АК	0	10	24		210*	P-123	
70- 205АК	0	18	33			P-123	
205К	0	10	24		210*	P-123	
6- 205АК	6	10	24			P-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
205АК	0	10	24		210*	Р-123	
206А	0	10	24			Р-123	
206К[1)]	0	10	24			Р-123	
6- 206К	6	10	24		210*	Р-123	
6- 206А	6	10	24			Р-123	
6- 206АК	6	10	24			Р-123	
76- 206К	6	18	33			Р-123	
76- 206АШ	6	18	33			Р-123	
76- 206КШ	6	18	33			Р-123	3.2.1
76- 206А	6	18	33			Р-123	
207К5	0	12	26		240*	Р-123	
6- 207К5	6	12	26		240*	Р-123	
25- 207БТ1	5	20	32		270*	Р-123	
207К5У	0	12	26		200*	Р-123	
6- 207К5У	6	12	26		200*	Р-123	
208А1	0	12	26		260*	Р-123	3.2.1
208А	0	12	26		260*	Р-123	3.2.1
208У	0	12	26		220*	Р-123	
25- 208Б1	5	20	32		280*	Р-123	
76- 208Б1	6	21	39			Р-123	
75- 208Б1	5	21	39			Р-123	
209	0	12	29		270*	Р-123	
209А	0	12	29		270*	Р-123	
6- 209	6	12	29		270*	Р-123	
6- 209А	6	12	29		270*	Р-123	
76- 209Е	6	24	42			Р-123	
210АК	0	12	29		270*	Р-123	
210	0	12	29		270*	Р-123	
211	0	8	20		230*	Р-123	
211А	0	8	20		230*	Р-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
6- 211Л	6	8	20		230*	Р-123	
212	0	13	33		310*	Р-123	
212ГТ1	0	13	33		310*	Р-123	
70- 212	0	28	48		370*	Р-123	
213	0	13	33		320*	Р-123	
70- 214К	0	30	56			Р-123	
214К	0	14	34		330*	Р-123	
214А	0	14	34		330*	Р-123	
215	0	14	34		330*	Р-123	
215А.	0	14	34		330*	Р-123	
215Ш	0	14	34		330*	Р-123	3.2.1
215АШ	0	14	34		330*	Р-123	
216К[2)]	0	8*		150	240	003	
217	0	16	40		390*	Р-123	
6- 217	6	16	40		390*	Р-123	
218У[2)]	0	8*		150	240	А-123	
6- 218У[2)]	6	8*		150	240	А-123	
218	0	18	42			Р-124	
6- 218	6	18	42			Р-124	
218Л1[2)]	0	8*		150	240	А-123	
219	0	16	40			Р-124	
6- 219	6	16	40			Р-124	
220	0	16	40		430*	Р-124	
220Ш[2)]	0	8*		150	240	003	3.2.1
221	0	20	46		470*	Р-124	
222	0	20	46		490*	Р-124	
224	0	20	46		500*	Р-124	
224Л1	0	20	46		500*	Р-124	
226[2)]	0	8*		250	350	003	
226АК[2)]	0	8*		250	350	003	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
226Л1[2)]	0	8*		250	350	003	
228Л[2)]	0	8*		300	400	003	
228АКЛ[2)]	0	8*		300	400	А-123	
230Л[2)]	0	8*		300	400	003	
230АКЛ[2)]	0	8*		300	400	А-123	
244[2)]	0	8*		400	500	003	
301	0	8	22		200*	Р-123	
302	0	8	22		200*	Р-123	
303	0	8	22		210*	Р-123	
303А	0	8	22		210*	Р-123	
6- 303Л1Ш	6	8	22			Р-123	3.2.1
303К	0	8	22		210*	Р-123	
304АК	0	10	24			Р-123	
304К	0	10	24		210*	Р-123	
305[1)]	0	10	24		220*	Р-123	3.1.25
60- 305	0	5	16		200*	Р-123	
6- 305	6	10	24			Р-123	
306А[1)]	0	10	24		250*	Р-123	3.1.25
306К[1)]	0	10	24		250*	Р-123	3.1.25
76- 306Е	6	18	33			Р-123	
307	0	12	26		270*	Р-123	
307АК	0	12	26			Р-123	
307У	0	12	26		170*	Р-123	
308	0	12	26		270*	Р-123	
6- 308	6	12	26		270*	Р-123	
309	0	12	29		300*	Р-123	
309К	0	12	29		300*	Р-123	
309Л	0	12	29		300*	Р-123	
310	0	12	29		320*	Р-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
310К	0	12	29		320*	Р-123	
6- 310	6	12	29		320*	Р-123	
6- 310АК	6	12	29			Р-123	
76- 310АК	6	24	42			Р-123	
311	0	13	33		350*	Р-123	
70- 311	0	28	48		430*	Р-123	
312	0	13	33		370*	Р-123	
313	0	13	33		370*	Р-123	
313АК	0	13	33		370*	Р-123	
314	0	14	34		390*	Р-123	
315	0	16	36		410*	Р-124	
315Ш1	0	16	36		410*	Р-124	3.2.1
316К5	0	14	34				
60- 316	0	8	20		320*	Р-124	
60- 316К5	0	8	20		320*	Р-124	
317	0	18	42		470*	Р-124	
76- 317	6	39	63			Р-124	
318АК	0	16	40		480*	Р-124	
318	0	16	40		480*	Р-124	
319К5	0	16	40			Р-124	
60- 319Л5	0	8	23			Р-124	
320Л	0	16	40		520*	Р-124	
70- 320	0	34	62			Р-124	
322	0	20	46		580*	Р-124	
405	0	10	24			Р-123	
405А	0	10	24			Р-123	
407	0	12	26			Р-123	
407АК	0	12	26			Р-123	
408	0	12	26		350*	Р-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
408AK	0	12	26		350*	P-123	
409	0	12	29			P-123	
409AK	0	12	29			P-123	
410	0	12	29			P-123	
411	0	13	33		400*	P-123	
412	0	13	33		410*	P-123	
412AK	0	13	33		410*	P-123	
413	0	13	33		430*	P-124	
414	0	14	34			P-124	
416A	0	14	34			P-124	
417	0	16	40		530*	P-124	
733JIT	0	24	65		580*	P-123	
802	0	8	22		180*	P-123	
6- 20703	6	8	22		175*	P-123	3.2.1
6- 20703K	6	8	22		100*	P-123	
6- 20803	6	8	22		100*	P-123	3.2.1
6- 20803K	6	8	22			P-123	
50205K	0	10	24			P-123	
50205AK	0	10	24			P-123	
50207	0	12	26		200*	P-123	
6- 50209A2	6	12	29			P-123	
50210	0	12	29		270*	M-525M	
50210AK	0	12	29		270*	M-525M	
50307	0	12	26		270*	P-123	
6- 50307A1	6	12	26			P-123	
50308	0	15	26			P-123	
50308A	0	12	26			P-123	
50309	0	12	29			P-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
50310	0	12	29			P-123	
50311	0	13	33		350*	P-123	
50407	0	12	26		320*	P-123	
50407АК	0	12	26			P-123	
50411	0	13	33		400*	P-123	
6- 60018	6	5	16			C-30	
60200	0	5	16		150*	P-123	
60202	0	8	22		180*	P-123	
60202АК4	0	8	22			P-123	
60203	0	8	22		190*	P-123	
60203У	0	8	22		150*	P-123	
6- 60204	6	10	24			P-123	
60205К	0	10	24			P-123	
60205АК	0	10	24			P-123	
60206К	0	10	24			P-123	
60206А1	0	10	24			P-123	
60208	0	12	26		260*	P-123	
60208К	0	12	26		260*	P-123	
60212	0	13	33		310*	P-123	
60214	0	14	34		330*	P-123	
60214К	0	14	34		330*	P-123	
26- 60220	6	27	48		430*	P-123	
60307	0	12	26		270*	P-123	
60722	0	60	90		570*	P-123	
60208А	0	12	26			P-123	
6- 80018	6	5	16			C-30	
6- 80018С21	6	5	16			C-30	
6- 80029С21	6	5	16		130*	C-30	
6- 80029Т2С2	6	5	16		130*	C-30	3.2.7
80106Б	0	10	24		170*	P-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
80200	0	5	16		150*	P-123	
6- 80200	6	5	16		150*	P-123	
5- 80200C21	5	5	16		150*	P-123	
6- 80201	6	8	22			P-123	
6- 80201C21	6	8	22			P-123	
6- 80201T2C2	6	8	22			P-123	
80202	0	8	22		180*	P-123	
80202C9[1)]	0	8	22			P-123	3.2.7, 3.1.25
76- 80202T2C2	6	16	30			P-123	3.2.7
80203	0	8	22		190*	P-123	
70- 80203C2	0	16	30			P-123	3.2.7
80204	0	10	24		210*	P-123	
70- 80204C2	0	18	33			P-123	3.2.7
6- 80204T2C2	6	10	24			P-123	3.2.7
80204C9	0	10	24			P-123	3.2.7
80205	0	10	24		210*	P-123	
6- 80205	6	10	24		210*	P-123	
6- 80205C21	6	10	24		210*	P-123	
76- 80206KC2	6	18	33			P-123	3.2.7
80208K	0	12	26			P-123	
80208A	0	12	26			P-123	
80212	0	13	33		310*	P-123	
76- 80212C2	6	28	48		310*	P-123	3.2.7
100704	0	10	24		180*	P-123	
6- 100704Б	6	10	24		180*	P-123	
6- 100704	6	10	24		180*	P-123	
5- 100704	5	10	24		180*	P-123	
6- 100720[2)]	6	8		150	240	003	
150212	0	13	33			P-123	
150213	0	11	23			P-123	

