

**SECTION 16425****PORTABLE ENGINE-GENERATOR SETS****PART 1 - GENERAL****1.01 REQUIREMENT**

Furnish and install a portable engine-generator system for use during periods of interruption of normal electrical service.

**1.02 SUBMITTALS**

The Contractor shall submit all applicable submittals listed in Section 16420.

**1.03 QUALITY ASSURANCE**

- A. In the best interest of the Miami-Dade Water and Sewer Department, the supplier of this equipment shall maintain a full-time "in-house" parts and service organization within 50 miles of the job site. Equipment offered by those who do not have an "in house" parts and service organization and who depend on others to provide services shall not be considered. This supplier shall have his name, address and telephone number clearly and visibly located on all equipment. Service shall be available on a 24-hour/7-day a week basis.
- B. The supplier of the equipment shall provide information and/or supervision required for the proper installation of the equipment, testing of equipment and training of operating personnel.
- C. All components shall bear UL labels.
- D. The stand-by system, including the generator set and associated controls shall be designed, fabricated, tested and furnished by one manufacturer to assure one source of responsibility. The manufacturer shall have been regularly engaged in the production of engine-alternator sets and associated controls for a minimum of five years and shall manufacture either the engine, or the generator or both.

**1.04 GUARANTEE**

The equipment furnished under this Specification shall be new, unused, of the latest design. The generator set, associated controls, and automatic load transfer switch shall be warranted for a minimum of five years or 1,500 operating hours whichever comes first. The supplier of the system shall have a parts and service facility within fifty miles from the jobsite in order to assure the owner continuity of service.

**1.05 REFERENCE STANDARDS**

Applicable provisions of the following Codes and Trade Standard Publications shall apply to the work of this Section and are hereby incorporated into, and made a part of, the Contract Documents:

1. NFPA 70: National Electrical Code
2. NFPA-110: Emergency and Standby Power Systems
3. NFPA-101: Life Safety Code
4. NFPA-AB1: Molded Case Circuit Breakers
5. NFPA MG1: Motors and Generators
6. NFPA 250: Enclosures for Electrical Equipment  
(Maximum 1,000 Volt)
7. NFPA 30: Flammable and Combustible Liquids Code

## **PART 2 - PRODUCTS**

### 2.01 ENGINE-GENERATOR SETS, GENERAL

- A. The engine-generator set shall be tested at the factory under rated load and power factor for performance and proper functioning of component parts and circuitry. The Department shall be furnished with manufacturer supplied certified test reports stating that the equipment has met the requirements of the tests.
- B. Portable engine-generator sets shall be liquid cooled, diesel-driven, 125 KW, 156 KVA at 0.8 PF, such as Onan Model 125 DVD, or approved equal, and shall comply with applicable portions of Section 16420. The unit shall provide a dual output voltage of 240/480 volts, 3 phase unit, with rotary selector switch to select the operating voltage. Each output, shall be protected by a main three-pole breaker, 150 AMP, and terminated in power receptacles JRSR 1034H and JRSR 1034D, as manufactured by Russell and Stoll, or approved equal.
- C. The Contractor shall provide a twenty foot long, 4 conductors plus ground portable power cable, wire size suitable for generator size, with plugs for each voltage. Plugs shall be JPS 1034H and JPS 2034 HR for 100 and 200 amps respectively, manufactured by Russell and Stoll, or approved equal. The generator set shall be mounted on a trailer and provided with a battery(s), battery charger, complete AC instrument panel, and factory installed weather-protective housing. The standard fuel tank normally supplied with the unit shall be furnished; however, it shall have a capacity sufficient for a minimum of eight hours operation and shall be elevated.

### 2.02 ENGINE EQUIPMENT

- A. Engine shall include positive displacement, mechanical full-pressure lubrication oil pump, full-flow lubrication oil filters with replaceable elements and dipstick oil level indicator.
- B. A fuel filter with replacement element shall be provided. A replaceable dry element air cleaner shall also be provided.
- C. Provide engine speed governing system to automatically control generator frequency to 4% or less or rated frequency from no-load to full-load rated output.
- D. Provide engine speed isochronous electric governing system to control generator frequency within ( $\pm$ ) 0.25% of rated frequency under steady-state load conditions.

- E. Provide engine protection devices with sensing elements located on the engine to initiate the following preliminary alarms and engine shutdowns:
  - 1. Low lubrication oil pressure alarm
  - 2. High coolant temperature alarm
  - 3. Low lubrication oil pressure shutdown
  - 4. High coolant temperature shutdown
  - 5. Overspeed shutdown
  - 6. Overcrank lockout
- F. Provide low coolant level shutdown, which shall active high engine temperature lamp and shutdown.

