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This Manu-Spec® utilizes the Construction Specifications Institute (CSI) *Project Resource Manual* (PRM), including *MasterFormat™*, *SectionFormat™* and *PageFormat™*. A Manu-Spec is a manufacturer-specific proprietary product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by brackets []; delete optional text in final copy of specification. Specifier Notes precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate product model numbers, styles and types are used in Specifier Notes and in the specification text Article titled "Acceptable Material." Metric conversion, where used, is soft metric conversion.

This Manu-Spec specifies a foamed-in-place polyurethane spray insulation with a core density of 2 lb/ ft² for use in residential, commercial and industrial applications.

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FOAMED-IN-PLACE INSULATION**PART 1 GENERAL**

1.1 SUMMARY

- A. Section Includes: This Section specifies foamed-in-place, closed-cell, polyurethane spray insulation for use in residential, commercial and industrial applications.

Specifier Note: Revise Paragraph below to suit project requirements. Add section numbers and titles per CSI MasterFormat and specifiers practice.

- B. Related Requirements:

Specifier Note: Include in this Paragraph only those sections and documents that directly affect the work of this section. If a reader of this section could reasonably expect to find a product or component specified in this section, but it is actually specified elsewhere, then the related section number(s) should be listed in the Subparagraph below. Do not include Division 00 documents or Division 01 sections since it is assumed that all technical sections are related to all project Division 00 documents and Division 01 sections to some degree. Refer to other documents with caution since referencing them may cause them to be considered part of the Contract.

1. Section [07 92 00 - Joint Sealants].
2. Section [].

1.2 REFERENCES

Specifier Note: Define terms that are unique to this Section and are not provided elsewhere in the contract documents. Include in this Article terms that are unique to the work result specified that may not be commonly known in the construction industry. Delete the following Paragraph if no Definitions are required.

- A. Definitions:
1. [].

Specifier Note: Paragraph below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain References Paragraph when specifying products and installation by an industry reference standard. List retained standard(s) referenced in this section alphabetically. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced and update as applicable. Contract Conditions Section 01 42 00 - References may be used to establish the edition date of standards. This Paragraph does not require compliance with standard(s). It is a listing of all references used in this section. Only include here standards that are referenced in the body of the specification in PARTS 1, 2 and/or 3. Do not include references to building codes at any level.

B. Reference Standards:

1. ASTM International (ASTM).
 - a. ASTM C423 - [2009], Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method .
 - b. ASTM C1029 - [2015], Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.
 - c. ASTM D1621 - [2016], Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 - d. ASTM D1622/D1622M - [2016], Standard Test Method for Apparent Density of Rigid Cellular Plastics.
 - e. ASTM D1623 - [2009], Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
 - f. ASTM D2126 - [2015], Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
 - g. ASTM E84 - [2016], Standard Test Method for Surface Burning Characteristics of Building Materials.
 - h. ASTM E96/E96M - [2016], Standard Test Methods for Water Vapor Transmission of Materials.
 - i. ASTM E283 - [2012], Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - j. ASTM E413 - [2016], Classification for Rating Sound Insulation.
 - k. ASTM G21 - [2015], Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
2. International Association of Plumbing and Mechanical Officials (IAPMO).
 - a. IAPMO Report # 0352.
3. International Code Council (ICC).
 - a. ICC-ES AC377 - [2016], Acceptance Criteria for Spry-Applied Foam Plastic Insulation.
4. International Code Council/American Society for Heating, Refrigeration and Air-Conditioning Engineers (ICC/ASHRAE).
 - a. ICC/ASHRAE 700 - [2015], National Green Building Standard.
5. National Fire Protection Association (NFPA).
 - a. NFPA (Fire) 259 - [2013], Standard Test Method for Potential Heat of Building Materials.
 - b. NFPA (Fire) 285 - [2012], Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.
 - c. NFPA (Fire) 286 - [2015], Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
6. Underwriter's Laboratories (UL).
 - a. UL 2818 - [2013] , Greenguard Standard for Chemical Emissions for Building Materials, Finishes and Furnishings.
7. US Green Building Council (USGBC).
 - a. LEED v4-[2016], LEED (Leadership in Energy and Environmental Design): Green Building Rating System.
8. [].

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate work of this Section with work of other trades for proper time and sequence.
- B. Pre-application Meeting: Convene pre- application meeting after Award of Contract and [one week] prior to commencing work of this Section to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer's written application recommendations.
 1. Comply with Section [01 31 19 Project Meetings] and coordinate with other similar pre-application meetings.

