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TOTAL INSULATION

TECHNICAL DISCUSSION

Heat Transfer

basic concepts



Heat Flow:

What is heat flow?

The flow of energy per area, per unit of time.

*In the International System of Units, it is measured in:
 W/m^2*



Heat Flow

This principle is associated with Newton's Law of Cooling, which argues that the loss of heat from a body is proportional to the temperature difference between that body and its surroundings.

$$\frac{dQ}{dt} = h \cdot A (T_{env} - T(t)) = -h \cdot A \Delta T(t)$$

Where:

Q = Energy in Joules

h = heat transfer coefficient

A = surface area where heat is being transferred.

T = surface temperature of the body

T_{env} = temperature of the environment.

ΔT = depends on the temperature gradient between the environment and the body



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Conductivity and Lambda Value

Thermal conductivity:

● It is the property of the material which indicates the ability to conduct heat.

● Appears in Fourier's Law of Heat Conduction.

● It is measured by watts per meter per kelvin $W / (k \cdot m)$ for the international system.

Thermal conductivities of various materials in $W / (K \cdot m)$

Material	λ	Material	λ	Material	λ
Steel	47 -58	Cork	0,03-0,04	Mercury	83,7
Water	0,58	Tin	64,0	Mica	0,35
Air	0,02	Fiberglass	0,03-0,07	Nickel	52,3
Alcohol	0,16	Glycerin	0,29	Gold	308,2
Alpaca	29,1	Iron	80,2	Paraffin	0,21
Aluminum	209,3	Brick	0,80	Silver	406,1-418,7
Asbestos	0,04	Firebrick	0,47-1,05	Lead	35,0
Bronze	116-186	Brass	81-116	Glass	0,6-1,0
Zinc	106-140	Lithium	301,2	Copper	372,1-385,2
Wood	0,13	Moist soil	0,8	Diamond	2300



Heat Flux Density

In terms of a building, assuming that the temperature gradient occurs in one direction and that the temperature is constant in perpendicular planes, the heat flux density for "x" direction on a plane, is given by the following equation:

$$q = -\lambda \, d \, t / d x$$

Where:

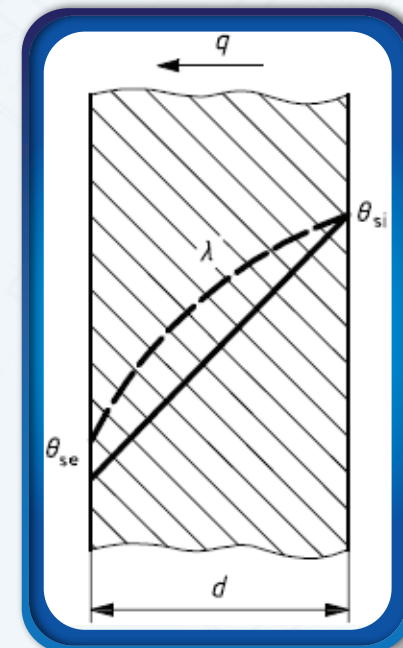
λ : Thermal conductivity of the insulation material or system.

d : Wall thickness or flatness;

θ_{si} : Inner surface temperature.

θ_{se} : θ_{si} : Outer surface temperature.

R : Thermal resistance of the wall



Thermal Resistance

- The thermal resistance of a material, known as factor "R", represents the material's ability to resist heat flow.
- In the case of homogeneous materials, it is the ratio between the thickness and thermal conductivity of the material.
- In non homogeneous materials, resistance is the opposite of thermal conductance.

$$R = \Delta T / (Q/A)$$

Where:

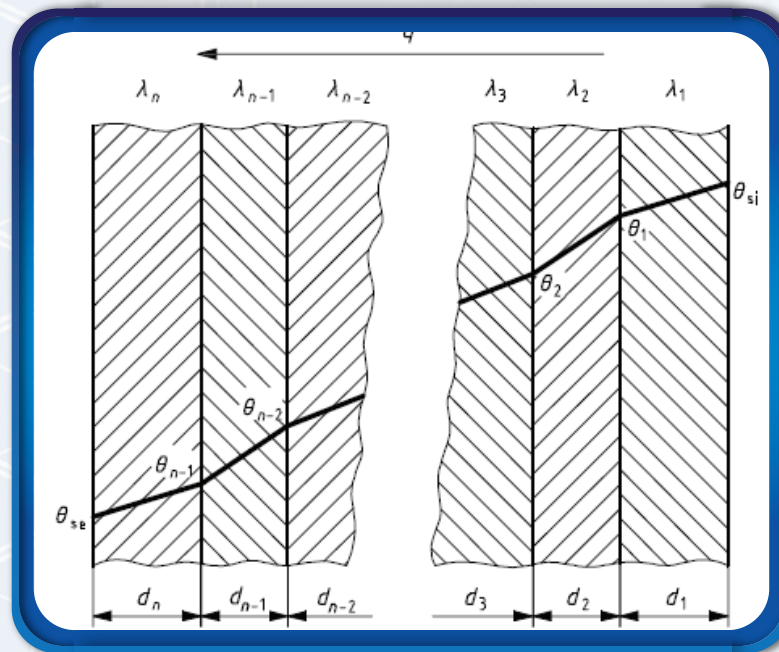
ΔT : *The temperature difference between the boundary surfaces of the isolated system.*

Q/A : *Amount of heat passing through a given area. For the imperial system, the units are (ft² h°F/Btu)*



System Made Up of Different Materials

In the heat transfer phenomenon, the area and the X material are a barrier that the heat flow attempts to go through to equal the temperature boundary, as there are different types of materials their thermal resistance can be added. To obtain an R' value (R equivalent)



$$R' = \sum_{j=1}^n \frac{d_j}{\lambda_j}$$



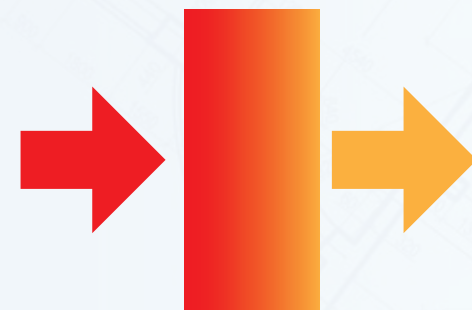
Conductivity: U Value

The U-value or transmission coefficient [W/m²K] is used to calculate thermal energy, when you want to know about the loss or gain of heat within buildings and thermal installations.

What is U-value?

It is the measure of the ability of a material to delay heat flow input into a building.

$$R \text{ equivalent} = 1/U$$



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HEAT TRANSFER MECHANISMS



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Heat Transfer

occurs by means of 3 mechanisms:

✓ **Conduction**



✓ **Convection**



✓ **Radiation**



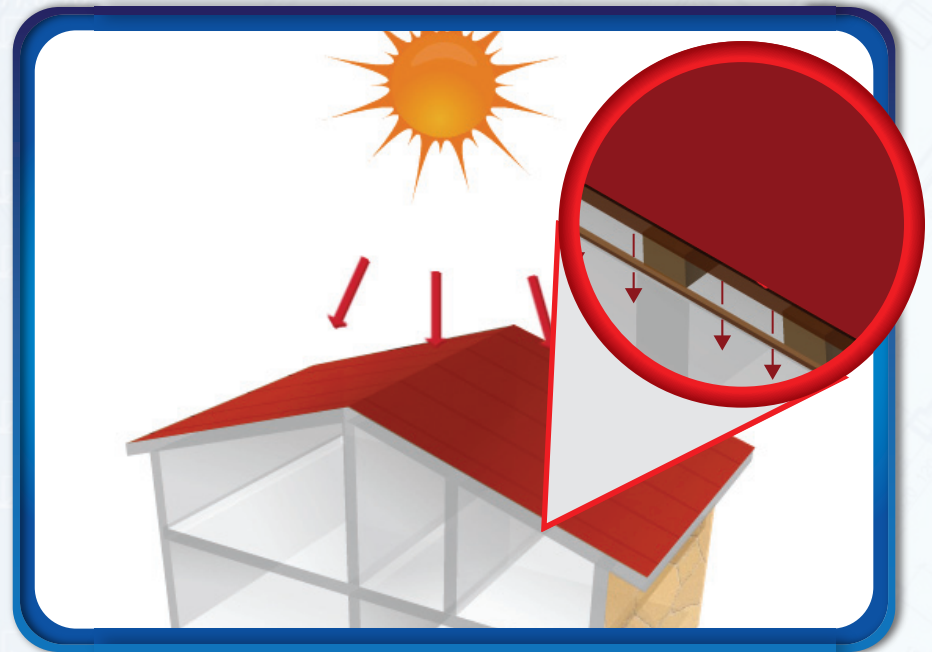
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Conduction

Heat conduction is a transfer mechanism of thermal energy between two systems based on the direct contact of their particles without the net flow of matter, which tends to equal the temperature within a body, and among different bodies in contact, by means of waves.



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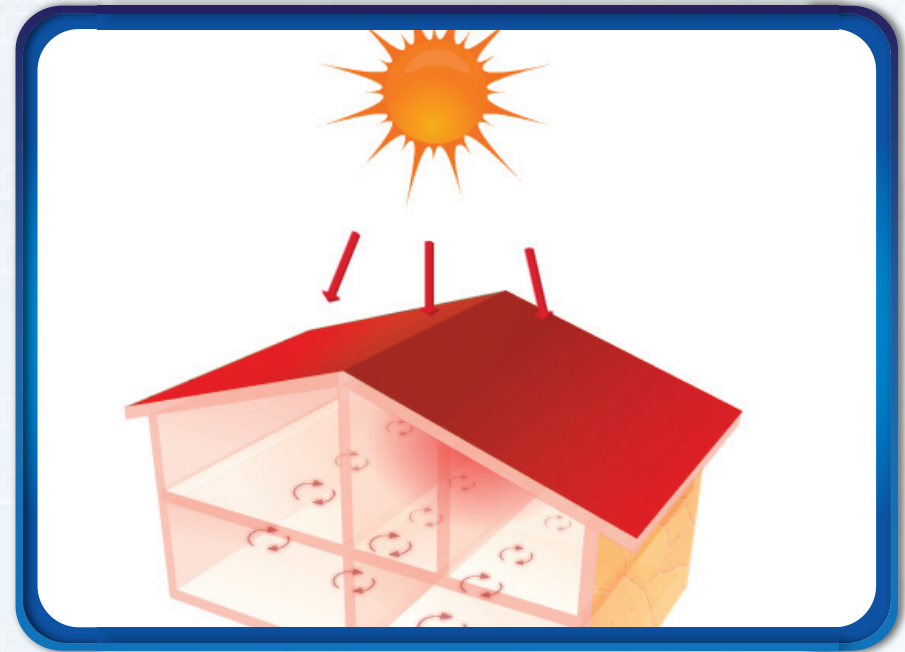
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Convection

Convection is characterized by the movement of fluids (air or water) that transports heat between zones at different temperatures.

When heated, they increase in volume, therefore their density decreases and they rise, thus moving the fluid found in higher areas or at different densities, which are cooler.



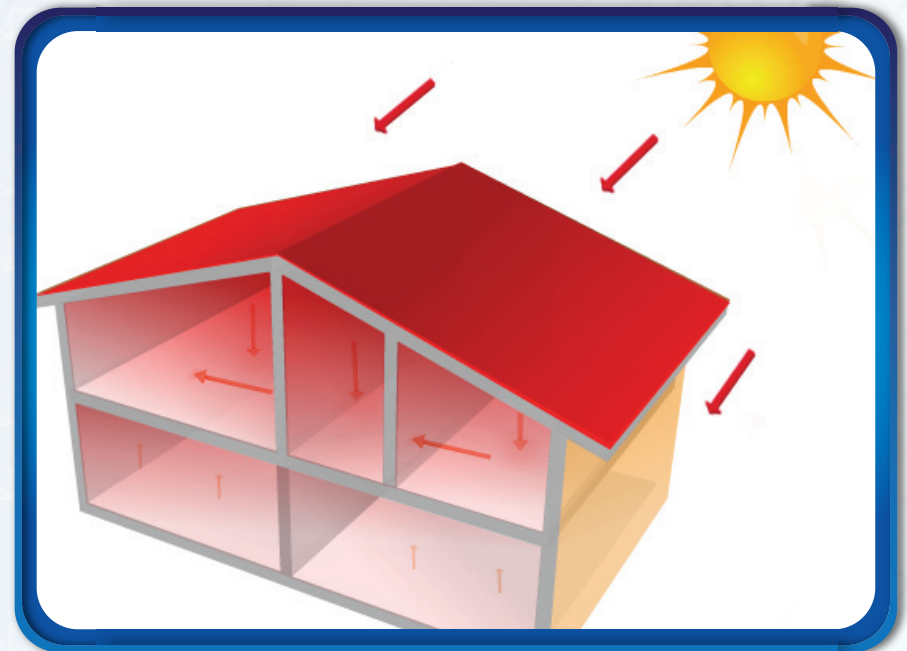
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Radiation

Radiation is energy that travels through open spaces in electromagnetic waves. In the case of the Earth, 70% of the radiation from the Sun is rejected by our magnetic field. The remaining portion penetrates Earth's atmosphere as infrared rays. They hit the Earth's surface and heat it due to its limited capacity to reflect infrared rays back into space.



