panelsan

WARRANTY RULES AND DISCLAIMER

WARRANTY

Contracted products will be considered under warranty cover for ..... years starting from the delivery date as long as being complied with Attc-1 (Panelsan Loading, Unloading, Storing and Installation Details) – Attc-2 (Panelsan Sandwich Panel Colour and Paint Type Details) and Warranty Rules.

Warranty Rules and Disclaimer

The warranty rules mentioned here are applied to the manufacturing defects for the sandwich panels used for wall and roof coverings which are produced under TS EN 14509. In case of determining a situation where panels being used out of their purpose (eg. materials being used to carry loads, or being used to erect scaffold during installation, etc.), they will not be considered under warranty.

1. In case of panels getting a process after the delivery (cuting, disassembly, retouch, etc.), the products will not be considered under warranty cover (see, Attc-1/7 – Maintenance and Repair)

2. Warranty period may depend on the atmospheric conditions, geographical location and area of use. (see Attc-2)

3. If the product has been used in an abrasive environment (eg. the air has dense salt content), or the product is in contact with moist and wet surfaces (eg. wood, timber, concrete, soil, or chemical materials etc.), or the smoke gets condense and produces water drop, or the product has been used in places where manure gets in touch with steel sheet, the products are not considered under warranty cover.

4. Paint surface protects the product from corrosion. In order to protect the covering, the buyer is obliged to make annual maintenance and audits, clean the surface from dirts (leaf, dust, etc.), and inform **Panelsan** about negative observations. (see Attc-1/7 Maintenance and Repair)

5. It has to be admitted that even though being exposed to similar conditions, the paint, color and brightness of a building's side facing the same direction will change over the time.

This warranty covers corrosion occurances on the sheets caused by peelings and fractures seen on the paint, and big and wavy color differantiations being exposed to UV rays equally.

This warranty is applied when the 10% of the building's side facing the same direction is affected only.

6. Protective films are just a precaution for scratchings and tarnishings that may happen during transportation and installation. Protective films do not protect the panels from weather conditions, their chemical effects, and damages that may happen during installation (see. Attc-1/4 – Storing. The warranty is valid as long as the rules stated in the insturctions are followed)

7. Panelsan have to be informed by the claimer in written form if the product is not suitable with the warranty rules in order to make an examination. This informing have to include all the informations to make Panelsan track the product easily, photographs to see the problem clearly, dispatch list number, package/party number, etc. If these informations don't exist, then the case can not be considered under warranty.

8. In case of a climate or environmental change for any reason (eg. building of a new facility that produces corrosive environment near the application zone) the warranty rules will be invalid. The buyer is obliged to inform **Panelsan**.

9. If the products have been damage by following conditions, they are not considered under warranty: Fire, lightning, flood, acid rain, explosion, winds at abnormal speed (over 80 km/h), earthquake, war happenings, riot, civil unrest, radiation, falling objects, and similar cases.

10. In case of the panels with metal coverings on both sides being used in places where the roof slope is lower than 7%, the situations of water accumulation and tarnishings caused by the design, production or installation of these parts are not under warranty.

11. For Membran installations, the membran warranty rules taken from the supplier based on the project are to be applied .

12. Turkish law is valid in international sales. In translations into other languages, in case of possible disaggrements, Turkish documents and Turkish verison will be valid.

13. It has to be spoken to **Panelsan** representative for the products that is desired to be produced out of warranty cover.

ATTC-1 INSTRUCTION FOR PACKING, TRANSPORTATION, STORAGE AND MOUNTING

1- Preparation for Installation

Before giving the orders of panel dimension and numbers, installation area should be controlled; vehicle access and crane settlement plan should be made; crane should be chosen appropriately for the height and dimensions of panel packages and height of the buildings and the construction on which the panel will be installed should be controlled according to technical rules.

It should be ensured that it is smooth in terms of the sizes of beam (lateral portion), level differences between the beams are considered and beams and rain grooves are on the same panel and construction in the facet is in its rope and triangle horizontally and plumb and scale vertically. Otherwise, there will be seat problems on the connection points of the panels. Before giving the orders, you should control them with on-site measurements.