Continuation of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
150308К	0	12	26			Р-123	
6- 160707	6	12	26		240*	Р-123	
6- 180504С9	6	10	24			Р-123	3.2.7
76- 180506БТ2С2	6	18	33			Р-123	3.2.7
76- 180506Е8Т2С2	6	18	33			Р-123	3.2.7
6- 180508К2С9	6	12	26			Р-123	
270310	0	12	26			Р-123	
360710УС9	0	12	29			Р-123	
6- 360710УС9	6	12	29			Р-123	
370208[1)]	0	12	26		250*	Р-123	3.1.25
6- 370208	6	12	26		250*	Р-123	
6- 530206К1	6	10	24		210*	Р-123	3.2.7
6- 530206К1С9	6	10	24		100*	Р-123	3.2.7
6- 950118Л	6	16	40		330	Р-123	
970208	0	12	26		260	Р-123	
970711[1)]	0	13	33		220*	Р-123	3.1.25
970921	0	20	46		320	Р-123	
980067Ю	0	5	16			Р-130	
6- 1000095	6	5	16		80*	С-23	
6- 1000096	6	5	16		100	С-23	
6- 1000818Б	6	16	40		240*	Р-123	
6- 1000828Л	6	23	53			Р-124	
6- 1000832ЛТ1	6	23	58		370*	Р-124	
6- 1000900	6	5	16			С-30	
1000902	0	8	22			С-30	
6- 1000902	6	8	22			С-30	
6- 1000906	6	10	24			Р-123	
6- 1000907	6	12	26			Р-123	
1000907	0	12	26			Р-123	

