

DAVIS ELEMENTARY SCHOOL RE-ROOFING OF BUILDINGS PROJECT NUMBER: 3213-4416-3

ADDENDUM NO. 2

November 6, 2023

Owner:

Lodi Unified School District 880 N. Guild Ave. Lodi, CA 95240

This Addendum has been prepared to clarify, modify, delete, or add to the drawings and/or specifications for the above referenced project, and revisions to items listed here shall supersede description thereof prior to the above stated date. All conditions not specifically referenced here shall remain the same. It is the obligation of the Prime Contractor to make subcontractors aware of any items herein that may affect submitted bids.

Acknowledge receipt of this addendum by inserting its number and date in the bidding documents. Failure to do so may subject bidder to disqualification.

All addenda items refer to the plans and specifications unless specifically noted otherwise.

Documents included:

- Asbestos Sampling Report Environmental Science Services
- CertainTeed Shingle Applicator's Manual
 - Chapter 14 Presidential Shake and Presidential Shake TL
- Solar Brite Roofing Systems Drawings
 - o SBK-DI2
 - o SBK-DD1
 - o SBK-DE1
 - o SBK-DE3
 - SBK-DP1I
 - o SBK-DP1
 - o SBK-DP7
 - o SBK-DP8i
 - o SBK-DP3
 - Solar Brite Universal 15A
 - Solar Brite Universal 15C
 - Section 073113-Presidential Shingles
- Section 075420 Solar Bright
- Site Photo

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TOTAL PAGES IN THIS ADDENDUM (including attachments): 1

PART A – RESPONSES TO CONTRACTOR QUESTIONS

1.1 **Question:** Is there any way to get the phone numbers to the one who hosted the event please. The representative of the school district if possible. I have measured the roof and I am only coming up with 380sqs of shingles to tear off and replace. The scope of work provided states 540 approx. sqs. Dont want to short myself 200 sqs.

Response: All measurements are approximate, exact measurements are the responsibility of the contractor.

PART B – Asbestos Report

1.2 Environmental Science Services Report

PART C – Solar Brite Drawings

1.3 Environmental Science Services Report

- CertainTeed Shingle Applicator's Manual
 - Chapter 14 Presidential Shake and Presidential Shake TL
 - Solar Brite Roofing Systems Drawings
 - o SBK-DI2
 - o SBK-DD1
 - o SBK-DE1
 - o SBK-DE3
 - SBK-DP1I
 - SBK-DP1
 - SBK-DP7
 - SBK-DP8i
 - SBK-DP3
 - Solar Brite Universal 15A
 - Solar Brite Universal 15C

PART D – Manual Sections

1.4 Section 073113-Presidential Shingles 1.5 Section 075420

PART E – Site Photo

1.6 Attached

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TOTAL PAGES IN THIS ADDENDUM (including attachments): 43

End of Addendum



AIHA Laboratory ID # 232274

October 29, 2023

Joe Patty Lodi Unified School District 880 N. Guild Ave Lodi Ca 95242

RE: Asbestos Sampling Report for: Lodi Unified School District Davis Elem. School 5224 E. Morada Lane Stockton, CA ESS Project Number: 20231837-1

Environmental Science Services performed a limited asbestos survey of suspect asbestos containing materials (ACBM) at the above referenced site on 10/25/23 for building materials identification.

Bulk Sampling Report

Materials suspected of containing asbestos that were identified and sampled include,

ROOFING MATERIAL (COMPOSITE

Sampling and Analysis

Asbestos bulk samples were collected and analyzed by Polarized Light Microscopy (PLM) with dispersion staining as described in the "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", Method EPA-600/R-93/116 (Federal Register/Volume 40, CFR 763, Subpart F Appendix A, July 1993). Samples were analyzed by Environmental Science Services Laboratories, located in Lodi, CA.

Findings

For all samples collected within the present scope, laboratory analysis indicated: PLM Analysis CVE Calibrated Visual Estimation Method EPA-600/R-93/116

Sample #	Material	Location	Type/% of Asbestos
1-5	ROOFING	FLAT ROOF (Sec.1)	NAD
6-8	ROOFING	PITCHED ROOF (Sec. 2)	NAD
9-11	ROOFING	FLAT ROOF (Sec. 3)	NAD

NAD: NO ASBESTOS DETECTED

Environmental Science Services California/Nevada Operations 916.417.5361 209.304.8444 Email: envss1ca@gmail.com www.greenenvironmental1.com 1 | P a g e



Environmental Science Services

Limitations

Reasonable effort was made by ESS, Inc. personnel to locate and sample all accessible areas regarding the remediation. This report is intended to assist in the areas specified only. If any additional areas are to be impacted or that the scope of work is modified, additional investigation is advised.

Thank you for allowing Environmental Science Services to assist you with your asbestos consulting needs. Please feel free to contact us with any questions regarding this report at: (916) 417-5361.

Sincerely,

John Shane Jones, CAC, IH California Certified Asbestos Consultant CA DOSH #16-5690 CDPH I/A 00004810 Nevada DOSH # IJPM-20188 Senior Staff Hygienist Environmental Science Services

Environmental Science Services

California/Nevada Operations 916.417.5361 209.304.8444 Email: envss1ca@gmail.com www.greenenvironmental1.com

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2033 HERITAGE PARK DR, OKLAHOMA CITY, OK 73120 1.800.822.1650

Polarized Light Microscopy Asbestos Analysis Report

QuanTEM Lab No. 363545 Account Number: C152		Client: Environmental Science Services PO Box 452 Lockeford, CA 95237					
Date Received: Received By:	10/26/20 Courtney	23 Holman		Lock.	on, en 55257		
Date Analyzed:	10/26/20	23	Proje	ect: DAVIS ELEM SCHL			
Analyzed By:	Cassie Sa	anborn	Project Locati	on: 5224 E MORADA LA	NE STOCKTON,	CA	
Methodology:	EPA/600	/R-93/116	Project Numb	per: 20231837-1			
QuanTEM Sample ID	Client Sample ID	Composition	Color / Description	Asbestos (%)	Non-Asbestos Fiber (%)		Non Fibrous
001	1	Layered	Gray Roofing	Asbestos Not Present	Glass Fiber	25	Tar Sand
001a		Layered	Black	Asbestos Not Present	Cellulose	10	Tar
			Roofing				
001Ь		Layered	Black Roofing	Asbestos Not Present	Glass Fiber	40	Tar
001c		Layered	Yellow Insulation	Asbestos Not Present	Glass Fiber	100	
001d		Layered	White Insulation	Asbestos Not Present	NA		Foam Binder
002	2	Layered	Brown Roofing	Asbestos Not Present	Glass Fiber	25	Tar Sand
002a		Layered	Brown Roofing	Asbestos Not Present	Glass Fiber	25	Tar Sand

Unless otherwise noted, upon receipt the condition of the sample was acceptable for analysis.

QuanTEM is a NVLAP accredited Testing PLM laboratory (Lab Code: 101959-0). This report relates only to the specific items tested. NVLAP accreditation applies only to analysis performed utilizing EPA---40 CFR Appendix E to Subpart E of Part 763 and EPA/600/R-93/116 methods. This report may not be used to claim product endorsement by NVLAP or any agency of the US Government. This report may not be reproduced except in full, without the written approval of the laboratory.



2033 HERITAGE PARK DR, OKLAHOMA CITY, OK 73120 1.800.822.1650

Polarized Light Microscopy Asbestos Analysis Report

QuanTEM Lab I Account Numbe	No. 363545 er: C152		Client: Environmental Science Services PO Box 452 Lockeford, CA 95237					
Date Received: Received By: Date Analyzed: Analyzed By:	10/26/2023 Courtney Holman 10/26/2023 Cassie Sanborn EPA/600/R-93/116		Project: DAVIS ELEM SCHL Project Location: 5224 E MORADA LANE STOCKTON, CA					
Methodology:			Project Number: 20231837-1					
QuanTEM Sample ID	Client Sample ID	Composition	Color / Description	Asbestos (%)	Non-Asbestos Fiber (%)		Non Fibrous	
002ь		Layered	Gray Roofing	Asbestos Not Present	Glass Fiber	30	Tar Sand Binder	
003	3	Layered	Brown Roofing	Asbestos Not Present	Glass Fiber	25	Tar Sand	
003a		Layered	Black Roofing	Asbestos Not Present	Glass Fiber	20	Tar Sand	
003Ь		Layered	Black Tar	Asbestos Not Present	NA		Tar	
	Cassid Sankin	노 Sanborn, Laboratory	Analyst	10/26/2023				

Unless otherwise noted, upon receipt the condition of the sample was acceptable for analysis.

