

FRP Selection Guide

Electrical & Utility Applications — non-conductive, corrosion-proof FRP for substations and utility sites

1. Why FRP in Electrical & Utility Environments

- **Non-conductive & RF-transparent** — reduces shock and arc-flash exposure for crews near live equipment.
- **Corrosion-proof** — immune to chlorides, acids, alkalis, and hydrogen sulfide (H₂S) in battery rooms; no rust or spalling.
- **Lightweight (~1/4 of steel)** — faster, safer installs, often without cranes; shorter outage windows.
- **Low maintenance** — no painting, re-galvanizing, or replacement cycle.
- **Lower total cost of ownership** — higher up-front cost, lower lifetime cost, before counting the value of an avoided incident.

2. Where FRP Is Used on Utility Sites

Application	Crimar product
Equipment platforms & walkways	FRP grating + structural profiles
Stair treads & access	FRP grating treads, profiles
Handrail & guardrail	Pultruded railing systems
Ladders, safety cages, step-overs	Pultruded profiles
Cable tray, supports & covers	Profiles + accessories
Trench / cable-trench covers	FRP grating

3. How to Select — 4 Steps

- **Step 1 — Environment** → **resin**. Outdoor/coastal, chemical exposure, or battery room (H₂S) drive the resin system (see §5).
- **Step 2 — Structure** → **grating type & profile size**. Load, span, and allowable deflection drive grating depth/type and profile sizing (§4, §6).
- **Step 3 — Safety & code**. Fire rating (ASTM E84 flame spread), slip resistance (gritted surface), and the non-conductive requirement.
- **Step 4 — Fit & installation**. Weight limits, connections, field cutting, and fabrication.

4. Grating: Molded vs. Pultruded

	Molded grating	Pultruded grating
Load direction	Bi-directional	High unidirectional

Best for	Corrosion, panels, moderate spans	Long spans, heavy/point loads
Open area	~60–70%	~40–60%
Typical use	Walkways, platforms, trench covers	Long-span / heavy-load platforms

Representative load/span (uniform ~4.8 kPa / 100 psf — verify):

Grating depth	Max walkway span
25 mm (1")	~0.7 m
38 mm (1.5")	~1.2 m
50 mm (2")	~1.5 m

FRP has a lower modulus than steel, so design is usually **deflection-governed**. Specify allowable deflection (e.g., L/200) up front.

5. Resin Selection

Resin	Best for	Notes
Isophthalic polyester	General corrosion, outdoor	Economical, broad chemical resistance
Vinyl-ester	Aggressive chemicals, battery rooms, coastal	Recommended for most utility/chemical service
Fire-retardant (FR)	Indoor, enclosed, code-driven	Class 1 flame spread (ASTM E84, ≤25)

All systems are non-conductive. For substations and battery rooms, **FR vinyl-ester** is the common default.

6. Structural Profiles

Shapes: I-beam, wide-flange, channel, angle, square/round tube, flat bar, rod.

Representative properties (lengthwise, verify): tensile strength ≈ 200–400 MPa; flexural strength ≈ 200–240 MPa; tensile modulus ≈ 17–30 GPa; density ≈ 1.8–2.0 g/cm³.

Design note: because of FRP's lower modulus, size members for deflection and connection bearing, not just stress.

7. Standards & Compliance

- **OSHA 1910.29** — walking-working surfaces (railing height, loads, openings).
- **ASTM E84** — surface burning / flame spread (FR grades).
- **ASTM D7957 / ACI 440** — where GFRP rebar is in scope.
- Non-conductive properties support electrical safety programs and reduce arc-flash/shock exposure.

8. Selection Checklist

- Environment (outdoor / coastal / chemical / battery room)
- Resin system (polyester / vinyl-ester / FR)

- Uniform load and any point/vehicle loads
- Span and allowable deflection (e.g., L/200)
- Grating type (molded / pultruded), depth, mesh, surface
- Fire rating required? (ASTM E84 Class 1)
- Slip resistance (gritted / concave)
- Non-conductive confirmed
- Connections / hold-downs / fabrication
- Quantity & timeline

9. Get Engineering Support

Send us your environment, loads, spans, and components — Crimar's team will help you select non-conductive FRP and provide a quote. **Request a quote: crimarcomposites.com/contacts/**

Specifications in this guide are representative engineering ranges; confirm final values with Crimar engineering for your project.