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MIL-G-3048B(SHIPS)
14 October 1955
SUPERSEDING
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9 February 1954

MILITARY SPECIFICATION

GENERATOR SET, DIESEL ENGINE, DIRECT- AND ALTERNATING-CURRENT, (NAVAL SHIPBOARD USE)

1. SCOPE

1.1 Scope. - This specification covers stationary, continuous duty, Diesel engine generator sets rated 2.5 to 300 kilowatts direct current (d.c.) and 2.5 to 1,000 kilowatts alternating current (a.c.).

1.2 Classification. - The Diesel-engine generator sets shall be of the following types, as specified (see 6.2):

Type I - Direct-current.
Type II - Alternating-current.

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).
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-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.

JAN-P-106 - Packaging and Packing for Overseas Shipment - Boxes, Wood, Nailed.

MIL-B-107 - Boxes, Wood, Wirebound (Overseas Shipment).

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-125 - Packaging and Packing for Overseas Shipment - Barrier-Materials, Waterproof, Flexible.

MIL-C-132 - Crates; Open, Wood, Maximum 2,500 pounds.

MIL-B-233 - Boxes, Repair Parts.

MIL-S-901 - Shockproof Equipment, Class HI (High-Impact) Shipboard Application, Test for.

MIL-D-963 - Drawings; Production (for Electrical and Mechanical Equipment for Naval Shipboard Use).

MIL-E-2036 - Enclosures for Electric and Electronic Equipment (Naval Shipboard Use).

MIL-R-2729 - Regulator Set, Voltage, A. C. Generator (Naval Shipboard Use).

MIL-G-3111 - Generators, Electric, Direct-Current (Naval Shipboard Use).

MIL-G-3124 - Generator Alternating Current, 60 Cycle (Naval Shipboard Use).

MIL-C-3769 - Crates, Intermediate, Sheathed, Wood, Nailed (for Maximum Net Loads of 3000 Pounds).

MIL-C-3774 - Crates, Open, Wood (2,500 to 10,000 Lb).

MIL-P-10062 - Packaging and Packing of Engines, Spare or Installed, (Other Than Aircraft).

MIL-L-10547 - Liners, Case, Waterproof.

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-B-15072 - Batteries, Storage, Lead-Acid, Portable (except for Aircraft and Automotive Vehicles).

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MIL-T-15108 - Transformers, Power Distribution, (Single-Phase, 60 Cycles) and Reactors (Balance Coils, Dry Type) (Shipboard Use).

MIL-R-15109 - Resistors and Rheostats, Shockproof (Naval Shipboard Use).

MIL-T-15301 - Tanks, Pressure, Diesel Starting (Shipboard Use for Pressures Up to and Including 600 P.S.I. Gage).

MIL-S-15371 - Starter, Engine, Electrical (Naval Shipboard Use).

MIL-P-15424 - Packaging of Hand Tools for Domestic and Overseas Shipment and Storage.

MIL-P-16018 - Packaging of Switchboards, Controllers, and Motor Starters (over 40 Pounds).

MIL-M-16034 - Meters, Electrical Indicating, (Switchboard and Portable Types).

MIL-P-16298 - Preservation, Packaging, Packing and Marking of Electric Machines Having Rotating Parts (Includes Associated Repair Parts).

MIL-I-16910 - Interference Measurement, Radio, Methods and Limits; 14 Kilocycles to 1000 Megacycles.

MIL-M-17059 - Motors, Alternating-Current, Fractional HP (Shipboard Use).

MIL-F-17292 - Format for List of Repair (Spare) Parts for Shipboard Mechanical and Electrical Equipment.

MIL-P-17652 - Preparation for Delivery of Electronic, Electrical, and Electro-Mechanical Parts.

MIL-E-18453 - Engines, Diesel, Propulsion and Auxiliary, Naval Surface Vessel.

NAVY DEPARTMENT

General Specifications for Inspection of Material.

General Specifications for Ships.

Section 62-5 - Protective Devices for Electric Circuits.

STANDARDS

MILITARY

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

MIL-STD-167 - Mechanical Vibration of Shipboard Equipment.

MIL-STD-178 - Definitions Applicable to Speed Governors for Electric Generator Sets

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DRAWINGS

BUREAU OF SHIPS

S6202-D-1449004 - Standardized Coupling and Mounting for Shipboard Diesel Generator Sets Rated 100 KW - 1200 RPM.

S6202-D-1449005 - Standardized Coupling and Mounting for Shipboard Diesel Generator Sets Rated 30 and 60 KW - 1200 RPM.

S6202-1449007 - Standardized Coupling and Mounting for Shipboard Diesel Generator Sets Rated 200 KW and 300 KW - 1200 RPM.

S6202-1449008 - Standardized Coupling and Mounting for Shipboard Diesel Generator Sets Rated 1000 KW - 720 RPM.

PUBLICATIONS

MILITARY

JPI-6 - Packaging 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 document forms 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 6, Ill.)

3. REQUIREMENTS

3.1 Definitions. - The terms as used hereinafter shall be as defined in Standard MIL-STD-178.

3.2 Material. - The material used in the construction of the generator set shall be such as will insure continued satisfactory operation under conditions of moisture and vibration encountered aboard ship and under the conditions of heat as specified hereinafter.

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3.3 Design. - The generator set shall consist of the parts specified in 3.3 and 3.9, as applicable. The design and construction shall be simple and sturdy. The generator set shall be as light in weight and as compact as possible consistent with reliable service operation.

3.3.1 Interchangeability. - All similar parts, including repair parts, of corresponding apparatus furnished on the same contract or order, or built to the same drawings, shall be strictly interchangeable without the necessity of further machining or hand fitting of any kind.

3.3.2 Generator mounting. - The generator rotor shall be direct-connected to, and in line with, the engine crankshaft. The use of gear, belt, or chain drives for the generator will not be acceptable. Except for the switchboard-mounted accessories, and such accessories as air flasks and exhaust mufflers, which are specified as unattached, each complete generator set shall be assembled as a unit on a welded steel sub-base, and shall form a rigid self-supporting structural unit suitable for handling and for installation on its foundation in the vessel without further stiffening or bracing. Where standardized generator sets are specified (see 6.2) dimensions for mounting the generator to the sub-base shall be in accordance with Drawings S6202-D-1449004, S6202-D-1449005, S6202-1449007, and S6202-1449008.

