

MIL-G-18916(SHIPS)

19 September 1955

SUPERSEDING

S47-6

1 August 1939

(See 6.3)

MILITARY SPECIFICATION

GOVERNORS, STEAM DRIVEN PUMP, PRESSURE

REGULATING, NAVAL SHIPBOARD

1. SCOPE

1.1 Scope. - This specification covers the requirements applicable to the design and construction of pump pressure regulating governors for steam driven pumps for miscellaneous services aboard Naval ships.

1.2 Classification. - Governors shall be of the following types, classes, series and sizes as specified (see 6.1):

1.2.1 Types. -

Type CP - Constant pressure.

Type CFAST - Constant pressure with automatic start.

Type CPASP - Constant pressure with automatic stop.

Type DP - Differential pressure.

Type DPAST - Differential pressure with automatic start.

Type DPASP - Differential pressure with automatic stop.

1.2.2 Classes. -

Class 1 - Self-contained piston operated.

Class 2 - External pilot actuated.

Class 3 - Self-contained direct acting diaphragm.

1.2.3 Series. - (See 6.3).

Series 1500 - Steam service 1500 p. s. i. g. max. 1000° F. max.

Series 600 - Steam service 600 p. s. i. g. max. 850° F. max.

Series 300 - Steam service 300 p. s. i. g. max. 750° F. max.

FED. SUP. CLASS 4820

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1.2.4 Sizes. - The main steam governing valves shall be of the following nominal sizes for the services listed, as specified (see 6. 1):

<u>Nominal size Inches</u>	<u>Boiler feed</u>	<u>Aux. boiler feed</u>	<u>Fuel oil</u>	<u>Lube oil</u>	<u>Fire pump</u>
3/4			X	X	
1			X	X	
1-1/4		X	X		X
1-1/2	X	X			X
2	X				
2-1/2	X				
3	X				

2. APPLICABLE DOCUMENTS

2.1 The following specifications, standards, drawings, and publications, of the issue in effect on date of invitation for bids, form a part of this specification:

SPECIFICATIONS

FEDERAL

- NN-B-591 - Boxes, Fiberboard, Wood-Cleated (for Domestic Shipment).
- NN-B-621 - Boxes, Wood, Nailed and Lock-Corner.
- NN-B-631 - Boxes, Wood, Wirebound (for Domestic Shipment).
- QQ-S-763 - Steel, Corrosion-Resisting: Bars and Forgings (Except for Reforging).
- QQ-S-766 - Steel, Corrosion-Resisting, Plates, Sheets, Strips, and Structural Shapes.
- QQ-S-781 - Strapping, Flat, Steel.
- LLL-B-631 - Boxes, Fiber Corrugated (for Domestic Shipment).
- LLL-B-636 - Boxes, Fiber, Solid (for Domestic Shipment).
- PPP-B-601 - Boxes, Wood, Cleated-Plywood.

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- JAN-P-100 - Packaging and Packing for Overseas Shipment: General Specification.
- JAN-P-103 - Packaging and Packing for Overseas Shipment - Boxes, Wood Cleated; Solid Fiberboard.
- JAN-P-104 - Packaging and Packing for Overseas Shipment Crates, Sheathed, Wood, Nailed.

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- JAN-P-106 - Packaging and Packing for Overseas Shipment - Boxes, Wood Nailed.
- JAN-P-108 - Packaging and Packing for Overseas Shipment - Boxes, Fiberboard (V-Board and W-Board), Exterior and Interior.
- MIL-P-116 - Preservation, Methods of.
- JAN-P-117 - Packaging and Packing for Overseas Shipment - Bags, Interior Packaging.
- MIL-B-121 - Barrier-Materials, Greaseproof.
- JAN-B-125 - Packaging and Packing for Overseas Shipment - Barrier-Materials, Waterproof, Flexible.
- JAN-P-127 - Packaging and Packing for Overseas Shipment - Tape, Adhesive, Pressure-Sensitive, Water-Resistant.
- JAN-P-132 - Packaging and Packing for Overseas Shipment - Crates; Unsheathed, Wood; Nailed (for Maximum Net Load of 2,500 Pounds).
- MIL-B-233 - Boxes, Repair Parts.
- JAN-W-562 - Wire, Nickel Alloy, Spring (Heat-Resistant and Age Hardenable).
- MIL-S-854 - Steel, Corrosion-Resisting: Plates, Sheets, Strips, and Structural Shapes.
- MIL-B-857 - Bolts, Nuts, Studs, and Tap Rivets (and Material for Same).
- MIL-G-858 - Gray Iron Alloy: Castings (Scale-Resisting).
- MIL-S-870 - Steel Castings, Molybdenum Alloy.
- MIL-B-892 - Bronze, Phosphor, Rolled or Drawn; Bars, Plates, Rods, Sheets and Strips.
- MIL-N-894 - Nickel-Copper-Alloy; Wrought.
- MIL-S-901 - Shockproof Equipment, Class HI (High-Impact), Shipboard Application, Tests for.
- MIL-D-963 - Drawings, Production (for Electrical and Mechanical Equipment for Naval Shipboard Use).
- JAN-S-1160 - Steel, Spring, Round or Square (Including Rectangular Sections Having Thicknesses Greater Than Half Their Width.
- MIL-S-1222 - Bolt - Studs, Nuts, and Bars, Round; Steel (for Service at Temperature Up to 850° F.).
- MIL-C-3769 - Crates, Intermediate, Sheathed, Wood, Nailed (for Maximum Net Loads of 3,000 Pounds).
- MIL-L-10547 - Liners, Case, Waterproof.

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- MIL-I-15024 - Identification Plates, Information Plates and Marking Information for Identification of Electrical, Electronic and Mechanical Equipment.
- MIL-T-15071 - Technical Manuals for Mechanical and Electrical Equipment.
- MIL-S-15083 - Steel; Castings.
- MIL-R-15137 - Repair Parts for Electrical and Mechanical Equipment (Naval Shipboard Use).
- MIL-S-15464 - Steel, Alloy, Chromium-Molybdenum; Castings.
- MIL-S-16410 - Steel, Spring; Bars and Wire.
- MIL-B-16541 - Bronze, Valve; Castings.
- MIL-M-16576 - Metal, Gun; Castings.
- MIL-R-17131 - Rods, Welding, Chromium-Cobalt Composition.
- MIL-F-17292 - Format for List of Repair (Spare) Parts for Shipboard Mechanical and Electrical Equipment.
- MIL-W-17481 - Wire, Steel, Corrosion-Resisting.
- MIL-P-17652 - Preparation for Delivery of Electronic, Electrical and Electro-Mechanical Parts.

NAVY DEPARTMENT

- General Specifications for Inspection of Material and Appendix VII - Welding.
 - Part D, Section D-1 - Qualification of Welding Process, General.
- General Specification for Ships.
 - Section S9-1 - Welding and Allied Processes.

