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Industry Recommendations for Installation and Maintenance of FRP Grating

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Industry Recommendations for Installation and Maintenance of FRP Grating

The Fiberglass Grating Manufacturers Council (FGMC) provides the following recommendations to preserve and maintain the function, safety, and appearance of Fiberglass Reinforced Polymer (FRP) grating. Refer to the *ANSI/ACMA/FGMC FRP Composites Grating Manual for Pultruded and Molded Grating and Stair Treads* for additional information:

www.acmaeducationhub.org

FRP Grating Arrangement

Bearing Bar Direction and Support

Pultruded grating and rectangular mesh molded grating have a bearing direction, as does steel bar grating. Square mesh molded grating is bi-directional and can be installed in either direction.

The bearing surface shall support each end of all bearing bars of a grating panel, including stair tread nosing. FRP grating panels require a minimum bearing surface of 1 inch (25 mm). Using a 1½ inch (38 mm) bearing surface combined with a ¼ inch (6 mm) clearance at each end of a panel ensures 1 inch (25 mm) bearing surface is maintained if the panel happens to shift (*see* Figure 1). Prior to lay down, ensure bearing surfaces are clean and smooth.

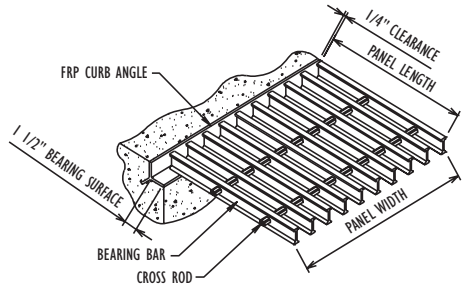

Figure 1 – Pultruded grating with curb angle support.

FRP Grating Arrangement

Panel Clearance

Adjacent panels typically have zero gap at cross rods and grating panel width should be adjusted so that trimmed cross rods are 1/2 the open space dimension (*see* Figure 2). This provides a uniform bar spacing for pultruded panels and prevents lateral movement (*see* Figure 2 and Figure 4). For best appearance, align pultruded bearing bars and cross rods or molded pattern of adjacent panels.

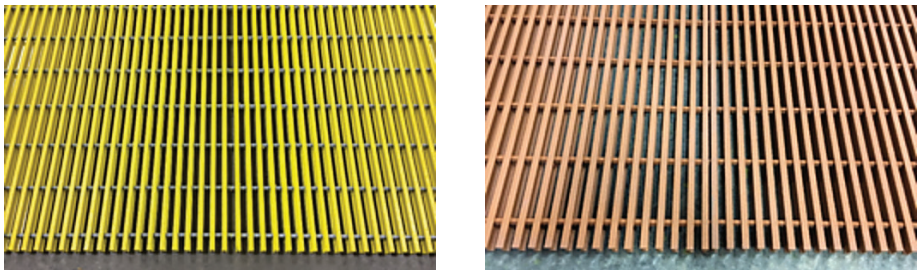

Figure 2 – Adjacent panels with and without proper bar spacing at seam.

The typical installed panel end to panel end clearance on all gratings is ¼ inch (6 mm) (Figure 3A). To address minor irregularities of wall surfaces, the recommended maximum clearance between bearing bar ends and vertical surface is ½ inch (12 mm) (*see* Figure 3B). The maximum clearance of bearing bars parallel to vertical surface should not exceed the open dimension of the grating (*see* Figure 3C). For areas requiring a restricted opening (tool drop), trim panels to meet this criterion.

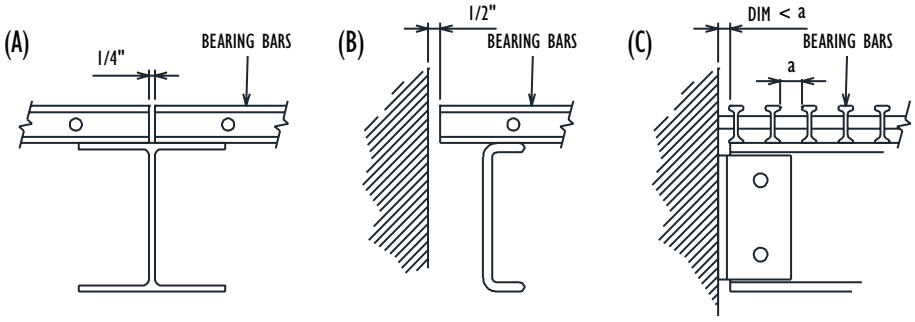

Figure 3 – Grating Clearances: (A) panel end to panel end; (B) bar ends against vertical surface; (C) cross rods against vertical surface.

