

## INTRODUCTION

At IB Roof Systems, we have seen a lot of changes in the roofing industry since our founding in 1978 and have gained a great deal of knowledge and expertise. Our commitment has been to work continually to create the most durable, fire-resistant and sustainable roofing systems available. By continually building, adapting and shaping IB around three key components: Quality, Service, and Expertise; building owners, home owners and design professionals can confidently select a premium quality, long-term roofing system installed by trusted and proven IB Authorized Applicators to protect and cover their homes, businesses and building assets.

We have used our knowledge and expertise to bring you the ultimate in fully integrated roofing systems designed for a wide variety of roofing needs and applications. Decades of experience in advanced thermoplastic PVC membrane technology, working closely to educate and support our IB Authorized Applicators in the use and installation of IB materials and roof systems, and visiting thousands of construction sites where IB roof assemblies were being installed allows us to bring you the highest quality products and superior levels of service available.

This manual is intended to provide IB Roof Systems' most recent statement of information available for the use and installation of IB Roof Systems products and roof assemblies. Therefore, this Manual supersedes and replaces all previous editions, publications, standard installation instructions and standard details pertaining to use and installation of IB Roof Systems products and roof assemblies. This manual is intended to be a comprehensive standard guide. Project-specific roof conditions or other design or construction requirements may exist that are not addressed by the manual. Questions and request for additional information regarding specific applications may be directed to IB Technical Services. IB reserves the right to change, modify, update, add or remove requirements contained in this manual as we deem necessary and without prior notice.

We appreciate your consideration of IB Roof Systems and look forward to putting our service, technical expertise and premium products to work for you.

IB Product Selection Guide					
Membranes					
Product	Description	System Type <sup>1</sup>	Color Options	Warranty Eligibility <sup>2</sup>	Size / Unit
IB PVC Single Ply 50	Polyester-reinforced, smooth backed 50 Mil thermoplastic PVC single ply membrane	MA, FA	White, Gray, Tan, Brown	10, 15	3' x 90' 6' x 90'
IB PVC Single Ply 60	Polyester-reinforced, smooth backed 60 Mil thermoplastic PVC single ply membrane	MA, FA, BA	White, Cool Sand, Gray, Tan	10, 15, 20	3' x 90' 6' x 90'
IB PVC Single Ply 80	Polyester-reinforced, smooth backed 80 Mil thermoplastic PVC single ply membrane	MA, FA, BA	White, Tan, Red, Brown, Evergreen	10, 15, 20, 25	3' x 60' 6' x 60'
IB PVC Single Ply FB 50	Polyester-reinforced, fleece backed 50 Mil thermoplastic PVC single ply membrane	FA	White	10, 15	6' x 90'
IB PVC Single Ply FB 60	Polyester-reinforced, fleece backed 60 Mil thermoplastic PVC single ply membrane	FA	White	10, 15, 20	6' x 90'
IB PVC Single Ply FB 80	Polyester-reinforced, fleece backed 80 Mil thermoplastic PVC single ply membrane	FA	White	10, 15, 20, 25	6' x 60'
IB PVC Single Ply ChemGuard™ 50	Polyester-reinforced, smooth backed 50 Mil thermoplastic PVC & Elvaloy® single ply membrane	MA, FA	White	10, 15	3' x 90' 6' x 90'
IB PVC Single Ply ChemGuard™ 80	Polyester-reinforced, smooth backed 80 Mil thermoplastic PVC & Elvaloy® single ply membrane	MA, FA, BA	White	10, 15, 20, 25	3' x 60' 6' x 60'
IB PVC GR FB 60	Fiberglass-reinforced, fleece backed 60 Mil thermoplastic PVC single ply membrane	FA	White, Aluminum, Old World Bronze	10, 15, 20	5' x 70'
IB PVC GR 60	Fiberglass-reinforced, smooth backed 60 Mil thermoplastic PVC single ply membrane	FA	White, Aluminum, Old World Bronze	10, 15, 20	5' x 70'
<sup>1</sup> MA: Mechanically Attached, FA: Fully Adhered, BA: Ballasted					
<sup>2</sup> Total Systems Warranty, Commercial Limited, Warranty Plus Limited, and Lifetime Residential Limited warranties					
Membrane Accessories					
Product	Description	Use			Size / Unit
IB Cover Strip	Polyester reinforced PVC membrane	Used for perimeter edge flashings and perimeter / corner zone flashing in MA assemblies			6" x 90'
					6" x 60'
IB Flexible Metal Profile	PVC metal profile ribs available in White, Aluminum, and Old World Bronze	Designed for GR Class membranes to simulate metal standing seam			9.8'
IB N.R. Detail Flashing Roll	60 Mil non-reinforced PVC flashing membrane available in standard IB membrane colors	Used at critical areas like canted corners, field wrapped penetrations, etc.			1' x 22'

IB WalkTread™	80 Mil embossed, slip-resistant PVC walk tread	Used as membrane protection in high traffic / maintenance areas	3' x 60'
Crossgrip	Slip resistant walkway that is available in gray or black	Used as membrane protection in high traffic / maintenance areas	3' x 33'
IB Pipe Flashings	IB factory fabricated cone flashing. Available in matching membrane color	Flashing of various penetrations such as pipes, conduit, gas lines, etc.	Various
IB Inside & Outside Corners	60 Mil inside and outside corner flashings available in matching membrane color	Made for easy installation to reduce jobsite error for inside and outside corner flashing conditions	5" x 5"
IB Round T-Joint Patch	Round patches that are available in matching membrane color	Generally used to reinforce T-joints. May be used to patch punctures	5"
IB Pitch Pans	PVC-clad sheet metal pitch pans	Used for various roof penetrations	Various
IB Clad Metal Scupper	PVC-clad sheet metal scupper	Drainage scupper	Various
IB Retrofit Drain	Clamping ring style roof drain	Primary roof drain	2" To 6"
IB Retrofit Overflow Drain	Clamping ring style overflow roof drain	Overflow roof drain	2" To 6"
IB Recover Membrane Vent	Roof vent	5" two-way vent used for recover applications	5"
IB 8" Roof Vent	Roof vent	Standard two-way used for attic ventilation	8"
IB Dryer/Exhaust Vent	Roof vent	Used for dryer, kitchen exhaust and bathroom vent	4"
<b>Metal/Termination Bar</b>			
<b>Product</b>	<b>Description</b>	<b>Use</b>	<b>Size / Unit</b>
IB PVC-clad Metal	PVC-clad sheet metal	Available in flat sheets, drip edge, gravel guard, scuppers	4'x10' flat sheets
IB Fascia	Sheet metal fascia	Available as IB 110 Fascia, 155 Fascia, and Snap Fascia	10'
IB Termination Bar	Membrane termination bar	Used for membrane terminations. Available in aluminum and PVC-clad	10'
IB Snap-On Coping	Parapet coping	Includes hold down cleats and metal drain chairs.	10'
<b>Membrane Adhesive</b>			
<b>Product</b>	<b>Description</b>	<b>Use</b>	<b>Size / Unit</b>
IB Water Borne Adhesive	Water-based PVC membrane adhesive	Used to adhere IB PVC and PVC Fleece Back membranes to various horizontal substrates	3 gal. pail
IB Vertibond Adhesive	Contact adhesive for IB PVC membranes	Used to adhere membrane to vertical surfaces. May also be used for field of roof.	5 gal. pail
Flexocol V Adhesive	Contact adhesive designed for GR class membranes	Used for adhering GR class smooth membranes to vertical surfaces and approved substrates.	2.64 gal. pail
<b>Separation Sheets</b>			
<b>Product</b>	<b>Description</b>	<b>Use</b>	<b>Size / Unit</b>
IB Separator Sheet	Lightweight reinforced synthetic separation sheet	Divorcing layer used between IB membranes and incompatible or contaminated materials and surfaces	5' 10" x 515'
IB Poly Separator	Standard duty spun-bound	Divorcing layer used between IB membranes and	7' 6" x 360'

Sheet	polyester roll	incompatible or contaminated materials and surfaces	
IB HD Poly Separator Sheet	Heavy duty spun-bound polyester roll	Divorcing layer used between IB membranes and incompatible or contaminated materials and surfaces	7' 6" x 150'
IB Fire Sheet 10	Fire resistant separation sheet	Divorcing layer and fire barrier used for combustible roof decks	4' x 250'
<b>Vapor Retarders</b>			
<b>Product</b>	<b>Description</b>	<b>Use</b>	<b>Size / Unit</b>
Sopravap'r	Self-adhered vapor retarder	Vapor retarder designed for installation over various roof decks	3' 7" x 133'
Elastocol Stick	Primer used in conjunction with Sopravap'r vapor retarder	Used to prime steel, plywood, or concrete roof decks	5 gal. pail
Elastocol Stick Zero	LEED compliant primer used in conjunction with Sopravap'r vapor retarder	Used to prime steel, plywood, or concrete roof decks	5 gal. pail
<b>Insulation / Thermal Barrier / Cover Boards</b>			
<b>Product</b>	<b>Description</b>	<b>Use</b>	<b>Size / Unit</b>
IB Energy Board II (Flat & Tapered)	ASTM C1289, Type II, Class 1, Grade 2 or 3 Polyisocyanurate board insulation	Polyisocyanurate roof insulation with standard facer	4' x 4' 4' x 8'
IB Energy Board III (Flat & Tapered)	ASTM C1289, Type II, Class 2, Grade 2 or 3 Polyisocyanurate board insulation	Polyisocyanurate roof insulation with inorganic coated glass facer	4' x 4' 4' x 8'
Atlas ACFoam® HS Cover Board	ASTM C1289, Type II, Class 4, Grade 1 Polyisocyanurate board with high compressive strength	Used as a cover board in MA and FA roofing assemblies	4' x 4' 4' x 8'
DensDeck®	Gypsum-based thermal / fire barrier and / or cover board	Used as a fire barrier, thermal barrier, or cover board in MA roofing assemblies	4' x 4' 4' x 8'
DensDeck® Prime	Gypsum-based thermal / fire barrier and / or cover board	Used as a fire barrier, thermal barrier, or cover board in FA roofing assemblies	4' x 4' 4' x 8'
Securock® Glass-Mat	Gypsum-based cover board	Used as a cover board in MA roofing assemblies	4' x 4' 4' x 8'
Securock® Gypsum Fiber	Gypsum-based thermal / fire barrier and / or cover board	Used as a fire barrier, thermal barrier, or cover board in MA and FA roofing assemblies	4' x 4' 4' x 8'
R-Tech® Fanfold Roof Underlayment	Lightweight EPS product with a polymeric laminate facer	Primarily used as a separation layer in recover applications	4' x 50'
Poly Shield Fanfold	Lightweight EPS product with a polymeric laminate facer	Primarily used as a separation layer in recover applications	4' x 50'
<b>Insulation Adhesive</b>			
<b>Product</b>	<b>Description</b>	<b>Use</b>	<b>Size / Unit</b>
Olybond 500 / Spot Shot Adhesive	Two-component, low-rise polyurethane foam adhesive	Adhesive designed to adhere insulation and cover boards to various substrates	1500 ML cartridges
IB Rapid Set Insulation Adhesive	Two-component, low-rise polyurethane foam adhesive	Adhesive designed to adhere insulation and cover boards to various substrates	1.5 L cartridge

Millennium Universal Primer	Primer used in conjunction with IB Rapid Set Insulation Adhesive	Primer is required for asphaltic membranes, plies, or asphalt contaminated substrates	3.5 gal. pail
Sealants			
Product	Description	Use	Size / Unit
M-1 Sealant	Multi-purpose sealant used various conditions and used in conjunction with IB Clad Pitch Pans	Primarily used to prime penetrations to be treated with One-Part Pourable Sealant in pitch pans	10.1 oz. caulk tube
One-Part Pourable Sealant	One-part pourable sealant for use in pitch pans	Used as a fluid applied flashing for penetrations in pitch pans	2 L pouch
IB Water Stop	Butyl-based mastic designed to seal membrane to a variety of surfaces	Sealant used in details such as vertical terminations, vent opening, pipes, and drain details	11 oz. caulk tube
SolarSeal 900 Caulking	Multi-purpose exterior grade caulking compatible with all IB membranes	Used in various conditions that require a maintained caulking	10.3 oz. caulk tube
Fasteners / Plates			
Product	Description	Use	Size / Unit
IB SD #12 Insulation Fastener	#12 Insulation Fastener	Primarily used to secure insulation and separation materials used in conjunction with IB 3" insulation plates	Various lengths
IB HD #14 Roofing Fastener	#14 Roofing Fastener	Used as a membrane and/or insulation fastener per IB specifications	Various lengths
IB XHD #15 Roofing Fastener	#15 Roofing Fastener	Used as a membrane and/or insulation fastener per IB specifications	Various lengths
IB 3" Insulation Plate	Insulation and separation material plate	Used with IB roofing fasteners to secure insulation and separation materials	3"
2" Barbed Seam Plate	Membrane plate	Used in in-seam MA roofing assemblies	2"
2-3/8" Barbed Seam Plate	Heavy duty membrane plate	Used in in-seam MA roofing assemblies	2-3/8"
Dekspike Roofing Fastener	Concrete roofing fastener	Used to fasten insulation and membrane to structural concrete	Various lengths

## Part 1 WARRANTY

### 1.0 WARRANTY PROGRAM

- A. IB Roof Systems offers a variety of premium material and roof system warranties designed to meet the building owner's needs and requirements. Available warranties include our unique Lifetime Residential Limited Material Warranty and other select Limited Material warranties; up to our premium Total System Warranty covering IB materials used in approved roof assemblies. Our roofing products are available through a nationwide network of experienced, independent IB Authorized Applicators who sell and install IB materials. IB provides training and technical support to these firms who operate and remain wholly independent from IB Roof Systems. IB assumes no responsibility for representations, warranties, errors or omissions made by those other than IB authorized personnel.

- B. Warranties for IB products and roof system installations are available only when installed by an IB Authorized Applicator in accordance with IB Specifications, Construction Details and the requirements of our Warranty Program; and upon payment in full of all labor and materials supplied in connection with the IB Roof Systems installation. Certain warranties offered by IB Roof Systems require payment of a warranty fee and are subject to approval and visual inspection by IB Technical Services for completion in accordance with IB warranty program requirements. All Total System Warranty projects require the submittal of an IB Notice of Award for our review and approval prior to project start.
- C. Roof assemblies and systems not contained in this manual may be eligible for issuance of an IB warranty only when approved in writing by an IB Technical Services Manager. Changes, additions or alterations of IB specifications, installation requirements, approved materials, construction details or warranty terms and conditions require written approval of an authorized IB Technical Services Manager. For additional information on IB's Warranty Program, refer to the Warranty Section of this manual.

