

**SECTION 32 35 16**  
**SOUND BARRIERS**  
**FS NOISHIELD BARRIERS**

**PART 1 – GENERAL**

Specifier Note: Retain or delete paragraphs in Summary per project requirements.

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Furnish and install of sound barrier wall system including:
    - a. Acoustical barrier wall panels.
    - b. Structural steel framing.
- B. Related Sections:
  - 1. Section 01 11 00 – Summary of the Project.
  - 2. Section 03 30 00 – Cast-In-Place Concrete.
  - 3. Section 31 23 16 – Excavation.
  - 4. Section 31 23 23 – Fill.
  - 5. Section 32 91 19 – Landscaping Grading.

**1.02 REFERENCES**

- A. American Society for Testing and Materials:
  - 1. ASTM E90 - Laboratory Measurements of Airborne Sound Transmission Loss of Building Partitions.
  - 2. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  - 3. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus
  - 4. ADTM G23 - Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials
  - 5. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
  - 6. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Colored Coordinates
  - 7. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
  - 8. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
  - 9. ASTM A123 - Standard Specification for Zinc (Hot-Dipped Galvanized) Coating or Iron and Steel Products
  - 10. ASTM A992 - Standard Specification for Structural Steel Shapes
  - 11. ASTM A36 - Standard Specification for Carbon Structural Steel

**1.03 SEQUENCING**

- A. Summary of the Project (Section 01 11 00): Work sequence.
- B. Construction Progress Documentation (Section 01 32 00): Project schedule.

**1.04 DEFINITONS**

- A. Sound Transmission Class (STC): Single number quantifier used to rate partitions, doors and windows for their effectiveness in blocking sound per ASTM E90.
- B. Noise Reduction Coefficient (NRC): Single number quantifier used to rate materials for their effectiveness in absorbing sound per ASTM C423.

## 1.05 SUBMITTALS

- A. General: Provide listed submittals in accordance with Conditions of the Contract and Division 1 (Section 01 33 00) Submittal Procedures.
- B. Product Data: Submit manufacturer's certification of compliance with this specification, standard details, certified product test results, installation instructions and general recommendations as applicable to materials and finishes for each component.
- C. Shop Drawings:
  - 1. Prior to shop drawing preparation and fabrication of panels, field measurements shall be taken of structure and substrates to receive panel system. Incorporate measurements and show adjustments so that panels may accommodate actual site conditions.

Specifier Note: If required, retain reference to PE and insert relevant State / Commonwealth.

- 2. Submit detailed design calculations, construction drawings and layout of sound barrier wall construction. [Calculations and drawings shall be prepared and sealed by a Professional Engineer experienced in sound barrier wall design and licensed in applicable State / Commonwealth.]
- D. Samples: Submit selection and verification samples for finishes, colors and textures. Sample materials shall be a minimum of 4 inches x 12 inches. Include any panel accessories as required.
- E. Sustainable Design Requirements (Section 01 81 13) for LEED Submittals:
  - 1. Recycled Content:
    - a. Indicate percentage or pre-consumer and post-consumer recycled content per unit of product.
    - b. Indicate relative dollar value of recycled content to total dollar value of product included in project.
  - 2. Local / Regional Materials:
    - a. Indicate distance between manufacturing facility and the project site.
    - b. Indicate distance between extraction, harvesting and recovery and the project site
    - c. Indicate relative dollar value of local/regional materials to total dollar value of product in project.
- F. Contract Closeout Submittals: (Refer to Section 01 78 00)
  - 1. Maintenance Data (Section 01 78 23.16).
  - 2. Warranty (Section 01 78 36) that all products shall perform in accordance with Contract Documents for a period of one (1) year from shipment and that any deficiencies shall be correctly promptly after receipt of written notice from Owner.

Specifier Note: Article below should include prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section. Coordinate article below with Division 1 (Section 01 43 00) Quality Assurance.

## 1.06 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Approved manufacturer listed in this section shall have a minimum of 10 years experience in the manufacture of sound control products.
- B. Installer's Qualifications: Installer shall be thoroughly trained and experienced in the necessary crafts and familiar with the methods needed for proper performance of this section.

## 1.07 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 (Section 01 60 00) Product Requirements.
- B. Check materials upon delivery to assure specified type, grade, color and texture of materials have been received.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store and handle materials in accordance with manufacturer's recommendations. Use all means necessary to protect materials from damage before, during and after installation.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. Basis of Design: IAC, Division of Sound Seal, Noishield Barrier Wall System.
  - 1. IAC, Division of Sound Seal, 401 Airport Road, North Aurora, IL, 60542; Telephone: (630) 270-1790; Fax: (630) 966-9710; E-mail: [iacacoustics@soundseal.com](mailto:iacacoustics@soundseal.com); Web site: [www.iacacoustics.com/](http://www.iacacoustics.com/).
- B. Substitutions: Submit prior to bidding in accordance with Document 00 43 25 and Division 1 (Section 01 25 00) Substitution Procedures.

