GENESIS NEW MATERIALS COMPANY LIMITED

GENESIS is the Brand Name of Aluminum Composite Panels,aluminum corrugated panel manufactured in 15# Shisha Road Baiyun District, Guangzhou, Guangdong, China. Zip : 510430

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ALUMINUM CORRUGATED PANEL

The GENESIS is a newly developed composite panels which can be used in place of conventional PE, and FR core panels. This is also applicable in place of Honeycomb and solid cladding sheets. The main advantages of the GENESIS are

1. Light weight compared to Solid sheet, PE and FR core
2. Non-combustible Aluminium core
3. Easy to fabricate compared to honey comb
4. More strength because of the corrugated core
5. Cost effective
6. More sound and heat insulation
7. 7. 100% Recycling

APPLICATION:

The GENESIS is offered in a wide variety of PVDF colors suitable for interior and exterior applications like wall cladding, roofing facades. GENESIS also replaces the brick walls. Because of the good sound and thermal insulation the GENESIS replaces the gypsum board partition and brick walls. GENESIS is also used as a clean room panel and in Automotive Industries.

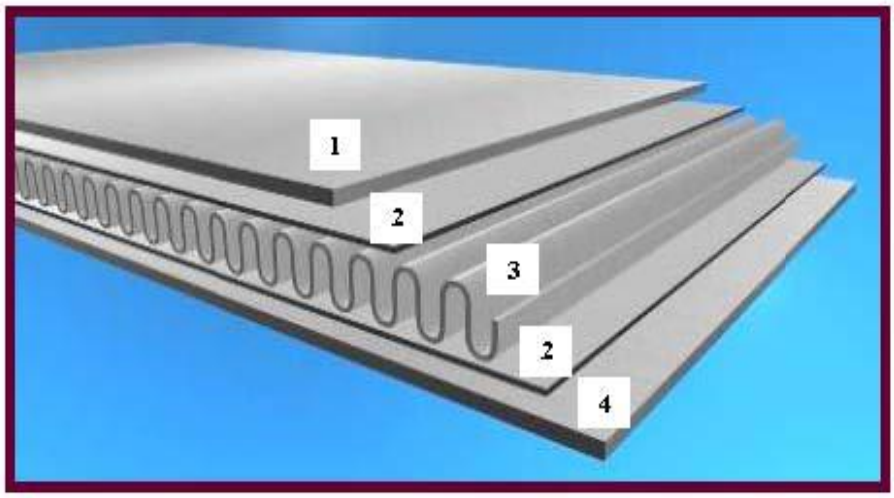
B. COMPOSITION: Two sheets of aluminum sandwiching a corrugated Aluminum core formed in a continuous lamination process. The core material shall be free of voids and/or air spaces and not contain foamed insulation material.

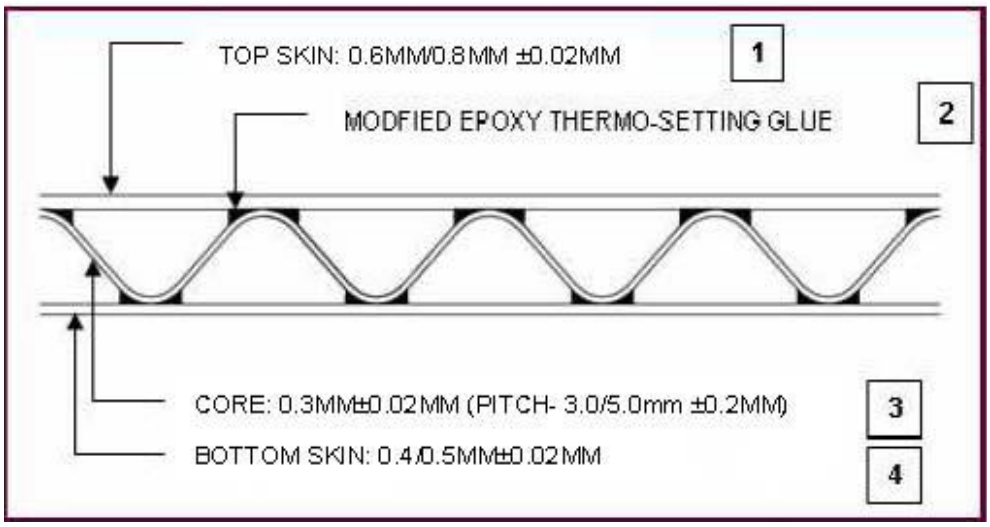
Exterior / Surface panel is Aluminum Sheet Coated with PVDF and interior/ rear side or back side of Panel will be available Mill Finish / Polyester Service Coat /Chromate

