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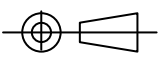
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ISSUE DATE: April 1963
REVISION DATE: JULY 31, 2012

FORM 09-01	THIRD ANGLE PROJECTION		CUSTODIAN ENGINEERING MANAGEMENT COMMITTEE	REVISION 1
	PROCUREMENT SPECIFICATION NONE		TITLE SHEAR FORMING EQUIPMENT - HORIZONTAL AND VERTICAL	CLASSIFICATION SPECIFICATION NAS958 SHEET 1 OF 11

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Full document details: AIA NAS958 2012



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AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC., 610 SHOREHAM BUILDING, WASHINGTON 5, D. C.

1.0 SCOPE

The specification set forth here will reflect the requirements of the AIA Companies in regard to "Shear Form," "Hydro Spin," and "Flo Turn" equipment. It will also set forth the conditions of acceptance of such equipment through qualification tests.

- 1.1 **Classification:** The AIA Companies have decided on three basic sizes of equipment. These sizes are defined in part piece outside diameter and forward extrusion finished work piece length capability (allowance must be considered in machine for trim). The machine capability expressed in finished work piece sizes are the following:

Section	Designation	Outside Diameter	Finished Length
3.3.1	60" Machine	62"	80"
3.3.2	90" Machine	93"	120"
3.3.3	150" Machine	155"	200"

2.0 APPLICABLE SPECIFICATIONS, CODES, AND STANDARDS

The latest revision of the following specifications, codes, and standards are included as a portion of this specification. Detail requirements of this specification shall preclude any contradictory portions of the following specifications, codes, and standards.

- 2.1 The National Machine Tool Builders Association (NMTBA) Electrical Standards.
- 2.2 The Joint Industries Conference (JIC) Hydraulic Standards for Industrial Equipment.
- 2.3 The American Standards Association (ASA).
- 2.4 The American Society of Mechanical Engineers' (ASME) Boiler and Pressure Vessel Code, Section VIII.
- 2.5 National Aerospace Standard 938, Machine Axis & Motion Nomenclature.
- 2.6 National Aerospace Standard 943, Interchangeable Perforated Tape Standards - Variable block format for positioning and straight cut numerically controlled equipment.
- 2.7 National Aerospace Standard 953, Numerical Control Systems (standard practice).
- 2.8 National Aerospace Standard 955, Interchangeable Tape Standards - Variable block format, contouring and contouring/positioning, numerically controlled equipment.
- 2.9 State and Local Electrical and Safety Codes that are more exacting shall apply.

3.0 REQUIREMENTS

- 3.1 **Responsibilities:** An over all responsibility shall be accepted by the manufacturer for the design, manufacture, performance, reliability, and packaging of the control system and the controlled equipment as defined in the specification. This responsibility shall provide for technical direction during installation and maintenance during the warranty period.