**2.02 PERFORMANCE REQUIREMENTS**

Specifier Note: Select one of the following two options for panel construction. Delete the alternative. Apply to panel structural requirements as well.

- A. FS/S (steel const.) Sound Transmission Loss (dB) per ASTM E90 & Sound Transmission Class (STC) per E413:

<b>1/3 Octave Band Center Frequency (Hz)</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1K</b>	<b>2K</b>	<b>4K</b>	<b>8K</b>	<b>STC</b>
Noishield FS/S (steel construction)	21	34	40	33	32	26	37	30

- B. FS/S (steel const.) Sound Absorption Coefficients per ASTM C423:

<b>1/3 Octave Band Center Frequency (Hz)</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1K</b>	<b>2K</b>	<b>4K</b>	<b>8K</b>	<b>NRC</b>
Noishield FS/S (steel construction)	1.12	1.12	1.10	1.01	0.89	0.76	0.57	1.05

- C. FS/A (aluminum) Sound Transmission Loss (dB) per ASTM E90 & Sound Transmission Class (STC) per E413:

<b>1/3 Octave Band Center Frequency (Hz)</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1K</b>	<b>2K</b>	<b>4K</b>	<b>8K</b>	<b>STC</b>
Noishield FS/A (aluminum construction)	21	32	37	30	37	28	30	31

- D. FS/A (aluminum) Sound Absorption Coefficients per ASTM C423:

<b>1/3 Octave Band Center Frequency (Hz)</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1K</b>	<b>2K</b>	<b>4K</b>	<b>8K</b>	<b>NRC</b>
Noishield FS/A (aluminum construction)	1.12	1.12	1.10	1.01	0.89	0.76	0.57	1.05

Specifier Note: Retain the longest applicable span. Delete the remaining options.

- E. Structural: Galvanized steel panels shall be designed to withstand a wind pressure of [24.2 PSF at a span of twenty (20) feet] [37.8 PSF at a span of sixteen (16) feet] [67.3 PSF at a span of twelve (12) feet] without reinforcement.
- F. Structural: Aluminum panels shall be designed to withstand a wind pressure of [14.3 PSF at a span of twenty (20) feet] [22.3 PSF at a span of sixteen (16) feet] [39.7 PSF at a span of twelve (12) feet] without reinforcement.
- G. Corrosion Testing: Modules shall prove testing for corrosion resistance in accordance with ASTM B117. After 2,400 hours of exposure, the coating system shall not fail due to blistering, loss of adhesion or corrosion along the score lines.
- H. Weather Testing: Modules shall prove testing for accelerated weathering in accordance with ASTM G23. After 2,400 hours of testing, module samples shall not exhibit chalking greater than No. 8 per ASTM D4214 or a color change greater than 5 NBS units per ASTM D2244.

## 2.03 COMPONENTS

### A. Standard Panel Construction:

1. Individual panels shall be two (2) feet high or (1.5) feet high x five (5) inches thick x up to twenty (20) feet in length.

Specifier Note: Select one of the following two options for panel construction. Delete the alternative. Apply to panel structural requirements as well.

2. Panels shall be constructed of [galvanized steel manufactured in accordance with ASTM A924 and ASTM A653] [aluminum type 5052].
3. Panel components shall meet the following structural requirements:
  - a. Perforated face sheet shall be [20 gauge steel] [0.050 mill finished aluminum].
  - b. Solid face sheet shall be [14 gauge steel] [0.050 mill finished aluminum].
  - c. Solid end caps shall be [18 gauge steel] [0.050 mill finished aluminum]

### B. Acoustic Fill:

1. Fiberglass, non-corrosive, resistant to attack by fungus, vermin proof and non-hygroscopic.
2. Free draining, self-supporting and shall retain physical and sound absorptive characteristics after long term exposure to the elements.
3. Class A Fire Rating with a Flame Spread not greater than 25.

### C. Bearing Blocks shall be:

1. Used to support the bottom panel of the wall system
2. 1 inch thick x 2.25 inch wide x 4 inch long
3. 65 durometer EPDM, neoprene or rubber.

### D. Steel columns:

Specifier Note: Select one of the following two options for steel column finish.

1. Fabricated structural steel members to [be hot-dipped galvanized after fabrication per ASTM A123] [receive epoxy paint coating].
2. Steel for wide flange shapes and built-up column members shall conform to ASTM A992. All other structural steel base plates and braces shall conform to ASTM A36.
3. Anchor Bolts: ASTM A36 galvanized.