MATERIAL SPECIFICATION

Aluminum Alloy Sheets: Alloy : AA3000 Series (PVDF Painted material) Core material : AA3000 Series

TYPICAL COMPOSITION OF ALUMINUM CORRUGATED PANEL (DIAGRAMATIC REPRESENTATION)





C. COATING FINISHES

D. Aluminum Coil alloy (3003 Series) coated with KYNAR® 500 based Polyvinylidene Fluoride (PVDF utilizing with minimum 70% KDF resin).PVDF Coating system offers Two or Three Layer coating depending on color selection such as Metallic colors and Normal RAL Colors. Metallic Colors are normally Three (3) coat system consisting Primer, Color and Clear Top coat. Normal RAL colors usually have Two (2) coat system composed of inhibitive Primer and Color Coat; in conformance with the following general requirements of AAMA 2605.

MATERIAL SPECIFICATION

Color:

Generally we are manufacturing GENESIS with various options of color coating, basically we have Four different types of colors such as: Solid / Enamel Colors, Metallic Colors, Natural Finishes (Stone & Timber) and Sparkling Colors.

1)	Standard color as selected by the owner / architect / engineer.
2)	Custom colors as per customer requirement.
3)	3. Clear coat over pretreated natural and brushed aluminum substrates.

PVDF: Kynar 500/ Hylar 5000 resin (Fluro Carbon Paint) is the most common coating for the composite panels; coating is available in various colors & finishes. Typical PVDF Coating -ECCA (European Coil Coating Association Standard and ASTM)

Test Type	Testing condition	Quality Standards		Remarks
		Polyester	PVDF	
Color	1 11.By Eye 2.Color meter	OK With In range ∆ E = 1.0 or less	OK With In range ∆ E = 1.0 or less	
Gloss	Gloss meter 60	20-70%	25-80%	
Pencil Hardness	2H	Passed	Passed	
Coating Thickness	Positector	16 micron ±3	35micron ±3	
Adhesion Test (Dry)	Cross cut	100/100	100/100	Forced/Natural Abrasion
MEK Testing	Rub MEK soaked piece of Cloth	30 times	100times	
Heat resistance	170 °C X 1 Hr	∆E = 1.5 or less	∆E = 1.5 or less	
Weather Resistance (Q-UV Test)	DEW Cycle UV Test 60 °C 4 Hr + 50 °C 4 hr condensation X 3	∆E = 2.0 or less White color	∆E = 2.0 or less	PE – 1000hr PVDF – 5000 Hr
Base metal		Aluminum	Aluminum	

D. MATERIALS

Product	Total Panel Thickness (mm)	Component Thickness (mm)			Aluminum	Core Material
		Surface Aluminum	Core Aluminum	Back side Aluminum		
GENESIS	4	0.6	3	0.4	Alloy AA 3105/3003-H14	Non-Combustible Aluminium Core
	6	0.8	4.7	0.5 & 0.4		

E. PRODUCT DIMENSION

GENESIS is available in various dimensions however our standard Product is 4mm x 1220mm x 2440mm . The other available sizes are as follows:

Dimension	Unit	Standard	Size Available
Width	mm	1220	1000 -1500
Length	mm	2440	≤ 6000mm
Thickness	mm	4	3, 5 & 6

F.TOLERANCES

1. Dimensional / Standard Size (Rounded) Thickness : 6mm ±0.3mm and 4mm ±0.2mm

Width : +/-2.0 mm Length : +/-3.0 mm

2. Panel Bow: Maximum 0.8% of any 1828mm (72”) panel dimension.

3. Squareness : 5mm

4. Maximum deviation from panel flatness shall be 3mm in 1500mm on panel in any direction for assembled units. (Non-accumulative -No Oil Canning)

5. Panel Dimensions: Field fabrication shall be allowed where necessary, but shall be kept to an absolute minimum. All fabrication shall be done under controlled shop conditions when possible.

6. Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle.

G. PRODUCT PERFORMANCE (PHYSICAL PROPERTIES)

Bond Integrity:

The Top PVDF coated Aluminum skin and the bottom service coated bottom skin bonded on the core together with an adhesive. This thermosetting adhesive being processed in high temperature (about 150º), so there shall be neither adhesive failure of the bond a) between the core and the skin nor b) cohesive failure of the core itself. Bond integrity tested, in accordance with ASTM D1781 (simulating resistance to panel de-lamination), below the following values: Peel Strength: 215 mmN /mm.

Physical Properties	Method	Unit	GENESIS	
			4MM	6MM
Weight	-	Kg/m2	3.47	4.50
Specific Gravity	-	g/cm³	0.87	0.78
Linear Thermal Expansion	ASTM D696	$x10^{-6}$ / °C	12	12
Thermal Conductivity	ASTM D976	W/(m.K)	0.33	0.13
Deflection Temperature	ASTM D648	°C	120	120

Physical Properties	GENESIS 4mm	GENESIS 6mm	AL	FE	S.Steel	Concrete	Glass	Acryl Sht	Gypsum
Specific Gravity	0.87	0.78	2.71	7.9	7.9	-	2.5	1.2	0.86
Linear Thermal Expansion (1m /50°C)	1.2mm	1.2mm	1.2mm	0.6mm	0.9mm	0.63mm	0.5mm	3.5mm	-
Thermal Conductivity -W/(m.K)	0.33	0.13	120	45	17	1.62	1	-	0.04

H. COMPARISON WITH OTHER BUILDING MATERIALS

I. SOUND TRANSMISSION LOSS

GENESIS is having high sound insulation property per unit compared to metal sheets like Aluminum solid sheet and Plywood. Our panels are tested for Sound Transmission loss according to ASTM E413.

DESCRIPTION	**STC**	
	4MM	**6MM**
GENESIS	41	45

J. DEFLECTION TEMPERATURE

GENESIS is having an approximate Deflection Temperature of 120°C.This characteristic proves the property of GENESIS to resist boiling water. Kindly note that; recommended heating temperature of and duration for heating the Panels.

Heating less than 30 Minutes Max Temperature 90°C

Heating more than 30 Minutes Max Temperature 70°C

K. MECHANICAL PROPERTIES

Substrate	Tensile Strength(Mpa)	Yield Strength(Mpa)	Elongation 50mm,(%)	Modulus of Elasticity
AA3003, H14	175	170	Min. 3%	69,000Mpa
AA3105, H14	170	150	Min 2 %	69,000Mpa

Properties of Skin

GENESIS is normally made with Aluminum Alloy 3003-H14 and other grades of Alloy 3000 are available as per customer requirement. General sheet metal work requiring greater strength than is provided by 1000 series alloys; profiled building sheet (roofing ceiling and siding); insulation panels; hollowware; food and chemical handling and storage equipment. 3003 is readily welded by the TIG and MIG procsses.

Mechanical properties of GENESIS has the following mechanical properties as average:

Mechanical Property	Method	Unit	GENESIS	
			4mm	6mm
Tensile Strength	ASTM E8	MPa	75	71
0.2% Proof Stress	ASTM E8	MPa	66	62
Elongation	ASTM E8	%	12	9
Temperature stability		° C	-40 t0 120	

L.BENDING LIMIT

We can bend the GENESIS in a Press Break or 3 roll Bending machine. Normally the smallest

radius which we can apply to bend the panel with out wrinkles at the radial surface of panel is termed as the bend radius. In 3 roll machine the bending diameter depends on the roll diameter, length and type of machine. For GENESIS the diameter is about 300 mm.

