This document has been electronically signed and/or sealed in accordance with the applicable State Board of Professional Engineering requirements.

Laboratory Test Report

Bartile Roofs Inc.
ANSI/FM 4473 Tile Testing
Haag File: 51240033TX-196

Bartile Roofs Inc.
725 North 1000 West
Centerville, Utah 84014

Attention: Mike Evans

November 7, 2024

IAS ACCREDITED TEST LAB TL-656

HAAG Research & Testing

Date Received:	August 13, 2024
Date(s) of Testing:	October 29 to October 31, 2024
Date of Report:	November 7, 2024
Lab:	Haag Research & Testing Co. 1410 Lakeside Parkway, Suite 100 Flower Mound, TX 75028 HaagResearchTesting.com 800.527.0168 214.614.6500 214.614.6501 fax IAS Accredited TL-656 Haag File: 51240033TX-196
Client:	Bartile Roofs Inc. 725 North 1000 West Centerville, Utah 84014 Attention: Mike Evans
Job Name:	Bartile ANSI/FM 4473 Tile Testing
Purpose of Work:	Test concrete roofing tiles for impact resistance
Accredited Standard Test:	ANSI/FM 4473 - *Test Standard for Impact Resistant Testing of Rigid Roofing Materials by Impacting with Freezer Ice Balls*

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 (refer to IAS Certificate of Accreditation appended as Attachment A). The accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communiqué dated April 2017 and included as Attachment B).

This report has been written for your sole use and purpose, and only you have the authority to distribute this report to any other person, firm, or corporation. Haag Research & Testing Co. (HRT) and its agents and employees do not have and do disclaim any contractual relationship with, or duty or obligation to, any party other than the addressee of this report and the principals for whom the addressee is acting. Only the engineer who signed this document has the authority to change its contents and then only in writing to you. This report addresses the results of work completed to date. Should additional information become available, we reserve the right to amend, as warranted, any of our conclusions. This report shall not be reproduced except in full without approval of HRT.

Description

HRT received concrete roofing tiles in Flower Mound, Texas, on August 13, 2024. Tested roofing tiles were provided directly from the manufacturer, Bartile Roofs Inc. (Bartile). Test results presented in this report are applicable to the tested tiles as received.

Tested tiles included Sierra Mission, European, Legendary Slate, Legendary Split Timber, New England Slate, and Split Timber profiles. Tiles were concrete, and profiles were S-shaped, double-Roman, or flat. Tile attributes are provided in Table 1. Weights reported in Table 1 are the average weights of tested tiles.

TABLE 1: TILE ATTRIBUTES

Product	Tile Profile	Average Weight (pounds)	Tile Length (inches)	Tile Width (inches)	Exposed Area (in^2)
Sierra Mission	S-Tile	7.8	15	10-1/2	114
European	Double-Roman	7.4	15	10-1/2	114
Legendary Slate	Flat	15.5	16-1/4	16	172
Legendary Split Timber	Flat	14.5	16-1/4	16	172
New England Slate	Flat	8.9	15-1/2	10	125
Split Timber	Flat	8.1	15-1/2	10	125

Procedure and Findings

Products were tested to ANSI/FM 4473 - Class 3 or Class 4. Table C-1 in Attachment C provides details on test equipment used during test procedures outlined in this report. Tested tiles were maintained at laboratory temperatures in the range of 60ºF to 90ºF for at least 72 hours prior to testing. Laboratory temperature during these tests was 72ºF, and relative humidity was 47%.

Test panels were impacted with propelled ice balls measuring 1-3/4 and/or 2 inches in diameter in accordance with ANSI FM 4473. Each tested tile location was impacted twice, with both impacts separated by no more than 1/2 inch. Target ice ball attributes for ANSI/FM 4473 Class 3 and Class 4 are listed in Table 2. Ice ball weights, speeds, and computed kinetic energies for each impact made during testing are listed in Tables D.1 and D.2 in Attachment D.

TABLE 2: TARGET ICE BALL ATTRIBUTES

Class	Diameter (inches)	Mass (pound)	Free-Fall Speed (feet/sec)	Free-Fall Energy (ft·lbf)
3	1-3/4	0.0928	98.5	14.00
4	2	0.1385	105.0	23.75

For a product to pass ANSI FM 4473, the product shall show no evidence of visible cracking or breakage such as splits, punctures, fractures, disengagement of lap elements, or exposure of materials not so intended.

Test panels were constructed by installing tiles in accordance with manufacturer instructions (Attachment E) and the TRI Alliance Installation Manual which can be obtained from https://tileroofing.org/industry/installation-guides/. Tiles were fastened to solid plywood with screws. Photographs of the tiles detailing test results are appended in Attachments F through K, according to Table 3. All photographs taken during testing will be retained for seven years and can be provided upon request.

TABLE 3: PHOTO ATTACHMENTS

Product	Attachment
Sierra Mission	F
European	G
Legendary Slate	H
Legendary Split Timber	I
New England Slate	J
Split Timber	K

Specification sheets for each of the tested products are appended in Attachment L.

Legendary Split Timber tiles met the pass criteria for Class 4 impacts. All other tiles met the pass criteria for Class 3 impacts. Some tiles met the pass criteria for Class 4 impacts at certain locations, but not all impact locations. All locations that did not pass Class 4 impact requirements successfully met or exceeded the pass criteria for Class 3 impacts.

Conclusions

1. All products listed in Table 1 were subjected to 1-3/4 and/or 2-inch-diameter ice balls, propelled at velocities consistent with free-fall speeds of similar size hail, developing impact kinetic energies in substantial conformance with ANSI/FM 4473.

2. Legendary Split Timber profile tiles successfully met the Class 4 requirements set forth in the *ANSI/FM 4473, January 2011, Test Standard for Impact Resistance Testing of Rigid Roofing Materials by Impacting with Freezer Ice Balls.*

3. Legendary Slate, Sierra Mission, European, New England Slate, and Split Timber profile tiles successfully met the Class 3 requirements set forth in the *ANSI/FM 4473, January 2011, Test Standard for Impact Resistance Testing of Rigid Roofing Materials by Impacting with Freezer Ice Balls.*

Respectfully submitted,

HAAG RESEARCH & TESTING, LLC

Steven R. Smith, P.E.
Texas License 107752
Director Research & Testing

Nov 11, 2024

Haag Research & Testing Co.
CA F-20657
Expires: 02/28/2025

Allen Swan
Senior Laboratory Technician

Nov 11, 2024

SRS/AWS:af

ATTACHMENTS: This report is complete only when all attachments are included.

Attachment A – IAS Certificate and Scope of Accreditation

Attachment B – ISO-ILAC-IAF Communiqué

Attachment C – Equipment List

Attachment D – Ice Ball Impact Summary

Attachment E – Bartile Installation Guide

Attachments F through K – Testing Photographs

Attachment L – Product Specification Sheets

Attachments

Attachment A

CERTIFICATE OF ACCREDITATION

This is to attest that

HAAG RESEARCH & TESTING, LLC

1410 LAKESIDE PARKWAY, SUITE 100
FLOWER MOUND, TEXAS 75028, U.S.A.

Testing Laboratory TL-656

has met the requirements of AC89, *IAS Accreditation Criteria for Testing Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories.* This organization is accredited to provide the services specified in the scope of accreditation.

Effective Date September 11, 2023

President

Visit www.iasonline.org for current accreditation information.

SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | www.iasonline.org

HAAG RESEARCH & TESTING, LLC

www.haagresearchtesting.com

Contact Name Steven R. Smith **Contact Phone** +1-214-614-6500

Accredited to ISO/IEC 17025:2017 *Effective Date September 11, 2023*

Physical	
ANSI FM 4473	Impact resistance testing rigid roofing materials by impacting with freezer ice balls
ANSI/FM 4478	American National Standard for Roof Mounted Rigid Photovoltaic Modules (Appendix E – Determining the Susceptibility to Hail Damage of Rigid Photovoltaic Modules only)
ASTM D228	Standard Test Methods for Sampling, Testing, and Analysis of Asphalt Roll Roofing, Cap Sheets, and Shingles Used in Roofing and Waterproofing, Tear Strength Only
ASTM D3161/D3161M	Standard test method for wind-resistance of steep slope roofing products (fan-induced method)
ASTM D4977	Standard Test Method for Granule Adhesion to Mineral-Surfaced Roofing by Abrasion
ASTM D7281	Standard test method for determining water migration resistance through roof membranes
HAAG Internal Procedure	HRT roofing sample desaturation
IEC 61215-2	Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test Procedures (MQT 17 – Hail Test only, excluding clause 4.17.5b)
UL 2218	Standard for impact resistance of prepared roof covering materials
Structural	
ASTM C518	Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

HAAG- HAAG Global

Attachment B

Joint ISO-ILAC-IAF Communique on the Management Systems Requirements of ISO/IEC 17025, General Requirements for the competence of testing and calibration laboratories

A laboratory's fulfillment of the requirements of ISO/IEC 17025 means the laboratory meets both the technical competence requirements and ***management system requirements*** *that are necessary for it to consistently deliver technically valid test results and calibrations. The* ***management system requirements*** *in ISO/IEC 17025 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001.*

ISO Acting Secretary General	ILAC Chair	IAF Chair

April 2017

Attachment C

Table C-1. Impact Testing Equipment List

HAAG ASSET TAG	EQUIPMENT	MANUFACTURER	MODEL	SERIAL NO.
3753	Ice Ball Launcher	Haag Engineering Co.	IBL-7	99.001.4.00
3013	Chronograph	Shooting Chrony Inc.	Beta	NA
4999	Digital Level	Digi-Pas	DWL-200	S12E18522
6999	Freezer Temperature Control	Johnson Controls	A419	NA
3771	Thermometer	ACU-RITE	MAT 252015D	00592W2
3809	Thermometer Wireless Sensor	ACU-RITE	MAT 252015D	00592TX
3759	Precision Scale	A&D Company	FX3000i	15706278

Attachment D

TABLE D.1: ICE BALL IMPACT DATA

Impact	Location	Diameter (in)	Mass (lbs)	Speed (fps)	KE (ft·lbf)
Sierra Mission					
1	Water Course	1-3/4	0.0957	98.80	14.52
1A	Water Course	1-3/4	0.0970	96.54	14.05
2	Butt Edge	1-3/4	0.0955	97.05	14.04
2A	Butt Edge	1-3/4	0.1003	96.32	14.46
3	Overlap	1-3/4	0.0969	98.60	14.64
3A	Overlap	1-3/4	0.0945	98.69	14.31
4B	Corner	1-3/4	0.0955	97.20	14.02
4C	Corner	1-3/4	0.0954	97.28	14.03
European					
1	Water Course	1-3/4	0.0978	98.17	14.65
1A	Water Course	1-3/4	0.0969	98.15	14.51
2	Butt Edge	2	0.1455	103.20	24.08
2A	Butt Edge	2	0.1417	103.40	23.55
2B	Butt Edge	2	0.1440	103.50	23.98
2C	Butt Edge	2	0.1428	103.70	23.87
3	Overlap	1-3/4	0.0941	97.85	14.00
3A	Overlap	1-3/4	0.0914	98.26	13.72
4	Corner	2	0.1420	103.85	23.80
4A	Corner	2	0.1408	104.50	23.90
Legendary Slate					
1	Unsupported Field	2	0.1442	103.00	23.78
1A	Unsupported Field	2	0.1425	103.80	23.86
2	Butt Edge	2	0.1458	102.80	23.95
2A	Butt Edge	2	0.1453	102.90	23.91
3	Overlap	2	0.1432	103.50	23.84
3A	Overlap	2	0.1424	103.70	23.80
4	Corner	1-3/4	0.0977	97.69	14.49
4A	Corner	1-3/4	0.0975	96.87	14.22
4A	Corner	2	0.1445	103.00	23.83

TABLE D.2: ICE BALL IMPACT DATA

Impact	Location	Diameter (in)	Mass (lbs)	Speed (fps)	KE (ft·lbf)
Legendary Split Timber					
1	Unsupported Field	2	0.1457	102.90	23.98
1A	Unsupported Field	2	0.1485	102.10	24.06
2	Butt Edge	2	0.1435	103.90	24.08
2A	Butt Edge	2	0.1460	104.00	24.54
3	Overlap	2	0.1428	103.60	23.82
3A	Overlap	2	0.1440	103.70	24.07
4	Corner	2	0.1445	102.90	23.78
4A	Corner	2	0.1445	103.00	23.83
New England Slate					
1	Unsupported Field	1-3/4	0.0957	97.86	14.24
1A	Unsupported Field	1-3/4	0.0974	97.67	14.44
2	Butt Edge	1-3/4	0.0968	96.67	14.06
2A	Butt Edge	1-3/4	0.0967	97.05	14.16
3	Overlap	1-3/4	0.0976	97.59	14.45
3A	Overlap	1-3/4	0.0982	96.48	14.21
4	Corner	1-3/4	0.0952	97.38	14.03
4A	Corner	1-3/4	0.0966	96.60	14.01
Split Timber					
1	Unsupported Field	1-3/4	0.0966	96.76	14.06
1A	Unsupported Field	1-3/4	0.0981	96.69	14.25
2	Butt Edge	1-3/4	0.0962	96.80	14.01
2A	Butt Edge	1-3/4	0.0955	97.14	14.01
3	Overlap	1-3/4	0.0972	96.65	14.11
3A	Overlap	1-3/4	0.0987	96.90	14.40
4	Corner	1-3/4	0.0985	97.18	14.46
4A	Corner	1-3/4	0.0972	97.81	14.45

Attachment E

BARTILE®

ESTABLISHED 1942

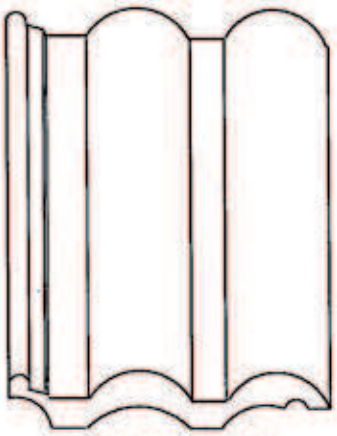
Installation Specifications and Guide

COMPLIES WITH 2006–IBC, 2006–IRC, 1997–UBC CODES
AND ICC EVALUATION REPORT ESR–2778 (JULY 2008)

WORLD'S FINEST ROOFING TILE

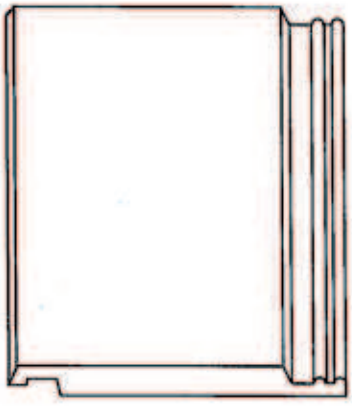
ENDURES THROUGH GENERATIONS

BARTILE STANDARD PROFILE OPTIONS

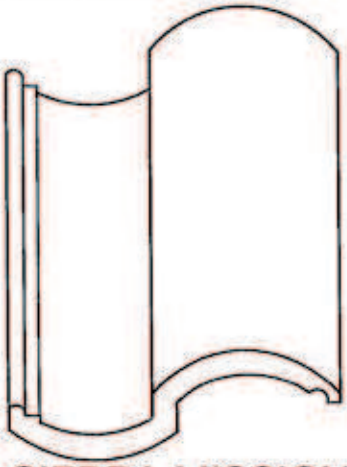


EUROPEAN

SPLIT-TIMBER



NEW ENGLAND SLATE



SIERRA MISSION

This Installation Aid is Intended to Inform the Installer of Various Options, and Factory Recommendations.
It is NOT INTENDED to Replace Local Codes and Practices, but Rather to Provide General Information.
Consult Your Local Building Inspector for Specific Information Relative to a Local Code Question.
The Installer Shall be Responsible for the Installation and Adhearence to the Code Requirements.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

IMPORTANT NOTICE TO USER

This installation specification and guide has been produced to aid the specifier, owner/installer, and roofer in the installation of BARTILE products. Every effort has been made herein to adhere to general code requirements. However, it must be explicitly understood by the user that it is his responsibility to understand and comply with the "then current" building codes, local jurisdiction requirements and climatic conditions applicable to this project.

Within these pages are various alternative methods for the installation of BARTILE. The installer must choose which method is practical for each installation as he must be responsible for the performance of the system as a whole. Local practices vary and it should be understood that this booklet should not be interpreted to be the only "proper' way to install a BARTILE roof, but in fact contains various proven installation techniques. BARTILE does not certify nor warrant any particular installation method or process. The BARTILE product warranty is limited to the furnishing of replacement BARTILE shingles for those which in the course of normal use, decompose or wear out during a period of 75 years. Breakage, color variance, and acts of God and normal weathering are excluded. See the text of the printed BARTILE limited 75 year warranty for details.

This Installation Aid is Intended to Inform the Installer of Various Options, and Factory Recommendations. It is NOT INTENDED to Replace Local Codes and Practices, but Rather to Provide General Information. Consult Your Local Building Inspector for Specific Information Relative to a Local Code Question. The Installer Shall be Responsible for the Installation and Adhearence to the Code Requirements.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

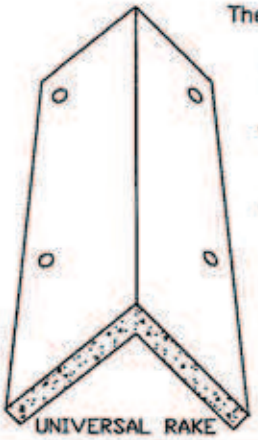
BARTILE ®

ESTABLISHED 1942

Installation Specifications and Guide

STANDARD TRIM UNITS

UNIVERSAL RAKE

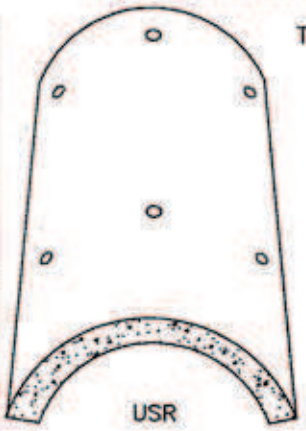


UNIVERSAL RAKE

The (UR) is the Standard Gable Finish for SPLIT–TIMBER, NEW ENGLAND SLATE, and EUROPEAN Profiles. Rakes Fasten on Either Side With Two Nails. The First and Last (UR) Must be Cut to Fit. Butt the Small End to Match Up With the Top Edge of Each Course of Field Tile.

NOTES:
Use 16d Galv. Nails.
Lap Rakes Approx. 3 in.
Tab Laps For High Wind (Over 80 MPH)

UNIVERSAL SPANISH RIDGE/RAKE/HIP

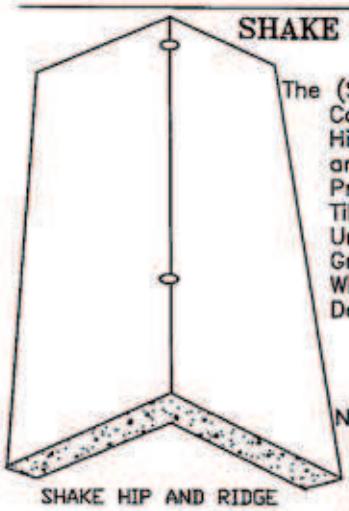


USR

The (USR) is the Standard Gable and Ridge Finish for SIERRA MISSION Profile, and Ridge Finish for European Profile. Nail Through Top Holes When Used as a Ridge, and Through Side Holes When Used as a Rake. The First and Last Rake Must be Cut to Fit.

NOTES:
Use 16d Galv. Nails.
Lap Trim Approx 3 in.
Tab Laps For High Wind (Over 80 MPH)

SHAKE HIP AND RIDGE

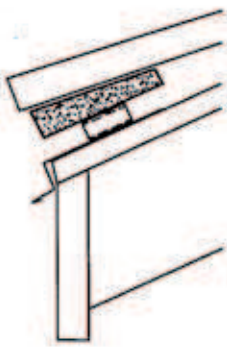


SHAKE HIP AND RIDGE

The (SH) is Normally Used to Cover Both Ridges and Hips, for SPLIT–TIMBER and NEW ENGLAND SLATE Profiles. The Cut Field Tile, Beneath the Hip Units, May either be Grouted, or be Covered With Flashing Tape if Desired. Use two Nails.

NOTES:
Use 16d Galv. Nails.
Lap Trim Approx. 3 in.
Tab Laps For High Wind (Over 80 MPH)

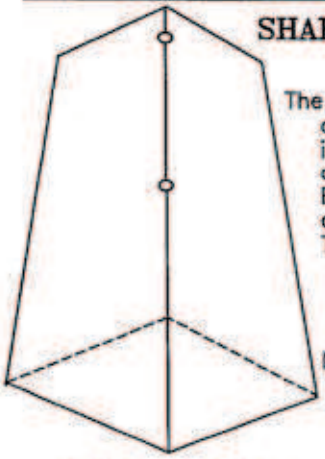
EAVE TILE RISER



The Eave Tile Riser is the Premium Option to Properly Elevate the 1st (Starter) Course of any of Our Flat Tile Profiles. It Includes 12" of Ventilated Batten to Support the Tile. Each Tile Riser Covers 12" of Eave. Eave Tile Risers are made in Colors and Styles to Match the Field Tile and Trim Tile Ordered.

NOTES:
Use Two 8d Galv. Nails, Fastened Through Tile Riser and Ventilated Batten to Roof Sheathing.

SHAKE HIP STARTER

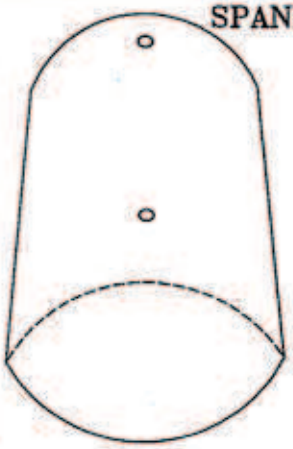


SHAKE HIP STARTER

The (SS) is Normally Used as the First Hip Unit in Each Hip Unit Line, at the Eave Edge. The Bull Nose Design Provides a Desirable Finish to The Hip Trim Unit Line.

NOTES:
Use 16d Galv. Nails.
Lap Trim Approx. 3 in.
Tab Laps For High Wind (Over 80 MPH)

SPANISH OVAL HIP STARTER



UOS

The (UOS) is Designed to be Used as the First Hip Unit in Each Hip Line, at the Eave Edge Starting Point. The Bull Nose Design Provides a Desirable Finish to the Hip Trim Unit Line.

