SECTION 13096

RADIO FREQUENCY SHIELDING ENCLOSURE
RF Welded System

Prepared by:

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RF WELDED SYSTEM

PART 1   GENERAL

1.1   SECTION INCLUDES

A. Design and engineering of complete system.

B. All shielding components required for complete installation, including but not limited to the following:
   1. Shielding panels.
   2. Shielding, non-oxidizing, copper coating.
   3. Shielding, copper sheeting.
   4. Doors, frames, and hardware.
   5. Wave guide vents for HVAC penetrations of shielding.
   6. Filters for power and communication penetrations of shielding.
   7. Pipe penetrations for water, gases, vacuum, wastes and other pipe penetrations of shielding.
   8. Special penetrations as noted.
   10. Fasteners and accessories.

C. View windows.

D. Provision for support of interior finish materials installed by others.

E. RF testing, including a test plan.

1.2   RELATED SECTIONS

A. Section 08710 - Door Hardware.

B. Section 08800 - Glazing.

C. Section 09260 - Gypsum Board Systems.

D. Section 09650 - Resilient Flooring.

E. Section 09900 - Painting.

F. Section 15410 - Plumbing Piping.

G. Section 15890 - Air Conditioning Ductwork.

H. Section 16123 - Building Wire and Cable.
1.3 REFERENCES


D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

E. AWS D1.1 - Structural Welding Code - Steel; American Welding Society.


1.4 PERFORMANCE REQUIREMENTS

A. Provide a controlled area in which radio frequency signals from any source will be contained or prevented from entering. Provide minimum attenuation versus frequency characteristics as listed below.

B. Welded Room:
   1. Magnetic Field Attenuation: 80 dB at 14 kHz, increasing to 100 dB at 200 kHz.
   2. Electric Field Attenuation: 110 dB from 200 kHz through 50 MHz.
   3. Plane Wave Attenuation: 110 dB from 50 MHz through 10 GHz.
   4. Microwave Attenuation: 100 dB from 1 GHz to 40 GHz.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.
B. Product Data: Include manufacturer's complete information on system, including system specifications and maintenance procedures.

C. Shop Drawings: Show full layout of system, including all dimensions and required points of coordination with work of other sections. Demonstrate full compliance with contract documents.

1.6 QUALITY ASSURANCE

A. Standards: Perform work of this section in accordance with provisions of the following:
   2. MIL-E-4957A.
   3. MIL-STD-220A.
   4. NSA 65-6.
   5. NSA 73-2A

B. Manufacturer Qualifications: Company with demonstrated experience in successful design and installation of radio frequency shielding enclosures.
   1. Submit information on not less than 20 completed projects that are similar to system specified.
   2. Include name and location of project, date installation completed, name and telephone numbers of Architect, Owner, and Contractor.

C. Installer Qualifications: Company approved by system manufacturer.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not begin work of this section until building has been enclosed and the area to receive radio frequency shielding is fully protected from the weather.

1.8 WARRANTY

A. Provide manufacturer's standard warranty against defective materials and workmanship for the following periods after Date of Substantial Completion:
   1. Enclosure: Ten (10) years.
   2. Movable Components (Doors, Demountable Panels) and Power Filters: One (1) year.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. This section is based on products manufactured by Global Partners in Shielding; 90 Dayton Avenue, Unit 4B, Passaic, NJ 07055; Tel: 973-574-9077; Fax: 973-574-9078.
B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

C. Substitutions: Not permitted.

2.2 WELDED ROOM MATERIALS AND FABRICATION

A. Standard: Comply with requirements of AISC "Manual of Steel Construction" for steel and welding materials.

B. Shielding Steel: ASTM A 366/A 366M or ASTM A 653/A 653M.

C. Welding Electrodes: AWS D1.1 for Metal Electrode, Inert Gas (MIG) welding method.

D. Steel Supports: ASTM A 36, configured as required to support RF panels adequately, finished with primer and finish coat of paint.