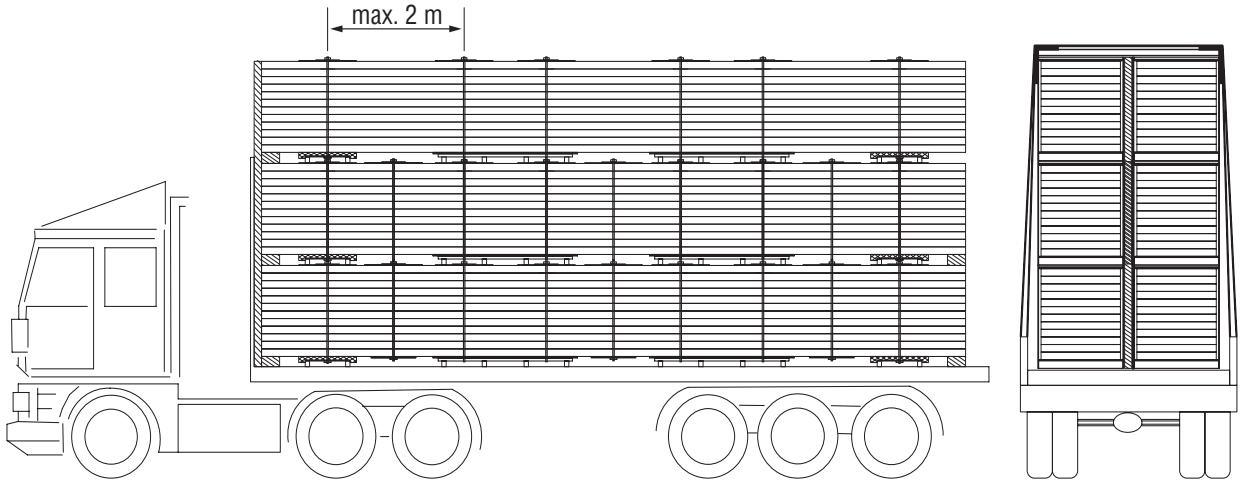
Before giving the orders, you should control them with on-site measurements

Check the compliance of the quality of product ordered with the dispatch note. Check the product delivered via dispatch note (numbers / sizes).

Check whether there is wrong shipment or there are any defects on the panels. If there is any problem mentioned above, it is necessary to determine the problem and note it down and sign the dispatch note mutually with the vehicle driver, to take the as delivery and return to sale representative immediately.PANELSAN shall be never liable to products which are not notified within 24 hours.

PANELSAN shall be never liable to inappropriate materials which are unloaded and installed.

2- Loading



The lengths of the panel packages should not exceed the length of the vehicle. Upon request, the panels exceeding the vehicle length are not considered under warranty.

The vehicle intended for shipment must be suitable for loading from the sides. It must be possible to dismount the side gusset panels of the vehicle. The vehicle should be tentless and flatbed. Side and rear doors should be closed after loading.Vehicle whose bed ground should be smooth and clean should have appropriate bed length for the panel sizes and panels shouldn't exceed the bed. Not more than 3 packages should be stacked per line. At least 10 ratchet straps should be made available per vehicle. Gussets (plastic, wood and etc.) should be put at the width of 20-30 cm so that ratchet straps cannot give damage to edges and connection points of the panels. At least 2 ratchet straps should be used on the 2nd line for the packages with panel heights of 10 m or above (1 line after the beginning and 1 line before the last line).

Protective materials should be placed among and on the fronts of the panel packages put side by side for the purposes of preventing the impact and friction (such as EPS wedge, wood wedge and etc.). Ratchet straps should be checked once per 100 km and it should be checked whether packages are removed or not. Width of vehicle should be at least 2.400 mm. Vehicle speed should never exceed 70 km per hour during driving.

Additional loads should not be loaded into the vehicle without the Panelsan authorized personnel's knowledge. Otherwise, since the products may get damage, they will be considered out of the warranty.

