

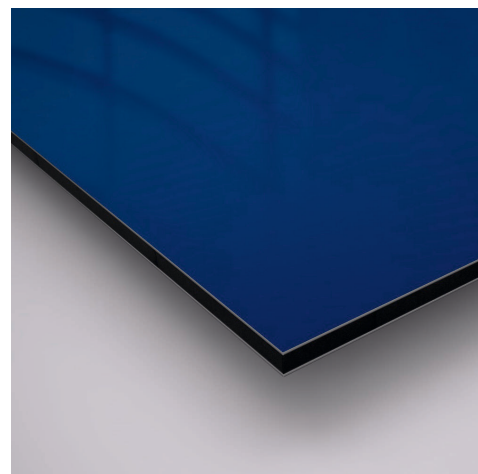
Technical data

CODE:**PRODUCT:**

ACPs

NOTE:

TECHNICAL DATA

IMAGE:**LAST UPDATE:**

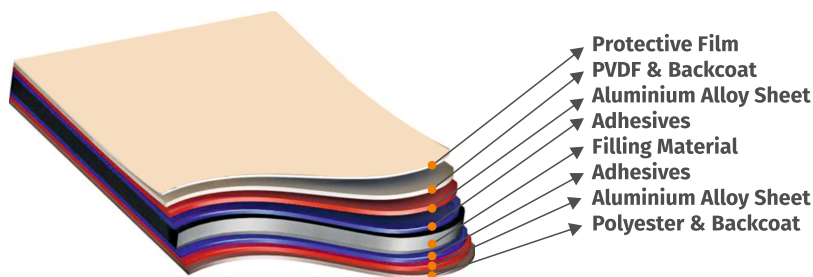
8/2021

ALUMINIUM COMPOSITE PANEL

General features of aluminium composite panel and application areas

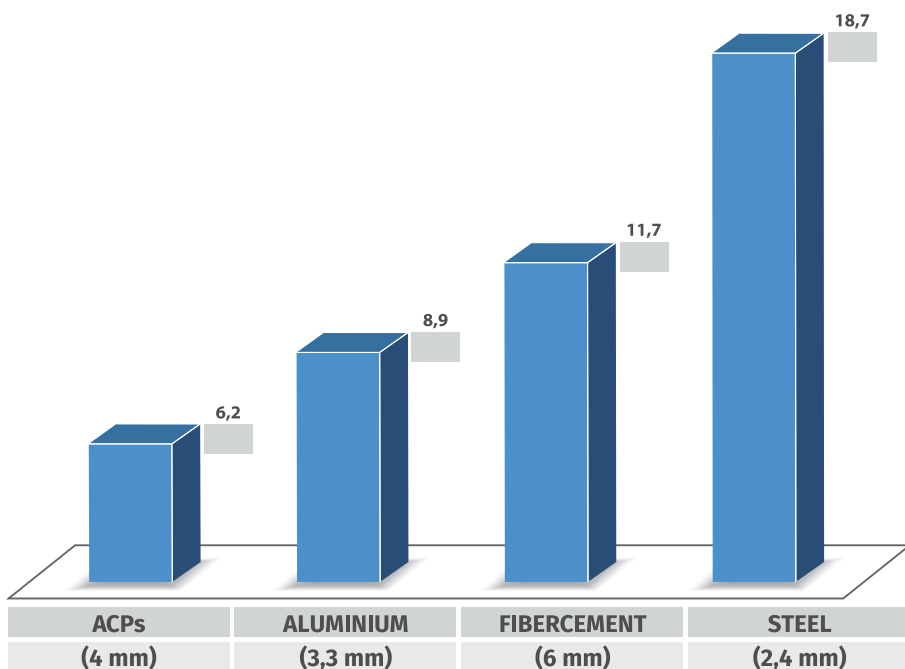
Why ACPs?

- Unlimited Color and Effect Option
- Super Fast Delivery
- Both Sides Coated Panels Available
- Flexibility on Special Dimension Production
- A2, B1 and LDPE types core options



“Aluminium composite panel is composed of filling different types of core material between two aluminium sheets. It has superior surface resistance, smooth appearance, and it is aesthetic, durable and easy maintenance”.

ACPs, which consists of two aluminium sheets 0,5 mm thickness and there between low density polyethylene, is as rigid as the other sheets which are heavier than them.



Rigidity comparison

General Features

- Highly durable rigid and light weight
- Unlimited color & design option
- Sound & heat isolation
- Resistant to all weather conditions
- Easy and fast application
- Aesthetic and elegant appearance
- Eco-Friendly. 100% recyclable

Product range

Aluminium composite panels are produced with three different types of core material in our facilities.

- Mineral filled FR Core
- Mineral filled A2 Core
- LDPE Core

Feature

Feature	A2 s1 d0	FR (B S1 d0)	LDPE
Amount of inorganic materials	< 10%	> 70%	30%
Amount of polymer	> 90%	< 30%	70%
Calorific heat potential of core material	≤ 3MJ/kg	≤ 14 MJ/kg	≤ 30 MJ/kg

Mineral filled fire retardant (FR) products

Mineral filled composite panels are produced with three different brand in our factory according to EN 13501-1. These products especially preferred for their resistance to fire with middle level.

