



Onduline[®]

Lightweight Roofing Systems

The Lightweight Roofing Expert

Created in France in the 40s, ONDULINE® started out as a pioneer in lightweight composite roofing and under-roofing materials. Since then, the group rapidly evolved into a global leader, achieving key innovations and acquisitions along the way.

Today, ONDULINE® develops high-performance products and award-winning solutions to more than 120 countries worldwide, with a keen focus on design, reliability, sustainability and user-friendliness.

With a robust international presence and close proximity to end-users, ONDULINE® has been able to maintain not only a strategic footprint but also a solid understanding of its customers' diverse roofing needs.

This is why ONDULINE® is able to deliver attractive, reliable, comfortable and perfectly adapted and unique roofing solutions.

■ Worldwide

leader

in Lightweight Roofing

Over **150** million m²

■ of roofing solutions sold every year

75 years

■ of industry experience

About **1,600**

■ employees and **43** nationalities

■ Present in over **120**

Countries through **40** subsidiaries

Above All
we protect



Our vision

Become the worldwide reference in quality cost effective lightweight roofing solutions.

Our mission

We are all involved in providing cost effective, efficient and aesthetic roofing worldwide, delivering protection and comfort to all our customers.

Our values

CARING

We care about people. It's the way we think and act. We put people first, the safety of our employees and the protection of our customers. From innovation, to supply chain, finance and customer service, we are all mobilized to serve our clients as well as we can.

COMMITMENT

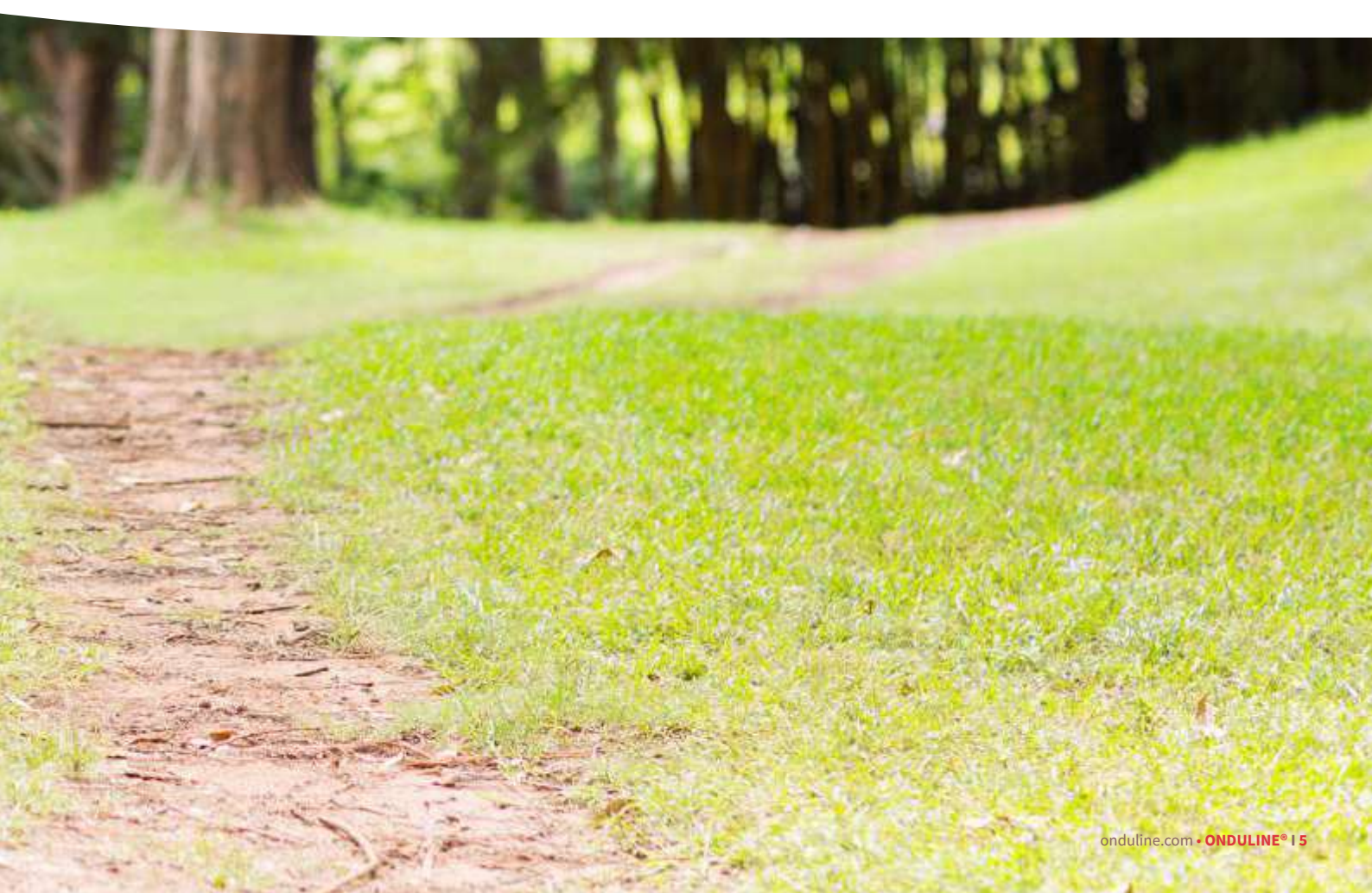
We are part of a wider community, and our actions have impacts on others. We are therefore committed to doing the best we can in terms of running a profitable and sustainable business, responsible product development, progress and safety for our employees and customers.

RELIABILITY

We focus on building long-term customer relationships that are founded on trust. Customers, suppliers partners, employees and end users can all depend on us to provide a quality solution that meets their needs.

OPENNESS

We are curious. We listen to each other and our customers to understand, learn and grow. We want to know how and why our markets and products work, and don't work. The challenges we face call on our entrepreneurial spirit, and push us to continuously progress and to innovate. We insist on always doing better.



ONDULINE® Roofing Systems

Reliable roofing solutions for all your needs

ONDULINE® meets your different roofing needs, combining reliability, quality and ensuring sustainability, while simplifying the design and implementation. Working closely with roofers for years, we know how crucial it is to select the right solution for our customers, that has to keep the expected performance for a long time. Considered as the fifth facade of the building, the roof contributes to aesthetics, building energy performance, health and well-being of its occupants.

ONDULINE® roofing products and accessories are extremely lightweight, making them fast and easy to install. ONDULINE® is guaranteed for its waterproofing performance. In warm weather, the material helps to maintain a consistent, comfortable temperature inside the building, while composite fibers aid noise reduction, especially during heavy rain.

100% green products, 100% responsible production

ONDULINE® sheets and tiles are manufactured in compliance with the strictest environmental regulations. Our unique technology delivers high quality products that contain no asbestos, and never had. Materials composed of recycled fibers, verified by a third party (ICC_ES), available on their website, whose certificates can help for LEED Ecological lifecycle performance, as per our Environmental Product Declarations.

APPLICATIONS



Individual & Collective Housing



Leisure Housing



Commercial Buildings and resorts



Public-access buildings



Renovation



RESORTS



LEISURE HOUSING



RESIDENTIAL



PUBLIC ACCESS BUILDINGS



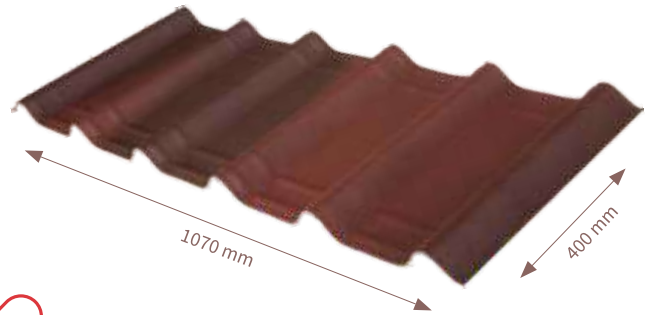
RENOVATION







LIGHTWEIGHT
ROOFING TILES



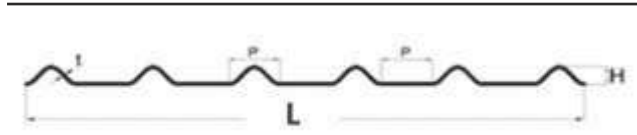
ONDUVILLA®

ONDUVILLA® is a unique and complete system that is well suited for new buildings or renovations and it is perfect for all standard roofing structures.



- 
Aesthetic
- 
Waterproofing
- 
Wind Resistant
- 
Thermal-comfort
- 
Acoustic comfort
- 
Lightweight

Technical Characteristics



Length	1070 mm
Width	400 mm
Thickness	3 mm
Wave Height	38 mm
Gross Surface	0.43 m ²
Corrugations + Flats	6 + 5
Weight	3.1 kg/m ²







Colours

PIGMENTED COLOURS

- 
• Shaded Red
- 
• Shaded Brown
- 
• Shaded Green
- 
• Anthracite Black

PAINTED COLOURS

- 
• Terracotta 3D
- 
• Classic Red 3D
- 
• Classic Green 3D
- 
• Stone Grey 3D



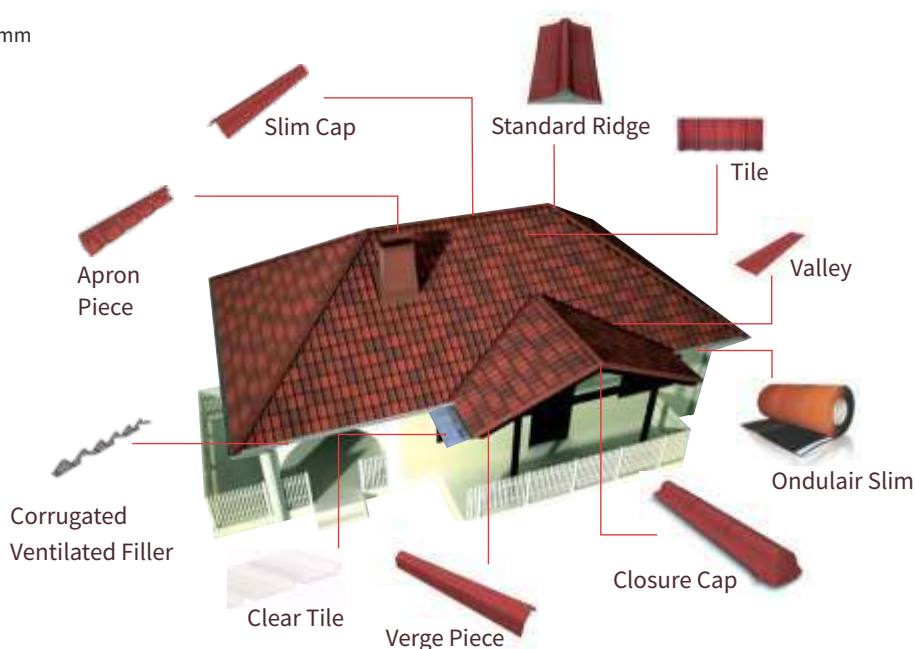
Your advantages

- **A complete system**, providing solutions and accessories for all roofing details
- **Clay-tile look**, outstanding aesthetics
- **Excellent waterproofing**
- **Good acoustic performance**, reduces external noise
- **Thermal comfort**
- **High wind resistance**, (up to 314 km/h)
- **Green**, eco-friendly production
- **Lightweight roofing materials**, allowing to make savings on the structure



