

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

REQUEST FOR PROPOSAL

ADDENDUM NO. 1

PACKAGED ENGINE GENERATOR

FOR EMERGENCY AND STANDBY POWER SUPPLY

(UNIT ONLY)

FOR

NEW (2018/2019) ORANGEBURG COUNTY DETENTION CENTER

ORANGEBURG, SOUTH CAROLINA

REQUISITION NO: FY18-0626

ISSUED JUNE 20, 2018

PROPOSER SHALL ACKNOWLEDGE RECEIPT OF ADDENDUM NO. 1 ON ADDENDUM ACKNOWLEDGEMENT
FORM OF ORIGINAL RFP REQUISITION NO. FY18-0626

To: Prospective Proposers

This addendum modifies the Request for Proposal dated June 8, 2018 only in the manner and to the extent stated herein and shown on any accompanying drawings and will become a part of the RFP Documents. Except as or otherwise indicated by this addendum all work shall be in accordance with the basic requirements of the Request for Proposal.

PROPOSER SHALL ACKNOWLEDGE RECEIPT OF ADDENDUM IN THE SPACE PROVIDED ON THE ADDENDUM ACKNOWLEDGEMENT FORM. FAILURE TO DO SO MAY CONSTITUTE INFORMALITY IN THE PROPOSAL AND/OR MAY SUBJECT THE PROPOSER TO DISQUALIFICATION.

THIS SOLICITATION DOES NOT COMMIT ORANGEBURG COUNTY TO AWARD A CONTRACT OR TO PROCURE OR CONTRACT FOR SERVICES. ORANGEBURG COUNTY RESERVES THE RIGHT TO REJECT, IN WHOLE OR PART, ANY AND ALL SUBMISSIONS IF IT IS IN THE BEST INTEREST OF THE COUNTY TO DO SO.

Addendum No. 1 consists of 19 pages

ITEM 1-1: ATTACHMENTS

The following attachments are enclosed as part of this addendum and are hereby incorporated into the Request for Proposal, Requisition No. FY18-0626.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

ATTACHMENT NO. 1A: Revised RFP Submission Form, two (2) Pages

ATTACHMENT NO. 1B: Engine Generators {Natural Gas} Specification Section 26 32 13 (14 pgs.)

CHANGES TO PROPOSAL REQUIREMENTS:

ITEM 1-2 CHANGE TO PROPOSAL REQUIREMENTS REFERENCE GENERAL INFORMATION

- a. Proposal due date is revised to Thursday, June 28, 2018, 2:00PM EST

ITEM 1-3 CHANGE TO PROPOSAL REQUIREMENTS REFERENCE PROJECT DESCRIPTION, GENERAL

- a. General

- a. Base Scope: Include costs within the proposal to provide and deliver the indicated packaged Diesel engine generator for emergency and standby power supply for the New (2018/2019) Orangeburg County Detention Center. The proposal shall include the cost for all work necessary to provide a full set of "For Construction" shop drawings. The proposal shall further include the cost for production of the indicated packaged engine generator for emergency and standby power supply required to meet the minimum standards of the Bid Documents, including but not limited to, quantity, weight, dimensions, performance, warranty and operation.
- b. Alternate Scope: Include costs within the proposal to provide and deliver the indicated packaged Natural Gas engine generator for emergency and standby power supply for the New (2018/2019) Orangeburg County Detention Center. The proposal shall include the cost for all work necessary to provide a full set of "For Construction" shop drawings. The proposal shall further include the cost for production of the indicated packaged engine generator for emergency and standby power supply required to meet the minimum standards of the Bid Documents, including but not limited to, quantity, weight, dimensions, performance, warranty and operation.

CLARIFICATIONS:

ITEM 1-4 CLARIFICATION REFERENCE THE REQUEST FOR PROPOSAL SUBMISSION FORM

- a. Remove RFP Proposal Submission Form and Replace with revised RFP Proposal Submission Form (Attachment No.1A).

