FRP Anti-Slip Surface Selection Guide

Surface types, coefficient-of-friction (COF) engineering data, grit selection and environment / industry-based anti-slip guidance for ZeAllgrate FRP grating.

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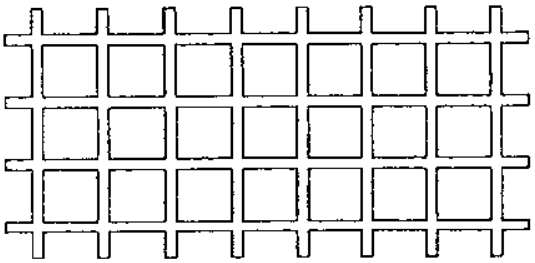



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1. Why Anti-Slip Matters

Slips, trips and falls remain one of the most common causes of lost-time injuries in industry. Wet, oily or contaminated walking surfaces sharply reduce traction. Modern safety guidance (OSHA / HSE style) requires walking-working surfaces to provide adequate traction, commonly expressed as a minimum coefficient of friction (COF) of about 0.5 under the relevant wet condition. Selecting the correct anti-slip surface is therefore a direct safety decision, not an aesthetic one.

- Target: minimum wet COF ≈ 0.5 for general walkways; higher for ramps, stair nosings and offshore decks.
- COF depends on surface texture, contaminant, shoe sole material, and test method — always compare values from the same test.
- Open mesh already improves drainage; the surface finish determines residual traction once water or oil sits on top.

2. Surface Types

Surface	Construction	Appearance	Best Traction
Smooth	Flat resin meniscus, no texture	Flat, clean-looking	Dry only
Concave (dished)	Dished / dimpled meniscus formed in moulding	Recessed channels	Dry / moderate wet
Convex	Raised rounded protrusions on top	Bumpy texture	Dry / moderate wet
Grit-top	Abrasive grit broadcast into wet resin before cure	Rough, sandy	Wet / oily / icy
Covered grit	Solid cover plate bonded to grating + grit-top finish	Closed, rough deck	Wet / spill containment

Concave is the standard moulded surface and drains water off the walking plane. Grit-top provides the highest traction because the abrasive particles still bite through a thin film of water or oil. Smooth is reserved for hygiene-critical cleanroom / food-contact areas where texture would trap contamination.

3. COF Engineering Data

Indicative COF values (typical; dry rubber sole reference). Actual values vary with test method, sole material, contaminant and surface condition. Common test methods: ASTM D2047 (James Machine), ASTM F1677 (Mark III), ASTM F2913 (tribometer / BOT-3000), ISO 13287 (footwear slip resistance).

Surface	Dry COF	Wet (water)	Wet (oil/grease)	Slip Risk
Smooth	0.50 – 0.65	0.30 – 0.45	0.15 – 0.25	High (wet)
Concave	0.70 – 0.85	0.50 – 0.65	0.30 – 0.45	Moderate
Convex	0.65 – 0.80	0.45 – 0.60	0.25 – 0.40	Moderate
Grit-top (silicon carbide)	0.85 – 1.00	0.70 – 0.85	0.50 – 0.65	Low
Grit-top (aluminium oxide)	0.80 – 0.95	0.65 – 0.80	0.45 – 0.60	Low
Covered grit	0.85 – 0.95	0.65 – 0.80	0.45 – 0.60	Low

Interpretation: COF > 0.6 good (dry); COF > 0.5 acceptable (wet); COF < 0.4 high slip risk. For continuously wet or oily service, grit-top is strongly recommended.

4. Grit Types & Grades

Grit	Hardness	Grades	Wear Life	Notes
Silicon carbide	Very high	Fine / medium / coarse	Longest	Sharpest particles; best wet/oily grip
Aluminium oxide	High	Fine / medium / coarse	Long	Tough, durable; good all-round grit

- **Fine** grit: comfortable underfoot, suitable for trolleys / wheeled traffic; moderate traction.
- **Medium** grit: general-purpose balance of traction and comfort; most common.
- **Coarse** grit: maximum traction for offshore / ramps; harsher underfoot and may catch trolley wheels.
- Grit wear life is typically 5–10+ years depending on traffic and contaminant; inspect annually and re-coat where smoothed.