Vehicle Loading Table

Metal Thickness	Insulation Thickness	Insulation Thickness (mm)	Due to Lengths Unit/Package			
			Domestic Transportation (6 Package/Vehicle)		Container (4 Package/ Container)	Closed Vehicle (6 Package/Vehicle)
3 and 5 Ribbed Roof Panel	Polyurethane (PUR) Polyisocyanurate (PIR) Expandable Polystyrene (EPS)		2,80 - 9,00 m	9,00 - 13,60 m	2,80 - 11,9 m	2,50 - 13,60 m
		40	14	14	18	12
		50	12	12	16	10
		60	10	10	14	9
		70	8	8	12	8
		75	8	8	12	6
		80	8	8	10	6
		100	6	6	8	6
		120	6	6	8	4
		150	5	5	6	4
5 Ribbed Roof Panel	Rockwool / Glasswool	50	12	12	(max. 16)	10
		60	10	10	(max. 14)	8
		80	8	8	(max. 10)	6
		100	6	6	(max. 8)	4
		120	5	5	(max. 8)	5
		125	5	5	(max. 6)	4
Wall Panels	Polyurethane (PUR) Polyisocyanurate (PIR) Expandable Polystyrene (EPS)	40	20	20	27	16
		50	16	16	22	14
		60	13	13	18	12
		70	11	11	15	10
		75	10	10	14	10
		80	10	10	13	9
		100	8	8	11	7
		120	7	7	9	6
		150	6	6	7	4
	Rockwool / Glasswool	50	12	12	(max. 22)	10
		60	12	12	(max. 18)	10
		80	9	9	(max. 13)	9
		100	8	7	(max. 11)	7
		120	6	5	(max. 9)	6
		125	4	4	(max. 7)	4
Cold Room Panels	Polyurethane (PUR) Polyisocyanurate (PIR)	60	13	13	18	12
		80	10	10	13	8
		120	7	7	9	6
		150	6	6	7	4
		180	5	5	6	4
		200	4	4	5	3

3- Unloading

Panels on the trucks should be unloaded on the roof or construction site in the form of packages with a crane or forklift with special apparatus (panel packages with height over 7 meters should be unloaded with a crane having 4 blades).

Piling for the roof packages should not be done with singular gap and one top of another. Packages should be distinguished over the roof with proper gaps.

Appropriate crane should be chosen because there will be differences in terms of sizes and weights of the packages. While lifting with a crane, steel cable or chain ropes shouldn't be used. Flat ropes should be used and they should be made of nylon, silk or hemp. The width should be minimally 20 cm. Wood wedges or a material to protect the edges of the panel should be placed on the places of incoming ropes. Wedges should be 3,5 cm longer than the package with from both the sides. Similarly, wedge having the same dimension as the bottom wedge should be placed on the points where the rope contacts on the upper side of the package. Ropes should be of necessary lengths. Otherwise, panel connections will become subject to damages (Figure 1). Packages with length more than 6 m should be lifted with special apparatus. (Figure 2). The apparatus to be used should be half the length of the shortest panel length.

Figure 1

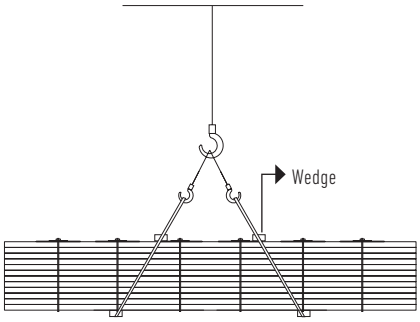
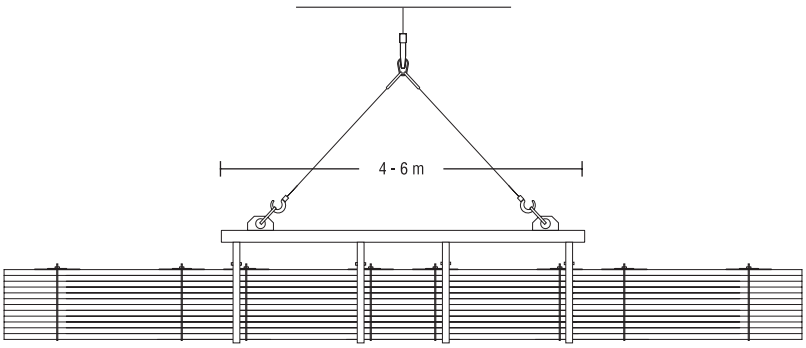


Figure 2



4- Storing

If the panel packages are intended to be stored without opening, they should be kept in a closed area protected against water, if possible. Panel packages should be kept on the surface with lower slope (2-3%) in order to protect against water vapor. Contact of the panels with soil, clay, plaster, fertilization, acid, salt, alkali and similar kinds of materials which may cause corrosion should be avoided before and during the installation. Applications which may cause scratches on the materials should be avoided.

If they are intended to be kept in an open environment, they should be covered with a nylon canvas in a way to create UV resistance in order to protect against sunlight and in a way to create vapor - pond and not to stop air flow in order to protect against water. They should be elevated to a distance which is at least 20 cm above the floor (Figures 3 - 4). They should be avoided being kept in the open environment more than 1 week and each package stored should be kept subject to humidity checks everyday despite the precautions. To avoid panels to be crushed, panels should be piled one top of another, and there should be no extra load on top of them (Figure 5).

Protective films are just a precaution for scratchings and tarnishings that may happen during transportation and installation.

