

MRI Shielding Installation Protocol

SCOPE OF WORK

1-Provide and install a complete MRI RF enclosure, composed of high-grade copper sheets, adhered to customer supplied Wood paneled MRI room, per sample drawings

2-Supply and install MRI shielded entry door, typically 4' x 7'

3-Supply and install MRI shielded window, 3.5' x 5'

4-Provide and install necessary electric filters for MRI room lightning and one dual outlet, 20-amp capacity each

5-Provide and install A/C vents: 2 inlets, and one venting filter (return. Typically, 12" x 14" (x2) and 16" x 16" (x1) but actual TBD.

6-If required: Provide and install Magnetic shielding, consisting of silicon steel panels allocated and mounted per magnetic field requirements (Optional)

7- Provide and install one quench vent filter. (Vent to be supplied and installed by others)

8- Install penetration panel, supplied by the equipment's vendor

EXCLUSIONS

- Interior drywall, lights & floors.
- Optional frames around shielded door and window
- Any item that is not listed under the "scope of work"

CUSTOMER RESPONSIBILITIES

Deviations from customer responsibilities may be cause for additional charges.

- Provide a clear and environmentally controlled area.
- Provide a level concrete surface that conforms to illustrated sample drawings, and as specified by the MRI system's planning guides
- Provide adequate power that can be used for tools in addition to proper lighting
- Access to the site at all times as the shield installers may work up to 12 hours per day including weekends

Process of workflow post the installation of the first phase, prior to MRI delivery

Penetration Panel:

Contractor to cutout and prepare the penetration panel area within the mri room based on architectural drawings and site specifics. It is highly and always advised that the location to be exactly ABOVE the drop ceiling for practical and esthetic reasons. There are many wires that are connected to the panel, and will run through the cable trays, therefore, panel and trays should always be mounted above the drop ceiling. If any current drawings indicate otherwise, then it is recommended to change the drawings to the recommended locations. Cut out size depends on the equipment, and usually provided by the equipments vendor, and consequently listed in the site-specific plans and architectural drawings.

The siemens Avanto panel cut out is 42 $\frac{3}{4}$ " x 18".

Cable trays:

All required cable trays for MRI wiring should be installed before the completion of the shield, to confirm the integrity of the work and perform the shield tests. If there are any complications or issues in mounting the trays, they must be fabricated and on site during the second and final phase of the shield installation where the shielding contractor and installers, will assist and guide as to "how to" install the trays. Reference drawing page 3.

Quench Vent:

The Quench vent must be installed prior to delivery. If there are concern, then at least have the vent ready, and you will be provided with assistance in the installation and magnet connection. Filter will be provided and installed by the shielding company.

AC vents:

Can cut the holes for vents. Run the ducts down. We will connect those to the filters and mount the filters to the copper. A small connection of ducts will be needed between the filter and down to the diverters. (Vents and return)

Ceiling and lights:

Can install the drop ceiling frames. As follows. Same for cable trays. Either normal screws with washers or Sammy's with 1/4" thread and use 1/4" threaded stainless rods. (3/16" would work as well).

What not to do, between phase one of shielding and equipment delivery:

Avoid inflicting any unknown cuts or holes in the copper. Communicate directly with the installers if anything must be cut for instruction. In the event any accidents or tiers occur, please provide photos and information to the installers in order to prepare the proper repair kits in advance.

If elected to install the ceiling, please DO NOT install the ceiling tiles around the cable trays and the magnet area, as that clearance is required by the MRI vendor to run the wiring clearly. Tiles with light fixtures may be installed based on proper installation criteria with electric wiring through the provided filters. Electric wiring if there are any concerns: Run the wires up to the penetration panel area and leave slack. MRI engineers or the shielding contractor will assist connecting those to the filters. Same with wiring for the lights. The conduits may be installed using stainless screws with large washers.

Prepare for deliver: a clear entry access of 8' x 8' is required for most magnets. The shielding company will re finish the entry wall promptly after delivery.

Testing and warranty:

Final RF test after magnet delivery and completion of delivery wall. Full report will be prepared and submitted to customer.

