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3.01.1 Roof Decks — General Requirements

- A.** The architect, engineer, or building owner is responsible for properly designing and constructing the roof deck as well as for the proper interrelationship of all building components. The density, internal moisture, integrity, and other inherent elements of the deck must also be suitable to receive the roof. IKO is not responsible for any of the previously mentioned factors and assumes no responsibility under any circumstances.
- B.** The roof deck construction and deck surface preparation requirements, which follow, are provided as a supplemental guide for the architect, engineer, or building owner. IKO's acceptance of a roof deck as satisfactory to receive the IKO roofing system refers only to the deck surface and not the design, construction, structural integrity, or attachment of the said deck.
- C.** Deck types not listed in this guide must be accepted, in writing, by the IKO Technical Services department to be eligible for a IKO Limited Warranty.
- D.** The surface of the roof deck, regardless of type, shall be dry, clean, smooth, firm, properly constructed, properly attached, and properly designed for anticipated loads with deflection not to exceed 1/240 of the span at mid-span.
- E.** The roof deck shall be constructed in accordance with the project specification or IKO guidelines and the roof deck manufacturer's requirements – whichever is more stringent.
- F.** All penetrations through the roof deck should be completed before installation of the roofing system. Projections may not penetrate cant strips around the parapet or other locations where cant strips are required. Penetrations shall not be placed closer than twenty-four inches (24") (610 mm) from the base of the parapet wall. Proper bracing is required around the opening as per the deck manufacturer's guidelines or Steel Deck Institute (SDI) requirements and in compliance with the applicable building code.
- G.** Utility piping, such as electrical conduit or gas lines, may not be installed on the surface of the roof deck. If installed above the surface of the roof, utility piping should be installed on support blocking.
- H.** If the roof deck slopes more than one inch (1") per foot (8%), see Section 6.03.1 of this manual for wood nailer insulation stops and backnailing guidelines for membrane systems.
- I.** Roof decks shall be designed and constructed with expansion joints in appropriate quantity and placement. Expansion joints must extend through the structural system to be functional. Expansion joints shall be incorporated to separate adjoining buildings or sections of buildings as determined by the designer. See also Section 3.03.1.
- J.** Thermal barriers, minimally one-half inch (1/2") (12.7 mm) thickness, if necessary to meet local building code or insurance requirements, may be installed directly over the roof deck and under the roofing system assembly.

3.01.1.1 Roof Decks — New Construction or Complete Tear Off

- A.** When roofing over existing steel support decks, stipulations shall be made for:
 - 1. Removal of surface corrosion and subsequent painting;
 - 2. Repair to holes or severely corroded sections;
 - 3. Fastening of loose decking; and
 - 4. Replacement of decking that is corroded beyond repair or otherwise unsuitable as a substrate.

3.01.1.2 Steel Decks

- A.** Steel decks must be a minimum of 22 gauge (0.8 mm), manufactured from mild steel, and be factory primed or galvanized to resist rusting. The top flanges of sheet panels shall be flat and properly installed such that the panels are aligned, smooth, and level.
- B.** Steel decks must comply with gauge, span, and fastening requirements listed in the current Factory Mutual Research Corporation (FMRC) Approval Guide and Loss Prevention Data Sheet 1-28, and/or as specified by the decking manufacturer.
- C.** Wood nailers of equal thickness of the roof insulation must be provided at perimeters and projection openings to function as insulation stops and to provide a fastening base for flanges of metal curb and flashings.
- D.** In some cases, steel decks may require the installation of an acceptable insulation or separation panel product before the application of a roof membrane assembly. The rigid board must be of the minimum thickness necessary to span the flutes, as well as capable of withstanding traffic, as recommended by the manufacturer. The rigid separation panels must be securely attached to the decking.
- E.** For Factory Mutual (FM) compliant assemblies, the first layer of rigid insulation must be mechanically attached with approved screws and plates. The subsequent layers may be attached using adhesives or hot asphalt, or all layers can be attached through the top layer with common fasteners through the deck. For CSA-compliant systems, contact the IKO Technical Services department for specifics.
- F.** Perimeter nailers must be provided. All cant strips used in conjunction with steel roof decks must be properly secured in place.
- G.** Any of the IKO guidelines for use over insulation may be applied over a steel deck, provided the steel deck is covered with acceptable rigid roof insulation or separation panel products.