Product	ACPs 100 B1	ACPs 200 B1	ACPs 300 B1
Paint type	Pvdf 2L	Hdpe	Polyester
Alloy	3003-3105-4115	3003-3105-4115	3105 - 3003
Temper of cover sheets	H24-H46-H42	H24-H46-H42	H46-H24
Thickness of aluminium coils (Top/Bottom)	0,5 / 0,5	0,4 / 0,4	0,3 / 0,3
Peeling strenght	> 17,5 kgf/ 2,5 cm	> 17,5 kgf/ 2,5 cm	> 17,5 kgf/ 2,5 cm
Witdh (mm)	1000 - 1250 - 1500	1000 - 1250 - 1500	1000 - 1250 - 1500
Lenght (mm)	2000 - 8000	2000 - 8000	2000 - 8000
Yield strength	42 N/mm ²	38 N/mm ²	26 N/mm ²
Tensile strength	48 N/mm ²	45 N/mm ²	32 N/mm ²
Elongation at rupture	19,3 (l0=5,65 A012-%)	14 (l0=5,65 A012-%)	12 (l0=5,65 A012-%)
Seperation	13,5 N/ mm	12,90 N/ mm	12,15 N/mm
Bending strength	110,3 Mpa	99,1 Mpa	97 Mpa
Bending elastic modulus	9992 Mpa	9870 Mpa	9601 Mpa
Tensile strength in high temperature	8,09 Mpa	8,09 Mpa	8,09 Mpa
Heat transfer coefficient	5,5 (Wm2/K)	5,5 (Wm2/K)	5,5 (Wm2/K)
Sound insulation	≥ 25 dB	≥ 25 dB	≥ 25 dB
Rigidity (4 mm)	2158 kN m ² /m	2090 kN m ² /m	2022 kN m ² /m
Section modulus (4 mm)	1,12 cm ³ /m	1,08 cm ³ /m	1,054 cm ³ /m
Rigidity (3 mm)	1250 kN m ² /m	1200 kN mv/m	1150 kN m ² /m
Section modulus (3 mm)	0,865 cm ³ /m	0,831 cm ³ /m	0,803 cm ³ /m

Mineral filled A2 class products

A2 class composite panels are produced under two different brand in our facilities. Using the A2 class aluminium composite panels become an obligation in most of countries for the facade above 20 meter. Fire retardancy behaviour of A2 class panels are highly superior than the B1 class panels.

Product	ACPs 100 A2	ACPs 200 A2
Paint type	Pvdf 2L	Hdpe
Alloy	3003-3105-4115	3003-3105-4115
Temper of cover sheets	H24-H46-H42	H24-H46-H42
Thickness of aluminium coils (Top/Bottom)	0,5 / 0,5	0,4 / 0,4
Peeling strenght	> 17,5 kgf/ 2,5 cm	> 17,5 kgf/ 2,5 cm
Witdh (mm)	1000 - 1250 - 1500	1000 - 1250 - 1500
Lenght (mm)	2000 - 6000	2000 - 6000
Yield strength	41 N/ mm ²	38 N/ mm ²
Tensile strength	43 N/ mm ²	43 N/ mm ²
Elongation at rupture	19,3 (l0=5,65 A012-%)	14 (l0=5,65 A012-%)
Seperation	13,5 N/mm	12,90 N/mm
Bending strength	115,5 Mpa	101 Mpa
Bending elastic modulus	9992 Mpa	9870 Mpa
Tensile strength in high temperature	8,09 Mpa	8,09 Mpa
Heat transfer coefficient	5,80 (Wm2/K)	5,8 (Wm2/K)
Sound insulation	≥ 25 db	≥ 25 db
Rigidity (4 mm)	2400 kN m ² /m	2288 kN m ² /m
Section modulus (4 mm)	1,75 cm ³ /m	1,67 cm ³ /m
Rigidity (3 mm)	1250 kN m ² /m	1192 kN m ² /m
Section modulus (3 mm)	1,25 cm ³ /m	0,93 cm ³ /m

LDPE core products

Aluminum composite panels with LDPE core are produced under four different brand for the applications that fire retardancy is not expected. Preferring A2 class or B1 class ACP for facade application is highly recommended rather than using ACP which have a LDPE core material for safety.

Product	ACPs 100	ACPs 200	ACPs 300	ACPs 400
Paint type	Pvdf	Hdpe	Polyester	Hdpe
Alloy	3003-3105-4115	3003-3105-4115	3003-3105	3003
Temper of cover sheets	H24-H46-H42	H24-H46-H42	H24-H46	H24
Thickness of aluminium coils (Top/Bottom)	0,5 / 0,5	0,4 / 0,4	0,3 / 0,3	0,21 / 0,21
Peeling strenght	> 17,5 kgf/2,5 cm	> 17,5 kgf/2,5 cm	> 17,5 kgf/2,5 cm	> 17,5 kgf/2,5 cm
Witdh (mm)	1000-1250-1500	1000-1250-1500	1000-1250-1500	1000-1250-1500
Lenght (mm)	2000-6000	2000-6000	2000-6000	2000-6000
Yield strength	42 N/ mm ²	38 N/ mm ²	26 N/ mm ²	26 N/ mm ²
Tensile strength	48 N/ mm ²	45 N/ mm ²	32 N/ mm ²	32 N/ mm ²
Elongation at rupture	19,3 (l0=5,65 A012-%)	14 (l0=5,65 A012-%)	12 (l0=5,65 A012-%)	12 (l0=5,65 A012-%)
Seperation	13,5 N/mm	12,90 N/mm	12,15 N/mm	12,15 N/mm
Bending strength	131,2 Mpa	103,7 Mpa	80,8 Mpa	53,5 Mpa
Bending elastic modulus	9992 Mpa	9870 Mpa	9601 Mpa	9601 Mpa
Tensile strength in high temperature	8,09 Mpa	8,09 Mpa	8,09 Mpa	8,09 Mpa
Heat transfer coefficient	5,5 (Wm ² /K)	5,5 (Wm ² /K)	5,5 (Wm ² /K)	5,5 (Wm ² /K)
Sound insulation	≥ 25 dB	≥ 25 dB	≥ 25 dB	≥ 25 dB
Rigidity (4 mm)	2055 kN m ² /m	1955 kN m ² /m	1846 kN m ² /m	1760 kN m ² /m
Section modulus (4 mm)	1,46 cm ³ /m	1,37 cm ³ /m	1,31 cm ³ /m	1,25 cm ³ /m
Rigidity (3 mm)	1012 kN m ² /m	951 kN m ² /m	888 kN m ² /m	834 kN m ² /m
Section modulus (3 mm)	1,18 cm ³ /m	1,10 cm ³ /m	1,03 cm ³ /m	0,97 cm ³ /m

TOLERANCES FOR PRODUCT

Dimensional Tolerances

Dimensional tolerances for aluminium composite panel is below given table.

