

Ondulit Italiana

Insulating multilayer
protected steel roofing

Ondulit Coverib

Complying with European Norm EN 14782 



Insulating multilayer protected steel roofing



In 1953 the multilayer protected steel sheet was officially introduced in the market.

From then onwards Ondulit has developed a wide range of solutions able to satisfy any technical and architectonic request.

For this reason Ondulit is a privileged partner for the most creative and demanding building planners.

Complying with European Norm EN 14782



Self supporting metal sheets for roofing, external cladding and internal lining.

System's Technical Approval Certificates:

I.T.C. Certificate (National Research Council) - N° 645/07
(since 1975 constantly confirmed certification).

C.S.T.B. Certificate N° 5/04-1798
(since 1983 constantly confirmed certification).

Company's Quality Assurance System certified
in compliance with ISO 9001:2000



Bureau Veritas Quality International Certificate N° 136720

Company's Environmental Management System certified
in compliance with ISO 14001:2004



Bureau Veritas Quality International Certificate N° 219232



The original Ondulit multilayer coating technology of steel is based on the synergistic protective effect known as “duplex”, characterizing those systems in which durability is increased by reciprocal protection of the individual layers. Thanks to an exclusive manufacturing process in continuous, all the different components of the multilayer system are integrated to form a compact material with a complete protection, of great efficacy and durability.

In particular:

The galvanized steel sheet:

- ensures infrangibility and mechanical resistance
- grants reduced thermal expansion

The 1,700 microns thick anticorrosive protective layers:

- completely coat the steel and protect it from oxidation
- deaden the metal, eliminating any noise problem under the action of rain or hail
- provide thermal inertia

The outer metal foils:

- wrap the thick anticorrosive layers preserving their plasticity in time
- reflect, in natural aluminium finish, thermal radiations.

Ondulit protective system is engineered not to have any weak points:

- even the edges are protected and the bends are rounded
- the special protective stabilized bituminous compound is provided with such plasticity and thickness to completely seal the metal sheet from contact with atmosphere and to eliminate any risk of microporosity which all coatings present in inverse proportion to their thickness
- the wrapped metal foils protect the bituminous compound - electrically insulator and chemically inert - preserving its plasticity and shielding it from ultra-violet rays
- the outer metal foils, both in aluminium or in copper, grant excellent corrosion resistance thanks to formation of a self-protective oxide patina and to the synergistic protection of the special plastic bituminous compound.



Lower section

1 - Aluminium foil*, 2 - Plastic bituminous compound, 3 - Galvanized steel , 4 - Bituminous primer, 5 - Aluminium foil*

* Upper coating can be produced in natural aluminium, or in prepainted aluminium, or copper foil, or in stainless steel foil.

** Lower coating can be produced in natural aluminium, or in prepainted aluminium foil.

Resistance to corrosion

Because of its function, roofing is subject to extremely heavy conditions of use and for this reason it needs particularly efficient protection systems.

The alternation of thermal and atmospheric cycles and the presence in the air of aggressive substances can cause, specially in humid and hot climates, rapid and serious decay of normal cladding materials. Particular conditions of installation such as limited slope of pitches, because of lesser rain washing, facilitate humidity stagnation and concentration of corrosive substances and can accelerate degradation phenomena.

In metal sheets with low protective thickness, in particular, these factors can cause localised deterioration of protective coatings at critical points, with the consequent corrosion processes of the metal. The areas most subject to these processes are:

- the corners of bends (corrosion due to the stretching or crushing of the paint)
- the fastening holes, scratches and cuts (corrosion by aeration cells)
- the areas around the impurities in the aluminium alloys (pitting corrosion).

Ondulit multilayer protection grants even in these critical areas superior performances and excellent reliability. This is thanks to the specific characteristics of the individual components of the protective system, which perfectly integrate together determining an overall protection of the sheet that is virtually unlimited in time even in the harshest environmental conditions.

Related to the kind of corrosive attack, conventionally there are three distinct types of corrosive atmospheres, which are frequently combined:

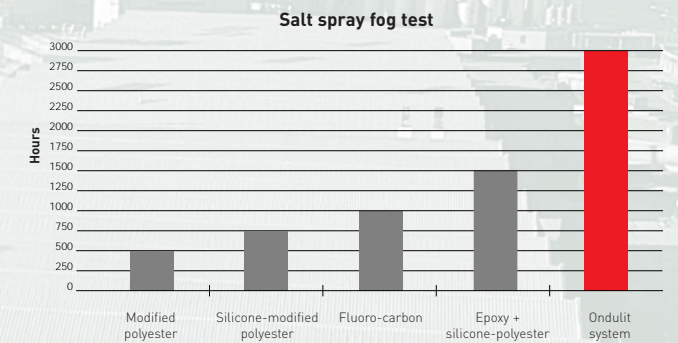
- marine atmosphere
- industrial atmosphere
- urban atmosphere.

Resistance to corrosion. Marine atmosphere

All coastal and inland areas exposed to sea winds are amongst the harshest natural environments for electro-chemical corrosion of all metal roofing. Presence of high levels of humidity and heavy concentration of sodium chloride determine a strong corrosive attack on all not adequately protected metal surfaces. High temperature accelerates the phenomenon. The extremely aggressive conditions of marine atmosphere, with heavy concentration of sodium chloride and presence of strong humidity, are reproduced during salt spray fog resistance test according to ISO 9227.

Salt spray fog test ISO 9227

The test consists in exposing a sample, on the coating of which a cross shaped incision has been made, in a chamber kept at a temperature of 35 °C and in which a solution of 5% sodium chloride is atomized. The chamber is therefore saturated of salt spray fog. The test is usually discontinued when signs of degradation appear. The graphic chart shows the results obtained by the most commonly used coating systems for steel roofing. It is evident that Ondulit multilayer protection system is far more efficient than simple pre-painting. *After 3,000 hours (predetermined exposure time) there was no blistering or peeling on the Ondulit sample with natural aluminium lining, not even along the incisions. The coating was intact with no sign of corrosion.*



Resistance to corrosion. Industrial and urban atmosphere

Atmospheres of the industrial type are not only limited to areas heavily polluted by sulphur dioxide and other chemical compounds (generally found in industrial areas), but they can extend to areas situated in the direction of winds blowing from such zones. The action of chemically aggressive substances, often combined with high levels of humidity, can produce a fast decay of normal metal roofs. The main cause of corrosion in urban atmosphere is due to high concentration of hydrocarbon combustion by-products. Considerable amounts of polluting agents, in particular sulphur dioxide, persist in the air. Specially in presence of humidity (as fog, dew, condensation, etc.) sulphur dioxide produces particularly aggressive action on metals. The Kesternich chamber test is usually adopted both for industrial and for urban atmospheres and in any case of exposure to emissions of combustion gases according to ISO 6988.

Sulphur dioxide test ISO 6988

The test consists in exposing a sample, on the coating of which a cross shaped incision has been made, in a chamber saturated with humidity and kept at a temperature of 40 °C and in which 2 litres of sulphur dioxide are added (on a total volume of 300 litres). Eight hours later the chamber is opened and the sample remains 16 hours at room temperature. These two expositions constitute a cycle. *After 45 cycles there were no signs of cracking, peeling, blistering or creepage. The Ondulit sample with natural aluminium lining remained intact, apart from a slight swelling along the incisions, with no sign of corrosion.*



Roofing is the construction element that more than any other protects and separates the building from the external environment.

