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An Interview With Weyman Lundquist on Designing for Medical Devices

Weyman Lundquist is President and CEO of West Coast Magnetics, providing engineering solutions to customer challenges in the field of power electronics.



Q: What are some design constraints for transformers used in medical devices?

A: Depending on the application, there are a variety of challenges. One key area is patient/clinician

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RAUMEDIC

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tems for diagnostic and therapeutic uses. For the clinical areas of neuro-monitoring and traumatology, RAUMEDIC produces high-precision pressure-measuring systems with microchip technology. In doing so, it plays a key role in safe patient care around the world.

With 70 years of experience in the areas of extrusion, injection molding and assembly, the company with a global workforce of 800 people turns customer ideas into mature products. The foundation of this work is formed by a quality management system based on ISO 13485 and cleanroom manufacturing on an area of 107,000 square feet based on ISO

14644 (Class 7).

Its global sales network and its own distribution companies in core markets ensure that medical and pharmaceutical customers as well as end users in hospitals and doctors' offices have a high level of product availability at all times.

For more information, be sure to check out RAUMEDIC Inc at MD&M Minneapolis at Booth #1530. You can also contact them by visiting www.raumedic.com, by calling 828-684-8870 or follow them on social media:

- Twitter: www.twitter.com/RAUMEDIC.
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WEST COAST MAGNETICS

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isolation from the power source itself. Isolation transformers are an integral part of many medical devices and isolation requirements for patient isolation typically have stringent specifications and often require very low levels of current leakage across the transformer.

Rotating transformers are used to transfer power across a moving interface, for example catheters, adjustable hand-held devices and boring tools. The choice of core and winding, and tight dimensional tolerances are uniquely critical for this type of design because power must be transferred efficiently across a moving interface and the air gap between the two halves of the transformer creates and inherent decoupling between the primary and secondary.

Transformers operating at RF frequencies are typically dominated by parasitic effects and are often specified based on their impedance matching properties. Impedance matching transformers must have a very high SRF and tight coupling between the windings. In many cases patient isolation is also required.

Q: What does it mean to be ISO13485 certified?

A: The textbook answer is that IOS13485 represents the requirements for a comprehensive quality management system for the design and manufacture of medical devices. WCM components are in medical devices, so being ISO13485 certified means that we support our customers in traceability and documentation for their FDA submissions. ISO13485 controls the

work environment to ensure product safety and focuses on risk management throughout the entire product life cycle. It is important to implement risk management not only during design and development, but also across manufacturing and any activities associated with design changes.

Q: What about inductors?

A: RF energy is used in many medical device applications and tuned inductors are typically part of the design, particularly when power transfer or generation is required. Inductance must be controlled tightly and must be stable with core excitation and temperature.

Q: Can you give an example?

A: A customer requested a low-voltage, 50-watt SMPS transformer requiring 5,000 Vac of isolation and had selected a catalog item core and bobbin typical for this power level for their preliminary design. WCM's engineering reviewed the design and concluded that the core and bobbin geometry would not support the 5,000 Vac hypot requirement.

WCM redesigned the transformer in a WCM410-10 geometry using triple Teflon-insulated litz and the redesign resulted in a transformer which was compact, inexpensive and easily supported the 5,000 Vac hypot requirement.

WCM's 410 series transformers have been designed to meet medical device requirements for patient isolation.

For more information be sure to stop by Booth #2048.