MIT
Design Standards

DIVISION 07 — Thermal and Moisture Protection

Issued 2022

Department of Facilities

Table of Contents

1. 071000 - WATERPROOFING 4

1.1 PROJECT INCLUDES 4
1.2 QUALITY ASSURANCE 4
1.3 PRODUCTS 4

2. 071100 - DAMPROOFING 4

2.1 PROJECT INCLUDES 4
2.2 PRODUCTS 4

3. 072100 - THERMAL INSULATION 5

3.1 PROJECT INCLUDES 5
3.2 SUSTAINABLE DESIGN 5
3.3 QUALITY ASSURANCE 5
3.4 PRODUCTS 5

4. 072700 - AIR BARRIERS 6

4.1 PROJECT INCLUDES 6
4.2 QUALITY ASSURANCE 6
4.3 PRODUCTS 6

5. 073126 - SLATE SHINGLES 6

5.1 PROJECT INCLUDES 6
5.2 SUSTAINABLE DESIGN 6
5.3 QUALITY ASSURANCE 7
5.4 PRODUCTS 7

6. 074200 - METAL WALL PANELS 7

6.1 PROJECT INCLUDES 7
6.2 SUSTAINABLE DESIGN 7
6.3 QUALITY ASSURANCE 7
6.4 PRODUCTS 8

7. 074300 - FIBER-CEMENT WALL PANELS 8

7.1 PROJECT INCLUDES 8

7.2 Sustainable Design 8
7.3 Products 8
8. 075000 - MEMBRANE ROOFING 8
8.1 Project Includes 9
8.2 Sustainable Design 9
8.3 Quality Assurance 9
8.4 Products 9
9. 076100 - SHEET METAL ROOFING 10
9.1 Project Includes 10
9.2 Sustainable Design 10
9.3 Quality Assurance 10
9.4 Products 10
10. 076200 - SHEET METAL FLASHING AND TRIM 11
10.1 Project Includes 11
10.2 Sustainable Design 11
10.3 Quality Assurance 11
10.4 Products 11
11. 077200 - ROOF ACCESSORIES 12
11.1 Project Includes 12
11.2 Products 12
12. 078100 - APPLIED FIREPROOFING 12
12.1 Project Includes 13
12.2 Quality Assurance 13
12.3 Products 13
13. 078400 - FIRESTOPPING 13
13.1 Project Includes 13
13.2 Sustainable Design 14
13.3 Quality Assurance 14
13.4 Products 14
14. 079200 - JOINT SEALANTS 14
14.1 Project Includes 14
14.2 Sustainable Design 14
14.3 Quality Assurance 15
14.4 Products 15

15. 079500 - EXPANSION CONTROL 15

15.1 PROJECT INCLUDES 15
15.2 QUALITY ASSURANCE 15
15.3 PRODUCTS 16

1. 071000 - WATERPROOFING

1.1 Project Includes

Waterproofing may include the following:

1. Sheet membrane waterproofing applied to foundation walls and footings.
2. Metal oxide waterproofing on interior side of concrete floors and walls at elevator pits and sump pits.

1.2 Quality Assurance

Field Quality Testing: Flood testing horizontal applications.

1.3 Products

Sheet Waterproofing: Self adhering rubberized asphalt and polyethylene sheet membrane, 56 mils thick, tensile strength 250 psi.

Metal Oxide Waterproofing: Pulverized iron and a chemical oxidizing agent to cause the iron particles to rust and grow in size in the presence of water for negative side waterproofing.

Accessories: Primer, drainage board and protection course.

2. 071100 - DAMPROOFING

2.1 Project Includes

Bituminous dampproofing applied to foundation and site walls not requiring waterproofing.

2.2 Products

Cold-Applied, Emulsified-Asphalt Dampproofing, Brush and Spray Coats: ASTM D1227, Type III, Class 1.

Accessories: Primers, patching compound and protection course.

3. 072100 - THERMAL INSULATION

3.1 Project Includes

Thermal insulation may include:

1. Rigid insulation at foundation walls, under slabs on grade.
2. Mineral wool board at exterior walls.
3. Spray foam insulation at precast panels.
4. Glass-fiber batts or blankets at exterior walls.
5. Spray foam insulation.

3.2 Sustainable Design

Provide thermal insulation with the following sustainable design features:

1. Recycled content.

3.3 Quality Assurance

R-Values: Comply with applicable local requirements, but not less than R-19 at exterior walls and R-30 at roof.

Field Quality Testing: Infrared thermographic survey.