3.01.1.3 Poured-In-Place Structural Concrete Decks

- A.** Poured-in-place structural concrete decks must have a minimum compressive strength of 3,000 PSI and be properly cured for a period specified by the concrete manufacturer or a minimum of twenty-eight days (28) before the application of the roofing system.
- B.** All poured-in-place structural concrete decks shall provide for bottom side drying. Decks poured over non-venting forms that remain in place are not acceptable.
NOTE: In such cases, special design and product considerations may be applied to address venting and drying concerns. Contact the IKO Technical Services department for further information.
- C.** All poured-in-place structural concrete decks shall be dry before the installation of the new roofing system. Wet decks must be permitted to dry, and frozen decks must be permitted to thaw and dry. All necessary precautions must be taken to avoid entrapment of moisture. IKO shall not be responsible or liable for damage to the roofing system caused by trapped moisture under the roofing system, whether it is from the concrete deck or some other source.
- D.** If there is any doubt concerning deck dryness, especially in the case of hot asphalt attachment, IKO recommends using the deck dryness test. When hot asphalt is used for the attachment of the insulation or base sheet, the following NRCA deck dryness test is recommended to verify the dryness of the concrete:
 - 1. Pour one (1) pint (0.5 L) of the specified bitumen that has been heated to a minimum of 204°C (400°F) on to the concrete deck.
 - 2. If the bitumen bubbles or foams, then the deck is not dry enough.
 - 3. After cooling, peel the bitumen off the deck. If the bitumen can be removed cleanly, then the deck is not dry enough.
- E.** All poured-in-place structural concrete decks shall be smooth, level, and free from dirt or contaminants. Concrete curing agents shall be checked for compatibility with roofing materials.
- F.** All roof deck ridges, depressions, or irregularities must be leveled before the application of the roofing system. Grind down ridges or irregularities. Fill depressions with cement grout or other material accepted by the roof deck manufacturer. Cracks greater than one-eighth inch (1/8") (3.2 mm) in width shall be repaired in accordance with the deck manufacturer's requirements.
- G.** All poured-in-place structural concrete decks receiving heat fused roofing materials or hot asphalt must first be primed with a suitable IKO primer. Self-adhesive and adhesive-applied components may also require priming of the deck. Check with the IKO Technical Services department for specific applications of individual products.

- H. Perimeter nailers must be provided. All cant strips used in conjunction with poured-in-place structural concrete roof decks must be properly secured to the structure.
- I. It is the responsibility of the architect, engineer, building owner, or roofing contractor to determine the suitability of the deck for direct membrane application to the concrete deck. Decks with textured finishes are not acceptable where the membrane system will be applied directly to the poured-in-place structural concrete deck.

3.01.1.4 Precast Concrete Decks

- A. Precast concrete decks shall be properly cured and installed in strict accordance with the deck manufacturer's specifications before the application of the roofing system. Any critically misshaped sections shall be replaced.
- B. All IKO installation guidelines over precast concrete decks, which require an IKO Limited Warranty, must have an acceptable insulation or separation panel solidly mopped, glued, or mechanically fastened over the deck.
- C. All precast concrete decks shall be dry before the installation of the new roofing system. Wet decks must be permitted to dry, and frozen decks must be permitted to thaw and dry. All necessary precautions must be taken to avoid entrapment of moisture. IKO shall not be responsible or liable for damage to the roofing system caused by trapped moisture under the roofing system, whether it is from the concrete deck or any other source.
- D. If there is any doubt concerning deck dryness, especially in the case of hot asphalt attachment, IKO recommends using the deck dryness test as outlined in subsection 3.01.1.3 Poured-In-Place Structural Concrete Decks.
- E. All precast concrete decks shall be smooth, level, and free from dirt or contaminants.
- F. All roof deck ridges, depressions, or irregularities must be leveled before the application of the roofing system. Grind down ridges or irregularities. Fill depressions and top joints between precast slabs with cement grout, or other materials accepted by the roof deck manufacturer, to provide a smooth deck surface. To permit maximum contact surface for roofing materials to be applied, leveling shall be gradual and smooth. Cracks greater than one-eighth inch (1/8") (3.2 mm) in width shall be repaired in accordance with the deck manufacturer's requirements.
- G. All precast structural concrete decks receiving heat fused roofing materials or hot asphalt must first be primed with a suitable IKO primer. Self-adhesive and adhesive-applied components may also require priming of the deck. Check with the IKO Technical Services department for specific applications of individual products.