QuanTEM is a NVLAP accredited Testing PLM laboratory (Lab Code: 101959-0). This report relates only to the specific items tested. NVLAP accreditation applies only to analysis performed utilizing EPA-40 CFR Appendix E to Subpart E of Part 763 and EPA/600/R-93/116 methods. This report may not be used to claim product endorsement by NVLAP or any agency of the US Government. This report may not be reproduced except in full, without the written approval of the laboratory.

Presidential Shake[®] and Presidential Shake[®] TL 14

YOUR OBJECTIVE: To learn the correct procedures for installing Presidential Shake and Presidential Shake® TL shingles

PRESIDENTIAL SHAKEAND PRESIDENTIAL SHAKE TL SHINGLES

Presidential Shake and Presidential Shake TL shingles are a premium oversized $(14^{1/4"} \times 40")$ roofing product.



Figure 14-1: Presidential Shake Shingle.

Presidential has the depth and dimension of hand-split cedar shakes. Constructed using Tri-Laminate technology, the Presidential TL is made of two base layers and a top layer of premium materials. Also, two different colors can be combined to create a one-of-a-kind look. Using our **Special Effects color combinations** provides dozens of options to custom design a roof.

The incomparable Presidential TL is a super-heavyweight shingle. Constructed using Tri-Laminate technology, the Presidential TL is made of two base layers and a top layer of premium materials. Use matching Mountain Ridge Solaris hip and ridge shingles which are also solar reflective.

Presidential Shake is available in an **impact resistant** design; specially manufactured with a polyester mat to meet UL 2218 Class 4 impact resistance rating. **NOTE:** This product must be installed over a clean deck (no roof-overs) and Presidential impact resistant starter shingles as well as hip and ridge cap accessories must be used to obtain the UL 2218 rating.



Figure 14-2: Presidential TL Tri-Laminate Construction.

Fastening, low slope underlayment and flashing requirements, are special because of the thickness, design and weight of the products. Open valleys are recommended; however, closed-cut valleys are also acceptable. Woven valleys are not recommended when applying Presidential and Presidential TL because the laminated shingle can buckle and become damaged when shaped into the valley.

On lower-sloped roofs where water drains slowly and due to the Presidential TL tri-laminate design, step flashing details are important to ensure a water-tight roof. Extra precautions such as putting a slater'sedge on step flashings under the shingle or applying two beads of asphalt cement lengthwise along the top of the step shingle (perpendicular to the shingle) should be considered when there are multiple roof penetrations or vertical obstructions in close proximity to each other (ex. several skylights on the same roof plane or a skylight close to a vertical wall).



Figure 14-3: Layers of a Presidential TL.

SLOPE RESTRICTIONS



Figure 14-4: Slope definitions

THE ROOF DECK* MUST BE AT LEAST: $\frac{3}{8}$ " (9.5 mm) thick plywood, or $\frac{7}{16}$ " (11 mm) thick non-veneer, or nominal 1" (25 mm) thick wood deck.

FOR UL FIRE RATING, underlayment may be required. Apply flat and unwrinkled.

STANDARD OR STEEP SLOPES: CertainTeed recommends DiamondDeck[®] or RoofRunner[™] Synthetic Underlayment or shingle underlayment meeting ASTM D226, D4869 or D6757. Always ensure sufficient deck ventilation, and take particular care when DiamondDeck, RoofRunner or other synthetic underlayment is installed. Follow manufacturer's application instructions.

LOW SLOPES: All roof shingles applied to a low slope deck (2" to below 4" per foot) require the use of CertainTeed WinterGuard® Waterproofing Shingle Underlayment, or its equivalent, * applied over the entire deck surface. Consult the WinterGuard and individual shingle application instructions for details.

- * For Presidential Shake applied to low slopes, underlayment equivalents to WinterGuard include:
- 1) waterproofing shingle underlayments meeting ASTM D1970;
- in areas not prone to snow or ice, two layers of 36" (915 mm) wide felt shingle undelayment lapped 19" (485 mm).
- 3) in areas not prone to snow or ice, two layers CertainTeed's DiamondDeck or RoofRunner in shingle fashion (half lap) per the low-slope application instructions

Shingle underlayment should meet ASTM D6757, ASTM D4869 Type 1 or ASTM D226 Type 1 Ensure sufficient deck ventilation when DiamondDeck, RoofRunner or other synthetic underlayment is installed. (One layer of shingle underlayment meeting ASTM D4869 applied over the required WinterGuard is also recommended.

IMPORTANT: Presidential Shake TL, applied to low slopes requires the use of WinterGuard or a waterproofing shingle underlayment meeting ASTM D1970. Two layers of felt or synthetic underlayment **IS NOT** an acceptable alternative to WinterGuard.

COLD WEATHER CLIMATES (ALL SLOPES): Application of WinterGuard or a waterproofing shingle underlayment meeting ASTM D1970 is strongly recommended whenever there is a possibility of ice build-up. Follow manufacturer's application instructions.

SEALING: Shingle sealing may be slowed if the shingles are applied in cool weather and may be further delayed by airborne dust accumulation. We recommend hand-sealing when weather conditions are likely to prevent the factory-applied sealant from activating.

CAUTION: To prevent cracking, shingles must be warm enough to allow proper forming for hips, ridges and valleys.

FLASHING: Corrosion-resistant flashing must be used to help prevent leaks where a roof meets a wall, another roof, a chimney or other objects that penetrate a roof.

WARRANTY: These shingles are warranted against manufacturing defects and are covered by SureStart[™] protection. See the warranty itself for specific details and limitations.

For technical questions, information on accepta alternative application methods and materials, or a copy of the product warranty, contact the sources listed below:	ible	Warranty	Alternate Instructions	Technical Questions
Your supplier or roofing applicator		~		
CertainTeed Home Institute 800-782-8	3777	~	~	
CertainTeed-RPG Technical Services 800-345-1	145	>	~	<



Figure 14-5: Proper and improper nailing.

IMPORTANT: For decks $\frac{3}{4}$ " (19 mm) thick or thicker, nails must go at least $\frac{3}{4}$ " (19 mm) into the deck. On thinner decks, nails must go at least $\frac{1}{8}$ " (3.2 mm) through the deck.

Nails must be 11- or 12-gauge roofing nails, corrosion-resistant, with at least $\frac{3}{8}$ " (9.5 mm) heads, and at least 1" (25 mm) long.

NOTE: Nails are required for Presidential TL and Presidential; staples are not an acceptable fastener.

LOW AND STANDARD SLOPE:

For low and standard slopes, use five nails for each full Presidential shingle as shown below.



Figure 14-6: Fastening Presidential and Presidential TL shingles on low and standard slopes.

STEEP SLOPE:

For steep slopes, use nine nails for each full Presidential shingle and apply 1" diameter spots of asphalt roofing cement under each shingle tab.

After applying 5 nails in between the nailing guide lines, apply 4 nails 1" above tab cutouts making certain tabs of overlying shingle cover nails.



Figure 14-7: Fastening Presidential and Presidential T/L shingles on steep slopes.

CAUTION: Too much roofing cement can cause shingles to blister.

ALIGNMENT AND SHIPLAP NOTCHES

To maintain the correct 5" and 15" diagonal offset pattern, use the **Alignment Notches** at $5^{1}/2$ " and $15^{1}/2$ " from the right edge of the shingle. These notches are pre-cut into the top of each shingle and serve as a shingle placement guide for the shingles being installed in the course above them.



