



CHABOT- LAS POSITAS COMMUNITY COLLEGE DISTRICT

Facilities Planning & Management Department

July 8, 2010

Addendum No. 1 INVITATION FOR BID NO.: 10-18 PVC Roof Replacement, Building 3500 - Chabot College

THIS ADDENDUM NO. 1 is issued to clarify, add, delete, correct and/or change the contract documents to the extent indicated and is hereby made a part of the above noted contract documents on which the contract will be based. Any modifications/changes made by this addendum affect only the portions or paragraphs specifically identified herein; all remaining portions of the proposal to remain in force. It is the responsibility of all bidders to conform to this addendum. Acknowledge receipt of this addendum in the space provided on the re-bid proposal form. Failure to do so may subject Bidder to Disqualification.

The original Bid Documents shall have the following clarification and modification by the revision as follows:

1. **Working Conditions** - The building contains a child care facility, and as such, small children will be around the building between the hours of 7:00 AM until 5:00 PM, and 6:00 PM until 10:00 PM Monday through Friday. The Staff will work to accommodate safety provisions which will occur around the building perimeter. The Contractor shall provide a schedule 72 hours in advance of scheduling work anywhere up slope above play areas on the east, south and west sides of the building.
 - a. Provide 100 lineal feet of portable 6 ft. tall chain link construct fencing to block off play areas identified by the owner when work occurs in adjacent areas.

2. **Working Hours** - The District has determined that the performance of some of the Work of this Project is necessary at off hours to avoid danger to life and property in accordance with the California Code of Regulations, Title 8, § 16200, General Basis for Determining Prevailing Wage Rate – (F) Overtime; Exception 3 - *If the awarding body determines that work cannot be performed during normal business hours or work is necessary at off hours to avoid danged to life or property, no overtime is required for the first eight (8) hours in any one calendar day, and 40 hours during any one calendar week.*
 - a. **Nap Time** - Children within the facility will be napping between 11:30 AM until 2:30 PM daily. No demolition, hammering, power screwing of fasteners into insulation or membrane, loading of the roof or any other noisy operation may occur during these hours.
 - b. **General Work Hours** - The Contractor may work on this facility during any hours which do not conflict with Nap Time or Hayward City Ordinances. Submit proposed work schedule at Pre-Construction Meeting.

3. **Tear off of Existing BUR** - This scope of work has been eliminated. New insulation assembly shall be installed over the existing roof and mechanically fastened to the plywood deck.
4. **Metal Roof and Gutter Demolition** - Remove all sheet metal barrel roofing and felt underlayment material and related gutter and counter flashing. Remove all existing gutter sections from the main roof area.
5. **Gutters** - Replace all existing gutters with new .032 seamless 5" aluminum gutters. Hang new gutters with K Style 40K Fascia Hanger w/ Snap Strap - Aluminum by GutterSupply.com or approved equal. Install hangers at 2 feet on center. Slope gutters to existing down spouts. Connect to and reuse existing down spout.
6. **Hatch Safety Railing System** - Provide and install a new OSHA approved safety rail system to the roof hatch.
7. **Metal Awnings** - No work is to be performed on the metal awnings except to clean them of debris.
8. **Walk Tred** - Provide and install Sarnafil walk pad (standard width) on three sides of the roof hatch.
9. **Complete Revised Section** – Revised Section No. 07540 is attached.
10. **Nailers** – Install new nailers around the perimeter of the roof, equal to the height of the new insulation.

If you have any questions regarding this Addendum No.1, please contact the Office of the Facilities Planning & Management in **writing, via facsimile or email**. All other terms and conditions of Bid No.10-18 are to remain the same.

