



## TABLE OF CONTENTS

**PART 1 GENERAL**

1.01	SECTION INCLUDES	Page
1.02	RELATED SECTIONS	Page
1.03	REFERENCES	Page
1.04	SUBMITTALS	Page
1.05	QUALITY ASSURANCE	Page
1.06	PERFORMANCE REQUIREMENTS	Page
1.07	REGULATORY REQUIREMENTS	Page
1.08	DELIVERY, STORAGE, AND HANDLING	Page
1.09	JOB CONDITIONS	Page
1.10	ENVIRONMENTAL REQUIREMENTS	Page
1.11	BIDDING REQUIREMENTS	Page
1.12	WARRANTY	Page

**PART 2 PRODUCTS**

2.01	MANUFACTURER	Page
2.02	ROOF DECK INSULATION AND MEMBRANE MATERIALS	Page
2.03	MEMBRANE ADHESIVES AND SEALANT MATERIALS	Page
2.04	MISCELLANEOUS ACCESSORIES	Page
2.05	LIVEROOF PRODUCTS	Page
2.06	ROOFING ASSEMBLY SUMMARIES	Page

**PART 3 EXECUTION**

3.01	EXAMINATION	Page
3.02	PROTECTION	Page
3.03	PREPARATION	Page
3.04	GENERAL INSTALLATION REQUIREMENTS	Page
3.05	REROOFING	Page
3.06	SUBSTRATE	Page
3.07	SEPARATION SHEET INSTALLATION	Page
3.08	FIRE SHEET INSTALLATION	Page
3.09	INSULATION ADHESIVE APPLICATION	Page
3.10	ADHERED INSULATION APPLICATION	Page
3.11	ADHERED COVER BOARD APPLICATION	Page
3.12	MECHANICALLY ATTACHED INSULATION APPLICATION	Page
3.13	MECHANICALLY ATTACHED COVER BOARD APPLICATION	Page
3.14	MECHANICALLY ATTACHED FIELD MEMBRANE APPLICATION	Page
3.15	ADHERED FIELD MEMBRANE APPLICATION	Page
3.16	ROOF FLASHINGS	Page
3.17	BASE FLASHINGS	Page
3.18	ROOF EDGES	Page
3.19	ROOF DRAINS	Page
3.20	ROOF SCUPPERS	Page
3.21	WALK TREAD	Page

**PART 4 ABOVE THE ROOF ACCESSORIES**

4.01	INSTALLATION SEASON FOR VEGETATIVE ROOFS	Page
4.02	VEGETATIVE ROOF PREPARATION	Page
4.03	LIVEROOF MODULE INSTALLATION	Page
4.04	LIVEROOF MAINTENANCE	Page
4.05	LIVEROOF ACCEPTANCE	Page
4.06	VEGETATIVE ROOF HDPE GEO-MEMBRANE LINER INSTALLATION	Page
4.07	PERMA-DRAIN INSTALLATION	Page
4.08	GROWTH MEDIA AND ORGANICS INSTALLATION	Page



4.09	VEGETATIVE ROOF ABOVE ROOF COVERING RIGID INSULATION INSTALLATION	Page
4.10	VEGETATIVE ROOF HDPE GEO-MEMBRANE LINER INSTRUCTION	Page
4.11	PERMA-DRAIN INSTALLATION	Page
4.12	GROWTH MEDIA AND ORGANICS INSTALLATION	Page
4.13	SOLAR-SCREEN INSTALLATION	Page
4.14	PRECAST PAVER INSTALLATION	Page
4.15	CLEAN-UP	Page

SECTION 07 54 19  
POLYVINYL-CHLORIDE ROOFING

## PART 1 GENERAL

## 1.01 SECTION INCLUDES

- A. Provide an IB Roofing Systems (Fully Adhered/ Mechanically Attached, Smooth Surface/ Fleece Back, Chem-Guard) Single-Ply Thermoplastic membrane roofing system over an approved (Plywood, OSB, Structural Wood Fiber, Steel, Light-Weight Insulating Concrete, Structural Concrete) roof deck, complete with related (insulation, cover-board, separator sheet) flashings, and accessories and performing such incidental or other work as may be necessitated by these operations.
- B. General Requirements.
- C. Thermal Insulation.
- D. Polyvinyl-Chloride Roofing.
- E. Flexible Flashing/ Laminated Sheet Flashing.

## 1.02 RELATED SECTIONS

- A. General Requirements (Division 01).

## 1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM) - Annual Book of ASTM Standards.
- B. ASTM E 108- 'Standard Test Methods for Fire Tests of Roof Coverings'.
- C. ASTM C 165- 'Standard Test Method for Measuring Compressive Properties of Thermal Insulation'.
- D. ASTM C 168- 'Terminology Relating to Thermal Insulation'.
- E. ASTM C 209-95 (reapproved 2001)- 'Standard Specification for Cellulosic Fiber Insulating Board'.
- F. ASTM C 472- 'Standard Test Methods for Physical Testing of Gypsum Plasters and Gypsum Concrete'.
- G. ASTM C 473- 'Standard Test Method for Physical Testing of Gypsum Panel Products.
- H. ASTM C 522-03- 'Standard Specification for Cellular Glass Thermal Insulation'
- I. ASTM C 578-04- 'Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation'.
- J. ASTM C 1177- 'Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- K. ASTM C 1289 'Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board'.
- L. ASTM D 4434- 'Standard Specification for Poly-Vinyl-Chloride (PVC) Sheet Roofing'.
- M. FM (Factory Mutual) Global, FM Approvals, and FM RoofNav.

- N. FM 4450- 'Approved Standard for Class 1 Insulated Steel Decks'.
- O. FM 4470- 'Approved Standard for Class I Roof Covers'.
- P. ASTM D 1079- 'Standard Terminology Relating to Roofing, Waterproofing, and bituminous Materials'.
- Q. Underwriters Laboratory (UL) – Roofing Systems and Materials Guide.
- R. CAN/CGSB 37.54-95
- S. Sheet Metal and Air Conditioning National Association, Inc. (SMACNA) - Architectural Sheet.
- T. American Society of Civil Engineers (ASCE) - ASCE 7-05 SEI 'Minimum Design Loads for Building and Other Structures'.
- U. ANSI/SPRI- Single-Ply Roofing Institute.
- V. NRCA- National Roofing Contractors Association.
- W. AIA- American Institute of Architects.
- X. International Building Code (IBC) and International Residential Code (IRC)

#### 1.04 SUBMITTALS

- A. Submit product data, samples, shop drawings, and installer certification under provisions of Division 1.
- B. Submittal Documentation: Submit product/technical data sheets indicating membrane materials, base flashing materials, insulation, separator/ thermal insulation, accessories and manufacturer's installation instructions and details.
- C. Samples: Submit 8"x 11" samples of each color of PVC membrane for approval.
- D. Shop Drawings: Submit shop drawings of tapered insulation system for approval; show direction and amount of slope, cricket locations, lengths and details.
- E. Installer Certification: Submit certification from manufacturer of membrane roofing system certifying that installer is approved by manufacturer for installation of specified roofing system.
- F. Manufacturers Certification: Submit manufacturer's certificate under provisions of Division 1 that products and installed system meet or exceed specified requirements:
  - I. Components to be used that are other than those supplied or manufactured by IB Roof Systems may be submitted for review and acceptance by IB Roof Systems. IB Roof Systems acceptance of any other product is only for a determination of compatibility with IB Roof Systems products and not for inclusion in the IB Roof System warranty. The specifications, installation instructions, limitations, and/or restrictions of the respective manufacturers must be reviewed by the Owner's Representative for acceptability for the intended use with IB Roof Systems products.
  - II. No deviation should be made from this specification. Installer assumes liability for any deviations from specifications.
- G. Above Roof Accessories: The building Owner, Architect, or Engineer shall verify that the roof is properly designed and constructed to adequately support the load of the above roof accessories.

