

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

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- b. At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 110-volts, or battery overcharge with battery terminal voltage above 150 volts, by verifying that:
1. The parameters in Table 4.8-2 meet the Category B limits,
  2. There is no visible corrosion at either terminals or connectors, or the connection resistance of these items is less than  $150 \times 10^{-6}$  ohms, and
  3. The average electrolyte temperature of a random sample of at least ten of the connected cells is above 60°F.
- c. At least once per 18 months by verifying that:
1. The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration,
  2. The cell-to-cell and terminal connections are clean, tight, and coated with anticorrosion material,
  3. The resistance of each cell-to-cell and terminal connection is less than or equal to  $150 \times 10^{-6}$  ohms, and
  4. The battery charger will supply at least 150 amperes for 3A1-S, 3A2-S, 3B1-S and 3B2-S and 200 amperes for 3AB1-S and 3AB2-S at greater than or equal to 132 volts for at least 8 hours.
- d. At least once per 18 months, during shutdown, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for the design duty cycle when the battery is subjected to a battery service test.
- e. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. This performance discharge test may be performed in lieu of the battery service test required by Surveillance Requirement 4.8.2.1d.
- f. Annual performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

TABLE 4.8-2

BATTERY SURVEILLANCE REQUIREMENTS

Parameter	CATEGORY A <sup>(1)</sup>		CATEGORY B <sup>(2)</sup>	
	Limits for each designated pilot cell	Limits for each connected cell	Limits for each connected cell	Allowable <sup>(3)</sup> value for each connected cell
Electrolyte Level	>Minimum level indication mark, and $\leq \frac{1}{4}$ " above maximum level indication mark	>Minimum level indication mark, and $\leq \frac{1}{4}$ " above maximum level indication mark	>Minimum level indication mark, and $\leq \frac{1}{4}$ " above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	$\geq 2.13$ volts	$\geq 2.13$ volts <sup>(c)</sup>	$\geq 2.13$ volts <sup>(c)</sup>	$> 2.07$ volts
Specific Gravity <sup>(a)</sup>	$\geq 1.195$ <sup>(b)</sup>	$\geq 1.190$ Average of all connected cells $> 1.200$	$\geq 1.190$ Average of all connected cells $> 1.200$	Not more than 0.020 below the average of all connected cells  Average of all connected cells $\geq 1.190$ <sup>(b)</sup>

- (1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their allowable values, and provided all Category A and B parameter(s) are restored to within limits within the next 6 days.
- (2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category B parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within 7 days.
- (3) Any Category B parameter not within its allowable value, declare the battery inoperable.
  - (a) Corrected for electrolyte temperature and level.
  - (b) Or battery charging current is less than 2 amps when on charge.
  - (c) Corrected for average electrolyte temperature.

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ATTACHMENT B

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

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- b. At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 110-volts, or battery overcharge with battery terminal voltage above 150 volts, by verifying that:
1. The parameters in Table 4.8-2 meet the Category B limits,
  2. There is no visible corrosion at either terminals or connectors, or the connection resistance of these items is less than  $150 \times 10^{-6}$  ohms, and
  3. The average electrolyte temperature of a random sample of at least ten of the connected cells is above ~~60°F~~ 70°F
- c. At least once per 18 months by verifying that:
1. The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration,
  2. The cell-to-cell and terminal connections are clean, tight, and coated with anticorrosion material,
  3. The resistance of each cell-to-cell and terminal connection is less than or equal to  $150 \times 10^{-6}$  ohms, and
  4. The battery charger will supply at least 150 amperes for 3A1-S, 3A2-S, 3B1-S and 3B2-S and 200 amperes for 3AB1-S and 3AB2- at greater than or equal to 132 volts for at least 8 hours.
- d. At least once per 18 months, during shutdown, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for the design duty cycle when the battery is subjected to a battery service test.
- e. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. This performance discharge test may be performed in lieu of the battery service test required by Surveillance Requirement 4.8.2.1d.
- f. Annual performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

TABLE 4.8-2

BATTERY SURVEILLANCE REQUIREMENTS

Parameter	CATEGORY A <sup>(1)</sup>		CATEGORY B <sup>(2)</sup>	
	Limits for each designated pilot cell	Limits for each connected cell	Limits for each connected cell	Allowable <sup>(3)</sup> value for each connected cell
Electrolyte Level	>Minimum level indication mark, and $< \frac{1}{4}$ " above maximum level indication mark	>Minimum level indication mark, and $< \frac{1}{4}$ " above maximum level indication mark	>Minimum level indication mark, and $< \frac{1}{4}$ " above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	$\geq 2.13$ volts	$\geq 2.13$ volts <sup>(c)</sup>	$\geq 2.13$ volts <sup>(c)</sup>	$> 2.07$ volts
Specific Gravity <sup>(a)</sup>	$\geq 1.195$ <sup>(b)</sup> 1.200	1.195 $\geq 1.190$ <sup>e</sup> Average of all connected cells $> 1.200$ 1.205	1.195 $\geq 1.190$ <sup>e</sup> Average of all connected cells $> 1.200$ 1.205	Not more than 0.020 below the average of all connected cells  Average of all connected cells $\geq 1.190$ <sup>(b)</sup> 1.195

- (1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their allowable values, and provided all Category A and B parameter(s) are restored to within limits within the next 6 days.
- (2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category B parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within 7 days.
- (3) Any Category B parameter not within its allowable value, declare the battery inoperable.
- (a) Corrected for electrolyte temperature and level.
- (b) Or battery charging current is less than 2 amps when on charge.
- (c) Corrected for average electrolyte temperature.