STANDARDS

MILITARY

- MIL-STD-129 - Marking for Shipment and Storage.

DRAWINGS

BUREAU OF SHIPS

- B-104 - Fittings, Pipe, Flanged; Composition, Pressures, 100 Pounds and Below.
- B-105 - Flanged Composition Pipe Fittings, 101 to 200 P. S. I. Steam Service.
- B-106 - Flanged Cast Steel Pipe Fittings.
- B-107 - Fittings, Pipe, Flanged, Cast Steel, Pressures 150 Pounds Maximum for All Services.

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BUREAU OF SHIPS (cont'd.)

- B-110 - Flanges, Steel for Steel Tubing, 150 P. S. I. Maximum Steam Service, 200 Pounds Maximum Hydraulic Service.
- B-141 - Flanges, Steel, 300 P. S. I. at 650° F. (Max.).
- B-152 - Flanged Cast Steel Pipe Fittings.
- B-153 - Packings and Gaskets, Standard Application of.
- B-159 - Flanges, Steel, Spherical Back Van Stone 400 P. S. I. at 850° F. (Max.).
- B-175 - Flanged Cast Steel Pipe Fittings, 401 - 600 P. S. I. at 850° F. Steam Service 551 - 750 P. S. I. at 425° F. Maximum for Boiler Feed Service.
- B-176 - Flanges, Composition, Silver Brazing, for Copper and Copper Nickel Alloy Tubing and Bronze Pipes, Pressures 100 Pounds and Below.
- B-177 - Composition Flanges, Silver Brazing, for Copper and Copper Nickel Alloy Tubing 101 to 400 Pounds.
- B-196 - Steel Flanges for Steel Tubing, Welding Neck 401 - 600 P. S. I. at 850° F. Maximum Steam Service 601 - 750 P. S. I. at 425° F. Maximum Boiler Feed Service.
- 5000-S4823-1385621 - Flanges, Bronze, 250 P. S. I. Max., Seawater.

PUBLICATIONS

MILITARY

- JPI-6 - Packaging and Packing of Spare Parts for Internal Combustion Engines.

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

2.2 Other publications. - The following documents form a part of this specification. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

CONSOLIDATED CLASSIFICATION COMMITTEE
Consolidated Freight Classification Rules.

(Application for copies should be addressed to the Consolidated Classification Committee, 202 Chicago Union Station, Chicago 8, Ill.)

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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 25, D. C.)

AMERICAN STANDARDS ASSOCIATION
B-16.5 - Steel Pipe Flanges and Flanged Fittings.

(Application for copies should be addressed to the American Society of Mechanical Engineers, 29 West 39th Street, New York, N. Y.)

3. REQUIREMENTS

3.1 Qualification. - The governors furnished under this specification shall be a product which has been tested and has passed the qualification tests specified herein (see 6.2).

3.2 General requirements. -

3.2.1 The principle of reliability is paramount and no compromise of this principle shall be made with any other basic requirements of design. It is the intention of this specification to obtain governors of such design that they will operate over a long period of years with a minimum of servicing. Where wear or erosion is unavoidable the parts subjected to such wear or erosion shall be of the best materials available for the purpose in order to reduce these detrimental effects to a minimum. The design and construction of all governors shall be the most compact consistent with the following requirements:

- (a) Reliability.
- (b) Accessibility for repair.
- (c) Resistance to wear or corrosion.
- (d) Economy.
- (e) Satisfactory operation when inclined as follows:
 - (1) Up to 15 degrees to either side (permanently inclined).
 - (2) With the ship rolling up to 45 degrees from the vertical to either side.
 - (3) With the ship pitching 10 degrees up and down from the normal horizontal plane.

3.2.2 The governors shall withstand the high-impact shock test specified in Specification MIL-S-901.

3.2.3 Each governor body and device shall be designed to suit the highest working pressure on which it is to be used, and shall be sufficiently rugged to withstand any stresses which may be transmitted via the piping installations arising from vibration, expansion and contraction.

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3.2.4 All types and classes of governors shall be suitable for use with reciprocating, centrifugal or rotary pumps. Governor for use with reciprocating pumps, or other types of pumps having a pulsating discharge, shall be designed so that the steam valve will not tend to shut off steam at each discharge stroke of the pump.

3.2.5 The construction of all governor valves and devices shall be such as to permit easy access to all parts for overhaul and repair. All wearing parts shall be removable without removing the governor valve from the steam line.

3.2.6 Each governor shall be completely suitable for the particular pump discharge pressure and range of adjustment as specified (see 6.1). Table I indicates typical requirements and is intended for guidance only.

Table I - Classification.

Steam governor valve series	Duty	Rated pump discharge pressure	Range of adjustment
		P. s. i. g.	P. s. i.
1500	BF	1800	1300 to 1800
	FO	1150	350 to 1150
	FS	150	50 to 150
600	BF	750	600 to 800
	FO	350	150 to 350
	LO	100	5 to 40
	FS	175	50 to 175
300	BF	450	375 to 475
	FO	350	150 to 350
	LO	100	5 to 40
	FS	175	50 to 175

- (a) BF duty means - boiler feed pump service is typical for this duty.
- (b) FO duty means - boiler fuel oil pump service is typical for this duty.
- (c) LO duty means - lubricating oil pump service is typical for this duty.
- (d) FS duty means - fire pump service is typical for this duty.

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3.2.7 Steam governing valves. -

3.2.7.1 Each governor design shall be such as to require a minimum pressure drop through the steam valve under operating conditions. This pressure drop shall not exceed 5 percent of the inlet pressure when the governor steam valve is passing its design rated flow; except that on steam systems at 600 p. s. i. or lower the pressure drop may be as high as 30 p. s. i. g. (see 6. 1. (e)).

3.2.7.2 Each steam governing valve shall be fitted with a simple, manually operated feature by which the automatic governing action may be rendered inoperative and allow full flow of steam through the valve. This feature shall consist of a handwheel and stem acting directly on the main steam valve. A suitable indicating device marked "Auto" and "Open" shall be fitted.

3.2.7.3 When the actuating medium is any fluid other than air or fresh water the valves shall be so designed that rupture of any diaphragm, or leakage through any joint cannot result in contamination of the steam driving the pump unit.

3.2.7.4 No packing glands, stuffing boxes, metal bellows or syphons shall be used on any automatically moving parts.

3.2.7.5 All governors shall have straight - through steam valves unless otherwise specifically approved by the bureau or agency concerned.

3.2.7.6 The steam valves of all classes shall have flanged connections throughout, including spring chambers, unless otherwise specified in the contract or order. Inlet and outlet flanges shall form part of the valve body. All flanges shall be drilled by the manufacturer to Navy standards unless otherwise specified in the contract or order.

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3.2.7.6.1 Inlet and outlet flange shapes and bolting shall be in accordance with drawings listed in tables II and III.

Table II - Line flange shape and bolting.

