INSTALLATION OF TEGOLA CANADESE SHINGLES

Bituminous shingles create a discontinuous roof covering, which becomes waterproof as a result of the overlapping of elements and of the incline of the laying surface. Thus, for any given slope (as long as it is greater than 15° or 25%, depending upon the model of shingle), the roof covering becomes impermeable simply because of the overlapping of shingles. In slopes less than 15° or 25%, meanwhile, and independent of the type of support used, shingles must be applied with the use of a bituminous membrane as a waterproof underlay.
The Tables below indicate the pitch limits with respect to the length of the slope for each shingle model in the grit and metal lines.

STANDARD and LIBERTY Shingles

Roof slope	Length of the slope		
	Up to 7 m	From 7 to 10 m	From 10 to 15 m
Greater than 35%	Nailed installation	Nailed installation	Nailed installation
From 30% to 35%	Nailed installation	Nailed installation	To be waterproofed with bituminous menbrane
From 25% to 30%	Nailed installation	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane
Up to 25%	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane

Table 7

Prestige ELITE & Prestige TRADITIONAL Tiles -TRADITIONAL & MOSAIK Shingles

Roof slope	Length of the slope		
	Up to 7 m	From 7 to 10 m	From 10 to 15 m
Greater than 40%	Nailed installation	Nailed installation	Nailed installation
From 35% to 40%	Nailed installation	Nailed installation	To be waterproofed with bituminous menbrane
From 30% to 35%	Nailed installation	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane
Up to 30%	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane

Table 8

Prestige COMPACT & COMPACT ZT Tiles - MASTER Shingles

Roof slope	Length of the slope		
	Up to 7 m	From 7 to 10 m	From 10 to 15 m
Greater than 45%	Nailed installation	Nailed installation	Nailed installation
From 40% to 45%	Nailed installation	Nailed installation	To be waterproofed with bituminous menbrane
From 35% to 40%	Nailed installation	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane
Up to 35%	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane

Table 9

GOTHIK Shingles

Roof slope	Length of the slope		
	Up to 7 m	From 7 to 10 m	From 10 to 15 m
Greater than 50%	Nailed installation	Nailed installation	Nailed installation
From 45% to 50%	Nailed installation	Nailed installation	To be waterproofed with bituminous menbrane
From 40% to 45%	Nailed installation	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane
Up to 40%	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane	To be waterproofed with bituminous menbrane

Table 10

If the laying surface is nailable but the slope is too long for a nailed installation method to be used, according to the values in the preceding tables, it is sometimes possible to proceed with a mixed nail-torch application.
To clarify this option, an example is provided below which, as in Table 5, analyzes three examples of a 33% pitch and a slope length of 5, 9 and 14 m. As the Table indicates, with a 33% pitch, nail-installation can proceed up to a 7 m slope. In slopes of greater length, waterproofing is necessary in the eaves, torch-applying the shingles onto the waterproof membrane, but allowing nailing of the last seven meters of the slope. From this example, the standard to follow for each specific case and with respect to the model of shingle chosen may be deduced.

EXAMPLES: INSTALLATION ON SLOPES OF DIFFERENT LENGTH (33% SLOPE)

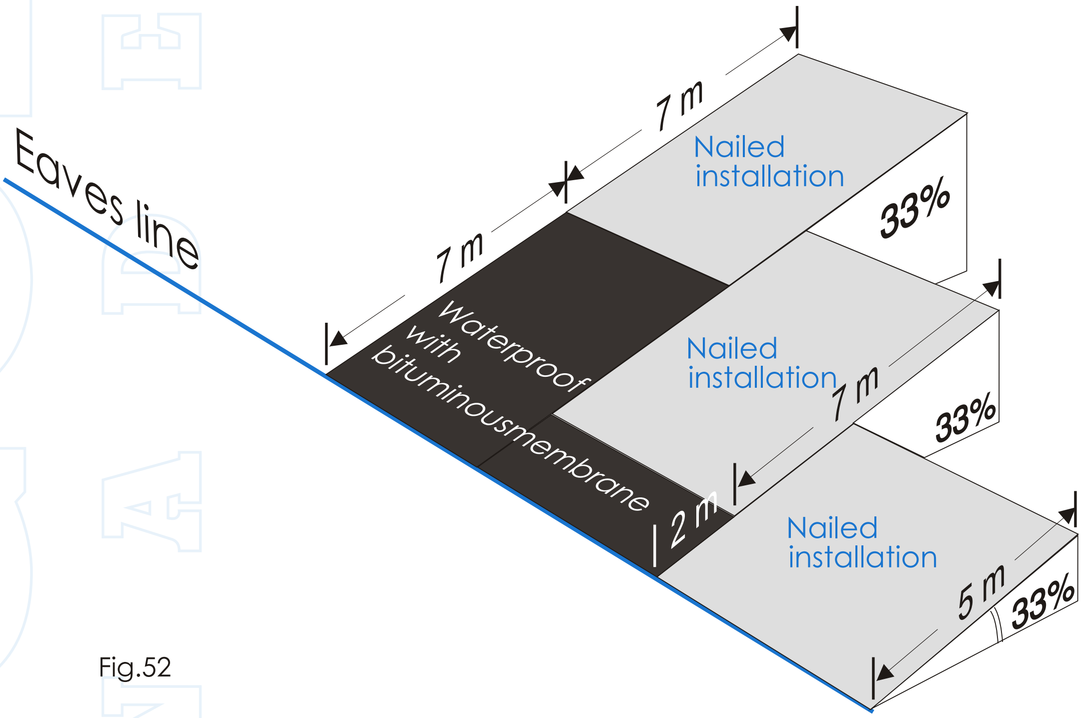


Fig.52

FOR SLOPES LONGER THAN 15 METERS, ASK TEGOLA CANADESE

SIZE OF THE VENTILATION CHAMBER

Efficient air circulation within the "ventilated roof" requires that the ventilation chamber be of the correct size. The thickness of the ventilation chamber is a function of the length and the pitch of the slope. In order for the ventilated roof to provide natural air circulation, certain conditions are required:

- there must be a slope in the roof.
- there must be an air mass available internally, that can be discharged from openings in the ridge in order to be replaced by ambient-temperature air through openings in the eaves.
- there must be a difference in temperature between the outside air and the air in the ventilation chamber.

A long or limited slope requires that the ventilation chamber be thicker, as the values in Table 11 indicate. Indeed, it becomes obvious that a minor slope in the roof must correspond to greater thickness in the ventilation chamber, in order to compensate for the reduced slope with an increase in available air mass. In addition, the length of the slope also becomes an impediment to natural air circulation, making it necessary to increase the thickness of the ventilation chamber in correspondence with the length of the slope. The size of air inlets and outlets is also calculated on the basis of the pitch of the roof and the length of the slope (Tables 12 and 13).

