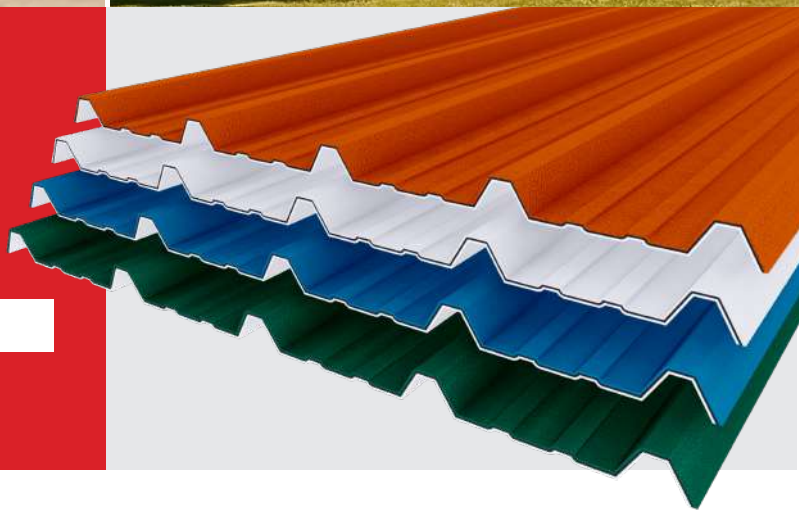
klar

TK AG PANELS

Rigid PVC Building Panels

KLAR MULTILAYER THERMO-ACOUSTIC PANELS

PRODUCT AND INSTALLATION MANUAL



1. PRODUCT DESCRIPTION

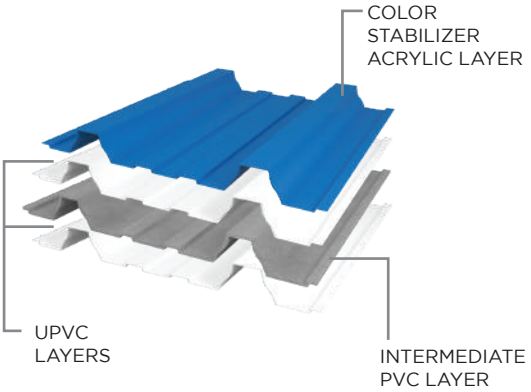
Klar multilayer thermo-acoustic panels are composed of a series of layers, manufactured with the most advanced co-extrusion technology, which provide excellent resistance to impact and extreme climates, ensuring their long useful life.

Each panel has two layers of rigid PVC (unplasticized polyvinyl chloride) that form the body and give structure, foamed PVC to generate thermo-acoustic insulation, UV protection agents, stabilizers, and pigments. These components together result in non-flammable and insulating (great R-value) properties, as well as in high resistance to corrosion from humidity, microbiological, and chemicals, making our panels a superior alternative to traditional coverings such as metal, fiber cement, wood and others used in agricultural and rural structures.

Our panels are ideal for large and medium size structures including hog, poultry, livestock farms, barns, calf barns, carwash facilities, garages, storage units (hay, fertilizers, machinery, etc.) and even in smaller projects like sheds, shelters, chicken coops, dog kennels, among others.

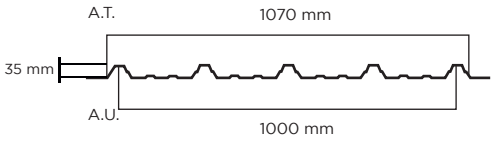
Also, their cleanability and minimum maintenance make them suitable for high sanitary safety activities such as food processing plants, farms and agro-industrial, pharma-industry, among others.

Thanks to its high resistance to humidity and saltpeter, it also is ideal for coastal constructions such as naval installations, boat storage, fishing markets and port facilities.

