• NFPA 99 Health Care Facilities Code
• Risk Assessment for Patient Services vs. Infrastructure Requirements
• Based on the 2012 Edition
• K900 series in the CMS Conditions of Participation
As the delivery of health care evolves, the manner and location where various procedures are performed has changed as well. However, the risks for patients and caregivers is the same for each type of procedure, whether performed in a retail clinic, doctor’s office or an operating room in a hospital.
This document has changed from a standard to a code – which means that prescriptive language is now used in the text - i.e. use of the terms **shall be** and **shall have** appear consistently to mandate that the requirements included in the statement are compulsory.
The code went thru a major overhaul from the 2005 edition to the 2012 edition. There were no intervening editions as this rewrite progressed.

This code is now risk-based with categories of systems and infrastructure compared to types and levels of services being performed.

There are no longer any ‘occupancy chapters’. Also, the Laboratory chapter and those requirements are now contained in NFPA 45.
Building System Categories

4.1.1 Category 1
Facility systems in which failure of such equipment or system is likely to cause major injury or death of patients or caregivers shall be designed to meet system Category 1 requirements.

Systems are expected to work or be available at all times to support patient needs.

Major injury can include the following:
1. Any amputation
2. Loss of the sight of an eye (whether temporary or permanent)
3. Chemical or hot metal burn to the eye or any penetrating injury to the eye
4. Any injury that results in electric shock and electric burns leading to unconsciousness and that requires resuscitation or admittance to a hospital for 24 hours or more
5. Any other injury leading to hypothermia, heat induced illness, or unconsciousness requiring resuscitation or admittance to a hospital for 24 hours or more
6. Loss of consciousness caused by asphyxia or lack of oxygen or exposure to a biological agent or harmful substance
7. Absorption of any substance by inhalation, skin, or ingestion causing loss of consciousness or acute illness requiring medical treatment
8. Acute illness requiring medical treatment where there is reason to believe the exposure was to biological agents, its toxins, or infected materials
Building System Categories

4.1.2 Category 2
Facility systems in which failure of such equipment is likely to cause minor injury to patients or caregivers shall be designed to meet system Category 2 requirements as defined in this code.

Systems are expected to provide a high level of reliability; however, limited short durations of equipment downtime can be tolerated without significant impact on patient care. Category 2 systems support patient needs but are not critical for life support.

A minor injury means *not serious* or *involving risk of life*.
Building System Categories

4.1.3 Category 3
Facility systems in which failure of such equipment is not likely to cause injury to patients or caregivers, but can cause patient discomfort, shall be designed to meet system Category 3 requirements as defined in this code.

Normal building system reliabilities are expected. Such systems support patient needs, but failure of such equipment would not immediately affect patient care. Such equipment is not critical for life support.
Building System Categories

4.1.4 Category 4

Facility systems in which failure of such equipment would have no impact on patient care shall be designed to meet system Category 4 requirements as defined in this code.

Such systems have no impact on patient care and would not be noticeable to patients in the event of failure.
The Category definitions in Chapter 4 shall apply to Chapters 5 through 11.

Chapter 5  Gas and Vacuum Systems
Chapter 6  Electrical Systems
Chapter 7 * Information Technology and Communications Systems
Chapter 8 * Plumbing
Chapter 9  Heating, Ventilation, and Air Conditioning (HVAC)
Chapter 10 Electrical Equipment
Chapter 11 Gas Equipment

* These two chapter were not adopted by CMS when they move to 2012 editions.
Risk Assessment categories shall be determined by utilizing a defined risk assessment procedure. All types of patient care spaces should be assessed.

Applying the category rules is generally a challenge that must be left to the facility owner, the medical staff, and the authority having jurisdiction and is outside the purview of engineers or installer. (2018 Edition of 99 will require the ‘HC facility’s Governing Body’ to conduct or approve the assessment).
Chapter 5 – Gas and Vacuum Systems

There are Category 1, Category 2 and Category 3 medical gas systems which are identical to the Level 1, 2 and 3 systems described in previous editions.

Chapter 5 does not specify which category to follow for a design or installation. The rules are applied once that decision has been reached following the guidelines in Chapter 4.
Chapter 6 – Electrical Systems

Level 1, 2 and 3 emergency power supply systems described in this chapter define the operating characteristics, such as run-time capability, load pick-up time, configuration of transfer switches and branch circuits. Class, type and level are in accordance with NFPA 110 and 111 related to emergency power supply systems and stored emergency power supply systems.

The Risk Assessment required by Chapter 4 considers the activities conducted at a particular site and compels a selection of EPSS to accommodate the safe execution of those activities. Different portions of a building or campus may have different level EPSS.
Chapter 6 – Electrical Systems (cont.)

Portions of this chapter deal with distribution of electrical services to patient care areas, anesthetizing locations and wet locations. Criteria for over-current protection, special wiring systems and grounding is included. Requirements for testing and inspection of electrical systems are detailed, particularly safety and performance parameters.

Normal power and emergency power installations and performance are to be similar at the user level. Portions of this chapter pertain to existing systems as well as new systems.
Chapter 9 – Heating, Air-Conditioning and Ventilation

Level 1, 2 and 3 systems requirements as described in this chapter define which locations and/or operating systems must be maintained with ventilation or process air, cooling or heating.

Beyond the requirements for comfort conditioning, the use of pressure differentials for prevention of chemical or biological contamination, exhaust systems for personnel safety and energy consumption are discussed here. Ventilation requirements to support EPSS are included.
Chapter 10 – Electrical Equipment

There are not any clear indications of what should comprise a Level 1, Level 2 or Level 3 piece of electrical equipment described in this chapter. The text does refer to operating characteristics and placement of equipment related to the patient care vicinity. Considerations include safety and reliability of equipment and methods for testing equipment to ensure the integrity of grounds and overall safety. Use of extension cords and relocatable power taps are discussed in this chapter.

Often, electrical appliances are the products that are most intimate to the patient in their hospital stay. Medical equipment, monitors, pumps and similar equipment are right at bedside and have the potential to cause harm due to electrical shock and/or electrocution. Therefore, the questions posed in order to assign a category of risk are usually apparent.
Chapter 11 – Gas Equipment

Similar to electrical equipment, there are not any clear indications of what should comprise a Level 1, Level 2 or Level 3 gas equipment described in this chapter. The text does refer to operating characteristics and safe use of compressed gases in cylinders. Considerations include, storage, transport and handling of gas cylinders and the potential for contribution to fires. Various connection types for cylinder, outlets, valves and regulators are discussed, to prevent cross-connection of gases.

The administration of a gas cylinder safety program is multifaceted, due to various trades and professions being in the chain. Facilities or materials management personnel may handle storage and delivery of tanks, while healthcare professionals connect them and manipulate the use of the gases. Many hospital fire incidents are related to improper use of oxygen or nitrous oxide creating a oxygen rich environment. Physical hazards related to cylinder pressures are prevalent also.
Thank you for your attention!

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