

Schedule A Supplementary Generator Specifications

1.0 GENERAL

- 1.1 Description of systems (total of two)
 - 1.1.1 Each generator system will consist of:
 - 1.1.1.1 Diesel engine with alternator.
 - 1.1.1.2 Complete unit common base plate.
 - 1.1.1.3 Unit mounted generator controls.
 - 1.1.1.4 Engine driven fan with unit mounted radiator.
 - 1.1.1.5 Starter system battery charger and battery.
 - 1.1.1.6 Fuel supply system with leak containment.
 - 1.1.1.7 Fuel storage capable of being refilled while in operation.
 - 1.1.1.8 Output breaker in common enclosure with generator control.
 - 1.1.1.9 Enclosure shall be tamperproof with limit switches on all doors and panels to indicate entry, and a dry-contact signal to monitor same.
 - 1.1.1.10 Factory testing.
 - 1.1.1.11 Site delivery.
 - 1.1.1.12 Site commissioning and instruction/demonstration.
 - 1.1.2 Generator controllers to include automatic shutdown, visual indicators, and dry-contact signals to indicate each of:
 - 1.1.2.1 Low oil pressure pre-shutdown and shutdown alarms.
 - 1.1.2.2 High coolant temperature pre-shutdown and shutdown alarms.
 - 1.1.2.3 Overspeed shutdown alarm.
 - 1.1.2.4 Overcrank shutdown alarm.
 - 1.1.2.5 Overload shutdown alarm.
 - 1.1.2.6 Over temperature condition in alternator.
 - 1.1.3 Generator set to include systems, visual indicators, and interface signals to indicate each of:
 - 1.1.3.1 Fuel level indication and low fuel warning.
 - 1.1.3.2 Enclosure intrusion warning.
 - 1.1.3.3 Starter battery/charging system fault.
 - 1.1.4 Generator set to include visual indicators for each of:
 - 1.1.4.1 Engine Runtime in Hours
 - 1.1.4.2 Output Currents, Voltage and Frequency
 - 1.1.5 Generator set to include remote manual emergency stop facility.
- 1.2 Shop Drawings (per generator system)
 - 1.2.1 Submit drawings for each generator in PDF format.

- 1.2.2 Production shall not commence until all applicable drawings have been reviewed and accepted by the Regional District.
 - 1.2.3 Incomplete drawings will be returned without review. Only shop drawings for the specific equipment being supplied will be accepted. Generic or standard catalog data will not be accepted.
 - 1.2.4 Shop drawings to include:
 - 1.2.4.1 Schematic power and control diagrams showing generator, voltage regulator, battery, battery charger, governor and all engine/generator protection and controls. These drawings should indicate all field connection terminals and requirements.
 - 1.2.4.2 Make and model of engine, alternator, governor, voltage regulator, battery, battery charger, block heater/thermostat, seismic equipment, vibration and/or acoustic isolators, control devices, power components and complete technical and performance data.
 - 1.2.4.3 Confirmation (test results) that generator will comply with 100% load performance requirements.
 - 1.2.4.4 Dimension and weight information for engine, alternator, controls and all accessories.
 - 1.2.4.5 Dimensions for all anchoring, including anchor sizing required.
 - 1.2.4.6 Fuel delivery system including flow rates, fuel consumption and relevant data.
 - 1.2.4.7 Confirmation that the required engine power at 100% rated load continuous operation condition (0.8 power factor) does not exceed the engine manufacturers recommended standby power rating.
 - 1.2.4.8 Manufacturers published standby power output curves.
 - 1.2.4.9 Description of generator set operation including, as appropriate:
 - Automatic starting and stopping, including time from start of cranking until full rated voltage and frequency are achieved.
 - Automatic shutdown and alarming (see sections 1.1.2 and 1.1.3)
 - Manual remote emergency stop activation and rearming.
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- 1.3 Operation and Maintenance Data (per generator system)
 - 1.3.1 Provide four (4) sets of operation and maintenance data for each generator to incorporate into an operations manual.
 - 1.3.2 Operation and maintenance manuals shall include, for each generator:
 - 1.3.2.1 Operation and maintenance instructions for engine, alternator, control panel, automatic transfer switch or manual transfer switch (as equipped), starter battery, battery charger, fuel system, exhaust system and accessories, to allow for effective operation, maintenance and repairs.
 - 1.3.2.2 Technical data, including but not limited to:
 - Illustrated parts list with part catalogue numbers.

