SECTION 07322
CONCRETE ROOFING TILES ARCHITECTURAL SPECIFICATIONS
VANDE HEY RALEIGH ARCHITECTURAL ROOF TILE

PART 1—GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section. (Working drawings available upon request.).

1.2 SUMMARY

A. This Section includes roofing tiles of the following types:

1. Vande Hey Raleigh Flat tile laid in a random, half joint, staggered or straight.
    a. Slate
    b. Shake
    c. Brushed
    d. Cotswold Stone
2. Vande Hey Raleigh Riviera tile laid in a straight pattern.
3. Vande Hey Raleigh Spanish tile laid in a straight or half joint pattern.
4. Vande Hey Raleigh Spanish Pans & Covers laid in a straight or slightly curved pattern.
5. Vande Hey Raleigh English Shingle , a non-tapered, non-interlocking shingle laid in half joint, random or staggered pattern.
6. Vande Hey Raleigh Turret Shingle, a tapered, non-interlocking shingle laid in half joint, random or staggered pattern on curved areas.
7. Vande Hey Raleigh Spanish Turret Pans & Covers laid in a straight pattern on curved areas.

NOTE:
a. Specifications, installation procedures and working drawings
available upon request.
b. All tile are tested in accordance with the following standards and
exceed minimums for strength, water absorption, freeze-thaw, dimensions and installed weight:

-ICC-ESR-1759
-ASTM C140 Dimensional Tolerances +/-5%
-ASTM C67 Freeze/Thaw 1.0% Max Loss of dry weight 50 cycles
-ASTM C67 Transverse Strength, 300 Lbs Force
-ASTM C1492 Permeability, Zero Free water on underside in 2 hours
-ASTM C140 Water Absorption, 10.5% maximum
-FM 4473 Impact Test, Class 3
- ASTM E 108, Fire Rating, Class A

B. Related Sections: The following sections contain requirements that relate to this Section:

1. Division 6 Section "Rough Carpentry" for wood framing, decking, eave and gable fascia, blocking and vent openings.
2. Division 7 Section "Flashing and Sheet Metal" for flashing, gutters, saddles and other sheet metal work.

3. Division 7 Section "Roof Specialties and Accessories" for skylights and other roof penetrations.

1.3
SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
B. Submit full range of samples for color, style, features and surface texture selection. After selections, submit two full-size tiles for verification of each color/style/feature/surface texture selected prior to bidding.

1.4
QUALITY ASSURANCE

A. Work must be performed by a firm with not less than 5 years of successful experience and shall have installed a minimum of five (5) projects of at least ½ the size of this project within the last five years. List projects and provide to architect prior to bidding.
B. For areas where experienced contractors are not available, Vande Hey-Raleigh will arrange an instructor/technician for instruction or inspection.

COMPENSATION WILL BE REQUIRED.

1.5
DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in manufacturer's unopened bundles or containers with labels intact.
B. Handle and store materials at project site to prevent water damage, staining, or other physical damage. Store roll goods on end. Comply with manufacturer's recommendations for job site storage, handling, and protection.

1.6
PROJECT CONDITIONS

A. Weather Conditions: Proceed with Work only when existing and forecasted weather conditions will permit work to be performed in compliance with manufacturer's recommendations and when substrate is completely dry.

1.7
EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.

B. Furnish quantity of full-size roofing tiles equal to 1 percent of amount installed.

1.8
WARRANTY

A. Provide a Lifetime, non pro-rated, transferrable written tile warranty from the manufacturer.

B. Material and workmanship shall also be guaranteed by the installation contractor for 3 years (residential) or 5 years (commercial) from the date of substantial completion.