## **1.1 IB ROOF SYSTEMS INSTALLATION**

- A. IB PVC Roof Systems are eligible for issuance of an IB Roof Systems Warranty upon installation in accordance with IB Specifications and Warranty Program by an IB Authorized Applicator. Selection of an IB roof assembly to meet project design requirements is the responsibility of the building owner, design professional and roofing contractor.
- B. IB Roof Systems provides project and contractor assistance through a qualified team of Field Technical and Independent Sales Representatives. Additional online and telephone support is available during regular business hours Monday through Friday on our Technical Help Line and covers all applications of IB PVC membranes and IB supplied components.

## **Part 2 GENERAL BUILDING DESIGN**

### **2.0 BUILDING DESIGN / USE**

- A. IB roof systems are designed for use over a large variety of commercial, educational, industrial and residential building structures.
- B. Design and selection of an appropriate IB roof assembly requires careful consideration of building design criteria, construction, occupancy and use, location, environmental elements and applicable building codes. IB Roof Systems does not practice architecture or perform engineering. The responsibility for selection and design of the roof assembly, supporting structure and building envelope remains with others.
- C. The roofing assembly is an integral part of the building envelope and requires integration with building structural components, cladding, fixtures, equipment and other envelope components for proper performance. The building owner, design professional and contractor should review project design criteria, existing conditions, anticipated roof use and exposures to confirm compatibility of materials and suitability for use on a particular project.
- D. Ensure the roof deck, walls, wood nailers and substrates are structurally sound, securely attached, capable of supporting required loads and suitable for installation of an IB roof system. Do not install IB roof assemblies over unsound substrates or non-approved roof decks.

### **2.1 SPECIALIZED BUILDING CONSTRUCTIONS**

- A. IB roof assemblies may be selected for use over properly designed unique or special purpose building constructions such as hangars, arenas, cold storage facilities, pools and plaza decks. Prior to installation a thorough review of the selected roof assembly and construction details should be performed to address design conditions presented by structures containing elevated levels of internal moisture or humidity, those subject to unusually hot or cold interior/exterior temperatures, structures with elevated external or internal pressure conditions, unusual environmental or operational exposures, and those incorporating use of the roof

as a walking deck, garden roof or substrate for specialized equipment or overburdens such as photovoltaic solar arrays.

- B. Installation requirements may include the incorporation of vapor and air barriers, alternate thermal insulations, additional ventilation, supplemental fastening and installation of approved protection or overburden components.
- C. Warranted roof installations involving specialized constructions require prior written approval by an IB Roof Systems Technical Services Manager. Contact IB Roof Systems for assistance with projects incorporating these and other similar design requirements.

## 2.2 SUBSTRATE INFORMATION - GENERAL

- A. IB roof assemblies may be installed over a large variety of common roof decks and substrates. Acceptable substrates must withstand all applicable design loads required by the Authority Having Jurisdiction including those imposed during new, reroofing or recover roof construction and service or maintenance activities.
- B. Roof decks and substrates must be smooth, clean and dry without depressions, offsets or excessive gaps between units or intersections with vertical walls and penetrations. Gaps or cracks greater than 1/4" shall be filled with a compatible repair material.
- C. Responsibility for the condition, performance, attachment and suitability of the roof deck, walls, structural members, framing, nailers, cladding and other building components remains with the building owner.
- D. Decks and substrates approved to receive IB roofing materials are free of defects, excessive moisture content, inadequate attachment, deflection, settling, rust, loss of structural integrity, excessive movement or improper design. Defects should be reported to the building owner or their representative immediately for corrective action.
- E. Field testing to determine roof system fastener withdrawal resistance, attachment performance of selected roof assembly adhesives, uplift resistance of existing roof assembly, and moisture content of substrates and/or existing roof assemblies is strongly recommended prior to the start of work and may be required by IB Roof Systems for issuance of our warranties.
  - 1. Pull tests to confirm fastener withdrawal resistance into various substrates should be conducted in accordance with ANSI / SPRI FX-1.
  - 2. Insulation adhesive testing to confirm adequacy of attachment of insulation to various substrates should be conducted in accordance with ANSI / SPRI IA-1.
  - 3. Surface moisture testing of structural concrete roof decks should be tested in accordance with ASTM D4263 plastic sheet method.
  - 4. Moisture scans to locate areas of elevated moisture content in existing roof assemblies and substrates can be conducted through nuclear, infrared and capacitance type roof surveys. Areas indicating potential moisture content should be reviewed and confirmed, with any wet areas removed prior to the installation of new roofing materials.
  - 5. Visual survey and inspection of all substrate, deck and structural support components and existing conditions are recommended prior to the start of roofing work.

**TABLE A.1 - SUBSTRATE REQUIREMENTS**

Deck	Required Criteria	Application
APA Plywood Sheathing	Plywood sheathing shall be C-D, Exposure 1-minimum 4-ply-not less than 15/32" thick	Maximum joist spacing 24" o.c. or less with minimum 1/8" to 1/4" spacing between panels
APA Oriented Strand Board Sheathing (OSB)	OSB sheathing shall be PS 2-10, Exposure 1, Structural 1 not less than 7/16" thick	Install with all sides bearing on and secured to joist and cross blocking in accordance with APA-The Engineered Wood Association requirements

Wood Plank	Minimum 1" nominal thickness and have a nominal width of 4" to 6"	All boards must be supported on rafters at each end and be securely nailed
	Tongue and Groove or shiplap planks are required	
	Kiln-dried lumber	Cover knotholes or cracks in excess of 1/4" with securely nailed sheet metal
22 ga. Steel	Cold formed steel decking— minimum finish coat of primer paint on both sides	Comply with Factory Mutual gauge and span requirements, and guidelines contained in FM LPDS 1-28 and 1-29
	G-90 galvanized steel recommended-minimum 22 gauge	
24 - 26 ga. Steel	Requires written approval from IB Technical Services Manager	Mandatory fastener withdrawal tests in accordance with ANSI / SPRI FX-1 required
Structural Concrete	Minimum deck thickness for structural concrete is 4 inches	Roof deck shall be allowed to cure prior to application of the roofing system. Evaluate surface moisture and deck dryness as required with the ASTM D4263 or hot bitumen test procedures.
	Minimum 2500 psi compressive strength	
	Finished to a smooth uniform surface free of sharp edges, ridges and irregular surfaces	
	Sumps for roof drains shall be provided in the casting of the deck	Repair cracks greater than 1/8 inch in width in accordance with the deck manufacturer's recommendations.
	Wood nailers shall be cast into the deck at perimeter edges and openings for non-insulated assemblies	
	Underside of deck shall be constructed to allow drying and prevent moisture entrapment. Deck forms shall be removed or vented. Do not install materials or finishes to underside of deck that are impermeable or restrict drying.	
Precast / Pre-Stressed Concrete	Minimum deck thickness 2"	Inspect deck panels prior to roof installation. Correct offset and variations in camber between units.
	Fill joints with suitable masonry grout at vertical offsets between panels troweled to provide a smooth, uniform surface	
Lightweight Insulating Concrete	Minimum deck thickness of 2"	Comply with requirements of deck manufacturer. Do not install during periods of inclement weather, rain or ambient temperatures below freezing. Frozen decks shall be replaced. Inspect deck for signs of entrapment or excess moisture.
	Minimum compressive strength of 200 psi and a minimum density of 22 pcf for adhered roofing systems	
	Lightweight Insulating Concrete fill must be cured and dry for adhered application of IB roof assemblies	Cellular lightweight insulating concrete may be installed over approved galvanized non-slotted decking or structural / precast concrete decks.
	Installation over non-venting substrates requires review and written approval of IB Technical Services Manager	
Cementitious Wood Fiber	Minimum deck thickness of 2"	Decks shall be protected from the weather during storage and application; any wet or deformed decking shall be removed and replaced.
	Secure all panels to supports to resist uplift and lateral movement	
	Grout and level deflections and irregularities between panels to provide a level, smooth deck	Composite deck panels containing EPS / XPS polystyrene insulation are not suitable for use with solvent-based roof system adhesives.
	Installation in high humidity environments requires careful design, maintenance and air / moisture control	



	to prevent excess moisture accumulation and deck deterioration	
Gypsum	Minimum deck thickness of 2"	Comply with requirements of deck manufacturer. Do not install during periods of inclement weather, rain or ambient temperatures below freezing. Frozen decks shall be replaced.
	Poured decks reinforced with steel mesh over gypsum formboard	Decks should be inspected for signs of entrapment or excess moisture.
	Precast units formed with reinforced steel edges for clipped or fastened application to supports	Mandatory fastener withdrawal tests in accordance with ANSI/SPRI FX-1 required.

## 2.3 DRAINAGE

- A. Roof decks should be designed and constructed to provide adequate drainage. Steep slope roof assemblies typically drain over perimeter roof edges or into external or interior gutters. Low slope roof decks commonly utilize both perimeter edge drainage and interior drainage by means of primary and secondary drainage outlets.
- B. Specific project drainage requirements depend on a variety of factors including building design, roof deck and perimeter edge design, building location, historical maximum rainfall rates, building storm water drainage system design and local code requirements.
- C. Building codes require the provision of positive slope in the roof assembly to facilitate roof drainage and direct water runoff into an approved storm water drainage system.
- D. Retrofit and replacement roof installations should include a review by the building owner, project designer and roofing contractor of the existing roof drainage system, its condition, performance, and applicable local code requirements. System upgrades such as provision for additional primary or secondary roof drains and overflow outlets, or the enlargement of existing roof drains, outlets and associated storm water piping should be coordinated with the scope of roof work.
- E. Roof systems by IB are designed for use with the following types of roof drains, outlets and perimeter edge details:
  1. Cast iron roof and overflow drains with integral clamping rings
  2. IB supplied spun aluminum or approved copper drains with IB PVC flashings
  3. Sheet metal scuppers constructed with IB PVC clad flashing metal or designed for use with IB PVC flashings
  4. Approved IB Edge Details constructed with IB PVC clad flashing metals, IB Termination Bar, or approved IB 2-piece Edge or Fascia Details with Kynar coated metal.

## 2.4 VAPOR RETARDERS

- A. Proper design and control of the flow of air and moisture vapor through the building envelope are the responsibility of the building owner and design professional. IB recommends vapor flow calculation considering specific building construction, occupancy and climatic conditions to determine the need and requirements for a vapor retarder within the assembly.
- B. The lack of adequate moisture vapor control can result in the accumulation of moisture within the roofing assembly. Consideration of vapor flow and dew point conditions should be undertaken during initial project design and upon subsequent modifications or changes to the building envelope, building use or occupancy. Reroofing and recover roof replacements can alter existing vapor flow conditions and should be reviewed by the building owner with their selected design professional or roofing contractor. The review should include evaluation of the need for a vapor retarder or maintenance of an existing assembly, the provision of additional

thermal insulation or ventilation, the effect of any added components such as radiant or air barriers, and other work necessary to avoid condensation or moisture build-up within or below the roofing assembly.

## C. Vapor Retarder Installation

1. Vapor retarders installed to control moisture vapor flow through the ceiling-deck-roof assembly may be used in conjunction with IB roof systems as components of the building envelope. As separate building components, vapor retarder type and construction must be compatible with the selected IB roof assembly and installation requirements and the requirements of the vapor retarder materials manufacturer.
2. Materials used as vapor retarders are classified according to their specific perm rating or permeance for the rate of vapor transmission. Project designers should consider the specific perm rating required by local code and applicable construction to provide adequate moisture vapor control for a structure's vapor flow conditions. Typical classification by perm ratings
  - a. Class I: Less than or equal to 0.1 Perm
  - b. Class II: 0.1 to 1.0 Perm
  - c. Class III: 1.0 to 10 Perm
3. When used, vapor retarders should be located on the warm side of the assembly installed to the structural deck, over an approved thermal barrier, separation sheet or minimal layer of approved IB insulation.
4. Vapor retarders require careful detailing at side and end laps, perimeter edge and wall terminations, penetrations, flashings and openings in the roof to establish a continuous seal and prevent unplanned moisture vapor intrusion into the roof assembly. Use only manufacturer recommended adhesives and accessories.

## 2.5 THERMAL BARRIERS / FIRE SHEETS

- A. Thermal barriers can be utilized over a variety of combustible and non-combustible roof deck constructions to enhance the fire resistance of a roofing assembly. Roof assemblies are classified as Class A, B or C tested in accordance with UL 790 or ASTM E108.
- B. IB Fire Sheet 10 are fire resistant thermal barrier separation sheets that may be used directly over combustible roof decks, over layers of thermal insulation or as a separation sheet over an existing roof assembly to enhance overall fire resistance of select IB roof assemblies.
- C. Select IB roof assemblies may also utilize layers of approved moisture resistant gypsum cover boards and fire-rated gypsum sheathing boards above the deck and below the IB roof membrane for specific fire rated constructions.
- D. IB Fire Sheets and thermal barrier boards shall be installed in accordance with IB specifications and the requirements of the applicable fire rated construction.

## 2.6 SEPARATION SHEETS

- A. Application of IB roof assemblies over certain structural decks, thermal insulations or existing roof assemblies may require separation through the installation of an approved IB Fire Sheet, IB Separator or Poly Separation sheet, HDPE or similar IB approved protection membrane; or by means of an approved IB insulation or recovery board.

## 2.7 EXPANSION JOINTS

- A. Expansion joints located on the roof deck are designed to relieve movement occurring within building components and reduce stresses that could adversely affect the roof assembly. Coordination is required to assure roof deck expansion joints are integrated into building structural control and expansion joints, and are properly flashed. Determination of expansion joint need, placement and design are the responsibility of the project designer and building owner.
  1. Typical expansion joint locations include:

- a. At decking material changes or changes in the direction of structural framing
  - b. Where wings of a building structure join such as T, U, I, L or similarly shaped structures
  - c. Where structural control and expansion joints in the building structure assembly occur
  - d. At intersections of building additions to existing structures
  - e. Where differential movement conditions exist at wall to roof intersections
  - f. Where differential interior conditions intersect within the building envelope, such as conditioned to non-condition space or at cold storage areas
2. Roof expansion joint details may be constructed with curbs set 8" or more above the roof or installed with an approved IB Low Profile Expansion Joint detail directly to the roof surface.
  3. Expansion joints should be set in a continuous line extending fully through the edge of the roof with approved wood nailers secured along both sides of the joint.
  4. Temporary construction ties at expansion joints must be removed. Do not install roof insulation or membrane materials directly across joint openings.
  5. Provide watertight detailing and functional integration of the expansion joint with other roof flashings and termination details at expansion joint terminations, intersections and closures.
  6. Protection of the finished roof assembly is recommended with expansion joint cross-over access installed at walkways and where service work is expected to reduce the potential for foot traffic and equipment damage.
  7. Avoid expansion joint construction and placement that restricts or prevents the free flow of water to outlets. Do not block or intersect drainage outlets and valley lines, or attempt to route roof drainage over an installed expansion joint.