Regards,

Priscilla Burruss
Capital Projects Buyer
pburruss@clpccd.org

PVC SINGLE PLY ROOFING
SECTION 07540

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Attached GENERAL CONDITIONS, GENERAL NOTES, INSTRUCTIONS TO BIDDERS, AND BID FORM are components of this section.
- B. Section 01340 – SHOP DRAWINGS/PRODUCT DATA/ SAMPLES
- C. Section 01400 – QUALITY REQUIREMENTS
- D. Section 01500 – TEMPORARY CONSTRUCTION FACILITIES
- E. Section 01600 – PRODUCT REQUIREMENTS
- F. Section 01740 – WARRANTIES
- G. Section 01770 – CLOSE-OUT PROCEDURES
- H. Section 01810 – CLEANING & CLEAN-UP

1.02 SCOPE OF WORK - Building 3500 at Chabot College

- A. Test all down spouts for drainage prior to start of work.
- B. Tear off existing BUR down to the deck.
- C. Mechanically fasten gypsum panel over plywood deck.
- D. Install a new white 72 mil mechanically fastened PVC membrane with flashing and other components in accordance with the manufacturer's layout for local wind conditions.
- E. Provide a written manufacturer's twenty (20) year FULL SYSTEM labor and material warranty to the Owner for the completed installation.

1.03 REFERENCES

- A. ASTM - Latest Editions
 - D-751 Test for Overall Thickness, Minutes, Inches
 - D-751 Test for Breaking Strength, Minutes. Lbf/in
 - D-751 Test for Elongation at Break, Minutes.
 - D-751 Test for Seam Strength, Minutes. (% of breaking strength)
(Failure occurs through membrane rupture not seam failure)
 - D-3045 Test for Retention of Properties after heat aging
 - D-751 Test for Breaking, Strength, Minutes/lbf
 - D-751 Test for Elongation, minutes, (% of original)
 - D-1004 Test for Tearing Strength, minutes, lbf (N)

D-2136 Test for Low Temperature Bend, -40 degree F
D-2565 Test for Acceleration Weathering Test (Xenon Arc)
D-1204 Test for Linear Dimensional Change
D-570 Test for Weight Change After Immersion in Water
D-5602 Test for Static Puncture Resistance, 33 lbf
D-5635 Test for Dynamic Puncture Resistance, 14.7 ft-lbf
E-108 Test for Fire Tests of Roof Coverings

- B. California Building Code, Title 24, latest edition
- C. California Code of Regulations, Title 8 - Construction Safety Orders and General Industry Safety Orders
- D. Owner: Chabot Las Positas Community College District (CLPCCD), Pleasanton, CA
- E. FMG - FM Global, Norwalk, MA
- F. NRCA-National Roofing Contractors Association
- G. SPRI-The Single Ply and Flexible Membrane Institute, Needham, MA
- H. U.L. - Underwriter's Laboratory, Northbrook, IL
- I. UPC- Uniform Plumbing Code, current edition

1.04 GENERAL

- A. Application standards:
 - 1. Regulatory Requirements
 - a. California Building Code, Title 24, most current edition as adopted
 - 2. ASTM E108, Class "A"
 - 3. National Roofing Contractors Association NRCA Roofing and Waterproofing Manual Latest Edition
 - 4. Sheet Metal and Air conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual (Latest Edition).
 - 5. Underwriter's Laboratories (UL): 790 Fire Resistance of Roof Assemblies.
 - 6. FM Global (FMG) Loss Prevention Data for Roofing Contractors
- B. Roofing systems shall be applied only by Contractors authorized by the membrane manufacturer prior to advertised Notice to Contractors.
- C. Upon completion of the installation, and the delivery to the Owner and membrane manufacturer by the Contractor of a certification that all work has been done in strict accordance with the contract specifications and the membrane

manufacturer's requirements, an inspection shall be made by a full time employee and technical representative of the membrane manufacturer to inspect the installed roof system.

- D. There shall be no deviation made from the contract specification or the approved shop drawings without prior written approval by the Owner, the Owner's representative and the membrane manufacturer.
- E. All work pertaining to the installation of the Roof Membrane and Flashing shall only be completed by Contractor personnel trained and authorized by the membrane manufacturer in those procedures.
- F. Manufacturer Experience:
 - 1. The manufacturer shall have a minimum of 15 years of documented history in the formulation and production with no formulation changes.
 - 2. Manufacturer shall be the actual manufacturer of the membrane, not a buyer and re-labeler of another manufacturer's materials.

