MRI Shielded Rooms
The Turnkey Package

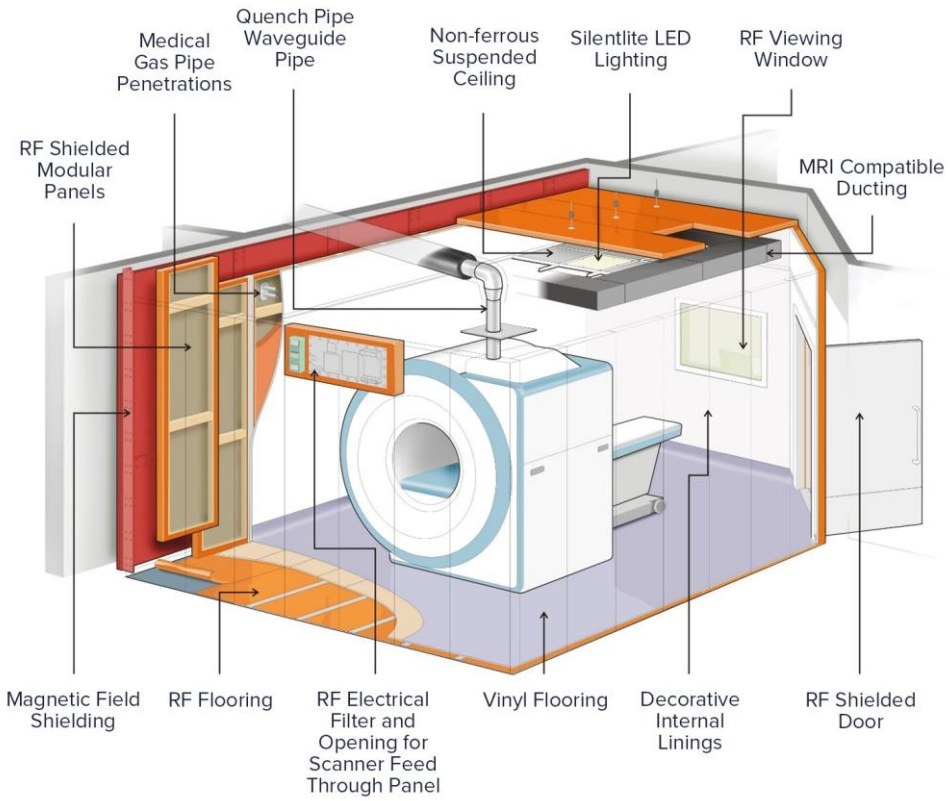
European EMC Products

Product Datasheet

Radio Frequency (RF) Shielded Room, Quench Pipes & Magnetic Field Shielding for MRI Scanner Rooms

Magnetic Resonance Imaging (MRI) is a sophisticated imaging system which provides high resolution images of the body without the use of ionising radiation. When a patient is placed in an MRI scanner, a powerful magnetic field causes all the protons in the body to align in the same direction. Radio Frequency (RF) pulses are then emitted by a gradient coil which causes the protons to deflect by varying degrees. This process results in the emission of an RF signal which is picked up by a receiver coil and converted into a digital internal image of the body. MRI scanners are placed inside a Radio Frequency (RF) Shielded Room to prevent external interference affecting the final images.

European EMC Products MRI Shielded Room Service Offerings:



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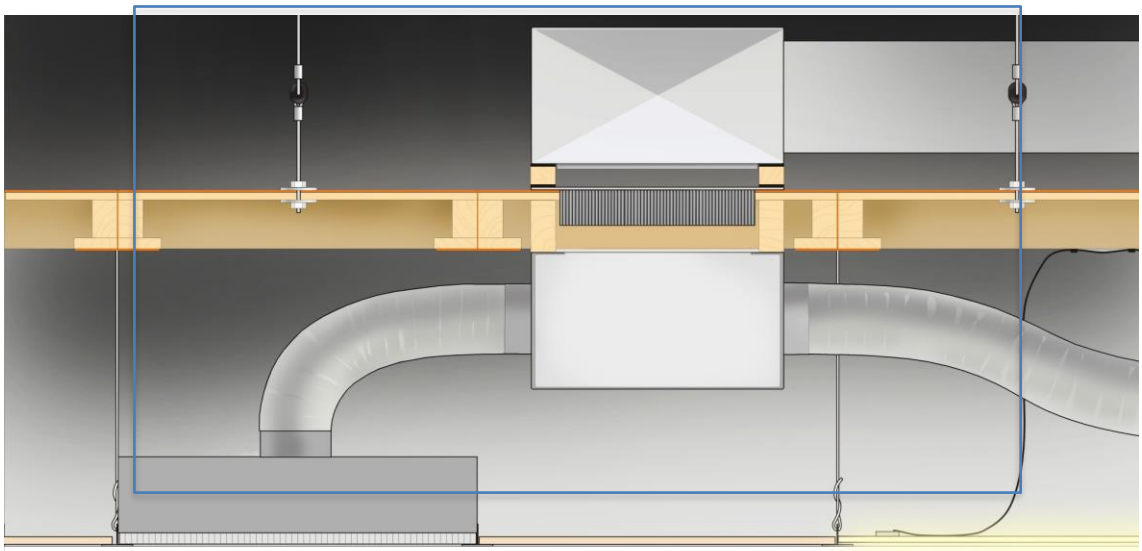
To function properly, an MRI scanner needs to sit in a specialised room or chamber shielded against RF interference. When creating an RF shielded room, EEP construct a Faraday Cage using Copper clad panels. Acoustic insulation can be fitted, and the necessary electrical power and data cabling is installed, along with various services - all of which are shielded using suitable filters.