NOTES:
Use 16d Galv. Nails.
Lap Trim Approx. 3 in.
Tab Laps For High Wind (Over 80 MPH)

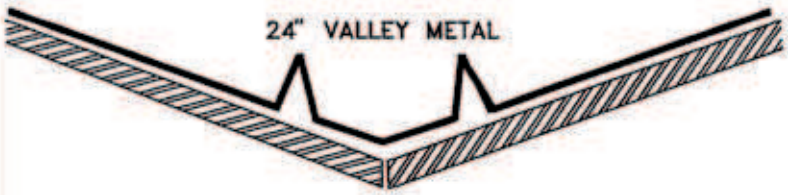
 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

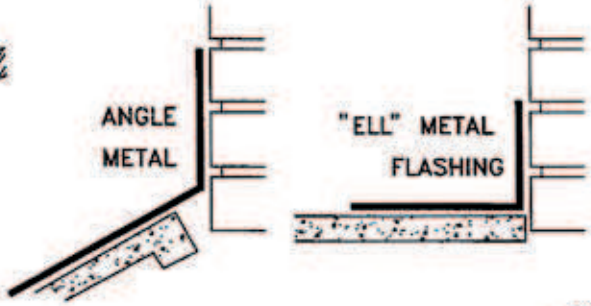
BARTILE

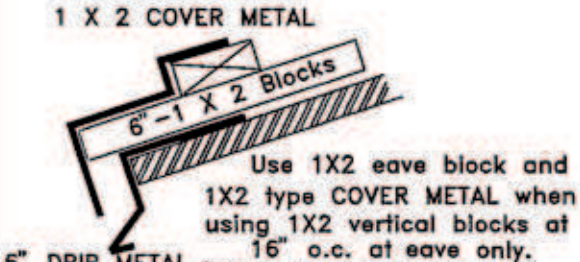
ESTABLISHED 1942

Installation Specifications and Guide

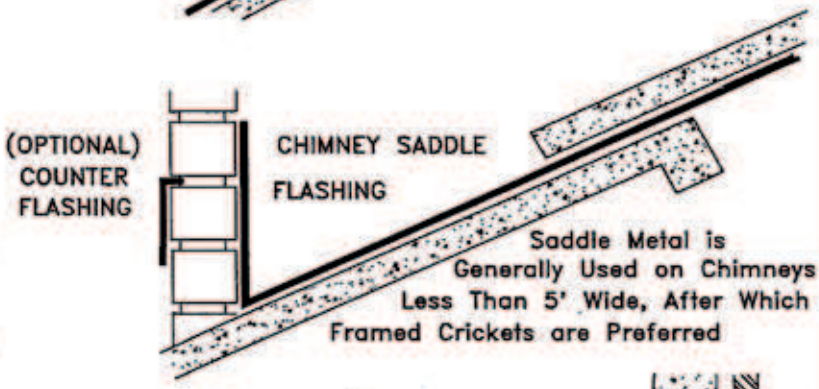
STANDARD BARTILE SHEET METAL PRODUCTS



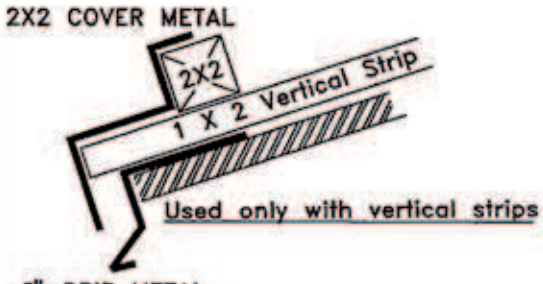


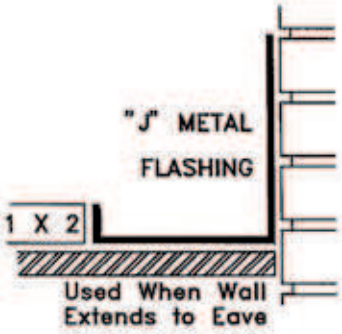


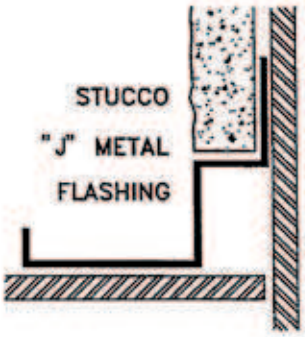
Use 1X2 eave block and 1X2 type COVER METAL when using 1X2 vertical blocks at 16" o.c. at eave only. (VENTILATED BATTENS MAY SUBSTITUTE FOR WOOD BLOCKS)

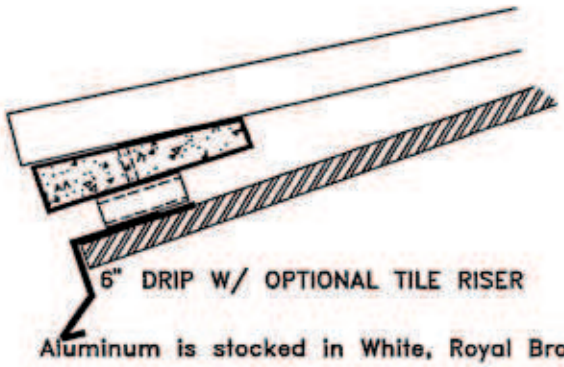


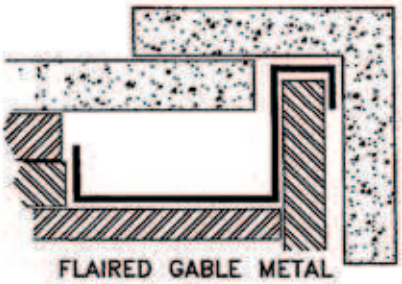
Saddle Metal is Generally Used on Chimneys Less Than 5' Wide, After Which Framed Crickets are Preferred



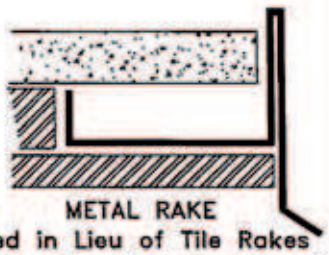








FLAIRED GABLE METAL (vertical strips shown)



METAL RAKE Used in Lieu of Tile Rakes (horizontal strip only shown)

Aluminum is stocked in White, Royal Brown, and Classic Cream. Lead is available in 2.5 lb. sheet.

The Standard Metal is Galvanized Iron. Optional Colored Metal is Readily Available, as Well as Copper. Aluminum is stocked in White, Musket Brown, Bronze, Charcoal, Pebblestone & Royal Brown. 2.5# Lead also Stocked. BARTILE also fabricates custon shapes for unique situations and special needs.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

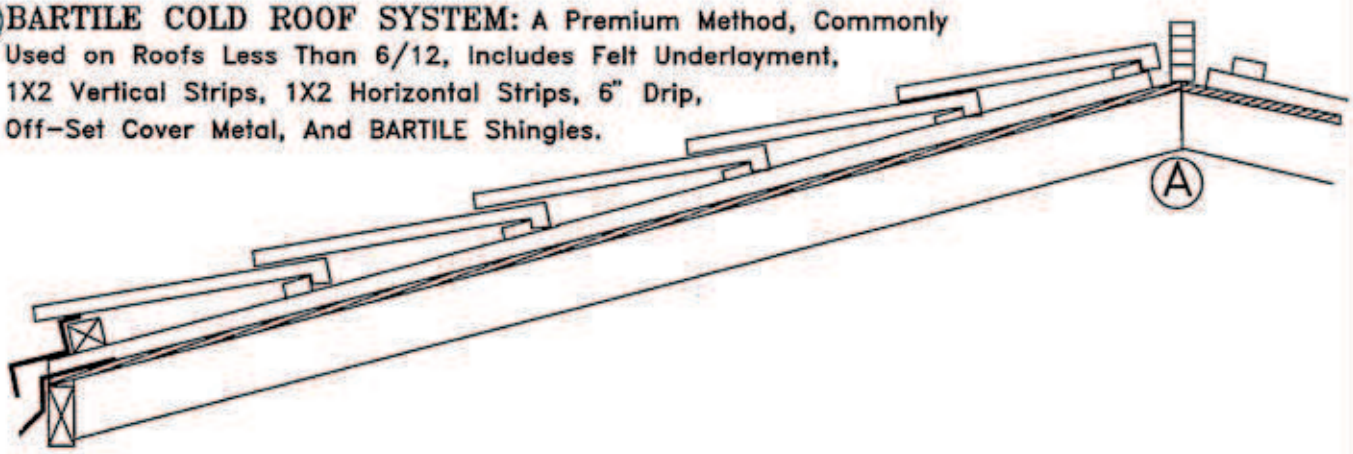
BARTILE®

ESTABLISHED 1942

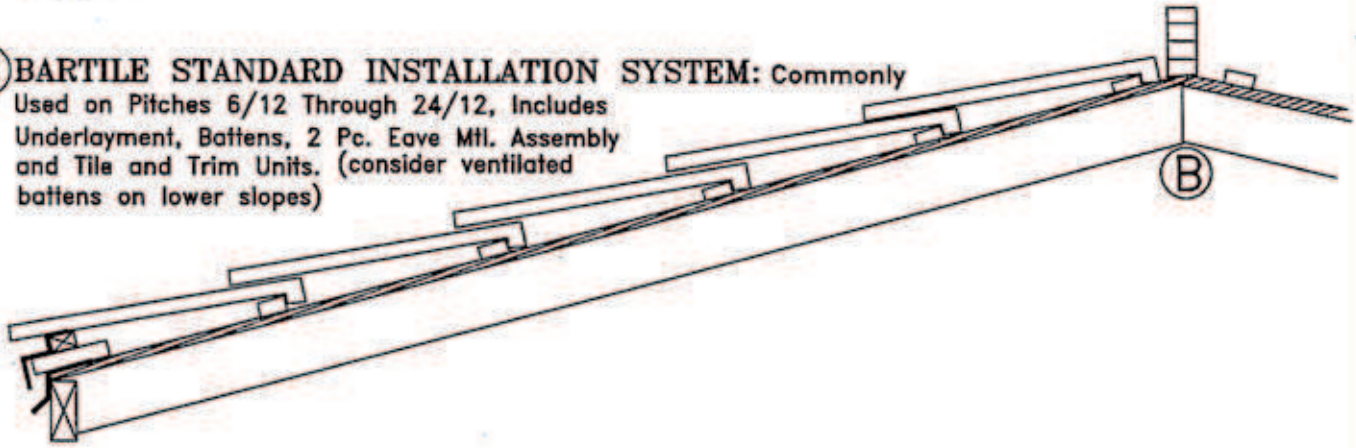
Installation Specifications and Guide

BASIC FIELD TILE INSTALLATION OPTIONS

(A) BARTILE COLD ROOF SYSTEM: A Premium Method, Commonly Used on Roofs Less Than 6/12, Includes Felt Underlayment, 1X2 Vertical Strips, 1X2 Horizontal Strips, 6" Drip, Off-Set Cover Metal, And BARTILE Shingles.

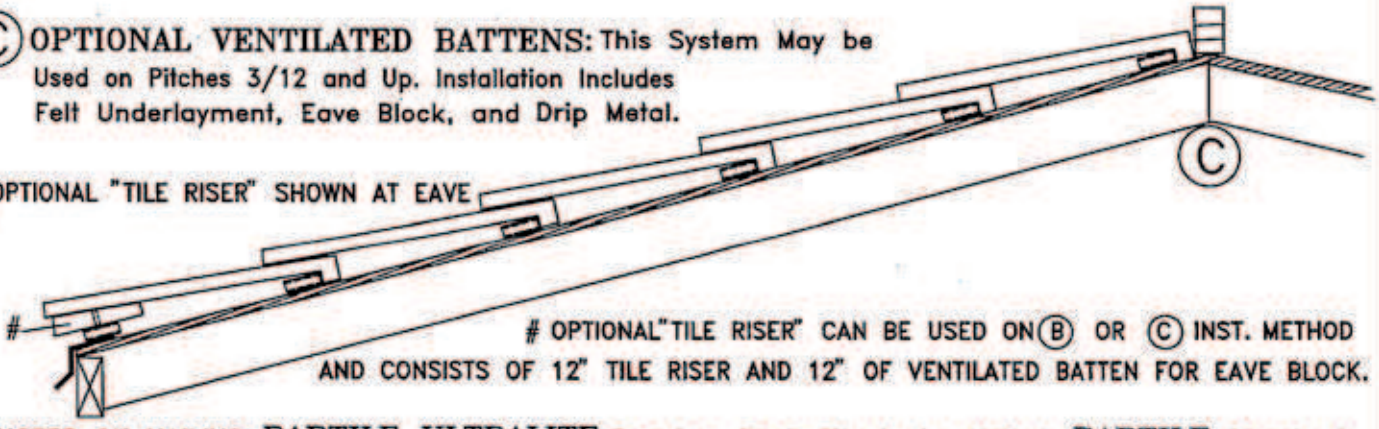


(B) BARTILE STANDARD INSTALLATION SYSTEM: Commonly Used on Pitches 6/12 Through 24/12, Includes Underlayment, Battens, 2 Pc. Eave Mtl. Assembly and Tile and Trim Units. (consider ventilated battens on lower slopes)



(C) OPTIONAL VENTILATED BATTENS: This System May be Used on Pitches 3/12 and Up. Installation Includes Felt Underlayment, Eave Block, and Drip Metal.

#OPTIONAL "TILE RISER" SHOWN AT EAVE



OPTIONAL "TILE RISER" CAN BE USED ON (B) OR (C) INST. METHOD AND CONSISTS OF 12" TILE RISER AND 12" OF VENTILATED BATTEN FOR EAVE BLOCK.

NOTES ON NAILING: BARTILE ULTRALITE Requires Each Tile to be Nailed. BARTILE Standard Wt. Requires (3 TILE) Periphery Nailing. (Includes Hips, Ridges, Rakes, and Eaves). On Pitches 2/12 To 5/12 (No Field Nailing Required), 6/12 To 9/12 (Nail 50%), 10/12 up (Nail each tile) The Nailing Requirements Under Severe Weather Conditions May Call For Additional Fastening.

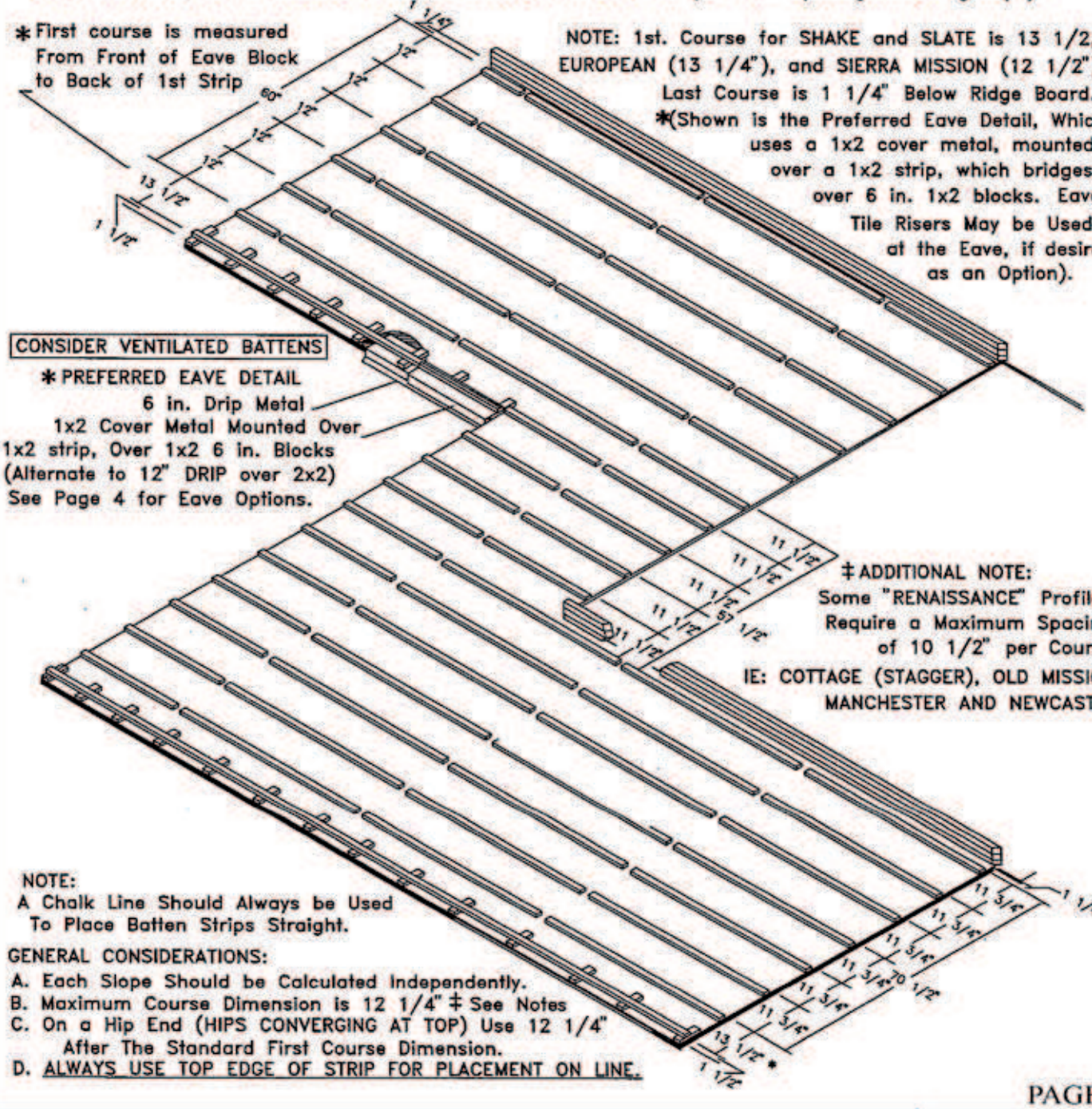
 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

BARTILE BATTEN LAYOUT

* 1. Begin With 6" 1x2 Eave Blocks (On 16" Centers), Eave Strip, Ridge Nailer, and 1st and Last Strip.
2. Measure Distance (in Inches) Between 1st and Last Batten, Then Divide by 12 (for 3" Headlap).
3. If the Resulting Number is not Even, ROUND UP, and Divide into the same total distance (in inches)
4. The Number Generated by This Formula is the Average Dimension Between Each Strip.(round to 1/8")
5. If Preferred, an Alternate SWING TAPE Method can be used. (use 12" Spacing on Swing Tape).

* First course is measured From Front of Eave Block to Back of 1st Strip

NOTE: 1st. Course for SHAKE and SLATE is 13 1/2, EUROPEAN (13 1/4"), and SIERRA MISSION (12 1/2") Last Course is 1 1/4" Below Ridge Board.
*(Shown is the Preferred Eave Detail, Which uses a 1x2 cover metal, mounted over a 1x2 strip, which bridges over 6 in. 1x2 blocks. Eave Tile Risers May be Used at the Eave, if desired as an Option).



CONSIDER VENTILATED BATTENS

* PREFERRED EAVE DETAIL
6 in. Drip Metal
1x2 Cover Metal Mounted Over 1x2 strip, Over 1x2 6 in. Blocks
(Alternate to 12" DRIP over 2x2)
See Page 4 for Eave Options.

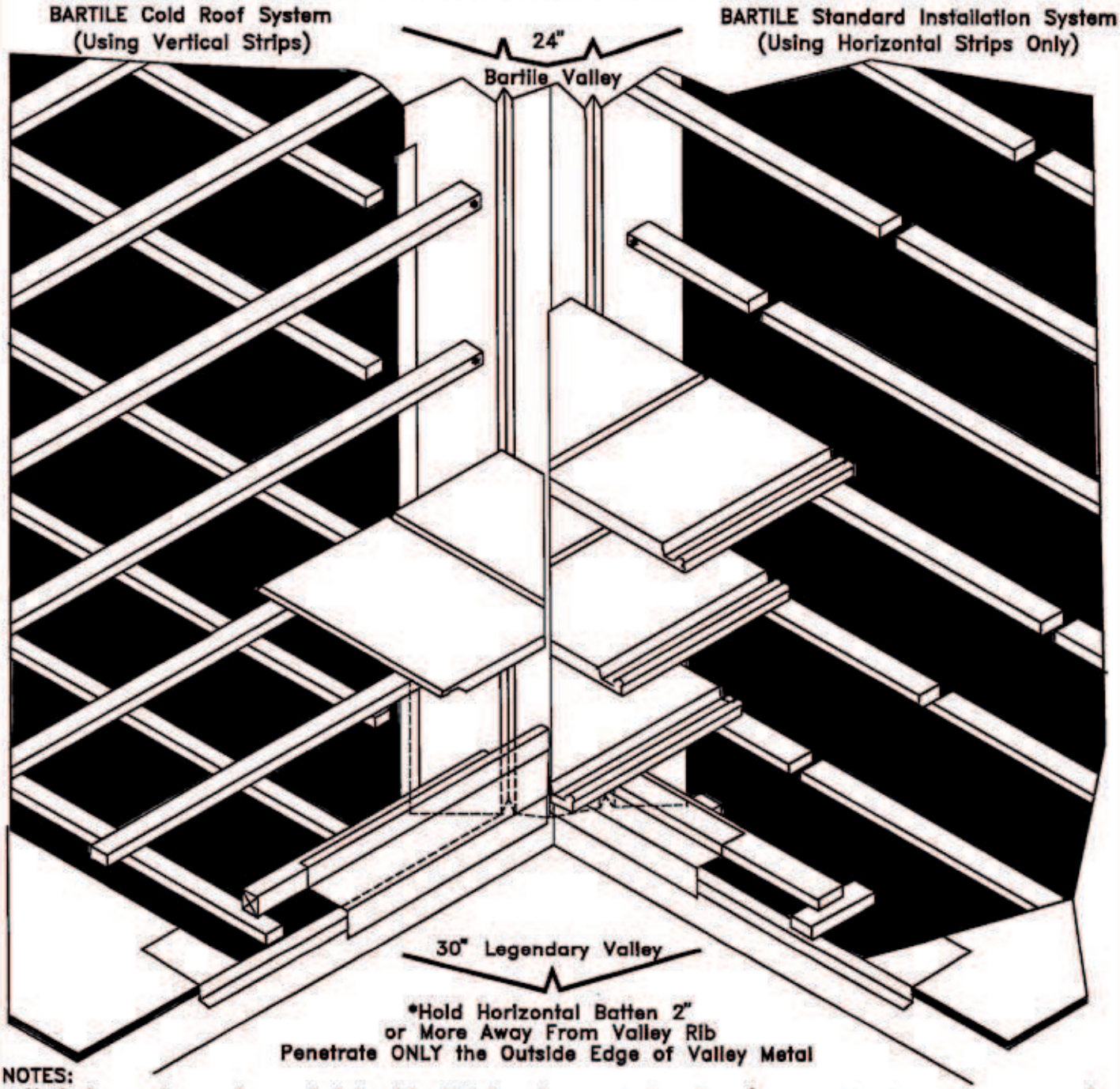
‡ ADDITIONAL NOTE:
Some "RENAISSANCE" Profiles Require a Maximum Spacing of 10 1/2" per Course
IE: COTTAGE (STAGGER), OLD MISSION MANCHESTER AND NEWCASTLE

NOTE:
A Chalk Line Should Always be Used To Place Batten Strips Straight.

