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SUPERSEDING
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MILITARY SPECIFICATION

LATHES, ENGINE OR TOOLROOM, BACK GEAR, BELT DRIVE, 12 INCH THROUGH 17 INCH

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers metal turning and thread cutting lathes with electric motor and back gear, belt drive, for use in general machine shop or toolroom operations.

1.2 Classification. The lathes covered by this specification are of the following types and sizes. The type and size supplied shall be as specified (see 6.2.1).

Type I - Engine Lathe

Type II - Toolroom Lathe

Sizes: 12, 13, 14, 15, 16 and 17 inch swing over bed

2. APPLICABLE DOCUMENTS

2.1 Military and federal publications. The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein.

MILITARY SPECIFICATIONS

MIL-M-18058 Machinery, Metal and Woodworking, Support Equipment and Associated Repair Parts, Preparation for Delivery of

FSC 3416

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MILITARY STANDARDS

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of U. S. Military Property
MIL-STD-461	Electromagnetic Interference Characteristics Requirements for Equipment

FEDERAL STANDARDS

FED-STD-595	Colors

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) OF 1970

Title 29, Code of Federal Regulations, Chapter XVII, Part 1910, and amendments	Occupational Safety and Health Administration Standards

NATIONAL BUREAU OF STANDARDS HANDBOOK H28

Screw-Thread Standards for Federal Services

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

AMERICAN NATIONAL STANDARDS

ANS B5.9	Spindle Noses
ANS B5.16	Accuracy of Engine and Toolroom Lathes
ANS Z55.1	Gray Finishes for Industrial Apparatus and Equipment

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(Application for copies should be addressed to the American National Standards Institute, Inc., Dept. 969, 1430 Broadway, New York, NY 10018.)

JIC ELECTRICAL STANDARDS FOR GENERAL PURPOSE MACHINE TOOLS

(Application for copies should be addressed to the National Machine Tool Builders' Association, 7901 Westpark Drive, McLean, VA 22101.)

AMERICAN GEAR MANUFACTURERS ASSOCIATION AGMA 360

Manual for Machine Tool Gearing

(Application for copies should be addressed to the American Gear Manufacturers Association, 1330 Massachusetts Ave., NW, Washington, DC 20005.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal Agencies.)

3. REQUIREMENTS

3.1 First Article approval. If First Article approval is required (see 6.2.1 and 6.3), inspection therefor shall be in accordance with Section 4. A First Article comprises a preproduction model or initial production sample; approval involves testing and evaluating the First Article for conformance with the requirements herein before, or in the initial stage of, production under a contract.

3.2 Design. The lathe shall be suitable for use in general manufacturing operations, capable of holding accurate repetitive dimensions on production parts, or for producing parts to toolroom tolerances, as required for the type lathe specified under 1.2. It shall be designed for readily changing feeds and speeds as may be required when used for production operations and for easily changing attachments and tooling as may be required when producing prototype parts of diversified nature. It shall be capable of performing all normal lathe functions such as turning, boring, and thread cutting on ferrous and non-ferrous materials.

3.3 Construction. All parts and materials used in the construction of the lathe shall be new. The types of materials used shall have the necessary qualities to meet the standards and requirements specified herein for construction, safety, accuracy and performance. All parts

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and mechanisms subject to periodic adjustment, repair, or replacement shall be readily accessible. Construction of the machine shall be complete so that when installed and connected to a power supply it will be ready for operation.

3.3.1 Castings and forgings. All castings and forgings shall be free of defects, scale and mismatching. No process such as welding, peening, plugging, or filling with solder or paste shall be used for reclaiming any defective part for use in the machine.

3.3.2 Welding, brazing or soldering. Welding, brazing, or soldering shall be employed only where specified in the original design. None of these operations shall be employed as a repair measure for any defective part.

3.3.3 Fastening devices. All screws, pins, bolts, and similar parts shall be installed in such a manner as to prevent change of tightness. Those subject to removal or adjustment shall not be swaged, peened, staked, or otherwise permanently installed.

3.3.4 Surfaces. All surfaces of castings, forgings, molded parts, stampings and welded parts shall be cleaned and free from sand, dirt, fins, sprues, flash, scale, flux and other harmful or extraneous materials. All edges shall be either rounded or beveled unless sharpness is required to perform a necessary function. Except as otherwise specified herein, the condition and finish of all surfaces shall be commensurate with the manufacturer's standard commercial practice.