### E. Post Footing: Refer to Section 03 30 0.

## 2.04 FABRICATION

- A. Perforated and solid sheets shall be roll-formed in lengths up to twenty (20) feet.
- B. Panel shall be assembled to form a free-draining module.
- C. Spot welds or mechanical fasteners shall not be acceptable to join the solid inner and perforated outer panel sheets together. Internal reinforcement shall not be acceptable.
- D. Fabricate panels to be rigid, neat in appearance and free from defects.
- E. Panel assembly shall such so as to compress and hold the fill materials in place under severe conditions of vibration such as encountered in shipment and installation. Any voids in the panel will be unacceptable.
- F. Panel manufacturer, where required, shall provide openings for any large known penetrations. Pipe and conduit penetrations shall be located and cut in the field and sealed in accordance with manufacturer's instructions.

## **2.05 FINISH**

- A. Panels shall be finished with a factory-applied polyester powder coating system.
- B. Finish coating shall have a dry film thickness of three (3) mils (+/- 0.5 mils).
- C. Powder colors shall be selected from manufacturer's list of available colors.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Project Management and Coordination (Section 03 31 00) – Coordination and project conditions
- B. Verify substrate is level, smooth, capable of supporting units and imposed loads and ready to receive work of this section.
- C. Verify gradients and elevations of substrate are correct.
- D. Beginning installation means acceptance of conditions.

### **3.02 INSTALLATION**

- A. Install in strict accordance with manufacturer's published instructions for specific installation conditions.
- B. Install wall to provide rigid structure.
- C. Perform excavation as specified in Section 31 23 16.

### **3.03 SITE TOLERANCES**

- A. Quality Requirements (Section 01 40 00) - Tolerances.
- B. Maximum variation from plumb: 1/4 inch.
- C. Maximum Offset from True Position: 1 inch.
- D. Components shall not infringe on adjacent property lines.

**END OF SECTION**

**SECTION 09 84 13**  
**FIXED SOUND-ABSORPTIVE PANELS**  
**CS NOISHIELD CLADDING**

**PART 1 – GENERAL**

Specifier Note: Retain or delete paragraphs in Summary per project requirements.

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Custom fabricated sound-absorptive wall panels.
  - 2. Mounting accessories.
- B. Related Sections:
  - 1. Section 09 20 00 – Plaster and Gypsum Board
  - 2. Section 09 70 00 – Wall Finishes

**1.02 REFERENCES**

- A. ASTM C423 – Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- B. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- C. ASTM E795 – Standard Practices for Mounting Test Specimens During Sound Absorption Tests

**1.03 DEFINITIONS**

- A. Noise Reduction Coefficient (NRC): Single number quantifier used to rate materials for their effectiveness in absorbing sound per ASTM C423.

**1.04 SUBMITTALS**

- A. General: Provide listed submittals in accordance with Conditions of the Contract and Division 1 (Section 01 33 00) Submittal Procedures.
- B. Product Data: Submit applicable reference standards, current performance data, application recommendations and product limitations.
- C. Samples: Submit for approval two samples of the sound-absorptive panel not less than 12 inches by 12 inches.
- D. Contract Closeout Submittals: (Refer to Section 01 78 00)
  - 1. Operation (Section 01 78 23.13) and Maintenance Data (Section 01 78 23.16).
  - 2. Warranty (Section 01 78 36) that all products shall perform in accordance with Contract Documents for a period of one (1) year from shipment and that any deficiencies shall be corrected promptly after receipt of written notice from Owner.

Specifier Note: Article below should include prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section. Coordinate article below with Division 1 (Section 01 43 00) Quality Assurance.

**1.05 QUALITY ASSURANCE**

- A. Installer's Qualifications: Installers shall have demonstrated experience in assembly and installation of products similar to those specified in this section.
- B. Manufacturer's Qualifications: Manufacturer shall have demonstrated experience in fabrication of products similar to those specified in this section for a minimum of 5 years.
- C. Fire Test Response Characteristics per UL Standard 723: Flame spread index of 20 or less; Smoke developed index of 50 or less.

**1.06 DELIVERY, STORAGE & HANDLING**

- A. General: Comply with Division 1 (Section 01 60 00) Product Requirements.

- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials near installation point at temperature and humidity conditions recommended by the manufacturer. Retain protective packaging.