ITEM 1-5 CLARIFICATION REFERENCE THE ENGINE GENERATOR FOR EMERGENCY AND STANDBY POWER SUPPLY MATERIAL

- a. Include attached Engine Generators {Natural Gas} Specifications Section 26 32 13 (Attachment No. 1B), in addition to Engine Generators {Diesel} Specification Section 26 32 13 included in RFP Requisition No. FY18-0626. Proposer shall provide both proposed costs (1) base scope cost for diesel generator, (2) alternate scope cost for natural gas generator on new RFP submission form included in this Addendum No. 1.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

ITEM 1-6 **CLARIFICATION REFERENCE BID DOCUMENTS**

- a. Copy the following links for access of New Orangeburg County Detention Center Project Contract Documents:

Drawings:

<https://www.dropbox.com/s/nq3von5odts06kd/561190%20Orangeburg%20Co%20Bid%20Drawings%2010-12-2017.pdf?dl=0>

Specification Volume 1 of 2:

<https://www.dropbox.com/s/z8dph1ye8vod5h6/561190%20Orangeburg%20Co%20Jail%20Specifications%20vol%201%2010-12-2017.pdf?dl=0>

Specification Volume 2 of 2:

<https://www.dropbox.com/s/lwc1m77wct502w4/561190%20Orangeburg%20Co%20Jail%20Specifications%20vol%202%2010-12-2017.pdf?dl=0>

ITEM 1-7 **CLARIFICATION REFERENCE PROJECT DESCRIPTION GENERAL**

- a. Proposer shall NOT include cost for installation. Installation is by others.

ITEM 1-8 **CLARIFICATION REFERENCE PROJECT DESCRIPTION BONDS**

- a. Required Payment Bond:

The proposal shall NOT include a payment bond in the amount of 100% of the proposal amount. A payment bond is not required as part of this proposal.

END OF ADDENDUM NO. 1

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

RFP Submission Form (Addendum No. 1 Attachment No. 1A)

The Vendor proposes the following in response to RFP Requisition No. FY18-0626

-
- A) Base Scope Total Lump Sum Amount: for the Diesel Packaged Engine Generator For Emergency and Standby Power Supply:
(Numerical Amount): \$ _____
(Written Amount): _____
- B) Indicate Additional Payment Terms _____

- C) Provide the time frame necessary to develop and submit the revised Shop Drawings
Incorporating reviewer comments. (Calendar Days): _____
- D) Provide the estimated lead time for Production (Calendar Days): _____
- E) Provide the estimated lead time for Delivery (Calendar Days): _____
- F) Alternate Scope Total Lump Sum Amount: for the Natural Gas Packaged Engine Generator For Emergency and Standby Power Supply:
(Numerical Amount): \$ _____
(Written Amount): _____
- G) Indicate Additional Payment Terms _____

- H) Provide the time frame necessary to develop and submit the revised Shop Drawings
Incorporating reviewer comments. (Calendar Days): _____
- I) Provide the estimated lead time for Production (Calendar Days): _____
- J) Provide the estimated lead time for Delivery (Calendar Days): _____

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

The undersigned declares that the person or persons signing this proposal is/are authorized to sign the proposal on behalf of the firm listed and to fully bind the firm listed to all the conditions and provisions thereof:

Respectfully submitted this _____ day of _____, 20____

(Name of Firm)

(Address)

By: _____
(Signature / Print Name / Title)

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

SECTION 263213 - ENGINE GENERATORS

(Addendum No 1 Attachment No. 1B)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract apply to this Section.