3.3.5 Painting. Unless otherwise specified (see 6.2.1), the machine shall be painted in accordance with the manufacturer's standard commercial practice. When specified, the final color shall be Machine Tool Light Gray similar to FED-STD-595, Number 16187 Gray Gloss, or ANS Z55.1, Number 70 Light Gray.

3.3.6 Threads. All threaded parts shall be in accordance with the Handbook H28.

3.3.7 Lubrication. Means shall be provided to insure adequate lubrication for all moving parts. Recirculating systems shall include filters which are cleanable or replaceable. Each lubricant reservoir shall have means for determining fluid level. All oil holes, grease fittings and filler caps shall be accessible.

3.3.8 Gears. All gears shall be in accordance with the applicable recommendations of AGMA 360.

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* 3.3.9 Safety measures. The machine shall have covers or other safety devices for all parts that present safety hazards. The devices shall include guards for belts, pulleys, chains, gears, and sprockets. All guards shall provide access to the guarded parts and shall not interfere with the operation of the machine. Except as otherwise specified by the procuring activity, the machine shall comply with the standards promulgated under OSHA applicable to the machine itself. Exceptions and additional requirements for safety and health shall be as specified (see 6.2.1 and 6.4).

3.3.10 Plates. All instruction plates and identification plates attached to the machine shall be of a corrosion-resistant material. Wording and marking shall be in the English language and shall be permanent using plain, bold-face characters on a contrasting background.

3.4 Components. The following requirements apply to components for both the engine lathe and toolroom lathe with applicable accuracies and accessories as specified herein.

3.4.1 Bed and base. The bed shall be constructed to provide strength and rigidity permitting maximum metal removal within the capacity of the lathe and shall be treated for stability to maintain alignment accuracy. The bed shall have a combination of V-ways and flat ways for guiding the carriage and tailstock. Bearing surfaces of the ways shall have a surface hardness not less than Rockwell C-45 and shall be precision finished. The bed shall be mounted on a base constructed to fully enclose the motor and drive mechanism. Easy access to the motor and drive shall be provided. The top of the base shall have a chip and coolant pan. Provision shall be made for securing and leveling the base on a foundation.

3.4.2 Headstock. The headstock shall be essentially a belt driven unit providing belt drive in the high spindle speed range and gear drive in the low speed range. The headstock shall enclose the spindle drive belts and gears. Power to the headstock spindle shall be from a motor and drive mechanism mounted below the headstock and within the base section. The drive mechanism shall be balanced for high speed operation. Means for adjusting belt tension shall be provided.

3.4.3 Headstock spindle. The headstock spindle nose shall conform to Table I for type and size and shall meet applicable requirements of ANS B5.9. The spindle bearings shall be of a type designed to minimize friction and heat and to support the spindle within the runout tolerances specified for the engine lathe or toolroom lathe under all radial and thrust loads. The method of installing bearings shall provide for adequate lubrication of each bearing and to protect the bearings from dirt.

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3.4.4 Headstock spindle drive. Unless otherwise specified, the spindle drive mechanism shall be the manufacturer's standard drive and means for changing spindle speeds. An automatic or manually operated spindle brake shall be provided. When specified (see 6.2.1), the spindle drive mechanism shall be one of the following types described in 3.4.4.1 or 3.4.4.2.

* 3.4.4.1 Quick change or variable speed drive. The quick change or variable spindle drive mechanism shall be of a type providing for quick spindle speed changes in each speed range by a speed selector device such as levers or dials in a location convenient to the operator. The speed change shall be made without manually shifting the drive belts. It shall not be necessary to stop the spindle when changing spindle speeds. Means shall be provided for setting desired spindle speed in revolutions per minute. The drive supplied shall be equipped with an automatic or manually operated spindle brake device.

* 3.4.4.2 Solid state, variable speed drive, 13, 15, 17 inch lathes. The variable speed drive mechanism shall be a solid state unit providing an infinite pre-selection of spindle speeds throughout each range of speeds without gaps between speed ranges. Spindle speeds shall be selectable by use of a conveniently located control and actual revolutions per minute shall be indicated. Changes from one speed range to another shall be readily made by a selector device in a location convenient to the operator. Speed changes shall be possible while the spindle is running. The drive mechanism shall include a spindle brake.

