

# Federal Wage System Job Grading Standard for Bearing Reconditioning, 4850

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## WORK COVERED

This standard is used to grade nonsupervisory work involved in cleaning, examining, repairing, gauging, rebuilding, lubricating, and preserving and packaging various types of used and new antifriction bearings (e.g., engine and instrument bearings) which are used in aircraft, ships, ground vehicles and equipment, and mechanical/electrical instruments.

The work requires knowledge of the procedures and techniques necessary to repair, refurbish, and examine new and used bearings. This includes detailed knowledge and skills in the performance of auditory, visual, tactile, dimensional, and nondestructive examinations necessary to determine extent and feasibility of repairs, acceptability for continued service of used bearings, and the usability of new bearings.

## WORK NOT COVERED

The following kinds of work are not covered by this standard:

- Work that primarily involves the use of magnetic particle and liquid penetrant equipment, radiographic and roentgenological fluoroscopic equipment, and ultrasonic testing devices to examine materials such as metals or plastics for physical defects or structural characteristics.

(See [Nondestructive Testing Series, 3705.](#))

- Work that primarily involves cleaning bearings through the use of automated and nonautomated immersion tanks, ultrasonic vibration methods, spray cleaners, wire brushes, buffers, and any other tools or processes to remove grease, rust, and carbon deposits. (See [Equipment Cleaning, 7009.](#))
- Work that primarily involves the application of preservative coatings and materials (e.g., vacuum formed plastic skins, foil, and polyethylene bags) to protect new and used bearing from corrosion, deterioration, and damage. (See [Packing, 7002.](#))

## TITLES

Jobs covered by this standard at the grade 8 level and above are to be titled *Bearing Reconditioner*.

Jobs graded by this standard below the grade 8 are to be titled *Bearing Worker*.

## GRADE LEVELS

This standard describes three levels of nonsupervisory bearing reconditioning work (grades 5, 7, 8). Depending on the nature of the work performed, grade 7 or grade 8 may represent the highest nonsupervisory level or full performance level of bearing reconditioning work found in a particular work situation.

This standard does not describe all possible grades at which jobs may be established in this occupation, or in any way limit the authority of agencies to assign work or particular duties to positions. If jobs differ substantially from the levels of skill, knowledge, and other work requirements of the grades described in this standard, they may warrant grading either above or below these grades, based on the application of sound job grading principles.

### BEARING WORKER, GRADE 5

*General:* Grade 5 bearing workers follow established procedures in the performance of routine tasks involved in the screening, identifying, annotating, cleaning, buffing and polishing, lubricating, preserving, and packaging a variety of new and used bearings. There may be occasional requirements, in a developmental capacity, to assist in the visual, auditory, tactile, and nondestructive examination of new and used bearings.

Developmental assignments are performed under the close technical supervision of a higher graded bearing worker or a bearing reconditioner.

*Skill and Knowledge:* Bearing workers at this level are skilled in induction procedures (e.g., screening, identifying, segregating, and cleaning) for new and used bearings. They screen obviously defective bearings (i.e., bearings with gross damage), identify, segregate, and tag new and used bearings according to part number(s) and specific processing (cleaning) procedures. They verify and/or complete bearing documentation and annotate (etch) bearings with information such as service time, activity, and modification data. In addition to the induction procedures, they are skilled in the use of bearing processing equipment and hand tools (e.g., wire and cloth polishing wheels) necessary to clean and polish bearing surfaces. They are also skilled in the proper cleaning techniques and procedures for various types of bearings, the application of specific types and amounts of lubricants and preservatives, and the setup and operation of simple packaging, sealing, and labeling equipment (e.g., heat sealing, vacuum forming, and addressograph machines), to accomplish packaging requirements.

Grade 5 bearing workers are knowledgeable of technical practices used in induction, processing (cleaning), buffing and polishing, lubricating, preserving, and packaging bearings. Through developmental work assignments, grade 5 bearing workers, learn detailed examining procedures for new and used bearings using visual, tactile, auditory, and nondestructive techniques.