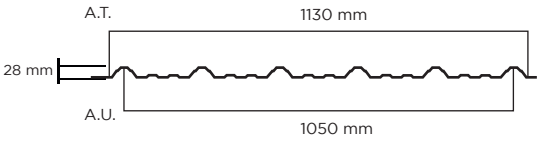


2. PRODUCT PRESENTATIONS

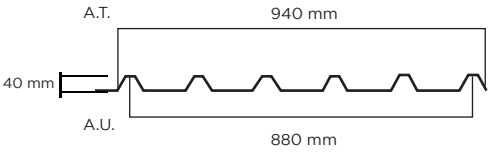
DIMENSIONS OF MULTILAYER THERMO-ACOUSTIC PANEL
Klar TK5 Ag Plus



DIMENSIONS OF MULTILAYER THERMO-ACOUSTIC PANEL
Klar TK6 Ag Liner



DIMENSIONS OF MULTILAYER THERMO-ACOUSTIC PANEL
Klar TK6S Ag Plus



Lengths and widths: +/- 1cm tolerance

3. PHYSICAL AND MECHANICAL PROPERTIES

Properties	Unit	TK6 Ag Liner	TK6S Ag Plus	TK5 Ag Plus	TK5 Ag Plus
Thickness*	mm	2.0	2.5	2.0	2.5
Specific weight	Kg/m^2	3.71	5.0	3.88	4.9
Radius of curvature	m	6	14	12	12
Ridge height	mm	28	40	35	35
Transverse overlap	Ridge	1	1	1	1
Longitudinal overlap	cm	25			
Thermal resistance	m^{2}K/W	0.0129	0.0161	0.0129	0.0161
Thermal conductivity	W/m.k	0.155			
Min. slope	%	10			
Temperature range	Cº	-10 a 45			
Maximum impact resistance	J	8	10	8	10

*The thickness of the panel may vary by +/-10%. For greater thicknesses and specific requirements, consult with your Klar executive or advisor.

4. GENERAL CHARACTERISTICS

FIRE RESISTANCE	DIN 4102 Classification, hardly flammable. In case of fire, flames have low propagation and reduced smoke emission. In addition, it does not generate thermal drip.
HIGH CORROSION RESISTANCE	Our panels can be subjected to saline, alkaline or acidic solutions with a concentration of less than 60% during a continuous 24-hour exposure. Unlike other coverings, they do not rust, avoiding problems due to water leaks and favoring water-exposed environments.
THERMAL INSULATION	Due to their low thermal conductivity, the transmission flow of external temperature (heat and cold) into a room is very low, improving efficiency and lowering your utility bills. The insulation coefficient is up to 25% higher than those of metal coverings.
MECHANICAL PERFORMANCE	Great adaptability to weather conditions within -10°C and 45°C.
EASY INSTALLATION	From being more user-friendly, not having sharp edges nor absorbing heat from the sunlight.
LEAD & RUBBER FREE	We guarantee our panels are manufactured using lead-free and rubber-free additives.
100% RECYCLABLE	Our materials are 100% recyclable and environmental friendly.
MORE THAN 20 YEARS OF USEFUL LIFE, FREE OF CRACKS	The upper layer contains UV protection, which allows having a great durability even outdoors, maintaining its color and properties.
INNOCUOUS	Using a proper cleaning and maintenance to avoid mold formation, our panels ensure high levels of innocuousness making our panels ideal for food plants, agriculture and pharma industries.

5. STRUCTURE MATERIALS

Whether you decide to use metal, wooden, or any other type of material structure for your Ag building, always make sure it is properly leveled all around its surface and gets properly attached to the ground. Get familiar with all implications of your building materials prior installation, including material performance under different temperature conditions (i.e., dilatation, etc), maximum weight withstand, appropriate distance between purlins (span), best hardware and sealants, and some other considerations as recommended by the manufacturers of those building materials.

6. TRANSPORTATION

As a first consideration for pickup or shipping, verify the transport unit has the appropriate dimensions to transport the panel size needed and properly secure panels in the truck bed. Any material damaged for this reason will not be covered by the warranty as damaged product.

Prior loading make sure the truck bed is free of oil, gravel and/or sharp elements that may damage the panels. It is recomended the use of wooden pallets -or similar- placed continuously along the entire length so that the load weight is evenly distributed.

Make sure there is separation between bundles in order to avoid friction and a potential damage to panels.

Avoid transporting other materials including metals, machinery, power tools, equipment, etc. in the same truck bed along with panels as prevention from accidental damage during the transfer of the unit.