GENERAL CONSIDERATIONS:
A. Each Slope Should be Calculated Independently.
B. Maximum Course Dimension is 12 1/4" ‡ See Notes
C. On a Hip End (HIPS CONVERGING AT TOP) Use 12 1/4" After The Standard First Course Dimension.
D. ALWAYS USE TOP EDGE OF STRIP FOR PLACEMENT ON LINE.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

VALLEY METAL AND INSTALLATION

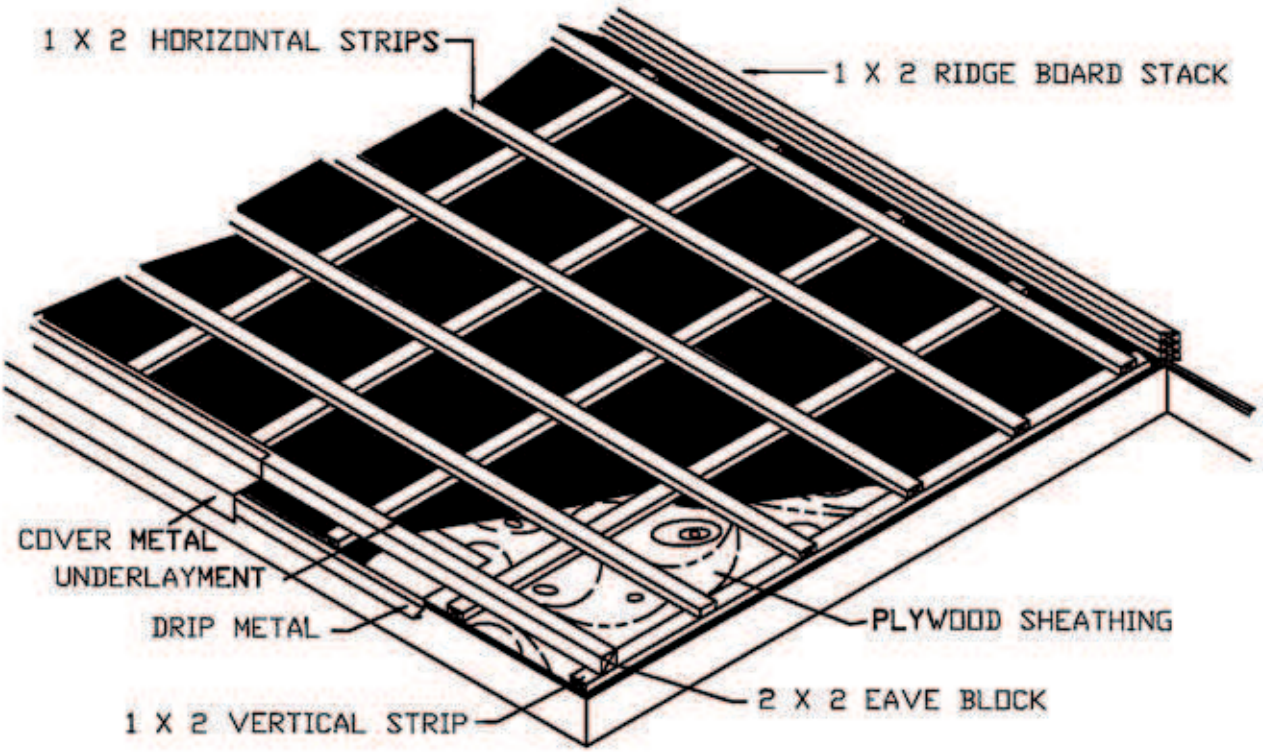


NOTES:

Underlayment may be sealed to drip Metal and woven at valley. (or run bleeder sheet at valley)
In ice and snow climates, valley metal should be set in mastic. Lap valley metal sections 6" min.
Use code approved underlayment, according to the climatic conditions applicable to the job.
Avoid penetrating valley metal while nailing tile. (use mastic instead) Avoid using small pieces.
BARTILE recommends a closed valley (as shown), but an open valley is acceptable. (where deamed appropriate). Do not block valley metal channel, nor drainage next to ribs in any way.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

BARTILE Exclusive Cold Roof System

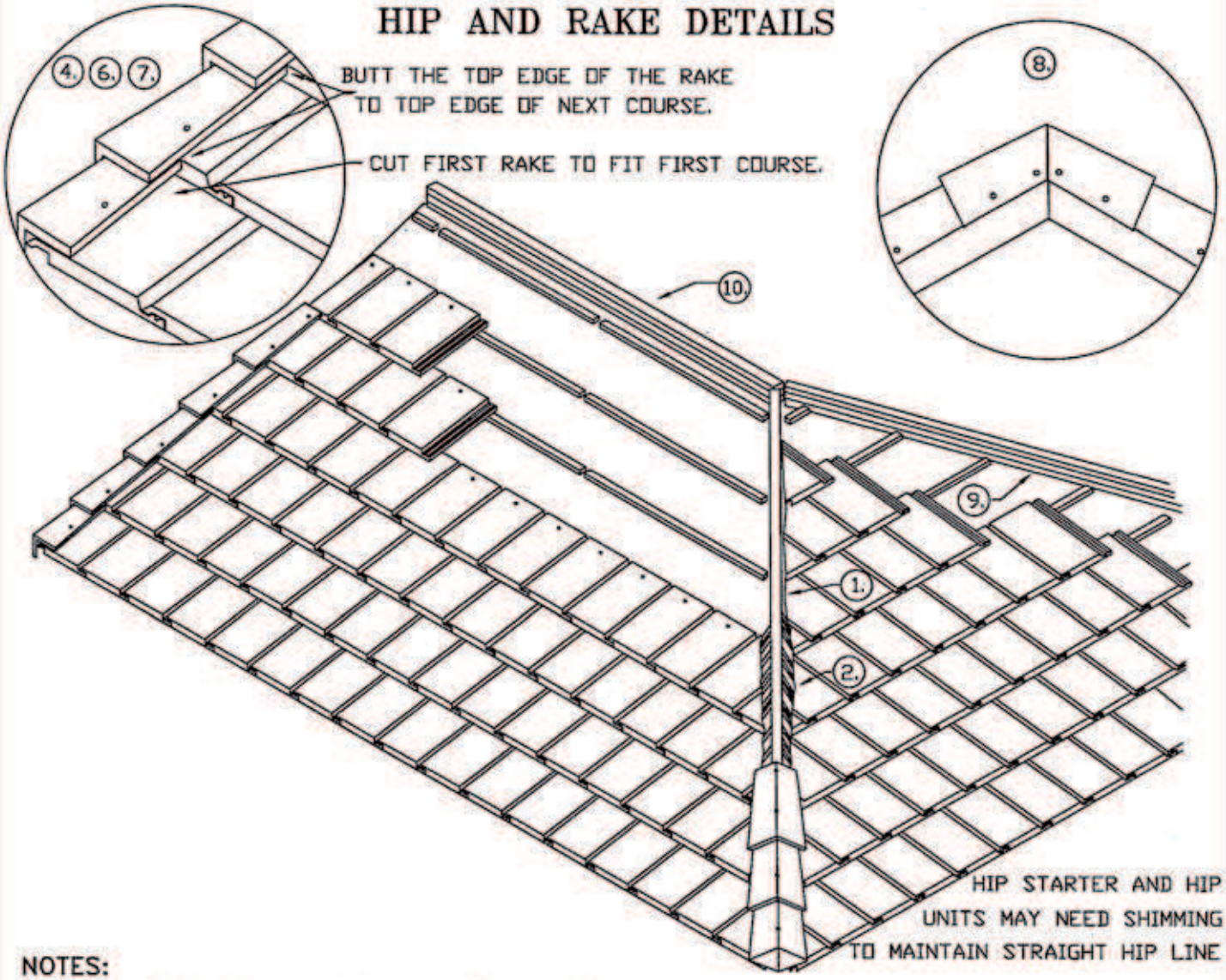


The BARTILE COLD ROOF SYSTEM Incorporates Both Vertical and Horizontal Strips, an Eave Cold Air Intake, and a Ridge (Warm Air) Exhaust. The Underlayment Area Stays Cooler in the Summer, and Reduces Ice Buildup at the Eave Area in the Winter by Disipating Attic Heat Below the Tile, and Exhausting it Through The Ridge Vent. The Tile Surface Therefore Remains Cooler, Which Reduces Snow Melt and Eave Ice Buildup Below the Heated Zone. The Vertical Strip System also Prevents Potential Underlayment Moisture From Collecting Behind the Horizontal Strips. The BARTILE COLD ROOF SYSTEM is Recommended for Slopes Under 6/12 and in Areas of Heavy Snow Buildup , and is Considered the Highest Functional Achievement in Tile Roofing.

NOTE The use of Ventilated Horizontal Battens will provide similar benefits. Use 1X2 Cover Mtl,6" blocks W/bridging 1X2 @ eave, not 2X2 as shown

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

HIP AND RAKE DETAILS



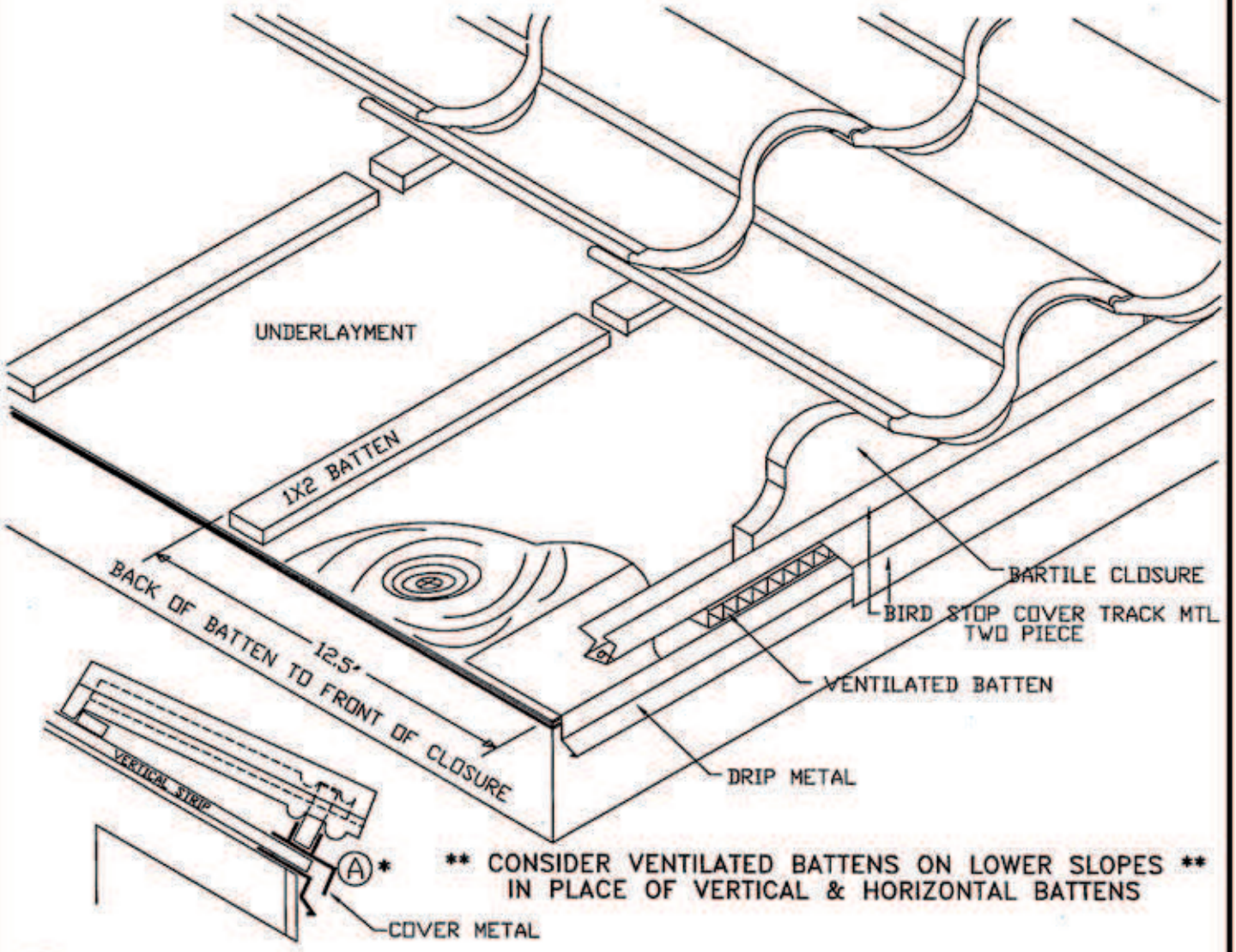
NOTES:

1. The Field Tile Must be Cut, (Mitered) to Fit Against the Hip Nailer Board.
2. Hip Cuts may be Grouted (Shown), or Covered With Flashing Tape, if Desired.
3. Hip Units are Nailed With Two 16d Galv. Nails. (One Nail is Exposed)
4. For Flat Tile, Every Other Course Must Start With a Cut Half Tile. (Half Bond)
5. Universal Rake Units Cover Either Side, Nail Through Either Side. (Not Top Hole)
6. First Rake Must be Cut to Fit the First Course of Tile. (Drill as Required)
7. Each Rake Covers One Course of Tile. Butt into Top Edge of Next Course.
8. The Last Rake Units at Crown Must be Mitered Together. (Drill as Required)
9. Hip Nailer Boards are Usually a Stack of 1x2 Strips 4 or 5 High, as Required.
10. Ridge Nailer Boards are Usually 3 to 5 Strips High, as Required.

****EUROPEAN AND SIERRA MISSION TILE ARE LAID STRAIGHT BOND, NOT OFF-SET.****
(Lay 5 Tile Wide, From Eave to Ridge, Verify Straight, Then Repeat)

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

SIERRA MISSION PROFILE EAVE DETAIL



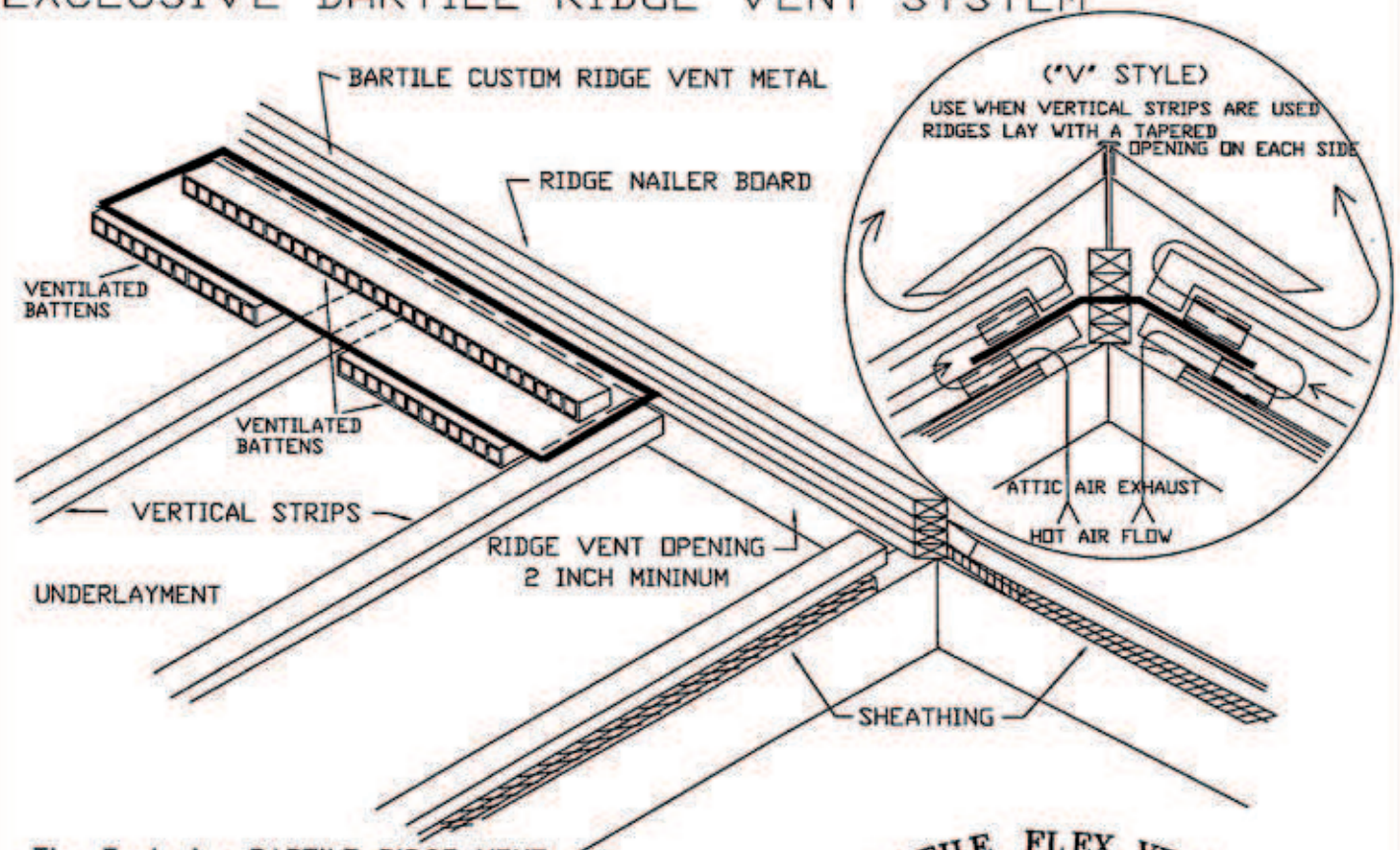
** CONSIDER VENTILATED BATTENS ON LOWER SLOPES **
IN PLACE OF VERTICAL & HORIZONTAL BATTENS

Ⓐ * If 1x2 Vertical Strips are Used, a Cover Track Metal (A) is Installed, at the Eave, on Top of the Verticals, With a Space as Shown.

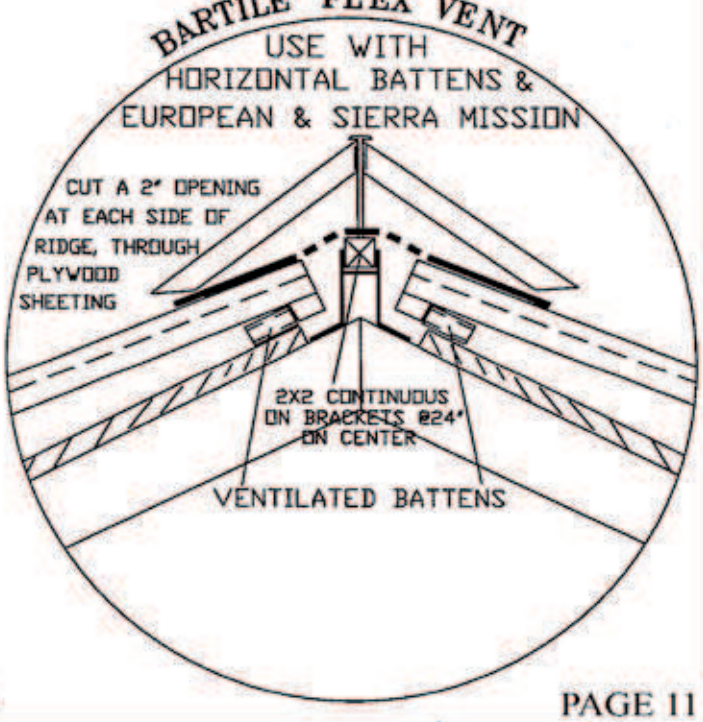
NOTES:
The Eave Closure Will Lock Between The Tile and Closure Track.
On Steeper Pitches, Cement the Closure into the Track With Adhesive.
DO NOT Block the Valley Drainage with the Closure Assembly, Leave Open.
The Closures are Furnished to Match The Tile Color, The Track is Galvanized or Optional Colored Metal, Copper, etc to Match Eave Metal.
* OLD MISSION Profile Requires 11" 1st Course With Balance at 10.5" Maximum.
SIERRA MISSION, OLD MISSION & EUROPEAN are Laid in Straight Vertical Rows Lay 5 Tile Wide, From Eave to Ridge, Verify Straight, Then Repeat

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

EXCLUSIVE BARTILE RIDGE VENT SYSTEM



The Exclusive BARTILE RIDGE VENT Consists of a 2" Slot or Opening at the Ridge, Covered by a Metal Shield, Which Prevents Intrusion by Water or Blowing Snow.



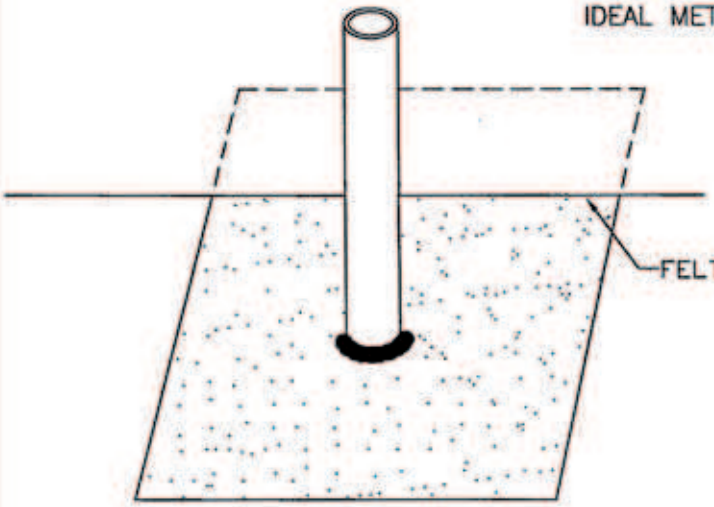
BARTILE COLD ROOF SYSTEM

Escaping Warm Attic Air Rises Naturally and Draws Cooler Air Through Soffit Vents into the Attic. The Air Moving Through the Air Space Below the Tile, in a Venturi Effect, Draws Cool Air Through the Eave Intake and Cools the Tile and Underlayment. This Reduces Ice Buildup in Winter and Keeps the Attic Cooler in the Summertime. The Process is Self-Initiating and Self Sustaining and Needs no Power. An Optional Screen May Be Secured Under the Vertical Strips and Ridge Nailer. Do not Block Ridge Openings.

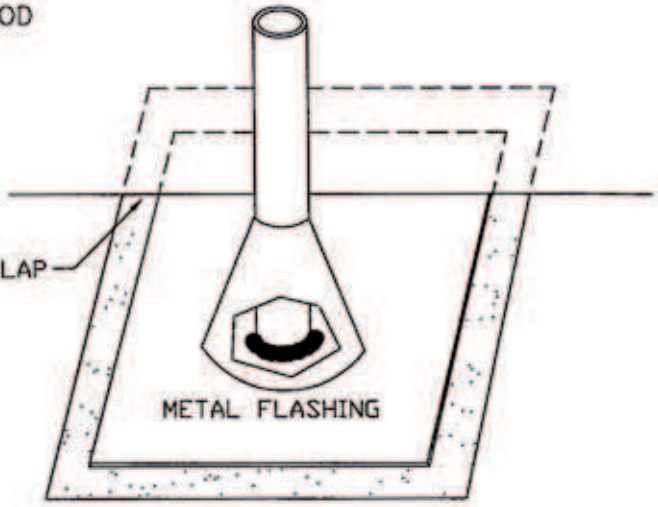
 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

PIPE FLASHING DETAILS

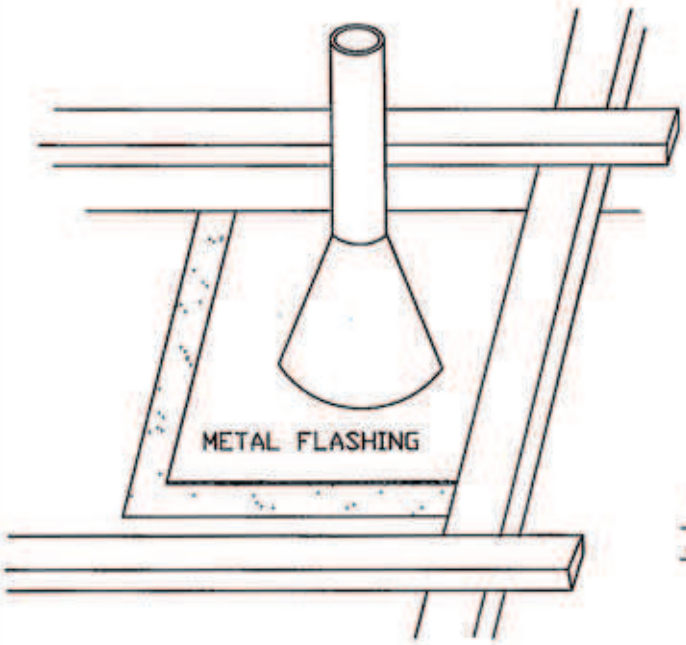
IDEAL METHOD



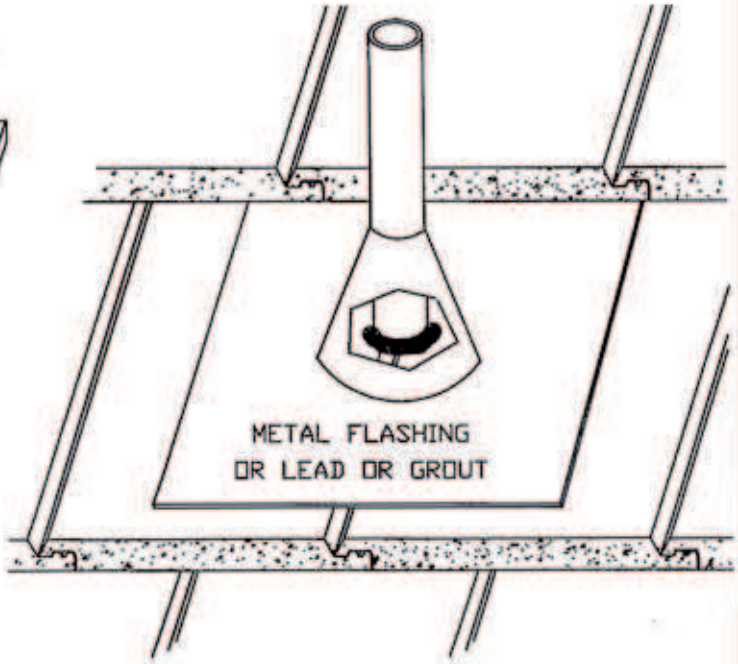
1. Hammer–fit a Felt Gasket to Pipe. Seal Gasket to Pipe With Mastic.