This film should be removed from each panel after the installation is completed without any delay. Otherwise the film will stick to the painted surface with the effects of heat and sun, it will make it harder to remove, and will damage the paint (figure 6). The Panelsan protective films should be removed within 3 months after the delivery date. Otherwise, the complaints about the protective films will be ignored, and they will not be considered under warranty. Opened panel package should be repacked in the end of the work day, the packaging should be renewed, and be stored with precautions in a place for not to be affected with weather conditions.

Figure 3

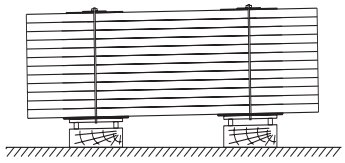


Figure 4

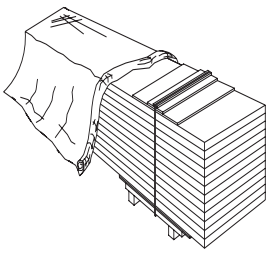
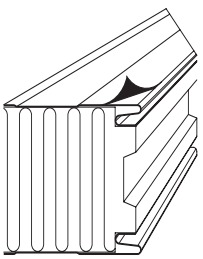


Figure 5

Figure 6



5- Handling

After panel packages are opened, never take the upper panel through pulling. Handle all the panels through lifting them one by one by avoiding the friction on the lower panel. Handling should be made with vertical lifters (vacuum – fairlead, special apparatus) and use of sufficient human labor (Figures 7 - 8 - 9).

Avoid holding panels to be handled from the connection parts or sheet coatings. Otherwise, the sheet may be removed from insulation material.

Figure 7

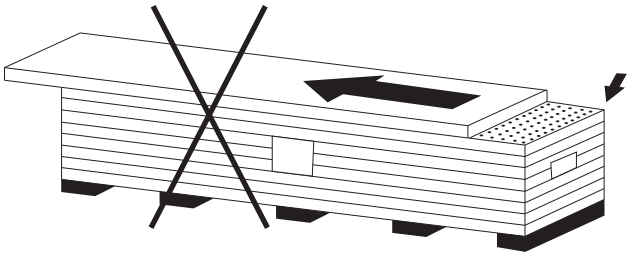


Figure 8

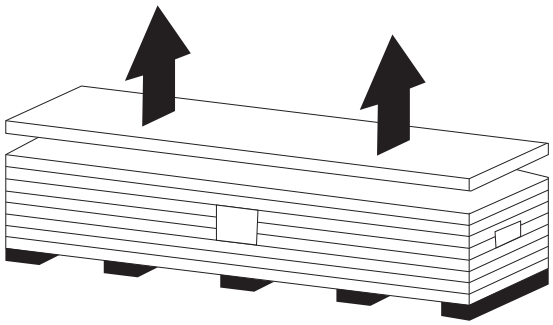


Figure 9

Figure 9 A - Vertical Lift

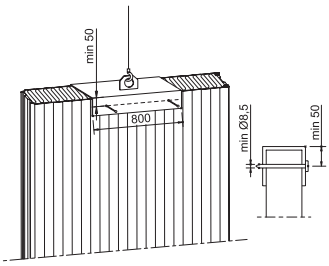


Figure 9 B Manuel Transfer

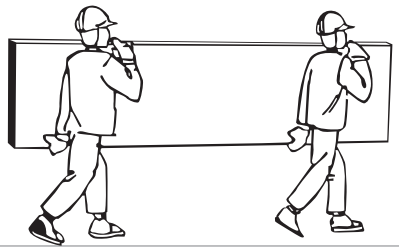


Figure C - Lift

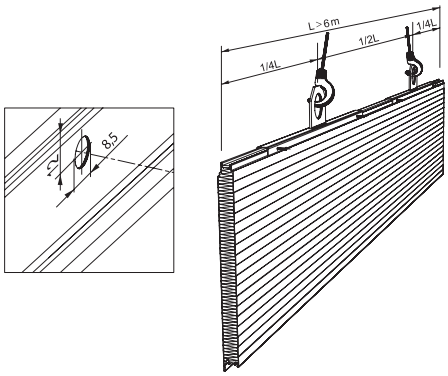
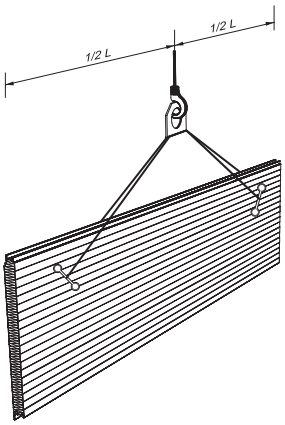