Our Faraday Cages cover the requirements of all the major MRI scanner manufacturers such as Siemens, Philips Medical, General Electric and Toshiba.

As part of our turnkey offerings we also manufacture and supply RF Shielded Doors and Windows. In addition to the above, and as a pre-cursor to building the room, we can also undertake optional site vibration and magnetic field fluctuation surveys to ensure the ground conditions meet with the manufacturer's specified limits.

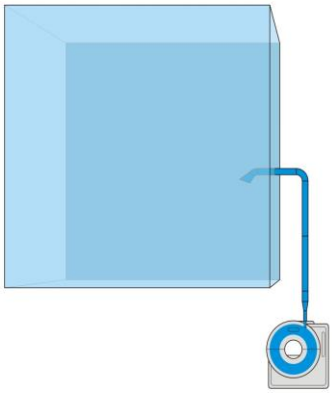
Cross Section Through a Typical MRI Room



MRI Quench Pipes

A quench is a sudden loss of superconductivity in the wire of the magnet. The stored magnetic energy turns into heat causing the liquid helium to boil off very rapidly. Many thousands of cubic metres of helium gas can be released in a few minutes, and the vent pipe has to be able to carry this flow safely.

The expansion ratio of a liquefied and cryogenic substance is the volume of a given amount of that substance in liquid form compared to the volume of the same amount of substance in gaseous form, at room temperature and normal atmospheric pressure.[1] The expansion ratio of liquid helium is 1 to 757.



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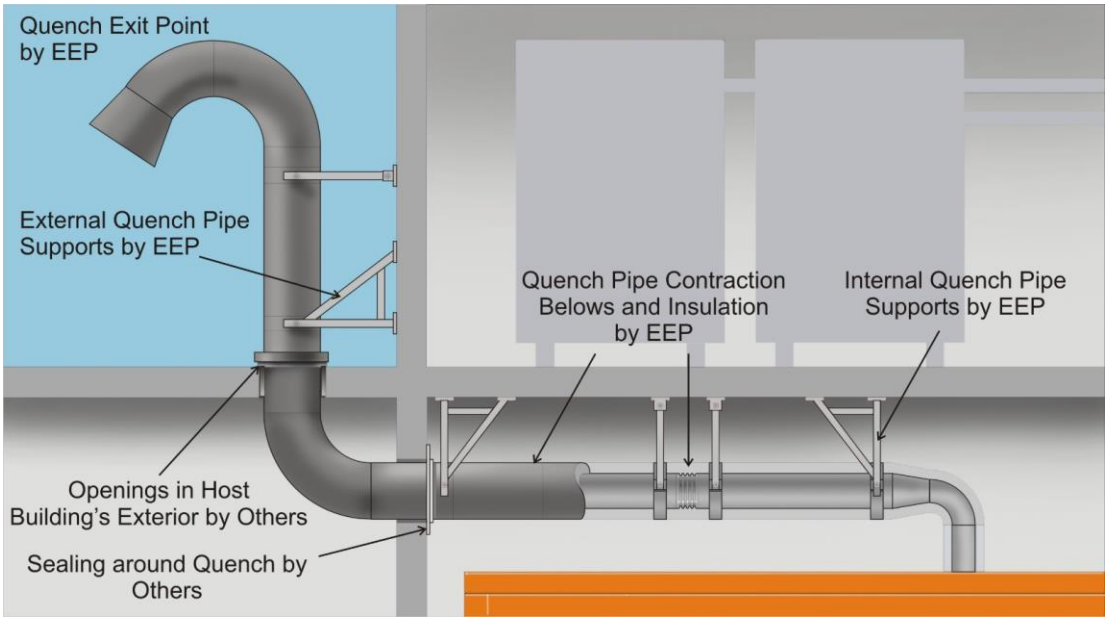
Components of a Typical Quench Pipe



EEP are well versed with the cryogenic engineering practices required to cope with the physical impact on the MRI Quench Pipe system which a helium discharge produces. We offer a bespoke Quench Pipe design, manufacture and installation to approved industry and safety standards, and follow strict procedures whilst undertaking materials selection.

