

The **Expert** Application Guide



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FOREWORD

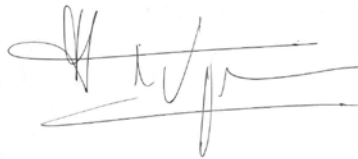
Satisfying our customers with a recognized top quality roof shingle is our priority but is not sufficient. The final aim of our IKO shingles is their perfect application that will guarantee their expected life cycle and ensure the satisfaction of the owner of the building.

This is the reason why we, at IKO, have taken great care in compiling The Expert Application Guide. It details the application rules and techniques based on more than 60 years experience and the latest research and technologies. It is important that when implementing IKO shingles you should strictly follow these rules and methods. It is the only way for us to back up our guarantee system and to help offering a beautiful and waterproof roof during many years.

Werner Vanderstappen
Ing. Shingles Application Engineer

A handwritten signature in black ink, appearing to read "W. Vanderstappen", written in a cursive style.

Michel Petitjean
General Manager

A handwritten signature in black ink, appearing to read "M. Petitjean", written in a cursive style.

INTRODUCTION

We are pleased to present you a reference book about shingles and their application techniques that have a history of successful roof performance. It does not, however, contain the only possible method with which one may obtain satisfactory roof performance.

The manual is used for a variety of purposes but its primary purpose is to provide practical information to those who sell, install and advise our products.



1. SHINGLES PRODUCT INFORMATION

Shingles are one of the most common roofing materials used in the world today. They are manufactured as strip shingles (one-layer) or laminated shingles (multi-layer) in a wide variety of weights, shapes and colours.

Strip shingles may have multiple cut-outs along the long dimension. Cut-outs separate the shingle's tabs, which are exposed to the weather and give the roof the appearance of being comprised of a larger number of individual units.

The shingles are self-adhesive or have self-seal dots of a thermoplastic material, which is activated by the heat of the sun when the shingles are on the roof. This will bond each shingle securely to the one below for wind resistance.

Weather resistant mineral granules applied to the top surface of shingles during the manufacturing process not only makes possible the widest range of colours available in roofing materials, but also protects the shingles from damaging effects of UV.

2. ADVANTAGES OF SHINGLES

Weather resistance

Shingles have demonstrated that they resist sunlight, heat, cold, water and ice.

Fire resistance

Our shingles have a very good fire resistance. They have been tested and their reaction to fire is class E, external fire performance is Broof (T1).

Wind resistance

The wind test, done on 23/09/2005 at the 'von Karman Institute for fluid Dynamics' in Brussels (Belgium), shows that our shingles have an extremely good wind resistance - up to 220 km/h. They were tested according to the ASTM norm 3161 – 17% pitch.

Ease of application

Generally, IKO shingles are considered to be the easiest of all standard roofing materials to apply. In addition, the IKO application guide and application DVD will be of help to anyone who wants to shingle a roof.

Adaptability

IKO shingles demonstrate their benefits on complicated roofs where the ease of application and the low wastage make them the ideal roofing material. Their flexibility and adaptability allow designers to use their creativity and imagination without limits.

Aesthetics

Our IKO shingles are available in a wide variety of colours and shapes, which will match the style of a wide range of buildings and blend in with their surroundings.

Style suitability

IKO shingles are suitable with most architectural styles, be it contemporary, modern or traditional.

Low maintenance

Properly applied IKO shingles require little or no regular maintenance and are easily repaired if damaged.

3. A FEW ESSENTIAL MUSTS

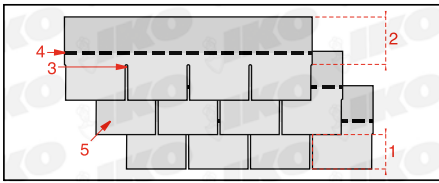
- Install the shingles properly. IKO shingles should never be installed directly over insulation (except for IKO Monarch® APP shingles); flow-through ventilation air space must be provided between the top of the insulation and the nailable deck (except concrete roof decks).
- Different production dates/codes should not be mixed on the same roof surface.
- Colour shading is inherent to IKO shingles and is not a defect. In order to minimize shading, IKO shingles should be picked and mixed randomly from different bundles and placed across and diagonally up the roof.
- Do not rack the IKO shingles up the roof!
- Do not remove the tape from the back of the IKO shingles. It is for packaging purposes only, not for sealing on the roof.
- The release film on the back of IKO Shield® shingles must be removed during application!
- The factory applied sealing strip will become effective when exposed to the heat of the sun. Hand sealing is necessary when applying in cold weather, on a steep pitch or in high wind areas.
- Bend bundle of IKO shingles before opening for easier separation.
- Caution: During hot weather avoid stepping on shingles as this could cause damage (eg footprints). Roof brackets can help to prevent this.
- Storage: Never stack higher than 17 bundles. Protect from direct sun light. Store warm before applying in cold weather.