Accessories

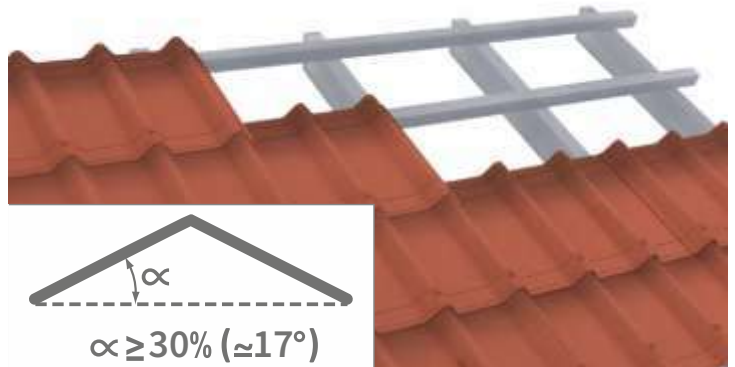
- 1 ONDUVILLA® RIDGE**
Flexible double wings accommodate a wide range of roof angles.
Colours: Shaded Red, Shaded Green, Shaded Brown, Anthracite Black, Terracotta, Classic Red, Classic Green, Stone Grey.
Size: L 900 mm x W 420 mm.
- 2 ONDUVILLA® VERGE**
Designed to provide a neat aesthetics at the edge of the roof. Can be used for both sides right/left.
Colours: Shaded Red, Shaded Green, Shaded Brown, Anthracite Black, Terracotta, Classic Red, Classic Green.
Size: L 1040 mm x W 105 mm x H 114 mm
- 3 ONDUVILLA® VALLEY F200**
Used to collect rainwater flowing into the valley with 3 corrugated barriers on each side.
Colours: Red, Brown, Green, Terracotta & Black.
Size: L 2000 mm x W 430 mm
- 4 CLEAR TILE**
Transparent tile designed to bring natural light into the living space.
Colour: Transparent.
Size: L 496 mm X W 400 mm
- 5 CORRUGATED VENTILATED FILLER**
Barrier to prevent animals from entering into the roof space (at the eave and ridge) and allows ventilation.
Colour: Black
Size: L 610 mm
- 6 ONDUVILLA® SLIM CAP**
Cap for ridge and hips, for roofs with a pitch up to 120% (or 50°).
Colours: Shaded Red, Shaded Green, Shaded Brown, Anthracite Black, Terracotta, Classic Red, Classic Green.
Size: L 1060 mm x W 175 mm
- 7 ONDUVILLA® CLOSURE CAP**
Designed for the finishing of ridge and hip lines (pitch up to 120%).
Colours: Shaded Red, Shaded Green, Shaded Brown, Anthracite Black, Terracotta, Classic Red, Classic Green
Size: L 1060 mm x W 175 mm
- 8 ONDUVILLA® APRON PIECE**
Designed to provide water tightness and ventilation to the ridge line for roofs with a pitch up to 120% (or 50°). Can also be used to seal the gap between ONDUVILLA® and vertical wall abutment.
Colours: Shaded Red, Shaded Green, Shaded Brown, Anthracite Black, Terracotta, Classic Red, Classic Green.
Size: L 1020 mm x W 140 mm
- 9 ONDULINE® SPEEDY SCREWS**
Universal screw for wood, hard wood and steel < 2mm.
Colours: Red, Black, Brown, Terracotta, Green.
Size: D 4.2 mm, L 65 mm
- 10 VENTILATED FOAM FILLER**
Barrier to prevent animals from entering into the roof space (at the eave and ridge) and allowing ventilation.
Colour: Black.
Size: L 610 mm



Installation principles

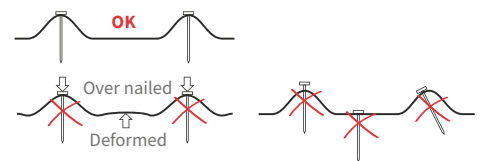
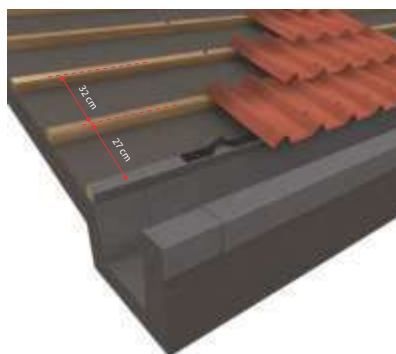
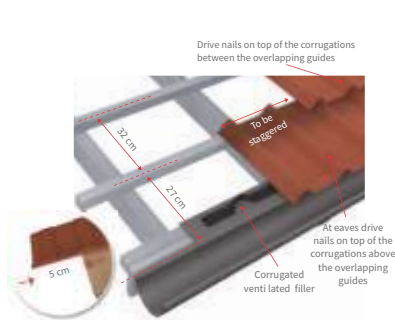
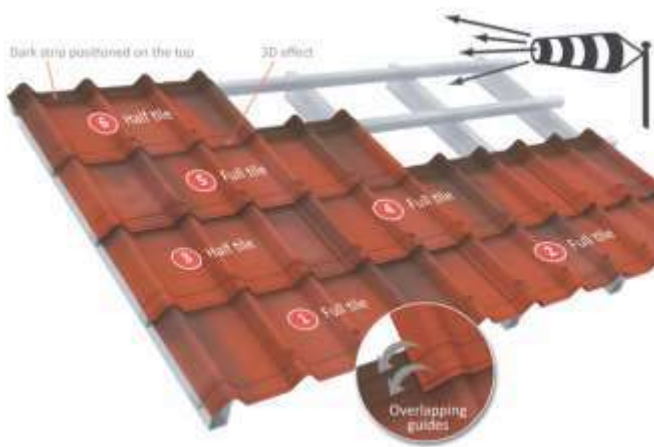
Start installation at eave, in the opposite direction of the prevailing wind. In the case of tiles with a shadow line, position the dark strip on top. Stagger the rows, by starting the second row with a half tile. Horizontal overlaps are one corrugation. Ensure proper waterproofing by aligning the overlapping guides.

MINIMUM ROOF PITCH TO BE 15°

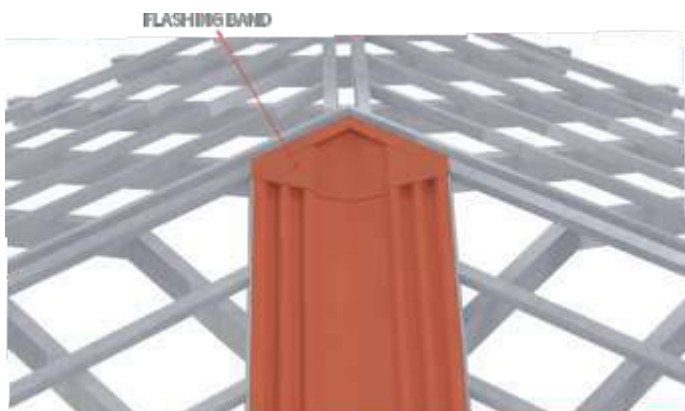


FIXING

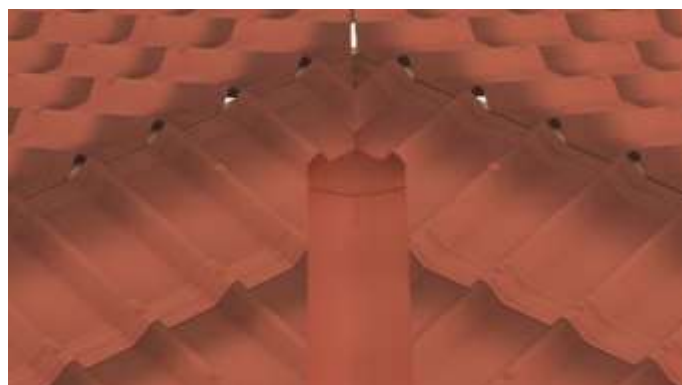
ONDUVILLA® is to be fixed at each overlap and each corrugation with ONDUVILLA® Speedy Screws. Fix the tiles following the order described in the picture, between the 2 overlapping guides. Do not fix those corrugations that will be overlapped by the next tile or verge piece.



HIP AND VALLEY TO RIDGE



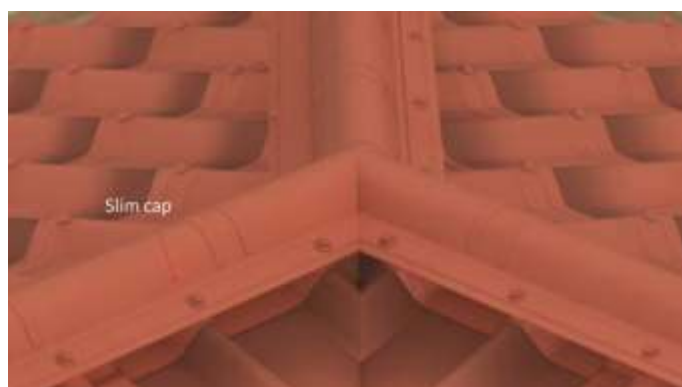
- Cut and install the valley, and secure waterproofing with FLASHING BAND.



- Install all ONDUVILLA® tiles.

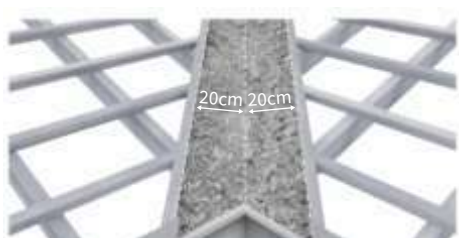


- Install APRON PIECE at ridge, ONDULAIR SLIM at hip, and a strip of FLASHING BAND (W 15cm) or ONDULAIR SLIM at meeting point.