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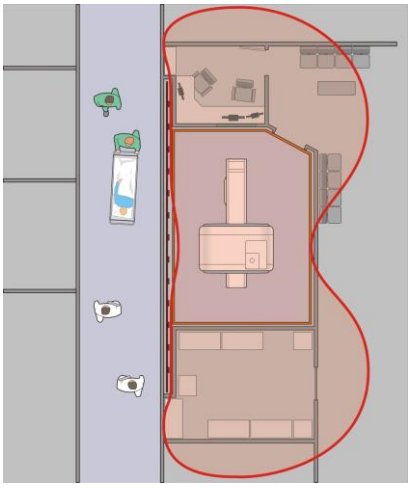
Magnetic Field Shielding

Magnetic fields are generated by permanent magnets, electromagnets, electric motors, electrical distribution systems and MRI scanners. When these fields need to be contained or controlled, European EMC Products can design and install shielding.

The purpose of Magnetic Field Shielding is to contain the 0.5 mT (milliTesla) or 5 Gauss stray magnetic field from extending into public, or uncontrolled areas.

Further reduction of the fringe magnetic fields to 0.1 mT or even 0.05 mT (less than 1 Gauss) are sometimes required to safeguard the performance of sensitive equipment such as computer monitors, image amplifiers and other medical equipment.

Prior to commencing the full design and installation of the physical magnetic field shielding, EEP can also plot the magnetic lines of force to verify where the magnetic field strength is located. By understanding the field shape, we are able to optimise the shield's design.



MRI Shielded Doors & Windows

EEP offer a bespoke design, manufacture and installation service to approved industry and safety standards, and follow strict procedures whilst undertaking materials selection for all single and double, manual or pneumatic RF Shielded Doors and shielded windows.

To add to our service offerings, we can also supply maintenance packages on all of our MRI RF Doors.

Product Datasheets are available upon request.

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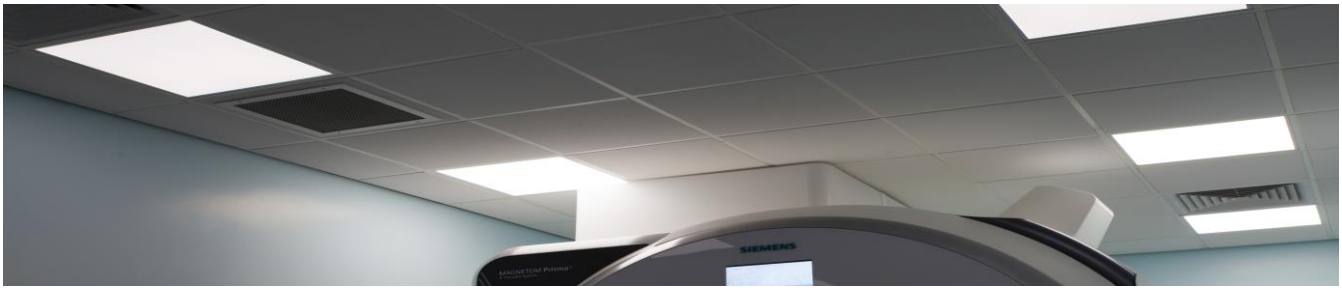
Product Datasheet

Silentlite® LED Lighting System for MRI Illumination



SILENTLITE® is a state-of-the-art LED lighting system designed by European EMC Products to meet the demands of an MRI chamber.

SILENTLITE® uses non-switch-mode technology to drive the LED panels and charge the standby batteries, giving continuous uninterruptable illumination in the event of power failure. These carry a Declaration of Conformity covering compliance to the Low Voltage and EMC Directives for use in the medical environment: EN60950-1:2001 and EN60601-1-2:2001.

Utilising the latest long-life, dimmable, white LED panels a lifespan of 50,000 hours or more can be achieved with a Silentlite® installation. Providing high quality light at higher efficiencies, our panels are unaffected by the strong magnetic fields created by an MRI scanner and provide a low interference and reliable alternative to Tungsten Halogen Lighting.

Specification

- Optional 6, 8 or 12 LED Panels. Bespoke options available.
- Optional 1 – 2 Power Circuits.
- Input: 220/240V 50/60Hz
- 40V DC lighting system meets SELV circuit requirements.
- In the event of power failure specified panels in the system act as a battery backup.