Dimensions	Tolerances
Panel thickness (mm)	+/- 0,2 mm
Panel lenght (mm)	2000 - 8000 mm (± 1 mm/ m)
Width of panel (mm)	-0 / +4 mm
Squareness tolerance (mm)	max. 5 mm
Curvature	Panel width 1000 mm - 1500 mm: max. 5 mm
	Panel width 1500 mm - 3000 mm: max. 7 mm
	Panel width >3000 mm: max. 10 mm

Weight tolerances

Weight informations belong to aluminium composite panels can be found in below given table

Weights of panels (Kg/m ²)				
Product	Thickness (mm)	A2	B1	LDPE
ACPs 100	2	-	-	3,83
	3	-	5,77	5,01
	4	8,37	7,33	6,19
	5	-	8,89	7,37
	6	-	10,45	8,55
ACPs 200	2	-	-	3,53
	3	-	5,54	4,71
	4	7,82	7,10	5,89
	5	-	8,66	7,07
	6	-	10,22	8,25

Weights of panels (Kg/m²)

Product	Thickness (mm)	A2	B1	LDPE
ACPs 300	2	-	-	3,22
	3	-	5,31	4,40
	4	-	6,87	5,58
	5	-	8,43	6,76
	6	-	9,99	7,94
ACPs 400	2	-	-	2,95
	3	-	5,11	4,13
	4	-	6,67	5,31
	5	-	8,23	6,49
	6	-	9,79	7,67

Due to thickness tolerance of ACP, weight of panels can be changed +/- 0,24 kg/m²

Pvdf coating (2 Layer) test methods and specifications

TOPCOAT TYPE	PVDF Polyvinylidifluoride coating (70%)	
PRIMER TYPE	Polyester primer	
Test types	Standard	PVDF Coating 2L
Topcoat dry film thickness (µm)	EN 13523-1	20µ +/- 2µ
Primer dry film thickness (µm)	EN 13523-1	5µ +/- 2µ
Backcoat dry film thickness (µm)	EN 13523-1	7µ +/- 2µ
Topcoat colour difference (ΔE)	EN 13523-3	ΔE < 1 (Solid colors) ΔE < 1,5 Metallic colors
60° Topcoat gloss	EN 13523-2	Semi Matt: 23-40
60° Backcoat gloss	EN 13523-2	Topcoat gloss +/- 20
Topcoat solvent resistance test	EN 13523-11	> 100 Double Rubb
Backcoat solvent resistance test	EN 13523-11	> 40 Double Rubb
Topcoat adhesion after indentation	EN 13523-6	0% No peel after cupping min. 4,5 mm
Topcoat pencil hardness	EN 13523-4	Min HB
Topcoat T - Bend test	EN 13523-7	Max 2,5 T (Depending on metal quality)
Uv resistance UV-A-340- D65/10°	EN 13523-10	2000 Hrs (ΔE < 3 Gloss 80%)
Humidity resistance	EN 13523-25	1000 Hrs No influence
Salt spray test resistance (0,2% acetic acid, 5% NaCl)	EN 13523-8	500 Hrs (Less than 3 mm or 2 mm respectively of under creep corrosion)
UV resistance category	EN 1396	RUV 4
Corrosion resistance category	EN 1396	RC 3

Hdpe coating test methods and specifications

TOPCOAT TYPE	High durable polyester coating	
PRIMER TYPE	Polyester primer	
Test types	Standard	HDPE Coating 2L
Topcoat dry film thickness (µm)	EN 13523-1	20µ +/- 2µ
Primer dry film thickness (µm)	EN 13523-1	5µ +/- 2µ
Backcoat dry film thickness (µm)	EN 13523-1	7µ +/- 2µ
Topcoat colour difference (ΔE)	EN 13523-3	ΔE < 1 (Solid colors) ΔE < 1,5 Metallic colors
60° Topcoat gloss	EN 13523-2	Matt 0-20; Semi matt 20-40; Semi gloss 40-60; Gloss 60-80; High gloss >80
60° Backcoat gloss	EN 13523-2	Topcoat gloss +/- 20
Topcoat solvent resistance test	EN 13523-11	> 100 Double Rubb
Backcoat solvent resistance test	EN 13523-11	> 40 Double Rubb
Topcoat adhesion after indentation	EN 13523-6	0% No peel after cupping min. 4,5 mm
Topcoat pencil hardness	EN 13523-4	Min F
Topcoat T - Bend test	EN 13523-7	Max 2,5 T (Depending on metal quality)
Uv resistance UV-A-340- D65/10°	EN 13523-10	2000 Hrs (ΔE < 3 Gloss 80%)
Humidity resistance	EN 13523-25	1000 Hrs No influence
Salt spray test resistance (0,2% acetic acid, 5% NaCl)	EN 13523-8	500 Hrs (Less than 3 mm or 2 mm respectively of under creep corrosion)
UV resistance category	EN 1396	RUV 4
Corrosion resistance category	EN 1396	RC 3

Polyester coating test methods and specifications

TOPCOAT TYPE	Polyester coating	
PRIMER TYPE	Polyester primer	
Test types	Standard	HDPE Coating 2L
Topcoat dry film thickness (µm)	EN 13523-1	20µ +/- 2µ
Primer dry film thickness (µm)	EN 13523-1	5µ +/- 2µ
Backcoat dry film thickness (µm)	EN 13523-1	7µ +/- 2µ
Topcoat colour difference (ΔE)	EN 13523-3	ΔE < 1 (Solid colors) ΔE < 1,5 Metallic colors
60° Topcoat gloss	EN 13523-2	Matt 0-20; Semi matt 20-40; Semi gloss 40-60; Gloss 60-80; High gloss >80
60° Backcoat gloss	EN 13523-2	Topcoat gloss +/- 20
Topcoat solvent resistance test	EN 13523-11	> 100 Double Rubb
Backcoat solvent resistance test	EN 13523-11	> 40 Double Rubb
Topcoat adhesion after indentation	EN 13523-6	0% No peel after cupping min. 4,5 mm
Topcoat pencil hardness	EN 13523-4	Min F
Topcoat T - Bend test	EN 13523-7	Max 2,5 T (Depending on metal quality)
Uv resistance UV-A-340- D65/10°	EN 13523-10	2000 Hrs (ΔE < 3 Gloss 80%)
Humidity resistance	EN 13523-25	1000 Hrs No influence
Salt spray test resistance (0,2% acetic acid, 5% NaCl)	EN 13523-8	500 Hrs (Less than 3 mm or 2 mm respectively of under creep corrosion)
UV resistance category	EN 1396	RUV 4
Corrosion resistance category	EN 1396	RC 3

WARRANTY CONDITIONS OF PAINTS

Life time of paints against atmospheric conditions on aluminium composite panels are changed depending on location and distance from sea water they used.