1.2 SUMMARY

- A. This Section includes packaged engine-generator sets for emergency and standby power supply with the following features:

1. Gas engine.
2. Unit-mounted cooling system.
3. Outdoor enclosure.

- B. Related Sections include the following:

1. Division 26 Section "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

1.3 DEFINITIONS

- A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.4 SUBMITTALS

- A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:

1. Thermal damage curve for generator.
2. Time-current characteristic curves for generator protective device.

- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
 4. Wiring Diagrams: Power, signal, and control wiring.
- C. Qualification Data: For manufacturer and testing agency.
- D. Source quality-control test reports.
1. Certified summary of prototype-unit test report.
 2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
 3. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
 4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
 5. Report of sound generation.
 6. Report of exhaust emissions showing compliance with applicable regulations.
 7. Certified Torsional Vibration Compatibility: Comply with NFPA 110.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.
- G. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with ASME B15.1.
- C. Comply with NFPA 37.
- D. Comply with NFPA 70.
- E. Comply with NFPA 110 requirements for Level 1 emergency power supply system.
- F. Comply with UL 2200.
- G. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

- H. Noise Emission: Less than 75 dBA of noise 23 feet from generator due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
 - 1. Ambient Temperature: Minus 15 to plus 40 deg C.
 - 2. Relative Humidity: 0 to 95 percent.
 - 3. Altitude: Sea level to 1000 feet (300 m).

1.7 COORDINATION

- A. Coordinate size and location of concrete bases for package engine generators, Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Caterpillar; Engine Div.- Basis of Design
 - 2. Generac Power Systems, Inc.
 - 3. Kohler Co.; Generator Division.
 - 4. Onan/Cummins Power Generation; Industrial Business Group.
 - 5. Spectrum Detroit Diesel.

2.2 ENGINE-GENERATOR SET

- A. Factory-assembled and -tested, engine-generator set.
- B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.
- C. Capacities and Characteristics:
 - 1. Power Output Ratings: Nominal ratings as indicated, with capacity as required to operate as a unit as evidenced by records of prototype testing.
 - 2. Output Connections: Three-phase, four wire.
 - 3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step- load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.3 ENGINE

- A. Fuel: Natural Gas.
- B. Rated Engine Speed: 1800 rpm.
- C. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).
- D. Lubrication System: The following items are mounted on engine or skid:
1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
 2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
 3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- E. Engine Fuel System:
1. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.
- F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

- G. Governor: Adjustable isochronous, with speed sensing.
- H. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator- set mounting frame and integral engine-driven coolant pump.
1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
 2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
 3. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
 4. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.
 - a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
 - b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.
- I. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.
1. Minimum sound attenuation of 25 dB at 500 Hz.
 2. Sound level measured at a distance of 23 feet (3 m) from exhaust discharge after installation is complete shall be 75 dBA or less.
- J. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.
- K. Starting System: 24-V electric, with negative ground.
1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
 2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
 3. Cranking Cycle: As required by NFPA 110 for system level specified.
 4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least three times without recharging.
 5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
 6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article. Include accessories required to support and fasten batteries in place.
 7. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

- a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
- b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
- c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
- d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
- e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
- f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.4 CONTROL AND MONITORING

- A. Provide a fully solid-state, microprocessor based, generator set control. The control panel shall be designed and built by the engine manufacturer. The control shall provide all operating, monitoring, and control functions for the generator set.
- B. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.
- C. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator- set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.
- D. Configuration: Operating and safety indications, protective devices, basic system controls, engine gages, instrument transformers, generator disconnect switch or circuit breaker, and other indicated components shall be grouped in a combination control and power panel. Control and monitoring section of panel shall be isolated from power sections by steel barriers.
- E. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:
 1. AC voltmeter.
 2. AC ammeter.
 3. AC frequency meter.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