For this reason it is important that cladding must grant high performances and total reliability in time.

The action of atmospheric agents and alternation of thermal cycles can in fact interfere negatively, in case of poor performing materials or unsuitable technical solutions, on the activities that are undertaken inside a building, even to affecting the very quality of life itself.

The exclusive Ondulit manufacturing technology, enabling perfect integration between the different components, utilizes and improves the best properties of each individual material.

The most important characteristics of cladding and the strong points of Ondulit multilayer protection are:

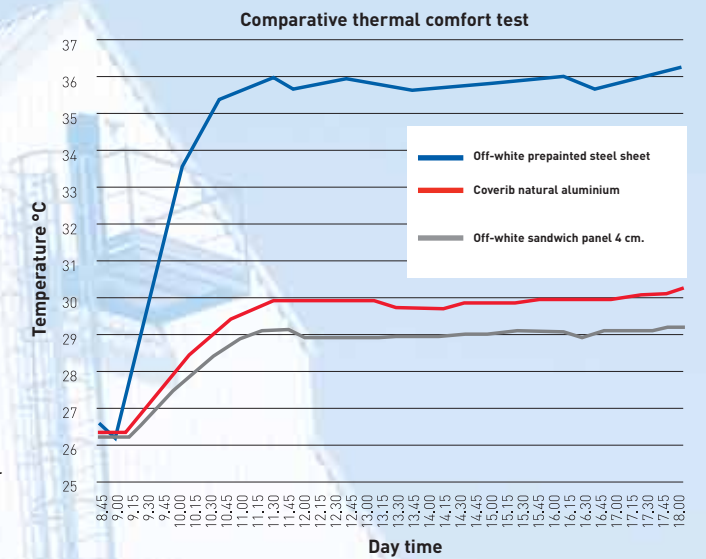
- great capacity of reflecting sun thermal radiation with low emission indoors
- high sound deadening power under the action of rain or hail
- adequate mechanical resistance with reduced thermal expansion, compatible with any kind of supporting structure.

Thermal comfort

The reflecting power of natural aluminium upper finishing (over 90% of the thermal radiations) with the thermal inertia of the thick protective layers, highly limits the overheating of cladding under sun radiations. Moreover, the lower natural aluminium foil emits only 5% of the small amount of heat absorbed by the sheet. In hot climates, the adoption of additional insulation is therefore often unnecessary, in particular for ventilated open buildings without air conditioning, as it is confirmed by the certified comparative thermal comfort test.

Comparative test of thermal comfort performances between different roofing materials

The test consists in determining the quantity of heat radiated by three different types of metal roof under a solar spectrum lamp. The walls of the testing chambers were partially opened in order to simulate a typical industrial building in hot climates. *The test shows how, in conditions of natural ventilation, the heat radiated inside a building by Ondulit-Coverib with natural aluminium finishing is practically identical to that of an off-white sandwich panel with 4 cm polyurethane.*

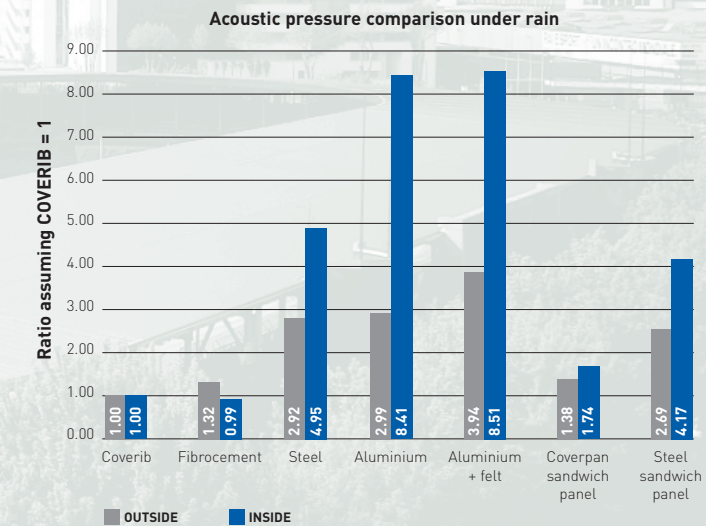


Acoustic comfort

Any normal metal cladding, subject to rain or hail beating, causes serious noise problems both in underlying and surrounding areas. Ondulit multilayer protective system is unique in having a thick antinoise protection layer on the external side of sheets. This protective coating absorbs precipitation impact on metal and avoids its vibration, the origin of roaring noise. Roofing is therefore aphonous. Moreover Coverib system features an average sound damping of 28 dB.

Comparative sound deadening test between different roofing materials

Submitted to artificial rainfall of even intensity, the equivalent sound pressure levels produced by the different roofing were measured. The results are shown assuming as 1 the noise measured with Coverib roof. *The deadening capacity of Ondulit-Coverib protected steel roofing is up to 8.41 times higher than a usual metal roofing as shown in the table chart.*

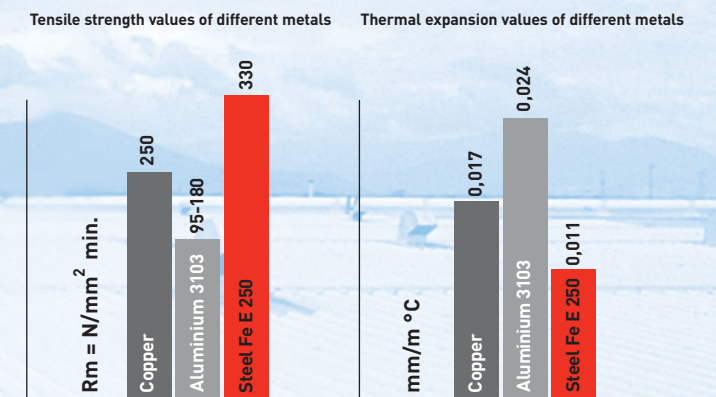


Mechanical resistance and thermal expansion

Mechanical resistance and thermal expansion properties of a roofing must be carefully evaluated during project phase. In Ondulit cladding systems mechanical and thermal expansion characteristics are those specific of the steel, constituting the sheet's internal core. In fact the special embossing of the external metal foils and the plastic characteristics of the interposed layers make absolutely compatible the effects of the differential thermal expansions.

Tensile strength and differential thermal expansion

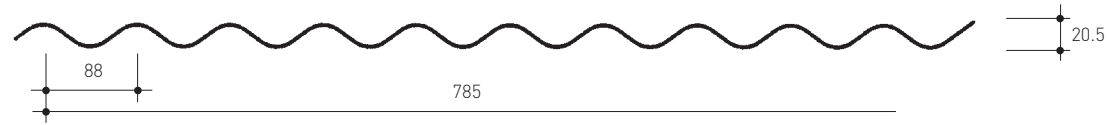
The steel core of Ondulit system offers the greatest tensile strength and the lowest thermal expansion values in comparison with the most commonly used cladding metals, as shown in the following tables. Higher tensile strength grants infrangibility, lack of breakage and allows larger spanning of the supporting structure. Lower thermal expansion allows using longer elements with no risk of technical problems nor of disruptive processes of the cladding itself caused by differential expansion between roofing and supporting structure.