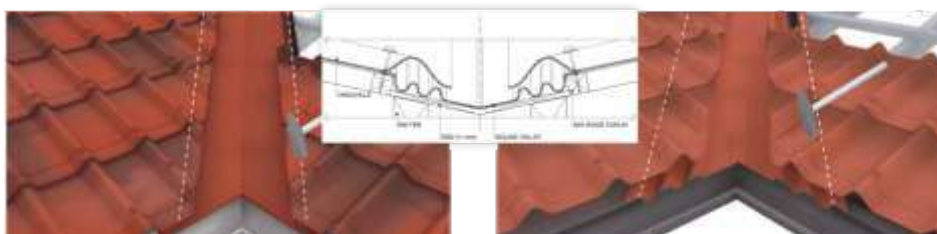


- Cut the Slim caps so that they touch each other on the line (no overlapping).

VALLEY



- Prepare the support.



- Position the valley, and fix it with standard nails (flathead). A universal ventilated filler can be added, to prevent birds or other animals to enter into the roof space.

- Fix the nails on top of corrugations, into the supporting batten.

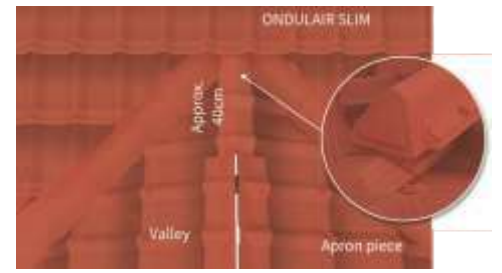
VALLEYS TO RIDGE



- Cut the valleys and fix them with standard nails. The empty surface will be used to glue the waterproofing solution.

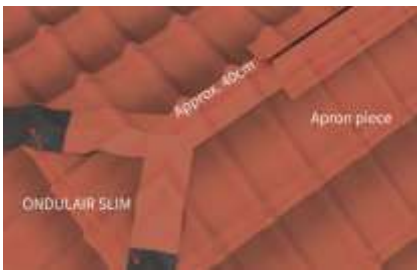


- Prepare and cut the appropriate shape and surface of FLASHING BAND membrane, and apply it with care to ensure secured waterproofing.



- At the ridge, before fixing the CLOSURE CAP, apply a strip of ONDULAIR SLIM (W 15 cm) for the first 40 cm and use APRON PIECES for the rest of the ridge line.

HIPS TO RIDGE



- Secure the watertightness of the detail by applying ONDULAIR SLIM.

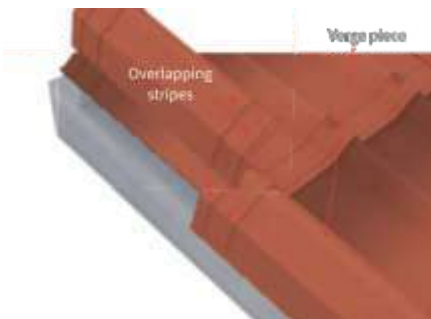


- Apply module consisting of 2 SLIM CAPS portions (to be fixed together using or ONDULAIR SLIM), cutting them at the right angle in accordance with the slope of the roof.

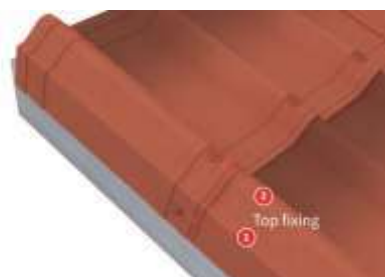


- Cut the SLIM CAP with an angle of 45° and fix it. The ridge piece has to overlap the hips.

VERGE



- At the beginning of the roof, the VERGE PIECE simply overlaps the first corrugation of ONDULIVILLA®.



- Additional to the usual fixing on top of the corrugation, side fixing is also necessary against wind uplift. Side fixing comes first, then finalize with top fixing.

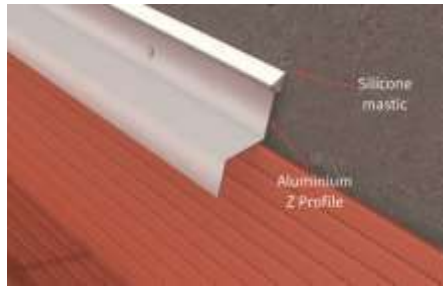


- On the opposite side, the roof may not end with a corrugation. Cut the last tile at the edge and bend it onto a batten in order to ensure proper watertightness. Then overlap the batten with the VERGE PIECE.

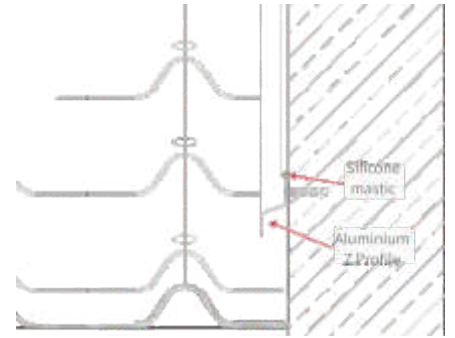
SIDE WALL ABUTMENT



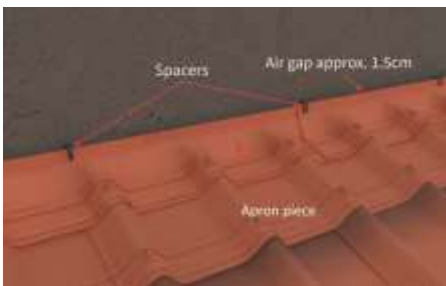
- Position the ONDUBAND® membrane, overlapping one corrugation in order to ensure waterproofing.



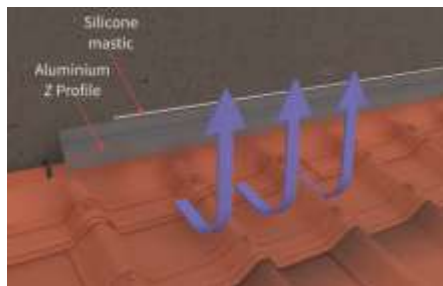
- Secure the waterproofing along the wall by fixing an aluminium Z-profile and a strip of silicone mastic.



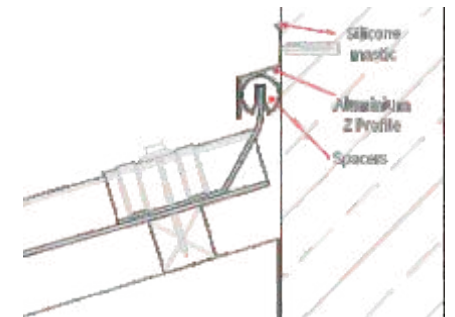
WALL ABUTMENT



- The ventilation gap between the wall and the apron piece should be secured with spacers that are applied at overlaps and in the middle of each apron piece.



- Aluminium Z profile is then fixed to the wall, and a line of silicone mastic is necessary for the watertightness.



MONO RIDGE TO WALL

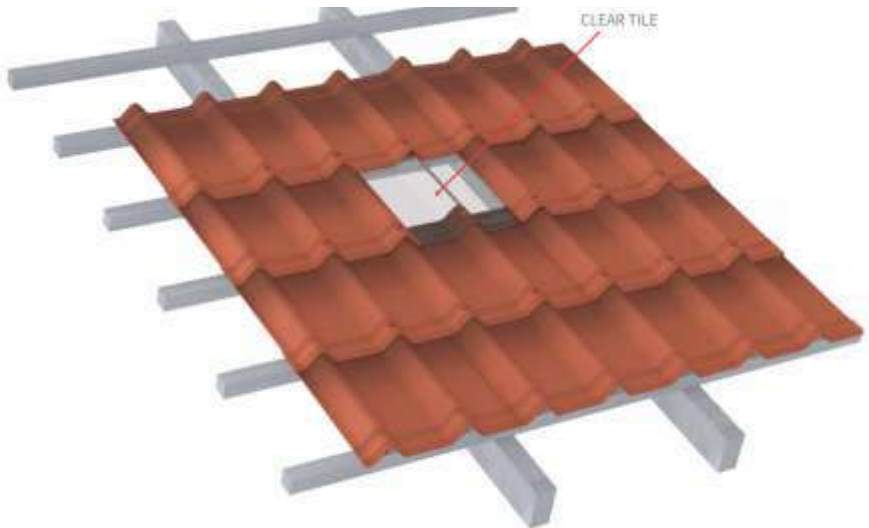


- Install the VERGE PIECE.



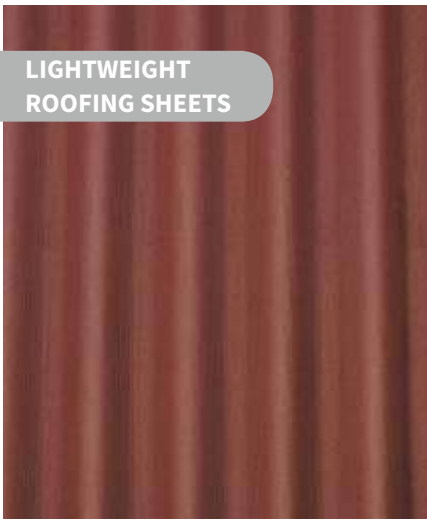
- Apply a STANDARD RIDGE PIECE and fix it on both sides.

CLEAR TILE



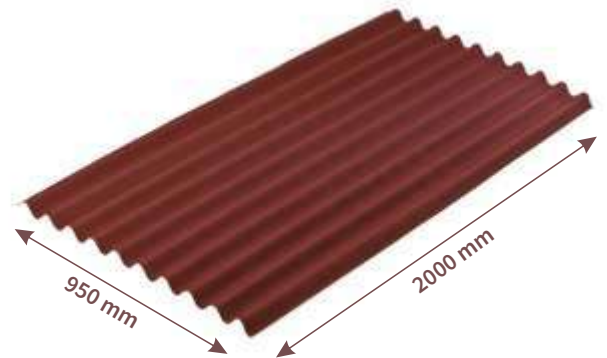
- Start by pre-drilling the CLEAR TILE at the location of the fasteners, with a diameter of 6 mm. Position and fix the accessory at the desired location using the same overlap principle as tiles.
- Cover the outer corrugations of the CLEAR TILE on each side.

LIGHTWEIGHT
ROOFING SHEETS



ONDULINE® CLASSIC

ONDULINE® is the original corrugated roofing system, an extremely tough lightweight roofing and wall cladding system. Extra resistance to hot and humid climates in it's DRversion.