**1.07 FIELD CONDITIONS**

- A. Environmental Requirements: Do not install modules until all wet work is complete, the building is enclosed and temperature and humidity are similar to building conditions during occupancy.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. Basis of Design: IAC, Division of Sound Seal, Noishield Type C / Noise-Foil Type V Cladding Panel.
  - 1. IAC, Division of Sound Seal, 401 Airport Road, North Aurora, IL, 60542; Telephone: (630) 270-1790; Fax: (630) 966-9710; E-mail: [iacacoustics@soundseal.com](mailto:iacacoustics@soundseal.com); Web site: [www.iacacoustics.com/](http://www.iacacoustics.com/).
- B. Substitutions: Submit prior to bidding in accordance with Division 1 (Section 01 25 00) Substitution Procedures.

**2.02 PERFORMANCE REQUIREMENTS**

- A. Minimum Sound Absorption Coefficients for Type A Mounting:

1/1 Octave Band Ctr. Freq. (Hz)	125	250	500	1K	2K	4K	NRC
Noishield Type C / Noise-Foil Type V (2½ inch thick panel)	0.30	1.05	1.07	1.01	0.96	0.88	1.00
Noishield Type C12 (2½ inch thick panel with ½ inch furring strip)	0.48	1.08	1.10	0.99	0.92	0.83	1.00
Noishield Type C38 (2½ inch thick panel with 1½ inch furring strip)	0.68	1.19	1.10	1.03	0.90	0.81	1.05

- B. Panel shall be of a thickness with sufficient rigidity to provide a panel flatness which shall not exceed a deflection of L/240 inches as measured diagonally across the panel.

Specifier Note: Select applicable panel model and base material. Delete any options which are not relevant.

**2.03 MATERIALS**

- A. Panel Construction:
  - 1. Noishield Type C / Noise-Foil Type V Cladding: Open back panel with face and bottom side of [22 gauge A60 galvaneal steel] [0.050 mill finished aluminum type 5052] perforated with 3/32 inch holes on 3/16 inch staggered centers and solid top side of [22 gauge galvaneal steel] [0.050 mill finished aluminum type 5052].
  - 2. Noishield Type C12: Include 1/2 inch furring strips to provide overall installed thickness of 3 inches.
  - 3. Noishield Type C38: Include 1/2 inch furring strips to provide overall installed thickness of 4 inches.
- B. Acoustical Fill: Sound retarding fiberglass fill shall be incombustible, inert, mildew-resistant, vermin-proof with a UL fire hazard classification equal to or better than Flame Spread – 25; Smoke Developed – 50; Fire Contribution – 0 per ASTM E84.

Specifier Note: Select applicable panel model, thickness and color range. Delete any options which are not relevant.

**2.04 FABRICATION**

- A. Panel shall be formed to maintain a consistent:
  - 1. Noishield Type C / Noise-Foil Type V: 2½ inch thickness, 18 inch and 24 inch width and a maximum length of 190 inches.
- B. The panel shall be filled with acoustical fill slightly thicker than panel depth to preclude any voids.
- C. Panels shall be factory coated using a baked enamel coating system applied through the use of an electrostatic charge to ensure complete edge-to-edge coverage. The coating shall be thermally coated to the surface achieving the required dry film thickness.

D. Color: As selected from the manufacture's standard range of colors.

## **2.05 ACCESSORIES**

A. All trim and closure trim shall be [18 gauge Galvanneal steel] [0.050 mill finished aluminum type 5052].

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate conditions, which have been installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions for installation.
- B. Do not install panels until unsatisfactory conditions are corrected.

### **3.02 INSTALLATION**

- A. Comply with manufacturer's product data, installation instructions and product carton instructions for installation.
- B. Install panels on room surfaces as indicated on the drawings.

### **3.03 CLEANING**

- A. Clean all surfaces according to manufacturer's recommendations. Replace damaged components as directed by the Architect.
- B. Remove all packaging and construction debris.

## **END OF SECTION**



**SECTION 32 35 16**  
**SOUND BARRIERS**  
**SFS NOISHIELD BARRIERS**

**PART 1 – GENERAL**

Specifier Note: Retain or delete paragraphs in Summary per project requirements.

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Furnish and install of sound barrier wall system including:
    - a. Acoustical barrier wall panels.
    - b. Structural steel framing.
- B. Related Sections:
  - 1. Section 01 11 00 – Summary of the Project.
  - 2. Section 03 30 00 – Cast-In-Place Concrete.
  - 3. Section 31 23 16 – Excavation.
  - 4. Section 31 23 23 – Fill.
  - 5. Section 32 91 19 – Landscaping Grading.

