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O/c B.O.
Group

Bearings for speci-al-purpose
Articles
Specifications.

ETY 500

ETY 500

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APPROVED		Shiv	29.8.85		

These specifications pertain to ball, roller and spherical plain bearings and also to individual special - purpose articles, components and are supplementary to GOST 520-71 appendix contains the nomenclature of bearings, balls and rollers, supplied as per these specifications.

Below, there is example of conventional designation of these bearings and individual components in the order and documents on them; bearing 60-2214 M ETY 500 roller III 5 x 10 A П ETY 500 ball Б IV 9 mm H Ю ... ETY 500.

I. Technical requirements.

1.1. Bearings and individual components should correspond to requirements of GOST 520-71, GOST 3722-81, GOST 6870-81, GOST 7242-81, GOST 5377-79, GOST 8338-75, GOST 8328-75, GOST 4657-81, to requirements of drawings, approved by drsinger and agreed with customer's representative, to requirements of these specifications and standard technical documents, indicated in the list of reference documents.

1.2. Bearings and individual components should comply with these specifications, if there are differences in requirements to the same parameter in GOSTs, drawings and these specifications.

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1.3. Chemical composition, mechanical properties and other indices of metals and materials, used for manufacture of bearings and individual components should conform to standards and this manual .

1.4. Hardness of bearing components made of steel $\square \times 15 \text{ C} \square$ should be in limits HRC, 61 -64

1.5. Roughness of surface of races of rings of all dimensions of annular, angular-contact, thrust and spherical ball bearings of accuracy class \odot GOST 520-71 should be not more than digit magnitude of roughness parameter $R_a 0.16 \mu$ as per GOST 2789-73.

The roughness of surfaces of races of rings of all dimensions of tapered roller bearings of accuracy class \odot GOST 520-71 should be not more than digit magnitude of roughness parameter $R_a 0.32 \mu$ as per GOST 2789-73.

The roughness of other surfaces of mentioned bearings and all surfaces of bearings of other types and classes should conform to drawings.

1.6. *Burnt spot on working* surfaces of rings and rolling elements of bearings are not allowed or well as burnt spots on mounting surfaces, lowering the hardness beyond limits, established by the specifications and GOST 520-71.

If the hardness *could* not be measured because of component *shape* and dimensions, on non-working surfaces of rings and rollers of bearings

there ~~may~~ be grinding marks of secondary tempering not followed by change of microstructure.

1.7. Cracks on the components of bearings are not allowed.

1.8. Ball bearings of class 0 should be assembled with balls of accuracy level II, as for accuracy classes 6 and 5 with balls of accuracy level I as per GOST 3722-60 annular roller bearings with short plain rollers of accuracy class 0 should be assembled with ~~the rollers of~~ accuracy level III A, as ~~for accuracy classes~~ and 5 with ~~rollers~~ accuracy level II A GOST 22696-77.

1.9. Radial and axial clearances in bearings should correspond to values, specified in the appendix to these specifications.

1-10 Annular roller bearings with short cylindrical rollers may be delivered with non-interchangeable rings. In this case on faces of both rings there should be serial number, inscribed by electrograph or other method.

1.11. Non-detachable annular ball bearings should have bearing faces on one side check the position of raceway axis from any face, if rings being manufactured do not have a face as a datum surface (during machining on transfer continuous flow lines or on machines with hopper or dispenser loaders).

1.12. There should not be any cuts on fillets (recesses) at ring, collars of roller bearings.

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- 1.13. The chromating of mounting surfaces of bearings is not allowed.
- 1.14. Depth of cyanided layer of cagewashers for bearings with long plain rollers should be in limits 0.05 - 0.2 mm. The cyanided layer on outer faces of cage washers is not necessary.
- 1.15. Value of radial run-out, axial run-out of race and run-out of faces of ball and roller annular, and angular-contact bearings of accuracy class 0 (which are indicated by I in lists) should be not more than those indicated in tables 1 and 2.

