

**SECTION 26 32 13**  
**ENGINE GENERATORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Packaged engine generator system and associated components and accessories:
  - 1. Engine and engine accessory equipment.
  - 2. Alternator (generator).
  - 3. Generator set control system.
  - 4. Generator set enclosure.
- B. Installation of unit and controls shall be provided by others or CM/GC.
- C. Start-up, certification and training shall be provided by manufacturer's authorized representative.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- B. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

**1.03 REFERENCE STANDARDS**

- A. ASTM D975 - Standard Specification for Diesel Fuel Oils; 2014a.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.
- C. NECA/EGSA 404 - Standard for Installing Generator Sets; National Electrical Contractors Association; 2014.
- D. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2011.
- E. NFPA 30 - Flammable and Combustible Liquids Code; National Fire Protection Association; 2012.
- F. NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines; 2015.
- G. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. NFPA 110 - Standard for Emergency and Standby Power Systems; National Fire Protection Association; 2013.
- I. UL 1236 - Battery Chargers for Charging Engine-Starter Batteries; Current Edition, Including All Revisions.
- J. UL 2200 - Stationary Engine Generator Assemblies; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate compatibility of generator sets to be installed with work provided under other sections or by others.
    - a. Transfer Switches: Existing Switches to remain.
  - 2. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment or other potential obstructions within the spaces dedicated for engine generator system.

3. Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.
  4. Coordinate the work to provide electrical circuits suitable for the power requirements of the actual auxiliary equipment and accessories to be installed.
  5. Notify Designer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Preinstallation Meeting: Convene one week before starting work of this section; require attendance of all affected installers.

#### **1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product, including ratings, configurations, dimensions, finishes, weights, service condition requirements, and installed features. Include alternator starting capabilities, engine fuel consumption rates, and cooling, combustion air, and exhaust requirements.
  1. Include generator set sound level test data.
  2. Include characteristic trip curves for overcurrent protective devices upon request.
  3. Include alternator thermal damage curve upon request.
- B. Shop Drawings: Include dimensioned plan views and sections indicating locations of system components, required clearances, and field connection locations. Include system interconnection schematic diagrams showing all factory and field connections.
- C. Derating Calculations: Indicate ratings adjusted for applicable service conditions.
- D. Specimen Warranty: Submit sample of manufacturer's warranty.
- E. Evidence of qualifications for installer.
- F. Evidence of qualifications for maintenance contractor (if different entity from installer).
- G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.
- H. Manufacturer's factory emissions certification.
- I. Manufacturer's certification that products meet or exceed specified requirements.
- J. Source quality control test reports.
- K. Provide NFPA 110 required documentation from manufacturer where requested by authorities having jurisdiction, including but not limited to:
  1. Certified prototype tests.
  2. Torsional vibration compatibility certification.
  3. NFPA 110 compliance certification.
  4. Certified rated load test at rated power factor.
- L. Manufacturer's detailed field testing procedures.
- M. Field quality control test reports.
- N. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
  1. Include contact information for entity that will be providing contract maintenance and trouble call-back service.
- O. Executed Warranty: Submit documentation of final executed warranty completed in Owner's name and registered with manufacturer.
- P. Maintenance contracts.

- Q. Project Record Documents: Record actual locations of system components, installed circuiting arrangements and routing, and final equipment settings.
- R. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. Extra Fuses: Two of each type and size.
  - 2. Extra Filter Elements: Two of each type, including fuel, oil and air.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with the following:
  - 1. NFPA 70 (National Electrical Code).
  - 2. NFPA 110 (Standard for Emergency and Standby Power Systems); meet requirements for Level 2 system.
  - 3. NFPA 37 (Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines).
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
  - 1. Authorized service facilities located within 100 miles of project site.
- D. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience with engine generator systems of similar size, type, and complexity; manufacturer's authorized installer.
- E. Maintenance Contractor Qualifications: Same entity as installer.
  - 1. Contract maintenance office located within 100 miles of project site.
- F. Products: Listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authorities having jurisdiction as suitable for the purpose indicated.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store generator sets in accordance with manufacturer's instructions and NECA/EGSA 404.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle carefully in accordance with manufacturer's instructions to avoid damage to generator set components, enclosure, and finish.

#### **1.08 FIELD CONDITIONS**

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.
- B. Verify existing field conditions prior to installation.

#### **1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide minimum one year manufacturer warranty covering repair or replacement due to defective materials or workmanship including labor.