E. Door and Frame Assembly: Provide doors that have been mortised, fit, and hung at the factory, with a continuous RF shield around entire door perimeter.
   1. RF Seal: Recessed contact mechanism built into door frame, consisting of galvanized steel door frame pocket containing two sets of contact fingers concealed in the pocket against damage; design finger system to be capable of replacement without special tools, soldering, or welding.
   2. Door Edge: Design knife edge extension of angle on door edge to fit between the two rows of contact fingers in door frame pocket when door is closed.
   3. Locking Device and Hinges: Cam actuated type latch, operable from both sides of door. Equip latch and hinges with permanently lubricated bearings at all points of pivot or rotation, rated for a minimum of 10,000 cycles without loss of attenuation and without adjustments. Design cam latching mechanism to draw door to its final closing position or release door upon application of not more than 20 pounds of pressure to rotating lever handle.

F. Wiring Raceways: Formed copper sheet, minimum 18 gage metal thickness.

G. Wave Guide Vents: Brass honeycomb vents with integral mounting collars for mounting and attachment to the RF shielded enclosure, sized to accommodate HVAC requirements; include attachment collars for installation inside and outside RF shield.

H. RF Filters: Provide filters that allow penetration of RF shield by power lines and communication wires without degradation of RF shield attenuation characteristics.
I. **Mechanical Sleeves:** Provide sleeves that allow penetration of RF shield by mechanical ducts and piping without degradation of RF shield attenuation characteristics.

**PART 3 EXECUTION**

3.1 **EXAMINATION**

A. Verify that substrates are ready to receive work of this section and openings correspond to locations and dimensions indicated on approved shop drawings.
   1. Verify that floors are level to within 1/8 inch in 10 feet.
   2. Verify that required utilities are available.

B. Do not begin work of this section until unacceptable conditions have been corrected.

3.2 **INSTALLATION**

A. Install all components of radio frequency shielding system in strict conformance with manufacturer's instructions and under direct supervision of a factory representative.
   1. Install all materials to be straight, level, true, and plumb.
   2. Verify integrity of RF shielding before covering shield material with other finish materials.
   3. Coordinate locations of penetrations with installation of RF shielding and approved shop drawings.

B. Install a ground stud on the RF shield adjacent to power line filters inside the shield, as shown on shop drawings, for subsequent attachment of a dedicated wire to the electrical ground point of the building under Section 16123. Internal to RF shield, the ground stud shall become the attachment point for a green wire system.

C. **Welded Room:** Fasten RF shielding to supporting structural frame by welding in accordance with AWS D1.1. Continuously weld all seams for RF integrity by MIG method, using electrodes that are structurally and electrically compatible with adjacent steel sheets. Construct welded steel floor sufficiently flat and free from warping and buckling to support scheduled floor finish without damage under design loads.
   1. Test all seams per the seam sniffer test method.
   2. Grind away any welds that fail the test and replace with new welds.

D. **Wave Guides:** Attach securely to RF shielded enclosure with frames or attachment collars as detailed.

E. **Mechanical Sleeves:** Attach securely to RF shielding with dielectrics, as required to allow penetration of shield without degradation of RF shield attenuation characteristics.
F. Filters: Attach securely to RF shielding at all power line and communication wire penetrations, as required to prevent degradation of RF shield attenuation characteristics.

G. Finishes: Installation of room finishes is specified in sections referenced in RELATED SECTIONS Article of this section.

3.3 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with provisions of Section 01400.

B. Perform field testing of completed RF shielding installation in presence of Owner's representative, to verify compliance with specified attenuation versus frequency characteristics.

C. Conduct test by manufacturer's qualified personnel, following procedures outlined in approved test plan and using calibrated test instrumentation.

D. Issue formal test report detailing results of the RF testing process.

E. Correct conditions responsible for any failure of RF shielding to meet specified attenuation characteristics at no additional cost to Owner.

END OF SECTION