Table.1.

Inner rings. Dimensions (μ)

Nominal diameters d (mm)		Variety of ring width	Radial run-out of race	Run-out of faces relative to hole	Axial run-out of race.
min.	max.				
-	30	16	10	16	32
30	50	16	12	16	32
50	80	20	16	20	40
80	120	20	20	20	40
120	180	24	24	24	48
180	250	24	32	24	48
250	315	28	40	28	56
315	400	32	48	32	64

Outer rings. Dimensions (μ)

Nominal diameters D (mm)		Radial run-out of race	Axial run-out of race
min.	max.		
-	30	12	32
30	50	16	32
50	80	20	32
80	120	28	36
120	150	32	40
150	180	36	48
180	250	40	56
250	315	48	64
315	400	50	72
400	500	64	80
500	620	80	96

Note:

During check at mandrel-less measurer, value of axial run-out of inner rings should not be more than 60 % of those specified in table 2.

1.16. Value of radial run-out (of double eccentricity) of races of press-fitted rings of ball thrust bearings of accuracy class 0 should be not more than those indicated in table 3.



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Nominal diameters d (mm)		Radial run-out (double eccentricity) of races of press-fitted rings, μ .
min.	max.	
	50	40
50	120	50
120	250	60
250	315	70
315	500	80

1.17. On the surfaces of cages, made of brass $\sqrt{C 59-1\sqrt{}}$, there may be intermetallic inclusions (dark spots) in accordance with the material standards.

1.18. Temperature of tempering and limits of hardness of rings and rolling elements, and additional conventional designations of bearings made of steel Ш X 15 and $\text{Ш X 15 C}\sqrt{}$ (alternatives have at the end the letter У -slag), which operate at excessive heat, showed correspond to those specified in Table 4.

Table 4.

Temperature of ring tempering, °C	Tempering of rollers (at temperature prescribed for rings)	Tempering of balls	Hardness of rings	Hardness of rollers of balls	Conventional designation of temperature tempering	
1	2	3	4	5	6	7
200	none		61-64	as per GOST 520-71	as per GOST 3722-60	T

1	2	3	4	5	6	7
225		none	60..63	as per GOST 520-71	as per GOST 3722-60	T ₁
250	begin- ning from diame- ter 15 mm	begining from diameter 25.4 mm	59 ..63	as per GOST 520-71 at diameter less than 15 mm and 58-63 at 15 mm, min.	as per GOST 3722-60 at diameter less than 25.4 mm and diameter 25.4 mm, min.	T ₂
300	all	dimensions	56..59	55..59	55..59	T ₃

Note:

1. High-temperature tempering of rolling elements may be done on ready-made components. In this case darkening of working surfaces is not considered as a reason for rejection.
2. Face limiting thrust washers of roller bearings must be subjected to tempering at the same temperature as their rings and have the same hardness.

1.19. Rings and rolling elements should not be used after repeated hardening if they are overheated.

1.20. Bearing components and individual components should be demagnetized.

1.21. Inosphatizing of cages, manufactured by stamping is allowed.

2. Acceptance Rules and methods of checking.

2.1. ~~Manufacturer checks~~ all bearings in accordance with requirements of these specifications, GOST 520-71, technical documents, indicated in the lists of reference documets (appendix 2)

2.2. Customer'd Representative has the right to check bearings and individual components for conformity with requirements of these specifications.

2.3. If accuracy norms, established by GOST 520-71 are observed, methods accpeted at plant, manufacturing the bearings, may be used to check the parameters of bearing rotation accuracy. Result of measurements as per procedure, established by GOST 520-71, prevails other methods in case of argument.

2.4. Measurements of geometrical parameters and checking of roughness of bearing component surfaces are carried out by QID on the working place, and (upon discretion of QID and customer's Representative)

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bearing components from each standard size are sent to plant corresponding laboratories not less than once a month.