2. Notify attendees [2 weeks] prior to meeting and ensure meeting attendees include as minimum:
 - a. Owner.
 - b. Architect.
 - c. Foamed-in-place insulation applicator.
 - d. Manufacturer's technical representative.
3. Ensure meeting agenda includes review of methods and procedures related to foamed-in-place insulation application including co-ordination with related work.
4. Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within [1 week] of meeting.

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Contract Conditions and Section 01 33 00 - Submittal Procedures.

1.4 SUBMITTALS

- A. Product Data: Submit product data including manufacturer's literature for foamed-in-place insulation components and accessories, indicating compliance with specified requirements and material characteristics.
 1. Submit list on foamed-in-place insulation manufacturer's letterhead of materials, components and accessories to be incorporated into Work.

Specifier Note: In many projects, a joint sealant is used to ensure no major gaps in the substrate need to be overcome by the foamed-in-place insulation. It is important to see details of how this will be applied and how the foamed-in-place insulation is joined to the joint sealant.

2. Include details of insulation joints with sealants.
3. Include product names, types and series numbers.
4. Include contact information for manufacturer and their representative for this project.

Specifier Note: Specify submittals intended to document manufacturer storage, installation and other instructions.

- B. Manufacturer's written recommendations, including:
 1. Delivery, storage and handling recommendations.
 2. Preparation and application recommendations.
- C. Field Reports: Submit third party inspection agency field reports within [3 days] of each representative's site visit and inspection.
- D. Test Reports: Submit test reports showing compliance with specified performance characteristics and physical properties including thermal performance.

Specifier Note: Coordinate Article below with Contract Conditions and with Section 01 78 36 - Warranties.

- E. Applicator's Qualifications: Submit verification of manufacturer's authorization and verifiable evidence of work similar to work of this Section.
- F. Warranty: Fully executed, issued in [Owner's] name, and registered with manufacturer, including:
 1. Manufacturer's [1-year] warranty, from date of substantial completion, covering defects in materials.

Specifier Note: Retain the following Paragraph only if specifying for a LEED® project. Specify only the technical submittal requirements necessary to achieve the credits desired for this Project.

- G. Sustainable Design (LEED) Submittals:

Specifier Note: Verify the section number and title where LEED submittal requirements are established before editing the following Paragraph. The LEED Credits in the following Paragraph are for example purposes only. Verify that actual submittals requested are appropriate to the project. LEED Credits are very specific to individual projects.

1. LEED Submittals: In accordance with Section [01 35 63 – Sustainability Certification Project Requirements].
2. Submit verification for items as follow:
 - a. LEED for homes:
 - 1) MR Credit 2.2 - Low-Emitting Materials.
 - 2) EQ Credit 2 - Containment Control - Option 4 Air Testing.
 - 3) EQ Credit 7 - Low-Emitting Materials.
 - b. LEED for schools: IEQ Credit 4.6 - Ceiling and Wall Systems.
 - c. LEED for Building and Construction:
 - 1) EQ Credit 1 - Enhanced Indoor Air Quality Strategies - Option 2 Additional Enhanced IAQ Strategies - D.
 - 2) EQ Credit 4 - Indoor Air Quality Assessment - Option 2 Air Testing.
 - 3) MR Credit 2 Construction Waste Management.
 - 4) MR Credit 5 - Regional Materials.
 - d. LEED for Interior design and Construction
 - 1) EQ Credit 1 - Enhanced Indoor Air Quality Strategies Option 2D.
 - 2) EQ Credit 2 - Low-Emitting Materials.
 - 3) EQ Credit 4 - Indoor Air Quality Assessment - Option 2 Air Testing.
 - e. LEED for Operations and Maintenance:
 - 1) MR Credit 2 - Purchasing – Facility Maintenance and Renovation – Option 1.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Supply maintenance data for foamed-in-place insulation for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

Specifier Note: If LEED is not a part of the project delete the following Paragraph in its entirety.

- B. Sustainable Design Closeout Documentation (LEED).
 1. Provide calculations on end-of-project recycling rates, salvage rates, and landfill rates for Work of this Section demonstrating percentage of construction wastes which were recycled.
 2. Submit verification from recycling facility showing receipt of materials.
- C. Record Documentation: In accordance with Section 01 78 00 Closeout Submittals.
 1. List materials used in foamed-in-place insulation work.
 2. Warranty: Submit warranty documents specified.

1.6 QUALITY ASSURANCE

- A. Applicator: Manufacturer authorized and experienced in performing work similar to that required for this project.