## 1.05 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum 20 years documented experience.
- B. Applicator: Company specializing in applying thermoplastic roofing with minimum five years documented experience and approved by materials manufacturer.
- C. Application of Roofing: Work of this Section to conform to the current edition of the 'IB Roof Systems Division 7 Roofing Binder, 'The NRCA Manual: Low Slope Roofing', 'The NRCA Manual: Steep Slope Roofing, The NRCA Water-proofing Manual', and 'The NRCA Green Roofing Manual'. *\*It is the responsibility of the applicator to address any conflicts or disparities between NRCA requirements and manufacturer's requirements.*
- D. Materials: Provide only top quality materials of manufacturer, certified as to type and weight conformance with specifications. All materials shall be provided or recommended by the Roofing System manufacturer.
- E. General Contractor: will be responsible for coordinating pre-roofing conference at least one week prior to initiation of roofing work. Manufacturer representative, foreman for roofing contractor, estimator for roofing contractor, architect, owner representative, sheet metal contractor, general contractor and other required parties must be present to discuss the execution of the work.
- F. Manufacturers Final Inspection: If a Manufacturer's Labor and Material Warranty is requested, an inspection shall be made by a representative of I B ROOF SYSTEMS, to observe the installation of the waterproofing system. The representative will check and test all welded seams prior to the installation of the separation layer, protection layers, insulation layers and drainage layer. *\* If any items are found to be deficient and cannot be corrected at the time of inspection, a punch list will be made and sent to the waterproofing contractor for correction.*
- G. Additional Quality Control Procedures: (Solar Roof, Paver, Vegetative, or LiveRoof Systems) The roofing applicator will not proceed with the installation any above the roof accessories like: Separation Layer, Drainage Mat, Above Roof Membrane Insulation, Pavers, Growth Media, LiveRoof Modules, Organics, or Solar System until the completion of any deficiencies in the waterproofing membrane. Notify IB Roof Systems upon completion of the punch list items.
- I. There shall be no deviation made from the contract specification or the approved shop drawings without prior written approval from the owner and/or the owner's representative and/or the design professional and IB Roof Systems. *The waterproofing contractor will conduct a 24 hour water test on the completed waterproofing membrane prior to the installation of the separation layer, protection layers, insulation layers and drainage layer.*
- II. The water test shall be witnessed and confirmed by the owner and/or the owner's representative and/or the design professional, the waterproofing contractor, the general contractor and IB Roof Systems. Upon completion of the waterproofing project, the waterproofing contractor shall submit, to IB Roof Systems, a Request for Inspection Form or Notice of Completion Form, certifying that all work has been done in accordance with the contract specification and IB Roof Systems requirements.

## 1.06 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

- B. Material Compatibility: Provide roofing materials and accessories that are compatible with one another under the conditions of service and application required, as demonstrated by the roofing manufacturer based on tested systems and a proven track record.
- C. Physical Properties: Roofing Membrane is to be a ASTM D 4434, type III that meets the following physical properties:
  - 1. Over-All Thickness: Weathering And Bottom Layer Are To Be Equal Thickness With A Minimum Total Thickness Of (50/60/80) Mil. Per ASTM D 751, +/- 10%.
  - 2. Scrim Reinforcement: 9 X 9 (per inch) Weft Polyester Scrim
  - 3. Scrim Water Absorption: Non-Wicking.
  - 4. Fire Hazard Classification Test Methods: UL 790, ASTM E 108
  - 5. Top Coating (Above Weathering Layer): Acrylic
  - 6. Initial Solar Reflectance: 0.87
  - 7. Initial Emissivity: 0.88
  - 8. Initial Solar Reflectance Index (Sri): >107
  - 9. Aged Solar Reflectance (3-Year): 0.74
  - 10. Aged Emissivity (3-Year): 0.89
  - 11. Aged Solar Reflectance Index (Sri): >93

#### 1.07 REGULATORY REQUIREMENTS

- A. Code Compliance: The buildings roofing system is to conform to applicable requirements of the Local Building Code.
- B. Fire Hazard Classification: The buildings roofing system is to be tested in accordance with ASTM E 108, and listed with Underwriters Laboratory (UL) or Factory Mutual (FM) as a: Class ('A' or 'B') Roofing System with current verifiable report or listing.
- C. Uplift Resistance: The buildings roofing system must be designed and applied to resist the following design pressures:

Field:	00.0 psf
Perimeter:	00.0 psf
Corner:	00.0 psf
- D. Factory Mutual (FM) Projects Only: The buildings roofing system is to be listed with FM for:
  - I. Fire Hazard Classification: Class I (A, B or C).
  - II. Hail Resistance: Severe Hail (SH) or Moderate Hail (MH).
  - III. Uplift Resistance:

Field:	FM I-(00)
Perimeter:	FM I-(00)
Corner:	FM I-(00)

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact. Store products in weather protected environment, clear of ground and moisture. Cover material so as to prevent condensation beneath covering.
- B. Bonding adhesives shall be stored at temperatures above 40° F.
- C. Store materials and equipment in a manner to avoid significant and/or permanent deflection of deck. Spread loads of roofing materials on roof structures to avoid damage to existing structure. Use protective plywood as required. No material shall be stored on new roofing unless properly protected to prevent damage to the finished roofing system.
- D. Over burden: LiveRoof® modules are to be delivered in good condition free from shipping damage.
  - I. To be efficient LiveRoof® modules are to be installed on the roof top immediately upon delivery. Any plastic wrapping should be removed to prevent overheating

in the sun. Alternatively, place in the shade.

- II. On the job site, LiveRoof® modules are to be handled to prevent damage to the modules themselves and all roofing components.
- III. LiveRoof® modules are to be conveyed to roof surface with equipment that is designed to carry the collective load of the LiveRoof® modules and transport vehicle or Hoppit®. Account for decreasing load limits when boom (of crane or fork lift) is extended. Use crane stabilizers and take all necessary precautions to protect building and personnel.
- IV. Never exceed the load capacity of the roof deck when placing LiveRoof® modules on the roof.
- V. When suspending LiveRoof® modules and conveyance vehicle above deck, take precautions to stabilize vehicle and prevent twisting of conveyance vehicle. A four inch thick sheet of styrofoam is recommended.
- VI. Surround area below conveyance vehicle and/or crane with caution/stay clear tape to prevent potential injury.
- VII. During installation, protect the roof deck and membranes with appropriate material such as plywood sheeting. Never scrape or puncture slip sheet or membranes. Keep roof surfaces free of soil, grit, or debris at all times with a household broom. Designate one person as the dedicated sweeper. Never set LiveRoof® modules on top of soil, dirt or grit.
- VIII. Transport carts to have pneumatic tires, to be wheeled about only upon protective plywood sheeting, and to be loaded so as not to exceed weight capacity of roof deck.

#### 1.09 JOB CONDITIONS

- A. ( )

#### 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Precautions: Install roofing only when adequate application temperatures that result in a satisfactory roofing system application can be maintained; apply no insulation or membrane adhesives to the substrate or roofing membranes when deck surface temperatures are less than the recommended application temperature range stated on the products labels, or printed literature. Install no roofing material when water in any form is present on roof deck surface, or when materials are damp or wet. Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.
- B. Temporary Roofing: When adverse job conditions or weather conditions prevent permanent roofing and associated work from being installed in accordance with requirements, and it is determined by Contractor that roofing cannot be delayed because of need for job progress or protection of other work, proceed with installation of temporary roofing, per requirements of the roofing manufacturer.
- C. Moisture: Condensation or moisture migration into the roof system must be controlled so that it does not compromise the performance of the insulation and other components of the assembly. Moisture vapor tends to migrate from warmer to cooler areas. Air/vapor retarders are used to inhibit or block the flow of warm moist air into the roof system. To determine if an air/vapor barrier is necessary, a design professional with experience with air handling and moisture control should be consulted.  
Special consideration should be given to construction related moisture. An example is the significant amount of moisture generated when concrete floor slabs are poured after the

roof has been installed. IB Roof Systems is not responsible for damage to the insulation when exposed to construction related moisture.

#### 1.11 BIDDING REQUIREMENTS

A. ( )

#### 1.12 WARRANTY

- A. Watertightness: Membrane roofing system, including membrane base flashing, roof insulation, and roofing accessories, is part of the watertight integrity of the project and as such shall be warranted for 0- years (or other time period as required by the state/ local contractors licensing board) by the Roofing Contractor.
- B. Manufacturer's Warranty: Submit executed copy of roofing manufacturers (Material Only, Warranty Plus, Total Systems) Warranty agreement for (10, 15, 20, 25, 20/25-years) total from the date of final acceptance by the Owner.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURER

- A. Acceptable Manufacturer: IB Roofing Systems, 2877 Chad Dr. Eugene, OR 97408: Toll Free: 800-426-1626 Fax: 541-610-1726, Email: [technical@ibroof.com](mailto:technical@ibroof.com), Website: [www.ibroof.com](http://www.ibroof.com)
- B. IB Roof Systems (XX-50/60/80-XX-X) FastSpec specified herein is the basis of design for all roofing assemblies. The structural deck, method of attachment and installation will be specific to each roofing assembly identified.
- C. No substitutions allowed.