End of table A.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
1000915	0	14	34			P-123	
6- 1000916	6	14	34			P-123	
1000918Л	0	16	40		300*	P-123	
6- 1000918Л	6	16	40		300*	P-123	
1000922Л	0	20	46		330*	P-123	
6- 1000924Д	6	20	46		330*	P-123	
6- 1000926Л	6	23	53		380*	P-123	
76- 1000930Д	6	51	96			C-32	
6- 7000101	6	8	22		145*	P-123	
6- 7000102	6	8	22		145*	P-123	
6- 7000105	6	10	24		160*	P-123	
7000106Б	0	10	24		170*	P-123	
7000107	0	12	26		170*	P-123	
7000108	0	12	26		190*	P-123	
6- 7000108	6	12	26		190*	P-123	
7000110	0	12	29		200*	P-123	
7000111Б	0	13	33		220*	P-123	
7000112Б	0	13	33			P-123	
6- 7000114Л	6	14	34			P-123	

* Indicated for reference

Table A.2 – Double row tapered angular ball bearing

Conventional Designation	Accuracy as per GOST 520	Internal axial clearance, in microns		Device for measuring the clearance	Load, N (kgf)	Remarks
		min.	max.			
1006	0	60	120	A-121	±20 (±2)	
1201	0	60	120	A-122	±40 (±4)	
1202	0	60	120	A-122	±40 (±4)	
1203	0	60	120	A-122	±40 (±4)	
1204	0	60	120	A-122	±40 (±4)	
1205	0	110	200	A-122	±100(±10)	
1207	0	120	220	A-122	±100(±10)	
1209	0	120	240	A-122	±100(±10)	
1210	0	120	240	A-122	±100(±10)	
1212	0	100	300	A-122	±100(±10)	
1308	0	60	150	A-122	±100(±10)	
1412	0	90	180	MA1516	±100(±10)	
1605	0	60	120	A-122	±40 (±4)	
1610	0	80	160	A-122	±100(±10)	
1730Л	0	90	170	003		

Note: In the absence of device A-122, it is permitted to take measurements on device 202 at the same load.

Table A.3 – Angular roller bearing with short cylindrical rollers

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
2207Л1	0	30	45		
2207ЛМ	0	30	45		
2211М	0	35	55		
2212Л	0	35	55	Р3Р-1	
60- 2214М	0	30	70		
30- 2214ЛМ	0	80	120		
30- 2214М	0	80	120		
2216Л1	0	30	70		
2217М	0	45	65		
2218Л1У	0	70	115		
2220Л1	0	70	115		
2222М	0	50	75		
2224ЛМ	0	50	75		
2226М	0	90	145		
2306Л2Т[1)]	0	30	60		3.1.25
20- 2308Б1Т2	0	40	75		
2309М1	0	40	75		
2309ЛМ	0	40	75		
2311КМ	0	35	55		
2311К1М	0	35	55		
20- 2312М1	0	50	90		
2313М	0	50	90		
2313М1	0	50	90		
2315М	0	40	60		
2316М	0	30	70		
2317Л1	0	70	115		

Continuation of table A.3

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
2318M	0	45	65		
2322Л1	0	80	130		
2505АЛ	0	25	35		
2609M	0	30	45		
2609ЛМ	0	30	45		
2609M1	0	30	45		
2612КМ	0	35	55		
2712	0	50	90		
2746M	0	90	165		
12302Б1	0	20	30		
12307КМ	0	30	45		
12308M	0	30	45		
12308ЛМ	0	30	45		
12309КМ	0	30	45		
12318M	0	45	65	002	
12320M	0	70	115		
12609M	0	30	45		
12609M1	0	30	45		
12609ЛМ	0	30	45		
6- 32118Д1Т	6	45	65		
32124Л1	0	50	75		
32130Д[1)]	0	70	105		3.1.25
5- 32206Б3	5	25	35		
55- 32207Б2Т	5	15	30		
5- 32208Б2Т	5	30	45		
32210Л1	0	20	55		
20- 32215ЛМ[1)]	0	40	75		3.1.25
60- 32216К1	0	30	70		
76- 32220Д1	6	85	105		