MINIMUM THICKNESS OF THE VENTILATION CHAMBER					
Length of the slope	Pitch of the slope				
	18%	26%	36%	46%	57%
5 m	5 cm	5 cm	5 cm	5 cm	5 cm
10 m	8 cm	6 cm	5 cm	5 cm	5 cm
15 m	10 cm	8 cm	6 cm	5 cm	5 cm
20 m	10 cm	10 cm	8 cm	6 cm	5 cm
25 m	10 cm	10 cm	10 cm	8 cm	6 cm

Table11

SIZE OF AIR INLETS PER m OF EAVES					
Length of the slope	PPitch of the slope				
	18%	26%	36%	46%	57%
5 m	50 cm^2	49 cm^2	48 cm^2	46 cm^2	42 cm^2
10 m	100 cm^2	98 cm^2	96 cm^2	92 cm^2	84 cm^2
15 m	150 cm^2	147 cm^2	144 cm^2	138 cm^2	126 cm^2
20 m	200 cm^2	196 cm^2	192 cm^2	184 cm^2	168 cm^2

Table12

SIZE OF AIR OUTLETS PER m of RIDGE					
Length of the slope	Pitch of the slope				
	18%	26%	36%	46%	57%
5 m	60 cm^2	59 cm^2	58 cm^2	56 cm^2	52 cm^2
10 m	120 cm^2	118 cm^2	116 cm^2	112 cm^2	104 cm^2
15 m	180 cm^2	177 cm^2	174 cm^2	168 cm^2	156 cm^2
20 m	240 cm^2	236 cm^2	232 cm^2	224 cm^2	208 cm^2

Table13

In most cases, the "ventilated roof" does not require the use of aluminum water vapor barriers. Indeed, the air circulation in the air gap guarantees that the water vapor emanating from underlying rooms will be eliminated. The system can be improved via the use of a membrane, such as Vapobar and Difbar, which regulate the passage of water vapor, allowing it to cross through insulating material without compromising its properties.
In unusual situations, such as covered swimming pools or restaurants, and, in general, in all cases in which there is a concentration of water vapor, the insertion of a vapor barrier is required.

OPTIMAL LAYING SCHEMES

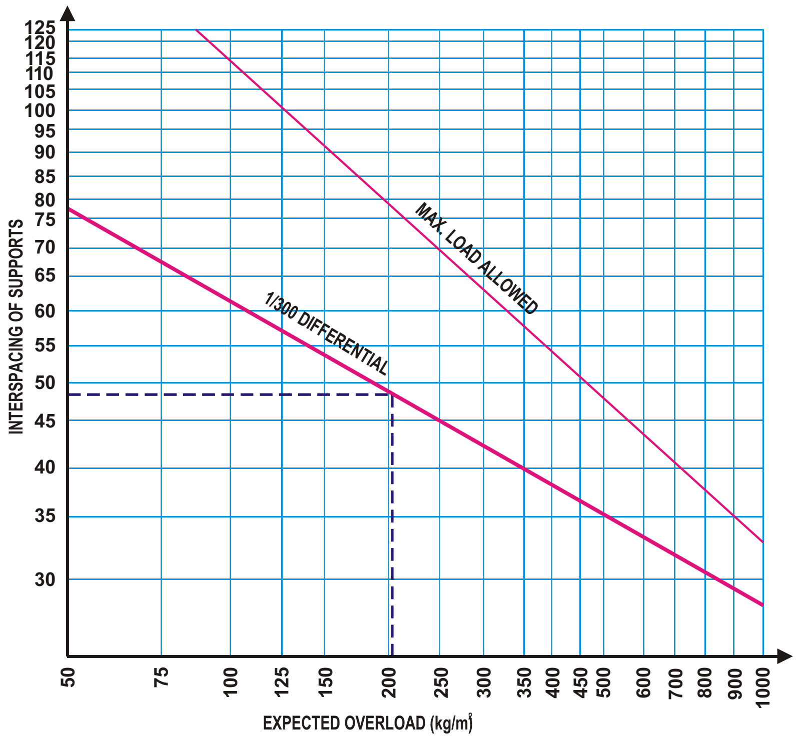
Multilayer conifer-wood panels, bonded with "plywood" phenolic resin, are the ideal substrate for laying bituminous shingles. They are easy to apply, they are water resistant, and they show high dimensional stability. The choice of the thickness and the distance between supports must be determined on the basis of the load they must bear.
Below, we provide diagrams that compare the "interspacing of supports" with the "panel bearing capacity" highlighting the bearing capacity of panels with 48 cm and 61 cm interspaces (optimal interspacing for containment of shrinkage).

Plywood Thickness 9,5 mm

Graph.4

LOAD CONDITIONS

- load uniformly distributed.
- panels laid on no less than three supports and with grain placed at a right angle to supports.
- calculations assume panels in humid conditions and with permanent loads over time.

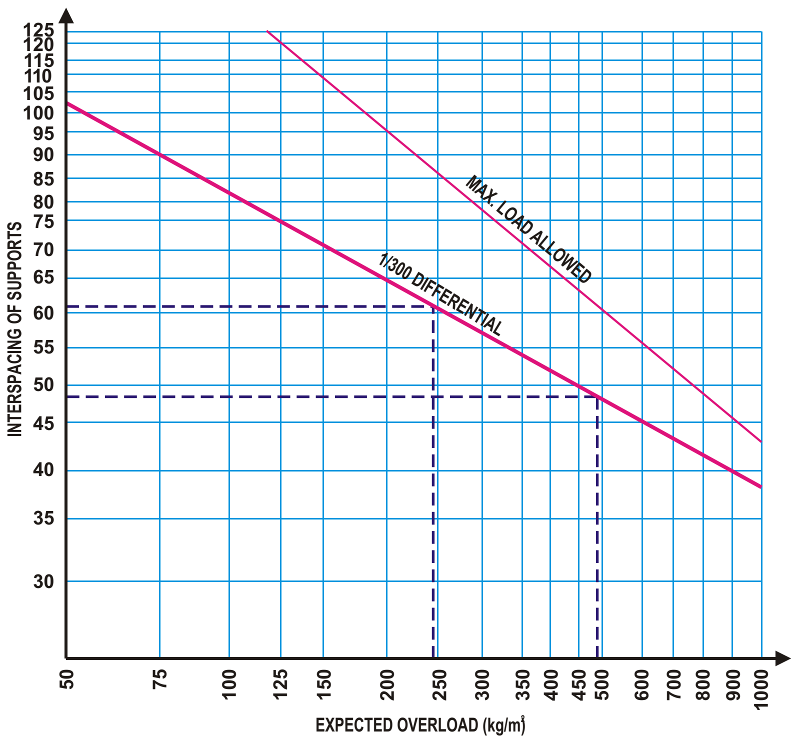


Plywood Thickness 12,5 mm

Graph.5

LOAD CONDITIONS

- load uniformly distributed.
- panels laid on no less than three supports and with grain placed at a right angle to supports.
- calculations assume panels in humid conditions and with permanent loads over time.



