NON-HOSPITAL MEDICAL AND SURGICAL FACILITIES ACCREDITATION PROGRAM

Accreditation Standards

Electrical Systems and Safety

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INTRODUCTION

The Canadian Standards Association's (CSA) standard *Electrical safety and essential electrical systems in health care facilities* (CSA Z32) specifies the safety requirements for electrical systems in health-care facilities. *Emergency electrical power supply for buildings* (CSA C282) specifies the emergency power supply requirements for health-care facilities. These standards apply to all facilities providing health-care services, both public and private, regardless of type, size, location or range of services. Electrical equipment is also subject to the requirements outlined in the NHMSFAP Equipment Management standard.

ELEC1.0 ELECTRICAL SYSTEMS AND SAFETY

ELEC1.1	**Electrical safety measures are implemented.**	
ELEC1.1.1	**M**	Only electrical equipment bearing a CSA mark/label or a label recognized by the CSA is used. *Guidance: The CSA mark certifies that the equipment has been tested and meets applicable Canadian standards. Examples include:*
ELEC1.1.2	**M**	Acceptance testing is performed on all electrical equipment before initial use. *Guidance: All medical and non-medical care equipment with electrical components, whether facility-owned, leased, loaner, demo or physician-owned, must be tested to ensure that the equipment is complete, safe and functioning properly before being used for the first time within the facility. This is referred to as acceptance testing and is performed by the manufacturer or a qualified biomedical technician when the equipment is received by the facility. Documentation of these acceptance tests/inspections/checks are on file for each piece of medical and patient care equipment with electrical components. Patient- and/or staff-owned electrical devices are not permitted within the facility patient care areas (e.g. electric blankets, phone chargers). Facility staff may bring their personal devices into the facility (e.g. cell phones, computers, tablets), however, these personal devices may not be "charged" in facility patient care areas unless the device and power cord has been evaluated by biomedical engineering.*
ELEC1.1.3	**M**	Acceptance testing and preventative maintenance is performed by a qualified biomedical technician or the manufacturer. *Guidance: The facility medical director is responsible for ensuring that the technician or manufacturer vendor performing the testing/inspection/checking, repairing, or performing preventative maintenance on electrical equipment is appropriately qualified.*

ELEC1.1.4	**M**	There are a sufficient number of electrical receptacles for equipment regularly used in patient care areas. *Guidance: The recommended number of duplex receptacles per patient care location/bay are as follows: In-patient unit (overnight stay) – 3; Critical care areas (PACU) – 8; Operating rooms – 14.*
ELEC1.1.5	**M**	Extension cords and power bars bear a CSA mark/label and are hospital-grade. *Guidance: Extension cords and power bars should not be used as a permanent solution for insufficient electrical receptacles and/or electrical receptacles which are not available in the location required. Alternatives to the use of an extension cord or power bar include installation of electrical receptacles in location(s) needed, installation of more electrical receptacles, and replacement of the equipment's original power cord with a longer cord.*
ELEC1.1.6	**M**	Extension cords and power bars are evaluated by biomedical engineering prior to being put into clinical use at the facility. *Guidance: The electrical safety and integrity of each electrical cord and power bar is evaluated before being put into clinical use. Biomedical engineering records are on file for extension cords and power bars.*
ELEC1.1.7	**M**	Extension cords and power bars are appropriately used. *Guidance: Extension cords and power bars may not be used in series with an extension cord or another power bar.*
ELEC1.1.8	**M**	Cords lying on the floor are secured (e.g. taped, covered). *Guidance: Cords lying on the floor are secured to prevent tripping and/or unintentional unplugging.*
ELEC1.1.9	**M**	Power bars are mounted or supported above the level of the floor to prevent contact with liquids.
ELEC1.2	**Normal electrical systems ensure effective and safe patient care.**	
ELEC1.2.1	**M**	Electrical equipment critical to patient care is plugged into essential electrical system receptacles. *Guidance: An essential electrical system is a system that has the capability of restoring and sustaining a supply of electricity in the event of a loss of the normal energy supply. Electrical receptacles supplied from the essential electrical system are coloured red. Electrical equipment critical to patient care includes but is not limited to monitors, anesthesia equipment and electro surgery devices.*
ELEC1.2.2	**M**	Each electrical receptacle is labelled with the supplying panel board identifier and circuit number. *Guidance: This label is to be visible when the receptacle cover plate is in place.*
ELEC1.2.3	**M**	Electrical panel boards are accessible by authorized personnel only. *Guidance: The panel board is locked or located in a restricted access location.*
ELEC1.2.4	**M**	Electrical panel board directories are clear. *Guidance: The labelling of the electrical panel board directory is clear.*
ELEC1.2.5	**M**	The normal electrical system is tested annually. *Guidance: Records of electrical system testing are on file. Annual testing includes branch circuit breakers, receptacle retentive force, line isolation and maximum hazard index.*