Continuation of table A.3

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
20- 32308ЛМТ2	0	40	75		
32310Л1	0	30	45		
32310М1	0	30	45		
32314М1	0	40	60		
70- 32412Л2	0	55	75	Р3Р-1	
32613	0	50	90		
32617М	0	45	65		
20- 42202Д	0	30	60		
42204Д1 [1)]	0	20	30		3.1.25
42205Д1 [1)]	0	25	35		3.1.25
42206Д1	0	25	35		
6- 42207ЛМ	6	30	45		
42207ЛМ [1)]	0	30	45		3.1.25
20- 42207ЛМ [1)]	0	40	75		3.1.25
60- 42207КМ	0	20	55		
42212Л2	0	35	50		
60- 42216Л1	0	30	70		
20- 42217М	0	65	115		
42219Д1Т	0	35	80		
20- 42305М [1)]	0	30	60		
42305ЛМ	0	25	35		
6- 42305ЛМ	6	25	35		
42306Д1	0	25	35		
6- 42307ЛМ	6	30	45		
42307ЛМ	0	30	45		
42307КМ	0	30	45		
42312М	0	35	55		
42312М1	0	35	55		
42412Л2	0	35	55	Р3Р-1	
20- 42413М	0	50	90	С-1	
42506Б1	0	25	35		3.1.25

Continuation of table A.3

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
42607Л1	0	30	45		
42612КМ	0	35	55		
62310М1	0	20	55		
92218Л2	0	45	65		
92220Л2Т	0	45	65		
30- 92224ЛМТ[1)]	0	100	150		3.1.25
92305ЛМ	0	25	35		
92312М	0	35	55		
92312М1	0	35	55		
92412Л1	0	50	90		
60- 102209К	0	20	55		
102305М	0	25	35		
102407М	0	30	45		
20- 102605М	0	30	60		
56- 112741ДТ1	6	45	90		
142220Л2	0	70	115		
142313Л1	0	50	90		
142314М1	0	40	60		
142318М	0	45	65		
20- 142320М	0	70	115		
252906Б	0				
6- 292124Л1	6				
292202Д	0				
6- 292203К	6				
292207Л	0				
292208М	0				
292211Л2	0				
292228МТ[1)]	0				3.1.25
292607Л1	0				
292617М	0				
292830ЛМТ	0				

End of table A.3

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
292919	0				
402310КМ	0	20	55		
20- 402312М	0	50	90		
20- 402312М1	0	50	90		
402313Л1	0	35	55		
402318М	0	45	65		
60- 402319М	0	35	80		
502207	0				
502207ЛМ	0				
502218Л1	0				
502220Л1	0				
502309М	0				
502309М1	0				
502309ЛМ	0				
502310КМ	0				
502312М	0				
502312М1	0				
512729У1	0	50	115		
752412Л1	0				
26- 782726М	6	90	145		
20- 782726М	0	90	145		
26- 782726КМ	6	90	145		3.3.4
20- 782726КМ	0	90	145		3.3.4
822707Д1	0				
922205К	0				
922906	0				
1002916ЛМ	0	40	60		
7502724М	0				

Table A.4 – Double row spherical radial roller bearing

Conventional designation of bearings	Accuracy as per GOST 520	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
3508	0	25	40		
3514	0	50	80		
30- 3516	0	80	110		3.2.3
3518	0	70	100		3.2.3
3520[1)]	0	60	100		3.2.3, 3.1.25
30- 3522	0	110	150		3.2.3
3526	0	90	120		3.2.3
3608	0	25	40		3.2.3
40- 3610	0	75	100		3.2.3
3611	0	30	50		3.2.3
3612	0	50	70		3.2.3
30- 3614	0	80	110		3.2.3
30- 3616	0	80	110		3.2.3

Table A.5 – Roller bearings with long cylindrical needle and helix rollers

Conventional designation of bearings	Designation of normative technical document	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
54707	ETY 500	35	75		
54708	ETY 500	35	75		
54810	ETY 500	30	75		
64704	ETY 500				
64706	ETY 500				3.2.4
64805	ETY 500				3.2.4
64903	ETY 500				3.2.4
64904	ETY 500				3.2.4
64905	ETY 500				3.2.4
64907K	ETY 500				
74716K	ETY 500				
94980	ETY 500				
654728	ETY 500				
704702	TY VNIIP.065				3.2.8
704702K	TY VNIIP.065				3.2.8
704702K2	TY VNIIP.065				3.2.8
804704K5	TY VNIIP.065				3.2.8
804707K3C10	TY VNIIP.065				3.2.8
804805K1	TY VNIIP.065				3.2.8
804906K1	TY VNIIP.065				
804907K3	TY VNIIP.065				3.2.8
864904	ETY 500				
864915	ETY 500				
904700U	TY VNIIP.065				3.2.8
904700K	TY VNIIP.065				3.2.8

End of table A.5

Conventional designation of bearings	Designation of normative technical document	Internal radial clearance, in mm		Device for measuring the clearance	Remarks
		min.	max.		
4024104У	GOST 4657				
4024106	GOST 4657				
4024107	GOST 4657				
4074104	GOST 4657				
4074114	GOST 4657				
4074116	GOST 4657				
941/12	GOST 4060				
941/15	GOST 4060				
942/8	GOST 4060				
942/20	GOST 4060				
942/30	GOST 4060				
943/20	GOST 4060				
943/25	GOST 4060				
943/30	GOST 4060				
943/40	GOST 4060				
943/45	GOST 4060				
НК222812	GOST 4060				
65911	ЕТУ 500				