2.5. Radial clearance value of bearing is determined as arithmetical mean of three measurements by turning one of the rings at 120° three times. Minimum values of bearing radial clearance during bearing completing and checking should be not less than the lowest limit, established by these specifications even if some individual values exceed the upper limit mean radial clearance of each bearing should not exceed limits of these specifications.

Feeler gauge may be used to check the radial clearance in spherical roller bearings .

2.6. Rings of all the bearings are completely checked for cracks except bearing rings as per GOST 4060-78, by method of magnetic-field or magnetic-particle fluorercent testing. In accordance with know-how accepted on the factory, rollers, balls and large steel cages are subjected to selective checking on magnetic crack detector on non-destructive testing devices.

2.7. Manutaturer conducts ring stand tests of bearing, accepted as per these specifications, in accordance with GOST 520-71 as per schedule, agreed with customer's representative on manufacturing plant.

If results of Periodic tests are not -
satisfactory, through analysis of detected flaws causes should be carried out. Further

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acceptance and shipment of bearings are stopped.

They are restarted after detected faults elimination measures are agreed with customer's representative.

3. Marking, preservation, Packing.

3.1. All bearings should have legible special acid or electrochemical stamp of QID, certifying the conformity of bearings to requirements of these specifications. Stamp is applied to mounting surface of bearing ring, for bearings without rings to cage, for bearings with hole diameter upto 25 mm width of ring or cage 15 mm, max - to packing box postal wrapper stamp is applied to postal wrapper of boxes with individual components, too.

Form of stamp is reported by bearing manufacturer to consumer and *articles* manufacturers.

3.2. On non-detachable ball bearings the marking prescribed by drawing, may be applied separately to both rings or to one of the rings.

3.3. Detachable bearings with non-interchangeable bearings with non-interchangeable rings should have serial number, traced by electrograph or by other method; on faces of both rings and on other detachable components .

On detachable bearings (of type 142 000) serial numbers should be on cage and on ring faces. Legible inscription "non-interchangeable" should be in certificate and on boxes with packed bearings.

3.4. Upon agreement with customer's representat-

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-ive at manufacturing plant in some cases it is allowed to trace the bearing conventional designation marking, bearing design particulars marking, and marking of manufacturer by electrographic or chemical methods.

3.5. Rings of bearings with the marking of the previous year may be used also during the first quarter of the next year. Beginning from the fourth quarter of current year, the marking of the next year may be used.

3.6. Preservation and packing of the bearings delivered as per ETY 500, should be carried out as per Instructions of manufacturer.

3.7. Into each box with packed bearings there should be put certificate of established form.

3.8. During preservation of bearings, supplied to customer as per **ETY-500** inhibitor "AKOP" is not used. Bearings and individual components, manufactured as per these specifications, may be stored at bearing manufacturer's ware house upto 3 months. Upon expiring of these terms, bearings and individual components should be again subjected to preservation and in the certificate there should be written a new term of safety guarantee for corrosion proofness.

4. Guarantee of supplier.

4.1. Manufacturer guarantees the **Operation** of 100 % of bearings as parts of series production assemblies during specified time.

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4.2. Preservation and packing of bearing, supplied as per these specifications, are to guarantee the bearing protection against corrosion for 24 months from date of production if storage rules are observed.

Appendix No.2.

List.

of reference documents for bearings, delivered as per ETY 500.

No.	Designation	Nomenclature.
1.	GOST 520-71	Ball-and roller bearings Technical requirements.
2.	GOST 800-78	Tubes made of steel <i>UX</i> 15 for bearings
3.	GOST 801-60	Ball-and roller bearing steel.
4.	GOST 2789-73	Surface finish parameters and characteristics.
5.	GOST 3635-78	Spherical plain bearings. specifications.
6.	GOST 3722-60	Ball bearings balls technical requirements.
7.	GOST 1060-78	Needle roller bearings with one outer protruded ring. specifications.
8.	GOST 5377-79	Annular roller bearings with short plain rollers without inner or outer ring. Types and basic dimensions.