Zone A: Shall mean all countries situated > 45° northern or > 45° southern breadth e.g. Scandinavia, Great Britain, Netherlands, Belgium, France, Switzerland, Austria, Germany

Zone B: Shall mean all countries situated between 45° and 30° northern as well as between 45° and 30° southern breadth e.g. France, Portugal, Spain, Italy, Greece, Turkey

Warranty conditions for PvdF paint

Warranty conditions of PvdF 2L product are below given table.

PVDF 2 LAYER TOPCOAT LIMITED WARRANTY CONDITIONS				
Provisions	Property	Climatic Zone	Distance from sea water	
			+ 1000 m	0 - 1000 m
1	Film integrity		≥97% in 15 years	No guarantee
2	Colour change	Zone A	ΔE ≤ 5 for 15 years	No guarantee
		Zone B	ΔE ≤ 5 for 15 years	No guarantee
3	Gloss retention	Zone A	>60% for 15 years	No guarantee
		Zone B	>50% for 15 years	No guarantee

Warranty conditions for Hdpe paint

Warranty conditions of Hdpe product are below given table.

HDPE TOPCOAT LIMITED WARRANTY CONDITIONS				
Provisions	Property	Climatic Zone	Distance from sea water	
			+ 1000 m	0 - 1000 m
1	Film integrity	Zone A	≥90% in 12 years	No guarantee
		Zone B	≥90% in 10 years	No guarantee
2	Colour change	Zone A	ΔE ≤ 5 for 12 years	No guarantee
		Zone B	ΔE ≤ 5 for 10 years	No guarantee
3	Gloss retention	Zone A	>50% for 12 years	No guarantee
		Zone B	>50% for 10 years	No guarantee

Warranty conditions for Polyester paint types

Warranty conditions of Polyester product are below given table.

POLYESTER TOPCOAT LIMITED WARRANTY CONDITIONS				
Provisions	Property	Part of construction	Distance from sea water	
			+ 1000 m	0 - 1000 m
1	Film integrity	Non vertical applications	≥90% in 8 years	No guarantee
		Non vertical applications	≥90% in 10 years	No guarantee
2	Colour change	Non vertical applications	ΔE ≤10 for 8 years ΔE ≤8 for 8 years for whites	No guarantee
		Non vertical applications	ΔE ≤10 for 10 years ΔE ≤8 for 10 years for whites	No guarantee

JOINTING AND FIXING METHODS

Thermal Expansion and Contraction

In order to avoid any tension occurring in the rivet and screw connections, the rivets and screws must be set tension free. The bore holes in the panels must be large enough to allow expansion. The linear thermal expansion of ACPs bond is 2,4 mm at a panel length of 1 meter and temperature difference of 100°.

Material	Linear thermal expansion coefficient/ °C	Elongation or shrinkage
ACPs 100 A2	19×10^{-6}	1 mm
ACPs 100 B1	24×10^{-6}	1,2 mm
Aluminium	24×10^{-6}	1,2 mm
Steel	12×10^{-6}	0,6 mm
(304) Stainless Steel	17×10^{-6}	0,9 mm
Concrete	12×10^{-6}	0,6 mm
Glass	9×10^{-6}	0,5 mm
Wood	5×10^{-6}	0,25 mm
Acrylic Sheet	70×10^{-6}	3,5 mm

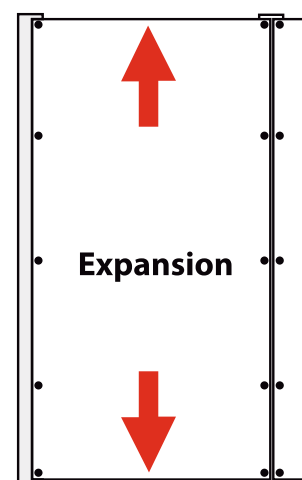
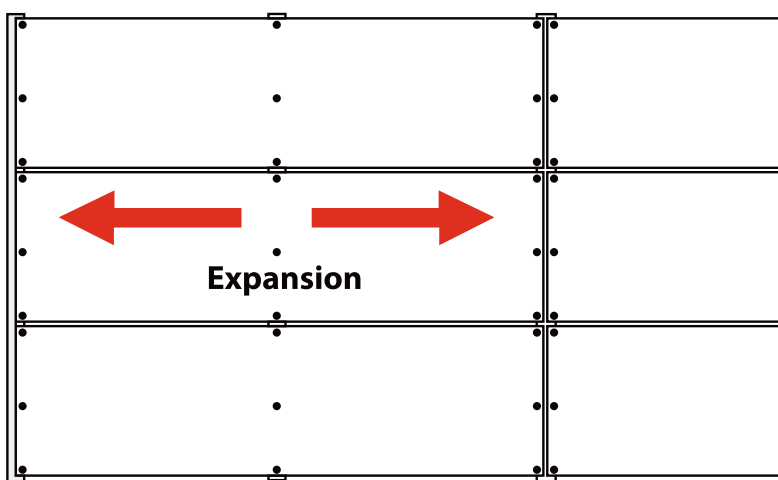
Calculation of expansion can be made with below given formula.