4. DC voltmeter (alternator battery charging).
 5. Engine-coolant temperature gage.
 6. Engine lubricating-oil pressure gage.
 7. Running-time meter.
 8. Ammeter-voltmeter, phase-selector switch(es).
 9. Generator-voltage adjusting rheostat.
 10. Start-stop switch.
 11. Overspeed shutdown device.
 12. Coolant high-temperature shutdown device.
 13. Coolant low-level shutdown device.
 14. Oil low-pressure shutdown device.
 15. Generator overload.
- F. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.
- G. Connection to Data Link: A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication is reserved for connections for data-link transmission of indications to remote data terminals. Data system connections to terminals are covered in Division 26 Section "Electrical Power Monitoring and Control."
- H. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.
1. Low oil pressure
 2. High water temperature
 3. Low coolant level
 4. Overspeed
 5. Overcrank
 6. Emergency stop depressed
 7. Approaching high coolant temperature
 8. Approaching low oil pressure
 9. Low coolant temperature
 10. Low voltage in battery
 11. Control switch not in auto. position
 12. Low fuel main tank
 13. Battery charger ac failure
 14. High battery voltage
 15. Voltage regulator alarm
 16. Voltage regulator fault
- I. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush- mounting type to suit mounting conditions indicated.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

- J. Remote Start-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push buttons shall be protected from accidental operation. This may be incorporated into the Remote Alarm Annunciator, otherwise mount adjacent to the Remote Alarm Annunciator.

- K. Functional Requirements
 - 1. The following functionality shall be integral to the control panel.
 - 2. Audible horn for alarm and shutdown with horn silence switch
 - 3. Standard ISO labeling
 - 4. Remote start/stop control
 - 5. Local run/off/auto/cooldown snap action control switch
 - 6. Cooldown timer
 - 7. Lamp test
 - 8. Push button emergency stop button
 - 9. Circuit breaker open / close pushbutton

2.5 GENERATOR OVERCURRENT AND FAULT PROTECTION

- A. Generator Circuit Breaker: Molded-case, electronic-trip type; 100 percent rated; complying with UL 489.
 - 1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
 - 2. Trip Settings: Selected to coordinate with generator thermal damage curve.
 - 3. Mounting: Adjacent to or integrated with control and monitoring panel
 - 4. Insulated case, electrically operated, 3 pole, NEMA 1/IP22. Breaker shall utilize a solid-state trip unit. The breaker shall be UL/CSA Listed, connected to engine/generator safety shutdowns. Breakers shall be housed in an extension terminal box which is isolated from vibrations induced by the generator set. Mechanical type lugs, sized for the circuit breaker feeders shown on drawing, shall be supplied on the load side of breaker.

- B. Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time, and predict when thermal damage of alternator will occur. When signaled by generator protector or other generator-set protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector shall perform the following functions:
 - 1. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
 - 2. Under single or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.
 - 3. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the generator set.
 - 4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

2.6 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

- A. Comply with NEMA MG 1.
- B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C. Electrical Insulation: Class H or Class F.
- D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.
- E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.
- F. Enclosure: Dripproof.
- G. Instrument Transformers: Mounted within generator enclosure.
- H. Digital Voltage Regulator:
 - 1. The digital voltage regulator shall be microprocessor based with fully programmable operating and protection characteristics and shall maintain generator output voltage within +/- 0.25% for any constant load between no load and full load.
 - 2. The regulator shall be capable of sensing true RMS in three phases of alternator output voltage, or operating in single phase sensing mode.
 - 3. The regulator shall provide an adjustable dual slope regulation characteristic in order to optimize voltage and frequency response for site conditions.
 - 4. The voltage regulator shall communicate with the Generator Control Panel via a communication network with generator voltage adjustments made via the controller keypad. Additionally, the controller shall allow system parameter setup and monitoring, and provide fault alarm and shutdown information through the controller. A PC-based user interface shall be available to allow viewing and modifying operating parameters in a windows compatible environment.
- I. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.
- J. Subtransient Reactance: 12 percent, maximum.