*Responsibility:* Grade 5 bearing workers perform repetitive work assignments in accordance with established practices and procedures. The supervisor or a higher graded bearing worker make assignments either orally or in writing. The instructions are specific and complete in reference to methods, sequence of operations, and priorities. Bearing workers at this level are responsible for accurate identification, documentation, and preliminary screening of new and used bearings during the induction process. They are responsible for following proper cleaning procedures according to the type(s) of bearings being processed. They are also responsible for the proper application of lubricants and preservatives and the setup and operation of packaging and labeling equipment. In addition, they are responsible for buffing and polishing bearings to be reworked. Work is checked upon completion for compliance with instructions and adherence to established standards and practices.

*Physical Effort:* Bearing workers frequently lift items weighing up to 23 kilograms (50 pounds). The work requires long periods of standing/sitting in combination with stooping, bending, reaching, pulling, and pushing.

*Working Conditions:* Bearing workers work in areas that are well lighted, heated, and ventilated. The workers are exposed to cuts and abrasions from buffing machines and burred or damaged bearings, and unpleasant fumes from various cleaning solvents and bearing preservatives.

## **BEARING WORKER, GRADE 7**

*General:* Grade 7 bearing workers rebuild bearings from matched salvageable parts and perform detailed visual, tactile, and auditory examinations on processed (assembled and disassembled) bearings to determine the extent of rework and/or condition that may warrant additional processing or rejection (e.g., bearings with surface imperfections such as superficial scratches or rust on active surfaces are forwarded for buffing and polishing for possible correction). Bearings are rotated by hand and/or spin tested on electric/electronic equipment to examine for inconsistent noises, vibrations, roughness, or drag. Visual examinations of bearings are supplemented through the use of radius scribes to evaluate surface defects and nondestructive examining procedures (i.e., magnetic particle and fluorescent penetrant) on bearings suspected of containing defects or as required.

Some grade 7 bearing workers use micrometers to perform limited dimensional checks in accordance with acceptance/rejection criteria. There may be occasional requirements in a developmental capacity to assist bearing reconditioners in the setup and/or operation of precision gauging and specialized test equipment.

Developmental assignments are performed under the close technical supervision of a bearing reconditioner or supervisor.

*Skill and Knowledge:* In comparison with grade 5 bearing workers who are concerned with induction procedures (e.g., screening, identifying, and cleaning), lubricating, preserving, and packaging new and used bearings, grade 7 bearing workers are concerned with visual, auditory,

tactile, and nondestructive examinations of bearings for surface defects and visual signs of wear on retainers and bearing surfaces. Grade 7 bearing workers are skilled in rebuilding bearings from serviceable components (e.g., retainers, seals, inner and outer rings retained as matched sets, and matched sets of rollers and balls) and visually examining clean bearings for particular defects and/or conditions (e.g., excessive discoloration, metal fatigue, cracked, flaked or broken parts, damaged shields, fretting, frosting, brinelling, and corrosion on bearing surfaces). They are also skilled in examining assembled bearings by rotating them by hand and/or spin testing them on electric/electronic equipment to examine for inconsistent noises, vibrations, roughness, or drag. In addition, workers at this level are skilled in the use of nondestructive examining procedures (i.e., magnetic particle and fluorescent penetrant) to check bearing components for cracks, seams, inclusions, laps, etc., and specialized equipment, fixtures, and handtools used to disassemble/ assemble bearings and aid in the visual examination of bearing components (e.g., ball tip scribes, fixtures to remove rollers, and low power magnifying equipment).

The work requires the ability to interpret blueprints, technical manuals, and engineering directives, and the use of shop mathematics to determine if bearings components are within acceptance/rejection limits. Through developmental work assignments grade 7 bearing workers learn to set up and calibrate precision gauging devices to perform dimensional and dynamic examinations on rebuilt and processed bearings.

Grade 7 bearing reconditioners are knowledgeable of the techniques and procedures necessary to perform detailed visual, tactile, auditory, and nondestructive examinations on bearing in accordance with technical criteria.

*Responsibility:* Grade 7 bearing workers work from oral and/or written instructions in accordance with established procedures for specific bearings. The grade 7 completes routine and repetitive work independently using knowledge of bearing reconditioning and rebuilding practices. The grade 7 has responsibility for visual, tactile, and auditory examinations of assembled and disassembled bearings in accordance with specific technical criteria. The bearing worker at this level is responsible for determining when bearing components must be reworked (i.e., buffed, and polished) to be within tolerance. In addition, the grade 7 is responsible for assembling and rebuilding bearing components and examining rebuilt and suspect bearing components through nondestructive techniques. The work is accomplished with little or no in-progress review. Completed work is reviewed to insure compliance with technical specifications, engineering directives, and trade practices.