Material	Thermal Conductivity(W/(mK))
GENESIS 4MM	0.33
GENESIS 6MM	0.13
Aluminium	205
Steel	50.2
Polyurethane	0.02
Glass Wool	0.04
Brick	0.28
Concrete	0.8
Gypsum Board	0.13
Air at 0^{o}	0.024

M.THERMAL CONDUCTIVITY

Compared to solid materials, the GENESIS panel have a lower thermal conductivity the table below shows the thermal conductivity comparison of different materials.
MATERIAL SPECIFICATIONS

N.HEAT TRANSMISSION

GENESIS panels reduce the Heat transfer from the outer air to the inner air. The air gap between the Panel and the wall increases the thermal insulation. The "U" Value of a GENESIS cladding system is given below

Type of panel Cladding	100 air Gap 115mm Brick wall	75air Gap 25mm Glass wool 115mm brick wall
GENESIS 4mm panel	1.3 W/m^2	0.85 W/m^2
GENESIS 6mm panel	1.2 W/m^2	0.72 W/m^2

O. FIRE TESTS Results of Reaction to Fire Tests GENESIS

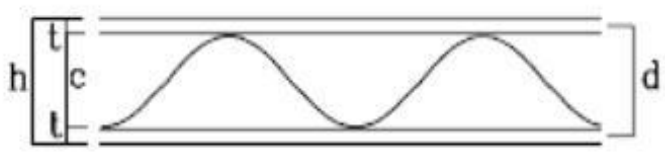
Test Standard	GENESIS	Result & Classification
BS476 Part 6 BS476 Part 7 BS476 Part 4	4mm & 6mm	Class 0 Class 1 Non combustible
DIN4102 Part 1	4mm & 6mm	Class A2

P. PANEL STRENGTH

The Panels used for the external cladding must withstand the wind load. This wind load will cause deflection of the panels and if the deflection is small the panel will not deform. The permanent deformation of the panel is calculated by 0.2% Proof Stress (yield stress) divided by the safety factor. In the calculation we are assuming that the total strength of the panel is the strength of the Aluminium skins. If the calculated 2% proof stress is grater than the permissible, normally the panel is strengthened by giving additional stiffeners. The other factors affecting the strength of the panel are:

1 Panel thickness, width and length
2 Supporting conditions.
3 Wind load

Bending Resistance: Calculation



Where d - Average panel thickness
h - Total panel thickness
c - Thickness of Aluminium core

$$d = \frac{h + c}{2}$$

Moment of inertia "I" in mm^4

$$I = \frac{b^* t^* d^2}{2}$$

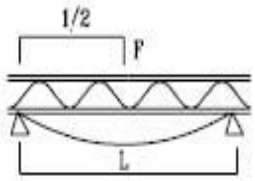
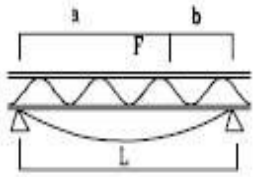
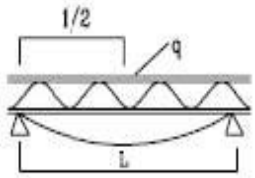
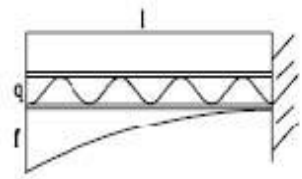
Where: b - Panel width in mm
t - Skin thickness in mm
d - Average panel thickness