PART 2--PRODUCTS

2.1
MANUFACTURER

A. Provide extruded concrete roofing tile with all required accessory trim pieces.

B. Acceptable manufacturer:

Vande Hey Raleigh Mfg., Inc.
1665 Bohm Drive, Little Chute, WI 54140-2529
Phone 920-766-0156 800-236-8453 (TILE) Fax 920-766-0776
http://www.vrmtile.com

2.2
CONCRETE ROOFING TILE

A. Cover sloped roofs so indicated on plans with concrete tile by Vande Hey Raleigh Mfg., Inc.

B. Specifications for field tile

STYLE	DIMENSIONS	APROX SQ*PER TILE	APROX EXPOSURE	LBS. PER SQ *SQ MTR*	KGS. PER
Flat	15 ⅜ " x 10 ⅝"	124*	12" x 9¾"	1,050*	51.3*
Riviera	15 ⅜ " x 10¼"	138	12" x 8-11/16"	1,000	48.8
Spanish	17¼" x 13"	86	14" x 12"	1,000	48.8
Pans and Covers	16 ¾" x 9¼"	75	13¾" x 14"	1,490	73.0
Shingle, English	15" x 7 ½"	315*	6" x 7½"	2,006*	97.9*
Shingle, Turret	varies	Varies*	varies	1,800*	87.9*

* For tile laid in a staggered pattern increase weight and tile per square by 20%.
*Tiles shall be colored throughout and not colored on the front surface only.

C. Note that the size characteristics given in base specifications for concrete roofing tiles are maximum allowable dimensions. Any acceptable and/or approved concrete roofing tile shall be no larger than that specified and referenced herein.

D. Flat field tile will be prepunched with two 3/16" holes at the time of manufacture for nailing purposes. All other field tile will be pre-punched with one 3/16" hole.
See Paragraph 3.3-Q.

E. Trim for hips, ridges and gables shall match color/style/features/surface/texture of field tile.

F. Field tile at hips and valleys shall be cut to correct angles on job by roofer.

G. Non-interlocking shingles in tapered sizes (Turret for round surfaces) and non-tapered (English for flat surfaces) with various textures are available for custom applications. Specifications, installation procedures and working drawings available upon request.

H. Spanish Turret Pans & Covers in tapered sizes with various textures are available for round surface applications. Specifications, installation procedures and working drawings available upon request.

I. Vande Hey Raleigh Mfg. recommends and makes available the entire Vande Hey Raleigh Roof System to include roof tile, trim and accessories (underlayments, flashings, battens, etc.) for a complete quality materials package.

2.3
ACCESSORIES

A. Underlayment:

1. For roof slopes 3:12 and above in the sun belt and 4:12 and above in severe weather areas

a. Two layers of No. 30 Asphalt Saturated felt as manufactured by Tamko ® Roofing Products, Joplin, MO, to meet requirements of ASTM D-226, Type 2 or equal.

b. Tri-flex ™ 30 as manufactured by Flexia Corp., Ontario, Canada, to meet requirements of ICBO AC-48 or equal.

c. Duck's Back™ rubberized underlayment as manufactured by Cetco®, Clinton, SC.

d. Daltex Roofshield® Roof Underlayment (a breather membrane not requiring ventilation to the underside of the roof deck) as manufactured by the Proctor Group, Ltd., Forfer, Scotland.

2. For roof slopes below 3:12 in the sun belt and below 4:12 in severe weather areas, tile are installed for cosmetic purposes only; use single ply membrane over a counter batten system.

3. Use self-seal membrane that meets or exceeds requirements of ICBO AC-48 along roof perimeters and protrusions in severe weather areas: Strong Seal Plus as manufactured by Cetco, Clinton, SC or equal.

B. WOOD BATTENS AND NAILERS

1.Pressure treated 1" x 2" x 8' batten strips with notches or ports 16" O.C. (available from the manufacturer) for slopes 3:12 and above in the sun belt and 4:12 and above in severe weather areas laid horizontally 12" maximum. For Spanish tile batten strips are laid horizontally 14" maximum. Leave ¾" space between the ends.

2. Pressure treated 1" x 4" horizontal batten strips @ 12" O.C. (14" O.C. with Spanish) over 1" x 3" vertical battens 24" O.C. installed under EPDM are required for slopes below 3:12 in the sun belt and below 4:12 in severe weather areas.