### 2.03 ENGINE COOLING SYSTEM

The engine cooling system shall be an engine-mounted radiator system, including belt driven coolant pump and thermostatic temperature controlled fan, which shall be sized to maintain safe operation at a temperature of 95 degrees F, ambient. Radiator air flow restriction shall not exceed 0.5 inches water.

### 2.04 ENGINE EXHAUST SYSTEM

- A. The engine exhaust system shall be of the size and type as recommended by the engine manufacturer. The exhaust system equipment and installation including piping, muffler, silencer and muffler shall be in accordance with applicable standards and local codes. Exhaust system shall be residential type whisper units for nighttime operation. A condensate trap and drain valve shall be provided where necessary at the low point of the piping.
- B. For maximum efficiency, operation economy, and prevention of engine damage, the exhaust system shall be designed so it does not create excessive backpressure on the engine. The piping size, connections, silencer, and muffler shall be properly selected and installed to ensure satisfactory operation of the engine.
- C. Engine exhaust silencer shall be designed and constructed to achieve a "critical" degree of noise attenuation. The exhaust silencer shall be of complete double-walled, all welded construction, protection, protected by a single coat of shop primer, and suitable for mounting as shown on the approved drawings. Backpressure at rated engine speed shall not exceed 4-inches of water. The exhaust silencer shall be Maxim, or approved equal.

### 2.05 GENERATOR

- A. Generators shall comply with Article 445 of NFPA 70, National Electric Code. The generator shall be of dripproof construction and have amortisseur windings. It shall be self-aligning, four pole, synchronous type, with revolving field, amortisseur windings, direct-drive centrifugal

blower for proper cooling and minimum noise, temperature compensated solid-state voltage regulator and brushless rotating-rectifier exciter system. It shall be suitable for the environmental conditions at the installation location.

- B. The generator shall be directly connected to the engine flywheel housing and driven through a flexible coupling to insure permanent alignment. Insulation shall meet NEMA standards for Class F. The maximum temperature rise shall not exceed 100 degrees Centigrade at 40 degrees Centigrade ambient. Generator design shall prevent potentially damaging shaft currents.

## 2.06 BATTERY AND CHARGER

- A. Provide a lead-acid battery of the heavy-duty diesel-starting type of sufficient capacity to provide for one and one-half minutes total cranking time without recharging mounted on the engine-generator enclosure.
- B. The battery charger shall be of the current limiting type and shall include overload protection. At its rated voltage, it shall be capable of delivering energy into a fully discharged battery unit without damaging the unit.

## 2.07 CONTROL PANEL

A control panel as an integral part of the engine-generator set shall be provided with the following:

- A. Oil pressure gauge
- B. Coolant temperature gauge
- C. Charge rate ammeter
- D. RUN-STOP selector switch
- E. Automatic engine shutdown for the following fault conditions:
  - 1. Overcrank
  - 2. Overspeed
  - 3. Low oil pressure
  - 4. High engine temperature
- F. Indicator lamp for each fault condition.
- G. Engine tachometer

## 2.08 ACCESSORIES

- A. Weather-Protective Housing

- \_\_\_\_\_ 1. The weather protection housing shall be constructed of welded and bolted 14 gauge sheet steel. Prime all metal parts with a minimum of two coats of rust-inhibiting primer. The final finish shall consist of a minimum of two coats of the manufacturer's standard.
2. Provide a removable panel under the engine oil pan, shuttered and screened air openings at front and sides, hinged double doors on each side and single rear door. Provide handles of the key-lock type, in all doors.
- B. Trailer shall be provided with a weatherproof, watertight storage box with locking latch for padlock, to be furnished by the Department.
- C. Trailers
1. Trailers shall be DOT approved, tandem axle with a minimum load capacity of seven thousand pounds, manufactured of welded structural steel forms, and equipped with hydraulic brakes on both axles, license plate holder, side and rear reflectors, rear stabilizing jack, and four first-grade or better truck type tires.
2. DOT approved lighting system to include stop lights, turn signals, tail and license plate lights. Trailer be an automotive type, with two wheels, heavy duty steel frame, axle and hub, leaf springs, tow bar with 3-inch diameter steel tow eye for pintle hook connection, swivel type pneumatic third wheel, break-away safety chain. The engine and compressor shall be rubber mounted to the frame.
- D. Vibration Isolation
- Vibration isolators, as necessary, shall be furnished to minimize vibration transmission. Where unusual vibration conditions are anticipated, adequate isolation treatment shall be supplied.

**PART 3 - EXECUTION** (Not Used)

END OF SECTION