- H. Perimeter nailers must be provided. All cant strips used in conjunction with precast structural concrete roof decks must be properly secured to the structure.
- I. It is the responsibility of the architect, engineer, building owner, or roofing contractor to determine the suitability of the deck for direct membrane application to the precast concrete deck. Decks with textured finishes are not acceptable where the membrane system will be applied directly to the precast concrete deck.
- J. Cast-in-place lightweight insulated concrete (LWIC) decking and top-pour surfacing require the attachment of separation panel products and the first layer of the membrane system with mechanical fasteners specific for such applications. For adhered membranes installed directly to the LWIC decking, a vented base sheet or spot-adhered base sheet must be used to minimize blistering due to trapped moisture, which can result in vapour pressure.

3.01.1.5 Pre-Stressed Concrete Decks

- A. Pre-stressed concrete decks shall be properly cured and installed in strict accordance with the deck manufacturer's specifications before the application of the roofing system. Any critically misshaped sections shall be replaced.
- B. All IKO installation guidelines over pre-stressed concrete decks, which require an IKO Limited Warranty, must have accepted rigid board stock solidly mopped, glued, or mechanically fastened to the deck before the application of a membrane system.
- C. All pre-stressed concrete decks shall be dry before the installation of the new roofing system. Wet decks must be permitted to dry, and frozen decks must be permitted to thaw and dry. All the necessary precautions must be taken to avoid entrapment of moisture. IKO shall not be responsible or liable for damage to the roofing system caused by trapped moisture under the roofing system, whether it be from the concrete deck or some other source.
- D. If there is any doubt concerning deck dryness, especially in the case of hot asphalt attachment, IKO recommends using the deck dryness test as outlined in subsection 3.01.1.3.
- E. All pre-stressed concrete decks shall be smooth, level, and free from dirt or contaminants.
- F. All roof deck ridges, depressions, or irregularities must be leveled before the application of the roofing system. Grind down ridges or irregularities. Fill depressions and top joints between pre-cast slabs with cement grout, or other material acceptable to the roof deck manufacturer, to provide a smooth deck surface. To permit maximum contact surface for roofing materials to be applied, leveling shall be gradual and smooth. Cracks greater than one-eighth inch (1/8") (3.2 mm) in width shall be repaired in accordance with the deck manufacturer's requirements.

- G.** All pre-stressed structural concrete decks receiving heat fused roofing materials or hot asphalt must first be primed with a suitable IKO primer. Self-adhesive and adhesive-applied components may also require priming of the deck. Check with the IKO Technical Services department for specific applications of individual products.
- H.** Perimeter nailers must be provided. All cant strips used in conjunction with pre-stressed concrete roof decks must be properly secured to the structure.
- I.** It is the responsibility of the architect, engineer, building owner, or roofing contractor to determine the suitability of the deck for direct membrane application to the pre-stressed concrete deck. Decks with textured finishes are not acceptable where the membrane system will be applied directly to the pre-stressed concrete deck.