Figure 14-8: Use the alignment notches to ensure shingles are applied at a 5" and 15" diagonal offset.

Shiplap Notches on the left and right side of each shingle are used to ensure the proper 4" exposure is continued across shingle courses by lining up the shiplap notches of adjacent shingles.

ONE CLEAN DECK APPLICATION METHOD

NOTE: Shingle applications are on 5" and 15" offsets with a 4" exposure. Apply shingles up the left side of the roof to establish the pattern and fill in to the right. When cutting shingles, always apply the right hand portion (cut-off the left side.) Use the pieces cut off the left rake, hip, or valley to complete courses at the right rake.

PREPARING THE DECK:

- Apply underlayment as required. CertainTeed suggests that a layer of shingle underlayment be applied. For UL fire rating, underlayment is generally required. Apply flat and unwrinkled.
- Snap horizontal and vertical chalklines to assure shingles will be correctly aligned. Expose all shingles 4" (125 mm).



Use TWO (2) OVERLAPPING LAYERS of CertainTeed's

"Presidential Starter" shingles, applied in the following fashion, starting at left rake/eaves corner. Starting at the right rake/eaves corner is not permitted. The staggered top edge of the starter pieces will allow a smooth and uniform transition for applied shingles.

1. Bottom Starter Course Layer: Cut 20" off the first bottom piece. Apply remaining $13^{1/4}$ " x 20" piece, followed by full $13^{1/4}$ " x 40" pieces along the eave. DO NOT REMOVE THE PERFORATED TOP SECTION. Extend the shingles over the rake and eaves about 1/2" (13 mm) if drip edge is used, or about 3/4" (19 mm) if no drip edge is used.



Colored granules matching the shingle blend are to be exposed at lowermost edge of roof.

Figure 14-9: Presidential Starter (bottom starter course.)

2. **Top Starter Course Layer:** Remove the 2" perforated top section. Cut 2" off the left side of the first top piece only. Install the $11^{1/4}$ " x 38" piece over and flush to the bottom starter course. Continue with $11^{1/4}$ " x 40" top course pieces over the rest of the bottom starter course.



Figure 14-10: Presidential Starter (top starter course.)

NOTE: The exposed colored granules on the "top" starter shingles must match the Presidential/Presidential TL shingle colors.

Fasteners should be placed about 1" and 13" in from both ends of a full length starter shingle. Fasteners for less than full 40" starter shingles should be placed about 1" in from each end and evenly spaced no more than 13" apart (2, 3 or 4 fasteners may be used on shorter starter shingles depending on the length.)



Figure 14-11: Use two (2) overlapping layers of CertainTeed's "Presidential Starter."

Here's a Tip... When establishing the 4-course shingle pattern, use the proper alignment notches to determine where to cut the shingles on the left hand side. For example, install the first course full shingle, then place a full shingle above it by lining up the right side edge with the 5¹/2" alignment notch in the 1st course shingle below, then fasten and trim the 2nd course shingle along the rake edge. Likewise, use the 15¹/2" alignment notch at the top of the 2nd course shingle to place the right side edge of the 3rd course shingle.Finally, use the 5¹/2" alignment notch at the top of the 3rd course shingle to place the 4th course shingle

5" AND 15" OFFSET, FOUR-COURSE DIAGONAL METHOD

1ST COURSE: Start at left rake, hip or valley and apply a full shingle.



Figure 14-12: First Course.

2ND COURSE: Cut 5" from the left edge of the first shingle. Install the remaining 35" piece by lining up the right lower edge with the $5^{1/2}$ " alignment notch in the top of the First Course shingle.



Figure 14-13: Second Course.

3RD COURSE: Cut 20" from the left edge of the first shingle. Install the remaining 20" piece by lining up the right lower edge of the shingle with the $15^{1/2}$ " alignment notch in the top of the Second Course shingle.



Figure 14-14: Third Course.

4TH COURSE: Cut 25" from the left edge of the first shingle. Install the remaining 15" piece by lining up the right lower edge of the shingle with the $5^{1}/2$ " alignment notch in the top of the Third Course shingle.



Figure 14-15: Fourth Course.

SUCCEEDING COURSES: Start the Fifth Course by installing a full shingle and repeat the four-course pattern. Continue applying shingles filling into the right of the first four courses.

ANOTHER WAY TO VIEW IT:

The 5" and 15" offset pattern is established over the 4 courses as follows:

1st course shingle = 40" L (full shingle) 2nd course shingle = 35" L (1st course - 5") 3rd course shingle = 20" L (2nd course - 15") 4th course shingle = 15" L (3rd course - 5")

AN ALTERNATIVE TO STARTING ON THE LEFT:

Follow the same application instructions specified in the 5" and 15" Offset Method above except instead of starting at the left rake, strike a chalkline perpendicular to the eave, at least 10' from the rake's edge. Install the First Course full shingle by aligning its left edge with the perpendicular chalk-line. Follow the 5" and 15" Offset Method instructions for the remaining courses.

IMPORTANT: The designed appearance and service of Presidential Shake Shingles requires strict adherence to the application instructions.

Here's a Tip... After establishing the 4 course shingle pattern, extend the 1st course by installing additional full shingles along the eave. Using the proper alignment notch in the shingle course below to maintain the 5" and 15" offset, build the courses up the roof by working "back and forth" across the roof deck. (Be careful to maintain the correct offsets!)



Figure 14-16: Highlight of open valley and chimney flashing details.

"SPECIAL EFFECTS" PRESIDENTIAL SHAKE SHINGLES

DUAL COLOR APPLICATION METHODS USING THE 5" AND 15" OFFSET

METHOD # 1 – ALTERNATING COLORS – SINGLE COURSES

- 1. Select color combinations of Presidential[®] Shake shingles for use in dual color application, e.g. Slate Gray and Weathered Wood. Color designations "A" and "B" for two different shingle colors will be used in the following shingle application instructions.
- 2. **STARTER COURSE:** Apply color "A" Starter Strip shingles to starter course and follow instructions for Starter Course application.
- 3. **1ST COURSE:** Apply color "B" Presidential Shake shingles to the first course. Follow instructions for First Course application. All shingles applied to the first course and all successive odd numbers will be the same color i.e., color "B".
- 4. **2ND COURSE:** Apply color "A" shingles to second course. Follow instructions for Second Course application. All shingles applied to the second course and all successive even numbers will be the same color i.e., color "A".
- 5. Every other course of shingles will alternate between colors "A" and "B". Complete shingle application to each course across the roof deck with the same color of shingles. To avoid confusion, completely fill in each course of shingles across the deck at the same time. Follow the appropriate installation instructions for Presidential Shake shingles.
- 6. HIP & RIDGE: Apply hip & ridge cap shingles that are the opposite color as that of the last course of Presidential Shake Shingle. For example, if the last (top) course of Presidential Shake Shingle is color "A", then hip and ridge cap shingles should be color "B".

METHOD #2 – ALTERNATING COLORS – DOUBLE COURSES

- 1. Select color combinations of Presidential Shake Shingles for use in dual color application, e.g. Slate Gray and Weathered Wood. Color designations "A" and "B" for two different shingle colors will be used in the following shingle application instructions.
- 2. **STARTER COURSE:** Apply color "A" Starter Strip Shingles to starter course and follow instructions for Starter Course application.
- 3. **1ST COURSE:** Apply color "A" Presidential Shake Shingles, same color as starter shingles, to the first course. Follow instructions for First Course application.
- 4. **2ND AND 3RD COURSE:** Apply color "B" shingles to the second and third courses. Follow instructions for Second Course and Third Course applications.

- 5. **4TH AND 5TH COURSES:** Apply color "A" shingles to the fourth and fifth courses. Follow instructions for Fourth Course and Fifth Course applications.
- 6. All succeeding courses continue with two courses of shingles of one color followed by two courses of shingles of the other color. To avoid confusion completely apply the two courses of same colored shingles at the same time. Follow the appropriate installation instructions for Presidential Shake shingles.
- 7. **HIP & RIDGE:** The hip & ridge shingle color to be used will depend upon the color of the last two courses of Presidential shingles. If the last two courses contain shingles of the same color, then the hip & ridge color will be the opposite color. For example, if the last two courses are color "A", then the color "B" hip & ridge shingles are used.