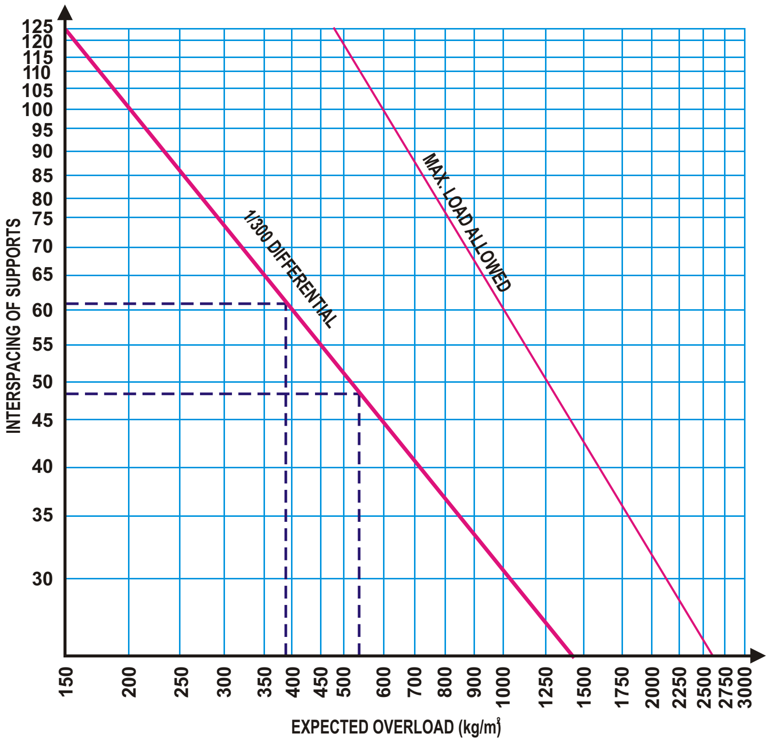
The overload to be considered includes:

- the weight of the roof itself (the entire Tegola Canadese ventilated roofing package is approximately 25-30 kg per m^2)
- wind pressure, as set out in the relevant standards
- the snow load, as set out in the relevant standards

(an initial evaluation can be made using the simplified Snow and Wind Tables that appear in Appendix 3).

Plywood Thickness 15,5 mm

Graph.6

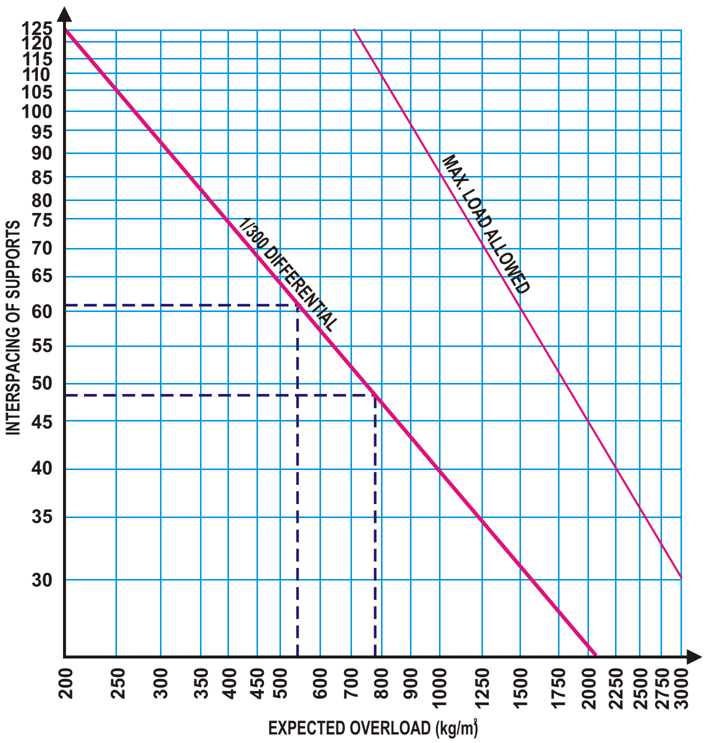


LOAD CONDITIONS

- **load uniformly distributed.**
- **panels laid on no less than three supports and with grain placed at a right angle to supports.**
- **calculations assume panels in humid conditions and with permanent loads over time.**

Plywood Thickness 18,5 mm

Graph.7

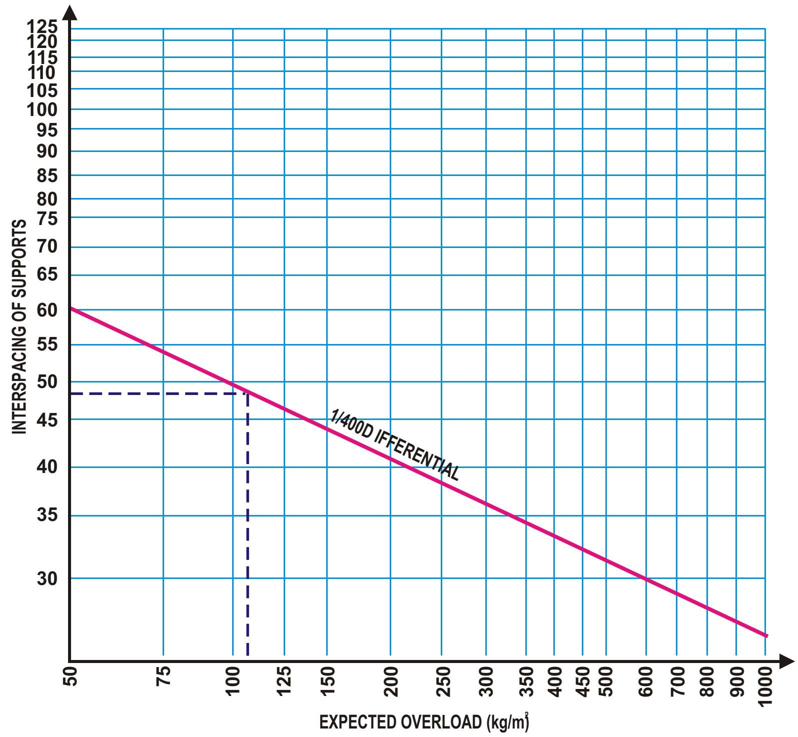


LOAD CONDITIONS

- **load uniformly distributed.**
- **panels laid on no less than three supports and with grain placed at a right angle to supports.**
- **calculations assume panels in humid conditions and with permanent loads over time.**

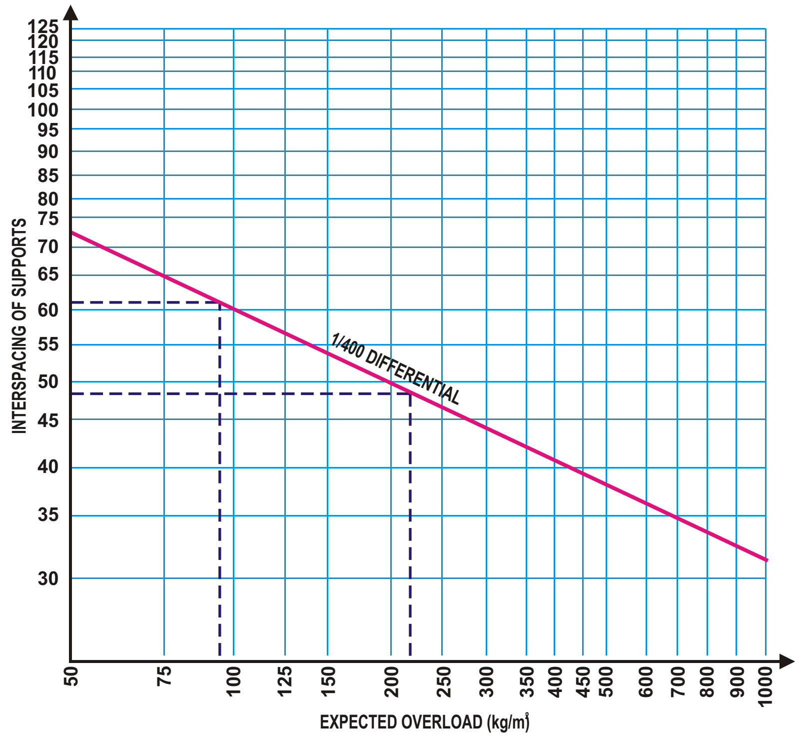
I seguenti grafici (dedotti dalla documentazione tecnica della Kronoply ed. 2005) definiscono le capacità di carico di pannelli di lamelle orientate (OSB) per uso portante in condizioni umide tipo OSB/3.