2. (Optional) Install a Base Flashing Lap Under Horizontal Felt Lap, and Seal.



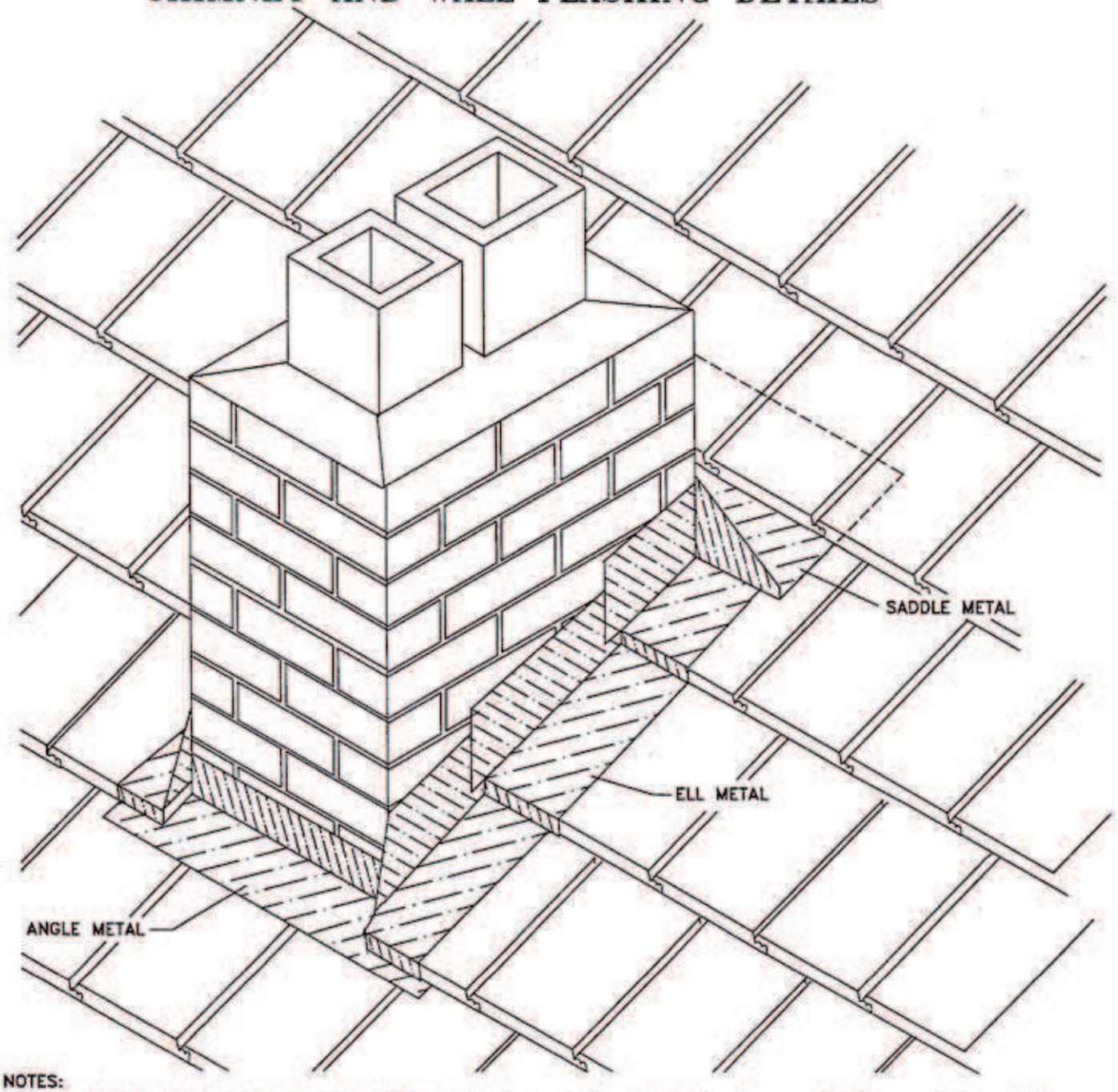
3. Set Vertical and Horizontal Battens as per Normal Layout for Tile. Pipe May Interrupt Batten, if so Shim or Block as Needed.



4. Cut Tile to Fit Around Pipe; Mastic the Space Around Pipe; Then Set the Pipe Flashing in a Bead of Mastic. Be Certain to Lap Flashing With Tile. Use Lead Flashing or Grout for Round Tile.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

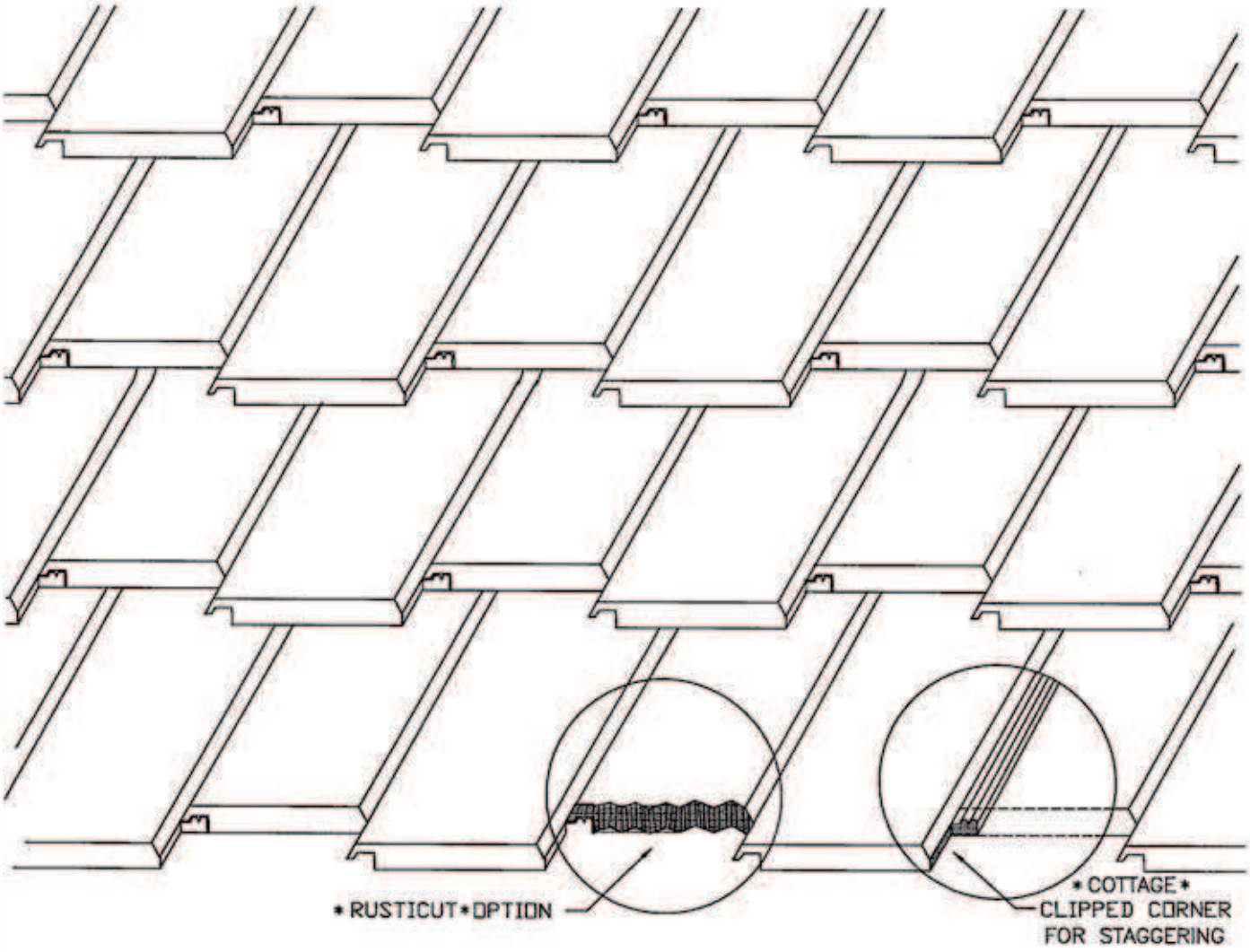
CHIMNEY AND WALL FLASHING DETAILS



NOTES:
Roll the Underlayment up the wall about 6" on all sides. Seal water tight. Leave a 2"–4" space between Battens and walls, for drainage. Install metal as shown, attaching only to wall, and seal. Counterflashing may be used. When wall terminates at or near eave, "J" METAL may be the preferred side wall flashing. Cut the sidewall tile within 1/2" of wall and seal with mastic. The EUROPEAN and SIERRA MISSION Profiles may require lead or grout flashings at the tile level, with metal underneath the tile. It is recommended that the "L" METAL be cut into 16" lengths, and the bottom 1" be cut and bent to cover the bottom edge of the tile.(as shown) Note how ANGLE METAL extends 3" beyond wall and SADDLE METAL extends 6" beyond wall on each side, then is bent over at flange.
See page 4 for metal details and options.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

STAGGERED INSTALLATION DETAILS (COTTAGE and RUSTICUT OPTIONS)



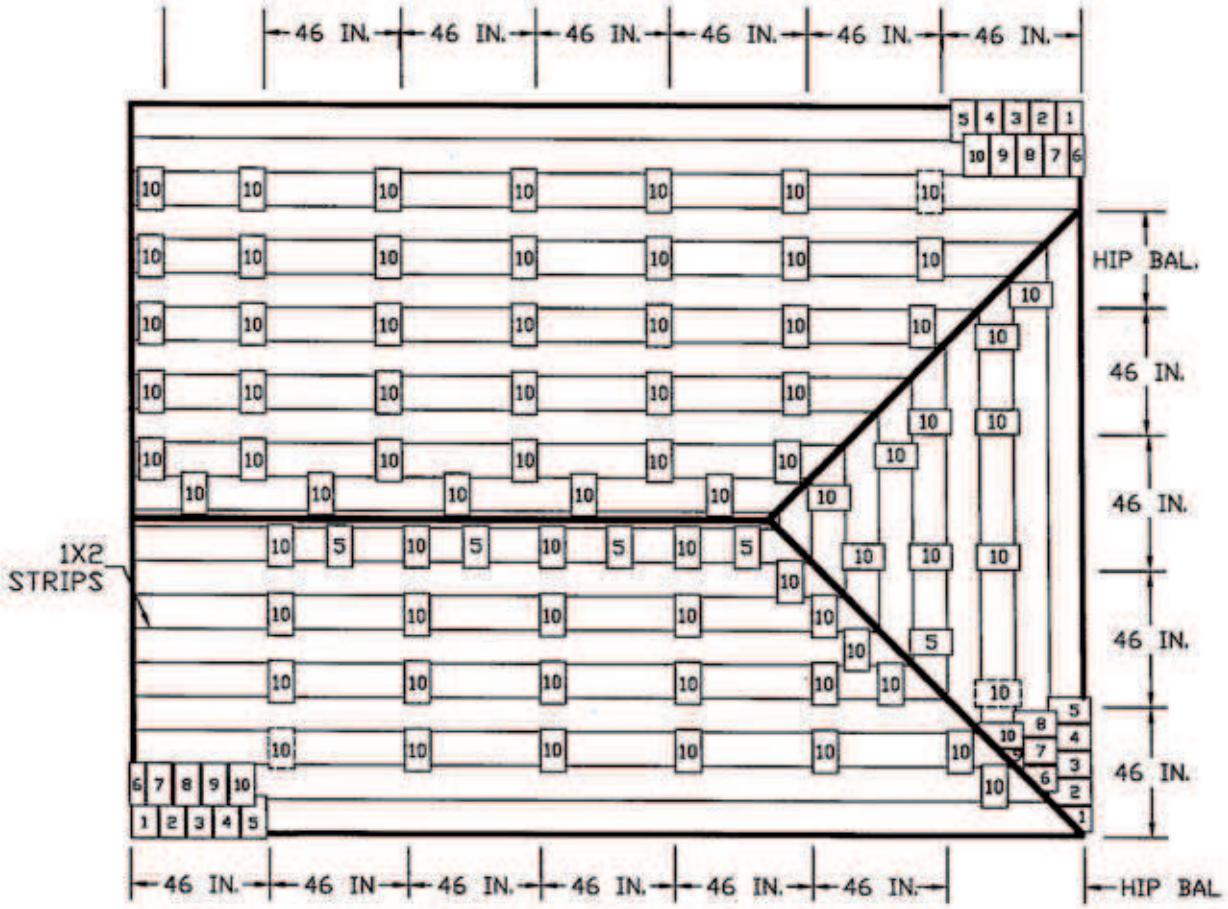
BARTILE "OLD WORLD VINTAGE", "SPLIT–TIMBER", & "NEW ENGLAND SLATE" are Available With Modifications of Holes and Corners (COTTAGE) Option, and an Irregular Edge (RUSTICUT) or "RUFF–CUT" Option. These Options Simplify the Installation for a Uniquely Beautiful Roof.

NOTES:

A. For COTTAGE Installation, 1st Batten is 12.5", Balance are 10.5" Maximum.
B. Every Other Field Tile is Raised 1.75" Above the Batten and Nailed to the Batten. (Unnotched)
C. The COTTAGE SERIES Tile are Ready to Install Without Further Modification.
D. The COTTAGE SERIES Requires 12% addl. Tile & Horiz. Battens & Adds Aprox. 12% Weight.
E. The RUSTICUT Option Does Not Alter the Spacing or Weight.
F. The RENAISSANCE SERIES Offers a Virtually Unlimited Range of Colors, Blends, and Textures.
G. Trim Units, Underlayment, and Metal are Generally Unaffected by Staggering of Field Tile.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

RECOMMENDED ROOF STOCKING LAYOUT



SAFETY* *NOTICE BARTILE IS SHIPPED STRETCH WRAPPED, ON SINGLE SIDED PALLETS * NEVER STAND ON ELEVATED SHIPPING PALLET * NEVER LIFT PALLET ABOVE PEOPLE * NEVER UNLOAD A SUSPENDED PALLET * ALWAYS UNLOAD OUTSIDE AND TOP ROWS FIRST, KEEP PALLET LOAD BALANCED AND IN CENTER * NEVER STACK TILE IN AN UNSECURE MANNER ON THE ROOF * THE CUSTOMER MUST ACCEPT RESPONSIBILITY FOR THE SAFE HANDLING OF PALLETS AND TILE

4. Illustrated, is the SPLIT–TIMBER/NEW ENGLAND SLATE Stacking Procedure, the

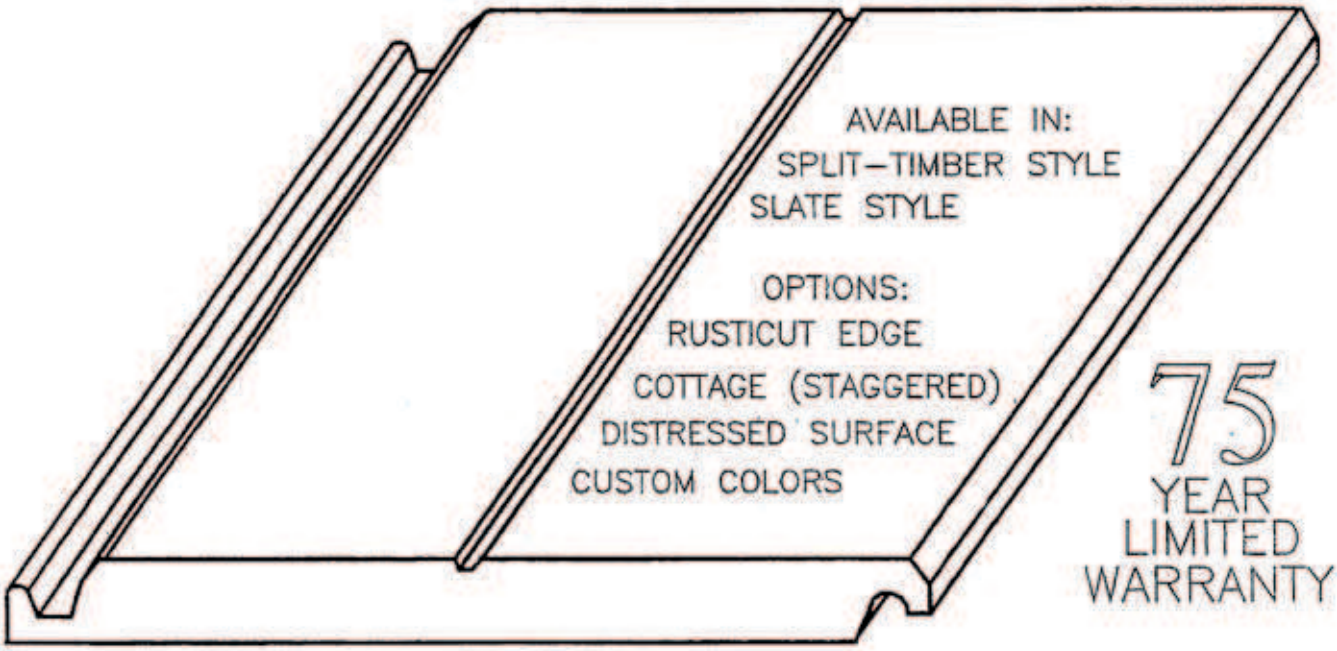
NOTES ON STACKING BARTILE:

1. The Tile are Generally Stocked in Stacks of 10 Pieces per Stack.
2. Each Stack of 10 Tile Will Cover Two Courses, Five Tile Wide.
3. Skipping the First Strip, Place Each (10 Tile) Stack on Every Two Strips.
4. Illustrated, is the "SPLIT–TIMBER"/"NEW ENGLAND SLATE" Stacking Procedure, the SIERRA MISSION and EUROPEAN Designs Lay in the Opposite Direction.
5. Stack Extra Tile at Hips, Valleys, and Rakes to Allow For Cut Tile and Waste.
6. Place the Stacks in Vertical Rows, Unless Interrupted by Pipes, Hips and Valleys.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

U.S.PATENT NO. 6,233,895

The Strongest–Most Durable –Easiest to Install Flat Concrete Roof Tile on the Market. Excedes CODE Requirements by a Wide Margin



LEGENDARY PROFILE

A Beautiful Roof Tile, so INNOVATIVE, so SIMPLE and INEXPENSIVE to Install, That Ordinary Roofing Products Pale by Comparison.

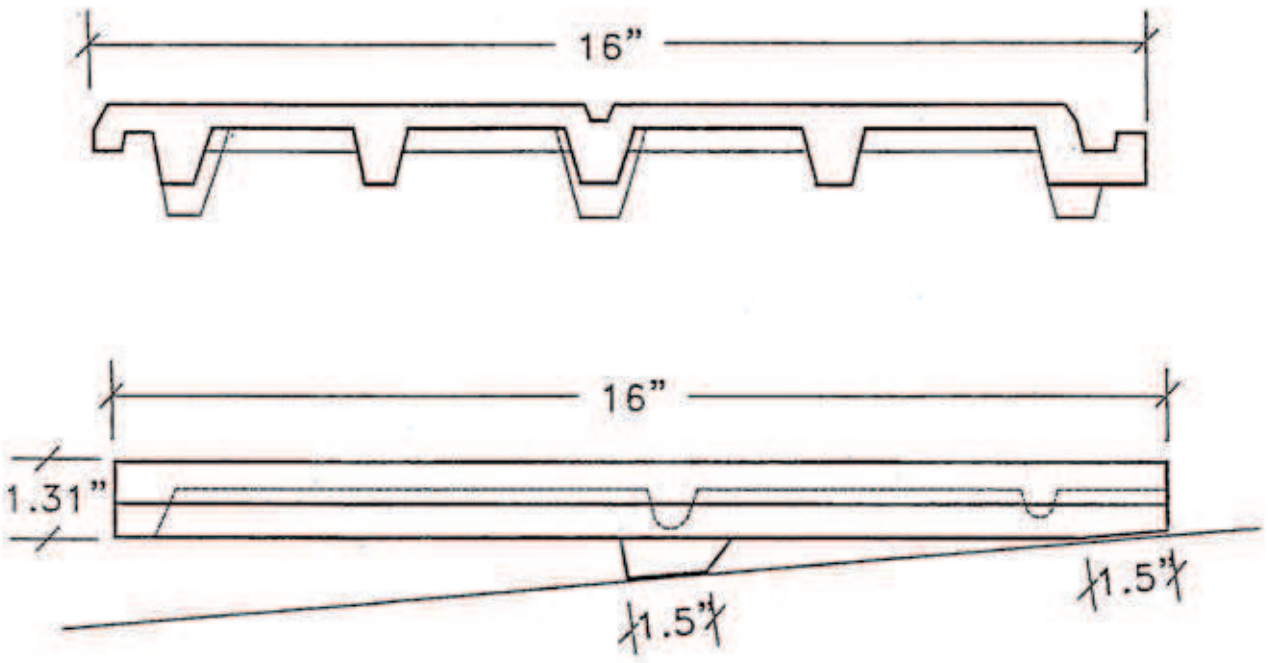
IDEAL FOR CHURCHES, HOTELS, RESTAURANTS, SHOPPING CENTERS, SKI RESORTS, APARTMENTS, COMMERCIAL BUILDINGS CONDOMINIUMS, HOMES, SEVERE CLIMATE INSTALLATIONS, ETC

APPROX. INSTALLED WT.:ULTRALITE 7.5 LBS/SQ.FT.–STD WT.10.5 LBS/SQ.FT.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

LEGENDARY ULTIMATE ROOF TILE

The HIGH–STRENGTH Tile With a COLD ROOF SYSTEM Built in.



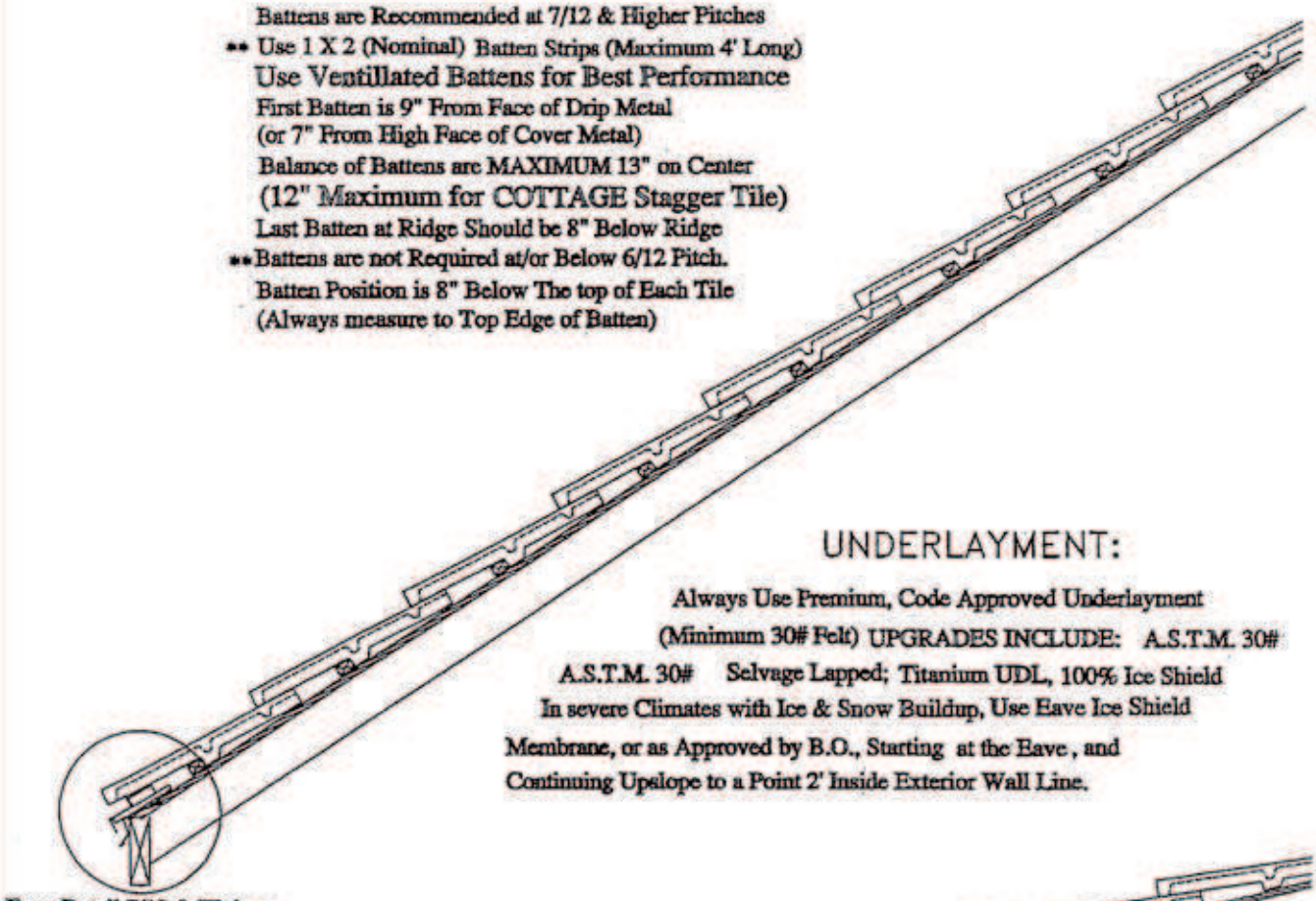
LEGENDARY ULTIMATE ROOF TILE has FREE AIR FLOW, Eave to Ridge, Between the Tile and Underlayment, to Remove HEAT BUILDUP Naturally, Through Convection Air Movement. This Important Innovation Reduces Ice Buildup in Winter, and Keeps the Building Cooler in the Summer.