3.3.2.1 Sets in which the generator is not mounted rigidly as a part of the engine crank-case or connected with a semirigid member, so that there will be a possibility of a slight movement between engine and generator frames or a possibility of misalignment developing from normal wear in service, shall be provided with a flexible connection between the generator and engine frame as follows:

3.3.2.1.1 Sets furnished with single-bearing generators shall have the engine end of the generator shaft piloted in either the engine flywheel or the engine crankshaft.

3.3.2.1.2 Sets furnished with double-bearing generators shall be coupled to the engine through a flexible coupling which will absorb slight misalighments.

3.3.3 Lifting means. - Eyebolts, lugs, holes, or equivalent means shall be provided to permit lifting the generator set and attached accessories as a complete unit. Eyebolts or other means of lifting the generator shall not be depended upon for lifting the assembled generator set.

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3.3.4 Couplings.- All single-bearing generators larger than 60 kilowatts (kw.) shall be provided with a forged-on half-coupling to suit the prime mover. Generators rated 60 kw. and below may be provided with a shaft extension having a keyway and a shrunk-on coupling. Where standardized generator sets are specified (see 6.2) the generator-to-engine coupling shall be in accordance with Drawings S6202-D-1449004, S6202-D-1449005, S6202-1449007, and S6202-1449008.

3.4 Diesel engines.- Diesel engines shall conform to Specification MIL-E-18453. Unless otherwise specified in the contract or order, the direction of engine rotation shall be counterclockwise when viewing the coupling end and shall be indicated by means of a metal arrow securely fastened to the engine block at the generator end.

3.5 Electric equipment.-

3.5.1 Grounding.- The power and starting circuits shall be ungrounded.

3.5.2 Generators.-

3.5.2.1 Frames.- The frame shall have feet of ample size, large enough to accommodate holding-down bolts, dowel pins, and jackscrews where used, to insure attachment to the sub-base. The generator set shall be so constructed that the frame of the generator shall not extend below the lower face of the sub-base.

3.5.2.2 Bearing.- Either sleeve or ball bearings shall be furnished on generators 40 kw. and smaller having a flexible coupling between the prime mover and generator. Sleeve bearings shall be furnished on generators over 40 kw. having a flexible coupling between the prime mover and generator, and on all sizes having a rigid coupling between the prime mover and generator.

3.6 Starting equipment.- Starting of the generator set shall be accomplished either by an electric starting system or by a compressed air starting system as specified (see 6.2).

3.6.1 Electric starting.- Electric starting systems shall consist of an electric starting motor and motor starter or a starting winding and motor starter. The Combination desired and the voltage therefor shall be as specified (see 6.2).

3.6.1.1 Performance.- With the required number of type 6V-SBMD-130 batteries conforming to Specification MIL-B-15072, in a fully charged condition, the starting equipment shall develop a torque sufficient to crank the generator set at 125 percent of the engine-starting speed under the following conditions: The engine shall have been at rest with the oil drained out of the crank-case for at least 6 hours. For 1 hour prior to the test, cold water of temperature not exceeding 35° F. shall be circulated through the engine cooling system. Immediately before the test the engine crank-case shall be filled with lubricating oil at 100° F.

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3.6.1.2 Starting motors. - Starting motors shall conform to Specification MIL-S-15371. The degree of enclosure shall be as specified (see 6.2).

3.6.1.3 Starting windings. - Where generators are provided with starting windings, a suitable interlock shall be provided to prevent operation of the motor starter when the generator set in operating normally. Means shall be provided to prevent the generator load circuit from being accidentally connected to the starting battery.

3.6.1.4 Motor starters. - Motor starters shall conform to Specification MIL-S-15371. The operation shall be semiautomatic.

3.6.2 Compressed air starting. - A compressed air starting system shall consist of an air flask conforming to Specification MIL-T-15301, reduction valves, and any other accessories required to start the engine when the generator set is connected to the ship's compressed air system.

3.7 Performance requirements. -

3.7.1 Load and overload. - The generator set shall be capable of delivering rated kw. continuously, and 110 percent rated kw. for 2 hours, without injury to any part. Continuous duty is defined as a requirement of service that demands operation at a substantially constant load for an indefinite period.

3.7.2 Speed (r.p.m.). - The rated r.p.m. of the Diesel engine and the generator, when direct-connected as specified in 3.3.2, shall conform to the requirements of the generator as specified in 3.8.4 and 3.9.3, as applicable.

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3.7.3 Governor performance.- The dead band shall not exceed 0.50 percent rated r.p.m. The momentary underspeed following sudden application of 100 percent load shall not exceed 7.0 percent. The recovery time following sudden application of 100 percent load shall not exceed 5 seconds (see 3.8.1 and 3.9.1).

3.7.4 Overspeed trip.- The engine shall be provided with an adjustable overspeed trip which shall operate to stop the engine at any pre-set value from 110 percent to 120 percent rated speed.

3.7.5 Torsional vibration.- The combined diesel generator set shall meet the requirements of type III of Standard MIL-STD-167.

3.7.6 Vibration resistance.- The generator set shall be capable of withstanding severe vibration transmitted through the ship's structure in the course of normal operation of the vessel. These vibrations may ordinarily be expected to vary in frequency from a very low value up to approximately 1,350 cycles per minute and have a double amplitude of as much as 0.030 inch. However, under special circumstances, these values may be exceeded if specifically required (see 6.2).

3.7.7 Mechanical balance.- There shall be no objectionable vibration of the assembled generator set at any load speed.

3.7.8 Inclination.- The generator set shall operate satisfactorily when inclined permanently from the normal horizontal position, up to 15 degrees to either side or 15 degrees on either end.

3.7.9 Parallel operation.- Unless otherwise specified in the contract or order, generator sets of the same size, type, and design on the same contract or order shall be capable of operating in parallel with each other throughout the permissible load ranges of the Diesel engines. Generator sets of different sizes, types and design shall be capable of operating in parallel when specified (see 6.2).

3.7.10 Mechanical shock.- The generator sets shall be class HI shockproof under the conditions specified in 4.4.20.

3.7.11 Radio interference suppression.- When specified (see 6.2), the radio interference suppression shall be in accordance with Specification MIL-I-16910. If filters or capacitors are employed for the reduction of interference they shall be approved by the bureau or agency concerned.

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3.7.12 The generator set shall be capable of withstanding without damage the selective tripping test specified in Section S62-5 of General Specification for Ships.