During loading and unloading, a visual inspection must be carried out to ensure the quality of the product is as intended (free of damages). Proceed to secure load to guarantee a safe transport.

If there is any risk of direct exposure to natural or artificial heat sources during transport, it is recommended not to wrap the panels completely with stretch film -or similar- as it could affect the product by accumulation of internal heat

7. HANDLING, STORAGE AND CARE

• For the correct storage and care of Klar multilayer thermoacoustic panels, the following should be considered:

• Must be stored in a cool, enclosed environment avoiding wet or humid areas and direct sunlight (do not exceed 60°C / 140°F)

• Panels must rest on a level, even surface, never on sloped, uneven, or irregular ones.

• For proper protection and care, panels should not be placed directly on the floor. It is recommended to use wooden pallets or similar, ensuring even weight distribution, and separated from floor. Never store panels sideways or diagonally.

• The maximum height of the panel stack shall not exceed 1.50 meters (5 feet).

• Panels shall not be handled diagonally or from opposite corner ends (i.e. do not lay opposite ends on the ground) since it may cause ruptures, deformation or damage.

• It is recommended to store panels in areas that allow clear maneuvering of the load and not close to objects that may cause damage during handling.

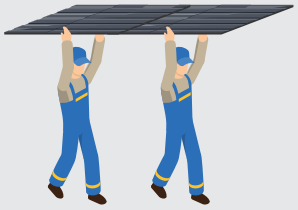
• Cover the panels with dark tarps or opaque plastic films but allowing flow of air.

• The above-mentioned area must have the corresponding signals.

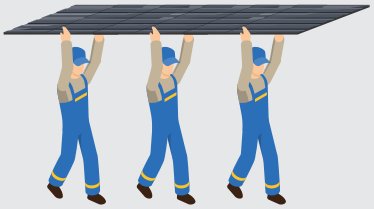
• Although panels do not have sharp or living edges that may cause cuts or hurt to personnel during transportation or handling, the use of EPP and gloves are always recommended, and following all safety procedures from your local county or State is encouraged.

• Considerations for manual handling:

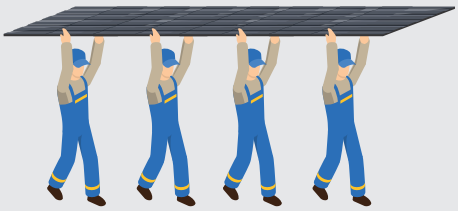
Up to 10 ft long



Up to 20 Ft long

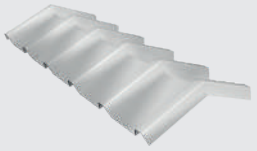
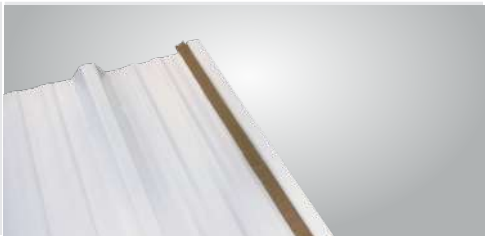


Up to 26 Ft long



Up to 40 Ft long

8. ACCESSORIES

Accesories	Description	
Klar Fittting Set	Zinc-coated self-drilling 3” screws #14 + EPDM Washer + PVC Head.	
Ridges: Klar TK5 Ag Plus Klar TK6 Ag Liner Klar TK6S Ag Plus	Klar’s PVC ridge cappings are manufactured with the most advanced co-extrusion, multilayer technology, which provides excellent impact and extreme weather resistance..	
Double-sided tape for overlap	High performance tape for roof end and overlaps sealing.	

