

INCH-POUND

A-A-59882

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COMMERCIAL ITEM DESCRIPTION

GEOMETRY MEASURING MACHINE

The General Services Administration has authorized the use of this commercial item description for all federal agencies.

1. SCOPE. This Commercial Item Description (CID) covers the circular geometry measuring machine and components.

2. SALIENT CHARACTERISTICS

2.1 Circular geometry measuring machine and components description. Each circular geometry measuring machine shall be a bench top model. Each circular geometry measuring machine shall have a minimum weight capacity of 40 pounds. Each circular geometry measuring machine shall use a mechanical bearing to eliminate the need for an air compressor.

2.1.1 Electrical power requirements. Each circular geometry measuring machine must be capable of operating using 120-volt, 60 Hz electrical power requirements.

2.1.2 Vertical column. Each circular geometry measuring machine shall be equipped with a column that extends at least 20 inches above the rotary table top to allow parts up to 20 inches in length to be inspected/measured and shall meet the following requirements:

2.1.2.1 Gage head movement. The vertical column shall be designed to allow the gage head to be elevated or lowered and allow for the precision alignment (centering and tilting) of cylindrical parts. The mechanism of elevating and/or lowering the gage head can be controlled manually or with the use of an electronic controller. In either case, the movement shall be smooth. Systems that use movable vertical height gage stands instead of permanently mounted vertical columns must include two height gage stands and two gage heads. The gage head amplifier shall allow the use of two gage heads during the alignment (tilt and centering) of cylindrical parts under test. The two vertical height gage stands must be of equal length.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data that may improve this document should be sent to: 403 SCMS/ GUEEA, Robins AFB GA 31098-1813. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.daps.dla.mil/online> .

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2.1.3 Rotary table. Each circular geometry measuring machine shall be equipped with a rotary table that meets the following requirements: Minimum of 5 inches in diameter. Shall include tilt and centering adjustment knobs. The tilt and centering functions for the rotary table shall be adjusted using computer aided displays and manual adjustment. The tilt axis location for the rotary table shall be identified to ensure proper placement of gage head during tilt/centering functions for cylindrical parts.

2.1.4 Test sphere. A test sphere shall be provided with each circular geometry measuring machine and shall conform to the following requirements: Manufactured from solid chromium carbide type steel, approximately 0.5 inches in diameter. Out of roundness shall not exceed 5 micrometers (μin). It shall be mounted on a base that will allow easy access to the equator. Each test sphere shall have a protective covering that screws over the sphere or fitted in a hard wood box with positive action latches.

2.1.5 Work table. Each circular geometry measuring machine shall include a sturdy work table suitable for placing the circular geometry measuring machine and computer components on and performing measurements. The work table shall be a minimum of 32 inches in height. The work table shall include a storage drawer for various components.

2.1.6 Electronic gage head. Each circular geometry measuring machine shall include a minimum of one electronic gage head/amplifier and stylus assortment. The amplifier display shall have the capability to change resolution for visual evaluation based on part geometry. Display resolutions shall include: 5 μin per minor division, 10 μin per minor division, 20 μin per minor division, 50 μin per minor division, 100 μin per minor division, 200 μin per minor division, 500 μin per minor division.

2.1.7 Computer PC. The circular geometry measuring machine shall be computer/software/menu driven using Microsoft Windows based Operating System. Computer system shall include the following:

2.1.7.1 Monitor. Minimum, 17 inch flat screen monitor with at least 1280 x 1024 resolution.

2.1.7.2 Printer. Color inkjet printer with at least 720 dpi resolution.

2.1.7.3 Keyboard and mouse. QWERTY keyboard with numeric key pad and standard two button optical mouse with scroll.

2.1.7.4 Memory. Minimum 512 MB.

2.1.7.5 Hard drive. At least 160 GB hard drive SATA or better.

2.1.7.6 Removable media. 3.5 inch floppy drive and CDR drive; DVR drive optional.

2.1.7.7 Video card. As required for operation of system.

2.1.7.8 Other hardware. Any other hardware required to make this system function as required by the commercial item description will be required.

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2.2 Safety. All space in which work is performed during operation, service, and maintenance shall be free of hazardous protrusions, sharp edges, or other features which may cause injury to personnel.

2.3 Diagnostic software. A copy of any diagnostic software required or recommended for maintaining the circular geometry measuring machine shall be provided with each circular geometry measuring machine on CD-ROM or DVD-ROM.