1.05 SHOP DRAWINGS:

- A. See Section 01340

1.06 SUBMITTALS

- A. See Section 01600

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver only approved materials to the job site. Deliver materials in original sealed containers with seals unbroken and labels legible and intact. Each roll or container of adhesive, primer, cleaner shall be a U.L. Listing mark or Classification Marking affixed to the side. Manufacturer's product shall be periodically inspected in accordance with U.L.'s Follow-Up Service Requirements.
- B. Materials shall be delivered in sufficient quantities so as not to cause delays in the work.
- C. Contractor for work under this section shall be responsible for storage and protection of all materials required. Store materials in a place which has been specifically assigned for that purpose. Do not store materials on the roof. Materials shall be protected from the weather and out of the direct rays of the sun. Materials shall be stored in a manner so as not to exceed the manufacturer's temperature limitations. In all cases, the storage and handling of materials shall conform to the requirements of the manufacturer and the applicable safety regulatory agencies.

- D. Material containers shall not be removed from the job site until final completion and/or until so authorized by the Roof Consultant. All waste materials and debris shall be cleaned up daily, and disposed of at an approved landfill.
- E. Any damaged materials or materials not conforming to the specified requirements shall be rejected by the Roof Consultant. Rejected materials shall be immediately removed from the job site and be replaced at no additional cost to the Owner.

1.10 SITE CONDITIONS

- A. Environmental Conditions:
 - 1. Do not proceed with application of single ply roofing materials when ambient temperature is less than 32° F, moisture is on the roof surface, or rain is eminent.
 - 2. Do not apply material unless surface to be covered by single ply membrane is clean and dry.

1.11 TESTS AFTER APPLICATION

- A. The contractor shall take in seam samples to verify welds at least two times per day for each robotic welder in use. The sample shall be lightly spot welded to the location from which it was removed. The contractor shall repair sample areas.
 - 1. All areas found to have inadequate weld shall be re-welded or stripped over with a 6" fully welded strip of 72 mil PVC.
- B. The manufacturer's technical representative shall visit each job site once during application and the Contractor shall provide a copy of the tech. reps field notes to the Consultant within 24 hours via FAX (206-428-1980) or email (rsmith@amtechbuildingsciences.com)

1.12 BID ITEMS

- A. Provide a price for all work described herein.

1.14 WARRANTY

- A. See Section 01740

1.15 SAFETY

- A. All regulations pertaining to safety as noted in OSHA Standard shall be strictly adhered to by the contractor and his subcontractors. Particular care shall be exercised in connection with operation of vehicles and other equipment on the job site. Safety barriers and equipment shall be provided by the contractor as required by the Owner.

END OF PART ONE

PART 2 - PRODUCTS

2.01 GENERAL

- A. Comply with Quality Control, References, Specifications, and Manufacturer's data. Where conflict may exist, more stringent requirements govern.
- B. Use of manufacturer's brand and/or trade names is done only to establish a standard by which other shall be compared, and not done to restrict or limit competition. See Section 01600 PRODUCT REQUIREMENTS, for SUBSTITUTIONS.
- C. The Owner shall be the final authority as to acceptance of any changes in materials.
- D. All materials used shall be accepted and approved by roof membrane manufacturer.
- E. The components of the mechanically-attached roof system are to be products of the membrane manufacturer as indicated on the detail drawings and specified in the contract documents.
- F. Components to be used that are other than those supplied or manufactured by the membrane manufacturer may be submitted for review and acceptance by the membrane manufacturer. The membrane manufacturer's acceptance of any other product is only for chemical compatibility with the membrane manufacturer products and is not for inclusion in the membrane manufacturer warranty. The specifications, installation instructions, limitations, and/or restrictions of the respective manufacturers must be reviewed by the signer for acceptability for the intended use with the membrane manufacturer products.

2.02 APPROVED MANUFACTURERS

- A. Sarnafil, Canton, MA

2.03 MATERIAL PERFORMANCE CRITERIA

APPROVED MEMBRANE SYSTEMS

- A. Sarnafil S327, 72 Mil polyester-reinforced membrane with an acrylic coating, and manufactured with a spread coating process.
- B. Equivalent membrane and manufacturer shall meet the following:
 - 1. Manufacturer must manufacture its own material (no private labeled membranes).
 - 2. PVC sheet membrane must have no formulation changes in the last 10