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What is Emittance?

Emittance is the ability of a material's surface to emit radiant energy

Notes:

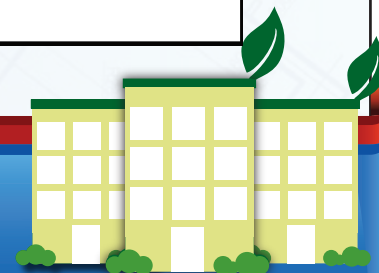
- ✓ All materials have emissivities ranging from zero to one degree.
- ✓ The lower the level of emissivity of a material, the lower the radiated heat from the surface (infrared radiant energy).
- ✓ There are certain substances such as carbon black, whose absorption capacity is about 1.
- ✓ For theoretical purposes, it is useful to imagine an ideal substance capable of absorbing all the radiant heat that strikes it. This substance is called black body.

Surface of the Material	Emissivity
Asphalt	0.90-0.98
Aluminum foil	0.03-0.05
Brick	0.93
Concrete	0.85-0.95
Glass	0.95
Fiberglass/Cellulose	0.8-0.90
Limestone	0.36-0.90
Márble	0.93
Paint: white spray	0.80
Paint: white enamel	0.91
Paint: black spray	0.80
Paint: black enamel	0.91
Paper	0.92
Plaster	0.91
Silver	0.02
Steel (mild)	0.12
Wood	0.90



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What is Reflectance?

Reflectance or reflectivity refers to the incoming radiant energy fraction that is reflected from a surface.

- ✓ Reflectivity and emissivity are related.
- ✓ Low emissivity is a clear indicator of a highly reflective surface.

For example, Prodex aluminum foil with 0.03 emissivity has a reflectivity of 0.97



Reflectancia del 97%

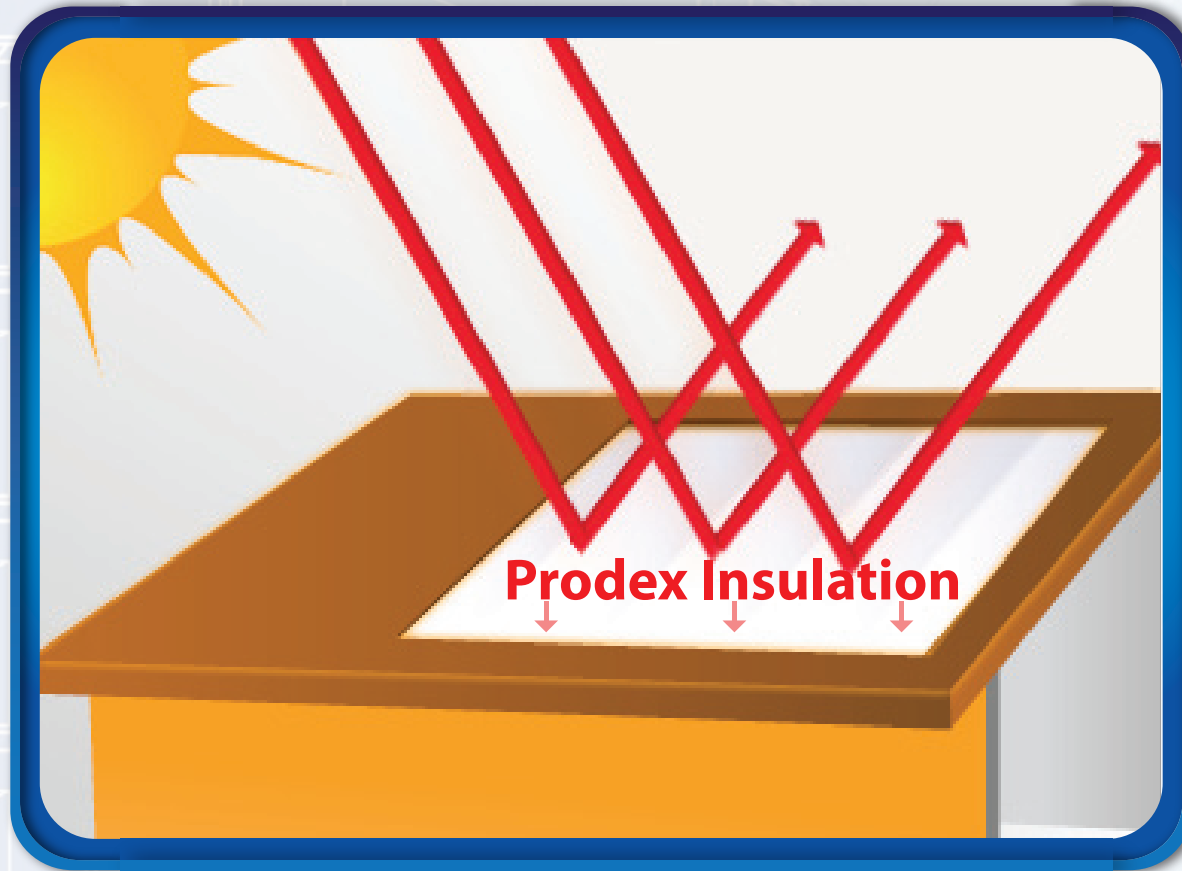


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Reflectance



Prodex® reflects



***Radiant heat
rejection***



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How Does Radiant Heat Affect You?

Radiant heat is the one traveling from one body to another without contact between them.

For example:

"If you sit around a campfire on a cold night, you will feel the radiant heat in front of your body, but your back will remain cold because it receives no radiant heat."



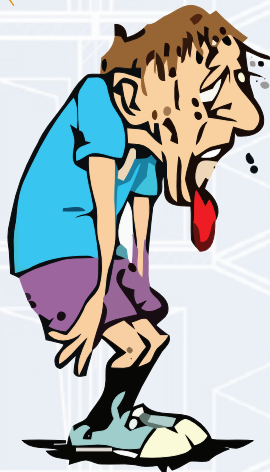
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How Does Radiant Heat Affect You?

The radiant heat emitted by the infrared rays of the Sun travels at the speed of light, and this energy is absorbed or reflected that fast.



*Radiant heat energy
is invisible, but it can be felt.*



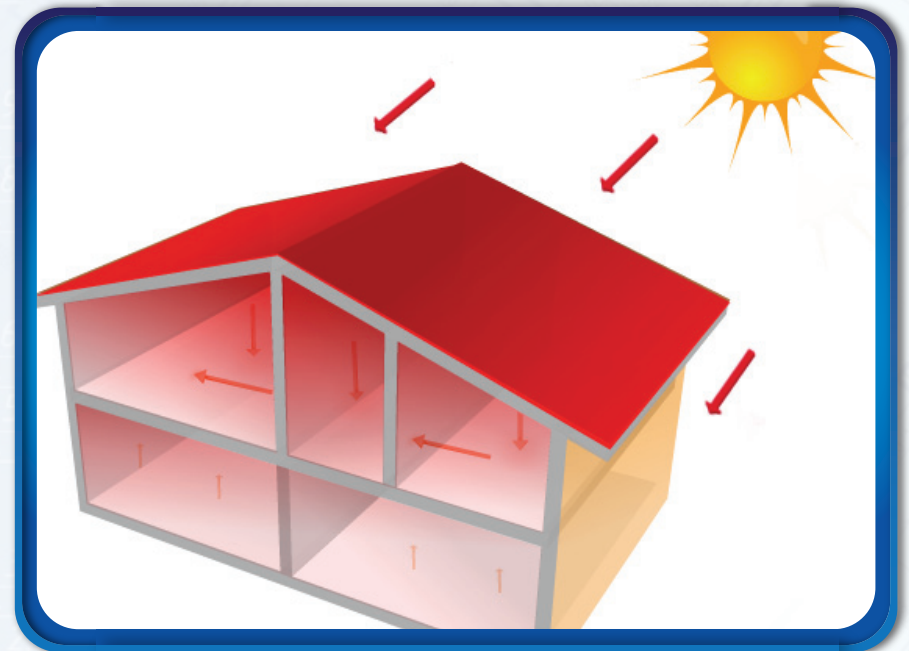
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How Does Radiant Heat Affect?

- ✓ Radiant heat warms the roof surface.
- ✓ Once this happens, the roof begins to transfer heat inside the house; this is where the insulation comes in.
- ✓ Typically, traditional insulation will absorb this radiant heat energy, eventually it will be heated and the heat will travel to the interior of the house.



Heat Transfer Mechanisms

RADIATION



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Thermic Insulation Need In a Building



One of the most important benefits that must be incorporated into the criteria of bioclimatic architecture is housing insulation; this will have an impact on the comfort of its owners.



The use of an efficient thermal wrap translates into economic benefits for the client family, as well as for the country and the environment.



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Potential Benefits

- ✓ The installation of insulation in roofs and walls reduces the need for cooling between 27% and 38%. The savings allow for a payback between 2.2 and 2.7 years.
- ✓ You can achieve a reduction in annual consumption of over 1000 kWh per social housing.



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What is Prodex®?

Now, there is an efficient and effective way to reduce energy costs, with an inexpensive and easy-to-install option



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Aerospace Technology

*On the sunny side of space,
temperature can reach 150 degrees, and on
the side of the shadow of the earth, up to 130 degrees.*

*In the late 70's, the implementation of
space suits began with reflective insulation with the aim
of improving isolation efficiency and reducing
transportation costs of typical materials such as
fiberglass or mineral wool.*



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Prodex®

- 100% closed cell polyethylene foam sheet, with 99% pure aluminum foil sheet of HIGH REFLECTIVE VALUE 97%.
- This system is based on an aluminum reflective surface and an air chamber, for which the space produced by the undulation of the sheet can be used. This air chamber is responsible for transporting the radiated heat to the highest points of the roof (ridge, flashing or roofbeams) and evacuate it.
- This way, we can ensure radiant energy does not pass through our insulation, thus reducing the heat load up to 55% during heat peak hours.



99% pure aluminum foil



Prodex® Insulation

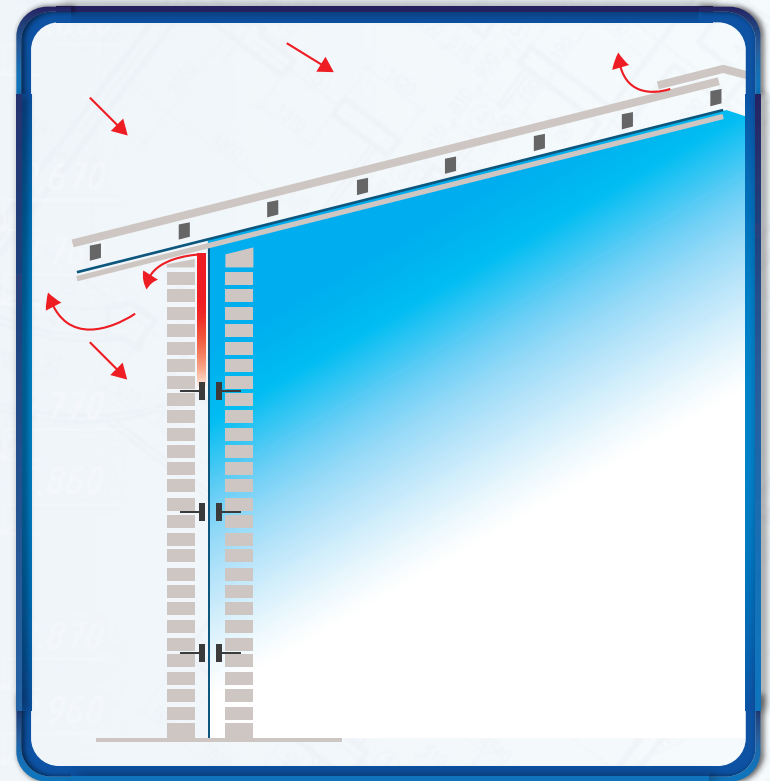


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Thanks to the emittance of high purity aluminum, we achieve a radiant heat wave rejection of 97%

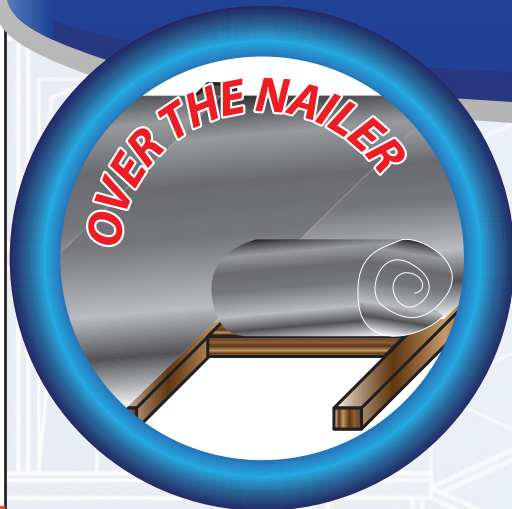


How does our system
AGAINST HEAT WORK?