4. MATERIALS SPECIFICATIONS

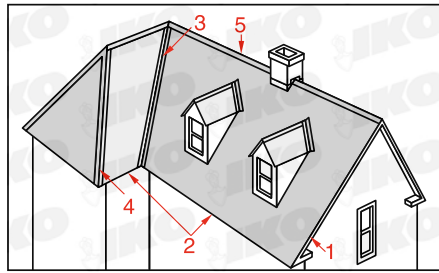
- **Shingles:**
IKO's selection of ± 60 different types and colours of fibreglass based oxidised shingles and APP modified bitumen slates.
- **Underlays:**
IKO's selection is given below (Use as required - see instructions)
 - **IKO Armourbase® PRO:** a 0,6 mm lightweight bitumen polyester based underlay covered with a polypropylene film on both sides.
 - **IKO Armourbase® 15:** a 1,5 mm glassfibre based oxidised bitumen membrane.
 - **IKO Armourbase Premium +:** a 1,0 mm modified self-adhesive membrane.
- **Valley Coverings:** (for Open Valley Method)
 - **IKO Armourvalley®:** a 4,5 mm APP modified membrane in matching shingle colours, or metal flashing.
- **Flashings:**
 - Metal drip edges for the rakes.
 - Metal drip edges for the eaves.
- **Fasteners:**
Corrosion resistant nails 25 mm in length and a head diameter of 10 mm. The shaft should be 3 mm in diameter and barbed.
Cambridge HD IKO shingles and nailing of hips and ridges require nails 30 mm in length.
- **Bituminous mastic:**
 - **IKO Shingle Stick** or an IKO approved bituminous mastic.
- **Sanitary vent:**
 - **IKO Armourvent® Sanitary:** a vent used for sanitary ventilation or soil pipe ventilation
- **Vents:**
Sufficient vents to satisfy minimum venting requirements for the roof deck.
 - **IKO Armourvent® Multi**
 - **IKO Armourvent® Multi Plus**
 - **IKO Armourvent® Ridge**
 - **IKO Armourvent® Ridge Plus**
 - **IKO Armourvent® Standard**
 - **IKO Armourvent® Special**

5. TERMS

Common terms used when applying shingles to roofs are given below and illustrated in the pictures.



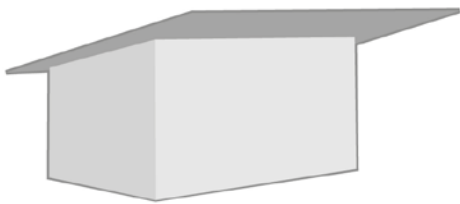
1. Exposure • 2. Headlap • 3. Cut-outs
4. Self Sealing Strip • 5. Tabs



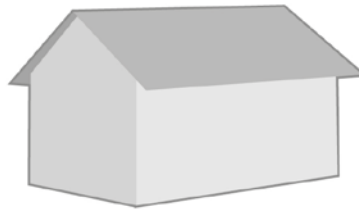
1. Rakes • 2. Eaves • 3. Valleys
4. Hips • 5. Ridges

6. MOST COMMON ROOF TYPES

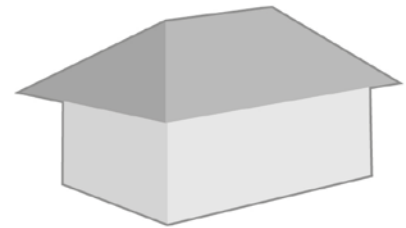
The most common roof types are shed roof, gable roof, pyramid roof, gambrel roof and hip roof.