- years.
3. Must not list any exclusion of the warranty for ponding water conditions.
 4. Membrane shall have a minimum of twenty-two (22) mils of waterproofing polymers above the reinforcements as documented by a third party source.
 5. Must provide an approved felt back PVC membrane (loose felt or slip sheets shall not be accepted).
 6. Mil thickness shall not deviate ± 2 mils. Membrane will be checked during installation for mil thickness compliance. If any deviation from mil thickness tolerance is found, entire order or shipment shall be returned to the manufacturer for replacement with specified material.
- C. Membrane shall conform to the ASTM D4434 (latest revision) Standard for Polyvinyl Chloride sheet roofing.
1. Classification: Type III.
- D. As manufactured, membrane shall conform to the following properties:
1. Reinforcing Material.
Polyester
 2. ASTM D-751 Breaking Strength, min. Lbf/in.
230
 3. ASTM D-751 Elongation at Break, min.
20%
 4. ASTM C-751 Seam Strength* min. (% of breaking strength)
85
 5. D-3045 Test for Retention of Properties after heat aging
 - a. D-751 Test for Breaking Strength, Min..lbf
95
 - b. D-751 Test for Elongation, min., (% of original)
90
 6. D-1004 Test for Tearing Strength, min., lbf (N)
50
 7. D-2136 Test for Low Temperature Bend, -40 degree F
Pass
 8. D-2565 Test for Accelerated Weathering Test (Xenon Arc)
10,000 hrs.
 - a. Cracking (7x magnification)
none
 - b. Discoloration (by observation)
Negligible
 - c. Cracking (7x magnification)
None
 9. D-1204 Test for Linear Dimensional Change
0.1%
 10. D-570 Test for Weight Change after Immersion in Water
2.5%

11. D-5602 Test for Static Puncture Resistance, 33 lbf
Pass
12. D-5635 Test for Dynamic Puncture Resistance, 14.7 ft-l.f.
Pass
13. E-108 Test for Fire Tests of Roof Coverings
Class A

*Failure occurs through membrane rupture not seam failure.

2.04 RELATED MEMBRANE PRODUCTS

- A. Sarnacol 2170 Adhesive
- B. G459 Flashing Membrane
 1. Fiberglass-reinforced, asphalt-compatible, 72 Mil thick membrane used where asphalt contamination is anticipated or when adhering to smooth asphalt flashing. G459 also provides additional chemical resistance against certain contaminants.
- C. PVC coated metal
 1. 0.023 inch thick G90 galvanized sheet metal laminated with 0.020 inch thick Sarnafil membrane.
- D. Sarnaflash
 1. Prefabricated expansion joint cover with foam tubing, galvanized metal nailing flanges and S327 membrane welding tabs.
- E. Sarnacorner
 1. Prefabricated inside and outside corners made of Sarnafil membrane
- F. Sarnastack
 1. Prefabricated membrane vent pipe slashing made of Sarnafil membrane.
- G. Sarnadrain-RAC
 1. Retrofit roof drain with PVC clad flange
 - a. Size to connect into existing drain leaders.

2.05 MISCELLANEOUS FASTENERS AND ANCHORS

- A. All fasteners shall be approved by the membrane manufacturer and shall be identified as such in the submittal.
 1. All fasteners, anchors, nails, straps, bars, etc. shall be of post-galvanized zinc or cadmium-plated steel, aluminum or stainless steel.
 - a. All screws for fastening metal edge shall stainless steel 410 compatible with galvanized steel and aluminum.
 2. Mixing metal types and methods of contact shall be in such a manner as to avoid galvanic corrosion.
 3. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins.
 4. All wood fasteners and anchors shall have a minimum embedment of 1 inch and shall be approved for such use by the fastener manufacturer.
 5. Metal discs shall be used to fasten insulation. Disc shall lay flat on

insulation surface. Submit for approval.

2.06 METAL FLASHING

- A. Termination Bar Flashing: 24 gauge galvanized sheet metal.
- B. Continuous cleat – edge flashing 22 gauge galvanized sheet metal

2.07 ADHESIVES

- A. PVC membrane to Dens Deck - Sarnacol Adhesive
- B. Insulation to deck and to Insulation – Sarnacole 2001 LR

2.08 INSULATION AND GYPSUM PANELS

- A. 2” felt faced polyisocyanurate insulation (as approved by membrane manufacturer)
- B. ¼” Dens Deck by Georgia Pacific

2.08 GUTTERS

- A. .032 Seamless aluminum OGEE gutter with screw in 5” gutter hangers.