OSB
Thickness 9 mm
Graph.8

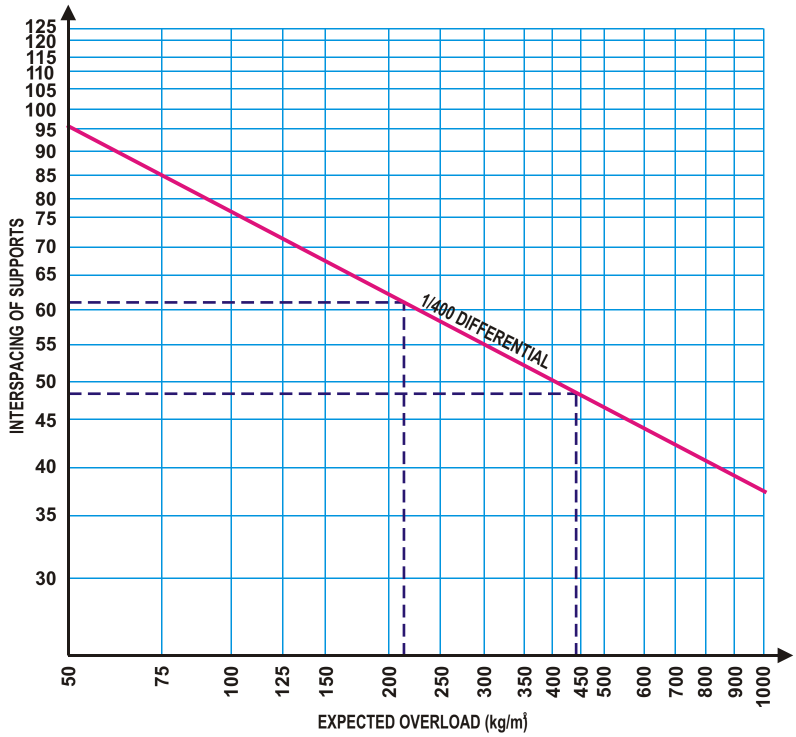


LOAD CONDITIONS
- load uniformly distributed.
- panels laid on no less than three supports and with grain placed at a right angle to supports.
- calculations assume panels in humid conditions and with permanent loads over time.

OSB
Thickness 12 mm
Graph.9

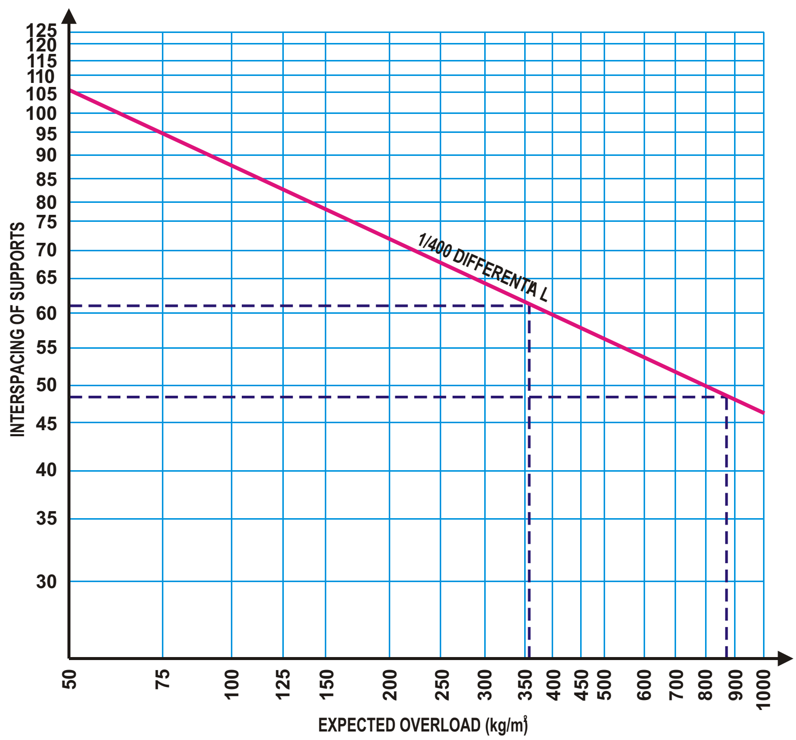


LOAD CONDITIONS
- load uniformly distributed.
- panels laid on no less than three supports and with grain placed at a right angle to supports.
- calculations assume panels in humid conditions and with permanent loads over time.



OSB
Thickness 15 mm
Graph.10

LOAD CONDITIONS
- load uniformly distributed.
- panels laid on no less than three supports and with grain placed at a right angle to supports.
- calculations assume panels in humid conditions and with permanent loads over time.



OSB
Thickness 18 mm
Graph.11

LOAD CONDITIONS
- load uniformly distributed.
- panels laid on no less than three supports and with grain placed at a right angle to supports.
- calculations assume panels in humid conditions and with permanent loads over time.

Proper installation requires that supports must always be placed at a right angle to the panel's grain. In addition, the panels must always be staggered in such a way as to ensure the uniform attachment of the entire bearing structure of the roof.
A space of at least 3 mm should be allowed in the joins between panels
Nailing should be done every 15 cm on the support surface, using galvanized annular-ring nails at least 45 mm long.
Special metal clips are placed among the plywood panels in order to improve and better distribute their bearing capacity. As the figures below illustrate, the clips are placed at the edges of the panels and, more specifically, halfway between the interspaces of the supports.

