

Q-NAP ACP is the Brand Name of Aluminum Composite Panels manufactured in Qatar by **Qatar National Aluminum Panel Co. (Q-NAP) P.O. Box : 37809** Doha – Qatar, our office is situated at **New Industrial Area, Pink Zone, Doha, Qatar**, Tel - +974 4411 4430, Fax - + 974 4411 8491. We are enjoying the position of first manufacturer of Aluminum and Stainless Steel Composite Panels in the State of Qatar.

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ALUMINUM COMPOSITE PANEL FABRICATION

A. COMPOSITION:

Two sheets of aluminum sandwiching a solid core of extruded Non-combustible mineral Core material formed in a continuous co extrusion process with no glues or adhesives between dissimilar materials. The core material shall be free of voids and/or air spaces and not contain foamed insulation material.

Exterior / Face panel is Aluminum Sheet Coated with PVDF and interior / Rear side of Panel will be available Mill Finish / Polyester Service Coat / Chromated.

Aluminum Face Sheets:

Aluminum Thickness : 0.50mm (0.0197") (nominal)
 Alloy : AA3000 Series (PVDF Painted material)

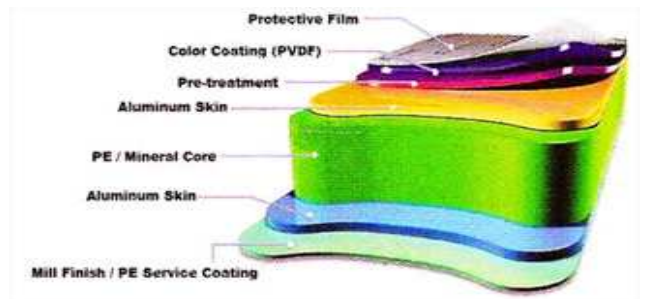
TYPICAL COMPOSITION OF ALUMINUM COMPOSITE PANEL (DIAGRAMATIC REPRESENTATION)

B. THICKNESS: (ACP - FR & ACP - PE)

4MM (0.157"); 6MM (0.236")

C. PANEL WEIGHT:

4mm 7.5 Kgs/m² , 6mm : 10.85 Kgs/m²



Product	Total Panel Thickness (mm)	Component Thickness (mm)			Aluminum	Core Material
		Top Skin Aluminum	Core PE/FR	Bottom Skin Aluminum		
Q-NAP ACP - FR	4	0.5	3	0.5	Alloy AA 3105/3003 - H14	Non-Combustible Mineral Filled Core
	6	0.5	5	0.5		

D. PRODUCT DIMENSION

Q-NAP ACP is available in various dimensions however our standard in 4mm x 1250mm x 2440mm. Other available sizes are as follows:

ACP-FR MATERIAL SPECIFICATION

Dimension	Unit	Standard	Size Available
Width	mm	1250	1000 - 1550
Length	mm	2440	≤ 6000
Thickness	mm	4	3, 5 & 6

E. TOLERANCES

- Dimensional / Standard Size (Rounded)
 - Thickness : 6mm ± 0.3mm and 4mm ± 0.2mm
 - Width : +/- 2.0 mm
 - Length : +/- 3.0 mm
- Panel Bow: Maximum 0.8% of any 1828mm (72") panel dimension.
- Squareness : 5mm
- Maximum deviation from panel flatness shall be 1/8" in 5'0" on panel in any direction for assembled units. (Non-accumulative - No Oil Canning)
- 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.
- Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle.

