

BATTLEFIELD MAINTENANCE SYSTEMS ENGINEERING
PERFORMANCE DESCRIPTION
FIXTURE, LATHE, METAL CUTTING
NSN 3465-00-022-8817

1. SCOPE

1.1 Scope. This specification covers a holding fixture to support and retain work-pieces in a 13-inch lathe while the lathe performs milling, drilling, slotting, tapping, and boring operations. The fixture provides an indexing capability and a vertical feed capability for layout work, when used in conjunction with the lathe cross slide.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issue of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3).

3.2 Design. The fixture shall be new and of the current standard commercial design meeting the performance requirements of this specification. All parts subject to wear or replacement shall be accessible for adjustment or repair (See 6.2). The fixture shall provide a means of holding round and rectangular workpieces, and shall include a graduated vertical feed (See 3.5 in its entirety). The fixture shall perform as specified herein when mounted on a 13-inch lathe (See 4. in its entirety).

3.2.1 Lubrication. All bearings (except sealed-for-life type), mating gears, and sliding parts shall be provided with standard means for lubrication. Oil holes, grease fittings, and filler caps shall be accessible. Lubrication reservoirs, if applicable, shall have means for checking levels.

3.2.2 Threads. The design, manufacture, and configuration of threads shall conform to recognized industry standards.

3.2.3 Interchangeability. All parts of the fixture shall be manufactured to definite standards and tolerances. All parts of the fixture shall be interchangeable without requiring modification of the replaced part or its mating components. All parts subject to possible future replacement as spare or repair parts shall be assigned a manufacturer's part number and shall be identified in the repair parts manual (See 6.2). All replacement, repair, and spare parts shall provide the same or better form, fit, function, and performance as the parts provided initially installed in the fixture. When industry or Government standards are applicable, all replacement parts shall conform to the standards.

3.3 Material. Materials not specifically designated herein or in the contract shall be of a quality commensurate with commercial practice within the machine tool industry. When dissimilar metals are in contact with each other, suitable protection against galvanic corrosion shall be applied.

3.3.1 Reclaimed-materials. The contractor is encouraged to use reclaimed materials for fabricating new parts without jeopardizing the chemical and physical properties, design integrity, and intent of the materials originally selected or specified. The reclaimed materials shall have been reprocessed, remanufactured, or recycled in a manner that shall restore them to the same chemical composition and physical properties as the materials originally selected for use. It shall not be permissible to use reclaimed parts as is, or rebuilt from scrap or other used equipment. Only that reclamation of defective parts or assemblies which retains original strength, performance, interchangeability, appearance, and dimensions shall be allowed.

3.4 Construction. The fixture shall be furnished complete so that, when installed, it can be used for all the operations for which it was designed.

3.4.1 Castings and forgings. Castings shall be free of blowholes, porosity, hard spots, shrinkage defects, cracks, and other defects. Forgings shall be free of scale, enclosures, cold shuts, mismatching, and other defects that could affect structural strength. The physical and chemical properties of castings and forgings shall be adequate to meet the performance requirements of this specification.

3.4.2 Sizes and capacities. The fixture shall be for use on 13-inch lathes. The fixture shall have a vertical adjustment of not less than 3.5 inches. The working surface (fixture plate) shall not be less than

5 by 5 inches. The fixture shall be capable of holding round stock up to two inches in diameter, and square stock up to two inches.

3.5 Performance and accuracy characteristics.

3.5.1 Fixture. The fixture shall perform as specified herein, when mounted on a 13-inch lathe. Vertical adjustment shall be graduated in increments of no greater than 0.001 inch. The error in adjustment shall not exceed 0.0005 of an inch per inch of adjustment. The working surface (fixture plate) shall be hardened to prevent wear and shall be finish ground.

3.5.1.1 Key seat cutting. The fixture shall securely hold round bar stock for key seat cutting. The surfaces of the cuts shall be free of chatter marks.

3.5.1.2 Keyway cutting. The fixture shall securely hold round bar stock while cutting in one continuous operation. Keyway cuts shall not vary more than .003 inch per foot from a straight line.