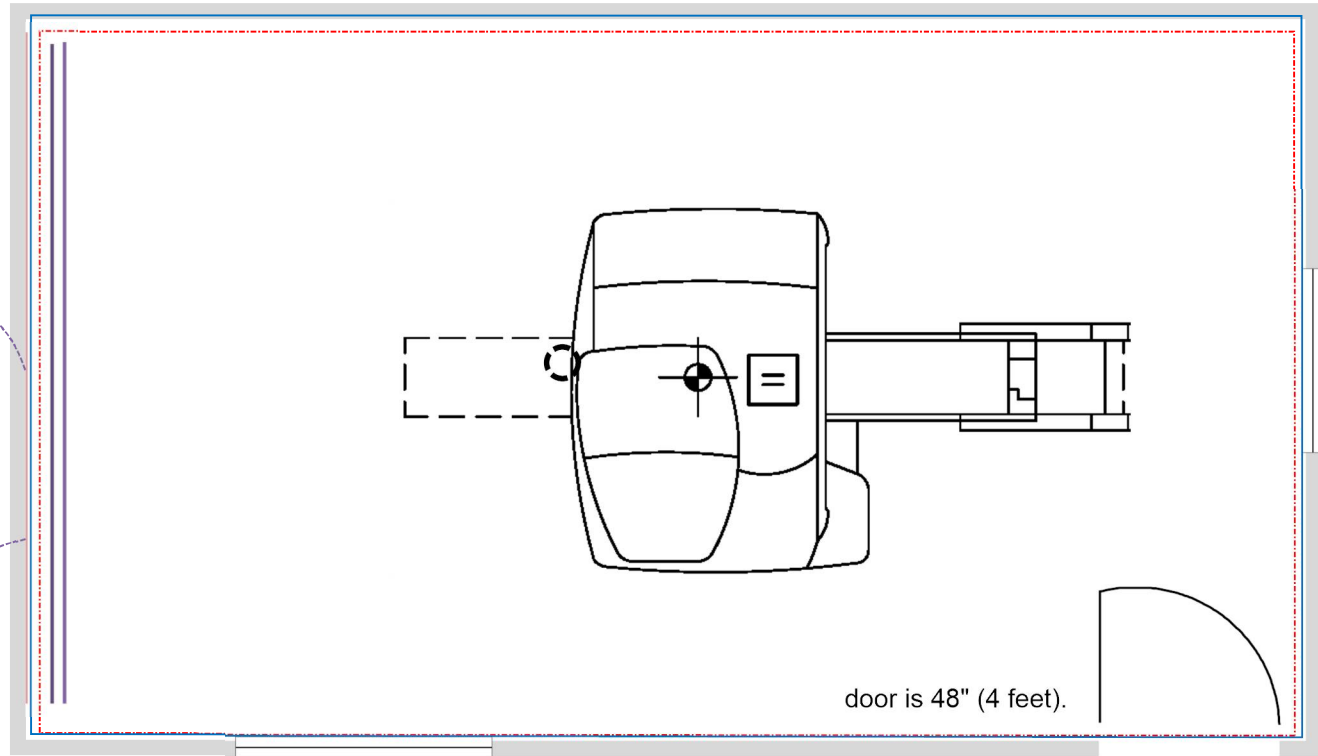
Warranty voidance

Workman's ship and material are always under warranty that is specified in the sales agreement. Any physical damage to the shield will be assessed and repaired at additional cost. Contractors are always responsible to handle any work with care around the shield and avoid damaging any parts of the copper foil throughout.

Lead times required:

From sales agreement date, 60 days are required to manufacture and deliver the material. The install can begin any time after within 3 weeks' notice.

Reference page 2 for details

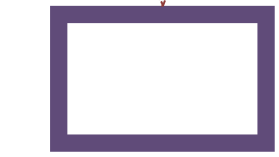


There are no gaps between any of the sheets, except for the normal spacing of frame thickness.

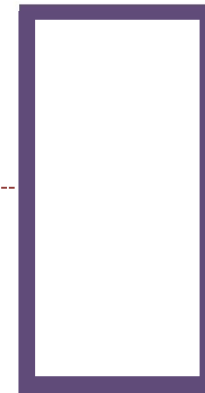
Openings may vary depends on customers options and specific site requirements. final specs will be provided after the architectural drawings are 90% complete, with Equipment's provider's site specifics.