NEW BUILDINGS

Typical installation on the nailer

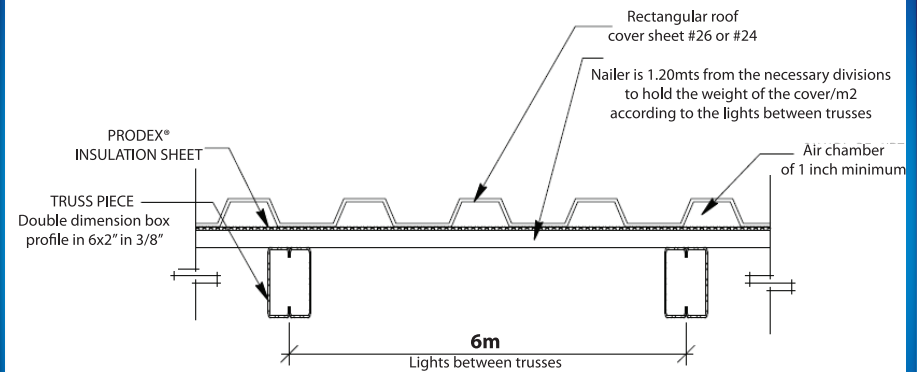
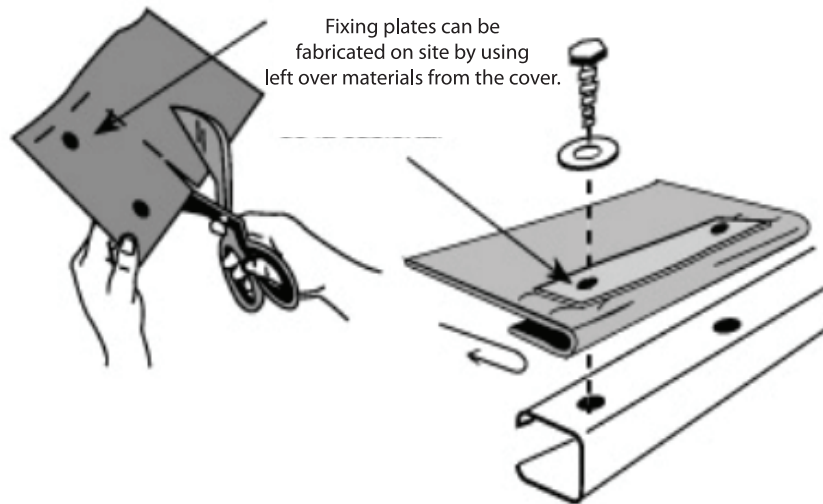


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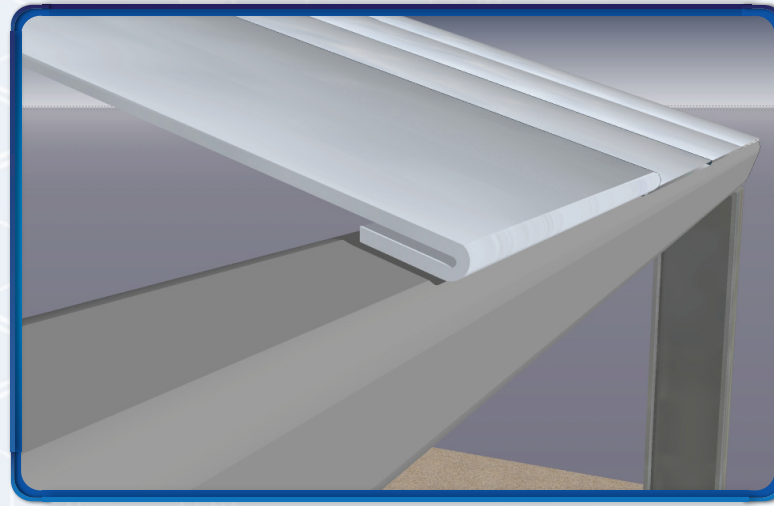
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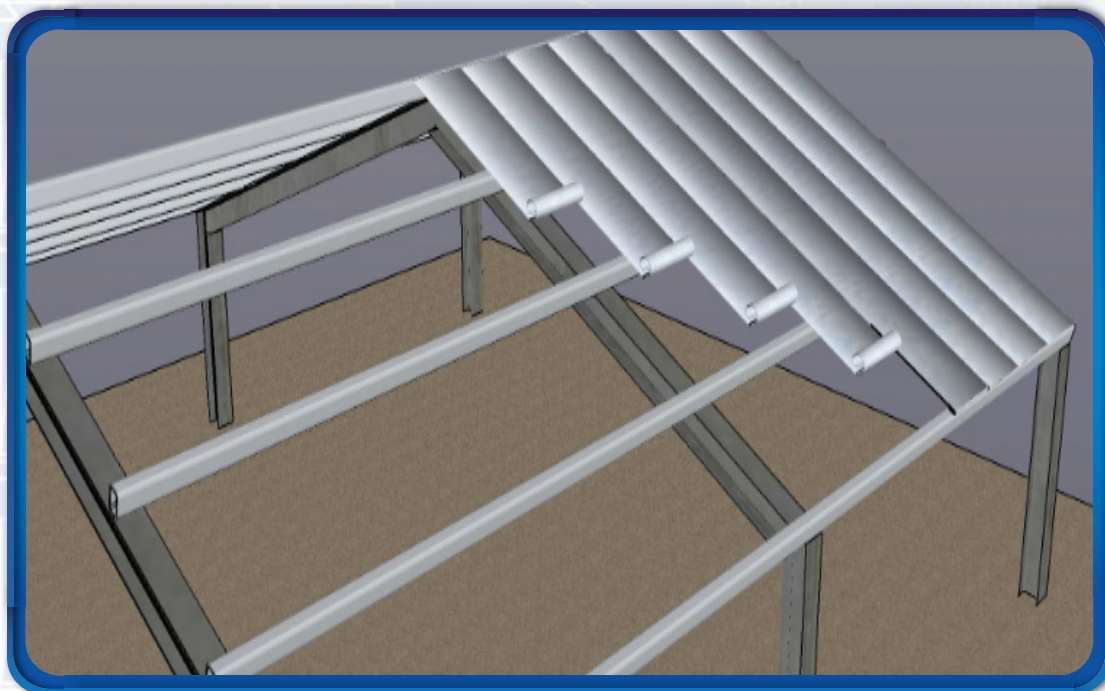
Prodex® Fixing at the End of a Structure



CLOSER LOOK AT AN ISOLATION SHEET OVER NAILERS ON AN INDUSTRIAL BUILDING



Length and Orientation of Prodex® Rolls



The rolls should be placed from one end where water falls, transversely cross the structure going above the ridge and finish at the edge of the other water fall.

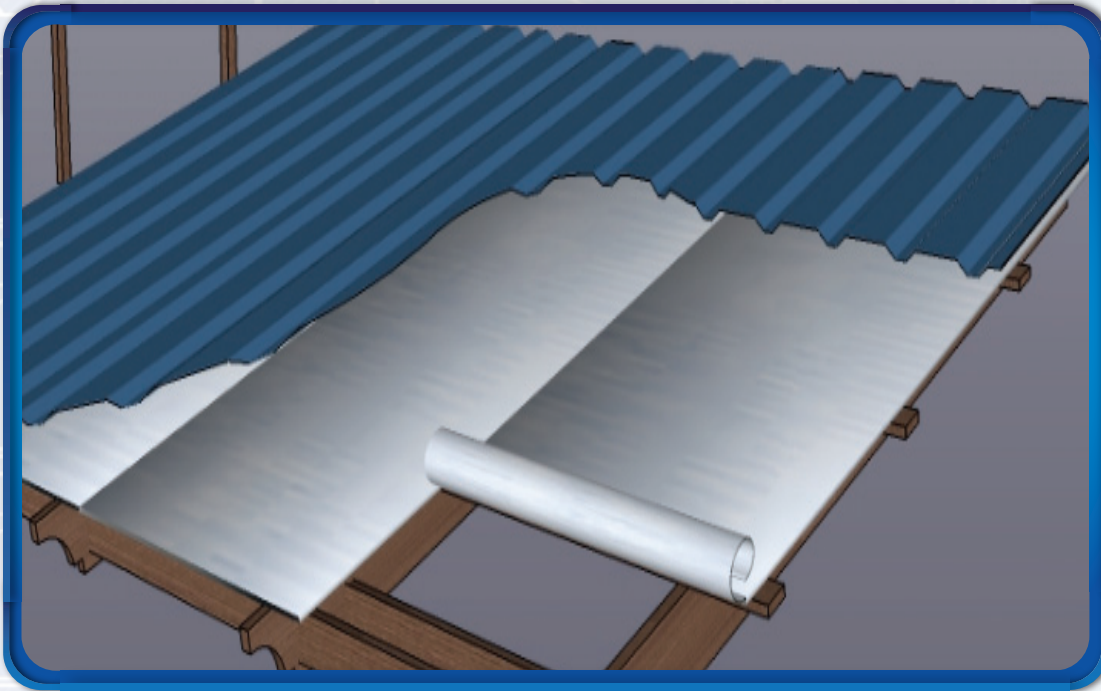


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Attaching Decks



*Stretch rolls over
the nailers before
placing the roof
deck sheets.*



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EXISTING BUILDINGS

Installation under the nailer

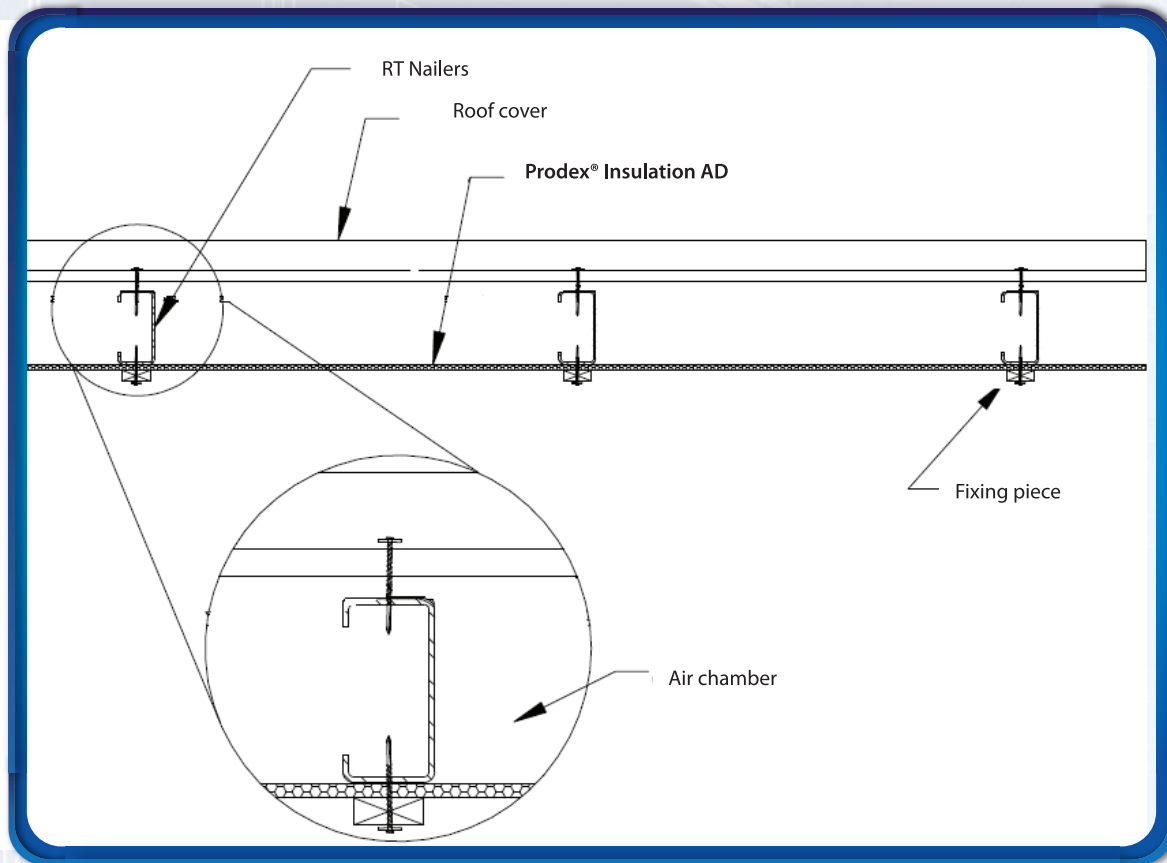


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Installation Under the Nailer



There are cases where, due to the constant production process, it is impossible to raise the roof deck, this is why Prodex® offers products and solutions to isolate the radiant heat from your building.

