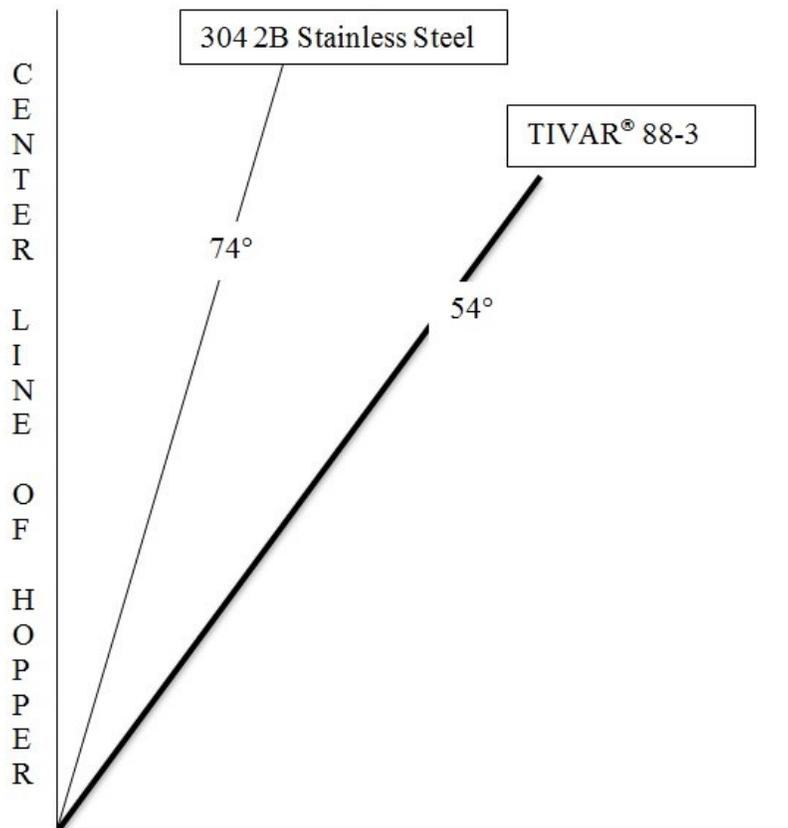


TIVAR® 88-3

TIVAR® 88-3 has the lowest coefficient of friction surface of any UHMW-PE material, for bulk material handling applications. The claim of having the lowest coefficient of friction surface is based on independent testing using the Jenike Direct Shear Tester ASTM test method D6128-00. The Jenike Shear Tester is a test method which measures the coefficient of friction of surfaces through the direct application of bulk materials. The resulting data is converted into wall friction angles required to achieve mass flow discharge (see chart below). Mass flow discharge is characterized as a “first-in, first-out” flow pattern, in which all the bulk material in a storage silo, bunker or hopper is in movement when any material is withdrawn. This flow pattern results in a fully live storage vessel, with no stagnant regions. Mass flow discharge is an ideal flow pattern for cohesive bulk solids that are susceptible to ratholing and core flow. TIVAR® 88-3 is available in sheet sizes of 4' x 10' , in thicknesses of 1/4", 3/8" and 1/2", with custom oversized butt welded shapes available.



Wall Friction Angle Chart



Sloping Wall Angles to Achieve Mass Flow Discharge with PRB coal as measured by the Jenike Direct Shear Tester ASTM test method D6128-00.

Mechanical Properties

| Value | Test Method | English |
|----------------------------------|-------------|-----------------------------------|
| Hardness Shore D | ASTM D 2240 | 64 |
| Tensile Break | ASTM D 638 | 5481 psi |
| Tensile Modulus | ASTM D 638 | 96976 psi |
| Elongation @ Break | ASTM D 638 | 104502 psi |
| Izod Impact | ASTM D 4020 | 45ft.-lbs./in ² = 45.2 |
| Static Friction | ASTM D 1894 | 0.16 |
| Dynamic Friction | ASTM D 1894 | 0.08 |
| Coefficient of Thermal Expansion | ASTM D 696 | 0.00011 |



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TIVAR® the seal of quality.

TIVAR® 88-3

TIVAR® 88-3 Polymer Liners for Improving the Flow of FGD Gypsum

Flue Gas Desulfurization gypsum (FGD gypsum) is a bulk material capable of developing a negative angle of repose. FGD gypsum can be characterized as an extremely cohesive bulk material that can adhere to vertical surfaces, building-up on small ledges, box corners, shallow angle plate work and minor surface protrusions or interruptions.

As a result of its cohesive strength FGD can plug-off transfer points and chutes within seconds, making the conveyance of this bulk material extremely challenging. The geometric construction of transfer chutes and hoppers that convey FGD gypsum is an important element of effective design. Geometry that incorporates shallow wall angles, box corners, valley angles, square and rectangular shapes with high friction surfaces materials is a major contributor to issues such as plugging, bridging, arching and loss flow.



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TIVAR® 88-3 liners are an excellent choice for addressing the flow problems associated with conveying FGD gypsum. TIVAR® 88-3 liners offer a low coefficient of friction non-stick surface which significantly reduces the ability of FGD gypsum to stick and build-up on the interior surfaces of hoppers, flop gates, diverters, transfer housings, chutes, belt cleaners, and return idlers. TIVAR 88-3 is also corrosion resistant and chemically inert, which eliminates problems with excessive steel rust and corrosion.

By taking advantage of the flexibility of TIVAR® 88-3 liners Lawrence Industries offers pre-fabricated liner kits, fabricated drop-in inserts or complete polymer chutes and hoppers. These design options serve to improve the reliable flow and discharge of FGD gypsum by using round and radius surfaces with welded seams and minimal surface penetrations.