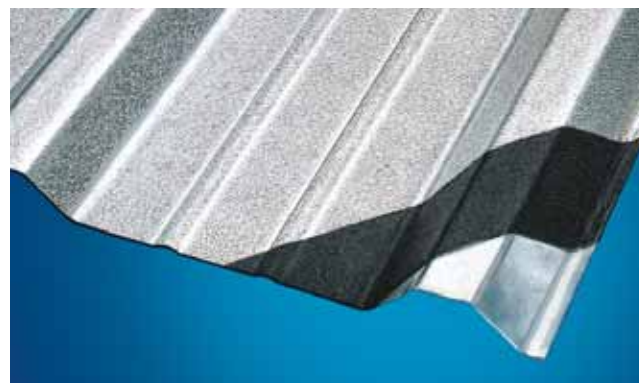
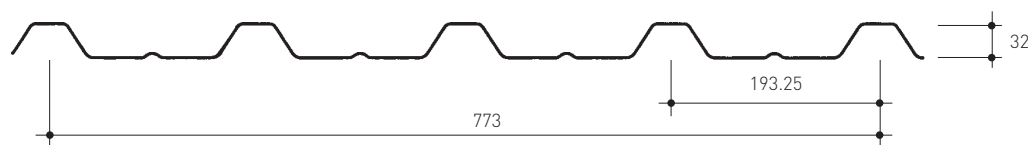
length	custom tailored
nominal width	900 mm
cover width	785 mm
average total thickness	2.4 mm
steel thickness	0.50 - 0.60 - 0.80 mm
	7.600 kg with steel 0.50
mass/m ²	8.200 kg with steel 0.60
	9.400 kg with steel 0.80
	on length: + 20, - 5 mm
tolerances	on covering width: + / - 5 mm
	on thickness and on weight: + / - 10%

ONDULIT



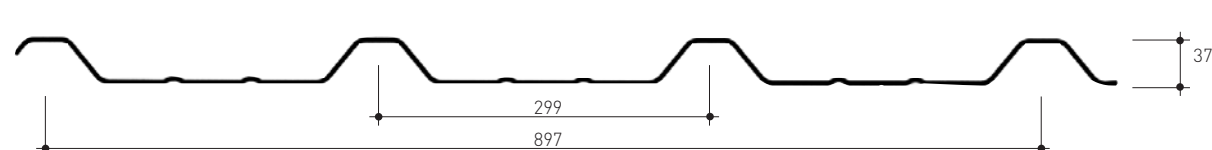
length	custom tailored
nominal width	850 mm
cover width	773 mm
average total thickness	2.4 mm
steel thickness	0.50 - 0.60 - 0.80 mm
	8.000 kg with steel 0.50
mass/m ²	8.600 kg with steel 0.60
	10.000 kg with steel 0.80
	on length: + 20, - 5 mm
tolerances	on covering width: + / - 5 mm
	on thickness and on weight: + / - 10%

COVERIB 850



length	custom tailored for minimum lot of 2500 sq. m.
nominal width	1000 mm
cover width	897 mm
average total thickness	2.4 mm
steel thickness	0.50 mm
mass/m ²	7.4 kg
	on length + 20, - 5 mm
tolerances	on covering width + / - 5 mm
	on thickness and on weight + / - 10%

COVERIB 1000



ONDULIT - Draft of specifications

Roofing (and/or cladding) shall be Ondulit, with CE marking according to EN 14782, sound deadening insulating multilayer protected sheets with sinusoidal profile, consisting of a galvanized steel sheet (EN 10147) (0.50, 0.60, 0.80 mm thick) protected on its external side by an anticorrosion & sound proofing stabilized plastic bituminous coat (thickness 1.5 mm approximately) and by a natural aluminium foil (alternatively prepainted aluminium foil or electrolytic copper foil or stainless steel foil), and on its reverse side by a bituminous primer and by a natural (or prepainted) aluminium foil.

In order to grant the lasting of the performances, the anticorrosive and sound deadening protection of approximately 1.5 mm thick must be on the upper side of the sheet.

Roofing shall grant the following performances :

- Sound proofing:	28 dB (ISO 140-3)
- Fire reaction:	Class B-s1, d0 (EN 13823; EN ISO 11925- 2)
- Salt spray fog:	3000 hours (ISO 9227)

COVERIB 850 - Draft of specifications

Roofing (and/or cladding) shall be Coverib 850, with CE marking according to EN 14782, sound deadening insulating multilayer protected sheets with trapezoidal profile, consisting of a galvanized steel sheet (EN 10147) (0.50, 0.60, 0.80 mm thick) protected on its external side by an anticorrosion & sound proofing stabilized plastic bituminous coat (thickness 1.5 mm approximately) and by a natural aluminium foil (alternatively prepainted aluminium foil or electrolytic copper foil or stainless steel foil), and on its reverse side by a bituminous primer and by a natural (or prepainted) aluminium foil.

In order to grant the lasting of the performances, the anticorrosive and sound deadening protection of approximately 1.5 mm thick must be on the upper side of the sheet.

Roofing shall grant the following performances :

- Sound proofing:	28 dB (ISO 140-3)
- Fire reaction:	Class B-s1, d0 (EN 13823; EN ISO 11925- 2)
- Salt spray fog:	3000 hours (ISO 9227)

COVERIB 1000 - Draft of specifications

Roofing (and/or cladding) shall be Coverib 1000, with CE marking according to EN 14782, sound deadening insulating multilayer protected sheets with trapezoidal profile, consisting of a galvanized steel sheet (EN 10147) (0.50 mm thick) protected on its external side by an anticorrosion & sound proofing stabilized plastic bituminous coat (thickness 1.5 mm approximately) and by a natural aluminium foil (alternatively grey prepainted aluminium foil), and on its reverse side by a bituminous primer and by a natural aluminium foil.

In order to grant the lasting of the performances, the anticorrosive and sound deadening protection of approximately 1.5 mm thick must be on the upper side of the sheet.

Roofing shall grant the following performances :

- Sound proofing:	28 dB (ISO 140-3)
- Fire reaction:	Class B-s1, d0 (EN 13823; EN ISO 11925- 2)
- Salt spray fog:	3000 hours (ISO 9227)

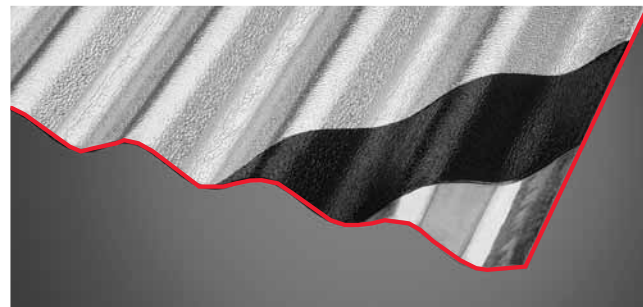
Allowable spans L for Ondulit, Coverib 850 and Coverib 1000 profiles in function of distributed loads "p" and of the static scheme.