Table A.6 – Radial thrust ball bearings

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
26216	0						
36204Л	0						
6- 36207Л	6						
36208Л	0						
36214Л	0						
36214АЛ	0						
6- 36214Л	6						
36318Л	0						
36318АКЛ	0						
6- 36318Л	6						
46114Л	0						
6- 46114Л	6						
46115Л	0						
6- 46115Л	6						
6- 46117Л	6						
5- 46117Л	5						
5- 46122Л	5						
6- 46122Л	6						
46205Л	0						
5- 46206Л	5						
46209Л	0						3.2.1
6- 46209Л	6						
46211Е	0						
6- 46211Е	6						
6- 46212Л	6						
46216Л	0						
5- 46305Л	5						
6- 46305Л	6						
6- 46306Л	6						
46309Е	0						

End of table A.6

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
6- 46312Л	6						
46318Л	0						
46318АКЛ	0						
6- 46318Л	6						
6- 66128Л	6						
6- 66221Л	6						
66221Л	0						
66409Д	0						
6- 116126Л	6						
6- 126825ЛТ	6	23	53			Р-123	
85- 176211Д1	5						
6- 246213Л	6						
25- 276207Б1Т	5						
25- 276207Б2Т2	5						
636905	0						
776702Х	0						
776801Х	0						
836906	0						
876707	0						
926722	0						
926722К1	0						
986711С1	0						
6- 1146832Л	6			250	370	003	
3056206	0						

Table A.7 – Tapered roller bearings

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
7202	0						
7204	0						
5- 7204A	5						
7205A	0						
5- 7205A	5						
7206	0						
6- 7206A	6						
7208	0						
7209	0						
7210	0						
7212A	0						
7214A	0						
7216	0						
7218[1)]	0						3.1.25
7304	0						
7305	0						
7307	0						
7308[1)]	0						3.1.25
7308A	0						
7309	0						
7310[1)]	0						3.1.25
7311K	0						
7312A	0						
7312M	0						
7313K1	0						
7314A	0						
7315K	0						
7507[1)]	0						3.1.25
6- 7507	6						
7508У	0						

Continuation of table A.7

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
7510	0						
7510A	0						
7511	0						
7511У	0						
7512[1)]	0						3.1.25
7512A	0						
7512	6						
7513	0						
7513К	0						
7514К1[1)]	0						3.1.25
7514А1	0						
7515А	0						
7516[1)]	0						3.1.25
7516А	0						
7518К	0						
7522А	0						
7522К[1)]	0						3.1.25
7526	0						
7607А	0						
7608А	0						
7614А	0						
7615А	0						
7616А	0						
7718К	0						
7806У[1)]	0						3.1.25
7806А	0						
7821	0						
27307	0						
27308У	0						
27308У1[1)]	0						3.1.25, 3.2.9

End of table A.7

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
27308АКУ[1)]	0						3.1.25
27706	0						
27709У	0						3.2.9
6- 97518	6			200	300		5.19
6- 97520У	6			50	150		5.19
807813К2[1)]	0						3.1.25
У- 807813А[1)]	0						
977908К	0						
977909	0						
987910К	0						
6- 20007109	6						
2007118К1	0						
20007118А	0						

Table A.8 – Thrust ball bearing

Conventional designation of bearings	Accuracy class as per GOST 520	Remarks
8100	0	
8102	0	
8103	0	
8104	0	
8105	0	
8106	0	
8109	0	
8111	0	
8118	0	
8120Л1	0	
8122Д	0	
8148Л	0	
8201	0	
8204	0	
8205	0	
8206	0	
8207	0	
6- 8207	6	
8208	0	
8209	0	
8218Л	0	
8222Л	0	
8305	0	
8306	0	
8307	0	
8320Л	0	
38204	0	
38205	0	
38207	0	
38209	0	

End of table A.8

Conventional designation of bearings	Accuracy class as per GOST 520	Remarks
98206	0	
208109	0	
308109	0	
688911С9	0	
808209	0	
808320Л	0	

Table A.9 – Slide bearing

Conventional designation of bearings	Designation of normative technical document	Internal axial clearance, in microns		Device for measuring the clearance	Remarks
		min.	max.		
Ш8	GOST 3635	30	100		
ШС8	GOST 3635	30	100		
ШМ8	GOST 3635	0	30		
НУШС8	GOST 3635	0	30		
Ш8Ю5Т	GOST 3635	20	50		3.2.10
Ш10	GOST 3635	30	100		
ШС10	GOST 3635	30	100		
Ш12	GOST 3635	30	100		
ШС12	GOST 3635	30	100		
Ш15	GOST 3635	30	100		
ШС15	GOST 3635	30	100		
Ш17	GOST 3635	30	100		
ШС17	GOST 3635	30	100		
Ш20	GOST 3635	30	100		
ШС20	GOST 3635	50	150		
ШМ20	GOST 3635	0	30		
Ш25	GOST 3635	30	100		
ШС25	GOST 3635	30	100		
Ш30	GOST 3635	30	100		
ШМ30	GOST 3635	0	30		
ШМ35	GOST 3635	0	30		
ШС35	GOST 3635	30	100		
Ш40	GOST 3635	30	100		
ШС40	GOST 3635	30	100		
Ш40У1	GOST 3635	200	300		

