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Bearings for Aviation Equipment

Unified Technical Specification.

Present unified Technical Specifications deal with ball, roller and hinged bearings supplied in series as well as with individual parts for articles of aviation Equipment.

Present Technical Specifications set additional technical requirements to bearings and individual parts in accordance with item 1.22 GOST 520 - 71 for bearings of accuracy class 6.

Following sections come under the composition of unified technical specification.

1. Technical requirements.
2. Rules of acceptance and methods of inspection.
3. Marking, preservation and packing.
4. Guarantee of supplier.

In orders and in technical papers, designation of bearings and individual parts, manufactured as per present technical specifications should consist of conventional designation of bearing specified in technical specifications with addition of No. of technical specifications.

For example: while ordering bearings 76-770067Kc15, 76 - 770068 KC 15 as per technical requirements 100/3 in the order followings should be specified :

Bearing 76 - 770067 KC 15 - ETY 100/3, bearing 76 - 770068 - KC 15 - ETY 100/3.

1. TECHNICAL REQUIREMENTS.

1.1. Bearings 76 - 770067 KC 15, 76 - 770068 KC should correspond to the requirements of present specifications and approved drawings.

Other requirements, which are not specified in present ETY and drawings, should correspond to the following standards and technical specifications:

GOST 520 - 71 " Ball and roller bearings Technical Requirements",

Pertain to bearings of accuracy class 6.

Requirements of table 13 and 14 do not pertain to aviation bearings.

Requirements of table 2 - 12 and 15 - 29 are observed in inspection of bearings by consumer.

GOST 3722 - 81 " Rolling bearings Balls . Technical Specifications ".

GOST 7242 - 81 " Single row radial ball bearings with shields. Technical Specifications".

GOST 9592 - 75 " Radial ball bearings with projecting inner ring. Types and basic dimensions"

Requirements to the materials for bearing parts should correspond to the standards and Technical Requirements.

1.2. Heat treatment and heattreatment inspection of bearings parts should be carried out as per instructions of manufacturing plant.

1.3. Repeated hardening of rings, in case of their overheating during hardening, is prohibited.

1.4. Ring and rolling element of bearings should undergo 100% Tempering for grinding stress relief. Tempering should be carried out in oil baths or in furnaces with forced circulations of air at a temperature T = 140 ± 5°C for 3 hours.

1.5. Rings and rolling element of ready bearings should be inspected during their delivery.

a. As per microstructure,

b. for contamination of metal with non metalic inclusions.

c. As per hardness,

d. For absence of cracks and burns on all surfaces.

1.6. Chrome-plating of mounting and other surfaces is not allowed.

1.7. Cracks, hair line cracks, laps, soft spots, burns on bearing parts and individual parts are not allowed.

Hence and after in the text word burn means grinding marks, strips and spots of secondary hardening and secondary tempering.

1.8. Bearings should be checked for smoothness of run, while rotating by hand they should have uniform run without jamming as well as the bearings should undergo the special inspection for absence of the followings:

a. Cracks on rivet heads;

b. Cuts on stamped bearing case separators in corners of bond.

1.9. In bearings with protective washers when external rings are rotating, in any position touching of washers to the separator and internal ring is not allowed.

1.10. During assembly bearings are filled up with working lubricant in correspondence with index, coming under conventional designation of bearings.

Bearings with index C 15 is filled up with working lubricant ЦИАТИМ - 207 GOST 1977A - 74.

1.11. Filling of lubricant is carried out through clearance between separator and rings on race way and in socket of separator.

2. RULES OF ACCEPTANCE AND INSPECTION METHODS.

2.1. For checking the stability of manufacturing technology durability and reliability of bearings, periodical inspections of bearings on test stand are carried out in manufacturing factory.

2.2. The customer has got the right to check-up completely the submited batch of bearings and separate parts for external appearance, magnetization, smoothness of rotation, noise, accuracy of dimensions and rotation as well as marking, lubricant and packing.

2.3. During acceptance of bearings and individual parts as per present ETY even if a single deviation from the requirement of ETY and GOST, specified in item 1i, is found, the submitted batch is subject to complete inspection by manufacturing factory for this deviation.

The batch is rejected finally if the same deviation is found again in the bearings, individual parts, which are selected, after complete inspection.

2.4. During acceptance of bearings and individual parts as per present ETY if from requirement of ETY and standards, specified in item 1.1. deviation is found as per mechanical, chemical or metalographycal indices, whole batch is finally rejected and is not allowed for re-submission.

2.5. Inspection of metal, supplied to the manufacturing factory of bearings and its introduction in production should be carried out as per instruction of manufacturing factory.