## 2.8 AREA DIVIDERS

- A. Area dividers are commonly used to reduce or separate sections of a roof. Common uses include segmentation of large roof areas, separation of dissimilar roof assemblies, and separation of existing left in place roof sections from new roof areas during reroofing. They are not suitable for use as expansion or structural control joints.
- B. Typical construction consists of a raised curb secured to the structural roof deck providing 8" or more vertical height above the finished roof with standard IB Base Flashing Detail. The roof drainage plan should include adequate provisions for drainage and avoid the blockage or restriction of water runoff to drains and outlets.
- C. Where the same or compatible IB roof membranes are utilized in new construction, low profile area dividers installed in accordance with IB specifications may be used between roof sections.
- D. Area dividers commonly receive either a sheet metal cap or are fully covered with IB membrane.

## 2.9 WOOD NAILERS

- A. Wood nailers and blocking are considered part of the building structure and are not part of the IB Roof System or IB warranty. Nailers and dimensional blocking must be securely attached and provided in accordance with project plans and IB Roof Systems Construction Details.
- B. Nailers and wood blocking should be constructed from #2 or better, kiln-dried dimensional lumber with nailers installed to match the thickness of installed roof insulation. Nailer width should extend 1/2" beyond the back edge of perimeter edge metal flange. Secure nailers and blocking to building structural members, deck and / or walls to withstand calculated wind and other design loads. IB Roof Systems recommends the use of non-treated lumber where suitable in accordance with project design criteria and exposure.
- C. Consideration should be given to the selection of appropriate type and corrosion resistance performance of fasteners and anchors for specific applications and exposures. Treated lumber using compounds such as Alkaline Copper Quaternary (ACQ), Copper Boron Azole (CA-B) or similar copper based wood preservatives exhibit higher rates of corrosion in fasteners and metal, particularly when exposed to moisture and / or

elevated humidity conditions. Contact IB Roof Systems Technical Services for specific compatibility of IB PVC membranes with various preservative treatments.

1. Use stainless steel fasteners and anchors for copper based treated nailer or blocking installations exposed to high levels of moisture or elevated humidity conditions
  2. Standard e-coated fasteners and anchors meeting the requirements of F.M. Approval Standard 4470 are acceptable for non-exposed, dry applications
  3. Areas of nailer / blocking contact with incompatible or moisture bearing materials and substrates should receive a suitable separation layer or protective sealant
- D. Nailers along perimeter edges, corner regions and top of parapet walls should be installed to resist calculated wind loads in accordance with ANSI / SPRI ES-1 and local building code requirements. Corner area securement should be increased by a factor of two or more as required to enhance wind resistance in these areas of heightened uplift pressures.
- E. Nailers should be secured with corrosion resistant anchor bolts or fasteners with integral heads or through washers sufficient to resist pull through or back-out; approved for the specific substrate to which they are attached. Each nailer length should receive a minimum of two anchors/fasteners with fasteners set no farther than 4" in from the ends. Install nailers to structural concrete, filled masonry / concrete blocking, and through steel or wood decks to resist a minimum vertical load of 200 lbs./ft. or the design load, whichever is greater. Fastener heads must be countersunk below nailer top surface.
- F. Where two or more nailers are required, attach second nailer to first sufficient to resist design loads with corrosion resistant fasteners installed a minimum of 12" o.c. staggered and 6" o.c. staggered within corner areas.
- G. Securement of new or existing wood nailers and blocking to resist calculated design loads should be reviewed by the building owner, design professional and contractor prior to project start to confirm adequacy of attachment and condition. Where anchors / fasteners are set into cement-filled masonry or concrete block, fastened into structural concrete, or secured to structural steel or wood framing members through an approved roof deck; perimeter nailer securement should be limited to 48" o.c. or less and 24" o.c. or less at corner regions. Fastening of nailers into steel or wood decking at perimeter edges without securement into underlying continuous blocking or structural framing may not result in adequate resistance. Where present and confirmed adequate to resist design loads, perimeter nailer securement should be limited to 12" o.c. staggered or less and 6" or less at corner regions.
- H. Retrofit Metal Decks: Nailers shall be installed in two or more layers to match total height of flute filler and recover insulation. Base nailer shall be set between and match height of existing standing seams / ribs, fastened a maximum of 12" o.c. with a minimum of two fasteners between each rib. Fasteners should be installed through the metal deck and into structural steel or wood framing beneath. Top nailer must be set above the height of metal ribs and provide a continuous, smooth nailing surface.

## Part 3 THERMAL ROOF INSULATION AND SUBSTRATES

### 3.0 ROOF INSULATION

- A. General
1. IB roof assemblies may be installed over a variety of insulated and non-insulated roof decks. The amount, type and location of thermal insulation used above or below the roof deck is typically determined by building design, location, intended use, applicable building codes and specific project design criteria.
  2. IB Energy Board polyisocyanurate, IB supplied EPS, XPS and composite roof board insulations are available in various thicknesses in both flat and tapered board stock. Determination of required thickness of insulation to meet specific thermal resistance values should consider the insulation LTTR value, applicable building codes, and the basis of project design for minimum total U-value and/or minimum insulation R-value as an assembly component.

3. IB supplied water-resistant gypsum cover boards, high-density polyisocyanurate cover boards, and EPS fan-fold recover insulations are available in various thicknesses as non-tapered board stock. They are used within IB roof assemblies above or below primary thermal insulation boards; and within recover roof assemblies as separation layers from existing substrates and membranes.
4. Installation of IB Roof Membranes over expanded (EPS) or extruded (XPS) polystyrene insulations requires separation of the membrane, flashing rolls and IB manufactured flexible flashings from direct contact with these insulation materials unless surfaced with an approved polymeric facer, or separated with an IB approved cover board insulation or IB Separation Sheet.
5. IB roof membranes are designed for installation only over approved insulations. Sprayed polyurethane foam insulation and/or existing sprayed foam (PUF) roof assemblies are not approved as substrates for an IB roof assembly.
6. Insulation materials not supplied by IB Roof Systems are not part of the IB Roof System. Non-IB supplied materials may be used as a non-warranted component within an IB roof assembly only upon prior review and written approval by an IB Technical Services Manager.
7. Roof assemblies incorporating air or vapor barriers require review by the building owner and project designer to ensure sufficient insulation is installed above the barrier layer to prevent moisture vapor condensation below it.
8. Recover assemblies with additional insulation can change the location of the dew point within the roof construction. Existing roof systems left in place may function as a vapor barrier or retarder within the new recover assembly and are a potential source of moisture. Damage from moisture entrapment and condensation can occur if moisture is present in the existing roof assembly or deck, or where moisture vapor is allowed to migrate through the existing assembly and into the new roof.
9. Air and vapor barriers require effective termination and sealing throughout the field of roof and at terminations, edges and penetrations to prevent air intrusion and moisture vapor from entering the roof assembly.
10. Wind uplift approvals and fire resistance ratings for insulated IB roof assemblies can include required minimum and maximum thicknesses. IB recommends the project designer review applicable IB listings and code approvals for information on allowable thicknesses that meet project design requirements.

## 3.1 APPROVED ROOF INSULATIONS

- A. Polyisocyanurate: Rigid flat board stock or tapered polyisocyanurate foam insulation with integral non-asphaltic fiber-reinforced felt or coated inorganic fiberglass facers laminated to both sides.
  1. IB Energy Board II: ASTM C1289, Type II, Class 1, Grade 2 (20 psi) or Grade 3 (25 psi)
  2. IB Energy Board III: ASTM C1289, Type II, Class 2, Grade 2 (20 psi) or Grade 3 (25 psi)
  3. IB supplied Atlas AC Foam® -HS Cover Board: ASTM C1289, Type II, Class 4, Grade 1, 80 (min.), 110 psi compressive strength. High-density polyisocyanurate foam core with coated glass facers.
- B. Expanded Polystyrene (EPS): Rigid, closed-cell expanded polystyrene foam flat or tapered insulation board stock conforming with the requirements of ASTM C578, Types I, II, VIII or IX as required by IB specification.
  1. Direct fastened or adhered installation: IB supplied flat or tapered EPS roof insulation. ASTM C578 Types II, VIII or IX, nominal density of 1.25 pcf or greater.
  2. Flute filler, loose laid or simultaneously fastened with approved cover board: IB supplied flat or tapered EPS roof insulation: ASTM C578 Type I nominal density of 1.0 pcf or greater.
  3. EPS insulation requires use of approved cover board or non-polystyrene insulation board as top layer; or use of approved IB Fire or Separation Sheet between the IB membrane and polystyrene insulation.
- C. Expanded Polystyrene (EPS) Fan-Fold Recover Board: Rigid, closed-cell expanded polystyrene foam, fan-fold insulation with factory laminated polymeric or metalized facers conforming with the requirements of ASTM C578, Type VIII; nominal density of 1.25 lbs. pcf.
  1. IB supplied Insulfoam® R-Tech® FF: ASTM C578, Type VIII; minimum 1/2" thickness

2. IB supplied Cellofoam® Polyshield® Fan-Fold: ASTM C578, Type VIII; minimum 1/2" thickness
- D. Extruded Polystyrene (XPS) roof insulation; Rigid, closed cell, flat or tapered extruded polystyrene foam insulation with integral formed skin or planed exterior faces, conforming to the requirements of ASTM C578, Type IV; nominal minimum compressive strength of 25 psi.
  1. Requires use of approved cover board or non-polystyrene insulation board as top layer; or use of approved IB Fire or Separation Sheet between the IB membrane and polystyrene insulation.
  2. IB supplied Dow Styrofoam™ Deckmate™ Plus FA; ASTM C578, Type IV
- E. Gypsum Roof Board: Moisture-resistant, gypsum roof boards in various thicknesses with integral water-resistant cores available in un-faced, fiberglass faced or primed fiberglass facer formats.
  1. IB supplied USG Securock® Glass Mat Roof Board, ASTM C1177 or Gypsum-Fiber Roof Board conforming to the requirements of ASTM C1278.
  2. IB supplied GP DensDeck® or DensDeck Prime® Gypsum Roof Boards with fiberglass or primed fiberglass mat facers conforming to the requirements of ASTM C1177.

## 3.2 INSULATION APPLICATION

- A. Storage and Handling
  1. Maintain all insulation materials in a weather-protected, ventilated environment. Keep clear of the ground secured against wind, moisture and damage.
  2. Prevent condensation beneath product packaging, coverings and temporary plastic shipping wrappers or shrouds by removing, opening and/or covering materials with breathable tarpaulins.
  3. Do not leave insulation materials exposed to the weather. Install only as much insulation as will be roofed with membrane and sealed against weather before the end of each day's work.
  4. Avoid storage of materials on-site or on the roof during extended periods of inclement weather. Secure all materials stored on the roof against wind damage and exposure to the elements.
  5. Do not use materials that become damaged or wet, contain visible defects or do not comply with IB specifications and requirements.
  6. Follow all rooftop safety guidelines and practices when handling insulation boards on the roof. Additional precautions should be taken when working near the edges of the roof and at openings when handling insulation boards, particularly where windy conditions exist or in areas subject to gusts.
- B. General Insulation Application Guidelines
  1. Roof deck shall be smooth, free of debris, clean, dry and securely attached. Do not install materials over wet or frozen substrates. Openings, projections, curbs and fixtures should be in place prior to the start of work.
  2. Conduits should be run above the completed roof system supported in accordance with IB approved pipe support details. Do not cut insulation boards for conduit placement on the deck or within the roofing assembly. Inspect the underside of the roof deck for location of below deck conduit, piping or equipment that might be located where fastening of the roof insulation, membrane and flashings may occur.
  3. Do not install warped or curled insulation boards. Set insulation over the substrate with board edges fitted uniformly and closely together. Do not kick into place. Avoid joints or gaps greater than 1/4" and fill gaps in excess of 1/4" with matching insulation material.
  4. Over approved steel decks, install insulation with long dimension board edges parallel to and bearing on the ribs. Do not install board thicknesses with flute span ratings less than required for the flute opening dimension of the steel deck. Follow manufacturer flute span ratings for each type and thickness of approved insulation board.
  5. Stagger board joints a minimum of 12" in one direction. For multiple layer installations, all joints must be staggered and offset both horizontally and vertically a minimum of 12" from preceding courses and layers.

6. Installation in multiple layers is recommended when single layer board thicknesses exceed 3" (76 mm). Fan-fold polystyrene recover boards are not approved for direct application to new or existing steel roof decks.
7. IB insulations with dimensions up to 4' x 8' may be fastened in place with approved IB fasteners and 3" insulation plates. Adhered IB insulations with dimensions up to 4' x 4' may be attached with IB Rapid Set or IB supplied OMG OlyBond insulation adhesive at the minimum rate of 12" o.c. Install insulation in accordance with IB specifications. Secure insulation to the roof deck to meet or exceed required project uplift resistance and code requirements unless loose laid as part of a ballasted IB roof assembly.
8. Perimeter and corner zone securement of the roofing assembly shall be increased in accordance with IB specifications and installation details. Supplemental insulation and membrane fastening, reduced spacing between or within fastener rows, and increased application of approved insulation adhesive may be required to conform to local building codes and expected wind loads calculated in accordance with ASCE 7 and ANSI / SPRI WD-1.
9. Additional insulation securement may be required above vapor retarder and air barrier assemblies. Mechanically attached insulation installed above these assemblies requires fastening at a minimum rate of 1 fastener per 2 square feet or as required by the applicable roof assembly wind uplift approval.
10. Adhered recover assemblies using IB insulation adhesive may require priming of the prepared substrate or existing roof surface with an IB approved substrate primer. Adhesion to asphalt bearing surfaces or existing membranes requires careful review, preparation and insulation adhesion uplift testing to ensure adequate performance.
11. Expanded (EPS) or Extruded (XPS) insulations are not acceptable for use with IB roof membranes unless faced with an IB approved polymeric or metalized facer, covered with an IB Separation Sheet, or used as a base layer beneath an approved IB cover board or second (top) layer of IB polyisocyanurate insulation.
  - a. Polystyrene insulations are not compatible with solvent bearing adhesives and other materials. Fully adhered IB membranes over roof insulation assemblies that contain polystyrene insulation require use of IB Water Borne membrane adhesive. Avoid exposure to solvent containing materials at flashings and penetrations.
  - b. Avoid use of polystyrene insulations where building occupancy and use may expose the roofing assembly to solvents or solvent vapors.
  - c. Do not install polystyrene insulations over existing coal tar roofs.
  - d. Plaza deck, paver and other roof assemblies with overburden components may require use of polystyrene insulations with compressive strengths higher than 25 psi.
  - e. Installations of dark colored IB membranes over polystyrene insulations in hot climate zones require prior review by IB Roof Systems Technical Services.
12. The responsibility for verification of substrate performance and fastener or insulation adhesive withdrawal resistance remains with the building owner, design professional or contractor. Fastener withdrawal and insulation adhesive uplift resistance should be reviewed and confirmed as meeting or exceeding minimum IB Roof Systems requirements and applicable building codes. IB Roof Systems assumes no responsibility for the design, condition, structural performance or load resistance of the roof deck and other building substrates including walls, claddings, wood blocking and equipment or fixtures.
  - a. Fastener pull tests should conform with the requirements of ANSI / SPRI FX-1.
  - b. Insulation adhesive uplift testing should conform to the requirements of ANSI / SPRI IA-1.
  - c. Test results must be submitted to IB Roof Systems Technical Services for prior review on all IB Total System Warranty projects requiring IB Wind Riders for high wind zone application.