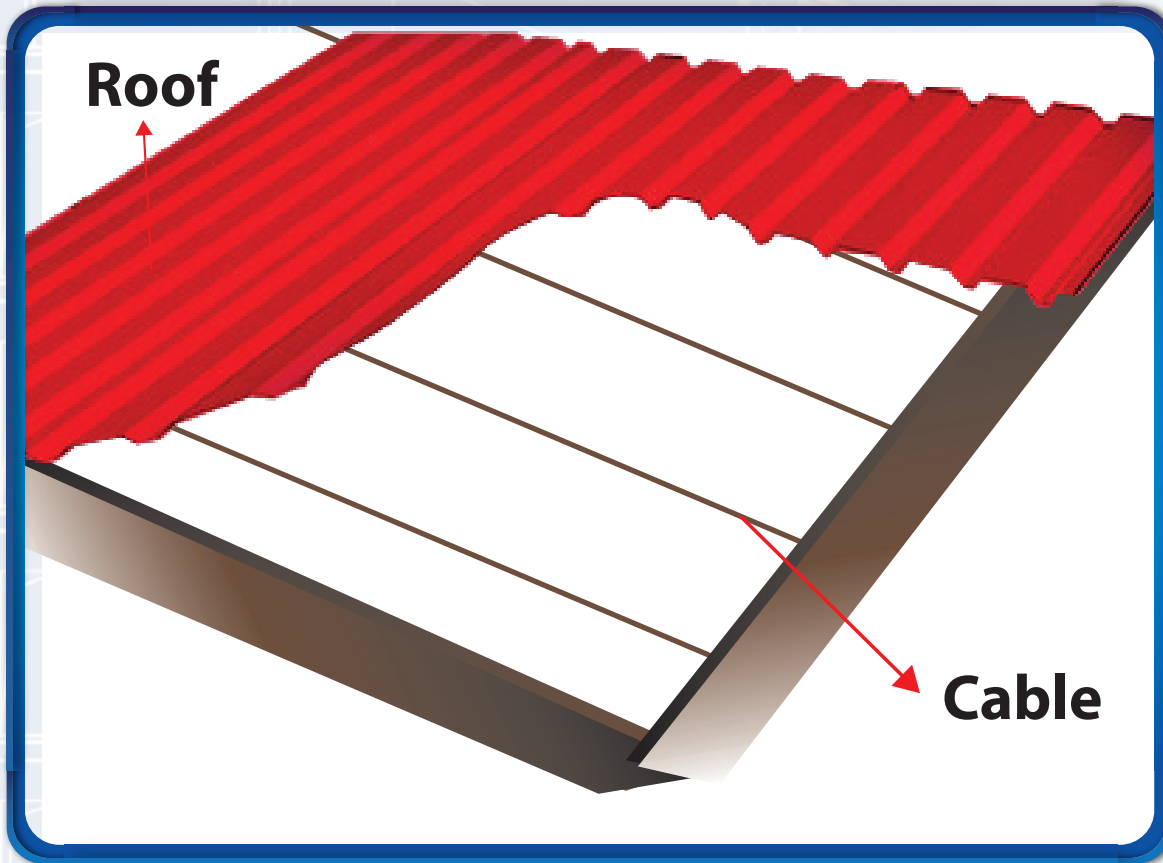


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Placing Cables or Plastic Strips



Cables or strips are placed along the roof fall at a distance of 2-meters each between cables.



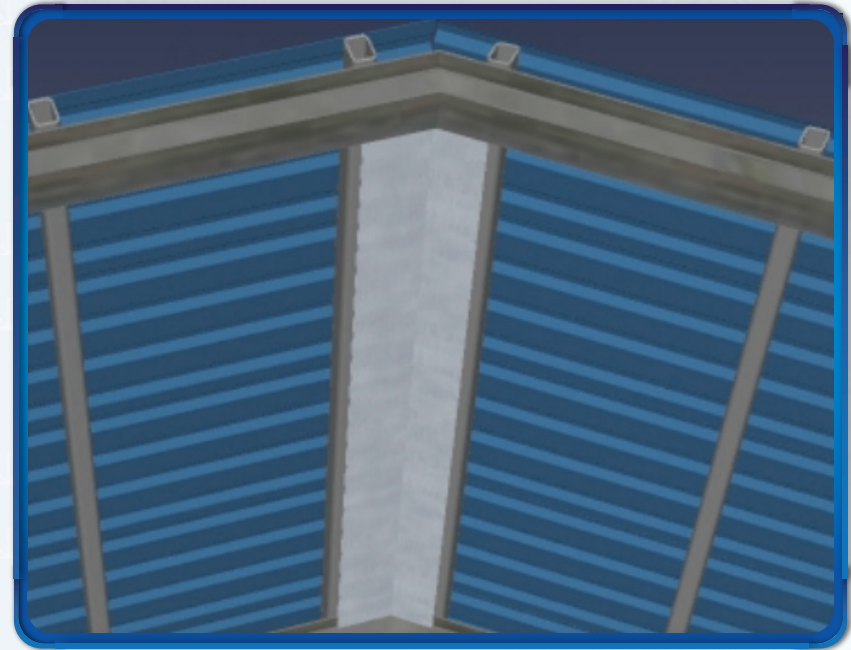
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Isolation of Ridges and Monitors

The distance between each support is measured, and Prodex® is placed along the ridge



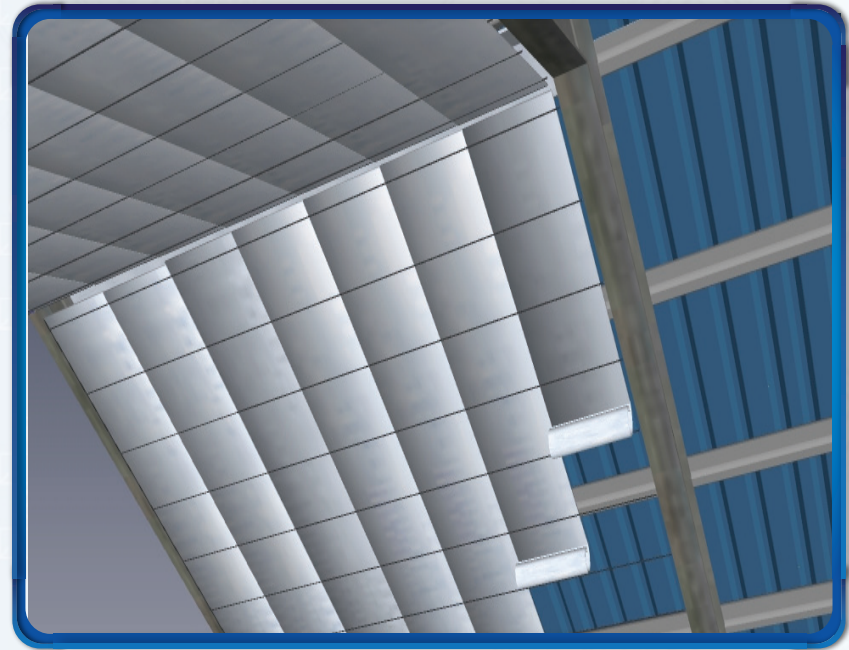
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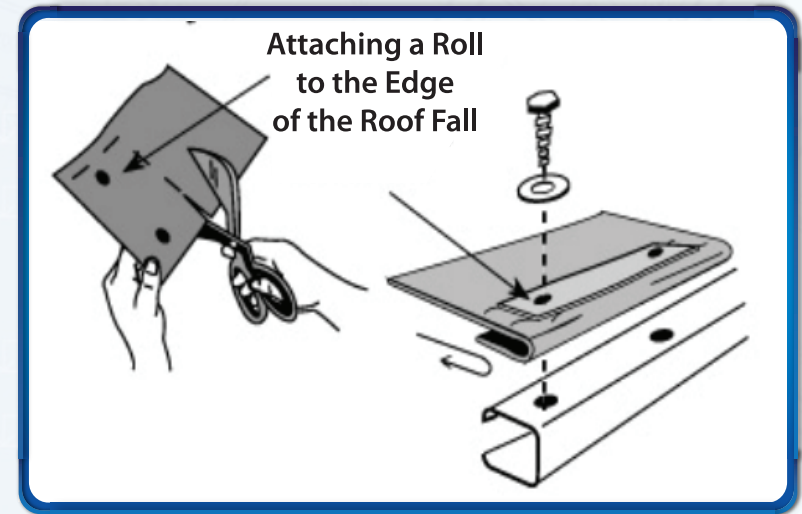


Attaching Rolls

Rolls are placed under the wires from the bottom to the top of the roof.



Attaching a Roll to the Edge of the Roof Fall



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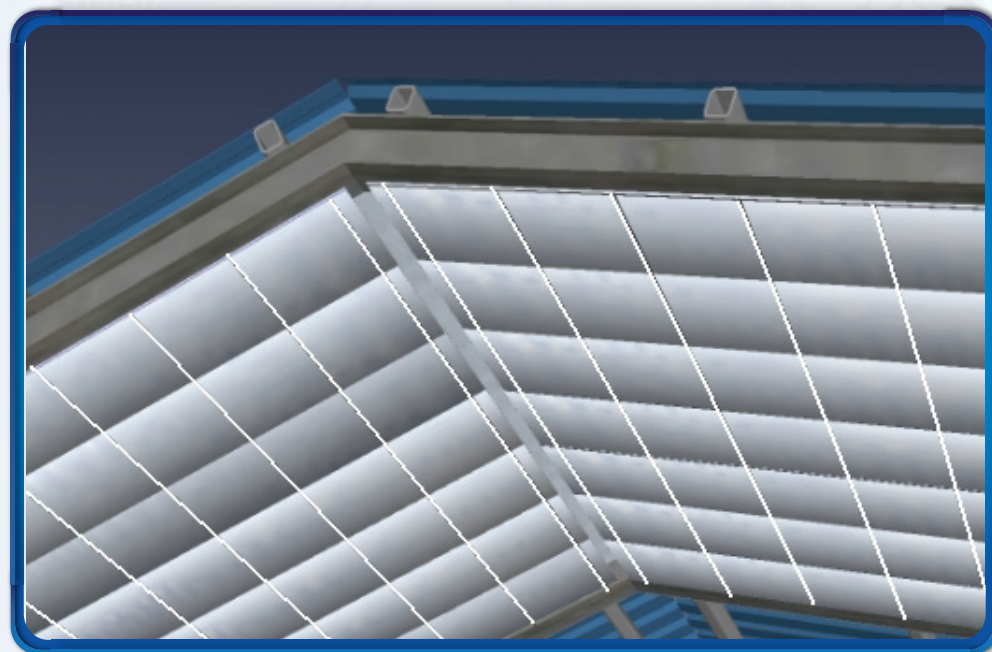
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Use of Plastic or Metal Strips

Prodex® insulation can be placed with plastic strips instead of galvanized steel cables, you must be careful to install strapping with UV protection.

It should be placed every 2 meters between each strip, at maximum.