3.Pressure treated 1" x 4" horizontal battens at 12" O.C. (14" O.C. with Spanish) over 1" x 3" vertical battens 24" O.C. over the underlayment can be used for the batten system on roofs 3:12 and above in the sun belt and 4:12 and above in severe weather areas in lieu of the ported batten system.

4. 1" x 2" wood nailers of sufficient height (depending on slope) to nail hip trim. For Spanish tile a 1x? with mounting flashing attached is used for the hip nailer which should be of sufficient height (depending on slope) to nail hip trim so they rest on the field tile with minimum clearance.

5. Either 1x? with mounting flashing attached for the ridge nailers or ridge venting is used at the ridges to fasten the ridge trim so they rest on the field tile with minimum clearance.

C. FLASHINGS

1. Eave metal shall be minimum 7-3/16" girth (or 9" girth with gutters) made of 16 oz. copper or .019 aluminum depending on the material used for the gutters. 7-3/16" eave metal is used on new construction without gutters.

2. All other flashings shall be 16 oz. soft-temper copper.

D. SEALANT, MORTAR, GROUT, ADHESIVE

1. Concealed sealants along ridge/hip trim and flashings with asphalt saturated felt underlayment shall be non-running, heavy body plastic roof cement as manufactured by Henry® Co., Huntington Park, CA, for Vande Hey-Raleigh Mfg., Inc. or equal to meet or exceed the requirements of ASTM D-2822-75and Federal Specifications SS-S-153C (Type 1). Sealants used with EPDM, Duck's Back™, StrongSeal™ Plus, Tri-Flex™ 30 or Daltex Roofshield ® Roof Underlayment shall be per manufacturer's recommendation.

2. Exposed sealants, such as those used on counter flashings or non-soldered joints, should be high quality such as Dymonic® as manufactured by TREMCO®, Cleveland, OH, or 3500™ Roof Tile Adhesive/Sealant by Geoce®, Elkhart, IN, to meet or exceed requirements of U.S. TT-S-00230C, U.S. Fed Cat. No 8030-965-2397, Canadian 19-GP-5M ASTM C290-79.

3. Mortar/grout for hips (with Spanish tile), open valleys and saddles shall be a combination of 50 lb. of Quickwall® Surface Bonding Cement and 120 lb. of Mason Mix to meet or exceed strength requirements of ASTM C-387 for Type "N" mortar and Concrete Acrylic Fortifier to meet or exceed ASTM C- 887 standard specifications as manufactured by Quikrete®, Atlanta, GA. Grout and colored oxide to match field tile available from the Manufacturer.

4. Adhesives to secure cut pieces of field tile along hips, valleys, gables, sidewalls, flying gables and protrusions and to install hip/ridge/rake trim shall be Titebond as manufactured by Franklin International, Columbus, OH, RT-600 Adhesive as manufactured by OSI Sealants, Mentor, OH or 3500 Roof Tile Adhesive/Sealant by Geocel, Elkhart, IN.

E. FASTENERS

1. Nails for the underlayment shall be 11 gauge, ⅞" long with ⅜" round head galvanized, copper or stainless steel. See paragraph 3.3 E for nailing pattern.

2. Nails for the flashings shall be 11 gauge 1" R/S compatible with the flashing material used (copper, galv, etc).

3. Nails for batten strips shall be 5 penny stainless steel nails or 16 gauge stainless steel staples of sufficient length to penetrate sheathing. See Paragraph 3.3 Q for nailing pattern.

4. Nails for field tile shall be 11 gauge copper or stainless steel with 5/16" heads 1¾" long to penetrate 11/16" into batten strips. With Spanish tile, nails shall be 10 gauge copper or stainless steel 3" long to penetrate ⅝"into batten strips. Nailing of tiles is determined by the roof slope and prevailing wind condition. For minimum standards, see UBC Table 15-D-2. See Figure 1 for Manufacturer's recommendations. All cut pieces without a lug shall be secured with copper wire or masonry construction adhesive.