If the last two courses of shingles are different in color, then the color of hip & ridge shingles will be the same as the last course of Presidential Shake shingle. For example, if the next to last course is color "A" and the last (top) course is color "B", then the Hip & Ridge color used is "B".

CAPPING THE HIP AND RIDGE

Cedar Crest[®] or Mountain Ridge[®] accessory shingles can be used for covering hips and ridges. Apply shingles up to the ridge. Fasten each accessory with two fasteners. The fasteners must be $1^{3}/_{4}$ " long or longer, so they penetrate either $3^{1}/_{4}$ " into the deck or completely through the deck.

MOUNTAIN RIDGE HIGH-PROFILE HIP AND RIDGE ACCESSORY SHINGLES

Use Mountain Ridge accessory shingles to cover hips, ridges or rake edges. One box will cover 20 linear feet. To prevent damage to shingles during application, they must be sufficiently warm to allow proper forming.

FASTENING

IMPORTANT: Use two nails to fasten each shingle. Nails must be **minimum 1³/4" (45 mm) long.** For the 4" (100 mm) starter shingle, place fastener 1" (25 mm) in from each side edge and about 2" (50 mm) from the rake (or eave) edge, making sure the fastener goes $^{3}/_{4}$ " into the deck or all the way through. For each full accessory shingle, place fasteners $8^{5}/_{8}$ " (219 mm) up from its exposed butt edge and 1" (25 mm) in from each side edge.

Here's a Tip... To provide a level surface for bip and ridge caps applied over Presidential TL, a "nailer" made from 1-by boards can be installed or a piece of metal can be formed to support the caps. Also ridge vents made from sturdy material can serve as a base to provide an even uniform appearance.

HIP, RIDGE AND RAKE SHINGLE APPLICATION

Apply the primary field roofing up to the hip or ridge from both sides of the roof and trim flush or lap over one side, not more than half the width of an accessory shingle.

Assure that the installed accessory shingles properly cover field shingles on both sides and along rake edges. For a rake edge installation, cut the field shingles flush to the rake edge. Apply accessory shingles ensuring they fit securely against the rake board. **To assist in proper alignment, snap a chalk line parallel to the hip, ridge or rake along the line where the side edges of the accessory shingles should fall.**

Prepare a 4" **Starter shingle** by cutting off the lower 8" color granule butt portion of one accessory shingle. Apply the 4" starter piece (with sealant nearest the outer edge) over the bottom corner of the hip or rake, or on either end of the ridge, overhanging the corner or end by approximately 1/2" and bending the starter shingle along its centerline to form into place (see figures below.) Install a nail on each side about 2" up from the starter shingle. The 8" piece that was cut off may be used to finish the opposite end of hip, ridge or rake.

Next, apply a full Mountain Ridge[®] shingle over the installed starter shingle, bending it along its centerline and forming into place over the hip, ridge or rake, flush with the bottom and side edges of the starter shingle. Install a nail on each side of the shingle 8⁵/8" up from the bottom edge and 1" in from each side edge.

Rake – Ensure field shingles at rake edge are flush with the outer edge of the rake board. Apply Mountain Ridge shingles fitting them snugly against the rake board. Use two color-coordinated aluminum trim or paneling nails, to pin the material to the fascia at 2" (50 mm) up from bottom edge and 2" (50 mm) and 3" (75 mm) in from front edge of shingle. *(See Figure 14-18)*.

Continue application of the Mountain Ridge shingles along the hip, ridge or rake as shown. Expose Mountain Ridge shingles 8", covering all fasteners.



Figure 14-17: Mountain Ridge Hip and ridge application.



Figure 14-18: Mountain Ridge Rake edge application.

CEDAR CREST MEDIUM-PROFILE HIP AND RIDGE ACCESSORY SHINGLES

Cedar Crest[®] hip and ridge shingles deliver a thicker appearance to accentuate the roof lines for a more attractive finish. Unlike other accessory products which have a monotone appearance, Cedar Crest has blended colors that complement the Landmark® Landmark TL, Presidential® and Presidential TL shingle colors. Cedar Crest's multi-layer design gives additional protection at critical stress points and its aggressive sealant helps ensure the caps stay on the roof. Use Cedar Crest accessory shingles to cover hips and ridges. Carefully separate the three-piece units prior to application, by first folding along the pre-cut lines and then detatching the pieces (see Figure 14-19). No cutting is necessary. There are 30 individual shingles (10 three-piece units) in each bundle. One bundle will cover 20 linear feet. Each 12" x 12" shingle has a shadowline that is a design feature which is visible when applied properly. To prevent shingle damage during application, they must be sufficiently warm to allow proper forming.



... separate to make 30 shingles

Figure 14-19: Separate to make 3 cap shingles.

FASTENING

IMPORTANT: Use TWO nails to fasten each shingle. Fasteners must be minimum $1^{3}/4^{"}$ (45 mm) long.

For the starter shingle, place fastener 1" in from each side edge and about 2" up from the starter shingle's exposed butt edge, making sure fastener goes 3/4" into the deck or all the way through the deck. (*see Figure 14-20*). For each full Cedar Crest shingle, place fasteners 85/8" up from its exposed butt edge and 1" in from each side edge (*see Figure 14-21*).



Figure 14-20: Apply a full cap shingle over the starter shingle.



Figure 14-21: Install cap shingles at an 8" exposure and fasten with one nail on each side as shown.

IMPORTANT: High Wind Instructions. In order to achieve the ASTM D3161 Class "F" Wind Resistance Classification each "hip and ridge" shingle must be both 1) fastened with nails as shown and 2) hand-sealed with two 1/4" (6 mm) wide beads of either BASF "Sonolastic[®] NP1[™] Adhesive" or Henkel "PL[®] Polyurethane Roof & Flashing Cement" applied from the middle of the shingle's raised

overlay on the top piece and extending approximately 4" (102 mm) along the sides of the headlap along a line 3/4"-1" (19 mm – 25 mm) in from each side edge of the shingle's headlap as shown. Immediately align and apply the next overlying shingle, gently pressing tab sides into adhesive and ensuring none becomes



Figure 14-22: Hand seal caps as shown.

visible. Only one side of thedouble thickness tab is laminated together; to secure the other side, after folding the shingle over the ridge and nailing into position, a 1" (25 mm) diameter spot of either NP1 or PL adhesive must be applied between the shingle layers as shown. Immediately align and apply the next overlying shingle, gently pressing tab sides into adhesive and ensuring none becomes visible.

CEDAR CREST APPLICATION

Apply primary roofing up to hip or ridge on both sides of roof and trim flush. Ensure that the Cedar Crest[®] shingles will adequately cover the top course of the shingles on both sides of the hip or ridge. Prepare a 4" "starter" shingle by cutting off the lower 8" color granule portion of one Cedar Crest shingle. Apply the 4" starter piece with raised overlay edge over the bottom corner of the hip or to either end of the ridge, overhanging the corner or end by approximately $\frac{1}{2}$ " and bending the starter shingle along its centerline to form into place (see Figure 14-20). Install a nail on each side about 2" up from the starter shingle's exposed butt edge and 1" in from each side edge of the shingle. Then apply a full 12" x 12" piece over the starter, bending the shingle along its centerline and forming it into place over the hip or ridge, flush with the bottom and side edges of the starter shingle. Fasten with two nails minimum $1^{3/4}$ " long with one nail on each side of shingle 85/8" up from the butt edge and 1" in from each side edge (see Figure 14-21).

Continue application of Cedar Crest shingles up the hip or along the ridge, forming each shingle over the hip or ridge, and fasten as shown in Fastening. Expose Cedar Crest shingles 8", covering all fasteners (see Figure 14-21).

