

Flame Retardant Certification for Micro-Module Data Centers



Overview

Data Center Fire Protection in 2025: Best PracticesA practical, standards-based guide to fire detection and suppression in data centers. Prefabricated Modu.

Key Takeaways

UL 94 V-0 certification is the primary flame retardant standard for plastics used in micro-module data center components, ensuring high fire resistance and compliance with safety regulations.Overview of Flame Retardant Standards

Micro-module data centers (micro DCs) contain high-density electronic equipment, wiring, and cooling systems, which increase the risk of thermal events and fire hazards. To mitigate these risks, components such as server racks, cable trays, panels, and enclosures often require flame-retardant plastics that meet stringent safety standards . The most widely recognized standard is UL 94, which classifies plastics based on their burning characteristics. The V-0 rating represents the highest vertical burn resistance, meaning the material self-extinguishes quickly and does not propagate flames .

UL 94 V-0 Certification Requirements

To achieve V-0 certification, materials must pass rigorous testing:

- Specimens are vertically mounted and exposed to a flame for 10 seconds, twice per test .

- Flaming must cease within 10 seconds after each application, with total flaming time across all tests not exceeding 50 seconds.
 - Burning material must not drip and ignite a cotton indicator below the specimen. Non-flaming drips are allowed.
 - Glowing combustion after the second flame application must not exceed 30 seconds. This certification ensures that plastics used in micro DCs reduce fire risk in critical areas such as electronic enclosures, connectors, and structural supports .
- Material Considerations

Flame-retardant plastics are typically engineered with additives to slow ignition and suppress flame spread. Common materials include PC/ABS blends like Calplas® FR108, which combine strength, heat resistance, dimensional stability, and UL 94 V-0 compliance . Material formulation, thickness, and conditioning are critical factors; even minor changes in additives or colorants can void certification unless retested . Non-halogenated flame retardants are increasingly preferred due to environmental and recycling concerns, offering similar performance with reduced ecological impact .

Integration with Micro-Module Data Center Safety

Flame-retardant certification complements broader micro DC safety standards. For example, UL 2755:2025 provides a framework for prefabricated modular data centers, addressing fire safety, electrical hazards, and rapid deployment requirements . Using UL 94 V-0 certified materials in micro DC components ensures compliance with these safety frameworks and facilitates approval by authorities having jurisdiction (AHJs). Additionally, flame-retardant materials support compliance with international certifications such as EN 50600 for physical infrastructure and ISO/IEC 27001 for information security, which are often required for micro DCs .

Practical Applications

Key micro DC components requiring flame-retardant plastics include:

- Server rack panels and access doors: Protect against internal fires and maintain structural integrity under heat stress.
- Cable trays and conduits: Prevent flame propagation along wiring pathways.
- Switch and router enclosures: Ensure electronics remain safe during thermal events.
- Clips, guides, and bezels: Maintain organization and safety without compromising fire resistance . Selecting UL 94 V-0 certified materials early in the design process helps avoid costly redesigns, ensures regulatory compliance, and enhances overall fire safety in micro-module data centers .

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