Lightweight



Waterproofing



Reduces
Rain Noise



Thermal-comfort



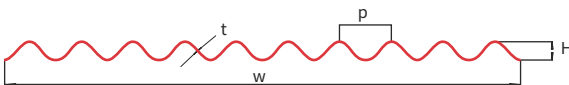
Wind
Resistant



Eco-responsible

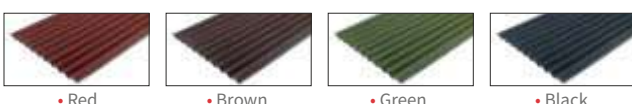
Technical Characteristics

ONDULINE® CLASSIC



Length	2000 mm
Width	950 mm
Thickness	3 mm
Height of corrugation	38 mm
# Corrugations per sheet	10
Gross surface	1.90 m ²
Net surface	1.56 m ²
Weight	3.4 kg/m ²

Colours



• Red

• Brown

• Green

• Black

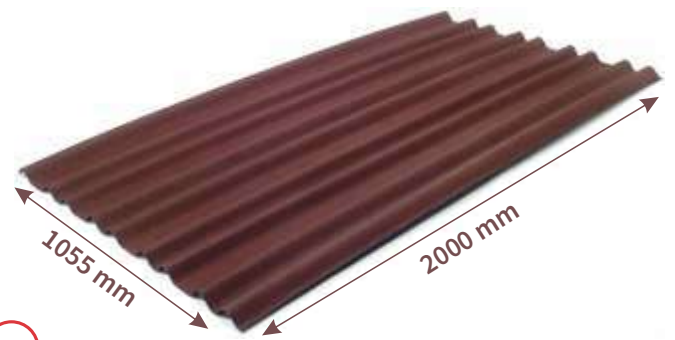




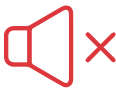



LIGHTWEIGHT
ROOFING SHEETS



ONDULINE® DURO 235

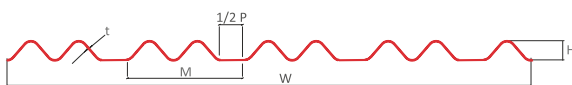
A nice and unique design, a smart choice for both customers and professionals, offering 10% higher coverage surface. Excellent resistance to hot and humid climate.



- 
Lightweight
- 
Waterproofing
- 
Reduces Rain Noise
- 
Thermal-comfort
- 
Wind Resistant
- 
Eco-responsible

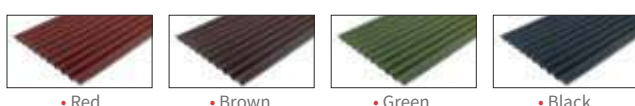
Technical Characteristics

ONDULINE® DURO 235



Length	2000 mm
Width	1055 mm
Thickness	3 mm
Height of corrugation	38 mm
# Corrugations + Flats	9+4
Gross surface	2.11 m ²
Net surface	1.75 m ²
Weight	3.3 kg/m ²

Colours



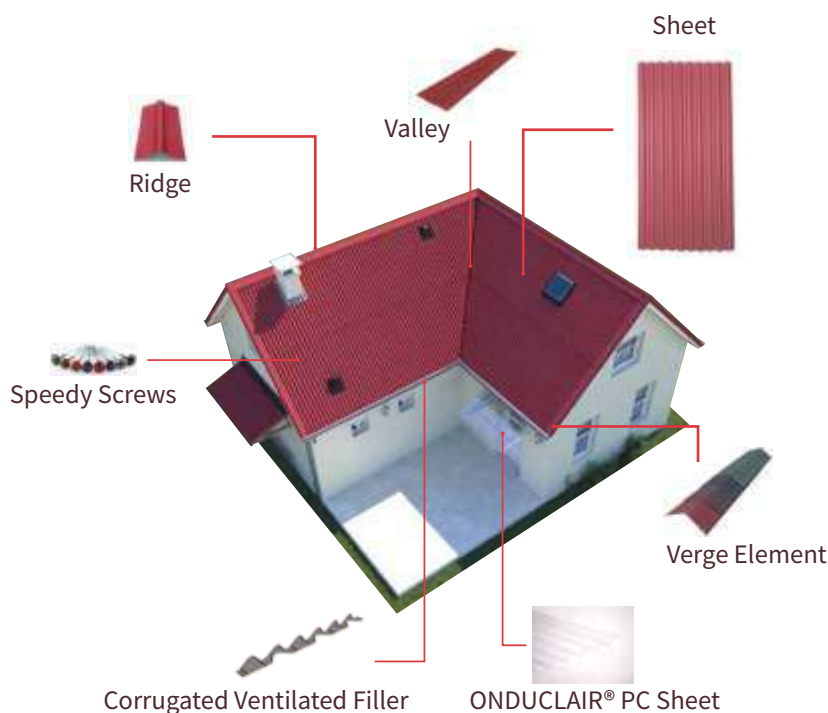
Your advantages

- **Thermal comfort**
- **Good acoustic performance**, reduces external noise
- **High wind resistance**, (up to 225 km/h on metallic purlins, up to 260 km/h on wooden purlins)
- **Lightweight roofing materials**, allowing to make savings on the structure
- **Never leaks**
- **Fast to install**
- **Never rust**
- **100% safe**, no asbestos
- **Green**, ecological products, eco-friendly production



Accessories

- 1 ONDULINE® RIDGE**
Flexible double wings accommodate a wide range of roof angles.
Colours: Red, Brown, Green, Black.
Size: L 1000 mm x W 470 mm
- 2 ONDULINE® VERGE**
Designed to provide a neat aesthetics at the edge of the roof. Can be used for both sides right/left.
Colours: Red, Brown, Green, Black.
Size: L 1100 mm x W 330 mm
- 3 ONDULINE® VALLEY G100**
Used to collect rainwater flowing into the valley.
Colours: Red, Brown, Green, Black.
Size: L 1000 mm x W 500 mm
- 4 ONDULINE® VALLEY F200**
Used to collect rainwater flowing into the valley with 3 corrugated barriers on each side.
Colours: Red, Brown, Green, Black.
Size: L 2000 mm x W 430 mm
- 5 ONDULINE® SPEEDY SCREWS**
Universal screw for wood, hard wood and steel < 2 mm.
Colours: Red, Black, Brown, Green.
Size: D 4.2 mm, L 65 mm
- 6 ONDUBAND®**
Multifunction self-adhesive flashing tape, which can be used for waterproofing of the chimney valley and other specific roof details.
Colours: Aluminium, Lead, Red Brick, Terracotta.
Size: L 10 m x W 0.3 m
- 7 VENTILATED FOAM FILLER**
Barrier to prevent animals from entering into the roof space (at the eave and ridge) and allowing ventilation.
Colour: Black
Size: L 610mm
- 8 ONDUCLAIR® PC**
Polycarbonate day lighting sheet in two different dimensions.
Colour: Transparent.
Size: L 2000 mm x W 950 mm
- 9 CORRUGATED FILLER**
Barrier to prevent animals from entering into the roof space (at the eave and ridge) and allows ventilation.
Colour: Black.
Size: L 610 mm



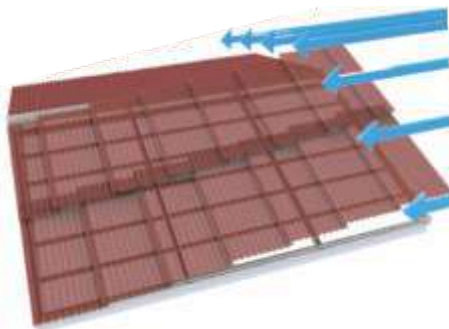
Installation principles

SHEET LAYOUT

! The installation here shown is for ONDULINE® CLASSIC. The same installation principles apply for ONDULINE® DURO 235 as well.



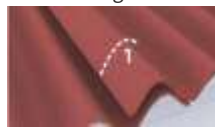
GENERAL

- Start fixing sheets at the opposite end of the roof from prevailing winds.
- Start every second row with a sheet cut in half vertically, in order to avoid side overlaps in the same line on all length of the roof, thus creating a broken bond pattern.
- Using a broken bond pattern, reduces the overall thickness of the overlapping.

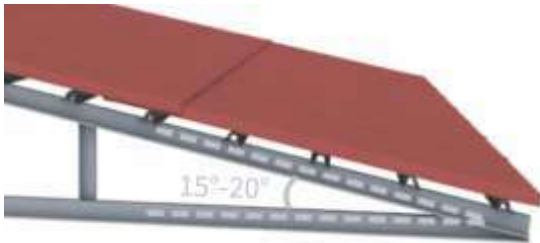


OVERLAPPING RULES

Following the overlapping rules is important to ensure a total waterproofing over a period of time. Side and end overlapping vary according to the roof pitches.

ROOF PITCHES	Maximum purlin distance	Overhang at eaves	Minimum end overlap	Minimum side overlap
>15°	45 cm 	7 cm 	20 cm 	1 corrugation 

METAL FRAME WITH ROOF PITCHES >15°



FRAME

For roof pitches >15°, ONDULINE® sheet shall be supported by purlins with maximum width distance of **45 cm.**



FIXING

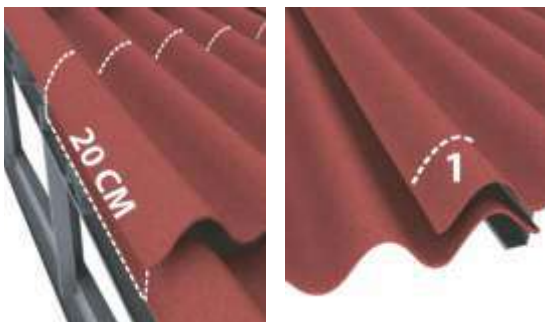
14 screws should be drilled per sheet.

- 5 screws at each corrugation at the end overlap or eaves.
- 3 screws at first intermediate purlin of the sheet.
- 3 screws at second intermediate purlin of the sheet.
- 3 screws at third intermediate purlin of the sheet.
- Screws should be drilled at each corrugation at the end overlap and side overlap.

To have a longlasting and guaranteed roof, it is mandatory to follow the nailing order and pattern.

OVERLAP

- For the end overlap, use minimum **20 cm.**
- For the side overlap, use minimum **1 corrugation.**



DETAILED FIXING STEPS



- To have a long lasting and guaranteed roof, it is mandatory to follow the fixing order and pattern.