To assist in proper alignment, snap a chalk line parallel to the hip or ridge applying along the line where the side edges of the Cedar Crest shingles should be.

METAL STEP FLASHING

Metal flashing must consist of a 5" x 6" piece, bent as shown in Figure 14-23.

Place each piece of flashing 2" up the roof from where the lowermost edge of the next (overlapping) shingle will be applied. Each succeeding course of flashing must "overlap" the flashing course below it a minimum of 2".



Figure 14-23: Metal step flashing.



"TEAR-OFF"

CertainTeed recommends but does not require old roofing be removed before installation of these products. Inspect the condition of the roof to determine that the load bearing capacity is adequate for the application of the Presidential® shingles. If the old roof consists of two or more layers of shingles, it is required to remove (tear-off) the existing roofing. After tear-off, repair the decking and / or install new decking and apply new underlayment, eaves flashing, and Presidential shingles using the recommended procedure.

"ROOF-OVER"

OVER ASPHALT SHINGLES:

IMPORTANT: If Presidential shingles are applied over existing roofing shingles, special "nesting" application methods must be followed. Applied incorrectly, raised shingle edges may result which can give an objectionable appearance and reduce the performance of the roofing.

If Presidential Shake Shingles are installed over existing wood shingles, replace old wood shingles along eave and rake edges with 1" (25 mm) x 4" (102 mm) boards. Beveled wood strips 4" (102 mm) x 5" (127 mm) wide may be installed below butt of shingles to provide a solid nailing base. Install Presidential Shake shingles using the recommended procedures.

SECTION 14 SELF-TEST

14-1. Applying two layers of felt shingle underlayment is not an acceptable alternative to WinterGuard[®] when installing Presidential[®] TL on a low slope. A. True.

B. False.

14-2. Nails must be used as fasteners to install Presidential TL and Presidential Shake.

A. True.

B. False.

14-3. Both Presidential Shake and Presidential Shake TL shingles must be installed using the "5" and 15" Offset Method."

A. True.

B. False.

14-4. Open valleys are recommended when installing either of these products.

A. True.

B. False.

14-5. Cedar Crest or Mountain Ridge[®] accessory shingles should be used to cap hips and ridges.

A. True.

B. False.























NOTES:

- 1. BEGIN INSTALLATION OF FASTENING PLATES 6" TO 9" (150 TO 230 mm) FROM THE CORNER.
- 2. POSITION FASTENING PLATES 1/2" TO 1" (13 mm to 25 mm) FROM EDGE OF MEMBRANE.
- 3. APPROXIMATELY 1/8" (3 mm) DIAMETER BEAD OF CUT-EDGE SEALANT IS REQUIRED ON CUT EDGES OF REINFORCED MEMBRANE.

PRE-MOLDED INSIDE CORNER FLASHING

SOLAR BRITE UNIVERSAL – 15A

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NOTES:

- 1. BEGIN INSTALLATION OF FASTENING PLATES APPROXIMATELY 6" (150 mm) FROM CORNER.
- 2. POSITION FASTENING PLATES 1/2" TO 1" (13 mm to 25 mm) FROM EDGE OF DECK MEMBRANE.

PRE-MOLDED OUTSIDE CORNER



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SECTION 07 31 13

ASPHALT SHINGLES

1. PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Includes all labor, materials, and equipment to install a new composition shingle roof system over one layer of self-adhering underlayment over the properly prepared substrate.
- B. Includes removal and disposal of existing roofing system(s), insulation. boards, gutters, flashings, sheet metal items, copings, etc. for a complete prepared roof surface to receive the new roofing system.
- C. Includes removal and replacement of all metal flashings, vent flashings, etc. with new galvanized sheet metal flashings, vents, & dormer vents.

1.2 RELATED SECTIONS

- A. Related Work Specified Elsewhere:
 - B. Section 06 Rough Carpentry
 - C. Section 07 Roof Insulation
 - D. Section 07 KEE Membrane Roofing
 - F. Section 07 Flashing and Sheet Metal

1. 1.3 REFERENCES

A. ASTM A 653/A 653M – Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron-Alloy-Coated (Galvannealed) by the Hot-Dip Process

B. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

C. ASTM B 370 – Standard Specification for Copper Sheet and Strip for Building Construction.

F. ASTM D 1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials used as Steep Roofing Underlayment for Ice Dam Protection.

G. ASTM D 3018 – Standard Specification for Class A Shingles Surfaced with Mineral Granules.

H. ASTM D 3161 – Standard Test Method for Wind Resistance of Asphalt Shingles (Fan-Induced Method).

I. ASTM D 3462 – Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.

J. ASTM D 4586 – Standard Specification for Asphalt Roof Cement, Asbestos-Free.

K. ASTM D-4869 – Standard Specification for Asphalt-Saturated Organic Felt Shingle Underlayment Used in Roofing.

L. ASTM D 6757 – Standard Specification for Inorganic Underlayment for Use with Steep Slope Roofing Products.

M. ASTM E 108 – Standard Test Methods for Fire Test of Roof Coverings

N. ASTM G 21 – Determining Resistance of Synthetic Polymers to Fungi

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Provide manufacturer's printed product information indicating material characteristics, performance criteria and product limitations.

C. Manufacturer's Installation Instructions: Provide published instructions that indicate preparation required and installation procedures.

D. Certificate of Compliance: Provide Certificate of Compliance from an independent laboratory indicating that the asphalt fiberglass shingles made in normal production meet or exceed the requirements of the following:

- 1. ASTM E 108/UL 790 Class A Fire Resistance
- 2. ASTM D 3161/UL 997 Wind Resistance.
- 3. ASTM D 3462

E. Shop Drawings: Indicate specially configured metal flashing, jointing methods, and locations, fastening methods and locations and installation details as required by project conditions indicated.

1.5 QUALITY ASSURANCE

A. Installer Minimum Qualifications: Installer shall be licensed or otherwise authorized by all federal, state and local authorities to install all products specified in this section. Installer shall perform work in accordance with NRCA Roofing and Waterproofing Manual Work shall be acceptable to the synthetic slate roof tile manufacturer.

B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by architect

2. Do not proceed with remaining work until workmanship, color and pattern are approved by Architect.

3. Rework Mock-Up area as required to produce acceptable work.

C. Pre-Installation Meeting – Conduct a pre-installation meeting at the site prior to commencing work of this section: Require attendance of entities directly concerned with roof installation.

Agenda will include:

- 1. Installation procedures and manufacturer's recommendations
- 2. Safety procedures
- 3. Coordination with installation of other work
- 4. Availability of roofing materials.
- 5. Preparation and approval of substrate and penetrations through roof.
- 6. Other items related to successful execution of work

D. Pre-Installation Meeting: Regulatory Requirements Products must conform with the following:

- 1. International Code Council –
- 2. State of Florida Approval Report
- 3. Texas Department of Insurance Evaluation -
- E. Maintain one copy of manufacturers application instructions on the project site.

F. Verify that manufacturer's label contains references to specified ASTM standards

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store Products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials and materials used with solvent based materials, in accordance with requirements of local authorities having jurisdiction.

C. Deliver shingles to site in manufacturer's unopened labeled bundles. Promptly verify quantities and conditions. Immediately remove damaged products from site.

1.7 PROJECT CONDITIONS

A. Anticipate and observe environmental conditions (temperature, humidity, and moisture) within limits recommended by manufacturer for optimum results. Do not install products under environment conditions outside manufacturer's absolute limits.

B. Provide 100 square feet of extra shingles of each color specified.

C. Take special care when applying the self-adhering waterproofing shingle underlayment and shingles when ambient or wind chill temperature is below 45 degrees F (7 degrees C). Tack Aqua Block 60 in place if it does not adhere immediately to the deck.

1.8 WARRANTY

A. Manufacturer's Warranty: Furnish shingle manufacturer's warranty for the product listed below:

1. CertainTeed Presidential Shake AR: Lifetime Limited Warranty

B. Warranty Transferability Clause: Make available to Owner shingle manufacturer's standard option for transferring warranty to a new owner.

