



Medium Performance Steel Shielding in Hospitals

SCOPE

This specification has been compiled to cover the general requirements for the design, construction and erection of a medium performance sheet steel RF Shielded enclosure. This enclosure will provide protection for E.E.G., E.M.G. and E.C.G. equipment from external RF emitters or alternatively, to contain RF emissions from Diathermy or similar equipment within hospitals.

GENERAL

This specification covers the general requirements applicable to the design, construction, installation and testing of all metal RF shielded enclosures.

The enclosures shall be suitable for preventing the emissions of electromagnetic energy generated inside the enclosure and for the prevention of entry of electromagnetic energy into the enclosure.

The construction will comprise a steel frame with all structural members welded and lined or covered with the required electrical shielding steel. The shielding steel shall be fastened to steel framework by methods described herein.

The completed areas shall be subject to typical hospital use including varying and movable floor leads, repetitious use of the access door(s) and continuous duty cycle of all ancillary equipment.

PERFORMANCE

The shielded room shall be designed and installed to meet the following attenuation:

Electric and Plane Wave Fields	60dB 10kHz – 100 MHz
	Rolling off to 50dB at 1GHz

CONTRACTOR QUALIFICATIONS

The shielded room including all accessories that will affect the RF shielding effectiveness, penetrations, power line filters, air vents, etc. Shall be designed and installed by an experienced company regularly engaged in the design and installation of all-metal RF shielded enclosures.

Evidence of this experience shall be made available to the client representative upon request and shall include certified test reports on installations completed by the contractor.

CONTRACTOR'S RESPONSIBILITY

The contractor will be responsible for installation of the screen, the filters, and the waveguide vents, all penetrations and testing of the screening effectiveness.

The electrical contractor shall be responsible for wiring the interior of the screen room for lighting and power. The fire sprinkler contractor will be responsible for installation of fire sprinklers and detectors.

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The mechanical contractor will be responsible for terminating air conditioning ducts on the waveguide bents.

APPLICABLE DOCUMENTS

MIL-STD-285, Attenuation Measurements for Enclosure, Electromagnetic Shielding.

REQUIREMENTS

Design Objective

Reliability to maintain high shielding effectiveness for long term usage with minimum maintenance shall be stressed throughout the design, construction and erection of the specified shielded enclosures. Particular attention shall be paid to the total project so that the installation of the specified door(s), electrical services, power line filters, ventilation and connector panels do not derate the required shielding effectiveness.

Reliability

The enclosure(s) will be subject to varying movable floor loads, highly repetitious use of the shielded access door(s) and continuous use of the ventilation system and AC power line filters. Adequate structural strength and permanent RF sealing of all seams is required to meet the total specification and usage.

Minimum Attenuation

The enclosure shall provide electric and plane wave attenuation as specified. The attenuation, or shielding effectiveness requirement, applies to the finished shielded enclosure when all power line filters are installed and carrying current and ventilation systems are operating. Coaxial connector panels shall be capped and shielded door(s) will be in the normal operating condition.

Shielding Effectiveness (Attenuation)

The shielding effectiveness of the completed enclosure shall be at least the minimum specified when tested as defined by MIL-STD-285.

Workmanship

The shielded enclosure and the specified accessories shall be installed and finished in a thoroughly workmanlike manner and shall be free from all defects which will affect the appearance of serviceability or the ability to meet the total requirement of the shielded enclosure.

Materials

All materials, parts, mechanical and electrical assemblies, etc. Used in the installation of the shielded enclosure shall be new, undamaged and of a quality consistent with the usage of the shielded enclosure. Except as noted herein, all equipment and component parts may be regular commercial grade products.

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Warranty

The contractor shall provide drawings of the design and installation for approval by the customer prior to the commencement of work.

Drawings

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Construction

The shielded room shall be constructed of 24 SWG (0.55mm) zinc coated steel sheets.