3.8 Type I, direct-current sets. -

3.8.1 Assembly. - Each d.c. generator set shall consist of the following parts plus such other accessories as necessary to make the set a complete, self-contained unit capable of functioning without dependence on any other ship's auxiliary when connected to the ship's fuel oil, electric, exhaust and water systems:

(a) Diesel engine prime mover.
(b) Diesel engine accessories.
(c) Direct-current generator.
(d) Balance coils (for three-wire generators).
(e) Generator field rheostat.
(f) Starting equipment.

Unless otherwise specified in the contract or order, excitors, voltage regulators, field discharge resistors, battery charging generators, or starting batteries will not be required. The steady-state speed regulation band in which the speed governor shall perform shall be not more than 0.25 percent rated r.p.m. in width. This band shall have a slope adjustable between 5.0 and 0.0 percent of 100 percent speed regulation. In either case the requirements of 3.8.2 apply.

3.8.2 Combined unit voltage regulation. - When driven by the intended Diesel engine prime mover, the following requirements shall apply:

(a) With the field rheostat so adjusted that the generator is operating at rated voltage, current and r.p.m., the rise in voltage shall be not more than 8.0 percent when the load is reduced from rated load in 20-percent steps to zero.
(b) With the field rheostat so adjusted that the generator is operating at rated voltage, at no load, and at speed corresponding approximately to no load, the drop in voltage shall be not more than 12.5 percent when rated load is applied in 20-percent steps from zero load up to the rated output.
(c) At any point on the voltage-load curves obtained as specified in (a) and (b), there shall be no rise in voltage with increase in load nor any drop in voltage with drop in load.

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3.8.3 Combined unit parallel operation. - Unless otherwise specified in the contract or order, the generators shall operate in parallel without voltage regulators or equalizers. At any given load division under the conditions of test specified in 4.4.16, the current load of any generator, expressed as a percentage of its rated full-load current, shall not differ from the total system current load expressed as a percentage of the total rated full-load currents of all connected generators by more than 7.5 percent for generators of the same kw. rating or 15.0 percent for generators of different kw. ratings. (Example: If four 120/240 volt, d.c. generators, A, B, C, and D, rated 60, 100, 100, and 100 kw., respectively, are operating in parallel and at one point are delivering 165, 194, 195, and 196 amperes, respectively, with no current in the neutral load, generator A would not be meeting specification requirements. They would all be meeting specification requirements at a certain point, however, if they were delivering 160, 196, 197, and 197 amperes, respectively, with no current in the neutral load.) Where there are currents flowing in the neutral loads of three-wire generators operating in parallel, the larger of the two main line currents in each generator shall be used to determine if parallel operation requirements are being met.

3.8.4 Generators. - Generators shall conform to Specification MIL-G-3111, and shall be of the following classification:

Service application - Ship's service.
Kilowatt rating - 2.5, 3, 5, 10, 15, 20, 30, 60, 100, 150, 200 and 300, as specified (see 6.2).
Voltage - 120 volts, two-wire or 120/240 volts, three-wire, as specified (see 6.2).
R.p.m. - 1200 to 1800, inclusive, as specified (see 6.2).
Enclosure - Dripproof.
Ambient temperature - 50°C.
Bearings - (See 3.5.2.2.)
Insulation - As specified (see 6.2).

3.8.5 Balance coils. - Balance coils shall conform to Specification MIL-T-15108, and shall be of the following classification:

Rating - As required by the d.c. generator.
Duty - Continuous with 2-hour 25-percent overload.
Mounting - As specified (see 6.2).

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3.8.6 Generator field rheostats. - Unless otherwise specified in the contract or order, generator field rheostats shall conform to Specification MIL-R-15109 and shall be of the following classification:

Enclosure - Dripproof.
Rating - As required by the generator.
Form - P.
Duty - Continuous.
Mounting - Switchboard.
Ambient temperature - 50°C.
Insulation - Class C.

3.8.7 Starting. - Under the cranking conditions specified in 3.6.1.1 the generator set shall start and produce full voltage at the generator terminals within 30 seconds.

3.9 Type II, alternating-current sets. -

3.9.1 Assembly. - Each a.c. generator set shall consist of the following parts plus such other accessories as are necessary to make the generator set a complete, self-containing unit capable of functioning without dependence on any other ship auxiliary when connected to the ship's fuel oil, electric, exhaust and water systems:

(a) Diesel engine prime mover.
(b) Diesel engine accessories.
(c) Alternating-current generator.
(d) Direct-current exciter or exciters.
(e) Voltage regulation system.
(f) Starting equipment.
(g) Synchronizing devices, unless parallel operation is not required.

Unless otherwise specified in the contract or order, field discharge resistors, starting batteries, or switches for synchronizing motors will not be required. The steady-state speed regulation band in which the speed governor shall perform shall be not more than 0.20 percent rated r.p.m. in width and shall have a slope of 3.80 percent of 100 percent speed regulation.

3.9.2 Combined unit parallel operation. - Under the conditions specified in 4.4.16.2, the generators shall operate in parallel in accordance with the kva. load (reactive power) division and circulating current requirements of Specification MIL-R-2729 and in accordance with the following kilowatt load (active power) division requirements: At any specified load division under the conditions of test

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specified in 4.4.16, the actual kilowatt load of any generator, expressed as a percentage of its continuous kilowatt rating, shall not differ from the total system kilowatt load, expressed as a percentage of the total continuous kilowatt rating of all connected generators, by more than the following:

(a) 5.0 percent for generators of the same size, type, design, and rating.
(b) 10.0 percent for generators of unequal size, type, design, and rating.

When measured as specified in 4.4.16.2.1.2 and 4.4.16.2.2.2, the current pulsation shall not exceed 2.0 percent of the rated current of one generator.

3.9.3 Generators. - Unless otherwise specified in the contract or order, generators shall conform to Specification MIL-G-3124 and shall be of the following classification:

Type - Rotating field.
Kilowatt rating - 30, 60, 100, 150, 200, 300, 500, 750, and 1,000, as specified (see 6.2).
Voltage - 450 volts.
Phases - Three.
Frequency - 60 cycles per second.
R.p.m. - 720, 1,200, or 1,800, as specified (see 6.2).
Enclosure - 500 kw. and over-water-air-cooled.
Under 500 kw. - Dripproof.
Bearings - (See 3.5.2.2.)
Ambient temperature - 50°C.
Insulation - As specified (see 6.2).