- C. Refer to manufacturer's warranty for adjustments for commercial applications.
- D. Provide contractors five (5) year workmanship warranty.

1. PART 2 PRODUCTS

2.1 MANUFACTURERS

Acceptable Manufacturer: Provide products manufactured by the CertainTeed Corporation. Contact Sales Support Group P.O. Box 860 Valley Forge, PA 19482 Toll Free 800-233-8990. Or equal / Or better than.

2.2 ASPHALT FIBERGLASS SHINGLES

A. CertainTeed Presidential Shake AR or equal: Conforming to ASTM D 3018 Type I – Self-Sealing; UL Certification of ASTM D 3462; ASTM D 3161 Class "F" (110-mph)/UL997 Wind Resistance and UL Class Fire Resistance; glass fiber mat base; ceramically colored/UV resistant mineral surface granules across entire face of shingle, algae-resistant; full two layer laminated four tab shingle.

- B. Weight: 355 pounds per square (100 square feet) (17.3 kg/sq m)
- C. Color: To be determined by the owner.
- D. Color.: As selected by Architect from manufacturer's standards

2.3 SHEET MATERIALS

 A. Waterproofing Underlayment: Imetco Aqua Block 60 Or equal / Or better than; ASTM D 1970 sheet barrier of self-adhering rubberized asphalt membrane shingle underlayment having internal reinforcement, and split back plastic release film.
Install over the entire roof area.

2.4 FLASHING MATERIALS

A. Sheet Flashing: ASTM A 361/A361M; 24 Gauge steel with minimum G115/Z350 galvanized coating

B. Sheet Flashing: ASTM B 209; 0.025 (0.63mm) thick aluminum, mill finish.

C. Sheet Flashing: ASTM B 370; cold rolled copper; 16 ounces per square foot (0.55mm), natural finish.

D. Bitumious Paint: Acid and alkali resistant type; black color.

E. Tinner's Paint: Color as selected by Architect to coordinate with shingle color.

2.5 ACCESSORIES

- A. Nails: Standard round wire type roofing nails, corrosion resistant; hot dipped zinc coated steel, aluminum or chromated steel; minimum 3.8-inch (9.5mm) head diameter; minimum 11 or 12 gage (2.5mm) shank diameter; shank to be sufficient length to penetrate through the roof sheathing or ³/₄ inch (19mm) into solid wood, plywood or non-veneer wood decking.
 - B. Asphalt Roofing Cement: ASTM D 4586, Type I or II

2.6 FLASHING FABRICATION

A. Form flashing to profiles indicated on Drawings and to protect roofing materials from physical damage and shed water.

B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

A. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions under provisions of Section 01 70 00.

B. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surfaces.

C. Verify deck surfaces are dry and free of ridges, warps or voids.

3.2 ROOF DECK PREPARATION

A. Follow shingle manufacturer's recommendations for acceptable roof deck material

B. Broom clean deck surfaces under eave protection and underlayment prior to their application

3.3 INSTALLATION – UNDERLAYMENT

A. A. Weather-lap joints 2 inches (50mm). Secure flange with nails spaced 8 inches (200 mm) on center.

B. Apply the self adhering waterproofing shingle underlayment over the entire roof deck in accordance with manufacturer's instructions.

3.4 INSTALLATION – PROTECTIVE UNDERLAYMENT

A. Weather-lap and seal watertight with asphalt roofing cement items projecting through or mounted on roof. Avoid contact or solvent-based cements with the self adhering underlayment.

3.5 INSTALLATION - VALLEY PROTECTION

A. For "closed-cut," "woven," and "open" valleys, first place one ply of self adhering underlayment, minimum 36 inches (910 mm) wide, centered over valleys. Lap joints minimum of 6 inches (152 mm) Follow instructions of shingle a waterproofing membrane manufacturer.

3.6 INSTALLATION – METAL FLASHING

A. Weather-lap joints minimum 2 inches (50 mm).

B. Seal work projecting through or mounted on roof with asphalt roofing cement and make weather tight.

3.7 INSTALLATION- ASPHALT SHINGLES

A. Install shingles in accordance with manufacturer's instructions for product type and application specified.

3.8 FIELD QUALITY CONTROL

A. Field inspection will be performed a minimum of once per week by the manufacturer with an inspection report provided to the owner, contractor & project team.

B. Visual inspection of the work will be provided by Owner. If conditions are unacceptable, Owner will notify the Architect.

3.9 PROTECTION OF FINISHED WORK

- A. Protect finished work from damage by other trades.
- B. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 07 54 20 SINGLE PLY KEE MEMBRANE ROOFING

1.GENERAL

1.1. SECTION INCLUDES

- A. Includes all labor, materials, and equipment to install an adhered KEE Membrane roof system over the properly prepared substrate.
- B. Includes removal and disposal of existing roofing system(s), insulation boards, gutters, flashings, sheet metal items, copings, etc. for a complete prepared roof surface to receive the new roofing system.

1.2. RELATED SECTIONS

- A. Related Work Specified Elsewhere:
 - 1. Section 06: Rough Carpentry
 - 2. Section 07: Insulation
 - 3. Section 07: Sheet Metal Flashing and Trim
 - 4. Section 07: Sealants

1.3. SUBMITTALS

- A. Product Data: Provide manufacturer's technical product data for each type of roofing product specified. Include data substantiating that materials comply with specified requirements.
- B. Samples: Submit two (2) samples of the following:
 - 1. Membrane, 3 each 12"x12".
 - 2. Fasteners / Plates, 3 each
 - 3. Insulation Board, 3 each 12" x 12"
- C. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the Manufacturer and the Owner.
- D. Design Loads: Submit copy of manufacturer's minimum design load calculations according to ASCE 7, In no case shall the design loads be taken to be less than those detailed in Design and Performance Criteria article of this specification.
- E. Certificates: Cool Roofing certified by Cool Roof Rating Council.
- F. Shop Drawings: For roofing system. Include plans, elevations, sections, details and attachments to other Work.
- G. Samples: If specifically requested for specified products; required for alternate products.
- H. Installer Qualifications: Provide evidence that installers meet the requirements of Article 1.4.

- I. Closeout Submittals:
 - 1. O & M Manuals: Maintenance instructions.
 - 2. Guarantee: Provide completed form per Article 1.5.
 - 3. Manufacturer's weekly inspection reports noting issues, corrections, and final inspection photos.

1.4. QUALITY ASSURANCE

- A. Installer Qualifications:
 - Minimum of 5 years of experience on similar work; knowledge and understanding of standards referenced herein; skill necessary to perform in compliance with this specification. Installers failing to demonstrate the required experience, knowledge, or skill shall be removed from the project.
 - 2. Factory trained and approved applicator, certificate must be current.
 - 3. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress. Maintain proper supervision of workmen.
 - 4. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer.
- B. Testing Characteristics: UL Class A roof; I-90 wind uplift.
- C. Applicator-Manufacturer Review: Provide Drawings and Specifications reviewed by Applicator with agent of roofing manufacturer; obtain manufacturer's agreement that specified system is proper for application shown.
- D. Manufacturers Participation:
 - 1. Pre-Application Job-Site Conference: Arranged by Applicator, with a minimum of 1 week advance notice; for review of storage, handling, protection, surface preparation, materials and application specifications; attended by applicator, his foreman, Architect, inspector, and manufacturer's agent.
 - 2. Source Quality Control: Manufacturer shall have in place a documented, standardized quality control program such as ISO-9001.
 - 3. When the project is in progress, the roofing system manufacturer will provide the following:
 - a. Report progress and quality of the work as observed.
 - b. Provide weekly job site inspections throughout the course of construction.
 - c. Provide electronic inspection reports submitted weekly to the Owner and/or Architect.
 - d. Report to the Architect and/or Owner in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
 - e. Confirm after completion that manufacturer has observed no application procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.5. WARRANTY

- A. Manufacturer: Provide a fifteen (15) year warranty on manufacturers form. Warranty shall period shall begin on date of acceptance of roofing by Owner.
- B. Manufacturer will provide the following services at years 2, 5, 10 & 15 at no cost to the owner.
 - 1. Inspection by a technical service representative and delivery of a written inspection report documenting roof conditions.
 - 2. General rooftop housekeeping, subject to limits but generally including removal of incidental debris.
- C. Provide one warranty by a single approved manufacturer for membrane roof areas, coping metal systems and transitions between the material types.
- D. Installer: Provide in required form for a period of three (3) years from date of acceptance by Owner.