5. Nails for trim pieces shall be 10 gauge copper or stainless steel 2½" long to penetrate into wood nailers. With Spanish tile, nails shall be 10 gauge copper or stainless steel 3" long to penetrate into wood nailers. All ridge, hip, rake and ridge end caps shall be nailed 6. All shingles shall be nailed (2 per piece) with 11 gauge non-corrosive nails (copper, hot dipped galvanized or stainless steel) 1¾" R/S to penetrate sheathing.

6. Screws are required for high wind specs and slopes above 18:12.

7. Fasteners for Pans and Covers shall be 2¼" TP thread point stainless steel screws of sufficient length for ¼"penetration through the underside of the plywood decking.

8. Hurricane clips for high wind specifications shall be 20 oz. soft temper copper.

F.
SNOW GUARDS/SNOW FENCE
1. Snow guards for snow areas shall be 38 oz. copper.

PART 3--EXECUTION
3.1 EXAMINATION

A. Check rafters, trusses and roof deck for humps, dips and loading capacity. A minimum ⅝" plywood deck is required for rafters/trusses 24" O.C. Install decking at hips to allow for a 1" flat surface to install the hip nailer and at the ridge to allow a 1½" opening if ridge venting is to be installed. A minimum ¾" deck is required for English shingle tile.

3.2 PREPARATION

A. The roof deck should be clean, smooth and dry when underlayment is applied.

B. Coordinate installation with flashing, gutters, vents, skylights and other. Adjoining work to ensure proper sequencing. Do not install roofing materials until all vent stacks and other penetrations through roof sheathing have been installed and are securely fastened against movement. When tile vents are used they have to be installed prior to cutting the penetrations.

3.3 INSTALLATION

A. Comply with manufacturer's installation instructions and recommendations, but not less than recommended by The NRCA's Steep Slope Roofing Manual and the Roof Tile Institute's Cold and Moderate Climate Manual, SMACNA Manual and local code requirements.

B. Eave fascia and plywood eave blocking shall extend above roof deck 1 ⅞" to ensure proper cant for bottom row of tile. For slopes below 3:12 in the sun belt or 4:12 in severe weather areas, use two piece eave metal and cant strip instead of blocking over the fascia. Details available from the manufacturer. For Spanish tile, the eave fascia is level with the roof deck. When vertical battens are installed; eave fascia is raised to compensate for the thickness of the vertical batten for Flat, Riviera and Spanish tile. Details available from the manufacturer. Eave fascia and plywood eave blocking shall extend above roof deck ¾" to ensure proper cant for bottom row of shingles with English and Turret shingles. Minimum slope for shingles is 6:12. Eave fascia and plywood eave blocking shall extend above roof deck 1¼" to 7" Ensure proper cant for bottom row of pans and covers with Spanish Pans and Covers. Minimum slope for Pans and Covers is 5:12.

C. Install eave metal overlapping joints 3 inches with sealant in between.

D. Install 24" standing seam, double rib (for closed valleys) or 24" double rib valley flashing (for open grouted valleys) lapped a minimum of 4" for slopes 4:12 and above and 6" for slopes below 4:12 over 36" full width vertical underlayment centered in all valley areas. At least one layer of underlayment shall be applied under all flashings. For slopes below 3:12 in the sun belt or 4:12 in severe weather areas; install flashings and EPDM underlayment per details provided by the Manufacturer. For Spanish tile install 28" standing seam, double rib (for closed valleys) or 24" double rib valley flashing (for open grouted valleys).

E. Apply underlayment (Paragraphs a. through d. of 2.3 A. 1.) with standard 3" lap laid parallel to eaves and ridge. Nail all horizontal seams one inch from the edge with 11 gauge, ⅞" long with ⅜" round head corrosive resistant nails 6" O.C. Lap all vertical seams a minimum of 6", seal with sealant and nail all vertical seams 3" O.C. Extend underlayment ¼" over lower edge of eave metal, to within 1" of outside valley rib and sealed to the metal, 4" up head and side walls, 2" over gable fascia and 6" over ridges and hips, thereby providing a double layer on ridges and hips. Check local building codes if self-seal membrane is required along eaves,

