

Diagnostic Shielding Q & A

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Compliance Standards

- OSHA 
- NCRP 
- Site-Specific Physics 
- Shop Drawings 
- Infection Control Guidelines 
- Quality Assurance Program 

 Underwriters Laboratories Inc.







Lead-lined Drywall & Plywood


Panel Thickness

1/2"	Pb"	1/32"
or		1/16"
3/8"		3/32"
		1/8"
5/8"		3/16"
		1/4"
		3/8"
		1/2"
		5/8"
		3/4"

1/2", 3/4"

1/2", 3/4"

Lead Discs



75%

Report #147
PGH 2.3.1.1 Sheet Lead

"... for typical shielding applications, a lead sheet is glued to a sheet of gypsum wallboard and installed lead inward with nails or screws on wooden or metal studs. X-Ray images of wall segments show that insertion of the nails or screws does not result in significant radiation leaks. In fact, the steel nails or screws generally attenuate radiation equally, or more effectively, than the lead displaced by the nails. **Therefore, steel nails or screws used to secure lead barriers need not be covered with lead discs or supplementary lead.** However, where of two lead sheets meet, the continuity of shielding shall be ensured at the joints (SEC. 2.4.2)..."

Leaded Glass, Acrylic and Frames

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Window Costs per Sq. Foot

GLASS	COST
1/16" lead equivalency	145.00 SF
3/32" lead equivalency	165.00 SF
1/8" lead equivalency	220.00 SF
1/4" Multiple layers of glass are required	
1/2" Multiple layers of glass are required	
1" Multiple layers of glass are required	

Prices are glass only and do not include the cost of the frame.



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Lead-lined Door Systems



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Door, Frame, Hardware, Cost

	1/16" lead	1/4" lead
3'-0" x 7'-0"	\$1,600	\$3,100
4'-0" x 7'-0"	\$1,800	\$3,700

Product only: Installation is approx: \$1,600 per unit

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SHIELDING ISSUES in the REAL WORLD

CT and X-ray Shielding- Light Lead

Possible problems

1. Physics design details multiple thicknesses of lead in a single room.
 - Contractors install the material in the wrong locations.
 - Result: Thousands of dollars to repair not to mention the down time for the facility.
2. Architect does not provide or incorporate the physics design or engineering details with the bid documents.
 - Contractor's bid does not carry the true cost to perform the work in their proposal.
 - Result: Change order with additional cost

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SHIELDING ISSUES in the REAL WORLD

PET /CT Shielding

Possible Problems

1. Many facility owners don't consult with the physicist early enough in the design development stage of a project.
 - Architect speaks with the selected equipment vendor who only discuss the need to shield the THE CT Machine.
 - The Architect's assumes, that's all that needs to be shielded!
 - Result: Major budget over runs due to lack of shielding of uptake/injection rooms, and toilets. Project delays occur and cost overruns.
2. Architect does not provide detailed drawings interpreting the physics report into actual constructible design.

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SHIELDING ISSUES in the REAL WORLD

PET /CT Shielding- Continued

Possible Problems

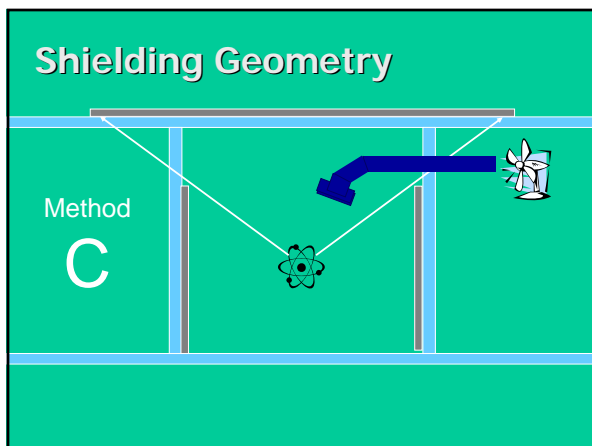
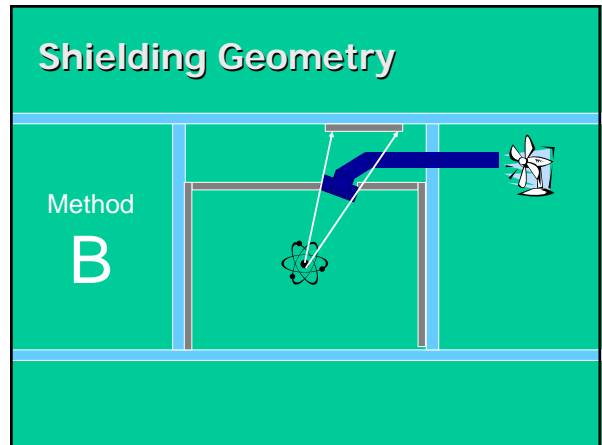
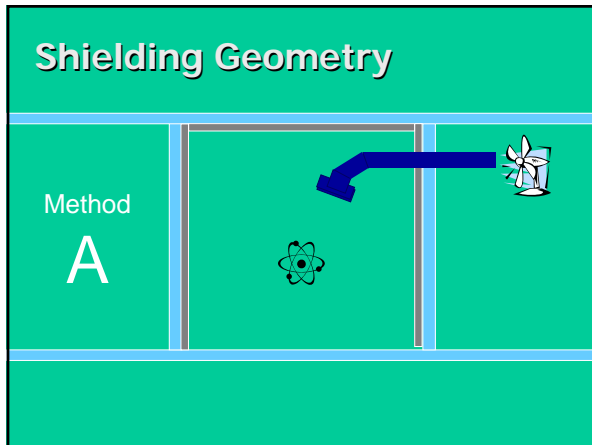
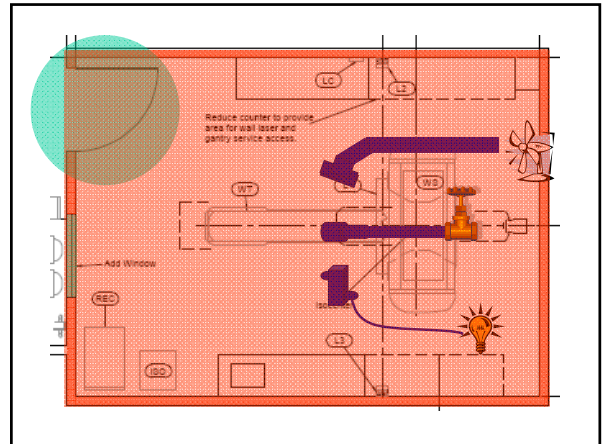
3. Penetration shielding not detailed, and often times overlooked by Architect and Contractor when reviewing the physics report.
 - This is very costly with PET/CT Shielding due to the thickness required.
4. Floor and ceiling shielding requirements.
 - Physicist details what is required and architect draws a single line on a drawings that represents a certain lead thickness hanging in mid air.. With out details GC often price the material with out any support structures..
 - Result: COST OVER RUNS- TIME DELAYS, and UPSET OWNER



SHIELDING ISSUES in the REAL WORLD

One of the largest errors we see as shielding contractors is the lack of communication and between the facility owner, physicist, architect, and selected CM/General Contractor.

As Specialty Shielding Contractors we fill the gap in the communication chain, by the providing drawings, specification and details that are created from your project specific physics reports. In the form of a shop drawings. These drawings are developed to meet the physics and construction requirements for state, local, and federal building codes.



Questions?