

SECTION 16621 - STANDBY GENERATOR SETS

Electrical Code Compliance: Comply with applicable local code requirements of the authority having jurisdiction and NEC Articles 517, 700, 701, and 702 pertaining to construction and installation of emergency and standby systems.

NFPA Compliance: Comply with applicable requirements of NFPA 37, "Installation and Use of Stationary Combustion Engines and Gas Turbines," NFPA 99, "Standard for Health Care Facilities," and NFPA 101, "Code for Safety to Life from Fire in Buildings and Structures."

UL Compliance: Comply with applicable requirements of UL 1008, "Automatic Transfer Switches," UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors," and UL 486B, "Wire Connectors for Use with Aluminum Conductors."

NEMA Compliance: Comply with applicable requirements of NEMA's Stds Pub No. 250, "Enclosures for Electrical Equipment (1000-Volts Maximum)."

IEEE Compliance: Comply with applicable portions of IEEE Std 446, "IEEE Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications."

Manufacturers: One of the following (for each rating of generator set):

Caterpillar Tractor Co
Generac.
Katolite
Kohler Co.
Onan Corp; Div of McGraw-Edison Co.

Generator Sets:

General: Except as otherwise indicated, provide manufacturer's standard propane or diesel engine-driven generator set and auxiliary equipment as indicated by published product information, and as required for a complete installation.

Courthouse Genset

Except as otherwise indicated, provide manufacturer's standard engine-driven generator set, designed to operate on diesel fuel, and auxiliary equipment as indicated by published product information, and as required for a complete installation.

Engine-Driven Generator: Provide packaged electrically turbocharged engine-driven generator assembly unit as indicated, with a Standby rating of 250 KW, with an upsized, 125 deg C permanent magnet alternator, at an electronically governed speed of 1800 RPM, and rated 80 percent power factor for continuous operation, 120/208 volt, 3-phase, 4-wire, 60 Hz, , at 105 deg F. Equip generator with 4-cycle, 6 or 8-cylinder, 1800 RPM, engine, designed to operate on diesel fuel.

Provide skid mounted double wall oil storage tank with built-in leak detection and alarms. Storage tank to contain a minimum of 24 Hours of fuel storage at 100% loading.

Public Health Building Genset

Propane Engine-Driven Generator: Provide packaged electrical power, liquid propane engine-driven generator assembly unit with a Standby rating of 70 KW, 88 kVA, with a 125 deg C, with an upsized alternator, at an **electronic** governed speed of 1800 RPM, and rated 80 percent power factor for continuous operation, 120/208 volt, 3-phase, 4-wire, 60 Hz, at 105 deg F ambient temperature. Equip generator with 6-cycle, 1800 RPM, liquid propane fired engine.

ENGINE-GENERATOR SET ACCESSORIES:

Provide a "Quiet Site II" (75dBA @ 7 meters), factory insulated, weather-protective housing for each generator. All electrical connections to be completely enclosed within the enclosure. Enclosure to come complete with factory installed and wired automatic motor operated intake and exhaust louvers which permit proper cooling, and removable access cover for controller and service points. **EXHAUST MUFFLER TO BE HOUSED INSIDE THE WEATHER-PROTECTIVE HOUSING, WITHOUT EXCEPTION.**

Provide the following generator main circuit breakers:

Courthouse

One (1) 1000A/3PSN, 250 Volt generator main circuit breaker disconnect, complete with lugs for four (4) sets of 350 MCM copper conductors.

Public Health Building

One (1) 300A/3PSN, 250 Volt generator main circuit breaker disconnect, complete with lugs for one (1) set of 500 MCM copper conductors.

Provide the following auxiliary devices:

Provide fully automatic equalizing battery charger with Float/Equalize switch and flush mounted A.C meter and D.C. meter, and 6 Amp output.

Provide 120 Volt battery protective heater.

Provide engine water jacket heater, of standard wattage and voltage indicated, with thermostatic controls to maintain engine coolant at proper temperature to fulfill start-up requirements of NFPA.

Provide two (2) commercial specification grade, GFI receptacles inside generator housing on a separate breaker/switch.