$f \leq 1/200 L$
 $\sigma \leq 1650 \text{ daN/cm}^2$
 Geometric and static properties have been calculated according to C.N.R. instructions 10022/84.

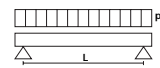
Ondulit

steel thickness	J cm ⁴ /m	W' min cm ³ /m	W' min cm ³ /m
0.50 mm	2.66	2.53	
0.60 mm	3.23	3.07	
0.80 mm	4.39	4.12	

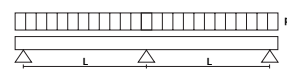
J = Moment of inertia W = Module of resistance to flexion



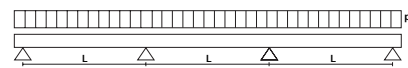
STATIC SCHEME: ONE SPAN



STATIC SCHEME: TWO SPANS



STATIC SCHEME: THREE SPANS



		Load = daN/m ²																	
steel thick.		60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400
0.50 mm	L = m	1.53	1.39	1.29	1.21	1.15	1.10	1.06	1.02	0.99	0.96	0.94	0.91	0.89	0.87	0.86	0.84	0.83	0.81
0.60 mm	L = m	1.63	1.48	1.38	1.29	1.23	1.18	1.13	1.09	1.06	1.03	1.00	0.98	0.95	0.93	0.92	0.90	0.88	0.87
0.80 mm	L = m	1.81	1.64	1.52	1.43	1.36	1.30	1.25	1.21	1.17	1.14	1.11	1.08	1.06	1.03	1.01	0.99	0.98	0.96

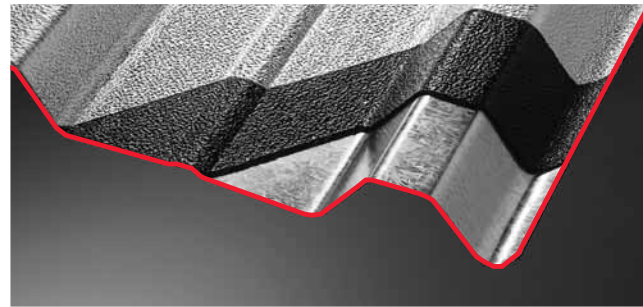
		Load = daN/m ²																	
steel thick.		60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400
0.50 mm	L = m	2.05	1.86	1.73	1.63	1.54	1.45	1.36	1.29	1.23	1.18	1.13	1.09	1.06	1.02	0.99	0.96	0.94	0.91
0.60 mm	L = m	2.19	1.99	1.84	1.73	1.65	1.58	1.50	1.42	1.36	1.30	1.25	1.20	1.16	1.13	1.09	1.06	1.03	1.01
0.80 mm	L = m	2.42	2.20	2.04	1.92	1.83	1.75	1.68	1.62	1.57	1.51	1.45	1.39	1.35	1.30	1.26	1.23	1.20	1.17

		Load = daN/m ²																	
steel thick.		60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400
0.50 mm	L = m	1.81	1.65	1.53	1.44	1.37	1.31	1.26	1.21	1.18	1.14	1.11	1.08	1.06	1.04	1.02	1.00	0.98	0.96
0.60 mm	L = m	1.93	1.76	1.63	1.54	1.46	1.39	1.34	1.29	1.25	1.22	1.19	1.16	1.13	1.11	1.08	1.06	1.05	1.03
0.80 mm	L = m	2.14	1.95	1.81	1.70	1.62	1.54	1.49	1.43	1.39	1.35	1.31	1.28	1.25	1.23	1.20	1.18	1.16	1.14

Coverib 850

steel thickness	J cm ⁴ /m	W' min cm ³ /m	W' min cm ³ /m
0.50 mm	8.59	3.76	3.40
0.60 mm	10.68	4.79	4.37
0.80 mm	14.47	6.71	6.07

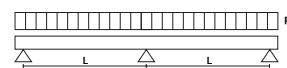
J = Moment of inertia W = Module of resistance to flexion



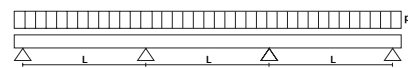
STATIC SCHEME: ONE SPAN



STATIC SCHEME: TWO SPANS



STATIC SCHEME: THREE SPANS



		Load = daN/m ²																	
steel thick.		60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400
0.50 mm	L = m	2.26	2.05	1.91	1.79	1.70	1.63	1.57	1.51	1.47	1.42	1.38	1.33	1.29	1.24	1.21	1.17	1.14	1.11
0.60 mm	L = m	2.43	2.21	2.05	1.93	1.83	1.75	1.69	1.63	1.58	1.53	1.49	1.45	1.42	1.39	1.36	1.33	1.29	1.26
0.80 mm	L = m	2.69	2.44	2.27	2.13	2.03	1.94	1.86	1.80	1.74	1.69	1.65	1.61	1.57	1.54	1.51	1.48	1.45	1.43

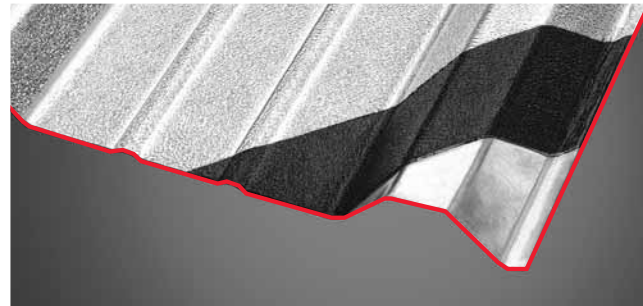
		Load = daN/m ²																	
steel thick.		60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400
0.50 mm	L = m	2.74	2.37	2.12	1.93	1.79	1.68	1.58	1.50	1.43	1.37	1.31	1.27	1.22	1.18	1.15	1.12	1.09	1.06
0.60 mm	L = m	3.10	2.69	2.40	2.19	2.03	1.90	1.79	1.70	1.62	1.55	1.49	1.44	1.39	1.34	1.30	1.27	1.23	1.20
0.80 mm	L = m	3.60	3.16	2.83	2.58	2.39	2.24	2.11	2.00	1.91	1.83	1.76	1.69	1.63	1.58	1.54	1.49	1.45	1.42

		Load = daN/m ²																	
steel thick.		60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400
0.50 mm	L = m	2.68	2.43	2.26	2.13	2.00	1.87	1.77	1.68	1.60	1.53	1.47	1.42	1.37	1.32	1.28	1.25	1.22	1.18
0.60 mm	L = m	2.88	2.62	2.43	2.29	2.17	2.08	2.00	1.90	1.81	1.73	1.67	1.60	1.55	1.50	1.46	1.42	1.38	1.34
0.80 mm	L = m	3.19	2.90	2.69	2.53	2.40	2.30	2.21	2.13	2.07	2.01	1.96	1.89	1.83	1.77	1.72	1.67	1.62	1.58

