**SECTION 07 32 00**

**CLAY ROOF TILE**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

A. Clay roof tile.

B. Fasteners.

C. Underlayment.

D. Flashings and Counter flashings.

**1.2 RELATED SECTIONS**

Delete any sections below not relevant to this project; add others as required.

A. Section 06 10 00 - Rough Carpentry.

B. Section 06 20 00 - Finish Carpentry.

C. Section 07 53 00 - Elastomeric Membrane Roofing.

D. Section 07 60 00 - Flashing and Sheet Metal.

E. Section 07 71 00 - Roof Specialties: Snow guards.

**1.3 REFERENCES**

Delete references from the list below that are not actually required by the text of the edited section.

1. ASTM A 167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
2. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction.
3. ASTM B 749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.
4. ASTM C 67 - Standard Test Methods of Sampling and Testing Brick and Structural Clay Tile.
5. ASTM C 387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
6. ASTM C 887 - Standard Specification for Packaged, Dry, Combined Materials for Surface Bonding Mortar.
7. ASTM C 920 - Standard Specification for Elastomeric Sealants.
8. ASTM C 1167 - Standard Specification for Clay Roof Tiles.
9. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
10. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
11. ASTM D 2626 - Standard Specification for Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing.
12. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
13. SMACNA Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association, Inc.

**1.4 SUBMITTALS**

1. Submit under provisions of Section 01 30 00.
2. Product Data: Manufacturer's descriptive literature for products specified in this section.
3. Shop Drawings (by roofing installation contractor): Indicate the following:
4. Roof tile:
	1. Exposure pattern.
	2. Locations and configurations of special shapes.
	3. Locations and configuration of each type roof flashing.

Delete the following paragraph no fabricated sheet metal items other than roof flashings are specified.

2. Fabricated sheet metal items:

1. Dimensioned profiles.
2. Locations and extent of each item; include joint locations.
3. Jointing methods and materials.
4. Provisions for prevention of electrolytic action between dissimilar materials.
5. Interface with adjacent construction.
6. Selection Samples: Two sets of color charts or samples representing manufacturer's full range of available colors.
7. Verification Samples: Three full-size tile samples of each type tile specified, representing actual color and finish of products to be installed.
8. Manufacturer's printed installation instructions for each product, including product storage requirements.
9. Closeout Submittals: Warranty documents, issued and executed by tile manufacturer, countersigned by Contractor.

**1.5 QUALITY ASSURANCE**

1. Installer Qualifications: Company specializing in installing roofing of the type specified in this section, with no fewer than three years of documented experience.

Delete mock-up if not required.

1. Mock-Up:
2. Construct mock-up using materials specified in this section.

Delete one of the following two paragraphs. If second paragraph is retained, insert size requirements.

1. Construct mock-up as directed, at location indicated or directed.
2. Construct mock-up at location indicated or directed, size \_\_ feet by \_\_ feet (\_\_ m by \_\_ m).
3. Obtain Architect's acceptance of mock-up before beginning construction activities of this section; accepted mock-up will be standard by which completed work of this section is judged.

Delete one of the following two paragraphs.

1. Mock-up may not remain as part of Work.
2. Accepted mock-up may remain as part of Work.
3. Pre-Installation Meeting:
	1. Convene at job site seven (7) calendar days prior to scheduled beginning of construction activities of this section to review requirements of this section.
	2. Require attendance by representatives of the following:
	3. Installer of this section.
	4. Other entities directly affecting, or affected by, construction activities of this section.
	5. Notify Architect four (4) calendar days in advance of scheduled meeting date.

**1.6 DELIVERY, STORAGE, AND HANDLING**

1. Store products of this section in manufacturer's unopened packaging until installation.
2. Maintain storage area conditions for products of this section in accordance with manufacturer's instructions until installation.

**1.7 WARRANTY**

* + 1. Product Warranty:
	1. The clay roof tile manufacturer shall provide a 75-year warranty guaranteeing material integrity and color fastness for roof tile.