**1.02 REFERENCES**

- A. American Society for Testing and Materials:
  - 1. ASTM E90 - Laboratory Measurements of Airborne Sound Transmission Loss of Building Partitions.
  - 2. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  - 3. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus
  - 4. ADTM G23 - Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials
  - 5. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
  - 6. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Colored Coordinates
  - 7. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
  - 8. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
  - 9. ASTM A123 - Standard Specification for Zinc (Hot-Dipped Galvanized) Coating or Iron and Steel Products
  - 10. ASTM A992 - Standard Specification for Structural Steel Shapes
  - 11. ASTM A36 - Standard Specification for Carbon Structural Steel

**1.03 SEQUENCING**

- A. Summary of the Project (Section 01 11 00): Work sequence.
- B. Construction Progress Documentation (Section 01 32 00): Project schedule.

**1.04 DEFINITONS**

- A. Sound Transmission Class (STC): Single number quantifier used to rate partitions, doors and windows for their effectiveness in blocking sound per ASTM E90.
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## 1.05 SUBMITTALS

- A. General: Provide listed submittals in accordance with Conditions of the Contract and Division 1 (Section 01 33 00) Submittal Procedures.
- B. Product Data: Submit manufacturer's certification of compliance with this specification, standard details, certified product test results, installation instructions and general recommendations as applicable to materials and finishes for each component.
- C. Shop Drawings:
  - 1. Prior to shop drawing preparation and fabrication of panels, field measurements shall be taken of structure and substrates to receive panel system. Incorporate measurements and show adjustments so that panels may accommodate actual site conditions.

Specifier Note: If required, retain reference to PE and insert relevant State / Commonwealth.

- 2. Submit detailed design calculations, construction drawings and layout of sound barrier wall construction. [Calculations and drawings shall be prepared and sealed by a Professional Engineer experienced in sound barrier wall design and licensed in applicable State / Commonwealth.]
- D. Samples: Submit selection and verification samples for finishes, colors and textures. Sample materials shall be a minimum of 4 inches x 12 inches. Include any panel accessories as required.
- E. Sustainable Design Requirements (Section 01 81 13) for LEED Submittals:
  - 1. Recycled Content:
    - a. Indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
    - b. Indicate relative dollar value of recycled content to total dollar value of product included in project.
  - 2. Local / Regional Materials:
    - a. Indicate distance between manufacturing facility and the project site.
    - b. Indicate distance between extraction, harvesting and recovery and the project site
    - c. Indicate relative dollar value of local/regional materials to total dollar value of product in project.
- F. Contract Closeout Submittals: (Refer to Section 01 78 00)
  - 1. Maintenance Data (Section 01 78 23.16).
  - 2. Warranty (Section 01 78 36) that all products shall perform in accordance with Contract Documents for a period of one (1) year from shipment and that any deficiencies shall be correctly promptly after receipt of written notice from Owner.

Specifier Note: Article below should include prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section. Coordinate article below with Division 1 (Section 01 43 00) Quality Assurance.

## 1.06 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Approved manufacturer listed in this section shall have a minimum of 10 years experience in the manufacture of sound control products.
- B. Installer's Qualifications: Installer shall be thoroughly trained and experienced in the necessary crafts and familiar with the methods needed for proper performance of this section.

## 1.07 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 (Section 01 60 00) Product Requirements.
- B. Check materials upon delivery to assure specified type, grade, color and texture of materials have been received.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store and handle materials in accordance with manufacturer's recommendations. Use all means necessary to protect materials from damage before, during and after installation.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. Basis of Design: IAC, Division of Sound Seal, Noishield Barrier Wall System.
  - 1. IAC, Division of Sound Seal, 401 Airport Road, North Aurora, IL, 60542; Telephone: (630) 270-1790; Fax: (630) 966-9710; E-mail: [iacacoustics@soundseal.com](mailto:iacacoustics@soundseal.com); Web site: [www.iacacoustics.com/](http://www.iacacoustics.com/).
- B. Substitutions: Submit prior to bidding in accordance with Document 00 43 25 and Division 1 (Section 01 25 00) Substitution Procedures.

**2.02 PERFORMANCE REQUIREMENTS**

- A. SFS/S (steel construction) Sound Transmission Loss (dB) per ASTM E90:

<b>1/1 Octave Band Center Frequency (Hz)</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1K</b>	<b>2K</b>	<b>4K</b>	<b>8K</b>	<b>STC</b>
	23	30	44	51	51	39	39	43

- B. SFS/S (steel construction) Sound Absorption Coefficients per ASTM C423:

<b>1/1 Octave Band Center Frequency (Hz)</b>	<b>125</b>	<b>250</b>	<b>500</b>	<b>1K</b>	<b>2K</b>	<b>4K</b>	<b>8K</b>	<b>NRC</b>
	.49	1.14	1.14	1.05	0.96	0.95	0.87	1.05

**Specifier Note: Retain the longest applicable span. Delete the remaining options.**

- C. Structural: Panels shall be designed to withstand a wind pressure of [41.5 PSF at a span of sixteen (16) feet] [41.5 PSF at a span of twelve (12) feet] without reinforcement.
- D. Corrosion Testing: Modules shall prove testing for corrosion resistance in accordance with ASTM B117. After 2,400 hours of exposure, the coating system shall not fail due to blistering, loss of adhesion or corrosion along the score lines.
- E. Weather Testing: Modules shall prove testing for accelerated weathering in accordance with ASTM G23. After 2,400 hours of testing, module samples shall not exhibit chalking greater than No. 8 per ASTM D4214 or a color change greater than 5 NBS units per ASTM D2244.