BENDING RESISTSNCE in Nmm = E* I

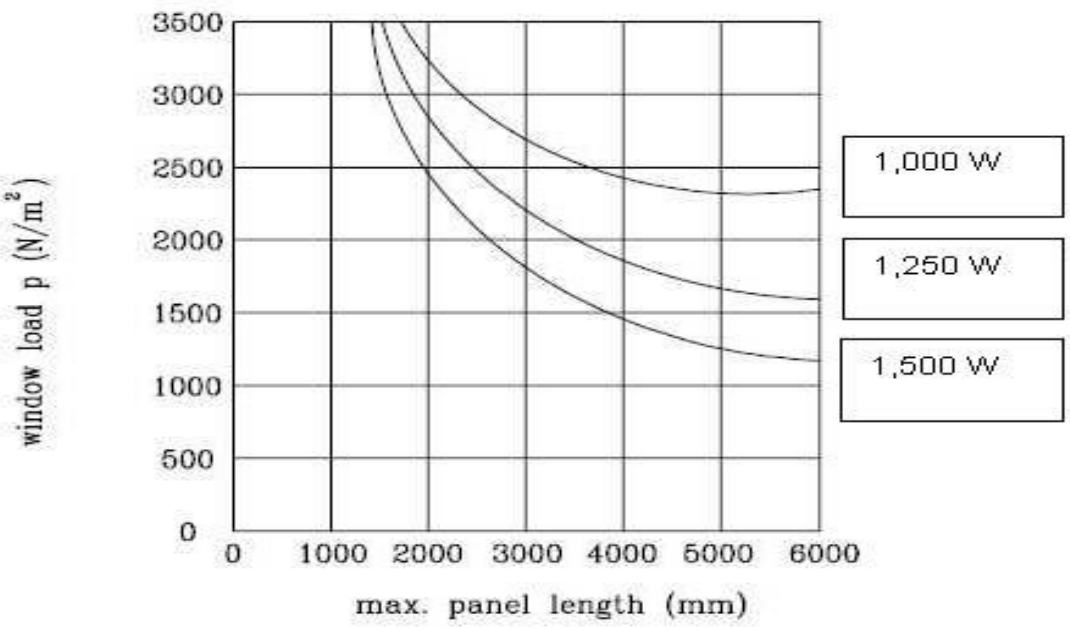
Where: I - Moment of inertia in mm^4
E - Modulus of Elasticity in N/mm^2. (For Aluminium 70000 N/ mm^2)

MATERIAL SPECIFICATION

DEFELECTION OF PANELS

BEAM TYPE	FORMULA
	$fm = \frac{F*l^3}{48*E*j}$
	$fm = \frac{F*q*l^4}{3*E*J*l}$
	$fm = \frac{5*q*l^4}{384*E*J}$
	$fm = \frac{q*l^4}{8*E*J}$

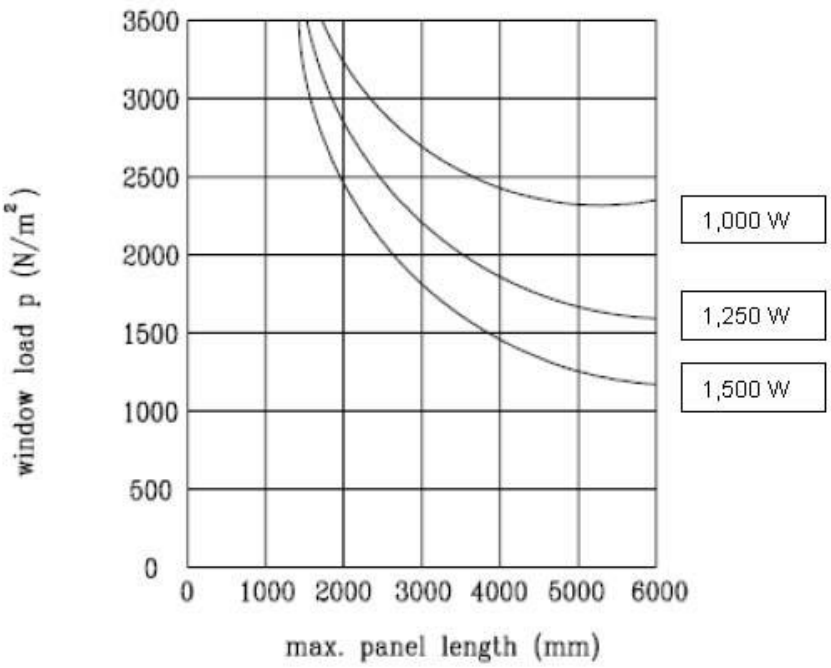
Where:	F	-	Load in N
	L	-	Span between bearings in mm
	Fm	-	Maximum deflection
	E*I	-	Bending resistance in N mm