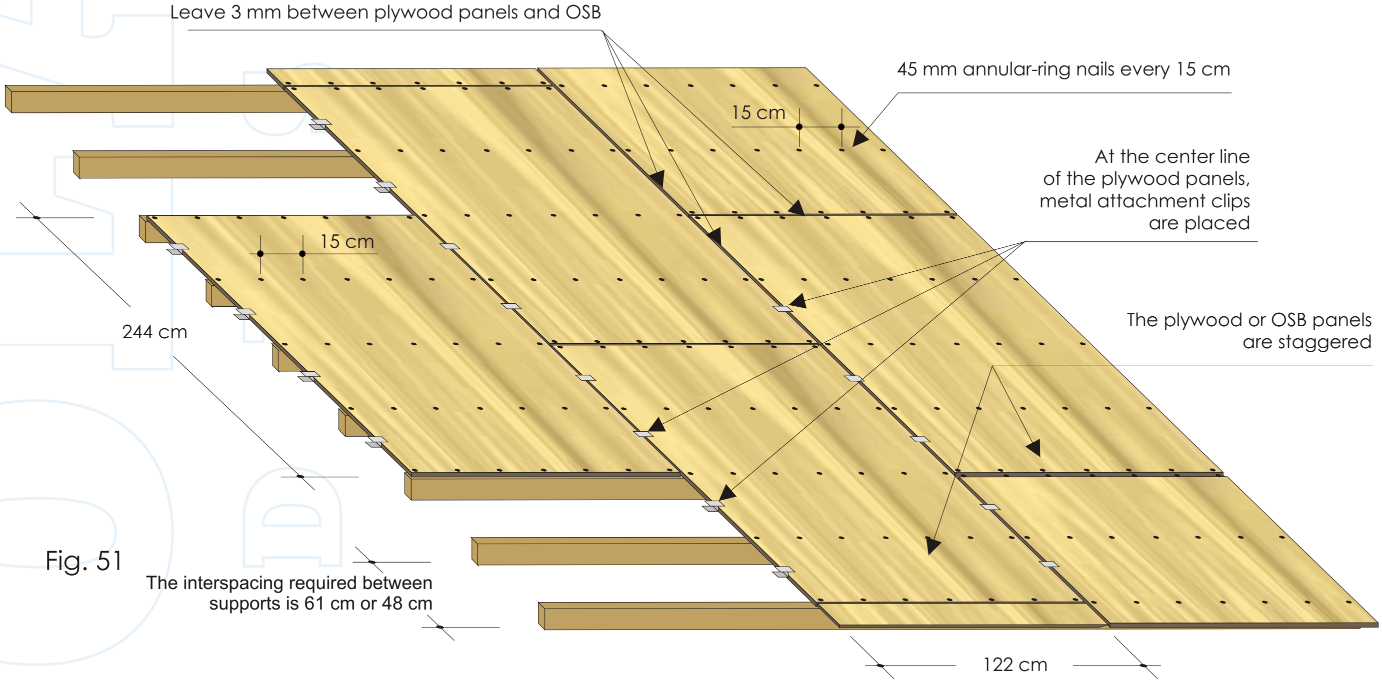


Fig. 51

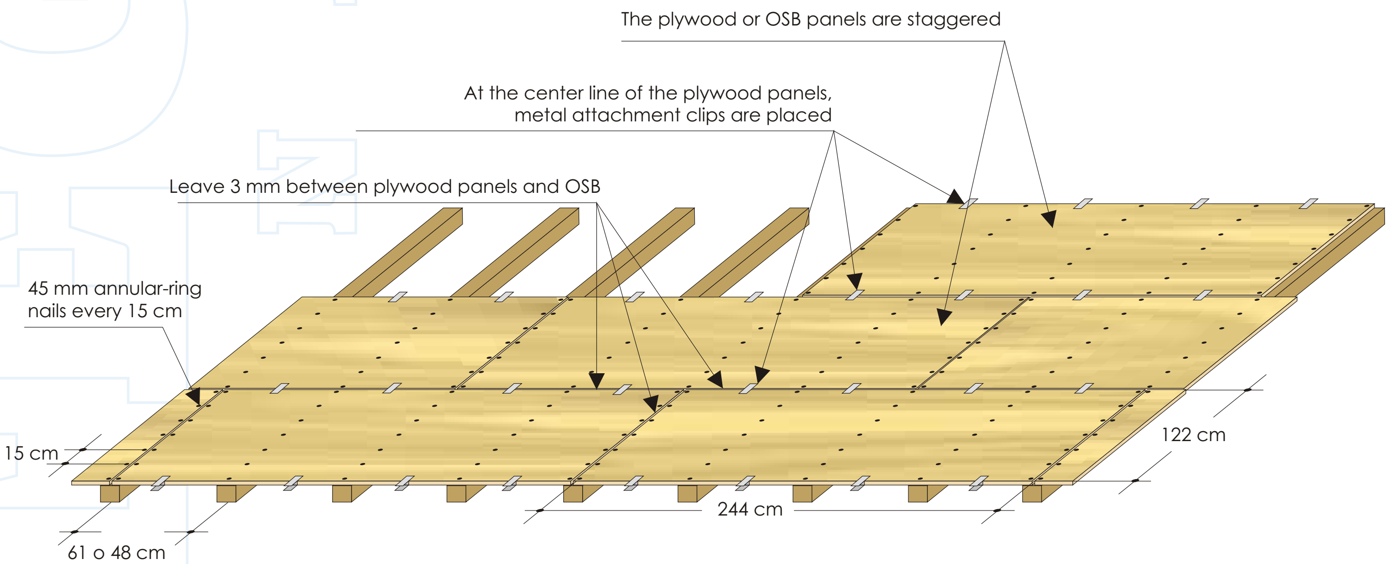
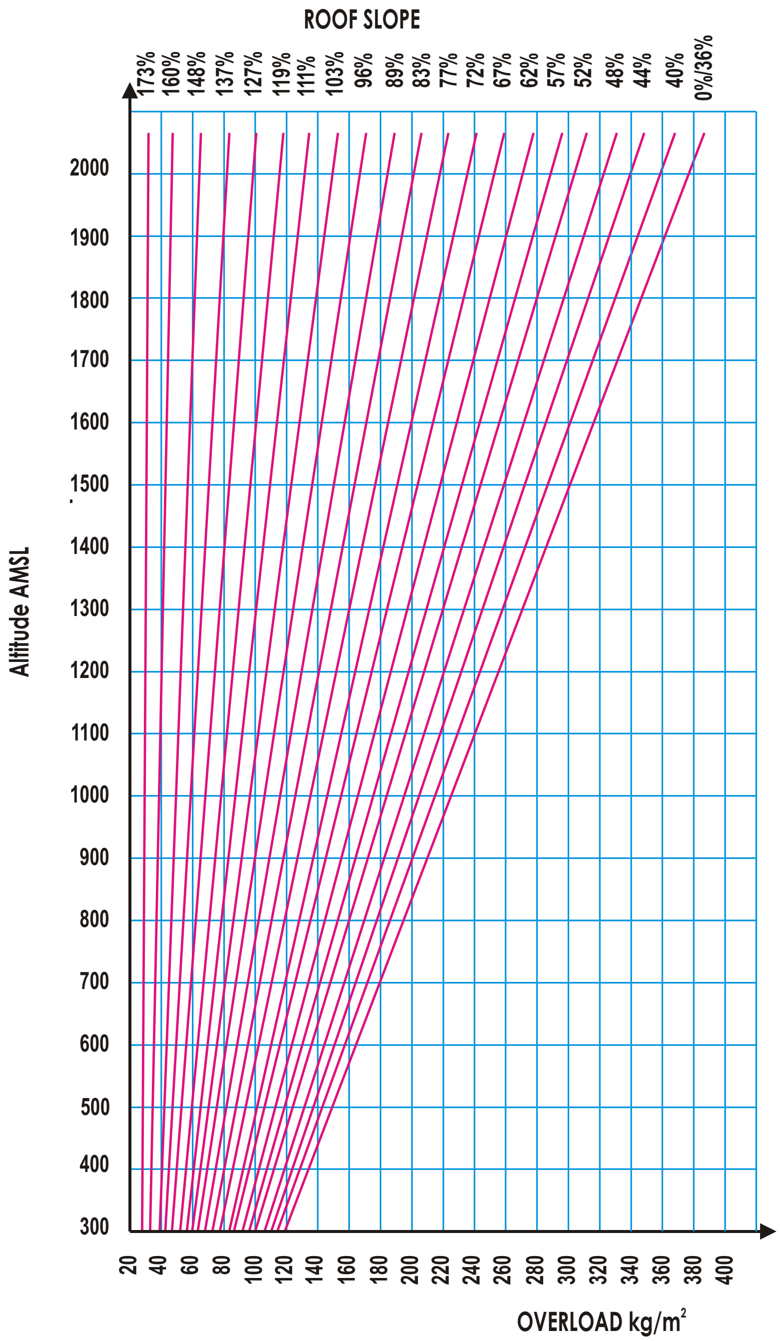