3.9.4 Voltage regulators. - Unless otherwise specified in the contract or order, voltage regulators shall conform to Specification MIL-R-2729, and shall be of the following classification:

Type - As specified (see 6.2).
Mounting - Switchboard.
Ambient temperature - 50°C.
Circuit controlled - Exciter field circuit.
Operation - Parallel, unless otherwise specified.
Compensation for parallel operation - Individual droop compensation.
Regulators per switchboard - As specified. (See 6.2.)

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3.9.5 Exciter field rheostats. - Unless otherwise specified in the contract or order, exciter field rheostats where furnished shall conform to Specification MIL-R-15109 and shall be of the following classification:

Enclosure - Dripproof.
Rating - As required by the generator, exciter, and voltage regulator.
Form - P.
Duty - Continuous.
Mounting - Switchboard.
Ambient temperature - 50°C.
Insulation - Class C.

3.9.6 Synchronizing device. - Unless otherwise specified in the contract or order, where parallel operation is required, a motor-operated synchronizing device shall be provided on the generator set such that the frequency, synchronizing and load distribution of the connected a. c. generators may be suitably controlled. Unless otherwise specified in the contract or order, governor motors shall conform to Specification MIL-M-17059 and shall be of the following classification:

Service - A.
Rating: Volts - 115.
R. p. m., horsepower and maximum torque as required by the synchronizing device.
Speed - Varying.

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Duty - Intermittent, 1/2 hour.
Enclosure - Totally enclosed.
Phases - Single phase.
Bearings - Ball or sleeve.
Ambient temperature - 50° C.
Insulation - Class A.
Mounting - Horizontal.

3.9.7 Starting.- Under the cranking conditions specified in 3.6.1.1 the generator set shall start and produce full voltage at the generator terminals within 10 seconds.

3.10 Identification plate.-. An identification plate shall be furnished with each generator set, and shall be installed on the sub-base in a location where it can be read without danger to personnel. This plate shall conform to type C or D of Specification MIL-I-15024, however, a type A plate in accordance with Specification MIL-I-15024, constructed of corrosion-resisting steel, nickel-copper-alloy or sheet brass, may be used provided one plate dimension does not exceed 5 inches or two plate dimensions do not both exceed 3 inches. These plates shall include the following information:

Generator set, Diesel
Serial No.
Government stock No.
Manufactured by
Contract No.
Space for Inspector's stamp
Engine model
Engine r.p.m.
Generator data
Manufacturer
Model
R.p.m.
Kw.
Volts
A.c. or d.c.

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3.11 Onboard repair parts and tools.-

3.11.1 Onboard repair parts.- Onboard repair parts shall be furnished in accordance with the individual equipment specifications except that onboard repair parts for balance coils and generator starting windings will not be required. These parts shall be based on the number of identical generator sets per vessel as specified (see 6.2).

3.11.2 Tools.- All special tools required for the assembly, disassembly and adjustment of the generator set shall be furnished.

3.12 Drawings.-

3.12.1 In addition to the drawings required by the individual equipment specifications, the following shall be submitted and shall conform to type I of Specification MIL-D-963:

(a) Dimensioned outline drawings of the complete generator set, including all connections, electrical and mechanical weights, centers of gravity, pump capacities, and other data necessary to clearly describe and depict the equipment.
(b) Piping diagrams, showing recommended connections for oil, water, and exhaust, necessary for proper installation and operation of the generator set.
(c) Drawings of the sub-base and flexible coupling. The drawing of the sub-base shall show the location of the identification plate.
(d) Name of manufacturer, type numbers, ratings (volts, amperes, r.p.m., kw.), of all electric equipment.
(e) An outline of the identification plate showing all plate markings.
(f) Any additional drawings required for the proper installation, operation, and maintenance of the equipment furnished.

3.12.2 Method of approval.- The contractor shall submit to the ordering activity, via the cognizant Government inspector, two blueprint copies of drawings specified in 3.12.1. Drawings, incorporating any necessary corrections required by the ordering activity, shall be distributed as specified (see 6.2). Drawings of the sub-base and flexible coupling shall be submitted to the bureau or agency concerned prior to manufacture.

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3.13 Technical manuals. - Technical manuals shall conform to type B of Specification MIL-T-15071. The following equipment as applicable shall be covered in the manual:

(a) Diesel engine and any associated accessories.
(b) Generator.
(c) Exciter (for a. c. sets).
(d) Balance coils (for three-wire, d. c. sets).
(e) Voltage regulator (for a. c. sets).
(f) Field rheostat or manual control means.
(g) Electric-starting or air-starting equipment as applicable.
(h) Temperature-indicating and alarm equipment.
(i) Governor motor.
(j) Special devices on equipment.
(k) Heat exchanger for generator.

Technical manuals shall contain reduced size prints of all approved drawings for electric equipment and a list of approved drawings indicating the manufacturer's and the bureau's drawing number in parallel columns.

3.13.1 Technical manual enclosure. - The generator set shall be provided with an accessible enclosure for holding and protecting the manual. This enclsoure shall be dripproof in accordance with Specification MIL-E-2036.

3.14 Workmanship. - The workmanship shall be first class in every respect.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling. -

4.1.1 Sampling procedure for selective tests (at the place of manufacture). - Generator sets shall be selected by the Government inspector in accordance with table I. The Government inspector may at his discretion require these tests to be made on additional sets if the routine tests (see 4.3.1) show large variations from the accepted design and performance.

Table I - Sampling procedure.

Quantity on order	Minimum number to be tested
10 or less	1
11 to 20	2
21 to 30	3
31 to 50	4
Over 50	4 plus 1 additional for each 50 or fraction thereof in excess of 50

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4.1.2 Sampling procedure for periodic tests (at the place of manufacture).- The first generator set of a design, type and size offered for delivery on a contract or order shall be subjected to the specified periodic tests in addition to the routine and selective tests (see 4.3). Thereafter, one identical generator set shall be selected during each calendar year during which such generator sets are offered for delivery. If the Government inspector is satisfied that the generator sets are in conformance with this specification, he may waive the subsequent periodic tests. A periodic test will be required after any change in design, which affects the performance characteristics. If routine and selective test data reveal variations beyond a normal manufacturing tolerance, the Government inspector may require that any or all of the periodic tests be made on a particular generator set to demonstrate that it meets the requirements of this specification.