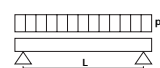
Coverib 1000

steel thickness	J cm ⁴ /m	W' min cm ³ /m	W' min cm ³ /m
0.50 mm	10.34	3.67	3.07

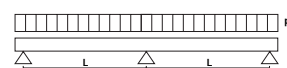
J = Moment of inertia W = Module of resistance to flexion



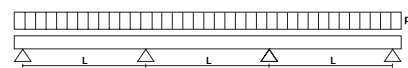
STATIC SCHEME: ONE SPAN



STATIC SCHEME: TWO SPANS



STATIC SCHEME: THREE SPANS



		Load = daN/m ²																	
steel thick.		60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400
0.50 mm	L = m	2.40	2.18	2.03	1.91	1.81	1.73	1.64	1.56	1.48	1.42	1.36	1.31	1.27	1.23	1.19	1.16	1.13	1.10

		Load = daN/m ²																	
steel thick.		60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400
0.50 mm	L = m	2.60	2.25	2.01	1.84	1.70	1.59	1.50	1.42	1.36	1.30	1.25	1.20	1.16	1.13	1.09	1.06	1.03	1.01

		Load = daN/m ²																	
steel thick.		60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400
0.50 mm	L = m	2.85	2.52	2.25	2.05	1.90	1.78	1.68	1.59	1.52	1.45	1.40	1.35	1.30	1.26	1.22	1.19	1.15	1.13



The particular superficial embossed finishing and the wide range of available colours allow Ondulit-Coverib 850 cladding to fit harmoniously in any environment. Upper and/or lower coating can be produced in natural aluminium, or in stainless steel foil or in prepainted aluminium foil in the following colours. Upper coating can also be supplied in natural copper foil. Coverib 1000 is available only in natural aluminium or grey prepainted foil.

Note: the faithfulness to the original colours is influenced by printing technical possibilities. We would suggest you to request the original samples in embossed aluminium.

Ondulit and Coverib 850



Coverib 1000



Customer service / Technical assistance

Ondulit Technical Assistance Service provides free technical advice world wide, with no obligation for the customer, from the planning stage.

In addition it draws up the erection plan of the roofing and the list of materials which will be submitted to the customer for approval. Under this aspect it is required that drawings should be sent to us in Autocad® format, complete with any information regarding the supporting structure.

Technical Assistance Service provides the customer with simple overall information.



Ondulit and Coverib 850 sheets can be supplied curved, bent, and custom cut to erect roofing of all kinds and complexity. Coverib 1000 can be supplied in straight sheets or curved as reported below.

Curving

Sheets can be supplied curved, both of concave or convex shape, according to the required radius.

Minimum radius:

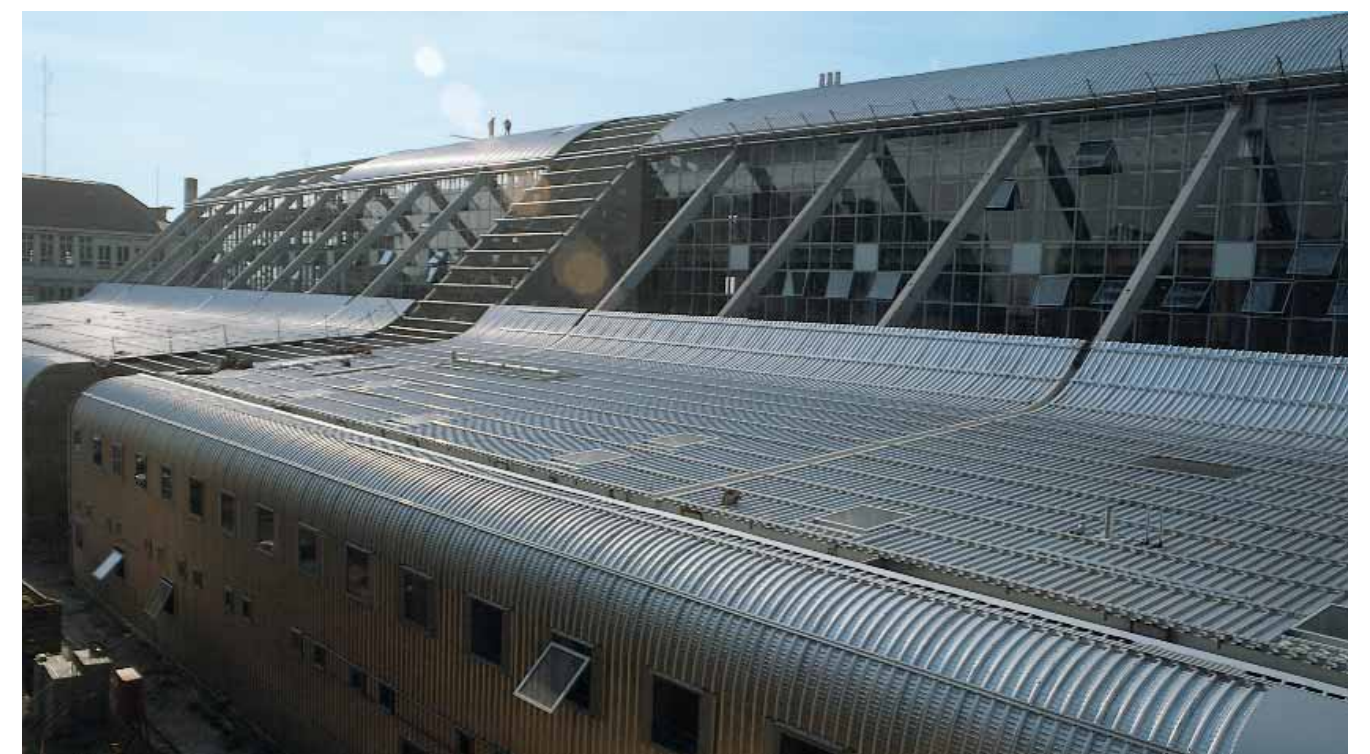
Ondulit convex:	250 cm
Ondulit concave (upside down):	300 cm
Coverib 850 convex:	100 cm
Coverib 850 concave (upside down):	400 cm
Coverib 1000 convex:	800 cm

N.B. Convex or concave curving with minimum radius is related to the sheet's length. We would suggest you contact Ondulit Technical Assistance Service.

Bending

Should the type of roofing require it, sheets can be supplied already bent, ready for installation.

N.B. We would suggest you contact Ondulit Technical Assistance Service to find out minimum angles of bending.



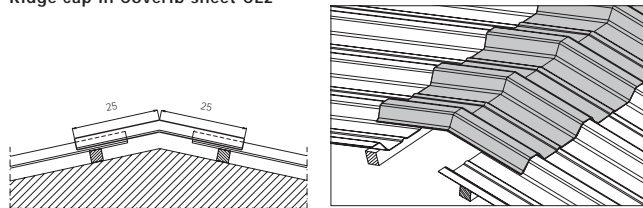
Ondulit supplies a wide range of flashing and accessories designed to fit roofing and walls of any shape and complexity. In the following pages some of the most commonly used accessories are shown for Coverib 850 trapezoidal profile. All elements are also available in Coverib 1000 profile and, excepting the pressed ones, in Ondulit sinusoidal profile. Standard flashings are 50 cm (as in picture) or 33 cm or 70 cm girth. Custom flashings are also available. Flashings are either in embossed aluminium 1 mm thick, natural or prepainted in the same shades of sheets, or in copper sheet 0.60 mm thick, in the case of copper roofing or in stainless steel 0.60 mm thick.