**2.03 COMPONENTS**

- A. Standard Panel Construction:
  - 1. Individual panels shall be five (5) inches thick x two (2) feet high or (1.5) feet high x up to sixteen (16) feet in length.

**Specifier Note: Select one of the following two options for panel construction. Delete the alternative. Apply to panel structural requirements as well.**

- 2. Panels shall be constructed of [galvanized steel manufactured in accordance with ASTM A924 and ASTM A653] [aluminum type 5052].
- 3. Panel components shall meet the following structural requirements:
  - a. Perforated face sheets shall be [20 gauge]
  - b. Solid septum sheet shall be [16 gauge]
  - c. Solid end caps shall be [18 gauge]
- B. Acoustic Fill:
  - 1. Fiberglass, non-corrosive, resistant to attack by fungus, vermin proof and non-hygroscopic.

2. Free draining, self-supporting and shall retain physical and sound absorptive characteristics after long term exposure to the elements.
  3. Class A Fire Rating with a Flame Spread not greater than 25.
- C. Bearing Blocks shall be:
1. Used to support the bottom panel of the wall system
  2. 1 inch thick x 2.25 inch wide x 4 inch long
  3. 65 durometer EPDM, neoprene or rubber.
- D. Steel columns:

**Specifier Note:** Select one of the following two options for steel column finish.

1. Fabricated steel members to [be hot-dipped galvanized after fabrication per ASTM A123] [receive three-step epoxy paint coating].
  2. Steel for wide flange shapes and built-up column members shall conform to ASTM A992. All other structural steel base plates and braces shall conform to ASTM A36.
  3. Anchor Bolts: ASTM A36 galvanized.
- E. Post Footing: Refer to Section 03 30 0.

#### **2.04 FABRICATION**

- A. Perforated and solid sheets shall be roll-formed in lengths up to sixteen (16) feet.
- B. Panel shall be assembled to form a free-draining module.
- C. Spot welds, mechanical fasteners or internal reinforcement shall not be acceptable.
- D. Fabricate panels to be rigid, neat in appearance and free from defects.
- E. Panel assembly shall such so as to compress and hold the fill materials in place under severe conditions of vibration such as encountered in shipment and installation. Any voids in the panel will be unacceptable.
- F. Panel manufacturer, where required, shall provide openings for any large known penetrations. Pipe and conduit penetrations shall be located and cut in the field and sealed in accordance with manufacturer's instructions.

#### **2.05 FINISH**

- A. Panels shall be finished with a factory-applied polyester powder coating system.
- B. Finish coating shall have a dry film thickness of three (3) mils (+/- 0.5 mils).
- C. Powder colors shall be selected from manufactures standard colors.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Project Management and Coordination (Section 03 31 00) – Coordination and project conditions
- B. Verify substrate is level, smooth, capable of supporting units and imposed loads and ready to receive work of this section.
- C. Verify gradients and elevations of substrate are correct.
- D. Beginning installation means acceptance of conditions.

#### **3.02 INSTALLATION**

- A. Install in strict accordance with manufacturer's published instructions for specific installation conditions.
- B. Install wall to provide rigid structure.
- C. Perform excavation as specified in Section 31 23 16.

#### **3.03 SITE TOLERANCES**

- A. Quality Requirements (Section 01 40 00) - Tolerances.
- B. Maximum variation from plumb: 1/4 inch.
- C. Maximum Offset from True Position: 1 inch.

D. Components shall not infringe on adjacent property lines.

**END OF SECTION**

**SECTION 32 35 16**  
**SOUND BARRIERS**  
**FST NOISHIELD BARRIERS**

**PART 1 – GENERAL**

Specifier Note: Retain or delete paragraphs in Summary per project requirements.

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Furnish and install of sound barrier wall system including:
    - a. Acoustical barrier wall panels.
    - b. Structural steel framing.
- B. Related Sections:
  - 1. Section 01 11 00 – Summary of the Project.
  - 2. Section 03 30 00 – Cast-In-Place Concrete.
  - 3. Section 31 23 16 – Excavation.
  - 4. Section 31 23 23 – Fill.
  - 5. Section 32 91 19 – Landscaping Grading.