Fig. 52

SNOW LOAD / WIND PRESSURE

Multilayer conifer-wood panels ("plywood"), bonded with phenolic resins, are the ideal substrate for the laying of bituminous shingles. They are easy to apply, are water-resistant, and show high dimensional stability.
The choice of the thickness and the distance between supports must be determined on the basis of the load they must bear.
It thus becomes necessary to evaluate:
- the weight of the roofing materials themselves (the entire Tegola Canadese ventilated roofing package weighs approximately 25-30 kg/m^2)
- wind pressure, as set out in the relevant standards
- snow load, as set out in the relevant standards

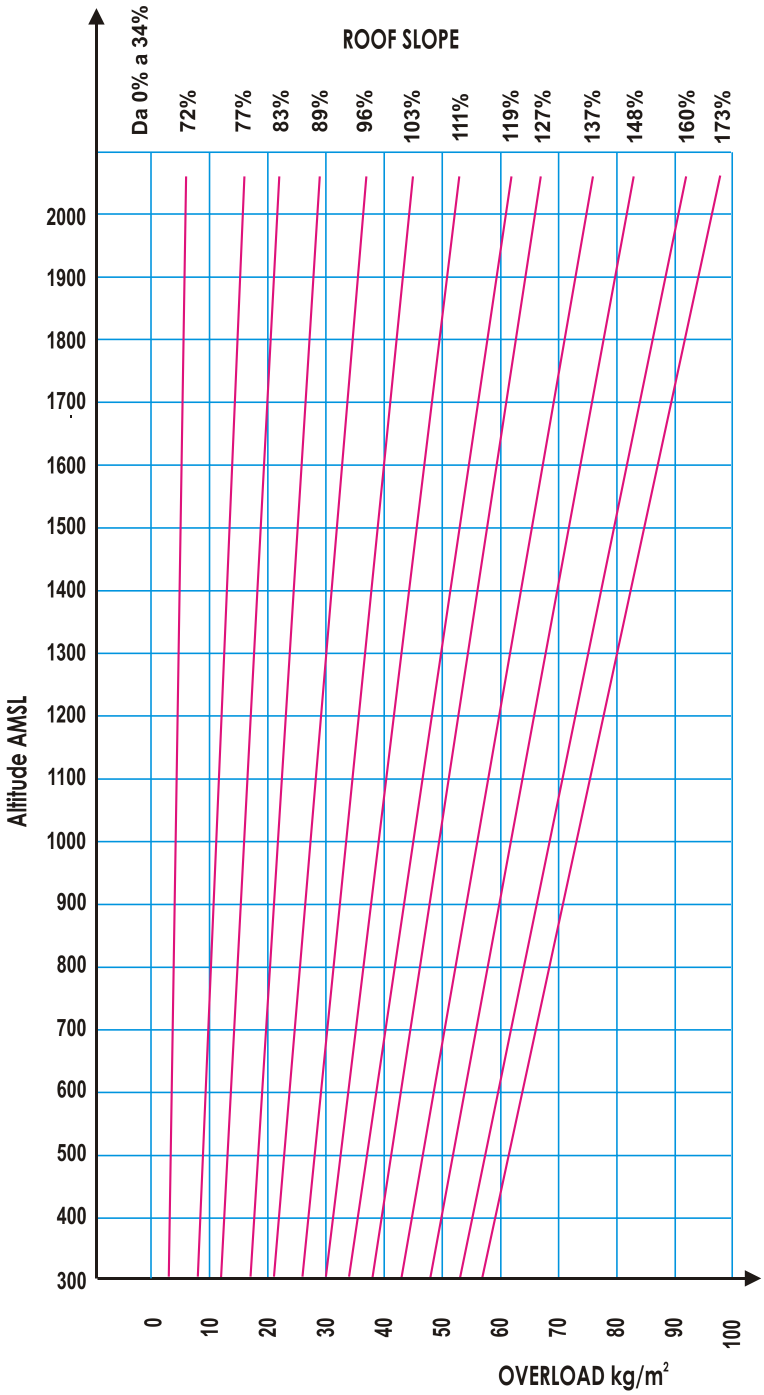
Below, we provide several graphs which offer a simplified approach to the calculation of the loads mentioned above.



Snow overload
Graph. 12

The graph defines snow overload according to various altitudes AMSL and the pitch of the slope.
The weight of the roof itself (30 kg/m^2) is already accounted for in the graph.

Wind overload
Graph.13



The graph permits calculation of wind pressure (kinetic action) in relation to altitude AMSL and the pitch of the slope.
N.B.: in roofs with less than 34% slopes, no wind load is calculated, because wind load is equal to or less than the depression created.

THERMAL INSULATION OF THE BUILDING ENVELOPE

Insulation allows the internal temperature of a building to be maintained at comfortable levels, and blocks the natural flow of heat/thermal energytoward the exterior during the winter or toward the interior during the summer. The insulation layer is found in all technical approaches to stratified roofing where it is generally located in an air gap within the roofing layers themselves. As regards various design, technical, or aesthetic requirements, this insulation layer may be located on the outer surface of the building envelope (solution for insulating inhabited attic spaces and for exterior wall insulation), on the interior surface (in the ceiling or walls), and, on the floor of the attic, if the attic won't be used as a living space.
This choice has an impact on the building's inertial response. If the insulation layer is placed on the outside (first case), it turns the rest of the roofing materials into an accumulation mass with a resulting reduction in the range of internal temperatures and is, as a result, an appropriate technology for environments inhabited twenty-four hours a day. Contrarily, when insulating material is placed on the inside (second case), the environment's reaction to thermal variations increases. In this case, if, on the one hand, the insulating material directly responds to the use of heating/cooling systems, on the other hand, it responds negatively to the rest of the roofing substrate which, as we've said, becomes an accumulation mass and during the warm months blocks the discharge of heat accumulated as a result of solar radiation; in the cold season, when heating is turned off, the environment quickly becomes cold. In general, roofing materials that separate two environments with differential temperatures offer resistance to the transfer of heat. The amount of that resistance varies according to the thickness of the materials used and is inverse to their potential to transmit heat (heat transfer). Heat transfer [$U=W/m^2$ °K] refers to the amount of heat that is dispersed for every m2 of the building envelope, if there is a difference in temperature between Ti (internal temperature) and Te (external temperature). It is defined as the inverse of the sum of the heat resistance [$R=m^2$ °K/W] of the layers that make up the walls or the surface of the roof. A lower heat-transfer value corresponds to a decreased heat loss.