FRP Grating Arrangement

Panel Clearance (cont'd.)

Figure 4 – Boardwalk installation with recommended panel clearances.

FRP Grating Installation

Personnel

Installation personnel should be familiar with these fabrication guidelines and the specific installation procedures provided by the grating manufacturer. Installation personnel should also be familiar with and follow the operation and safety procedures of the tools used. Personnel should observe all safety precautions as stated in the grating Safety Data Sheets (SDS).

Personal Protective Equipment (PPE):

- Safety glasses or face shield
- Sturdy gloves
- NIOSH N95 dust mask
- Long sleeve shirt
- Earplugs/earmuffs
- Hard hat
- Foot protection

Figure 5 – Typical Personal Protective Equipment.

FRP Grating Installation

Handling

Treat FRP grating panels with the care one would use for plywood. Individual panels can usually be lifted and hand carried by workers. Wear gloves when handling FRP grating. Heavy or multiple panels will need mechanical assistance to lift and transport safely. Do not use wire rope to lift panels, as the wire rope can slip and damage the panels. Instead, protect the grating with wood blocks or heavy cardboard and use nylon web straps. Use care with fork trucks and do not damage the web or underside of the grating with the forks.

Fabrication

Perform grating fabrication with the proper tools:

- Straight and long cuts – circular saw with straight edge guide (*see* Figure 6).
- Curvilinear cuts, openings for penetrations, irregular notches, or various small cuts – jig saw (*see* Figure 7).
- Abrasive saw blades, typically used for masonry, perform best – gritted or diamond (30-60 grit size).

Coarse tooth blades designed for metal or wood do not cut FRP well, may damage the product, or may break during the cutting process.

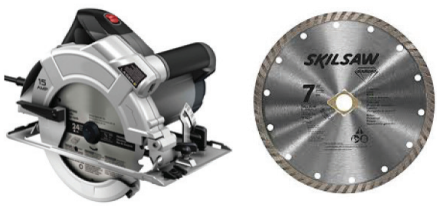

Figure 6 – Circular saw and abrasive saw blade.

Figure 7 – Jig saw and abrasive saw blades.

Pultruded grating differs from steel grating with regard to dimensions. In the bearing direction, there are infinite possibilities for length. While we do not recommend cutting longitudinally through a cross rod, it is sometimes necessary. This situation will not affect the panel integrity. Adjust panel width and make longitudinal cuts on one side of the bearing bar or the other, keeping all bearing bars intact. Cutting any pultruded or molded bearing bar in the longitudinal direction is not recommended.

FRP Grating Installation

Fabrication (cont'd.)

Make all field cuts smooth and uniform, using tools, blades, and cutting procedures as recommended herein. Follow the grating manufacturer's standard for sealing of cuts. The installer should take advantage of the longest and widest panels possible. Generally, large panels: a) provide a cleaner installation, b) require fewer hold down clips and fasteners compared to multiple smaller panels for an equivalent area, c) involve less labor, and d) provide better performance due to multi-span conditions.

Installers may choose to cut penetrations within an uncut grating panel or they may seam the penetration with two panels (*see* Figure 8). Seamed penetrations may result in narrow panels with the potential for increased deflection. Use panels with a minimum width of 12 inches (300 mm). The installer may use panel connectors, a trimmer bar (an FRP bar or angle installed under the abutment of two gratings and held in place with hold down clips), or similar means to minimize differential deflection between these seamed panels.

Figure 8 – Grating section removed for pipe penetration.

Attachment

When placing grating, do not force the grating into position using pry bars, hammers, or any other item that may damage the grating. Accurate field dimensions and fabrication should alleviate this situation.

Attach all grating panels to the structure with two hold-downs at each support and a minimum of four per panel. Do not share fasteners between adjacent panels. Tighten grating fasteners to the manufacturer's specification. Over tightening (particularly with "M" clips) can deform the clip and cause surface trip hazards or premature loosening (*see* Figure 9).

FRP Grating Installation

Attachment (cont'd.)

Figure 9 – Typical grating attachment: "M" clip for molded grating; Saddle clip for pultruded grating; and G-clip for square mesh grating.