4.2 Inspection (at the place of manufacture).-

4.2.1 Generator sets.- Each generator set shall be subjected by the Government inspector to a thorough examination to ascertain that the material, workmanship, and design are in conformance with this specification. The fit of parts shall be observed with particular reference to the interchangeability of such parts as are likely to require replacement during the normal service life of the generator set.

4.2.2 Repair parts.- All repair parts shall be subjected to a careful examination to ascertain that the materials, workmanship, and finish are first-class in every respect and that the parts are in full conformance with the manufacturer's approved drawings. The principal object of this inspection shall be to determine if the repair parts are exact duplicates of those used in the generator set. If the Government inspector has reason to doubt the ready interchangeability of the repair parts with the original parts he may require a suitable demonstration of such interchangeability.

4.3 Tests.- The manufacturer shall make, previous to the tests to be witnessed by the Government inspector, sufficient tests to insure that the design of the generator set conforms in all respects to the requirements of this specification. To prevent delays and the additional cost of repeated tests, not more than two tests shall be made, the second test to be made within such time after the first test as stipulated by the Government inspector. Failure to make the necessary repairs or remedy defects within that time shall be considered sufficient cause for the final rejection. Tests shall be

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performed as shown in table II. All tests shall be conducted with the generator set operated as a complete unit with all parts specified in 3.8.1 and 3.9.1 as applicable. The standard Government factory test record forms shall be used.

Table II - Routine, selective and periodic tests.

Description of tests (all tests to be conducted on assembled units)	Applicable test paragraph		
	Routine tests	Selective tests	Periodic tests
Generator air-gap	4.4.1	4.4.1	4.4.1
Forty-five minute preliminary run	4.4.2	4.4.2	4.4.2
One-hour continuous test at full load	4.4.3	4.4.3	4.4.3
Four-hour continuous test at full load	-----	-----	4.4.4
110 percent rated load for 2 hours	4.4.5	4.4.5	4.4.5
Mechanical balance	4.4.6	4.4.6	4.4.6
Governor	4.4.7	4.4.7	4.4.7
Voltage regulation test with regulator in field circuit (a.c. generator sets only)	4.4.8	4.4.8	4.4.8
Voltage regulation of d.c. generator sets	4.4.9	4.4.9	4.4.9
Commutation	4.4.10	4.4.10	4.4.10
Rheostat	-----	4.4.11	4.4.11
Effectiveness of enclosure	-----	-----	4.4.12
Torsiograph	-----	-----	4.4.13
Lubrication	-----	-----	4.4.14
Starting	-----	-----	4.4.15
Parallel operation	-----	-----	4.4.16
Inclined operation	-----	-----	4.4.17
Weight	-----	-----	4.4.18
Radio interference suppression	-----	-----	4.4.19
Mechanical shock (required on one generator set only)	-----	-----	4.4.20

4.3.1 Routine tests.- Each generator set shall be subjected, by or under the supervision of the Government inspector, to the routine tests specified in table II to determine conformance with this specification. Nonconforming equipment shall be individually rejected.

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4.3.2 Selective tests.- Each sample generator set selected in accordance with 4.1.1 shall be subjected to the selective tests specified in table II. If any sample is found not to conform to this specification, acceptance shall be withheld. Acceptance shall be discontinued until the manufacturer, after being informed of the reasons for rejection, has inspected or tested at least one other completely constructed generator set in addition to the rejected set and has demonstrated that such correction and adjustments have been made that all sets fully conform to this specification.

4.3.3 Periodic tests.- Each sample generator set selected in accordance with 4.1.2 shall be subjected to the periodic tests specified in table II.

4.4. Test procedures.-

4.4.1 Generator air-gap.- The minimum air-gap between the rotor and stator iron shall be carefully measured and recorded. The air-gap shall be measured by suitable steel feelers or gages. The measurements shall be made in at least 8 places approximately 45 mechanical degrees apart, with at least 1 of the measurements made at the bottom.

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4.4.2 Forty-five minute preliminary run. - The generator set shall be operated at full load for 45 minutes to bring it up to or near its operating temperature. During this period the general operation of the set shall be observed and any necessary adjustments shall be made.

4.4.3 One-hour continuous test at full load. - Immediately following the test specified in 4.4.2, the generator set shall be operated at full load for 1 hour. The following data shall be taken at regular intervals during the test and recorded on standard Government test record forms:

Time.
Ambient temperature.
Fuel consumption.
Engine fuel oil pressure.
Engine lubricating oil pressure.
Engine lubricating oil temperature.
Water temperature.
Speed of engine.
Generator bearing temperatures.
Direct-current generator sets only:
- Volts, line to line.
- Volts, line to neutral (for three-wire sets).
- Current, line.
- Current, neutral (for three-wire sets).
- Generator frame temperature.
- Generator exhaust temperature.

Alternating-current generator sets only:
- Volts, line to line.
- Current line.
- Generator and exciter frame temperature.
- Generator and exciter armature temperature.
- Generator and exciter exhaust air temperature.
- Frequency.
- Kva. and kw.
- Power factor.
- Exciter current.

4.4.4 Four-hour continuous test at full load. - The requirements of 4.4.3 shall apply except that the period of time shall be 4 hours instead of 1 hour. Also, at the conclusion of the 4-hour period, generator and exciter field and armature temperatures shall be recorded.

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4.4.5 Two-hour, 110 percent rated load test. - Following any full-load run, 110 percent rated load shall be applied for a period of 2 hours. The operation of protective devices shall be checked during this test.

4.4.6 Mechanical balance. - The mechanical balance shall be observed during the progress of the other tests.

4.4.7 Governor tests. - Sufficient tests shall be conducted to insure conformance with the requirements of 3.7.3.

4.4.8 Voltage regulation test with regulator in field circuit (a.c. generator sets only.) - The requirements of Specifications MIL-G-3124 and MIL-R-2729 shall apply.

4.4.9 Voltage regulation of d.c. generator sets. - The test requirements of Specification MIL-G-3111 shall apply except that the r.p.m., instead of being held at rated value, shall be as determined by the Diesel engine prime mover.

4.4.10 Commutation. - During the voltage regulation test, the commutation should be observed at each load point. It should be noted if any injurious sparking occurs when the entire load is applied or dropped in one step.