Series	Applicable drawings		Maximum allowable pressure P. s. i.	Maximum allowable temperature ° F.
	Shape	Bolting		
1500	ASA B-16.5 series 1500 (class a)		1500	1000
600	B-175	B-196	600	850
300 Steel	B-106	B-141	300	750
300 Steel	B-106	B-141	300	425
300 Bronze	B-105	B-177	300	425

Table III - Actuating connection flange shape and bolting.

Class	Duty	Applicable drawings	
		Shape	Bolting
1500	BF	ASA B-16.5 series 1500 (class a)	
	FO	ASA B-16.5 series 900 (class a)	
	FS	B-105 (thickness) B-104 (diameter)	5000-S4823-1385621
600	BF	B-175	B-196
	FO (350 p. s. i.)	B-106	B-141
	FO (1150 p. s. i.)	ASA B-16.5 series 900 (class a)	
	LO	B-107	B-110
	FS	B-105 (thickness) B-104 (diameter)	5000-S4823-1385621
300 Steel only	BF	B-152	B-159
	FO	B-106	B-141
	LO	B-107	B-110
300 Bronze only	FO	B-105	B-177
	LO	B-104	B-176
	FS	B-105 (thickness) B-104 (diameter)	5000-S4823-1385621

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3.2.7.6.2 All gasket mating surfaces of flanges shall be finished with a serrated or phonographic finish with 60 to 80 cuts per inch of face width, 0.002 to 0.003 inch deep cut.

3.3 Description of types. -

3.3.1 Type CP - constant pressure. - This governor shall be designed to maintain a constant predetermined pressure at a selected point in the pump discharge line by control of the steam supply to the pump driver, regardless of variation in steam pressure and pump load.

3.3.2 Type DP - differential pressure. - This governor shall be designed to maintain a constant predetermined difference in pressure between two selected points in the pump discharge line (for example: across a boiler feedwater regulator) by control of the steam supply to the pump driver, regardless of variation in steam pressure and pump load. The differential pressure shall be adjustable from 50 pounds per square inch (p. s. i.) to 100 p. s. i.

3.3.3 Type CPAST and type DPAST governors are the basic types CP and DP with additional automatic start features. These governors shall be designed and arranged to positively and automatically start a pump when the pressure in the actuating line falls below a certain low predetermined pressure, after which the basic governor takes over and maintains the pump pressure for which it is set as specified in 3.3.1 and 3.3.2.

3.3.3.1 After automatic starting the governor shall operate as a basic CP or DP governor until manually reset for automatic starting. The starting feature shall be adjustable as to starting pressure.

3.3.4 Type CPASP and type DPASP governors are the basic types CP and DP with additional automatic stopping features. These governors shall be designed and arranged to positively and automatically stop a pump when the pressure in the actuating line to the stopping device falls below a certain low predetermined pressure, and shall not automatically restart the pump even though the actuating line pressure is reestablished.

3.3.4.1 The automatic stopping feature shall be arranged so that it can be made inoperative by manual means, in which case the governor shall operate as a basic CP or DP governor. The stopping device shall be adjustable as to stopping pressure.

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3.4 Design requirements. -

3.4.1 The basic design features specified herein are desirable; however consideration will be given to governors differing in design from the features described provided it is demonstrated to the bureau or agency concerned that, none of the general requirements enumerated in 3.2 are sacrificed.

3.4.2 Class 1, Self-contained Piston-operated design. -

3.4.2.1 This basic design shall include a piston operated main steam governing valve controlled by an auxiliary valve, the auxiliary valve being operated by an adjustable external spring acting against a diaphragm and balanced by the pressure in the actuating line.

3.4.2.2 The auxiliary valve shall be single-seated spring loaded type with removable valve seats. The auxiliary valve chamber shall be self-draining to prevent accumulation of water around the auxiliary valve spring.

3.4.2.3 The main steam valve shall be single seated spring loaded type. The valve seat shall be integral with the valve body and shall be faced with cobalt chromium composition facing.

3.4.2.4 The piston operated design shall have cylinder liners which are readily removable. The main valve shall not be integral with its operating piston.

3.4.3 Class 2, External pilot actuated design. -

3.4.3.1 This basic design shall include pressure sensing and relaying devices installed separately from the main steam valve.

3.4.3.2 A master control device shall sense the pressure, or differential pressure to be controlled and by means of suitable pneumatic relays and valves shall actuate the main steam governing valves controlling the pumps in order to maintain the desired pump output pressures.

3.4.3.3 Unless otherwise specified in the contract or order the main steam governing valves shall not be furnished as a part of the class 2 governors (see 6.1). When main steam governing valves are required by the contract or order to be furnished as a part of class 2 governors, the steam governing valves shall conform to all the requirements for class 1 governors of this specification covering such valves.

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3.4.3.4 Ships service air will normally be supplied to the governor at pressures varying from 50 p. s. i. g. to 85 p. s. i. g. the governor shall be designed to operate in accordance with this specification when the air supply is as low as 35 p. s. i. g.

3.4.3.5 Class 2 governors shall be so designed that the control of several pumps and pressure signals from more than one point may be integrated into a single control system. An example of such a requirement is the governing of three steam turbine driven main boiler feed pumps in one boiler room supplying feed water to two boilers, with the pressure signals being taken across the feed water regulators to each boiler. The actual arrangement required shall be as specified (See 6.1).

3.4.3.5.1 When an integrated system as specified in 3.4.3.5 is specified all components of the system, except the steam governing valves, shall be mounted in an enclosed cabinet and all devices completely connected and tested as a complete assembly.

3.4.3.5.2 When an integrated system receives the pressure signal from more than point, the lowest pressure signal shall automatically govern.

3.4.3.5.3 When an integrated system governs more than one pump, all the pumps shall be controlled equally so as to equally share in the pumping load. It shall be possible to normally isolate any pump from the integrated system without interfering with the governing of the remaining pump or pumps; and it shall be possible to start a pump independently of the system and, when the pump discharge pressure reaches the system pressure, to place the pump under control of the governing system without interfering with the governing of the remaining pump or pumps.

3.4.3.6 The final control element for class 2 governors shall operate the steam governing valve at each pump thereby controlling the steam flow to the pump driver. The final control element may be a diaphragm operated control valve with valve positioner, or a device suitable for operation in conjunction with the hydraulic governing system of the pump driver, as required (see 6.1).

3.4.3.7 A manually operated control device shall be furnished for each pump by means of which a pneumatic signal may be transmitted to the final control element thereby controlling or shutting down the pump independently from the automatic controls. This manually operated device will be installed separately from the other devices.

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3.4.3.8 The tubing required for interconnecting the various devices and elements is not to be furnished as a part of the governor or governor system, except where two or more devices and elements are furnished mounted within a cabinet in which case all necessary interconnections shall be made within the cabinet.

3.4.3.9 All pipe connections other than for the control air shall be flanged. The flanges shall conform to the dimensions given in the applicable flange standards, and shall be finished on their gasket seats with a fine tool (F2) finish.