Delete the following paragraph if a special warranty is not required for complete roofing assembly. Edit as required.

1. Special Warranties:
	1. Roofing Contractor Warranty: The Contractor warrants products of this section, as installed, to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for a period of 3 years. Combine special warranty of this section with products, as installed, of the following sections:
		1. Section 07 53 00.
		2. Section 07 60 00.

**1.8 EXTRA MATERIALS**

Edit the following requirement to suit tile specified. Establish quantity based on total area of tile installed. Delete if not required.

1. Provide an additional quantity of roof tile matching tile installed, in the amount of 3 percent of the total installed, but not less than one full carton, for Owner's use in roof maintenance.

**PART 2 PRODUCTS**

**2.1 MANUFACTURERS**

* + 1. Manufacture shall have been in continuous operation for over 100 years.
		2. Manufacturer shall meet Cradle to Cradle specifications.
		3. Acceptable Tile Manufacturer: Ludowici Roof Tile; P.O. Box 69, 4757 Tile Plant Road, New Lexington, OH 43764. Tel: (800) 945-8453. Email: info@ludowici.com. www.ludowici.com.
		4. Requests for substitution will be considered in accordance with provisions of Section 01 60 00.
		5. Unless otherwise specified for an individual product or material, supply all products specified in this section from the same manufacturer.

**2.2 CLAY ROOF TILE**

1. Roof Tile - General: Incombustible, vitrified tile manufactured from shale and fire clays, having less than 2.0 percent moisture absorption when tested in accordance with ASTM C 67, and meeting Grade 1 freeze/thaw resistance requirements when tested in accordance with ASTM C 1167.
	1. Color: Standard color \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Clay Roof Tile Type:
	1. Acceptable field tile product: 16 inch Straight Barrel Mission (Edit for other tile profiles).
		1. Profile: High.
		2. Nominal size: 8.0 inches (203.2 mm) wide by 16 inches (406.4 mm) long.
		3. Average exposure: 11.5 inches (292.1 mm) center to center by 13 inches (330.2 mm) long.
	2. Accessory/trim tile pieces required:
	3. Short Course Cover tile
	4. Eave Closure tile
	5. Top Fixture tile
	6. Rolled Rake tile
	7. Hip & Ridge system required (Edit the following requirement to suit project conditions):
		1. Ridge Tile Profile: Circular Cover (CC) Ridge
		2. Hip Tile Profile: Circular Cover (CC) Hip
		3. Closed Ridge End: Circular Cover (CC) Closed Ridge End (starter & finishers), non-decorative
		4. Hip Starter: Circular Cover (CC) Hip Starter, non-decorative
		5. Intersection Terminals: Standard, Non-decorative