**TABLE A.2 - INSULATION FASTENER SCHEDULE FOR ADHERED IB ROOF MEMBRANES**

Deck Types	Insulation Type		Thickness	4' x 4'			4' x 8'		
				Field	Perimeter	Corner	Field	Perimeter	Corner
- 22 ga. Steel - Structural Concrete - 1/2" - 3/4" Plywood - 1" Wood Plank	Isocyanurate	IB Energy Board II	1.5" - 1.9"	5	8	10	10	15	20
		IB Energy Board II	2.0" Min.	4	6	8	8	12	16
		IB Energy Board III	2.0" Min.	4	6	8	8	12	16
	Polystyrene	EPS / XPS <sup>2</sup>	1.0" Min.	6	9	12	12	18	24
		Insulfoam <sup>2</sup>	1.5" Min.	6	9	12	12	18	24
	Cover Board	DensDeck® Prime / Securock® Gypsum Fiber Roof Board	.25" Min.	6	9	12	12	18	24
		DensDeck® Prime / Securock® Gypsum Fiber Roof Board	.50" - .625" Min.	5	8	10	10	15	20
		AC-Foam® HS Cover Board	.50"	5	8	10	10	15	20
	- 24 ga. Steel - LWIC over Steel Form Deck <sup>1</sup> - 7/16" OSB - Cementitious Wood Fiber - Poured Gypsum	Isocyanurate	IB Energy Board II	1.5" - 1.9"	8	12	16	16	24
IB Energy Board II			2.0" Min.	6	9	12	12	18	24
IB Energy Board III			2.0" Min.	6	9	12	12	18	24
Polystyrene		EPS / XPS <sup>2</sup>	1.0" Min.	8	12	16	16	24	32
		Insulfoam® HD	1.5" Min.	8	12	16	16	24	32
Cover Board		DensDeck® Prime / Securock® Gypsum Fiber Roof Board	.25" Min.	8	12	16	16	24	32
		DensDeck® Prime / Securock® Gypsum Fiber Roof Board	.50" - .625" Min.	6	9	12	12	18	24
		AC-Foam® HS Cover Board	.50"	6	9	12	12	18	24

The above fastening guidelines are approved by IB Roof Systems for use in accordance with our current specifications and meet minimum IB installation requirements for issuance of standard published IB warranties. Roof deck fastener withdrawal resistance must meet or exceed IB required minimums. Fasteners and plates must be IB labeled and approved for the specific deck type. Buildings with field of roof design velocity pressures above -30 psf and projects requiring IB Wind Riders may require additional fasteners and roof system securement. IB Roof Systems does not practice architecture or engineering. It is the responsibility of the designer of record, building owner or roofing contractor to determine required roof assembly wind resistance and comply with applicable code requirements. Contact IB for additional information and refer to published IB roof assembly Approval listings, General Requirements, Specifications and Construction Details for information on roof components and fastening rates to meet specific project design requirements.

<sup>1</sup> Requires prior written approval of IB Technical Services for existing dry Cellular LWIC over minimum 24 gauge Steel Form-Deck

<sup>2</sup> Requires minimum .25" layer of IB approved Gypsum or HD Isocyanurate cover board or minimum 1.0" layer of IB Polyisocyanurate board above EPS/XPS insulation



**TABLE A.3 - SUBSTRATE WITHDRAWAL RESISTANCE AND INSULATION FASTENER TABLE**

Deck / Substrate Type	Fastener Withdrawal - Average Resistance Values <sup>1</sup>	Insulation Fastener / Plate Recommendations		Fastener Penetration Into Deck
		Fastener	Plate	
1" minimum Wood Plank	450 lbs.	HD #14, SD #12	3" Round Galvalume	1" Min.
1/2" minimum C-D, Exposure 1 Plywood	425 lbs.	HD #14, SD #12	3" Round Galvalume	1/2" through
5/8" OSB	350 lbs.	XHD #15, HD #14	3" Round Galvalume	1/2" through
7/16"	275 lbs.	XHD #15, HD #14	3" Round Galvalume	1/2" through
22 ga. Steel	525 lbs.	XHD #15, HD #14, SD #12	3" Round Galvalume	3/4" through
24 ga. Steel	425 lbs.	XHD #15, HD #14	3" Round Galvalume	3/4" through
Cellular LWIC over 24 ga. Steel Form	425 lbs.	XHD #15, HD #14	3" Round Galvalume	3/4" through
Structural Concrete	800 lbs.	IB Concrete or Dekspike	3" Round Galvalume	1-1/4" Min.
Poured Gypsum	300 lbs.	IB Deklite	3" Round Deklite	1-1/2" Min.
Cementitious Wood Fiber	300 lbs.	IB Deklite	3" Round Deklite	1-1/2" Min.

<sup>1</sup>Fasteners shall be IB Roof Systems supplied and approved for the specific substrate / roof deck type

**TABLE A.4 - IB INSULATION ADHESIVE SCHEDULE FOR ADHERED IB ROOF MEMBRANES**

Approved Decks / Substrates	Insulation Type <sup>2</sup>	Thickness	Field	Perimeter	Corner
<ul style="list-style-type: none"> <li>- Structural Concrete</li> <li>- Cellular Lightweight Insulating Concrete</li> <li>- Cementitious Wood Fiber</li> <li>- Approved Existing Roof Systems<sup>1</sup></li> </ul>	Polyisocyanurate	1.0" Min.	12" o.c.	6" o.c.	4" o.c.
	EPS / XPS <sup>3</sup>	1.5" Min.			
	HD ISO / EPS or Approved Composite	1.5" Min.			
	Gypsum Cover Board	.25" Min.			
	HD ISO Cover Board	.50" Min.			

The above insulation adhesive guidelines are approved by IB Roof Systems for use in accordance with our current specifications and meet minimum IB installation requirements for issuance of standard published IB warranties. Roof deck insulation adhesive withdrawal resistance must meet or exceed IB required minimums. Contractor must confirm adequate adhesion to substrates with insulation adhesive pull tests in accordance with ANSI / SPRI IA-1. Insulation adhesive must be IB labeled and approved for the specific deck and substrate type. Buildings with field of roof design velocity pressures above -30 psf and projects requiring IB Wind Riders may require additional adhesive and supplemental roof system securement. IB Roof Systems does not practice architecture or engineering. It is the responsibility of the designer of record, building owner or roofing contractor to determine required roof assembly wind resistance and comply with applicable code requirements. Contact IB for additional information and refer to published IB roof assembly Approval listings, General Requirements, Specifications and Construction Details for information on roof components and adhesive application rates to meet specific project design requirements.

<sup>1</sup>Prepared and primed existing smooth or granule surfaced asphaltic BUR and MB roof systems meeting IB specifications and requirements

<sup>2</sup>Roof insulation boards must be IB Roof Systems labeled, supplied or approved for use with IB roof membranes and assemblies

<sup>3</sup>Requires minimum .25" layer of IB approved Gypsum or HD Isocyanurate cover board or minimum 1.0" layer of IB Polyisocyanurate board above EPS/XPS insulation

## Part 4 ROOF MEMBRANE INSTALLATION

### 4.0 ROOF MEMBRANE GENERAL INSTALLATION REQUIREMENTS

- A. IB roof systems installed in accordance with IB specifications and installation details are designed to provide a watertight roofing assembly that resists the elements and exposure to normal weathering conditions over their expected lifecycle. IB PVC membranes, system components and accessories are tested and designed for use within approved IB roof assemblies.
- B. Use of non-IB labeled, supplied or approved components will result in exclusion of those products from IB warranty coverage unless expressly approved in writing by an IB Technical Services Manager; and may result in the rejection of the entire roof assembly for coverage under an IB warranty.
- C. IB Roof System materials are sold to and intended for installation only by IB Authorized Applicators in accordance with our published specifications and requirements.
- D. Building Code Compliance: The building owner, design professional and roofing contractor are solely responsible for the design and installation of the roofing assembly in compliance with the requirements of the local building code and authorities having jurisdiction.
  - 1. Fire Resistance: Review applicable code requirements for external and internal fire resistance ratings for the roofing assembly. IB roof assemblies are typically tested in accordance with UL 790 and ASTM E108 for external fire resistance classification. Internal fire resistance hourly P-Series ratings incorporating a large number of IB specifications are available for use with specific project designs.
  - 2. Wind Uplift Performance: Roof system design and installation must provide adequate wind uplift resistance for design pressures as calculated using ASCE 7, revision as adopted by local authorities having jurisdiction and the building code.
  - 3. System Performance Criteria: Review project requirements for compliance with applicable local building codes and specific design criteria. Typical roof assembly installation requirements and material performance properties are contained within various national building codes, reference, performance and design standards including:
    - a. International Building Code (IBC)
    - b. International Residential Code (IRC)
    - c. International Energy Conservation Code (IECC)
    - d. International Green Construction Code (IGCC)
    - e. International Mechanical Code (IMC)
    - f. International Fire Code (IFC)
    - g. International Plumbing Code (IPC)
    - h. International Existing Buildings Code (IEBC)
    - i. ASTM
    - j. ANSI / SPRI
    - k. ASCE 7
    - l. ASHRAE
    - m. SMACNA
    - n. UL
    - o. Sustainable Design Standards-LEEDS, American High-Performance Buildings Coalition, Green Building Initiative Green Globes Certification
    - p. Reflectivity Performance Standards-CRRC, Energy Star, Title 24
    - q. Local Ordinance, Modifications and Adoptions to Building Codes

### 4.1 MATERIAL HANDLING AND STORAGE

- A. Store IB materials in a weather protected environment, clear of ground and secured against wind, moisture and physical damage. Material storage indoors or within jobsite containers and trailers until ready for installation on the roof is recommended.
- B. Avoid exposure of stored materials to extreme temperatures. Adhesives, sealants and caulks require protection from freezing and exposure to excessive heat above 90°F. Store at temperatures above 40°F and within recommended storage temperature ranges.
- C. Prevent condensation beneath product packaging, coverings and temporary plastic shipping wrappers or shrouds by removing, opening and/or covering materials with breathable tarpaulins.
- D. Avoid exposure of materials to sources of ignition or combustion.
- E. IB materials should be delivered and received in original IB packaging in a dry, undamaged condition with seals and labels intact. Receipt of materials damaged during transport or containing defects should be reported immediately to IB Roof Systems. Do not install damaged or defective materials.
- F. Rooftop Storage and Handling:
  - 1. Materials and equipment stored on the roof must be properly staged and supported to avoid overloading and/or permanent deflection of deck.
  - 2. Distribute roofing materials in a uniform manner to avoid damage to existing structure or unsafe storage conditions; secured against wind and the exposure to the elements.
  - 3. Avoid use of newly installed IB roof areas as a staging area for materials or equipment storage, or exposure to excess construction traffic and work of other trades. When traffic over completed roof areas is necessary, provide adequate temporary protection to prevent damage and contamination of the finished roofing. Use protective plywood, cushioning layers of compatible insulation and tarps as necessary to avoid damage.
- G. Storage and disposal of construction debris, packaging, containers and hazardous materials shall comply with project specifications and the requirements of the authority having jurisdiction.

## 4.2 QUALITY CONTROL DURING APPLICATION

- A. IB PVC Single Ply Membranes and flashings require installation in conformance with published IB specifications and details. Deviations from IB requirements require prior review and written approval of an IB Technical Services Manager. Where discrepancies exist between existing project conditions or specifications and IB requirements, the contractor shall promptly notify the design professional, building owner and IB Roof Systems for resolution prior to commencing work.
- B. Use only original IB products labeled, supplied and / or approved by IB Roof Systems for use in conjunction with approved IB specifications.
- C. Installer shall be an IB Authorized Applicator utilizing personnel trained in the application of thermoplastic membranes and IB roof assemblies. Contractor shall implement and maintain a regular quality control program to ensure installation in conformance with IB specifications.
- D. Projects requesting an IB Total System Warranty require submittal of a Notice of Award to IB Roof Systems prior to installation. Final Inspection by an IB Field Technical Representative is required to determine roof system compliance with IB Warranty Program requirements.
- E. Field Technical Representatives are available for technical support and assistance during project Start-Up, Interim and Final Inspection. Punch lists detailing corrective work and conditions requiring repair shall be provided to the IB Authorized Applicators for correction.

## 4.3 WEATHER PRECAUTIONS

- A. Install roofing only when ambient temperatures and environmental conditions exist to maintain a satisfactory roofing system application. Ensure forecasted weather conditions will permit work to be performed in accordance with project and IB requirements.
  - 1. Proceed with roof installation only when ambient temperatures are 40°F and rising.

2. When temperatures are below 55° F., adhesives, sealants and caulks should be kept warm. Ground storage of materials during cold weather is recommended within heated interior spaces, jobsite trailers or containers; and in temporary containers or areas on the roof immediately prior to installation.
  3. Product shelf life, curing cycles and performance properties can be adversely affected by exposure and storage of materials in extremely warm temperatures above 90° F. Jobsite materials should be stored out of direct sunlight, protected from the elements and extreme temperatures.
  4. Care must be taken when installing adhesives, sealants and caulks during cold or extremely warm temperatures and in periods of elevated humidity, wind or other adverse environmental weather conditions.
  5. Normal activation, open and setting times can vary with climatic, altitude and other environmental factors, and may require adjustments to installation methods in order to achieve specified application rates and proper performance.
- B. Do not install materials over wet or frozen substrates. Avoid installation of membrane and insulation adhesives to deck and substrates where surface temperatures are below or above recommended application ranges.
- C. Follow all cold weather installation precautions and material application guidelines. Do not apply water-based adhesives during freezing weather or when temperatures are forecasted to fall below freezing within 24 hours of application.

