SECTION 07 30 00

STEEP SLOPE ROOFING

Section 07 31 13.13 Fiberglass-Reinforced Asphalt Shingles

IKO TECHNICAL SUPPORT

Project:
Address:
City, ST:

PREPARED BY:

PROJECT NO.:

SPEC NOTE: Delete items below not applicable for this project.

1.0 GENERAL

1.01 SECTION INCLUDES

Roof Assembly with internal attic space,

A IKO Asphalt Roofing Shingles (see table in Section 2.02)
B ArmourGard Ice & Water Protector or equivalent from Section 2.04
C Roofgard-SB or equivalent underlayment from Section 2.05

1.02 RELATED WORK SPECIFIED ELSEWHERE

A Section 07 01 50.19 Preparation for Re-Roofing
B Section 07 62 00 Sheet Metal Flashing and Trim
C Section 07 71 23 Manufactured Gutters and Downspouts

1.03 REFERENCES ****Red – Only for ENERGY STAR rated shingles*****

All Reference Standards are latest editions, unless noted otherwise

A FLASHING
1. ASTM A 653/A 653M Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
2. ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
3. ASTM B 370 Standard Specification for Copper Sheet and Strip for Building Construction

B ROOFING CEMENT
1. ASTM D 4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free
2. CAN/CGSB 37.4 Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing
3. CAN/CGSB 37.5 Cutback Asphalt Plastic Cement
4. ASTM D 3019 Standard Specification for Lap Cement, Asbestos-Free
5. ASTM D2822 Standard Specification for Asphalt Roof Cement

C FASTENERS
1. ASTM F 1667 Specification for Driven Fasteners, Nails, Spikes and Staples, Type I, Style 20
2. CSA B 111, Wire Nails, Spikes, and Staples

D ASTM D 226 / D 226M - 09 Standard Specification for Asphalt Saturated Organic Felt Used in Roofing and Waterproofing
E ASTM D 1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials used as Steep Roofing Underlayment for Ice Dam Protection
F ASTM C 1549 Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
G ASTM D 3018 Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules
H ASTM D 3161 Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method)
I ASTM D 7158/D 7158M-11 Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)
J ASTM D 3462 Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules
K ASTM D 4869 / D 4869M - 05(2011) Standard Specification for Asphalt Saturated Organic Felt Underlayment Used in Steep Slope Roofing
L ASTM E 108 - 11 Standard Test Methods for Fire Tests of Roof Coverings (ULC S107)
M ASTM E 903 Standard Test Method for Solar Absorptance, Reflectance, and Transmission of Materials Using Integrating Spheres
N Asphalt Roofing Manufacturers Association (ARMA)
O Canadian Asphalt Shingle Manufacturers' Association (CASMA)

1. CSA A 123.2 Asphalt Coated Roofing Sheets
2. CSA A 123.3-05 (R2010) Asphalt Saturated Organic Roofing Felt
3. CAN/CSA A 123.5-05 (R2010) Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granule
4. CAN2 51.32 Sheathing, Membrane, Breather Type Paper
5. CAN3 A 123.51 -M85 (R2011) Asphalt Shingle Application on Roof Slopes 1:3 and Steeper
6. CAN3 A 123.52 Asphalt Shingle Application on Roof Slopes 1:6 to Less than 1:3

P Canadian Roofing Contractors Association (CRCA)

Q FM Class Number 4473 Specification Test Standard for Impact Resistance Testing of Rigid Roofing Materials by Impacting with Freezer Ice Balls

R National Roofing Contractors Association (NRCA)

S UL 790 (Exterior Exposure), Standard Test Methods for Fire Tests of Roof Coverings

T UL 997 Wind Resistance of Prepared Roof Covering Materials

U UL 2218 Impact Resistance of Prepared Roof Covering Materials Asphalt Roofing

1.04 SUBMITTALS

A Submit copies of IKO's technical data sheets including product characteristics, performance criteria, installation instructions (including required preparation and installation procedures), limitations, and colour.

B Submit duplicate samples of full-sized shingles to match finish and profile for each type of roofing shingle to be used at the job.