Heat transmittance

$$U = \frac{1}{R} \left[\frac{W}{m^2 \,°K}\right] \qquad (I)$$

The thermal resistance is determined by the relationship between the thickness of the layer and the heat conductivity of the material λ [W/m °K].

Thermal resistance

$$R = \frac{s}{\lambda} \left[\frac{m^2 \,°K}{W}\right] \qquad (II)$$

The UNI 10351 standard distinguishes the λ of materials from the values derived in the laboratory ("λm" and "λ") which are used in making calculations. The second is obtained simply by multiplying the first by a reduction coefficient "m," defined as a percent, which accounts for the loss of performance of the material after it has been installed (consult Appendix VII). In the technical materials of materials on the market, the "λd" is reported, which can analogously be used in reduction calculations with the same coefficient "m."

An additional distinction is made in the UNI 10351 standard which regards the use of non-homogenous materials (combinations of hollow blockwork, concrete and cement mortars). In these cases, the issue is not heat conductivity but unit thermal conductance [$C=W/m^2\,°K$]. Specifically, the UNI 10355 standard reports the principle types of materials and the values associated with them.
The exchange of heat between the air and the wall and roofing surfaces should be considered as well. The surface coefficient of heat transfer refers to the coefficient of heat transfer between the air and surfaces; thermal resistance is its inverse.
As a result, in a layered roofing substrate one considers:
Rtot= 1/hi+s1/ λ1+s2/ λ2+…+si/ λi+1/C+1/he

Surface Coefficients of Heat Transfer

Chiusure verticali

$$\frac{1}{hi} = 0{,}123 \qquad (III)$$

Vertical Substrates

$$\frac{1}{hi} = 0{,}107 \qquad (IV)$$

Horizontal Substrates

$$\frac{1}{he} = 0{,}043 \qquad (V)$$

And, finally, total heat transfer:

$$U_{tot} = \frac{1}{\frac{1}{hi}+\frac{s1}{\lambda 1}+\frac{s2}{\lambda 2}+\cdots+\frac{si}{\lambda i}+\frac{1}{C}+\frac{1}{he}} \left[\frac{W}{m^2\,°K}\right] \qquad (VI)$$

REFERENCE TABLES FOR CALCULATION OF ROOFING MATERIALS

The UNI 10351 standard provides values for the main building materials in use, indicating a percent increase between standard heat-conductivity (λm) and calculated heat conductivity (λ). In Table 14, below, we provide reference values for these principal building materials. In Table 15, we evaluate insulating materials specifically.

HEAT CONDUCTION COEFFICIENT λ OF ROOFING MATERIALS

MATERIALS	DENSITY Kg/m^3	λm W/(m K)	m (%)	λ W/(m K)
Aria in quiete	1.3			0.026
Concrete				
sand and gravel	2000	1.01	15	1.16
sand and gravel	2400	1.66	15	1.91
expanded clay	500	0.14	20	0.16
expanded clay	1700	0.63	20	0.75
porous	400	0.12	25	0.15
porous	800	0.20	25	0.25
Masonry				
Masonry	600	0.13	90	0.25
Masonry	1400	0.40	25	0.50
Masonry	2000	0.80	12	0.90
Wood				
fir	450	0.10	20	0.12
pine	550	0.12	20	0.15
maple	710	0.15	20	0.18
oak	850	0.18	20	0.22
Metal				
steel	7800			52.00
aluminum	2700			209.00
lead	113			35.00
copper	8900			380.00
Stone				
slate	2700			2.00
basalt	2800			3.50
granite	2500			3.20
Insulating Materials				
glass (semi-rigid)	20	0.039	10	0.043
glass (rigid)	30	0.036	10	0.040
stone (semi-rigid)	40	0.038	10	0.042
stone (rigid)	100	0.034	10	0.038
polystyrene	20	0.037	10	0.041
polyethylene	30	0.032	20	0.039
expanded polyurethane	35		10	0.035
expanded polyurethane	15		10	0.054
Mortar				
plaster	1200			0.35
sand and plaster	1400			0.70
lime	1800			0.90
lime	1800			0.90
concrete	2000			1.40
plasterboard	900			0.21
Fillers				
Expanded clay	330	0.09	15	0.10
Expanded perlite	100	0.055	20	0.066
Bituminous materials				
waterproof membrane	1200			0.26
TEGOLA CANADESE	1550			0.17

Table 14

How can we optimize a roof's thermal insulation? These tables provide quick and useful information regarding the calculation of the roof conductivity, based upon the materials used in its construction, and provide practical assistance in choosing the most suitable insulating material.

HEAT CONDUCTION COEFFICIENT λ IN INSULATING PRODUCTS

	DENSITÀ	λm	m	λ
	Kg/m³	W/(m K)	%	W/(m K)
Polyurethane board, cut from large blocks	32	0.023	40	0.032
Polyurethane board, cut from large blocks	40-50	0.022	45	0.032
Polyisocyanurates board. cut from large blocks	40	0.022	45	0.032
Faced extruded expanded polystyrene	35	0.030	15	0.035
Expanded polyurethane on job	37	0.023	50	0.035
Faced extruded expanded polystyrene	30	0.031	15	0.036
Rigid fiberglass panels	100	0.035	10	0.038
Rigid mineral fiber from feldspathic rock panels	100-125	0.034	10	0.038
Semi-rigid fiberglass panels	30	0.036	10	0.040
Semi-rigid mineral fiber from feldspathic rock panels	55	0.036	10	0.040
Sintered expanded polystyrene board. cut from large blocks. UNI 7819	25-30	0.036	10	0.040
Expanded polystyrene board. cut from large blocks	20	0.036	10	0.040
Unfaced extruded expanded polystyrene	30	0.037	10	0.041
Phenolic resin board	35	0.034	20	0.041
Sintered expanded polystyrene board. cut from large blocks	30	0.038	10	0.042
Expanded cork with binders	90	0.039	10	0.043
Mineral fiber from basaltic rock rockwool quilt	60-80	0.037	20	0.044
Sintered expanded polystyrene board. cut from large blocks	20	0.040	10	0.044
Phenolic resin board	60	0.037	20	0.044
Pure expanded cork and expanded with binders	130	0.041	10	0.045
Sintered expanded polystyrene board. cut from large blocks	15	0.043	10	0.047
Fiberglass felt/resin	14	0.044	10	0.048
Expanded urea resins on job	30	0.032	50	0.048
Expanded cellular glass	130	0.050	10	0.055
Loose materials with a low volumetric mass cellulose fiber	32	0.040	45	0.058
Board with expanded perlite. bituminous fibers and binders	190	0.059	20	0.071
Loose materials with a low volumetric mass expanded vermiculite in grain size from 0.1 mm to 12 mm	80	0.064	20	0.077

Table 15

ROOF CONDENSATION (DEWPOINT)

Let us imagine a situation in which we introduce water vapor into a closed room with an internal temperature of +25°C. Initially, the vapor will disperse into the air without creating any particularly noteworthy effects. As the experiment continues, we will arrive at a point in which we observe that the water vapor has begun to condense, forming drops of water. This means that, at that point, the air in the room is saturated and that relative humidity stands at 100%. In such conditions, the amount of water present in the environment is 23 g for every m^3 of air. If we were to repeat the same operation with an inside temperature of 0°C, the results would show that, when relative humidity reaches 100% and condensation begins, the amount of water per m^3 will be only 4,839 g. We can deduce from this that the amount of water that the air can support is a function of air temperature itself. Thus, if in the same room with a temperature of +20°C, we were to introduce relative humidity of 60% and at this point we were to reduce the temperature, we would find that at around +12°C the relative humidity would be 100% and the condensation "dewpoint" would begin (see Table 17). It thus seems clear that, in an insulated roof, and in the presence of a heat difference between the internal temperature (Ti +20°C) and the external temperature (which, during the winter months, is around 0°C), the dewpoint will be reached, with resulting condensation of water vapor.
Insulating material, which becomes saturated with humidity, experiences a notable loss of its insulating capacity, inasmuch as water is an excellent heat conductor. The same insulating material undergoes, as a result of internal humidity, rapid deterioration. This leads to the formation of mold, and mildew, and humidity stains and to the rapid deterioration of roofing materials and structures. The positioning of the dewpoint in a normal wooden roof, once the effects of actual water vapor pressure and the saturation pressure trend have been calculated, may be visualized as shown in the diagram.