#### 2.02 ROOF DECK INSULATION AND MEMBRANE MATERIALS

- A. Thermal Barrier: 4'x 8' Dens-Deck Prime Glass-Mat Faced Gypsum Roof Board: Thickness 1/4", Flute Spanability: 2-5/8", Permeance (per ASTM E 96) not more than 50 perms, R-Value (per ASTM C 518) not less than 0.28, Water absorption (per ASTM C 1177) less than 10 percent of weight, weight per sq. ft: 1.15 lbs. supplied by IB Roof Systems
- B. Thermal Barrier: 4'x 8' Dens-Deck Prime Glass-Mat Faced Gypsum Roof Board: Thickness 1/2", Flute Spanability: 5.0", Permeance (per ASTM E 96) not more than 35 perms, R-Value (per ASTM C 518) not less than 0.56, Water absorption (per ASTM C 1177) less than 10 percent of weight, weight per sq. ft: 1.975 lbs. supplied by IB Roof Systems
- C. Thermal Barrier: 4'x 8' Dens-Deck Prime Glass-Mat Faced Gypsum Roof Board: Thickness 5/8", Flute Spanability: 8", Permeance (per ASTM E 96) not more than 50 perms, R-Value (per ASTM C 518) not less than 0.67, Water absorption (per ASTM C 1177) less than 10 percent of weight, weight per sq. ft: 2.55 lbs. supplied by IB Roof Systems
- D. Thermal Barrier: 4'x 8' Securock Roof Board: Thickness 1/4", Flute Spanability: 2-5/8", Permeance (per ASTM E 96) not more than 30 perms, R-Value (per ASTM C 518) not less than 0.20, Water absorption (per ASTM C 1177) less than 10 percent of weight, weight per sq. ft: 1.43 lbs. supplied by IB Roof Systems
- E. Thermal Barrier: 4'x 8' Securock Roof Board: Thickness 3/8", Flute Spanability: 5", Permeance (per ASTM E 96) not more than 26 perms, R-Value (per ASTM C 518) not less than 0.30, Water absorption (per ASTM C 1177) less than 10 percent of weight, weight per sq. ft: 1.97 lbs. supplied by IB Roof Systems

- F. Thermal Barrier: 4'x 8' Securock Roof Board: Thickness 1/2", Flute Spanability: 8", Permeance (per ASTM E 96) not more than 26 perms, R-Value (per ASTM C 518) not less than 0.50, Water absorption (per ASTM C 1177) less than 10 percent of weight, weight per sq. ft: 2.47 lbs. supplied by IB Roof Systems
- G. Thermal Barrier: 4'x 8' Securock Roof Board: Thickness 5/8", Flute Spanability: 8", Permeance (per ASTM E 96) not more than 24 perms, R-Value (per ASTM C 518) not less than 0.60, Water absorption (per ASTM C 1177) less than 10 percent of weight, weight per sq. ft: 3.06 lbs. supplied by IB Roof Systems
- H. Rigid Insulation: 4'x (4/8)' Expanded Poly Styrene (EPS): Thickness (X)", Permeance (per ASTM E 96) not more than 3.5 perms, R-Value per inch (per ASTM C 518) not less than 4.17 @ 75° F, Water absorption (per ASTM C 1177) less than 3.0 percent of weight, Density (per ASTM C 303) 1.50 lbs, Premier Industries Insulafoam, supplied by IB Roof Systems
- I. Recovery Board: 4' x 50' R-Tech Fanfold Roof Underlayment: Thickness 1/2", Type II, Permeance (per ASTM E 96) not more than 3.5 perms, R-Value (per ASTM C 518) not less than 2.08 @ 75° F, Water absorption (per ASTM C 1177) less than 3.0 percent of weight, Density (per ASTM C 303) 1.50 lbs. Premier Industries Insulafoam R-Tech, supplied by IB Roof Systems
- J. Rigid Insulation: 4'x (4/8)' IB Energy Board II Polyisocyanurate Thermal Insulation: Thickness (X)", Permeance (per ASTM E 96) not more than 3.5 perms, R-Value per inch (per ASTM C 518) not less than 6.0 @ 75° F, Water absorption (per ASTM C 1177) less than 3.0 percent of weight, Compressive Strength (per ASTM D 1621) 20 PSI. supplied by IB Roof Systems
- K. Separation Sheet: Fire resistant glass fiber mat used as a separation sheet over polystyrene foam insulation or beneath insulation over wood substrates. Each roll contains ten (10) squares of material, 4 feet by 250 feet, 80 lbs., Atlas FR 10 Separator Sheet. supplied by IB Roof Systems
- L. Separation Sheet: Fire resistant glass fiber mat used as a separation sheet over polystyrene foam insulation or beneath insulation over wood substrates. Each roll contains four (4) squares of material, 4 feet by 105 feet, 79 lbs., Atlas FR 50 Separation Sheet. supplied by IB Roof Systems
- M. Separation Sheet: Non-woven polyester UV-stabilized mat, 4.0 oz/sq. used as a separation sheet beneath membranes as a protection layer and used over membranes in ballast applied assemblies. Each roll contains 27 squares of material, 7.5 feet by 360 feet, 70 lbs., Poly Separation Layer 4 oz. supplied by IB Roof Systems
- N. Separation Sheet: Non-woven polyester UV-stabilized mat, 16 oz/sq. used as a separation sheet beneath membranes as a protection layer and used over membranes in ballast or paver applied assemblies. Each roll contains 11 squares of material, 7.5 feet by 150 feet, 144 lbs., Poly Cushioning Layer 16 oz. supplied by IB Roof Systems
- O. Detail Flashing Membrane: 0.060 mil. smooth, unreinforced thermoplastic PVC membrane for flashing/reinforcing supplied by IB Roof Systems.
- P. Root Barrier: UV-stabilized polyethylene resin HDPE geo-membrane liner used as a separation sheet over membranes in vegetative roof assemblies. Each roll contains 8 squares of material, 7.5 feet by 107 feet, (?) lb, Polyflex. supplied by IB Roof Systems
- Q. Drainage Layer: A two-part, sheet drain with polystyrene core and a nonwoven filter fabric. Primarily used for deeper vertical and select horizontal applications where maximum flow capacity is required. Each roll contains 2 squares of material, 4 feet by 50 feet, (?) lb, J-Drain 500, supplied by IB Roof Systems
- R. Solar Screen: Solar Membrane (1-layer): 50 mil. IB Solar Screen Chemical Resistant

Poly-Vinyl-Chloride (PVC) non-wicking polyester fiber reinforced thermoplastic membrane, conforming to ASTM D 4434, Type III.

- S. Roof Covering: Field & Base Flashing Membrane (1-layer): (50/60/80) mil. IB ('Chem-Guard') Single-Ply (Chemical Resistant) Poly-Vinyl-Chloride (PVC) non-wicking polyester fiber reinforced thermoplastic membrane, conforming to ASTM D 4434, Type III with the following physical properties:

50/60/80 mil. Membrane Property Thickness (in)	Method ASTM D 751	Results 0.05/0.06/0.08 (+/- 10%)
Weight (per 540/340 sq. ft)		180/200/195 lbs.
Initial Solar Reflectivity	Min.	0.87
3-Year Solar Reflectivity	Min.	0.73
Initial Emittance	Min.	0.88
3-Year Emittance	Min.	0.88
Breaking Strength	ASTM D 751	MD: 370465/540 lbs./in XMD: 310/400/480 lbs./in
Elongation @ Breaking (%)	ASTM D 751, B-Grab Method	MD: 40 lbs./in XMD: 38 lbs./in
Retention of Properties after Heat Ageing:	ASTM D 3045 @ 80° F for 56 days, 6 hours	Pass
Breaking Strength (%)		Pass
Elongation @ Break (%)		Pass
Tearing Strength (%)		Pass
Tearing Strength (lbf.)	ASTM D 751	MD: 72/73/74 lbs./in XMD: 49/60/70 lbs./in
Low Temperature Bend (C°)	ASTM D 2136 @ -40° C	Pass
Accelerated Weathering	ASTM D 53 5,000 Hour Min.	Cracking (7x mag.): none Crazing (7x mag.): none
Linear Dimensional Change	ASTM D 1204 @ 80° F for 56 days, 6 hours	MD: -0.4 % XMD: -.00 %
Change in Weight after immersion in water	ASTM D 570 @ 70° F for 168 hours	1.5 %
Static Pressure Resistance	ASTM D 5602 @33 lbf at 23° C	Pass
Dynamic Puncture Resistance	ASTM D 5635 20 j @ 23° C	Pass
Seam Strength		100%
Warranty (years non-prorated)		15/20/25 years

2.03 MEMBRANE ADHESIVE AND SEALANT MATERIALS

- A. Water-Borne-Water-based Membrane Bonding Adhesive for use with IB Roof Systems Single-Ply membranes.
- B. Vertibond-Solvent Based Membrane Bonding Adhesive for use with IB Roof Systems Single-Ply membranes.
- C. One part polyurethane sealant suitable for sealing upper lip of exposed termination bars and around upper edge of penetration clamping rings, meets or exceeds ASTM C 920, Solar Seal #900 Teropolymer Rubber Adhesive/ Sealant by NPC.