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

1. ASTM E 108/UL 790 indicating Class A Fire Resistance
2. ASTM D 3161/D 7158 indicating class of Wind Resistance.
3. FM Class Number 4473/UL 2218 indicating Class 4 Impact Resistance when applicable
4. ASTM D 3462/CSA A 123.5-05 indicating product properties
5. State of Florida Approval where applicable

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

E All unused shingles remain property of the owners.

1.05 ENVIRONMENTAL AND PROJECT REQUIREMENTS

A Apply each part of the roofing system only when surfaces are clean and dry.

B Cover walls and other surfaces in the vicinity of hoisting apparatus (when used) with heavy canvas or other suitable protective material. Any damage caused by this contract shall be repaired to match the original materials and appearance at no cost to the owner.

C Conduct operations so as to leave deck exposed for the minimum period of time. Protect the work area as required to prevent water infiltration or environmental damage to building interior.

D All material shall be neatly stored, elevated, and protected from damage due to wetness or freezing.

E Maintain all site equipment in good working order.

F Maintain one copy of manufacturers' application instructions at the project site.

1.06 QUALITY ASSURANCE

A Provide all primary roofing products including shingles, underlayment, and leak barrier by a single manufacturer.

B Installer Qualifications: where required for extended limited warranty coverage, the installer must be approved or otherwise authorized by IKO to install all roofing products to be installed on this project. Work is to be executed only by those skilled to perform it expeditiously and who has been responsible for satisfactory installations similar to that specified during a period of at least the immediate three (3) years.

C Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application for installation of system to be installed.
1. Do not proceed with remaining work until workmanship and pattern are approved by Architect or equivalent.
2. Rework Mock-Up area as required to produce acceptable work.

1.07 REGULATORY REQUIREMENTS

A Provide a roofing system achieving an ASTM E 108 Class A fire classification.
B When applicable, provide a roofing system achieving an **ENERGY STAR** rating. ***ENERGY STAR rated only***
C Ensure that materials and fastening methods meet requirements of jurisdictional authorities. The Installer is to be licensed or otherwise authorized to install roofing in the jurisdiction the work is to be performed in.
D Install all roofing products in accordance with all Federal, Provisional, State and local building codes.
E All work shall be performed in a manner consistent with current OSHA guidelines.

1.08 PRE-INSTALLATION MEETING

A General: For all projects in excess of 250 squares of roofing being installed by a ShieldPro-plus+™ Contractor, a pre-installation meeting is strongly recommended.
** NOTE TO SPECIFIER ** The pre-installation meeting is suggested for all projects over 250 squares total roofing. Delete if not required.
B Timing: The meeting shall take place prior to the start of the roofing installation.
C Topics: The ShieldPro-plus+™ Certified contractor and owners representative shall review all pertinent requirements for the project, including but not limited to, scheduling, weather considerations (see section 1.10 below), project duration, product availability, and requirements for the specified warranty (see section 1.11 below).
D Agenda will include:
1. Installation procedures and manufacturer's recommendations
2. Safety procedures
3. Coordination with installation of other work
4. Availability of roofing materials
5. Preparation and approval of substrate and penetrations through roof
6. Other items related to successful execution of work

1.09 DELIVERY, STORAGE, AND HANDLING

A All materials shall arrive on site with their original containers or wrappings carrying the manufacturer's seals and labels intact. Store materials at least 100 mm (4 inches) off the ground or roof deck and be contained in the manufacturer's unopened and labeled packaging until they are ready for installation. Packing is to have the manufacture's name, product brand name, and standards pertaining thereof.
B Store products in a covered, ventilated area.
C Store bundles on a flat surface. Maximum stacking height shall not exceed IKO's recommendations. Store all rolls on end.

1.10 WEATHER CONDITIONS

A Proceed with work only when existing and forecasted weather conditions will permit work to be performed (see IKO Residential Information Bulletin R-52).
B When application conditions might limit the effectiveness of the sealing strip, such as in cool weather or in areas subject to high winds or blowing dust, shingle adherence should be ensured through manual sealing as described in Section 3.07 D found below.