Note that there are 8 Deck Bearing Points on each tile, to Distribute the Live Load, and Reduce Underlayment Scuffing.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

WHEN TO USE BATTEN STRIPS:

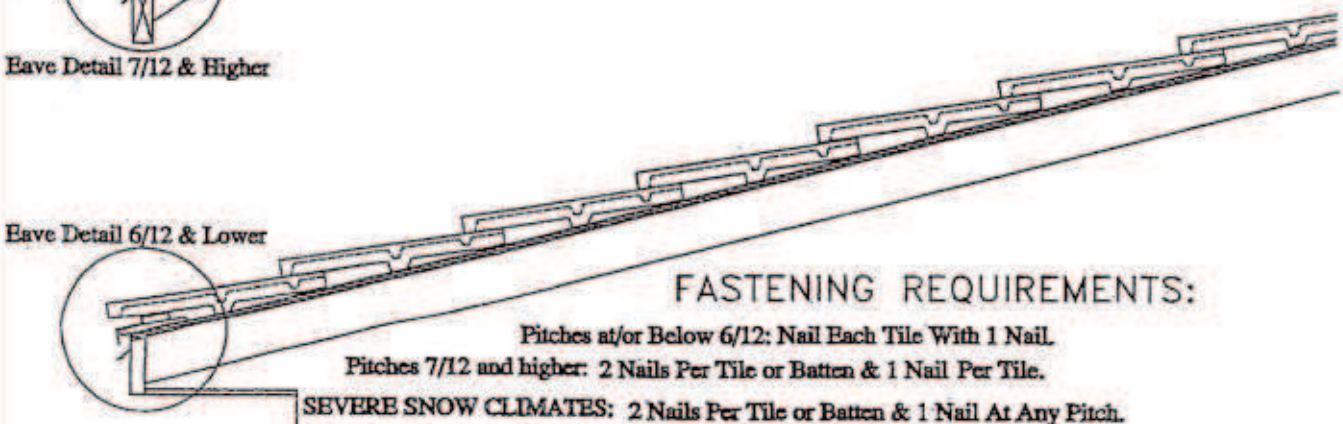
Battens are Recommended at 7/12 & Higher Pitches
** Use 1 X 2 (Nominal) Batten Strips (Maximum 4' Long)
Use Ventillated Battens for Best Performance
First Batten is 9" From Face of Drip Metal
(or 7" From High Face of Cover Metal)
Balance of Battens are MAXIMUM 13" on Center
(12" Maximum for COTTAGE Stagger Tile)
Last Batten at Ridge Should be 8" Below Ridge
**Battens are not Required at/or Below 6/12 Pitch.
Batten Position is 8" Below The top of Each Tile
(Always measure to Top Edge of Batten)



Eave Detail 7/12 & Higher

UNDERLAYMENT:

Always Use Premium, Code Approved Underlayment
(Minimum 30# Felt) UPGRADES INCLUDE: A.S.T.M. 30#
A.S.T.M. 30# Selvage Lapped; Titanium UDL, 100% Ice Shield
In severe Climates with Ice & Snow Buildup, Use Eave Ice Shield
Membrane, or as Approved by B.O., Starting at the Eave, and
Continuing Upslope to a Point 2' Inside Exterior Wall Line.



Eave Detail 6/12 & Lower

FASTENING REQUIREMENTS:

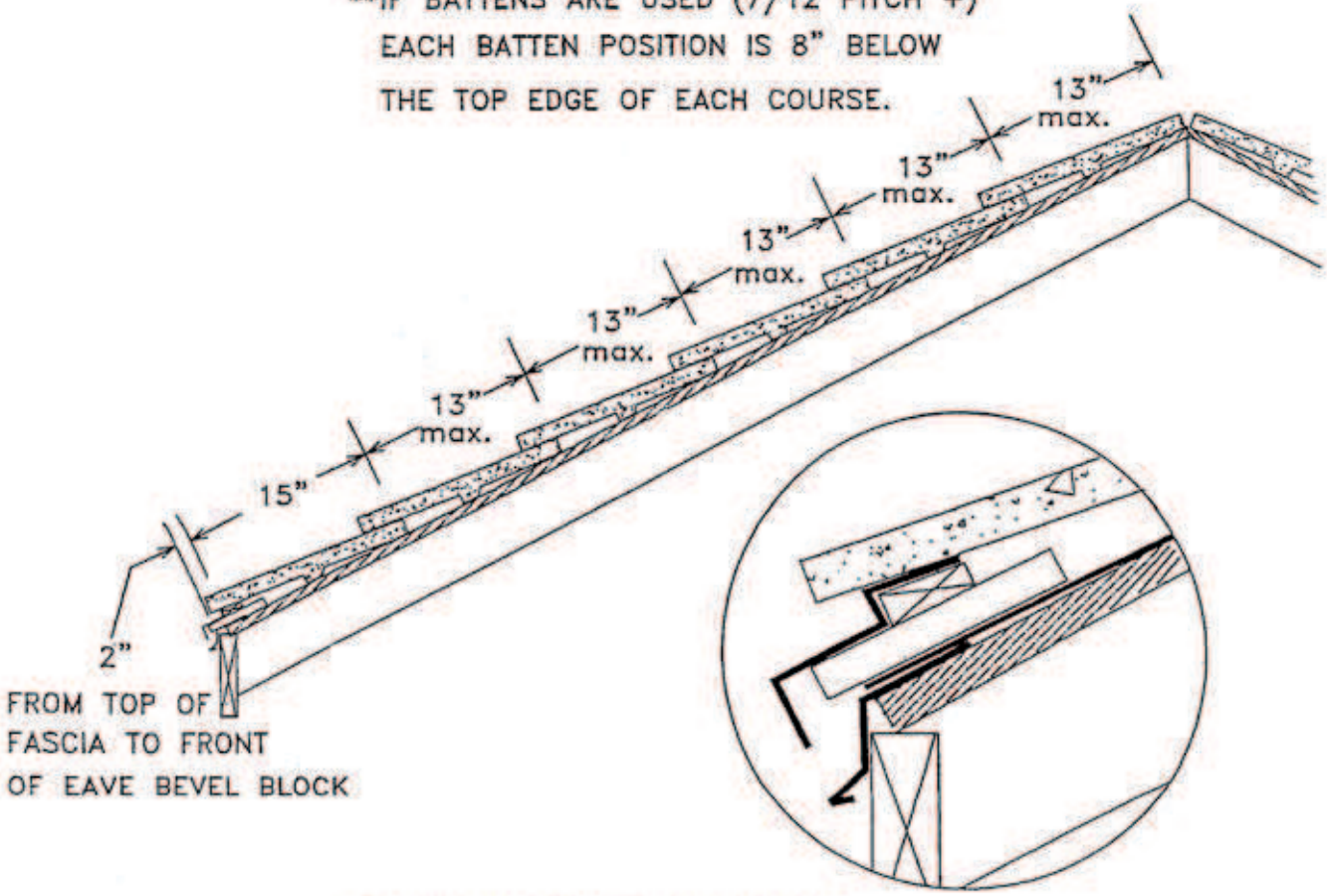
Pitches at/or Below 6/12: Nail Each Tile With 1 Nail.
Pitches 7/12 and higher: 2 Nails Per Tile or Batten & 1 Nail Per Tile.
SEVERE SNOW CLIMATES: 2 Nails Per Tile or Batten & 1 Nail At Any Pitch.
Nails Shall be Per UBC 15-D-1/2, 2 1/2" in Length.
In Designated High Wind Areas: Fasten Nose of Eave Tile With Wind Clip.
Fasten Standard Weight & Light Weight Tile in The Same Manner.

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

TILE COURSE LAYOUT

TILE SHOULD BE LAID IN STRAIGHT, UNIFORM COURSES (MAXIMUM 13") ON CENTER, LAID TO A CHALK LINE FOR EACH COURSE.

**IF BATTENS ARE USED (7/12 PITCH +) EACH BATTEN POSITION IS 8" BELOW THE TOP EDGE OF EACH COURSE.

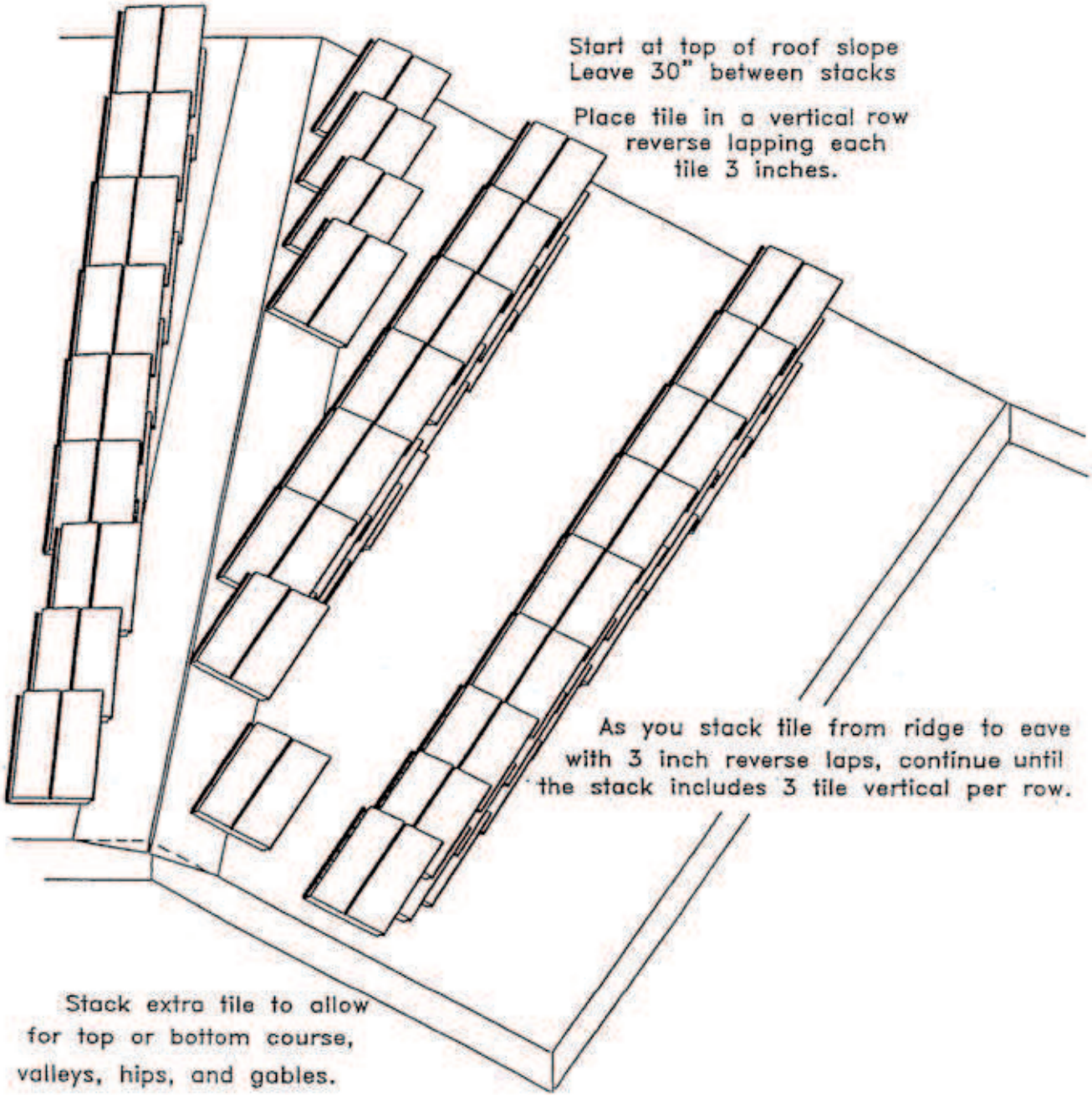


** COTTAGE CUT TILE REQUIRE 12" MAXIMUM PER COURSE LAYOUT TO MAINTAIN MINIMUM 3" COURSE OVERLAP

 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

U.S.PATENT NO. 6,233,895

LEGENDARY TILE STACKING LAYOUT



 BARTILE ROOFS INC. 725 NO. 1000 W. CENTERVILLE, UT 84014 PHONE (801) 295-3443

Attachment G

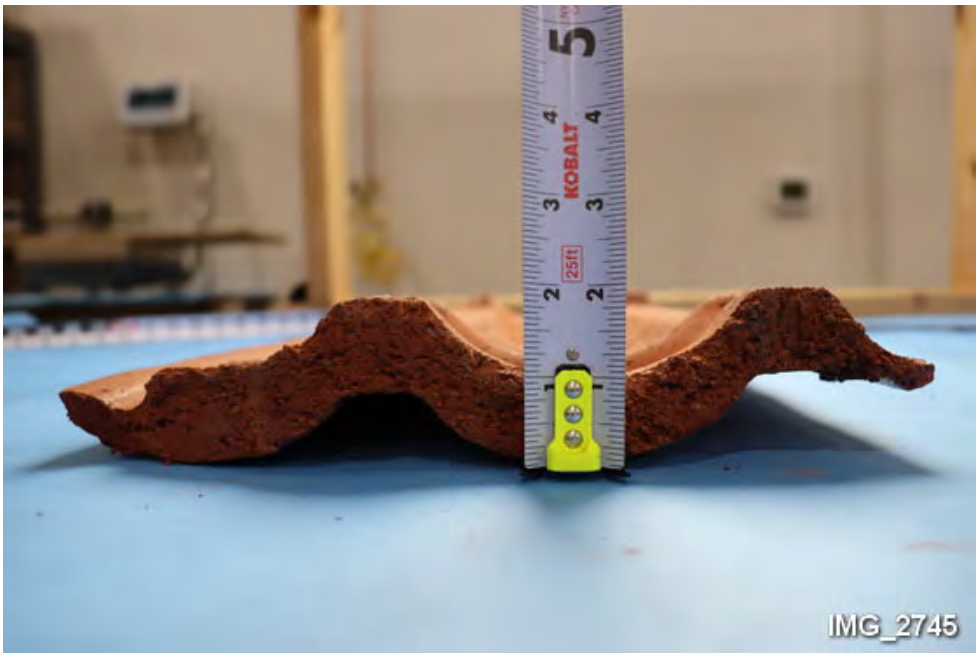
Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment G - European Tile Photographs
Haag File No. 51240033TX-196

G1. Top of European Style Tile 1.

G2. Top of European Style Tile 1.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment G - European Tile Photographs
Haag File No. 51240033TX-196

G3. Bottom of European Style Tile 1.



G4. Edge of European Style Tile 1.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment G - European Tile Photographs
Haag File No. 51240033TX-196

G5. Overview of test panel before impact testing.

G6. Overview of test setup with Haag IBL-7 ice ball launcher.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment G - European Tile Photographs
Haag File No. 51240033TX-196

G7. Top of Tile 1 before impact testing.

G8. Top of Tile 1 after impact testing. (Note four impact locations marked with paint.)

G9. Close-up of Impacts 2 and 2A. (Note tile broke with Impact 2A.)

G10. Close-up of Impacts 4 and 4A.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment G - European Tile Photographs
Haag File No. 51240033TX-196

G11. Top of European Style Tile 2.

G12. Overview of test panel before impact testing.

G13. Top of Tile 2 before impact testing.

G14. Top of Tile 2 after impact testing. (Note 2 impact locations marked with paint.)

G15. Close-up of Impacts 2 and 2A.

G16. Top of European Style Tile 3.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment G - European Tile Photographs
Haag File No. 51240033TX-196

G17. Top of Tile 3 before impact testing.

G18. Top of Tile 3 after impact testing. (Note tile broke at Impact 1 after not breaking at Impacts 2B and 2C.)

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment G - European Tile Photographs
Haag File No. 51240033TX-196

G19. Close-up of Impact 1. (Note impact broke tile.)

G20. Close-up of Impacts 2B and 2C. (Note tile did not break due to Impacts 2B and 2C.)

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment G - European Tile Photographs
Haag File No. 51240033TX-196

G21. Top of European Style Tile 4.

G22. Top of Tile 4 before impact testing.

G23. Top of Tile 4 after impact testing. (Note 4 impact locations marked with paint.)

G24. Close-up of Impacts 1 and 1A.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment G - European Tile Photographs
Haag File No. 51240033TX-196

G25. Close-up of Impacts 3 and 3A.

Attachment H

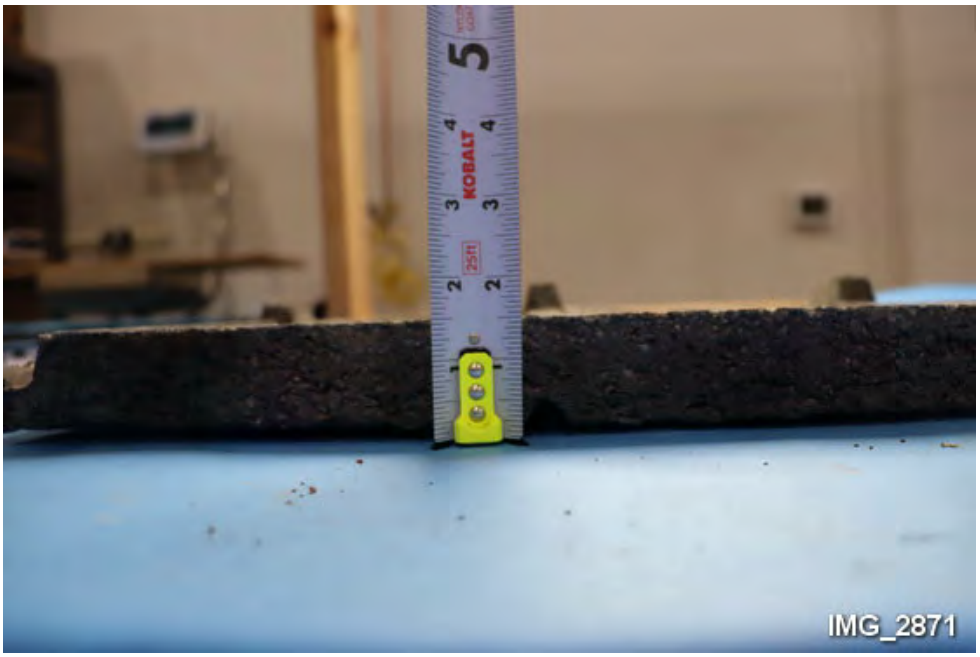
Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196

H1. Top of Legendary Slate Tile 1.

H2. Top of Legendary Slate Tile 1.

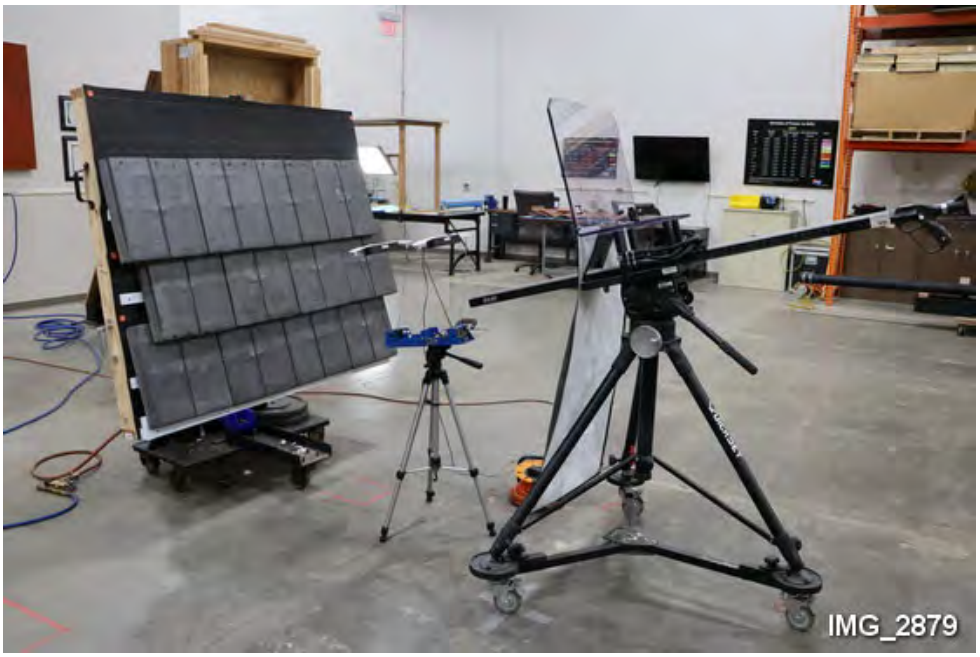
Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196

H3. Bottom of Legendary Slate Tile 1.



H4. Edge of Legendary Slate Tile 1.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196



H5. Overview of test setup with Haag IBL-7 ice ball launcher.

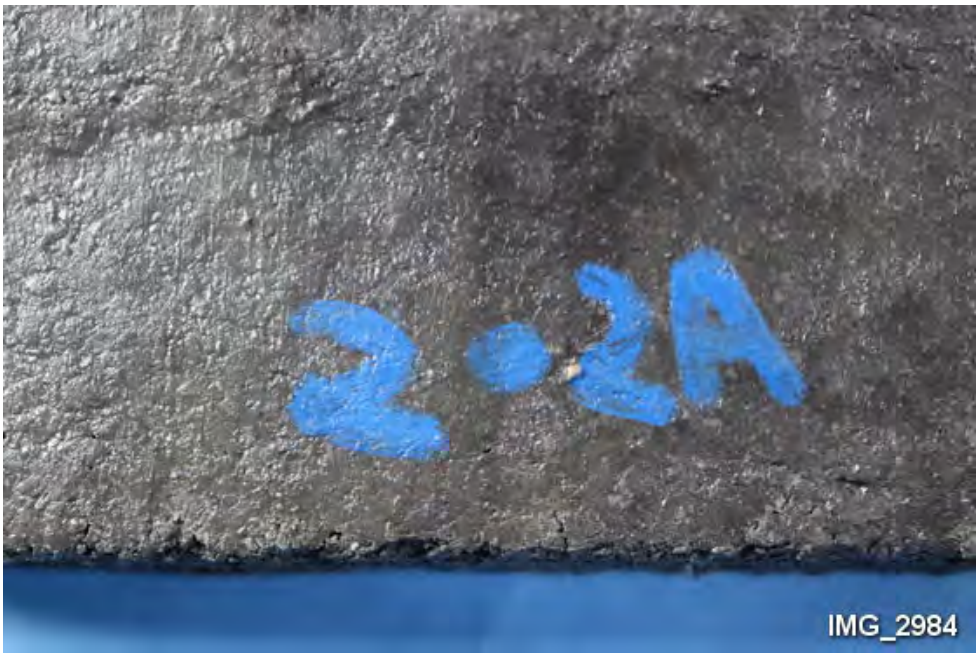
H6. Overview of test panel before impact testing.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196

H7. Overview of test panel after impact testing.