ELEC1.2.6	**M**	Automatic emergency lighting is provided for patient care areas and exit routes. *Guidance: Automatic emergency lighting is available to provide dependable illumination in the event of a power failure. In the event that the emergency lighting system does not automatically activate, an alternate means of light must be readily available (e.g. flashlights).*
ELEC1.3	**Uninterruptible power supply ensures effective and safe patient care.**	
ELEC1.3.1	**M**	Uninterruptible power supply (UPS) units are connected to medical equipment that requires the use of an UPS. *Guidance: Some medical equipment may specify the need for an UPS source to provide continuity of power for critical equipment. An uninterruptible power supply (UPS) automatically provides a continuous, temporary supply of electric power for a limited time if there is a failure of the primary power supply.*
ELEC1.3.2	**M**	UPS unit operation and maintenance manual is readily available. *Guidance: A copy of the operation and maintenance manual is kept in a location that is accessible by staff.*
ELEC1.3.3	**M**	UPS units are maintained. *Guidance: UPS units require periodic testing, cleaning and battery checking in accordance with the manufacturer's instructions for use. Records of UPS testing, cleaning and battery checking are on file at the facility.*
ELEC1.3.4	**M**	Clinical staff know the limited power duration of the UPS unit. *Guidance: There are many types of UPS units. Some UPS units provide power when the electrical supply fails while others operate continuously to ensure there are no fluctuations in the power supply. Some provide only a few seconds of power until the emergency supply generator kicks in while others may supply power for hours. Some UPS units are portable and self-contained while others are permanently connected into the facility's essential electrical system. Therefore, clinical staff need to know how the UPS works and the safe operating time that is available.*
ELEC1.4	**Emergency electrical power supply ensures effective and safe patient care during an interruption of the normal electrical supply.**	
ELEC1.4.1	**M**	Emergency electrical power supply is provided by a generator. *Guidance: Class 1 facilities are required to have an emergency electrical power supply. The generator may be located in a separate service room, an outside enclosure or on the roof of the building/facility. Class 2 and 3 facilities, as determined by the medical director in consultation with a professional electrical engineer, may not be required to have an emergency electrical supply. Class 2 and 3 facilities without an emergency electrical power supply must have written documentation on file (i.e. letter, memorandum) stating that the medical director in consultation with a named electrical engineer has determined that not having an essential electrical system (a system capable of restoring and sustaining a supply of electrical energy if the normal supply is lost) would not produce unacceptable risk to the effective and safe care of patients at the facility. The letter/memorandum is signed by the medical director and the named electrical engineer.*
ELEC1.4.2	**M**	The generator bears a CSA mark/label or a label recognized by the CSA. *Guidance: The CSA mark certifies that the equipment has been tested and meets applicable Canadian standards.*
ELEC1.4.3	**M**	The generator enclosure is structurally sound and protects the equipment from weather.