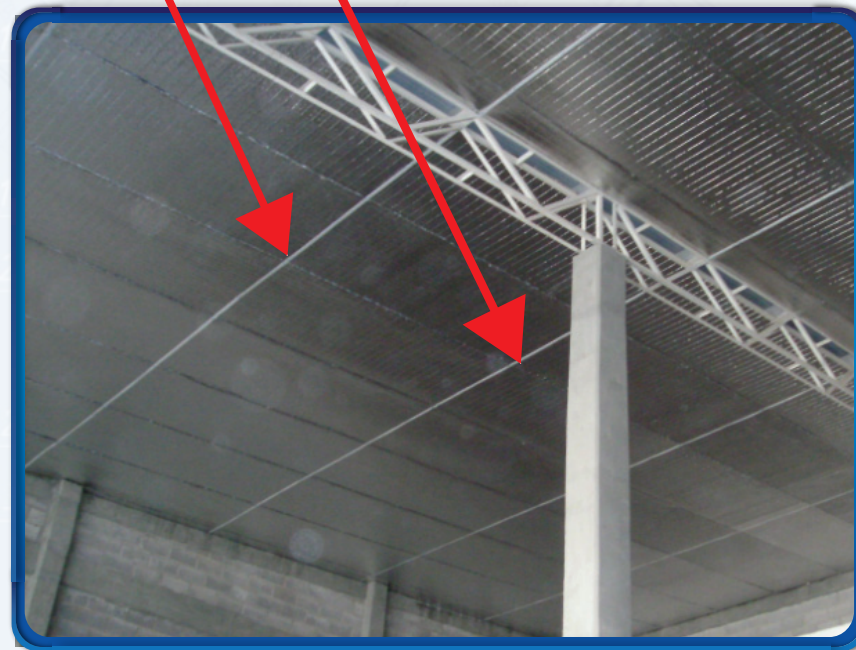
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Installation of a Strip

The strip is placed once the insulator is fixed to the end of the structure, as it moves to the ridge or to the end of the structure start installing the strip according to the distance between purlins

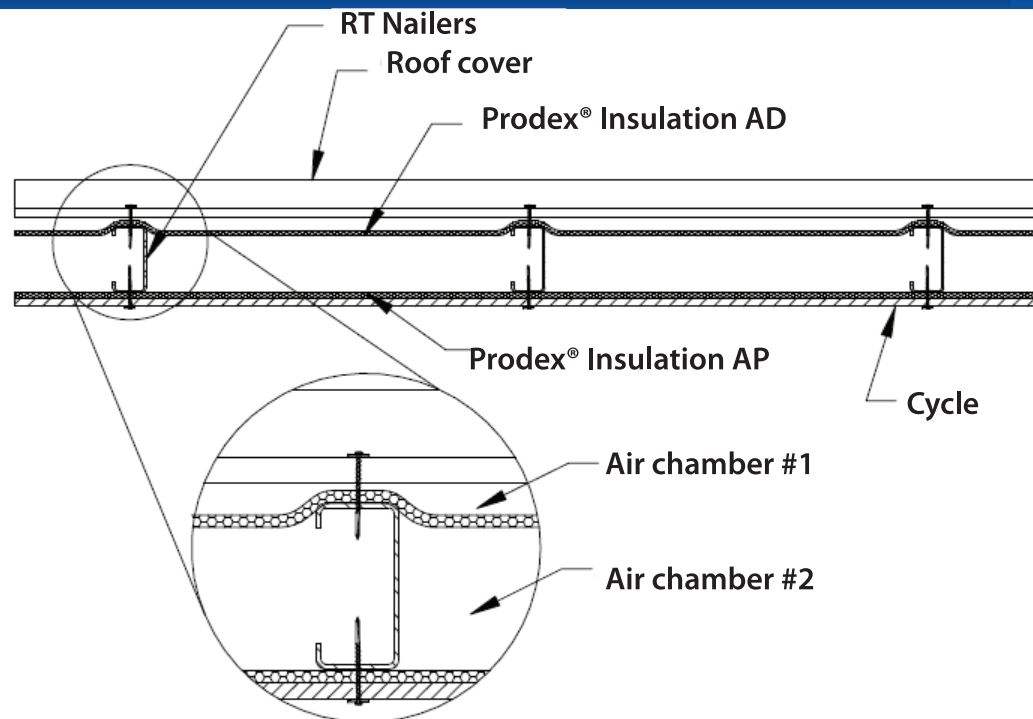


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Double Foil Sheet of Reflective Insulation



Double air chamber with AD, AP
and roof sample

*It is installed in places
requiring a high R
value, from R 22 to R 30*



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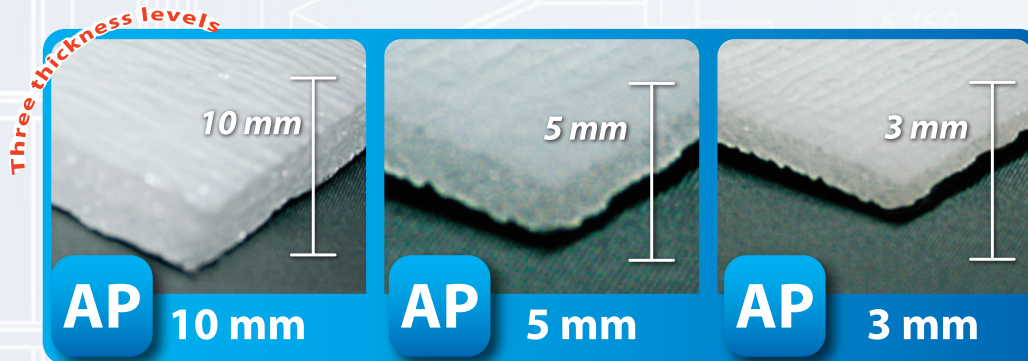
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Insulation Solutions

AP ALUMINIUM + POLYESTER

- ✓ Provides high quality finishes in facilities without ceilings or suspended ceilings.
- ✓ Excellent tear and high temperatures resistance.



AP INSULATORS	THICKNESS(mm)	WIDTH(m)	LENGTH(m)	SQM. PER ROLL	WEIGHT PER SQM.	USABLE WIDTH
AP10/1 ALUM SIDE	10mm	1.22m	20m	24.4m ²	0,34 kg/m ²	1.17 m
AP5/1 ALUM SIDE	5mm	1.22m	20m	24.4m ²	0,214 kg/m ²	1.17 m
AP3/1 ALUM SIDE	3mm	1.22m	10m	12.2m ²	0,184 kg/m ²	1.17 m



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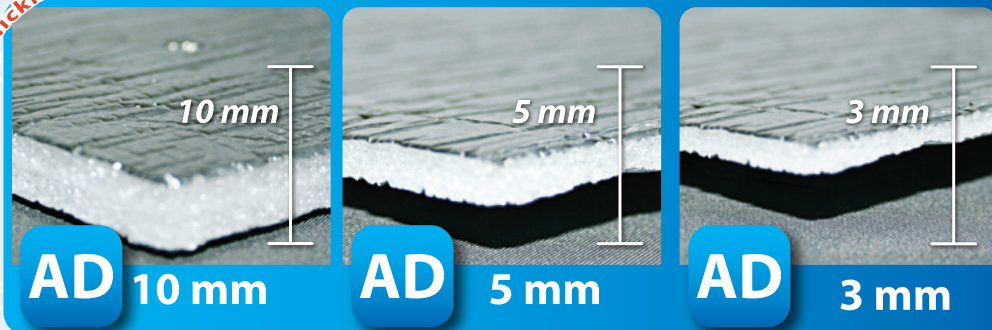


Insulation Solutions

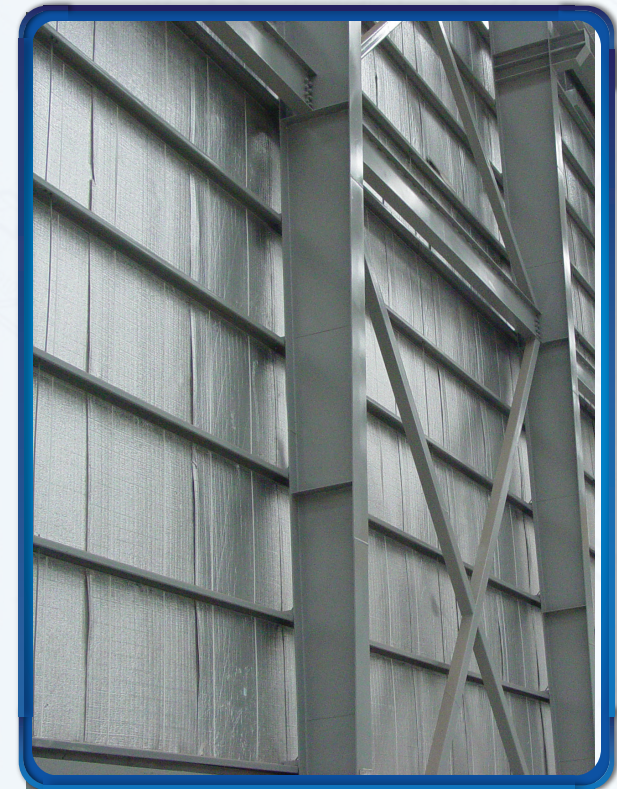
AD ALUMINUM + ALUMINUM

- ✓ Class A anti-flame Product
- ✓ Side seals with 5 mm and 3mm thicknesses to ensure the foam is not exposed in the installation process.
- ✓ It increases energy savings in controlled environments with the use of air conditioners.

Three thickness levels



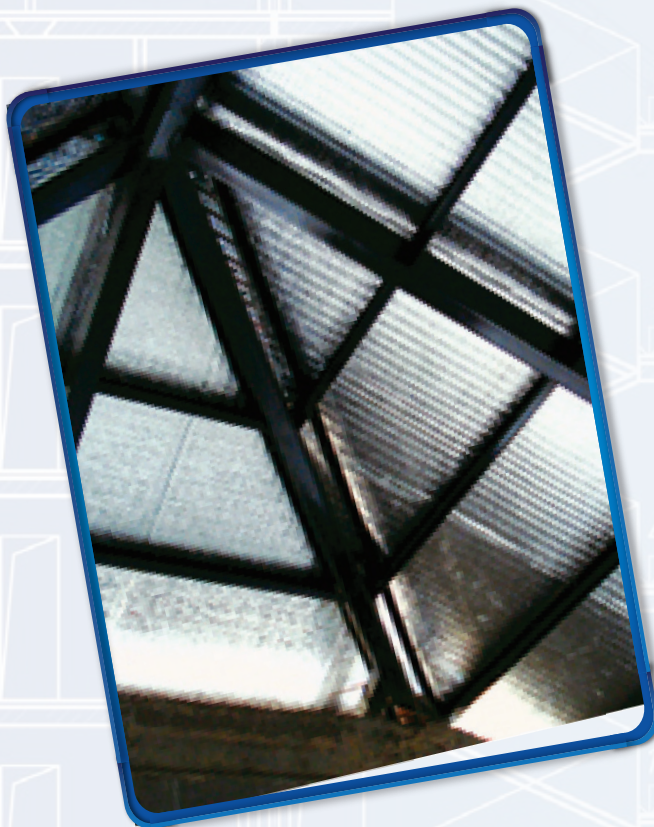
AD INSULATORS	THICKNESS (mm)	WIDTH(m)	LENGTH(m)	M ² POR ROLLO	SQM. PER ROLL	USABLE WIDTH
AD10/DOUBLE ALU	10mm	1.22m	20m	24.4m ²	0,414 kg/m ²	1.17 m
AD5/DOUBLE ALU	5mm	1.22m	20m	24.4m ²	0,242 kg/m ²	1.17 m
AD3/DOUBLE ALU	3mm	1.22m	20m	24.4m ²	0,204 kg/m ²	1.17 m



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Prodex® Fast Action



REQUEST OUR 2 PRODUCTS WITH TAPE INCLUDED

PRODEX Fast Action reduces labor costs

Thermic Reflective Insulation with Tape included

- ✓ Reduces spending on materials and tools, saving time and labor, for its quick and easy installation

Presentations:

AP (3mm-5mm) with tape included
AD (3mm-5mm) with tape included



EASE



RESISTANCE



SPEED



ECONOMY



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Design and Selection of Thermic Insulation

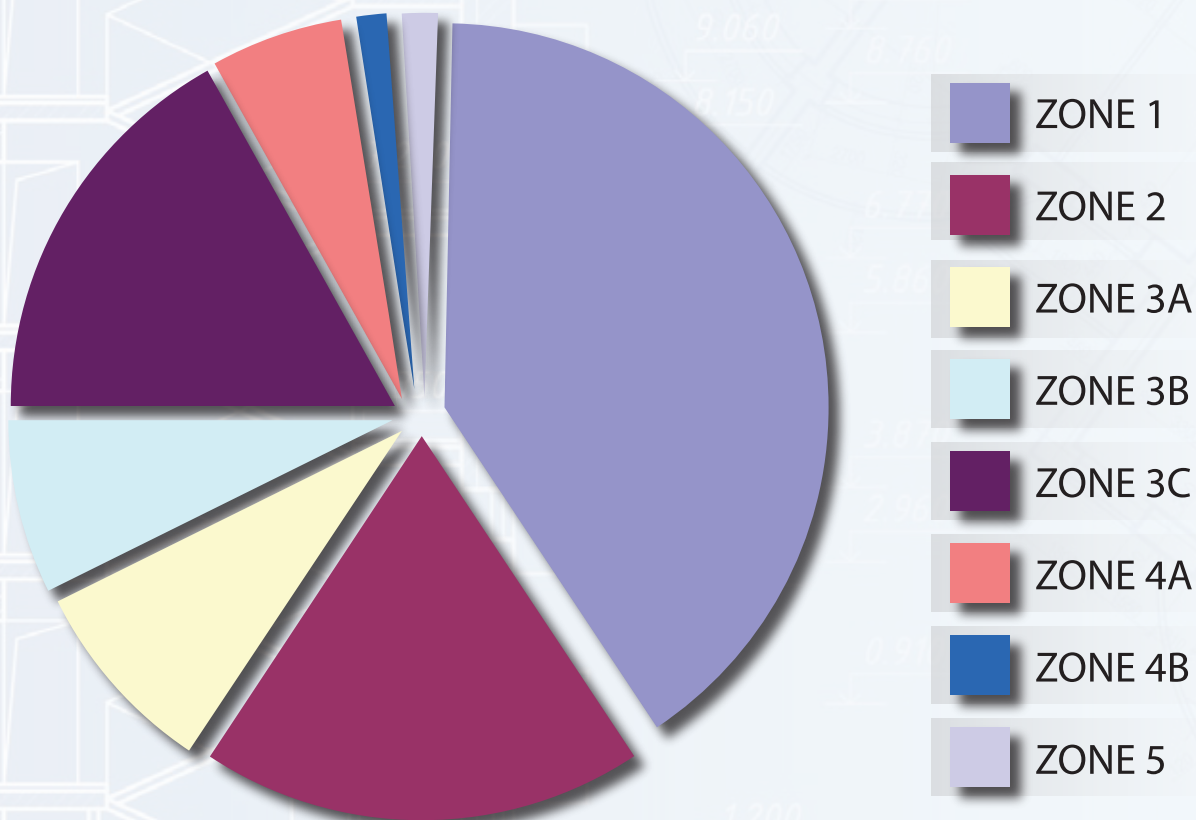
Climate Zones

According to the 2004 version of ASHRAE-90.1 and the International Energy Conservation Code 2004, climate zones are established based on Degree Days of average monthly temperatures and rainfall.