### **PART 2 PRODUCTS**

#### **2.01 ACCEPTABLE MANUFACTURERS**

- A. Packaged Engine Generator Set - Basis of Design: Kohler Model No. 250REZXB
- B. Packaged Engine Generator Set - Other Acceptable Manufacturers:
  - 1. Caterpillar Inc; Model G3412: [www.cat.com/power-generation](http://www.cat.com/power-generation).
  - 2. Cummins Power Generation Inc; Model GTA855e: [www.cumminspower.com](http://www.cumminspower.com).

- C. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Products other than basis of design are subject to compliance with specified requirements and prior approval of Engineer. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.
- E. Source Limitations: Furnish engine generator sets and associated components and accessories produced by a single manufacturer and obtained from a single supplier.

## **2.02 PACKAGED ENGINE GENERATOR SYSTEM**

- A. Provide new engine generator system consisting of all required equipment, sensors, conduit, boxes, wiring, piping, supports, accessories, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
- B. System Description:
  - 1. Application: Emergency/standby.
  - 2. Configuration: Single packaged engine generator set operated independently (not in parallel).
  - 3. Total System Power Rating: 250 kW, standby, including applicable derating adjustments.
  - 4. Where design is based on single generator set, use of multiple, smaller unit(s) operated in parallel to obtain equivalent total system power rating is not permitted.
- C. Packaged Engine Generator Set:
  - 1. Type: Gaseous (spark ignition).
  - 2. Basis of Design: Kohler Model 250REZXB.
  - 3. Power Rating: 250 kW, standby.
  - 4. Voltage: 208Y/120 V, 3 phase, 60 Hz.
  - 5. Main Line Circuit Breaker 800 Amp:
    - a. Type: Electronic trip with long time and short time delay and instantaneous pickup.
    - b. Trip Rating: Select according to generator set rating.
    - c. Features:
      - 1) Shunt trip.
      - 2) Auxiliary contacts.
- D. Generator Set General Requirements:
  - 1. Prototype tested in accordance with NFPA 110 for Level 1 systems.
  - 2. Factory-assembled, with components mounted on suitable base.
  - 3. List and label engine generator assembly as complying with UL 2200.
  - 4. Power Factor: Unless otherwise indicated, specified power ratings are at 0.8 power factor for three phase voltages and 1.0 power factor for single phase voltages.
  - 5. Provide suitable guards to protect personnel from accidental contact with rotating parts, hot piping, and other potential sources of injury.
  - 6. Main Line Circuit Breakers: Provide factory-installed line side connections with suitable lugs for load side connections.
- E. Service Conditions: Provide engine generator system and associated components suitable for operation under the service conditions at the installed location.
  - 1. Altitude: 1000 Feet.
  - 2. Ambient Temperature: Between minus 20 and 104 degrees F.
- F. Starting and Load Acceptance Requirements:
  - 1. Cranking Method: Cycle cranking complying with NFPA 110 (15 second crank period, followed by 15 second rest period, with cranking limiter time-out after 3 cycles), unless otherwise required.

2. Cranking Limiter Time-Out: If generator set fails to start after specified cranking period, indicate overcrank alarm condition and lock-out generator set from further cranking until manually reset.
  3. Start Time: Capable of starting and achieving conditions necessary for load acceptance within 10 seconds (NFPA 110, Type 10).
  4. Maximum Load Step: Supports 100 percent of rated load in one step.
- G. Exhaust Emissions Requirements:
1. Comply with federal (EPA), state, and local regulations applicable at the time of commissioning; include factory emissions certification with submittals.
  2. Do not make modifications affecting generator set factory emissions certification without approval of manufacturer and Engineer. Where such modifications are made, provide field emissions testing as necessary for certification.
- H. Sound Level Requirements:
1. Do not exceed 75 dBA when measured at 23 feet from generator set in free field (no sound barriers) while operating at full load; include manufacturer's sound data with submittals.
- I. Interface with Existing Work: Existing ATS switches, controls, fire alarm system, etc.

