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FRP Louver Bill of Materials

Material Parameters for 32 Sets of Louvers with Insect Screen
1. Top and bottom frames: FRP C channel , 50×42×5 mm
2. Intermediate crossbeams: FRP rectangular Tube , 40×20×3 mm
3. Left and right vertical posts:FRP rectangular tube, 50×28×3 mm
4. Louver blades: Z-section profile, 70×3 mm
5. Retaining strips for fixing insect screen: FRP flat bar, 30×3 mm
6. Wall-mounting profiles: FRP angle line, 30×3 mm

The perimeter frames are the primary load-bearing components. The top and bottom frames can support 120 kg per linear meter, and the left and right vertical posts can support 140 kg per piece. All metal rivets used for louver installation are 304 stainless steel. A transparent anti-corrosion coating will be applied to all surfaces prior to shipment to prevent corrosion damage.

Main Material Composition of the Profiles
1 Resin Polyester unsaturated resin 27.1% Kewell H950 resin grade
2 Fibre E-glass wound felt 10.8% Hebei Ruisheng 450 g/m² E-glass wound felt
Roving 58.0% Jushi / Shandong Fiberglass 4800 tex E-glass A-grade roving
3 Calcium powder 800-mesh fine calcium carbonate 2.70%
4 Pigment paste Standard pigment paste 0.8%
5 UV inhibitor 0.6%

Comparison with mild steel frame and aluminium blades

Option 1 (Conventional Metal):
· Frame: 50×25×3 mm carbon steel for all perimeter members
· Louver blades: aluminum alloy
Option 2 (FRP):
· Top and bottom frames: 50×42×5 mm FRP channel steel profiles
· Left and right vertical posts: 40×20×3 mm FRP rectangular tubes
· Louver blades: FRP Z-section profiles

The following is a systematic comparison of the two options across multiple performance dimensions.

Material	Density(g/cm³）
Mild steel	7.8
Aluminum alloy	2.7
FRP (glass fibre reinforced plastic)	1.5-2.0

FRP has a density only 1/4 to 1/5 that of mild steel, and is about 1/3 lighter than aluminum alloy. In profile terms:

· FRP is ~75% lighter than Mild steel
· FRP is ~30% lighter than aluminum alloy

The FRP solution offers a dramatic weight advantage – for the same volume, an FRP frame weighs about one-quarter of a mild steel frame and about two-thirds of an aluminium frame. This significantly reduces structural loads on the building.

2.**Mechanical Strength**

Performance indicator	Mild steel	Aluminium alloy	FRP
Tensile strenth(MPA)	~400	200-300	350-450
Specific strength (strength-to-weight ratio	Baseline	Moderate	4-5×that of steel

FRP's tensile strength is comparable to or even exceeds that of ordinary Mild steel, and approaches that of high-grade alloy steel. In terms of specific strength (strength per unit weight), FRP is about 5 times that of carbon steel – meaning that for the same weight, FRP provides far greater load-bearing capacity than steel.

Additionally, FRP louvers maintain stable performance under strong winds or pressure differentials, and do not deform over time or under sustained stress.

FRP matches carbon steel in absolute strength, and far surpasses both steel and aluminium in specific strength.

Corrosion Resistance

Property	Mild Steel	Aluminum Alloy	FRP
General corrosion resistance	Poor (rusts easily)	Moderate (oxidises)	Excellent (non-rusting, non-corroding)
Resistance to acids, alkalis, salt spray	poor	Moderate	Excellent
Resistance to seawater / high humidity	poor	Moderate	Excellent

FRP is a highly corrosion-resistant material. It offers good resistance to atmospheric conditions, water, and common concentrations of acids, alkalis, salts, as well as many oils and solvents. Mild steel readily oxidises and rusts, while aluminium alloy also suffers from oxidation, especially in saline environments.

In aggressive environments such as coastal areas with high salt spray, chemical plants, and wastewater treatment facilities, FRP provides an overwhelming advantage.

Thermal and Electrical Properties

Property	Mild steel	Aluminium	FRP

		alloy	
Thermal conductivity (W/m·K)	~50	~200	0.35 – 0.47
Relative thermal conductivity	1×	1×	1/100 to 1/1000 that of metals
Electrical conductivity	Conductive	Conductive	Non-conductive / insulating
Coefficient of thermal expansion (per °C)	~12×10^{-6}	~23×10^{-6}	~7.3×10^{-6}

FRP has extremely low thermal conductivity, making it an excellent thermal insulator. Its coefficient of thermal expansion is lower than that of steel and aluminium, ensuring better dimensional stability under temperature fluctuations. FRP is also a good electrical insulator and is unaffected by electromagnetic fields.

FRP offers unbeatable advantages in thermal insulation and electrical non-conductivity compared to both carbon steel and aluminium alloy, making it particularly suitable for applications where temperature control and electrical safety are critical.

5.Maintenance and Service Life

Item	Mild steel	Aluminum Alloy	FRP
Outdoor service life	5-10 years(uncoated)	10-15 years	20-30+ years
Maintenance requirement	High (periodic anti-corrosion coating)	Moderate	Very low/Maintenance free

Mild steel requires regular anti-corrosion maintenance. Aluminium alloy performs better but still needs upkeep in saline or industrial atmospheres. FRP, on the other hand, demands little to no periodic maintenance, offering a significant life-cycle cost advantage.

The FRP solution has a service life 2-3 times that of carbon steel, with substantially lower maintenance costs.

Summary – Core Advantages of the FRP Solution

1. Light weight with high strength – weighs only about 1/4 of carbon steel, with specific strength 5 times that of steel.
2. Superior corrosion resistance – does not rust or corrode, ideal for coastal, chemical, and other harsh environments.
3. Thermal and electrical insulation – thermal conductivity is only 1/100 to 1/1000 that of metals; excellent electrical insulator.
4. Long service life with minimal maintenance – 20-30+ years of reliable performance, virtually maintenance-free.

FRP louvers are particularly recommended for coastal areas with high salt spray, chemical plants, electroplating workshops, wastewater treatment plants, offshore engineering, and other corrosive environments. For dry inland conditions, the carbon steel + aluminium alloy

option may have a lower initial material cost, but when considering the total life-cycle cost, FRP remains a highly competitive choice.