Frequency of Thermal Zones for 1,400

Locations in Mexico



What is Degree Day?

This is the method according to ASHRAE; it is a measure of the need for cooling or heating.

Degree days are defined as:

The algebraic difference, expressed in degrees, between the average temperature on any given day and a reference temperature.

Thermal Zone No.	Classification based on Degree Days
1	$5\ 000 < \text{GDR}$
2	$3\ 500 < \text{GDR} \leq 5\ 000$
3A y 3B	$2\ 500 < \text{GDR} \leq 3\ 500$; $\text{GDC} \leq 3\ 000$
3C	$\text{GDR} \leq 2\ 000$
4A y 4B	$\text{GDR} \leq 2\ 500$; $\text{GDC} \leq 3\ 000$
4C	$2\ 000 \leq \text{GDC} \leq 3\ 000$



The "R" Value and Degree Days

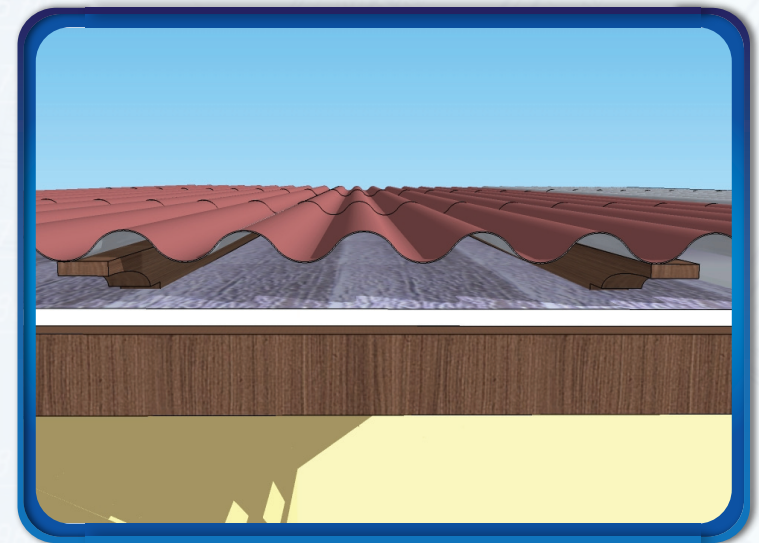
- For the construction codes and standards in the developed world, the "R" value is associated with a climate zone.
- The climate zone is defined by Degree Days in the area.
- Therefore, without Degree Days is not possible to establish the R-value required for the design of the building.



"R" Values by Climate Zone

Standard: nmx-c-460

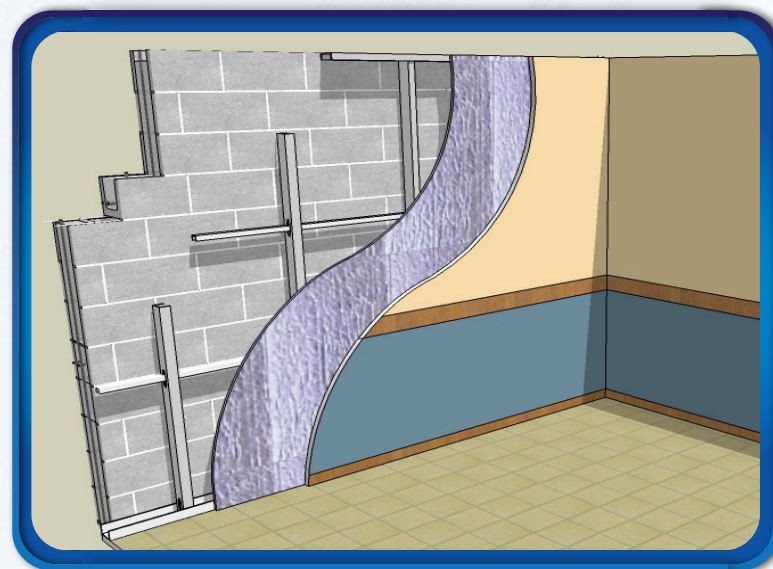
Thermal Zone No.	ROOFS		
	m² K / W (ff² h °F / BTU)		
	Minimum	Habitability	Energy Saving
1	1,40 (8,00)	2,10 (12,00)	2,65 (15,00)
2	1,40 (8,00)	2,10 (12,00)	2,65 (15,00)
3A, 3B, 3C	1,40 (8,00)	2,10 (13,00)	2,80 (16,00)
4A, 4B, 4C	1,40 (8,00)	2,10 (15,00)	3,20 (18,00)



"R" Values by Climate Zone

Standard: nmx-c-460

Thermal Zone No.	WALLS		
	$\text{m}^2 \text{ K} / \text{W}$ $(\text{ft}^2 \text{ h } ^\circ\text{F} / \text{BTU})$		
	Minimum	Habitability	Energy Saving
1	1,00 (5,70)	1,10 (6,00)	1,40 (8,00)
2	1,00 (5,70)	1,10 (6,00)	1,40 (8,00)
3A, 3B, 3C	1,00 (5,70)	1,10 (7,00)	1,80 (10,00)
4A, 4B, 4C	1,00 (5,70)	1,10 (10,00)	2,10 (12,00)



"R" Values by Climate Zone

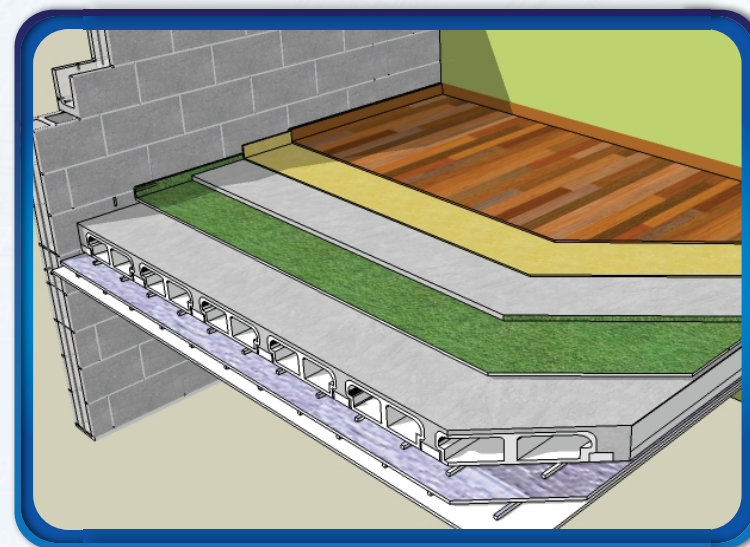
Standard: nmx-c-460

**Thermal Zone
No.**

FLOORS, MEZZANINE

$\text{m}^2 \text{ K} / \text{W}$
($\text{ff}^2 \text{ h } ^\circ\text{F} / \text{BTU}$)

	Minimum	Habitability	Energy Saving
1	NA	NA	NA
2	0,70 (4,00)	1,10 (6,00)	1,20 (7,00)
3A, 3B, 3C	0,90 (5,00)	1,40 (8,00)	1,60 (9,00)
4A, 4B, 4C	1,10 (6,00)	1,80 (10,00)	1,90 (11,00)

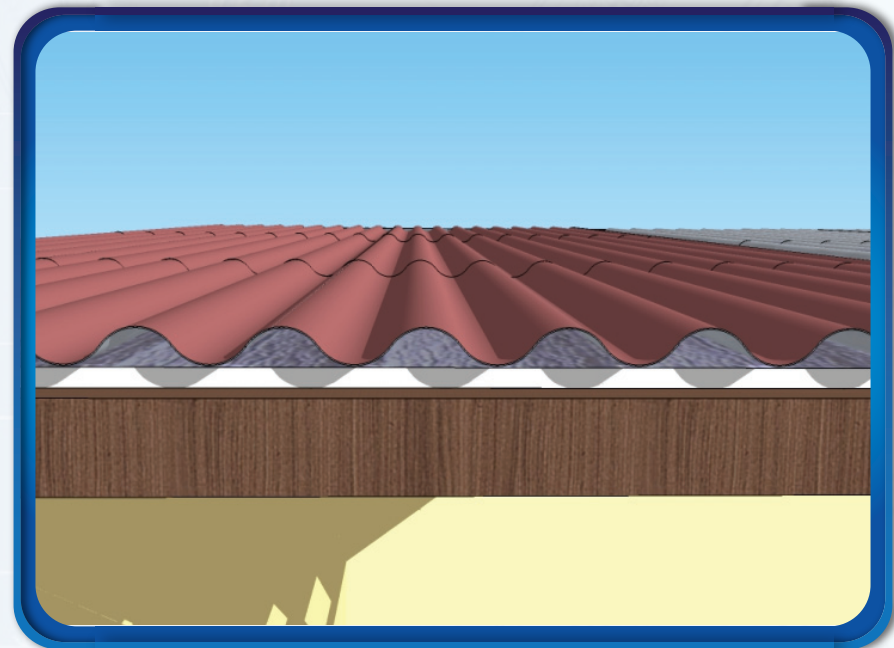


What R-Values are Obtained with Prodex® for Roofs?

Source ASTM: STP 1116

AD	Value R (ft ² ·h·°F/Btu)
3	8.137787304
5	8.489790824
10	9.369799624

AP	Value R (ft ² ·h·°F/Btu)
3	4.57754725
5	4.92955077
10	5.80955957

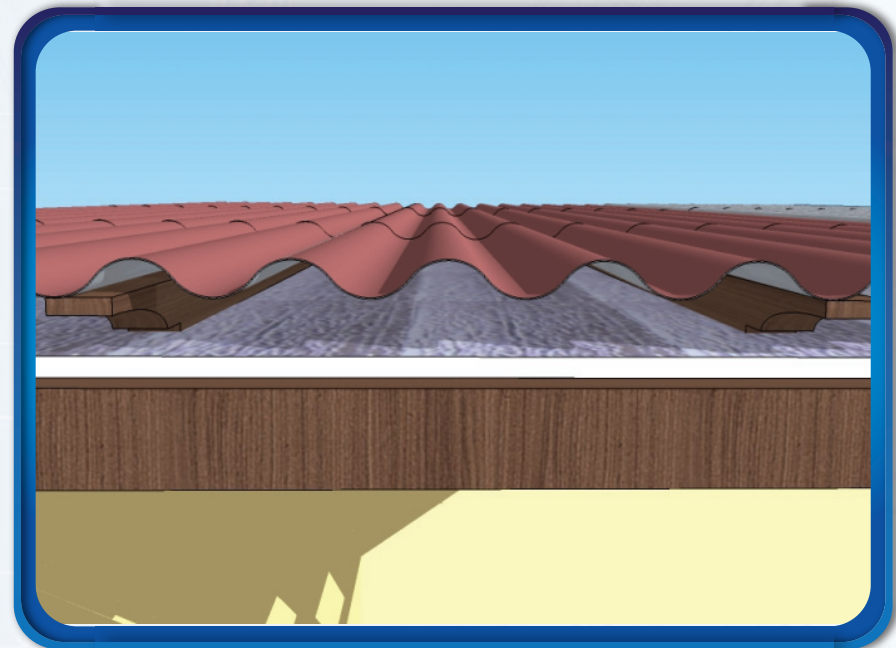


What R-Values are Obtained with Prodex® for Roofs?