H8. Top of Tile 1 after impact testing. (Note 5 impact locations marked with paint.)

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196



H9. Close-up of Impacts 2 and 2A.

H10. Close-up of Impacts 3 and 3A.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196

H11. Close-up of Impact 4B. (Note hairline crack.)

H12. Close-up of Impact 4B after wetting. (Note hairline crack.)

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196

H13. Top of Legendary Slate Tile 2.

H14. Overview of test panel before impact testing.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196

H15. Overview of test panel after impact testing.

H16. Top of Tile 2 after impact testing. (Note 3 impact locations marked with paint.)

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196

H17. Close-up of Impacts 1 and 1A.

H18. Close-up of Impact 4. (Note hairline crack.)

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196

H19. Close-up of Impact 4 after wetting. (Note hairline crack.)

H20. Top of Legendary Slate Tile 3.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196

H21. Overview of test panel before impact testing.

H22. Overview of test panel after impact testing.

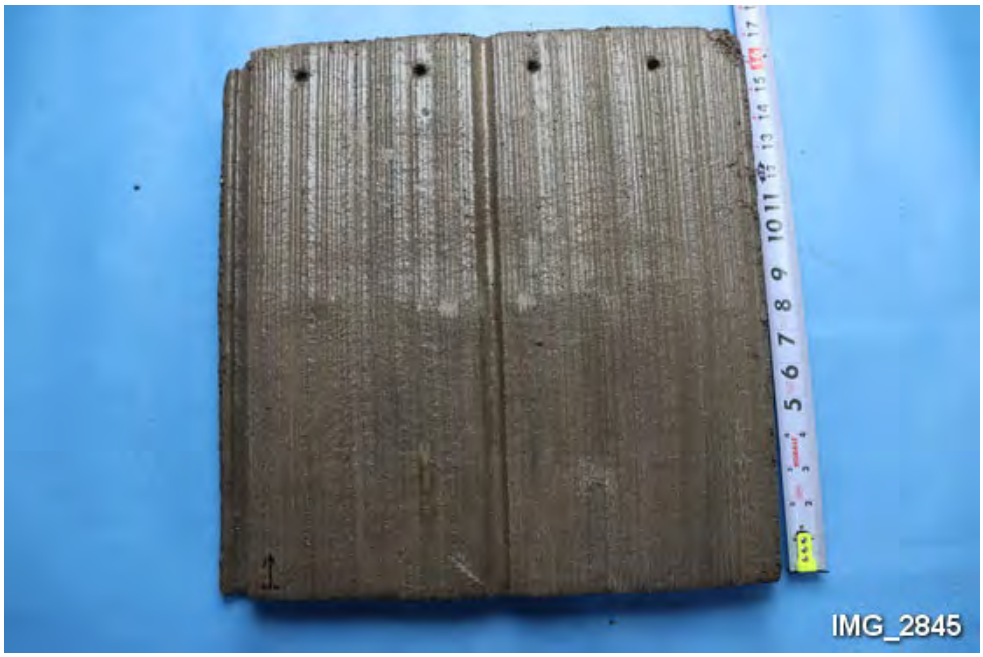
Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment H - Legendary Slate Tile Photographs
Haag File No. 51240033TX-196

H23. Top of Tile 3 after impact testing. (Note 2 impact locations marked with paint.)

H24. Close-up of Impacts 4 and 4A.

Attachment I

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment I - Legendary Split Timber Tile Photographs
Haag File No. 51240033TX-196



I1. Top of Legendary Split Timber Tile 1.

I2. Top of Legendary Split Timber Tile 1.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment I - Legendary Split Timber Tile Photographs
Haag File No. 51240033TX-196

I3. Bottom of Legendary Split Timber Tile 1.

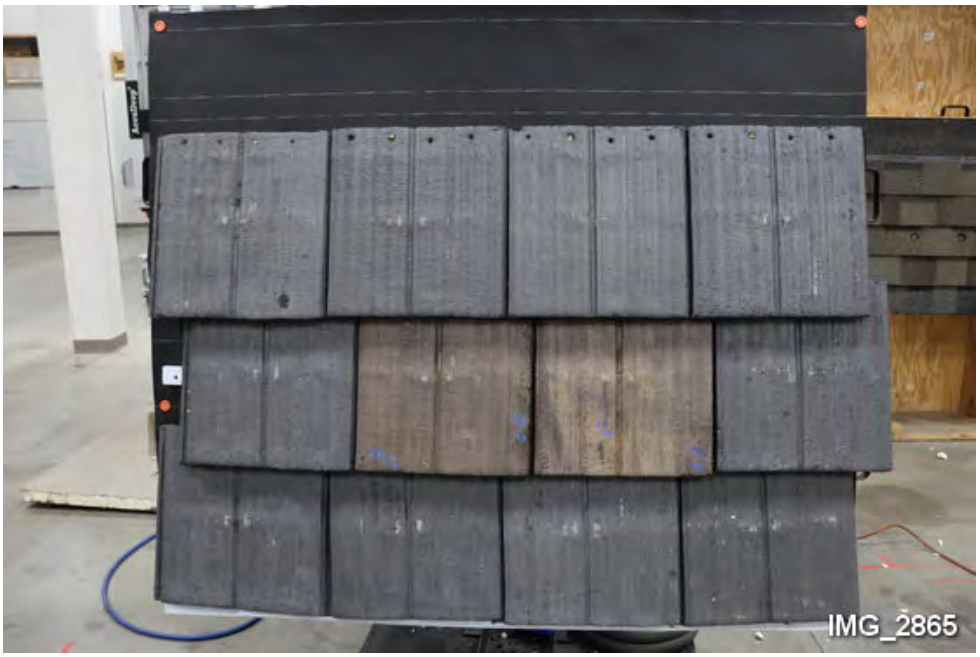
I4. Edge of Legendary Split Timber Tile 1.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment I - Legendary Split Timber Tile Photographs
Haag File No. 51240033TX-196

I5. Overview of test setup with Haag IBL-7 ice ball launcher.

I6. Overview of test panel before impact testing.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment I - Legendary Split Timber Tile Photographs
Haag File No. 51240033TX-196



I7. Overview of test panel after impact testing.

I8. Top of Tile 1 after impact testing. (Note four impact locations marked with paint.)

I9. Close-up of Impacts 2 and 2A.

I10. Close-up of Impacts 3 and 3A.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment I - Legendary Split Timber Tile Photographs
Haag File No. 51240033TX-196

I11. Top of Legendary Split Timber Tile 2.

I12. Overview of test panel before impact testing.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment I - Legendary Split Timber Tile Photographs
Haag File No. 51240033TX-196

I13. Overview of test panel after impact testing.

I14. Top of Tile 2 after impact testing. (Note four impact locations marked with paint.)

I15. Close-up of Impacts 1 and 1A.

I16. Close-up of Impacts 4 and 4A.

Attachment J

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment J - New England Slate Tile Photographs
Haag File No. 51240033TX-196

J1. Top of New England Slate Tile 1.

J2. Top of New England Slate Tile 1.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment J - New England Slate Tile Photographs
Haag File No. 51240033TX-196

J3. Bottom of New England Slate Tile 1.

J4. Edge of New England Slate Tile 1.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment J - New England Slate Tile Photographs
Haag File No. 51240033TX-196

J5. Overview of test setup with Haag IBL-7 ice ball launcher.

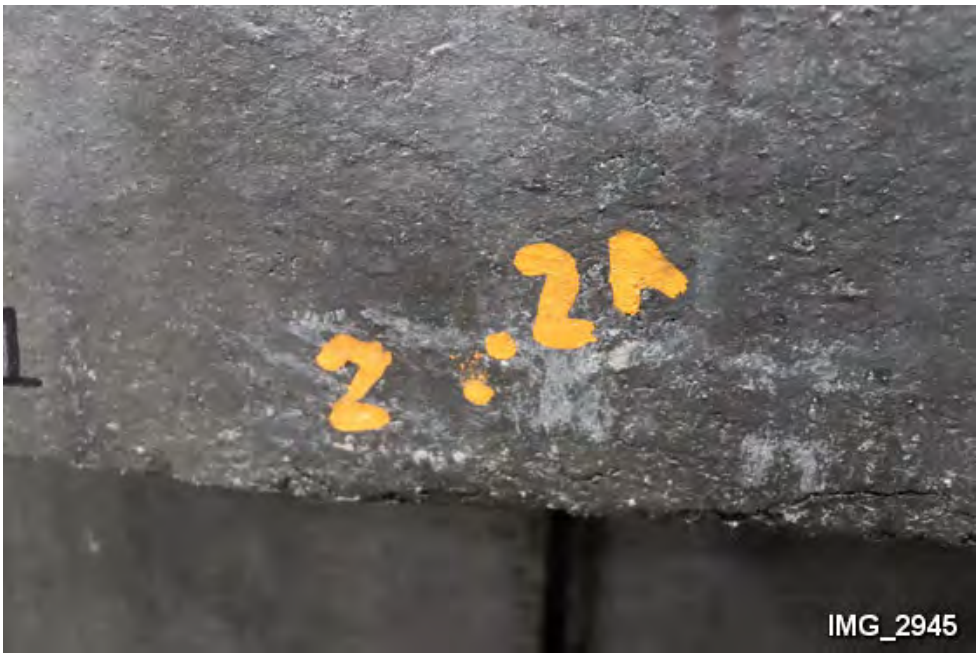
J6. Overview of test panel before impact testing.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment J - New England Slate Tile Photographs
Haag File No. 51240033TX-196

J7. Overview of test panel after impact testing.

J8. Top of Tile 1 after impact testing. (Note four impact locations marked with paint.)

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment J - New England Slate Tile Photographs
Haag File No. 51240033TX-196



J9. Close-up of Impacts 2 and 2A.

J10. Close-up of Impacts 3 and 3A.

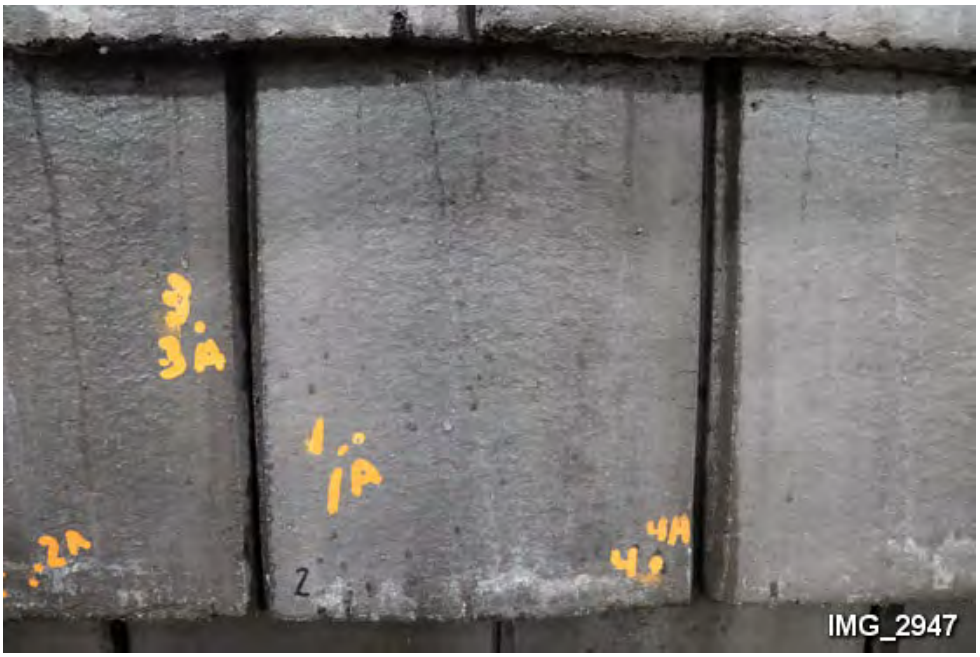
Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment J - New England Slate Tile Photographs
Haag File No. 51240033TX-196

J11. Top of New England Slate Tile 2.

J12. Overview of test panel before impact testing.

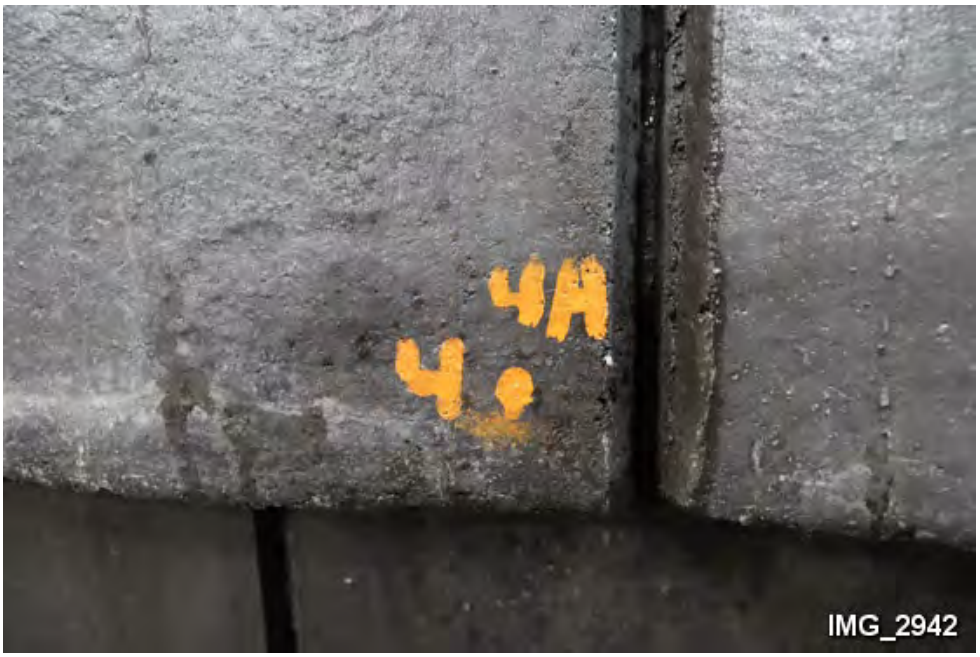
Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment J - New England Slate Tile Photographs
Haag File No. 51240033TX-196

J13. Overview of test panel after impact testing.



J14. Top of Tile 2 after impact testing. (Note four impact locations marked with paint.)

J15. Close-up of Impacts 1 and 1A.

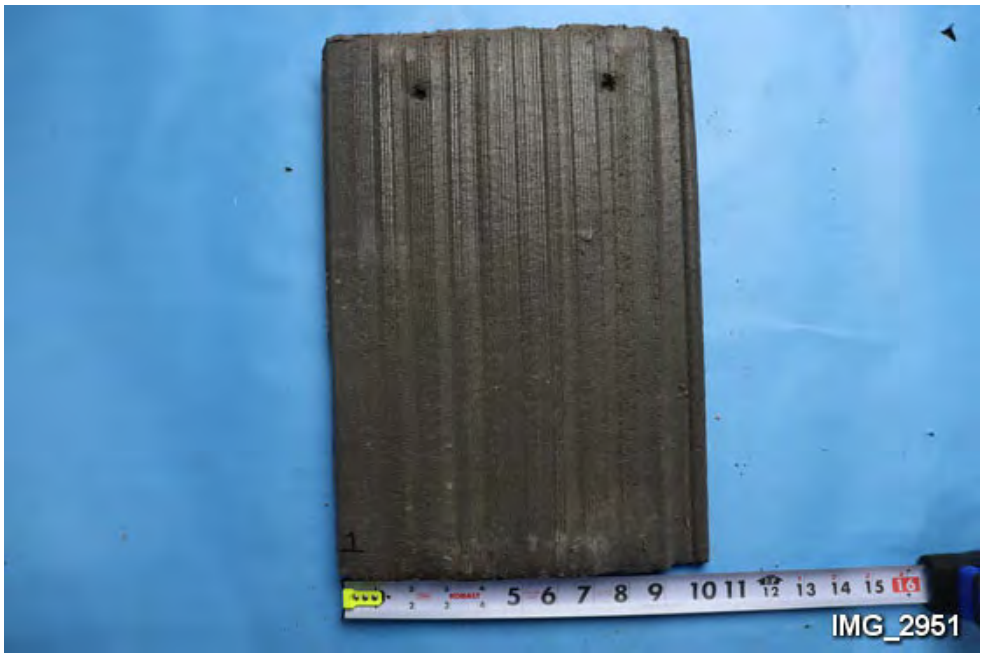


J16. Close-up of Impacts 4 and 4A.

Attachment K

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment K - Split Timber Tile Photographs
Haag File No. 51240033TX-196

K1. Top of Split Timber Tile 1.



K2. Top of Split Timber Tile 1.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment K - Split Timber Tile Photographs
Haag File No. 51240033TX-196

K3. Bottom of Split Timber Tile 1.

K4. Edge of Split Timber Tile 1.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment K - Split Timber Tile Photographs
Haag File No. 51240033TX-196

K5. Overview of test setup with Haag IBL-7 ice ball launcher.

K6. Overview of test panel before impact testing.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment K - Split Timber Tile Photographs
Haag File No. 51240033TX-196

K7. Overview of test panel after impact testing.

K8. Top of Tile 1 after impact testing. (Note 4 impact locations marked with paint.)

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment K - Split Timber Tile Photographs
Haag File No. 51240033TX-196

K9. Close-up of Impacts 2 and 2A.

K10. Close-up of Impacts 3 and 3A.

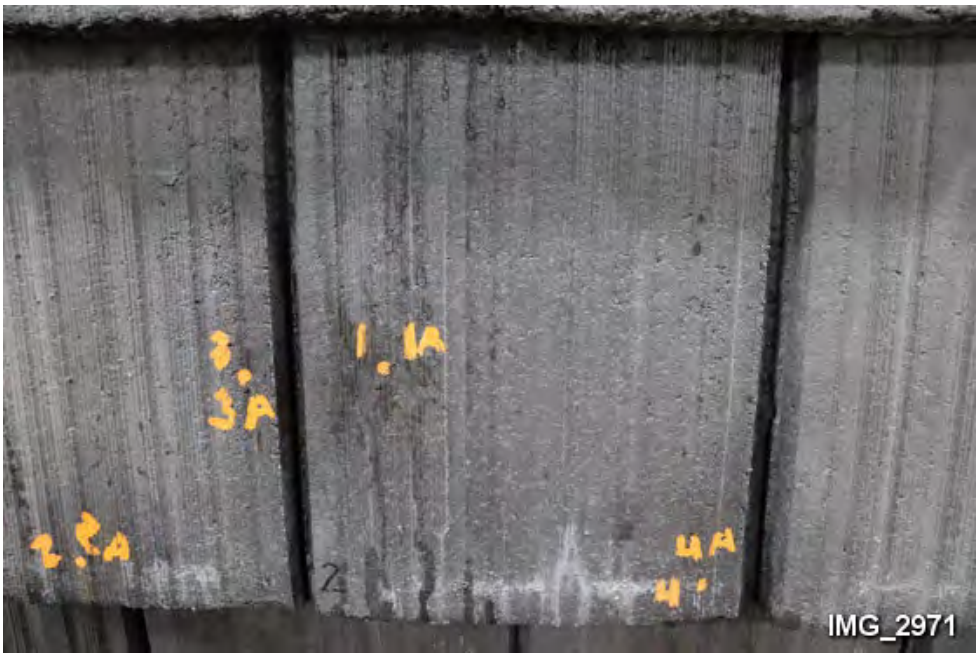
Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment K - Split Timber Tile Photographs
Haag File No. 51240033TX-196

K11. Top of Split Timber Tile 2.

K12. Overview of test panel before impact testing.

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment K - Split Timber Tile Photographs
Haag File No. 51240033TX-196

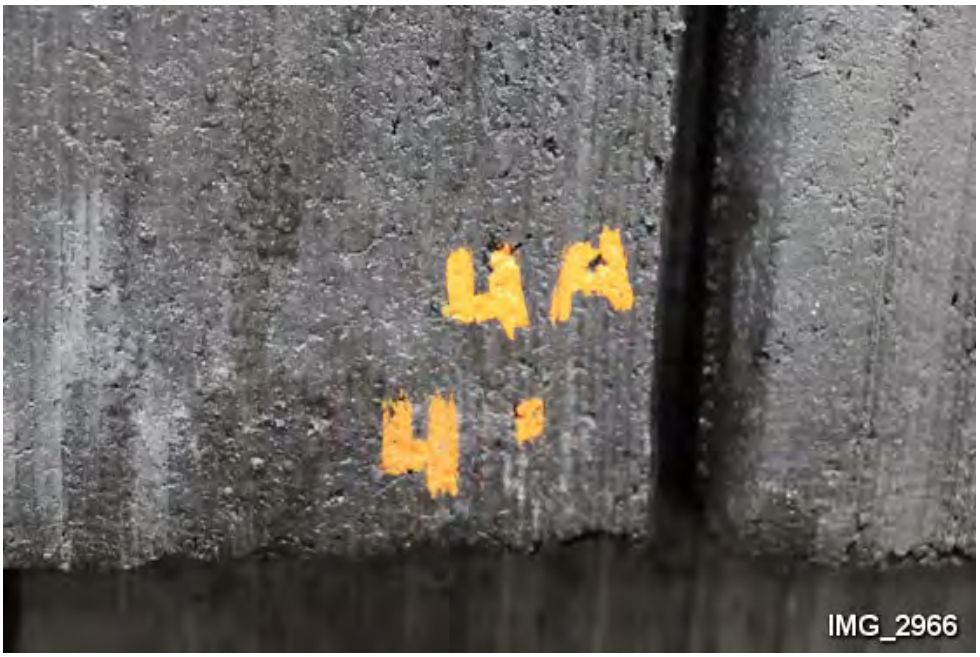
K13. Overview of test panel after impact testing.



K14. Top of Tile 2 after impact testing. (Note 4 impact locations marked with paint.)

Bartile ANSI/FM 4473 Tile Testing: Impact Testing
Lab Attachment K - Split Timber Tile Photographs
Haag File No. 51240033TX-196

K15. Close-up of Impacts 1 and 1A.



K16. Close-up of Impacts 4 and 4A.

Attachment L

BARTILE
PREMIUM ROOF TILES

European

EUROPEAN

The classic barreled tile that has graced homes across Europe for centuries has been carefully replicated to maintain the old century feel.

COLORS

Please refer to the product brochure or Bartile website for the colors available. Due to the inherent nature of the concrete, variations in color and texture should be expected. Though photographs in the brochure are as close as possible to the actual roof tiles, prior to ordering, please contact Bartile and we will gladly provide you with current roof tile samples of the color you have chosen.

LIMITATIONS

Use on roofs with slopes greater than 2" per foot. Low slope applications (2" and 3" per foot) require additional underlayment consult your local building official to see which codes are applicable.

PRODUCT COMPOSITION

Cementitious materials such as Portland cement, blended hydraulic cements, sand, raw or calcined natural pozzolans and aggregates all get mixed together and extruded into a mold to form the concrete tile.

ROOF DECK REQUIREMENT

Sheathing must be adequate to support the loads involved, but not less than normal 1" thick lumber or 15/32" thick plywood or decking material recognized in a code evaluation report or by the local building official. The use of sheathing less than 15/32" will require supporting data.

INSTALLATION

Detailed installation instructions including diagrams are online at www.bartile.com or www.tileroofing.org. The following is a general summary of the installation methods and should not be used as an installation guide.

VENTILATION

The need for proper attic ventilation is required by most building code authorities, in accordance with the IBC and IRC. These codes recognize that the proper ventilation is necessary component of any successful tile roof system. Generally building codes require that a minimum net free ventilating area for attics be 1:150 ratio. Check with your local building official for regional requirements.