5. Selection by Environment

Environment	Recommended Surface	Reason
Indoor dry walkway	Smooth / concave	Traction adequate; easy clean
Periodically wet	Concave / grit-top	Drainage + reserve grip
Continuously wet	Grit-top (medium)	Highest wet COF
Oily / chemical spill	Grit-top (coarse)	Grit bites through oil film
Food / washdown	Smooth + grit step nosing	Hygienic flat deck; grip on stairs
Offshore / deck	Grit-top (coarse)	Wet, salt, deck movement
Ramps & stair nosings	Grit-top	Elevated slip risk on incline
Outdoor / icy	Grit-top	Residual grip under thin ice / water

6. Selection by Industry

Industry	Recommended Surface	Typical Notes
Chemical processing	Grit-top (SS316 fasteners)	Acid / solvent spills; washdown
Wastewater treatment	Grit-top or concave	Wet, H■S, chlorine vapour
Food & beverage	Smooth + grit nosing	Hygiene; daily washdown
Offshore / marine	Grit-top coarse	Salt spray, wet deck, movement
Power / substation	Concave / grit-top	Non-conductive FRP; dry substation areas
Marine / ship decks	Grit-top	Wet, deck movement, safety
Municipal / public	Concave / convex	General foot traffic, aesthetics

7. Maintenance of Anti-Slip Surfaces

- Keep surfaces clean: oil, grease and trapped dust build-up reduce COF on any surface.
- Wash with water + mild detergent; high-pressure wash ≤ 100 bar to remove contamination.
- Do not use wire brushes that strip the resin-rich / grit layer.

- Inspect grit annually: where grit has worn smooth (visible shiny resin patches), plan re-coating or panel replacement.
- Re-coating: abrade, clean, broadcast fresh grit into a fresh resin coat, cure and de-shine.
- Re-test COF after major cleaning or re-coating if the installation is safety-critical.

8. Surface Comparison Summary

Criterion	Smooth	Concave	Convex	Grit-top
Dry traction	Low	Good	Good	Excellent
Wet traction	Low	Moderate	Moderate	Excellent
Oily traction	Very low	Low	Low	Good
Cleanability / hygiene	Excellent	Good	Good	Moderate
Wheel / trolley friendliness	Excellent	Good	Good	Moderate–poor (coarse)
Relative cost	Lowest	Low	Low	Higher
Typical life before re-coat	n/a	15+ yrs	15+ yrs	5–10+ yrs grit

9. Slip-Resistance Test Methods

Standard	Method	Typical Use
ASTM D2047	James Machine (lab, dry)	Static/dry floor COF rating
ASTM F1677	Mark III portable slip tester	Wet/dry on-site walkway measurement
ASTM F2913	Tribometer / BOT-3000	Quantitative wet/dry COF on-site
ISO 13287	Footwear vs. sole reference	Footwear slip resistance (combined surface)

- Test the actual installed surface with its contaminant — lab COF on a clean panel does not predict oily-deck performance.
- Always compare surfaces measured by the same method; numbers across methods are not directly interchangeable.
- For safety-critical areas (ramps, stair nosings, offshore decks), require a wet COF test before acceptance.

10. Specifying & Ordering Notes

- State surface finish explicitly on the order: smooth / concave / convex / grit-top (fine / medium / coarse) / covered grit.
- State grit type (silicon carbide vs. aluminium oxide) and grit grade.
- For hygiene-critical areas, specify smooth deck plus grit nosing on stairs rather than full grit-top.
- Grit-top is available on both molded and pultruded grating; confirm thickness and resin system together with the surface.
- Samples are available before production for traction and appearance approval.

11. 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: ASTM D2047 / F1677 / F2913 slip-resistance test methods; ISO 13287 footwear slip resistance; OSHA / HSE walking-surface guidance; FGMC (ACMA) surface-finish guidelines; ZeAllgrate internal test data.