! Use only ONDULINE® recommended fasteners

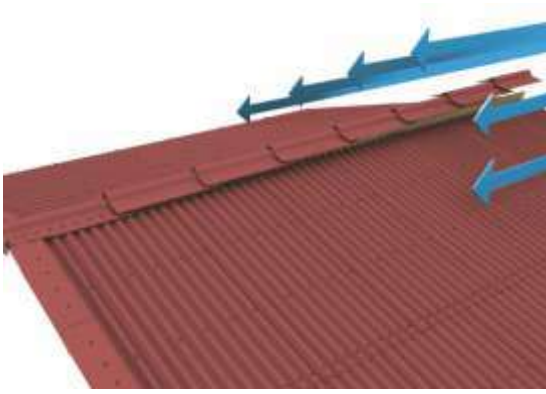
- Fix every corrugation at eaves, sheets overlaps and either side of vertical joints.
- Fix every corrugation on intermediate purlins.
- Fastening must always be carried out at the top of corrugation.
- Select the correct type of drill screw to suit purlin type.
- Drive the drill screw through the top of the corrugation.
- Be careful to avoid over compressing of the corrugation.



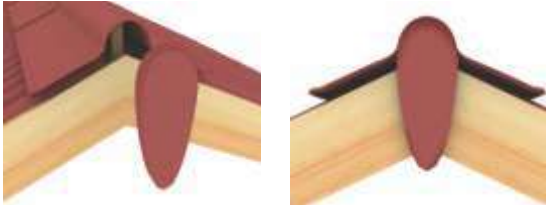
RIDGES

- Use a ridge plank to support the ridge.
- The ridge element should be fastened at each corrugation of the overlapped sheet.
- Add an extra purlin when necessary if, the distance between the last purlin and the ridge is too wide.





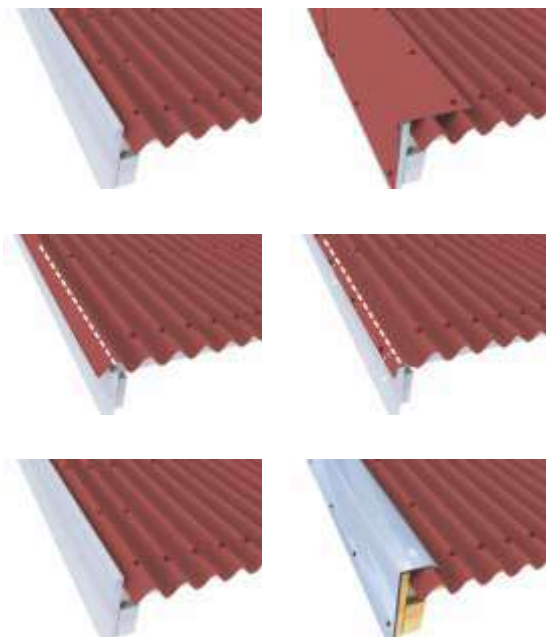
- Start fixing the ridge element opposite to the prevailing winds end, of the roof.
- The ridge element should overlap the ONDULINE® sheet at minimum 12 cm.
- Lay ridge elements with a minimum overlap of 12.5 cm.



- A ridge cap can be cut out of the flat part of a ridge element.

VERGES

Optimize aesthetic, waterproofing, and wind uplift resistance by using a verge element. Fix it first into the sidewall, then on the top of the corrugation.



COVERING WITH AN ONDULINE® VERGE ELEMENT

- Fasten bargeboard level with top of ONDULINE® sheet.
- The ONDULINE® verge is then overlaid and nailed into position.
- It is possible to use a ridge element for this purpose.

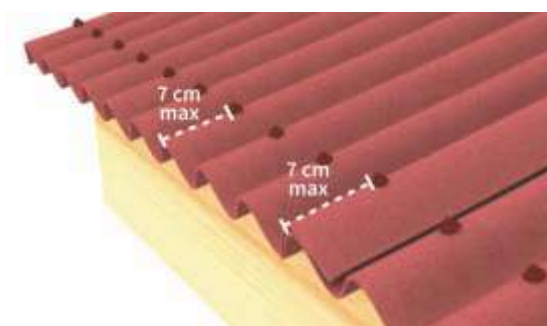
COVERING WITH AN ONDULINE® SHEET CORRUGATION

- Fasten bargeboard level with top of finished ONDULINE® roof.
- Covering with the metal verge unit is then overlaid and nailed into position.

COVERING WITH A METAL FLASHING VERGE UNIT

- Fasten bargeboard level with top of finished ONDULINE® roof.
- Covering with the metal verge unit is then, overlaid and nailed into position.

EAVES

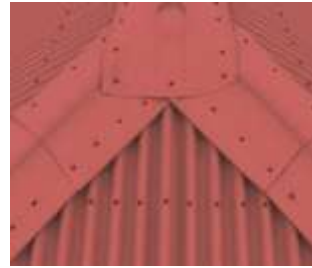


The sheets overhang at the eaves should **not be more than 7 cm**. Please set this distance while elaborating the roof project.

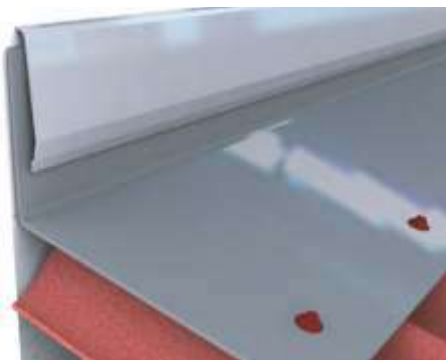
HIP DETAIL



- Fix the hips before the ridge element.
- Overlay with the hip elements and fix it as shown on the picture.



END WALL ABUTMENTS

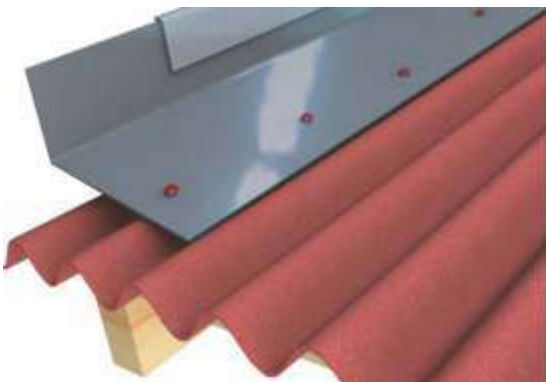


3RD PARTY FLASHING

- Use pre-formed plate of metal to seal end wall abutment enabling the ventilation.
- Use a separate cover flashing for the wall.



SIDE WALL ABUTMENTS



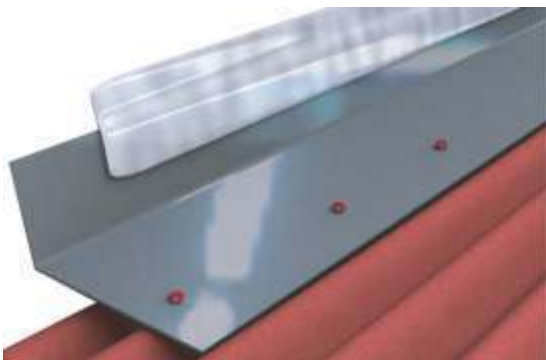
HARD COVER FLASHING TO WALL

- Use a pre-formed plate of metal flashing to seal side wall abutment. Take into consideration the possible dilation while drilling.



ONDULINE® FLASHING TAPE TO WALL

- Use a pre-formed plate of metal flashing to seal side wall abutment.
- Take into consideration or possible dilation while drilling.
- Use ONDULINE® flashing tape (ONDUBAND®) as cover flashing to the wall.

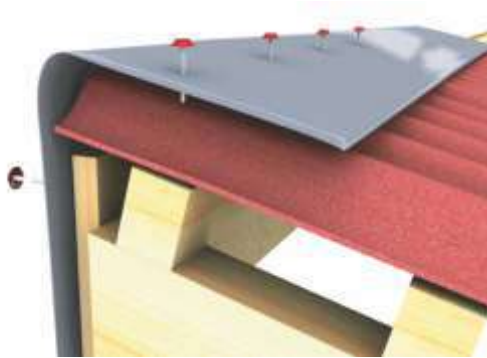


END ROOF



USING ONDULINE® RIDGE UNIT

- Fit ridge board and purlin. The ONDULINE® ridge unit is then overlaid and nailed or screwed into position.

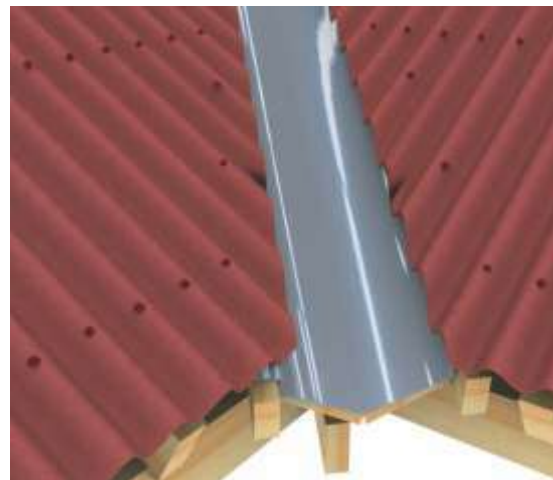


USING A PIECE OF METAL RIDGE ELEMENT

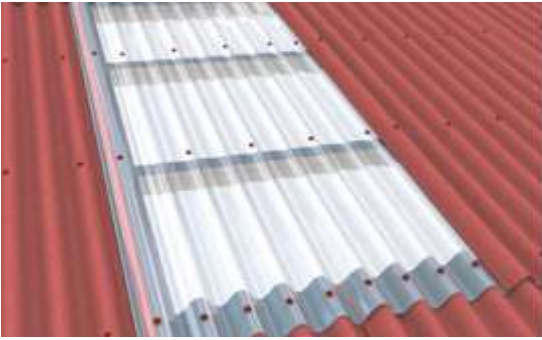
- Fit metal ridge element and purlin. The metal ridge element is then overlaid and nailed or screwed into.

VALLEY

- Fix valley board / trim purlin and line with metal pre-formed unit.
- The vertical valley depth should be sufficient to allow the water to flow.
- The sheets are cut across (parallel to the valley line). The overhang is max 4 cm.
- You can use ONDULINE® valley or a metal valley.



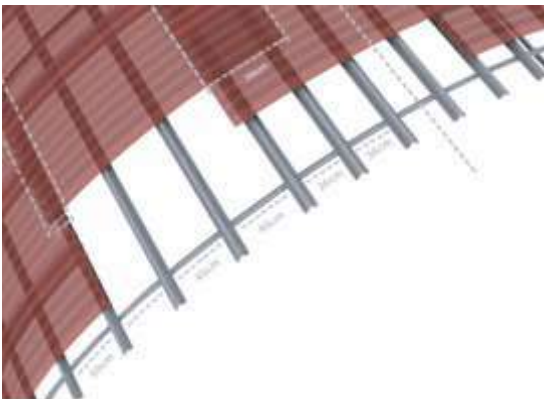
SKYLIGHT - ONDUCLAIR® PC



- Perfect complement to the ONDULINE® corrugated sheet.