Walls

The walls shall be tack welded at maximum 150mm centres with the shielding material suitably fixed to steel frame or top hat sections and overlapped 300mm at the joints. Blind rivet fixing may be substituted for welding subject to details being provided and approval being given by the client representative.

Brackets shall be fitted for attachment of steel stud walls or top hats shall be fitted for further application of plasterboard wall finishes.

Floor

The foil shall be similar to the walls and laid over a bituminous painted surface or malthoid if the floor is bare concrete. The sheets shall be overlapped 300mm at joints and tack welded at 150mm centres.

Ceiling

The ceiling shall be constructed of the shielding material and fastened in a manner similar to the walls. Provision shall be made for suitable suspension of the ceiling as may be necessary for internal linings, lighting and air conditioning fixtures as required.

Shielded Doors

RF shielded doors with matching frames shall be fitted to maintain the specified RF integrity.

Waveguide Vents for Air Ducts

The enclosure shall be furnished with RF shielded honey comb type vents whose cut-off frequency will be greater than 12GHz and whose shielding effectiveness below cut-off will equal or exceed the shielding requirements of the total enclosure. Pressure drop shall be no more than 25Pa of water at 5m/sec. The inlet air vent shall be sized as required for the air volume required and shall be furnished with a flange or spigot suitable for connection to air conditioning ducts.

Coordinate this work with the Mechanical Sub-Contractor.

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Ancillary Fittings

Power Line Filters

Mains power filters shall be installed on all power lines entering the shielded enclosure. These filters shall provide minimum attenuation figures as those laid down for the performance of the enclosure itself.

Signal Filters

Suitable RF filters of minimum attenuation required to meet the performance of the enclosure shall be installed on all fire alarm, telephone, intercom, nurse call or other cables entering the shielded room.

Earth Point

The enclosure shall be earthed at one point only, located as specified near the filter panel and/or power distribution panel. The earth stud shall be fixed to the shield at the point of entry to prevent any possible RF penetration due to mechanical loosening.

Penetrations

The contractor shall design and install suitable penetrations for entry on sprinkler pipes, water, gas and cables as necessary.

Testing and Certification

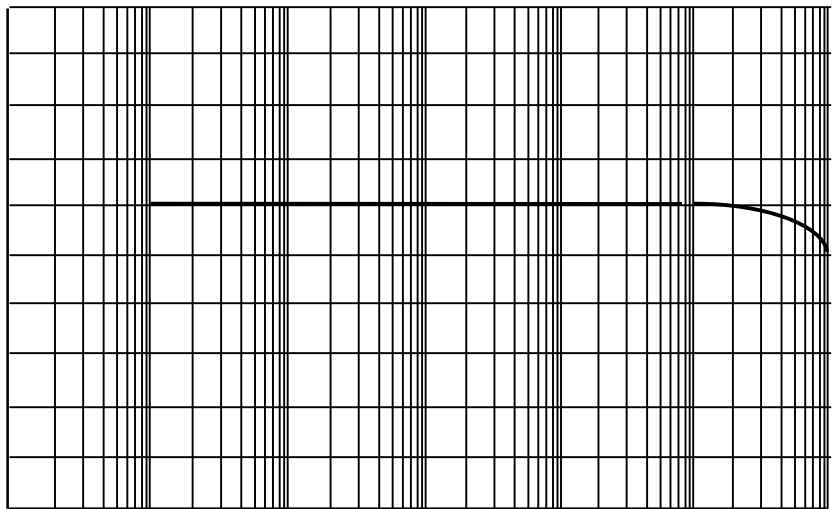
Each shielded enclosure shall be tested in full accordance with MIL-STD-285 to cover the frequency range and performance as specified.

Initial Testing

Initial testing shall be carried out after completion of the shielding, but prior to installation of any internal finishes. This test should be carried out in the frequency range specified to ensure conformance with the performance required.

Final Testing

Final testing and certification shall be carried out after completion of all works including internal finishes and connection of all services.



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