Spray Applied Polyurethane Foam Roofing – (07 57 13)

1. All applicable parts of the General Roofing Specification (Section 07 30 00) shall be included in this section.
2. Assessment of Sprayed Applied Foam (SPF) Roofs
   2.1. A SPF Roof shall be determined as a failed roof when any of the following conditions exist throughout the roof system:
      2.1.1. When the existing structure is overstressed.
      2.1.2. When there is damage to the existing roof deck – rust, rot, spalling, etc.
      2.1.3. If the SPF roof insulation or protective coating loses adhesion to the substrate to which it is applied.
      2.1.4. If the protective coating turns brittle and is cracked and the SPF insulation beneath it is also cracked.
      2.1.5. If there is a significant loss of protective coating and the SPF insulation has severe UV damage to it.
3. Roof Slope Use as defined in Part 7, General Roofing Specification (07 30 00)
   3.1. A SPF roof can be used on the following slopes:
      3.1.1. Low slope
      3.1.2. Transitional slope
      3.1.3. High Slope, in accordance with manufacturer's limitations and testing data.
   3.2. All roof cricket slopes shall have the length to width ratio of 2:1. The roof crickets shall be constructed of polyiso insulation board.
   3.3. Special Conditions for slope of roof system
      3.3.1. The minimum slope for new building construction is ½" unit vertical in 12" unit horizontal.
      3.3.2. The recommended roof slope for new roofing on existing buildings are 3/8" unit vertical in 12" unit horizontal, when possible.
      3.3.3. The absolute minimum slope for new roofing on existing buildings is "positive roof drainage". Ponding is not acceptable. SPF insulation shall be used to fill in low areas on existing roofs before installing the specified SPF roof system.

4. Repair or replacement of roof shall not contradict Part 6, General Roofing Specification (07 30 00).
    4.1. If roof does not meet condition(s) for repair, restoration or rejuvenation, a SPF roof system may be installed over the existing roof system when the following conditions are present in the existing roof system:
        4.1.1. There is only one roof system in place.
        4.1.2. The existing roof system meets wind uplift requirements. If the existing wind uplift rating is unknown, approved plates and fasteners may be installed to fasten the existing roof to the steel or plywood roof deck to achieve the required wind uplift for the existing roof system.
    4.2. If the SPF roof system must be replaced, the Designer shall determine if the existing SPF roof system shall be removed or can remain to save the existing R Value and have an isolation board attached over it before receiving a new roof system.
    4.3. Additional information, regarding what constitutes a failed SPF roof system can be found in Part 2 of this Section.
5. Demolition Requirements
    5.1. All items as found in Part 10, General Roofing Specification (07 30 00).
    5.2. No special demolition requirements for SPF roof systems.
6. Back of Parapet Wall Treatment
    6.1. SPF roof systems shall be spray applied to the back of parapets as required.
    6.2. There are no height restrictions for applying SPF roof systems to the back of parapet walls.
    6.3. The SPF roof insulation thickness on the back of parapets shall be one (1) inch minimum.
    6.4. CMU or CIP concrete parapets do not require metal counter-flashing. The SPF roof system is a self-flashing roof system.
    6.5. Back of parapet walls with stucco or synthetic wall systems shall be separated from the SPF roof system with metal flashing that counter flashes the SPF roof system.
7. High Wall Treatment

7.1. SPF roof system shall be spray applied to high walls as required.

7.2. There are no height limitations of SPF roof systems on high walls.

7.3. If the SPF roof system is installed to a height that can be seen from the ground, the final top coat color of the protective coating shall match or blend in with existing high wall and surrounding colors.

8. SPF Roof System Components

8.1. Rigid Insulation Board (Optional)

8.1.1. Acceptable types are polyisocyanurate foam board and composite insulation board, thickness to be determined by the Designer. Boards may be attached by mechanically fastening or adhering the boards with low rise adhesive.

8.1.2 Rigid Insulation Board is optional for use over various types of roof decks. A minimum ½" thermal barrier board shall be installed over steel decks and a minimum ¼" thermal barrier board over combustible decks before installing rigid insulation board. This is not required when the Manufacturer can demonstrate that the composite roof system has passed the Class A Exterior and Class I Interior Fire Tests.

8.2. Thermal Barrier Board

8.2.1. A thermal barrier board shall be installed over combustible deck installations where a Class A fire rating is required. Direct to combustible deck application of SPF roof system is approved if a Class B fire rating is acceptable.

8.2.2. A minimum ½" thermal barrier board shall be installed over steel roof deck construction before the installation of either insulation board or SPF roof insulation.

8.2.3. Thermal barrier boards are not required but are optional in SPF roof system applications over existing BUR, Modified Bitumen, and Metal Panel or SPF roof systems. Thermal barrier boards are not required over concrete roof decks.

8.3. Substrate Primer

8.3.1. All roof top surfaces to receive the SPF roof system, with the exception of rigid insulation and factory primed thermal barrier boards shall receive substrate primer prior to the installation of SPF roof insulation or protective coating direct to the substrate.