Foam Insulation: The use of spray applied polyurethane foam insulation for interior building application is prohibited.

3.4 Products

Extruded polystyrene insulation board, ASTM C578.

1. R-Value: R 5.4 per inch.

Mineral wool board, ASTM C612, Type IVB, 4 pounds per cubic square foot.

1. R-Value: R-4.3 per inch.

Spray polyurethane foam insulation, closed cell type typical.

1. R-Value: R-6.2 per inch.
2. Soy-based foams not acceptable.

Glass-fiber batts or blankets, ASTM C665, unfaced type.

1. R-Value: R 3.2 per inch.

Accessories:

1. Adhesives.
2. Vapor barriers.
3. Thermal barriers.

4. 072700 - AIR BARRIERS

4.1 Project Includes

Continuous air and vapor barrier membrane over concrete masonry units and gypsum sheathing at exterior assemblies.

4.2 Quality Assurance

Standards:

1. NFPA 285 compliant assemblies.

4.3 Products

Air and Vapor Barrier Membrane, Fire-Rated Type: Self-adhering rubberized asphalt and polyethylene sheet membrane, 56 mils thick.

Air Permeance: Not to exceed 0.004 cubic foot per minute per square foot of surface area at 1.57-pounds per square foot pressure difference when tested to ASTM E2178.

Vapor Permeance: 0.05 perms maximum when tested to ASTM E96, Water Method.

Accessories: Silicone strips at seal to penetrations.

5. 073126 - SLATE SHINGLES

5.1 Project Includes

Slate shingles for roofing and accessories.

5.2 Sustainable Design

Provide slate shingles with the following sustainable design features:

1. Regional materials, slate.

5.3 Quality Assurance

FM Global: Projects must comply with FM Global requirements. Materials must be listed in the FM Approval Guide.

Existing Buildings at MIT: MIT maintains a database of roofing and warranties for existing buildings. Request information from the MIT Project Manager.

Ice/water shield underlayment should extend throughout as much of the roof area as possible.

5.4 Products

Slate Shingles: ASTM C406, Grade S1.

Accessories:

1. Building Felt: ASTM D226, 30# type.
2. Underlayment: Rubberized asphalt ice and water shield.
3. Snow Guards: Pad-type aluminum with painted finish.
4. Slater's nails.

6. 074200 - METAL WALL PANELS

6.1 Project Includes

Metal wall panels, mounting systems and accessories.

6.2 Sustainable Design

Provide metal wall panels with the following sustainable design features:

1. Recycled content.

6.3 Quality Assurance

Aluminum-faced or metal-faced composite material panels shall be FM Approved. If no FM Approved panels are available, the proposed panels shall have a mineral fiber or similar less-combustible core, or have passed a large scale fire test such as FM 4880; NFPA 285; or BS 8414.NFPA 285 compliant assemblies.

FM Global: Projects must comply with FM Global requirements. Materials must be listed in the FM Approval Guide.

6.4 Products

Aluminum-Faced Composite Panel Materials Fire-Rated: ASTM B209, 4 mils thick.

Insulated Metal Wall Panels: ASTM B209, aluminum sheet on rigid foam core, 3 inches thick.

1. Attachment System: Concealed fasteners.

Corrugated Metal Wall Panels: ASTM B209, aluminum sheet, 0.040 inch thick.

1. Attachment System: Exposed fasteners.

Steel Framing: ASTM C645 with ASTM A653 G60 hot-dipped galvanized coating.

Accessories: Trims and fasteners.

Finish: AAMA 2605, 3-coat metallic fluoropolymer finish, 70 percent resin.

7. 074300 - FIBER-CEMENT WALL PANELS

7.1 Project Includes

Fiber-cement wall panels, mounting systems and accessories.

7.2 Sustainable Design

Provide fiber-cement wall panels with the following sustainable design features:

1. Recycled content.

7.3 Products

Fiber-Cement Panel Materials: ASTM C1186.

1. Attachment System: Rainscreen, concealed fasteners.

Steel Framing: ASTM C645 with ASTM A653 G60 hot-dipped galvanized coating.

Accessories: Trims and fasteners.

Finish: AAMA 2605, 3-coat metallic fluoropolymer finish, 70 percent resin.

8. 075000 - MEMBRANE ROOFING

8.1 Project Includes

Single-ply membrane roofing and roof insulation.