3.4.4 Class 3, Self-contained direct acting diaphragm design. -

3.4.4.1 This design shall include a diaphragm with an adjustable spring tension acting against one side of the diaphragm which is balanced by the pressure in the actuating line against the other side of the diaphragm.

3.4.4.2 The steam valve shall be of the double-seated balanced type.

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3.5 Material requirements. -

3.5.1 Materials for steam governing valves shall be as specified in table IV. Material for parts not shown in table IV shall be of the quality best suited for the purpose intended, and shall be subject to review and approval by the bureau or agency concerned. Material shall be free from all defects and imperfections that might affect the serviceability of the finished product.

Table IV - Materials.

Parts	Steam Governor Valve Series	Specification	Material
Bodies, bonnets, stuffing boxes, spring chambers See Note 1	1500	MIL-S-15464 class 2 or 3	Chrome-molybdenum alloy steel
	600 300	MIL-S-15083 MIL-S-870	Class B, cast steel Cast molybdenum steel
	300 (425°F. Max)	MIL-S-15083 MIL-M-16576 MIL-B-16541	Cast steel Gun metal Valve bronze
Diaphragms see Note 3	All	MIL-N-894 MIL-B-892 MIL-S-854 QQ-S-766	Nickel-copper alloy, rolled Phosphor bronze, rolled CRES, Class 2 CRES, Class 4
Main valve stems and disks see Note 1	All	QQ-S-763	Corrosion-resisting steel, class 3 (surface hardened)
	300 (425°F. Max)	MIL-N-894 MIL-M-16576 QQ-S-763	Nickel-copper alloy Gun metal (disk only), Corrosion-resisting steel, class 3
Auxiliary valve disks and seats	All	MIL-S-853	Corrosion-resisting steel, class 5. See Note 2
	300 (425°F. Max)	MIL-N-894 MIL-M-16576 QQ-S-763	Nickel-copper alloy Gun metal Corrosion-resisting steel, class 5

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Table III - Materials (cont'd.).

Parts	Steam Governor Valve Series	Specification	Material
Cylinder liners, bushings	All	QQ-S-763	Corrosion-resisting steel, class 5, hardened Nickel cast iron, hardened
	300 (425°F. Max)	MIL-G-858 MIL-N-894 QQ-S-763	Niresist Nickel-copper alloy Corrosion-resisting steel, class 6
Valve stems	All	MIL-N-894 QQ-S-763	Nickel-copper alloy Corrosion-resisting steel
Bolts, studs	All	MIL-B-857	Steel - for temperatures up to 750°F.
		MIL-S-1222	Steel - symbol B 16 for temperatures up to 1000°F.
Springs, main and pilot valve	1500	JAN-W-562	Wire, nickel alloy
	600 300	MIL-W-17481	Corrosion resisting steel
		MIL-S-16410 JAN-S-1160	Steel, cadmium plated Steel, cadmium plated
Springs, adjusting	All	MIL-W-17481	Corrosion-resisting steel
		MIL-S-16410	Steel, cadmium plated
		JAN-S-1160	Steel, cadmium plated

Note 1. - Main valve seating surface shall be faced with cobalt chromium alloy, (Specification MIL-R-17131)

Note 2. - Auxiliary valve seating surface shall be hardened to not less than 475 Brinell.

Note 3. - Special line rubber reinforced by fabric may be used for diaphragms when subject to 180 °F. Maximum temperature satisfactory to the bureau or agency concerned. Such material shall be completely protected against deteriorating effects of temperature and the liquid handled.

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3.5.2 The use of materials differing in properties from those specified for a given application will be considered when the contractor shows the necessity for such substitution, the material proposed is readily obtainable, and provided that the material is satisfactory to the bureau or agency concerned.

3.5.3 Welding shall be in accordance with Section S9-1 of General Specifications for Ships except welding of chrome alloy steel which shall be approved as required by Section D-1, Part D, Appendix VII of General Specifications for Inspection of Material.

3.5.4 Threaded parts shall conform to Handbook H28. A suitable anti-seize compound shall be used on threaded parts subjected to a temperature above 300° Fahrenheit (F.).

3.5.5 The use of studs, tap bolts or cap screws is prohibited unless specifically approved by the bureau or agency concerned where the use of through bolts is impracticable.

3.5.6 All pressure castings and weldments shall be radiographed and magnetic powder tested in such areas as directed by the bureau or agency concerned.

3.5.7 All packing and gaskets shall be in accordance with Drawing B-153. All packing shall be of a brand approved by the bureau or agency concerned.

3.6 Performance requirements. -

3.6.1 Type CP. -

3.6.1.1 Governors for BF duty. -

3.6.1.1.1 When centrifugal pumps are operating under normal steady steam pressure controlled by BF duty governors the pump discharge pressures at shut-off shall be not less than 2.5 percent nor more than 4.0 percent above the rated discharge pressure of the pumps at rated capacity. This rise in pressure shall be continuous; that is, at no point of the curve from rated capacity to shut-off shall there be a drop in the characteristic. (This requirement is based on pumps having constantly rising head-capacity curves with shut-off, at constant rated speed, not less than 15 percent greater than rated discharge pressure.)

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3.6.1.1.2 The pressure capacity characteristic curves of a pump with a governor in control, when determined from rated capacity to shut-off and from shut-off to rated capacity, shall not vary at any given capacity by an amount in excess of 0.67 percent of the rated discharge pressure for pumps rated at 750 p. s. i. g. or less, and 1.0 percent for pumps rated at more than 750 p. s. i. g.

3.6.1.1.3 When a pump is operated under steady conditions, the constant pump discharge pressure for which a governor is set shall not vary more than plus or minus 0.67 percent of the governor setting. The maximum momentary variation in pump discharge pressure due to sudden major changes in capacity shall not exceed plus or minus 10 percent of the rated pump discharge pressure, and such fluctuations shall settle down to normal within 10 seconds.

3.6.1.1.4 During a gradual reduction in steam pressure of 20 percent, or gradual increase of 20 percent, the pump discharge pressure shall not vary more than plus or minus 1.5 percent, with turbine overload nozzle open.

3.6.1.2 Governors for FO duty. -

3.6.1.2.1 When pumps are operating under steady conditions controlled by FO duty governors the pump discharge pressures shall not vary more than plus or minus 2 percent.

3.6.1.2.2 Under steady normal operating conditions with any setting of pump discharge pressure, the pump discharge pressure shall rise not less than 2.8 percent nor more than 5.7 percent of the governor setting during gradual changes from full load to 25 percent load and vice versa, and under those conditions the governor shall be stable from full load to minimum load and vice versa.

3.6.1.2.3 During gradual reduction in steam pressure of 20 percent and vice versa, the pump discharge pressure shall not vary by more than 2.8 percent of the rated discharge pressure.