#### 4.4 INSPECTION AND PREPARATION OF SURFACES

- A. The building owner is responsible for the condition and performance of all roof decks and substrates including existing roof areas left in place, scheduled to receive new roofing.
- B. Substrates and existing surfaces should be inspected for deterioration, defects and entrapped or excess moisture prior to the start of work.
1. Wet or deteriorated areas and decking shall be replaced or repaired prior to the start of work.
  2. Fastener and adhesive pull tests should be conducted to confirm adequate substrate / roof deck condition and acceptable withdrawal resistance.
  3. Existing substrates, flashings or materials scheduled for reuse should be carefully inspected and properly prepared to ensure they are compatible and suitable for incorporation into the new roof system; free of defects, voids, excessive deflection, contaminants or moisture.
- C. Roof deck and flashing substrates must be clean, dry and adequately supported and secured to resist required structural design loads and loads imposed during construction.
- D. Penetrations, equipment, wood nailers, drainage outlets and flashings shall be in place and ready to receive roofing prior to the start of work.
1. Abandoned equipment and penetrations should be removed with openings repaired before installation of new roofing materials.
  2. Inspect existing drainage outlets and the roof drainage plan for adequate roof drainage and conformance to code requirements.
  3. Review existing flashing conditions, perimeter edges, walls, terminations and penetrations and for adequate clearances, heights and conformance with IB specifications and construction details.
- E. Substrates and materials requiring primer shall be primed in accordance with manufacturer and IB specifications.
- F. Review work plan to avoid excess loading of roof areas during material transport, temporary storage and installation. Protect building components and fixtures from damage during work.

#### 4.5 REROOFING / RECOVER INSTALLATION

- A. IB Roof Systems are acceptable for installation on reroofing projects with tear-off of the existing roof construction to the structural roof deck, as well as recover projects where the existing roof construction will be

left in place. The building owner, project designer and contractor should review and take a variety of key design factors into consideration, in addition to conforming with applicable building codes.

- B. Factors requiring consideration prior to a decision to Reroof or Recover include but are not limited to the following:
  - 1. Condition, make-up and number of layers of all existing roof assemblies present on the roof.
  - 2. Determination and required scope of repairs to correct existing conditions adversely affecting current or future roof performance such as uncontrolled moisture / air vapor intrusion, condensation, inadequate ventilation, structural defects, movement / deflection, inadequate drainage, design deficiencies, adverse environmental or building use exposures, and other conditions which may negatively affect the performance of the new roof.
  - 3. Condition, type, suitability, potential moisture content and required scope of repair for the existing roof construction, structural roof deck, walls, wood nailers, metal flashings, curbs, equipment supports, penetrations, flashing details and drainage outlets for installation of the new roof system.
  - 4. Compatibility of existing roof materials and substrates with the proposed IB Roof System.
  - 5. Ability of the structure to support additional loads and weight of the proposed new roof assembly and required construction traffic.
  - 6. Reroof or Recover roofing assembly compliance with applicable fire, wind, owner required insurance / system performance design criteria and the requirements of the Authority Having Jurisdiction.
  - 7. The building owner, design professional and contractor should consider the impact of changes or alterations in original roof system design, construction or function that may occur during roof replacement.
    - a. Common roof design and performance factors affected include potential changes in roof / building thermal performance, moisture / air vapor transmission and retention, design loads on building components and cladding, dew points, ventilation requirements, changes to existing roof drainage plans and other similar roof system design features.
    - b. Consideration should also be given to any changes in building occupancy or use, and to the effects of addition or demolition of equipment and other rooftop fixtures or penetrations.
- C. Roof systems eligible for Recover installations with separation sheets or recover insulation boards include the following general roof types and assemblies:
  - 1. Smooth and Mineral Surfaced Asphalt BUR and Modified Bitumen
  - 2. Gravel Surfaced Asphaltic BUR or Modified Bitumen with aggregate removed
  - 3. Fully Adhered or Mechanically Attached Single Ply-including PVC, TPO, EPDM, other as approved by IB Technical Services
  - 4. 24 gauge or heavier Standing Seam or select Exposed Fastener Metal Roof Systems
- D. Recover IB roof assemblies can generally be considered when the following conditions are present:
  - 1. No more than one existing roof membrane assembly is present.
  - 2. Existing roof assembly and substrates are dry. Roof systems containing moisture over more than 20-25% of their area typically require full tear-off and replacement.
  - 3. Building structure and substrate to which IB Roof Systems components are to be attached are able to support and will provide adequate resistance to additional and expected in-service design loads, including the weight of the new assembly, both during construction and once in place.
  - 4. The building owner, design professional and / or contractor have reviewed the existing roof conditions and applicable project design requirements, and have selected an IB Recover Roof System for retrofit roof replacement.
  - 5. Existing roof assembly and substrates are compatible with the selected IB roof system, suitable for recover roof installation in accordance with IB specifications and construction details, and comply with IB Warranty Program requirements.
- E. Reroofing / Recover General Installation Requirements
  - 1. Repair all defects and deficiencies in existing substrates and roof deck prior to the start of work. Decking and substrates should be visually examined and inspected to determine suitability for installation of new

materials. Equipment scheduled for demolition should be removed and the area readied to receive new roofing.

2. Building owner, design professional and/or contractor shall complete required moisture scans, pull tests, field uplift testing and other required materials or performance testing prior to beginning work. Conditions not in compliance with project requirements and IB specifications shall be corrected.
3. Remove all existing penetration and membrane termination flashings including metal edging, base flashings, integral metal flashings, counter-flashings and drain flashings. Clean residues and contaminants from substrates, curbs, wood nailers, drains and flashings; inspect and correct flashing details for adequate height, clearances, securement, areas of deterioration and other conditions not conforming with IB specifications.
4. Existing vertical surfaces at walls and curbs retaining excess contaminant or incompatible materials require separation from new materials with a layer of plywood / OSB sheathing or approved cover board. IB separation sheets may be used for separation of existing substrates at mechanically attached base and wall flashings.
5. Where required by project design or regulatory requirements, separation may include installation of IB Fire Sheets.
6. Substrates must be clean, smooth, dry and well secured. Remove and replace deteriorated decking and all wet materials. Steel decking exhibiting rust shall be inspected for condition and suitability to receive new materials. Repair areas of minor rusting with a rust inhibitor coating.
7. For recover applications, remove all existing aggregate ballast, pavers and overburden materials. Provide temporary securement against wind uplift as needed during the course of roofing work.
8. Maintain adequate roof drainage and avoid restricting or blocking drainage outlets or pathways during roof work. Install new or additional drainage openings prior to the start of work with drain components, leaders and flashings ready for installation as work progresses.
9. Recover assemblies over existing metal roof systems typically require modification and additional review of project details and terminations with detailed review of the existing metal roof system. IB Roof Systems offers a variety of roof systems suitable for application over existing metal roofs. Project review and prior approval by an IB Technical Services Manager is required.

## **4.6 REROOFING AND RECOVER OF EXISTING COAL TAR ROOFS**

- A. Coal Tar based roof assemblies are incompatible with most PVC based roof membranes. They contain inherent characteristics and physical properties that can create significant challenges to successful retrofit installation.
  1. Whenever possible, complete tear-off and preparation of substrates to receive an appropriate Reroofing assembly should be undertaken to avoid adverse conditions present with existing Coal Tar roofs.
    - a. Coal tar bitumen contains compounds and can generate vapor or fumes that are detrimental to the performance of PVC and other roof membrane materials.
    - b. Coal tar membranes exhibit cold flow properties even at relatively low temperatures that can result in bitumen movement and / or migration through joints, screw holes and other openings created during normal reroofing activities.
    - c. Typical edge and flashing detailing for coal tar built-up roofs are designed to restrict bitumen migration at penetrations and perimeter edges. Mechanical fastening of recover insulation boards, membranes and flashings; and disturbance or damage to existing coal tar flashing details during retrofit roof installation can result in bitumen drippage within the building interior or onto exterior surfaces.
    - d. Recover projects over existing Coal Tar roofs require prior approval of an IB Technical Services Manager. Fully adhered, white or light-colored IB PVC roof systems over two or more layers of IB Energy Board polyisocyanurate with IB-approved Gypsum or HD Polyisocyanurate cover board are available for recover installation over prepared existing or torn-off Coal Tar membranes. Installation

requires removal of loose aggregate surfacing and full separation from contact with the coal tar membrane and associated residues.

- e. Roof system insulation adhesives require field withdrawal resistance testing to confirm acceptable adhesion and uplift resistance to the existing substrate. Contact IB Technical Services for additional requirements on IB PVC roof system reroofing and recover installations over existing Coal Tar membranes.

## 4.7 GENERAL ROOF INSTALLATION

- A. The roof system work plan should avoid traffic whenever possible over previously completed roof areas. Projects with multiple roof sections or levels may require more than one staging area and generally should progress from the upper or highest roof sections to the lower roof sections. Protect completed work from damage, construction traffic and the work of other trades.
- B. Install the roof assembly in accordance with the conditions of the work contract, applicable local building codes and IB Roof Systems specifications and application details.
- C. Follow safe roofing practices for all elements of project staging, materials handling, installation, personal protection and fire safety in adherence with applicable project, local, state and federal safety regulations and requirements.
- D. Do not install more material than can be completed in a watertight manner by the close of day. Where temporary waterproofing is required prior to final roof system installation, consideration should be given to the installation of a compatible temporary roof.
  - 1. Selected temporary roof membranes may qualify and be left in place as a vapor retarder depending on project design and suitability for use with the selected IB roof system.
  - 2. Contact IB Roof Systems for additional information on the use of temporary roofs.
- E. Night seals are required in accordance with IB specifications and installation details to provide closure and protection of partially completed roof areas during construction. Consideration should be given to installing adequate temporary weather protection and night seals in regards to potential weather exposure and length of time left in place. Remove and discard night seal materials and roofing materials that become wet, contaminated, or damaged before the continuation of work.
- F. For occupied structures and projects where odor or fume control concerns exist, care should be taken during project planning to assess potential entry points into the structure. Consideration should be given to the use of compatible air / vapor barrier seals at openings in the roof deck, terminations, walls and penetrations; and selection of mechanically attached construction details and / or low-fume, reduced VOC content adhesives and accessory products where appropriate for the specific application.

## 4.8 WIND RESISTANCE

- A. IB Roof Systems standard fastening and roof assembly attachment guidelines are approved by IB Roof Systems for use in accordance with our current specifications.
- B. IB standard attachment guidelines meet minimum IB installation and warranty requirements for application of IB roof assembly specifications over approved roof decks and substrates.
- C. Conformances to specific local building code, insurance or project design criteria may require selection and use of IB specifications and attachment schedules that exceed IB standard minimum attachment schedules.
- D. Wind exposures and design wind loads requiring additional fasteners and supplemental roof system securement above standard fastening rates can result from a variety of project-specific factors including but not limited to, structures with mean roof heights above 40 feet, domed or irregularly shaped roofs, Partially Enclosed or Exposure D building classifications, structures located in High Wind Hurricane, Coastal or Special Wind Regions and buildings with calculated field of roof design velocity pressures above -30 psf.
- E. Projects requiring IB Total System Warranty Wind Riders may require additional fasteners and supplemental roof system securement.

- F. Calculations of anticipated wind uplift design loads are the responsibility of the project design professional and should be conducted in accordance with the current edition ASCE 7 design standard or edition required by the Authority Having Jurisdiction.
- G. The building owner, design professional and roofing contractor should review available tested IB roof assembly approval listings for information on required roof components, limitations and fastening rates to meet applicable local building codes and specific project design criteria. It is the responsibility of the designer of record, building owner or roofing contractor to comply with all local code requirements.
- H. Roof deck fastener withdrawal resistances must meet or exceed IB required minimums.
- I. Fasteners and plates shall be IB labeled or approved by IB Roof Systems for use with the specific deck type and installation.

**TABLE A.5 - STANDARD IN-SEAM MEMBRANE FASTENING SCHEDULE FOR IB MECHANICALLY ATTACHED ROOF MEMBRANES**

Deck Types	Fastening Rate	IB Fastener	IB Plate	Pull-Test Resistance Values
22 ga. Steel	18" o.c.	IB XHD #15	2-3/8" Barbed	525 lbs.
Structural Concrete	18" o.c.	IB Concrete, Dekspike or CD-10	2-3/8" Barbed	800 lbs.
24 ga. Steel	12" o.c.	IB XHD #15	2-3/8" Barbed	425lbs.
1/2" minimum Plywood	12" o.c.	IB XHD #15 or HD #14	2-3/8" or 2" Barbed	425 lbs.
1" minimum Wood Plank	12" o.c.	IB HD #14	2-3/8" or 2" Barbed	450 lbs.
LWIC over Steel Form Deck <sup>1</sup>	12" o.c.	IB XHD #15	2-3/8" Barbed	425 lbs.
Cementitious Wood Fiber	6" o.c.	IB Deklite	2" Deklite Barbed	300 lbs.
Poured Gypsum	6" o.c.	IB Deklite	2" Deklite Barbed	300 lbs.
7/16" minimum OSB	6" o.c.	IB XHD #15 or HD #14	2-3/8" or 2" Barbed	275 lbs.
5/8" minimum OSB	12" o.c.	IB XHD #15 or HD #14	2-3/8" or 2" Barbed	350 lbs.

<sup>1</sup>Requires prior written approval of IB Technical Services. Limited to existing dry Cellular LWIC fill over minimum 24 ga. Steel Form Deck with fastener penetration through the steel deck.

The above fastening guidelines are approved by IB Roof Systems for use in accordance with our current specifications and meet minimum IB installation requirements for issuance of standard published IB warranties. Roof deck fastener withdrawal resistance must meet or exceed IB installation requirements for issuance of standard published IB warranties. Roof deck fastener withdrawal resistance must meet or exceed IB required minimums. Fasteners and plates must be IB labeled and approved for the specific deck type. Buildings with field of roof design velocity pressure above -30 psf and projects requiring IB Wind Riders may require additional fasteners and roof system securement. IB Roof Systems does not practice architecture or engineering. It is the responsibility of the designer of record, building owner or roofing contractor to determine required roof assembly wind resistance and comply with applicable code requirements. Contact IB for additional information and refer to published IB roof assembly approval listings, General Requirements, Specifications and Construction Details for information on roof components and fastening rates to meet specific project design requirements.