Pressed flashings are made in embossed natural aluminium sheet 1.5 mm thick and 0.60 mm thick copper. Fixing groups are composed of stainless steel screws complete with metal washers - either in natural or prepainted aluminium, or in copper - and gaskets in plastic bitumen with self sealing properties. Available for natural light areas are:

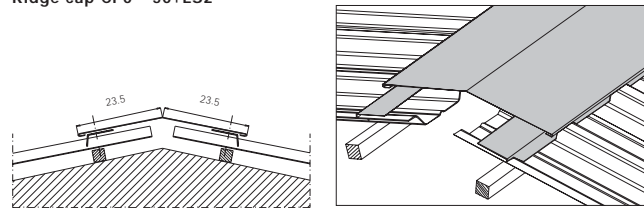
- sinusoidal and trapezoidal profile Coverlux sheets in fiberglass reinforced polyester resin
- trapezoidal profile Polilux sheets in extruded compact polycarbonate.

Note: asterisks represent the code of the colour

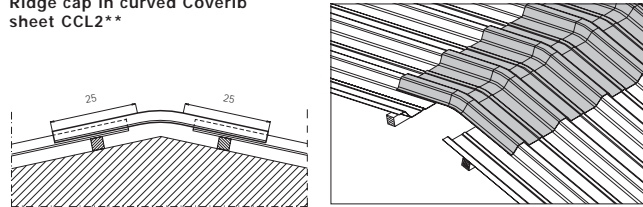
Ridge cap in Coverib sheet CL2**



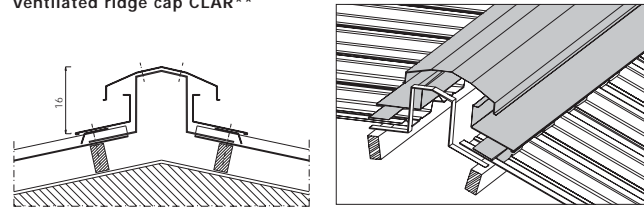
Ridge cap CP0**50+LS2**



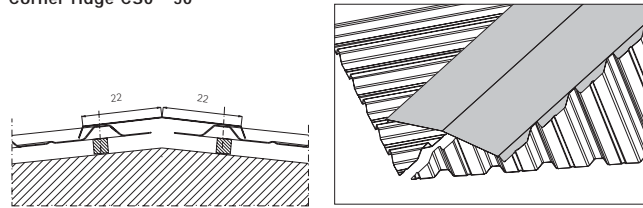
Ridge cap in curved Coverib sheet CCL2**



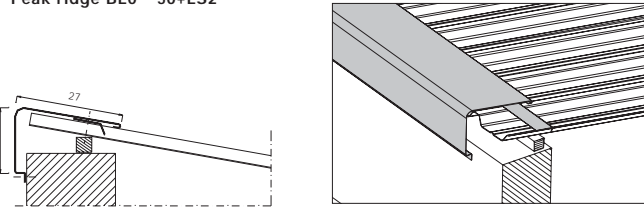
Ventilated ridge cap CLAR**



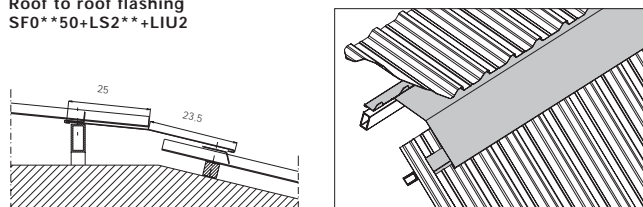
Corner ridge CS0**50



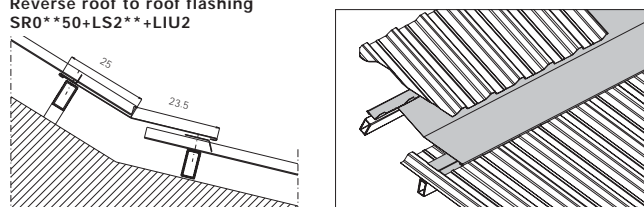
Peak ridge BL0**50+LS2**



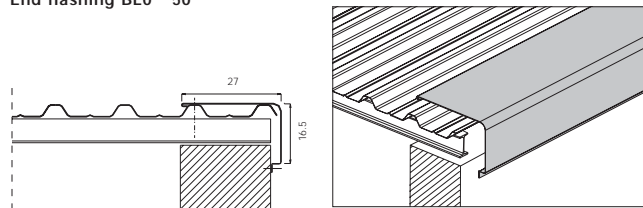
Roof to roof flashing SF0**50+LS2**+LIU2



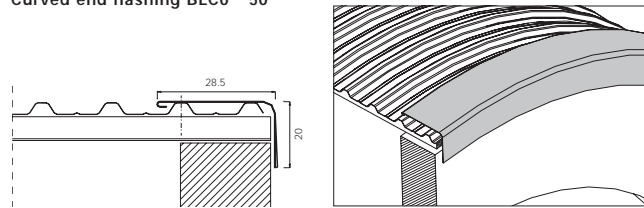
Reverse roof to roof flashing SR0**50+LS2**+LIU2