SINCE 1942

APPLICABLE STANDARDS

ICC 2778

ASTM E108 Class A Fire Rated

ASTM C67 Freeze Thaw tested

Class 4 Impact Resistance

75 Year Warranty

TECHNICAL DATA

Weight:	11 lbs per sq. (Super Duty Weight)
	9.5 lbs per sq. (Standard Weight)
	7.5 lbs per sq. (Ultralite Weight)
Dimensions:	10 3/8" x 15" nominally
Pieces per sq:	122
Exposure:	12"
Headlap:	3" minimum
Cost:	2.24 sq per pallet

725 North 1000 West, Centerville, UT 84014 • 1-800-933-5038

BARTILE
PREMIUM ROOF TILES

European

VALLEYS

There are several metal valleys that are acceptable but valleys should be No#26 gauge corrosive resistant metal meeting ASTM A653 and should extend 11 inches from the center and have a splash diverter at the edge. Consult Bartile installation manual for further information.

UNDERLAYMENT

One layer of minimum ASTM D226 Type II (No. 30 felt) or approved equal, with a recognized code evaluation report, shall completely cover the decking and be lapped over the hips and ridges and through valleys. Underlayment shall be lapped 6" vertical (end or side lap) and 2" horizontally (head lap). Bartile recommends double layer of the required underlayment (see page 17 of Installation guide). Felt should extend over rake edge a minimum 1". Where roof slopes fall between 2:12 and under 4:12 underlayment shall meet ASTM D1970 (such as self-adhered ice barrier) or two layers of an approved ASTM rated felt paper. Any tile installed less than 4:12 pitch shall be considered decorative. Check your local building department for specific code requirements.

ENHANCED COLD ROOF METHOD

Bartile recommends cold roof installations for high snow accumulation areas and high temperature climates. Consult www.tileroofing.org or www.bartile.com for further information.

BATTEN SYSTEM

Bartile is installed on a batten system. There are several types of batten systems that are acceptable. Consult www.tileroofing.org or www.bartile.com for further information.

EAVE TREATMENT

Drip edge metal is installed under the eave riser and should be a minimum of 2"x4". Consult Bartile installation manual for specific details.

FASTENING

Corrosion resistant meeting ASTM A641 Class I or approved corrosion resistance, of No II gauge diameter and of sufficient length to properly penetrate 3/4" into or through the thickness of the batten. The head of the nail used for the tile fastening shall not be less than 5/16" and complying with ASTM F1667. Check your local building department regarding nails.

FLASHING

No 26 gauge corrosion-resistant metal flashing meeting ASTM A653. Check with the local building codes to see if they have a minimum gauge thickness that is allowed in that jurisdiction.

WARRANTY

The Bartile provides a 75 year warranty against manufacturing defects and also is non-prorated for the entire warranty period. For specific warranty details and limitations please visit www.bartile.com.

HISTORY

In the 1930's Bartile was a franchise in the Western US that Lewis Evans Sr. had a vision to consolidate to form one company. He began production in 1942 and was running Bartile as a tile manufacturer shipping to the Western United States based in Salt Lake City, Utah. Sometime in the 1950's he trademarked the Bartile name and still use it to this day.

Lewis Evans Sr. was a pioneer to the tile roof industry. We continued to produce the Original Bartile style tile line until the late 1960's and finally halting mass production in the 1970's of that profile. Lewis introduced new profiles such as Rivera, Old Shake & Slate, and French Oval profiles that ran from the 1960's thru the mid-1980's. In 1979 Bartile purchased the land we currently still operate our plant today. Bartile automated their production line in 1984 to produce our New England Slate and Split timber lines. We introduced our European profile in 1985 and our Sierra Mission in 1987. Bartile has always been about innovation. In 1998 we introduced our Legendary profile tile which has a patented built-in cold roof technology designed into the tile itself. In the late 2000's we introduced our Yorkshire tile which has four different widths and three different lengths to replicate a staggered slate look. Bartile has numerous different trim tiles to truly create a custom roof. Innovation is who we are.

We have come a long way since 1942 but we think Lewis Sr. would be proud. Unfortunately, Lewis Evans Sr. passed away in 1981 and two of his sons Lewis Evans Jr. and Mike Evans purchased the business form their mother and other family members and operate it to this day. With their sons and daughters working for Bartile, this is truly a multi-generational family business.

www.bartile.com 725 North 1000 West, Centerville, UT 84014 • 1-800-933-5038

BARTILE
PREMIUM ROOF TILES

Sierra Mission

SIERRA MISSION

From the top of the Sierra Madre to the old villas of Spain, Mission tile has been used for centuries. Our Sierra Mission creates the look and feel of the clay tiles of old.

COLORS

Please refer to the product brochure or Bartile website for the colors available. Due to the inherent nature of the concrete, variations in color and texture should be expected. Though photographs in the brochure are as close as possible to the actual roof tiles, prior to ordering, please contact Bartile and we will gladly provide you with current roof tile samples of the color you have chosen.

LIMITATIONS

Use on roofs with slopes greater than 2" per foot. Low slope applications (2" and 3" per foot) require additional underlayment consult your local building official to see which codes are applicable.

PRODUCT COMPOSITION

Cementitious materials such as Portland cement, blended hydraulic cements, sand, raw or calcined natural pozzolans and aggregates all get mixed together and extruded into a mold to form the concrete tile.

ROOF DECK REQUIREMENT

Sheathing must be adequate to support the loads involved, but not less than normal 1" thick lumber or 15/32" thick plywood or decking material recognized in a code evaluation report or by the local building official. The use of sheathing less than 15/32" will require supporting data.

INSTALLATION

Detailed installation instructions including diagrams are online at www.bartile.com or www.tileroofing.org. The following is a general summary of the installation methods and should not be used as an installation guide.

VENTILATION

The need for proper attic ventilation is required by most building code authorities, in accordance with the IBC and IRC. These codes recognize that the proper ventilation is necessary component of any successful tile roof system. Generally building codes require that a minimum net free ventilating area for attics be 1:150 ratio. Check with your local building official for regional requirements.

SINCE 1942

APPLICABLE STANDARDS

ICC 2778

ASTM E108 Class A Fire Rated

ASTM C67 Freeze Thaw tested

Class 4 Impact Resistance

75 Year Warranty

TECHNICAL DATA

Weight:	11 lbs per sq. (Super Duty Weight)
	9.5 lbs per sq. (Standard Weight)
	7.5 lbs per sq. (Ultralite Weight)
Dimensions:	10 3/8" x 15" nominally
Pieces per sq:	118
Exposure:	12" or 10.5" for Old Mission
Headlap:	3" minimum
Cost:	2.30 sq per pallet

725 North 1000 West, Centerville, UT 84014 • 1-800-933-5038

VALLEYS

There are several metal valleys that are acceptable but valleys should be No#26 gauge corrosive resistant metal meeting ASTM A653 and should extend 11 inches from the center and have a splash diverter at the edge. Consult Bartile installation manual for further information.

UNDERLAYMENT

One layer of minimum ASTM D226 Type II (No. 30 felt) or approved equal, with a recognized code evaluation report, shall completely cover the decking and be lapped over the hips and ridges and through valleys. Underlayment shall be lapped 6" vertical (end or side lap) and 2" horizontally (head lap). Bartile recommends double layer of the required underlayment (see page 17 of Installation guide). Felt should extend over rake edge a minimum 1". Where roof slopes fall between 2:12 and under 4:12 underlayment shall meet ASTM D1970 (such as self-adhered ice barrier) or two layers of an approved ASTM rated felt paper. Any tile installed less than 4:12 pitch shall be considered decorative. Check your local building department for specific code requirements.

ENHANCED COLD ROOF METHOD

Bartile recommends cold roof installations for high snow accumulation areas and high temperature climates. Consult www.tileroofing.org or www.bartile.com for further information.

BATTEN SYSTEM

Bartile is installed on a batten system. There are several types of batten systems that are acceptable. Consult www.tileroofing.org or www.bartile.com for further information.

EAVE TREATMENT

Drip edge metal is installed under the eave riser and should be a minimum of 2"x4". Consult Bartile installation manual for specific details.

FASTENING

Corrosion resistant meeting ASTM A641 Class I or approved corrosion resistance, of No II gauge diameter and of sufficient length to properly penetrate 3/4" into or through the thickness of the batten. The head of the nail used for the tile fastening shall not be less than 5/16" and complying with ASTM F1667. Check your local building department regarding nails.

FLASHING

No 26 gauge corrosion-resistant metal flashing meeting ASTM A653. Check with the local building codes to see if they have a minimum gauge thickness that is allowed in that jurisdiction.

WARRANTY

The Bartile provides a 75 year warranty against manufacturing defects and also is non-prorated for the entire warranty period. For specific warranty details and limitations please visit www.bartile.com.

HISTORY

In the 1930's Bartile was a franchise in the Western US that Lewis Evans Sr. had a vision to consolidate to form one company. He began production in 1942 and was running Bartile as a tile manufacturer shipping to the Western United States based in Salt Lake City, Utah. Sometime in the 1950's he trademarked the Bartile name and still use it to this day.

Lewis Evans Sr. was a pioneer to the tile roof industry. We continued to produce the Original Bartile style tile line until the late 1960's and finally halting mass production in the 1970's of that profile. Lewis introduced new profiles such as Rivera, Old Shake & Slate, and French Oval profiles that ran from the 1960's thru the mid-1980's. In 1979 Bartile purchased the land we currently still operate our plant today. Bartile automated their production line in 1984 to produce our New England Slate and Split timber lines. We introduced our European profile in 1985 and our Sierra Mission in 1987. Bartile has always been about innovation. In 1998 we introduced our Legendary profile tile which has a patented built-in cold roof technology designed into the tile itself. In the late 2000's we introduced our Yorkshire tile which has four different widths and three different lengths to replicate a staggered slate look. Bartile has numerous different trim tiles to truly create a custom roof. Innovation is who we are.

We have come a long way since 1942 but we think Lewis Sr. would be proud. Unfortunately, Lewis Evans Sr. passed away in 1981 and two of his sons Lewis Evans Jr. and Mike Evans purchased the business form their mother and other family members and operate it to this day. With their sons and daughters working for Bartile, this is truly a multi-generational family business.

BARTILE ROOFING PRODUCTS

New England Slate, Split Timber, European **(all figures are nominal)**

TYPE:	- INTERLOCKING CONCRETE ROOF TILE STANDARD WEIGHT & ULTRALITE AVAILABLE
COLOR FINISH	- INTEGRAL COLOR (COLORED THROUGHOUT)
COLORATION TYPE	- MINERAL OXIDE PIGMENTS (OVER 400 COLORS)
COLORS AVAILABLE	- SOLID,BLENDED AND MULTIPLE BLEND COLORS
SURFACE COATING	- CLEAR ACRYLIC FOR EFFLORESCENCE CONTROL
FABRICATION TYPE	- AUTOMATED LINE, HIGH PRESSURE EXTRUSION
CLASSIFICATION	- EXCEEDS CLASS A (INCOMBUSTIBLE)
WEIGHT PER SQ.FT.	- 10.5 LBS. & 8 LBS. FOR ULTRALITE
TILE SIZE	- 15" LONG X 10 3/8" WIDE
THICKNESS	- APPROXIMATELY 1 1/8" AT RIBS, WITH 5/8" X 1" BATTEN ENGAGEMENT LUGS
SIDE LAP INTERLOCK	- 1 1/8" WIDE VERTICAL INTERLOCKING CHANNEL
MINIMUM HEAD LAP	- 3"
PIECES PER SQUARE	- 122 (12% - 15% ADDITIONAL FOR COTTAGE TILE LAYOUT) MEETS OR EXCEEDS ALL KNOWN CODES AND STADARD ICC, ICBO, UBC, ASTM, BOCA, SBC AND ANSI
FREEZE-THAW	- ASTM C-67-83 AND C-1492
STRENGTH	- ASTM C-1492, UBC 32-12, ICBO ES-3909, ICC 2778
WATER ABSORBTION	- UBC 32-12 BY WT. LESS THAN 10%, 14% ULTRALITE
PERMEABILITY	- PASSES THE ICBO/ICC 24 HR. – 2" STATIC HEAD TEST

*ALL DIMENSIONS & WEIGHTS ARE APPROXIMATE

SECTION 073216 - CONCRETE ROOF TILES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Concrete roof tiles.
2. Tile accessories
3. Self-adhering sheet underlayment.
4. Ridge Ventilation System
5. Drip Metal at Eave

B. Related Sections include the following:

1. Division 06 Section "Rough Carpentry" for wood Decking, Blocking, and Fascia’s.
2. Division 07 Section "Sheet Metal Flashing and Trim" for metal not part of this Section.

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079, glossaries in RTI/WSRCA's "Concrete and Clay Roof Tile Design Criteria Installation Manual for Moderate Climate Regions," and NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 SUBMITTALS:

A. Samples for Initial Selection: For each type of concrete tile and concrete tile accessory indicated.

1. Include similar Samples of trim involving color selection.

B. Samples for Verification: For the following products, of sizes indicated, to verify color selected.

1. Concrete Tile: Full size.
2. Concrete Tile Accessories: Full size.
3. Fasteners: Stainless Steel, or Hot Dipped Galvanized, Ring Shak
4. Self-Adhering Underlayment: 12 inches square.

C. Material Test Reports: For each type of tile.

D. Research/Evaluation Reports: For concrete tiles, fasteners, and fastener systems.

E. Maintenance Data: For concrete tile roofing to include in maintenance manuals.

F. Warranties: Special warranties specified at the end of this Section.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain concrete tiles and concrete tile accessories through one source from a the manufacturer.

B. Fire-Test-Response Characteristics: Provide concrete tiles and related roofing materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class **A**; UL 790 or ASTM E 108 for application and roof slopes indicated.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution, if requested.

1. Approval of mockups is also for material and construction qualities specifically approved by Architect in writing.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double-stack rolls.

1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress. Stack Rolls on Ends only.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be performed according to manufacturer's written instructions and warranty requirements.

1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.8 WARRANTY

A. Special Concrete Roof Tile Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace tile that fails in materials within specified warranty period. Material failures include manufacturing defects that result in leaks.

1. Material Warranty Period: 50 years from date of Substantial Completion.

B. Special Roofing Installer's Warranty: Roofing Installer's warranty, on warranty form at end of this Section, signed by roofing Installer, covering Work of this Section, in which roofing Installer agrees to repair or replace components of concrete tile roofing that fail in materials or workmanship within the following warranty period:

1. Warranty Period of Installer: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but may not be limited to, products specified.
2. Products: Subject to compliance with requirements, provide the products specified.
3. Manufacturers: Subject to compliance with requirements, provide products by of the manufacturers specified.

2.2 CONCRETE TILE

A. Products:

1. Bartile Roofs Inc; Legendary Roof Tile: Slate or Shake Design.

B. Concrete Tile: ASTM C 1492, extruded-concrete roof tile units of shape and configuration indicated, with integral color, and free of surface imperfections. Provide with fastening holes predrilled at factory when manufactured.

1. Weight: Standard weight.
   Low-Profile Shape: Flat Style Interlocking Concrete Roof Tile
2. Side Configuration: Interlocking
3. Size: 16” x 16”

4. Colors, Blends, and Textures: As selected by Architect from manufacturer's Standard Color Selection in either Legendary Slate or Shake Profiles.

ACCESSORIES

C. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.

D. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied.

E. Elastomeric Sealant: Polyurethane based joint sealant; of Grade NS, Class 25, Use NT related to exposure, and, as applicable to joint substrates indicated.

F. Roofing Asphalt: DO NOT USE.

G. Cold-Applied Adhesive: DO NOT USE.

H. Foam Adhesive: Two-component polyurethane expanding adhesive as recommended for application by tile manufacturer.

I. Mortar: Synthetic Mortar**,** similar color to selected tile, for concealed-from-view mortar.

J. Eave Closure, Tile Riser: Manufacturer's standard eave closure/Booster formed to shape of tile.

K. Ridges and Hips: Use Manufacturer's standard Ridge/Hip tile, and Hip Starter Tile.

L. Ventilating Battens**:** Synthetic Ventilating Battens by Battens Plus.

M. Hip and Ridge Storm-block Rolls: 9” by 25’ Self Adhesive Butyl Adhesive Backed Colored Aluminum corrugated 25’ Rolls.

2.3 FASTENERS

A. Roofing Nails: ASTM F 1667, Hot-dipped galvanized steel, or Stainless Steel, sharp-pointed, roofing nails with barbed shanks; minimum 7/16-inch diameter head; and of sufficient length to penetrate 3/4 inch (19 mm) into solid wood decking or sheathing.

1. Where nails are in contact with metal flashing, use nails made from same metal as flashing, or Stainless Steel.

B. Self-adheared Underlayment Nails: None normally needed, otherwise use (A) roofing nails.

C. Ventilating Batten Fasteners: ASTM F 1667, Minimum ½" Crown steel wire staples, gun driven.

D. Wire Ties: For supporting small Valley cut tile pieces, use Stainless Steel if required..

E. Twisted-Wire-Tie System: Continuously twisted two-wire unit with loops formed 6 inches apart, minimum diameter stainless-steel wire and 0.037-inch diameter stainless steel tie wires with matching-metal folding clip anchors if required

1. Tile Wire Products:

a. Newport Fastener Company, Inc.; Twisted Wire Tyle Tye.
b. Wire Works, Inc. (The); Twisted Wire Works System.

F. Storm Clips: Stainless steel strap-type, 0.04-by-1/2-inch (1.0-by-13-mm) L-shaped retainer clips designed to secure side edges of tiles. Provide with two fastener holes in base flange.

1. Hurricane resistive Products:

a. Newport Fastener Company, Inc.; Storm Lock Side Clips.
b. Wire Works, Inc. (The); Grip McClips.

2.4 UNDERLAYMENT MATERIALS

A. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, minimum of 40 mils thick, or greater; slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer for adjoining concrete or masonry surfaces to receive underlayment.

1. Products:

a. Carlisle Coatings & Waterproofing, Div. of Carlisle Companies Inc.; WIP-300HT

2.5 SHEET METAL FLASHING AND TRIM

B. Sheet Metal Flashing and Trim: Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim."

1. Sheet Metal: Stainless Steel, or by Architect..

C. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item.

1. Apron Flashings: Fabricate with lower flange extending a minimum of 6 inches over and 4 inches beyond each side of downslope tile roofing and[**6 inches** up the vertical surface.
2. Step Flashings: Fabricate with a 3-inch (75-mm) headlap extending a minimum of 4 inches 5 inches over the underlying tile roofing and 4 inches up the vertical surface.

3. Channel Flashings: Fabricate with vertical surface extending a minimum of 4 inches above the tile and 6 inches beneath the tile roofing and with a 1-inch high vertical return to form a runoff channel.Retain subparagraph below for metal pan or channel flashings acting as an internal gutter at rake edge fasciae. Revise dimensions to suit Project.

4. Chimney Saddle Flashings: Fabricate with concealed flange extending a minimum of 18" beneath upslope tile roofing, 4 inches beyond each side of chimney or skylight, and 6 inches above the roof plane.
5. Closed-Valley Flashings: Fabricate in lengths not exceeding 10 feet, with 1-inch-or more high, inverted-V Rib at center of valley and with equal flange widths of 16 inches.
6. Drip Edges: Fabricate in lengths not exceeding 10 feet , with 6-inch (50-mm) roof-deck flange and 1-1/2-inch (38-mm) fascia flange with 3/8-inch (9.6-mm) drip at lower edge.

D. Vent-Pipe Flashings: Stainless Steel or Lead Type L51121, at least 1/16 inch (1.6 mm) thick. Provide sleeve sized to slip over or turn down into pipe, soldered to skirt at slope of roof and extending at least 6 inches beyond pipe onto roof (FHA Rated).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through roof.
3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. General: Install underlayments according to tile manufacturer's written recommendations

1. Cover **ridge** and/or **hip** wood nailers with underlayment strips.

B. Single-Layer Roof Self Adhearing Membrane Underlayment: Install perpendicular to roof slope in parallel courses. Lap sides a minimum of 3-1/2 inches or to Manufacturers marked line, over underlying course. Lap ends a minimum of 6 inches. Stagger end laps between succeeding courses at least 4'. Verify that underlayment is sealed to deck.

C. Self-Adhering Sheet Underlayment: Install wrinkle free, complying with low-temperature installation restrictions of underlayment manufacturer if applicable. Install on entire roof

surface, lapped in direction to shed water. Lap sides not less than 3-1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm), staggered 24 inches (600 mm) between succeeding courses. Roll laps with roller. Cover underlayment with tile within thirty days.

1. Prime concrete and masonry surfaces to receive self-adhering sheet underlayment.
2. Install self-adhering sheet underlayment over entire roof deck.

D. Metal-Flashed Closed Valley Underlayment: Install 1 additional layer of 36-inch- (914-mm-) wide self-adhering underlayment centered in valley. Stagger end laps between layers at least 72 inches (1830 mm). Lap ends of each layer at least 12 inches (300 mm) in direction to shed water.

1. Lap roof-deck underlayment over previously installed layer of valley underlayment at least 6 inches.

3.3 METAL FLASHING INSTALLATION

A. General: Install metal flashings and other sheet metal to comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim."

1. Install metal flashings according to tile manufacturer's written recommendations and recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

B. Apron Flashings: Extend lower flange over and beyond each side of downslope tile roofing and up the vertical surface.

C. Step Flashings: Install with 3-inch headlap extending over the underlying tile and up the vertical surface. Install with lower edge of flashing just upslope of, and concealed by, butt of overlying tile. Fasten to roof deck only.

D. Chimney or Cricket Flashings: Install against roof-penetrating elements, extending concealed flange beneath upslope tile roofing and beyond each side.

E. Closed Valley Flashings: Install centrally in valleys, lapping ends at least 8 inches (200 mm) in direction to shed water. Fasten upper end of each length to roof deck beneath overlap.

1. Secure hemmed flange edges with metal cleats spaced 18 inches apart and fastened to roof deck.
2. Adhere 18 wide strips of self-adhering sheet to metal flanges and to self-adhering sheet underlayment.

F. Channel Flashings: Install over underlayment and fasten to roof deck.

G. Rake Drip Edges: Install over underlayment and fasten to roof deck.

H. Eave Drip Edges: Install beneath underlayment and fasten to roof deck.

I. Pipe Flashings: Form flashing around pipe penetrations and tile roofing. Fasten and seal to tile roofing.

J. Ridge Ventilation System: Install centrally and mechanically fasten to ridge. Adhere each side to roof tile in elastomeric sealant.

1. Install Ridge Vent fabric mesh over roof deck air ventilation gaps to prevent insect entry.

3.4 BATTENS

A. Install 2x wood nailers at ridges and hips, and securely fasten to roof deck.

B. Install Ventilated Battens at Eave (tile riser) course, and on all roof slopes 7/12 and higher.

3.5 CONCRETE TILE INSTALLATION

A. General: Install roof tiles according to manufacturer's written instructions and recommendations in RTI/WSRCA's "Concrete Roof Tile Design requirements.

1. Maintain uniform exposure and coursing of tiles throughout roof.
2. Extend tiles 1-2 inches (50 mm) over eave fasciae.
3. Nail Fastening: Hand fasten nails to clear the tile so the tile hangs from the nail and is not drawn up.

    a. Install wire through nail holes of cut tiles that cannot be nailed directly to roof deck, such as at valleys, and fasten to nails driven into deck.
4. Install storm clips to capture edges of longitudinal sides of tiles and securely fasten to roof deck, if directed by Architect for high winds.

5. Cut and fit tiles neatly around roof vents, pipes, ventilators, and other projections through roof. Fill voids with synthetic mortar.
6. Install tiles with color blend approved by Architect.

Legendary Flat Tile Installation:

1. Maintain minimum 3-inch head lap between succeeding tile courses.
2. Offset joints in succeeding courses according to manufacturer’s guidelines.
3. Extend tiles 1 inch minimum over fascia, at eaves.
4. Install ridge tiles in V-ridge configuration with laps facing away from prevailing wind.

5. Install Hip and Ridge tiles in a V-ridge configuration. Anchor each Ridge tile with 2 fasteners to Ridge nailer boards.