9. INSTALLATION OF PANELS

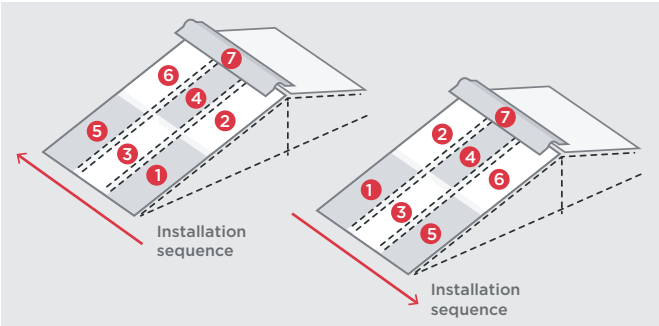
To achieve a correct installation, the following steps must be followed:

STEP 1
Make sure to have all materials and tools shown in section 10 as well as all necessary EPP. It is recommended to follow all safety procedures from your local county or State.

STEP 2
Inspect and validate the structure. Make sure the distance between supports (purlins) are in accordance with the design of the project.

STEP 3
Make sure panel dimensions are the correct ones for the space to cover. Otherwise, measurements and drafts shall be taken, and panels be cut as needed. Consider smooth-edge sawing discs when cutting panels.

STEP 4
In all cases, installation of panels must be done in the prevailing wind’s opposite direction and following the sequence shown on picture below.



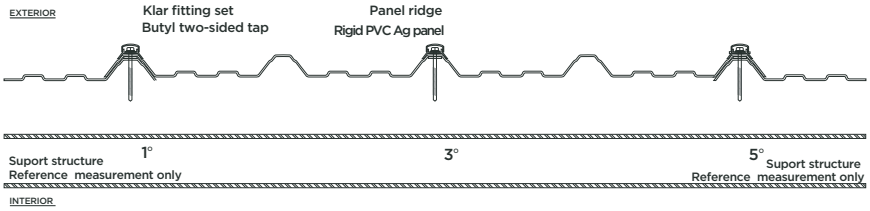
STEP 5
During installation and maintenance, do not put any kind of weight on top of the panels until they are properly fastened or secured to the structure. It is recommended to distribute the load or your own weight using boards with protection.

STEP 6

It is strongly recommended not to use any flat cardboard, drywall, plywood, underlayment, insulation membranes, films, or any similar product under panels because this normally creates a 'heat chamber' effect that may alter or deform the product.

STEP 7

When installing the first panel, consider fixing the first, center, and last ridge of the panel (ridges 1,3, and 5), keeping in mind that ridges 1 and 5 are also used for overlapping the following panels. We recommend fixing panels using fasteners over the ridges rather than on the lower areas of the panel to avoid potential deformations.



STEP 8

Lay down the first panel on the support structure, checking its alignment and making sure it is squared. When drilling, make sure to do it over the ridges and in a 90-degree angle against the panel. Use the recommended self-drilling screws keeping in mind the hole diameter in the panel must be 3-4mm oversized compared to the screw diameter to allow for dilatation.

It is important that this first panel is well squared as it will serve as a guide for the next panels. Consider using 4 self-drilling screws per square meter (m^2). In windy areas consider using 6 self-drilling screws per square meter ($m^{2)}$.

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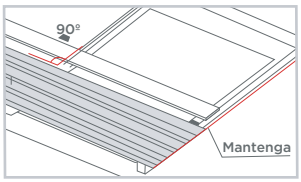
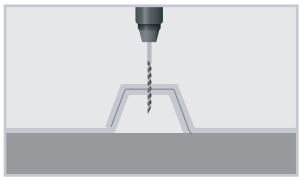


Alignment & Square



Drill 90°

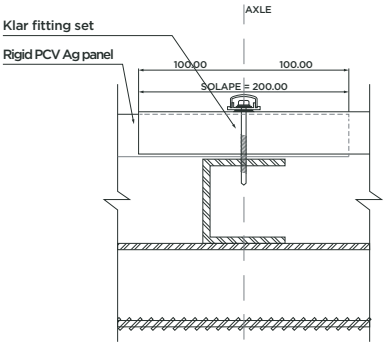
Klar Fitting Set

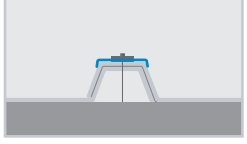
STEP 9

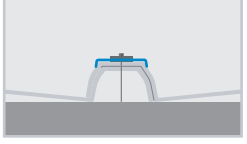
Continue with the next panel overlapping a ridge; keep in mind that in areas of considerable winds you should overlap at least two ridges. It is also recommended to use a double-sided butyl 3mm tape along and across the panels (overlapping based on structure design).