No.	Designation	Nomenclature
9	GOST 6870-81	Rolling bearings needle rollers specifications.
10	GOST 7242-81	Single row radial ball bearings with shields types and basic dimensions technical requirements.
11	GOST 15527-70	Copper zinc (brass) alloys, pressure treated. Grades .
12	GOST 6267-74	Lubricant CIATIM-201.
13	GOST 9569-79	Paraffined (war) paper
14	GOST 10354-73	Polyethylene film
15	GOST 17711-72	Copper zinc (brass) cast alloys. grades
16	GOST 4657-81	Single-row radial needle roller bearings Basic dimensions. Technical requirements.
17	GOST 22696-77	Rolling bearings plain rollers specifications.

Bearings supplied as ETY 500 for tank T 72 M

Table .1.

Conventional designation of bearing	Accuracy class as per GOST 520-71	Inner Clearances (μm)		Device for clearance measurement	Load N (kg)	Notes
		radial	axial			

1	2	3	4	5	6	7
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6-18	6	5-16	110	c-30		
6-25	6	5-16		C-23		
6-27	6	5-16	110	C-30		
6-104	6	10-24	180	P-123		
106	0	10-24		P-123		
6-111П	6	13-33		P-123		
6-112П	6	13-33	270	P-123	←	
6-113П	6	13-33	270	P-123		
115П	0	14-34	280	P-123		
6-118	6	16-40		P-124		
128	0	25-53		P-124		
5-201	5	8-22	170	P-123		
202	0	8-22	180	P-123		
6-204	6	10-24	210	P-123		
204K	0	10-24	210	P-123		
205K	0	10-24	210	P-123		
206 K I)	0	10-24		P-123		
6-206K	6	10-24	210	P-123		

See para 1.15

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Continuation Table-1.

1	2	3	4	5	6	7
207K5	0	12-26	240	P-123		
6-207K5	6	12-26	240	P-123		
210	0	12-29	270	P-123		
211	0	8-20	230	P-123		
212	0	13-33	310	P-123		
70-214K	0	30-56		P-123		
226	0	8	250-350	003		See para 5.1
226Л1	0	8	250-350	003		See para 5.1
301	0	8-22	200	P-123		
305 ^{I)}	0	10-24	220	P-123		See para 1.15
309Л	0	12-29	300	P-123		See para 5.2
317	0	16-40	470	P-124		
6-80018	6	5-16		C-30		
80205	0	10-24	210	P-123		
6-80205	6	10-24	210	P-123		
100704	0	10-24	180	P-123		
6-160707	6	12-26	240	P-123		
9707II ^{I)}	0	13-33	220	P-123		See para 1.15
6-100095	6	5-16	80	C-23		
6-1000818Б	6	16-40	240	P-123		
1000907	0	12-26		P-123		
6-1000918Л	6	16-40	300	P-123		
6-7000101	6	8-22	145	P-123		
6-7000102	6	8-22	145	P-123		
6-7000105	6	10-24	160	P-123		

Continuation table-1.

1	2	3	4	5	6	7
7000106	0	10-24	170	P-123 M-444		
7000107	0	12-26	170	P-123 M-444		
6-46305IT	6					
8104	0					
8306	0					
8308	0					
108	GOST 3635-78		30-100			
112	GOST 3635-78		30-100			
7000108	0	12-26	196	P-123 M-444		
7000110	0	12-29	200	P-123		
1201	0		60-120	A-122	+40(+4)	If device A-122 is not available, measurements may be taken on device 202 under the same loads
1202	0		60-120	A-122	+40(+4)	
1204	0		60-120	A-122	+40(+4)	
1605	0		60-120	A-122	+40(+4)	
2207IT1	0		30-45			
2211M	0		35-55			
30-2214M	0		80-120			
2309MI	0		40-75			
12308M	0		30-45			
6-32118, II, IT	6		45-65			
42204, AI, I)	0		20-30			See para 1.15
92412, II, I	0		50-90			See para 5.4