1.11 WARRANTY SUPPLEMENT *****Choose Warranty Option*****

A Provide manufacturer's supplemental warranty (Iron Clad or SPP Extended) to cover labor and materials in the event of a material defect for the following period after completion of application of shingles:

1. First 15 Years (Limited Lifetime Warranty) for selected products; First 5 Years for 3-Tab/Strip Shingle products
2. Extended Warranty Protection (can only be provided by an IKO ShieldPro-plus+™ Contractor).
3. Upgraded Wind Warranty from 110 to 130 mph (by complying with all manufacturers' conditions and instructions).
4. Warranty Transferability Clause: Make available to the owner, IKO's standard option for transferring warranty to a new owner.
5. Refer to IKO's warranty for adjustments for commercial applications

2.0 PRODUCTS

2.01 MANUFACTURER

A Acceptable Manufacturer: IKO Industries Inc. 235 W. South Tec Drive Kankakee, IL. 60901 Phone:815-936-9600

B Substitutions: Not permitted-*except where noted*

2.02 MATERIALS *****Select All Applicable Products from the table below*****

A Materials shall meet or exceed requirements and recommendations of the Specifications listed in Section 1.03 REFERENCES above.

B Colour: To be selected by owner from the manufacturer's colour range available in that service area.

C All primary roofing products, including shingles, underlayment, and Ice & Dam protection are to be supplied by a single manufacturer

1.	***Asphalt Shingles:***	***IKO Industries Shingles (select from table), colour from Architect's selection. Class "A" fire resistance rating, in conjunction with an approved underlayment.***
2.	***Roof Protection:***	***Roof eave protection shall consist of 1.8-mm Ice & Water protector underlayment such as ArmourGard as manufactured by IKO Industries Ltd., as required by the Local Building Codes and designer.***
3.	***Roof Ventilation:***	***All roof ventilation is to meet building code. Recommend at minimum, Strip vents at soffits and cap vents as instructed from the architectural drawings.***
4.	***Felt Underlayment:***	***1 ply, 15lb non-perforated asphalt impregnated felt conforming to ASTM D 4869 Type II or CSA A123.2 Asphalt Coated Roofing Sheets. Underlayment is mandatory for slopes under 8:12. Synthetic underlayment as approved by IKO is also acceptable.***
		Valley underlayment construction consists of an additional full-width sheet of ASTM D4869, Type I or Type II (No. 15) or ASTM D4869, Type III or Type IV (No. 30) asphalt-saturated underlayment felt or polymer-modified bitumen underlayment, base sheet, or water and ice-dam protection membrane

5.	***Eavestroughs and Downpipes:***	***To meet building code. Recommend pre-formed 100 mm (4") wide eavestrough and rectangular downpipes made of 28 gauge pre-finished. (colour to Architect's choice)***
6.	***Sheet Metal and Roof Flashings:***	***All exposed metal flashing to meet building code***

	Crowne Slate	ArmourShake	Royal Estate	Grandeur	Cambridge	Marathon Ultra	Marathon 25
Super-heavyweight	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shingle Type	Architectural slate or tile	Dimensional thickness, random-cut appearance	Architectural	Architectural	Architectural	3-tab	3-tab
SBS modified	Yes			Yes			
Exposure (inches)	10”	5 ½”	5 5/8”	5 7/8”	5 7/8”	5 5/8”	5 5/8”
Meets D 3462	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Meets D 3018	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wind Resistance Rating (see table below for Wind Classes)							
D 3161 (Wind)	Class F	Class F	Class F	Class F	Class F	Class F	Class F
D 7158 (Wind)	Class H	Class H	Class H	Class H	Class H	Class H	Class H
Meets UL 997 (Wind)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fire Resistance Rating UL 790 (Fire) ASTM E 108 (Fire)	Class “A”	Class “A”	Class “A”	Class “A”	Class “A”	Class “A”	Class “A”
FM Class No. 4473 UL 2218 (Impact)	Class 4	Class 4		Class 4			
CSA A 123.5	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IKO Iron Clad Protection Period	15 Year	15 Year	15 Year	15 Year	15 Year	5 Year	5 Year
Limited 10-Year Algae Resistant Warranty	Available	Available	Available	Available	Available for AR	5-year	Available for AR (5- Year)
Limited wind warranty coverage up to:	110 mph	110 mph	110 mph	110 mph	110 mph	60 mph	60 mph
High Wind warranty upgrade to 130 mph	Available	Available	Available	Available	Available		
Meets IRC Wind Code Requirements	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ICC ER – 5796 Listing					Listed		Listed
Energy Star Rating					Super White Cambridge AR	Super White Marathon Ultra AR	