MRI Shielding door and window pre installation frame and opening

double studded frames



Opening: 50" w x 38" h



Door opening: 50" w x 83.75" h

Site:	RF shielding procedure	Drawing:	2208	Project:		Drawn:	Calscan	Notes: for illustration only. may not be to scale.	Page 1 of 3
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For Illustrative purposes only, about the Shielding install process, with requirements and pre requisites

MRI Room

Contractor: Wood framing based on design and local code

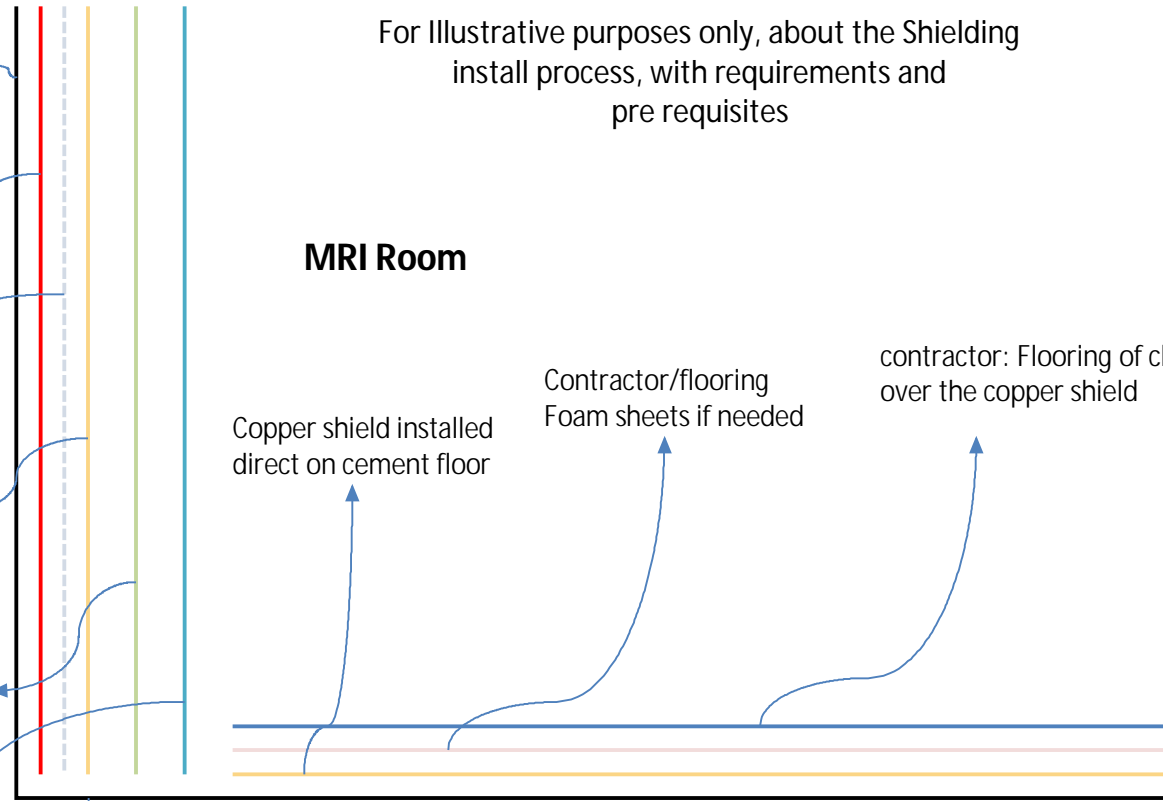
Contractor: 3/4" Ply wood sheets on all 4 walls and ceiling

Shielding company: Iron shielding composed of steel 1/8" sheets (if required) cross area depends on design

Shielding company: copper shielding on all walls, floor, and ceiling

Contractor (Shielding company will assist) : will install wood studs, adhered to copper shield. Size depends on space required between the copper and the dry wall.