Figure 9 D - Vacuum Lift



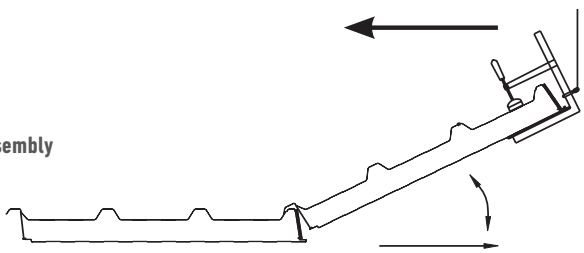
6- General Installation Rules

The bearer that the panels to be installed on is checked, and dominant wind direction should be determined.
The panels are installed against the dominant wind direction, according to the joint detail of the roof and wall panels which will be installed vertically or diagonally. (Figure 10)

Figure 10

Prevailing Wind Direction

Assembly



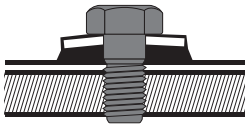
Adhesive sponge should be applied on the surfaces in contact with the carrier system and sandwich panel and the surfaces in contact with the sandwich panel and accessories (min. 2 / 10 mm). This application will prevent heat bridges created as a result of the contact between metals and corrosion.

If possible, accessories of installed panels should be sealed immediately. If it is not possible, precautions should be taken against humidity and open areas of the panel should be closed with nylons. Particularly, rockwool should be protected against humidity as long as installation of panels is continued in order to prevent the occurrence of the problems resulting from high water absorption capacity of the panel.

While accessories are installed, 2 cm of mastic application should be internally made on the edges of the accessories for the purposes of preventing water and air penetration. 2 mm of mastic gap is left for panel connections in cold room panels. External and internal insulation of these areas with mastic shouldn't be forgotten. While choosing the screws as the fastening elements:

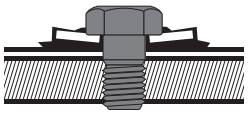
- Screws with high corrosion resistance, appropriate for panel thickness and type should be chosen. Screws also have to be appropriate for the thickness and the type of the carrier, should be checked whether the screw is appropriate for drilling capacity. In addition, correct screw should be chosen by estimating the load to be imposed by the panel on the screw.
- While panels are installed, screws shouldn't be penetrated (excluding concrete screws excluded); they should be neither too tight nor loose via torque adjustment; they should be correctly screwed (Figure 11 A). Metal coating of the panel towards the inner side should be connected to carrying column tightly; however, they should be screwed without causing deformation of outer metal screwed (crush due to screwing) (Figure 11 B – C). Because mineral wool – insulated panels are fibrous and flexible, screwing should be made with metal connection plaques (Figure 12). Appropriate plaques should be chosen according to connection detail of the panel; screwing on the roof panels should be made with EMPDM seals and fixed chute profiles according to twisting measures. (You can demand appropriate fixed chutes for your roof from customer representative.

Figure 11 A



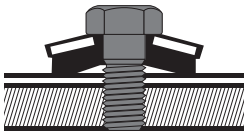
Correct Screwing

Figure 11 B



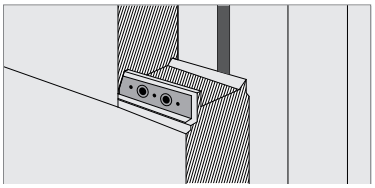
Over Screwed

Figure 11 C



Not fully Screwed

Figure 12



- After the protective films are removed, pay attention to have the installation surface is on the same side.
- For the partially delivered panels, the installation of one party of panels should be installed on the same wall in terms of not having different color tone. Also pay attention to production date, special warnings during the installation.
- Pay attention while cutting or welding in the field, since they affect the panel surfaces and may cause burrings on the panel surfaces.

During Membran Panel installation;

- It's important for the application area to be clean and dry before the welding process.
- During the installation, it's required for the screws to be not visible from the outside while welding.
- Membran welding process should be done with correct welding machine at suitable heat.
- The joints should be straight, and they should not cause any bulge that leads water accumulation.
- The surface have to be cleaned when the membran panel installation is completed. There shouldn't be any material remaining on the surface that may cause scratches, punctring, etc.
- Panel surface should not be stepped on after the installating has been completed to prevent any deformation. In case of necessity they can be used as pathwalk.