F. PRODUCT PERFORMANCE (PHYSICAL PROPERTIES)

- Bond Integrity

Bond integrity tested, in accordance with ASTM D1781 (simulating resistance to panel delamination), there shall be neither adhesive failure of the bond a) between the core and the skin nor b) cohesive failure of the core itself below the following values:

Peel Strength: 105.75 N mm/mm (23.5 in lb/in) as manufactured

Physical Properties	Method	Unit	ACP - FR	
			4MM	6MM
Weight	-	Kg/m ²	7.5	10.85
Specific Gravity	-		1.89	1.8
Linear Thermal Expansion at 100 °C	ASTM E228	x10 ⁻⁶ / °C	24	24
Thermal Conductivity	ASTM D976	W/(m.K)	0.43	0.4
Deflection Temperature	ASTM D648	°C	110	110



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ACP-FR MATERIAL SPECIFICATION

G. COMPARISON WITH OTHER BUILDING MATERIALS

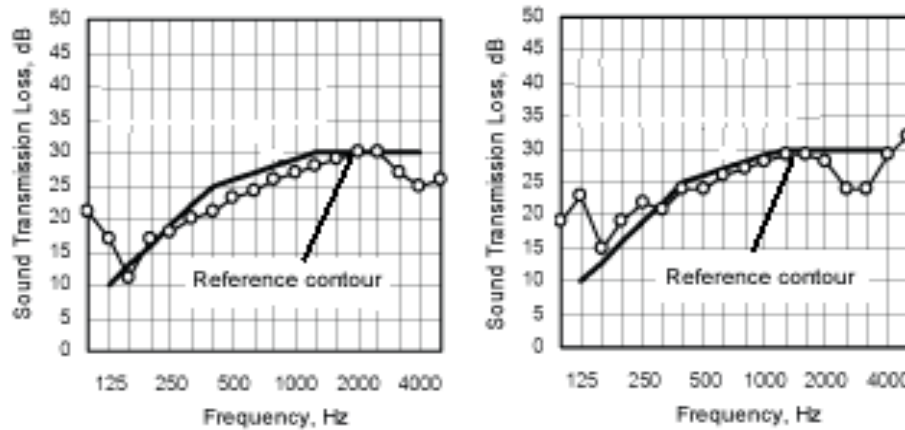
Physical Properties	Acp - FR	AL	FE	S.Steel	Concrete	Glass	Acryl Sht	Gypsum
Specific Gravity	1.8 -1.89	2.71	7.9	7.9	-	2.5	1.2	0.86
Linier Thermal Expansion (1m /50°C)	1.2mm	1.2mm	0.6mm	0.9mm	0.63mm	0.5mm	3.5mm	-
Thermal Conductivity - W/(m.K)	0.4 -0.45	210	45	17	1.62	1	-	0.04

COMPARISON WEIGHT & RIGIDITY

Q-NAP FR Specific Gravity 1.2 - 1.9			Aluminum Specific Gravity 2.71			Stainless Steel Specific Gravity 7.89		
	Thickness (mm)	Weight (Kg / M ²)	Thickness (mm)	Weight (Kg / M ²)	Weight Ratio %	Thickness (mm)	Weight (Kg / M ²)	Weight Ratio %
ACP - FR	4 MM	7.5	3.3	8.9	82	2.4	18.9	40
	6 MM	10.89	4.5	12.2	85	3.2	25.2	43

H. SOUND TRANSMISSION LOSS

Q-NAP FR is having high sound insulation property per unit compared to metal sheets like Aluminum Steel, and Plywood. Our panels are tested for Sound Transmission loss according ASTM E413. Please find below graphical representation of sound transmission loss.



Q-NAP FR	4MM	6MM
STC	25	25



ACP-FR MATERIAL SPECIFICATION

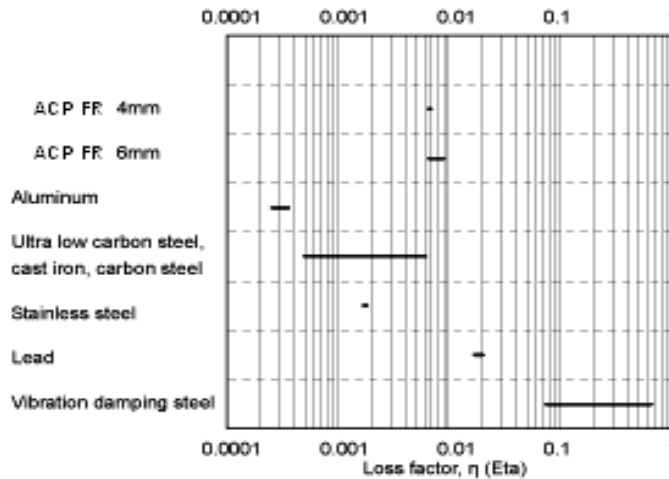
I. DEFLECTION TEMPERATURE

Q-NAP panel is having an approximate Deflection Temperature of 110°C. This characteristic proves the property of panel to resist boiling water. The Q-Nap Fr has a temperature stability of -40°C to +80°C, and recommended heating temperature and duration for heating the Panels as follows.