valleys, sidewalls, gables and protrusions. In severe weather areas; install self-seal membrane up the roof slope minimum 2 feet beyond the interior face of the exterior wall or as required by code, whichever is greater and 3 feet parallel to and overlapping the valley metal 3” on each side. For slopes below 3:12 in the sun belt and 4:12 in severe weather areas, single ply EPDM over vertical battens should be used as underlayment. The roof deck shall be clean, smooth and dry when underlayment is applied. The underlayment and flashings provide the weather proofing for the tile roof system. The building should be water tight before the tiles are installed. Do not use a slap stapler to install the underlayment or button/cap nails with the battens. Duck’s Back underlayment will stretch in the hot sun. It must be rolled out and loose laid. Do not stretch when nailing.

F. Two layers of 30# felt can be applied in lieu of one layer of Duck’s Back. Place the first 18” wide ply parallel to the eave edge, with the bottom extending ¼” over the lower edge of the eave flashing; seal to eave flashing. Place the second 36” wide ply over the first ply flush at the bottom and sealed to the first ply. Place the bottom edge of the third ply up 15” from the bottom edge of the second ply and each successive ply up 18” from the bottom of each previous ply. Stagger the vertical laps of each successive layer so that vertical joints do not align in any two adjacent plies. See Paragraph 3.3 E for nailing of felt.

G. Self-seal membrane or Tri-Flex 30 can be applied in lieu of one layer of Duck’s Back on roofs that have ventilated air space below the deck. Place the first ply at eave edge, with bottom edge extending ¼” over lower edge of eave flashing; seal to eave flashing. Place each successive ply overlapping the top edge of the previous ply 3“.

H. On slopes below 3:12 in the sun belt and 4:12 in severe weather areas, .045 EPDM is installed over 1x3 vertical battens. Details are available from the manufacturer.

I. Install sidewall flashing at sidewalls and at sides of roof protrusions that have no saddles. A vapor barrier extending over the flashing should be used behind thesiding. A 3’ strip of self-seal membrane extending6" up the sidewall should be installed under the flashing.

J. At lower sides of dormers, chimneys and other walls, extend angle flashing at least 3" up walls and 3" over tile with ½" hem. A 3’ strip of self-seal membrane extending 3" up the angle should be installed under the flashing. Install Riviera closures with Riviera tile and ridge closures with Spanish tile. Counter flash as necessary.

K. Chimneys and other roof protrusions over 30" require a framed saddle (cricket) with a maximum ridge length of 24". Saddle flashing installed over self-seal membrane and Rosin paper must extend a minimum of 12" up the roof and 3½" up the back of the chimney. Thoroughly counter flash as necessary. For protrusions less than 30" wide a flat saddle flashing that extends a minimum of 6" up the vertical and 18" up the slope is used.

L. All counter flashing is to be plugged, pointed and made secure.

M. Lay out roof as follows: first, install ridge nailer/vent. Next strike lines centered on each hip if applicable. Then strike the horizontal line for the top edge of first batten (13¼" for flat, 12¾" for Riviera and 15” for Spanish) above the eave to ensure that the tile have approximately 1” overhang allowing for drainage and air flow under the tile without causing ice damage or wind uplift. Next, strike the horizontal line for the top edge of the top batten, approximately 1” below the ridge nailer/vent. Then divide the distance between these two lines into equal increments not to exceed 12 inches for Flat and Riviera and 14” for Spanish and strike lines for the top edges of the battens.

N. Install horizontal 1" x 2" x 8' ported batten strips. Use pressure treated battens with notches or ports 16" O.C., leave ¾” space between the ends and fasten with 18 fasteners. For slopes below 3:12 in the sun belt and 4:12 in severe weather areas for concrete tile, use a counter batten system. Details available from the Manufacturer.

O. Stack tile on roof selecting them randomly from several pallets to ensure an even color blend or order them pre-blended from the factory.

P. Tile should be laid from right to left for Flat and Spanish tile and from left to right for Riviera (as viewed facing the ridge).

