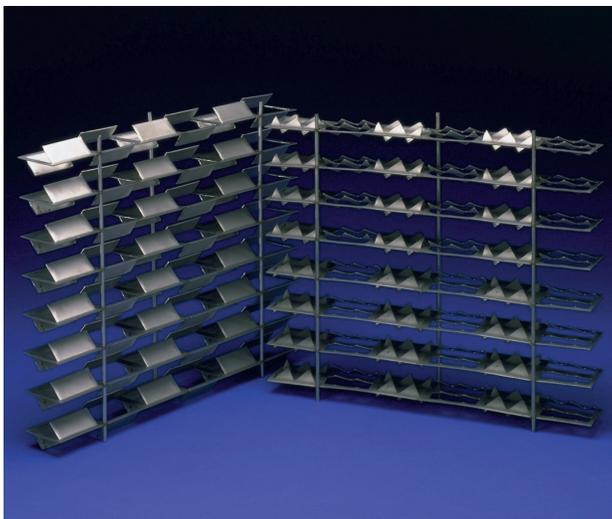


FLEXIGRID® and GLITSCH GRID® Structured Packing

FLEXIGRID and GLITSCH GRID structured packings are specifically designed to provide reliable operation in severe services that are susceptible to fouling, erosion, coking and high solids content.

There are three distinct styles of FLEXIGRID structured packing - FLEXIGRID packing styles 2, 3 and 4. Style 2 is optimized for maximum capacity, low liquid holdup and minimum pressure drop and provides the greatest fouling resistance. Style 3 provides improved efficiency because it has a larger projected area perpendicular to the gas flow (causing higher localized vapor velocities). Style 4 provides a greater specific surface area and higher heat transfer performance. GLITSCH GRID EF25A structured packing was one of the first grid packings ever applied and is still widely used in refineries around the world.



FLEXIGRID® Style 3 High Efficiency Packing (Left) and FLEXIGRID® Style 2 High Capacity Packing (Right)

FLEXIGRID structured packing is constructed in 60" [1524 mm] long x 16" [406 mm] wide x 2.75" [70 mm] tall modules. The vertical, parallel blades of the packing are held in a fixed position with welded cross members. GLITSCH GRID EF25A packing is constructed in 60" [1524 mm] x 15" [381 mm] x 2.125" [54 mm] resistance welded modules. During installation in the tower, each successive layer of the grid packing is rotated 45 degrees to the previous layer to achieve improved efficiency and enhance bed integrity.

Fouling and Coking Resistance

Blades of FLEXIGRID packing are bent out at an angle from the vertical to induce turbulent contact between the rising vapors and descending liquid. There are no horizontal surfaces on the packing so that the packing can drain freely and liquid and solids do not collect. This minimizes liquid residence time (or liquid holdup) which reduces the potential for coking.

Coking in the wash zone of refinery fractionators (as well as polymerization in many other refinery and petrochemical applications) is often caused by dry-out due to vaporization from under-irrigated packing. Adequate wetting of the packing is required to ensure that the packing is continually flushed clean. This allows for the removal of particles that can otherwise collect and begin the formation of coke in this high temperature environment. The low surface areas of FLEXIGRID and GLITSCH GRID packings allow for excellent wettability at low liquid rates -- meaning that the packing can remain adequately wetted at lower liquid rates.

The large blade spacing provides large flow channels through the grid so solid particles can be more easily passed.

Corrosion and Erosion Resistance

FLEXIGRID and GLITSCH GRID packings are typically manufactured from 16 gauge [1.5 mm] material, but upon request are also available in 14 gauge [2 mm]. The standard 16 gauge [1.5 mm] packing thickness is 7 - 15 times thicker than conventional sheet metal structured packings and 3 - 5 times thicker than a typical random packing. This increased packing thickness gives the packing a significantly greater life in corrosive and/or erosive systems.

Materials of Construction

Koch-Glitsch grid packings are available in a wide variety of materials including:

- Carbon Steel
- Stainless Steels, including Austenitic, Ferritic, Martensitic; types 410/430, 304, 316 and 317 are readily available
- Duplex Stainless Steel
- Nickel Alloys

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Resistance to Upsets

Both the increased packing thickness and welded construction provide a rigid framework that makes the packing very strong and resistant to damage during upsets. The top three layers of the grid are normally “J”-bolted together for increased mechanical strength. No other retaining device is usually required because of the high open area and low pressure drop of FLEXIGRID and GLITSCH GRID packing.

When additional uplift protection is required, the entire FLEXIGRID or GLITSCH GRID packing bed can be held together with tie rods to form a continuous structure which is highly resistant to mechanical damage and upset.

High Capacity and Low Pressure Drop

FLEXIGRID and GLITSCH GRID packings have an extremely high open area and thus provide higher capacity and lower pressure drop than other packings (or trays). As a result, FLEXIGRID and GLITSCH GRID packings are used in pumparound of refinery fractionator vacuum columns to increase throughput and minimize column pressure drop.

| FLEXIGRID® & GLITSCH GRID® | | FG 2 | FG 3 | FG 4 | EF25A |
|-------------------------------------|----------------------------------|------|------|------|-------|
| Specific Surface Area ¹⁾ | ft ² /ft ³ | 13.7 | 13.7 | 20.4 | 11.3 |
| | m ² /m ³ | 45 | 45 | 67 | 37 |
| Packing Weight ²⁾ | lb/ft ³ | 16.4 | 16.4 | 24.2 | 15.1 |
| | kg/m ³ | 263 | 263 | 387 | 242 |
| Layer Height | inch | 2.75 | 2.75 | 2.75 | 2.125 |
| | mm | 70 | 70 | 70 | 54 |

1) Relative mass transfer efficiencies are highly dependent on packing geometry (blade design and angles) and can not be accurately predicted using relative differences in the specific surface areas.

2) Packing weight is dependent on packing thickness and material type.

**Droplet Removal Efficiency at V = 10.3 ft/sec [3.1 m/s] (C_s = 0.36 ft/s [0.11 m/s])
~12” [300mm] Thickness**