$$\Delta L = \alpha \times \Delta T \times L$$

α : Linear thermal expansion coefficient $24 \times 10^{-6} / ^\circ\text{C}$

ΔT : Temperature difference

L : Length or height of panel

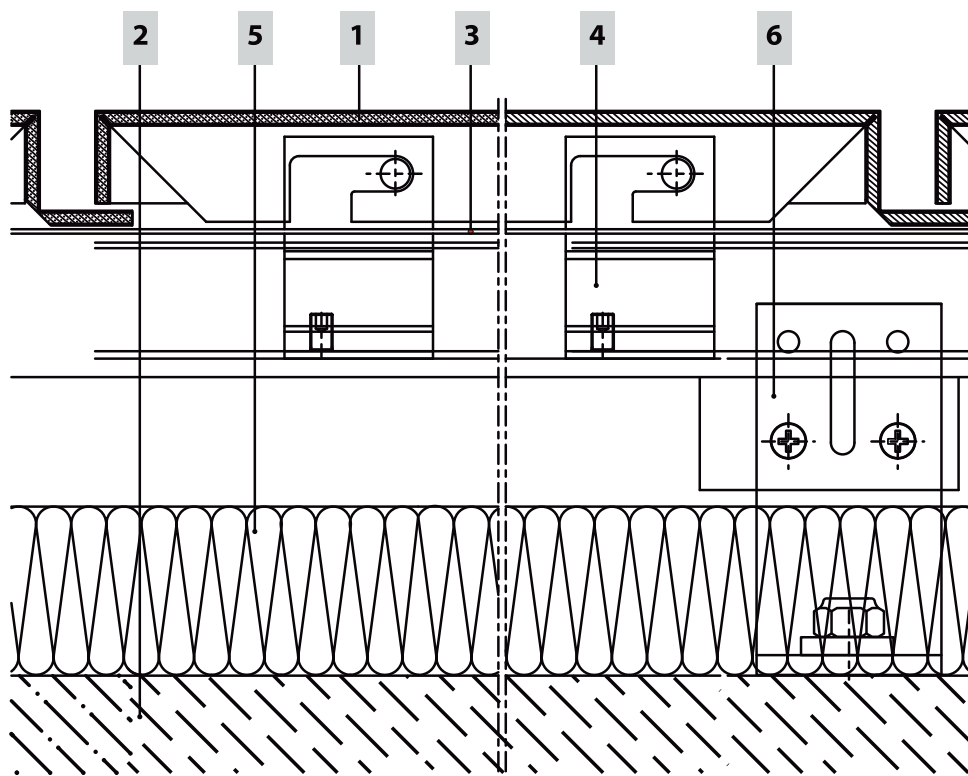
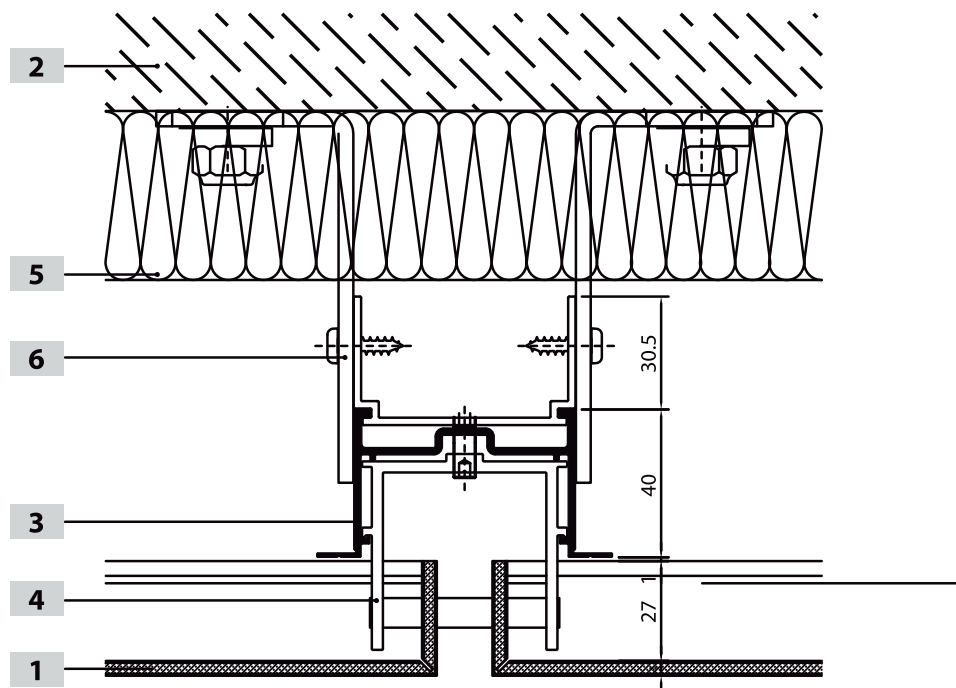


In order to clarify the situation on simple example; 1 x 3 meter black colored panels can reach approximately 70°C surface temperature under 40°C air temperature. The night temperature is accepted 20°C. Expansion on panel in mm is calculated below given formula.

$$\Delta L = 24 \times 10^{-6} / ^\circ\text{C} \times 50^\circ\text{C} \times 3000 \text{ mm} = 3,6 \text{ mm}$$

Half of the panel expansion must be expected on the opposite panel edges.

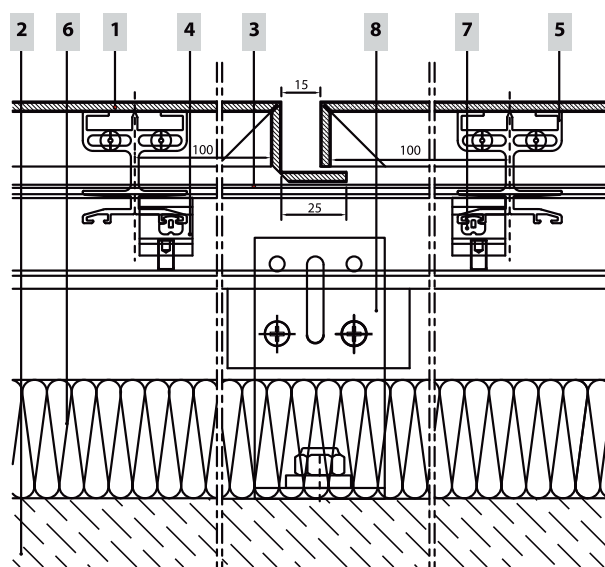
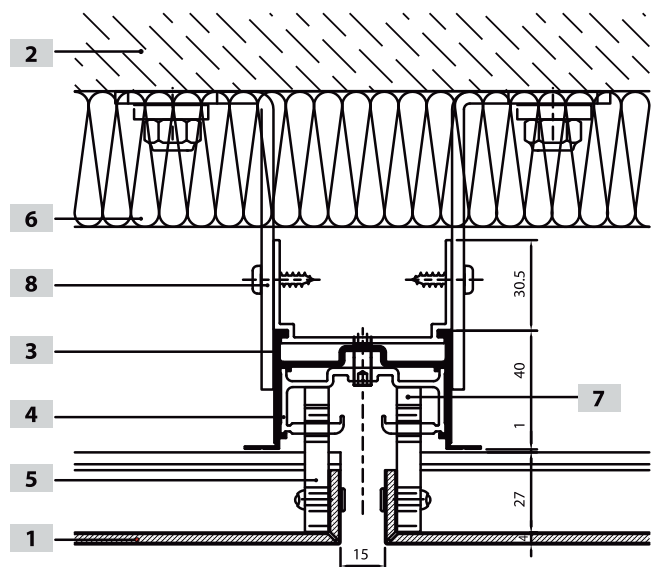
Application with notching