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CUSTODIAN: MANUFACTURING EQUIPMENT COMMITTEE

PROCUREMENT
SPECIFICATION

TITLE

SHEAR FORMING EQUIPMENT - HORIZONTAL AND VERTICAL

CLASSIFICATION
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- 3.1.1 The manufacturer will in turn hold subcontractors responsible for the performance of the control sub-systems and components.
- 3.1.2 The manufacturer will be responsible for the inspection, acceptance, and warranty of the control system, controlled equipment, and all sub-systems. The warranty period shall be for one (1) year from final machine acceptance during which time the prime contractor is responsible for replacement of all defective materials, workmanship, and engineering and in turn will assure compliance of his suppliers and subcontractors to the warranty. Exceptions may be made on low cost perishable components which preventive maintenance procedures may provide for more frequent replacements than one (1) year.
- 3.1.3 At the customer's option, the manufacturer will be responsible for instructions and indoctrination of the user's personnel. The period and extent of training may vary according to the complexity of the system and the prior training of the user's employees. Basic and advance training in system trouble shooting and diagnostic procedures are to be available by the prime contractor prior to and/or during the installation and check out of the equipment.
- 3.2 Design: The dimensions and capacities for the respective types and sizes shall be as shown in Section 3.3 etc.
- Vertical, two roller opposed type machines are generally preferred because of the ease of loading and unloading the machines of both the work pieces and the tools. Deflection is minimized, resulting in closer part tolerance. This type of machine affords reverse extrusion when the tail stock assembly is moved perpendicular, on its own slides, to the center line of the machine.
- 3.2.1 Assembly Arrangement: The machine shall be so arranged that the table top will be at floor level on vertical machines. The machine frame or base shall be capable of supporting all required loads. Coolant shall be picked up under the table and returned to a coolant reservoir. No coolant shall be allowed in pit or on machine components in pit. Machine shall be provided with adequate splash guards and safety provisions, yet not obscure the work area unnecessarily from the operator.
- 3.2.1.2 All components of the machine, such as pumps, reservoirs, filters, etc., are to be located in the pit. Any or all of these components are to be located so that they can be safely inspected or attended during machine operation with full flood coolant on.
- 3.2.2 Standard Equipment: All designated machines shall be equipped with:
- 3.2.2.1 Size and Contour Control: The machine shall be equipped with size and contour control (3.6.1) and adjustable positive stop extruding system (3.2.5).
- 3.2.3 Table and Table Drive:
- 3.2.3.1 Work table runout (and tailstock) will be within TIR .0015" of machine centerline.
- 3.2.3.2 Table drive must be properly lubricated and have the capacity for intermittent heavy duty service commensurate with the designated size machine. The drive should be powered by motors of adequate torque at selected RPM.
- This drive must have the capability of constant RPM and constant surface speed operation. The drive shall be equipped with a brake automatically energized when drive power is cut. Table must stop within 1% RPM from signal.
- 3.2.4 Tool Rings: Six sets of tool rings of various radii (step type optional) to be selected by the buyer. These tool rings shall be of reversible design to obtain maximum service and convenience. These tool rings shall have sufficient strength to withstand any normal imposed loads to be anticipated under forming of known materials in either direction and the specified working conditions of this equipment.

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- 3.2.4.1 The tool ring housings shall be mounted in such a manner as to contain the forming forces within their traveling mounting. This will tend to minimize machine column deflection and part wall thickness variations.
- 3.2.5 Adjustable Positive Stop Extruding System: Each tool ring slide shall have mechanical stops which will be equipped with a micrometer adjustment to permit each tool ring slide to be locked independently against the inward travel and capable of supporting full hydraulic inward pressure.
- 3.2.6 Flood Coolant: The machine shall be equipped with a flood coolant system which shall consist of:
- 3.2.6.1 Outlet nozzles at each tool ring location individually controlled.
- 3.2.6.2 Coolant return which keeps pit and units in pit free of any coolant.
- 3.2.6.3 Reservoir and pumps shall supply adequate volume and pressure for machine size involved and have a filtering system.
- 3.3 Types, Sizes, Class:
- 3.3.1 Machine Size Designation Requirements 60" x 80"
- 3.3.1.1 Work outside diameter capacity 62"
- 3.3.1.2 Table drive speed - 0 to 400 RPM (Infinite adjustment)
- 3.3.1.3 Constant torque, varying horsepower, range 5 to 200 RPM at 160,000 in lbs.
- 3.3.1.4 Constant horsepower, varying torque range 300 to 400 RPM at 485 HP.
- 3.3.1.5 Above based on a 50% duty cycle.
- 3.3.1.6 Work Finished Length Capacity 80"
- 3.3.1.7 Tailstock force 60,000 lbs.
- 3.3.1.8 Vertical slide forces 125,000 lbs.
- 3.3.1.9 Horizontal slide forces 125,000 lbs.
- 3.3.1.10 Capacities required above are delivered capacities at the point of utilization.
- 3.3.1.11 Slide Feed Ranges Infinitely Adjustable
- 3.3.1.11.1 Tailstock 0 to 20" per minute
- 3.3.1.11.2 Horizontal 0 to 40" per minute
- 3.3.1.11.3 Vertical 0 to 40" per minute
- 3.3.1.12 The tool ring spindles are to be power driven in an infinite range of speeds to match the available work surface speeds. This is to be console controlled with readout to match the table speed control in either constant RPM or constant surface speed for synchronization.
- 3.3.2 Machine Size Designation Requirements 90" x 120"
- 3.3.2.1 Work outside diameter capacity 93"

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