**2.3 ACCESSORY MATERIALS**

1. Underlayment (Edit the following requirement to suit project conditions, building design/use, structure & attic venting design/criteria, roof design) – select one, delete others:
	1. Option 1:
		1. Field of Roof: 2 layers of 30 lbs/sq ASTM D 2626, Type II asphalt-saturated organic felt, mechanically attached
		2. Critical Roof Areas: Ludo Pro SBS-SA HT-S, SBS Modified Bitumen Waterproofing, self-adhering
	2. Option 2:
		1. Field of Roof: Ludo Flex SBS-MA, SBS Modified Bitumen Waterproofing, mechanically attached
		2. Critical Roof Areas: Ludo Pro SBS-SA HT-S, SBS Modified Bitumen Waterproofing, self-adhering
	3. Option 3:
		1. Field of Roof: Ludo Pro SBS-SA HT-S, SBS Modified Bitumen Waterproofing, self-adhering
		2. Critical Roof Areas: Ludo Pro SBS-SA HT-S, SBS Modified Bitumen Waterproofing, self-adhering
	4. Option 4:
		1. Field of Roof: Ludo Bond SBS-SA TU-HT, SBS Modified Bitumen Waterproofing, self-adhering
		2. Critical Roof Areas: Ludo Bond SBS-SA TU-HT, SBS Modified Bitumen Waterproofing, self-adhering
	5. Option 5:
		1. Field of Roof: Ludo Pro Perma, Permeable Synthetic, self-adhering.
		2. Critical Roof Areas: Ludo Pro Block, High Temperature Asphalt Compound, self-adhering
2. Wood Stringers: S4S, maximum 19 percent moisture content, nominal 1.5 inch (38.1 mm) thick, of height required to support tile.
3. Flashing: 16oz/sq ft, 0.56mm thick ASTM B 370 cold rolled copper.
4. Tile Fasteners: Corrosion-resistant (copper or stainless to be specified/selected); types and sizes specified in manufacturer's instructions for indicated uses and conditions.
5. Copper Wire: 16 gauge (1.3 mm) minimum.
6. Grout for Finishing Rake Edges:
	* + 1. Mix the following materials in equal parts:
		1. Factory-mixed mortar meeting requirements of ASTM C 387, Type M.
		2. Factory-mixed surface bonding mortar meeting requirements of ASTM C 887.
	1. Add mineral oxide pigment to match color of roof tile.
	2. Add water and acrylic additive in accordance with mortar materials manufacturers' instructions to obtain correct mix for workability.
7. Roof Cement: Asphalt roof cement conforming to ASTM D 4586, Type I or II.
8. Sealant Used in Lieu of Flashing Cement: ASTM C 920 silicone; provide one of the following:
	1. Dow Corning 790 Silicone Building Sealant.
	2. GE SilProof.
9. Screws: No. 8 or No. 9 brass or stainless steel, flathead Phillips or square drive, not less than 1-3/4 inches (45 mm) long.
10. Nails for Solid Wood Deck: Corrosion resistant copper, brass, or stainless steel; minimum 3/8 inch (9.5 mm) head diameter; shank of minimum 11 gage (3 mm) diameter and length sufficient to penetrate 3/4 inch (19 mm) into deck but not through the underside.
11. Nails for Plywood Sheathing: Slater's copper ring shank nail, 11 gage (3 mm), not less than 1-3/4 inches (45 mm) long with 3/8 inch (9.5 mm) head; point must penetrate through underside of deck.
12. Wood Nailers and Cant Strips: Preservative-treated wood, as specified in Section 06 10 00.
13. Adhesive: NP1 Roof Tile Adhesive.
	1. Do not expose to ultraviolet rays.
	2. Do not allow direct contact with waterproofing shingle underlayment.

**2.4 FLASHING FABRICATION**

* 1. Form flashing to profiles indicated on drawings and as required to protect roofing materials from physical damage and shed water and in accordance with manufacturer's instructions for indicated project conditions.
	2. Form sections square and accurate in profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
1. Fabricate other indicated sheet metal items as follows:
	* 1. Gutters: SMACNA Plate Number \_\_\_\_\_\_.
		2. Conductor heads: SMACNA Plate Number \_\_\_\_\_\_.
		3. Downspouts: SMACNA Plate Number \_\_\_\_\_\_.
2. Fabrication of other indicated sheet metal items is specified in Section 07 60 00.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

1. Verify that roofing penetrations and plumbing stacks are in place and properly flashed to deck surface.
2. Verify that roof openings are correctly framed.
3. Verify that deck surfaces are dry and free of ridges, warps, and voids.

**3.2 PREPARATION**

1. Comply with tile manufacturer's recommendations on preparation of acceptable roof deck.
2. Broom clean deck surfaces prior to installation of underlayment.

**3.3 UNDERLAYMENT AND ACCESSORY INSTALLATION**

1. Underlayment:
	1. Beginning at eave edge, install perpendicular to roof slope; extend minimum of 4 inches (100 mm) over gutters and valley flashing, and minimum 6 inches (150 mm) up abutting vertical surfaces.
	2. Overlap side joints minimum 2-1/2 inches (64 mm); overlap end joints minimum 6 inches (150 mm).