G-clips do not require drilling or tool access beneath grating panels (*see* Figure 9). G-clip installation for square mesh molded grating requires at least one bar to be cut and removed. This allows the clip jaw to slide under the mounting flange. There are some cases where the cross rod on pultruded grating is required to be cut for G-clip installation. These cuts must be made in the field by the installer and do not affect grating performance. FRP grating subjected to uplift forces require special attention and may require other attachment methods. Consult with the grating manufacturer for specific attachment requirements.

Stair tread supports shall be of sufficient length to engage the nosing and all bearing bars. Maximum clearance between the tread and stair stringer is ¼ inch (6 mm). All stair treads shall be securely fastened to the stair stringer tread support with a minimum of 4 fasteners. To prevent any displacement due to lateral loads and clamp slippage, use only through-bolted fasteners on stair treads. Do not use clamp-style fasteners (G-clips) to secure stair treads.

All stair treads and landings should have an appropriate nosing that provides a cover and protection to the front of the tread or landing front without obstructions. The nosing may be integral with the stair tread or landing, or attached with stainless steel fasteners (through-bolted). All nosing should have an anti-slip surface based on the full width of the stair tread.

At all transition points, the adjacent surface must be level with, or slightly higher (maximum $^{1}/_{16}$ inch or 2 mm) than the FRP grating. The FRP grating installed higher than adjacent surfaces will cause premature wear of the exposed edge.

FRP Grating Maintenance

Periodic Inspection

After final installation, grating panels and stair treads should be inspected as part of a regular maintenance program. As a minimum, verify hold down clips are flush and fasteners are secure, panels are undamaged, and surface grit is adequate.

Temporary Operations

Protect grating from possible construction damage. Place items with small footprints, such as scaffold poles and cabinet supports, on blocks with larger dimensions. Do not drag objects across the grating. Heavy or irregular shaped objects should have plate (steel, wood, FRP) between the object and the grating. Cover high traffic areas (walkways and stairs) during construction with plate (wood, FRP, matting). Use a pneumatic wheeled cart to transport items. When working with chain, place plate over the work area to prevent chain links from tangling in the grating bearing bars. Forcefully removing a tangled chain may damage the grating. Never hang heavy objects from the grating with a strap wrapped between the bearing bars. Instead, use a bracket or an eyebolt connected to a plate to apply load to the top of the grating.

Do not weld or perform other hot work above or adjacent to unprotected FRP grating. If these operations are unavoidable, provide a suitable cover to protect FRP grating from spatter or other detriments. Exposure to excessive heat will degrade the properties of grating and lead to premature failures. If FRP grating is burnt or charred, consult the manufacturer to determine if repair or replacement is required.

Cleaning Procedures

Improper chemicals, temperatures, and pressures may soften or remove the grit surface.

GENERAL CLEANING may be performed at a frequency determined by the volume and type of traffic:

- Sweep dirt and dust – these contaminants can act as an abrasive and wear the surface under traffic.
- Immediately mop up or rinse away spills. Spills are not only a safety hazard, but also some chemicals can soften or stain the coating if not immediately removed. The concentration of splash and spills of some chemicals may increase to a higher concentration due to evaporation if the spills are not neutralized immediately.

FRP Grating Maintenance

Cleaning Procedures (cont'd.)

PERIODIC CLEANING may be performed to remove contaminants that accumulate and which general cleaning practices will not remove:

- At regular intervals, wash the grating with mild cleaning solutions such as an alcohol base (Windex), alkali such as tri-sodium phosphate (Simple Green), or similar detergents.
- Do not use abrasives. Depending on the surface, cleaning is best performed by scrubbing with a soft bristle brush either mechanically or by hand, or moderate pressure washing.

Figure 10 – Pressure washing grating panels.

- Keep water pressure below 1,000 psi, using a standard 40° white nozzle (*see* Figure 10). Sweep the water in a continual motion as one would wash an automobile, keeping the water blast about 12 inches from the surface and not in any one spot for more than several seconds. Very high pressure and close proximity can cause damage.
- Cleaning solutions, including high-pressure water should be at ambient temperature and not exceed 115°F (45°C). Excessive temperature can cause coating to soften.
- Remove all residual cleaning solutions from the grating surface by thorough rinsing or wet vacuum.

For unique situations or items not addressed herein, consult the FRP grating manufacturer for recommendations.

NOTES

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