(Visit our website at www.iko.com or See IKO Residential Information Bulletin R-34)

Wind Speed Table

ASTM D 3161	ASTM D 7158	(Imperial)	(Metric)
Class A		60 mph	97 kph
Class D	Class D	90 mph	145 kmp
Class F	--	110 mph	177 kph

--	Class G	120 mph	193 kph
--	Class H	150 mph	242 kph

To ensure coverage under the High Wind Application Limited Wind Resistance Warranty;

- *the shingles must be installed with additional nails , and*
- *the shingles must have an opportunity to seal or be manually sealed as described below in Section 2.07; D, and*
- *Starter strip shingles must be used at all eaves and rakes.*

2.03 HIP AND RIDGE SHINGLES *****Choose One*****

A **Hip & Ridge 12 Ridge Cap Shingles** by IKO. A high profile self-sealing hip and ridge cap shingle matching the colour of selected roof shingle. Each bundle covers approximately 33 lineal feet

B **Ultra HP™ Hip Profile Ridge Cap Shingles** by IKO. A high profile self-sealing hip and ridge cap shingle matching the colour of selected roof shingle. Each bundle covers approximately 20 lineal feet.

C **Marathon Series 3Tab** by IKO for use as a field fabricated ridge cap shingle and is to be from shingles matching the colour of the selected roof shingle. Each bundle covers approximately 33 lineal feet.

2.04 ICE & WATER PROTECTOR *****Choose One*****

A **GoldShield** by IKO: Self-adhering, self-sealing, bituminous sheet with advanced flexibility, slip resistant surface meeting ASTM D 1970. Each roll contains approx. 200 sq. ft. (36" by 66.7'). Each roll is backed by a silicone treated release film for easier installation.

B **ArmourGard** by IKO: Self-adhering, self-sealing, bituminous sheet with advanced flexibility and a slip-resistant surface meeting ASTM D 1970. Each roll contains approx. 195 sq. ft. (36" X 65'). Each roll is backed by a silicone treated release film for easier installation.

C **StormShield®** by IKO: Self-adhering, self-sealing, bituminous sheet surfaced with a sand-fines surface. Each roll contains approx. 200 sq ft., (36" X 66.7'). Each roll is backed by a silicone treated release film for easier installation.

2.05 SHINGLE UNDERLAYMENT

A **RoofGard-SB** Synthetic Underlayment.

B **RoofGard-Cool Grey** Synthetic Underlayment.

C Water repellent, breather type cellulose fiber building paper meeting or exceeding the requirements of ASTM D 226 Type I / CSA 123.3-M #15 Roofing Underlayment (See IKO Residential Information Bulletin R-24). ***Generic***

D Water repellent breather type sheathing cellulose fiber building paper meeting or exceeding the requirements of ASTM D 226 Type II and/or CAN 2-51.32 #30 Roofing Underlayment. ***Generic***

E Type I—#8 Underlayment: Water repellent breather type cellulose fiber building paper meeting or exceeding the requirements of ASTM D 4869 Type I. ***Generic***

F Product: Type II—#13 Underlayment: Water repellent breather type cellulose fiber building paper meeting or exceeding the requirements of ASTM D 4869 Type II. (See IKO Residential Information Bulletin R-32) ***Generic***

2.06 ROOFING CEMENT

A Asphalt Plastic Roofing Cement meeting the requirements of ASTM D 4586, Type I or II or CAN/CGSB-37.5.

B Lap Cement meeting the requirements of D 3019, Non-Asbestos-Fibered, Type III or CAN/CGSB-37.4.

C ASTM D2822, Standard Specification for Asphalt Roof Cement.

2.07 ATTIC VENTILATION

*****Choose One - Ridge vent must have intake from soffits or passive ventilation*****

A Ridge ventilator designed to allow the passage of air out of attics. For use in conjunction with eave/ soffit intake ventilation products. All roof ventilation is to be installed as to meet building codes and as instructed from the architectural drawings.