STEP 10

When securing ridge overlaps with self-drilling screws, make sure they are properly fixed and tightened with adequate (tight but gentle) torque. Too tight may cause panel deformation -and even cracking the panel surface- but too loose may result in a potential filtration spot. Always secure ridges over the center of the ridge and in line with the supporting purling underneath.



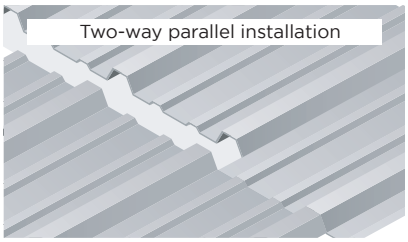




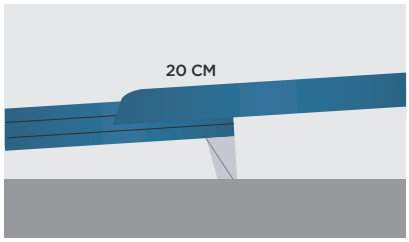
STEP 11
Avoid using rigid or cemented sealants at drilling points. Instead, is recommended the use of flexible sealants that may allow yield during panel dilatation.

STEP 12
After finishing the sequence of panel installation, you must double check alignment of the panels prior to starting the process of placing the finishing accessories.

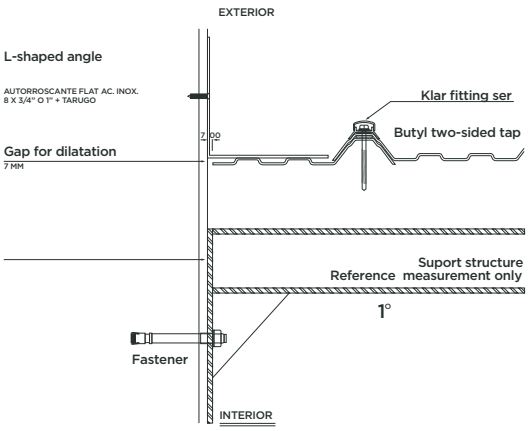
STEP 13
For double slope or double pitch roofs, consider doing a parallel 'mirroring' installation to allow proper panel alignment and to form a uniform vertex throughout its development thus allowing the correct ridge cap installation.



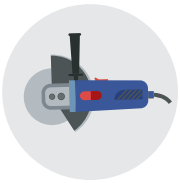
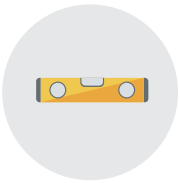
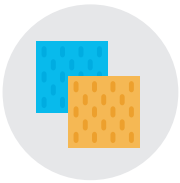
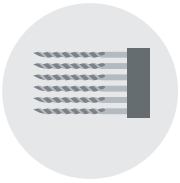
STEP 14
For ridge cap accessory installation, make sure to secure the ridge cap using the recommended fixing set and the installation sequence as specified in the previous step (Step 13). The screws must go where a support or lower support is available



STEP 15
In areas where panels converge with other materials of the structure, always consider a 7mm (0.275") gap to allow panel dilatation and avoid cracks or deformations. In some cases the use of flexible sealants are acceptable but make sure it is applied only in one of the ends to allow material mobility.

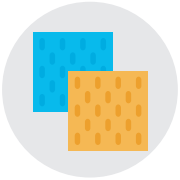


10. INSTALLATION TOOLS

Description	Material	Description	Material
Circular Saw with smooth 'toothless' disc.		Tape Measure	
Cordless Drill		Measuring Square	
Level		Cleaning Rag	
Drill bits		Bit Extenders	

11. CLEANING AND CARE

After installation and to keep your thermo-acoustic multilayer panels in their best condition Klar recommends performing once a year the following:

Description	Material
Use a soft cloth or cleaning rag to remove any particles left from cutting panels during installation.	
Use neutral soap or detergent at 10% solved into water for no longer than 15 mins prior to rinsing with water	
Tap water	
Squeegees and rag extenders are acceptable but make sure to apply softly on surface.