### **2.03 ENGINE AND ENGINE ACCESSORY EQUIPMENT**

- A. Provide engine with adequate horsepower to achieve specified power output at rated speed, accounting for alternator efficiency and parasitic loads.
- B. Engine Fuel System - Gaseous (Spark Ignition):
1. Fuel Source: Natural gas.
  2. Engine Fuel Connections: Provide suitable, approved flexible fuel lines for coupling engine to fuel source.
  3. Provide components/features indicated and as necessary for operation and/or required by applicable codes, including but not limited to:
    - a. Carburetor.
    - b. Gas pressure regulators.
    - c. Fuel shutoff control valves.
    - d. Low gas pressure switches.
- C. Engine Starting System:
1. System Type: Electric, with DC solenoid-activated starting motor(s).
  2. Battery(s):
    - a. Battery Type: Lead acid or Nickel-cadium.
    - b. Battery Capacity: Size according to manufacturer's recommendations for achieving starting and load acceptance requirements under worst case ambient temperature; capable of providing cranking through three complete periods of cranking limiter time-outs without recharging.
    - c. Provide battery rack, cables, and connectors suitable for the supplied battery(s); size battery cables according to manufacturer's recommendations for cable length to be installed.
  3. Battery-Charging Alternator: Engine-driven, with integral solid-state voltage regulation.
  4. Battery Charger:
    - a. Provide dual rate battery charger with automatic float and equalize charging modes and minimum rating of 10 amps; suitable for maintaining the supplied battery(s) at full charge without manual intervention.
    - b. Capable of returning supplied battery(s) from fully discharged to fully charged condition within 24 hours, as required by NFPA 110 for Level 1 applications while carrying normal loads.

- c. Recognized as complying with UL 1236.
  - d. Furnished with integral overcurrent protection; current limited to protect charger during engine cranking; reverse polarity protection.
  - e. Provide integral DC output ammeter and voltmeter with five percent accuracy.
  - f. Provide alarm output contacts as necessary for alarm indications.
5. Battery Heater: Provide thermostatically controlled battery heater to improve starting under cold ambient conditions.
- D. Engine Speed Control System (Governor):
1. Single Engine Generator Sets (Not Operated in Parallel): Provide electronic isochronous governor for controlling engine speed/alternator frequency.
  2. Generator Sets Used with Closed Transition Transfer Switches: Provide electronic isochronous governor with frequency regulation suitable for transfer.
  3. Frequency Regulation, Electronic Isochronous Governors: No change in frequency from no load to full load; plus/minus 0.25 percent at steady state.
- E. Engine Lubrication System:
1. System Type: Full pressure, with engine-driven, positive displacement lubrication oil pump, replaceable full-flow oil filter(s), and dip-stick for oil level indication. Provide oil cooler where recommended by manufacturer.
  2. Oil Heater: Provide thermostatically controlled oil heater to improve starting under cold ambient conditions.
- F. Engine Cooling System:
1. System Type: Closed-loop, liquid-cooled, with unit-mounted radiator/fan and engine-driven coolant pump; suitable for providing adequate cooling while operating at full load under worst case ambient temperature.
  2. Fan Guard: Provide suitable guard to protect personnel from accidental contact with fan.
  3. Coolant Heater: Provide thermostatically controlled coolant heater to improve starting under cold ambient conditions; size according to manufacturer's recommendations for achieving starting and load acceptance requirements under worst case ambient temperature.
  4. Coolant: Anti-freeze coolant, 50% Ethylene-Glycol and 50% water mixture with anti-corrosion additives as recommended by engine manufacturer supplied by contractor at start-up.
- G. Engine Air Intake and Exhaust System:
1. Air Intake Filtration: Provide engine-mounted, replaceable, dry element filter.
  2. Engine Exhaust Connection: Provide suitable, approved flexible connector for coupling engine to exhaust system.
  3. Exhaust Silencer: Provide engine-mounted exhaust silencer with minimum sound attenuation of 75 dBA; select according to manufacturer's recommendations to meet sound performance requirements, where specified.

#### **2.04 ALTERNATOR (GENERATOR)**

- A. Alternator: 4-pole, 1800 rpm (60 Hz output) revolving field, synchronous generator complying with NEMA MG 1; connected to engine with flexible coupling; voltage output configuration as indicated, with reconnectable leads for 3 phase alternators.
- B. Exciter:
1. Exciter Type: Brushless; provide permanent magnet generator (PMG) excitation system; self-excited (shunt) systems are not permitted.
  2. PMG Excitation Short-Circuit Current Support: Capable of sustaining 300 percent of rated output current for 10 seconds.

- 3. Voltage Regulation (with PMG excitation): Plus/minus 0.5 percent for any constant load from no load to full load.
- C. Temperature Rise: Comply with UL 2200.
- D. Insulation System: NEMA MG 1, Class F or Class H; suitable for alternator temperature rise.
- E. Enclosure: NEMA MG 1, drip-proof.
- F. Total Harmonic Distortion: Not greater than five percent.
- G. Alternator Heater: Provide strip heater to prevent moisture condensation on alternator windings.