8.2 Sustainable Design

Provide membrane roofing with the following sustainable design features:

1. Roofing: High solar reflectance index (SRI).
2. Solar ready design and construction.

8.3 Quality Assurance

FM Global: Projects must comply with FM Global requirements. Materials must be listed in the FM Approval Guide and installed according to the RoofNav assembly appropriate for the needed, wind, hail and interior and exterior fire ratings.

FM RoofNav: Roofing assemblies must be designed based on a specific FM Global RoofNav number. The number must be included in the specifications issued for bidding.

The installing contractor must provide a completed FM Global Form 2688, Checklist for Roofing System, for FM Global review and comment prior to the purchase, delivery or installation of any roof materials. The Form 2688 should include actual building dimensions, a proposed RoofNav number, and the proposed brand, thickness, securement type, and securement rate of all proposed assembly components.

If a fully adhered membrane will be installed, the roof covering should pass either visual construction observation (VCO) or uplift testing in accordance with Data Sheet 1-52, Field Verification of Roof Wind Uplift Resistance, before the installation is considered complete.

R-Values: Comply with applicable local requirements, but not less than R-30 at roof.

Existing Buildings at MIT: MIT maintains a database of roofing and warranties for existing buildings. Request information from the MIT Project Manager. Predominant manufacturer is Sika Sarnafil.

Product: Manufacturer's standard 20 year warranty.

8.4 Products

Membrane Roofing:

1. Membrane: PVC 60 mils min. thickness, white color.
2. Type: Fully adhered or mechanically fastened.

Accessories:

1. Vapor Barrier: Reinforced polyethylene.
2. Insulation: Extruded polystyrene, tapered and cricketed.
3. Protection Board Over Insulation: Glass-mat cementitious sheathing.
4. Walkway pads.
5. Exterior Pavers: Precast concrete.

9. 076100 - SHEET METAL ROOFING

9.1 Project Includes

Custom fabricated sheet metal roofing.

9.2 Sustainable Design

Provide sheet metal roofing with the following sustainable design features:

1. Recycled content, metals.

9.3 Quality Assurance

Standards: SMACNA Architectural Sheet Metal Manual.

FM Global: Projects must comply with FM Global requirements. Materials must be listed in the FM Approval Guide and installed according to the RoofNav assembly appropriate for the needed, wind, hail and interior and exterior fire ratings.

Products: Manufacturer's standard 20 year warranty.

9.4 Products

Aluminum Sheet: ASTM B209.

1. Finish: AAMA 2605, 3-coat metallic fluoropolymer finish, 70 percent resin.

Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 temper.

1. Non-Patinated Exposed Finish: Mill.

Stainless-Steel Sheet: ASTM A240, Type 304.

1. Finish: No. 2D dull, cold rolled.

Fabrication: Comply with SMACNA, provide one of the following seam types as indicated.

1. Standing seam.

2. Flat seam.
3. Batten seam.

Accessories:

1. Underlayment, high temperature.
2. Gutters and downspouts
3. Snow guards.
4. Solder, compatible with metal, and flux.
5. Elastomeric sealants.
6. Epoxy seam sealer.

10. 076200 - SHEET METAL FLASHING AND TRIM

10.1 Project Includes

Sheet metal flashing and trim may include the following:

1. Metal flashing and counterflashing.
2. Metal copings.
3. Gutters and downspouts.
4. Sheet metal accessories.

10.2 Sustainable Design

Provide sheet metal flashing and trim with the following sustainable design features:

1. Recycled content, metals.

10.3 Quality Assurance

Standards: SMACNA Architectural Sheet Metal Manual

FM Global: Projects must comply with FM Global requirements. Materials must be listed in the FM Approval Guide.

Product: Manufacturer's standard 20 year warranty.

10.4 Products

Aluminum Sheet: ASTM B209.

1. Finish: AAMA 2605, 3-coat metallic fluoropolymer finish, 70 percent resin.

Copper Sheet: ASTM B370, cold-rolled copper sheet, H00 temper.

1. Non-Patinated Exposed Finish: Mill.

Stainless-Steel Sheet: ASTM A240, Type 304.

1. Finish: No. 2D dull, cold rolled.

Fabrications:

1. Metal Copings and Roof Edges: Aluminum, 0.040 thick, brake-formed.
2. Roof Drain and Penetration Flashing: Stainless steel, 0.0187 inch thick.
3. Through-Wall Flashing: Stainless steel, 0.0156 inch thick.
4. Miscellaneous Flashings at Metal Wall Panels: Aluminum, 0.040 thick.