3.4.5 Carriage. The carriage shall have both hand and power feed mechanisms and shall feed in both longitudinal directions regardless of the direction of spindle rotation. Power feeds to the carriage and cross slide shall be by a geared feed mechanism, operated by controls on the carriage apron. Gear shafts within the apron shall be supported at both ends. Adequate lubrication shall be supplied to all bearings and gears and to sliding components. A clamping device shall lock the carriage to the bed when cross feeding. The carriage wings and cross slide shall be equipped with wipers to prevent chips and dirt from entering between sliding units. Adjustable gibs shall be provided to compensate for wear. The carriage shall have provisions for use of standard attachments such as a follower rest and a taper attachment.

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3.4.6 Cross slide. The cross slide and the compound rest slide shall have full length gibs to adjust for wear. The cross slide feed screw shall be protected from damage by chips and dirt. Each feed screw shall have a nonglare, adjustable feed dial graduated to indicate tool movement or metal removal in 0.001 inch increments. The compound shall rotate 360° on the cross slide and shall have a scale graduated in degrees to at least 90° each side of zero for angular settings of the compound rest. The compound slide shall have a T-slot for mounting tool holders.

* 3.4.7 Feed mechanism. The selection of feeds and thread leads shall be made by shifting tumbler gears contained in a quick change gear box. The direction of carriage travel shall be controlled by a lever located convenient to the operator. The power feeds shall be designed so that the threads of the leadscrew are used when thread cutting only. The power feed levers and half-nut shall be interlocked to prevent simultaneous engagement. The end gearing shall be designed to permit the use of transposing gears for producing metric lead threads. The feed mechanism shall have a slip type or disengaging type clutch to protect the drive from damage by overload or accidental jamming when in power feed.

3.4.8 Tailstock. The tailstock shall be constructed so as not to interfere with operation of the compound slide when used at angular settings. A clamping device shall securely lock the tailstock in position on the bed. Tailstock set-over shall allow for center alignment and for limited taper turning. The tailstock spindle shall accept taper, tang type tools and shall eject tools when retracted. The spindle shall not jam when fully extended or retracted. Graduations shall indicate spindle extension in increments not greater than one-tenth inch. A locking device shall clamp the spindle in any extended position without causing misalignment with the headstock center.

3.5 Sizes and capacities. The lathe sizes and capacities shall meet the requirements of Table I. Optional features shall be supplied only when specified (see 6.2.1).

