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Telecommunications Standby Battery Systems

Regulatory Review and Compliance

Introduction

Lead-acid and nickel-cadmium (Ni-Cd) batteries have a long history of fire safety, especially in telecommunications facilities. Unfortunately, the recent proliferation of flammable lithium-ion (Li-ion) batteries has caused the addition of new battery requirements in the fire codes and standards. The new requirements are primarily meant to address lithium-ion battery hazards but at times have incorrectly been applied or attempted to be applied to non-flammable lead-acid batteries, which generally have exemptions in fire codes and standards from the more onerous requirements. This document is intended to help fire officials understand that a telecommunications facility's lead-acid and nickel-cadmium batteries are normally exempt from many newer requirements that are intended to address primarily lithium-ion fire safety.

Background

Telecommunications facilities across the United States — including central offices, data centers, and remote network sites — rely on stationary battery backup systems, predominantly vented lead-acid (VLA, aka “flooded” or “wet cell”), valve-regulated lead-acid (VRLA) and nickel-cadmium configurations, to ensure uninterrupted power to critical communications equipment during utility outages. These batteries operate on continuous float charge and discharge only during abnormal power conditions, such as when commercial AC power fails. They do not perform routine charge-discharge cycling, energy arbitrage, peak shaving, or grid export functions common for newer Energy Storage Systems (ESS) regulated by codes. In both design and operation, they function as standby power systems.

Unique even for most standby applications, telecommunications battery systems are not intended for easy isolation from the charging systems and loads. The batteries do not supply power to the premises wiring but are an integral part of the electronic communications equipment. Battery isolation could result in an outage of critical telecommunications services, including life-saving emergency services like 911.

Beginning with the [2018 International Fire Code](#) (IFC), model codes introduced a comprehensive regulatory framework for ESS under [NFPA 855](#) Chapter 12, establishing energy-capacity thresholds — 70 kWh for lead-acid and nickel-cadmium, 20 kWh for lithium-ion — above which stringent safety requirements apply. These requirements — including [UL 9540](#) system listing, [UL 9540A](#) thermal runaway testing, 3-foot array separation, and hazard mitigation analysis — were developed primarily in response to the emergence of large-scale lithium-ion battery installations for grid services and renewable energy integration.

Recognizing that traditional telecom and UPS backup batteries present a fundamentally different risk profile, the International Code Council (ICC) progressively incorporated explicit exceptions into subsequent IFC editions. IFC 2018 introduced exceptions for lead-acid batteries. [IFC 2021](#) and [2024](#) continued and expanded these provisions, additionally exempting lead-acid batteries integrated into [UL 1778](#)-listed Uninterruptible Power Supply (UPS) equipment used solely for standby power and telecom DC battery systems operating at or below 50 VAC/60 VDC under exclusive communications utility control per [NFPA 76, Standard for Fire Protection of Telecommunications Facilities](#).

Multiple jurisdictions and subject matter experts have affirmed this approach of having lesser requirements for telecommunications battery plants. As an example, IFC 2024, Section 1207.1.4.1, **Communication Utilities**, exempts typical telecommunications lead-acid battery plants from the requirement to have an operational permit. Furthermore, the 2024 IFC allows exemptions from electrical disconnect requirements, elevation restrictions, size limitations and separation rules, commissioning processes, automatic fire suppression, and explosion control when lead-acid batteries are utilized by communications utilities for standby power plants up to 60 VDC in accordance with NFPA 76. The IFC also permits omission of fire detection and spill control systems for smaller communication facilities. These exemptions have been regularly retained by local adoptions by Authorities Having Jurisdiction (AHJs) and underscore the fact that lead-acid batteries used in communications utility standby power applications do not have the same risk characteristics as grid-interactive ESS utilizing lithium-ion or other more reactive battery chemistries.

Applicable Requirements from NFPA 855 That Apply to Lead-Acid and Nickel-Cadmium Standby Battery Plants Over 70 kWh Used in Telecommunications Applications

Both the current editions of the IFC and [NFPA 1, Fire Code](#), draw upon NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems*, as a reference standard for the battery requirements. Based on a review of the 2026 Edition of NFPA 855, the following design guidelines for telecommunications standby lead-acid batteries are recommended:

- Construction documents and manuals for telecommunications standby batteries are to be provided as required by NFPA 855, Section 4.2.
- Emergency planning and training including *Emergency Operations Plans* and *Emergency Response Plans* are to be provided per NFPA 855, Section 4.3. A Safety Data Sheet (SDS) for hazardous materials contained in the batteries must be retained at the installation site as required by NFPA 855, Section 7.1.
- Telecommunications standby batteries are fire resistant and combustible storage is kept away for the lead-acid standby power systems required by NFPA 855, Section 4.5.
- Approved signage is provided according to NFPA 855, Section 4.7.5.
- Telecommunications standby batteries are operated in controlled environments with compatible charging equipment. The installations are in secure, dedicated locations, with building loads, seismic loads and egress as required by local building codes and NFPA 855. The installations and operations are in accordance with the battery and charging equipment manufacturers' specifications. The commissioning, operation, and decommissioning of telecommunications standby batteries follow telecommunications industry practices as permitted by NFPA 855 Chapters 6, 7, and 8.
- Rooms or spaces containing telecommunications standby batteries are typically separated from non-telecommunications equipment areas by fire barriers with a minimum 1-hour fire resistance rating as permitted for lead-acid batteries in NFPA 855 and adopted fire codes. Telecommunications equipment spaces, including spaces with battery systems, typically are served by code-compliant fire detection systems as required by NFPA 855, Section 9.7.1.
- Telecommunications standby battery installations are provided with adequate exhaust ventilation and vented safety caps as required by NFPA 855 Chapter 9 and decades of adopted fire codes. Installations with batteries that use free-flowing liquid electrolyte are also provided with code-specified spill control and neutralization kits.

Table 1 summarizes the applicable NFPA 855 topics and requirement section for telecommunications lead-acid and nickel-cadmium standby battery systems that have an energy capacity in excess of 70 kWh in a single fire area.

Table 1: Applicable NFPA 855 topics and requirements for telecommunications lead-acid and nickel-cadmium standby battery systems.

Topic	NFPA 855 Reference
Construction Documentation	Section 4.2
Emergency Operation and Response Plans	Section 4.3
Safety Data Sheets	Section 7.1
Housekeeping of Combustibles	Section 4.5
Signage	Section 4.7.5
Environmental Control	Section 4.6.7
Access Control	Section 9.6.1.2.1.2
Seismic and Building Loads	Section 4.7.3 and 4.7.4
Commissioning Procedures	Section 6
Decommissioning Procedures	Section 8
Operating Procedures	Section 7
1hr Fire Rated Partitions	Section 9.7.5.2
Fire Detection	Section 9.7.1
Exhaust Ventilation	Section 9.7.6.1
Vented Safety Caps	Section 9.7.6.4
Spill Control and Neutralization	Sections 9.7.6.2 and 9.7.6.3

As noted earlier, the 2024 IFC, Section 1207.1.4.1, goes further than NFPA 855 and exempts telecommunications lead-acid and nickel-cadmium battery plants from the requirement to have an operational permit.

Methodology

Telecom standby battery systems can meet broad “energy storage” definitions by stored kWh; however, IFC 2024 and NFPA 855 establish explicit exception/alternative compliance pathways for specified telecommunications DC plants and UL 1778 UPS standby configurations. When the exception conditions are met and documented, AHJs can regulate these systems under the applicable NFPA 855 Chapter 12 provisions plus NEC Article 480, without applying ESS-specific requirements intended for different chemistries and operating modes.

Findings

For lead-acid and nickel-cadmium telecom battery installations, the appropriate regulatory approach is to apply the IFC’s (or NFPA 1) base stationary battery requirements and telecom-specific allowances — particularly the targeted NFPA 855 requirements suitable for lead-acid and nickel-cadmium batteries — rather than the more onerous ESS-specific provisions intended for lithium-ion hazards.

If a telecom facility transitions to lithium-ion batteries, then ESS rules appropriately apply. Both NFPA 76 and the IFC direct compliance with NFPA 855 and full ESS requirements in that case, reflecting the different hazard characteristics of lithium-ion technology.

Recommendations

Each case should be evaluated per the code’s definitions, scope exclusions, and the system’s intended use. The decision flowchart in Figure 1 provides a practical tool for this evaluation.