End of table A.9

Conventional designation of bearings	Designation of normative technical document	Internal axial clearance, in microns		Device for measuring the clearance	Remarks
		min.	max.		
ШС50	GOST 3635	50	150		
ШС55	GOST 3635	150	300		
ШСЛ60К	as per drawing	50	150		
2ШСЛ60	GOST 3635	150	300		

Table Г.6 – Radial thrust ball bearing

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
6- 6211E	6						
6- 36100E1	6						
4- 36101E4	4						
36205K1	0						
5- 36207Л	5						
36208Л	0						
5- 36208K	5						
36209АЛ	0						
6- 36210E	6						
36211E	0						
36212E[1)]	0						3.1.25, 3.2.1
36216Л	0						
36216E	0						
36308Л	0						
46108Л	0						
6- 46108Л	6						
6- 46112Л	6						
46116Л	0						
6- 46118Л	6						
46120АЛ	0						
46124Л	0						
5- 46126Л	5						
46202K	0						
5- 46202E1	5						
6- 46204Л	6						
46209АЛ	0						

Continuation of table Г.6

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
46210Л	0						
46211Л	0						
6- 46212Л	6						
5- 46213Л	5						
46213Л	0						
46215К	0						
46215А	0						
46215К1	0						
6- 46218Л	6						
6- 46220Л	6						
6- 46222Л	6						
5- 46304Б	5						
6- 46304Б	6						
46308Л	0						
46310Л	0						
66322Е	0						
66412Л	0						
6- 116222Б1Т2	6						
5- 126119Б3Т2	5	120	150	320	460		
6- 126209Б	6						
6- 176122Д	6						
85- 176128Б1Т2	5						
6- 176130Д	6						
176208Д	0						
86- 176211Р1	6	43	66	71	153		
85- 176211Р1	5						

Continuation of table Г.6

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
36- 176218Б4	6	48	73	81	169		
6- 176220БТ	6	18	42				
6- 176222Л1Т	6	80	196	200	300		
86- 176226ДТ1	6						
80- 176226Л	0	76	119	142	319		
6- 176228Л	6						
86- 176234Б1	6						
6- 176313ЕШ1	6						
6- 176317Л	6						
6- 176317Е	6						
5- 176320Л	5	16	40				
5- 236208Л	5						
5- 236208ЛТ2	5						
25- 276207Б1Т2	5						
5- 276209Р1	5						
25- 276209Б1Т							
5- 336208К	5						
6- 346808Е	6						
6- 446115Л	6						
466322Л	0						
636906С17	0						
1116928Л	0						
6- 1176720Б1Т2	6						
66- 1736826	6						

End of table Г.6

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
3056204	0						
3056205	0						
3056207Д	0						
3086304Л	0						

Table Г.7 – Tapered roller bearing

Conventional designation of bearings	Accuracy class as per GOST 520	Radial clearance, in microns	Device for measuring the clearance	Remarks
6- 7203A	6			
7205	0			
7205K1	0			
7207	0			
7207A	0			
7212	0			
7215HA	0			
7215	0			
7215K1	0			
7216A	0			
7304У	0			
7310A	0			
7310K2	0			
7312A	0			
7506[1)]	0			3.1.25
7507A	0			
6- 7507A2	6			
7508A	0			
7511A3	0			
6- 7512A	6			
6- 7513	6			
7514A1	0			
7516M	0			
7517K	0			
7517A	0			
7518A	0			
7518AK1	0			
7605	0			
6- 7607A	6			
6- 7610A	6			

End of table Г.7

Conventional designation of bearings	Accuracy class as per GOST 520	Radial clearance, in microns	Device for measuring the clearance	Remarks
7611	0			
7614	0			
7616КМ	0			
7821К1	0			
7909К1	0			
7909А	0			
27310НУ	0			
97508	0			
6- 97518А	6			
6- 97518А1	6			
6- 97520АУ	6			
1027307А	0			
2007106	0			
2007107	0			
2007108	0			
2007108А	0			
2007111	0			
2007114	0			
2007928	0			
3007212А	0			

Table Г.8 – Thrust ball bearing

Conventional designation of bearings	Accuracy class as per GOST 520	Remarks
6- 8100	6	
8101	0	
6- 8104	6	
8107К	0	
8108	0	
6- 8110	6	
8112	0	
8210	0	
8214	0	
8215	0	
8308	0	
8311	0	
8313	0	
8316	0	
38210	0	
3687/1300К1	0	

Table Г.9 – Slide bearings

Conventional designation of bearings	Designation of normative technical documents	Axial clearance, in microns		Device for measuring the clearance	Remarks
		min.	max.		
ШМ5	GOST 3635-78	0	30		
ШС6	GOST 3635-78	30	100		
ШМ10	GOST 3635-78	0	30		
2Ш15	GOST 3635-78	30	100		
ШМ15	GOST 3635-78	0	30		
2Ш20	GOST 3635-78	30	100		
ШС30	GOST 3635-78	30	100		
НУШС30	РД 37.006.057-88	0	30		
Ш35	GOST 3635-78	30	100		
ШМ40	GOST 3635-78	0	30		
ШМ45	GOST 3635-78	0	50		
ШС45	GOST 3635-78	50	150		
Ш45	GOST 3635-78	50	150		
2ШСЛ70	as per drawing	180	350		
8ШС100К1	as per drawing	50	150		

Note: The minimum radial clearance in the bearing is ensured technologically.

