C282 Logbook-15

Emergency electrical power supply for buildings maintenance logbook

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Inspection, test, and maintenance of emergency electrical power supply for buildings

Table 2 — Weekly inspection, test, and maintenance requirements

1. Consumables:
   (a) Inspect auxiliary supply tank fuel level (gas pressure) and main tank level (gas pressure) (if applicable). There shall be a minimum supply of 2 h (see Clause 7.3.1).
   (b) Inspect lubricating oil level.
   (c) Inspect engine coolant level.
   (d) Inspect engine, generator, fuel tank(s), and cooling systems for leakage.
   (e) Inspect for proper operation of fuel transfer pump (if applicable).
   (f) Inspect fuel filter for contamination if filter is equipped with a transparent bowl.
2. Starter system:
   (a) Inspect electric starter for cleanliness, mounting, and terminal security.
   (b) Air starter:
      (i) Inspect air tanks for pressure.
      (ii) Inspect valves for leakage.
      (iii) Test auxiliary engine and compressor for proper operation.
      (iv) Bleed off any condensation.
3. Batteries and charging equipment:
   (a) Inspect all battery cells for correct electrolyte fill level (applicable to vented or flooded lead-acid batteries only).
   (b) Test all battery cells for correct electrolyte specific gravity (applicable to vented or flooded lead-acid batteries only).
   (c) Inspect electrical connections for tightness and evidence of corrosion.
   (d) Inspect battery for cleanliness and dryness between terminals.
   (e) Inspect charger electrical connections for cleanliness and tightness.
4. Engine:
   (a) Test lubricant and/or coolant heaters for proper operation.
   (b) Inspect governor control linkages and oil level (if applicable).
   (c) Inspect fuel pump oil sump (if applicable).
   (d) Inspect fan belts for correct tension and wear.
5. Control panel:
   (a) Inspect control panel covers for security.
   (b) Test annunciator lamps to confirm that they are operational.
   (c) Inspect control panel settings (ensure that the unit is ready for automatic start-up).
   (d) Test remote visual and audible trouble signals at the building fire alarm panel.
6. Inspect air control louvre settings to ensure proper operation.
7. Test emergency lighting unit(s).
8. Verify whether room temperature is above 10 °C.
9. Inspect generator and transfer switch room(s) for cleanliness and accessibility to all components of the emergency system.
10. Correct all defects found during inspections and tests.
11. Record all inspections, tests, and corrective actions in the log (see Clause 11.5.3).

Note: *The work described in this Table shall be carried out by a competent person or individuals trained by the system manufacturer.*

Table 3 — Monthly (weekly in health care facilities) inspection, test, and maintenance requirements

1. Complete all items specified in Table 2.
2. Test and verify the entire system as follows:
   (a) Simulate a failure of the normal electrical supply to the building.
   (b) Verify that the battery charger current output increases while cranking.
   (c) Operate the system under at least 30% of the rated load for 60 min.
   (d) Operate all automatic transfer switches under load.
   (e) Inspect brush operation for sparking, if applicable.
   (f) Inspect for bearing seal leakage.
   (g) Inspect for correct operation of all auxiliary equipment, e.g., radiator shutter control, coolant pumps, fuel transfer pumps, oil coolers, and engine room ventilation system(s).
   (h) Record the readings for all instruments in the log (see Clause 11.5.3) and verify that they are normal.
   (i) Drain the exhaust system condensate trap.
3. Inspect block heater hoses and wires.
4. Correct all defects found during inspections and tests.
5. Record all inspections, tests, and corrective actions in the log (see Clause 11.5.3).
6. Inspect all electrical components to ensure proper function.

Note: *The work described in this Table shall be carried out by a competent person or individuals trained by the system manufacturer.*

Table 4 — Semi-annual inspection, test, and maintenance requirements

1. Complete all items specified in Tables 2 and 3.
2. Inspect and clean engine crankcase breathers.
3. Inspect and clean all engine linkages.
4. Lubricate the engine governor and ventilation system.
5. Test protective devices for proper operation.
6. Before start-up, perform two full cranking cycles (as specified in Clauses 10.4.1 and 10.4.2). Near the end of each cycle (and while still cranking), measure and record the lowest indicated battery voltage. If the measured voltage is less than 80% of the battery's rated voltage, replace the battery. Alternatively, perform a battery load test using a suitable load tester.
7. Inspect ventilation system belt(s).
8. Correct all defects found during inspections and tests.
9. Record all inspections, tests, and corrective actions in the log (see Clause 11.5.3).

Notes:

(1) *Items 2 to 9 require special skill and shall be carried out by a competent person or individuals trained by the system manufacturer.*

(2) *For Item 5, if it is not possible to create the fault condition, a simulated fault condition should be performed if possible*

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Table 5 — Annual inspection, test, and maintenance requirements