3.01.1.6 Plank and Heavy Timber Wood Decks

- A.** Wood shall be a minimum of one inch (1") (25 mm) thick, between four inches (4") (100 mm) and eight inches (8") (200 mm) wide, and kiln dried. Tongue and groove, or sidelap lumber, is preferred over square edge lumber.
- B.** Confirm the compatibility between roofing materials and preservatives used to treat the wood. Contact the IKO Technical Services department before membrane application if there are any questions.
- C.** All wood shall be stored on skids or raised platforms and be covered with a waterproof tarp. Wood decks shall be roofed promptly after installation.
- D.** All wood planks must have a bearing on rafters at each end and be securely fastened to the joists or trusses.
- E.** Any knotholes or cracks in the lumber more than three-eighths inch (3/8") (9.5 mm) shall be covered with strips of securely fastened sheet metal.
- F.** Plank and heavy timber wood decks require the installation of a layer of mechanically fastened insulation, a separation panel, or a base sheet.

3.01.1.7 Plywood Decks

- A.** Plywood decks must be a minimum of fifteen-thirty seconds inch (15/32") (12 mm) thick with joist spacing not to exceed twenty-four inches (24") (610 mm) on the center. Various provincial codes may require specific board thickness and/or joist spacing and should, therefore, be consulted to ensure compliance.
- B.** Plywood decks shall be exterior grade, American Plywood Association's (APA) Product Standard PS-1. Fire retardant plywood is not acceptable.
- C.** If plywood other than APA Product Standard PS-1 is considered, then the roofing contractor must confirm the compatibility between the roofing materials and any preservatives used to treat the plywood.
- D.** All plywood shall be stored on skids or raised platforms and be covered with a waterproof tarp. Plywood decks shall be roofed promptly after installation.
- E.** Joints in the plywood deck must be supported by wood framing or some other means to prevent deflection.
- F.** The plywood deck must be secured to joists or trusses in accordance with the building code and APA recommendations. Plywood decks require the installation of a layer of mechanically fastened insulation, a separation panel, or a base sheet.
- G.** When roofing over plywood decks, stipulations shall be made for:
 - 1. Repairs of holes;
 - 2. The adhesion of new materials to the existing materials unless the new materials are mechanically attached through to the deck, or any issues attributable to the materials are left in place; and
 - 3. Replacement of decking that is warped, rotted, or deteriorated beyond repair or otherwise unsuitable as a substrate.
- H.** Decks not specified herein may be encountered. Contact the IKO Technical Services department for confirmation of suitability to receive an IKO roof assembly.

3.02.1 Roof Decks — Re-Cover

- A.** Tear-off to the roof deck is considered new construction. Refer to the appropriate part of section 3.01.1.

- B.** When IKO-modified bitumen or BUR systems are attached directly to existing smooth built-up or modified bitumen roofs, IKO is not responsible for failures due to lack of the existing roof's adhesion to the existing substrate. Decks damaged during the course of demolition must be evaluated for suitability to receive a new IKO roofing system. It is recommended that the new system be secured through the existing system into the decking using appropriate screws and plates where possible to ensure that the new system is suitably attached to the structure.
- C.** Re-cover is defined as the installation of a new roofing system over an existing system. The existing roof must present a suitable surface to receive the new roofing system.
- D.** The roof deck must be clean, dry, and free of projections or depressions and comply with the minimum general requirements as outlined in Part 3, Section 3.01.1.
- E.** It is recommended that an Infrared Scan be performed to locate any wet insulation under the existing roof membrane. Any wet insulation shall be removed and any blisters repaired. When wet insulation is removed and replaced, it must be covered with a layer of like materials of equal thickness to the layer of smooth surface built-up or modified bitumen that was removed. IKO will not be responsible for diminished life and/or premature failure of the membrane assembly due to pre-existing conditions within the old assembly left in place.
- F.** Existing flashings must be removed before the installation of the new flashing system.
- G.** If the existing metal flashing is damaged or deteriorating, or otherwise not reusable, then the existing metal flashing must be removed and replaced. All existing lead flashings must be removed. All metal flashing forming a part of the membrane assembly contacting the bitumen must be primed with a suitable IKO primer/adhesive.