ACPs carrier system materials

No	Description
1	ACPs
2	CONCRETE WALL
3	VERTICAL CARRIER PROFILE
4	FIXING PROFILE
5	ROCKWOOL
6	GALVANIZED ANCHOR

Clipping application

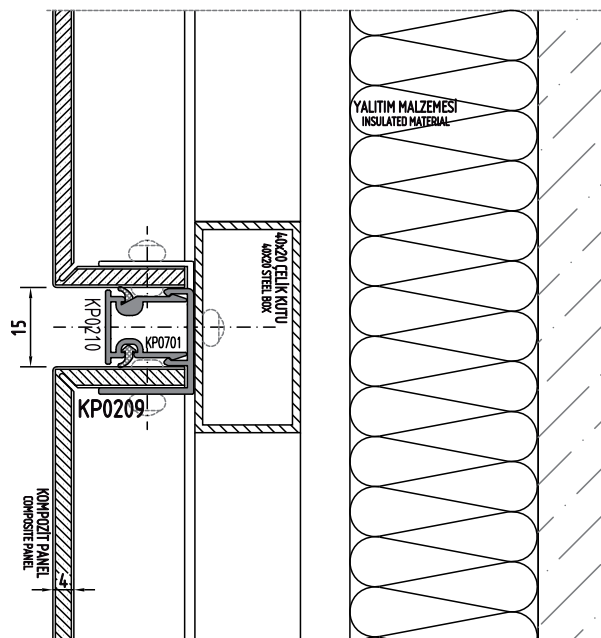
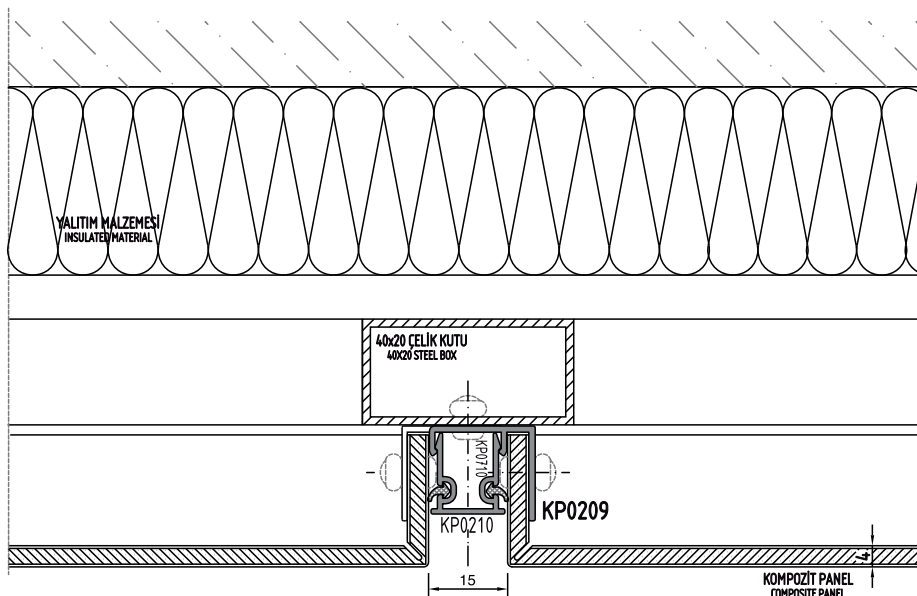


ACPs carrier system materials

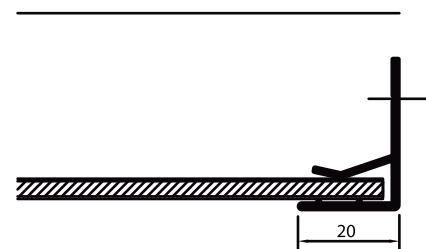
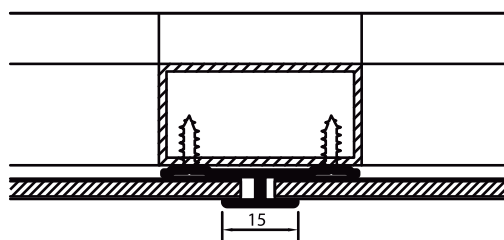
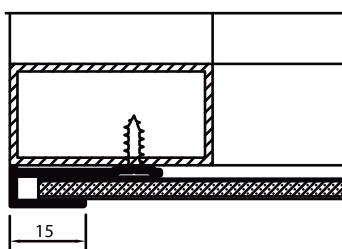
No	Description	No	Description
1	ACPs	5	CONNECTION PROFILE
2	CONCRETE WALL	6	ROCKWOOL
3	VERTICAL CARRIER PROFILE	7	EPDM GASKET
4	FIXING PROFILE	8	GALVANIZED ANCHOR