If dark color is chosen for external surface of the panel, the following conditions should be considered in order to minimize the deformation:

- The construction where panel will be installed shall be free from errors in vertical and horizontal line.
- Team to perform panel installation will be required to be experienced and to act in line with the rules applicable to installation, lifting and lowering.
- Appropriate screws and equipment should be chosen for panels and construction and installation should be proceeded with an appropriate torque.
- Projects should be assessed well (appropriate carriage tables) and appropriate panels and metal thickness for static tables should be chosen.
- For the partially delivered panels, the installation of one party of panels should be installed on the same wall in terms of not having different color tone. Also pay attention to production date, special warnings during the installation

- Table of 'Panel Sizes According to Color Groups' shall be taken as basis for roof and wall panels
- Temperature of the day when installation will be made should be +10°C and above in order to minimize thermal stress
- Wall panels should be installed with a single opening system.

Sandwich panels are long-lasting products. Because of this, although the panels are fully straight when they are produced at the factory, they can be exposed to different effects over time (eg. load bearing, wind, pressure, internal/external temperature difference). These effects may result in deformation on flat surfaces, and losing of flatness on surfaces. Even if all these conditions are satisfied, PANELSAN never warrants the homogeneity smoothness on the dark color group for the external surfaces and never take liability for the same issues.

7- Maintenance and Repair

For the purposes of extending the life of sandwich panels, they should be checked at last once a year in line with the following questions; assistance should be required from PANELSAN against the charge.

- Are there screws which are dislocated, broken and loosened?
- Are there any ruptures and scratches on the surface of the panel?
- Are there any regions subject to water penetration?
- Is it necessary to replace the mastics?
- Are there any accessories which are deformed due to the effects of air conditions?

Panel surfaces should be washed with non-pressurized water at least once a year; in case of stains, they should be removed with water-based dish detergent and a sponge without pressing. (Consult the firm for stains which cannot be removed. Avoid applying chemical process.)

If there are tiny scratches not reaching to metal on the panels, these should be repaired with air-dried touchup painting and painting brush upon obtaining information from the firm. (Even if the paint is of the same type and color, you should be aware that there may be color tone differences. For this reason, it is suggested that it should be first tried in a small place.

If there are scratches penetrating into zinc (galvanized) layer and crushes with external force on the panels, these should be replaced with new ones immediately. As long as these rules are observed, life cycle of the panels will be longer.

ATTC-2 SANDWICH PANEL TYPE OF DYE AND COLOR DETAILS

Comparison of Dyes and Coatings in terms of Their Characteristics

Type of Dye	Code	Application Thickness	Chemical Endurance	UV Endurance	Impact Resistance	Corrosion Resistance	Humidity Resistance	Color Difference Stability	ASM Resistance	Heat Resistance (max./min/°C)
Polyester	PES	20-25	**	*	***	**	***	***	***	90/-30
High Duble Polyester	HDP	20-25	***	**	***	**	****	****	****	90/-30
Polyviniliden Fluorid	PVDF	20-27	****	*****	***	****	*****	*****	*****	80/-40
Polyurethane	PUR	25	****	***	***	****	****	***	***	80/-40
Kloroid Polyviniliden Plastis	PVC(P)	100-200	*****	****	****	*****	****	**	****	70/-40
Film	PVC	100-200	*****	*	*****	*****	****	**	****	70/-40

***** Excellent , **** Very Good, *** Good, ** Averange, * Poor

Endurance period of food safe and anti-bacterial dyes should be assessed to be the same as the endurance periods of polyester painting. No heavy metals are used for manufacturing antibacterial or food-safe dyes. Guarantees for all the types of the dyes are provided. However, guarantee periods may vary for each project because such periods depend on environmental conditions, geographic location and application.

Polyester Paints

This is one of most commonly used dyes because of its affordability and wide range of colors and easy accessibility. Among types of dyes, it is the simplest basic dye. Corrosion and endurance to UV and chemicals is less than the other types of dyes. Coils which are painted at the same time but manufactured at different times and installed on different facets create ton and brightness difference. This justifies that its color and brightness endurance is low. This is apparently observed on dark-colored panels. Through additions to resins of polyester dyes, chemical and mechanical endurance can be increased (High Double Polyester). However, high-endurance polyester dyes are not preferred so much because the higher the endurance is, the more it costs.