2.7 GASEOUS FUEL SYSTEM

- A. Gas Train: Comply with NFPA 37.
- B. Engine Fuel System:
 - 1. Natural-Gas, Vapor-Withdrawal System:
 - a. Carburetor.
 - b. Secondary Gas Regulators: One for each fuel type, with atmospheric vents piped to building exterior.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

- c. Fuel-Shutoff Solenoid Valves: NRTL-listed, normally closed, safety shutoff valves; one for each fuel source.
- d. Fuel Filters: One for each fuel type.
- e. Manual Fuel Shutoff Valves: One for each fuel type.
- f. Flexible Fuel Connectors: Minimum one for each fuel connection.
- g. Fuel change gas pressure switch.

2.8 OUTDOOR GENERATOR-SET ENCLOSURE

- A. The complete diesel engine generator set, including generator control panel, engine starting batteries and fuel oil tank, shall be enclosed in a factory assembled, weather protective enclosure mounted on the fuel tank base meeting the sound requirement specified herein.
- B. A weather resistant enclosure of steel with electrostatically applied powder coated baked polyester paint. It shall consist of a roof, side walls, and end walls. Fasteners shall be either zinc plated or stainless steel. Handles shall be lockable with all doors keyed alike and hinges shall be zinc die cast or stainless steel. Access doors shall be hinged, have hold open devices and can be easily removed without the use of tools. Intake openings shall be screened to prevent the entrance of rodents or pests.
- C. Lube oil and coolant drains shall be extended to the exterior of the enclosure and terminated with drain valves. Cooling fan and charging alternator shall be fully guarded to prevent injury.

2.9 MOTORS

- A. General requirements for motors are specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
 - 1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
 - 2. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.

2.10 VIBRATION ISOLATION DEVICES

- A. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with restraint.
 - 1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
 - 2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
 - 3. Minimum Additional Travel: 50 percent of required deflection at rated load.
- B. Lateral Stiffness: More than 80 percent of rated vertical stiffness.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

1. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.11 FINISHES

- A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.12 SOURCE QUALITY CONTROL

- A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.

- B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Full load run.
3. Maximum power.
4. Voltage regulation.
5. Transient and steady-state governing.
6. Single-step load pickup.
7. Safety shutdown.
8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.
9. Report factory test results within 10 days of completion of test.

2.13 ACCESS STAIRS

- A. If generator controls are located more than 6 feet above the finished grade, provide a permanently mounted, exterior rated, OSHA approved platform and stair as required to access the controls for the generator. Provide a safety chain with padlocking capability across the entrance to the stair to deter unauthorized access to the platform.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

- B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.
- B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.
- C. Install packaged engine generator with restrained spring isolators having a minimum deflection of 1 inch (25 mm) on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases.
- D. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.
- E. Install platform and stair after the generator has been placed and set but before witness testing by the owner and/or the Architect

3.3 CONNECTIONS

- A. Piping installation requirements are specified in Division 23 Sections. Drawings indicate general arrangement of piping and specialties.
- B. Connect engine exhaust pipe to engine with flexible connector.
- C. Connect fuel piping to engines with a gate valve and union and flexible connector.
- D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 IDENTIFICATION

- A. Identify system components according to Division 26 Section "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Tests and Inspections:

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
 3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
 - a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
 - b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
 - c. Verify acceptance of charge for each element of the battery after discharge.
 - d. Verify that measurements are within manufacturer's specifications.
 4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float- charging conditions.
 5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
 6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
 7. Exhaust Emissions Test: Comply with applicable government test criteria.
 8. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases and verify that performance is as specified.
 9. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
 10. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at four locations 50 feet from generator, and compare measured levels with required values.
- B. Coordinate tests with tests for transfer switches and run them concurrently.
- C. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.
- D. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
- E. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
- F. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

ORANGEBURG NEW DETENTION FACILITY
ORANGEBURG, SC
APN: 561190

- G. Remove and replace malfunctioning units and retest as specified above.
- H. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.
- I. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.6 DEMONSTRATION

- A. Contractor shall train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 263213