Specifier Note: Retain the following Paragraph only when the area covered by the insulation exceeds 25,000 square feet. Delete the Paragraph in its entirety if a mock-up is not required

- B. Mockup: Construct full size [10 × 10] feet mockup of foamed-in-place insulation using proposed procedures, materials and quality of work where directed by Architect [and in accordance with Section 01 43 00 Quality Assurance].

Specifier Note: Retain and edit the following Paragraph to include conditions which need to be demonstrated by the mockup.

1. Include [window] [and] frame [and sill], insulation, [building corner condition,] [junction with roof system] [and] how materials interface with sealants.

2. Purpose: To judge quality of work and material application.
3. Allow Architect [24] hours minimum prior to inspection of mockup.
4. Do not proceed with work prior to receipt of written acceptance of mockup by Architect.
5. When accepted, mock-up will demonstrate minimum standard of quality required for work of this Section.
6. Approved mock-up may [not] remain part of finished work.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in accordance with manufacturer's written instructions.
 1. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact and product name and manufacturer name clearly visible.

Specifier Note: Verify the section number and title where delivery requirements are established before editing the following Paragraph.

2. Deliver materials in accordance with Section [01 61 00 - Common Product Requirements].
- B. Store materials off ground and protected from exposure to harmful environmental conditions, clean, dry, frost-free and at recommended temperature and humidity levels.

1.8 WARRANTY

- A. Project Warranty: Refer to Contract Conditions for project warranty provisions.
- B. Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.
 1. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.

PART 2 PRODUCTS

Specifier Note: Retain Article below for proprietary method specification. Add product attributes performance characteristics, material standards and descriptions in other Articles as applicable. Use of such phrases as or equal, approved equal or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining or equal products.

2.1 MANUFACTURER

- A. Accella Polyurethane Systems, LLC.
- B. Address: 100 Enterprise Drive, Cartersville, GA 30120; Phone: (770) 607-0755; Phone: (770) 423-9781; Email: sprayfoam@accellapolyurethane.com; Website:www.premiumspray.com.

Specifier Note: Verify model numbers with manufacturer and edit the following Paragraph to meet project requirements.

2.2 DESCRIPTION

- A. Two-component foamed-in-place closed-cell polyurethane spray insulation.

Specifier Note: Retain and edit the following Paragraph to meet the project requirements.

2.3 PERFORMANCE CRITERIA

- A. Comply with NFPA (Fire) 259, 285, and, 286.
- B. Comply with UL 2818.
- C. Comply with ICC/ASHRAE 700, and ICC-ES AC377.



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- D. Meet requirements of IAPMO Report # 0352.
- E. E. Surface Burning Characteristics to ASTM E84:
 - 1. Flame spread: Class 1 <20.
 - 2. Smoke Development: Class 1 <400.
- F. Fungi Resistance: To ASTM G21.

Specifier Note: Retain the following Paragraph only if specifying for a LEED project.

- G. Comply with requirements of LEED v4.

2.4 MATERIALS

- A. Two-component medium density, one-to-one by volume, fire retardant spray applied polyurethane foam comprised primarily of isocyanurate and resin blend, with zero ozone-depleting blowing agents, catalysts, and, polyols to ASTM C1029.
 - 1. R-Value to ASTM C518: 7.0 at 1 inch
 - 2. Core density to ASTM D1622/D1622M: 2 lb/ft³.
 - 3. Water vapor transmission - Permeance to ASTM E96/E96M:

Specifier Note: For water vapor transmission for thicknesses other than those noted in the following three paragraphs contact Accella Polyurethane Systems, LLC., directly.

- a. 1.49 Perms at 1 inch.
 - b. 0.92 Perms at 1.5 inches.
 - c. 0.77 Perms at 2 inches.
- 4. Air impermeability to ASTM E283: <0.005 L/s-m².
- 5. Sound transmission coefficient to ASTM E413: 38.
- 6. Noise reduction coefficient to ASTM C423: 0.10.
- 7. Tensile strength to ASTM D1623: 58 psi.
- 8. Compressive strength to ASTM D1621: 41 psi.
- 9. Dimensional stability to ASTM D2126: <0.27 %.
- 10. Thermal and humid ageing: To ASTM D2126.
- B. Acceptable Material: Accella Polyurethane Systems, LLC., Foamsulate 220.