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1	2	3	4	5	6	7
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142220	2 0		70-115			
6-292124	1 6					
292607	1 0					
20-782726	M 0		90-145			
7502724	M 0					
804704K-						
5TY37.006.						
065-74						

See para
5.3

941/15 GOST
4060-78

941/20 GOST
4060-78

942/20 GOST
4060-78

943/25 GOST
4060-78

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Table 2.

Rollers separately delivered as per ETY 500 for
tank T 72 M

Conventional designation of rollers	Size (mm)	Technical requirements	Notes
Roller 2x19,8A5 GOST 6870-81	2x19,8	as per GOST 6870-81	
Roller 2,5x9,8A5 GOST 6870-81	2,5x9,8	--	
Roller 2,5x13,8A3 GOST 6870-81	2,5x13,8	--	
Roller 2,5x13,8A5 GOST 6870-81	2,5x13,8	--	
Roller 3x19,8A5 GOST 6870-81	3x19,8	--	
Roller 4x34,8A5 GOST 6870-81	4x34,8	--	
Roller 4x39,8A5 GOST 6870-81	4x39,8	--	
Roller Π 5x10A Π ETY 500	5,0x10	See para 5.6	
Roller 5x43,8A5 GOST 6870-81	5x43,8	as per GOST 6870-81	
Roller 5x49,8A5 GOST 6870-81	5x49,8	as per GOST 6870-81	
Roller Π 7x10AB ETY 500	7x10	See para 5.5	
Roller 10x30 ETY 500	10x30	See para 5.7	
Roller Π 18x26AP ETY 500	18x26	See para 5.8	

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Table.3.

Balls supplied separately as per ETY 500 for tank T 72 M.

Conventional designation of balls	Diameter of balls (mm)	Allowance as per GOST 3722-60		Accuracy level as per GOST 3722-60	Note
		Group	Permissible deviations		
1	2	3	4	5	6
BY 4 mm H GOST 3722-60	4,000	H	$\pm 0,025$	Y	
Π 5 mm B GOST 3722-60	5,000	B	$\pm 0,005$	Π	
Y 6 mm ± 50 GOST 3722-60	6,00	Special allowance	$\pm 0,050$	Y	
Y 6,35 mm H GOST 3722-60	6,350	H	$\pm 0,050$	Y	
IY 6,35 mm H Π ETY 500	6,350	H	$\pm 0,050$	IY	See para 5.9.
IY 7,144 mm H GOST 3722-60	7,144	H	$\pm 0,050$	IY	
Σ Y 7,938 mm H GOST 3722-60	7,938	H	$\pm 0,050$	Y	
III 9,525 mm GOST 3722-60	9,525	H	$\pm 0,050$	III	
Σ IY 10mm H GOST 3722-60	10,000	H	$\pm 0,050$	IY	
IY 10,319 mm ± 75 GOST 3722-60	10,319	Special allowance	$\pm 0,075$	IY	
Y 12 mm ± 75 GOST 3722-60	12,000	Special allowance	$\pm 0,075$	Y	

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Continuation table 3.

