FRP Grating Installation & Maintenance Manual

Expanded combined manual covering safe installation, fastening, handrail & ladder erection, thermal movement, lifecycle maintenance, cleaning, repair and troubleshooting for ZeAllgrate molded and pultruded FRP grating.

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Brand	ZeAllgrate
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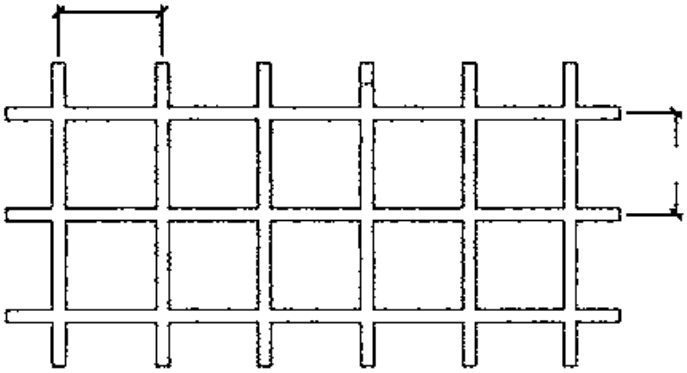



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1. Safety & Pre-Installation

1.1 Personal Protective Equipment (PPE)

- Safety glasses or face shield; dust mask / respirator (N95 or FFP2 minimum) when cutting or grinding.
- Cut-resistant gloves, long sleeves and long trousers (FRP dust is abrasive and irritating).
- Safety footwear with anti-slip sole; hearing protection for power tools.
- Harness / fall arrest where working at height (per OSHA 29 CFR 1910 and local rules).

1.2 Handling, Storage & Inspection

- Lift panels with soft slings or spreader bars; never use bare steel wire rope on the finished surface.
- Store flat on level dunnage with at least 3 supports per panel; do not stack more than ~20 panels.
- Store indoors or under waterproof cover; prolonged UV exposure causes cosmetic chalking only.
- Inspect on receipt against the packing list: size, thickness, resin, surface, colour. Check for cracks, delamination, chipped corners.
- Report any damage or discrepancy to ZeAllgrate within 7 days of receipt.

Warning: FRP dust can cause skin, eye and respiratory irritation. Wet cutting or local exhaust ventilation strongly reduces airborne dust. FRP is combustible and non-conductive — never use it as an electrical earthing path, and keep hot work (welding/grinding) off the panels.

2. Tools Required

Category	Tool	Spec / Note
Cutting	Carbide-tipped circular saw	40–60 teeth; finished face up to limit chipping
Cutting	Abrasive cut-off disc / angle grinder	For trimming and edge finishing
Cutting	Jigsaw with carbide blade	For cut-outs around pipes and posts
Drilling	Cordless drill + carbide / HSS bits	M6–M12; use backing block to prevent breakout
Fastening	Torque wrench (calibrated)	0–60 N·m range; required for bolted clips
Fastening	Socket set / spanners	For M6–M12 nuts and bolts
Measuring	Tape measure, spirit level, chalk line	Level tolerance ±5 mm over support run
Finishing	File / deburring tool	Remove sharp edges from holes and cuts
Finishing	Resin gel coat / edge sealer	Seal all cut edges after machining

3. Support Structure Preparation

- Support framing must be level and true; maximum out-of-level ±5 mm over any 3 m run.
- Bearing surface must be clean, flat and free of weld splatter, rust scale and loose debris.
- Steel supports should be cleaned and coated with a compatible corrosion-protection system before grating is laid.
- Provide continuous bearing (not point contact). Minimum bearing length: 50 mm molded, 75 mm pultruded.
- For corrosive service, isolate FRP panels from dissimilar metal supports with isolation washers / neoprene strips to prevent galvanic contact and noise.
- Confirm support spacing matches the grating load/span tables for the intended live load.

4. Panel Installation

- Lay panels dry first to check layout and fit before drilling any fixing holes.
- Orientation: pultruded bearing bars MUST run perpendicular to the supports (across the clear span), never parallel.
- Maintain panel-to-panel gap of 3–5 mm (indoor) and 5–8 mm (outdoor with large temperature swing) to allow thermal movement.
- Maintain minimum bearing length: 50 mm molded, 75 mm pultruded at every support.
- Cut-outs: drill a minimum 10 mm radius pilot hole at each internal corner to avoid stress concentrations; never leave sharp internal corners.
- Openings larger than 300 × 300 mm require additional support framing or FRP angle reinforcement — consult ZeAllgrate.
- Seal all cut edges with resin sealer or fit FRP edge banding to prevent moisture ingress and improve impact resistance.
- Edge banding: bond flat-bar trim (e.g. 3×25, 3×40 or 5×50 mm) with epoxy / polyester adhesive and fix at 200–300 mm centres.