Accessories:

1. Solder, compatible with metal, and flux.
2. Bituminous isolation coating.
3. Building felts and slip sheets.
4. Elastomeric sealants.
5. Epoxy seam sealer.

11. 077200 - ROOF ACCESSORIES

11.1 Project Includes

Roof accessories may include the following:

1. Roof hatches.
2. Elevator vents.

11.2 Products

Roof Hatches:

1. Type: Single leaf, galvanized steel or aluminum, insulated curb.

Elevator Vents:

1. Type: Automatic dampers.
2. Material: Extruded aluminum.

12. 078100 - APPLIED FIREPROOFING

12.1 Project Includes

Applied fireproofing may include the following:

1. Spray applied fireproofing for concealed and exposed locations.
2. Spray applied intumescent fireproofing for exposed locations.

12.2 Quality Assurance

Independent Inspection: Engage an independent inspector for fireproofing in accordance with the Massachusetts State Building Code.

Fire Performance: ASTM E119 and local regulations.

FM Global: Projects must comply with FM Global requirements. Materials must be listed in the FM Approval Guide.

12.3 Products

Concealed Sprayed On Fireproofing:

1. Type: Cementitious, 15 pounds per cubic foot dry density, ASTM E605.

Exposed Fireproofing:

1. Type: Intumescent.
2. Finish Coating: As selected by the Architect from manufacturer's full range.

Accessories: Primers, adhesive, lath, and reinforcing fabric and as recommended by the manufacturer.

13. 078400 - FIRESTOPPING

13.1 Project Includes

Firestopping may include the following:

1. Penetrations through fire-resistance-rated floor and roof construction.
2. Penetrations through fire-resistance-rated walls and partitions.
3. Penetrations through smoke barriers and construction enclosing compartmentalized areas.
4. Sealant joints in fire-resistance-rated construction.

13.2 Sustainable Design

Provide firestopping with the following sustainable design features:

1. Low VOC adhesives and sealants.
2. No added urea-formaldehyde.

13.3 Quality Assurance

Fire Performance: ASTM E119 and local regulations.

FM Global: Projects must comply with FM Global requirements. Materials must be listed in the FM Approval Guide.

Firestop Contractor: FM 4991 approved.

13.4 Products

Through-Penetration Firestop Systems: Subject to compliance with requirements, provide one of the following:

1. Endothermic, latex sealant and compounds.
2. Intumescent latex sealant, putty and wrap strips.
3. Mortar.
4. Pillows/bags.
5. Silicone foams and sealants.

Fire-Resistive Elastomeric Joint Sealants:

1. Single-component, neutral-curing, silicone sealant.

14. 079200 - JOINT SEALANTS

14.1 Project Includes

Joint sealers at exterior and interior vertical and horizontal joints.

14.2 Sustainable Design

Provide joint sealants with the following sustainable design features:

1. Low VOC adhesives and sealants.
2. No added urea-formaldehyde.

14.3 Quality Assurance

Field Constructed Mock Ups: Each joint type.

14.4 Products

Silicone Elastomeric Joint Sealants:

1. Exterior Type and Application: Multi part nonacid curing silicone sealant, ASTM C920, for joints in vertical surfaces, modulus as required for application, exterior use.
2. Interior Type and Application: One part mildew resistant silicone sealant, ASTM C920, for sanitary applications, interior use.

Latex Joint Sealants:

1. Interior Type and Application: Acrylic emulsion, ASTM C834, for limited movement joints in vertical and overhead surfaces, interior use.

Paving Joint Fillers:

1. Exterior Type and Application: Bituminous fiber filler for exterior paving joints.

Accessories:

1. Plastic foam joint fillers.
2. Elastomeric tubing backer rods.
3. Bond breaker tape.

15. 079500 - EXPANSION CONTROL

15.1 Project Includes

Expansion joint cover assemblies at walls and floors.

15.2 Quality Assurance

Fire Performance Standards:

1. ANSI/UL 263.
2. NFPA 251.
3. UBC 43-1.
4. ASTM E119 and ASTM E814 as applicable.

15.3 Products

Assemblies:

1. Type: Metal assembly with flat cover plates.
2. Performance: Based on building use.

Expansion Joint Cover Materials:

1. Stainless Steel: ASTM A167, Type 304 for plates, sheet, and strips.
2. Preformed Seals: ASTM D2000 rubber extrusions.
3. Elastomeric Sealant: ASTM C920, Use T.

Finishes:

1. Stainless Steel Finish: AISI No. 2B bright, unpolished.

END OF DOCUMENT