Application with join strip



Application with H profile

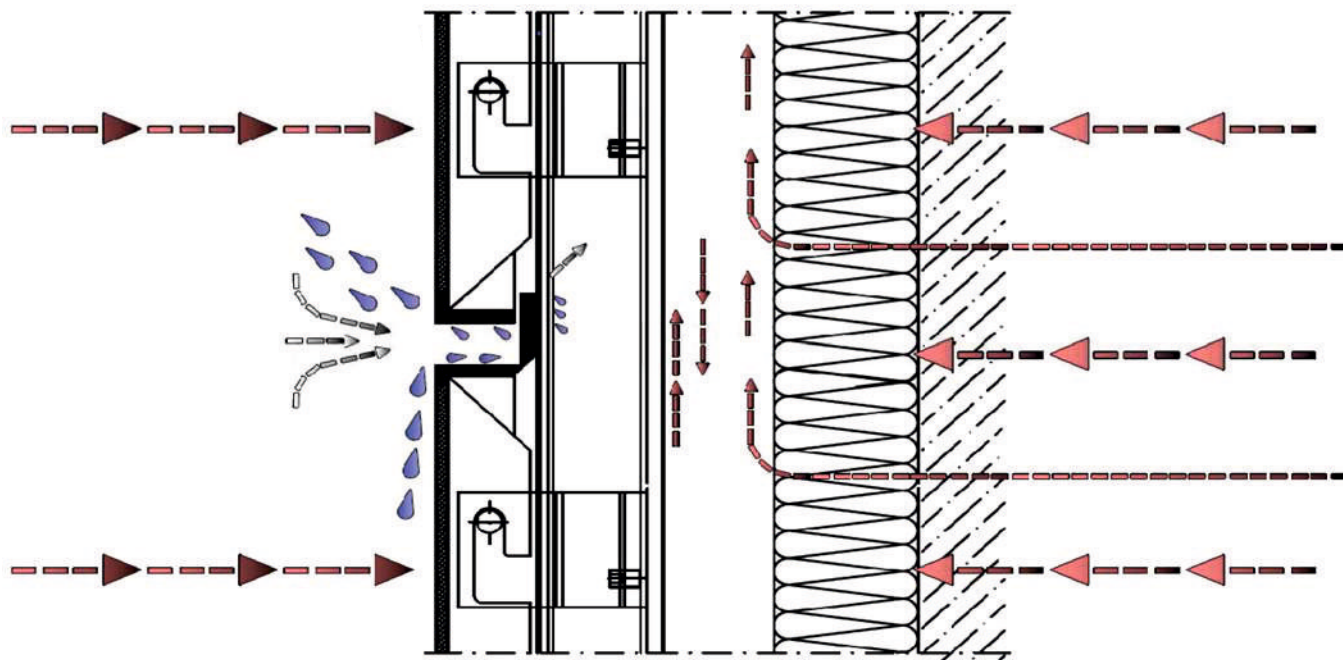


WATER PROOFING

There are two types of application methods. You can find details below; Application methods will be chosen accordingly to where the visual and functional requirements.

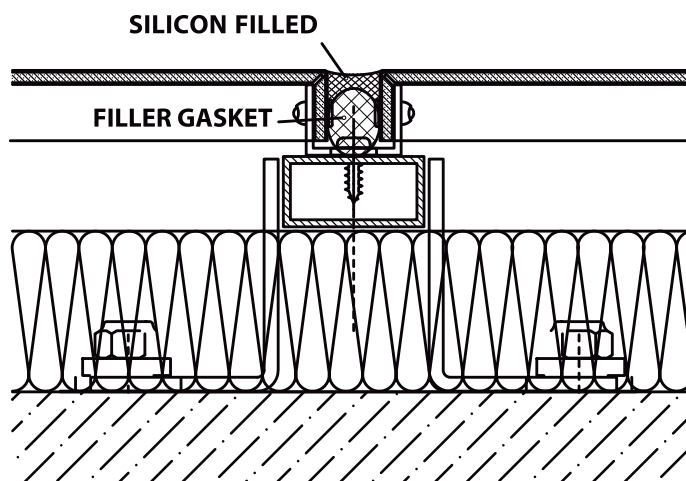
Open Grooved Solutions

On the Composite Panel applications water transfer and stratification made by the composite panel bending form and the profiles used on the connection points. This system provides air circulation inside. The drops are dried with this circulation.



Silicon Filled Solutions

Water insulation is performed by filling all the gaps with silicone which is visible from outside. The silicon must be suitable for environmental conditions.



WIND LOAD AND STRES

Due to weather condition wind load pressure and stress on the panel must be calculated before application. During the calculation below given criteria's must be considered.

- Wind load
- Panel Thickness
- Coil Thickness & Safety Tension
- Sub Construction
- Panel Dimensions

During the project first of all wind load has to be calculated. If not calculated properly there might be some damages on the sub construction.

Composite panels are applied on aluminium or steel sub-construction. Therefore it is not only the panel which is exposed to wind load. The sub-construction on which the panels have been applied will be exposed as well. During the statical calculation of sub-construction allowed maximum stress should not be exceeded.

WIND LOAD RESISTANCE VALUE

$c \cdot q = W$ (Wind Load)

W = Wind Load

C = Coefficient

q = Absorption $q: v^2 / 16$ v: Wind velocity (m/sn)

Height of building / Width of building < 5 C:1,2 (Common buildings)

Height of building / Width of building < 5 C:1,6 (Tower buildings)

Wind speed and suction depending on elevation

The distribution of wind load on the affected surface of the building $W = c \cdot q$

Height from the ground (m)	Wind velocity (v) (m/s)	Absorption (q) kN/m^2	Height from the ground (m)	Common buildings	Tower buildings
0 m - 8 m	28	0,5	0 m - 8 m	0,60 kN/m^2	0,80 kN/m^2
9 m - 20 m	36	0,8	9 m - 20 m	0,96 kN/m^2	1,28 kN/m^2
21 m - 100 m	42	1,1	21 m - 100 m	1,32 kN/m^2	1,76 kN/m^2
> 100 m	46	1,3	> 100 m	1,56 kN/m^2	2,08 kN/m^2

* Wind loads should be applied according to TS 498. Wind load calculation depends on the geometry of the structure.

* Wind loads depend on the table calculated according to the unit area of to the building.