**1.02 REFERENCES**

- A. American Society for Testing and Materials:
  - 1. ASTM E90 - Laboratory Measurements of Airborne Sound Transmission Loss of Building Partitions.
  - 2. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  - 3. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus
  - 4. ADTM G23 - Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials
  - 5. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
  - 6. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Colored Coordinates
  - 7. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
  - 8. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
  - 9. ASTM A123 - Standard Specification for Zinc (Hot-Dipped Galvanized) Coating or Iron and Steel Products
  - 10. ASTM A992 - Standard Specification for Structural Steel Shapes
  - 11. ASTM A36 - Standard Specification for Carbon Structural Steel

**1.03 SEQUENCING**

- A. Summary of the Project (Section 01 11 00): Work sequence.
- B. Construction Progress Documentation (Section 01 32 00): Project schedule.

**1.04 DEFINITONS**

- A. Sound Transmission Class (STC): Single number quantifier used to rate partitions, doors and windows for their effectiveness in blocking sound per ASTM E90.
- B. Noise Reduction Coefficient (NRC): Single number quantifier used to rate materials for their effectiveness in absorbing sound per ASTM C423.

## 1.05 SUBMITTALS

- A. General: Provide listed submittals in accordance with Conditions of the Contract and Division 1 (Section 01 33 00) Submittal Procedures.
- B. Product Data: Submit manufacturer's certification of compliance with this specification, standard details, certified product test results, installation instructions and general recommendations as applicable to materials and finishes for each component.
- C. Shop Drawings:
  - 1. Prior to shop drawing preparation and fabrication of panels, field measurements shall be taken of structure and substrates to receive panel system. Incorporate measurements and show adjustments so that panels may accommodate actual site conditions.

Specifier Note: If required, retain reference to PE and insert relevant State / Commonwealth.

- 2. Submit detailed design calculations, construction drawings and layout of sound barrier wall construction. [Calculations and drawings shall be prepared and sealed by a Professional Engineer experienced in sound barrier wall design and licensed in applicable State / Commonwealth.]
- D. Samples: Submit selection and verification samples for finishes, colors and textures. Sample materials shall be a minimum of 4 inches x 12 inches. Include any panel accessories as required.
- E. Sustainable Design Requirements (Section 01 81 13) for LEED Submittals:
  - 1. Recycled Content:
    - a. Indicate percentage or pre-consumer and post-consumer recycled content per unit of product.
    - b. Indicate relative dollar value of recycled content to total dollar value of product included in project.
  - 2. Local / Regional Materials:
    - a. Indicate distance between manufacturing facility and the project site.
    - b. Indicate distance between extraction, harvesting and recovery and the project site
    - c. Indicate relative dollar value of local/regional materials to total dollar value of product in project.
- F. Contract Closeout Submittals: (Refer to Section 01 78 00)
  - 1. Maintenance Data (Section 01 78 23.16).
  - 2. Warranty (Section 01 78 36) that all products shall perform in accordance with Contract Documents for a period of one (1) year from shipment and that any deficiencies shall be correctly promptly after receipt of written notice from Owner.

Specifier Note: Article below should include prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section. Coordinate article below with Division 1 (Section 01 43 00) Quality Assurance.

## 1.06 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Approved manufacturer listed in this section shall have a minimum of 10 years experience in the manufacture of sound control products.
- B. Installer's Qualifications: Installer shall be thoroughly trained and experienced in the necessary crafts and familiar with the methods needed for proper performance of this section.

## 1.07 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 (Section 01 60 00) Product Requirements.
- B. Check materials upon delivery to assure specified type, grade, color and texture of materials have been received.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store and handle materials in accordance with manufacturer's recommendations. Use all means necessary to protect materials from damage before, during and after installation.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Basis of Design: IAC, Division of Sound Seal, Noishield Barrier Wall System.
1. IAC, Division of Sound Seal, 401 Airport Road, North Aurora, IL, 60542; Telephone: (630) 270-1790; Fax: (630) 966-9710; E-mail: [iacacoustics@soundseal.com](mailto:iacacoustics@soundseal.com); Web site: [www.iacacoustics.com/](http://www.iacacoustics.com/).
- B. Substitutions: Submit prior to bidding in accordance with Document 00 43 25 and Division 1 (Section 01 25 00) Substitution Procedures.

### 2.02 PERFORMANCE REQUIREMENTS

Specifier Note: Select one of the following two options for panel construction. Delete the alternative. Apply to panel structural requirements as well.