B Passive Ventilation (roof louvers or equal), is to be used only as additional exhaust ventilation, or when ridge vents cannot be installed due to architecture. Install in accordance with local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.

C Power Ventilation (power ventilation fans or equal), to be used only when ridge vents cannot be installed due to architecture. Install in accordance with local building codes.

When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.

2.08 NAILS/FASTNENERS

A Standard round wire, zinc-coated steel or aluminum complying with CSB B 111 and meeting local building codes.
B ASTM F 1667 Specification for Driven Fasteners, Nails, Spikes and Staples and meeting local building codes.

2.09 METAL FLASHING *****Choose One*****

A Hot-dip galvanized steel sheet, complying with ASTM A 653/A 653M and meeting local building codes.
B Copper sheet, complying with ASTM B 370 and meeting local building codes
C Aluminum sheet, complying with ASTM B 209 and meeting local building codes.

3.0 EXECUTION

3.01 EXAMINATION

A Do not begin installation until the roof deck has been properly prepared.
B If roof deck preparation is the responsibility of another installer, notify the architect or building owner of unsatisfactory preparation before proceeding.
C The roof deck must be smooth, firm, dry, and securely nailed. Plywood must be exterior grade, conforming to building code requirements. Half-inch plywood is recommended for best deck performance.
D The installation of asphalt shingles on dimensional lumber (including shiplap/board decks) is not recommended as it may potentially cause buckling problems. Buckling is not covered by our Limited Material Warranty.
E Roof slope should be 1:3 or steeper. For slopes 1:3 to 1:6, see special underlayment requirements outlined below. Follow the more stringent of the CAN3 A 123.52 Asphalt Shingle Application on Roof Slopes 1:6 to Less than 1:3 instructions or those of the local building code.
F Never apply asphalt shingles to roof slopes less than 2:12.
G REROOFING: Split and re-nail curled or buckled shingles, replace any missing shingles, remove loose or protruding nails, and sweep surface clean.

3.02 APPLICATION

H Follow manufacturer's application instructions in conjunction with reference standards found in Section 1.03 REFERENCES and in accordance with local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.
I Install asphalt shingles on roof slopes in accordance with CAN3 A 123.51-M85 and as per manufacture instructions. Follow whichever method is the more stringent.
J Install ice dam protection underlayment (IKO product as recommended in Section 2.04 ICE & WATER PROTECTOR) directly on plywood at all eaves and roof edges as well as at all penetrations, abutments, and to vertical walls as instructed. Also apply 1-ply of underlayment over the entire deck surface, except where Ice & Water protector membrane has been installed.
K As not every situation can be covered in this summary sheet, IKO Industries Ltd. supports the use of application details as specified by ARMA,NRCA , and CRCA.

3.03 PREPARATION *****Tear-Off Only*****

A Remove all existing roofing down to the roof deck.
B Verify that the deck is dry, sound, clean, and smooth. It shall be free of any depressions, waves, and/or projections. Cover with sheet metal, all holes over 25 mm (1 inch) in diameter, cracks over 12 mm (1/2 inch) in width, loose knots, and excessively resinous areas.
C Replace damaged deck with new materials.
D Clean deck surfaces thoroughly prior to installation of IKO's Ice & Water protector membranes used for eaves protection and before installation of underlayment.

3.04 PREPARATION *****New Construction*****

A Clean deck surfaces thoroughly prior to installation of IKO's Ice & Water protector membranes used for eaves protection and before installation of underlayment.
B At areas that receive Ice & Water protector membrane, fill knotholes and cracks with latex filler.
C Install crickets on any chimney wider than 600 mm (24 inches), on the upslope side of all chimneys and penetrations, on all roofs steeper than 6:12, and where required by code.

3.05 PREPARATION *****Recover Only*****

A Verify that the deck is structurally sound and free of deteriorated decking. All deteriorated decking shall be removed and replaced with new materials.
B Verify that the existing shingles are dry, sound, clean, and smooth. All curled, buckled, or loose tabs shall be nailed down or removed.
C Clean deck surfaces thoroughly prior to installation of IKO's Ice & Water protector membranes used for eaves protection and before installation of underlayment.