8.3.2. The primer shall be as required by the roofing manufacturer issuing the roof warranty for the project and installed per manufacturer's published application instructions.

8.4. SPF Roof Insulation

8.4.1. The SPF roof insulation shall comply with ASTM C1029 Type III. The SPF roof insulation shall have a minimum Compressive Strength of 50 psi and have a flame spread of less than 75.

8.4.2. The SPF roof insulation shall be fire classified as part of the SPF composite roof system Class A or Class B fire rating.

8.4.3. The SPF roof insulation shall contain only zero ozone depleting blowing agents.

8.4.4. The SPF roof insulation shall be installed at a minimum thickness of 2 inches over rigids insulation board and a minimum 1.5 inches over all other horizontal roof surfaces. Vertical substrates shall receive 1-inch minimum thickness. The Designer determine the final minimum thickness to be installed.

8.4.5. SPF roof insulation shall be stored, transported and installed in compliance with manufacturer's instructions and prevailing statues and regulations.

8.5. High Tensile Acrylic Roof Coating

8.5.1. High tensile acrylic roof coating shall be internally plasticized to provide a permanently flexible waterproof coating that is fire classified by Underwriters Laboratories or a recognized fire testing agency to comply with UL 790 or ASTM E-108 Class A or Class B as required. The high tensile acrylic coating shall meet all the requirements of ASTM D6083 and comply with the following physical performance property requirements:

Volume Solids >50%	ASTM D2697
Initial Elongation 250% minimum	ASTM D2370
Initial Tensile Strength 250 psi minimum	ASTM D2370
Solar Reflective Index (Initial) >100	ASTM E1980
Solar Reflective Index (3 Year) >85	ASTM E1980

8.5.2. No Private Label Products or Manufacturers allowed.

8.5.3. The SPF High Tensile Single Lock Granule roof system shall have a minimum twenty (20) year, no dollar limit (NDL) material and labor warranty to be provided by the roofing manufacturer.

8.5.4. A two (2) year minimum material and labor warranty shall be provided by the Roofing Contractor.

8.5.5. The minimum dry mil thickness of the high tensile acrylic roof shall be 40 on both horizontal and vertical surfaces. The coating shall be applied in a minimum of 4 separate applications. Each successive coat shall be applied in a direction perpendicular to the previous coat. The first coat and second shall be applied to achieve 24 dry mils. # 11 size roofing granules shall be broadcast into the wet second coat at the rate of 35 lbs. per 100 square feet. Once the second coat has cured, any loose granules shall be removed and the third coat spray applied and back rolled at 12 dry mil thickness. The fourth application shall be applied to achieve 8 dry mils. Third and fourth coats shall be white in color. Coating shall terminate a minimum of 2 inches past the termination of the SPF roof insulation.

8.5.6. Roof top areas at egress points, walkways and around roof top equipment to be serviced shall receive a double lock granule system. The additional material to be installed on top of the completed single lock SPF roof system shall consist of an additional 12 dry mils of coating with 35 lbs. per 100 square feet of # 11 granules broadcast into the wet coating. Once the coating has cured, any loose granules shall be removed and two additional applications of coating installed to fully encapsulate the second layer of granules. The encapsulation coats shall

result in 20 dry-mil thickness of coating over the second layer of granules.

8.6. Roof Mounted Equipment / Accessories

8.6.1. All materials to be compatible with SPF roof system materials.

8.6.2. All roof top mounted curbs and penetrations shall be a minimum of 8 inches above the height of the finished roof surface.

9. Closeout Documents

9.1. All items found in Part 16, General Roofing Specification (07 30 00).

10. Preventative Maintenance Criteria

10.1. All items found in Part 17, General Roofing Specification (07 30 00).

10.2. Roof System Manufacturer shall provide school roof maintenance personnel training in the proper inspection and housekeeping procedures for the SPF roof system on an annual basis for the entire warranty period. Any deficiency observed during the annual inspection shall be documented and reported in writing to the SFB for either warranty or non-warranty repair.

11. Budgeting Cost Ranges

11.1. This part shall apply only to SFB budgeting and economic projections and analysis. Not to be used for anything else

11.2. Budget Cost Range

11.2.1. Low-Range $5.50 - $7.50 per square foot

11.2.2. Mid-Range $7.00 - $9.00 per square foot

11.2.3. High-Range $8.00 - $20.00 per square foot

11.3. Life Cycle Costing Estimates (per year per SF)

11.3.1. Years 0 – 5 $0.00

Years 5 – 10 $.005 per square foot per year

Years 11-20 $.01 per square foot per year

Recoat at 20 Years $2.00 - $3.50 per square foot for a new 10 – 20 Year Manufacturer NDL Warranty

12. Expected End of Life (EOL) for SPF Roof System exceeds 40 Years based on historical data for SPF Roof Systems installed in Arizona

13. PM Criteria for SPF Roof Systems

13.1. In addition to the PM Criteria described in the General Roofing Specification (07 30 00), the roof shall be inspected one time per year by the roof manufacturer for the length of the warranty.