MATERIAL SPECIFICATION

WIND LOAD; For GENESIS 4mm 0.5 mm top skin, 0.3mm Core and 0.5mm bottom skin

For GENESIS 6mm 0.8 mm top skin, 0.3mm Core and 0.5mm bottom skin

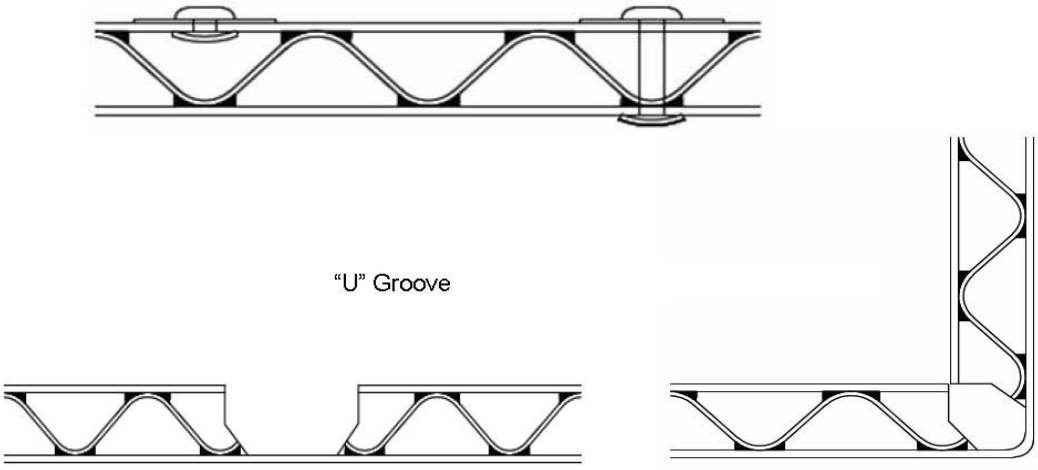


Q. FABRICATION

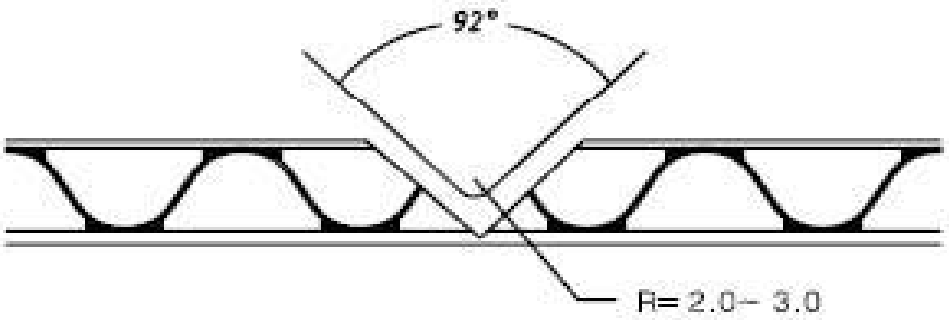
GENESIS panels can be easily fabricated by the mechanical processing like saw cutting, bending, grooving drilling etc. The shear cutting is not recommended for the GENESIS panels, all other conventional type fabrication method can be adopted for the processing of the GENESIS

MATERIAL SPECIFICATION

RIVETING



3) Grooving Cutter Shape



R.RESISTANCE TO NATURAL FORCES The GENESIS panel has very good fungi and frost resistance. And since the panel is connected to the earth through the sub structure, if a lightning strikes a GENESIS panel the electricity will be discharged to the earth through the substructure. S. PRODUCT WARRANTY All Aluminum Corrugated Panels supplied by GENESIS NEW MATERIALS COMPANY LIMITED will be warranted for a period maximum of 15 Years from the date of supply, as per our standard product warranty Policy. Formal Warranty documentation will be issued in the name of Client and will be endorsed by the regional agents / the company itself.