END OF PART TWO

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify installation conditions as satisfactory to receive work. Notify the Owner Representative immediately if deck is believed to be unsound, or otherwise unable to support foot traffic and new roof system.
- B. Do not install new roofing until all unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions.
- C. Verify that work of other trades penetrating roof deck or requiring men and equipment to transverse roof deck has been approved by the Owner, Manufacturer, and Roofing Contractor.
- D. Check projections, curbs, and deck for inadequate anchorage, foreign material, moisture, or unevenness that would prevent quality and execution of new roofing system.

3.02 PREPARATION

- A. DEMOLITION AND DISPOSAL
 - 1. All debris shall be removed from the job site each day. Upon completion of the project, the contractor shall remove all rubbish, accumulated materials, empty containers, and scrap from the premises leaving the job site in a clean, acceptable condition. Any adjacent areas which are damaged by the contractor due to demolition or removal shall be repaired to the satisfaction of the Owner or replaced. All scrap, debris, and empty containers shall be disposed of off-site, otherwise approved by the Owner.
- B. ROOF SYSTEM PREPARATION
 - 1. Inspect for existing membrane bridging
 - a. Inspect all crickets and areas of horizontal to vertical membrane transitions to identify areas where existing membrane is not in full contact with substrate (bridging membrane).
 - b. Slice the membrane in these areas to allow the membrane to be loosely laying on the substrate.
 - 2. Remove all existing clad metal flashing.
 - 3. Sweep roof surface clean.

3.03 CARPENTRY

- A. Flashing, Curbs, Walls and Parapets:
 - 1. Raise all curbs to a minimum height of 8 inches above finished roof line.
- B. Plumbing Vent Locations:
 - 1. Mechanically attach wood blocking to structural deck at all pipe and plumbing vent locations; minimum two fasteners per section. **Blocking thickness:** equal to final insulation thickness. Width: Six inches, nominal.
 - 2. Offset blocking layers 12 inches; weave corners.

- C. Metal Curb Flashing:
 - 1. Raise curb. Clean flange.
 - 2. Replace rotted blocking.
 - 3. Mechanically attach wood blocking to existing blocking. **Blocking thickness:** Equal to final insulation thickness. **Width:** Same as existing.
 - 4. Fasteners shall be installed in two rows staggered. Spacing in any one row shall not exceed 24 inches.
 - 5. Offset blocking layers 12 inches' weave corners
 - 6. Reuse existing counter flashing.

3.04 INSULATION AND DENS DECK INSTALLATION

- A. Over the prepared and clean deck surface, install 2" insulation, butting all joints tightly. Fasten insulation as required by the membrane manufacturer.
 - a. Gaps between insulation panels shall not exceed ¼".
 - b. Where the gap exceeds a ¼ inch, cut out a minimum space of 12 inches wide by 18 inches long and fasten with 2 fasteners positioned 5 inches in from each end.
 - c. Install fasteners around the edge of the cut panel at 12" O.C.
 - d. Fastener plates shall not come within 3 inches the edge on any piece of insulation.
- B. Over the clean insulation surface, mechanically fasten 1 layer of ¼ inch Dens Deck with discs and screws at the rate of 5 per 4' x 8' panel. All joints shall be no wider than ¼ inch.
 - a. Offset edges of dens deck 12 inch from all edges of insulation.

3.05 DRAINS, SCUPPERS & GUTTERS

- A. Test all roof drains prior to start of work with water from a hose running wide open for 5 minutes in each drain. Notify the District immediately, and follow up with an email to the Consultant within 24 hours of any plugged roof drains.
- B. Remove all existing roof membrane from roof drains
- C. Install new Sarnadrains at all roof drain locations. .
- D. If drain leader line is loose within the deck assembly, advise the Owner immediately.
- E. Install roof membrane into drain assembly as required by manufacturer.

3.06 INSTALLATION OF ROOFING MEMBRANE

- A. The surface of the insulation shall be inspected prior to installation of the roof membrane. The substrate shall be clean, dry and smooth with no excessive surface roughness, contaminated surfaces or unsound surfaces such as broken, delaminated, or damaged insulation boards. Separation layer shall be installed

over any incompatible or irregular substrate. Overlap separation layer edges 4 inches and fasten through the overlaps at 24 inches (0.6m) O.C. using fasteners and plates to hold in position. The installation of the separation layer is to be followed immediately by the installation of the membrane.

