

## SECTION 08 56 49, RADIATION SHIELDED WINDOWS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Radiation Shielded Control Windows with factory set X-Ray Lead Glass must be manufactured to industry standards and provide the same shielding equivalent as the partition, barrier or wall wherein the Radiation Shielded Window occurs. Available optionally with bottom sill voice passage where required on plans.
- B. Radiation Shielded Window with X-Ray Lead Glass must comply with the National Council on Radiation Protection and Measurements (NCRP) Report No. 147 "Structural Shielding Design for Medical X-Ray Imaging Facilities".
- C. Internal lead lining of Radiation Shielded Window frame and X-Ray Glass Lead Equivalent shielding value to provide same level of radiation shielding protection as wall, partition or barrier window occurs in as specified by the projects qualified health or medical physicist of record, familiar with the particular facility, room usage, equipment, and compliance with local and national Radiation Safety Standards.

#### 1.02 REFERENCES

- A. **Standards:** Comply with requirements of the National Council on Radiation Protection and Measurements (NCRP), Report No. 147 "Structural Shielding Design or Medical X-Ray Imaging Facilities".
- B. Comply with lead shielding equivalents as specified by the qualified health radiation physicist report for this particular project and meeting the same shielding as the partition the shielded window occurs in.  
**ASTM A653** American Society for Testing and Materials ,Zinc-Iron-Alloy Coated Steel  
**Federal Specification QQ-L-201F Grade C:** 99.9% pure sheet lead.  
**ASTM B749-85, Type L51121:** 99.9% pure sheet lead  
**DD-G-451**, Federal Specification, clear sheet / plate glass quality.  
**ASTM C 1036**, American Society for Testing and Materials, flat glass.  
**ANSI Z97.1**, American National Standards Institute "Safety Glazing Materials used in Buildings" and "Safety Performance Specifications and Methods of Test".  
**CPSC 16 CFR 1201, CAT II**, Consumer Product Safety Council "Safety Standard for Architectural Glazing Materials"

#### 1.03 RELATED DOCUMENTS

- A. Related Specification Sections: 13 49 00 X-Ray Protection, 08 34 40 Radiation Protective Doors, 09 29 60 Lead Lined Gypsum Board.

#### 1.04 SUBMITTALS

- A. **Technical Data:** Sizes, locations and verification of shielding equivalent protection value in compliance with this specification, project plans and radiation physicist shielding report.
- B. **Product Data:** Submit manufacturers printed data and specifications for Radiation Shielded Control Window Frames with X-Ray Lead Glass including installation and maintenance instructions to ensure compliance with this specification, project plans and radiation physicist shielding report.
- C. **Certificate of Compliance:** Manufacturer shall provide certificate of compliance indicating that Radiation Shielded Window with X-Ray Lead Glass provided for this project has been produced in accordance with requirements specified herein and the radiation physicist shielding report.

#### 1.04 DELIVERY, STORAGE AND HANDLING

- A. **Product Handling:** Follow Manufacturer / Fabricator specific handling and storage requirements to prevent damage, scratches or breakage of fragile X-Ray Lead Glass.
- B. **NEVER** store outdoors, set flat or use knives or strong cleaners on X-Ray Lead Glass.

### PART 2 – PRODUCTS

## 2.01 APPROVED MANUFACTURERS / SUPPLIERS

- A. Ray-Bar Engineering Corporation, Toll Free (800) 444-XRAY (9729) · Phone (626) 969-1818 Fax (800) 333-XRAY(9729) · www.raybar.com · www.xrayglass.com · e-mail sales@raybar.com, a recognized manufacturer / fabricator regularly engaged in the successful production of the products specified herein for over 70 years.

## 2.02 MATERIALS AND FABRICATION

**Galvannealed or JetCoat Steel** standard 16 gauge thick Zinc-Iron-Alloy Coated Steel with primer finish formed to Ray-Bar Modular Lead Lined Telescopic frame profile with welded and smooth ground mitred corners providing proper perimeter overlaps between shielded wall system and factory set X-Ray Glass.

**Optional Frame Materials:** Stainless Steel 304 16 gauge with #4 brushed finish or available in Brushed Grained Aluminum .063” thick 5052-H32 where required in project plans.

**Lead Lining:** 99.9% pure sheet lead meeting QQ-L-201F Grade C and ASTM B749-85, Type L51121 internal sheet lead lining formed to interior frame profile providing shielding overlaps.

**X-Ray Lead Glass** factory set into radiation shielded window frame is an annealed, high density flat glass manufactured to glazing industry standards and provide the same shielding equivalent as the partition, wall or door wherein the X-Ray Glazing occurs. Each piece must be clearly labeled or identified as “X-Ray Lead Glass” and protective lead shielding thickness equivalency.

- A. **Glass Thickness:** 5/16” minimum in single layer or multiple layers as needed to obtain required shielding equivalent to meet lead thickness value in wall or partition that X-Ray Lead Glass occurs in.
- B. **Glass Appearance:** Clear with yellow hue due to radiation protective oxide and heavy metal contents.

**X-Ray Safety Glass**, required at glazing locations in lead lined door vision lites or in side lites, borrowed lites or windows in wall locations within 24” of door openings, must be permanently labeled as impact resistant in compliance with ANSI Z97.1 and CPSC 16 CFR Part 1201, CAT II for impact resistance, such as Ray-Bar X-Ray Safety Glass as manufactured solely by Ray-Bar Engineering Corporation, Toll Free (800) 444-XRAY (9729)

• Phone (626) 969-1818 • Fax (800)333-XRAY(9729) email: sales@raybar.com • www.raybar.com • www.xrayglass.com (no known equal)

- A. **Thickness:** minimum 5/16”~3/8” range in single layer or multiple layers as needed to obtain required shielding equivalent to meet lead thickness value in wall, partition or door that X-Ray Safety Glass occurs in.
- B. **Sizes:**
1. Single pane sizes up to and including 48” X 96” maximum, X-Ray Lead Glass must have a minimum density to provide proper shielding with no less than 60% total heavy metal oxide content and a minimum of 55% lead oxide content by weight.

- C. **Appearance:** Clear with yellow hue due to radiation protective oxide contents.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. Radiation Shielded Control Window with X-Ray Lead Glass must be carefully installed vertically into completed lead lined wall or partition rough opening after lead backed drywall installation per manufacturers instructions and details.

Window frame must be clean, square and plumb with 1/8” maximum space for clearance around perimeter and allowance for appropriate factory set X-Ray Glass and glazing tape, gaskets and stops. Frame must be set snug against wall with Shielded frame and glass side installed on radiation source side, and formed steel slip side installed on control room side.

Avoid pinching or unequal pressure points against Frame and X-Ray Lead Glass surfaces and edges.

- B. Glass must be immediately cleaned and protected from damage by other trades or activities until room is

complete.

### **3.02 CERTIFICATION**

- A. Upon completion of Radiation Shielded Frame with X-Ray Lead Glass installation, Manufacturer / Fabricator shall furnish a certificate of compliance stating that all glazing materials are in accordance with this specification, the plans and the physicist shielding report for this project.

### **3.03 TESTING**

- A. After the X-Ray equipment has been installed and placed in operating condition but prior to occupancy and use, the radiation shielding shall be tested by the original calculating project health radiation physicist of record at Owners expense.

**END OF SECTION 08 56 49, RADIATION SHIELDED WINDOWS**