3.02.1.1 Resaturated or Coated Smooth Surface Built-Up or Modified Bitumen Roofs

- A.** Smooth surface built-up or modified bitumen roofs that have been resaturated or coated require the installation of a layer of insulation, a separation panel, or a mechanically fastened base sheet.
- B.** The initial layer of insulation, separation panel, or base sheet must be mechanically fastened. If both a layer of insulation and base sheet are used, then they may both be mechanically fastened using a common fastener. Alternately, successive layers of insulation or base sheet may be hot asphalt or cold applied into place.
- C.** If hot asphalt is used for the attachment of the initial base sheet, insulation, or separation panel, then the existing surface must first be primed with an IKO asphalt primer and installed in accordance with the manufacturer's recommendations. See Section 3.02.1 B.

3.02.1.2 Non-Resaturated or Uncoated Smooth Surface Built-Up or Modified Bitumen Roofs

- A.** Smooth surface built-up or modified bitumen roofs that have not been resaturated or coated may have an IKO-modified bitumen or BUR system installed directly over the existing surface provided that the following conditions are satisfied:
 - 1. Any wet insulation has been removed and any blisters repaired. When wet insulation is removed and replaced, it must be covered with a layer of like material or built-up roof of equal thickness to the layer of smooth surface built-up or modified bitumen that was removed. It is recommended that an Infrared Scan be performed to locate any wet insulation under the existing roof membrane;
 - 2. The existing roof does not have areas of loose alligatoring on the surface;
 - 3. The existing roof does not have large splits or cracks in the surface; and
 - 4. The existing roof is primed with an IKO asphalt primer.
- B.** The asphalt primer shall be permitted to dry before the installation of the roofing system components.
- C.** If insulation or a separation panel is required, it shall be installed as per the manufacturer's recommendations.
- D.** If insulation, or a separation panel, and a base sheet are required, then they may be mechanically fastened with a common fastener. For alternate attachment options, please contact the IKO Technical Services department.

3.02.1.3 Mineral Surface Built-Up or Modified Bitumen Roofs

- A.** Mineral surface built-up or modified bitumen roofs that have not been resaturated or coated may have an IKO-modified bitumen or BUR system installed directly over the existing surface provided that the following conditions are satisfied:
 - 1. Any wet insulation has been removed and any blisters have been repaired. When wet insulation is removed and replaced, it must be covered with a layer of modified bitumen or built-up roof of equal thickness to the layer of smooth surface built-up or modified bitumen that was removed;
 - 2. The existing roof does not have areas of loose alligatoring on the surface;
 - 3. The existing roof does not have large splits or cracks in the surface;
 - 4. The existing roof has all roof cement removed; and
 - 5. The existing roof is primed with an IKO asphalt primer.

- B.** The asphalt primer shall be permitted to dry before the installation of the roofing system components.
- C.** If insulation or a separation panel is required, then the first layer must be mechanically fastened or hot asphalt attached to the primed surface. For alternate attachment options, please contact the IKO Technical Services department.
- D.** If insulation, or a separation panel, and a base sheet are required, then they may be mechanically fastened with a common fastener.

3.02.1.4 Gravel Surface Asphalt or Coal Tar Built-Up or Modified Bitumen Roofs

- A.** Gravel surfaces on built-up roofs and the high spots must be removed and the depressions filled.
- B.** Any wet insulation shall be removed and any blisters repaired. When wet insulation is removed and replaced, it must be covered with a layer of like material or built-up roof of equal thickness to the layer of gravel surface built-up roof that was removed.
- C.** Conditioned surfaces of BUR systems meant to receive a new membrane must be dry, smooth, free of debris, have large voids over one-eighth inch (1/8") (3.2 mm), and be sufficiently stable so as not to impede the performance of the new assembly.
- D.** Embedded gravel after scarification on built-up roofs requires the installation of an accepted insulation and base sheet or a separation panel such as Protectoboard. The initial layer of insulation and base sheet shall be mechanically fastened with a common fastener and plate. For alternate attachment options, please contact the IKO Technical Services department.
- E.** A mechanically fastened separation panel, a minimum of one-eighth inch (1/8") (3.2 mm) thick (recommended to be one-quarter inch (1/4") (6.4 mm) thick) is required over the existing roof if the roof is not smooth or the existing roof is coal tar pitch. All loose gravel must be removed. Refer to Section 2.04.1.
- F.** If removing the existing membrane causes surface damage to the existing insulation, then a separation panel must be installed over the existing insulation to provide a smooth surface.