3.5.1.3 Vertical slotting. The fixture shall be capable of holding the workpiece while milling a vertical slot. Milling shall be accomplished by using a vertical feed on the fixture and an end mill in the lathe. The accuracy of a predetermined slot width shall be ± 0.001 inches. The slot shall be perpendicular to the horizontal plane and shall have an accuracy of ± 0.0015 per inch of slot length.

3.5.2 Rotary adjustment. The fixture shall allow a workpiece to be rotated 360 degrees about the horizontal axis. The scale shall be graduated in degrees and shall accommodate bar stocks from one-fourth inch to two inches. The device shall be capable of being secured in any position from 0 through 360 degrees with an accuracy of ± 30 minutes when measured from the base cut.

3.5.3 Rigidity. When attached to the lathe, the fixture shall be rigid enough to produce a 125 micro-inch arithmetical average (AA) maximum finish on a one inch square bar of AISI 1045 cold rolled steel after a cut of 0.5 inch depth, full width, for a distance of 2.5 inches, at a rate of no less than 1.75 inches per minute using a one inch diameter end mill.

3.6 Protective finish. The lathe fixture shall be finished to prevent corrosion in accordance with the best commercial practice of the machine tool industry. Where no protective finish is utilized (such as bedways, machine guide surfaces, etc.) the natural finish of the material or the finish obtained from heat treatment is permissible provided the surfaces are free from scale or corrosion.

3.7 Standard equipment and accessories. The fixture shall be furnished with the necessary standard equipment to permit mounting on lathes, including all the necessary work holding clamps and fasteners

needed to perform the operations specified herein. Brackets, clamps, contours, or other holding and restraining devices shall be provided as required.

3.7.1 Case. A case with a hinged lid shall be furnished to carry and store the fixture, including any required attachments, special wrenches, spare parts, instructions, or other accessory items. The case shall be provided with means to secure the individual items so that they cannot be displaced during normal handling.

3.7.2 Special wrenches. All special wrenches or tools that are required for operation or maintenance of the fixture shall be furnished.

3.8 Product identification. Nameplate(s) shall be permanently attached to each fixture and legibly marked. Markings shall include the manufacturer's name and CAGE code, serial number, and shall include the National Stock Number (NSN) 3465-00-022-8817.

3.9 Workmanship. Standards of workmanship shall assure that the lathe fixture shall have the efficient operating characteristics found in standard commercial units and as specified in Section 3 herein.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of inspection. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

4.3 First article inspection. First article inspection shall be applied to the preproduction model or initial production item (see 3.1). Unless otherwise specified, first article inspection shall consist of the examination in 4.5 and all tests under 4.6. Failure of the first article to pass the examination or any of the tests shall be cause for rejection.

4.4 Quality conformance inspection. Unless otherwise specified, quality conformance inspection shall be applied to production items offered for acceptance under the contract. Unless otherwise specified, quality conformance inspection shall consist of a. through c. below. Failure of any item to pass an examination or test shall be cause for rejection of the item.

- a. Product examination (see 4.5).
- b. Tests (see 4.6).

c. Packaging inspection (see 4.7).

4.4.1 Sampling. Unless otherwise specified, sampling for quality conformance inspection shall be in accordance the following:

<u>INSPECTION/TEST</u>	<u>INSPECTION LEVEL</u>	<u>AQL</u>
Product examination (4.5)	General Level II	1.0
Tests (4.6)	General Level II	1.0
Packaging inspection (4.7)	Special Level S-4	4.0

4.5 Product examination. Visually and manually examine the fixture to determine conformance with the requirements of 3.2 through 3.4.2 and 3.7 through 3.9. Visual examinations shall include verification of completeness of manufacture and assembly, conformance to specified standards, adequacy of markings, proper cleaning, and freedom from the identified defects. Manual examinations shall include the operation of movable parts by hand to assure proper functioning. The examination provisions may be applied to the earliest practical point in manufacture at which it is feasible to inspect for acceptance without risk of change in the characteristic by subsequent operations. Failure of the contractor to provide objective evidence that the fixture and its components have passed the examinations prescribed for them by the contractor's inspection system shall be cause for rejection. In addition, failure of the contractor to provide objective evidence that all parts are manufactured to definite standards, clearances, and tolerances so that no replacement part will degrade the form, fit, or function of the end item (see 3.2.3), shall be cause for rejection.