*Physical Effort:* The physical effort required at this level of work is the same as that required at the [grade 5 level](#).

*Working Conditions:* Bearing workers work in areas that are well lighted, heated, and ventilated. They frequently work in environmentally-controlled clean rooms where adherence to cleanliness procedures are observed. Special clothing (e.g., coveralls, smocks, hoods, shoe coverings, and gloves) must be worn while working in clean rooms. Bearing workers are exposed to unpleasant fumes from various cleaning solvents and preservatives. They are subject

to burns from heated bearings and cuts/abrasions from damaged bearings. In addition, they are subject to eye strain from the use of microscopes and low power magnifying equipment.

## **BEARING RECONDITIONER, GRADE 8**

*General:* Grade 8 bearing reconditioners perform detailed dimensional examinations and operational tests on individual bearings and bearing components. They set up, calibrate, and operate a variety of precision measuring and testing devices based on optical, mechanical, electronic, electro-mechanical, laser, pneumatic, and magnetic principles. Bearing reconditioners determine the acceptability of bearings for initial use or continued service by comparing actual dimensions, tolerances, quality characteristics, and test results to technical specifications. They rebuild bearings by gauging and selecting compatible inner and outer races, cages, and rolling elements from new or salvageable materials.

*Skill and Knowledge:* In comparison with grade 7 bearing workers who are concerned with visual, auditory, tactile, and nondestructive examinations of bearings for surface defects and visual signs of wear on retainers and bearing surfaces, grade 8 bearing reconditioners perform detailed, dimensional, and operational examination of bearings and bearing components to determine their acceptability for continued use or initial placement in service by comparing actual dimensions, tolerances, and test results to rigid technical specifications required according to the type and class of bearing being examined. Grade 8 bearing reconditioners are skilled in the calibration and the use of precision measuring devices and specialized test equipment such as radial and axial play gauges, dial indicators, flushness gauges, proficorders, surface finish/texture measuring gauges, roller/ball diameter measuring gauges, concentricity and roundness measuring equipment, optical comparators, and airflow gauging equipment to examine tolerances, dimensions, and operating characteristics of bearings and bearing components (e.g., inside and outside diameters, ring out of roundness, radial runout of inner ball groove to inside diameter, ring taper, squareness, parallelism of sides on inner and outer rings, internal axial clearance, radial or axial deflection clearance, surface roughness/waviness, starting and kinetic torque, contact angles, and ball sizes). The work requires the ability to interpret blueprints and mechanical drawings, the use of arithmetic and standard shop formulas in performing dimensional measurements, and skill in the use of gauge blocks, balls, and rollers to calibrate measuring equipment.

Grade 8 bearing reconditioners have a broad and comprehensive knowledge of the techniques and procedures necessary to examine dimensions, tolerances, and operational characteristics of bearings and bearing components using a variety of precision measuring and testing devices. They are also knowledgeable of the effects and procedures necessary to correct or compensate for measurement error due to temperature, humidity, stylus angle and size, distortion, and deformation.

*Responsibility:* Grade 8 bearing reconditioners receive work assignments from their supervisor in the form of work orders accompanied by engineering directives, blueprints, or microfiche according to the specific type and class of bearings being processed or reconditioned.

From these, bearing reconditioners are responsible for independently obtaining accurate dimensional and operational data for individual bearings and bearing components. Grade 8 bearing reconditioners evaluate test and examine data in terms of compliance with technical specifications and reliability based on end item functional and operational life requirements.

They are also responsible for the accurate matching of serviceable bearing components (e.g., retainers, races, and matched sets of balls and rollers). Completed work is reviewed to insure compliance with technical specifications, engineering directives, and trade practices.

*Physical Effort:* The physical effort required at this level of work is the same as that required at the [grade 5 level](#).

*Working Conditions:* The working conditions encountered at this grade level are the same as those encountered at the [grade 7 level](#).