3.6.1.2.4 Maximum momentary variation in pump discharge pressure due to sudden major changes in capacity with steady steaming conditions, shall not exceed plus or minus 10 percent of the governor pressure setting, and such fluctuations shall settle down to normal within 10 seconds.

3.6.1.3 Governors for LO and FS duty. -

3.6.1.3.1 Under steady operating conditions the pump discharge pressure shall not vary more than 1 p. s. i. total for LO service, and plus or minus 2 percent, or 5 p. s. i., whichever is greater, for FS service.

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3.6.1.3.2 Under normal operating steam conditions, with any setting of the governor the pump discharge pressure shall be maintained within a tolerance of plus or minus 5 p. s. i. for series 300 and 600 governors, and 7.5 p. s. i. for series 1500 governors during gradual changes from 25 percent load to full load and vice versa; also during a gradual reduction in steam pressure of 20 percent and vice versa the same pump discharge pressure tolerances shall be maintained.

3.6.1.3.3 Maximum momentary variation due to sudden major changes in capacity with steady steam conditions shall not exceed plus or minus 10 percent of the pump discharge pressure for pressures of 100 p. s. i. g. or above, or plus or minus 10 p. s. i. for lower pressures; and such fluctuations shall settle down to normal within 10 seconds.

3.6.2 Type DP. -

3.6.2.1 Feed system. - The following are performance requirements of type DP governors for BF duty controlling centrifugal pumps, when the actuating pressure signal is obtained across a feed water regulating valve or other pressure drop element in the discharge from the pump. The pressure drop across the pressure drop element at the rated flow of the pump shall be the rated normal differential pressure signal of the governor.

3.6.2.1.1 When the pump is operated under steady conditions, the set differential pressure across the pressure drop element shall not vary more than plus or minus 5 percent of the setting. The maximum momentary variation in differential due to sudden major changes in flow shall not exceed plus or minus 15 percent of the differential setting. Such fluctuations shall settle down to normal within 10 seconds.

3.6.2.1.2 When the pump is operated under normal steam pressure, and the flow through the pressure drop element is gradually changed from minimum to maximum and vice versa, the pressure differential across the pressure drop element shall be maintained within plus or minus 5 percent of the differential for which the governor is set.

3.6.2.1.3 When the pump is operated under normal steady steam pressure while the differential pressure signal is held constant at the rated differential pressure, and the pump discharge valve is gradually closed from the position of rated pump capacity to shut-off, and from shut-off to rated capacity, the pump pressure capacity characteristic curves shall not vary at any given capacity by an amount in excess of 0.67 percent of the rated discharge pressure; and the pump discharge pressure at shut-off shall not be less than 2.5 percent nor more than 4.0 percent above the rated discharge pressure

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of pump at rated capacity. The rise in the characteristic curves shall be continuous; that is at no point of the curve from rated capacity to shut-off shall there be a drop in the characteristic. (This requirement is based on pumps having constantly rising head-capacity curves with shut-off, at constant rated speed, not less than 15 percent greater than rated discharge pressure.)

3.6.2.1.4 When a pump is operated under steady conditions with the differential pressure signal held constant, the discharge pressure for which the governor is set shall not vary more than plus or minus 0.67 percent of the governor setting. The maximum momentary variation in pump discharge pressure due to sudden major changes in capacity shall not exceed plus or minus 10 percent of the governor setting, and such fluctuations shall settle down to normal within 10 seconds.

3.6.2.1.5 During a gradual reduction in steam pressure of 20 percent, and vice versa, the differential pressure across the pressure drop element shall not vary more than plus or minus 1.5 percent, with turbine overload nozzle open.

3.6.2.2 Fuel oil system. - The following are performance requirements of type DP governors for FO duty controlling positive displacement rotary pumps, when the actuating pressure signal is obtained across a fixed orifice in the discharge line from the pump. The pressure drop across the orifice at the rated flow of the pumps shall be the rated normal differential pressure signal of the governor.

3.6.2.2.1 All the requirements of 3.6.1.2.1 to 3.6.1.2.4 inclusive shall be met.

3.7 Identification plates. -

3.7.1 Each steam governing valve body shall have the following information stamped or cast thereon, or on a metal identification plate permanently attached thereto:

- (a) The governor type, class, series and nominal size.
- (b) The maximum steam pressure and temperature.
- (c) The manufacturers type or model designation and serial number.
- (d) The trademark or name of the manufacturer.
- (e) An arrow indicating the direction of steam flow.
- (f) The standard Navy stock number, if assigned.
- (g) Contract or order number.

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3.7.2 Each auxiliary device not attached to the governor valve shall have an identification plate attached thereto, having the following information:

- (a) Name of manufacturer.
- (b) Identification of governor of which the device is an auxiliary.
- (c) Designation of the device as to purpose or function.
- (d) The standard Navy stock number, if assigned.
- (e) Contract or order number.
- (f) Any other data that the manufacturer considers essential.

3.7.3 Identification plates shall be type A or B in accordance with Specification MIL-I-15024, except that plates of plastic or aluminum are not acceptable. Plates shall be secured to the equipment with corrosion resistant metal screws.

3.8 Repair parts and tools. -

3.8.1 Onboard. - Each set of onboard repair parts shall include the following as applicable, plus any additional parts considered by the manufacturer to be essential in successful servicing of the governors:

- (a) 100 percent complete replacement for all governors per ship:

- (1) Diaphragms.
- (2) Springs exposed to steam.
- (3) Special packing, seals.
- (4) Gaskets.
- (5) Auxiliary valves.
- (6) Auxiliary valve seats.
- (7) Piston rings.

- (b) One part for each 4 governors or fraction thereof, per ship:

- (1) Springs of each size and type not exposed to steam.
- (2) Cylinder liners of each size and type.

3.8.2 Tools. - A complete set of special tools required for the maintenance and repair of the governors shall be included in each set of onboard repair parts. No ordinary commercial tools or wrenches shall be included. Each tool or wrench shall be indelibly marked for the purpose intended. Special tools are defined as those tools not listed in the Catalog of Naval Material, General Stores Section. (Copies of this catalog may be consulted in the office of the Government inspector.)

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3.8.2.1 Special tools and wrenches shall be detailed on master drawings, and included in the lists of material on sectional assembly drawings.

3.8.3 Each box containing onboard repair parts shall contain a list entitled, "List of onboard repair parts and tools". The list shall be in a format suitable for use on outline drawings and in technical manuals. It shall not be less than 8-1/2 by 11 inches in size.

3.8.3.1 The format of the list shall include a heading and columns of data for the items listed. The heading shall include titles and applicable entries as follows:

Reproduced from drawing number _____
 Number of Ships _____
 Application _____
 Contract number _____
 Manufacturer _____
 Quantities are for _____ units per ship
 The columns shall include:
 Line number _____
 Piece number _____
 Name of part _____
 Quantity _____
 Manufacturers service part number _____
 Manufacturers master drawing number _____
 Bureau of Ships master drawing number _____
 Standard Navy stock number _____

Additional columns may be used as applicable.