- D. One part polyurethane sealant suitable for sealing upper lip of exposed termination bars and around upper edge of penetration clamping rings, meets or exceeds ASTM C 920, IB Urethane Caulk 150 Adhesive/ Sealant by BASF.
- E. One part butyl based high viscosity sealant suitable for sealing between flashing membrane and substrate surface behind exposed termination bars and for sealing between roofing membrane and drain flange. Ashland PLIOBOND 9508 Water Cut-Off Mastic, by Ashland Chemicals.
- F. 100 percent solids epoxy based two-part sealant suitable for filling sealant pans at irregularly-shaped penetrations. Epoxy is part A. Polyamide is part B. Chemlink 2-Part Pourable Sealer, by Chemlink.

#### 2.04 MISCELLANEOUS MATERIALS

- A. Insulation Adhesive:
  - 1. Tite-Set Insulation Adhesive supplied by IB Roof Systems.
  - 2. Olybond Spot Sot 500 Insulation Adhesive supplied by IB Roof Systems.
  - 3. Millennium One Step Insulation Adhesive supplied by IB Roof Systems.
- B. Mechanical fasteners:
  - 1. # 14 HD Screws: Heavy duty gauge alloy steel fastener with CR-10 coating with a .245 inch diameter thread: Factory Mutual Standard 4470 Approved, #3 Phillips truss head for use on approved decks. supplied by IB Roof Systems
  - 2. #15 XHD Screws: Heavy duty gauge alloy steel fastener with CR-10 coating with a .275 inch diameter thread: Factory Mutual Standard 4470 Approved, #3 Phillips truss head for use on approved decks. supplied by IB Roof Systems
  - 3. # 12 Standard Screws: Heavy duty gauge alloy steel fastener with CR-10 coating with a .245 inch diameter thread: Factory Mutual Standard 4470 Approved, #3 Phillips truss head for use on approved decks. supplied by IB Roof Systems
  - 4. NTB-Fastener: A large diameter glass fiber filled nylon auger with a 1 inch head and locking wire barbs. Major thread diameter of .750 inch. supplied by IB Roof Systems
  - 5. Steel Fluted Concrete Anchors: Hammer-in, non-threaded fastener designed to secure insulation and membrane to structural concrete. Alloy steel fastener with a CR-10 coating and a .250 inch shank diameter. supplied by IB Roof Systems
- C. Plates and Batten Bars:
  - 1. Factory Mutual and Dade County Approved, IB Roof Systems 3" Glavalume Coated Steel Insulation Plates used to attach approved separator sheets, rigid insulation, and cover boards.
  - 2. Factory Mutual and Dade County Approved, IB Roof Systems 2" Barbed Galvalume Coated Steel Membrane Plates used to attach the in seam of single ply roofing membranes.
  - 3. Factory Mutual and Dade County Approved, IB Roof Systems 2-3/8" Magnum Barbed Galvalume Coated Steel Plates used to attach the in seam of single ply roofing membranes.

4. Factory Mutual and Dade County Approved, IB Roof Systems 2" NTB Barbed Galvalume Coated Steel Membrane Plates used to attach the in seam of single ply roofing membranes.
  5. Factory Mutual and Dade County Approved, IB Roof Systems 3" NTB Galvalume Coated Steel Membrane Plates Insulation Plates used to attach approved separator sheets, rigid insulation, and cover boards.
  6. Factory Mutual and Dade County Approved, IB Roof Systems 1" Galvalume Coated Steel Batten Bar used to attach the in seam of single ply roofing membranes.
  7. Factory Mutual and Dade County Approved, IB Roof Systems NTB 1-1/2" Galvalume Coated Steel Batten Bar used to attach the in seam of single ply roofing membranes.
- D. Termination Bars:
1. Extruded aluminum termination bar with angled lip caulk receiver and lower leg bulb stiffener. Pre-punched slotted holes at 6 inches on center. 1" inch by 10 feet, Termination Bar, by IB Roof Systems.
  2. 24. Gauge, galvanized finished, 0.060 PVC clad steel termination bar with angled lip caulk receiver and lower him stiffener: 3" inch by 10 feet, IB Clad Termination Bar.
- E. Factory Fabricated Membrane Flashings:
1. Dielectrically welded, supported/ non-supported 'Cone' and 'No-Cone' Single-Ply membrane flashings. supplied by IB Roof Systems
  2. Dielectrically welded, non-supported 'Inside' and 'Outside' Single-Ply membrane corners. supplied by IB Roof Systems
  3. Dielectrically welded, PVC two (2) way membrane vents with supported Single-Ply membrane targets. supplied by IB Roof Systems
  4. Dielectrically welded, PVC eight inch (8") vents with supported Single-Ply membrane targets. supplied by IB Roof Systems
  5. 5": 60 mil. IB ('Chem-Guard') Single-Ply (Chemical Resistant) Poly-Vinyl-Chloride (PVC) non-wicking polyester scrim reinforced thermoplastic membrane T-Joint Patches. supplied by IB Roof Systems
- F. Factory Fabricated Drains/ Overflows/ Scuppers:
1. Spun Aluminum, Plastisol coated, retro-fit roof drain/ overflow insert with a factory welded non-wicking polyester scrim reinforced thermoplastic membrane target, available in 3-6" diameter with a 12" drain stem, and a rubber compression sealing anti-back flow gasket: IB/U-Flow Drain.
  2. Custom 24. Gauge, galvanized finished, 0.060 PVC clad steel scupper with factory welded smooth, unreinforced thermoplastic PVC membrane: IB custom Clad Metal Scuppers.
- G. Metal Edge Termination:
1. Custom 24. Gauge, galvanized finished, 0.060 PVC clad steel Drip or Gravel Stop Edge Metal supplied by IB Roof Systems, meeting the minimum dimensional standards:

Edge Metal (Non-Raised Edge) With Hemmed Edge		Weight Per Piece
2" Face	2-1/2" min. Deck Flange	5.0 lbs.
3" Face	2-1/2" min. Deck Flange	6.0 lbs.
4" Face	2-1/2" min. Deck Flange	7.0 lbs.
5" Face	2-1/2" min. Deck Flange	8.0 lbs.
Gravel Guard (3/4" Raised Edge) With Hemmed Edge		Weight Per Piece
2" Face	2-1/2" min. Deck Flange	7.0 lbs.
3" Face	2-1/2" min. Deck Flange	8.0 lbs.
4" Face	2-1/2" min. Deck Flange	9.0 lbs.
5" Face	2-1/2" min. Deck Flange	10.0 lbs.

2.05 LIVEROOF PRODUCTS

- A. LiveRoof® modules are formed of 100 mil. thick (sidewall) recycled polypropylene and colored black. LiveRoof® modules measure 1 foot x 2 feet outside diameter, 3 inches tall. The LiveRoof® Soil Elevator™, the insert collar that allows for growing soil above the container edge, is approximately 3 ½ inches tall, 18 mil. Thick, and composed of gray recycled polypropylene or suitable biodegradable material. Each module is to be filled to the top of the Soil Elevator™. Height from container bottom is approximately 4 inches, although normal settling is to be expected and will reduce this height somewhat.
- B. Saturated weight with mature vegetation: approximately 26-29 lb. per square ft.
- C. Module clearance above roof deck: ½ inch.
- D. When prevegetated at a Nursery, the Nursery is to execute the following: LiveRoof® Soil Elevator™ is to be properly inserted into fasteners inside LiveRoof® module. LiveRoof® module is to be filled with LiveRoof® soil and appropriately settled either by mechanical vibration or flooding with water.
- E. Any settled soil is to be replaced so that LiveRoof® soil extends to top of Soil Elevator™ at time of planting.
- F. LiveRoof® module is to be filled with LiveRoof® plants, selected by purchaser. Plants are to be grown to maturity (approx. 95%+ soil coverage).
- G. LiveRoof® media is an engineered blend of inorganic and organic components based upon German FLL granulometric guidelines modified so as to contain ecologically sustainable levels of organic content.
- H. LiveRoof® is an "extensive" green roof system. LiveRoof® recommended plant mixes are composed of highly drought resistant ground covers. Local Horticulturists should be consulted for specific recommendations.