ELEC1.4.4	**M**	The generator enclosure is kept locked at all times and is accessed by authorized personnel only.
ELEC1.4.5	**M**	The generator enclosure is free of obstructions.
ELEC1.4.6	**M**	The generator enclosure is equipped with battery-operated emergency lighting.
ELEC1.4.7	**M**	There is sufficient fuel on site to operate the generator under maximum load for a minimum of two hours. *Guidance: Facilities are required to maintain a fuel supply sufficient to safely end the procedure and transfer/discharge patients from the facility.*
ELEC1.5	**The emergency electrical power supply system is inspected, tested and maintained in accordance with CSA C282.**	
ELEC1.5.1	**M**	The emergency generator operation and maintenance manual is readily available. *Guidance: A copy of the operation and maintenance manual is kept in a location that is accessible by staff.*
ELEC1.5.2	**M**	Weekly inspection, testing and maintenance is performed. *Guidance: Weekly inspection, testing and maintenance is performed in accordance with the manufacturer's operating and maintenance instructions and covers at minimum the following items in accordance with CSA C282: fuel level, oil level, coolant level, starter system, batteries and charging equipment, inspecting the system for leakage, inspecting the control panel, and testing the emergency lighting unit(s). The facility medical director is responsible for ensuring that the person performing the testing/inspection/checking or preventative maintenance is appropriately qualified. Records of weekly inspection, testing and maintenance are on file.*
ELEC1.5.3	**M**	Monthly inspection, testing and maintenance is performed. *Guidance: Monthly inspection, testing and maintenance is performed in accordance with the manufacturer's operating and maintenance instructions and covers at least the following items in accordance with CSA C282: simulating a failure of the normal electrical power supply and operating the system under at least 30% of the rated load for 60 minutes. The facility medical director is responsible for ensuring that the person performing the testing/inspection/checking or preventative maintenance is appropriately qualified. Records of monthly inspection, testing and maintenance are on file.*
ELEC1.5.4	**M**	Semi-annual inspection, testing and maintenance is performed. *Guidance: Semi-annual inspection, testing and maintenance is performed in accordance with the manufacturer's operating and maintenance instructions and covers at least the following items in accordance with CSA C282: cleaning and lubricating the engine and performing two full cranking cycles. The facility medical director is responsible for ensuring that the person performing the testing/inspection/checking or preventative maintenance is appropriately qualified. Records of semi-annual inspection, testing and maintenance are on file.*
ELEC1.5.5	**M**	Annual inspection, testing and maintenance is performed. *Guidance: Annual inspection, testing and maintenance is performed in accordance with the manufacturer's operating and maintenance instructions and covers at least the following items in accordance with CSA C282: control panel testing, changing filters and fluids, inspecting belts and hoses, fuel testing (limited storage life), and a 2 hour full-load test. The facility medical director is responsible for ensuring that the person performing the testing/inspection/checking or preventative maintenance is appropriately qualified. Records of annual inspection, testing and maintenance are on file.*

ELEC1.5.6	**M**	Quinquennial (every 5 years) inspection, testing and maintenance is performed. *Guidance: Quinquennial inspection, testing and maintenance is performed in accordance with the manufacturer's operating and maintenance instructions and covers at least the following items in accordance with CSA C282: inspection of insulation of generator windings, draining and flushing of the cooling system, replacement of the thermostats, and conducting an infrared thermal imaging assessment of all electrical connections, contacts and energized components. The facility medical director is responsible for ensuring that the person performing the testing/inspection/checking or preventative maintenance is appropriately qualified. Records of quinquennial inspection, testing and maintenance are on file.*
ELEC1.5.7	**M**	Records of inspection, testing and maintenance of the emergency electrical power supply are maintained. *Guidance: Inspection, testing and maintenance records include the date when the inspection, testing or maintenance was carried out, the name(s) of the person(s) who performed the inspection, testing or maintenance, notes on any unsatisfactory conditions observed or discovered and the actions taken to correct these.*
ELEC1.6	**Policies and procedures contain all the information necessary for the safety of patients, staff and visitors.** *Intent: Policies and procedures ensure that activities/procedures are performed consistently and accurately by all personnel within the non-hospital facility.*	
ELEC1.6.1	**M**	There are policies and procedures for electrical safety. *Guidance: The policies and procedures for electrical safety should outline the selection, acquisition and acceptance of electrical equipment, preventative maintenance, equipment checks, safe use, controls, and protective measures (e.g. safety features, contraindications for use).*

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REFERENCES

Canadian Standards Association. Electrical safety and essential electrical systems in health care facilities. 4th ed. Toronto: Canadian Standards Association; 2015. 91 p. CSA Standard No.: Z32-15.

Canadian Standards Association. Emergency electrical power supply for buildings. 6th ed. Toronto: Canadian Standards Association; 2015. 67 p. CSA Standard No.: C282-15.

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Operating Room Nurses Association of Canada (ORNAC). The ORNAC standards, guidelines, and position statements for perioperative registered nurses. 13th ed. Toronto: CSA Group; 2017. Section 4 – Risk management and occupational health and safety: 4.5.2 - The number, location, and installation of electrical receptacles shall be in accordance with CSA Standards (CSA R2013); p. 373.

Operating Room Nurses Association of Canada (ORNAC). The ORNAC standards, guidelines, and position statements for perioperative registered nurses. 13th ed. Toronto: CSA Group; 2017. Section 4 – Risk management and occupational health and safety: 4.5.13 - Equipment shall be labelled with a dated preventive maintenance sticker (Phillips, 2017). p. 375.

Recalls and safety alerts [Internet]. Ottawa: Government of Canada; 2018 [cited 2018 Aug 31] Available from: http://www.hc-sc.gc.ca/ahc-asc/media/advisories-avis/index-eng.php