- ❖ Heating less than 30 Mnts Max Temperature 90°C
- ❖ Heating more than 30 Mnts Max Temperature 70°C

J. VIBRATION DAMPING

Q-Nap ACP has best vibration damping effect that absorbs mechanical energy arises out of vibration to convert it into thermal energy.



Above chart depicts Vibration damping property in comparison with other materials like Aluminum, Stainless Steel, Carbon Steel, Led etc.

As seen in the Chart Q-NAP FR has larger vibration loss than solid metals.

K. MECHANICAL PROPERTIES

Properties of Skin

We are using Alloy 3105 – H14. OR Alloy 3003 –H14

General sheet metal work requiring greater strength than is provided by 1000 series alloys; profiled building sheet (roofing and siding); insulation panels; hollowware; food and chemical handling and storage equipment. 3003 is readily welded by the TIG and MIG processes.

MECHANICAL PROPERTY	METHOD	UNIT	ALUMINUM AA3105 – H14
0.2% Proof stress	ASTM E8	MPa	152
Flexural Elasticity	ASTM E8	GPa	70



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Mechanical properties of ACP

Q-NAP ACP PE / FR is having the below mechanical properties as average:

Mechanical Property	Method	Unit	ACP - FR	
			4mm	6mm
Tensile Strength	ASTM E8	MPa	50	30
0.2% Proof Stress	ASTM E8	MPa	45	27
Elongation	ASTM E8	%	7.2	5.1
Flexural Elasticity , E	ASTM C393	GPa	40	29.5
Flexural Rigidity, E x I	ASTM C393	kNmm ² /mm	138	348
Punching Shear Strength	ASTM D732	N/ mm ²	32.5	21

L. BENDING LIMIT

We can bend the ACP/FR and PE 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 ACP/fr, the radius is about 300mm.

Smallest bending radius (Parallel in Press Break Machine)

Thickness	ACP/fr
4mm	100mm
6mm	120mm

M. THERMAL CONDUCTIVITY

Compared to solid materials, the ACP/PE and ACP/FR panel have a lower thermal conductivity the table below shows the thermal conductivity comparison of different materials.

Material	Thermal Conductivity(W/(mK))
ACP/fr 4mm	0.43
ACP/fr 6mm	0.4
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°C	0.024

N. HEAT TRANSMISSION



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Q-Nap ACP/fr 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 heat transmission coefficient (U- Value) ACP fixed wall system is given below.

Type of panel Cladding	100 air Gap 115mm Brick wall	75air Gap 25mm Glass wool 115mm brick wall
ACP/FR 4mm panel	1.5 W/m ² K	0.94 W/m ² K
ACP /FR 6mm panel	1.32 W/m ² K	0.79 W/m ² K

O. REACTION TO FIRE

Q-NAP ACP – FR is a fire safe material passed mandatory requirements of relevant internationally acceptable standards and is best suitable for external and internal uses. Core of the panels are mainly composed of minerals which can resist fire, however a small amount of Polyethylene also included. Main ingredient (minerals) does not permit the proliferation of flame and restricts development of smoke. Q-NAP ACP – PE on the other hand is composed of Polyethylene however, Skin Aluminum retard rapid spread of fire.

