



RIGEL MEDICAL
GMC-INSTRUMENTS GROUP

What is electrosurgery?

Electrosurgical units (ESUs) are a crucial piece of equipment in operation rooms, used in 85% of all surgeries. These units use high frequency currents to generate heat and manipulate human tissue. Electrosurgery testing ensures patient safety, due to the high risks that are associated with high frequency electrical current and the human body. Periodic testing is an IEC 60601-2-2 requirement and manufacturers typically recommend 6-12 month test intervals. The procedure typically involves electrical safety tests, visual inspections and performance tests.

The performance procedure usually consists of output power measurement tests, high frequency measurement tests and return electrode monitoring tests.

Power measurement tests include several parameters to ensure that each mode is performing as it should. Electrosurgery is provided through cutting currents, coagulation currents or a blend of both. Cutting is an uninterrupted sinusoidal waveform with high average power and high current density. Coagulation currents are intermittent bursts of sine waves which drive the current through the tissue with relatively low current. With this in mind, it's essential that power measurements include voltage peaks, output currents and crest factors.

ESUs use high frequencies exceeding 400 kHz, which is the range where electrical current tends to stray. This can lead to decreased functionality and potential thermal injury to the patient. These high frequency leakage limits are specified in IEC 60601. Leakage tests must be carried out under different fault condition to ensure full patient safety.

The return electrodes function is to dissipate current from the patient, ideally over a wide surface area. Return electrode monitoring (REM) was developed to ensure patient safety from burns, by ensuring adequate contact between the patient and the return electrode. REM technology

relies on split electrodes, whereby the resistance of the return electrodes site is consistently monitored. Testing of the REM function ensures that when impedance increases beyond a set threshold, the electrosurgical unit alarms and deactivates.

If you require more help, please contact us at
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