2.6. For appearance of burns and soft spots on balls etching should be carried out as follow.

- contineous - after machining for operation of hard grinding or before final lapping.
- At random.
  a. In the process of machining for hard lapping operationin quantity of 3 % from abatch, but not less than 50 pieces of balls;
  b. After final lapping in quantity - 2 % from submitted batch, but not less than 50 pieces of balls

2.7. Burns and soft spots on the rings, balls of bearing from steel grade W x x15 are detected in alcoholic or accqueous solutions of nitric acid.

2.8. For detection of cracks, hair, line cracks, laps, soft spots or burns.

a. All rings should indergo the checking for absence of cracks with magnetic flaw detection method.
b. All rings should undergo etching for detection of burns and soft spots.

2.9. Etching of rings is carried out after final grinding.

2.10. Hardness of rings is checked by Rockwell device as per scale "A".

2.11. Nonuniformity in hardness for one ring should not exceed two units HR C_3.

2.12. Quality control of heattreatment of bearing rings should be carried out in devices by nondestrictive method of inspection, as per instructions of manufacturing factory of bearings.

2.13. Inspection of radial, axial clearances and runout of rings should be carriedout before filling of working lubricant and before installation of shields and seal.

2.14. Easiness of rotation is checked for 100% bearings after filling of working lubricant and installation of shields and seal and should correspond to that of a standard bearing set by manufacturing factory.

2.15. Inspection of bearings for sealing should be carried out by rolling method in operating conditions, specified in instructions of manufacturing factory.

2.16. Bearings 76-770067 KC 15, 76-770068KC15 are subjected to rolling by random selection. Actual percentage of rolling is set by manufacturing factory.

2.17. During rolling, release of lubrican between shields or seals and outer rings is not allowed and insignificant release of lubricant between washers or seals and inner ring is allowed. In case, if during rolling lubrication is released along the face and it is not possible to find out wherefrom it is coming out, bearing is set for re-rolling, etc.

2.18. After rolling random checking for residual lubricant in bearing carried out. Permissible quantity of residual lubricant is set by manufacturing factory.

3. MARKING, PRESERVATION AND PACKING.

3.1. Bearings 76 - 770067 KC 15, 76-770068 KC 15 should have the marking of the designation of bearing type and manufacturing factory on the face of outer ring.

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3.2. In some cases, specified by approved drawings, it is allowed to mark designating types, dimensions, structural features, conventional designation of manufacturing factory with electrographic, chemical, electro chemical or utrasonic methods.

In case of marking of bearings with electrographic method, subsequent trimming of protected places is essential before assembly of bearing.

3.2. Preservation and packing of bearings 76-770067 KC 15, 76-770068 should be carriedout with fillable working lubricant as per instruction VI .37 .006.072-77.

In this case preservation of outer surfaces of bearings is allowed with plastic lubricant GOST 19537 - 74 which is applicable in cold condition on the surfaces which are to be preserved.

3.3. Bearings and indivadual parts, prepared as per present ETY, can be stored in marketing warehouses of manufacturing factory upto 3 months.

3.4. All bearings and individual parts, received as per present ETY are packed for each consumer seperately. On every wrapper of case (or on case itself) and in the certificate, No. of technical requirement should be specified, according to which bearings are despatched.

Certificate for bearings should be of specified sample.

3.5. Types and dimensions of boxes for packing of bearings should be prepared as per GOST 18148-79 or as per drawings of manufacturing factory of bearings.

4. SUPPLIERS GUARANTEE.

4.1. Life of bearings guaranteed by manufacturing factory is set according to service life before first overhauling (guaranteed service life) of articles, in which they are set the basis of state or official long run tests of articles.

Guaranteed operating life of bearing is considered in hours, equal to service life of article upto first overhauling (guaranteed service life). Service of bearing without indications of fatigue of metal, breakage of parts and other defects during this period is guaranteed by the factory.

4.2. Bearings should satisfy the guaranteed life by 100%.

In the product, which has undergone the state or official tests, or during its work, if any bearing fails before the specified life time due to unsatisfying working condition in the given object, in such cases the manufacturing factory should improve the working capacity in accordance with operating conditions and life time of the product (till first overhauling).

4.3. Tests for guaranteed life of bearing are carried out during long-term serial tests of articles, in which they are mounted. Bearings, which are under gone these tests, should be sent to manufacturing factory for observation and conclusion.

Periodicity of tests should correspond to position effective in manufacturing factory of articles.

4.4. Mounting and dismounting of bearings in articles, forces should not be transmitted through rolling elements.

4.5. Lubricant and packing of bearings, should guarantee

the bearings against corrosion for 24 months.