Standard Battery Testing Requirements Summary

The tables below summarize the testing requirements and schedules from the following standards:

- IEEE Std 450-2010: IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications
- IEEE Std 1188-2005: IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead- Acid (VRLA) Batteries for Stationary Applications
- ANSI/NETA MTS-2015
- NERC Standard PRC-005-6: Protection System, Automatic Reclosing, and Sudden Pressure Relaying Maintenance.

LEAD ACID ACTIVITY	Monthly			
	VLA		VRLA	
Float voltage measured at the battery terminals	I		I	
General appearance and cleanliness of the whole installation	I	N	I	N
Charger output current and voltage	I		I	
Crack in cells (evidence of electrolyte leakage)	I		I	
Evidence of corrosion at terminals, connectors, racks or cabinets	I	N	I	N
Ambient temperature and ventilation	I	N	I	N
Pilot cells (If used) voltage and electrolyte temperature	I			
Battery float charging current or pilot cell specific gravity	I			
Unintentional battery grounds	I	N		N
Electrolyte levels	I	N		
Cell-to-cell and terminal connection resistance		N[6]		N[6]
Structural Integrity of the battery rack		N		N
Verify tightness of accessible bolted electrical connections[5]		N[6]		N[6]
Perform a thermographic survey under load[7]		N[6]		N[6]
Verify presence of flame arresters		N		
Verify existence of suitable eyewash equipment		N		N

LEAD ACID ACTIVITY	Quarterly/ Tri-annual*			
	VLA		VRLA	
Float voltage measured at the battery terminals	I	P	I	
General appearance and cleanliness of the whole installation	I		I	
Charger output current and voltage	I		I	P
Crack in cells (evidence of electrolyte leakage)	I		I	
Evidence of corrosion at terminals, connectors, racks or cabinets	I		I	
Ambient temperature and ventilation	I		I	
Pilot cells (If used) voltage and electrolyte temperature	I			
Battery float charging current or pilot cell specific gravity	I			
Unintentional battery grounds	I	P		P
Electrolyte levels	I	P		
Voltage of each cell	I		I	
Specific Gravity of 10% of the cells of the battery	I[2]			
Temperature of at least 10% of cells	I			
Temperature of the negative terminal of each cell			I	
Cell/unit internal ohmic values			I	P[10]

LEAD ACID ACTIVITY	Yearly/18-months*					
	VLA			VRLA1		
Float voltage measured at the battery terminals	I	N	P	I	N	P[1]
General appearance and cleanliness of the whole installation	I			I		
Charger output current and voltage	I			I		
Crack in cells (evidence of electrolyte leakage)	I			I		
Evidence of corrosion at terminals, connectors, racks or cabinets	I			I		
Ambient temperature and ventilation	I			I		
Pilot cells (If used) voltage and electrolyte temperature	I					
Battery float charging current or pilot cell specific gravity	I					
Unintentional battery grounds	I					
Electrolyte levels	I					
Voltage of each cell	I	N			N	
Specific Gravity of 10% of the cells of the battery	I					
Temperature of at least 10% of cells	I					
Temperature of the negative terminal of each cell				I	N	
Specific Gravity of all cells	I[2]					
Cell condition	I		P			
Cell/unit internal ohmic values		N	P[4]	I	N	P
Cell-to-cell and terminal connection resistance	I	N	P[3]	I	N	P
Structural Integrity of the battery rack	I		P			P
AC ripple current and/or voltage imposed on the battery				I		
Performance or modified performance capacity test of entire bank	I[8]	N[8]	P[4]	I[9]	N[9]	P[10]
Verify Equalizing Voltage Setting is in accordance to Battery's Manufacturer recommendation		N			N	
Verify all charger functions and alarms		N			N	

The information and comparison provided in these tables is based on the standards versions stated above and the purpose is to provide a quick reference and guidance to determine testing activities for batteries. For further details and information please consult the standards and internal testing requirements.

