Power Precision

Electrical Equipment Maintenance Frequencies - Based on CSA Z463-18 Guideline on Maintenance of Electrical Systems

Table M.12.2

Direct Current (DC) Battery and Charging Systems

Legend:
x = a test or inspection should be performed
y = factory testing should be performed
- = factory testing not required
n/s = not specified; testing frequency is at the discretion of user
n/a = not applicable
a/n = as needed

	Types of equipment -Tests to be performed			
Maintenance activities	Visual inspection	Station ground resistance	Earth Resistivity	DC Chargers
Monthly				
Check float voltage at battery terminals	X		X	
Check cleanliness of battery and rack cabinet				
Check charger output current and voltage	X		X	
Check electrolyte levels	X		X	
Check for cracks in cells and leakage				
Check for corrosion and integrity in terminals, racks, and cabinets				
Check ambient temperature and ventilation (25 °C is optimal)	X		X	
If pilot cells are used, check voltage and electrolyte temperature	X			
Check battery float charging current and/or pilot cell specific gravity	X	X	X	
Check for unintentional battery grounds	X	X	X	
If battery monitoring systems are installed, check that they are all operational	X		X	
Check for cover integrity, cracks in cells or units, and leakage of electrolyte	X		X	
Check for excessive jar or cover distortion			X	
Check plates for buckling, warping, scaling, swelling, and cracking	X			
Clean lead-acid battery surfaces with bicarbonated sodium	X			
Clean nickel-cadmium battery surfaces with boric acid solution		X		
Verify that each cell's level is between the MIN and MAX lines	X	X		
Add distilled water to cells with low levels (record amounts)	X	X		
Quarterly				
Check the voltage of each cell			X	
For lead-antimony batteries, check the float charging current and the specific gravity of 10% of the cells of the battery			X	
For technologies other than lead-antimony, if the battery float charging current is not used to monitor the state of the charge, check the specific gravity of 10% of the cells of the battery			X	
Check the temperature of a representative sample of 10% or more of the battery cells				
Check the temperature of the negative terminal of each cell or unit of the battery				
For applications with a discharge rate of 1 h or less, check a representative sample of the intercell connection resistances (minimum 10% or six connections). If an upward trend is detected, corrective action should be taken.		X		
Check cell or unit internal ohmic values		X		
Yearly (minimum)				
For lead-antimony batteries, check the specific gravity of all the cells of the battery			X	
For technologies other than lead-antimony, if the battery float charging current is not used to monitor the state of the charge, check the specific gravity of all the cells of the battery			X	
Check the cell condition			X	
Check cell-to-cell and terminal connection resistance			X	
Check the structural integrity of the battery rack or cabinet	X	X	X	
Check cell-to-cell and terminal connection resistance of the entire battery			X	
Check ac ripple current and/or voltage imposed on the battery			X	
Performance test the battery capacity			X	
Performance test the battery capacity every 3 years and yearly when the capacity drops by 10%	X			
Visual and Mechanical				
Check the integrity of equipment such as operating meters, capacitors, cables, etc.				X
Check for ventilation obstructions, and clean vents. Replace filters as needed. Vacuuming or blowing with low-pressure air might be needed to remove dust and contaminants. More frequent cleaning can be needed depending on the site conditions.				X
Check connectors. Discoloured connectors or cables can be an indication of loose or corroded connectors. Tighten connectors as needed.				X
Electrical				
Check the capacitors and replace them as needed. High ripple on the output can be an indication of aged capacitors. Electrolyte capacitors have a limited operation life.				X
Check for ground leakage in floating equipment. Unbalanced dc voltage readings between the positive and negative to ground indicate leakage failure on the dc bus.				X
Check the output voltage				X
Operation				
Check alarm settings and meter readings against the battery manufacturer's requirements				X
Check the float and, when applicable, equalize the readings at the battery terminals to confirm the correct adjustments. Readjust the settings as needed.				X
When applicable, switch between float and equalize to test operation				X
Verify the voltage across each cell	X	X		
Float lead-calcium cells between 2.2 and 2.3 V/cell	X			
Float lead-antimony cells between 2.17 and 2.21 V/cell	X			
Float nickel-cadmium cells at 1.42 V/cell		X		
Read each cell's specific gravity	X			
Load test the battery	X	X	X	

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Opportunities				
Load test yearly when the battery reaches 90% of its design life				
Replace the battery when it reaches 80% of its design life (or after 20 years)				
Replace 10 year life batteries			X	
Replace generator starting batteries	X			

(1) Prior to testing ensure that all client requirements necessary to allow work access to the equipment are met [e.g., permits, safety hazard and risk analysis]
(2) The information shown above is based on: CSA Z463-18 Guideline on Maintenance of Electrical Systems and is not necessarily identical to the source.