## 2.05 GENERATOR SET CONTROL SYSTEM

- A. Provide microprocessor-based control system for automatic control, monitoring, and protection of generator set. Include sensors, wiring, and connections necessary for functions/indications specified.
- B. Control Panel:
  - 1. Control Panel Mounting: Unit-mounted unless otherwise indicated; vibration isolated.
  - 2. Generator Set Control Functions:
    - a. Automatic Mode: Initiates generator set start/shutdown upon receiving corresponding signal from remote device (e.g. automatic transfer switch).
    - b. Manual Mode: Initiates generator set start/shutdown upon direction from operator.
    - c. Reset Mode: Clears all faults, allowing generator set restart after a shutdown.
    - d. Emergency Stop: Immediately shuts down generator set (without time delay) and prevents automatic restarting until manually reset.
    - e. Cycle Cranking: Programmable crank time, rest time, and number of cycles.
    - f. Time Delay: Programmable for shutdown (engine cooldown) and start (engine warmup).
    - g. Voltage Adjustment: Adjustable through range of plus/minus 5 percent.
  - 3. Generator Set Status Indications:
    - a. Voltage (Volts AC): Line-to-line, line-to-neutral for each phase.
    - b. Current (Amps): For each phase.
    - c. Frequency (Hz).
    - d. Real power (W/kW).
    - e. Reactive power (VAR/kVAR).
    - f. Apparent power (VA/kVA).
    - g. Power factor.
    - h. Duty Level: Actual load as percentage of rated power.
    - i. Engine speed (RPM).
    - j. Battery voltage (Volts DC).
    - k. Engine oil pressure.
    - l. Engine coolant temperature.
    - m. Engine run time.
    - n. Generator powering load (position signal from transfer switch).
  - 4. Generator Set Protection and Warning/Shutdown Indications:
    - a. Comply with NFPA 110; configurable for NFPA 110 Level 1 or Level 2, or NFPA 99 systems including but not limited to the following protections/indications:
      - 1) Overcrank (shutdown).
      - 2) Low coolant temperature (warning).
      - 3) High coolant temperature (warning).
      - 4) High coolant temperature (shutdown).
      - 5) Low oil pressure (warning).
      - 6) Low oil pressure (shutdown).

- 7) Overspeed (shutdown).
- 8) Low fuel level (warning).
- 9) Low coolant level (warning/shutdown).
- 10) Generator control not in automatic mode (warning).
- 11) High battery voltage (warning).
- 12) Low cranking voltage (warning).
- 13) Low battery voltage (warning).
- 14) Battery charger failure (warning).
- b. In addition to NFPA 110 requirements, provide the following protections/indications:
  - 1) High AC voltage (shutdown).
  - 2) Low AC voltage (shutdown).
  - 3) High frequency (shutdown).
  - 4) Low frequency (shutdown).
  - 5) Overcurrent (shutdown).
- c. Provide contacts for local and remote common alarm.
- d. Provide lamp test function that illuminates all indicator lamps.
5. Other Control Panel Features:
  - a. Event log.
  - b. Communications Capability: Compatible with system indicated. Provide all accessories necessary for proper interface.
- C. Remote Annunciator:
  1. Remote Annunciator Mounting: Wall-mounted; Provide flush-mounted annunciator for finished areas and surface-mounted annunciator for non-finished areas unless otherwise indicated.
  2. Generator Set Status Indications:
    - a. Generator powering load (via position signal from transfer switch).
    - b. Communication functional.
  3. Generator Set Warning/Shutdown Indications:
    - a. Comply with NFPA 110 for Level 1 systems including but not limited to the following indications:
      - 1) Overcrank (shutdown).
      - 2) Low coolant temperature (warning).
      - 3) High coolant temperature (warning).
      - 4) High coolant temperature (shutdown).
      - 5) Low oil pressure (warning).
      - 6) Low oil pressure (shutdown).
      - 7) Overspeed (shutdown).
      - 8) Low fuel level (warning).
      - 9) Low coolant level (warning/shutdown).
      - 10) Generator control not in automatic mode (warning).
      - 11) High battery voltage (warning).
      - 12) Low cranking voltage (warning).
      - 13) Low battery voltage (warning).
      - 14) Battery charger failure (warning).
    - b. Provide audible alarm with silence function.
    - c. Provide lamp test function that illuminates all indicator lamps.
- D. Remote Emergency Stop: Provide approved red, mushroom style remote emergency stop button where indicated or required by authorities having jurisdiction.

## 2.06 GENERATOR SET ENCLOSURE

- A. Enclosure Type: Sound attenuating, weather protective.