- Schematic diagram of electrical controls.
- Flow diagrams for fuel system, lubricating system and cooling system.
- Maintenance and overhaul instructions and schedules.
- Precise details for adjustment and setting of time delays or sensing controls which may require on site adjustments.

1.3.2.3 Certified copy of test results.

1.3.2.4 Copy of manufacturer's warranty.

1.3.2.5 Complete set of As Built drawings, including dimensions, weights, schematics, and wiring diagrams. Also, a complete copy of installation instructions.

1.4 Maintenance Materials (per Generator system)

1.4.1 Provide maintenance materials, to be included in generator delivery, as listed below:

1.4.1.1 Two (2) fuel filter replacement elements

1.4.1.2 Two (2) lube oil filter replacement elements

1.4.1.3 Two (2) air cleaner filter elements

1.4.1.4 Two (2) sets of fuses for control panel

1.4.1.5 Two (2) of each type of indicating lamp

1.4.1.6 One (1) set of fan belts

1.4.1.7 Special tools for unit servicing

1.5 Source Quality Control (per Generator system)

1.5.1 Factory test generator including engine, alternator, governor, control panel and accessories.

1.5.2 The generator and accessories are to be manufactured and tested in accordance with the manufacturer's quality assurance program. The programs will comply with the intent of CSA CAN3-Z299.3 or ISO 9001. Provide copy of the manufacturer's quality assurance procedures manual.

1.5.3 The generator will be CSA approved, and the equipment will bear a label showing that it is approved for use in Canada.

1.5.4 Perform the following tests:

1.5.4.1 Perform functional and load tests to verify conformance with specifications, codes and performance requirements.

1.5.4.2 Automatic shutdown devices and trouble alarms. Tests to include actual out-of-limits operation with protective devices in their installed and in-services condition to prove sensor operation within manufacturer's recommended limits. Jumper testing sensors or remote simulation testing to prove shutdowns is not permissible.

1.5.4.3 Automatic start-up; transfer to load, transfer back to normal power, cool down and shut down.

1.5.4.4 Demonstrate that battery reverts to high rate charge after cranking.

1.6 Warranty

1.6.1 Warranty period shall be 2 years or 300 hours of run time.

2.0 PRODUCTS

2.1 Diesel engine: to ISO 3046-1

2.1.1 Engine standard product of current manufacture, from company regularly engaged in production of such equipment.

2.1.2 Capacity:

2.1.2.1 Size the generators based on rate power in kW at rated speed, after adjustment for system losses in auxiliary equipment necessary for engine operation; to be calculated as follows:

- Sechelt Landfill combined maximum loads are:
 - 25 kW
- Pender Harbour Transfer Station combined maximum loads are:
 - 7 to 10 kW

2.1.2.2 Sechelt Landfill generator and controller to be designed and equipped for automatic standby power service, including Hand/Off/Auto Start warning indicator and dry-contact signal for same.

Load parameters:

- 25kW Prime Output (20kW is the absolute minimum; if so, a 1 minute overload at 150% of normal rated current **must** be tolerated)
- 240/120 Voltage, Single Phase, 3 wire, 60 hertz
- Fuel Tank to supply up to **NNN hours** of continuous uninterrupted operation

2.1.2.3 Pender Harbour Transfer Station generator and controller to be designed and equipped for manual transfer service.

Load parameters;

- 7kW to 10kW Prime Output (7kW is the absolute minimum; if so, a 1 minute overload at 150% of normal rated current **must** be tolerated)
- 240/120 Voltage, Single Phase, 3 wire, 60 hertz
- Fuel Tank to supply up to **NNN hours** of continuous uninterrupted operation.