Provide one (1) 100W incandescent, enclosed metal fixture with switch at each access door.

Provide two (2) 70 Watt Metal Halide wall pak light fixtures on the outside of the enclosure with a snap switch disconnect inside the enclosure.

Microprocessor based control panel with digital readouts.

Extend conduit and control wiring from existing automatic transfer switch (ATS) to generator enclosure for "start" contacts and "source" identification. Also, extend additional control conductors from generator control panel to ATS for a remote 16 light annunciator panel. Verify number of conductors required with equipment supplier.

Provide concrete support pad that extends a minimum of 6" on all sides of enclosure, with anchor bolts of galvanized steel, of types and sizes as shown on the drawings. Provide Hilti chemical action type anchor bolts of galvanized steel, to securely mount generator base to concrete floor.

Installation:

Install standby engine-driven generator units as indicated, in accordance with the equipment manufacturer's written instructions, and with recognized industry practices, to ensure that engine-generator units fulfill requirements. Comply with NFPA and NEMA standards pertaining to installation of engine-generator sets and accessories.

Coordinate with other work, including raceways, electrical boxes and fittings, LP piping and accessories, as necessary to interface installation of engine-generator equipment work with other work.

Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds 486A, B and the National Electrical Code.

Align shafts of engine and generator within tolerances recommended by engine-generator unit manufacturer.

Grounding: Provide equipment grounding connections for standby engine-driven generator unit as indicated. Tighten connections to comply with tightening torques specified in UL Std 486A to assure permanent and effective grounding.

FIELD QUALITY CONTROL:

Start-up Testing:

NFPA 110 "ACCEPTANCE TEST" & "FULL LOAD TEST".

Engage local equipment manufacturer's representative to perform a complete on-site "Installation Acceptance" test in strict accordance with NFPA 110, Section 5-13. Upon completion of the "Installation Acceptance" test, Contractor to perform the "Full Load Test" in strict accordance with NFPA 110, Section 5-13.2.5. Contractor to provide a certified **typed** copy of all required test results and logs.

NFPA 110 "Installation Acceptance" Test shall be conducted for a minimum of two (2) hours utilizing the Building Load. All required tests and observations shall be witnessed and recorded in compliance with NFPA 110 standard. All test reports shall be submitted to Engineer prior to requesting a Final Inspection of the total system.

NFPA 110 "Full Load Test" shall be conducted for a minimum of two (2) hours with a load bank connected to the generator equal to the generator equal to 100% of the nameplate KW rating. All required tests and observations shall be witnessed and recorded in compliance with NFPA 110 standard. All test reports shall be submitted to Engineer prior to requesting a Final Inspection of the total system.

Additional Tests/Checks are to include the following:

Check lubricating oil, and antifreeze in liquid cooled models for conformity to the manufacturer's recommendations under environmental conditions present.

Test prior to cranking engine for proper operation, accessories that normally function while the set is in a standby mode. Accessories include: engine heaters, battery charger, generator strip heater, remote annunciator.

Check, during start-up test mode, for exhaust leaks, path of exhaust gases outside the building, cooling air flow, movement during starting and stopping, vibration during running, normal and emergency line-to-line voltage and phase rotation.

Test, by means of simulated power outage, automatic start-up by remote-automatic starting, transfer of load, and automatic shut-down. Prior to this test adjust, for proper system coordination, transfer switch timers. Monitor throughout the test, engine temperature, oil pressure, battery charge level, generator voltage, amperes, and frequency.

Upon completion of installation demonstrate capability and compliance of system with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise,

remove and replace with new units, and proceed with retesting. Initial testing and retesting to be at no cost to Owner.

Warranty: Provide a five (5) year comprehensive limited warranty. Warranty period to begin with substantial completion. Warranty to cover 100% of all mileage, labor, and parts for engine, alternator, and transfer switch. Warranty personnel and parts to be located within 50 miles of site.

Building Operating Personnel Training: Train Owner's building personnel in procedures for starting-up, testing and operating natural gas engine-driven generator sets. In addition, train Owner's personnel in periodic maintenance of batteries and preventive maintenance items.

END OF SECTION 16621