- B. Enclosure Material: Steel or aluminum.
- C. Hardware Material: Stainless steel.
- D. Color: Beige or match building limestone..
- E. Access Doors: Lockable, with all locks keyed alike.
- F. Openings: Designed to prevent bird/rodent entry.
- G. External Drains: Extend oil and coolant drain lines to exterior of enclosure for maintenance service.
- H. Sound Attenuating Enclosures: Line enclosure with non-hygroscopic, self-extinguishing sound-attenuating material.
- I. Exhaust Silencers: Where exhaust silencers are mounted within enclosure in main engine compartment, insulate silencer to minimize heat dissipation as necessary for operation at rated load under worst case ambient temperature.
- J. Enclosure Space Heater: Provide thermostatically controlled enclosure space heater to prevent condensation and improve starting under cold ambient conditions; size according to manufacturer's recommendations for achieving starting and load acceptance requirements under worst case ambient temperature.
- K. Distribution Panel/Load Center:
  - 1. Pre-wired 100 Amp, 120/240 Volt, 1 Phase for all generator block heaters, lighting, receptacles, alternator heater, etc.

## **2.07 SOURCE QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Perform production tests on generator sets at factory to verify operation and performance characteristics prior to shipment. Include certified test report with submittals.
- C. Generator Set production testing to include, at a minimum:
  - 1. Operation at rated load and rated power factor.
  - 2. Single step load pick-up.
  - 3. Transient and steady state voltage and frequency performance.
  - 4. Operation of safety shutdowns.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that the ratings and configurations of generator sets and auxiliary equipment are consistent with the indicated requirements.
- C. Verify that rough-ins for field connections are in the proper locations.
- D. Verify that mounting surfaces are ready to receive equipment.
- E. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Installation of generator, controls and wiring shall be provided by others or CM/GC for project.
- B. Perform work in a neat and workmanlike manner in accordance with NECA 1.
- C. Install products in accordance with manufacturer's instructions.
- D. Install generator sets and associated accessories in accordance with NECA/EGSA 404.
- E. Arrange equipment to provide minimum clearances and required maintenance access.

- F. Unless otherwise indicated, mount generator set on properly sized structural steel with vibration isolators constructed in accordance with structural engineer. Provide suitable vibration isolators, where not factory installed.
- G. Provide required support and attachment in accordance with Section 26 05 29.
- H. Use manufacturer's recommended oil and coolant, suitable for the worst case ambient temperatures.
- I. Provide gas piping in accordance with Section 22 10 05.
- J. Provide engine exhaust piping, where not factory installed.
  - 1. Include piping expansion joints, piping insulation, thimble, condensation trap/drain, rain cap, hangers/supports, etc. as indicated or as required.
  - 2. Do not exceed manufacturer's maximum back pressure requirements.
- K. Install exhaust silencer, where not factory installed.
- L. Provide grounding and bonding in accordance with Section 26 05 26.
- M. Identify system wiring and components in accordance with Section 26 05 53.

### **3.03 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Provide services of a manufacturer's authorized representative to prepare and start systems and perform inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.
- C. Notify Owner and Architect at least two weeks prior to scheduled inspections and tests.
- D. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
- E. Provide all equipment, tools, and supplies required to accomplish inspection and testing, including load bank and fuel.
- F. Preliminary inspection and testing to include, at a minimum:
  - 1. Inspect each system component for damage and defects.
  - 2. Verify tightness of mechanical and electrical connections are according to manufacturer's recommended torque settings.
  - 3. Check for proper oil and coolant levels.
- G. Prepare and start system in accordance with manufacturer's instructions.
- H. Perform acceptance test in accordance with NFPA 110.
- I. Inspection and testing to include, at a minimum:
  - 1. Verify compliance with starting and load acceptance requirements.
  - 2. Verify voltage and frequency; make required adjustments as necessary.
  - 3. Verify phase sequence.
  - 4. Verify control system operation, including safety shutdowns.
  - 5. Verify operation of auxiliary equipment and accessories (e.g. battery charger, heaters, etc.).
  - 6. Perform load tests in accordance with NFPA 110 (1.5 hour building load test followed by 2 hour full load test).
- J. Provide field emissions testing where necessary for certification.
- K. Sound Level Tests: Measure sound levels for compliance with specified requirements. Identify and report ambient noise conditions.
- L. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

- M. Submit detailed reports indicating inspection and testing results and corrective actions taken.

**3.04 CLEANING**

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

**3.05 CLOSEOUT ACTIVITIES**

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. See Section 01 79 00 - Demonstration and Training, for additional requirements.
- C. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
  - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
  - 2. Provide minimum of 2 hours of training.
  - 3. Instructor: Manufacturer's authorized representative.
  - 4. Location: At project site.
- D. After successful acceptance test and just prior to Substantial Completion, replace air, oil, and fuel filters.

**3.06 PROTECTION**

- A. Protect installed engine generator system from subsequent construction operations.

**END OF SECTION 26 32 13**