## 4.9 WIND RESISTANCE AT PERIMETERS AND CORNERS

- A. Perimeter Roof Edges: Perimeter and Corner roof zones of the roof are subject to higher wind uplift pressures. Determination of wind uplift design loads for Perimeter and Corner Zones require careful review of project design criteria, applicable building codes and calculation in accordance with ASCE 7.
- B. Supplemental fastening and securement of roof assembly components in these areas and along perimeter roof edge terminations to meet higher anticipated wind loads is required.



1. Perimeter and Corner Zone securement of the roofing assembly shall be increased in accordance with IB specifications and installation details.
2. Supplemental insulation and membrane fastening, reduced spacing between or within fastener rows, and increased application of approved insulation adhesive may be required to conform to local building codes and expected wind loads calculated in accordance with ASCE 7 and ANSI / SPRI WD-1.
- C. Buildings constructed with a continuous minimum 36" perimeter parapet wall height may use Perimeter Zone dimensions and uplift design pressures through the corner regions.
- D. Refer to ASCE 7 as adopted by local building code or Authority Having Jurisdiction for calculation of required Perimeter and Corner Zone dimensions and related design uplift pressures. Membrane widths (e.g., distance between rows of in-seam fasteners) are typically reduced by one-half with membrane half-sheets installed throughout these zones of the roof. The building owner, design professional and contractor must review project design criteria and wind uplift loads to determine the location, width and required roof assembly wind load resistance for these areas.
  1. Perimeter and Corner Zone widths are calculated using the requirements of ASCE 7 and following general guidelines. Refer to IB Construction Details MS-01 and MS-02 for additional information.

**TABLE A.6 - PERIMETER AND CORNER ZONE AREAS**

<b>Roof Heights ≤ 60'</b>	<b>Building Width</b> (Lesser plan dimension) x .01 or <b>mean roof height</b> x .04 (whichever is less) with a minimum of 4% of least horizontal dimension or 3 feet.
<b>Roof Heights &gt; 60'</b>	<b>Building Width</b> (Lesser plan dimension) x .01 with a minimum of 3 feet.

Corner Zone dimensions are set by the width and intersection of the building's Perimeter Zones for buildings with roof heights less than 60 feet. Roof heights above 60 feet require the length of the Corner Zone along each perimeter edge outward from the corner to be multiplied by a factor of two.

## 4.10 MECHANICALLY ATTACHED PERIMETERS AND CORNERS

- A. Mechanically attached, insulated IB roof assemblies require securement of the underlying insulation boards with approved IB fasteners and insulation plates or IB insulation adhesive.
  1. Insulation boards secured with approved IB insulation adhesives must be installed in accordance with the requirements of the IB Roof Assembly Wind Uplift Approval Listing and IB adhesive specifications. Bead applied insulation adhesives are limited to a maximum spacing between rows of 12" o.c.
  2. Mechanically attached insulation boards shall be secured with IB approved fasteners and insulation plates at the minimum rate of 6 fasteners per 4' x 8' board and 4 fasteners per 4' x 4' board.
  3. IB fan-fold recover boards shall be secured with IB approved fasteners and insulation plates at the minimum rate of 1 fastener per 12 sq. ft.
  4. Consult IB Technical Services for additional securement requirements on mechanically attached roof assemblies over air barriers or vapor retarders.
- B. Mechanically Attached Perimeter Zone Membrane Attachment:
  1. Spacing between rows of fasteners at membrane laps shall be reduced to a maximum of 60% of the field of roof spacing within the Perimeter Zone.
  2. Standard IB installation details incorporate the use of half-width membrane rolls for practicality and convenience throughout the required Perimeter and Corner Zone areas, fastened within the lap at the same spacing as the field of roof.
  3. As an alternate, IB batten bar and reinforced IB Cover Strip may be installed at the mid-point between in-seam fastening rows on full-width membrane courses within the Perimeter Zone. Batten bars shall be fastened with the same fastener spacing as the field of roof.

4. Steel Decks: Install perimeter zone courses perpendicular to deck ribs for Factory Mutual projects and field design pressures –75 psf and above. Install IB Batten Bar and Cover Strips at mid-points between full-width field courses where roof edge is parallel to deck ribs.
- C. Mechanically Attached Corner Zone Membrane Attachment:
  1. Spacing between rows of fasteners at membrane laps shall be reduced to a maximum of 40% of the field of roof spacing within the Corner Zone.
  2. Corner Zone half-sheet courses may be installed picture frame method and increase securement by means of extending half-sheet fastening rows through the corners in both directions. At intersections of perimeter half-sheets, continue row fastening at same rate for field of roof through the corner to perimeter walls or roof edges. Install IB Cover Strip over extended fastener line.
  3. As an alternate, install two courses of IB Batten Bar and reinforced IB Cover Strip between full-width membrane sheets within the Corner Zone. Fasten at the same fastener spacing as the field of roof.
- D. Fasten membrane courses in-seam along perimeter and corner half-sheets or through IB Batten Bar with reinforced IB Cover Strips in accordance with Table A.5 (Standard In-Seam Membrane Fastening Schedule For Mechanically Attached Roof Membranes) or applicable IB Roof Assembly Wind Uplift Approval Listing requirements.
  1. Approved IB mechanically attached roof assemblies require the following minimum number of half-sheets installed along building perimeters and corners:

**TABLE A.7 - HALF SHEET SECUREMENT TABLE FOR PERIMETER AND CORNER ZONES**

Number of Half Sheets	Roof Height	Wind Speed
1	≤ 15 feet <sup>1</sup>	IB Standard Warranty
2	Up to 35 feet	
3	36-60 feet	

\*Half-sheet guidelines reflect IB minimum requirements for issuance of standard published IB Limited Material and Total System warranted assemblies installed in accordance with IB specifications and construction details. Additional half-sheet and perimeter/corner zone requirements may apply in accordance with specific project design criteria including wind riders, installation in high wind or hurricane zones, or to meet applicable building codes. IB recommends the roofing contractor, project designer and building owner review project requirements for expected roof assembly design uplift pressures, calculated perimeter and corner zone dimensions and required roof system uplift resistance values.

<sup>1</sup>Limited to buildings located in states of CA, OR and WA with minimum plan dimension less than 75 feet (Maximum 85 mph Wind Zone per ASCE 7-05)

## 4.11 ADHERED PERIMETERS AND CORNERS

- A. Supplemental fastening of perimeter and corner roof insulation and and cover boards for Fully Adhered roof membranes:
  1. Install IB approved roof insulation and cover boards within Perimeter and Corner Zone areas in accordance with Table A.2 (Insulation Fastener Schedule For Adhered IB Roof Membranes) or increase insulation board fastening within Perimeter Zone areas by 50% over required Field of Roof fastening rate with a minimum rate of 1 fastener per 2 square feet. Corner Zone fastening shall be at the rate of 1 fastener per 1 square feet.
  2. Supplemental fastening at the enhanced perimeter or corner rate shall be applied to any partial boards falling within these zones.
  3. Insulation boards installed with approved IB insulation adhesives shall be installed in accordance with Table A.4 (IB Insulation Adhesive Schedule For Adhered IB Roof Membranes) or applicable IB Roof Assembly Wind Uplift Approval Listing requirements.

## 4.12 FLASHINGS

### A. General

1. IB Roof Systems requires installation of all roof construction details in accordance with published IB Construction Details utilizing IB manufactured and approved accessories, membranes and required components.
2. IB Base and Wall Flashing Details are approved for use over a variety of substrates conforming with IB requirements including structural poured and precast concrete, masonry block, dimensional lumber, plywood and oriented strand board sheathing, approved pre-manufactured metal curbs and IB supplied, approved gypsum cover boards.
3. IB reinforced and non-reinforced membranes are designed for installation with factory manufactured IB standard and custom flashing accessories as shown in approved IB Construction Details at parapet walls, roof edges, curbs, drainage outlets, pipe penetrations and other roof transitions and terminations.
4. Base flashings shall be constructed with IB reinforced membrane the same mil thickness as used in the field of roof and shall be installed as a separate component from installation of the field membrane. Field membrane courses may not be extended up vertical surfaces at base flashings and walls.
5. Tie-ins to sloped roof areas, transitions of roof plane or installation at valleys with slopes 2" in 12" or greater require termination and securement of the field membrane in accordance with IB Construction Details. Refer to IB Construction Details for additional requirements.
6. Base flashings and wall coverings may typically be installed either as Fully Adhered or Mechanically Attached in place and should conform to the height recommendations and limitations below. Insufficient height or termination of base flashings and penetrations below a roof's potential water accumulation depth, or where exposed to wind-driven rain or snow loads should be avoided. Sealants and caulks may be inadequate in preventing water entry under these conditions and will require periodic regular owner maintenance.
7. Proper securement of IB Roof Systems field and flashing membranes is required to ensure adequate resistance to wind and other loads to which the roof system will be subjected. For standard IB Roof System installations, follow the following securement requirements for mechanical fastening of IB field of roof and flashing membranes at roof system terminations, penetrations, vertical intersections, walls and perimeter edges.
8. Use only IB supplied and approved fasteners, plates, anchors, and accessory products for the securement of IB membranes and flashing products.
9. Flashings shall be mechanically attached in accordance with IB Construction Details, published IB Specifications, and the following Flashing Securement Table.
10. Install manufacturer approved flashing details and materials for the warranty term specified at all wall, curb, and penetration flashings, edging, coping and drainage outlets. Inside and outside corners shall receive an additional layer of non-reinforced membrane flashing.
11. Conduits and wiring shall be properly secured and supported above the IB roof system on approved piping / conduit support details.
12. Wood blocking and nailers shall be provided where required by project details and in accordance with IB Construction Details.

**TABLE A.8 - BASE AND WALL FLASHING ALLOWABLE HEIGHT**

Detail Condition	Fully Adhered	Mechanically Attached
Base flashings: recommended minimum completed height	8"-12" above field membrane	8"-12" above field membrane
Base and wall flashings: allowable maximum heights (without intermediate fastening rows)	60" above field membrane	18" above field membrane

## 4.13 FLASHING INSTALLATION

### A. General Application Guidelines

1. Substrate surfaces shall be smooth, clean, dry and properly secured in place, ready to receive flashing materials prior to the start of work.
2. Hand welding of flashing membrane and accessory laps and seams by means of a hand welder shall maintain a minimum 1-1/2" weld width.
3. Flashing seams and laps shall be probed after completion and adequate set time for watertight seam integrity and proper bond. Regular test welds prior to and during progress of work is an important part of project quality control and consistency in proper membrane seaming.
4. Avoid contamination of lap and seam areas prior to welding with membrane or insulation adhesives, caulks or primers.
5. For occupied structures and projects where odor or fume control concerns exist, care should be taken during project planning to assess potential entry points into the structure. Consideration should be given to the use of compatible air / vapor barrier seals at openings of the roof deck, terminations, walls and penetrations; and selection of construction details and low-fume, reduced VOC, content adhesives and accessory products where approved for the specific application.
6. Remove and discard flashing materials or membrane used for temporary seals prior to completion of final flashing application.
7. Surfaces with existing asphalt, coal tar, mastics, sprayed polyurethane foam or similar incompatible materials shall be removed, thoroughly cleaned, or separated from contact with new IB flashings.
8. Where tie-ins are required to new or existing air or vapor barriers and retarders, consult IB Technical Services and the specific material manufacturer for recommendations and requirements on required detailing.

### B. Base and Wall Flashings

1. Base and wall flashing membranes shall be constructed from reinforced IB membrane, cut into manageable lengths and allowed to relax prior to installation.
2. Wood and steel-framed walls shall be surfaced with approved plywood, OSB or IB approved gypsum cover board products designed for direct application of roofing materials. Framed walls with approved gypsum sheathing require provision of a suitable wood nailing strip or wood blocking for the termination and attachment of flashing membranes.
3. For fully adhered application, install membrane with 3" end and side laps using only IB adhesives approved for vertical substrate installations. Follow all IB requirements and recommendations for acceptable environmental conditions and temperatures and required application rates. Application during colder weather requires special attention to material storage and handling, and typically requires longer open times for adhesive set-up and curing.
4. Adhesive application rates will vary according to the porosity and condition of the substrate surface. A light prime coat of adhesive or manufacturer's approved primer may be required particularly at concrete and masonry block surfaces prior to application of primary flashing membrane adhesive. Where required, allow prime coat to dry thoroughly.
5. For mechanically attached, loose laid flashing application install membrane with 5" side laps and 3" end laps. Fasteners and barbed seam plates shall be IB supplied, approved for the specific substrate type.
6. Split / rough face concrete masonry block units are not suitable for direct flashing application. Smooth-faced units should be installed at areas to receive base and wall flashings with provision for through wall or reglet style counterflashing.
7. Walls clad with smooth, corrugated or standing seam metal panels, lap siding, hardboard, EIFS, stucco / cement finish or similar exterior claddings require the installed IB base flashing to extend up vertical surfaces behind the cladding with a minimum 2" overlap. Bottom edge of cladding or finish materials shall include provision of a sheet metal closure and counterflashing.

## C. Coated Metal Flashings

1. Use only IB PVC clad coated metal flat stock, formed metal edging and flashing components for construction of flashing details where membrane or flashing terminations to coated metal flanges are required.
2. Through-Wall or Through-Edge Scuppers, Overflow Scuppers, Penetration Pockets, Perimeter Edge Metal Wall Closures, 90° flashings with inside/outside corners and similar constructions shall be formed to provide a continuous clad metal flange with all overlapping joints sealed, riveted and covered with a strip of non-reinforced membrane prior to application of reinforced flashing membrane.
3. Form exposed edge metal flanges with a 1/2" hem formed where applicable for use with a continuous metal cleat. Clad metal termination bars and miscellaneous metal flashings should be formed with fully closed 1/2 hems with or without caulk lip kick-out as required.
4. Flashings formed from PVC clad metal for perimeter drip edge, gravel guard edge, 90° or other transitions, clad metal termination bars and similar linear lengths of metal flashing require sealing of butt-joints in accordance with published IB Butt-Joint Details. Install metal flashings with a 1/4" gap between ends to allow for expansion. Seal joint with application of a 2" strip of foil bond-breaker tape and cover with a minimum 5" wide strip of non-reinforced IB PVC membrane centered over the joint and extending down the outside face prior to application of final reinforced flashing strip-in membrane.
5. Perimeter edge details and copings should be installed in accordance with ANSI / SPRI ES-1 and applicable local code requirements. Continuous metal cleats one gauge heavier than the edge metal or as required for pre-manufactured IB edge systems shall be installed along perimeter edges and copings. As an alternate, IB PVC clad edge metal may be externally fastened in accordance with IB Construction Details with approved fasteners
6. Lapped PVC clad perimeter edge metal and similar metal flashing butt-joints are susceptible to fatigue and splitting of flashing and / or field membranes at these locations due to movement and expansion of metal flashings. IB Roof Systems does not recommend use of lapped butt-joint details nor warrants against leaks or damage caused by metal movement.