5. Fastening & Clips

Every panel must be secured at each support intersection. Use a minimum of 4 clips per panel; clip spacing must not exceed 1200 mm. See the Fastening System Manual for full clip-type detail.

Grating Type	Thickness	Clips per Panel (min.)	Max. Clip Spacing
Molded	25 mm	4	Every support intersection
Molded	38 mm	6	Every support intersection
Molded	50 mm	6	Every support intersection
Pultruded	40 mm	6	≤ 1200 mm; every bearing-bar support
Pultruded	50–75 mm	8	≤ 1200 mm; every bearing-bar support

Torque to specification; do not over-torque (FRP crushes under excessive clamp force). Indicative torque: M6 = 6–9 N·m, M8 = 15–20 N·m, M10 = 25–30 N·m, M12 = 40–50 N·m. Re-torque after the first 6 months of service (see §8).

6. Handrail & Ladder Installation

- Handrail height 950–1100 mm above walking surface (top rail); mid-rail at ~half height; toe board 100–150 mm where objects may fall (OSHA 29 CFR 1910.23).
- Post spacing: maximum 2400 mm for FRP handrail, typically 1500 mm for heavy-use / industrial duty.
- Mount posts to the support structure (not to the grating alone) using base plates and chemical anchors or through-bolts to steel framing.
- Ladder cages / rest platforms: per OSHA 1910.27; install offset ladder supports where rung span exceeds manufacturer limits.
- Bond handrail joints with structural adhesive and mechanical fixings; allow thermal movement at one end of long runs.
- All handrail and ladder components must be compatible with the surrounding environment (use SS316 or FRP in corrosive / marine service).

7. Thermal Expansion & Movement

FRP has a higher coefficient of thermal expansion (CTE) than steel. Indicative in-plane CTE: ≈ 12 × 10■■ /°C for molded grating and ≈ 5 × 10■■ /°C (longitudinal) for pultruded. Thermal movement must be accommodated to prevent buckling, binding or fastener failure.

Expansion gap: $\Delta L = L \times \alpha \times \Delta T$

- Example: 3.66 m molded panel, 50°C temperature range → ΔL = 3660 × 12×10■■ × 50 ≈ 2.2 mm.
- For runs longer than 6 m, install expansion joints every 6 m with a 10–15 mm gap.
- Use slotted holes (≈ 1.5 × bolt diameter) at one end of each panel to permit longitudinal movement.
- Never rigidly fix a panel at both ends — always leave one direction free to move.

8. Maintenance Schedule

Frequency	Inspection / Action
Daily	Walk-over visual check: no rocking panels, no loose protrusions, surface kept clear of spills and debris.
Weekly	Clean walkways of oil, water and build-up; check grit-top surfaces are not loaded with contamination.
Monthly	Inspect clips and bolts visually; check handrail stability, toe boards and cut-out edge protection.
Quarterly	Spot-torque 10% of clips; inspect edge banding and cut edges for damage; check expansion gaps are unobstructed.
6 months	Full re-torque of all fasteners to specification; check for relaxation after first thermal cycles.
Annual	Full structural survey: clip torque, surface wear, chalking, impact damage, handrail load test, record condition.
3–5 years	Deep clean / high-pressure wash; assess grit wear and plan re-coating or panel replacement where worn smooth.

9. Cleaning & Disinfection

FRP grating is non-absorbent and does not rust, making it easy to clean. Use water with a mild detergent; high-pressure washing up to ~100 bar is acceptable. Do not use wire brushes that will strip the resin-rich surface.

Industry	Cleaning Frequency	Compatible Agents
Food & beverage	Daily washdown	Neutral / alkaline detergents, quaternary sanitizers, steam (≤90°C)
Wastewater / chemical	Weekly – monthly	Mild acids / caustics within resin compatibility; fresh water rinse
Marine / offshore	Monthly	Fresh-water wash to remove salt deposit
Power / municipal	Quarterly	Water + detergent; remove grease and airborne deposits
General industrial	As required	Water + detergent; remove spills promptly

Avoid strong solvents (acetone, ketones, concentrated acids) unless the selected resin system is confirmed compatible. Always rinse after chemical cleaning. Refer to the Resin Selection Guide chemical-compatibility table before using aggressive agents.