Source ASTM: STP 1116

AD	Value R (ft ² ·h·°F/Btu)
3	15.32347875
5	15.67548227
10	16.55549107

AP	Value R (ft ² ·h·°F/Btu)
3	9.12753922
5	9.47954274
10	10,35955154

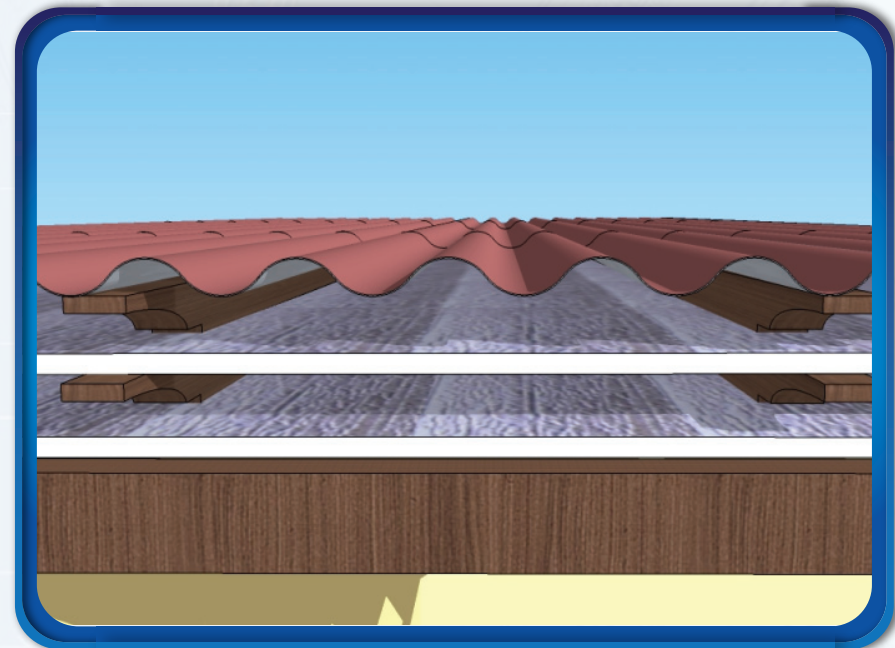


What R-Values are Obtained with Prodex® for Roofs?

Source ASTM:STP 1116

AD	Value R (ft ² ·h·°F/Btu)
3	20.4237889
5	21.12779594
10	31.01584625

AP	Value R (ft ² ·h·°F/Btu)
3	17.55941993
5	18.26342697
10	20.02344457



What R-Values are Obtained with Prodex® for Internal Walls?

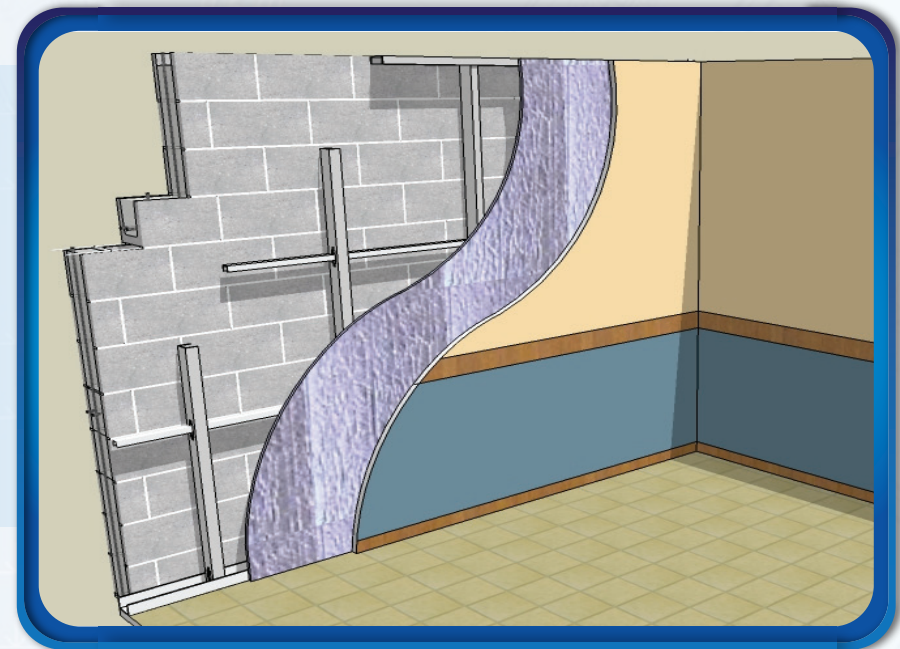
Source ASTM : STP 1116

AD3: R 6.6

AD5: R 7.00

AD10: R 7.17

Double layer of AD 10: R10.46



What R-Values are Obtained with Prodex® for Internal Walls?

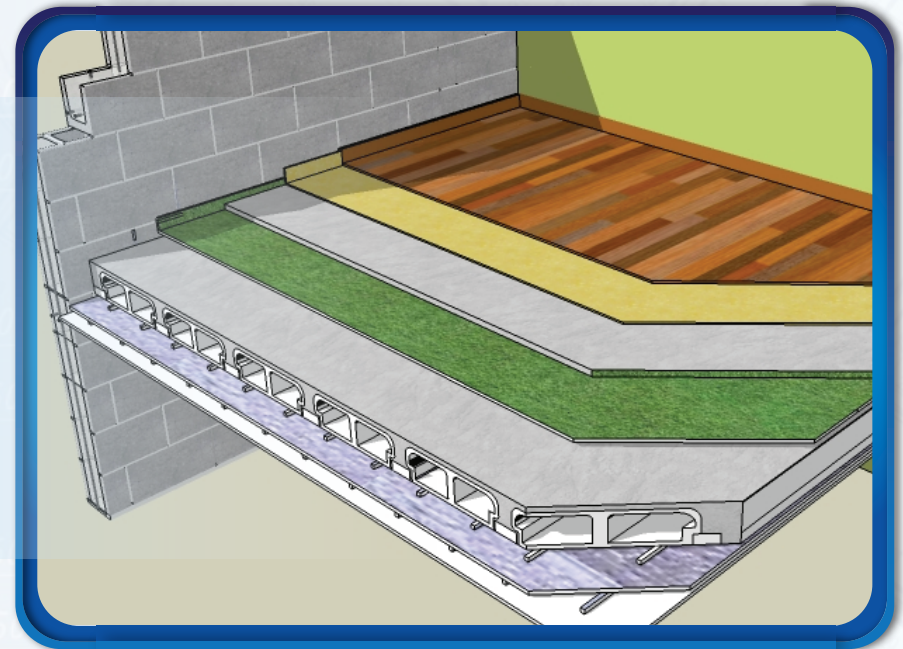
Source ASTM: STP 1116

AD3: R 6.6

AD5: R 7.00

A 10: R 7.17

Double layer of AD 10: R 9.12



Calculation of Loads According to HDD / CDD

Heating Degree Day

Cooling Degree Day

Each city has a number of degree days, which is determined by climate zone. The local weather service should be able to give this information for each specific city

Examples:

Los Angeles: $GDC = 1274$ $GDR = 679$

Orlando: $GDC = 580$ $GDR = 3428$

Guadalajara: $GDC = 200$ $GDR = 2800$



Load Calculation

**External heat coming in
(CDD) Requires air conditioning
(CDD = Cooling Degree Days)**



**Heat coming out
(HDD) requires heating
(HDD = Heating Degree Days)**



Specific Area in sq. ft²



Quick Estimate

Heating load $Q_h = A \cdot HDD \cdot 24/R$.

Cooling load $Q_c = A \cdot CDD \cdot 24/R$

The result is the amount of BTUs required to maintain a given area comfortable.



Equipment efficiency and costs

Eh: Heating equipment:

0.70 to 0.95

1.0

1-3

Hydrocarbons

Electrical resistance

Heat pumps

Ec: Cooling equipment:

1.5- 3.0 Air conditioning



Equipment Efficiency and Costs

Utility Factor:

Heating = $Q_h/E_h \times 0.00001$

Cooling = $Q_c/E_c \times 0.000293$

Cost Factors:

Thermic = \$1.6 kwh = 0.0855 (varies with location)

Cost of heating $Q_h/E_h \times 0.00001 \times 1.6$ (\$/year)

Cost of cooling $Q_c/E_c \times 0.000293 \times 0.0855$ (\$/year)



Example

CDD = 3428 (Orlando)

A = 1000 sq. ft

Equipment efficiency = 2

R = 2 (no insulation)

\$/year:

$$1000 \times 3428 \times 24 \times 0.000293 \times 0.0855 / (2 \times 2) = \$515.26/\text{year}$$

↑ ↑
R E c



Total Consumption vs R

- $C = (1000 \cdot 3428 \cdot 24 \cdot 0.000293 \cdot 0.0855) / (2 \cdot R)$
- C \$/year for an area of 1000 sq. ft
- $C = 1036.6 / R$

R	Cooling cost	Savings (\$/year)
2	515,3	0
5	206,1	311
10	103,1	414
15	68,7	449
20	51,5	467



Return of Investment Time

- A cost-benefit balance must be made.
- It is desirable for the benefit to be much greater than the cost.
- The benefits of Prodex[®] are guaranteed for years.
- With a simple ROI calculation, the investment can be quickly assessed.
- Payback period = Cost (\$) / Savings (\$ / yr) = years.
- For example an investment of \$1.25 per sq. ft with \$412 in savings.

PR= 3 years



What R-Value of Thermic Insulation Do I Need for My Design?

- The climate zone where the project will be located must be established.
- Determine what is the value for CDD (cooling degree days) and HDD (heating degree days) for the established climate zone.
- Determine the required U-value for ceilings, walls and floors.
- Determine the required R value that the insulation must have according to the building.
- Select the product and the installation system that meets the R-value estimate.
- Calculate the energy savings by installing the insulation sheet in case you have A/C.
- Estimate the ROI Time.

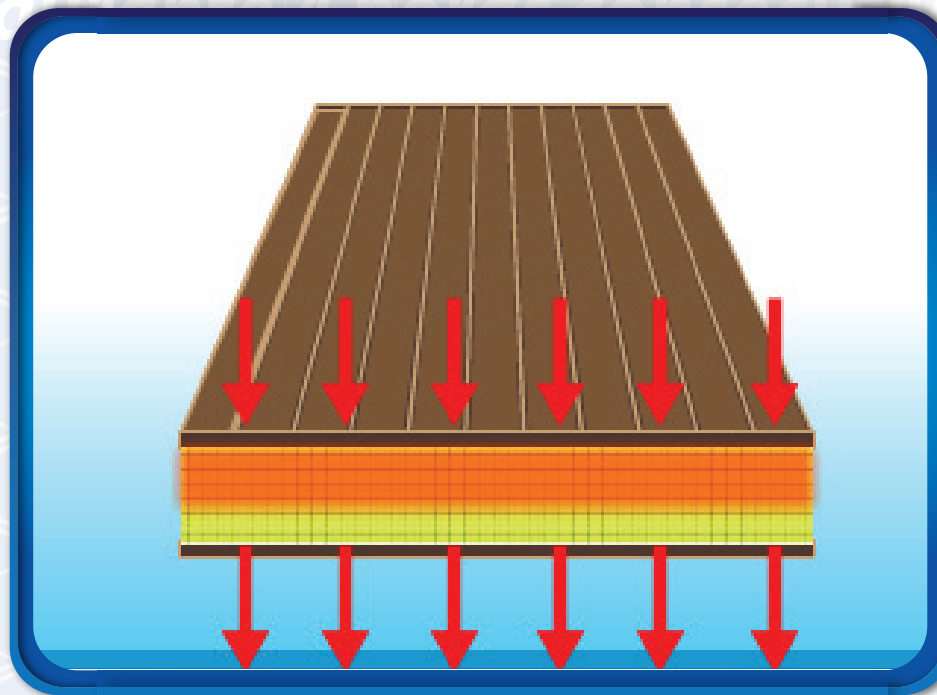


Prodex® Insulation vs. Mass Insulation



How Does a Mass Insulator Behave

during 4 Consecutive Hours?