3.8.3.2 The list shall be treated so as to be resistant to oil, water, and fading.

3.8.4 Stock. - The selection, stock numbering, and quantities of repair parts for stock shall be determined and processed in accordance with Specification MIL-R-15137.

3.8.4.1 The cognizant supply demand control point for repair parts for stock is Ships Parts Control Center, Mechanicsburg, Pa., unless otherwise specified in the contract or order.

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3.9 Drawings. -

3.9.1 Drawings shall conform to type I of Specification MIL-D-963, and shall include detail master drawings, outline drawings and certification data.

3.9.2 The object of the master drawing system is to preclude the necessity of repeating details of individual parts, or of repeating complete drawings. A contractor shall be required to make master drawings only for those types and classes of governors for which he has qualified. After a master drawing has received final approval, it will be unnecessary to repeat that drawing on later contracts or orders. Certification data sheets however are required for each type, class, series and size of governor on each contract or order.

3.9.3 Master drawings shall include details of all component parts. Several details should be shown on each detail drawing. Details of single parts on size A sheets, resulting in a multiplicity of drawing sheets, should be avoided. Size F drawings (28 inches by 40 inches) are preferred.

3.9.4 A sectional assembly drawing shall be furnished for each type, class, series and size of governor. Each of these drawings shall contain a complete list of material and a complete reference table of drawings. When the same part is used in more than one type, class or size of governor, such a part shall always bear the same piece or item number in all lists of material.

3.9.5 An outline drawing shall be furnished for each type, class, series, size and duty of governor. This drawing shall include a dimensioned outline of the equipment, and also the following:

- (a) Complete performance data under maximum and minimum conditions.
- (b) Concise description of operation with such diagrams as necessary for clarity.
- (c) Complete instructions for adjustments.
- (d) Table of weights.
- (e) Complete list of repair parts as required by Specification MIL-F-17292.

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- (f) Reference to the sectional assembly drawing.
- (g) Reference to letters granting qualification approval, and approval of master drawings.
- (h) Standard Navy stock number of governor.

Note 1. - Details of parts such as bolts, nuts, small springs, and similar items may be omitted provided complete identification is given. This information may be shown in tabular form on the sectional assembly drawings.

Note 2. - Contract numbers and vessel numbers shall not be referenced on detail master drawings, sectional assembly drawings, nor outline drawings.

Note 3. - Sectional assembly and outline drawings may be combined on one sheet providing the sheet is no longer than 28 inches by 50 inches.

3.9.6 Subassemblies furnished as repair parts in lieu of or in addition to individual repair parts shall be recorded on the related sectional assembly and outline drawings by reference notes.

3.9.6.1 Subassemblies of parts, which should not be further disassembled nor the parts thereof individually purchased by Naval activities, shall be marked NSS (not supplied separately) on the drawings. This applies to subassemblies whose parts are not interchangeable because of fits, tolerances, or other reason, therefore parts should not be purchased or stocked by Naval supply activities.

3.9.7 Certification data shall be furnished on size A sheets on tracing cloth. Certification data shall contain the following data plus any additional data required by the individual contract or order:

- (a) Identification of equipment at head of sheet, for example:
 "Certification Data
 for
 Pump Pressure Regulating Governor
 Type CP, Class 1, Size 1-1/2
 Series 600, 850° F Max."
- (b) Name of governor manufacturer.
- (c) Government (bureau or agency) drawing and revision number of C. D. (include in drawing number block at bottom of sheet).
- (d) Manufacturer's drawing and revision number of C. D. (include in drawing number block at bottom of sheet).

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- (e) Government contract number and date, or shipbuilder's order number and date.
- (f) Manufacturer's order number.
- (g) Manufacturer's identification or designation of governor.
- (h) Pertinent application data, such as,
 - Pump application.
 - Pump discharge pressure.
 - Steam pressure and temperature.
 - Differential pressure.
 - Air pressure.
- (i) Number of ships involved.
- (j) Numbers and identification of ships, if known.
- (k) Number of governors and sets of repair parts per ship.
- (l) Total number of governors and sets of repair parts on contract or order.
- (m) Reference manufacturer's and Government drawing numbers of outline and sectional assembly drawings.
- (n) Any additional data or remarks.
- (o) Certifying signature of representative of contractor.
- (p) File number and date of approval agency's letter approving the certification data.
- (q) Standard Navy stock number of equipment.

3.10 Technical manuals. - Technical manuals shall be type C in accordance with Specification MIL-T-15071.

3.10.1 In addition to the requirements for type C books, the technical manuals shall contain a brief resume of the principles of operation together with such illustrations, sketches and schematic diagrams as necessary to convey a clear understanding of the functions and operation of the equipment. Step by step instructions covering operation, maintenance, disassembly and reassembly of the equipment shall be copious and thorough. Exploded view drawings shall be used where helpful for clarity.

3.10.2 When so stated in the contract or order one technical manual may cover all types, series and sizes of governors of one class installed on a ship, but a separate manual shall be provided for each class of governor.

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3.10.3 Where specifically stated in a contract or order and approved by the bureau or agency concerned, the governor technical manual may be combined with the technical manual covering the pump with which the governor is associated; but in this case all the text, data, and drawings, required for a complete governor manual shall be inserted in the pump technical manual as a separate and complete chapter.

4. QUALITY ASSURANCE PROVISIONS

4.1 Inspection (at the place of manufacture). - Each governor shall be inspected at the place of manufacture to determine compliance with this specification as to material, dimensions and workmanship.

4.2 Shop tests. -

4.2.1 Each governor valve body, except of Series 300 governors for 425° F Maximum temperature, shall be tested hydrostatically to 2-1/2 times the maximum specified working pressure of its series. Series 300 (425° F Maximum temperature) governor bodies shall be tested to 450 p. s. i. g. All other parts of the governors subject to pressure shall be hydrostatically tested to 1-1/2 times the maximum working pressures, but not less than 50 p. s. i. g.

4.3 Performance acceptance tests. -

4.3.1 One governor of each type, class, series and size on contract or order as selected by the Government inspector, shall be tested at the Naval Engineering Experiment Station, Annapolis, Maryland, to determine compliance with the specification. Whenever possible this test shall be conducted in conjunction with the test of the pump which it is intended to govern.

4.3.1.1 When requested by the contractor, consideration will be given by the Bureau of Ships to waive performance acceptance tests if identical units have successfully passed such tests within the previous 24 months.

4.3.1.2 Governors shall be shock tested in accordance with Specification MIL-S-901.

4.3.1.3 Shock tests will not be required if identical units have previously been shock tested and approved.

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4.3.1.4 A governor will be considered to have failed to pass shock tests in event of any of the following:

- (a) Breakage of any parts, including mounting bolts.
- (b) Appreciable distortion or dislocation of any part.
- (c) False operation which does not recover within 10 seconds.