1. Complete all items specified in Tables 2 to 4.
2. Control panel (see Clause B.23):
   (a) Open all inspection covers and inspect all electrical connections.
   (b) Test breakers for proper operation.
   (c) Clean insulators and bushings.
   (d) Test voltage regulator for proper operation.
   (e) Operate all moving parts to ensure that they move freely.
   (f) Clean and dress contacts as necessary.
   (g) Remove all dust.
   (h) Check gauge calibration.
   (i) With the generator set operating at full load (see Clause 11.3), conduct an infrared survey of all electrical connections to identify any high-resistance connections.
   (j) For off-site fueled generators, turn position-indicating gas valve to off-position to ensure valve rotates properly and that the audible alarm on generator control panel is activated.
3. Engine:
   (a) Change engine lubrication oil and filters.
   (b) Test strength of coolant and chemical protection level of coolant inhibitors.
   (c) Change fuel filters, clean strainer(s), and verify that the fuel supply valve is open.
   (d) Inspect the exhaust system. Check and record the back pressure of the exhaust system to ensure that it complies with the engine manufacturer's requirements, and compare with previous readings.
   (e) Clean and lubricate linkages.
   (f) Inspect air filters.
   (g) Inspect all mechanical connections.
   (h) Inspect all electrical connections.
   (i) Inspect all external surfaces of heat exchanger(s) and clean as necessary.
   (j) Inspect all belts and hoses and replace if necessary.
   (k Test and inspect ignition system(s). Replace any defective components.
   (l) Inspect coolant pump(s) for leaks and external wear (if belt driven, remove the belt(s) first).
4. Diesel fuel storage tank(s):
   The fuel oil in any storage tank (and auxiliary supply tank, if used) shall be tested in accordance with Clause 11.5.5, and if the fuel oil fails the test, it shall be
   (a) drained and refilled with fresh fuel in accordance with Article 6.5.1.5 of the *National Fire Code of Canada*; or
   (b) full filtered to remove water, scale, bacteria, and oxidized gums/resins in order to minimize filter clogging and ensure diesel start-up (see Clause B.24 for commentary).
   When the fuel is filtered, it shall be treated with a suitable conditioner and stabilizer to minimize degradation while in storage.
   Note: *The bottom(s) of the tank(s) shall be also tested chemically for water.*

Table 5 (Concluded)

5. Generator:
   (a) Test surge suppressor and rotating rectifier on brushless machines.
   (b) Grease bearings (replace old grease with new) (if applicable).
   (c) Clean commutator and slip rings (if applicable).
   (d) Clean rotor and stator windings using clean compressed air.
   (e) Inspect coupling bolts and alignment.
   (f) Inspect conduits for tightness.
   (g) Inspect windings at rotor and stator slots.
   (h) Inspect all electrical connections.
   (i) With the generator set operating at full load (see Clause 11.3), conduct an infrared survey of all electrical connections to identify any high-resistance connections.
6. Overcurrent protective devices:
   (a) Electrically isolate all overcurrent protective devices.
   (b) Remove all dust.
   (c) Test devices for proper operation.
   (d) While performing the full load test required by Clause 11.3, conduct an infrared survey of all electrical connections, contacts, and energized components.
7. Transfer switches:
   (a) Isolate transfer switch, open all inspection covers, and inspect all electrical connections.
   (b) Operate all moving parts to ensure that they move freely.
   (c) Clean and dress contacts as required.
   (d) Remove all dust.
   (e) Clean and lubricate linkages.
   (f) Conduct an infrared survey of all electrical connections, contacts, and energized components while under load on both the normal and the emergency side.
8. Lubricate door locks and hinges (if necessary), especially those of outdoor enclosures.
9. Conduct a 2 h full-load test (see Clause 11.3).
10. As needed, review and provide instruction on the technical requirements specified in Tables 2 to 4 with the person(s) responsible for carrying out the work.
11. Correct all defects found during inspections and tests.
12. Record all inspections, tests, and corrective actions in the log (see Clause 11.5.3).

Note: *Items 2 to 11 require special skill and shall be carried out by a competent person or individuals trained by the system manufacturer.*

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Table 6 — Quinquennial (every 5 years) inspection, test, and maintenance requirements

1. Generator:
   Inspect insulation of generator windings. Use an insulation tester (megger). The resistance in megohms should be not less than
   $$\frac{\text{Rated voltage} + 1000}{1000}$$
   If the resistance is less, dry out the insulation using the auxiliary heat process.
2. Engine:
   (a) Drain and flush the cooling system. Refill the system with new coolant.
   (b) Clean radiator tubes and cooling fins.
   (c) Replace thermostats.
   (d) Inspect valve clearances and adjust as appropriate.
3. While performing the full load test required by Clause 11.3, conduct an infrared thermal imaging assessment of all electrical connections, components, and energized components.
4. Correct all defects found during inspections and tests.
5. Record all inspections, tests, and corrective actions in the log (see Clause 11.5.3).

Note: *Items 1 to 5 require special skill and shall be carried out by a competent person or individuals trained by the system manufacturer.*

Weekly inspection, test, and maintenance requirements (refer to Table 2 on page 1)

Consumables (No. 1)						Starter system (No. 2)					Signature	Date
							Air starter					
Auxiliary supply tank fuel level	Oil level	Coolant level	Check for leaks	Fuel transfer pump	Fuel filter	Electric starter	Air pressure	Valve leakage	Aux. engine	Bleed condensate		

Batteries and charging equipment (No. 3)					Engine (No. 4)				Signature	Date
Electrolyte level*	Electrolyte spec. grav.*	Electrical connections	Battery terminals	Charger connections	Heater operation	Governor	Fuel pump oil sump	Fan belts		

Control panel (No. 5)				Other (Nos. 6 to 9)				Additional requirements, if applicable (see Clause 11.5.2)				Signature	Date
Panel covers	Annunciator lamps	Panel settings	Visual and audible signals	Air control louvres	Emergency lighting	Room temp. (°C)	Room cleanliness and accessibility						

**Applicable to vented or flooded lead-acid batteries only.*

Notes:

(1) *Mark "X" for satisfactory or "O" for unsatisfactory.*

(2) *The work described in this Table shall be carried out by a competent person or individuals trained by the system manufacturer.*