

1.0 GENERAL

.1 Requirements

- .1 Power generating equipment should generally be designed for an optimum run time of 72 hours, coordinate and review requirements with BCIT.
- .2 Location for refuelling must be coordinated for ease of access by refuelling truck.
- .3 Locate genset where there will be minimal impact on building aesthetics and occupants (noise concerns).
- .4 Review fuel requirements with BCIT on a project-specific basis.

.2 Generator Enclosure

- .1 Provide custom fabricated steel enclosure for generator. Lockable, vandal resistant complete with automatic intake and exhaust air dampers.
- .2 Provide vertically hinged access doors where required to access equipment for routine operation and maintenance of generator, engine and control panel.
- .3 Provide intake and exhaust openings, sized to generator manufacturer's recommendations, complete with automatic motorized damper, silencers, hood and bird screen.

.3 System Description

- .1 Power Generation Diesel: Generating system consists of:
 - .1 Diesel engine.
 - .2 Alternator.
 - .3 Alternator control panel.
 - .4 Automatic transfer equipment.
 - .5 Battery charger and battery.
 - .6 Automatic engine room ventilation system.
 - .7 Fuel supply system.
 - .8 Exhaust system.
 - .9 Steel mounting base.
 - .10 Synchronizing panel.
 - .11 Manual bypass switch.
 - .12 System designed to operate as emergency standby.

- .2 Automatic Transfer Switch: Automatic load transfer equipment to:
 - .1 Monitor voltage on phases of normal power supply.
 - .2 Initiate cranking of standby generator unit on normal power failure or abnormal voltage on any one phase below pre-set adjustable limits for adjustable period of time.
 - .3 Transfer load from normal supply to standby unit when standby unit reaches rated frequency and voltage pre-set adjustable limits.
 - .4 Transfer load from standby unit to normal power supply when normal power restored, confirmed by sensing of voltage on phases above adjustable pre-set limit for adjustable time period.
 - .5 Shutdown standby unit after running unloaded to cool down using adjustable time delay relay.
 - .6 Integrate with Building Management System (BMS). Coordinate exact requirements with BCIT facilities, however the following are generally required:
 - .1 Run Time.
 - .2 Low Fuel.
 - .3 Other Alarms.

.4 Submittals

- .1 Submit in accordance with Section 01 33 00 Submittal Procedures.
- .2 Product Data: in addition to manufacturer's product literature and WHIMIS MSDS sheets;
 - .1 Product characteristics, performance criteria, physical size, horsepower, watt rating, limitations and finish.
- .3 Shop Drawings: Submit stamped and signed by professional engineer, registered or licensed in Province of British Columbia. Closeout Submittals;
 - .1 Provide maintenance data for materials for incorporation into manual specified in Section 01 78 23 Operations and Maintenance Data and 01 78 39 Project Record Documents.
 - .2 Include instructions for particular unit supplied in Operation and Maintenance Manual. Do not include general description of units manufactured by supplier. Include the following:
 - .1 Operation and maintenance instructions for engine, alternator, control panel, automatic transfer switch, manual bypass switch, battery charger, battery, fuel system, engine room ventilation system, exhaust system and accessories, to permit effective operation, maintenance and repair.
 - .2 Technical data:

Consultants are to provide complete specifications, and review these Technical Standards documents to include BCIT requirements within the specifications as applicable to the project.

- .1 Illustrated parts lists with parts catalogue numbers.
- .2 Schematic diagram of electrical controls.
- .3 Flow diagrams for:
 - .1 Fuel system.
 - .2 Lubricating oil.
 - .3 Cooling system.
- .4 Certified copy of factory test results.
- .5 Maintenance and overhaul instructions and schedules.
- .6 Precise details for adjustment and setting of time delay relays or sensing controls which require on site adjustment.

2.0 PRODUCTS

.1 Product Description

- .1 Diesel Engine:
 - .1 To be a current product to the latest design, operational, energy efficiency, and environmental standards.

.2 Equipment Identification

- .1 Provide equipment identification in accordance with Section 26 05 00 Common Work Results for Electrical and Section 26 05 53 Identification for Electrical Systems (Labeling).
- .2 Control panel:
 - .1 Nameplates for controls including alternator breakers and program selector switch.
 - .2 Nameplates for meters, alarms, indicating lights and minor controls.

.3 Accessories

- .1 Steel Mounting Base:
 - .1 Complete generating set mounted on structural steel base of sufficient strength and rigidity to protect assembly from stress or strain during transportation, installation and under operating conditions on suitable level surface.
 - .2 Assembly fitted with vibration isolators and control console resiliently mounted.
 - .3 Spring type isolators with adjustable side snubbers and adjustable for levelling.

- .4 Sound insulation pads for installation between isolators and concrete base.
- .2 Outdoor Enclosure:
 - .1 Sound attenuation of the enclosure shall not exceed 80dB at 7 meters.
 - .2 Exterior walls to be minimum 14 gauge steel with R12 rigid insulation. Interior cladding to be minimum 22 gauge steel.
 - .3 Size the enclosure to provide operating space around all equipment and clearance in front of all electrical equipment. Where applicable, provide adequate space for the automatic transfer switch. Enclosure shall fully enclose sub-base fuel tank.
 - .4 Mount enclosure on steel base-frame designed to withstand lifting (with generator and all associated equipment), transport and placement.
 - .5 Enclosure shall be fully weatherproof and constructed to withstand site conditions, including snow loading, in Burnaby, BC.
 - .6 Complete with two duplex convenience receptacles, LED lighting and connections to block heaters and battery charger.
 - .7 Where required, provide electric heater in enclosure.
 - .8 Where required by manufacturer, provide bypass duct option to warm the interior of the generator enclosure to safely operate the generator continually for 72 hours.
- .4 Finishes**
 - .1 Apply finishes in accordance with Section 26 05 00 Common Work Results for Electrical.
 - .2 Alternator control cubicle: Paint inside, exterior to match engine and alternator.
 - .3 Exhaust and inlet air hoods: International orange.
 - .4 Other ducts and racks: Grey.
 - .5 Supply 0.25 L of grey touch up enamel.
- .5 Source Quality Control**
 - .1 Factory test generator set including engine, alternator, control panels, transfer switch and accessories in presence of an Engineer.

3.0 EXECUTION**.1 Installation**

- .1 Locate guards so that normal daily maintenance inspections can be undertaken without their removal.

.2 Field Quality Control

- .1 Perform tests in accordance with Section 26 05 00 Common Work Results for Electrical.
- .2 Provide fuel for testing and leave full tanks on acceptance.
- .3 Demonstrate full operation of generator system.
- .4 Run unit on load for minimum of 4 hours to show load carrying ability, stability of voltage and frequency, and satisfactory performance of dampers in ventilating system to provide adequate engine cooling.
- .5 At end of test run, check battery voltage to demonstrate battery charger has returned battery to fully charged state.
- .6 Submittal – A testing and commissioning report shall be stamped and signed by a professional engineer registered, or licensed in Province of British Columbia.
- .7 Submittal – A fire alarm verification report for the generator signals shall be submitted by an ULC test agency.

.3 Cleaning

- .1 Clean in accordance with Section 01 74 11 Cleaning.

.4 Protection / Maintenance

- .1 Provide clearance around systems, equipment and components for observation of operation, inspection, servicing, maintenance and as recommended by manufacturer and CSA B139.

*** END OF ELECTRICAL POWER GENERATING EQUIPMENT SECTION ***