Table Г.10 – List of separate rollers, supplied as per ETY 500 for prototype products

Conventional designation of rollers	Size, in mm	Technical requirements	Remarks
Roller 2x7,8 A5 GOST 6870-81	2x7,8	GOST 6870	
Roller 2x9,8 A3 GOST 6870-81	2x9,8	GOST 6870	
Roller 2x11,8 A5 GOST 6870-81	2x11,8	GOST 6870	
Roller 2,5x9,8 A3 GOST 6870-81	2,5x9,8	GOST 6870	
Roller 4x34,8 A5 GOST 6870-81	4x34,8	GOST 6870	
Roller 5x49,8 A5 GOST 6870-81	5x49,8	For bearing 274913K	
Roller 6x59,8 GOST 6870-81	6x59,8	GOST 6870	
Roller 6,5x6,5 НРД IV ТУ 37.006.075-87	6,5x6,5	ТУ 37.006.075	
Roller 6,5x6,5 КН III ТУ 37.006.075-87	6,5x6,5	ТУ 37.006.075	
Roller 6,5x9 ТУ 37.006.075-87	6,5x9	For bearing 2505КМУ	
Roller 8x12 Е II ТУ 37.006.075-87	8x12	ТУ 37.006.075	
Roller 9x14 ТУ 37.006.075-87	9x14	For bearing 12507КМ	
Roller 10x12 КАВД III ТУ 37.006.075-87	10x12	ТУ 37.006.075	
Roller 10x14 ВПД III ТУ 37.006.075-87	10x14	ТУ 37.006.075	
Roller11x11 КНД III ТУ 37.006.075-87	11x11	ТУ 37.006.075	
Roller12x16 КАН II ТУ 37.006.075-87	12x16	ТУ 37.006.075	

End of table Г.10

Conventional designation of rollers	Size, in mm	Technical requirements	Remarks
Roller 12x18 КЕАД III ТУ 37.006.075-87	12x18	ТУ 37.006.075	
Roller 12x18 КАНД III ТУ 37.006.075-87	12x18	ТУ 37.006.075	
Roller 12,5x22 АНБ IV ТУ 37.006.075-87	12,5x22	ТУ 37.006.075	
Roller 14x14 КНП III ТУ 37.006.075-87	14x14	ТУ 37.006.075	
Roller 20x20 К ЕТУ 500	20x20	*	**

* Rollers 20x20 К (черт. инв. № 45139) for bearings 6-892748К2. Acceptance of the rollers as per same ТУ, is for the specified bearing. Difference in dimensions of the rollers in single sorted group should not exceed:
on diameter - 0,002 мм; on length - 0,010 мм ТУ 37.006.075.
** Number of rollers in single sorted group should be in multiples of 44.

Table Г.11 – List of separate balls supplied as per ETY 500 for prototype product

Conventional designation of balls	Ball diameter, in mm	Accuracy class as per GOST 3722	Remarks
Ball 2-40 GOST 3722-81	2,000	40	
Ball 3,175-10 GOST 3722-81	3,175	10	
Ball Б 3,175-100 GOST 3722-81	3,175	100	
Ball 3,969-10 GOST 3722-81	3,969	10	
Ball Б 3,969-60 Ю ЕТУ 500	3,969	60	3.2.12.4
Ball 4-200 GOST 3722-81	4,000	200	
Ball Б 4,763-40 Ю ЕТУ 500	4,763	40	3.2.12.4
Ball 5-60 Ю ЕТУ 500	5,000	60	3.2.12.4
Ball 7,144-40 GOST 3722-81	7,144	40	
Ball 7,938-60 GOST 3722-81	7,938	60	
Ball Б 7,938-20 GOST 3722-81	7,938	20	
Ball 8-100 GOST 3722-81	8,000	100	
Ball Б 9-100 GOST 3722-81	9,000	100	
Ball 9,525-60 Ю ЕТУ 500	9,525	60	3.2.12.4
Ball 12-100 GOST 3722-81	12,000	100	
Ball 14,288-60 GOST 3722-81	14,288	60	
Ball 15,081-40 GOST 3722-81	15,081	40	
Ball Б 16-200 GOST 3722-81	16,000	200	
Ball 20,638-60 GOST 3722-81	20,638	60	
Ball 25,4-60 Ю ЕТУ 500	25,400	60	3.2.12.4
Ball 25,4-100 Ю ЕТУ 500	25,400	100	3.2.12.4
Ball 38,1-60 GOST 3722-81	38,100	60	

APPENDIX Д
(mandatory)

Table Д.1 – List of separate bearings supplied as per ETY 500 for serial products such as M3, M4, M7

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
6- 130Л	6	23	58			Р-124	
132Л	0			300	470		
140Л	0			390	630		
70- 205К	0	18	33			Р-123	
76- 206Д	6	18	33			Р-123	
76- 206ДТ	6	18	33			Р-123	
6- 218	6	16	40			Р-123	
26- 221	6	34	60			Р-124	
228Л[1)]	0	23	53			Р-124	3.1.25
70- 312	0	28	48			Р-123	
420206	0	10	24			Р-123	
470729	0	18	45			Р-124	
76- 1000928Л	6	46	86			Р-124	
6- 1000956Л1	6	40	100			С-32	
2209Л2	0	30	45				
2236ЛМ	0	60	90				
2314	0	40	60				
2314М1	0	40	60				
12211КМ	0	35	50				
12311М1	0	35	55				
12312КМ	0	35	50				