4.6 Tests. Each fixture shall be tested to determine compliance with test requirements as specified in 4.6.1 through 4.6.6.

4.6.1 Key seat cutting. The fixture shall be mounted on a lathe. Using a No. 204 Woodruff cutter (or equal) and a No.608 Woodruff cutter (or equal), respectively, one key seat shall be cut in a three-quarter inch diameter bar and in a two-inch diameter bar of AISI 1045 steel. Key seats shall be examined for compliance with 3.5.1.1.

4.6.2 Keyway cutting. The fixture shall be mounted in a lathe. Using a minimum feed of 1.75 inches per minute, one keyway measuring 0.25 inch deep x 0.5 inch wide x 6 inches long shall be cut in a two inch round bar of AISI 1045 steel. The keyway shall be examined/tested for compliance with 3.5.1.2.

4.6.3 Vertical slotting. The fixture shall be mounted on a lathe. One vertical slot measuring 0.125 inches deep, 0.375 inches wide, and one inch long be cut in a 1/4 inch deep by 1 1/2 inch wide by 6

inches long piece of AISI 1045 steel. Accuracy shall be as specified in 3.5.1.3.

4.6.4 Rigidity. The basic fixture shall be mounted on a machine of sufficient size, rigidity, and horsepower to conduct this test. A test specimen, a one-inch square bar of AISI 1045 cold rolled steel, shall be mounted on the fixture. Using a one-inch diameter end mill, a cut shall be taken, as specified in 3.5.3. The test specimen shall then be examined for compliance with 3.5.3.

4.6.5 Rotary adjustment. The fixture shall be mounted on a lathe, and test cuts shall be made on the periphery of a two-inch diameter bar made of AISI 1045 cold rolled steel. Cuts shall be made 0.125 inch wide, 0.125 deep, and one inch long. Cuts shall be made at 45 degrees, 90 degrees, 135 degrees, 180 degrees, and 270 degrees from the first cut. The cuts shall be examined for compliance with 3.5.2.

4.6.6 Protective finish. The hardness, adhesion, and thickness of the paint used on the fixture shall be checked as follows:

- a. The graphite point of a sharpened HB lead pencil shall be pressed at a right angle into a painted area of the fixture until the graphite crumbles. Failure of the surface to withstand the test, as evidenced by a pitting of the paint, shall be cause for rejection.
- b. A test sample of the same metal, painted with the same process and at the same time as the fixture, shall have a sharpened H lead pencil pressed into the paint as in a. Failure of the surface to pit (paint too hard) shall be cause for rejection.
- c. Two, 2 inch intersecting lines shall be cut through the paint to the base metal of the test sample. A strip of 0.5-inch wide fiberglass tape shall be firmly pressed over the intersection and then pulled from the surface. Adhesion of any paint to the tape shall be cause for rejection (see 3.6).
- d. Using a paint thickness measuring instrument, or by masking a portion of the test sample during painting, measure the thickness of the paint. Failure of the paint to be at least 0.002 inch thick shall be cause for rejection (see 3.6).

4.7 Packaging inspection. Packaging inspection shall be conducted before and after packaging to determine compliance with Part I – Section D Packaging requirements.

6 NOTES

6.1 Intended use. The lathe fixture covered by this specification is intended for use in milling, drilling,

slotting, tapping, layout, boring, turning, and indexing operations.

6.2 Repair part manuals. Repair parts and accessory identification in repair part manuals shall include the prime contractor's name, nomenclature and part number. Repair part identification in repair part manuals shall also include the original equipment/part manufacturer's (OEM) (actual part manufacturer's) name, Commercial and Government Entity (CAGE), nomenclature and part number of the part used in the end item, immediately after the prime contractor's part identification. Items with high mortality rates shall be so identified.