Delete the following paragraph if second layer not required. Two layers are recommended if using 30-pound underlayment.

* 1. Install second layer parallel to first layer, maintaining specified overlap at gutters, valley flashings, and at side and end joints; locate side joints minimum 18 inches (457 mm) from first layer side joints, and locate end joints minimum 12 inches (300 mm) from first layer end joints.
	2. Install additional layer on rough surfaces; install additional layer of full-width underlayment parallel to, and centered on, hips, ridges and valleys.
	3. Fasten sides and ends to deck with fasteners spaced at maximum 6 inches (150 mm) on centers.
1. Install flashing at all locations where roof intersects other roofs, sidewall or parapet walls, chimneys, ventilators, and similar projections, and at gable edges.

Delete the following paragraph if not required.

1. Valley Flashings:
	1. Install minimum 24 inch (610 mm) wide flashing over full-width waterproofing membrane material; fasten metal to deck with cleats.
	2. Overlap end joints minimum 8 inches (203.2 mm); do not solder joints.
	3. Lap waterproofing membrane material over edges of flashing 4 inches (100 mm).
2. Intersections of Roof Surfaces and Abutting Vertical Surfaces:
	1. Install continuous 12 inch (304 mm) wide strips of waterproof membrane material to extend 9 inches (228 mm) across roof deck and 3 inches (76 mm) up vertical surface.
	2. Install continuous metal flashing to extend 3 inches (76 mm) up vertical surface.
	3. At locations where vertical surface will abut top edge of tile, install metal flashing to extend 3 inches (76 mm) up vertical surface, form metal flashing to extend minimum 3 inches (76 mm) over tile, and form 1/2 inch (12 mm) return hem at edge of metal.
	4. Form saddle flashings for protrusions through roof in accordance with manufacturer's instructions.
3. Fabricated Sheet Metal Items: Install in accordance with shop drawings and SMACNA ASMM.
4. Fabricated Sheet Metal Items: Installation is specified in Section 07 60 00.
5. Nailers: Install nominal 2 inch by appropriate height by 48 inches (50.8 mm by appropriate height by 1220 mm) pressure-treated wood nailers as detailed at ridge, hips and cover tiles, directly over underlayment. Protect with layer of waterproofing membrane material before installing hip and ridge accessory.

**3.4 TILE INSTALLATION**

* + 1. Install tile roofing in strict conformance with manufacturer's instructions. Overhang of tile at eaves should be not less than 3/4 inch (19 mm) and not more than 2 inches (51 mm). This dimension should be related to the size of gutters and should either be shown on the drawings or specified here.
		2. Install first course over eave closure, with overhang.
	1. Do not drive fasteners tightly against tiles, to reduce risk of breakage and to allow natural deck movement.
	2. Allow tile to "hang" on its fasteners.
	3. Provide 3/4 inch (19 mm) to 2 inches (51 mm) overhang, permitting proper flow into gutters.
		1. Install each subsequent course with maximum exposure in each course of 13 inches (330.2 mm). Wet cut tile at hips and valleys, using masonry saw with diamond blade.
		2. At hip and ridge, and on mansard roofs, install bead of adhesive at butt end of each tile, located so it is completely concealed. Install sealant as required at hip and ridge accessories to achieve watertight installation.

**3.5 PROTECTION**

* 1. Do not permit traffic over finished roof surface unless absolutely necessary.
	2. Minimize traffic over finished roof surface. If necessary, wear soft-soled shoes and walk on the "butt" of the tile in order to avoid breakage.
	3. Replace tile broken due to improper protection or traffic control.

**3.6 SCHEDULES**

1. Location: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	1. Tile: 16 inch Straight Barrel Mission
	2. Color: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	3. Texture: Smooth

**END OF SECTION**