Q. Fasten tile as they are installed on the battens. Fastening requirements are determined by the slope, height of the roof and prevailing wind conditions. See Figure 1 for Fastening Specifications. To provide a maximum basic wind protection of 80 MPH

1. For Flat & Riviera slopes <10:12, nail every tile with one fastener. (Flat tile-in the right side hole)

2.For Flat & Riviera slopes 10:12 and greater, nail every tile (Flat) with two fasteners. (Riviera tile-one screw)

3. For Spanish slopes <10:12 nail every other tile (50%).

4. For Spanish slopes 10:12-18:12, nail every tile (100%).

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FIGURE 1—FIELD TILE FASTENING SPECIFICATIONS

R. Rake trim shall be installed as tile are laid along the gable edge. Trowel sealant or use adhesive on the underside of the rake trim and secure the side with two 3” copper R/S 10 gauge nails or stainless steel screws.

S. Ridge trim shall be installed as roof progresses. Use a 2½” stainless steel nail for standard installation or #10 2½” stainless steel screw for high wind areas. Ridge trim must be sealed between the laps with a generous amount of sealant/mastic/foam to completely fill any voids between the lap of the two pieces. Fill the space between tile and ridge nailer/vent with sealant. Install ridge closures with Spanish tile. Install an end cap where gables meet ridge.

T. Hip starters and hip trim shall be laid as hip tile are cut and secured in place. Fill the space between the hip nailer and mitered tile with sealant. Use colored grout for Spanish tile. Wire, nail or screw small pieces to the hip nailer to prevent slippage.

U. All hip, ridge and ridge end cap trim shall be nailed and shall be lapped in sealant.

V. Specifications for tile in heavy snow areas

1. Roofs that have gables within 5' of a valley require special attention. Using gable flashing instead of rakes is recommended. If rakes are used, you have to prevent snow and ice slides from catching on the exposed edges and pushing them off. Use a generous amount of adhesive between the rake and the field tile. Use screws to fasten the two field tile along the gable and for the rakes instead of nails. Right and left rakes mitered 45° along the top side should be specified for Flat and Riviera tile. For Spanish tile use grout to fill all voids along the exposed edges.

2. Proper attic or counter batten ventilation is required for all styles of tile to ensure that building heat loss is not trapped under the tile. A 250 square foot minimum factor should be used instead of the standard 300 square foot factor in determining the eave and ridge venting requirements. Special attention should be given to roofs without ventilated attic space. Send a copy of your plans to our Estimating Department for a review and recommendations on your venting system.

3. Snow guards are recommended for all roof and valley areas with slopes of 17:12 or lower. Special attention should be given to upper roofs with roofs below them. Decorative styles are available upon request.

W. High Wind Specifications and for roofs exceeding 40 feet

1. The following installation procedures are required in addition to the standard Vande Hey Raleigh specifications to increase the warranty to 125 mile per hour. With the counter batten system, the warranty is reduced to 100 mile per hour winds.

a) For Flat tile, fasten all field tile with two 2½” nails stainless steel roofing

nails of sufficient length for ¼“ penetration through the underside of the plywood decking. Flat tile will be prepunched with two 3/16" holes at the time of manufacture. For Riviera tile, fasten all field tile with one 2¼” stainless steel screw (TP thread point). Riviera tile will be prepunched with one 3/16" hole at the time of manufacture. For Spanish tile fasten all field tile with two stainless steel screws (2¼" TP thread point) of sufficient length for ¼” penetration through the underside of the plywood decking. Tile will be prepunched with two 3/16” holes at the time of manufacture. Fasten all hip and ridge trim pieces with 2¼” stainless steel screws and all rake trim with 3” stainless steel screws. Use a generous amount of adhesive at the laps of the trim.

b) Install hurricane clips set on a dab of sealant and fasten with a 1” SS screw at all eaves.

c) For Flat and Riviera tile set every other tile in a dab of masonry adhesive on the underside of the waterlock 1½" from the bottom (be sure the amount and location of the adhesive used doesn't prevent the tile from resting flat on the tile below) and fasten every other tile with regular hurricane clips. Do not lay in half joint pattern.

d) The openings under the Spanish hip pieces shall be closed with mortar grout, color to match the color of tile.

END OF SECTION 07322