2.06 ROOFING ASSEMBLY SUMMARIES:

- A. ROOF DECK:
  - ½" (15/32") 5-ply CDX plywood rated and stamped by the APA
  - 5/8" (19/32") 5-ply CDX plywood rated and stamped by the APA
  - ¾" (24/32") 5-ply CDX plywood rated and stamped by the APA
  - ½" (15/32") Oriented Strand Board (OSB) rated and stamped by the APA
  - 5/8" (19/32") Oriented Strand Board (OSB) rated and stamped by the APA
  - ¾" (24/32") Oriented Strand Board (OSB) rated and stamped by the APA
  - 22 ga. Steel Decking
  - 24 ga. Steel Decking
  - 26 ga. Steel Decking
  - 2" 2500 psi Structural Concrete Decking
  - 2" 200 psi Light Weight Insulating Concrete over Structural Concrete Deck
  - 2" 200 psi Light Weight Insulating Concrete over 22 ga. Steel Deck

- B. SUBSTRATE: Roof deck must be clean, dry, smooth, and structurally sound to receive the new roofing system. Drainage must be incorporated in the design to prevent ponding water.
- C. SEPARATION SHEET: ( ) is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ) and the building code (whichever is more stringent).
- D. INSULATION: ( ) is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ) and the building code (whichever is more stringent).
  - 1. Fasten insulation according to the Local Building Code.
  - 2. Fasten insulation to resist uplift pressures at the corners, perimeters, and field of roof per manufacturer's and ASCE 7-05 SEI.
- E. SEPARATION SHEET: ( ) is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ) and the building code (whichever is more stringent).
- F. THERMAL BARRIER: ( ) is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ) and the building code (whichever is more stringent).
  - 1. Fasten Thermal Barrier according to the Local Building Code.
  - 2. Fasten insulation to resist uplift pressures at the corners, perimeters, and field of roof per manufacturer's and ASCE 7-05 SEI
- G. MEMBRANE: (50/60/80) mil. IB ('Chem-Guard') Single-Ply (Chemical Resistant) Poly-Vinyl-Chloride (PVC) non-wicking polyester scrim reinforced thermoplastic membrane per the Roofing Manufacturers attachment requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ) and the building code (whichever is more stringent).
- H. BASE FLASHING: (50/60/80) mil. IB ('Chem-Guard') Single-Ply (Chemical Resistant) Poly-Vinyl-Chloride (PVC) non-wicking polyester scrim reinforced thermoplastic membrane, fully adhered at all flat to vertical transitions.
- I. FLASHING ACCESSORIES, installed on-top of the surface of the (50,60,80 mil.) Single-Ply PVC Membrane per the Roofing Manufacturers attachment requirements.
- J. ABOVE THE ROOF ACCESSORIES.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify that deck is supported and secured.
- C. Verify that roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set.
- D. Verify that attachment capabilities of the roof deck and fasteners by conducting pull-out tests per (Insulation Adhesive: ANSI-SPRI IA-1-2005/ Mechanical Attachment: ANSI/SPRI-FX-1 07 & TAS 137).

- E. Beginning of installation means installer accepts substrate.

### 3.02 PROTECTION

- A. Protect building surfaces against damage from roofing work. Provide safety barriers and other protection devices as needed to protect property and people.

### 3.03 PREPARATION

- A. Remove in its entirety the existing BUR assembly including all residual asphaltic adhesives and primers from drains, walls, curbs. Penetrations, metal flanges, etc.
- B. Accurately layout work surfaces for materials application. Verify acceptability of substrate for roofing. Lay PVC Field Membrane perpendicular to the incline starting at the low point of the roof.
- C. Provide material to substrate as required to produce an even substrate that will maintain the required slope for drainage.

### 3.04 GENERAL INSTALLATION REQUIREMENTS

- A. All drains, projections and edges shall be installed in strict accordance with practices set forth in the NRCA Roofing Manual or manufacturer of membrane. All mechanical equipment requiring fastening shall be fastened with hex head screws with neoprene washers.
- B. Cooperate with inspection and testing agencies engaged or required to perform services in connection with roofing system installation.
- C. Provide cut-offs at end of each day's work, to cover exposed partially installed membrane and insulation. Remove cut-offs before resuming work.
- D. In finished areas, storing, walking, wheeling, or trucking will not be permitted. Provide smooth, clean boards or plank walkways, runways, and platforms near supports, as needed to distribute weight to conform to indicate live load limits and transient loads imposed during roofing installation and construction.
- E. Membrane overlaps shall be shingled with the flow of water whenever possible.

### 3.05 REROOFING:

- A. Mineral or Smooth Surfaced Asphaltic Built-up roofing or Modified Bitumen (SBS or APP):
  - 1. All existing roofing, base flashing, deteriorated wood blocking or deteriorated metal flashings shall be removed.
  - 2. Remove only that amount of roofing and flashing which can be made weather-tight with new materials during a one-day period or before the onset of inclement weather.
- B. Single Ply (PVC):
  - 1. The Owner's Representative and Applicator shall determine the condition of the roof deck and existing insulation. Deteriorated decking or wet or deteriorated materials are to be removed and replaced.
- C. Gravel Surfaced Asphaltic Built-up Roofing or Modified Bitumen (SBS or APP):
  - 1. On graveled surfaces, all loose gravel and debris shall be removed by power brooming or vacuuming. All blisters shall be removed and sealed or cut, fastened

down and sealed. Any accumulation of bitumen or other irregularities shall be spudded and removed so as to produce a smooth surface.

2. On smooth surfaced roofs, the surface must be clean and dry. All blisters shall be removed and sealed or cut, fastened down and sealed. For Type III hot asphalt attachment of new insulation board, priming of the old roof surface after preparation is necessary.
3. Coal-tar pitch or heavily resaturated roofs may require removal. Contact I B ROOF SYSTEMS Technical Services for coal-tar pitch or heavily resaturated reroof preparation requirements.

### 3.06 SUBSTRATE:

#### A. Steel Deck:

1. All rusted or deteriorated decking shall be brought to the attention of the Owner's Representative to determine method of treatment or replacement. Surface-only rusted metal shall be sanded and treated with rust-inhibiting paint. Sections that have rusted deeper than the surface or are not structurally sound shall be removed and replaced. Deck type shall match existing and the attachment shall conform to local code requirements.

#### B. Dimensional Wood Deck:

1. All rotted or deteriorated wood shall be removed and replaced. The deck thickness shall be 1-1/2 inch (38 mm) lumber. All knot holes greater than 2" shall be covered with min. 24 ga. Sheet metal or incorporate a cover-board that can span the opening and provide live and dead load support.

#### C. Engineered Wood (Plywood or Oriented Strand Board)

1. Minimum 15/32 (12 mm) plywood or OSB depending on design pressures and holding capacity of membrane/insulation fasteners. Increase thickness if needed to match existing roof decking being replaced. Deck type and attachment shall conform to local code requirements. Fastener heads shall be recessed into the wood surface.

#### D. Poured Structural Concrete Deck:

1. The roof deck shall be smooth, even, free of dust, dirt, excess moisture or oil and be structurally sound. Sharp ridges, other projections and accumulations of bitumen above the surface shall be removed to ensure a smooth surface before roofing. Any deteriorated decking shall be repaired.

#### E. Poured Lightweight Concrete Substrate:

1. The roof deck shall be smooth, even, free of dust, dirt, excess moisture or oil and be structurally sound. Sharp ridges, other projections and accumulations of bitumen above the surface shall be removed to ensure a smooth surface before roofing. Any deteriorated decking shall be repaired.

#### F. Insulating Fill Substrate:

1. All wet or deteriorated insulating fill shall be removed and replaced. All accumulations of bitumen shall be removed and the surface of the deck shall be smooth, and free of ridges and depressions. See steel/concrete requirements.

### 3.07 SEPARATION SHEET INSTALLATION

- A. Separation Sheet shall be applied over non-compatible, or irregular substrate starting at the low side of the roof with non-bucking water seams. Side and end laps shall be a minimum of 2".
- B. Separation Sheet must be secured with approved corrosion-resistant screws and 3" galvalume insulation plates, as supplied by I B ROOF SYSTEMS, to prevent movement from wind or traffic.
- C. The installation of Separation Sheet is to be followed immediately by the installation of IB PVC Single-Ply.

### 3.08 FIRE SHEET INSTALLATION

- A. Fire Sheet shall be applied over non-compatible, or irregular substrate starting at the low side of the roof with non-bucking water seams. Side laps shall be a minimum of 2" (for single layer only) and to the two (2) ply exposure lines marked on the sheet with all end laps a minimum of 2".
- B. Fire Sheet must be secured with approved corrosion-resistant screws and 3" galvalume insulation plates, as supplied by I B ROOF SYSTEMS, to prevent movement from wind or traffic.
- C. The installation of Fire Sheet is to be followed immediately by the installation of IB PVC Single-Ply Membrane.

### 3.09 INSULATION ADHESIVE APPLICATION

- A. Place (Insulation/ Thermal Barrier/ Cover-board) onto adhesive beads within 5 minutes of application and walk-in immediately to spread beads for maximum contact.
- B. Time required is normally 4 to 5 minutes at 80 degrees F (27 degrees C) but will depend on the ambient temperature at the time of application.
- C. (Tite-Set Adhesive) Apply adhesive directly to approved substrate using continuous ribbons 2.5 to 3.5 inches wide by 1 to 1-1/2 inches high, placed a maximum of 12 inches O.C. Application rate can vary and an increased amount of adhesive may be required at the perimeter of the roof depending on building and parapet wall heights.
- D. (Olybond Spot Shot 500 Adhesive) Apply adhesive directly to approved substrate using continuous ribbons 3/4 to 1 inches wide by 1 inches high, placed a maximum of 12 inches O.C. Application rate can vary and an increased amount of adhesive may be required at the perimeter of the roof depending on building and parapet wall heights.
- E. Increase the ribbons as required at the corners and perimeter to meet the design pressures for the building, per ANSI/SPRI WD-1.