3.06 INSTALLATION OF UNDERLAYMENTS
*****Required for New/Tearoff – Optional for Recover *****

A General:
1. Underlayment are to meet the requirements of one of the following:
   a ASTM D 226 / D 226M - 09
   b ASTM D 4869 / D 4869M - 05(2011)
   c CSA A123.2
   d CSA A 123.3-05 (R2010)
   e CAN/CSA A 123.5-05 (R2010)
   f CAN2 51.32
2. Install using methods recommended by IKO and in accordance with local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.
3. Install an ice dam protection underlayment of self-adhesive membrane (IKO's Ice & Water protector membrane) directly on to the plywood at all eaves and roof edges as well as at all penetrations, abutments, and to vertical walls. Add one ply of underlayment over the entire deck surface, except where IKO's Ice & Water protector membrane has been installed.

B Eaves:
1. Install eave protection using methods recommended by IKO and in accordance with local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.
2. Install eaves edge metal flashing tight with fascia boards; lap joints 50 mm (2 inches) and seal with plastic cement; nail at the top of the flange.
3. Base flashing should be in place before shingles are applied. Cap flashings of sheet metal and base flashing of metal or mineral surfaced roofing should be used at chimneys, skylights, vents, walls and other vertical surfaces and sealed with asphalt plastic cement. Flashing shall conform to the requirements of applicable building codes and good roofing practice.
4. Overhang eaves with underlayment by a nominal 6 mm (1/4 inch) minimum and extending up the roof at least 600 mm (24 inches) beyond the interior wall line.

5. In colder climates where required by codes, and on all roofs with slopes between 2:12 and 4:12 (low slopes), install eaves protection using an IKO's Ice & Water protector membrane product, up the slope from eaves edge a full 900 mm (36 inches) or to at least 600 mm (24 inches) beyond the interior "warm wall". Lap ends 150 mm (6 inches) and bond. IKO's ArmourGard, StormShield, or GoldShield Ice & Water Protectors are recommended for best performance and are to be applied according to instructions printed on each box.
6. Alternately, use 2 layers of asphalt saturated felt (or equivalent), the first sheet overlapping the eave protection by 480 mm (19 inches), followed by full 900 mm (36 inches) widths overlapping each preceding course by 480 mm (19 inches). (NOTE: IF THESE PROCEDURES ARE FOLLOWED, SHINGLES APPLIED TO SLOPES 3:12 TO 4:12 WILL BE WARRANTED FOR THE FULL WARRANTY TERM FOR THE SHINGLE. SHINGLES ON SLOPES 2:12 TO 3:12 WILL BE WARRANTED FOR 12 YEARS – see Limited Warranty for full details.) For areas where the roof slope is 150 mm per 300 mm down to 100 mm per 300 mm (6 inches per foot down to 4 inches per foot), it is strongly recommended to cover the remainder of the deck with one ply asphalt saturated felt (or equivalent) laid parallel to the eaves, with 50 mm (2 inches) horizontal laps and 100 mm (4 inches) end laps. Apply metal drip edges on top of any underlay along rake edges and directly to the deck along eaves.

C Valleys:

1. Install IKO eaves protection at least 900 mm (36 inches) wide and centered on the valley. Lap ends 150 mm (6 inches) and seal.
2. Where valleys are indicated to be "open valleys", install metal flashing over IKO's Ice & Water protector membrane before roof deck underlayment is installed; DO NOT nail through the flashing. Secure the flashing by nailing at 450 mm (18 inches) on center just beyond edge of flashing so that nail heads hold down the edge of the flashing.
3. Instructions on additional details for valley installations can be found in the ARMA's Residential Asphalt Roofing Manual and/or NRCA's Roofing and Waterproofing Manual.

D Roof Deck:

1. Install one layer of roof deck underlayment over the entire area not protected by IKO's Ice & Water protector membrane. Install sheets horizontally so water sheds.
2. On roofs sloped at more 4:12, lap horizontal edges at least 50 mm (2 inches) and at least 50 mm (2 inches) over eaves protection membrane.
3. On roofs sloped between 2:12 and 4:12, lap horizontal edges at least 480 mm (19 inches) and at least 480 mm (19 inches) over eaves protection membrane.
4. Lap ends at least 100 mm (4 inches). Stagger end laps of each layer at least 900 mm (36 inches).
5. Lap underlayment over valley protection at least 150 mm (6 inches).

