CAPE ELECTRIC

HOSPITAL AND MEDICAL ESTABLISHMENTS

HUMAN / EQUIPMENT SAFETY

In compliance with latest National and International standards

- Ensure safety of patients and healthcare professionals from electrical shock
- Prevent fire hazards from electrical and biomedical equipment
- Ensure reliable diagnostic performance
- Enhance lifespan of biomedical equipment and promote sustainability

Risk for patients due to electric shock

- Conductive parts bypass skin.
- Conductive solution or electrode gel intentionally lowers the resistance offered by the skin (e.g. defibrillation pads, EKG pads, ultrasound equipment, patient monitors and ventilators).
- Anaesthetised patients are unable to respond or protect themselves during electrical shock incidents involving surgical or medical equipment

Accidents in hospitals and medical locations

- Electrical fire accidents are common in medical locations. During COVID period, > 25 major fire accidents happened in hospitals killing > 125 people and injuring 1000's.
- Electricity is the primary source of fire.
- India has the most number of hospital fires in the world.
- Air conditioners and ventilators were frequently referred to as "the most prevalent source" of fires.
- Most often non disconnection of protective device is the reason for accidents.

EMI & EMC

Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC) are critical considerations due to the presence of sensitive medical equipment and various electronic devices. EMI refers to unwanted electromagnetic field that disrupts the function of electronic devices, while EMC ensures that device operates correctly in its environment without being affected by or causing interference. Effective EMI/EMC management is crucial to prevent malfunctions in medical equipment, which can have serious consequences for patient safety.

Electromagnetic Interference leads to :

- Malfunctioning monitors, displaying inaccurate data
- Interference with life-support equipment's
- Incorrect readings from diagnostic equipment's
- Electrostatic discharge affecting both equipment and personnel
- Interference in communication systems

Technical requirements in medical locations and solutions by CAPE

- TN-S & IT electric system earthing.
- Protective Equipotential bonding.
- Touch voltages <25V at medical locations to avoid shock hazard through supplementary equipotential bonding.
- Continuity of power supply during first fault for lifesaving equipment.
- Safety measures against fire in oxygen and alcohols rich areas.
- Voltage disturbances and EMC compliance for reliable operation of sensitive and expensive Biomedical equipment.

What we do

- Understand the installation and identification of the risk,
    a. Inspection of all 18 safety measures recommended in NEC 2023
    b. Testing of all 11 safety measures recommended in NEC 2023
    c. Inspection of (Biomedical) installation incompliance with IS 13450 / IEC 60601
- Preparation and implementation of Improvement plan,
- Training of Hospital employees for safety audits and testing.

Example of what we do: Most hospitals have multiple earth electrodes connected to different parts of electrical and biomedical installation. This is against science and electrical theory and is the reason for fire and failures. We help the customers to implement “protective equipotential bonding” as per the latest standard.

Services to hospitals by CAPE

- Electrical Safety Verification (Safety Audits) in Existing and New Hospitals.
- Medical IT System ensuring continuity of power supply even under first fault conditions for lifesaving equipment with an IT supply.
- Global Earthing Systems ensuring automatic disconnection and less than 50V touch voltage.
- Lightning protection system – Protection of buildings from lightning damage.
- Surge protection system – Protection of expensive medical equipment from damage due to transient surges.
- Supplementary Equipotential Bonding - ensuring maximum touch voltages of 25V at medical locations to avoid shock hazards.
- Electromagnetic compatibility and EMP-compliant hospital buildings - Voltage disturbances and EMC compliance for reliable operation of sensitive biomedical equipment.

Benefits of using solution by CAPE

- Electrical hazards are mitigated in the property.
- Reduced risk of explosion and fire.
- Safety assured for medical personnel and patients from electric shock.
- Availability of the power supply during first fault in group 2 locations.
- Medical equipment that are essential for medical care are protected from degradations and damages.
- Long life assured for bio medical appliances.

Our technical team for hospital safety is guided by **Mr. S. Gopa Kumar**, who is a member representing India in MT40 of TC 64 of International Electrotechnical Commission (IEC), maintaining global standards on medical locations.

S. Gopa Kumar
Member

IEC - TC64: (Electrical Installations) MT 03, MT 12, MT 40, MT 41, WG 43
TC81: (Lightning Protection) ahG 19, MT 03, MT 14, MT 21, WG 18
SC 37 A: (Surge Protective Devices) WG 03 & WG 05
SyC LVDC (LVDC) WG 01

BIS - National Building Code (electrical committee),
ETD 20 (National Electrical Code of India 2023, IS732, IS3043 IS/IEC 62305),
ETD 30 & ETD50
SC 37 A: (Surge Protective Devices) WG 03 & WG 05

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