* Time frames indicated in NERC-PRC-005-6
1 This inspection applies for the initial installation as well, according to IEEE Std 1188
2 For lead-antimony batteries. For other technologies, only if float charging current is not used to monitor state of charge
3 Standard indicates to verify battery continuity, terminal connection resistance, intercell or unit-to-unit connection resistance
4 Standard indicates to evaluate battery performance by indicative measurements like internal ohmic values or float current every 18 months or perform a capacity test every 6 years
5 NETA MTS Table 100.12
6 Only one of the three actions is required
7 According to NETA MTS Section 9
8 Intervals and test procedure according to IEEE Std 450, every 25% of life expectancy or two years (whichever is less)
9 Intervals and test procedure according to IEEE Std 1188, every 25% of life expectancy or two years (whichever is less)
10 Measure internal ohmic values every 6 months or perform a capacity test every 3 years

I Indicates recommendations by IEEE Standards

N Indicates recommendations by NETA Standard for Maintenance Testing Specifications

P Indicates NERC PRC-005-6 requirements

STD_BAT_Test_ReqSum_DAL_v1

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Standard Battery Testing Requirements Summary

The tables below summarize the testing requirements and schedules from the following standards:

- IEEE Std 1106-2005: IEEE Recommended Practice for Installation, Maintenance, Testing, and Replacement of Vented Nickel-Cadmium Batteries for Stationary Applications
- ANSI/NETA MTS-2015
- NERC Standard PRC-005-6: Protection System, Automatic Reclosing, and Sudden Pressure Relaying Maintenance.

NiCad

ACTIVITY	Quarterly/ Tri-annual*	
Float voltage measured at the battery terminals	I	
General appearance and cleanliness of the whole installation	I	
Charger output and voltage	I	
Electrolyte levels	I	P
Unintentional battery grounds		P
Crack in cells (evidence of electrolyte leakage)	I	
Evidence of corrosion at terminals, connectors, racks or cabinets	I	
Ambient temperature and ventilation	I	
Pilot cells (If used) voltage and electrolyte temperature	I	
Verify Station DC supply voltage		P

NiCad

ACTIVITY	Semi-annually
Float voltage measured at the battery terminals	I
General appearance and cleanliness of the whole installation	I
Charger output and voltage	I
Electrolyte levels	I
Crack in cells (evidence of electrolyte leakage)	I
Evidence of corrosion at terminals, connectors, racks or cabinets	I
Ambient temperature and ventilation	I
Pilot cells (If used) voltage and electrolyte temperature	I
Voltage of each cell	I

I Indicates recommendations by IEEE Standards

N Indicates recommendations by NETA Standard for Maintenance Testing Specifications

P Indicates NERC PRC-005-6 requirements

NiCad

ACTIVITY	Yearly1 / 18 months*		
Float voltage measured at the battery terminals	I	N	
General appearance and cleanliness of the whole installation	I	N	P
Charger output and voltage	I		P
Charger float and equalizing voltage levels. Adjust to manufacturer's recommended settings		N	P
Verify all charger functions and alarms		N	
Electrolyte levels	I		
Crack in cells (evidence of electrolyte leakage)	I		
Evidence of corrosion at terminals, connectors, racks or cabinets	I		
Ambient temperature and ventilation	I	N	
Pilot cells (If used) voltage and electrolyte temperature	I	N	
Voltage of each cell	I	N[5]	
Intercell connection torque	I		
Condition and resistance of cable connections	I	N[2]	P
Verify tightness of accessible bolted electrical connections by calibrated torque-wrench[3]		N[2]	
Perform thermographic survey[4]		N[2]	
Structural Integrity of the battery rack	I	N	P
Verify existence of suitable eyewash equipment		N	
Verify application of an oxide inhibitor on battery terminal connections		N	
Perform internal ohmic measurements		N	
Perform load test		N[6]	
Measure battery system voltage from positive-to-ground and negative-to-ground		N	
Performance or modified performance capacity test of entire bank	I[7]	N[6]	

NiCad

ACTIVITY	6 Years
Performance or modified performance capacity test of entire bank	P

The information and comparison provided in these tables is based on the standards versions stated above and the purpose is to provide a quick reference and guidance to determine testing activities for batteries. For further details and information please consult the standards and internal testing requirements.

* Time frames indicated in NERC-PRC-005-6

1 This inspection applies for the initial installation as well, per NETA-ATS

2 Only on of the three methods is required

3 Method in accordance with manufacturer's published data or Table 100.12 of NETA-MTS

4 Method in accordance with NETA-MTS - Section 9

5 NETA-MTS specifies float voltage measurement for each cell and total battery

6 Optional, in accordance with manufacturer's published data or IEEE 1106

7 Every five-year intervals until the battery shows signs of excessive capacity loss

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