2.PRODUCTS

2.1. KEE SINGLE-PLY ROOFING

- A. Products:
 - 1. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this section.
 - 2. The design is based upon roofing systems by The Garland Company Inc./VPG, Local representative Richard Jones (559) 647-1196. Or equal or better than.
 - a. Solar Bright 60 Membrane (ASTM D 751)
 - b. Membrane Thickness: (ASTM D 751) 60 mil nominal
 - c. Breaking Strength (ASTM D 751): 298X278 lbf/in
 - d. Tearing Strength (ASTM D 751): 89X109 lbf/in
 - e. Factory Seam Strength (ASTM D 751) 286 lbf
 - f. Solar Reflectivity (ASTM C 1549) 82% (White)
 - g. Emissivity (ASTM C 1371) 91% (White)
 - h. SRI (ASTM E1980) 109 (White)
- B. The Products specified are intended and the Standard of Quality for the products required for this project. If other products are proposed the bidder must disclose in the bid the manufacturer and the products that they intend to use on the Project. If no manufacturer and products are listed, the bid may be accepted only with the use of products specified.
 - 1. Bidder will not be allowed to change materials after the bid opening date.
 - If alternate products are included in the bid, the products must be equal to or exceed the products specified. Supporting technical data shall be submitted to the Architect/ Owner for approval seven (7) days prior to the bid date for review. A pre-bid addendum shall be submitted for all bidders to review if the substitution is permitted.
 - 3. In making a request for substitution, the Bidder/Roofing Contractor represents that it has:
 - a. Personally investigated the proposed product or method, and determined that it is equal or superior in all respects to that specified.

- b. Will provide the same guarantee for substitution as for the product and method specified.
- c. Will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
- d. Will waive all claims for additional cost related to substitution, which consequently become apparent.
- e. Cost data is complete and includes all related cost under his/her contract or other contracts, which may be affected by the substitution.
- f. Will reimburse the Owner for all redesign cost by the Architect for accommodation of the substitution.
- 4. Architect/ Owner reserves the right to be the final authority on the acceptance or rejection of any or all bids, proposed alternate roofing systems or materials that has met ALL specified requirement criteria.
- 5. Failure to submit substitution package, or any portion thereof requested, will result in immediate disqualification and consideration for that particular contractors request for manufacturer substitution.

2.2. VAPOR RETARDER

A. Red Rosin or equal: One ply of mechanically attached to the prepared substrate, install at all wood deck roof areas.

2.3. NAILERS

A. Douglas Fir; No. 2 or better, pressure treated; no creosote or asphalt preservatives allowed.

2.4. ROOF BOARD INSULATION

- A. Roof Insulation Base Layer 4' x 8' max dimension: N/A
 - 1. Thickness: 1"
 - 2. R-Factor Average: 5.7
 - 3. Attachment Method: Mechanically attached with (16) screws and plates per 4'x8' sheet.
- B. Roof Insulation top layer: Georgia Pacific Dens Dek Prime Roof Board. Or equal or better than.
 - 1. Max Dimension: 4' x 8'
 - 2. Thickness: 1/2" at all horizontal surfaces and 1/4" inch at all vertical surfaces.
 - 3. Attachment Method: Insuloc Insulation Adhesive, 12" ribbon pattern.
- C. Tapered Insulation: Tapered roof board insulation to be used as required for tapered insulation system or tapered crickets. Hunter or equal or better than, ASTM C 1289, Type II, Class 1, Grade 2, (20psi) polyisocyanurate insulation board.
 - 1. Field Slope: __1/2"__ inch per foot.
 - 2. Sump Slope: ___1/2"___ inch per foot.
 - 3. Cricket Slope:__1/2"__ inch per foot as needed for crickets and proper slope.
 - 4. Attachment Method: Mechanically Attached

2.5. FASTENERS

A. Heavy duty #15 threaded fastener with a #3 Phillips drive used with barbed fastening plate to secure the insulation board to the structural decking. It is used on minimum 22 gauge steel decks

or minimum 15/32" CDX plywood decks. It is also designed to offer an optimum combination of driving performance, back-out and corrosion resistance with excellent pullout performance.

- 1. TruFast #15 EHD Roofing Fasteners or equal or better than.
- B. Fastening Plate: A 2-3/8" diameter metal barbed fastening plate used with HP-X, CD-10 or HD 14-10 Fasteners for membrane or insulation securement. This plate can be used for membrane or insulation securement.
 - 1. TruFast Metal Seam Plates, 2.4" barbed.
- C. Insulation Fastening Plate: A nominal 3-inch metal plate used for insulation attachment in conjunction with the appropriate fastener.
 - 1. TruFast Metal Insulation Plates, 3" round.

2.6. ACCESSORIES

- A. Solar Bright 60 membrane shall be used for all flashing requirements to match the field membrane and warranty expectations selected for the roofing system.
- B. Solar Bright Inside Corners: Pre-molded corner flashing for inside corners. 80 mil thickness. Color White.
- C. Solar Bright Outside Corners: Pre-molded corner flashing for outside corners. 80 mil thickness. Color - White.
- D. Solar Bright T-Joint Covers: 40 mil thick non-reinforced PVC flashing cut into a 4.5 inch (114mm) diameter circle used to seal step-offs at splice intersections.
- E. Solar Bright Pipe Flashings: A pre-molded flashing and clamping ring used for pipe penetrations. Available for 1 inch to 6 inch (25 - 152mm) diameter pipes.
- F. Solar Bright Split Pipe Seals: Pre-fabricated flashing consisting of 60 mil reinforced Membrane for pipes 1 inch to 6 inch (25 152mm) in diameter. A split (cut) and overlap tab are incorporated to allow the pipe seal to be opened and wrapped around the pipe when it is not possible to pull a standard pipe flashing over a round penetration.
- G. Solar Bright Non-Reinforced Flashing: 60 mil thick rolls 12 inches and 24 inches wide. Used for inside/outside corners and field fabricated pipe flashings when use of pre-molded accessories is not feasible.
- H. Solar Bright Heat Weldable Walkway Rolls: offering superior tear, puncture and weather resistance and designed to protect membrane in those areas exposed to repetitive foot traffic or other hazards. Walkway material may be heat welded to membrane using an automated heat welder or hand held heat welder. Walkway Rolls are 36 inches (914mm) wide by 60 feet (18.3 M) long and are nominal 80 mils thick.
- I. Single ply Coated Sheet Metal: Provide where flashing, gravel stops and sheet metal are in contact with single ply roofing membrane. Install 22 gauge cleat all all edge metal conditions.

2.7. SOLVENT, SEALANT, AND ADHESIVES

- A. As recommended by manufacturer.
- B. SolarBright Low VOC two sided Bonding Adhesive: Low VOC solvent-based contact adhesive that allows bonding of membrane to various porous and non-porous substrates.

- 1. Weight: 7.4lbs
- 2. VOC: 199
- 3. Color: Amber
- 4. Solids: 20%

3.EXECUTION

3.1. EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- D. Do not commence Work until all other work trades have completed jobs that require them to traverse the deck on foot or with equipment.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2. PREPARATION

- A. Do not apply wet roofing, on wet application surface, or when temperature of deck less than 50 degrees F.
- B. Provide entire roof system including treated wood nailers, Single-ply coated sheet metal, and coordination of items such as roof drains, sumps, jacks, etc.
- C. Protect adjoining materials from stains particularly around perimeter of building; prevent debris from clogging roof drains.
- D. Deck surface swept clean and dry; keep free of loose and foreign materials.