TABLE I

SIZES AND CAPACITIES

MACHINE CHARACTERISTIC	SIZES (Dimensions in Inches)					
	12 Inch	13 Inch	14 Inch	15 Inch	16 Inch	17 Inch
Capacities:						
Swing over bed and carriage wings	12	13	14	15	16	17
Swing over cross slide	6-1/2	7-3/4	8-1/4	9-1/8	9-5/8	10
Center distance, basic, tailstock flush with bed	23	28	28	30	30	30
Optional center distance	35	40, 52 or 66	40 or 48	42 or 66	45, 54, 78 102, 126	42 or 66
Headstock:						
Type spindle nose	L-00 or 4-D1	L-00 or 4-D1	L-00, 3-D1, or 4-D1	6-D1	L-00or 4-D1	6-D1
Hole through spindle, diameter	1-3/8	1-3/8	1-3/8	2-1/4	1-3/8	2-1/4
Center size, Morse (ANS)	#3	#3	#3	#4	#3	#4
Collet capacity, draw bar, round stock	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16	1-1/16
Spindle speed changes	12 or variable	8 or variable	12 or variable	8	8	8
Spindle speed range, RPM	55 to 1700	50 to 940	50 to 1500	45 to 1250	30 to 980	45 to 1250
Drive motor, single or two speed	1 HP	2 or 2/1 HP	2 HP	5 HP	3 or 3/1½ HP	5 HP
Optional fixed speeds and range, RPM	-	(16) 50 to 1600	-	(8) 75 to 1800	(16) 30 to 1200	75 to 1800
Optional variable speed range, and drive motor - single or two speed	55 to 2000 2 or 2/1 HP	35 to 2000, 2 HP or 0 to 2500, 5 HP	50 to 1750 3 or 3/1½ HP	0 to 2500 5 HP	- -	0 to 2500 5 HP
Carriage:						
Cross slide travel	6	6-1/2	8	8	9	9-3/4
Compound rest travel	2-1/4	3	3-1/8	3-3/4	3-3/4	3-3/4
Tool post for toolholder size	3/8 by 3/4	1/2 by 1-1/8	1/2 by 1-1/8	5/8 by 1-1/2	5/8 by 1-3/8	5/8 by 1-1/2
Leadscrew diameter and threads per inch	7/8, 8	1, 6	1, 6	1-1/4, 6	1-1/8, 6	1-1/4, 8
Number feed and thread changes	48	48	48	80	48	80
Feed range longitudinal, IPR	0.002 to 0.036	0.002 to 0.050	0.0017 to 0.035	0.0005 to 0.120	0.0015 to 0.080	0.0005 to 0.120
Threads per inch, American Standard series	4 to 80	4 to 80	4 to 80	4 to 80	4 to 80	4 to 80
Optional feeds and feed range with 5 HP	-	(80) 0.0005 to 0.120	-	-	-	-
Tailstock:						
Center size, Morse (ANS)	#2	#3	#3	#4	#3	#4
Spindle travel	2-7/8	3-1/2	4-1/4	5-1/2	5-3/4	5-1/2
Spindle diameter	1-3/8	1-1/2	1-15/32	2-1/4	2-1/4	2-1/4
Accessories:						
Chuck size, diameter, 3-jaw	6	6 or 7-1/2	6	8, 10 or 12	7-1/2 or 9	8, 10 or 12
4-jaw	8 or 10	8 or 10	8 or 10	8, 10 or 12	10 or 12	8, 10 or 12
6-jaw	6, 8 or 9	6, 8 or 9	6, 8 or 9	8, 10 or 12	8, 10 or 12	8, 10 or 12
Steady rest, capacity	3	3-1/2	4-1/2	4	4-3/4	4
Follower rest capacity	3	3-1/4	4-1/4	4	4-1/4	4
Taper attachment taper per foot and length	3-1/2 by 9	3-1/2 by 9	3-1/2 by 9-3/4	3-1/2 by 12	3-1/2 by 11-1/2	5 by 12

Requirements are not less than those shown. Where a range is shown, the requirements are from the smaller value or less to the larger value or more.

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3.6 Lathe accuracy. The lathe shall not exceed the tolerances of ANS B5.16 for the engine lathe or toolroom lathe as applicable, when checked in accordance with 4.5.2 and 4.5.3.

3.7 Electrical equipment. The machine electrical system shall conform to JIC Electrical Standards for General Purpose Machine Tools. An identified ground terminal, suitable for connection of the grounding conductor specified in Table 15-1 of JIC Standards shall be provided. The main drive motor shall be as normally supplied by the machine tool builder for the lathe and speed range specified. It shall be a ball bearing continuous duty type which meets the requirements for drip-proof enclosure. Unless otherwise specified (see 6.2.1), the machine shall operate from a 230/460 volt, 3 phase, 60 Hz power supply, and shall be initally wired for operation on 230 volts.

3.8 Electromagnetic interference control. When specified (see 6.2.1), equipment procured under this specification shall comply with the requirements of MIL-STD-461.

3.9 Standard equipment for engine lathes. Unless otherwise specified (see 6.2.1), the following equipment shall be supplied with each engine lathe.

3.9.1 Face or drive plate, small. The face plate or drive plate shall be fitted to the lathe spindle and shall have slots for driving parts held between centers, or driving studs for fitting into the chuck mounting holes of a cam-lock spindle nose may be substituted for same purpose.

3.9.2 Tool post, round. The round tool post shall be the single screw type with rocker base and opening for holding a toolholder shank size in accordance with Table I, and shall be for mounting in the compound rest T-slot.

* 3.9.3 Lathe centers and center sleeve. One headstock and one tailstock center and a headstock center sleeve shall be supplied. The centers shall have a 60° included angle and shall be made of steel. The centers and center sleeve shall conform to the applicable requirements of ANS B5.9 for the type spindle nose furnished. Center runout shall be within the tolerance of ANSI B5.16.

3.9.4 Thread indicator dial. The thread indicator shall be mounted on the carriage to engage the leadscrew and have a dial graduated to indicate when to engage the half-nut for thread cutting.

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3.9.5 Thread cutting stop. The stop shall be for mounting on the cross slide or carriage and shall be adjustable to set the depth of successive cuts when thread cutting.