E Penetrations:

1. Vent pipes: Install a 600 mm (24 inches) square piece of IKO's Ice & Water protector membrane lapping over roof deck underlayment; seal tightly to pipe.
2. Vertical walls: Install Ice & Water protector membrane for eaves protection extending at least 150 mm (6 inches) up the wall and 300 mm (12 inches) on to the roof surface. Lap the Ice & Water protector membrane over the roof deck underlayment. Sheet metal flashing along the slopes of roof shall be stepped with a minimum of 75 mm (3 inches) head lap in both lower flashing and counter flashing. Where roof slopes downward from wall, flashing shall extend over shingles. Where a roof slopes upward from the wall, flashing shall extend up the slope under the shingles to a point equal in height of 400 mm (15 ¾ inches) to the flashing on masonry. Counter flashing shall be embedded approximately 25 mm (1 inch) into the wall with turn back water stop
3. Skylights and roof hatches: Install IKO's Ice & Water protector membrane from under the built-in counterflashing and 300 mm (12 inches) on to the roof surface, lapping over roof deck underlayment.
4. Chimneys: Intersection of shingle roofs and masonry walls or chimneys shall be protected using 24 gauge (or better) galvanized sheet metal to extend not less than 150

mm (6 inches) up the wall and 300 mm (12 inches) on to the roof surface. Lap the Ice & Water protector membrane over the roof deck underlayment.

5. Rake Edges: Install metal edge flashing over the IKO Ice & Water protector membrane and roof deck underlayment; set tight to rake boards; lap joints at least 50 mm (2 inches) and seal with plastic cement; secure with nails.
6. Instructions on additional details for sealing Penetrations can be found in the ARMA's Residential Asphalt Roofing Manual and/or NRCA's Roofing and Waterproofing Manual

3.07 INSTALLATION OF SHINGLES

A General:

1. Install in accordance with IKO's instructions and local building codes in conjunction with reference standard in Section 1.3 REFERENCES.
2. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.
3. Minimize breakage of shingles in cold weather (below 4°C or 40°F) by avoiding dropping bundles on edge or by "breaking bundles" over the roof ridge or other bundles. Separating shingles carefully, taking extra precautions in colder temperatures.
4. Handle shingles carefully in hot weather to avoid scuffing the surfacing or damaging the shingle edges.
5. Install the asphalt shingles on roof slopes in accordance with CAN3 A 123.51-M85

B Placement and Nailing: *****Tear-Off or New Construction*****

1. Use galvanized (zinc coated) roofing nails, 11 or 12 gauge, with at least 10 mm (3/8 inches) diameter heads, long enough to penetrate through plywood or 20 mm (¾ inches) into boards.
2. Use 4, 5, or 6 nails per shingle placed in the nail line per IKO's instructions and local codes. Placement of nails varies based on the type of shingle specified, roof slope, and other environmental considerations. Consult the manufacturer's application instructions for the specified shingle for details.
3. Drive nails straight so that nail head is flush with, but not cutting into shingle surface. Do not overdrive or under drive the nails.
4. Shingle offset varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.

C Placement and Nailing: *****Re-cover*****

1. Beginning with the starter strip, trim shingles so that they "nest" within the shingle located beneath it. This procedure will yield a first course that is typically 75 mm to 100 mm (3 inches to 4 inches) wide rather than a fully exposed shingle.
2. Laterally, offset the new shingles from the existing keyways, to avoid waves or depressions caused by excessive dips in the roofing materials.
3. Using the bottom of the tab on existing shingles, align subsequent courses.
4. Secure with 4, 5, or 6 nails per shingle placed in the nail line per IKO's instructions and local codes. Placement of nails varies based on the type of shingle specified, roof slope, and other environmental considerations. Consult the manufacturer's application instructions for the specified shingle for details.
5. Nails must be driven flush with the shingle surface. Do not overdrive or underdrive the nails.
6. Shingle offset varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details