Caution: Fastener penetration of the existing roof and roof deck may cause a flow of coal tar/bitumen into the building.

3.02.1.5 Sprayed-In-Place Urethane Roofs

- A.** Sprayed-in-place urethane roofs are not acceptable substrates for IKO-modified bitumen or BUR systems. Sprayed-in-place urethane roofs must be removed from the deck before the installation of the new roofing system.

3.03.1 Expansion Joints

- A.** The architect, engineer, or building owner is responsible for the design, location, and use of the expansion joints.

3.03.1.1 Expansion Joints — Design Recommendations

- A.** Although the designer, engineer, or building owner is responsible for the design, location, and use of the expansion joints, IKO strongly recommends expansion joints whenever:
 1. The length of the building exceeds two hundred feet (200') (61 m),
 2. Steel framing or structural steel changes direction or elevation,
 3. Roof decking changes direction such as “L”, “U”, or “T” configurations,
 4. The roof deck material changes from one material to another,
 5. Additions are connected to an existing building, or
 6. Canopies, overhangs, or loading docks junction into the main structure or expansion joints are provided in the structural system.

Note: The above list is not all-inclusive as it does not define all the possible conditions that would require an expansion joint.

3.03.1.2 Expansion Joints — Flashing Recommendations

- A.** All metal/elastomeric composite expansion joint covers that penetrate the membrane shall be elevated on curbs a minimum of eight inches (8") (200 mm) above the surface of the roof.

- B.** Roof level expansion joints must be waterproof, monolithic, and factory vulcanized. The standard of quality referenced herein is Redline by Situra Inc. Call the IKO Technical Services department or Situra Inc. for information on acceptable roof level expansion joints relative to the IKO roofing systems.
1. Redline (Situra brand name) is installed typically in an asphaltic-based medium. Apply the base coat of the asphalt medium directly to the substrate and embed the Redline waterproof expansion joint material making sure that the bottom polyester fleece is in full contact with the hot asphalt bitumen. Press the Redline material into the hot asphalt to ensure a continuous and even bond.
 2. Spread an even coat of asphalt on the top surface of the Redline expansion joint ensuring that the top white polyester fleece is completely covered and strip in felt plies. The system is to be wholly encapsulated between plies in an asphalt/bitumen compatible roofing/waterproofing system with a flood coat (mopping is acceptable) of asphalt. The joint shall not obstruct water flow across its surface and shall form a continuous monolithic waterproof barrier.
 3. Always lay the Redline expansion joint material in lengths of ten feet (10') (3 m) or less to allow for full contact with the hot bitumen adhesive. Do not lay Redline into cold asphalt. The application temperatures for hot asphalt referenced elsewhere in this guideline shall apply to the Redline product as well.
 4. Flamline by Situra is a permissible heat-fusible expansion joint option.
- C.** Expansion joints shall be continuous and shall not be terminated before the break in the structure.
- D.** For expansion joints to function properly, construction ties must be removed.
- E.** Effective treatment of expansion joints may be satisfied by other methods and products. The IKO Technical Services department shall approve such treatments before application.

3.03.1.3 Area Dividers and Control Joints

- A.** Area dividers and control joints are not expansion joints; however, they do serve the same purpose in some applications. Area dividers are an acceptable alternative to expansion joints if they are installed where expansion joints were not included in the original design. Area dividers shall be designed and installed using the same criteria as expansion joints.

End of Section