- A. FST/S (steel const.) Sound Transmission Loss (dB) per ASTM E90 & Sound Transmission Class (STC) per E413:

1/3 Octave Band Center Frequency (Hz)	125	250	500	1K	2K	4K	8K	STC
Noishield FST/S (steel construction)	24	38	41	33	35	29	34	33

- B. FST/S (steel const.) Sound Absorption Coefficients per ASTM C423:

1/3 Octave Band Center Frequency (Hz)	125	250	500	1K	2K	4K	8K	NRC
Noishield FST/S (steel construction)	1.12	1.12	1.10	1.01	0.89	0.76	0.57	1.05

Specifier Note: Retain the longest applicable span. Delete the remaining options.

- C. Structural: Galvanized steel panels shall be designed to withstand a wind pressure of [24.2 PSF at a span of twenty (20) feet] [37.8 PSF at a span of sixteen (16) feet] [67.3 PSF at a span of twelve (12) feet] without reinforcement.
- D. Corrosion Testing: Modules shall prove testing for corrosion resistance in accordance with ASTM B117. After 2,400 hours of exposure, the coating system shall not fail due to blistering, loss of adhesion or corrosion along the score lines.
- E. Weather Testing: Modules shall prove testing for accelerated weathering in accordance with ASTM G23. After 2,400 hours of testing, module samples shall not exhibit chalking greater than No. 8 per ASTM D4214 or a color change greater than 5 NBS units per ASTM D2244.

### 2.03 COMPONENTS

- A. Standard Panel Construction:
1. Individual panels shall be two (2) feet high or (1.5) feet high x five (5) inches thick x up to twenty (20) feet in length.

Specifier Note: Select one of the following two options for panel construction. Delete the alternative. Apply to panel structural requirements as well.

2. Panels shall be constructed of [galvanized steel manufactured in accordance with ASTM A924 and ASTM A653] [aluminum type 5052].
3. Panel components shall meet the following structural requirements:
  - a. Perforated face sheet shall be [20 gauge] [0.050 mill finished aluminum].
  - b. Solid face sheet shall be [14 gauge] [0.050 mill finished aluminum].
  - c. Solid end caps shall be [18 gauge] [0.050 mill finished aluminum].
  - d. A dampening material applied to the inside of the solid face.



- B. Acoustic Fill:
  - 1. Fiberglass, non-corrosive, resistant to attack by fungus, vermin proof and non-hygroscopic.
  - 2. Free draining, self-supporting and shall retain physical and sound absorptive characteristics after long term exposure to the elements.
  - 3. Class A Fire Rating with a Flame Spread not greater than 25.
- C. Bearing Blocks shall be:
  - 1. Used to support the bottom panel of the wall system
  - 2. 1 inch thick x 2.25 inch wide x 4 inch long
  - 3. 65 durometer EPDM, neoprene or rubber.
- D. Steel columns:

Specifier Note: Select one of the following two options for steel column finish.

- 1. Fabricated structural steel members to [be hot-dipped galvanized after fabrication per ASTM A123] [receive epoxy paint coating].
  - 2. Steel for wide flange shapes and built-up column members shall conform to ASTM A992. All other structural steel base plates and braces shall conform to ASTM A36.
  - 3. Anchor Bolts: ASTM A36 galvanized.
- E. Post Footing: Refer to Section 03 30 0.

#### **2.04 FABRICATION**

- A. Perforated and solid sheets shall be roll-formed in lengths up to twenty (20) feet.
- B. Panel shall be assembled to form a free-draining module.
- C. Spot welds or mechanical fasteners shall not be acceptable to join the solid inner and perforated outer panel sheets together. Internal reinforcement shall not be acceptable.
- D. Fabricate panels to be rigid, neat in appearance and free from defects.
- E. Panel assembly shall such so as to compress and hold the fill materials in place under severe conditions of vibration such as encountered in shipment and installation. Any voids in the panel will be unacceptable.
- F. Panel manufacturer, where required, shall provide openings for any large known penetrations. Pipe and conduit penetrations shall be located and cut in the field and sealed in accordance with manufacturer's instructions.

#### **2.05 FINISH**

- A. Panels shall be finished with a factory-applied polyester powder coating system.
- B. Finish coating shall have a dry film thickness of three (3) mils (+/- 0.5 mils).
- C. Powder colors shall be selected from manufacturer's list of available colors.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Project Management and Coordination (Section 03 31 00) – Coordination and project conditions
- B. Verify substrate is level, smooth, capable of supporting units and imposed loads and ready to receive work of this section.
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#### **3.02 INSTALLATION**

- A. Install in strict accordance with manufacturer's published instructions for specific installation conditions.
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### **3.03 SITE TOLERANCES**

- A. Quality Requirements (Section 01 40 00) - Tolerances.
- B. Maximum variation from plumb: 1/4 inch.
- C. Maximum Offset from True Position: 1 inch.
- D. Components shall not infringe on adjacent property lines.

**END OF SECTION**