Roof bedding:
- bituminous membrane 4 mm
- glass wool 50 mm
- matchboarding 20 mm

Ambient conditions
- Ti +20° - HR 70%
- Te -10 - HR 70%

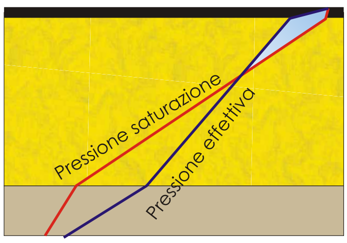


Fig. 53

We can, in addition, deduce that in the areas affected by condensation there will be an accumulation of 13 g of water per m^2 every 24 hours.
What emerges from this analysis is the need to block updrafts of water vapor by placing an adequate barrier beneath the insulating layer or, alternatively, constructing a ventilated roof in order to establish a layer of moving air above the insulation. This is absolutely necessary in cases in which there is an inhabited attic and external temperatures are near to or less than 0°C.

Below, we list some of the products that are in common use as barriers, indicating, for each, the coefficient of resistance to water vapor transmission or permeability (μ).

Table 16

RESISTANCE TO WATER VAPOR PERMEABILITY (μ)			
Material	μ	Thickness m	sD (s x μ)
Bituminous board 0.5 kg/m²	2,500	0.0004	1
Bituminous board 1 kg/m²	2,500	0.0008	2
Polyethylene	60,000	0.00006	3.6
Bituminous membrane	30,000	0.003	90
Aluminum	Infinite	0.00005	Infinite

Although it is widely believed that barriers with a resistance factor equal or superior to that of the roof should be used, it is nevertheless advisable, in the case of non-ventilated roofing with inhabited attic areas, to use aluminum and/or metal barriers, which are the only products that deserve to be called "barriers." It's important to remember as well that the vapor barrier must always be positioned under the insulating material and below the dewpoint.

Table 17

DEWPOINT TEMPERATURES TABLE

Internal air temperature °C	Relative humidity of internal air / of dewpoint (or condensation) temperature										
	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
-10	-17.6	-16.6	-15.7	-14.7	-13.9	-13.2	-12.5	-11.8	-11.2	-11.2	-10.0
-5	-12.9	-11.8	-10.8	-9.9	-9.1	-8.3	-7.60	-6.9	-6.2	-5.6	-5.0
+0	-8.1	-6.6	-5.6	-4.7	-3.8	-3.1	-2.3	-1.6	-0.9	-0.3	+0.0
+2	-6.5	-5.3	-4.3	-3.4	-2.5	-1.6	-0.8	-0.1	-0.6	+1.3	+2.0
+4	-4.8	-3.7	-2.7	-1.8	-0.9	-0.1	+0.8	+1.6	+2.4	+3.2	+4.0
+6	-3.2	-2.1	-1.0	-0.1	+0.9	+1.9	+2.8	+3.6	+4.4	+5.2	+6.0
+8	-1.6	-0.4	+0.7	+1.8	+2.9	+3.9	+4.8	+5.6	+6.4	+7.2	+8.0
+10	+0.1	+1.4	+2.6	+3.7	+4.8	+5.8	+6.7	+7.6	+8.4	+9.2	+10.0
+12	+1.9	+3.2	+4.3	+5.5	+6.6	+7.6	+8.5	+9.5	+10.3	+11.2	+12
+14	+3.8	+5.1	+6.4	+7.5	+8.6	+9.6	+10.6	+11.5	+12.4	+13.2	+14.0
+16	+5.6	+7.0	+8.2	+9.4	+10.5	+11.5	+12.5	+13.4	+14.3	+15.2	+16.0
+18	+7.4	+8.8	+10.1	+11.3	+12.4	+13.5	+14.5	+15.4	+16.3	+17.2	+18
+20	+9.3	+10.7	+12.0	+13.2	+14.3	+15.4	+16.5	+17.4	+18.3	+19.2	+20.0
+22	+11.1	+12.5	+13.9	+15.2	+16.3	+17.4	+18.4	+19.4	+20.3	+21.2	+22.0
+25	+13.8	+15.3	+16.7	+17.9	+19.1	+20.2	+21.3	+22.3	+23.2	+24.1	+25.0
+30	+18.5	+19.9	+21.2	+22.8	+24.2	+25.3	+26.4	+27.5	+28.5	+29.2	+30.0
+35	+23.0	+24.5	+26.0	+27.4	+28.7	+29.9	+31.0	+32.6	+33.1	+34.1	+35.0
+40	+27.6	+29.2	+30.7	+32.1	+33.5	+34.7	+35.9	+37.0	+38.0	+39.0	+40.0

DEGREE / PERCENT CONVERSION TABLE

Gradi / Percentuale
and coefficient for calculation of surface area of pitched ro

The slopes used in the various Tegola Canadese graphics and installation instructions are normally expressed as percents.
The current degree-percent conversion table can also be used as a guide to converting slope.
The third column provides the coefficient that should be used in calculating the actual roof surface area with respect to various degrees of slope. The actual roof surface area is obtained by multiplying the coefficient by the design surface.

TAVOLA DI CONVERSIONE		
Percent (%)	Degrees (°)	Coefficient for calculation of roof surface
1.75	1	1.000
3.50	2	1.001
7.00	4	1.002
10.51	6	1.005
14.05	8	1.011
17.74	10	1.016
21.26	12	1.022
24.93	14	1.030
28.67	16	1.039
32.49	18	1.050
36.40	20	1.063
40.40	22	1.078
44.52	24	1.093
48.77	26	1.110
53.17	28	1.132
57.74	30	1.152
62.49	32	1.177
67.45	34	1.204
72.65	36	1.233
78.13	38	1.268
83.91	40	1.290
90.04	42	1.345
96.57	44	1.390
100.00	45	1.412
103.55	48	1.440
111.06	50	1.493
119.17	52	1.555
127.99	54	1.620
137.64	56	1.700
148.28	58	1.790
160.03	60	1.886
173.20	62	1.999

Table 18

NOTES

WARNINGS
The data used here are average values based upon current production and may change at any time and without notice. The information presented here is the best available according to our experience in the use of our products, but Tegola Canadese assumes no responsibility for the impact of factors not in our control upon installation or construction work.

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