PVDF Paints

When compared to polyester dyes, its mechanic and chemical endurance is higher. It has excellent UV endurance and can resist against discoloration for the longest time. It is the most endurable dye against stains and dirt. It has high brightness. Its endurance against scratches and corrosion is quite good although it is lower than plastisol. Because its cost is high, it is generally preferred for prestigious buildings. It should be preferred for the zones with high UV

Plastisol Paints

It is type of coating/painting with the highest corrosion resistance. Allowing to manufacturing with patterns makes it preferable for aesthetic reasons. Its UV and chemical resistance is good though it is not as good as PVDF. However, corrosion and discoloration may be observed depending on the local and climate conditions. It should be preferred for roofs with lesser slopes in wet regions due to its corrosion resistance. It shouldn't be used in places where the surface temperature may exceed 80°C.

Polyurethane Paints

It is a type of dye having higher resistance to UV, impacts and corrosion when compared to polyester. It should be preferred particularly for high buildings (height: 20 m and above). Polyurethane dyes with high endurance against scratches are more aesthetic and highly-costly dyes.

Film

PVC films are coatings with high impact and chemical resistance. It is very sensitive against UV. It has a very low endurance against discoloration. Because it is manufactured in different patterns and colors, it is generally preferred for visuality and aesthetics.

Suggestions for Usage Area According to Types of Dyes		Corrosion Resistance	Uv Resistance
Polyester	PE	RC3	RUV2
Polyviniliden Fluorid	PVDF	RC4	RUV4
Kloroid Polyviniliden Plastis	PVC	RC4	RUV2
Polyurethane	PUR	RC3	RUV3

Examples for Mild Climatic Environments

	External Environment	Internal Environment
C1 - Very Low	-	For buildings heated with clean atmosphere, for example, offices, shops, schools, hotels.
C2 - Low	Atmospheres with lower level of pollution. (Generally rural areas)	Unheated buildings, places where condensation may occur, for example, stores, sport halls.
C3 - Mild	Urban and industrial atmospheres, medium level of Sulphur dioxide pollution (Shores with lower level of salt)	Places with high humidity and air pollution such as dining halls, manufacturing process plants, laundries, beer factories, dairies.
C4 - High	Industrial areas (Shore with medium level of salt).	Chemical plants, swimming pools, shores, ships and shipyard.
C5 - I - Very High	High humidity-containing and aggressive atmosphere and industrial areas.	Buildings or areas with condensation and high pollution almost at all the times.
C5 - M - Very High	High level of salt, shores and marine areas.	Buildings or areas with condensation and high pollution almost at all the times.

UV Resistance Category According to Regions

RUV2	Zones on the north of Latitude 45°in Northern Hemisphere and places up to 900 m.
RUV3	Zones on the south of Latitude 45° in Northern Hemisphere, zones on the north of Latitude 37° and places up to 900 m.
RUV4	Zones on the south of Latitude 37° in Northern Hemisphere and places up to 900 m.

Ankara is located on 390 57' of northern latitude. Its altitude is between 79 -1.150 m and pollution level is high. PCDF and light-colored dyes are suggested because of their high UV endurance and resistance against pollution on the outer metal. It is recommended to use PVDF in the category of dyes and light color.

Criteria of Color Tone Difference

Color difference values seen during the production process are specified below as Color Difference Acceptance Tolerances. However, in addition to all the values below, it has to be accepted that the appearance of paint/color will change slowly, gradually and regularly in the process of a building's façade is exposed to same conditions.

Color Difference Acceptance Tolerances	
Upper Sheet for Roof Products (Exterior Surface).	ΔE: 1,70 + 0,20
Lower Sheet for Roof Products (Interior Surface)	ΔE: 1,50 + 0,20
Upper Sheet for Wall Panels) (Exterior Surface)	ΔE: 1,20 + 0,20
Sheet for Wall Products (Interior Surface) Except Light / Dark Color.	ΔE: 1,30 + 0,20
Lower Sheet for Wall Products (Interior Surface) Light / Dark Color	ΔE: 1,30 + 0,20

Note : ΔE refers to total color difference between the sample and measured material color. The value of this measure can differ up to ΔE = 2,0 based on human eye, the eye sensitivity, the color being light or dark, bright or dull, and the light intensity.

WARNING: Tone differences and deformation on the metal are among the problems which are mostly encountered for metallic and luminous colors.	
Metallic Colors	RAL 9006 - RAL 9007
Luminous Colors	RAL 1026 - RAL 2005 - RAL 2007 - RAL 3024 - RAL 3026

Climatic effects are also specified as variable effects according to TS EN 14509 standards (eg. temperature difference between the two surfaces of the panel)
According to the this standard, temperature gradients resulting from the difference between exterior temperature (T1) and interior temperature (T2) are considered as variable effects.
In Europe, four different lowest winter temperature ratings are used based on latitudes, altitudes above sea level, and distance to the sea: 0°C, -10°C, -20°C, -30°C. The exterior temperature for the roof panels that have a layer of snow on top of theirs is 0°C.