10. Repair Procedures

10.1 Minor Crack / Chip Repair

- Clean and dry the area; abrade around the damage to a feather edge.
- Fill with matching resin paste (polyester / vinyl ester) mixed with appropriate catalyst.
- For structural cracks (through the load-bearing bar), replace the affected panel rather than patching.
- Cure per resin datasheet; sand and re-seal; touch up surface / grit where required.

10.2 Edge & Cut-Edge Repair

- If edge banding is lifting, re-bond with epoxy / polyester adhesive and re-fix with SS316 rivets at 200–300 mm centres.
- Recoat exposed cut edges with resin sealer; inspect for moisture ingress before re-sealing.

10.3 Panel Replacement

- Remove clips; lift out damaged panel; inspect support framing and clean the bearing surface.
- Fit a replacement panel of the same resin, thickness and surface; maintain bearing length and expansion gaps.
- Re-fit clips to the spacing table and torque to specification; seal any new cut edges.

11. Troubleshooting

Symptom	Likely Cause	Corrective Action
Loose clips / rattling	Fastener relaxation after thermal cycling	Re-torque to spec; check washers and clip type
Panel rocking / movement	Insufficient clips or wrong spacing	Add clips to spacing table; check bearing length
Excessive deflection	Overload or over-spanning	Verify load vs. span table; add supports
Surface wear / grit smoothed	High traffic abrasion	Re-coat grit or replace panel; inspect annually
White / chalky surface	UV weathering (cosmetic)	Wash down; cosmetic only — no strength loss
Panel buckling / lift	Insufficient expansion gap	Increase gap; fit slotted holes at one end
Local discolouration / softening	Chemical attack	Identify chemical; verify resin compatibility; replace resin grade
Bolt / clip corrosion	Wrong fastener material or galvanic couple	Switch to SS316 or FRP; fit isolation washers

12. Appendix: Quick-Reference Tables

12.1 Indicative Torque Table

Bolt Size	Typical Torque (steel)	Typical Torque (SS)	Edge Distance (min.)
M6	6 – 9 N·m	5 – 8 N·m	15 mm
M8	15 – 20 N·m	12 – 18 N·m	20 mm

Bolt Size	Typical Torque (steel)	Typical Torque (SS)	Edge Distance (min.)
M10	25 – 30 N·m	22 – 28 N·m	25 mm
M12	40 – 50 N·m	35 – 45 N·m	30 mm

12.2 Chemical Compatibility Quick Reference (indicative)

Service	Recommended Resin	Recommended Fastener
General indoor / dry	ZeAll ISO	Galvanized or SS304
Water / wastewater	ZeAll VE	SS316 or FRP
Strong acids / oxidisers	ZeAll VE / Novolac VE	SS316 or FRP
Food contact	ZeAll FDA	SS316
Marine / coastal	ZeAll VE (UV-stab)	SS316
High temperature >120°C	ZeAll Novolac VE	SS316 / alloy

13. Glossary & Abbreviations

Term	Meaning
FRP	Fiberglass Reinforced Polymer (fibre-reinforced thermoset plastic)
CTE	Coefficient of Thermal Expansion (per °C)
Tg	Glass Transition Temperature of the resin
Molded grating	Panels moulded in a grid with fibres wrapped around bars
Pultruded grating	Continuous fibre pultruded bars assembled into a grid
Bearing length	Length of panel resting on a support beam
Clip	Metal / FRP bracket that clamps a bar to the support
Toe board	Kick plate at platform edge preventing objects falling
COF	Coefficient of Friction

14. Receipt & Handover Checklist

Check Item	Pass / Fail
Quantity & sizes match order / drawings	■
Resin system & surface / colour as specified	■
No transport cracks, delamination or chipped corners	■
Material certificates / test reports supplied	■
All cut edges sealed / edge-banded	■
Bearing length 50 mm (molded) / 75 mm (pultruded)	■
Expansion gaps 3–5 mm (indoor) / 5–8 mm (outdoor)	■
Minimum 4 clips per panel; ≤1200 mm spacing	■
Handrail heights & toe boards per OSHA 1910.23	■

Check Item	Pass / Fail
Final torque verified & recorded	■
As-built drawings & maintenance log filed	■

15. Contact Information

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For technical support, custom fabrication queries or project-specific calculations, contact ZeAllgrate engineering: sales@izeall.com | +86-513-6681-9918 | No.888 Changtai Road, Nantong, Jiangsu, China.

Sources: industry technical catalog; FGMC (ACMA) installation guidelines; OSHA 29 CFR 1910.23 / 1910.27 Walking-Working Surfaces; ASTM D790 / D638 material standards; ZeAllgrate manufacturing quality procedures.