### 3.10 ADHERED INSULATION APPLICATION

- A. ( ) is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ), the local building code and the recommendations of the insulation manufacturer.
- B. First Course: Start by installing a full width layer at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) lay perpendicular to the roof slope. Install continuous ribbons of approved insulation adhesive directly to the top surface of the Roof Deck per the pattern density required. Continue installing full width layers of insulation as described until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- C. Second Course: Start by installing a cut layer of insulation, achieving a minimum end-lap offset of the first course of insulation by 12", at the low side of the roof (directly above the

first course of insulation) laid perpendicular to the roof slope. Install continuous ribbons of approved insulation adhesive directly to the top surface of the Roof Deck per the pattern density required. Continue installing full width layers of insulation as described in B, until reaching the end of the area that is being roofed that work day or onset of inclement weather.

- D. Subsequent Courses: Continue installing additional courses, alternating sections B, and C, until reaching the area that can be roofed by the end of the workday or onset of inclement weather.
- E. All courses shall be installed with side and end-laps of no more than ¼" gaps.
- F. Installer must not kick or damage insulation during installation. All damaged, severely cupped, or unusable pieces must be discarded.
- G. Insulation must be installed with the correct facer side up (as written on the insulations face).
- H. Insulation must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).
- I. Completely cover applied insulation with finished roofing system. Protect open spaces between insulation, walls, and spaces at curbs, until permanent roofing, flashing accessories, and roofing components are applied. **INSULATION MAY NOT BE LEFT UNCOVERED OVERNIGHT.**

### 3.11 ADHERED COVER-BOARD APPLICATION

- A. ( ) is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ), the local building code and the recommendations of the Cover-board manufacturer.
- B. First Course: Start by installing a full width layer at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) lay perpendicular to the roof slope. Install continuous ribbons of approved insulation adhesive directly to the top surface of the Insulation per the pattern density required. Continue installing full width layers of Cover-board as described until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- C. Second Course: Start by installing a cut layer of Cover-board, achieving a minimum end-lap offset of the first course of insulation by 12", at the low side of the roof (directly above the first course of insulation) laid perpendicular to the roof slope. Install continuous ribbons of approved insulation adhesive directly to the top surface of the Insulation per the pattern density required. Continue installing full width layers of Cover-board as described in B, until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- D. Subsequent Courses: Continue installing additional courses, alternating sections B, and C, until reaching the area that can be roofed by the end of the workday or onset of inclement weather.
- E. All courses shall be installed with side and end-laps of no more than ¼" gaps.
- F. Installer must not kick or damage Cover-board during installation. All damaged, severely cupped, or unusable pieces must be discarded.
- G. Cover-board must be installed with the correct facer side up (as written on the insulations face).

- H. Cover-board must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).
- I. Completely cover applied Cover-board with finished roofing system. Protect open spaces between insulation, walls, and spaces at curbs, until permanent roofing, flashing accessories, and roofing components are applied. COVER-BOARD MAY NOT BE LEFT UNCOVERED OVERNIGHT.

### 3.12 MECHANICALLY ATTACHED INSULATION APPLICATION

- A. ( ) is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ), the local building code and the recommendations of the Thermal Barrier manufacturer.
- B. First Course: Start by installing a cut layer of insulation, achieving a minimum end-lap and side-lap offset of the underlying insulation courses of insulation by 12", at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) laid perpendicular to the roof slope. Place approved insulation plates and fasteners over the face of the insulation per the pattern density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing full width layers of insulation as described until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- C. Second Course: Start by installing a cut layer of insulation, achieving a minimum end-lap offset of the first Thermal Barrier course of insulation by 12", at the low side of the roof (directly above the first course of Thermal Barrier) laid perpendicular to the roof slope. Place approved insulation plates and fasteners over the face of the insulation per the pattern density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing full width layers of insulation as described in 3.06, B, until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- D. Subsequent Courses: Continue installing additional courses, alternating sections 3.06: B, and 3.06: C, until reaching the area that can be roofed by the end of the workday or onset of inclement weather.
- E. All courses shall be installed with side and end-laps of no more than ¼" gaps.
- F. Installer must not kick or damage Thermal Barrier during installation. All damaged, severely cupped, or unusable pieces must be discarded.
- G. Thermal Barrier must be installed with the correct facer side up (as written on the Thermal Barrier face).
- H. Thermal Barrier must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).
- I. Completely cover applied insulation with finished roofing system. Protect open spaces between insulation, walls, and spaces at curbs, until permanent roofing, flashing accessories, and roofing components are applied. INSULATION MAY NOT BE LEFT UNCOVERED OVERNIGHT.

### 3.13 MECHANICALLY ATTACHED COVER-BOARD APPLICATION

- A. ( ) is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ), the local building code and the recommendations of the Thermal Barrier/ Cover Board manufacturer.
- B. First Course: Start by installing a cut layer of Thermal Barrier/ Cover Board, achieving a minimum end-lap and side-lap offset of the underlying insulation courses of insulation by 12", at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) laid perpendicular to the roof slope. Place approved Thermal Barrier/ Cover Board plates and fasteners over the face of the Thermal Barrier/ Cover Board per the pattern density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing full width layers of Thermal Barrier/ Cover Board as described until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- C. Second Course: Start by installing a cut layer of Thermal Barrier/ Cover Board, achieving a minimum end-lap offset of the first Thermal Barrier/ Cover Board course of insulation by 12", at the low side of the roof (directly above the first course of Thermal Barrier) laid perpendicular to the roof slope. Place approved Thermal Barrier/ Cover Board plates and fasteners over the face of the Thermal Barrier/ Cover Board per the pattern density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing full width layers of insulation as described in 3.06, B, until reaching the end of the area that is being roofed that work day or onset of inclement weather.
- D. Subsequent Courses: Continue installing additional courses, alternating sections 3.06: B, and 3.06: C, until reaching the area that can be roofed by the end of the workday or onset of inclement weather.
- E. All courses shall be installed with side and end-laps of no more than ¼" gaps.
- F. Installer must not kick or damage Thermal Barrier/ Cover Board during installation. All damaged, severely cupped, or unusable pieces must be discarded.
- G. Thermal Barrier/ Cover Board must be installed with the correct facer side up (as written on the Thermal Barrier face).
- H. Thermal Barrier/ Cover Board must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).
- I. Completely cover applied Thermal Barrier/ Cover Board with finished roofing system. Protect open spaces between insulation, walls, and spaces at curbs, until permanent roofing, flashing accessories, and roofing components are applied. THERMAL BARRIER/ COVER BOARD MAY NOT BE LEFT UNCOVERED OVERNIGHT.

#### 3.14 MECHANICALLY ATTACHED FIELD MEMBRANE APPLICATION

- A. ( ) Field Membrane is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ), and the local building code.
- B. Zone 2 & 3 (perimeter & corner): Start by installing a 36" (half rolls) wide sheets at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) so that the water flows over, but never against the side laps. Turn over the edge, below the nailer (roof edge applications) or at the base of the perimeter parapet or roof curbs. Place approved fasteners at the ink markings of the Field Membrane per the lap spacing density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal

decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing 36" (half rolls) wide Sheets as described until reaching the end of the perimeter zone that is being roofed that work day or onset of inclement weather.

- C. **Welding Start-Up** (start of every welding cycle: morning, after break, after lunch, ECT): Before starting any finish welding, operators are to conduct several test welds using the same membrane at the same ambient temperature as the just installed courses and cut 1" wide strips of the test membrane and pull apart (tear bond) to determine quality of the welds. A satisfactory weld is when the weathering layer (membrane surface) is fully welded to the underside of the overlapping membrane, and when pulled, is torn away, exposing the reinforcement scrim of the underlying membrane. Minimum acceptable Automatic welds are 1-1/2" wide and 2" wide for hand welds. Automatic Welder temperature and speed is to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed). Hand Welders are to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed).
- D. All courses shall be installed with 5" side-laps, and 4" end-laps.
- E. Membrane must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).
- F. **Zone 1 (field):** Start by installing a 72" (full rolls) wide sheets lapping onto the last course of the perimeter and corner sheets, so that the water flows over, but never against the side laps. Place approved fasteners at the ink markings of the Field Membrane per the lap spacing density required and secure using a clutch or adjustable depth powered fastening device. Installer to ensure that the fasteners are to engage the top rib (metal decks) or upper flat surface of the substrate and not over drive or strip out fastener from the roof deck. Continue installing 72" (full rolls) wide Sheets as described until reaching the end of the field zone that is being roofed that work day or onset of inclement weather.
- G. Membrane must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).
- H. **Zone 3 (corner):** install perimeter sheets as described in section 3.09: B. install additional rows of fasteners and plates over the top surface of the installed sheets in a straight line at 3' intervals at the fastener spacing required by the designer of record or authority having jurisdiction. Install a cover-strip of reinforced 50 mil. IB membrane that is heat-welded around the perimeter of the cover-strip.