## D. Drains / Scuppers

1. Roof drains shall be cast iron or minimum 11 gauge or heavier spun aluminum type for new or retrofit installations manufactured with integral clamping rings and strainers.
2. IB Aluminum Retrofit Drain with a factory-applied IB reinforced membrane target flashings are available for use in most new construction and retrofit drain applications.
3. Sump areas approximately 36" x 36" for primary drains and 36" x 48" for primary / overflow drain sets, should be formed into the deck or constructed with tapered insulation to facilitate drainage and water removal from the roof. Sump area shall be tapered a minimum of 1/2" per foot and shall not exceed 3" per horizontal foot slope.
4. Drain flashings shall be installed in accordance with IB Construction Details with a seamless drain target sheet. Field membrane shall be terminated around the drain and fastened 12" o.c. with IB fasteners and barbed seam plates.
5. Clad metal through-wall scuppers shall be installed over the completed base and wall flashing assembly. A wood nailer is required at the juncture of the deck and wall for securement of the scupper flange to the deck. Scupper flange shall be fastened 6" o.c. with appropriate fasteners for the specific substrate.
6. Mechanically attached base and wall flashings require separate securement 6" o.c. through IB Aluminum Termination Bar around perimeter edge of scupper opening prior to placement and securement of the clad metal scupper.

## E. Pipe and Penetration Pocket Flashings

1. Install pipe penetration flashings with IB PVC Cone, Split Cone or No-Cone Flashings. Pipe flashings may be trimmed to fit external pipe diameter and sealed along the top edge with stainless steel draw band and IB Polyurethane Caulk.

2. Where required for irregular size or pipe flashings with greater than an 8" diameter, contact IB Roof Systems for assistance with custom pipe flashing requirements. Where custom flashings are not available from IB, field fabricated no-cone pipe flashing details may be constructed from reinforced IB membrane target sheets with non-reinforced upper membrane in accordance with IB Construction Details.
3. Hot pipe, heater, dryer vent and similar flashings with operating / surface temperatures above 120° F; require use of an approved IB Hot-Pipe Flashing Detail. Install an insulated metal jacket or curb flashing with separate sheet metal rain collar prior to application of IB PVC pipe flashing. As an alternate, an insulated metal curb may be installed with sheet metal cap flashing.
4. Use of appropriate grade and type round structural pipe supports in lieu of irregularly shaped penetrations such as c-channel, angle iron, I-beam, or Unistrut type channels, angles or beams are recommended to facilitate use of standard pipe flashings. Penetration supports subject to regular movement or vibration such as at equipment stands, screen walls, or other elevated rooftop equipment should be flashed with flexible IB PVC Pipe Flashings.
5. Where irregularly shaped supports are not suitable for pipe or curb flashing application, consideration may be given to use of IB PVC Clad Pitch Pan and IB supplied pourable urethane sealant. When used, solid soldered stainless steel sheet metal cap flashings are recommended to reduce owner required sealant maintenance.

**TABLE A.9 - FLASHING SECUREMENT**

Detail Condition	Fully Adhered	Mechanically Attached
<b>Membrane termination to roof deck or base of walls:</b>	12" o.c.	Fasten at in-seam spacing for field of roof / Min. 12" o.c.
Perimeter edge wood nailers and parapet walls		
Curbs, expansion joints, wood blocking, columns and similar vertical terminations in the field of roof		
<b>Membrane termination:</b> At pipes and small penetrations in field of roof (Less than 12" o.c. diameter)	6" o.c. / Min. of 3 fastener and plates per detail	6" o.c. / Min. of 3 fastener and plates per detail
<b>Membrane termination:</b> At drains and large pipe / stack flashings in field of roof (12" o.c. diameter or greater)	12" o.c. / Min. 4 fasteners and plates per detail	Fasten at in-seam spacing for field of roof / Min. 12" o.c. (Min. 4 per detail)
<b>Base flashing:</b> Top edge at walls or parapets	12" o.c.	12" o.c.
With reglet or approved counterflashing / coping		
With termination bars	6" o.c.	6" o.c.
<b>Intermediate rows:</b> at high walls	12" o.c.	Fasten at in-seam spacing for field of roof / Min. 12" o.c.
<b>Transitions, valleys and tie-ins to sloped areas</b>	12" o.c.	Fasten at in-seam spacing for field of roof / Min. 12" o.c.
<b>Base flashing:</b> Top edge at field of roof curbs, wood blocking, expansion joints and similar vertical terminations	12" o.c.	12" o.c.
<b>Perimeter metal edge flashings:</b>	Nails: 4" o.c. Screws: 12" o.c.	Nails: 4" o.c. Screws: 12" o.c.
IB PVC clad metal		
Continuous metal cleat (22 ga. Min.)	Screws: 12" o.c.	Screws: 12: o.c.

IB Snap-Fascia	Screws: 12" o.c.	Screws: 12" o.c.
IB 110 Metal Edge		
IB Aluminum Lip Termination Bar	Screws: 6" o.c.	Screws: 6" o.c.
Sheet metal coping with exterior cleat (inside face securement)	Screws: 24" o.c.	Screws: 24" o.c.
<sup>†</sup> The above fastening schedules are minimum IB requirements for standard published IB warranty installations. Fastening schedules for high-wind and specific project design conditions, and/or to comply with ES-1 and applicable building codes may require supplemental increased fastening for compliance.		

## 4.14 WALKWAYS

- A. IB WalkTread™ should be installed over the completed IB roof membrane at hatches, doorways, ladders and established access points to the roof; and around rooftop fixtures, equipment or other areas requiring periodic service work and traffic from maintenance personnel. Additional walk pads may be installed throughout the roof as designated walkways for personnel access.
- B. IB WalkTread™ is designed for continuous perimeter edge heat-weld seaming to the finished IB roof membrane surface. Refer to IB Construction Details for additional information.
- C. Walk pads shall be cut into manageable lengths spaced a minimum of 3" apart at ends to allow for drainage. Place walk pads to avoid installation directly over laps and seams in the field of roof and around flashings.
- D. Consideration should be given to placement of walk pads to avoid restriction or blockage of roof drainage.

## Part 5 LOOSE-LAID BALLASTED AND OVERBURDEN ROOF INSTALLATION

### 5.0 BALLASTED, PAVER-SURFACED AND OVERBURDEN ROOF SYSTEMS

- A. Roof assemblies utilizing Stone Ballast or Concrete Paver surfacing; or that incorporate overburden applications such as Vegetative, Solar or Decking components above the completed roof installation are available with various IB Roof Systems applications and membranes. Projects utilizing these types of roof assemblies should be reviewed with IB Technical Services prior to bid and installation for specific application requirements including integration of compatible system components and accessories, use of required protection, filtration and drainage materials; and use of flashing details appropriate for each type of installation.
- B. Above roof pavers or tile, vegetative components, solar or decking materials approved for use over IB Roof Systems assemblies remain the sole responsibility of their manufacturer or other parties. Overburden materials may require removal during the service life of the roof to permit repair, maintenance or additions to the assembly. The responsibility for removal and replacement of overburden materials installed above IB roof membranes for repair, maintenance or alteration remains with the building owner or other parties.
- C. Vegetative, Solar ready and Overburden type roof systems can impose substantial additional design loads on the roof deck assembly and building structure. Project design review by the building owner, project designer and roofing contractor is strongly encouraged to ensure the building structure is capable of supporting all anticipated construction and in-place service loads.
- D. Protection of underlying thermal insulation and roof components is recommended to avoid damage from construction traffic, future maintenance or service work, and the additional weight of heavyweight ballast, pavers or overburden materials. Consideration should be given to the use of thermal insulation materials with compressive strengths equal to or greater than 25 psi, along with use of High-Density Polyisocyanurate or gypsum cover boards directly below the roof membrane (excludes assemblies with Stone Ballast).
- E. Protection courses of IB Separator Sheets, Fire Sheets, IB approved high and / or low-density polyethylene slip sheets and / or hot air welded IB WalkTread™ installed in accordance with IB specifications are required over the installed IB roof membrane for ballasted, paver-surfaced, vegetative and select overburden

assemblies. Contact IB Technical Services for specific protection course installations and assembly requirements.

- F. Protection of base flashings, penetrations, parapet walls and vertical flashings against foot-traffic damage on Plaza Deck applications or systems where regular service work is expected is recommended. Extension of metal counterflashings over the installed flashing should be considered to protect flashings from traffic.
- G. Wind Resistance: Ballasted, Paver Surfaced, Vegetative, Solar and Overburden roof assemblies are subject to a variety of wind load conditions and uplift pressures. Construction of these assemblies should conform to required project design criteria and the requirements of the local Authority Having Jurisdiction.
  - 1. IB Roof Systems recommends that all IB roof assemblies beneath Vegetative, Solar Ready and Overburden components be installed to meet or exceed roof design uplift pressures separately from any above roof components. Installed IB roof membrane and assembly components must meet or exceed minimum IB attachment guidelines and installation requirements to qualify for Notice of Award submittal under IB's warranty program.
  - 2. Ballasted and Paver surfaced IB roof assemblies shall be designed and constructed to meet or exceed the minimum requirements of ANSI / SPRI RP-4 Wind Design Standard for Ballasted Single-Ply Roofing Systems, the requirements of the local Authority Having Jurisdiction, and in accordance with IB Specifications and Construction Details. Use of manufacturer-specific wind-rated paver systems and assemblies requires prior review and approval of IB Technical Services.
  - 3. Integration of anchor cleats, perimeter edge angle and hold down clips requires careful review and coordination of project details with IB requirements. Fastening of paver clips, cleats and angles directly through installed IB membranes and flashings are not acceptable unless approved in writing by an IB Technical Services Manager.
  - 4. Peel stops are required on all loose-laid ballasted roof systems installed in accordance with IB Construction Details, at angle changes greater than 2" per foot, and at transitions in membrane assembly or securement to mechanically attached or fully adhered roof sections.

## 5.1 LOOSE-LAID BALLASTED PERIMETERS AND CORNERS

- A. Ballasted and Paver surfaced IB roof assemblies must be enhanced to resist higher wind loads at Perimeter and Corner Zone areas. Install ballast and supplemental securement as required to meet or exceed the minimum requirements of ANSI / SPRI RP-4 Wind Design Standard for Ballasted Single-Ply Roofing Systems, the requirements of the local Authority Having Jurisdiction, and in accordance with IB Specifications and Construction Details.
- B. Ballast shall be smooth, river bottom stone conforming to gradation requirements of ASTM D7655 / D7655M. Install stone ballast or approved concrete pavers within Perimeter and Corner Zones using the appropriate gradation and / or weight in accordance with project details, building height, location and construction height of parapet walls.
- C. Perimeter and Corner Zones require installation of #2 Ballast applied at the minimum rate of 1300 lbs. per 100 square feet. Integration of anchor cleats, perimeter edge angle and hold down clips requires careful review and coordination of project details with IB requirements.
- D. Approved heavyweight standard concrete pavers weighing a minimum of 22 lbs. per square foot may be used as an alternate to #2 ASTM D7655 / D7655M ballast on warranted IB roof assemblies. Pavers must be steel trowel finished with integral drainage channels or designed to avoid restriction of water flow to drains and outlets.

## 5.2 SEPARATION SHEET FOR BALLASTED, PAVER, VEGETATIVE AND OVERBURDEN ASSEMBLIES

- A. Ballasted and Paver Applications: Install IB Poly or HD Poly Separator Sheet over the completed field membrane prior to application of ballast or pavers, lapping in accordance with IB specifications.



1. Install separation sheets up curbs, walls, supports and other vertical penetrations to the height of installed ballast or pavers. Install sheets trimmed to edge of drains and outlets so that storm water runoff is not restricted.
  2. Ballast or paver surfacing should be installed immediately after application of IB Separator Sheet to hold in position and to protect the roof assembly from uplift. Ballast and separator sheet at completed membrane and flashing laps and seams must be held back to permit inspection by IB Technical Field Representatives on IB Total System warranty projects.
  3. Use of paver pedestals requires installation of protection pads consisting of IB WalkTread™ hot air welded in place.
  4. Reuse of existing stone ballast requires prior approval of IB Technical Services. Walkways, service areas, roof access locations, and areas utilizing heavy pavers for perimeter ballast may require additional layers of IB Poly Separator Sheet or one layer of HD Poly Separator Sheet.
- B. Vegetative, Solar and Overburden Applications: IB HDPE or IB approved slip-sheets are required over the completed field membrane prior to application of Vegetative and select Overburden type above roof components such as topping slabs or thin-set tiles in mortar beds. Protection / separation sheets require lapping on sides and ends and may require hot air seaming to protect the roof membrane from root intrusion, contaminants and non-compatible materials. Refer to IB Roof Systems Specifications and Construction Details for specific installation and separation sheet seam requirements where applicable.
1. Patio decks, deck framing, dimensional lumber-framed supports or wood runners bearing directly upon the completed IB roof membrane should be avoided where possible. Provide wood blocking or curb supports installed to the structural deck or structural framing, flashed in accordance with IB Construction Details with an integral sheet metal cap. Where supports must bear on the installed roof membrane, install a protection course of IB WalkTread™ and consider installation of additional wood blocking below the membrane at locations where supports or runners are scheduled to be located.
  2. IB Solar Ready Roof Specifications are compatible with the use of IB supplied U-Anchor attachment flashings to install solar framing or anchoring of ballast trays. Contact IB Roof Systems for additional information on the use of these hot air welded accessories with integral IB PVC target flashings. Projects requiring alternate PV solar mount options may be submitted to IB Roof Systems for review on a project basis.

## 5.3 BALLAST AND PAVER COMPONENTS

- A. Ballast shall be smooth, river bottom stone conforming with gradation requirements of ASTM D7655 / D7655M. Heavyweight individual concrete pavers and interlocking extruded lightweight pavers may be used as an alternate to stone ballast when approved by IB Technical Services.
1. Ballast and pavers shall be installed as required to meet project wind uplift and design criteria, and the requirements of the local Authority Having Jurisdiction. Refer to design recommendations contained in accordance with ANSI / SPRI RP-4 Wind Design Standard for Ballasted Single Ply Roof Systems.
  2. Install stone ballast or approved concrete pavers uniformly and evenly over the field of roof and within Perimeter and Corner Zones using the appropriate gradation and / or weight in accordance with project details, building height, location and construction height of parapet walls. Final surfacing should be applied immediately upon application of each roof area, installed in conjunction with required IB Separator Sheets to avoid the need for temporary ballast and potential for wind uplift.
  3. IB Total System warranty projects utilizing IB PVC Ballasted Roof Systems require the following minimum applications of stone ballast in the field of roof. Additional ballast may be required depending on specific project requirements.
    - a. #4 Ballast: nominal 1-1/2"; applied at 1000 lbs. per 100 square feet.
    - b. #2 Ballast: nominal 2-1/2"; applied at 1300 lbs. per 100 square feet.
  4. Perimeter and Corner Zones require installation of #2 Ballast applied at 1300 lbs. per 100 square feet.

