

**SECTION 134913
LEAD RADIATION SHIELDING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Construction of lead enclosure around x-ray treatment rooms and control rooms.
- B. Lead sheet applied to gypsum board.
- C. Radiation treatment room view window frames.
- D. Lead lining field applied to wall joints and penetrations.

1.02 RELATED REQUIREMENTS

- A. Section 081113 - Hollow Metal Doors and Frames: Lead-lined hollow metal doors and frames.
- B. Section 081416 - Flush Wood Doors: Lead-lined flush wood doors.
- C. Section 081420 - Plastic Laminate Faced Doors: Lead-lined plastic laminate faced doors.
- D. Section 087100 - Door Hardware: Lead-lined door hardware.
- E. Section 088000 - Glazing: Lead glazing in windows.
- F. Section 092116 - Gypsum Board Assemblies: Joint taping over lead lined gypsum board.
- G. Section 099000 - Painting and Coating - Low VOC Products: Field painting.

1.03 REFERENCE STANDARDS

- A. APA E30 - Engineered Wood Construction Guide; 2019.
- B. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products; 2020.
- C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- D. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- E. NCRP Report 147 - Structural Shielding Design for Medical X-Ray Imaging Facilities; 2004, with Errata (2005).
- F. PS 1 - Structural Plywood; 2023.

1.04 SYSTEM DESCRIPTION

- A. Protection: Walls, fixed control screens, including wall interruptions for doors and glazing, in accordance with physicist report.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate this work with the construction of the building elements that x-ray protection is applied to or installed in.
- B. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.06 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on leaded glass.
- C. Shop Drawings: Indicate layout, details, dimensions, interface with adjoining work .

1.07 QUALITY ASSURANCE

- A. Radiologist Report: Obtain from Owner current copy of "Radiation Shielding Study Report". Coordinate recommendations with actual Work. Report any discrepancies to Architect for clarification.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years documented experience.

- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Integrated X-Ray Shielding Assemblies:
 - 1. Radiation Protection Products: www.rppinc.com/#sle.
 - 2. Ray-Bar Engineering Corp: www.raybareng.net/#sle.
 - 3. Substitutions: See Section 016000 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

- A. Comply with applicable health and occupation codes for integrity of radiation protection and continuity of protected construction.

2.03 LEAD SHEET AND ASSOCIATED MATERIALS

- A. Sheet Lead: ASTM B 749, thickness of 1/16 inch min. or as indicated in Physicist report or on the drawings.
- B. Gypsum Board: ASTM C1396/C1396M, paper faced, square edges and square ends; 48 inch by 96 inch size, 1/2 inch thick.

2.04 FABRICATION

- A. Lead-Laminated Gypsum Board: Fabricate with monolithic sheet lead bonded to one surface of board, extend lead sheet 1 inch beyond one side and one end of board.
 - 1. Lead sheet strips for board not fabricated with extension of laminated sheet for joints.
- B. Lead Lined Plastic Laminate Faced Doors: Specified in Section 081420.
- C. Lead-Lined Door Frames: Specified in Section 081113.
- D. Hardware: Specified in Section 087100.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing surfaces are ready to receive work and opening dimensions are as indicated on shop drawings.

3.02 INSTALLATION - LEAD SHEETS

- A. Install lead laminated board to wall substrate by mechanical attachments; lead headed fasteners spaced at 4 inches to framing members. Install lead laminated products with lead face against supports.
 - 1. Install 7/8 inch diameter lead tabs over screw penetrations if lead headed fasteners not used.
- B. Lap edges and ends of lead sheets 1 inch. Apply lead patches, same thickness as lead sheet, over penetrations, to achieve continuity of protection.
- C. Joints: Where batten strips are used, where boards with different thickness of lead abut and where lead-lined board abuts unlined board, shim at studs as necessary to furnish flush surface. Where batten strips are required for lead thickness over 1/16" (1.59mm) install not less than 2 inch wide strips of lead over studs where vertical joints occur. Install strips of continuous lengths, furnishing 1 inch overlap on each side of joint.
- D. Wherever lead protection is penetrated, cut, or punctured for any reason, assure continuity of shielding by use of sheet lead, lead plugs, or other approved method.
- E. Extend lead protection from finished floor to a height of 96 inches, or greater as noted in the physicist report. Install

3.03 INSTALLATION - COMPONENTS AND ACCESSORIES

- A. Install components and accessories in accordance with manufacturer's instructions. Where built-in items penetrate lead linings provide lead shields behind those cutouts as required to maintain continuity of radiation protection. Where outlet boxes, junction boxes, ducts, conduit,

and similar items prevent use of shields, provide sheet lead sleeves or linings as required.

- B. Install lead lined glazed frames as specified in section where frames are specified and in accordance with lead lining fabricator's instructions.
- C. Install lead lined doors as specified in the section where the doors are specified; coordinate installation of door hardware.
- D. Install leaded glass in prepared frames in accordance with manufacturer's recommendations.

3.04 FIELD QUALITY CONTROL

- A. Inspection and testing will be performed by a licensed radiologist technician in coordination with regulatory agency requirements, to ascertain compliance of installation regarding radiation passage or leakage.
- B. Cooperate and offer assistance in such work. Execute instructions given.

END OF SECTION