



Everbrite
LIGHTING

MedLux Cove Lighting Application Note: Designing For Magnets That Use “Gradient Cables”

What are “Gradient Cables”?

When an MRI patient is being scanned, high current AC magnetic fields (Gradients) are superimposed on the strong fixed field created by the magnet. The gradient fields cause molecular shifts that are sensed by the MR equipment and are used to create the scan images. The magnitude of voltages and currents flowing in the gradient cables during a scan will vary depending on the type of scan being executed. In the maximum cases, currents can approach 100A and voltages can exceed 1kV! As a result, fairly strong electrical fields are created in the near vicinity of these cables.

What is the Effect?

When the placement of any cove system component, particularly the signal cables or the cove ‘sticks’ themselves, is too close to the gradient cables, a flickering effect may occur. Generally, this is only evident when the cove system is turned OFF at the keypad/controller panel. When the cove system is running, the effect is much harder to see and is generally not noticed. Of course, when there is no scan being executed, no gradient signals are being produced, so the cove system operates normally.

Guidelines

In order to avoid interaction between the gradient cables and the MedLux RGB or White Cove systems, it is necessary to place the cove components a minimum of 24” from the cables, *in any direction*. The high strength fields produced by the gradient cables could induce a significant current in the cove boards and signal cables when the units are installed parallel to the gradient cables. We also have seen situations where the gradient cables cross over cove components in a perpendicular fashion and create similar problems, even with shielding.

Some magnet vendors route the gradient cables upwards from the magnet thereby making placement of cove components somewhat easier, but most vendors run their cables horizontally, above the drop ceiling, for some distance between the magnet and the equipment room penetration panel. It is important to determine how these cables will be run before finalizing the architectural plan for placement of the cove components. It is especially important to locate the signal and power filters for the cove system as far as possible from the gradient power cables and their facility filters.