**Patient Care Equipment Testing and Inspection**

**Date Implemented:**

**Reviewed/Revised Date(s):**

**Policy Statement:**

Per the NFPA 99, 2012 edition, Chapter 10, providers must test and visually inspect all patient care equipment upon placing the device into use for the first time, whenever the device is repaired or modified, and additional frequencies as determined appropriate. This policy and procedure provide guidance for testing and inspection of the patient care equipment in our building.

**Definitions:**

**Electrical Continuity** is the presence of a complete path for current flow. A closed switch that is operational for example has continuity.

**Electrical Polarity** is a term used throughout industries and fields that involve electricity. There are two types of poles, positive and negative. This represents the electrical potential at the ends of a circuit. Interconnection of electrical devices nearly always requires correct polarity to be maintained.

**Lead Leakage** refers to when an unintentional electrical connection occurs between the ground and an energized part or conductor.

**Patient-Care-Related Electrical Equipment (PCREE)** is defined as an electrical equipment appliance that is intended to be used for diagnostic, therapeutic, or monitoring purposes in a patient care vicinity. Examples of PCREE includes, but is not limited, to oxygen concentrators, pumps, ventilators, electrical beds, electrical lifts, and other life support equipment.

**Patient-Care Vicinity** is a space, within a location intended for the examination and treatment of patients, extending 6 feet beyond the normal location of the bed, chair, table, treadmill, or other device that supports the patient during examination and treatment and extending vertically to 7 feet 6 inches above the floor.

**Power Cord-Strain Relief** shall be provided at the attachment of the power cord to the appliance so that mechanical stress, either pull, twist, or bed, is not transmitted to internal connections. A strain relief molded onto the cord shall be bonded to the jacket and shall be of compatible material.

**Procedures:**

1. All PCREE will be visually inspected and tested before being put into service for the first time, after any repairs or modifications that may have compromised electrical safety, and at additional frequencies as determined appropriate by the **[Administrator or Title of Designee]**
2. Visual Inspection for power cord physical integrity. The visual inspection of the power cord will ensure that the power cord is assembled correctly including:
   1. Power cord
      1. All cord-connected electricity powered appliances that are not double insulated and are used in the patient-care vicinity shall be provided with a three-wire power cord and a three-pin grounding type plug.
      2. Double-insulated appliances shall be permitted to have two conductor cords and shall be rated as Class II devices.
   2. Attachment plug
      1. The attachment plug shall be a two-pole, three-wire grounding type.
      2. Appliances supplied by other than 120-V single phase systems shall use the grounding-type plug (cap) appropriate for the particular power system.
      3. The grounding prong of the plug shall be the first to be connected to, and the last to be disconnected from, the receptacle.
      4. If screw terminals are used, the stranded conductor shall be twisted to prevent stray strands, but the bundle shall not be tinned after twisting.
      5. If the conductor is not twisted, it shall be attached by an approved terminal lug.
      6. The power cord conductors shall be arranged so that the conductors are not under tension in the plug.
   3. Cord-strain relief
      1. The strain relief shall not cause thinning of the conductor insulation.
      2. The strain relief of replaceable plugs shall be capable of being disassembled.
      3. Plugs shall be permitted to be integrally molded onto the cord jacket if the design is listed for the purpose.
3. Testing. The wiring of each cord assembly shall be tested for continuity and polarity. The testing of continuity and polarity shall be completed with a Safety Analyzer device.
4. Resistance Testing:
   1. For appliances that are used in the patient-care vicinity, the resistance between the appliance chassis, or any exposed conductive surface of the appliance, and the ground pin of the attachment plug shall be less than 0.50 ohm under the following conditions:
      1. The cord shall be flexed at its connection to the attachment plug or connector.
      2. The cord shall be flexed at its connection to the strain relief on the chassis.
   2. This requirement shall not apply to accessible metal parts that achieve separation from main parts by double insulation or metallic screening or that are unlikely to become energized (such as escutcheons or nameplates, small screws).
   3. This test shall be completed before undertaking any leakage current measurements.
5. Leakage Current Tests and Limits:
   1. Fixed Equipment:
      1. Permanently wired appliances in the patient-care vicinity shall be tested prior to installation while the equipment is temporarily insulated from the ground.
      2. The leakage current flowing through the ground conductor of the power supply connection to ground of permanently wired appliances installed in general or critical care areas shall not exceed 10.0 mA (ac or dc) with all grounds lifted.
   2. Touch Currents – Portable Equipment:
      1. The touch current for cord-connected equipment shall not exceed 100 µA with the ground wire intact (if a ground wire is provided) with normal polarity and shall not exceed 500 µA with the ground wire disconnected.
      2. If multiple devices are connected together and one power cord supplies power, the leakage current shall be measured as an assembly.
      3. When multiple devices are connected together and more than one power cord supplies power, the devices shall be separated into groups according to their power supply cord, and the leakage current shall be measured independently for each group as an assembly.
   3. Touch Leakage Test Procedures. The measurements shall be made using the circuit, with the appliance ground broken in two modes of appliance operation as follows:
      1. Power plug connected normally with the appliance on.
      2. Power plug connected normally with the appliance off (if equipped with an on/off switch).
      3. If the appliance has fixed redundant grounding the touch leakage current test shall be conducted with the redundant grounding intact.
   4. Lead Leakage Current Tests and Limits – Portable Equipment:
      1. The leakage current between all patient leads connected together and ground shall be measured with the power plug connected normally and the device on.
      2. The leakage current shall not exceed 100 µA for ground wire closed and 500 µA ac for ground wire open.
      3. Lead leakage tests can also be conducted with the Safety Analyzer device.
6. Documentation of testing and inspections will be maintained per requirements.
7. The building will maintain all instructions manuals for PCREE on-site. These instruction manuals will be reviewed by a member of environmental/maintenance services at a minimum of when the device is entered into service and when repaired or modified.

**Reference**

National Fire Protection Association. *NFPA 99 Health Facilities Code 2012 English Edition*. (2011, Aug. 31). *NFPA 99 Code 2012* Chapter 10. <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=99>