

FIBERGRATE ENGINEERING BRIEF

Converting Steel Grating Specifications to FRP Specifications

For many years steel grating has been the primary product used and specified on most industrial applications. However, since 1966, FRP grating and its benefits have more and more become the product of choice when specifying. Unfortunately, engineers tend to write their specification calling out Fibergrate's FRP grating, but fail to change the load specification requirements to optimize the use of our materials.

Most often the specification is for a steel grating with a uniform load of 125 pounds per square foot (psf) and a maximum deflection of 1/4". This specification requires a deeper, more expensive fiberglass product than would be necessary because the actual usage of the grating is not being considered.

Why is steel grating specified at 125 psf with a maximum deflection of 1/4"?

1. If steel grating is deflected (bent) more than 1/4" on a 36" clear span it will yield or stay bent when the load is removed. This constitutes failure in the steel product, and because it is bent, a tripping hazard exists. Because the steel, or aluminum grating, will yield at this low deflection, the maximum allowable deflection must be limited to 1/4" maximum.
2. Engineers routinely build safety factors into their specifications. Since there is no safety factor at the 1/4" deflection, the engineer must provide the safety factor in the loading criteria. Typically a load of 125 to 150 psf is chosen since a floor cannot be loaded with people to a level of more than 50 to 65 psf. This provides a 2 or 2.5 safety factor in the design specification for steel and aluminum gratings. An example of this is an elevator. Normally an elevator is 5' x 6' and has a load limit of about 1800 to 2100 pounds or 12 to 14 people. This equates to about 60 to 70 psf. Certainly a crowded elevator would not make a comfortable nor typical work platform situation. Even a platform covered with 55 gallon barrels, full of water, only generates a uniform distributed load of 110 psf.

High rise office buildings are designed to only 40 psf per building code. Fibergrate recommends that work platforms be designed to a more conservative 50 to 65 psf if being used as access or work platforms.

FRP grating, especially square mesh molded products, can be deflected up to 3" on a 36" span without structural failure. Our safety factor is obtained from the fact that our product does not yield when deflected beyond 1/4". Because of this characteristic, Fibergrate recommends that the deflection criteria be set at 3/8" which still provides an 8 to 1 safety factor (for this example). Therefore, Fibergrate's recommended load specification for work surfaces is 50 psf with a maximum deflection of 3/8".