

Design of MRI Scanner Magnetic Field Shielding Permissible Magnetic Flux Levels



The figures below are from the Siemens, Philips and GE pre-installation guides and show the maximum permissible magnetic flux levels from the MRI Scanner which various types of medical equipment can tolerate.

Philips (from PMS-UK/INT3/781/2003-10-29/CH)

| Object | mT (milli-Tesla) | Gauss (G) |
|---|------------------|-----------|
| Magnetic data carrier (diskette, tape, disk, credit card) | 1.0mT | 10 |
| Optical disk data carrier | 60mT | 600 |
| Pacemaker | 0.5mT | 5 |
| Video monitor, monochrome (stationary) | 1.0mT | 10 |
| Video monitor, colour | 0.1mT | 1 |
| Image intensifier | 0.1mT | 1 |
| Ultrasound | 0.1mT | 1 |
| X-Ray CT scanner with photomultipliers | 0.1mT | 1 |
| Linear accelerator | 0.1mT | 1 |
| Gamma camera | 0.1mT | 1 |
| Electron beam microscope | 0.1mT | 1 |
| ECG equipment * | 0.1mT | 1 |

GE (from SIGNA MRI PRE-INSTALLATION 2223170 rev 12)

| | | |
|---|---------|-----|
| Nuclear cameras | 0.05 mT | 0.5 |
| Positron Emission Tomography scanner | 0.1mT | 1 |
| Linear Accelerator | 0.1mT | 1 |
| Cyclotrons, Accurate Measuring scale | 0.1mT | 1 |
| Image intensifiers, Colour TV, Video display (colour, B/W, monochrome) | 0.1mT | 1 |
| CT scanner, Ultrasound, Lithotripter | 0.1mT | 1 |
| Electron microscope, Advantage Workstation with CRT Monitor | 0.1mT | 1 |
| Power transformers, Main electrical distribution transformers, Moving steel equipment | 0.3mT | 3 |
| Cardiac pacemakers, Neurostimulators, Bio stimulation devices | 0.5 mT | 5 |
| Magnetic tapes and floppy discs, Hard copy imagers | 1 mT | 10 |
| Line printers, Video Cassette Recorder (VCR), Film processor | 1 mT | 10 |
| Credit cards, watches, Clocks, Telephone switching station | 1 mT | 10 |
| Water cooling equipment, HVAC equipment, Major mechanical equipment room | 1 mT | 10 |
| Credit cards, watches, Clocks, Telephone switching station | 1 mT | 10 |
| Large steel equipment | 1 mT | 10 |
| X-ray tubes | 1 mT | 10 |
| System Control Cabinet, MR Common Chiller (MRCC) equipment (option) | 3 mT | 30 |
| Heat Exchanger for Mobile System Gradient Coil Cooling | 3 mT | 30 |
| GOC Computer Cabinet, Octane Computer | 5 mT | 50 |
| Operator Workspace Cabinet, LCD Colour Monitor for OW (See note 5) | 5 mT | 50 |
| SRFD II or SRF Cabinet, ACGD/PDU Cabinet | 5 mT | 50 |

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| | | |
|--|-------|-----|
| Water Chiller for Gradient Coil Cooling & GE Main Disconnect Panel | 5 mT | 50 |
| Magnet Monitor, Telephones, Metal detector for Screening | 5 mT | 50 |
| LCD Colour Monitor for Advantage Workstation & Brainwave HW Lite Cabinet | 5 mT | 50 |
| Service Tool Magnet Power Supply Cabinet & Oxygen Monitor | 10 mT | 100 |
| Service Tool Shim Power Supply Cabinet | 10 mT | 100 |
| Shield/Cryo Cooler Compressor Cabinet | 10 mT | 100 |
| | | |
| Pneumatic Patient Alert Control Box | 10 mT | 100 |
| Penetration Panel, Blower Box, Magnet Rundown Unit | 20 mT | 200 |
| Remote Oxygen Sensor Module | 20 mT | 200 |

Siemens (from E-Magnetom PCE -E - Release 2004-08-12)

| | | |
|---|---------|-----|
| Image intensifiers, gamma cameras, linear accelerators (non-Siemens) | 0.05 mT | 0.5 |
| Linear accelerators (Siemens) | 0.1 mT | 1 |
| Colour monitors | 0.15 mT | 1.5 |
| CT Systems (Siemens) | 0.2 mT | 2 |
| Magnetic shielded colour monitors | 0.3 mT | 3 |
| B/W monitors, cardiac pacemakers, insulin pumps, safety limit for unrestricted access | 0.5 mT | 5 |
| Computers, disc drives, oscilloscopes, host PC, imager PC, ASTEX RFPA, Shim Tray | 1 mT | 10 |
| Heating Control 3 | | |
| Small motors, watches, photographic equipment, magnetic storage devices (short term) | 3 mT | 30 |
| Electronic Cabinets GPA, CCA, RCA | 5 mT | 50 |
| Filter, shim power supply | 10 mT | 100 |
| Servo-Ventilator (Siemens) | 20 mT | 200 |

NB; All of the information provided within this datasheet has been obtained from the relevant manufacturer's pre-installation guide and is to be used for reference purposes only.

About Us

European EMC Products Ltd was formed in July 1996 to supply high quality products and services to the Electro-Magnetic Compatibility (EMC) market. The emphasis being on EMP and RF Shielded Chambers and associated products and services such as RF Shielded Windows, Shielded Doors and Shielding Effectiveness and EMP Testing.

Quality

European EMC Products are registered to BS EN ISO 9001:2015, Certificate No. FS 38901. License scope: The design, assembly, servicing and testing of RF Shielded structures and equipment including EMI shielding and thermal management materials; Gas tight doors; and specialised mobile electromagnetic pulse protected (EMPP) containers.

Disclaimer

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