B. General:

1. Membrane overlaps shall be shingles with the flow of water where possible.
2. FMG Loss Prevention Data Sheet 1-28 (latest issue).

C. Perimeter and corners

1. Over the properly installed and prepared substrate surface, the membrane manufacturer perimeter half sheets are to be installed parallel with the entire perimeter edge. Half sheets are to be laid out in approved pattern as shown on the membrane manufacturer detail drawings. Sheets are overlapped 5-½ inches. A 5-½ inch overlap line has been provided to ensure proper overlap. The 5-½ inch overlap shall allow the top sheet to extend 2-½ inches past the discs for welding. Fasteners and discs are to be installed along the edge of the membrane. Fasteners and Discs are to be spaced according to the membrane manufacturer's calculations. Discs are to be held back a minimum of 1 inch from the edge of the membrane manufacturer membrane. Fasteners shall be installed according to the manufacturer's instructions. Fasteners shall be installed using the fastener manufacturer's recommended fastening tools with depth locators. Fasteners shall clamp the membrane tightly to the substrate.

D. Interior-field sheets

1. Over the properly installed and prepared substrate surface the full width membrane is to be unrolled. Sheets shall be overlapped a minimum of 5-½ inches. A 5-½ inch overlap line has been provided to ensure proper overlap. The 5-½ inch overlap shall allow the top sheet to extend 2-½ inches past the discs for welding. Fasteners and discs are to be installed along the edge of the membrane. Fasteners and discs are to be spaced according to the membrane manufacturer's calculations. Discs are to be held back a minimum of 1-inch from the edge of the membrane. Fasteners shall be installed according to the manufacturer's instructions. Fasteners shall be installed using the fastener manufacturer's recommended fastening tools with depth locators. Fasteners shall clamp the membrane tightly to the substrate.

E. Securement around perimeter and rooftop penetrations:

1. Around all perimeters, at the base of walls, drains, curbs, vent pipes, or any other roof penetrations, fasteners and discs shall be installed according to perimeter rate of attachment. Fasteners shall be installed according to the manufacturer's instructions. Fasteners shall be installed using the fastener manufacturer's recommended fastening tools with depth

- locators. Fasteners shall clap the membrane tightly to the substrate.
2. Membrane flashing shall extend 2 ½ inches past the discs and be hot-air welded to the deck sheet.

3.08 HOT-AIR WELDING OF LAP AREAS

A. General

1. All seams shall be hot air welded. Seam overlaps shall be a minimum of 3 inches wide when automatic machine welding, and 4 inches wide when hand welding.
2. Welding equipment shall be provided by or approved by the membrane manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by the membrane manufacturer Technical Representative prior to welding.
3. All membrane to be welded shall be clean and dry. No adhesive shall be in the seam.

B. Hand Welding

1. Hand welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
2. The back edge of the seam shall be welded with a narrow, but continuous weld to prevent loss of hot air during the final welding.
3. The nozzle shall be inserted into the seam at a 45 degree angle. Once the proper welding temperature has been reached and the membrane begins to “glow”, the hand roller is positioned perpendicular to the nozzle and pressed lightly. For straight seams, the 1-½ inch wide nozzle shall be used. For corners and compound connections, the ¾ inch wide nozzle shall be used.

C. Machine Welding

1. Machine welded seams are achieved by the use of the membrane manufacturer’s automatic welding equipment. The Contractor shall provide sufficient power necessary to operate all welding equipment in accordance with the recommendations of the welding machine manufacturer. When using this equipment, the membrane manufacturer’s instructions shall be followed and local codes for electric supply, grounding and over current protection observed.

D. Quality Control of Welded Seams

1. The Contractor shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and uninterrupted flow of dark gray material from the underside of the top membrane. On-site evaluation of welded seams shall be made daily by the Contractor to locations as directed by the Owner’s

representative or the membrane manufacturer's representative.

- a. One inch wide cross-section samples of welded seams shall be taken at least three times a day, marked and correlated on roof plan to identify location, and saved for Consultant inspection.
- b. In lieu of marking samples and providing correlated roof plan, tack weld the sample to the patch where the sample was removed.
- c. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Contractor at no extra cost to the Owner.