3.9.6 Plain carriage stop. The stop shall be for clamping on the front bed way to provide a stop for the carriage when facing, boring or shoulder turning.

3.9.7 Coolant system. The coolant system shall be a complete unit consisting essentially of a reservoir, pump, electrical control and necessary tubing and regulating nozzle to deliver cutting fluids to the work and tool.

3.9.8 Work light. The work light shall include all necessary equipment required for mounting on the lathe carriage and shall be adjustable for illuminating the work.

3.9.9 Wrenches. Special wrenches or tools required and normally supplied with the lathe or accessories shall be furnished.

3.10 Standard equipment for toolroom lathes. Unless otherwise specified (see 6.2.1), each toolroom lathe shall be equipped with the standard equipment specified under 3.9 for the engine lathe and the following.

3.10.1 Taper attachment. The taper attachment shall be supplied with a telescopic feed screw. The attachment swivel bar shall be graduated for setting in both degrees and inches per foot.

3.10.2 Face plate. large. The face plate shall be the large diameter normally supplied with the lathe and shall be fitted to the spindle. The plate shall be ribbed for strength and have radial slots for clamping fixtures or work. Runout shall be within the tolerances of ANS B5.16.

3.10.3 Micrometer carriage stop. The micrometer stop shall be for clamping on the front bed way to provide an adjustable stop for the carriage in lieu of a plain stop. The stop shall have a screw with graduations in 0.001 inch and adjustment of at least one inch.

3.10.4 Precision leadscrew. The leadscrew shall be precision finished to be within the tolerances of ANS B5.16 for lead error, alignment and cam action for toolroom lathes.

3.11 Optional equipment. When specified (see 6.2.1), the following shall be supplied for either type lathe.

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3.11.1 Chuck, 4-jaw, independent. The chuck shall be fitted to the spindle furnished. The chuck shall be a four-jaw, wrench operated chuck with reversible, hardened, step type jaws for internal and external grip. The chuck runout shall be within the tolerance of ANS B5.16.

* 3.11.2 Chuck, 3-jaw, universal. The chuck shall be fitted to the spindle furnished. The chuck shall be a three-jaw, wrench operated, scroll chuck to move all jaws simultaneously. The chuck jaws shall be for both internal and external grip. The chuck shall center the work to within 0.003 inch TIR. When specified (see 6.2.1), the chuck shall be adjustable to 0.0005 inch TIR.

* 3.11.3 Chuck, 6-jaw, universal. The chuck shall be fitted to the spindle furnished. The chuck shall be a six-jaw, wrench operated, scroll chuck to move all jaws simultaneously. The chuck jaws shall be for both internal and external grip. The chuck shall center the work to within 0.003 inch TIR. When specified (see 6.2.1), the chuck shall be adjustable to 0.0005 inch TIR.

* 3.11.4 Spindle nose collet chuck. The collet chuck shall be fitted to the spindle furnished. Components of the chuck shall be hardened and ground with the exception of the handwheel. Tightening and releasing collets shall be through an impact mechanism operated by the handwheel. Collets for the chuck shall consist of multiple steel jaws equally spaced radially and permanently held in a resilient bonding medium. The bonding shall be impervious to temperature, oil and cutting fluids. When closed, the collet shall grip the work on the entire length of the jaws. A set of collets shall cover all diameters from 1/16 inch through 1-1/16 inch or 1-3/8 inch as specified (see 6.2.1), each collet having a 1/8 inch range.

3.11.5 Steady rest. The steady rest shall be the hinged type having three adjustable plain tip jaws which can be set to any diameter work part within the capacity of the rest in accordance with Table I.

3.11.6 Follower rest. The follower rest shall be for mounting on the carriage and shall have two adjustable plain tip jaws which can be set to any diameter work part within the capacity of the rest in accordance with Table I.

3.11.7 Indexing square toolholder. The square toolholder shall be for mounting on the compound rest to hold and index four tools to the cutting position. The holder shall have a quick acting lever to clamp and unclamp the turret for indexing.

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3.11.8 Hardened feed screws. The cross feed screw and the compound rest feed screw shall be hardened and precision finished for accuracy and to minimize wear. Surface hardness of the threads shall be not less than Rockwell C-50.