4.4 Qualification tests at a Government laboratory. - Qualification tests shall be conducted at the Naval Engineering Experiment Station, Annapolis, Maryland.

4.4.1 Separate qualification is required for each type, series and class of governor. Qualification of series 1500 governors may be extended to series 600 governors of identical design when requested by the manufacturer and approved by the Bureau of Ships.

4.4.2 The characteristics of governors to be tested shall be as agreed upon between the manufacturer and the Bureau of Ships.

4.4.3 The qualification tests shall include the shock test and any other tests which shall adequately demonstrate the ability of the governors to perform in accordance with requirements of this specification and the specified characteristics of the particular governors tested. Since the governor performance is determined by its effect on pump performance, it is to be understood that the pumps and turbines used during the governor tests are of adequate characteristics to prove the governor performance.

4.4.3.1 Governors which require an auxiliary fluid, such as compressed air or oil, for operation shall be given additional tests, except shock tests, to demonstrate satisfactory performance when the auxiliary fluid pressure is 25 percent below and 25 percent above the rated pressure.

4.5 Inspection procedures. - For Naval purchases, the general inspection procedures shall be in accordance with General Specifications for Inspection of Material.

5. PREPARATION FOR DELIVERY

5.1 Cleaning, preservation and packaging. -

5.1.1 For domestic shipment - immediate use. - Cleaning, preservation, and packaging of equipment for domestic shipment - immediate use shall be in accordance with the manufacturer's commercial practice.

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5.1.2 For domestic shipment and storage or for overseas shipment. - Cleaning, preservation and packaging shall be in accordance with Specification MIL-P-116 unless otherwise specified herein or in the contract or order.

5.1 2.1 Governor valves. -

5.1.2.1.1 Disassembly of equipment. - The equipment may be disassembled, as much as necessary to make accessible all machined or critical internal surfaces. After applying the preservative to the internal surfaces, the equipment shall be reassembled for shipment so as to provide the best protection of the internal parts. Dismantling of secondary assemblies, accessories or projecting parts, which will protect the part from damage or facilitate reduction of cubage is permitted where the part removed will not affect permanent settings or alignments and can be readily reassembled in the field without special tools. Such parts shall be cleaned, preserved, packaged, packed and marked for identification and arranged in a secure and compact manner within the shipping container. All unpainted surfaces which are subject to corrosion shall be cleaned, dried and preserved as follows:

5.1.2.1.2 Cleaning and drying. - Cleaning shall be in accordance with process C-1 of Specification MIL-P-116. The surfaces shall be dried by any of the procedures specified in Specification MIL-P-116.

5.1.2.1.3 Preservation. - Immediately after cleaning and drying, the moisture-free unpainted metal surfaces subject to corrosion shall be treated with a preservative, in accordance with Specification MIL-P-116 and as specified herein. The preservative shall not be applied to nonmetallic parts, leather, or rubber.

5.1.2.1.3.1 External metal surfaces. - All unpainted external metal surfaces subject to corrosion shall be treated with type P-1 or type P-2 preservative. Type P-1 preservative shall be applied to external ferrous and other corrodible metals where it will not normally have to be removed to put the equipment in operation or where its removal by solvent will not damage the part or equipment. Type P-1 preservative does not normally require an overwrap.

5.1.2.1.3.2 Internal surfaces in contact with oil. - All internal surfaces which normally are in contact with oil (including fuel oil, or lubricating oil) shall be treated with type P-2 preservative. Type P-2 preservative shall be applied to interior ferrous and other corrodible metal surfaces of repair parts and equipment. Type P-2 preservative shall not be used for surfaces in contact with water or steam.

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5.1.2.1.3.3 Internal surfaces in contact with water. - Type P-3 preservative shall be applied to the interior surfaces of components and equipments that are normally in contact with water or steam. Type P-3 preservative shall not be used for surfaces in contact with fuel or lubricating oil.

5.1.2.1.4 Packaging. - The unit shall be packaged by method I conforming to Specification MIL-P-116. All open flanges, pipe taps and other openings shall be covered with barrier material conforming to grade A, type 1, class 1 of Specification MIL-B-121 and a blank flange of metal or plywood shall be bolted over the barrier. On smaller openings, a metal or plastic plug may be used. All other preserved surfaces, if any, shall be wrapped with barrier material conforming to grade C, type 1, class 1 of Specification MIL-B-121 and secured in place with tape conforming to type 1, grade B, of Specification JAN-B-127. The tape should not come in contact with any machined surface.

5.1.2.2 Accessories. - Accessories such as gages, or parts of the unit (that may be removed to prevent damage to the part or reduce cube as specified in 3.2.2.1) shall be preserved and packaged in accordance with Specification MIL-P-17652 and Publication JPI-6, as applicable, and secured to the basic unit or arranged in a compact manner within the shipping container.

5.1.2.3 Repair parts and tools. - Repair parts (onboard and stock) and tools shall be cleaned, preserved and packaged in accordance with Specification MIL-P-116, as applicable. Repair parts and tools shall be packaged one item per unit package except items used as sets or in quantities greater than one.

5.1.2.3.1 Repair parts boxes. - When specified (see 6.1), onboard repair parts and tools shall be packaged in type M or type W repair parts boxes conforming to Specification MIL-B-233.

5.1.2.4 Technical Manuals. - Technical manuals furnished with the equipment shall be packaged in accordance with method IC-3 of Specification MIL-P-116, using type II, grade A, class b, waterproof bags conforming to Specification JAN-P-117. Each package shall be externally marked "Technical Manual Enclosed". One copy of the packaged technical manual shall be packed with each unit and one copy shall be packed within the repair parts box. All other technical manuals shall be packaged in accordance with Specification MIL-T-15071.

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5.2 Packing. -5.2.1 Domestic shipment - immediate use. -

5.2.1.1 When specified in the contract or order, the governor unit and related equipment (except repair parts and tools) shall be packed in accordance with the latest edition of the Consolidated Freight Classification Rules or other carrier rules, as applicable to the mode of transportation.

5.2.2 Domestic shipment and storage. -

5.2.2.1 Governor. - The governor unit and related equipment shall be packed in wood cleated plywood or nailed wood boxes or sheathed crates conforming to Specification PPP-B-601 (domestic type), NN-B-621, MIL-C-3769 or JAN-P-104, respectively. The gross weight of wooden boxes shall not exceed approximately 200 pounds unless the weight of the individual item exceeds this amount. When the gross weight of the item exceeds 200 pounds, but does not exceed 500 pounds, it shall be packed in a modified style 2, nailed wood box with skid type base. Exterior skids of not less than 2 inches by 4 inches shall be provided. The unit shall be anchored to the skids, or the equivalent thereof, by means of through bolts. When the gross weight of the item or equipment exceeds 500 pounds, it shall be packed in a sheathed crate. Cushioning, blocking and bracing shall be in accordance with Specification JAN-P-100.