2.1.2.4 Under following site conditions:

- Altitude: 500 m
- Ambient temperature: 5 to 35 degrees Celsius

- 2.1.3 Automatic Transfer Switch (Sechelt Landfill)
 - 2.1.3.1 Suitable for loads specified in section 2.1.2.2
 - 2.1.3.2 Automatic transfer equipment to be wall mounted.
- 2.1.4 Cooling System:
 - 2.1.4.1 To maintain manufacture's recommended engine temperature range at 10% continuous overload in ambient temperature of 40 degrees Celsius.
 - 2.1.4.2 (*Sechelt only*) Block heater: thermostatically controlled lube oil or liquid coolant heater connected to line side of automatic transfer switch to allow engine to start in outdoor ambient temperature 0 degrees Celsius.
 - 2.1.4.2.1 Switch and fuse in heater circuit, mounted in engine-alternator control and fed from line side of automatic transfer switch.
- 2.1.5 Fuel:
 - 2.1.5.1 Type A fuel oil: CAN/CGSB-3.6
 - 2.1.5.2 Generator to function using "marked" ultra-low sulfur diesel as a fuel source.
- 2.1.6 Lubrication:
 - 2.1.6.1 Mechanical hydraulic with:
 - 2.1.6.1.1 Pressure lubricated by engine driven pump.
 - 2.1.6.1.2 Lube oil filter: replaceable, full flow type, removable without disconnecting piping.
 - 2.1.6.1.3 Lube oil cooler.
 - 2.1.6.1.4 Engine sump drain valve and extension to perimeter of base.
 - 2.1.6.1.5 Oil level dipstick.
- 2.1.7 Starting system:
 - 2.1.7.1 Positive shift, gear engaging starter 12 or 24 VDC.
 - 2.1.7.2 Cranking
 - 2.1.7.3 Lead acid, 12 or 24 V storage batteries with sufficient capacity to crank engine for 1 minute at 0 degrees Celsius without using more than 25% of ampere hour capacity.
 - 2.1.7.4 Battery charger: constant voltage, solid state, two stage from trickle charge at standby to boost charge after use. Regulations: plus or minus 1% output for plus or minus 10% input variation. Equipped with dc voltmeter, dc ammeter and on-off switch. Minimum charger capacity: 7 A.
- 2.1.8 Guards to protect personnel from hot and moving parts. Locate guards so that normal daily maintenance inspections can be undertaken without their removal.
- 2.1.9 Mechanism to enable lock out of equipment.

- 2.1.10 Dip tray.
- 2.2 Alternator
 - 2.2.1 Alternator to ANSI/NEMA MG1.
 - 2.2.2 Ratings:
 - 2.2.2.1 240/120 Voltage, Single Phase, 3 wire, 60 Hz, +/- 1% voltage regulation
 - 2.2.3 Resolving field, brushless, single bearing.
 - 2.2.4 Drip proof.
 - 2.2.5 Amortisseur windings.
 - 2.2.6 Synchronous type.
 - 2.2.7 Dynamically balanced rotor permanently aligned to engine by flexible disc coupling.
 - 2.2.8 Exciter: rotating brushless permanent magnet.
 - 2.2.8.1 EEMAC class H insulation on windings.
- 2.3 Control Panel
 - 2.3.1 Totally enclosed.
 - 2.3.2 Microprocessor based
 - 2.3.3 Lamp test button
- 2.4 Steel Mounting Base
 - 2.4.1 Complete generating set to be mounted on structural steel base of sufficient strength and rigidity to protect assembly from stress or stain during transportation, installation and under operating conditions on suitable level surface.
 - 2.4.2 Assembly fitted with vibration isolators and control console resiliently mounted.
 - 2.4.3 Sound insulation pads for installation between generator and concrete base.
 - 2.4.4 Sound reducing/dampening enclosure.
- 2.5 Equipment Identification
 - 2.5.1 Equipment to be clearly identified, with permanent labels.
 - 2.5.2 Control panel:
 - 2.5.2.1 Nameplates for controls such as alternator breakers and operation selector switch.
 - 2.5.2.2 Nameplates for meters, alarms, indicating lights and minor controls.
- 2.6 Fabrication
 - 2.6.1 Shop assemble generating unit including:
 - 2.6.1.1 Base.
 - 2.6.1.2 Engine and radiator.
 - 2.6.1.3 Alternator.
 - 2.6.1.4 Control panel.
 - 2.6.1.5 Battery and charger.

2.6.1.6 Exhaust system.

3 EXECUTION

- 3.1 Installation (for each generator)
 - 3.1.1 Locate generator and install as indicated.
 - 3.1.2 Remove all shipping blocks, packing, etc.
 - 3.1.3 Start generator and test to ensure correct performance of components.

- 3.2 Field Quality Control (for each generator)
 - 3.2.1 Perform tests as specified herein.
 - 3.2.1.1 Operation of all components to be demonstrated including:
 - 3.2.1.1.1 battery charger reverts to high rate charge after cranking;
 - 3.2.1.1.2 alarm devices;
 - 3.2.1.1.3 automatic starting of set and automatic transfer of load on failure of normal power;
 - 3.2.1.1.4 automatic shutdown of engine on resumption of normal power;
 - 3.2.1.1.5 controls and all other components making up the overall system.

 - 3.2.2 Provide fuel for testing and top up fuel tank after testing.