3.12 Additional requirements. Requirements for additional features, accessories or tooling shall be as specified (see 6.2.1). Equipment in 3.10 may be specified for an engine lathe.

3.13 Fungus control. When required (see 6.2.1), fungus proofing shall be as specified.

3.14 Lubrication chart or plate. Unless otherwise specified (see 6.2.1), a lubrication chart or plate shall be permanently and securely attached to each machine. If a chart is furnished, it shall be placed in a transparent plastic folder, or permanently sealed between clear plastic sheets with suitable means for mounting. The following information shall be furnished on the chart or plate:

Points of application

Service interval

Type of lubricant

Viscosity

Military or Federal Specification Number

3.15 Nameplate. Unless otherwise specified (see 6.2.1), a corrosion-resistant metal nameplate identifying the machine in accordance with MIL-STD-130 shall be securely attached to each machine. The nameplate shall contain the information listed below. If the machine is a special model, the model designation shall include the model of the basic standard machine and a suffix identified in the manufacturer's permanent records. The captions listed may be shortened or abbreviated, provided the entry for each such caption is clear as to its identity.

Nomenclature

Manufacturer's name

Manufacturer's model designation

Manufacturer's serial number

Power input (volts, total amps, phase(s), frequency(s))

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Contract Number or Order Number

Federal Stock Number, National Stock Number, or Plant Equipment Code

Date of manufacture

U S

3.16 Technical data. Data shall be furnished as specified (see 6.2.2).

3.17 Workmanship. Workmanship of the machine and accessories shall be of a quality equal to that of the manufacturer's commercial equipment of the type specified herein.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may utilize 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 when such action is deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 First Article inspection. When First Article approval is required under 3.1, First Article inspection shall be performed. Unless otherwise specified (see 6.2.1), First Article inspection shall comprise the examination in 4.4 and all tests in 4.5. Failure of the item to pass any examination or test shall be cause for disapproval of the First Article.

4.3 Quality conformance inspection. Each item shall be subject to quality conformance inspection prior to being offered for acceptance. Unless otherwise specified (see 6.2.1), quality conformance inspection shall consist of the examination in 4.4, the tests in 4.5.1 through 4.5.4, and the inspection in 4.6. Failure of the item to pass any examination or test shall be cause for rejection.

4.4 Examination. The lathe and its equipment shall be examined for compliance with the requirements in 3.2 through 3.5 and 3.7 through 3.17.

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4.5 Tests.

4.5.1 Operational test. The lathe shall be operated in accordance with the manufacturer's standard procedure for warm-up and run-off checks. The run-off checks shall include checks of all electrically, mechanically and hydraulically operated components, manually operated controls and feed and speed change mechanisms to determine proper operation.

4.5.2 Alignment accuracies. The lathe shall be checked in accordance with the manufacturer's standard test procedure to determine that the machine accuracies conform to the requirements of 3.6. Test equipment shall be the manufacturer's choice of instruments which have an accuracy traceable to the Bureau of Standards.

4.5.3 Performance test. The following turning tests shall be performed on the lathe to determine cutting accuracies and performance of components under load. The test material shall be SAE 1040 or a steel of equal machineability. The test bar shall be not less than 1-1/2 inches in diameter for holding in a chuck and not less than one inch diameter for holding in a collet. The length of the bar shall be sufficient for holding and turning the length required in the test performed. Spindle speeds and feed rates shall be based on the recommended cutting speed for the material and adjusted for optimum performance for the cut being made using a single point, high speed steel or carbide tool. There shall be no evidence of chatter on the turned part. Accuracy of turned diameters shall be within the tolerances required in 3.6.

4.5.3.1 Round turning test. The test bar shall be held in a chuck or collet as applicable and turned for a length not less than one inch and checked for roundness.

4.5.3.2 Cylindrical turning test. The test bar shall be held in a chuck and round turned to the configuration of the specimen shown in ANS B5.16 for turning cylindrical. A finish cut shall be made over the two collars in one pass without adjusting the depth of cut between collars. The two collars shall be checked for turning cylindrical with the work held in a chuck. The bar shall then be prepared for turning between centers and a finish cut shall be made over the two collars in one pass. The diameter shall be checked for turning cylindrical with the part mounted between centers.