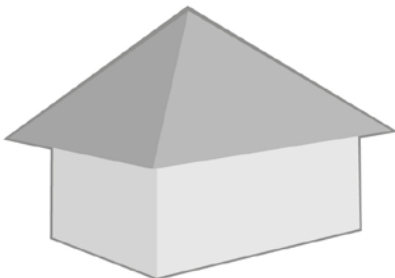
Shed roof



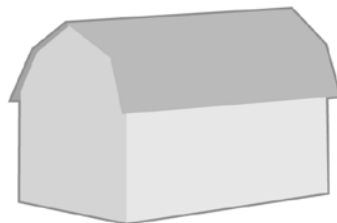
Gable roof



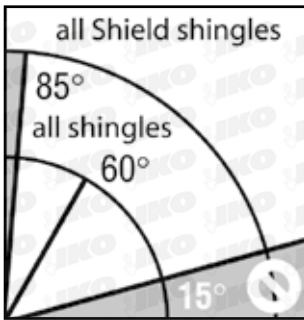
Hip roof



Pyramid roof



Gambrel roof



7. WHICH SHINGLES ON WHICH ROOF PITCH

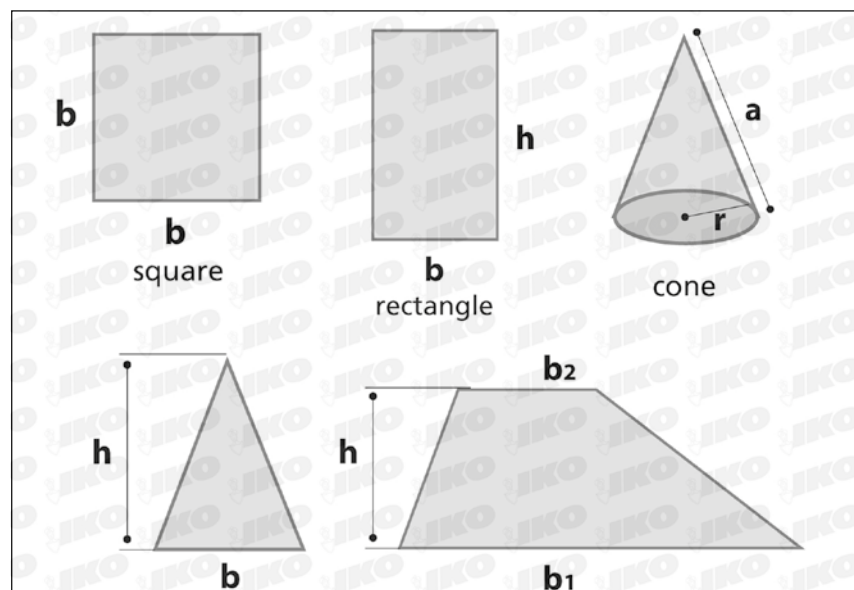
Shingles can be applied on roof pitches from 15° to 90°. On all pitches, IKO recommends that an underlay must be used underneath the shingles. On a vertical wall (i.e. from 85° up to 90°), IKO recommends the use of “Shield®” shingles (i.e. self-adhesive).

8. MEASURING; ESTIMATING; CALCULATING

The most accurate method to measure a roof is from up on the roof. These measurements should be taken by roofing professionals.

Roofs come in a variety of shapes and styles but virtually every kind of roof is made out of plane surfaces that can be subdivided into simple geometric shapes: squares, rectangles, trapezoids and triangles. Thus, roofing area calculations simplify to area calculations for these basic shapes.

8.1. Area calculations



Area of a square = base length (b) x base length (b) = b^2

Area of a rectangle = base length (b) x height (h) = $b \times h$

Area of a triangle = base length (b) x height (h)/2 = $\frac{b \times h}{2}$

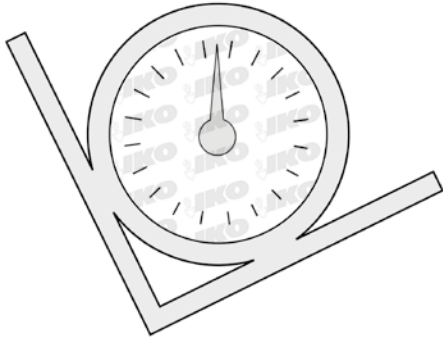
Area of a trapezoid = (base length (b1) + base length (b2)) x height (h)/2 = $\frac{(b1+b2) \times h}{2}$

Area of a cone = $\pi \times$ radius of base (r) x length of pitch to peak (a) = $\pi \times r \times a$

IKO advises that an extra 10% material is ordered to take into account the amount of shingles required for special roof details and wastage from cutting, which were not included in the calculation, as given above.

8.2. Determining the pitch of a roof

The roof's pitch can be measured with an IKO roof pitch meter.



8.3. Additional material estimates

To complete the estimate, the required quantity of starter strips, hips and ridges, valleys, ventilation, nails, bitumious mastic and underlays must be determined. This depends on the length of the eaves, the hips and ridges, valleys and roof area.

Quantities

8.3.1. Nails

The number of nails required per m² roof area and the roof coverage per bundle of IKO shingles on roof pitches from 15° - 85° is given beside.