4.4.11 Rheostat tests. - Rheostat tests shall be conducted with the generator fields cold.

4.4.12 Effectiveness of enclosure. - Enclosure tests in accordance with Specification MIL-E-2036 shall be conducted on the electrical portion of the generator set in either of the following cases:

(a) Where enclosure tests on identical electric equipment were not conducted prior to assembly.
(b) Where it is evident that the effectiveness of any enclosure has been altered by assembly as a part of the generator set.

4.4.13 Torsiograph test. - The generator set shall be tested in accordance with the requirements of type III of Standard MIL-STD-167.

4.4.14 Lubrication. - By a careful observation and general inspection of the parts, the Government inspector shall determine that the performance of the lubricating system is satisfactory. It shall be demonstrated that the limitation of the generator bearing temperatures, as specified in Specifications MIL-G-3111 and MIL-G-3124 have not been exceeded. This test may be made at no-load provided the bearing load is not influenced appreciably by the load condition of the generator. Lubricant similar to that required for service operation shall be used.

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4.4.15 Starting tests. -

4.4.15.1 Electric starting. - The generator shall be subjected to seven starts consisting of cranking the assembled generator set until the engine fires, then stopping the engine and repeating the procedure as soon as the set comes to rest. This test shall be conducted with the engine in a cold condition as specified in 3.6.1.1.

4.4.15.2 Compressed air starting. - The test shall be conducted in accordance with Specification MIL-E-18453.

4.4.16 Parallel operation test. - This test, where required, shall be conducted on the generator set being subjected to the periodic tests and an idential generator set.

4.4.16.1 Direct-current sets. - With each generator operating at rated voltage and at a speed corresponding to approximately 20 percent load, the engine governors shall be adjusted for equal percentage division of load equal to approximately 20 percent of the combined kilowatt rating of the paralleled generators. No further adjustment of the governor and rheostats shall be made for the duration of the test. The load shall be varied from 20 to 100 percent of the combined kw. rating of the two paralleled generators in four approximately equal steps and back to 20 percent load in the same manner. The speed, line voltage, line current, kilowatt load, field voltage and field current of each generator at each load point shall be recorded.

4.4.16.2 Alternating-current sets. - Parallel operation tests on generators shall be made by one of the following two methods:

(a) Simultaneous active and reactive power loading.
(b) Separate active and reactive power loading.

4.4.16.2.1 Simultaneous active and reactive power loading.

4.4.16.2.1.1 This test shall be made with each generator connected to its intended Diesel engine prime mover and with the automatic voltage regulator and exciter which are intended to be furnished with the generator set. With each generator at rated voltage and at a speed corresponding to approximately 20 percent load, the governors and voltage reactive droop compensation shall be adjusted for equal percentage division of load at rated power factor, of approximately 20 percent of the combined kw. and kvar. ratings of the parallel generators. No further adjustment of the governor, voltage regulator and rheostats shall be made for the duration of the test. The load shall be varied from 20 percent to 100 percent of the combined continuous kva. rating of the parallel generators at approximately rated power factor in four approximately equal steps and back to 20 percent load in the same manner. The speed, voltage, current, kilowatt load, reactive kva. load, field voltage and field current of each generator at each load point shall be recorded.

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4.4.16.2.1.2 The current pulsation of paralleled generators shall be measured at 25, 50, 75, and 100 percent of rated continuous load at 0.80 power factor. The current pulsation is defined as the differences between the maximum r.m.s. and minimum r.m.s. current values that occur during a cycle of pulsation, expressed as a percentage of rated full load r.m.s. current. The maximum and minimum values shall be determined by the pencil ammeter method using a portable ammeter conforming to Specification MIL-M-16034. To obtain the current pulsation by this method, a generator shall be operated in parallel with another generator under conditions of steady load. The pointer will be observed to oscillate through a small angle. Due to the damping of the meter, the pointer will indicate less than the time pulsation in current. The glass cover over the scale shall be removed and a straight edge placed against the pointer. The pointer shall be moved slowly by the straight edge toward the maximum point of its swing until the pointer just perceptibly moves away from the straight edge. The pointer then reads the maximum value of r.m.s. current during a cycle of the pulsation. The minimum value of r.m.s. current shall be read similarly by placing the straight edge on the opposite side of the pointer and moving it toward the minimum point of the swing. The percent pulsation shall be

$$\frac{(I\ max. - I\ min.)}{I\ rated} \times 100$$

4.4.16.2.2 Separate active and reactive power loading. -

4.4.16.2.2.1 With each generator connected to its intended Diesel engine prime mover with the exciter and manual exciter field rheostat to be furnished with the generator set, the governors shall be adjusted as required. No further adjustments of the governor shall be made for the duration of the test. The load shall be varied from 20 percent to 100 percent of the combined kw. rating of the paralleled generators in four approximately equal steps and back to 20 percent load in the same manner. At each load point the field current on each generator shall be equalized while adjusting the voltage to approximately rated value. The speed voltage, current, kw. load, field voltage and field current of each generator at each load point shall be recorded.

4.4.16.2.2.2 Following the above tests, the current pulsation shall be measured as specified in 4.4.16.2.1.2 except that the load shall be at unity power factor instead of 0.80 power factor.

4.4.16.2.2.3 With each generator connected to any convienient prime mover and with the exciter and automatic voltage regulator to be furnished with the generator unit, the voltage regulator reactive droop compensation shall be adjusted as required by Specification MIL-R-2729. The parallel operation test shall be conducted by loading

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the paralleled generators on another generator or balanced impedance load at any convenient power factor between zero and 0.80 lagging. The load shall be varied over the range from no-load to 100 percent of the combined continuous kva. rating of the generators in five approximately equal steps and back to no load in the same manner. At each load point the frequency shall be adjusted to rated frequency and kw. load, of any, balance. At no load, the frequency shall be varied from 57 to 63 cycles in approximately one-cycle steps to determine the circulating current. At each test point, the speed, voltage, current, kw. load, reactive kva. load, field voltage and field current of each generator shall be recorded.

4.4.16.2.2.4 The three-phase currents of each generator may be used in lieu of reactive kva., in those tests where the complete test is run at a load power factor between zero and 0.1 lagging. If current is used in lieu of reactive kva., the difference between the average of three-phase currents of one generator and that of the other generator at each load point shall be considered the reactive current differential for the point.