Fire Tests for general and external cladding:

Country	Test Standard	Q-Nap ACP/fr	Result & Classification
United Kingdom	BS476 Part 7 BS476 Part 6	4mm & 6 mm	Class-1 Class-0
Germany	DN4102 Part 1	4mm & 6 mm	Class B1
USA	ASTM D1781-76 Climbing drum peel test	4mm & 6 mm	Passed
EUROPE	BSEN-13501-1	4mm & 6 mm	Class B-S1, d0

Wall and Roof

Country	Test Standard	Q-Nap ACP/fr	Result & Classification
USA	ASTM E119 Fire rating	4mm & 6mm	1 hr 54 min

In addition to regular standard Fire Tests, we are performing heavy fire tests on the Products which are non-standard as well in order to determine the quality of the products please find below Picture of Typical Ad-Hoc fire test which we are conducting.

ACP-FR MATERIAL SPECIFICATION

Typical interior Room Corner Test



P. COATING FINISHES

1. Aluminum Coil alloy (3000 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. The coating is done in conformance with the following general requirements of AAMA 2605.

a. Color:

Generally we are manufacturing ACP 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) Clear coat over pretreated natural and brushed aluminum substrates.

b. Dry Film Thickness: : 30 micron (minimum)

c. Gloss at 60° : 20 – 80%

d. Color Retention

ASTM D-2244 : Max 5 Units (Accelerated Test 4000 Hrs)



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- e. Gloss retention :
- f. ASTM D523-89 : minimum 70% after 4000 Hrs
- g. Hardness:
 - ASTM D-3363 : 2H
- h. Impact:
 - ASTM D-2784 : No Breakage / Loss of Paint
- i. Adhesion:
 - ASTM D-3359, Dry : No Removal (1 mm x 1mm Cross hatch)
 - Wet : No change at after 37.8formulated °C, for 24 hrs
 - Boiling water : at 100°C 20 min, No change
- j. AbrasionResistance
 - ASTM D-968 : Passed (Sand Falling / Sand blasting)
- k. Humidity Resistance
 - ASTM D-714 : 3000 Hrs (RH 100 % at 35°C)
- l. Salt Spray Resistance:
 - ASTM B-117 : 3000 Hrs (5% NaCl solution at 35°C)
- m. Chemical Resistance:
 - 1) ASTM D-1308 : 10% Muriatic Acid for an exposure of 15 minutes.
No visual change viewed by unaided eye
 - 2) ASTM D-1308 : 20% Sulfuric Acid for an exposure of 18 hours.
No visual change when viewed by unaided eye.
- n. Mortar Resistance (AAMA 605.2): No Change
- o. Detergent Resistance
 - ASTM D2248-93 : No Change (Detergent, 3% solution, 38°C, 72hrs)
- p. Chalk Resistance
 - ASTM D : Max 8 Units (Accelerated Test 4000 Hrs)
- q. Weatherability : 15 Years
- r. Bendability : 1T – 2T

Q. PANEL STRENGTH

The Panels used for the external cladding must with stand the wind load. This wind load will cause deflection of the panels and if the deflection is small the panel will not deform.



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The permanent deformation of the panel is calculated by 0.2% 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 greater 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

We are using the Aluminium alloy 3105-H14/3003 –H14 for our FR skins 2% proof stress is 152-170MPa and suitable where the wind speed is 50m/sec.

R. JOINING HOLES / BOLTS & NUTS

In the installation work other important factors are the strength of the joining holes and the rivets. Normally the distance from the hole centre to the panel edge should be 2 times larger than hole diameter. And to prevent the galvanic corrosion of the panels use only Aluminium or stainless steel rivets, bolts nuts etc. if we are using dissimilar metals lay a coating to prevent the galvanic corrosion.

S. STRENGTH OF SUBSTRUCTURE

The sub structure where we are installing the panels should take care the wind load and the panels. The strength of the substructure depends on the material and section of the structure, anchoring intervals of sub structure and wind pressure. The maximum deflection on the sub structure must be smaller than the 0.5% of supporting intervals.

T. RESISTANCE TO NATURAL FORCES

a) Lightning

If a lightning strikes a ACP/FR panel the electricity will be discharged to the earth through the substructure. Since the panel is connected to the earth through the sub structure.

U. PRODUCT WARRANTY

All Aluminum Composite Panels supplied by Qatar National Aluminum Panel Co. will be warranted for a period of 10 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.