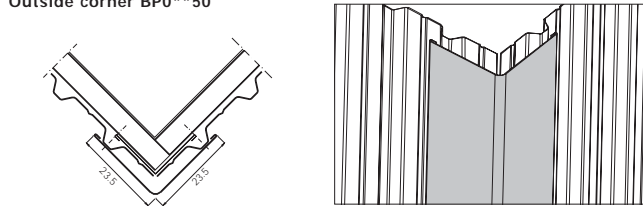
End flashing BL0**50



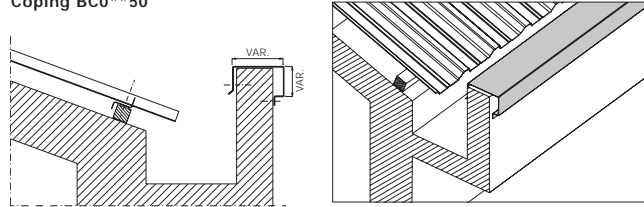
Curved end flashing BLC0**50



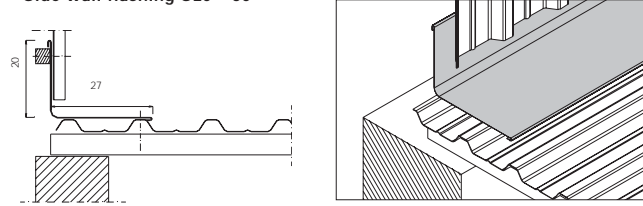
Outside corner BP0**50



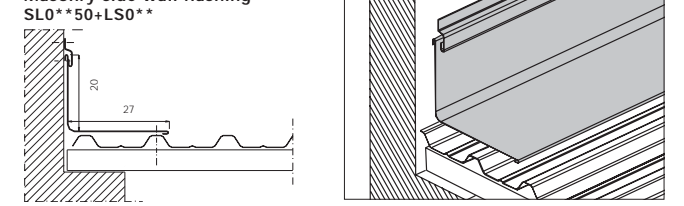
Coping BC0**50



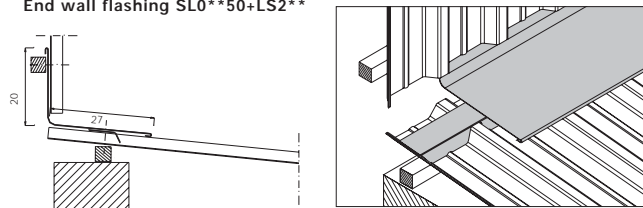
Side wall flashing SL0**50



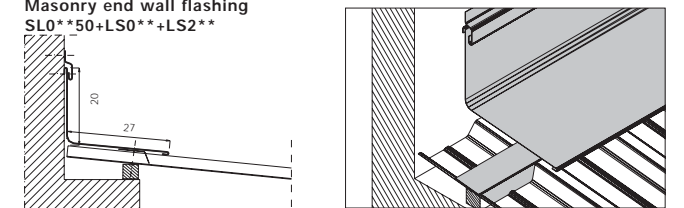
Masonry side wall flashing SL0**50+LS0**



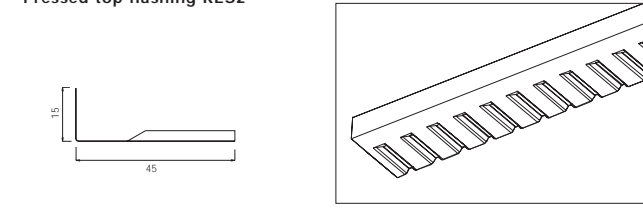
End wall flashing SL0**50+LS2**



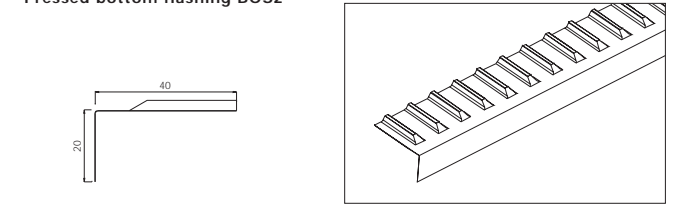
Masonry end wall flashing SL0**50+LS0**+LS2**



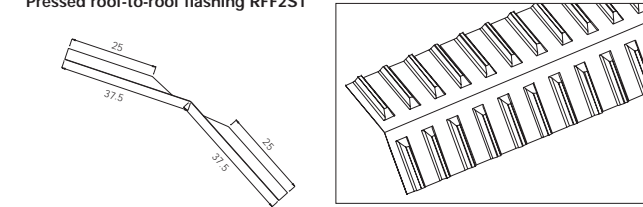
Pressed top flashing RES2



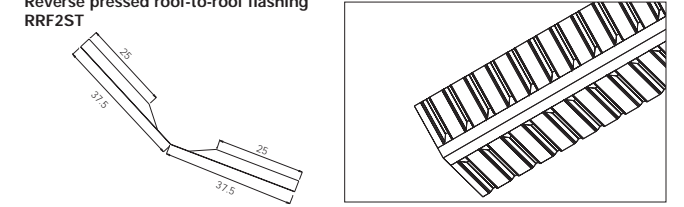
Pressed bottom flashing BOS2



Pressed roof-to-roof flashing RFF2ST



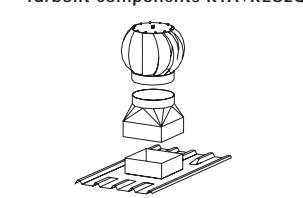
Reverse pressed roof-to-roof flashing RRF2ST



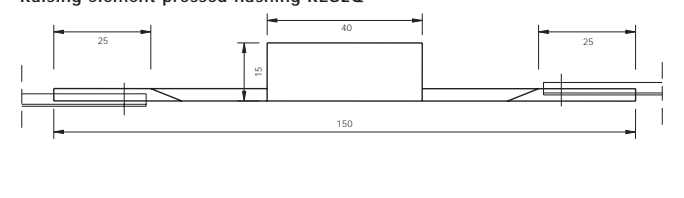
Turbolit turbo extractor TA



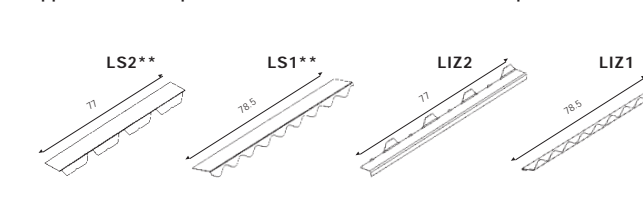
Turbolit components RTA+RES2Q



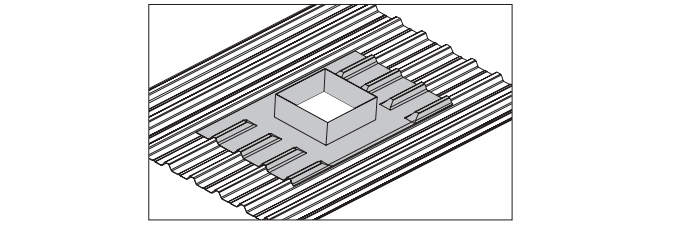
Raising element pressed flashing RES2Q



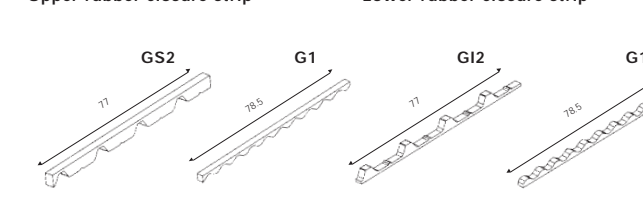
Upper closure strip



Lower closure strip

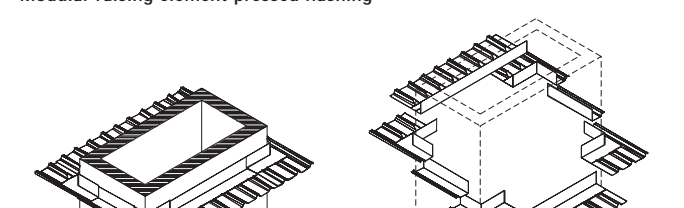


Upper rubber closure strip

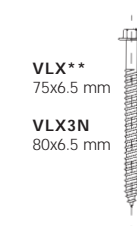


Lower rubber closure strip

Modular raising element pressed flashing



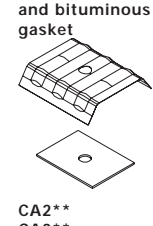
Wood screw



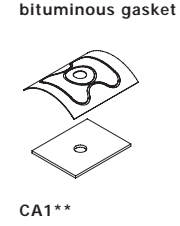
Self tapping steel screw



Metal washer and bituminous gasket



Metal washer and bituminous gasket



VLX**
75x6.5 mm

VLX3N
80x6.5 mm

VMDX**
75x6.3 mm

CA2**
CA3**

CA1**



In non industrial buildings, reliability, comfort and aesthetics are principle requirements of a roofing, both for new and for reclamation of existing real estate.