4.4.17 Inclined operation. - The inclination tests shall be made upon completely assembled units, including the Diesel engine prime mover. The set shall be run at rated speed without excitation. During the progress of these tests it shall be ascertained that the mechanical balance is as good as it was in the normal horizontal position, that there is no pounding or grinding of the bearings, that the lubrication is satisfactory, and that there is no leakage of lubricant from the bearings. If the generator is provided with oil ring lubrication it shall be ascertained that the rings do not rub or strike against the sides or ends of the oil well, that they do not "dance" or show pronounced irregularity of movement, and that the shaft does not "sling oil" into the generator.

4.4.18 Weight. - The generator set shall be weighed dry. Any part not normally mechanically attached to the assembly shall be weighed separately.

4.4.19 Radio interference suppression. - Where radio interference suppression is required, the generator sets shall be tested in accordance with Specification MIL-I-16910.

4.4.20 Mechanical shock test. - The requirements hereinafter apply only to complete generator sets weighing less than 4500 pounds dry, the parts of which have not passed satisfactorily the class HI shock test. Where all parts, such as engines, generators and engine starters have passed satisfactorily the class HI shock test, the class HI shock test on the completely assembled generator set is

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not required. The tests shall be as specified for type A of Specification MIL-S-901. The generator set shall be mounted on the shock machine in manner simulating the actual installation on board ship. The features of the tests shall be as follows:

(a) Weight designation of the shock test. - As required by the generator set.

(b) Definition of failure to perform principal functions. -

(1) Breakage of any parts, including mounting bolts.

(2) Appreciable distortion of any parts. - This requirement does not apply to any parts which are purposely intended to disort in order that the shock may be absorbed, thereby protecting the equipment from damage, for example, the mounting of motor starters by means of straps which under the application of shock of sufficient magnitude may be deformed but can be readily reformed.

(3) A value of insulation resistance lower than that permitted by the individual specifications.

(4) Low dielectric strength. - The dielectric strength test shall be made in accordance with the individual specifications except that it shall be made with an applied voltage equal to 65 percent of that specified. Under these conditions, insulation failures shall be cause for rejection.

(5) Failure to pass inspection. - The equipment shall be disassembled following checks in accordance with (b) (1) to (4), inclusive, and inspected thoroughly for damage. The extent of disassembly need be only to the point where the condition of the generator set can be easily observed. The effect of the shocks and subsequent check tests on the structive and insulation should be carefully observed and recorded.

(c) Acceptable method of mounting the equipment on the shock-testing machine. - Figure 7A of Specification MIL-S-901 for the generator set and any accessories mounted thereon. For separate parts, such as engine starters, the individual specifications shall apply.

(d) Place at which shock test will be conducted. - At a Government laboratory.

(e) Number of generator sets to be shock-tested. - One.

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(f) Disposal of shock-tested equipment. -

(1) Generator sets which have been subjected to the class HI shock test and have failed to meet the requirements will not be acceptable, either in whole or any of the parts.

(2) Generator sets which have been subjected to the class HI shock test and have successfully passed this test, shall be considered acceptable under the contract or order, provided the post shock tests and the mechanical corrective measures specified hereinafter are satisfactorily met. These sets need not bear the "sub-standard" identification plate. Generator sets shall be subjected to a full-load heat run test of 2 hours duration. Mounting flanges connecting the engine and generator shall be replaced in event of minor deformation. Minor deformation affecting alignments shall be corrected. Minor deformations are defined as those which do not cause unqualified rejection of the design under the class HI shock test, but which are in excess of the dimensional tolerances specified in the applicable drawings.

4.5 Additional inspection. - Where other specifications form a part of this specification, unless otherwise specified, sampling, inspection, and tests shall be conducted as required in the referenced specification.

4.6 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 Preservation and packaging. -

5.1.1 Domestic shipment-immediate use. - Preservation and packaging of the equipment and related accessories (except repair parts and tools) shall be in accordance with the manufacturer's commercial practice.

5.1.2 Domestic shipment and storage or overseas shipment. -

5.1.2.1 Engines. - Engines and installed accessories shall be preserved and packaged in accordance with type II, class B of Specification MIL-P-10062, except as specified herein.

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5.1.2.1.1 Cooling system. - All systems using water as coolant shall be flushed with preservative type P-3 of Specification MIL-P-116. The system shall be drained before and after flushing with preservative including all points at engine block, pumps and auxiliary engine. Isolate pumps having rubber type impellers to prevent damage by preservative type P-3 of Specification MIL-P-116.

5.1.2.1.2 Engine lubricating oil system. - The lubricating oil system, including independent systems, such as the governor, shall be filled to the normal level with preservative type P-2 of Specification MIL-P-116. The engine shall be started and operated at idling speed for a period of time sufficient to thoroughly flush the system.

5.1.2.1.3 Engine fuel oil system and combustion chamber. - Prior to the completion of the preservation period specified in 5.1.2.1.2, the fuel system shall be coupled to a supply source of clean type P-2 preservative of Specification MIL-P-116 so as to flush the fuel system. The combustion chamber shall be treated by removing the injectors and fogging or spraying with type P-2 preservative. Excess of preservative shall not be permitted to accumulate in the combustion chamber. Fuel tanks shall be flushed with preservative type P-2.

5.1.2.1.4 Valve mechanism. - Access covers shall be removed and all surfaces within the valve compartment, including rocker mechanism, valve stems, springs, guides, push rods and the inside face of the cover plate shall be sprayed with preservative type P-2 of Specification MIL-P-116.

5.1.2.1.5 Transmission and transfer cases. - Transmission and transfer cases and any other gear [illegible] not lubricated by the main engine lubricating system shall be drained of lubricant and all surfaces within the housing cleaned with petroleum solvent. The unit shall be filled with preservative type P-[illegible] of Specification MIL-P-116. After operating without load for sufficient time to insure complete coverage, the gear shall be drained of preservative.

5.1.2.1.6 Draining preservative. - After internal preservation of the engine has been completed, the preservative shall be drained from all parts of the engine to prevent subsequent coagulation of the preservatives in pockets and low places.

5.1.2.2 Generators and exciters. - Generators and exciters shall be preserved and packaged in accordance with Specification MIL-P-16298.

5.1.2.3 Detached meters and accessories. - Detached meters and accessories shall be preserved and packaged as specified in Publication JPI-6 and Specifications MIL-P-17652, MIL-P-16298 and MIL-P-16018, as applicable.

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5.1.2.4 Repair parts and tools.-

5.1.2.4.1 Mechanical repair parts and special tools shall be preserved and packaged in accordance with Publication JPI-6 or Specification MIL-P-15424, as applicable.