D Nailing on Steep Slopes/High Wind Areas: (see IKO Residential Information Bulletin R-64)

1. For high wind areas, or on slopes of 21:12 (60°) or more, use more nails per shingle (consult specific shingle instructions and building code for exact quantity). Ensure that no nail is within 50 mm (2 inches) of a joint/cutout of the underlying shingle.
2. Seal down each shingle at time of application with three 25 mm (1 inch) diameter (approx. size and thickness of a quarter) spots of asphalt plastic cement placed under

the shingle 50 mm (2 inches) above the bottom edge and equally spaced along the shingle. Apply plastic cement in moderation since excessive amounts may cause blistering. CAUTION: Shingles should seal to the underlying course when the factory applied asphalt sealant is sufficiently warmed by the heat of direct sunlight.

3. When application conditions might limit the effectiveness of the sealing strip, such as in cool weather or in areas subject to high winds or blowing dust, shingle adherence should be ensured through manual sealing as described above.

E Valleys (see IKO Residential Information Bulletin R-49)

*****Choose a Method*****

1. Install valleys using the "open metal valley" method (Recommended):
   a Snap diverging chalk lines on the metal flashing, starting at 75 mm (3 inches) each side of top of valley, spreading at 3 mm per 300 mm (1/8 inch per foot) to the eaves.
   b Run shingles to chalk line.
   c Trim last shingle in each course to match the chalk line; do not trim shingles to less than 300 mm (12 inches) wide.
   d Cut a 50 mm (2 inches) triangle off the top corner to direct water into the valley and embed the valley end of each shingle into a 75 mm (3 inches) band of asphalt plastic cement.
   e Apply a 50 mm (2 inches) wide strip of plastic cement under ends of shingles, sealing them to the metal flashing.

2. Install valleys using the "closed cut valley" method:
   a Run the first course of shingles from the higher roof slope across the valley at least 300 mm (12 inches).
   b Run succeeding courses of shingles from the lower roof slope across the valley at least 300 mm (12 inches) and nail not closer than 150 mm (6 inches) to the center of valley.
   c Run shingles from the upper roof slope into the valley and trim 50 mm (2 inches) from the center line.

3. Install valleys using "woven valley" method: *****Strip Shingles Only*****
   a Run shingles from both roof slopes at least 300 mm (12 inches) across center of valley, lapping alternate sides in a woven pattern.
   b DO NOT nail within 150 mm (6 inches) from the valley center line.
   c Cut a 50 mm (2 inches) triangle off the top corner to direct water into the valley and embed the valley end of each shingle into a 75 mm (3 inches) band of asphalt plastic cement.
4. Instructions on additional details for valley installations can be found in the ARMA's Residential Asphalt Roofing Manual and/or NRCA's Roofing and Waterproofing Manual.

F Penetrations

1. All penetrations are to be flashed according to IKO, Asphalt Roofing Manufacturers Association (ARMA), Canadian Asphalt Shingle Manufacturers' Association (CASMA), Canadian Roofing Contractors Association (CRCA), and/or National Roofing Contractors Association (NRCA) guidelines as to meet local building codes.

3.08 VENTILATION

A General

1. Ventilation must meet or exceed current F.H.A., H.U.D. and local code requirements.
2. Instructions on additional details for the installation of proper ventilation can be found in the ARMA's Residential Asphalt Roofing Manual and/or NRCA's Roofing and Waterproofing Manual

B Ridge / Soffit ventilation

1. Cut continuous vent slots through the sheathing, stopping 150 mm (6 inches) from each end of the ridge.
2. On roofs without a ridge board, make a slot 50 mm (2 inches) wide, centered on the ridge.
3. On roofs with a ridge board, make two slots 45 mm (1-3/4 inches) wide, one on each side.
4. Install ridge vent material along the full length of the ridge, including uncut areas.
5. Butt ends of ridge vent material and join using roofing cement.
6. Install eaves vents in sufficient quantity to equal or exceed the ridge vent area.

3.09 PROTECTION

A Protect installed products from foot traffic until completion of the project.

B Any roof areas that are not completed by the end of the workday are to be protected from moisture and contaminants.

END OF SECTION