2.4 Performance. Each circular geometry measuring machine shall have the capability to measure out of roundness, concentricity, circular flatness, perpendicularity and runout of spherical and cylindrical parts up to 20 inches in length.

2.4.1 Radial bearing accuracy. The radial bearing accuracy shall not exceed 5 μin .

2.4.2 Axial bearing accuracy. The axial bearing accuracy shall not exceed 5 μin .

2.4.3 Coning accuracy. The coning accuracy shall not exceed 5 μin plus 1 μin per inch.

2.4.4 Gage head/amplifier accuracy. The gage head/amplifier accuracy shall not exceed 10 μin .

2.4.5 System software. The system software shall provide reference circles, as identified below, for circular measurement evaluation.

2.4.5.1 Reference circles. The system software shall provide the following reference circles: Minimum Circumscribed Circle (MCC), Maximum Inscribed Circle (MIC), Least Squares Circle (LSC).

2.4.5.2 Response variables. The system software shall include response variables, undulations per revolution (UPR), and other filtering techniques to reduce the effects of surface finish.

2.4.5.3 Data retention. The system software shall have the capability to retain circular measurement data so it can be recalled for re-evaluation by changing measurement analysis parameters.

2.4.5.4 Data recall. The system software shall have the capability to recall circular measurements and combine multiple circular graphs onto one graph with separation between each so they are not overlapped.

2.5 Operator/users manual. The operator/users manual shall include the following documentation:

2.5.1 Calibration instructions. Detailed instructions shall be provided for calibrating the gage head/amplifier using gage blocks.

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2.5.2 Accuracy instructions. Detailed instructions shall be provided for performing the radial bearing accuracy, coning bearing accuracy and axial bearing accuracy calibration/verification using the provided test sphere and the reversal calibration method as described in ANSI B89.3.1-1972. The reversal method requires the precision sphere to be rotated 180° and the gage head re-located to the 180° position. Two circular profiles are measured and printed on one circular graph with separation between the two profiles.

2.5.4 Data graphing. Detailed instructions shall be provided for placing a multiple circular graphs onto one chart with separation between them.

2.5.5 Data export. Detailed instructions shall be provided for accessing the recorded/saved data points and exporting the data into an excel spreadsheet for bearing accuracy analysis.

2.5.6 Additional instructions. Additional instructions shall be provided in the Operator/Users Manual including: How to change range/resolution. How to change filtering/UPR. How to change reference circles. How to center a sphere and measure the out of roundness. How to align (Tilt & Center) a cylindrical part and measure out of roundness. How to combine circular measurements onto one chart and interpret out of roundness for each circle. How to print a chart with and without reference circles. How to save and recall circular measurements.

3. REGULATORY REQUIREMENTS.

3.1 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with 23.403 of the Federal Acquisition Regulation (FAR). However, used, rebuilt, or refurbished items shall not be provided.

3.2 Green Procurement Program. Green Procurement Program (GPP) is a mandatory federal acquisition program that focuses on the purchase and use of environmentally preferable products and services. GPP requirements apply to all acquisitions using appropriated funds, including services and new requirements. FAR 23.404(b) applies and states the GPP requires 100% of Environmental Protection Agency (EPA) designated product purchase that are included in the Comprehensive Procurement Guidelines list that contains recovered materials, unless the item cannot be acquired: a) competitively within a reasonable timeframe; b) meet appropriate performance standards, or c) at a reasonable price. The prime contractor is responsible for ensuring that all subcontractors comply with this requirement.

4. PRODUCT CONFORMANCE PROVISIONS. The products provided shall meet the salient characteristics of this Commercial Item Description, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial marketplace. The government reserves the right to require proof of such conformance.

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

- a. First production inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 First production inspection. The first production circular geometry measuring machine shall be subjected to the examinations, tests, and analyses described in 4.5.1 through 4.5.7. The contractor shall provide or arrange for all test equipment and facilities.

4.3 Conformance inspection. Each production circular geometry measuring machine shall be subjected to the examinations and tests described in 4.5.6.

4.4 Inspection requirements.

4.4.1 General inspection requirements. Apparatus used in conjunction with the inspections specified herein shall be laboratory precision type, calibrated at proper intervals to ensure laboratory accuracy.

4.4.2 Data. During all testing specified herein, at least the following data, unless not applicable, shall be recorded at intervals not to exceed 30 minutes. Additional data or shorter intervals shall be provided as appropriate for any specific test.