5.2.2.2 Repair parts and tools. - Repair parts and tools (onboard and stock) not packaged in repair parts boxes conforming to Specification MIL-B-233 shall be packed in wood cleated fiberboard or wood cleated plywood, nailed wood, wirebound, corrugated or solid fiberboard boxes conforming to Specification NN-B-591, PPP-B-631 (domestic type), NN-B-621, NN-B-631, LLL-B-631 or LLL-B-636, respectively. Fiberboard boxes shall conform to the special requirements of the applicable container specification. Closure of the shipping container shall conform to the applicable container specification. The gross weight of wood and wood cleated fiberboard boxes shall not exceed approximately 200 pounds unless the weight of a single item exceeds this weight. Cushioning, blocking and bracing shall be in accordance with Specification JAN-P-100.

5.2.2.2.1 Onboard repair parts and tools packaged in repair parts boxes conforming to Specification MIL-B-233 shall be overpacked in shipping containers specified in 5.2.2.2 or conforming to Specification JAN-P-132. The gross weight shall not exceed approximately 200 pounds.

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5. 2. 3 Overseas shipment. -

5. 2. 3. 1 Governor. - The governor unit and related equipment shall be packed in wood cleated plywood, nailed wood boxes, or sheathed crates conforming to Specification PPP-B-601 (overseas type), JAN-P-106, MIL-C-3769 or JAN-P-104, respectively. The gross weight of wooden boxes shall not exceed approximately 150 pounds unless the weight of an individual item exceeds this amount. When the gross weight of the item exceeds 150 pounds, but does not exceed 500 pounds, it shall be packed in a modified style 2, nailed wood box with skid type base as specified in 3. 3. 2. 1. When the gross weight of the item or equipment exceeds 500 pounds, it shall be packed in a sheathed crate. Cushioning, blocking and bracing shall be in accordance with Specification JAN-P-100.

5. 2. 3. 2 Repair parts and tools. - Onboard and stock repair parts and tools not packaged in repair parts boxes conforming to Specification MIL-B-233 shall be packed in wood cleated fiberboard, wood cleated plywood, nailed wood, or symbol "V" fiberboard boxes conforming to Specification JAN-P-103, PPP-B-601 (overseas type), JAN-P-106, or JAN-P-108, respectively. The gross weight of wood boxes shall not exceed approximately 200 pounds unless the weight of an individual item exceeds this amount. The gross weight of fiberboard boxes shall not exceed approximately 70 pounds. Cushioning, blocking and bracing shall be in accordance with Specification JAN-P-100.

5. 2. 3. 2. 1 Onboard repair parts and tools packaged in repair parts boxes conforming to Specification MIL-B-233 shall be overpacked in shipping containers specified in 5. 2. 3. 2 or conforming to Specification JAN-P-132. The gross weight shall not exceed approximately 200 pounds.

5. 2. 3. 3 Case liners. - Overseas shipping containers, except nailed wood crates and modified style 2, nailed wood boxes, shall be lined with a waterproof case liner conforming to Specification MIL-L-10547 and appendix thereto.

5. 2. 3. 4 Strapping. - Overseas shipping containers shall be closed and strapped in accordance with the applicable container specification using flat steel strapping conforming to type 1, class A or B of Specification QQ-S-781.

5. 2. 4 For domestic and overseas shipment. - Where practicable, shipping containers shall be of uniform size and shall be designed to fit the contents in a compact manner. The contents of each container shall be packed within the container in such a manner that the contents cannot move about after the container is closed.

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5. 2. 4. 1 Shrouding. - Equipment bolted to the base of a modified style 2, nailed wood box shall be shrouded within the box with barrier material conforming to Specification JAN-E-125 in lieu of a case liner. Shrouding shall be applied at least two-thirds of the way down in a manner to prevent the formation of water pockets and to permit free circulation of air. All sharp projections which would tend to tear the shroud shall be padded or covered with a suitable cushioning material

5. 2. 4. 2 Ventilation. - Ventilation of sheathed crates shall be in accordance with the ventilation requirements of the applicable crate specification.

5. 2. 4. 3 Technical manuals and drawings. - Technical manuals as specified in 3. 10 shall be packed in accordance with Specification MIL-T-15071. Drawings, when required by the contract or order, shall be packed in accordance with Specification MIL-D-963.

5. 3 Marking. - In addition to any special marking required by the contract or order, interior packages and exterior shipping containers shall be marked in accordance with Standard MIL-STD-129. The serial number of the equipment shall be placed on the outside of the shipping container.

6. NOTES

6. 1 Ordering data. - Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type, class, series and size required (see 1. 2).
- (c) Steam inlet pressure and temperature.
- (d) Pump characteristics:
 - (1) Design (that is, centrifugal, rotary, reciprocating).
 - (2) Service (that is, main feed, fuel oil service, etc.).
 - (3) Capacity (g. p. m.), normal rating.
 - (4) Normal rated discharge pressure (p. s. i. g.).
 - (5) Range of pressure adjustment.
- (e) Valve capacity in pounds of steam per hour.

Note 1. - Turbine driven pumps are required to deliver their rated output with 20 percent reduction in normal steam pressure.

Note 2. - The design rated flow of the governor steam valve should not exceed, by more than 10 percent, the steam requirements of the pump turbine at maximum rated power output when operating at maximum steam pressure at the inlet to the governor valve.

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- (f) Is steam valve to be included (if type DP governor).
- (g) Differential pressure (if type DP governor).
- (h) Pressure of operating air (if type DP governor).
- (i) Automatic starting pressure, for type CFAST and DPAST governors.
- (j) Automatic stopping pressure, for type CPASP and DPASP governors.
- (k) Technical manual requirements (see 3. 10).
- (l) Onboard repair parts and tools requirements (see 3. 8).
- (m) The number of governors per vessel on which onboard repair parts are to be based.
- (n) If repair parts boxes are required, specify type (metal or wood) (see 5. 1. 2. 3. 1).
- (o) Whether for domestic shipment - immediate use; domestic shipment and storage; or overseas shipment (see 5. 1 and 5. 2).
- (p) That the following data is required with bids:
 - (1) Sectional assembly drawing of governor, with list of material.
 - (2) Dimensioned outline drawing.
 - (3) Description of operation.

6. 2 Qualification. - In the procurement of products requiring qualification, the right is reserved to reject bids on products that have not been subjected to the required tests and found satisfactory for inclusion on the Qualified Products List. The attention of suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government, tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products covered by this specification may be obtained from the Chief of the Bureau of Ships, Department of the Navy, Washington 25, D. C.

6. 3 Series 1500 governors of this specification correspond to class AA governors which the Navy has used previously. Series 800 governors of this specification correspond to class A governors of Section S47-6 of General Specifications for Material. Series 300 governors (750° F. Max.) of this specification correspond to class B governors of Section S47-6 of General Specifications for Material. Series 300 governors (425° F. Max.) of this specification correspond to class C governors of Section S47-6 of General Specifications for Material.

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Patent notice. - When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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