  Battery back-up standby capability (batteries require 6 hours to recharge):
  - 60 minutes before lux level falls below 50 lux.
  - 4 hours before lux level falls below 10 lux.
  * The above figures quoted are for a typical system install with two panels battery backed up.

- SILENTLITE® consumes just 25% the power of Halogen lighting which reduces energy costs and air conditioning. Anticipated annual saving for an MRI chamber: £600
- High quality lighting – colour rendition index of 85; colour temperature 4100K.
- Each panel fits a standard 600 x 600mm ceiling grid and weighs 2kg.
- The lightweight panels can be easily mounted within tiled or plasterboard ceilings.
- Panels can be dimmed and switched separately to create different lighting levels for patient comfort and operating efficiency.
- SILENTLITE® control electronics assures no possibility of strobing.
- SILENTLITE® luminaire Reliability - MTBF (Mean Time between Failures Mil Std 217F) - 30,000 hours at full illumination, 25°C ambient (Ground Benign).
- Control Box includes input and output RF filtration - No additional mains filter requirement.

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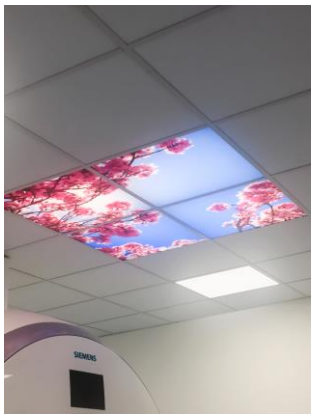
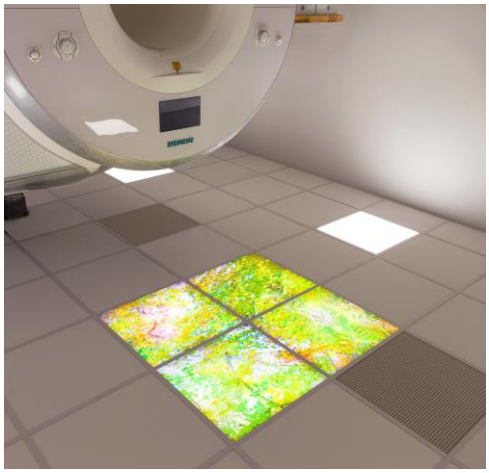
Silentlite Virtual Skylite & Virtual Wall Panels

SILENTLITE® Virtual Skylites and Virtual Wall Panels are a high definition image, MRI compatible, decorative LED panel mood lighting system. The LED panels are positioned ideally to provide a focal point for the patient and their aim is to assist in creating a more calming and relaxing environment whilst they undergo their MRI scan. The picture ceiling also aids in making the room feel less clinical.

These high definition image, internal lighting features are not solely for use in MRI Rooms. Both ceiling and wall panels can be manufactured for use in a variety of healthcare facilities/rooms such as X-Ray rooms, CT rooms, consulting rooms, dental practices, clinics and reception/waiting areas to assist in providing a calming and stress-free environment.

Virtual Skylites can be incorporated within a European EMC Products SILENTLITE® installation, or as a standalone product against an existing lighting system. Images can be chosen from our standard range or bespoke panels can be created via high definition images supplied by our clients.





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About Us

Established in 1996, European EMC Products (EEP) are an established British company whose experience and understanding of the science of shielding makes it an ideal partner in whom you can place your trust with confidence. The purpose of installing EEP shielding systems is to protect people and equipment against the threats posed by electromagnetic and radio frequency (RF) interference, radiation, magnetic fields and electromagnetic pulses.
Our diverse range of turnkey products and services, including design, project management, testing and consultancy are delivered across multiple sectors to an international client base.

Quality

European EMC Products Limited are registered to BS EN ISO 9001:2015, Certificate Number FS38901.
Registered Scope: The design, assembly, installation, servicing and testing of RF Shielded Structures and equipment including EMI Shielding, Blast Doors, Gas Tight Doors and specialised mobile Electromagnetic Pulse Protection (EMPP) containers.

Radio Frequency, Magnetic Shielding and Quench systems for MRI (Magnetic Resonance Imaging) scanners.
The design, assembly and installation of Ionising Radiation Protection facilities.
The design, manufacture and installation of LED lighting systems for medical applications.
EEP Filters Limited are registered to BS EN ISO 9001:2015, Certificate Number FS38901.
Registered Scope: The design, manufacture, management of installation and testing of high performance EMC and EMP Power and Data Line Filters.

Disclaimer

NB: All the information provided within this datasheet is for reference only. Product specifications are subject to change without notice.