Continuation of table Д.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
6- 32128Д1Т2	6	60	90				
5- 32130Б	5	65	100				
42226М	0	60	90				
42230М	0	70	105				
42234ЛМ	0	75	110				
292216Л1	0						
292730Д1	0						
1032956М[1)]	0	110	165				3.1.25
1032964ЛМ[1)]	0	135	205				3.1.25
1092964ЛМ[1)]	0	135	205				3.1.25
20- 3522	0	50	80				
3613	0	40	65				
20- 3624Н	0	50	80				
941/17 941/25 941/30 943/50	GOST 4060						
6- 36206Л	6						
6- 36219Л	6						
6- 36219Л5	6						
46313Л	0						
176144Л	0						
5- 176226БТ1	5						
6- 176236Д	6						
476840	0			200	400		
476964Л	0			280	360		

End of table Д.1

Conventional designation of bearings	Accuracy as per GOST 520	Internal clearance, microns				Device for measuring the clearance	Remarks
		Radial		Axial			
		min.	max.	min.	max.		
1126964Л[1)]	0	280	360				3.1.25
1126964ЛУ3	0						
8114	0						
8202	0						
6- 1046964Л1	6						
6- 1846964Л1	6						
Ш6	GOST 3635						

Table Д.2 – List of separate rollers, supplied as per ETY 500 for prototype products

Conventional designation of rollers	Size, in mm	Technical requirements	Remarks
Roller 1,6x17,8 A 5 ETУ 500	1,6x17,8	GOST 6870	Number of rollers in every sorted group should be in multiples of 42 (see.p.3.2.11.1)
Roller 2x15,8 A 5 GOST 6870-81	2x15,8	GOST 6870	
Roller 10x10 КПДП (У) ТУ 37.006.075-87	10x10	ТУ 37.006.075	Number of rollers in every sorted group should be in multiples of 75
Roller 12x12 КПДП (У) ТУ 37.006.075-87	12x12	ТУ 37.006.075	Number of rollers in every sorted group should be in multiples of 112 or 96
Roller 14x14 П 111 ТУ 37.006.075-87	14x14	ТУ 37.006.075	

Table Д.3 – List of bearings supplied as per ETY 500 for products for п/я А-7187

Conventional designation of bearings	Accuracy class as per GOST 520	Remarks
70- 109	0	
70- 205К	0	
70- 210	0	
70- 210АК	0	
42130К3М	0	
70- 42208М	0	
70- 42210Л3М	0	
70- 42211М	0	
70- 42213К3М	0	
70- 42218К3М	0	
70- 42313М	0	
70- 42315К3М	0	
70- 42316К3Л2	0	
70- 42410К3М	0	
70- 307	0	
70- 307А	0	
307	0	
307А	0	
70- 309К	0	
309К	0	
70- 208К	0	
70- 208А	0	
80104	0	
6- 8207	6	
70- 212	0	

End of table Д.3

Conventional designation of bearings	Accuracy class as per GOST 520	Remarks
6- 221	6	
406АК	0	
6- 32220Д1	6	
6- 346313Л	6	
2218Л1	0	
70- 32221Д	0	
2413М	0	
ШС12	GOST 3635	

APPENDIX E
(mandatory)
Specimen of the passport

Manufacturer			PASSPORT		
Conventional designation of the bearings or spare parts	Class or degree of accuracy	Quantity	Box number	Number of sheets in the passport	Additional specifications

Bearings (separate parts) accepted by the inspection department corresponds to GOST...

ETУ (TУ) and is approved for usage.

The manufacturer guarantees the serviceability of the bearing (separate parts) in products according to ETУ (TУ)…….

Storage period of bearings (separate parts) in factory packing……..

Preservation done on «……» …….200.....

Factory head — Inspection head

(Signature) — (Signature).

rubber stamp — rubber stamp

…….

Cutting line during export supply

Bearings (separate parts) are accepted by the customer's representative.

Customer's representative:

(Signature)

Rubber stamp

End of appendix E;

Backside of the passport

ATTENTION!

1 The bearing and their part should be stored in the factory packing.

2.Boxes, initial packing materials should be opened only before assembly.

While mounting the bearings (parts) in the articles, it is necessary that the:

- closed bearings with protective washers a**nd sealing, filled with working** compound at the manufacturer's end should not be cleaned

- During the presence of protective consistent grease on the external surface, the same should be removed by wiping;

- During preservation with liquid inhibitor lubricants-carry out washing in petrol;

-During preservation with consistent lubricant- carry out heating in oil and washing in petrol;

-During de-preservation of ingot bearings-carry out washing in spirit or alcohol gasoline blend.

Similar methods of de-preservation are given in instruction manual of ОАО"ВНИПП".

3. During difference/shortage in quantity, type, sorting of bearings or their parts, the passport should be returned to the manufacturer.

The claims are not accepted without the passport of the manufacturer.