### 3.15 ADHERED FIELD MEMBRANE APPLICATION

- A. ( ) Field Membrane is to be attached to the roof deck per the fastening and fastener requirements for the design pressure determined by the Authority Having Jurisdiction (AHJ), and the local building code.
- B. All Zones (1 field, 2 perimeter, & 3 corner): Start by installing a 72" (full rolls) wide sheets at the low side of the roof (either at the base of a perimeter parapet wall or at the nailer of the perimeter edge) so that the water flows over, but never against the side laps. Turn over the edge, below the nailer (roof edge applications) or at the base of the perimeter parapet or roof curbs. Apply adhesive to the top surface of the substrate, and the bottom surface of the sheet at the nominal rate of 1 gallon per 120 sq.ft per surface per square. Allow the adhesive to dry to the touch. Carefully roll the sheets in and avoid wrinkles or buckles. Use a weighted roller and run over the entire surface of the adhered membrane to ensure a bond between the bottom surface of the membrane, and the adhesive applied to the surface of the substrate.

- C. Welding Start-Up (start of every welding cycle: morning, after break, after lunch, ECT): Before starting any finish welding, operators are to conduct several test welds using the same membrane at the same ambient temperature as the just installed courses and cut 1" wide strips of the test membrane and pull apart (tear bond) to determine quality of the welds. A satisfactory weld is when the weathering layer (membrane surface) is fully welded to the underside of the overlapping membrane, and when pulled, is torn away, exposing the reinforcement scrim of the underlying membrane. Minimum acceptable Automatic welds are 1-1/2" wide and 2" wide for hand welds. Automatic Welder temperature and speed is to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed). Hand Welders are to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed).
- D. All courses shall be installed with (3) side-laps, and 4" end-laps.
- E. Membrane must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).
- F. Membrane must be installed tightly around the base of pipe penetrations, or trimmed and gapped as required by the fire code around heat sources (like heat flumes, chimneys, ECT.).

### 3.16 ROOF FLASHINGS

- A. Install the field, perimeter, and corner membranes as described in sections above.
- B. Cone Flashings: Install a minimum 4 membrane plates and fasteners evenly distributed around the base of all pipe/ penetrations (larger than 6" diameter flashings require additional fasteners typically spaced 6" on center near the base of the vertical pipe/ penetration. Measure the top height of the cone flashing and mark 1/2" above height of penetrations and install a continuous 1/8" bead of water stop around penetration. Slide cone flashing over penetration and center. Heat weld around the perimeter of the target sheet. Probe and repair all non-welded areas.
- C. Cone Flashing (split flashings): Install a minimum 4 membrane plates and fasteners evenly distributed around the base of all pipe/ penetrations (larger than 6" diameter flashings require additional fasteners typically spaced 6" on center near the base of the vertical pipe/ penetration. Measure the top height of the cone flashing and mark 1/2" above height of penetrations and install a continuous 1/8" bead of water stop around penetration. Wrap cone flashing around penetration and center. Tack weld in several spots to prevent flashing from becoming misaligned. Heat weld around the perimeter of the target sheet and up the vertical lap of the split cone. Probe and repair all non-welded areas.
- D. Install stainless steel draw band 1/8" below the top of the cone to penetration connection and tool in a 1/4" continuous bead of Urethane sealant at the top of the flashing.

### 3.17 BASE FLASHINGS

- A. Install the field, perimeter, and corner membranes as described in sections above.
- B. Install a membrane plates and fasteners evenly distributed around the base of all roof to wall (curbs, parapet walls, roof top equipment, ECT) 6" on center (for alternate field termination at base flashing see the manufacturers roofing details). Cut base flashing membrane to size and either adhere using VERTIBOND adhesive applied to both the substrate and the back of the base flashing membrane, or loose laid per the IB specifications manual. Heat weld around the perimeter of the base flashing sheet. Heat weld the appropriate inside or outside corner. Probe and repair all non-welded areas. Terminate the top of the membrane by installing a continuous bead of water stop between

the top of the sheet and the top edge of the vertical substrate and nail off using the appropriate fastener at 6" on center. Counter flash as specified.

### 3.18 ROOF EDGES

- A. Install the perimeter, and corner membranes as described in sections above.
- B. Start by laying the IB Clad Metal tightly to the interior edge of the roof edge and secure to the wood nailer/ blocking using approved fasteners that meet the withdrawal requirements for perimeter securement by the local building code. Gap all end joints a minimum of ¼" and install 2" wide IB foil tape starting at the bottom edge of the crimp and to the interior outer edge of the deck flange. Install an IB cover strip that is a minimum of 5" wide and fully welded to the IB Clad Metal. Thant starts from the underside of the metal, and is terminated a minimum of 2" beyond the deck flange. Install a minimum 6" wide edge metal cover strip by welding the membrane starting at the top edge of the deck flange and welded to the field membrane. Over-lap and heat weld all end laps a minimum of 3".

### 3.19 ROOF DRAINS

- A. Install the field, perimeter, and corner membranes as described in sections above.
- B. Install a membrane plates and fasteners evenly distributed around the base of the roof drain 6" on center. Cut drain flashing target membrane to size and Heat weld around the perimeter. Probe and repair all non-welded areas. Make a small hole to allow water to enter drain. Using a sharp knife, cut small x where the drain bolt can be inserted to the drain bowls threaded hole. Lift target and apply a heavy bead of water stop between the drain and the target sheet. Lay clamping ring and strainer basket over the target sheet, thread in the drain bolts, than tighten to provide compression seal at the drain.

### 3.20 ROOF SCUPPERS

- A. Install the perimeter, and corner membranes as described, and the base flashings of the perimeter walls as described in section above.
- B. Position IB Scupper over the scupper opening. Fasten the scupper at the holes provided on the scupper flange. Heat weld around the perimeter of the target sheet. Probe and repair all non-welded areas.

### 3.21 WALK TREAD

- A. Probe all field and base flashing laps and seal as described in the membrane application section above.
- B. Clean the area that is to receive the Walk Tread and position in designated walking and access areas. Trim Walk Tread and gap to reveal all underlying membrane seams a minimum of 6" (3" above and 3" below seam) and Walk Tread end laps.
- C. Heat weld the side and end laps to the following: Minimum acceptable Automatic welds are 1-1/2" wide and 2" wide for hand welds. Automatic Welder temperature and speed is to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed). Hand Welders are to be monitored and adjusted throughout the day to prevent over-heating (creating blisters, burns and/or distortions of the lap area), under-heating (laps are not thermally sealed).
- D. Probe all welds at the side and end laps. Repair as noted above.

## Part 4 ABOVE THE ROOF ACCESSORIES

### 4.01 INSTALLATION SEASON FOR VEGETATIVE ROOFS

- A. Vegetative Roof installation to be conducted when plants are properly adapted and acclimatized to local weather conditions. When weather is above 35° F and there is no ice on the roof.

#### 4.02 VEGETATIVE ROOF PREPERATION

- A. Before working on roof, all Installers and Laborers to be:
  - I. Properly instructed in safety procedures.
  - II. Instructed to keep all work surfaces clean and debris free.
  - III. To report immediately any damage to membranes, protective sheeting, or drain elements to supervisor, and to make appropriate repairs before proceeding.
  - IV. Instructed in proper methods of Vegetative Roof installation.
  - V. Install roof membranes and slip sheet/root barrier in accordance with manufacturer's instructions.
  - VI. All surfaces to be smooth, free of debris, soil, and grit prior to placing modules. All materials to be tested water tight and free draining prior to module placement.
  - VII. All surfaces to be maintained clean and free of debris, soil, and grit during installation process via use of blower or broom. Never walk upon such materials as they may damage membranes.

#### 4.03 LIVEROOF MODULE INSTALLATION

- A. LiveRoof® module installation to follow behind installation of irrigation system, pavers, ballast, and edging.
- B. LiveRoof® installation to be conducted in strict accordance with LiveRoof® installation guidelines. Rows to be straight, modules to be tight against each other, arranged in proper directional orientation, and LiveRoof® Soil Elevators™ removed only when individual modules are completely surrounded by edging or other LiveRoof® modules, so as to prevent soil spillage. NOTE: If biodegradable Soil Elevator™ is used, then Soil Elevator™ is left in place.
- C. LiveRoof® module installation to be conducted in accordance with landscape design.
- D. LiveRoof® modules to be placed directly on top of appropriate slip sheet/root barrier.
- E. Any custom fitting and cutting against edging or parapet to include the underlayment of the LiveRoof® module with appropriate drainage fabric/media filter and the placement of such drain cloth completely under the altered module and tight across the face of the module up to the top of module tight against the surrounding parapet or edge treatment.
- F. After installing modules, they should be immediately watered so as to thoroughly moisten the media from top to bottom. Water shall be of suitable quality for plant growth and irrigation system or hoses and sprinklers may be used for such purpose. Note: it takes approximately 1 inch of water, or 1½ gallons per module to moisten each module thoroughly.