Contractor: dry wall, install using stainless wood screws, to the wood that is installed and mounted onto the copper shield



Copper shield installed direct on cement floor

Contractor/flooring Foam sheets if needed

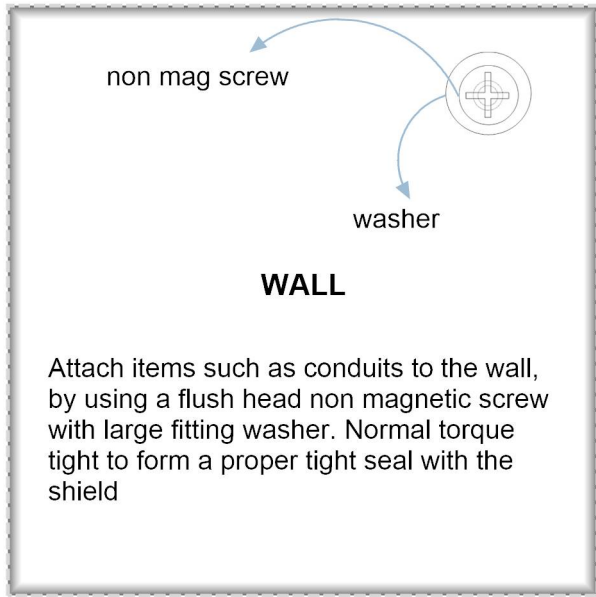
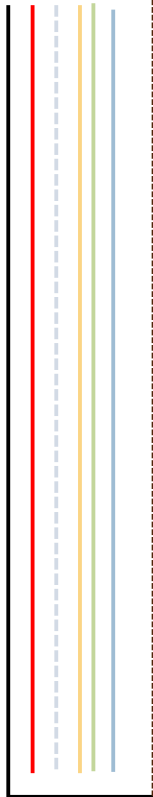
contractor: Flooring of choice over the copper shield

Cement floor to be flat, incline if any not to exceed 0.75" and not to exceed 0.25" within the magnet slab area. copper shielding is installed directly on the cement.

Note: there are no intentional gaps or air space between layers. there will be sapce between dry wall and copper in order to run conduits, outlets etc..space / gap depends on requirement and will be determined by the size of the frames.

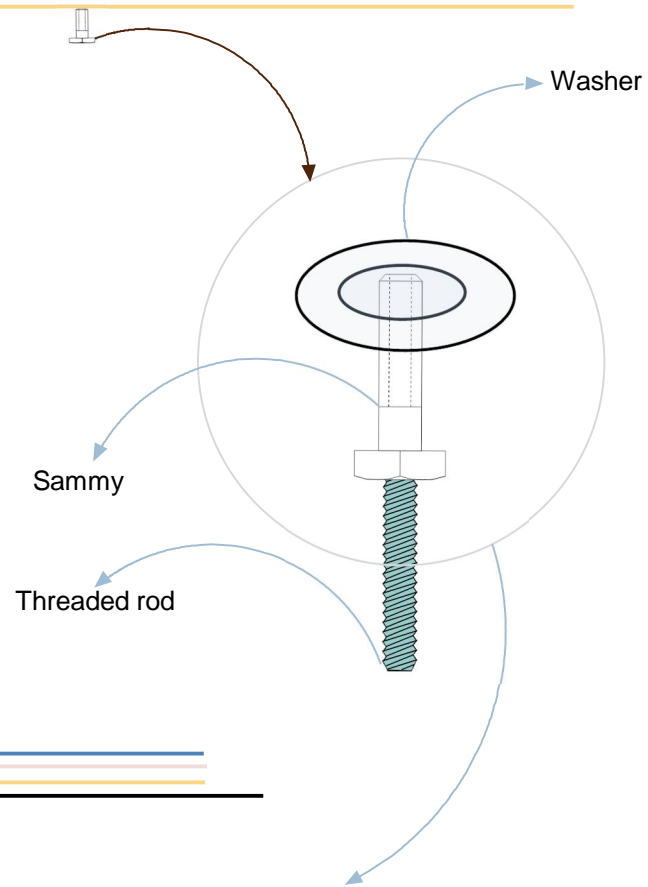
****Shield material will be copper foil, 2 oz, 2.75 mil****

Site: RF shielding procedure	Drawing: 2208	Project:	Drawn: Calscan	Notes: For illustration only. may not be to scale.	Page 2 of 3
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MRI Room

Ceiling



Attach drop ceiling hardware with non magnetic hardware with washers. preferred method:
 The use of Sammy, male 1/4", with female 1/4" threaded head, (or 3/16") with washer, to form a tight seal, and the use of stainless threaded rods, that can be used to attach ceiling frames, Cable Trays, and other items.

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Site: RF shielding procedure	Drawing: 2208	Project:	Drawn: Calscan	Notes: For illustration only. may not be to scale.	Page 3 of 3
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