CURVED ROOFS / DOMES

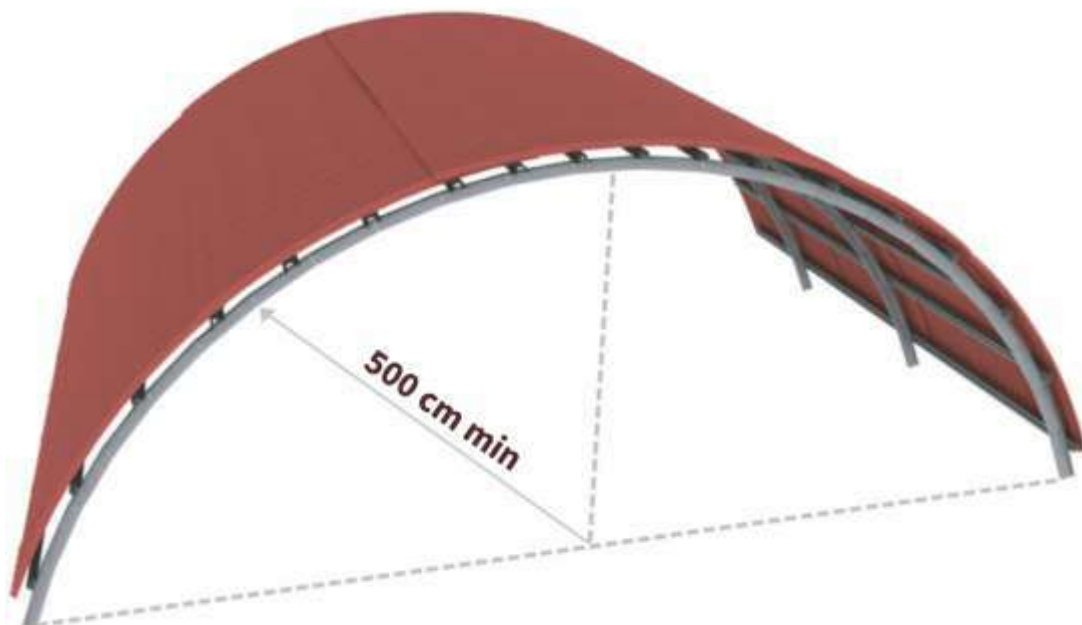


When the frame design is established, continuously setup the lines courses to get the right positions of purlins :

- Top dome : (pitch < 17%) - maximum span is 36 cm.
- 17% < pitch < 27% - maximum span is 45 cm.
- Pitch > 35% - maximum span is 60 cm.

At rooftop (slope = 0%)

- Avoid sheet overlap (lay the top sheet centered in its middle).
- No sheet overhang more than 7 cm.
- Side lap: 2 corrugations.



Rooflights

Daylighting solutions for improved comfort

The different options of our daylighting solutions allow you to select the most appropriate system in order to improve the internal environment of your building, while significantly increasing its energy efficiency.



EN-1013



Reaction to fire
Euroclass
B-s1, d0





ONDUCLAIR® PC

Day lighting single-skin polycarbonate system for roofing and cladding. Outstanding light transmission and UV protection.



UV Resistant



Impact Resistant



Fire Resistant



Lightweight

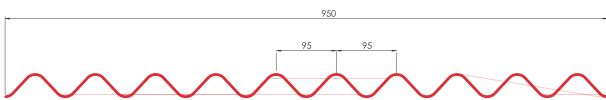


Light Transmission

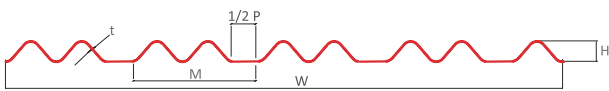


Technical Characteristics

ONDULINE® CLASSIC



ONDULINE® DURO 235



Length	2000 mm
Coverage width	
ONDULINE® Classic	950 mm
ONDULINE® Duro 235	1055 mm
Thickness	1.2 mm
Finish	1 external side UV protection
Colour	Crystal
Fire rating	B-s1, d0
Light transmission	90%
Impact resistance	1200 joules
Service temperature	-40°C to + 110°C

Installation principles

The installation is carried out with the ribs (or corrugations) running down the slope of the roof (longitudinal and transversal overlaps). Horizontal laying direction, Opposite direction of the prevailing wind. The sheet to be installed covers along the adjacent longitudinal edge of the sheet, installed previously.

Vertical laying direction:
From the bottom up.

The downslope lap (cut back) of the top sheet covers the lower sheet already installed.



The fixings must include following accessories (waterproofing and loads distribution):

- Sealing washers
- Saddle supports or curved washers adapted to the profile and to the site corrosivity.

Because of the coefficient expansion of the material, drill the fastener holes to a diameter 4 mm larger than the fastener diameter.

PVC washers are prohibited.



Roofing accessories

ONDUBAND®



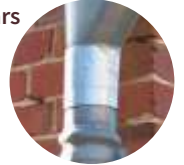
Technical Characteristics

Length	10 m
Width	0.10 / 0.15 / 0.20 / 0.30 m
Thickness	1.5 mm
Basic weight	38 mm

Cold self-adhesive tape covered, with a polymer aluminium sheet (natural or colored) reinforced with a support polyester.

Benefits

- Easy and fast to fix, just use a cutter or shears
- Waterproofing, multipurpose use, flexible application
- Offers a large and design range
- Exists hose reel



Usage

ONDUBAND® can be used for sealing connection work and small surfaces' repairs.

Colour

Aluminium, Lead, Red Brick and Terracotta

ONDULAIR® SLIM



Technical Characteristics

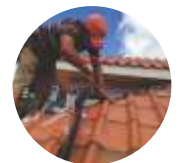
Width	150 mm
Thickness of the aluminum	140 µ
Free area for ventilation	32.5 cm ² /linear metre
Density of butyl glue	1.7 g/m ³
Standard width of butyl glue	15 mm +/- 1 mm
Minimum installation temperature	+5° C
Temperature resistance from	-30 °C to +80 °C

Material / Application

ONDULAIR SLIM® is a sealing tape which is designed to combine excellent waterproofing and ventilation properties. Slim size (width 15 cm) makes it compatible with the use of the Slim cap, the ridge accessory of ONDUVILLA® Roofing System, offering ultimate aesthetics to the roof. It will provide an efficient complement of ventilation at hips in Residential applications, where the draining of water vapor is essential. It can also be used at ridge, in non-residential applications (roof surface < 20 m²). ONDULAIR SLIM® is made of lacquered, UV resistant, single-layer aluminum. The size of the vents also ensures good protection against insects.

Benefits

- Multipurpose use, flexible application.
- Easy to use, just use a cutter or shears.
- Excellent adhesion to most substrates.
- Design that easily blends in with your surrounding.



Installation principles

The best application temperature range is above +5 °C. Carefully cut the tiles to have a gap of 1 cm between both sides. ONDULAIR® SLIM has to be pressed on firmly after the application. The overlapping between 2 rolls has to be at least 50 mm.

At ONDULINE®, our ongoing mission is to take serious sustainable actions at every level of our business, from our products and processes, to our people and our planet. We are constantly striving to fundamentally improve the way we operate, providing our customers with truly sustainable roofing solutions at a reasonable price, improving people's lives as well as the neighborhoods, they live in. And we'll continue to make major strides in all of these area.

OUR PRODUCTS

All of our products and materials are lightweight, which makes for simpler, more efficient transportation as well as less waste at construction sites.

They are also **asbestos-free**, composed of **recycled fibers** and use **natural pigments** for coloration.



OUR PROCESSES

We achieve a **very low carbon footprint** as well as low energy consumption in our manufacturing processes (4 kwh per m²). Our plants are equipped with **high-performance treatment** systems for gas effluents and emit no liquid waste in any form. ONDULINE® has received a VAR Confirmation report (VAR 1016) by ICC-ES to precise the recycled content of its solutions.

Additionally, thanks to hightech recycling processes, we have been able to achieve high content of post-consumer material (around 50%). We are currently **recycling some 200,000 tons of material** each year.

OUR PEOPLE

In addition to all the sustainable initiatives behind our products and processes, ONDULINE® is quite simply a great company to work for – one that values its workers. We employ more than 1,600 people across the globe, representing dozens of nationalities, cultures and languages. Our people are young, dynamic and passionate about their experience. They stay with us for seven years on average, well above the global median for private-sector workers.

OUR PROOF

ONDULINE®'s achievements are regularly **recognized by leading standards and organizations**. For instance, we've earned the prestigious **ISO 14021** and **VAR 1016** certifications for **high-impact recycling**, as well as **LEED Gold** for **sustainable green building operations**.



REPAINTING INSTRUCTIONS

TYPE OF PAINT

- Use a specific water-based roofing paint, preferably an exterior grade latex acrylic paint or pure acrylic paint.
- For best results apply the same color as the original.

! DO NOT USE SOLVENT OR OIL BASED PAINTS OR COATINGS on ONDULINE® material.

- The optimum quantity is one litre of paint for 5m², depending on the type of paint. Check the specification written on the paint tin. Be careful, the surface calculation must be based on the developed surface, not the net square meter of the roof.
- A corrective coefficient of 1.3 for ONDULINE® CLASSIC has to be applied. For instance, a roof surface of 10m² represents a painted surface of 10x1.3=13m².

PAINTING CONDITIONS

- Usually apply paint only when air and surface temperatures are above 10°C, above the dewpoint and relative humidity is below 85%. Avoid to paint the sheet if the outside temperature is over 35°C in order to guarantee the best quality. In any case, check the instructions on the paint tin.
- Coating must not be applied outdoors when it is raining, snowing, etc. or when any form of precipitation is imminent. You must stop painting early enough in the day to allow the paint to dry before the sun goes down. Do not paint on windy days.
- In case of doubt contact your ONDULINE® sales office.

PAINT PREPARATION

- The paint must be thoroughly mixed before use.
- The paint may be thinned by adding small amount of water (about 90:10) and mixing until correct consistency for spraying or brushing. This will assure good penetration into the surface structure.
- Some specific paints may need a higher dilution, up to 30% of water, check the instructions on the paint tin.

SURFACE PREPARATION

- Coating integrity and service life will be reduced because of improperly prepared surfaces. The surface should be free of moisture, dirt, loose paint, etc. Any blisters, cracks or sharp edges should be first repaired and all surface debris removed.
- Mold and mildew should be removed by scrubbing with a mixture of one-quart household bleach to three quarts of water. Scrub well with a brush and allow solution to remain on the surface for ten minutes before rinsing with clean water.
- WEAR PROTECTIVE GLASSES OR GOGGLES AND WATERPROOF GLOVES! All areas must be thoroughly dry prior to painting.