	1	2	3	4	5	6
Y	12 mm H GOST 3722-60	12,000	H	$\pm 0,100$	Y	
IY	14 mm H GOST 3722-60	14,000	H	$\pm 0,100$	IY	
IY	15,875 mm-100 GOST 3722-60	15,875	Special allowance	$\pm 0,100$	IY	
III	19mm ± 100 GOST 3722-60	19,000	Special allowance	$\pm 0,100$	III	
IY	15,081 mm H GOST 3722-60	15,081	H	$\pm 0,100$	IY	
BIY	10 mm HЮ ETY 500	10,000	H	$\pm 0,050$	IY	See para 5.9.
III	22,225 mm H GOST 3722-60	22,225	H	$\pm 0,150$	III	
IY	23,813 MM H GOST 3722-60	23,813	H	$\pm 0,150$	IY	
IY	25,4 MM H GOST 3722-60	25,400	H	$\pm 0,150$	IY	
IY	31,75 mm H GOST 3722-60	31,750	H	$\pm 0,200$	IY	

5. Additional technical requirements to bearings and rollers.

5.1. Bearings 226 and 226П1 Check the axial play minimum radial clearance (appendix No,3, column 3 of table 1) are ensured by the technological process.

5.2. Bearing 309П
Clearance between cage and outer ring should be in limits 0.45-0.75 mm.

5.3. Bearing 804-704 K 5.

5.3.1. Supplied with total clearance between all needles in limits 0.075-0.442 mm.

5.3.2. Check for leakage should be carried out on fixture of manufacturer by oil ТАП -15, MC-20 or МК -22 after crimping cover cap, during 10 minutes

5.3.3. The roughness of outer cylindrical surface of rings of bearing should be not more than Ra 0.63 μ as per GOST 2789-73.

5.3.4. End play of bearing ring bottom face outer surface relative to outer cylindrical surface generatrix during measurement at point of maximum diameter of bottom face (at distance 1 mm from chamfer edge) should not exceed 0.1 mm.

5.4. Bearing 92412П1

Clearance between roller faces and inner ring faces should be 0.2-0.45 mm.

5.5. Roller II, III 7 x 10 AB.

5.5.1. Material, the rollers made of and hardness as per GOST 520-71.

5.5.2. Limit deviations :- 0.010 mm along diameter, and - 0.020 mm along length;

0.001 mm - of diameter variety and taper.
0.008 mm- of end play, and as for lobing 0.003 mm (during measuring in prism with angle 60°).

5.5.3. Variety in diameter 0.003 mm.

5.5.4. The roughness of antifriction surface of rollers Ra 0.32, and of faces Ra 0.63.

5.6. Roller μ 5 x 10 A П

5.6.1. Material, rollers made of, and hardness as per GOST 520-71.

5.6.2. Limit deviations minus 0.010 mm along diameter, minus 0.030 mm along length, 0.001 mm of diameter variety and taper; 0.008 mm- of end play; and as for lobing 0.003 mm (during measuring in prism with angle 60°).

5.6.3. Variety in diameter 0.003 mm, and in length 0.008 mm .

5.6.4. The roughness of antifriction surface of rollers Ra 0.32, and of faces Ra 0.63.

5.7. Roller 10 x 30.

5.7.1. Material the rollers made of, and hardness as per GOST 520 -71 .

5.7.2. Limit deviation: ~~0.010~~ mm along diameter, -0.28 to -0.42 mm along length.

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5.7.3. Among classified rollers of same grade, difference of diameters 0.005 mm.

5.8. Roller D IV 18 x 26 AP

5.8.1. Roller's material and hardness-as per GOST 520-71

5.8.2. Limit deviations:- of diameter -0.010 mm, of length - 0.100 mm of diameter variety and taper 0.002 mm of end play 0.025 mm, of lobing 0.006 mm (when measuring in the prism with angle 60°)

5.8.3. Variety in diameter 0.004 mm .

5.8.4. The roughness of antifriction surface of rollers Ra 0.32, and of faces Rs 0.63.

5.9. Balls, with index "10" in designation, are made of steel 95 x 18 GOST 5632 - 72.

Balls should be heat-treated upto hardness HRC 59-63.

Burnt spots, soft spot, corrosion, cavities cracks are not allowed. Other requirements as per GOST 3722-60.

Detection of burnt spots on ball surface is carried out by pickling as per instructions of manufacturer.

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