STRESS CALCULATION FORMULA

Stress : $B \cdot W \cdot B^2 / t^2$

B : Length of panel / Coefficient for panel width

W : Wind pressure

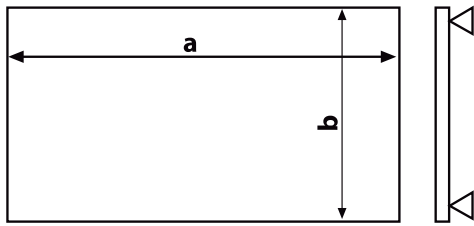
b^2 : The length of short side of panel

t^2 : $(\text{Thickness of panel}^3 - \text{Thickness of core material}^3) / \text{Thickness of panel}$

Thickness of panel	t^2 (mm^2)	0,2% Proof stress (N/mm^2)
2	3,5 mm^2	119
3	6,33	119
4	9,25	119
5	12,2	119
6	15,16	119

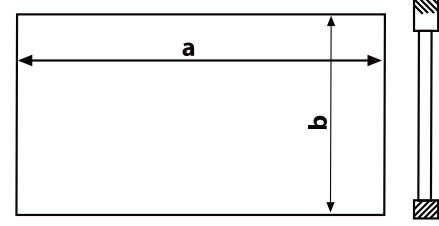
Result of this calculation should be below 119 N/mm^2 . Otherwise plastic deformation is occurred.

1 SUPPORTED ON 2 EDGES



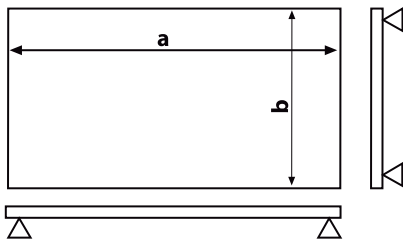
$$1 - \text{Stress} = (0,75).w.b^2 / t^2$$

2 FIXED ON 2 EDGES



$$2 - \text{Stress} = (0,50).w.b^2 / t^2$$

3 SUPPORTED ON 4 EDGES



$$3 - \text{Stress} = B.w.b^2 / t^2$$

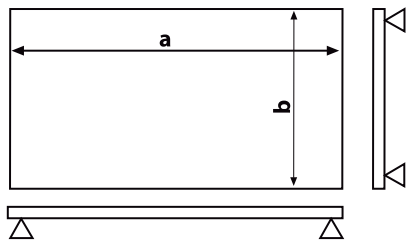
a/b	1	1,2	1,4	1,6	1,8	2,0	>3,0
B	0,287	0,376	0,453	0,517	0,569	0,61	0,713

MAXIMUM STRESS (N/mm²)

Thickness of panel	Panel width (mm)	Length of panel (mm)								
		900	1157	1200	1500	1800	2100	2400	2700	>3000
0,5 (51)	600	10	12	12	14	14	14	14	14	14
	900	13	16	20	23	27	27	31	31	31
	977	13	19	19	27	29	31	31	37	37
	1200	20	21	22	29	40	44	47	47	56
	1500	23	27	29	35	46	55	63	69	74
1 (102)	600	18	24	24	26	28	29	29	29	29
	900	25	33	34	47	53	56	59	62	66
	977	25	39	39	53	59	63	63	74	74
	1200	40	42	45	62	76	87	95	99	103
	1500	45	54	62	70	92	110	126*	138*	148*
1,5 (153)	600	28	36	36	39	42	44	44	44	44
	900	38	49	56	70	80	85	86	94	99
	977	38	58	58	80	88	94	94	110	110
	1200	56	62	67	92	113	130*	142*	149*	155*
	1500	70	82	92	105	137*	165*	189*	208*	223*
2 (204)	600	38	47	47	52	56	58	58	58	58
	900	50	66	75	94	107	113	119*	125*	131*
	977	50	78	78	107	117	126*	126*	147*	147*
	1200	75	83	89	123*	151*	173*	190*	198*	206*
	1500	94	109	123*	140*	183*	220*	252*	277*	297*
2,5 (255)	600	47	59	59	64	69	73	73	73	73
	900	63	82	93	117	134	141*	149*	156*	164*
	977	63	97	97	133*	147*	157*	157*	184*	184*
	1200	93	104	112	154*	189*	216*	237*	248*	258*
	1500	117	136	154*	175*	229*	275*	315*	346*	371*

* marked panels must be supported

4 FIXED ON 4 EDGES



$$4 - \text{Stress} = B \cdot w \cdot b^2 / t^2$$

a/b	1	1,2	1,4	1,6	1,8	2,0	>3,0
B	0,308	0,383	0,4356	0,468	0,487	0,497	0,500

MAXIMUM STRESS (N/mm²)

Thickness of panel	Panel width (mm)	Length of panel (mm)								
		900	1157	1200	1500	1800	2100	2400	2700	>3000
0,5 (51)	600	8	9	10	10	10	10	10	10	10
	900	13	17	19	20	22	22	22	22	22
	977	13	20	20	24	25	25	25	25	25
	1200	19	22	23	30	36	38	39	39	39
	1500	20	22	30	37	47	53	57	59	61
1 (102)	600	18	19	19	19	19	19	19	19	19
	900	27	34	37	42	44	44	44	44	44
	977	27	40	40	48	50	51	51	51	51
	1200	37	45	48	62	70	75	77	78	78
	1500	42	48	62	75	93	106	114	119*	121*
1,5 (153)	600	26	29	29	29	29	29	29	29	29
	900	40	50	55	62	65	66	66	66	66
	977	40	59	59	72	75	77	77	77	77
	1200	55	67	72	93	106	113	116	117	117
	1500	62	72	93	112	140*	159*	171*	178*	181*
2 (204)	600	35	38	39	39	39	39	39	39	39
	900	54	67	73	83	87	88	88	88	88
	977	54	79	79	97	101	103	103	103	103
	1200	73	89	96	123*	141*	150*	155*	156*	156*
	1500	83	96	123*	150*	187*	212*	228*	237*	242*
2,5 (255)	600	44	48	48	49	49	49	49	49	49
	900	67	84	91	104	109	109	109	109	109
	977	67	99	99	121*	126*	126*	126*	126*	126*
	1200	91	111	120*	154*	176*	188*	194*	195*	195*
	1500	104	120*	154*	187*	233*	265*	285*	296*	302*

* marked panels must be supported