3.3. INSTALLATION

- A. Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
 - 1. Install insulation or membrane underlayment over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch (6 mm). Stagger joints both horizontally and vertically if multiple layers are provided.
 - 2. Secure insulation to the substrate with the required mechanical fasteners or insulation adhesive in accordance with the manufacturer's current application guidelines and as specified in section 07 54 20, 2.4, A, B, & C above.
 - Securely attach insulation to the roof deck. Attachment must have been successfully tested to meet or exceed the calculated uplift pressure required by Factory Mutual (FM I-90) & the International Building Code (ASCE-7) or ANSI/SPRI WD-1.

- B. Application; Adhered system over roof deck
 - 1. Position SolarBright membrane over the acceptable substrate. Fold membrane sheet back lengthwise so half the underside of the membrane is exposed.
 - 2. Apply SolarBright Bonding Adhesive in accordance with the manufacturer's published instructions, to the exposed underside of the membrane and the corresponding substrate area. Do not apply Bonding Adhesive along the splice edge of the membrane to be hot air welded over the adjoining sheet. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.
 - 3. Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.
 - 4. Fold back the un-bonded half of the sheet lengthwise and repeat the bonding procedures.
 - 5. Position adjoining sheets to allow a minimum overlap of 2 inches (51mm).
 - 6. Hot-air weld the SolarBright membrane sheets using the Automatic Hot Air Welding Machine or Hot Air Hand Welder in accordance with the manufacturer's hot air welding procedures.
 - 7. Continue to install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches (51mm) and complete the bonding procedures as stated previously.
 - 8. Parapet Wall Covering: Install as shown, extend to full height of parapet; lap under parapet cap flashing and over wall substrate 2 inches minimum on the back side of the wall. Secure in adhesive and attach at 9" on center on the outside face to assure a completely watertight installation.
 - 9. Walkway: Per manufacturer's instructions and as shown on drawings. If drawings do not show walkways a minimum required will be;
 - a. A path from the main roof access point to and around all HVAC units, to and around all serviceable roof top equipment, to and around all roof hatches, to and around all access points as designated by the owner, and as needed for protection of the roofing system will have walkway installed.
 - b. All support blocking will have walkway pad installed as a protection mat.
- C. Fasteners:
 - 1. General: Per manufacturer's recommendation; fastening length and pattern based on performance values supplied by the fastener/disc manufacturer and conforming to Factory Mutual I-90 fastening pattern.
 - 2. Walkway Fastening: Provide 2 inch continuous heat weld strip around perimeter of membrane. A 3" opening is to be left non-welded at the lower side of the walkway pad to allow drainage and venting.
- D. Hot Air Welding
 - 1. All field seams exceeding 10 feet in length shall be welded with an approved automatic welder.
 - 2. All field seams must be clean and dry prior to initiating any field welding.
 - 3. Remove foreign materials from the seams (dirt, oils, etc.) with Acetone or authorized alternative. Use CLEAN WHITE COTTON cloths and allow approximately five minutes for

solvents to dissipate before initiating the automatic welder. Do not use denim or synthetic rags for cleaning.

- 4. All welding shall be performed only by qualified personnel to ensure the quality and continuity of the weld.
- 5. Contaminated areas within a seam will inhibit proper welding and will require a membrane patch or replacement of the membrane.
- E. Hand Welding
 - 1. The lap or seam area of the membrane should be intermittently tack welded to hold the membrane in place.
 - 2. The back "interior" edge of the membrane shall be welded first, with a thin, continuous weld to concentrate heat along the exterior edge of the lap during the final welding pass.
 - 3. The nozzle of the hand held hot air welder shall be inserted into the lap at a 45° angle to the lap. Once the polymer on the material begins to flow, a hand roller shall be use to apply pressure at a right angle to the tip of the hand welder. Properly welded seams shall utilize a 1-1/2 inch wide nozzle, to create a homogeneous weld, a minimum of 1-1/2 inches in width.
 - 4. Smaller nozzles may be used for corners, and other field detailing, maintaining a minimum 1 inch weld.
- F. Automatic Machine Welding
 - 1. Follow all manufacturers' instructions for the safe operation of the automatic welder.
 - 2. Follow local code requirements for electric supply, grounding and surge protection.
 - 3. The use of a dedicated, portable generator is highly recommended to ensure a consistent electrical supply, without fluctuations that can interfere with weld consistency.
 - 4. Properly welded seams shall utilize a 1-1/2 inch wide nozzle, to create a homogeneous weld, a minimum of 1-1/2 inches in width.

G. Inspection

- 1. The job foreman and/or supervisor shall initiate daily inspections of all completed work which shall include, but is not limited to the probing of all field welding with a dull pointed instrument to assure the quality of the application and ensure that any equipment or operator deficiencies are immediately resolved.
- 2. Ensure that all aspects of the installation (sheet layout, attachment, welding, flashing details, etc.) are in strict accordance with the most current Solar Bright Roofing Systems Specifications and Details.
- 3. Excessive patching of field seams because of inexperienced or poor workmanship will not be accepted at time of final inspection for warranty acceptance.
- H. Metal Flashings:
 - 1. General: Fabricate and install per Section 07601 FLASHING AND SHEET METAL, as shown and per manufacturer's recommendations. Install PVC coated metal flashing at intersections of roofs with sloped or vertical surfaces, roof interruptions and penetrations.

- 2. Base Flashing: Extend up vertical surfaces 6 inches, minimum, and onto the horizontal roof surfaces not less than 3 inches, unless otherwise noted. Provide PVC coated metal flashing with 2 inches minimum overlap of roofing membrane; heat weld in the horizontal plane, with subsequent sealing of seams with sealant.
- 3. All perimeter edge details are to be fabricated from Garland/VPG SolarBright Clad Metal and required to have 22 gauge cleat.
- 4. Ensure all fascia extend a minimum of 2 inch lower than the bottom of the wood nailers.
- 5. Fasten all metal flashing to wood nailers or approved substrate with approved fasteners eight (8") inches on center.
- 6. Manufacture and install Solar Bright Clad metal in accordance with approved details, ensuring proper attachment, maintaining 1/2 inch expansion joints and the installation of a minimum 2 inch bond breaker tape prior to sealing the joint.
- 7. Solidly weld Solar Bright Clad expansion joints with a 6 inch strip of Solar Bright membrane welded to the Solar Bright Clad, covering the bond breaker tape (cover plates are optional).

I. Roof Drains

- 1. Flash all roof drains in accordance with Solar Bright roof drain details.
- 2. Replace all worn or broken parts that may cut the Solar Bright membrane or prevent a watertight seal. This includes the clamping ring and strainer basket.
- 3. Replace all drain bolts or clamps used to hold the drain compression ring to the drain bowl.
- 4. Solar Bright non-reinforced 60 mil membrane shall be used for flashing the drain assembly. Drain assemblies and basins or "sumps" must be free of any asphalt or coal tar pitch residue prior to installation.
- 5. The drain target sheet should be sized and installed to provide for a minimum of 12 inch of exposed 60 mil on all sides of the drain.

3.4. FIELD QUALITY CONTROL

- A. Perform field inspection and testing as required under provisions of Division 01 Section Quality Requirements & manufacturers recommendations.
- B. Heat weld test cuts will be required. One (1) test cut per 5,000 square feet will be required.
- C. Correct defects or irregularities discovered during field inspection.
- D. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system a minimum of two (2) days per week. A copy of the specification should also be on site at all times.

3.5. CLEANING

- A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.
- B. At completion clean exposed surfaces in a manner that will not damage finish.

3.6. FINAL INSPECTION

- A. At completion of roofing installation and associated work, meet with Contractor, Architect, installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.
- B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. The roofing system manufacturer reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan shall be provided by the Roofing Contractor.
- D. If core cuts verify the presence of damp or wet materials, the Roofing Contractor shall be required to replace the damaged areas at his own expense.
- E. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements
- F. Notify the Contractor, Architect, & Owner upon completion of corrections.
- G. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

END SECTION 07 54 20