#### 4.04 LIVEROOF MAINTENANCE

- A. Thereafter, water modules only during extend hot, dry weather when plants actually show signs of wilting.
- B. Check system every two weeks for weed intrusion, and immediately pull all weeds. Never allow weeds to flower and set seed.

- C. To limit the appearance of foot steps on plants, one may fashion plywood “snowshoes” and attach them by bungee straps to ones boots. A size of 6” x 14” is suitable for many people. These may make walking slower and awkward; take appropriate precautions, and as always when working on a roof tether oneself when working near roof edge to prevent falling. Follow OSHA guidelines.
- D. Apply suitable biocontrols, fungicides, or insecticides only as required to control diseases and insects. Comply with all applicable local, state, and federal regulations and label instructions when applying these materials. Avoid runoff into sensitive areas.
- E. Apply slow release fertilizer as needed in accord with manufacturer’s directions. Avoid runoff into sensitive areas.

#### 4.05 LIVEROOF ACCEPTANCE

- A. Inspection to determine acceptance of modules to be made by General Contractor’s Representative or by Owner’s Representative upon General Contractor’s request; five working days notice required.
- B. Upon acceptance, Owner assumes responsibility for module/plant maintenance.

#### 4.06 VEGETATIVE ROOF HDPE GEO-MEMBRANE LINER INSTALLATION

- A. Over the proper separation sheet and/or the waterproofing membrane unroll the IB HDPE Geo-Membrane Liner and draw tight without folds or wrinkles.
- B. Adjacent sheets shall be overlapped 3” and hot-air welded. Overlaps shall be made with the flow of water where possible. All sheets shall be applied in the same manner lapping all sheets as specified.
- C. Install the HDPE Geo-Membrane Liner on vertical surfaces 2” above the height of the overburden as a minimum.
- D. Intermittently secure the IB HDPE Geo-Membrane Liner to the IB Single-Ply PVC Membrane on all vertical surfaces with IB Foil Tape as per IB Roof Systems recommended details.

#### 4.07 IB PERMA-DRAIN INSTALLATION

- A. Install the IB Perma-Drain at the lowest point to create a shingling effect to ensure sound drainage. The drainage panels must be shingled in the direction of the water flow.
- B. Install the IB Perma-Drain filter side up. The IB Perma-Drain may be adhered at 10’ intervals using two sided masking tape.
- C. Overlap the flat tab.
- D. Overlap the fabric onto the preceding panel and adhere the overlapped fabric with duct tape to prevent overburden from entering the drainage panel during installation.
- E. Inspect the fabric and repair any holes or tears with new filter fabric lapping the repair area by 6” in all directions and seal with duct tape.
- F. Around all protrusions cover all cut areas with extra piece of filter fabric lapping the cut area by 6” in all directions and seal with duct tape.
- G. Ensure any exposed core is covered with filter fabric.

- H. Do not leave the drainage panel exposed to direct sunlight for prolonged periods. The installation of the overburden should occur on the same day as the installation of the drainage panel.

#### 4.08 GROWTH MEDIA AND ORGANICS INSTALLATION

- A. ( )

#### 4.09 VEGETATIVE ROOF ABOVE ROOF COVERING RIGID INSULATION INSTALLATION

- A. Extruded Polystyrene (XEPS) Insulation shall be installed according to the insulation manufacturer's current published specifications for use with a Rooftop Garden System
- B. XEPS Insulation directly over the protection layer. Install insulation in parallel courses, butted together in moderate contact without gaps, and staggered end joints. Provide full support at ends. When multiple layers of insulation are specified the subsequent layers shall be installed with joints offset from the underlying layer.
- C. XEPS Insulation shall be neatly cut to fit around penetrations and projections without gaps.
- D. Install Tapered XEPS Insulation in accordance with the insulation manufacturer's shop drawings.
- E. Install Tapered XEPS Insulation around drains to create a drain sump.
- F. Do not install more XEPS Insulation than can be covered with IB 4.0 oz Poly Separation Sheet, IB Perma-Drain, and overburden by the end of the day.

#### 4.10 VEGETATIVE ROOF HDPE GEO-MEMBRANE LINER INSTALLATION

- E. Over the proper separation sheet and/or the waterproofing membrane unroll the IB HDPE Geo-Membrane Liner and draw tight without folds or wrinkles.
- F. Adjacent sheets shall be overlapped 3" and hot-air welded. Overlaps shall be made with the flow of water where possible. All sheets shall be applied in the same manner lapping all sheets as specified.
- G. Install the HDPE Geo-Membrane Liner on vertical surfaces 2" above the height of the overburden as a minimum.
- H. Intermittently secure the IB HDPE Geo-Membrane Liner to the IB Single-Ply PVC Membrane on all vertical surfaces with IB Foil Tape as per IB Roof Systems recommended details.

#### 4.11 IB PERMA-DRAIN INSTALLATION

- A. Install the IB Perma-Drain at the lowest point to create a shingling effect to ensure sound drainage. The drainage panels must be shingled in the direction of the water flow.
- B. Install the IB Perma-Drain filter side up. The IB Perma-Drain may be adhered at 10' intervals using two sided masking tape.
- I. Overlap the flat tab.
- J. Overlap the fabric onto the preceding panel and adhere the overlapped fabric with duct tape to prevent overburden from entering the drainage panel during installation.
- K. Inspect the fabric and repair any holes or tears with new filter fabric lapping the repair area by 6" in all directions and seal with duct tape.

- L. Around all protrusions cover all cut areas with extra piece of filter fabric lapping the cut area by 6" in all directions and seal with duct tape.
- M. Ensure any exposed core is covered with filter fabric.
- N. Do not leave the drainage panel exposed to direct sunlight for prolonged periods. The installation of the overburden should occur on the same day as the installation of the drainage panel.

#### 4.12 GROWTH MEDIA AND ORGANICS INSTALLATION

- A. ( )

#### 4.13 SOLAR-SCREEN® INSTALLATION (for photovoltaic panel integration)

- A. Install the field membrane as previously described and seam probe/ repair all seams and end laps.
- B. Surface prep and clean the surface of the field membrane that has been laid out by the solar integrator to receive the Solar-Screen® membrane.
- C. Chalk lines and position membrane into place. Ensure that the sides of the Solar-Screen® sheets extends a minimum of 3" from the outer edges (top-bottom-side) of the perimeter photovoltaic panels and a minimum of 1" from outer photovoltaic panels and the inner photovoltaic panels.
- D. Cut Solar-Screen® membrane to size and either adhere using VERTIBOND adhesive applied to both the substrate and the back of the Solar Shield membrane, or loose laid per the IB specifications manual.
- E. Heat weld around the perimeter of the Solar-Screen® sheet. Probe and repair all non-welded areas.
- F. Solar integrator than applies the self adhered photovoltaic panels directly to the welded in place Solar-Screen® sheets.
- G. Wire panels together and locate all conduit/raceways on-top/attached to approved blocking with PVC compatible isolation pads between the top surface of the roofing membrane, and the bottom of the blocking. **DO NOT PENETRATE THE FINISH ROOFING WITH FASTENRS USED TO ATTACH THE BLOKING INTO THE ROOF DECK!**

#### 4.14 PRECAST PAVER INSTALLATION

- A. Prior to the installation of the pavers install a divider (as detailed) between the area to receive the overburden and the pavers. The divider may be pressure treated wood (minimum 6" x 6") or concrete divider (minimum 4" x 4").
- B. Install the divider on a 1" XEPS insulation spaced intermittently to allow for the flow of water.
- C. Install IB HDPE Protection Sheet.
- D. Install pavers a minimum of 24" from all vertical surfaces (e.g. perimeter, walls, dividers etc.) and all penetrations (e.g. drains, vent pipes etc.).
- E. Install pavers in parallel rows. Cut and fit all pavers neatly at all vertical surfaces and penetrations.
- F. Pavers are to be installed on pedestals and fully supported at all edges. Shim and adjust all pavers/pedestals as required to provide a level surface.

4.15 CLEAN UP

- A. During installation, keep all work surfaces clean and free of grit, dirt, or debris. Following installation, remove all excess materials and tools from job site. Ensure that any damage that occurs as a result of installation is appropriately and immediately repaired.

END OF SECTION