6. Install Legendary tile with a one-quarter tile offset on each succeeding course. Each Legendary tile has the appearance of TWO tile in each tile individual piece.

7. Install L-shaped gable Rake tile on Gables..

C. Closed Valleys: Cut tiles at valleys to form straight lines, trimming upper concealed corners of tiles. Maintain uniform gap of 1/4 to 3/4 inch at centerline of valley.

1. Drill or notch cut valley tiles and wire tie to fastener placed clear of valley metal flashing. Do not nail tiles to metal flashing.

3.6 ADJUSTING AND CLEANING

A. Remove and replace damaged or broken tiles.

B. Remove excess tile and debris from Project site.

3.7 ROOFING INSTALLER'S WARRANTY

A. WHEREAS <**Insert name**> of <**Insert address**>, herein called the "Roofing Installer," has performed roofing and associated work on the following project:

1. Owner:
2. Address:
3. Building Name/Type:
4. Address:
5. Area of Work:
6. Acceptance Date:
7. Warranty Period:
8. Expiration Date:

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period, of

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

a. lightning;
b. peak gust wind speed exceeding 100 mph;
c. fire;
d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;

f. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this ____ day of _____Month, 20__ __.

1. Authorized Signature:
2. Full Name:
3. Title:

END OF SECTION 073216

BARTILE
PREMIUM ROOF TILES

Split Timber Spec Sheet

Standard Weight: 10.25 lbs per sq ft

Ultralite: 8 lbs per sq ft

Width: 10 3/8”

Height: 15 1/4”

Thickness: 1 1/8”

Std Weight Tile: 1.92 sq per pallet

Ultralite Tile: 2.88 sq per pallet

122 pc per sq installed

BARTILE
PREMIUM ROOF TILES

New England Slate Spec Sheet

Standard Weight: 10.25 lbs per sq ft

Ultralite: 8 lbs per sq ft

Width: 10 3/8”

Height: 15 1/4”

Thickness: 1 1/8”

Std Weight Tile: 1.92 sq per pallet

Ultralite Tile: 2.88 sq per pallet

122 pc per sq installed

ICC-ES Evaluation Report

ESR-2778

Reissued July 2024

Subject to renewal July 2026

This report also contains:

- CBC Supplement

- FBC Supplement

ICC-ES Evaluation Reports are not to be construed as representing aesthetics or any other attributes not specifically addressed, nor are they to be construed as an endorsement of the subject of the report or a recommendation for its use. There is no warranty by ICC Evaluation Service, LLC, express or implied, as to any finding or other matter in this report, or as to any product covered by the report.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION Section: 07 32 16—Concrete Roof Tiles	REPORT HOLDER: BARTILE ROOFS, INC.	EVALUATION SUBJECT: BARTILE EXTRUDED CONCRETE ROOF TILES	

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2021, 2018, 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2021, 2018, 2015, 2012, 2009 and 2006 *International Residential Code*® (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Properties evaluated:

- Roof covering
- Fire classification
- Wind resistance

1.2 Evaluation to the following green code:

- 2022 *California Green Building Standards Code (CALGreen)*, Title 24, Part 11

Attributes verified:

- See Section 3.0

2.0 USES

The Bartile extruded concrete roof tiles comply with ASTM C1492, and when installed in accordance with this report, may be used as a Class A roof covering.

3.0 DESCRIPTION

Bartile extruded concrete roof tiles are available in European, Mission “S”, Flat and Legendary styles. Flat tiles are available in shake and slate designs. The European, Mission “S” and Flat tiles are $15^1/_4$ inches long by $10^1/_2$ inches wide (387 mm by 267 mm) and have $1^1/_8$-inch to $1^1/_4$-inch (28 mm to 32 mm) interlocking double tongue-and-groove side laps. The tiles also have anchor lugs at the bottom intended for installation over wood furring strips. The lugs are typically $^1/_2$ inch (13 mm) deep, $1^1/_2$ inches (38 mm) wide and $^5/_8$ inch (16 mm) thick. The tile thickness varies from $^1/_2$ inch (13 mm) to 1 inch (25.4 mm) at the ribs.

The Legendary tiles are 16 inches long by 16 inches wide (406 mm by 406 mm) and have a 1-inch (25.4 mm) interlocking side lap. The tiles have an overall height of $1^3/_8$ inches (44.4 mm). The tiles have anchor lugs and midpoint knubs to provide additional support for installation directly to deck.

Accessory tiles in each style are available for rakes, ridges, and hips.

The tiles are available in both standard-weight and lightweight varieties for each style. They vary only in weight due to the lightweight tiles being produced using crushed lightweight shale in place of sand.

When installed with a standard 3-inch (76 mm) head lap, the following are the approximate installed weights:

DESCRIPTION	INSTALLED WEIGHT (pounds per square foot)	
	Standard-weight Tiles	Lightweight Tiles
European	9.5	7.5
Mission "S"	9.5	7.5
Flat (Shake and Slate)	10.25	8.0
Legendary	10.4	8.9

See Figure 1 for details.

The attributes of the roof tiles have been verified as conforming to the provisions of CALGreen Section A5.406.1.2 for reduced maintenance. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

4.0 INSTALLATION

4.1 General:

Except as otherwise noted in this report, installation of the Bartile roof tiles must be in accordance with the Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions, dated March 2010, published by the Tile Roofing Institute and Western States Roofing Contractors Association. In the case of a conflict between the installation manual and this report, this report governs. This report and the TRI/WSRCA installation manual must be available at the jobsite at all times during installation. The roof tiles must be installed on a minimum roof slope of $2^1/_2$:12 (20.8% slope). Care must be taken during field installation to ensure that horizontal joints are kept parallel to the eave, and vertical joints are at right angles to the eave, in order to ensure uniform contact between the tiles and proper fit and appearance. All cracked and broken tiles must be replaced. Plastic battens described in a current ICC-ES evaluation report may be used in lieu of wood battens, provided the battens are installed in accordance with their evaluation report, the tile installation is subject to the limitations in the evaluation report on the battens, and nails attaching the roof tiles are of sufficient length to penetrate through the sheathing.

4.2 Lightweight Tiles:

Lightweight tiles are installed in the same manner as standard-weight tiles, except that each tile is attached with No. 11 gage, corrosion-resistant roofing nails.

4.3 Wind Resistance:

4.3.1 2021 IBC and 2018 IBC: For maximum basic design wind speeds of 130 mph (209 km/h) or less and mean roof heights of 60 feet, tiles must be installed in accordance with the prescriptive parameters of IBC Table 1507.3.7.

4.3.2 2021 IRC, 2018 IRC, 2015 IBC, 2015 IRC and 2012 IBC: For ultimate design wind speeds of 130 mph (209 km/h) or less and mean roof heights of 60 feet (18.3 m) for the IBC) and mean roof heights of 40 feet (12.2 m) for the IRC, tiles must be installed in accordance with the prescriptive parameters of IBC Table 1507.3.7 or IRC Section R905.3.7.

4.3.3 2012 IRC: For basic wind speeds of 100 mph (161 km/h)] or less and mean roof heights of 40 feet (12.2 m) or less, tiles must be installed in accordance with the prescriptive parameters of Section R905.3.7 of the IRC, as applicable.

4.3.4 2009 IBC, 2009 IRC, 2006 IBC and 2006 IRC: For basic wind speeds [3-second gust of 100 mph (161 km/h)] or less and mean roof heights of 60 feet (18288 mm) or less for the IBC and 40 feet (12192 mm) or less for the IRC, tiles must be installed in accordance with the prescriptive parameters of Table 1507.3.7 of the IBC or Section R905.3.7 of the IRC, as applicable. For application beyond these prescriptive parameters, the tiles and the fastening systems must be designed to withstand the aerodynamic wind uplift moment in accordance with the section on Design Considerations for High Wind Applications in Appendix B of the TRI/WRSCA installation manual. The generic required aerodynamic uplift moment, determined in accordance with Tables 5A through 6D of the TRI/WRSCA installation manual, must be multiplied by the tile factor ratio in

Table 2 to obtain the required aerodynamic uplift moment for the specific Bartile roof tile being installed. The allowable aerodynamic uplift moment for the roof tile fastening system selected from Table 7 of the TRI/WRSCA installation manual, must be equal to or greater than the required aerodynamic uplift moment for the specific Bartile roof tile being installed.

4.4 Fire Classification:

4.4.1 New Construction: When installed in accordance with this report, the tiles are Class A roof coverings in accordance with the exception to Section 1505.2 of the IBC and Section R902.1 of the IRC.

4.4.2 Reroofing Applications: The existing roof coverings must be removed and the new roof installed in accordance with the requirements of 2021 IBC Section 1512 [2018 and 2015 IBC Section 1511 (2012, 2009 and 2006 IBC Section 1510)] or 2021, 2018 and 2015 IRC Section R908 (2012, 2009 and 2006 IRC Section R907), as applicable. The roof classification is as noted in Section 4.4.1.

4.5 Roof Slope Limitation:

Tile must be installed on roof slopes of between $2^1/_2$:12 (21% slope) and 24:12 (200% slope). Tile may be installed at a roof slope greater than 21:12 when the bottom edge of each tile is secured with a roof tile clip or nail in accordance with the TRI/WRSCA installation manual. On roof slopes of less than 3:12 (25% slope), the tiles are only considered as decorative and must be applied over a roof covering approved by the building official.

4.6 Tile Replacement:

Damaged tile must be completely removed. Existing fasteners must be removed and the resulting hole must be cleaned and patched with a sealant specified by the manufacturer. The replacement tile must be set into place while maintaining the required head and side lap. The new tile must be secured using a roof tile adhesive described in a current ICC-ES evaluation report, applied to the bottom half of the replacement tile.

5.0 CONDITIONS OF USE:

The Bartile extruded concrete roof tiles described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The tiles are manufactured, identified, and installed in accordance with this report, the manufacturer's instructions, and the applicable code. In the event of a conflict between the manufacturer's instructions and this report, this report governs.

5.2 The roof sheathing and roof framing system must be designed for the appropriate loads determined in accordance with the applicable code, subject to the approval of the code official.

5.3 The tiles are manufactured in Centerville, Utah, under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Clay and Concrete Roof Tiles (AC180), dated February 2012 (editorially revised July 2022).

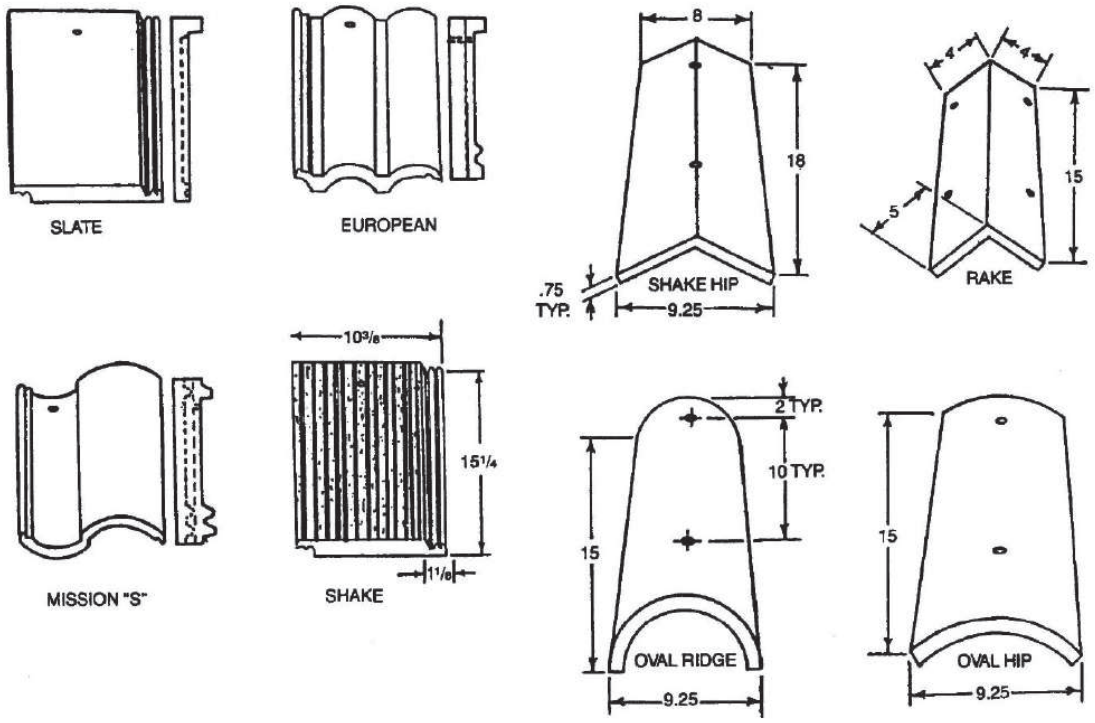
7.0 IDENTIFICATION

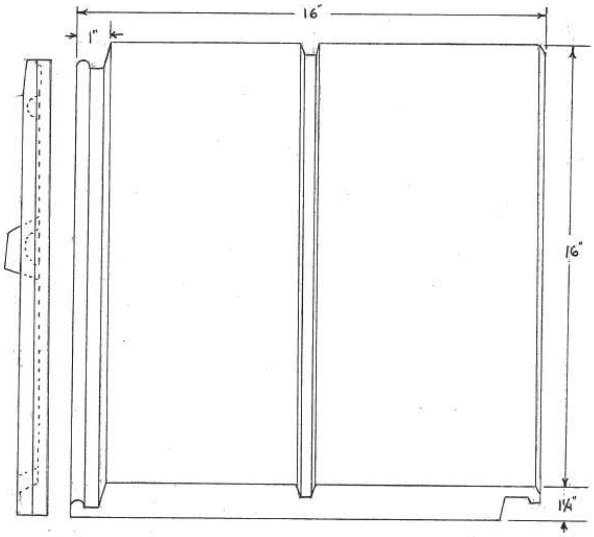
7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES-2778) along with name, registered trademark, or registered logo of the report holder [and/or listee] must be included in the product label.

7.2 In addition, the shipping pallets have labels bearing the name "Bartile," the style and color of the tile, the production date , the installed weight, and the evaluation report number (ESR-2778). The lightweight tile labels also bear the words "LT. WT. Bartile."

7.3 The report holder's contact information is the following:

BARTILE ROOFS, INC.
725 NORTH 1000 WEST
CENTERVILLE, UTAH 84014
(801) 295-3443
www.bartile.com
lew@bartile.com





LEGENDARY

FIGURE 1—LEGENDARY PROFILE

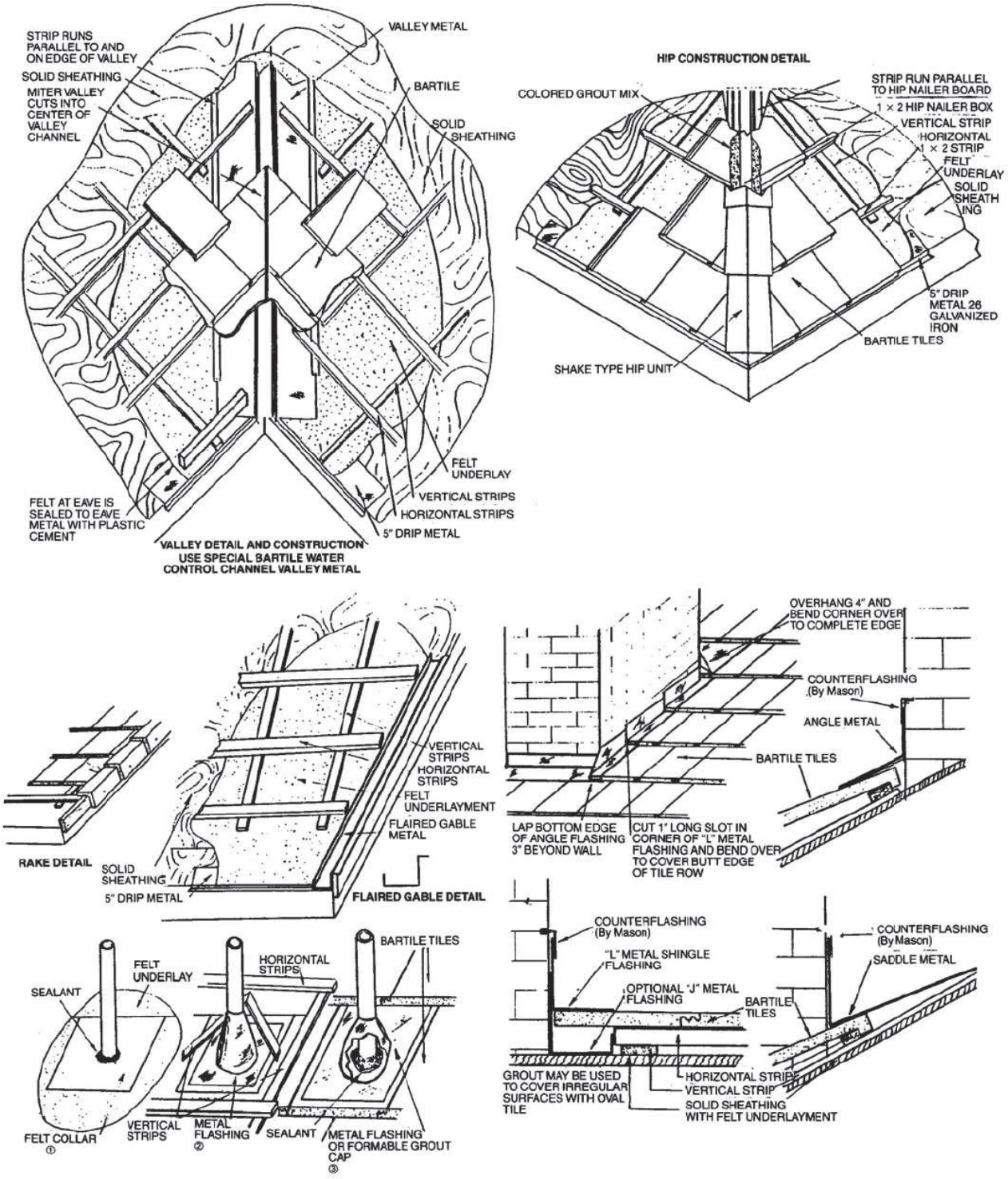

STRIP RUNS PARALLEL TO AND ON EDGE OF VALLEY
SOLID SHEATHING
MITER VALLEY CUTS INTO CENTER OF VALLEY CHANNEL
VALLEY METAL
BARTILE
SOLID SHEATHING
FELT UNDERLAY
VERTICAL STRIPS
HORIZONTAL STRIPS
5" DRIP METAL
FELT AT EAVE IS SEALED TO EAVE METAL WITH PLASTIC CEMENT
VALLEY DETAIL AND CONSTRUCTION
USE SPECIAL BARTILE WATER CONTROL CHANNEL VALLEY METAL
HIP CONSTRUCTION DETAIL
COLORED GROUT MIX
STRIP RUN PARALLEL TO HIP NAILER BOARD
1 × 2 HIP NAILER BOX
VERTICAL STRIP
HORIZONTAL 1 × 2 STRIP
FELT UNDERLAY
SOLID SHEATHING
5" DRIP METAL 26 GALVANIZED IRON
BARTILE TILES
SHAKE TYPE HIP UNIT
RAKE DETAIL
SOLID SHEATHING
5" DRIP METAL
VERTICAL STRIPS
HORIZONTAL STRIPS
FELT UNDERLAYMENT
FLAIRED GABLE METAL
FLAIRED GABLE DETAIL
OVERHANG 4" AND BEND CORNER OVER TO COMPLETE EDGE
COUNTERFLASHING (By Mason)
ANGLE METAL
BARTILE TILES
LAP BOTTOM EDGE OF ANGLE FLASHING 3" BEYOND WALL
CUT 1" LONG SLOT IN CORNER OF "L" METAL FLASHING AND BEND OVER TO COVER BUTT EDGE OF TILE ROW
BARTILE TILES
HORIZONTAL STRIPS
FELT UNDERLAY
SEALANT
FELT COLLAR ①
VERTICAL STRIPS
METAL FLASHING ②
SEALANT
METAL FLASHING OR FORMABLE GROUT CAP ③
COUNTERFLASHING (By Mason)
"L" METAL SHINGLE FLASHING
OPTIONAL "J" METAL FLASHING
BARTILE TILES
COUNTERFLASHING (By Mason)
SADDLE METAL
GROUT MAY BE USED TO COVER IRREGULAR SURFACES WITH OVAL TILE
HORIZONTAL STRIPS
VERTICAL STRIPS
SOLID SHEATHING WITH FELT UNDERLAYMENT

FIGURE 2

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 32 16—Concrete Roof Tiles

REPORT HOLDER:

BARTILE ROOFS, INC.

EVALUATION SUBJECT:

BARTILE EXTRUDED CONCRETE ROOF TILES

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2010 *California Building Code* (CBC)
- 2010 *California Residential Code* (CRC)

Properties evaluated:

- Fire classification
- Weather resistance
- Wind-uplift resistance

2.0 *California Building Code*

The Bartile concrete roof tiles described in the evaluation report ESR-2778 may be used where a Class A roof covering complying with CBC Section 1505.1.1, a Class B roof covering complying with CBC Section 1505.1.2, or a Class C roof covering complying with CBC Section 1505.1.3 is required, provided installation is in accordance with the evaluation report and the additional requirements of Sections 1507.3.10 and 1511 of the CBC.

The roof tiles may be used in the construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area, provided installation is also in accordance with the evaluation report and the additional requirements of Sections 701A.3 and 705A of the CBC.

3.0 *California Residential Code*

The Bartile concrete roof tiles described in the evaluation report ESR-2778 may be used where a Class A roof covering complying with CRC Section R902.1.1, a Class B roof covering complying with CRC Section R902.1.2, or a Class C roof covering complying with CRC Section R902.1.3 is required, provided installation is in accordance with the evaluation report and the additional requirements of Section R905.3 of the CRC.

The roof tiles may be used in the construction of new buildings located in any Wildland–Urban Interface Fire Area, provided installation is also in accordance with the evaluation report and the additional requirements of Sections R327.1.3.1 and R327.5 of the CRC.

The products described in this supplement have not been evaluated for compliance with the International Wildland–Urban Interface Code®.

This supplement expires concurrently with the evaluation report, reissued July 2024.

ICC-ES Evaluation Report

ESR-2778 FBC Supplement

Reissued July 2024

This report is subject to renewal July 2026.

www.icc-es.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 32 16—Concrete Roof Tiles

REPORT HOLDER:

BARTILE ROOFS, INC.

EVALUATION SUBJECT:

BARTILE EXTRUDED CONCRETE ROOF TILES

1.0 REPORT PURPOSE AND SCOPE

The purpose of this evaluation report supplement is to indicate that the Bartile concrete roof tiles, described in ICC-ES evaluation report ESR-2778, have also been evaluated for compliance with the codes noted below:

Applicable code editions:

- 2020 *Florida Building Code—Building*
- 2020 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The concrete roof tiles described in Sections 2.0 through 7.0 of the evaluation report, ESR-2778, comply with the *Florida Building Code—Building* and the *Florida Building Code–Residential.* The design requirements shall be determined in accordance with the *Florida Building Code-Building* or the *Florida Building Code-Residential,* as applicable. The installation requirements noted in the ICC-ES evaluation report ESR-2778 for the 2018 *International Building Code* and *2018 International Residential Code®* meet the requirements of the *Florida Building Code-Building* or the *Florida Building Code-Residential,* as applicable, with the following conditions:

The roof tiles must be installed in accordance with Section 1609 of the Florida Building Code—Building or with FRSA/TRI Florida High Wind Concrete and Clay Roof Tile Installation Manual, Sixth Edition, where the nominal design wind speed, V_{asd}, is determined in accordance with Section 1609.3.1 of the *Florida Building Code—Building*.

Use of the concrete roof tiles described in the evaluation report for compliance with the High-Velocity Hurricane Zone provisions of the Florida Building Code—Building, and the Florida Building Code—Residential has not been evaluated, and is outside the scope of this supplement.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued July 2024.