Exterior surface T1 temperature has a maximum summer temperature based on surface color and reflectability. T1 values suitable for availability calculations, and T1 values taken at minimum level for maximum limit situation are followed:

(i) **Extra light color** R_G=75-90 T1= +55 °C
(ii) **Light color** R_G=40-74 T1= +65 °C
(iii) **Dark color** R_G=8-39 T1= +80 °C
R_G; is reflection value when magnesium oxide = 100%.
Maximum temperature difference between interior and exterior temperatures may increase during installation.

As it can be seen on the related standard, dark colored panels get exposed to thermal load more than light colored ones, and they can get deformed more easily, since they can be exposed to a temperature difference around 80°C between the day and night cycles. Since dark colours absorbs solar power and radiation better, there will be inner and outer heat differences, and since there will be dilatations on the outer surface, this will cuase shrinks. Highest difference between inner and outer surfaces may occur during installation. Because of this, installation of the panels with light color at low temperatures increases the effects of thermal load on the building during midseason.). If panels with dark colour are going to be used, building design should be made in accordance with the thermal load. Panelsan does not take any responsibility with these deformations and does not give any warranty.

Suggested Panel Sizes By Color Groups				
Insulation	**Panel Type**	**Color Groups**		
		Group 1 / Very Light Colors	**Group 2 / Light Colors**	**Group 3 / Dark Colors**
PUR -PIR	HS-OS Wall Panels	10.00 m	6.00 m	6.00 m
	Wall, Cold Room	12.00 m	12.00 m	9.00 m
	Roof	13.50 m	13.50 m	11.00 m
Rockwool-Glasswool / MW	HS-OS Wall Panels	10.00 m	8.00 m	6.00 m
	Roof	13.00 m	11.00 m	9.00 m
EPS	HS-OS Wall Panels	10.00 m	9.00 m	6.00 m
	Roof	13.00 m	11.00 m	9.00 m

If dark color is chosen for external surface of the panel, the following conditions should be considered in order to minimize the deformation:

- The construction where panel will be installed shall be free fromerrors in vertical and horizontal line.
- Team to perform panel installation will be required to be experienced and to act in line with the rules applicable to installation, lifting and lowering.
- Appropriate screws and equipment should be chosen for panels and construction and installation should be proceeded with an appropriate torque.
- For the partially delivered panels, the installation of one party of panels should be installed on the same wall in terms of not having different color tone. Also pay attention to production date, special warnings during the installation
- Projects should be assessed well (appropriate carriage tables) and appropriate panels and metal thickness for static tables should be chosen.
- Table of 'Panel Sizes According to Color Groups' shall be taken as basis for roof and facet panels.
- Temperature of the day when installation will be made should be +10°C and above in order to minimize thermal stress.
- Wall panels should be installed with a single opening system. Even if all these conditions are satisfied, PANELSAN never warrants the homogeneity smoothness on the dark color group for the external surfaces and never take liability for the same issues. Sandwich panels are long-lasting products. Because of this, although the panels are fully straight when they are produced at the factory, they can be exposed to different effects over time (eg. load bearing, wind, pressure, internal/ external temperature difference). These effects may result in deformation on flat surfaces, and losing of flatness on surfaces.

*For the colours apart from the RAL codes on the table, please contact with your sales representative.

Color Groups	RAL Codes
Group 1 - Very Light Colors	1015 - 1016 - 1018 - 6019 - 7035 - 9001 - 9002 - 9010
Group 2 - Light Colors	1002 - 1003 - 1004 - 1014 - 1015 - 1017 - 1019 - 1021 - 1023 - 1035 - 2000 - 2003 - 2004 - 2008 - 5012 - 50185024 - 6018 - 6021 - 6033 - 7000 - 7037 - 7040 - 9022
Group 3 - Dark Colors	3000 - 3002 - 3003 - 3005 - 3011 - 3013 - 5002 - 5005 - 5009 - 5010 - 5011 - 5022 - 6000 6003 - 6005 - 6011 - 6020 - 6029 - 7015 - 7016 - 7022 - 7024 - 7026 - 7031 - 7038 - 7043 - 8011 - 8012 - 8014 - 8016 - 8017 - 8019 - 8022 - 8023 - 9004 - 9005 - 9006 - 9007 - 9017