**! DO NOT USE ABRASIVE OR HIGH PRESSURE WATER BLASTERS to clean sheets or tiles.
Low-pressure water (80psi or less) may be used.**

- Badly weathered areas (bare spots with no paint) should be hand brushed with a coat of paint prior to spray coating. Failure to take this step can give poor results. After spot priming the bare areas, the entire roof should be painted.
- A primer can be used as under coat. Use the same finish paint as self priming coat, dilute the paint 50:50 with water and mix well. Apply by brush ensuring that the bristles' ends reach the valleys in the structure of the surface and deposit the paint. Allow to dry fully.

PAINT APPLICATION

- Start from the ridge part of the roof.
- Keep mixing the paint preparation on a regular basis in order to avoid losing homogeneity.
- It is better to apply the paint in the direction of the slope. Spread the paint well avoiding over-deposition.
- Drying time is about 8 hours and may fluctuate according to the weather conditions.
- For best results apply two thin coats of paint instead of one heavy coat. Allow to dry fully between the two coats.

NOTE: Same recommendations apply for the back side of the sheets / tiles.

ONDULINE® RECOMMENDS TO :

- Take care of the minimum recommended slope to facilitate the water run-off.
- Use the appropriate quantity of fixing to ensure a better resistance to wrenching.
- Maintain regularly your roof for a better durability.

GENERAL QUESTIONS**WHAT ARE THE FIXINGS USED WITH ONDULINE® SOLUTIONS?**

- **Wood support:**
 - ONDULINE® speedy screws.
- **Metal support:**
 - ONDULINE® speedy screws.
- **On concrete:**
 - ONDULINE® speedy screws.

DOES IT CRACK IN HOT AND COLD WEATHERS?

ONDULINE® products may be applied both in the most cold and most hot and humid climates easily. No problems have been encountered in applications made in areas where the temperature was +50°C under shadow and in regions where the cold was almost -50°C.

DOES ITS COLOUR CHANGE?

ONDULINE® products are affected slightly by UV. However, due to the colouring process, this change is not felt and it preserves its color for many years.

WHAT IS THE MINIMUM PITCH?

The minimum pitch is 15°, with the use of a full deck or 17° for a metal batten structure.

HOW TO INSTALL A GUTTER TO AN ONDULINE® ROOF?

A gutter can be installed, provided it is not fixed directly on the products, but on the structure.

ONDUCLAIR®**WHAT IS A SINGLE-SKIN SHEET?**

It's a sheet composed of a single thin wall.

WHAT IS THE DIFFERENCE BETWEEN TRANSPARENT, CRYSTAL AND OPAL?

- Transparent: one can see the shape, not the colour.
- Crystal: one can see shape and colour.
- Opal: one can't see shape nor colour.

WHAT IS THE FIRE PERFORMANCE?

- Polycarbonate (PC): Euroclass B-s1, d0

WHAT IS THE LIGHT TRANSMISSION?

- Polycarbonate (PC) Crystal: 90 %

GENERAL INFORMATION

PRECAUTIONS ON ROOF USAGE

Roof traffic

Only walk on the roof if this is necessary. To distribute the loads, planks or ladder should be laid flat and by the roof purlins to carry out maintenance and related work. All precautions should be taken and safety regulations must be observed and applied.

ROOF MAINTENANCE

- Maintenance of the roof is the responsibility of the owner.
- To ensure long life we recommend that the following maintenance procedures are carried out.
- Remove moss and debris. Do not allow leaf debris to build up on the surface of the corrugated roofing sheets, the debris will form leaf mould which can soften the material and reduce the effective life of the product.
- Check that branches are not in contact with the roof surface as wind generated movement can result in mechanical damage to the surface of the sheets.
- Clean all rainwater gutters, down-pipes and gullies regularly ensuring efficient water run-off from the roof.
- Maintain a good state of roof elements such as flashing, chimney stacks, etc.
- Maintain a good state of the roof and its ventilation.

SITE STORAGE

ONDULINE® is delivered to site on pallets of 150 to 420 sheets (depending on means of transport and sheet specification) shrink wrapped. It is not recommended to stack pallets. Sheets must be stored flat and covered at all times to protect against weather and dust. In hot climates ONDULINE® must be protected from direct sunlight.

HANDLING

ONDULINE® may be stored in freezing temperatures but installation should not be attempted in these conditions. ONDULINE® should be lifted from the pallet, not dragged across it. The material should then be handled using conventional techniques for corrugated sheeting.

TECHNICAL SERVICES

ONDULINE® provide a comprehensive technical and laboratory advice service for all applications of ONDULINE® system. Please always refer to our specific technical guides for complete installation details and check with our representative, your local dealer or your specifier for your country building codes and regulations.

RE-USE OF ONDULINE® SHEETS

In the event of sheets having to be removed from a roof or side wall, the nails are extracted with an ordinary claw hammer levered against a piece of wood shaped to the corrugation. ONDULINE® sheets thus recovered may be used again - an important economical aspect.

PRECAUTIONS

When using ONDULINE® in conditions of high internal humidity it is important to use a vapour barrier and adequate ventilation on the roof space.

CONDITIONS OF SALE

The color impregnation is long lasting, but weathering effects cannot be entirely discounted and will affect ONDULINE® in the same way as they affect natural material roofs. The ONDULINE® group assumes no responsibility for the effect of structural movement. Details are correct at the time of printing, but the manufacturers reserve the right to vary specifications and details at any time without notice. To avoid any possible misunderstandings, we require that a customer seeking advice on suitability or performance of goods or relating to the nature of services supplied should put such requirements to us in writing. Goods are not tested or sold as fit for any particular purpose unless so agreed in writing. There might be slight variations in size, weight and color.

HEALTH AND SAFETY

The photographs and drawings in this brochure are of installations in many parts of the world; building practices shown may not therefore comply with the recommended safety standards in other countries.

ROOF SAFETY MEASURES

Roof safety is a must for any building owner. Unprotected edges, heights, tripping hazards, and extreme heat can put workers at risk for accidents. The right protection devices and policies will ensure that employees can perform work in a secure environment. General practices such as limiting who can access the roof, requiring training for those who do, and providing safety equipment will help to keep facilities for staff and outside contractors from harm.

Roofs aren't designed for constant foot traffic yet inspections and repairs require workers to tread lightly across the roof. Many roof accidents involve trips or falls from heights that result in hundreds of deaths annually and scores of other non-fatal injuries.

When workers access your roof, their priority is to work on the equipment at hand. If they aren't thinking about your roof integrity, workers may leave tools or debris from repairs. Even accidentally dropping tools can damage your roof.

ROOFING HAZARDS

Slippery Conditions – It can be difficult to maintain footing on steep pitches, moisture, or flat roofs with gravel.

Electrical – Workers need to be aware of roof tasks that take them near overhead power lines, conduit, solar panels etc.

Loose Debris – Tree branches, leaves, construction materials, and tools can all pose a tripping hazard. In windy conditions, they may also become flying debris.

Extreme Heat – Pick a clear, calm, cool time of day to work on roofs. Wet roofs are slippery. Wind also poses a danger, and excessive heat softens bitumen based roofing products, making them vulnerable to damage.

IMPROVE SAFETY WITH PROTECTION DEVICES

There is a lot of options that will make your roof a safer working environment. Many are modestly priced, will last for years on end, and can be added without major modifications.

Appropriate Footwear is Essential – Wear SAFETY shoes with a soft rubber sole for extra traction. Keep the bottom of your shoes free of mud and dirt, and the roof swept clear of dirt and debris.

Use a High-Quality Safety Harness – Slips and falls cause the most roofing-related injuries and deaths. A safety harness won't just keep you from injuring yourself-it could also save your life.

Use an Extension Ladder – Leaning over a too-short ladder causes numerous falls every year as well. Your ladder needs to safely touch the roof so you don't have to lean forward, which can topple the ladder. It should also extend slightly higher than the roof - you want to hold on to the edges while you climb down.

Once you have a sturdy extension ladder, make sure you use it properly to stay safe. Take the following steps:

Set up your ladder on even ground. The ladder shouldn't wobble at all once you step on it.

Angle your ladder correctly. Place your ladder a quarter of its length away from the roof. For instance, if your ladder is 16 feet tall, place the bottom four feet away.

Fasten the ladder securely to the roof. Consider adding roof brackets, which are also called roof jacks. Install the brackets and set a board between them to create a scaffolding that can keep you from falling if you slip.

SAFETY DATA SHEET (S.D.S.)

IMPORTANT

COMPOSITION/INFORMATION ABOUT INGREDIENTS

Read this S.D.S. before handling or disposing of this product. This product safety information data sheet is provided to help our customers in compliance with health, safety and environmental regulations. It does not take over other documentation as technical instructions. We have taken reasonable effort to ensure that sources for this data are correct and reliable. This data is given in good faith but it shall not exempt the user to know and to apply the regulations. Since conditions or methods of handling and using this product are beyond our control, we do not assume responsibility and expressly disclaim liability for damages resulting from, or connected with, the handling, storage, use or disposal of the product. This S.D.S. information may not be applicable if this product is combined with any other products not mentioned in the company's updated documentation.

These products do not contain any form of asbestos materials and there are no hazardous ingredients in this material. Ingredients consist of: - Organic fibers - Mineral substances (as calcium carbonate) - Thermosetting resins - Thermoplastic resins (for painting finish) - Mineral pigments and/or carbon black - Bitumen.

IDENTIFICATION OF HAZARDS

EMERGENCY OVERVIEW :

ONDULINE® Products are stable and are not expected to create any unusual emergency hazards.

SUMMARY :

Hazardous exposures are unlikely to occur with this range of products.

POTENTIAL HEALTH EFFECTS : EYES

Contact with the eye may result in mechanical irritation characterized by itching or redness.

POTENTIAL HEALTH EFFECTS : SKIN

Mechanical rubbing may cause skin irritation even if never observed.

POTENTIAL HEALTH EFFECTS : INGESTION

Not a likely route of entry.

POTENTIAL HEALTH EFFECTS : INHALATION

Inhalation of dusts produced during cutting this product may cause irritation of the respiratory tract even if never observed.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

None expected.

FIRST RESCUE PROCEDURE

FIRST AID:

EXTINGUISHING MEDIA

Eyes: Do not rub or scratch your eyes. Flush eyes with large amount of water. If irritation persists contact a doctor.

Skin: Wash exposure skin with soap and water. If irritation develops or persists seek medical attention.

Ingestion: Product is not intended to be ingested or eaten. If the product is ingested, do not induce vomiting. Seek medical attention.

