

**V.J**  
**PJM DESIGN AND APPLICATION OF STATIONARY  
BATTERIES AND CHARGERS FOR TRANSMISSION FACILITIES**

1.0 SPECIFICATION

- 1.1 As a minimum requirement, battery and charger systems must be designed for the purpose intended and should be specified to meet the requirements of all applicable industry standards, including but not limited to ANSI, IEEE, NEMA, OSHA and NESC.
- 1.2 The battery system should be sized in accordance with IEEE 485 for a minimum duty cycle of no less than 8 hours with the most severe possible multiple breaker operation (usually bus differential operation) at the end of the cycle.
- 1.3 It is suggested that the load cycle be given to the manufacturer for sizing of the battery and charger system and that the user's engineer verify the manufacturer's calculations.
- 1.4 Correction factors should be included in battery sizing calculations to account for temperature conditions, battery aging and unforeseen load increases.
- 1.5 The charger should be protected by automatic current limiting, and be self-protecting against transients and surge voltages, and be designed to prevent the battery from discharging back into the internal charger load.

2.0 APPLICATION AND INSTALLATION

- 2.1 When multiple battery and charger systems are provided to supply multiple relay systems (referred to as primary and backup or system one and system two), the batteries and chargers, including all associated wiring, should be kept physically and electrically separated to avoid a problem with one system affecting the other system
- 2.2 Batteries should be installed in facilities that assure that appropriate ambient temperatures are maintained and that the batteries are not exposed to solar radiation.

- 2.3 Battery systems should be installed in accordance with manufacturer's instructions and applicable industry standards, with special attention given to cell handling and cell connections and protection.
- 2.4 Before a battery and charger system are placed in service, appropriate acceptance testing should be conducted and appropriate data, such as cell voltage and specific gravity, should be recorded for future use.
- 2.5 Battery and charger systems should be adequately monitored and alarmed to assure that improper operation and abnormal conditions are reported for immediate corrective action.
- 2.6 Batteries should be physically arranged to facilitate safe and effective inspection and maintenance.

### 3.0 MAINTENANCE

See section V.L.2.J for maintenance requirements.