4.5.4 Horsepower test. The machine shall be subjected to a cutting test which applies not less than the full nameplate rated input power to the spindle motor for at least one minute. Spindle speed

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shall be chosen by the supplier at the lowest practicable for this test without applying torque in excess of the design maximum value to any machine component. Material and dimensions of the workpiece, tooling, depth of cut, and feed rate shall be at the option of the supplier, provided the required loading is achieved. There shall be no apparent evidence of chatter, stalling, or permanent distortion during or after the test.

4.5.5 Electromagnetic interference control test. Equipment requiring electromagnetic interference control testing shall be tested for compliance with 3.8.

4.6 Inspection of preparation for delivery. Preservation-packaging, packing and marking shall be inspected to determine compliance with the requirements of Section 5.

5. PREPARATION FOR DELIVERY

5.1 Preservation-packaging. Preservation-packaging shall be in accordance with MIL-M-18058 at Level A or C as specified (see 6.2.1).

5.2 Packing. Packing shall be in accordance with MIL-M-18058 at Level A, B, or C as specified (see 6.2.1).

5.3 Marking. Marking shall be in accordance with MIL-STD-129. Additional marking shall be as specified (see 6.2.1).

6. NOTES

6.1 Intended use. The engine lathes and toolroom lathes, except lathes having solid state variable speed drives, are intended for use in general machine shops, laboratories or portable machine shop units to produce repair parts, production parts or prototype parts to close tolerances. The solid state variable speed lathes are intended for use in general manufacturing to produce precision parts in small or large quantities or for toolroom type operations where wide ranges of spindle speeds and feeds are required to machine various materials.

6.2 Ordering data.

* 6.2.1 Procurement requirements. Purchasers should specify their requirements in procurement documents, including whether each choice is required or not required, by entering an appropriate statement identified to each of the following:

a. Title, number and date of this specification.

b. Type and size lathe required (see 1.2).

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c. First Article approval, if required (see 3.1 and 6.3).

d. Painting, if different and Machine Tool Light Gray if required (see 3.3.5).

e. Specify exceptions and additional safety and health requirements (see 3.3.9 and 6.4).

f. Type headstock spindle drive, as required (see 3.4.4).

g. Optional sizes and capacities required (see 3.5 and Table I).

h. Power requirements and voltage for initial wiring, if different (see 3.7).

i. Electromagnetic interference control, if required (see 3.8 and 6.4).

j. Standard equipment for engine lathes, if different (see 3.9).

k. Standard equipment for toolroom lathes, if different (see 3.10).

l. Optional equipment as required (see 3.11).

m. Chuck adjustable to 0.0005 inch TIR, if required (see 3.11.2).

n. Chuck adjustable to 0.0005 inch TIR, if required (see 3.11.3).

o. Maximum collet size, 1-1/16 or 1-3/8, as required (see 3.11.4).

p. Additional requirements (see 3.12).

q. Fungus control, if required (see 3.13).

r. Lubrication chart or plate, if different (see 3.14).

s. Nameplate, if different (see 3.15).

t. First Article inspection, if different (see 4.2).

u. Quality conformance inspection, if different (see 4.3).

v. Required level of preservation-packaging (see 5.1).

w. Required level of packing (see 5.2).

x. Additional marking requirements (see 5.3).

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6.2.2 Contract data requirements. Required technical data such as operators manuals, parts lists, foundation and anchor bolt plans, wiring diagrams and other instructions for operation and maintenance, as identified on a numbered DD Form 1664, should be specified on a DD Form 1423 incorporated into the contract.

6.3 First Article. When First Article approval is required under 3.1, the solicitation should adhere to the applicable portions of Section 1, Part 19, of the Armed Services Procurement Regulation.

6.4 Safety and health determinations. In order that equipment integrated into the user's operational environment will comply with the Standards promulgated under the Occupational Safety and Health Act of 1970, limitation and control of noise levels, radiation, electromagnetic emission, noxious vapors, heat, etc. as applicable, specific requirements concerning guarding the point(s) of operation, and other safety and health requirements should be specified.

6.5 Item interchangeability. Lathes covered by this specification are of the same type and are interchangeable with lathes procured by use of the previous issue.

6.6 Marginal notations. The margins of this specification are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Army - WC
Navy - SH
Air Force - 84

Review Activities:
Army - WC
Navy - SH
DSA - GS

User Activities:
Army - SM, WV
Navy - MC

Preparing Activity:
DSA - IP

Project Number:
3416-0146