8.3.1.1. IKO Shingles on plane roof surfaces, without any details.

Shingle type Number of shingles/ bundle	Roof pitch	Number of nails/m ²	Roof coverage/ bundle
Superglass®-3Tab (21sh/bdl)	15° - 25°	32	2,62 m ²
	25° - 60°	28	3,00 m ²
	60° - 85°	42	3,00 m ²
Superglass®-Biber (21 sh/bdl)	15° - 25°	32	2,62 m ²
	25° - 60°	28	3,00 m ²
	60° - 85°	42	3,00 m ²
Armourglass® (21sh/bdl)	15° - 25°	40	2,62 m ²
	25° - 60°	35	3,00 m ²
	60° - 85°	56	3,00 m ²
Victorian® (21sh/bdl)	15° - 25°	32	2,62 m ²
	25° - 60°	28	3,00 m ²
	60° - 85°	42	3,00 m ²
Diamant® (27 sh/bdl)	15° - 25°	41	2,62 m ²
	25° - 60°	36	3,00 m ²
	60° - 85°	54	3,00 m ²
Cambridge HD (20 sh/bdl)	15° - 60°	28	3,10 m ²
	60° - 85°	42	3,10 m ²
ArmourShield® (22 sh/bdl)	15° - 60°	29	3,00 m ²
	60° - 90°	44	3,00 m ²
BiberShield® (19 sh/bdl)	15° - 60°	30	2,72 m ²
	60° - 90°	46	2,72 m ²
DiamantShield® (22 sh/bdl)	15° - 60°	32	2,46 m ²
	60° - 90°	48	2,46 m ²
Monarch® (18 sh/bdl)	15° - 25°	40	2,25 m ²
	25° - 60°	35	2,58 m ²
	60° - 85°	56	2,58 m ²
Monarch®-Diamant (22 sh/bdl)	15° - 25°	41	2,13 m ²
	25° - 60°	30	2,46 m ²
	60° - 85°	44	2,46 m ²

sh = a shingle sheet • bdl = a bundle

Technical data of nails to be used (approximate figures):

Length: 25 mm

Shank diameter: 3 mm

Head diameter: 10 mm

Weight: 1,79 g/nail

1 kg = 560 nails

Available quantities: 10 kg and 23 kg

8.3.1.2. Number of nails required for coverage of roof hips and ridges

Shingle type	Number of nails/linear metre
Superglass®-3 Tab • Marathon Ultra®	15
Armourglass®	15
Monarch®	15
Superglass®-Biber	see Superglass®-3 Tab
Victorian® • BiberShield®	see Armourglass®
Diamant® • Monarch® Diamant • DiamantShield®	18
ArmourShield®	13
Cambridge HD	see Marathon Ultra®

sh = a shingle sheet • *bdl* = a bundle

Approximate technical data of the nails:

Length: 30 mm

Thickness of the nail wire: 3 mm

Nail head: approximately 10 mm

Weight: 2,26 gram/nail

1 kg: 442 nails

Note:

When using **Superglass®-Biber shingles**, Superglass®-3 Tab shingles should be used for hip and ridge coverage.

When using **Victorian®-Biber or BiberShield® shingles**, Armourglass® shingles should be used for hip and ridge coverage.

When using **Cambridge HD shingles**, Marathon Ultra® 3-Tab shingles should be used.

8.3.2. Bitumious mastic

Bitumious mastic® should be used:

- On roof pitches between 60° - 85°
- In conditions which might not allow the self seal dots to be effective (eg at low temperatures, in shaded areas of the roof or when there is no direct sun rays on the applied shingles)
- On roof pitches located in windy areas (e.g. in exposed hilly or mountainous regions, in coastal areas, on high buildings)

The amount of bitumious mastic required for different shingle types is given below for roof pitches between 15° - 90°. It does not include roof areas with special details.

Shingle type	Roof area glued/tube Bitumious mastic
Superglass®-3 Tab	8 m ²
Armourglass®	6 m ²
Monarch®	6 m ²
Victorian® • Superglass®-Biber	7 m ²
Diamant® • Monarch® Diamant	12 m ²
ArmourShield® • DiamantShield® • BiberShield®	Only in cold weather conditions (< 10° C) 12 m ²
Cambridge HD	17 m ²

One dot of cold glue: approximately 1,2 g

Technical data of the bituminous mastic recommended for use
(approximate figures):

One dot of mastic weighs: 1,2 g (a dot with a diameter of 2 cm)

Weight of tube of mastic: 400 g

Weight of can of mastic: 5000 g

Note:

The above calculations do not include any details.