5.1.2.4.2 Electrical repair parts shall be preserved and packed in accordance with Specification MIL-P-17652 or MIL-P-16298 as applicable.

5.1.2.4.3 Other repair parts not specifically covered herein shall be preserved and packaged in accordance with Specification MIL-P-116. Unit and intermediate packaging requirements shall be in accordance with Publication JPI-6.

5.1.2.4.4 When specified in the contract or order, onboard repair parts shall be intermediate packaged in repair parts boxes conforming to type M or W of Specification MIL-B-233.

5.2 Packing.-

5.2.1 For domestic shipment-immediate use.- The equipment and related accessories (except repair parts and tools), packaged as specified in 5.1.1 shall be packed to insure carrier acceptance and safe delivery to destination. Containers shall comply with the Consolidated Freight Classification Rules or other carrier regulations applicable to the mode of transportation.

5.2.2 For domestic shipment and storage or overseas shipment.-

5.2.2.1 Generator sets.-

5.2.2.1.1 Sets not exceeding a gross weight of 500 pounds shall be packed in cleated plywood or nailed wood boxes conforming to Specifications PPP-B-601 and JAN-P-106, respectively. Boxes shall be modified by the addition of 2 by 4 inch skids placed flat and the sets shall be bolted through the base and skids.

5.2.2.1.2 Sets exceeding 500 pounds gross weight shall be packed in sheathed crates conforming to Specification MIL-C-3769 or JAN-P-104 as applicable.

5.2.2.1.3 When specified in the contract or order, sets shall be packed in unsheathed crates conforming to Specification MIL-C-132 or MIL-C-3774 as applicable. Equipment shall be shrouded within the unsheathed crates with barrier material conforming to type E-2 of Specification JAN-P-125. Shrouds shall be secured in place to prevent loosening and shall be arranged in a manner to avoid formation of water pockets.

5.2.2.1.4 Where prior approval by the bureau or agency concerned has been granted, generator sets exceeding the weight limitations imposed by the containers specified herein may be packed in containers of the manufacturer's design and construction.

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5.2.2.2 Repair parts, tools and detached accessories.-

5.2.2.2.1 Detached accessories, onboard and stock repair parts and tools shall be packed in wood cleated fiberboard, cleated plywood, nailed wood, wirebound, corrugated or solid fiberboard boxes conforming to Specifications NN-B-591, PPP-B-601, NN-B-621, NN-B-631, LLL-B-631 and LLL-B-636, respectively for domestic shipment and storage and Specification JAN-P-103, PPP-B-601, JAN-P-106, MIL-B-107 and exterior grade boxes of SpecificationJAN-P-108 for overseas shipment. Fiberboard boxes shall comply with the special requirements of the applicable box specification. The gross weight of wood or wood cleated boxes shall not exceed 200 pounds for domestic shipment and storage or 150 pounds for overseas shipment. Overseas containers shall be lined with a sealed case liner conforming to Specification MIL-L-10547 and appendix thereto. Individual components exceeding the weight limitation specified herein shall be packed in containers as specified in 5.2.2.1.1 or 5.2.2.1.2.

5.2.2.2.2 Onboard repair parts packaged in repair parts boxes as specified in 5.1.2.4.4 shall be overpacked in containers specified in 5.2.2.2.1 or in unsheathed crates conforming to Specification MIL-C-132. The gross weight of repair parts boxes shall not exceed 200 pounds.

5.2.2.2.3 Index list.- An index list of repair parts conforming to Specification MIL-F-17292 shall be inserted in the repair parts containers.

5.3 Technical manuals.- Technical manuals, pamphlets and handbooks, as applicable, shall be packaged and packed in accordance with Specification MIL-T-15071.

5.4 Marking.- In addition to any special markings required in the contract or order, marking of unit and intermediate packages and shipping containers shall be in accordance with Standard MIL-STD-129.

6. NOTES

6.1 Intended use.- Generator sets covered by this specification are intended for ship's service and emergency service applications aboard ship. Generator sets having rotary amplifier type voltage regulators (see 3.9.4) are intended for use where very fine voltage control is required and where a static voltage regulator circuit is desired.

6.2 Ordering data.- Procurement documents should specify the following:

(a) Title, number, and date of this specification.
(b) Type required (see 1.2).
(c) Whether generator set is to be of a standardized type (see 3.3.2 and 3.3.4).
(d) Requirements for Diesel engines (see 3.4)

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(e) Starting equipment required (see 3.6), and, if electric, the combination desired and the voltage therefor (see 3.6.1).
(f) Enclosure of starting motor (see 3.6.1.2).
(g) Vibration resistance if other than specified in 3.7.6.
(h) Special parallel operation requirements (see 3.7.9).
(i) Whether radio interference suppression is required (see 3.7.11).
(j) Kilowatt rating, r.p.m., and class of insulation (see 3.8.4 and 3.9.3).
(k) For d.c. sets only:
Mounting of balance coils (see 3.8.5).
Voltage (see 3.8.4).
(ℓ) For a.c. sets only:
Type of voltage regulator control and number of regulators per switchboard (see 3.9.4).
(m) Number of identical generator sets per vessel (see 3.11.1).
(n) Number of sets of drawings required and their distribution (see 3.12.2).
(o) Number of technical manuals required, and their distribution (see 3.13).
(p) Method of testing where radio interference suppression is required (see 4.4.19).
(q) Whether for domestic shipment-immediate use; domestic shipment and storage; or overseas shipment (see 5.1 and 5.2).
(r) If onboard repair parts are to be packaged in repair parts boxes, specify type M or type W (see 5.1.2.4.4).
(s) If unsheathed crates are required for the packing of generator sets (see 5.2.2.1.3).

6.3 Test record form. - The applicable factory test record form is NAVEXOS-2839, "Generator Sets, Diesel and Gasoline Engine Driven - Factory Test Record". Copies may be obtained upon application to the Government inspector, except that Naval activities should make application to the District Publication and Printing Office, of any Naval District Headquarters.

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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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Bureau of Ships
Other interest:
None

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SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity *(as indicated on reverse hereof)*.

SPECIFICATION

ORGANIZATION *(Of submitter)*		CITY AND STATE
CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT $

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO IF "YES", IN WHAT WAY?

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity)*	DATE

DD FORM 1 APR 63 1426 REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE C-8279

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