Ondulit roofing systems grant extraordinary durability - with consequent elimination of maintenance expenses - and excellent thermal and acoustic insulation.

Furthermore the aesthetic qualities and the broad range of available colours make it suitable both for traditional buildings as well as for modern architectonic projects, in any environment.



1



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5



6

- 1. Residential houses (Turin)
- 2. Residential houses - (Paris)
- 3. Shopping mall - (Matera)
- 4. Lighthouses and Signal Service - (Brest) - (France)
- 5. Individual house - Settimo Torinese (Turin)
- 6. Traditional building - Fiuggi (Frosinone)



The cladding of industrial plants must be able to perform in difficult environmental conditions, providing ample guarantee of durability. Ondulit multilayer protected roofing systems fear no comparison in this specific field and moreover are very practical.

Such requisites, coupled with extensive knowledge of production plant's needs, are very often successful specially in cases of rehabilitation of deteriorated cladding and allow the adoption of specific solutions for every single need.



7



8



9

- 7. Logistiques Ponroy Santé - Vendée (France)
- 8. Fish farm - Lampedusa (Sicily)
- 9. Porcelanosa Ceramics - Villa Real (Spain)
- 10. Schnell Reinforcement Equipment - Fano (Pesaro)



10



The design of this kind of buildings normally involves demanding and high technical solutions. As a consequence the cladding particularly must guarantee high level performances. Designers find in Ondulit a specialised partner able to fully meet these needs. Thanks to an experience that fears no comparison Ondulit is able to propose custom made technical solutions for individual projects allowing such high performances and exceptional durability to fulfil the most challenging projects.



11



12



13

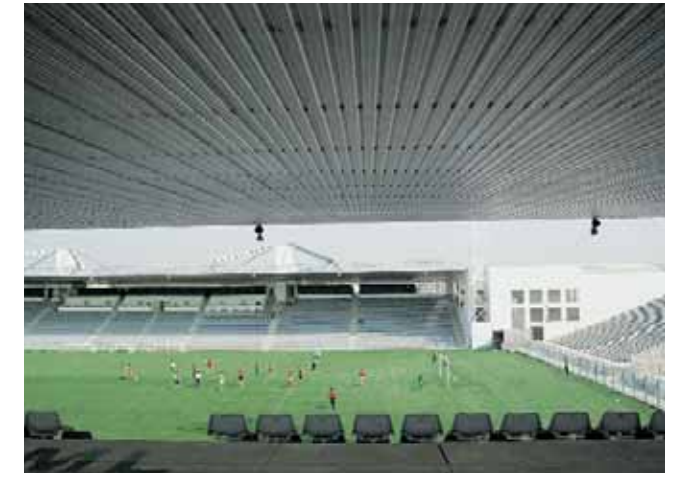


14

- 11. Railway station - (Lyon) - (France)
- 12. Carrefour Hypermarket - (Matera)
- 13. Malpensa Airport - (Milan)
- 14. Porta Palazzo indoor market - (Turin)



Designing needs and architectonic characteristics of a school, a church, a sport facility, a stadium, an hotel are very diverse. Anyway, in all these cases, very often cladding becomes the distinctive and qualifying feature of the whole building. Furthermore the public destination of this kind of buildings involves materials offering highest guarantees of durability. Ondulit roofing systems couple versatility and reliability guaranteed and certified to the highest levels.



15



16



17



18



19

- 15. Des Costières Stadium - (Nîmes) - (France)
- 16. Parking and escalators - (Perugia)
- 17. Castelferretti Stadium - (Ancona)
- 18. Multiplex cinema - Ostia (Rome)
- 19. Giglio Stadium - (Reggio Emilia)



Salt spray resistance

- according to ISO 9227: 3,000 hours

- according to ASTM B117: After 3,000 hours (predetermined exposure time) there was no blistering or peeling on the Ondulit sample with natural aluminium lining, not even along the incisions. The coating layer was intact with no sign of corrosion.

Resistance to SO₂

- according to ISO 6988: 45 cycles

- according to DIN 50018 - UNI 5085: After 45 cycles there were no signs of cracking, peeling, blistering or creepage. The Ondulit sample with natural aluminium lining remained intact, apart from a slight swelling along the incisions, with no sign of corrosion.

Humidity resistance (ISO 6270-1) 3,000 hours

- according to ASTM D2247: After 3,000 hours (predetermined exposure time) there were no signs of cracking, peeling, blistering or creepage even along the incisions. The Ondulit sample with natural aluminium lining remained intact with no sign of corrosion.

Accelerated weathering

(Weatherometer ATLAS): After 1,200 hours (corresponding to at least five years of installation) no Ondulit sample showed any signs of degradation such as corrosion, cracking, blistering, neither on the aluminium foil nor on the paint film, not even within the 4 mm holes previously drilled to simulate the fastening conditions.

Reflective power

90%*

Radiating power

5%*

Thermal transmission (ASTM C236 54T)

$K = 3.84 \text{ W/m}^2 \text{ K}^*$

Thermal conductivity

$\lambda = 0.126 \text{ W/m K}^*$

Deadening (Istedil Certificate)

Up to 8.41 times higher than a 0.70 mm thick aluminium sheet and up to 4.17 times higher than a sandwich panel with 4 cm insulation**

Note: *Data valid for natural aluminium surfacing

**ISTEDIL tests 1302 / 2002 - G e 1302 / 202 - C

Sound insulation

Coverib 28 dB (at 500Hz according to ISO 140-3, ISO 717-1).

Resistance to thermal shocks (Test approval underway)

No sliding of layers, no blistering or wrinkling.

Admissible thermal interval

- 30 ÷ + 80 °C

Impact strength (ITC - CNR NORM)

Dynamic stress:
steel sphere: 0.5 Kg ($\varnothing \cong 50 \text{ mm}$)
height of fall: 2.50 m
impact energy: daN/m 1.25
Manifest dents on the impact areas; no tears on the aluminium foil and no piercing of the protective layers.

Abrasion resistance (UNI 4543)

The natural aluminium protecting foil of Ondulit samples remained unaltered in the area hit by the sand blast; samples with painted aluminium foils showed a slight loss of weight (0.0059 g) due to the abrasion of the paint film.

Reaction to fire (EN 13823; EN ISO 11925 - 2)

Class B-s1, d0

Colour fastness (Xenotest 150-UNI 5146)

> point 7 of the blue range

Frost resistance (UNI 3949-74)

After 20 cycles, 24 hours each, of freezing and defrosting there were no signs of deformation or peeling of any of the layers of the sample.

The suggestion and data reported in this catalogue are based on information we believe to be reliable, being the result of long experience and considerable knowledge as well as of field and lab test. They are offered in good faith, but with no guarantee, as conditions and methods of use of our products are beyond our control. They do not involve any responsibility whatsoever for Ondulit Italiana S.p.A. Ondulit Italiana S.p.A. is fully entitled to modify or improve its products at any time without notice.

Ondulit Italiana spa

Insulating multilayer protected steel roofing

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