Add, on roof pitches 15° - 25°, 10 % minimum to the calculated requirement for cutting losses.

8.3.3. Calculation for shingle requirement according to roof pitch

Table is based on IKO rules. Local regulations must always be followed.

Shingle Type	Roof pitch	Exposure	Roof coverage/bundle	Shingle weight Kg/m ²
Superglass®	15° - 25°	12,5 cm	2,62 m ²	11,0
	26° - 85°	14,3 cm	3,00 m ²	9,6
Superglass®-Biber	15° - 25°	12,5 cm	2,63 m ²	10,5
	26° - 85°	14,3 cm	3,00 m ²	9,2
Armourglass®	15° - 25°	12,5 cm	2,62 m ²	12,5
	26° - 85°	14,3 cm	3,00 m ²	10,9
Victorian®	15° - 25°	12,5 cm	2,62 m ²	12,0
	26° - 85°	14,3 cm	3,00 m ²	10,5
Diamant®	15° - 25°	9,7 cm	2,62 m ²	12,0
	26° - 85°	11,2 cm	3,00 m ²	10,5
Cambridge HD	15° - 85°	15,0 cm	3,10 m ²	12,0
ArmourShield®	15° - 90°	13,4 cm	3,00 m ²	9,2
BiberShield®	15° - 90°	14,3 cm	2,72 m ²	11,0
DiamantShield®	15° - 90°	11,2 cm	2,46 m ²	11,2
Monarch®	15° - 25°	12,5 cm	2,25 m ²	13,5
	26° - 85°	14,3 cm	2,58 m ²	12,4
Monarch – Diamant®	15° - 25°	9,7 cm	2,13 m ²	13,5
	26° - 85°	11,2 cm	2,46 m ²	12,0

Example of calculation to determine the amount of shingles (i.e. bundles) required:

- **Shingle type: Armourglass®**
 Roof pitch: 32°
 Roof surface: 240 m²
 Calculation: For roof pitch: 26° - 85°, roof coverage/bundle = 3,00 m²
 For roof area of 240 m², shingles requirement = 240/3,00 = 80 bundles
- **Shingle type: Diamant®**
 Roof pitch: 20°
 Roof surface: 365 m²
 Calculation: For roof pitch: 15° - 25°, roof coverage/bundle = 2,62 m²
 For roof area of 365 m², shingles requirement = 365/2,62 = 140 bundles

Note:

The above calculations do not include any details.
 Add 10% minimum to the calculated requirement for cutting losses.

8.3.4. Calculations for hip and ridge shingles and starterstrip requirements

Shingle Type	Hip or ridge/bundle	Starterstrip/bundle
Superglass®-3 Tab	9 m	21 m
Superglass®-Biber	Superglass®-3 Tab	21 m
Armourglass®	12 m	21 m
Monarch®	10 m	18 m
Monarch®-Diamant	7,3 m	22 m
Victorian®	Armourglass®	21 m
Diamant®	8,9 m	27 m
DiamantShield®	7,3 m	22 m
BiberShield®	Armourglass®	19 m
ArmourShield®	8,8 m	22 m
Cambridge HD (Marathon Ultra®)	Marathon Ultra®: 9 m	21 m

Note on hips and ridges:

When applying **Superglass® - Biber** or **Victorian®**, be sure that you order rectangular shingles in matching colours to cover hips and ridges. For **Cambridge HD** order 'Marathon Ultra®' in matching colours.

8.3.5. Calculation for underlay requirements

	Underlay type	Underlay area/roll
Underlay for shingles	Armourbase® Premium +	20 m ²
	Armourbase® 15	20 m ²
	Armourbase® PRO	30 m ²
Underlay for Armourvalley	Armourfix® APP 460P60	20 m ²

Example of calculation:

- Underlay type: **Armourbase® PRO**
Roof surface: 240 m²
Calculation: Armourbase® PRO = 30 m²/roll
Underlay requirement = 240m²/30 = 8 rolls

Note:

The above calculation does not include any details. Add 15% minimum to calculated requirement for cutting losses.

8.3.6. Calculation for required amount of valley

Valley type	Length of valley/roll
Armourvalley®	7,5 m

Example of calculation:

- Valley type: **Armourvalley®**
Valley length: 100 m
Calculation:
Armour valley = 7,5 m/roll
Amount required = $100 \text{ m} / 7,5 = 14$ rolls

Note:

The above calculation does not include any details.
Add 5% minimum to calculated amount for cutting losses.

8.3.7. Calculation of the ventilation requirements

See Section 18 on Ventilation.