2.5 ACCESSORIES

- A. Sealants: Compatible with both substrate and polyurethane foam insulation in accordance with [insulation manufacturer's written recommendations] [and] [Section 07 92 00 - Joint Sealants].

PART 3 EXECUTION

3.1 APPLICATOR

- A. Use only applicators authorized by manufacturer who have training and experience of work similar to Work of this Section.

3.2 EXAMINATION

- A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for foamed-in-place insulation application in accordance with manufacturer's written recommendations.
 - 1. Visually inspect substrate in presence of Architect.
 - a. Ensure substrates are clean of oil or excess dust.
 - b. Ensure that there is no surface spalling.

- c. Ensure sealants completely fill gaps in substrate and at joints and are applied in accordance with [insulation manufacturer's written recommendations] [and] [Section 07 92 00 - Joint Sealants].
2. Inform Architect of unacceptable conditions immediately upon discovery.
3. Proceed with application only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Architect.
4. Starting application of foamed-in-place insulation implies substrate conditions are acceptable for Work of this Section.

3.3 PREPARATION

- A. Remove loose or foreign matter, which might impair adhesion of materials.
- B. Fill open joints and voids in concrete greater 1 inch with sealant.
- C. Ensure substrates are free of surface moisture, frost and ice prior to application of foamed-in-place insulation.

3.4 APPLICATION

- A. Site mix liquid components and apply foamed-in-place insulation in accordance with manufacturer's written recommendations.
- B. Spray apply foamed-in-place insulation evenly in 1/2 to 3 inch thick increments as indicated.
 1. Increment thickness: 1/2 inch minimum, 3 inches maximum.
- C. Keep foamed-in-place insulation materials 3 inches minimum clear of heat-emitting devices and where surface temperatures exceeds 200 °F.

3.5 FIELD QUALITY CONTROL

- A. Field Inspection: Coordinate field inspection in accordance with Section [01 45 00 Quality Control].

Specifier Note: Delete the following Paragraph if no third party inspection agency is required.

- B. Third Party Inspection Agency: Coordinate third party inspection agency services with Section [01 45 00 - Quality Control].
 1. Arrange and pay for third party inspection.

Specifier Note: Edit the following Paragraph to meet project requirements. Coordinate site visits with third part inspection agency or delete the Paragraph and all of its subparagraphs if site visits are not required.

2. Schedule site visits to review work at stages listed:
 - a. After delivery and storage of metal interior wall paneling, and when preparatory work on which Work of this Section depends is complete, but before installation begins.
 - b. Twice during progress of work at 25 percent and 60 percent complete.
 - c. Upon completion of Work, after cleaning is carried out.
 - d. Obtain reports within three days of review and submit immediately to Architect.

Specifier Note: Specify requirements if manufacturers are to provide field quality control with onsite personnel for instruction or supervision of product installation, application, erection, or construction. Manufacturer field reports are included under PART 1, Submittals.

- C. Manufacturer's Services:

Specifier Note: Use the following Paragraphs only when manufacture's field services are provided and are required to verify the quality of the installed components. Establish the number and duration of periodic site visits required by manufacturer and specify below. Contact National Comfort Products Inc. to determine any costs associated with Technical Representatives providing manufacturer's field services. Delete if field services are not required.

1. Coordinate manufacturer's services with Section [01 45 00 - Quality Control].

Specifier Note: Delete the following paragraph if no costs are associated with manufacturer's services.

2. Arrange for payment for manufacturer's services.
3. Have manufacturer's technical representative review work involved in handling, application and protection of closed-cell spray polyurethane foam insulation, and submit written reports in acceptable format to verify compliance of Work with Contract conditions.
4. Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for product installation review in accordance with manufacturer's instructions.
 - a. Report any inconsistencies from manufacturer's recommendations immediately to Architect.
 - b. Schedule site visits to review work at stages listed:
 - 1) After delivery and storage of foamed-in-place insulation, and when preparatory work on which Work of this Section depends is complete, but before application begins.
 - 2) Upon completion of Work, after cleaning is carried out.

3.6 CLEANING

- A. Perform daily progress cleaning.
 1. Leave work area clean at end of each day.
- B. Upon completion, remove surplus materials, rubbish, tools and equipment.
- C. Collect recyclable waste and dispose of at appropriate recycling facilities.

Specifier Note: Coordinate the following Article with Section 01 76 00 - Protecting Installed Construction.

3.7 PROTECTION

- A. Protect applied foamed-in-place insulation from damage during construction.
- B. Repair or replace adjacent materials damaged by application of foamed-in-place insulation.

END OF SECTION