- B. Approved heavyweight standard concrete pavers weighing a minimum of 22 lbs. per square foot may be used as an alternate to #2 and #4 ASTM D7655 / D7655M ballast on warranted IB roof assemblies. Pavers must be steel trowel finished with integral drainage channels or designed to avoid restriction of water flow to drains and outlets.
- C. Lightweight extruded interlocking pavers weighing a minimum of 10 lbs. per square foot may be used when installed in accordance with the paver manufacturer's wind-rated tested assembly. Proposed interlocking paver assemblies and paver assemblies utilizing field-installed anchors require prior review and approval of IB Technical Services.
- D. Paver assemblies require use and integration of approved paver manufacturer system accessories in accordance with the applicable wind-rated paver assembly. Installation and use of these components should be reviewed prior to project bid and installation with IB Technical Services and must conform with IB requirements and construction details.

**TABLE A.10 - IB ROOF SYSTEMS FASTSPEC ASSEMBLY SELECTION GUIDE**

FastSpec Code	Description
<b>Mechanically Attached Roof Assemblies: Wood Decks - New or Tear Off</b>	
MA-2FS-W	MA Membrane / 2 Fire Sheets / Wood Deck
MA-IN-2FS-W	MA Membrane / Insulation / 2 Fire Sheets / Wood Deck
MA-CB-W	MA Membrane / Cover Board / Wood Deck
MA-CB-IN-W	MA Membrane / Cover Board / Insulation / Wood Deck
MA-1FS-W	MA Membrane / Fire Sheet / Wood Deck
MA-IN-1FS-W	MA Membrane / Insulation / Fire Sheet / Wood Deck
MA-IN-W	MA Membrane / Insulation / Wood Deck
MA-FF-W	MA Membrane / Fan-Fold / Wood Deck
MA-SS-W	MA Membrane / Separation Sheet / Wood Deck
<b>Mechanically Attached Roof Assemblies: Wood Decks - Recover</b>	
MA-1FS-EX-W	MA Membrane / Fire Sheet / Existing Roof / Wood Deck
MA-CB-EX-W	MA Membrane / Cover Board / Existing Roof / Wood Deck
MA-CB-IN-EX-W	MA Membrane / Cover Board / Insulation / Existing Roof / Wood Deck
MA-IN-EX-W	MA Membrane / Insulation / Existing Roof / Wood Deck
MA-FF-EX-W	MA Membrane / Fan-Fold / Existing Roof / Wood Deck
MA-SS-EX-W	MA Membrane / Separation Sheet / Existing Roof / Wood Deck
<b>Mechanically Attached Roof Assemblies: Steel Decks – New or Tear Off</b>	
MA-CB-IN-S	MA Membrane / Cover Board / Insulation / Steel Deck
MA-IN-S	MA Membrane / Insulation / Steel Deck
MA-IN-VB-S	MA Membrane / Insulation / Vapor Barrier / Steel Deck
<b>Mechanically Attached Roof Assemblies – Steel Decks – Recover</b>	
MA-1FS-EX-S	MA Membrane / Fire Sheet / Existing Roof / Steel Deck
MA-CB-EX-S	MA Membrane / Cover Board / Existing Roof / Steel Deck
MA-CB-IN-EX-S	MA Membrane / Cover Board / Insulation / Existing Roof / Steel Deck
MA-IN-EX-S	MA Membrane / Insulation / Existing Roof / Steel Deck
MA-FF-EX-S	MA Membrane / Fan-Fold / Existing Roof / Steel Deck
MA-SS-EX-S	MA Membrane / Separation Sheet / Existing Roof / Steel Deck
<b>Mechanically Attached Roof Assemblies – Metal Roof Panels – Recover</b>	
MA-CB-FL-MR	MA Membrane / Cover Board / Flute Filler / Metal Roof Panel
MA-IN-FL-MR	MA Membrane / Insulation / Flute Filler / Metal Roof Panel
<b>Mechanically Attached Roof Assemblies – Concrete Decks – New or Tear Off</b>	
MA-CB-C	MA Membrane / Cover Board / Concrete Deck
MA-CB-IN-C	MA Membrane / Cover Board / Insulation / Concrete Deck

MA-IN-C	MA Membrane / Insulation / Concrete Deck
MA-FF-C	MA Membrane / Fan-Fold / Concrete Deck
<b>Mechanically Attached Roof Assemblies – Concrete Decks – Recover</b>	
MA-1FS-EX-C	MA Membrane / Fire Sheet / Existing Roof / Concrete Deck
MA-CB-EX-C	MA Membrane / Cover Board / Existing Roof / Concrete Deck
MA-CB-IN-EX-C	MA Membrane / Cover Board / Insulation / Existing Roof / Concrete Deck
MA-IN-EX-C	MA Membrane / Insulation / Existing Roof / Concrete Deck
MA-FF-EX-C	MA Membrane / Fan-Fold / Existing Roof / Concrete Deck
MA-SS-EX-C	MA Membrane / Separation Sheet / Existing Roof / Concrete Deck
<b>Mechanically Attached Roof Assemblies – Lightweight Insulating Concrete Decks – Recover</b>	
MA-CB-RI-EX-LWIC	MA Membrane / Cover Board / Insulation / Existing Roof / Lightweight Insulating Concrete Deck
MA-IN-EX-LWIC	MA Membrane / Insulation / Existing Roof / Lightweight Insulating Concrete Deck
<b>Fully Adhered Roof Assemblies – Wood Deck – New or Tear Off</b>	
FA-CB <sup>MA</sup> -W	FA Membrane / Cover Board <sup>(MA)</sup> / Wood Deck
FA-CB <sup>MA</sup> -IN <sup>MA</sup> -W	FA Membrane / Cover Board <sup>(MA)</sup> / Insulation <sup>(MA)</sup> / Wood Deck
FA-IN <sup>MA</sup> -W	FA Membrane / Insulation <sup>(MA)</sup> / Wood Deck
FA-CB <sup>RB</sup> -W	FA Membrane / Cover Board <sup>(RB)</sup> / Wood Deck
FA-CB <sup>RB</sup> -IN <sup>RB</sup> -W	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(RB)</sup> / Wood Deck
<b>Fully Adhered Roof Assemblies – Wood Decks – Recover</b>	
FA-CB <sup>MA</sup> -EX-W	FA Membrane / Cover Board <sup>(MA)</sup> / Existing Roof / Wood Deck
FA-CB <sup>MA</sup> -IN <sup>MA</sup> -EX-W	FA Membrane / Cover Board <sup>(MA)</sup> / Insulation <sup>(MA)</sup> / Existing Roof / Wood Deck
FA-CB <sup>RB</sup> -EX-W	FA Membrane / Cover Board <sup>(RB)</sup> / Existing Roof / Wood Deck
FA-CB <sup>RB</sup> -IN <sup>RB</sup> -EX-W	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(RB)</sup> / Existing Roof / Wood Deck
FA-IN <sup>RB</sup> -EX-W	FA Membrane / Insulation <sup>(RB)</sup> / Existing Roof / Wood Deck
<b>Fully Adhered Roof Assemblies – Steel Decks – New or Tear Off</b>	
FA-CB <sup>MA</sup> -IN <sup>MA</sup> -S	FA Membrane / Cover Board <sup>(MA)</sup> / Insulation <sup>(MA)</sup> / Steel Deck
FA-HSCB <sup>MA</sup> -IN <sup>MA</sup> -S	FA Membrane / HS Cover Board <sup>(MA)</sup> / Insulation <sup>(MA)</sup> / Steel Deck
FA-IN <sup>MA</sup> -S	FA Membrane / Insulation <sup>(MA)</sup> / Steel Deck
FA-CB <sup>RB</sup> -IN <sup>MA</sup> -S	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(MA)</sup> / Steel Deck
FA-CB <sup>RB</sup> -IN <sup>RB</sup> -VB-TB <sup>MA</sup> -S	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(RB)</sup> / Vapor Barrier / Thermal Barrier <sup>(MA)</sup> / Steel Deck
<b>Fully Adhered Roof Assemblies – Steel Decks – Recover</b>	
FA-CB <sup>MA</sup> -EX-S	FA Membrane / Cover Board <sup>(MA)</sup> / Existing Roof / Steel Deck
FA-HSCB <sup>MA</sup> -EX-S	FA Membrane / HS Cover Board <sup>(MA)</sup> / Existing Roof / Steel Deck
FA-CB <sup>MA</sup> -IN <sup>MA</sup> -EX-S	FA Membrane / Cover Board <sup>(MA)</sup> / Insulation <sup>(MA)</sup> / Existing Roof / Steel Deck
FA-IN <sup>MA</sup> -EX-S	FA Membrane / Insulation <sup>(MA)</sup> / Existing Roof / Steel Deck
FA-CB <sup>RB</sup> -EX-S	FA Membrane / Cover Board <sup>(RB)</sup> / Existing Roof / Steel Deck
FA-CB <sup>RB</sup> -IN <sup>RB</sup> -EX-S	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(RB)</sup> / Existing Roof / Steel Deck
FA-IN <sup>RB</sup> -EX-S	FA Membrane / Insulation <sup>(RB)</sup> / Existing Roof / Steel Deck
<b>Fully Adhered Roof Assemblies – Concrete Decks – New or Tear Off</b>	
FA-CB <sup>MA</sup> -C	FA Membrane / Cover Board <sup>(MA)</sup> / Concrete Deck
FA-CB <sup>MA</sup> -IN <sup>MA</sup> -C	FA Membrane / Cover Board <sup>(MA)</sup> / Insulation <sup>(MA)</sup> / Concrete Deck
FA-IN <sup>MA</sup> -C	FA Membrane / Insulation <sup>(MA)</sup> / Concrete Deck
FA-CB <sup>RB</sup> -IN <sup>RB</sup> -C	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(RB)</sup> / Concrete Deck
FA-IN <sup>RB</sup> -C	FA Membrane / Insulation <sup>(RB)</sup> / Concrete Deck
FA-CB <sup>RB</sup> -IN <sup>RB</sup> -VB-C	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(RB)</sup> / Vapor Barrier / Concrete Deck
FA-IN <sup>RB</sup> -VB-C	FA Membrane / Insulation <sup>(RB)</sup> / Vapor Barrier / Concrete Deck
<b>Fully Adhered Roof Assemblies – Concrete Decks – Recover</b>	
FA-CB <sup>MA</sup> -EX-C	FA Membrane / Cover Board <sup>(MA)</sup> / Existing Roof / Concrete Deck
FA-CB <sup>MA</sup> -IN <sup>MA</sup> -EX-C	FA Membrane / Cover Board <sup>(MA)</sup> / Insulation <sup>(MA)</sup> / Existing Roof / Concrete Deck
FA-IN <sup>MA</sup> -EX-C	FA Membrane / Insulation <sup>(MA)</sup> / Existing Roof / Concrete Deck

FA-CB <sup>RB</sup> -EX-C	FA Membrane / Cover Board <sup>(RB)</sup> / Existing Roof / Concrete Deck
FA-CB <sup>RB</sup> -IN <sup>RB</sup> -EX-C	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(RB)</sup> / Existing Roof / Concrete Deck
FA-IN <sup>RB</sup> -EX-C	FA Membrane / Insulation <sup>(RB)</sup> / Existing Roof / Concrete Deck
<b>Full Adhered Roof Assemblies – Lightweight Insulating Concrete – Concrete &amp; Steel Decks – New or Tear Off</b>	
FA-LWIC-C	FA Membrane / Lightweight Insulating Concrete / Concrete Deck
FA-LWIC-S	FA Membrane / Lightweight Insulating Concrete / Steel Deck
<b>Fully Adhered Roof Assemblies – Lightweight Insulating Concrete – Recover</b>	
FA-CB <sup>RB</sup> -EX-LWIC	FA Membrane / Cover Board <sup>(RB)</sup> / Existing Roof / Lightweight Insulating Concrete
FA-CB <sup>RB</sup> -IN <sup>RB</sup> -EX-LWIC	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(RB)</sup> / Existing Roof / Lightweight Insulating Concrete
FA-IN <sup>MA</sup> -EX-LWIC	FA Membrane / Insulation <sup>(MA)</sup> / Existing Roof / Lightweight Insulating Concrete
<b>GR – Fully Adhered Roof Assemblies – Wood Decks – New or Tear Off</b>	
FA-CB <sup>RB</sup> -IN <sup>RB</sup> -W	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(RB)</sup> / Wood Deck
<b>GR – Fully Adhered Roof Assemblies – Steel Decks – New or Tear Off</b>	
FA-CB <sup>RB</sup> -IN <sup>MA</sup> -S	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(MA)</sup> / Steel Deck
<b>GR – Fully Adhered Roof Assemblies – Concrete Decks – New or Tear Off</b>	
FA-CB <sup>RB</sup> -IN <sup>RB</sup> -C	FA Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(RB)</sup> / Concrete Deck
<b>Overburden – Fully Adhered &amp; Loose Laid Roof Assemblies</b>	
PBS-CB-IN-S	Pavers Ballasted Membrane / Cover Board / Insulation / Steel Deck
PBS-CB-EX-S	Pavers Ballasted Membrane / Cover Board / Existing Roof / Steel Deck
PBS-CB-IN-EX-S	Pavers Ballasted Membrane / Cover Board / Insulation / Existing Roof / Steel Deck
PBS-CB-IN-C	Pavers Ballasted Membrane / Cover Board / Insulation / Concrete Deck
PBS-CB-EX-C	Pavers Ballasted Membrane / Cover Board / Existing Roof / Concrete Deck
PBS-CB-IN-EX-C	Pavers Ballasted Membrane / Cover Board / Insulation / Existing Roof / Concrete Deck
SBS-IN-S	Stone Ballasted Membrane / Insulation / Steel Deck
SBS-IN-EX-S	Stone Ballasted Membrane / Insulation / Existing Roof / Steel Deck
SBS-IN-C	Stone Ballasted Membrane / Insulation / Concrete Deck
SBS-IN-EX-C	Stone Ballasted Membrane / Insulation / Existing Roof / Concrete Deck
RTG-FA-CB <sup>RB</sup> -IN <sup>RB</sup> -C	Organics / Fully Adhered Membrane / Cover Board <sup>(RB)</sup> / Insulation <sup>(RB)</sup> / Concrete Deck