NFPA 99

Health Care Facilities Code

Condensed Practical Reference & Field Checklists

Prepared for biomedical/facilities engineering staff responsible for the electrical systems, medical gas systems, and risk-based classification of patient care spaces in a health-care facility.

Important note on scope and use: *This document is an original, independently written condensed overview and practical checklist tool. It summarizes, in the author's own words, the general structure and risk-category concepts of NFPA 99 (a U.S. National Fire Protection Association code) for quick field reference. It is* ***not a reproduction of the official code text****, is not a substitute for it, and must not be used as the sole basis for facility certification, accreditation surveys, or life-safety compliance decisions. NFPA 99 is a U.S. code; facilities outside the U.S. should treat it as a widely referenced best-practice benchmark and confirm which code actually applies locally (national building/electrical/health-facility codes, or a local adoption of NFPA 99 or an equivalent). For any formal compliance work, the current officially published NFPA 99 text (and the applicable local regulation) must be consulted directly.*

Delara Mohammadi
MedTech Consultant

delaramohammadi.com | info@delaramohammadi.com
+98 938 400 3858

1. About This Code

NFPA 99 sets minimum requirements for the design, construction, and ongoing performance of systems, equipment, and practices in health-care facilities that directly affect patient and staff safety — most notably electrical systems, medical gas and vacuum systems, and the built environment supporting clinical care. Unlike IEC 60601-1 (which governs a specific medical device) or ISO 13485 (a manufacturer's quality system), NFPA 99 governs the *facility and its infrastructure* — the electrical distribution, backup power, gas piping, and environment that medical equipment depends on to function safely.

1.1 Why it matters for biomedical/clinical engineering, not just facilities staff

- Medical equipment failures are sometimes actually facility/utility failures in disguise — unstable power, an undersized emergency generator transfer, or a mislabeled gas outlet can cause a device to "fail" that is otherwise working correctly.
- Biomedical engineers are frequently asked to help interpret risk categories for new or renovated patient care spaces, since equipment criticality (life support, anesthetizing locations, general care) directly drives which facility-level protections are required.
- Isolated power systems, ground-fault protection, and wet-location electrical safety requirements interact directly with medical equipment installation and testing.

2. Risk Category Classification (Core Concept)

A foundational concept in NFPA 99 is classifying spaces and systems by **risk category**, based on the potential consequence to patients if the system fails — rather than applying one fixed standard everywhere. This is conceptually similar to the risk-based approach used in medical equipment maintenance scheduling (see the companion WHO-informed maintenance guide).

Category	General meaning
Category 1	Facility systems whose failure is likely to cause major injury or death of patients, staff, or visitors (e.g. critical care areas, operating rooms) — the most stringent requirements apply.
Category 2	Facility systems whose failure is likely to cause minor injury to patients, staff, or visitors (e.g. general inpatient care areas).
Category 3	Facility systems whose failure is not likely to cause injury, but can cause patient discomfort (e.g. some administrative/support areas with limited clinical function).
Category 4	Facility systems whose failure would have no impact on patient care.

The assigned category determines which specific electrical, gas, and construction requirements apply to that space — higher-risk categories require more redundancy, more frequent testing, and stricter construction/monitoring provisions.

3. Key Requirement Areas

Area	What it broadly covers
Electrical systems	Essential electrical system (normal + alternate/emergency power) design, branch circuiting (life safety, critical, equipment branches), automatic transfer switches, and generator testing/runtime requirements.
Isolated power & ground-fault protection	Requirements for isolated power systems and line isolation monitors in specific high-risk wet procedure locations, and ground-fault circuit protection where applicable.
Medical gas and vacuum systems	Design, installation, labeling, alarm, and testing requirements for piped medical gas (oxygen, medical air, nitrous oxide, etc.) and vacuum systems, including source equipment, alarm panels, and station outlets.
Environment of care	Requirements touching HVAC (pressure relationships, air changes in specific spaces), plumbing, and general building systems supporting infection control and patient safety.
Hyperbaric facilities	Specific fire/life-safety requirements for hyperbaric chambers, where present.
Emergency management	Facility emergency preparedness, utility failure response planning, and continuity of critical patient care systems during a utility outage or disaster.
Information technology / network systems	Reliability and risk-category-based requirements for IT/network infrastructure supporting clinical systems (HDO — Health Delivery Organization — responsibilities).

4. Practical Field Checklists

Use these as a starting self-assessment tool for biomedical/facilities coordination. They do not replace a formal life-safety survey, an authority-having-jurisdiction inspection, or the full code text.

A. Risk Category Awareness Checklist

Check Item / Action	Status
■ Risk category assigned and documented for each patient care space (Category 1–4), ideally by an interdisciplinary team including biomedical/clinical engineering input.	Y / N / NA
■ Assigned category reviewed whenever a space's clinical use changes (e.g. general ward converted to critical care).	Y / N / NA
■ Equipment specified for a space matches the electrical/gas infrastructure actually installed for its risk category.	Y / N / NA
■ New construction or renovation plans reviewed against risk-category requirements before equipment installation.	Y / N / NA

B. Essential Electrical System Checklist

Check Item / Action	Status
■ Emergency/alternate power source (generator) tested per the defined schedule, with runtime and transfer-time results documented.	Y / N / NA
■ Automatic transfer switch tested and confirmed to switch within the required time window.	Y / N / NA
■ Branch circuiting (life safety, critical, equipment) verified correctly labeled and distributed for each patient care space.	Y / N / NA
■ Isolated power system and line isolation monitor (where installed) tested and alarm functions confirmed.	Y / N / NA
■ Receptacle testing (retention force, polarity, grounding) performed per schedule in patient care areas.	Y / N / NA
■ Battery/UPS backup for critical equipment tested and runtime confirmed adequate.	Y / N / NA

C. Medical Gas & Vacuum System Checklist

Check Item / Action	Status
■ Source equipment (manifolds, compressors, vacuum pumps) inspected and tested per schedule.	Y / N / NA
■ Area alarm panels tested and confirmed to correctly reflect source and zone status.	Y / N / NA
■ Station outlets tested for correct gas identity, flow, and pressure at point of use.	Y / N / NA
■ Piping and labeling verified correctly color-coded/labeled per the applicable gas identification system.	Y / N / NA
■ Shutoff valves accessible, clearly labeled, and functioning correctly.	Y / N / NA
■ Certification/verification testing documentation on file for any new or modified gas system installation.	Y / N / NA

D. Coordination with Biomedical Equipment Checklist

Check Item / Action	Status
■ New equipment's power requirements (voltage, current, inrush) checked against the branch circuit and risk category of its intended location before installation.	Y / N / NA
■ Equipment relying on emergency power confirmed to be plugged into the correct (red/emergency-labeled) receptacles.	Y / N / NA
■ Any equipment installation in a wet procedure location assessed against isolated power/ground-fault protection requirements for that space.	Y / N / NA
■ Facilities and biomedical teams coordinate on utility-related root-cause investigation when equipment failures are reported (see the companion WHO-informed maintenance guide, Section 5.2).	Y / N / NA

Reminder: *NFPA 99 is a U.S. code; many countries reference it as a benchmark or adopt parts of it locally, but the actual legally binding requirement in any given country may be a different national code. Always confirm which code has jurisdiction before using this as a compliance basis.*