Inhalation: Move person to not contaminated air. Seek medical attention whether any symptom develops or persists.

Dry chemical, carbon dioxide, water fog Hazardous decomposition products: complex mixture of gas, aldehyde, CO, CO₂, SO₂ and soot.

Fire Fighting Equipments and procedures: Respirators and protective gear required for fire fighting.

EMERGENCY ACTIONS TO TAKE IN CASE OF ACCIDENTAL SPREADING

Not applicable to ONDULINE® Products.



HANDLING AND STORAGE HANDLING PROCEDURES

Wash hands with soap and water after handling and working with this product.

Storage procedures:

ONDULINE® Products must be stored flat and covered at all times to protect against heat, weather and dust. In hot climates, packaged sheets must be protected from direct sunlight. Warehouses should be in accordance with package directions.

CONTROL OF EXPOSURE AND INDIVIDUAL PROTECTION

Gloves:

Protective gloves may be used when handling material. Exposure effects after handling, possible skin irritation but never observed.

Eye protection:

Use safety glasses or goggles when necessary (strongly recommended while cutting the product)

Disposal procedures:

Follow federal, provincial, state and municipal regulations for handling building products.

PHYSICAL AND CHEMICAL DATA

State : Solid.

Odour : Slight bitumen odour.

Boiling point : Not applicable

Specific gravity : ~ 1.1

Vapour pressure : Not applicable

Evaporation rate : Not applicable

Solubility in water : Insoluble

pH = Not applicable

Appearance : Versatile corrugated bituminous element, various colours

Colour : The external side is coloured, underside is black.

STABILITY AND REACTIVITY

Chemical stability: Stable under normal conditions.

Chemical stability – conditions to avoid : Very strong oxidizers and organic solvents.

Incompatibility : None identified.

Hazardous decomposition : None identified.

Polymerization : Will not occur

Possibility of hazardous reactions : None expected.





ONDULINE BUILDING MATERIALS WARRANTY (ASIA-PACIFIC AREA)



MATERIAL WARRANTY

ONDULINE® sheets, ONDUVILLA® tiles and their accessories (valley, verge, ridge) ("Products") are warranted by ONDULINE® to the person or entity owning the Products (the "Owner") to be free from defect for the duration stated hereafter from the date of purchase by the purchaser provided certain conditions, hereafter clarified, are fulfilled and provided the maintenance and storage requirements mentioned below are respected.

Products are warranted under normal usage.

Subject to the conditions set forth below, in the event that Products or any portion thereof are found to be defective, upon presentation of this Warranty Certificate and proof of purchase, ONDULINE® will exchange new products for defective Products under the terms of this warranty. Any such replacement products shall be warranted only for the period applicable to Products originally purchased.

For the first 60 months from the date of purchase, ONDULINE® will furnish replacement products for 100% of Products which are proven to be defective for reasons other than circumstances listed below. Starting from the 61st month, ONDULINE® will then partially contribute to the replacement of defective Products pursuant to the following formulas, the remainder of the replacement's amount being paid by the Owner:

- from month 61 to the end of month 120, ONDULINE®'s contribution ("OC") shall be:

$$\% \text{ of OC} = 100 - [(M - 60) \times 1.2]$$

M = number of month after purchase

- from month 121 to the end of month 180, OC shall be:

$$\% \text{ of OC} = 100 - [(120 - 60) \times 1.2] - [(M - 120) \times 0.4]$$

Example: at the 146th month, ONDULINE® will contribute to 17.6% of the replacement of the defective Products: $100 - [(120 - 60) \times 1.2] - [(146 - 120) \times 0.4] = 17.6\%$

ONDULINE®'s obligation to contribute to the replacement of defective Products shall cease at the end of the 180th month.

EXCLUSIONS

This warranty does not cover, and ONDULINE® will not be responsible for any labor costs, tear-off costs, disposal costs, equipment costs, delivery costs, or other costs incurred in removing defective Products or installing replacement products, or any other cost consequent upon the defects in the original Products.

Due to the natural character of the raw materials, solid colors can vary in tone within the same pallet or between different pallets.

Products will not be considered defective with respect to color, shade or hue. Products are neither covered for color evolution nor for aesthetic issues.

VOIDING OF WARRANTY

ALL WARRANTIES ARE VOID UNLESS THE FOLLOWING CONDITIONS ARE MET.

Products must have been installed in direct accordance with ONDULINE®'s fixing instructions as stipulated in the fixing guide.

Neither the installer of the Products nor the Owner must thereafter attempt to alter or repair the same or to remove the Products to any other site or sites.

The defect complained of arises solely from a manufacturing defect of the Products and not as a result of:

- nonuse of ONDULINE®'s fixings;
- any defect in the structure or foundations of the building on which the Products have been installed, including, but not limited to, improper design of the structure, actual installation error, settling, shifting, distorting, or movement of the walls or foundation of the structure;
- mechanical impacts, mishandling of the Products;
- the failure of the installer to install the Products in direct compliance with the fixing specifications;

- extraordinary deterioration (including, but not limited to, traffic on the roof or impact of falling objects);
- acts of God such as natural disaster (hail, floods, lightning, hurricane, tornado, earthquakes, etc.);
- force majeure events such as war, military occupation, military or civilian rebellion, public or any unauthorized violent protests, nuclear explosions, radiation, radioactive leaks, chemical corrosive materials and fumes such as paint removers, etc.;
- mold, moss, algae, fungus, misuse, neglect or improper storage or handling of the Products before, during, or after installation;
- failure of the Owner to clean debris off and maintain the Products;
- any kind of modification of the Products (refinement, alteration, decoration, etc.) carried out by the Owner or its contractors;
- damage to the Products as a result of interference by a third party, including animals;
- moisture accumulation caused by contact with damp or wet insulation or other absorbent materials;
- improper or insufficient ventilation;
- improper use of the Products;
- improper repair of the Products.

CLAIMS

You must submit any claims under this warranty in writing together with proof of purchase of the Products to ONDULINE® Customer Services, 35 rue Baudin, 92300 Levallois-Perret, France.

Should you fail to establish the date of purchase, ONDULINE® is entitled to refuse to warranty the Products under this warranty.

Any claim under this warranty must be submitted before the end of the warranty duration.

In order to enable ONDULINE® to determine whether the Products are defective or not, the Owner shall supply ONDULINE® with samples and photographs of the allegedly defective Products which ONDULINE® deems sufficient to illustrate the damage and the Owner must not remove the Products until it has given ONDULINE® a reasonable opportunity to examine it.

DISCLAIMERS

The Products are only warranted to be free from defects in workmanship and material. ONDULINE® MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEEDS THE OBLIGATIONS SET FORTH IN THIS WARRANTY ARE HEREBY DISCLAIMED BY ONDULINE®.

ONDULINE® makes no other representation or warranty of any kind, and no representative, employee, distributor or dealer of ONDULINE® has the authority to make or imply any representation, promise or agreement which in any way varies the terms of this agreement.

ONDULINE® reserves the right to discontinue or modify any of its products, including color, shape, and size, without notice to the Owner, and shall not be liable as a result of such discontinuation or modification. Nor shall ONDULINE® be liable in the event replacement products may vary in color in comparison to the original Products as a result of normal weathering.

If ONDULINE® replaces any Products under this warranty, it may substitute products designated by ONDULINE® to be of comparable quality or price in the event the Products initially installed have been discontinued or modified. ONDULINE® shall not be obligated to pay freight charges for delivery of replacement products.

MAINTENANCE REQUIREMENTS

Maintenance is the responsibility of the Owner. For the Products, there is virtually non-specific maintenance required, except including following tasks that are mandatory to keep roofs in good order. These tasks are reminded hereafter:

Leaf debris: do not allow leaf debris to build up on the surface of the Products.

Left unattended the debris will form leaf mould which by holding moisture in the corrugation bases will soften the materials and ultimately reduce their effective life.

Tree and shrub branches: check that overhanging branches are not in contact with the surface of the Products, as wind generated movement can result in mechanical damage.

Ventilation channels: always ensure high and low-level ventilation channels are unrestricted. Blockage of ventilation channels should result into condensation problems likely to shorten life of roof and insulation & ceiling materials.

Concreting: If a new concrete slab is laid under the roof concrete curing process will generate high level of humidity in the attic subject to cause condensation and damage our products. Forced ventilation must be arranged until concrete is completely cured (28 days).

Gutters: Clean all gutters, down-pipes and gullies regularly. If water collection systems are used, filter and circulate water in accordance with the instructions of the system manufacturer.

Whilst rainwater run-off from ONDULINE® roofs is non-hazardous, we do not recommend its use for human consumption due to the inherent risk of air born pollutants being introduced into the water collection system.

Roof traffic and Safety: working on roofs can be a hazardous operation. Personnel should walk on roofs only if this is absolutely necessary, and should use planks or ladders laid flat and supported by the roof purlins, in order to carry out maintenance and related work.

All precautions should be taken as specified by applicable safety regulations.

STORAGE REQUIREMENTS

Packing: products are delivered in a non-return packing specially designed to guarantee optimum storage conditions.

Storage: packs must be transported and stored under conditions which protect the Products from humidity and excessive heat.

If the packs are covered with a plastic cover, prolonged storage in full sunlight should be avoided.

Pallets must not be stacked.

Construction site storage: lay flat.

Handling: the weight of the Products allows easy manual handling. Mechanical or rope sling handling may be used for high buildings.

SOLE REMEDY

ONDULINE®'s only liability under this warranty, or in any action based upon warranty, contract, negligence (of ONDULINE®, its agents or employees), strict product liability or otherwise, is limited to the replacement of Products that ONDULINE® deems defective. The Owner and ONDULINE® expressly agree that the remedy of replacement of the defective Products is the exclusive and sole remedy available from ONDULINE®.

NO CONSEQUENTIAL DAMAGES

ONDULINE®'S LIABILITY TO AN OWNER TO WHOM THIS WARRANTY EXTENDS SHALL NOT EXCEED ONDULINE®'S SALE PRICE FOR THE PRODUCTS. ONDULINE® SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY FAILURE OR DEFECT IN THE PRODUCTS, INCLUDING BUT NOT LIMITED TO LOSS OF ANY REVENUE, LOSS RELATED TO BUSINESS INTERRUPTION OR OTHER ECONOMIC LOSS.

If any portion of this document shall be held ineffective or void, for any reason, the remainder shall remain in effect.

This warranty shall be interpreted and governed by French laws. All disputes resulting from the present warranty are subject to the courts of Paris.

OFIC Building Materials India Pvt. Ltd.

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Onduline V. Jan 2019

Onduline[®]

Lightweight Roofing Systems