- a. Date.
- b. Time started.
- c. Time finished.
- d. Results.

4.4.3 Test rejection criteria. Throughout all tests specified herein, the circular geometry measuring machine shall be closely observed for the following conditions, which shall be cause for rejection:

- a. Failure to conform to salient characteristics, design or performance requirements specified herein or in the contractor's technical proposal.
- b. Structural failure of any component, including permanent deformation, or evidence of impending failure.
- c. Evidence of excessive wear.
- d. Conditions that present a safety hazard to personnel during operation, servicing, or maintenance.

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4.5 Test methods.

4.5.1 Examination of product. Each circular geometry measuring machine shall be examined to verify compliance with the requirements herein prior to accomplishing any other tests listed in 4.5. A contractor-generated, Government-approved checklist shall be used to identify each requirement not verified by a test or analysis, and shall be used to document the inspection results. Particular attention shall be given to materials, workmanship, dimensions, surface finishes, protective coatings and sealants and their application, and markings. Proper operation of each circular geometry measuring machine function shall be verified. Certifications and analyses shall be provided in accordance with Table I.

4.5.2 Inspection of product. The first production unit (circular geometry measuring machine) will be inspected at the AFPSL (Air Force Primary Standards Laboratory).

4.5.3 Traceability. All test equipment is directly traceable to the National Institute of Standards and Technology (NIST).

4.5.4 Accuracies. The mechanical bearing accuracies (see following table) will be calibrated/verified using a test sphere and reversal calibration method described in the instructions provided by the manufacturer. Mechanical bearing accuracies to be calibrated/verified are listed in Table I.

TABLE I. Certifications and analyses.

Paragraph	Required Certifications and Analyses
2.4.1 <u>Radial bearing accuracy.</u>	Contractor certification that the circular geometry measuring machine, radial bearing accuracy meets the requirements of section 2.4.1.
2.4.2 <u>Axial bearing accuracy.</u>	Contractor certification that the circular geometry measuring machine, axial bearing accuracy meets the requirements of section 2.4.2.
2.4.3 <u>Coning accuracy.</u>	Contractor certification that the circular geometry measuring machine, coning accuracy meets the requirements of section 2.4.3.

4.5.5 Gage block calibration. The gage head/amplifier will be calibrated using gage blocks owned by the Air Force following instructions provided by manufacturer.

4.5.6 Acceptance. The circular geometry measuring machines will be inspected and accepted at destination as specified elsewhere in this contract. The circular geometry measuring machines will be checked to assure specified performance requirements are met. Test equipment used will have first echelon certification directly traceable to the NIST where required. Tests will be performed to assure the circular geometry measuring machine meet the requirements of paragraphs 2. to 2.4.5.4 of this commercial item description. Such testing at destination does not

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relieve the contractor of performing all inspection and quality checks at the point of fabrication, or as necessary to assure performance as specified herein.

4.5.7 Dimension measurement. A first production circular geometry measuring machine shall be measured to demonstrate compliance with the dimensional requirements of 2.1 through 2.1.7.8.

5. PACKAGING.

5.1 Preservation, packing, and marking shall be as specified in the contract or order.

6. NOTES.

6.1 Source of documents.

6.1.1 Department of Defense and Federal documents may be obtained at <https://assist.daps.dla.mil/online> or from the Document Automation and Production Service, Bldg 4D (DPM-DODSSP), 700 Robbins Avenue, Philadelphia PA 19111-5094.

6.1.2 FAR and DFARS may be obtained from the Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. Electronic copies of the FAR may be obtained from <http://www.arnet.gov/far> Electronic copies of the DFARS may be obtained from <http://www.acq.osd.mil/dpap/dars/dfars/index.htm> .

6.1.3 ANSI/EIA standards may be obtained at <http://www.ansi.org> or <http://www.eia.org> or available from the Electronics Industry Association, Engineering Department, 2001 Pennsylvania Ave., N.W., Washington, D.C., 20006. Phone: 1-800-854-7179 (USA and Canada).

6.2 Ordering data. The contract or ordering data should specify the following:

- a. Title, number, and date of this CID.

6.3 Key words.

Bench top model.
Mechanical bearing
Minimum weight capacity of 40 pounds

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Custodian:
Air Force - 84

Preparing activity:
Air Force - 84

Review activity:
DLA - IS

Agent:
Air Force - 99

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