Experimental Conditions

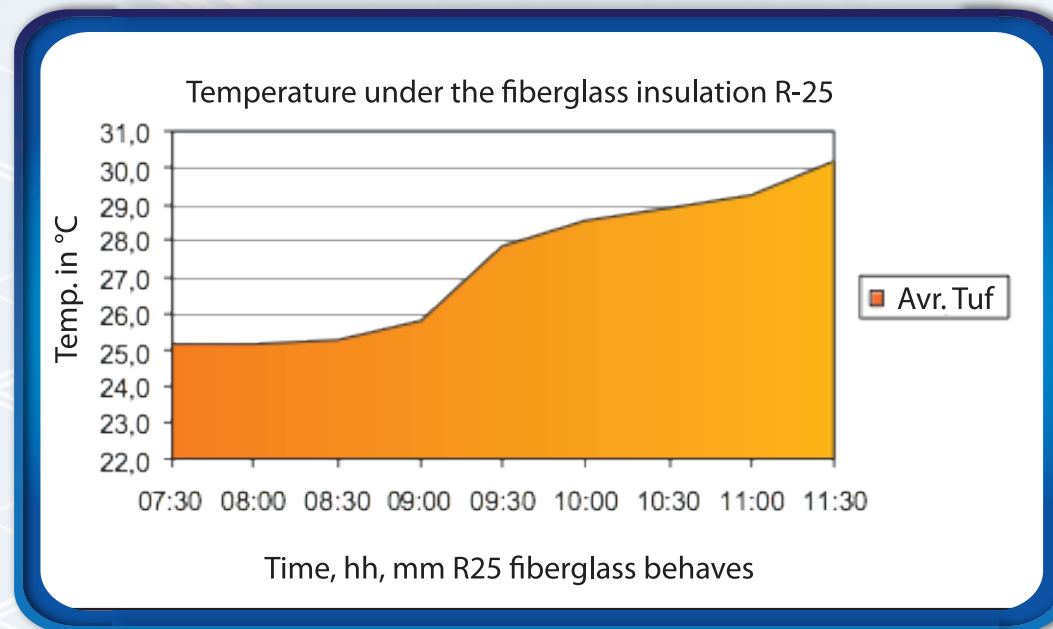
Ave. Env. T : 26°C

Cub. Env. T : 77°C

The installation of the 8" fiberglass insulation sheet equivalent to a R25 starts evidencing a problem regarding its installation, as there is no way to maintain the required separation for the material not to be compressed. It goes from 8" to just 5" directly damaging the insulation capacity of the system as follows:



The respective temperatures are measured every 30 minutes during 4 hours, and they are recorded on an Excel spreadsheet to obtain a graph that shows us the behavior of the R-25 insulation sheet.



As observed, just as the theory of mass insulation predicts, where the incoming heat flow penetrates the core of the fiberglass until it reaches a saturation point where the insulation ability of R-25 is lost. This can be easily verified with a series of vertical measurements of the downward cut of the fiberglass as observed on the diagram below.

***This proves the accuracy of the principle of operation of mass insulation.
"THEY DO NOT PREVENT THE HEAT TRANSFER, THEY ONLY DELAY IT"***



How Does Prodex® Behave

during 12 Consecutive Hours?



Installation of Lights

Four 250-watt lights are installed at a uniform distance distributed through a 1.60m-section on the two models

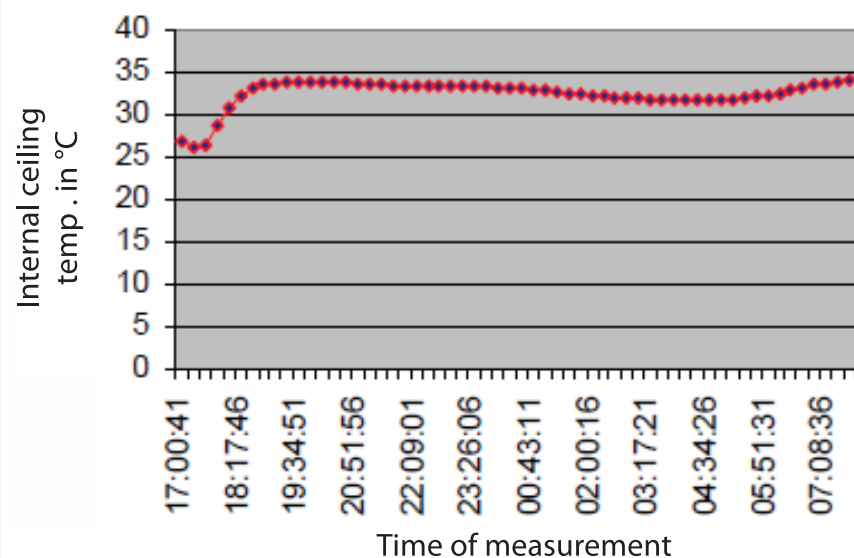


Deck Temperature Without Prodex®

Results:

- * **Deck without Prodex®**
- * **Minimum temperature: 26.0 °C**
- * **Maximum temperature: 34.5 °C**
- * **Average temperature: 32.7 °C**

Fiber cement deck without insulation



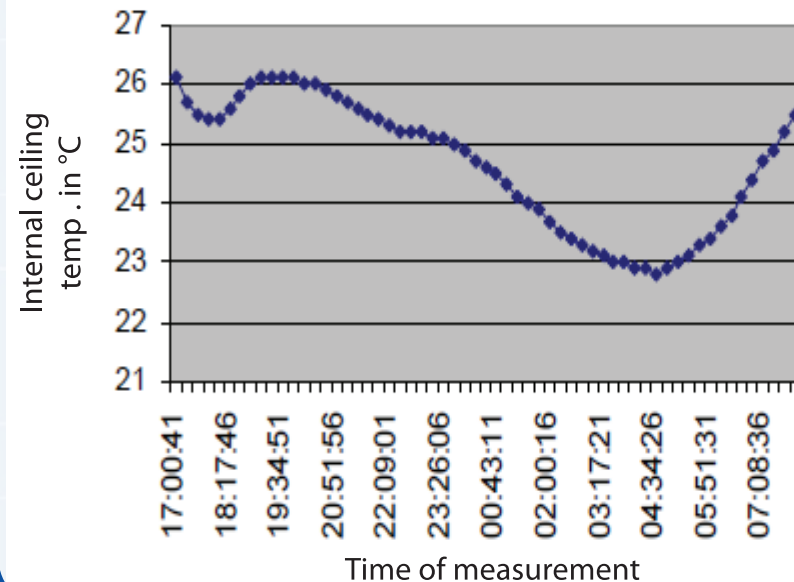
Deck Temperature With Prodex®

Prodex® AD5

Results:

- * **Deck with Prodex®**
- * **Minimum temperature: 22.8 °C**
- * **Maximum temperature: 26.1 °C**
- * **Average temperature: 24.6 °C**

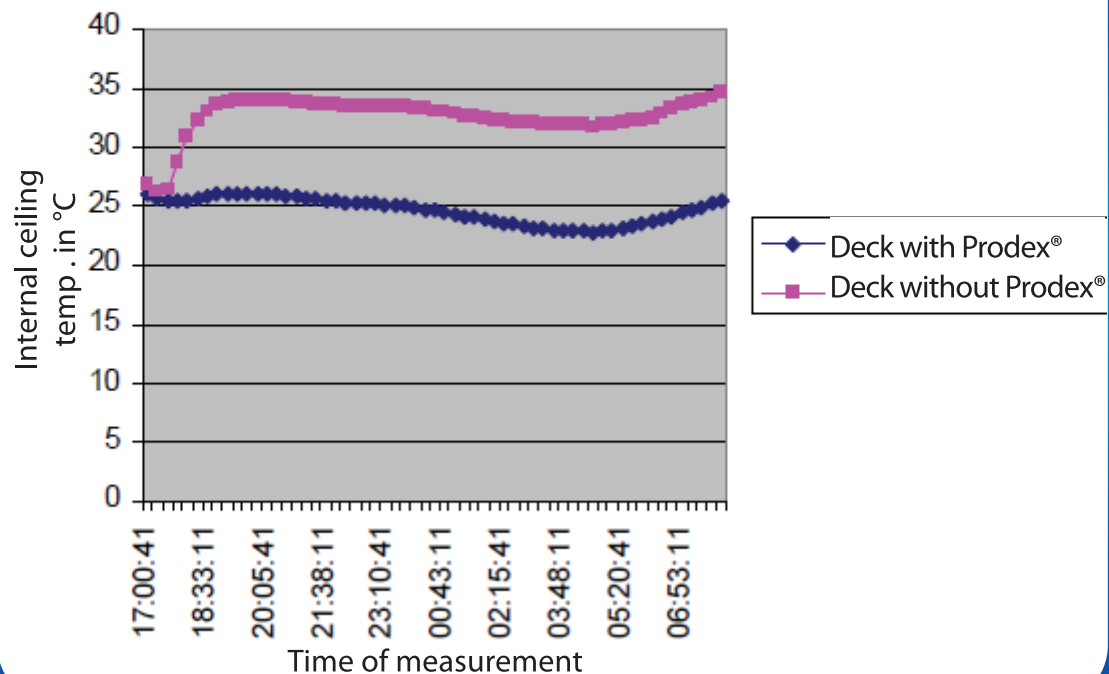
Fiber cement deck with Prodex® AD5



Comparative Chart

There is a temperature difference of 10 degrees Celsius under equal operating conditions

Comparison Between Decks

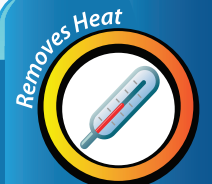


Technical Features

- ✓ Polyethylene structure with 100% closed cell
- ✓ Density of 20 to 30 kg / m²
- ✓ Steam barrier
- ✓ Emittance of 0.03
- ✓ Waterproof
- ✓ Resistant to mildew
- ✓ LAMBDA value(*) of the foam of 0032 w/mk

*LAMBDA:

Thermal conductivity coefficient which expresses the quantity of heat flow passing through the area of a sample unit.



Environmental Characteristics

- ✓ **Our products are free of toxic gases.**
- ✓ **We do not damage the ozone layer.**
- ✓ **CFC Free.**
- ✓ **All Prodex products are eco-friendly.**
- ✓ **They do NOT cause allergies.**
- ✓ **We are members of the United Green Building Council.**
- ✓ **Our packages are made with OXOBIODEGRADABLE technology.**



Certifications

ISO 9001:2000: We strive to meet present and future needs of our customers through the innovation and continuous improvement of our integrated management system.



ISO 14001: 2004: This International Standard provides the framework for companies to demonstrate their commitment to environmental regulations, properly handling the impacts of their activity on the environment.



BASIC STANDARD: Minimizes the risk of supply chain processes of its exports and imports to ensure the integrity of the load.



Business Alliance for Secure Commerce



Certifications

ICCES: It ensures that the 5 mm double-sided aluminum (AD-5) insulation meets the requirements established by the United States of America.



Energy Star: It is a program of the U.S. Environmental Protection Agency and the U.S. Department of Energy which helps save money and protect the environment through products and energy-efficient practices.



U.S Green Building Council: International Certification System for green building. Companies that are part of the organization guarantee products focused on energy-saving, efficiency, environmental quality, resource management and sensitive to impacts.



Certifications

Rima Internacional: Prodex® is a member of RIMA (International Association of Reflective Insulation Manufacturers). RIMA is the only commercial association that represents the branches of reflective insulation in the United States. RIMA's goal is to promote the concept and acceptance of reflective insulation worldwide.

RIMA *International*
Reflective Insulation Manufacturers Association International

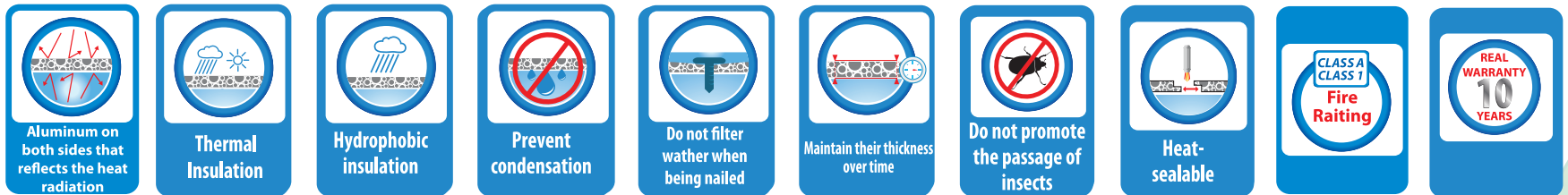


PRODEX® IS ENERGY SAVING TO BENEFIT OUR PLANET

PRODEX® insulation products are recommended for green building because they hold the most important certifications as a company focused on the conservation of the environment.

PRODEX® IS ENERGY EFFICIENT

Our products are an opportunity to preserve energy, which have an impact on power consumption by improving the efficiency of air conditioning, refrigeration, hot water tanks and heating.



Comfort in harmony with the environment

www.prodexcr.com Phone: (506) 2438-2322