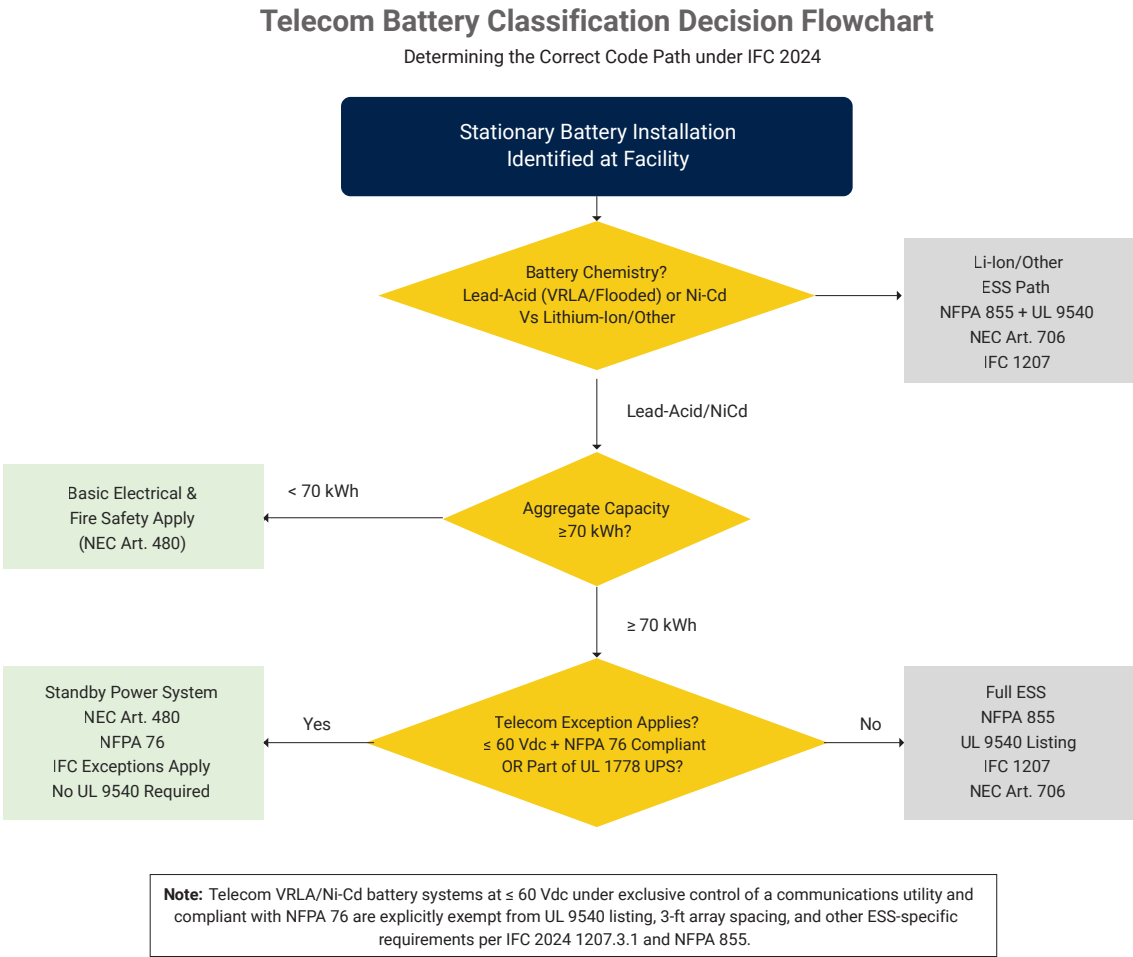


Figure 1: Decision flowchart for determining the correct code path for telecom battery installations under IFC 2024.

AHJ Documentation Checklist (Recommended Submittal Items)

The following documentation should be prepared and reviewed with local AHJs when determining the suitable requirements applicable to a communications facility battery system:

- > System one-line diagram showing the DC plant/rectifiers (or UPS) and confirming whether any inverter/grid-interactive functionality exists.
- > Battery chemistry and configuration (e.g., VRLA, flooded lead-acid, nickel-cadmium, lithium-ion), including manufacturer cut sheets for cabinets/strings.
- > Nominal and maximum system voltage confirmation (to support any claim of ≤ 60 VDC operation for the telecom DC plant exception).
- > Statement of exclusive communications utility control (owner/operator attestation) when the telecommunication exception is being used.
- > NFPA 76 applicability and compliance basis for the facility power equipment area (ventilation approach/hydrogen control, spill control if applicable, access controls). NFPA 76 applies only to new battery installations.
- > UPS listing documentation (UL 1778) and confirmation the UPS is used solely for standby power when UPS exception is being used.
- > Operations/maintenance overview (float charge, testing frequency, monitoring, service procedures) to confirm standby-only operation.
- > Stored energy calculation (kWh) and room layout, if needed, to demonstrate whether thresholds are exceeded and which IFC/NFPA provisions are triggered when exceptions do not apply.

Telecommunications battery backup systems — predominantly lead-acid and nickel-cadmium designs — are essential components of our nation's critical communications infrastructure. Their long-standing classification as standby power systems is supported by fundamental technical differences from grid-interactive ESS and has been validated by codes and standards organizations at every level.

Over recent code cycles, from IFC 2015 through IFC 2024, regulators have drawn increasingly clear boundaries for how standby telecom batteries are addressed within NFPA 855 Chapter 12. Where the IFC 2024 §1207.3.1 exception conditions are met and documented, the code provides an alternate compliance pathway and removes specified ESS requirements (e.g., separate UL 9540 system listing and related ESS-specific measures) that were developed primarily for actively cycled and higher-energy-density ESS applications based on lithium-ion concerns.

References

International Code Council (ICC), **International Fire Code (IFC)**, 2024

NFPA 1, **Fire Code**, 2024

NFPA 76, **Standard for the Fire Protection of Telecommunications Facilities**, 2020

NFPA 855, **Standard for the Installation of Stationary Energy Storage Systems**, 2026

UL 9450 **Energy Storage Systems and Equipment**, 2026, March 2025

UL9450A **Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems**

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