3.09 MEMBRANE FLASHING

- A. At Parapets – wall flashing membrane shall start 2 inches below the exterior of the top of the parapet and run continuously to the base flashing weld point. Flashing shall be terminated according to the membrane manufacturer recommended details. Coping shall be reused with all fasteners installed on vertical surfaces.
- B. All flashing shall be installed concurrently with the roof membrane as the job progresses. No temporary flashing shall be allowed without the prior written approval of the Owner's representative and the membrane manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces.
- C. Only an area which can be completely covered in the same day's operations shall be coated with adhesive. The surface with adhesive coating shall be allowed to dry completely prior to installing the membrane.
- D. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels as required by welding techniques.
- E. Install discs according to the membrane manufacturer's specifications with acceptable fasteners into the structural deck at the base of parapets, walls and curbs. Discs are required at the base of all tapered edge strips and at transitions, peaks, and valleys according to the membrane manufacturer's details.
- F. The membrane manufacturer's requirements and recommendations and the specifications shall be followed. All material submittals shall have been accepted by the membrane manufacturer prior to installation.
- G. All flashing shall extend a minimum of 8 inches above roofing level unless otherwise accepted in writing by the Owner's representative and the membrane manufacturer Technical Department.

- H. All flashing membranes shall be adhered to solvent resistant substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bitumen shall be in contact with the membrane manufacturer membrane.
- I. All flashing membranes shall be mechanically fastened along the top edge through pre-drilled galvanized metal strip spaced at a maximum of 9 inches on center.

3.10 PVC COATED METAL BASE FLASHING

- A. All flashing shall be installed concurrently with the roof membrane as the job progresses. No temporary flashing shall be allowed without the prior written approval of the Owner's representative and the membrane manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashing, the affected area shall be removed and replaced at the Applicator's expense.
- B. PVC coated metal flashing shall be formed and installed per the detail drawings.
- C. All metal flashing shall be fastened according to membrane manufacturer's details.
- D. Adjacent sheets of PVC coated metal shall be spaced ¼ inch apart. The ends of the PVC coated metal shall be fastened 6 inches on center. The joint shall be covered with 2 inch wide aluminum tape. A 4 inch wide strip of flashing membrane shall be hot-air welded over the joint.
- E. At flashing around louver vents, install continuous air seal consisting of Tremco TF Tape under nailer and under flange of PVC clad metal to prevent air leakage under membrane from vent.

3.11 METAL FLASHING

- A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:
 - 1. FMG Loss Prevention Data Sheet 1-49 (latest issue).
 - 2. Sheet Metal and Air Conditioning Contractors National Association Inc. (SMACNA Sheet Metal Manual –latest issue).
- B. Complete all metal work in conjunction with roofing and flashing so that a watertight condition exists daily.
- C. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.

- D. Metal joints shall be watertight.
- E. Metal flashing shall be securely fastened into the deck. Fasteners shall penetrate the wood nailer a minimum of 1 inch.
- F. Counter flashing shall overlap base flashing at least 4 inches.

3.12 TEMPORARY CUT-OFF

- A. All flashing shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary water stops shall be constructed to provide a 100% watertight seal. The stagger of the insulation panel joints shall be made even by installing partial panels. The new membrane shall be carried into the water stop. The water stop shall be sealed to the deck and/or substrate so that water shall not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in a continuous heavy application of sealant as described in Section 2-14. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of off site. None of these materials shall be used in the new work.
- B. If inclement weather occurs while a temporary water stop is in place, the Contractor shall provide the labor necessary to monitor the situation to maintain a watertight condition.
- C. If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Contractor's expense.

3.13 ADJUSTING AND CLEANING

- A. Repair of Deficiencies:
 - 1. Installations or details noted as deficient during final Inspection must be repaired and corrected by contractor, and made ready for re-inspection, within five (5) working days.
 - 2. All roof drains shall be water tested for 24 hours.
- B. Clean-up:
 - 1. Immediately upon job completion, roof membrane surfaces, and grounds shall be cleaned of all debris. All gutters adjacent to work areas shall be cleaned.
- C. Final Acceptance Inspection:
 - 1. Do not call for a Final Inspection until work has been checked by the Project Manager/Superintendent to assure that all work complies with specifications.

END OF SECTION