

Linebacker

Ultra-High Molecular Weight Polyethylene ... UHMW = 6 Million

LINEBACKER is an Ultra-High Molecular Weight (6,000,000) Polyethylene wear sheet, which is glass bead filled and chemically crosslinked. This provides 60 to 100% greater wear resistance and improved dimensional stability, as compared with competitive non-filled and crosslinked UHMW-PE products.

EASY TO HANDLE

Linebacker can be drilled, punched, saw cut, and machine lathed. In addition, its reduced weight – when compared to steel – makes installation far easier than before. Compare the weights in the chart for popular thicknesses.

48" x 120"	Linebacker	Carbon Steel
1/4"	50 lbs.	408 lbs.
3/8"	75 lbs.	613 lbs.
1/2"	100 lbs.	817 lbs.

ABRASION RESISTANT

Excellent results in extreme sliding abrasion applications. Compare the Sand Slurry Test* results in the chart below with other popular wear materials.

Test Material	Carbon Steel
Linebacker	7
Virgin UHMW-PE (Unfilled)	15
Polyurethane (D -70)	31
AR Wear Steel	52
TFE	72
304 Stainless Steel	84
Polycarbonate	96
Carbon Steel	100

*Material samples were rotated for 24 hours at 1750 RPM in a 50% sand slurry solution. Weight loss was measured and compared to carbon steel, which was assigned an abrasive rating of 100. (The lower the abrasive rating, the better the material survived the test.)

CHEMICAL RESISTANT

Linebacker remains unaffected in corrosive environments. It effectively resists a variety of reagents over a broad temperature range and has almost zero water absorption.

Compare your specific problem area with the results of tests conducted on dumb-bell type samples of UHMW immersed in the following solutions for 30 days:

	20° C	50° C	80° C
INORGANIC ACIDS			
Chromic Acid (80%)	+	+	/
Hydrochloric Acid (100%)	+	+	+
Nitric Acid (20%)	+	+	/
Phosphoric Acid (85%)	+	+	+
Sulfuric Acid (50%)	+	+	+
ALKALIS			
Potassium Hydroxide Solution	+	+	+
Sodium Hydroxide Solution	+	+	+
AQUEOUS SOLUTIONS OF INORGANIC SALTS			
Aluminum Chloride	+	+	+
Ammonium Nitrate	+	+	+
Calcium Chloride	+	+	+
Sodium Chloride	+	+	+
Sodium Hypochlorite	+	+	+
Zinc Chloride	+	+	+
ORGANIC ACIDS			
Acetic Acid (99%)	+	+	/
Butyric Acid	+	+	
Citric Acid	+	+	+
Formic Acid	+	+	
Oleic Acid	+	+	/
HYDROCARBONS & HALOGENATED HYDROCARBONS			
Diesel Oil	+	+	/
n-Heptane	+	+	
ALCOHOLS, KETONES, ESTER & AMINES			
Acetone	+	+	
Aniline	+	+	/
Benzyl Alcohol	+	+	+
Butyl Alcohol	+	+	+
Cyclohexanol	+	+	+
Ethanol	+	+	
Ethyl Acetate	+	+	
Glycerine	+	+	+
Lauryl Alcohol	+	+	+
Propyl Alcohol	+	+	+

+ % resistant
/ % limited resistant
- % not resistant

mechanical properties not appreciably affected
decrease in yield strength and ultimate tensile strength less than 20%
decrease in yield strength and ultimate tensile strength greater than 20%

Linebacker

Linebacker has been used successfully in the following applications and industries:

APPLICATION	Concrete	Sand	Aggregate	Coal Preparation	Coal Handling	Pulp & Paper	Coal Storage	Metals Processing	Mining
Air Separator Covers	●							●	●
Baffles	●			●				●	●
Barrel Liners	●							●	
Belt Wipers & Scrapers		●	●	●	●	●	●	●	●
Bin Liners	●	●	●	●	●		●	●	●
Breaker Plates								●	
Bucket Housings	●	●		●	●		●	●	
Bucket Liners			●	●	●		●	●	●
Bumper Plates						●			
Bunker Linings	●	●			●		●	●	●
Centrifuge Liners				●				●	
Chain Guides & Raceways	●	●	●			●			●
Chemical Separators								●	
Chute Liners	●	●	●	●	●		●	●	●
Cladding								●	
Conveyor Troughs		●	●	●	●	●	●	●	●
Cyclone Liners			●	●				●	
Deflector Foils						●			
Disc Filter Wipers		●							
Distributor Sleeves		●							
Doctor Blades						●		●	
Drum Liners		●	●					●	
Duct Liners			●					●	●
Dump Car Liners					●		●	●	
Exhaust Nozzles	●			●				●	
Filter Plates & Liners		●		●				●	
Filter Scrapers & Wipers		●		●				●	
Flume Liners				●				●	
Froth Scrapers & Wipers				●				●	
Froth Plates & Liners				●				●	
Gate Liners & Guides			●		●		●	●	●
Hopper Liners		●	●	●	●		●	●	●
Idler Rollers & Pulleys	●	●	●			●			●
Laundry Liners									
Mixer Baffles & Blades	●								
Mixer Liners	●							●	
Mill Impact Plates				●				●	
Noise Abatement	●	●	●	●	●	●	●	●	●
Rail Car Liners								●	
Shakers		●	●					●	
Sluice Liners		●	●						
Slurry Liners		●	●	●					●
Trough Liners	●	●			●		●	●	●
Truck Bed Liners					●		●		
Washer Liners		●	●	●		●		●	●

FRICION FREE

Linebacker's low coefficient of friction and self-lubricating characteristics reduce sticking and bridging ... even with fine, wet material. Sticky materials like wet coal or sand won't hang up, thereby lowering material handling costs.

In cold weather, material has less tendency to stick or cake. Under normal operating conditions, Linebacker's super slick surface means material will move faster, regardless of how dry or wet it may be.

APPLICATION ANALYSIS

To determine if you have a liner problem that Linebacker could solve, we suggest you review three general types of abrasion:

A. **Sliding:** Flowing or moving materials abrade (plow away) the fine particles of the substrate; such as:

1. Vibrating feeders
2. Chutes
3. Wear Plates
4. Drag Flite Conveyors

*Excellent Linebacker application.

B. **Light Impact:** Sharp-edged materials drop onto the substrate, creating a tumbling action or turbulence which causes cuts and punctures with subsequent failure of the substrate; examples are:

1. Flat Backs
2. Elbows
3. Transfer Points
4. Drop Points

*Small scale Linebacker test first.

C. **Heavy Impact:** Chunks of material weighing 5 lbs. or more are dropped or dumped onto the substrate. Stresses are so great that the substrate is literally ripped apart; examples are:

1. Barges
2. Dump Trucks
3. Mine Cars
4. Rail Cars

*Consult Astralloy Engineering

Normally, Linebacker's cost-effectiveness must be carefully considered if any of the following conditions prevail:

1. Operating temperature over 180°F.
2. Material exerts a continuous force on the substrate of more than 550 psi.
3. Granules are larger than 2 – 3" in diameter and of high hardness.
4. Granules are of high hardness, in dry environment, sharp, and moving at high velocities through 90 degree elbows.

FABRICATION

Sawing: Saw blades of 3 skip tooth type with a wide kerf (1/8" to 3/16") running between 52 and 110 feet per second or carbide circular saw blades with 3/16" kerf run at speeds of 170 to 220 feet per second are most suitable. The higher the cutting speed, the cleaner the cut will be.

Machining: Keep machining speeds between 152.5 and 220 feet per second. Chip breakers are very helpful, as is a coolant to prevent warpage. Cutting angles can be varied up to 25 degrees and the clearance angle from 6 to 16 degrees.

Drilling: If using high speed drills, use a coolant to prevent warpage. The tool selected should give enough clearance for a high degree of swarf removal.

Planing: Both wood planes and metal shapers at high speeds result in good surface finishes.

FASTENING TIPS

There are three methods that have proven effective and relatively easy to use in the field:

Power Actuated: This versatile and fast method works well on concrete and steel substrates. It is recommended that 1 ¼" to 1 ½" studs, R23 washer and red charge be used on steel substrate.

Elevator Bolt: This method is one of the easiest where ease of installation and removal are both a consideration. Various industries report equal success, whether the bolts are flush mounted or countersunk.

Plug Weld: When the application does not allow drilling into substrate, plug welding provides the flexibility required.

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THERMAL STABILITY

Linebacker's properties remain stable over a wide temperature range: from -250° to +185° F. Due to its thermoplastic characteristics, some warpage is normal, although proper spacing of fasteners keeps the effects to a minimum. To approximate linear expansion, only three items are necessary:

- a = Highest anticipated operating temperature (°F)
- b = Lowest anticipated operating temperature (°F)
- c = Length of Linebacker sheet to be used (inches)

$$[(a) - (b)] \times .00007 \times c = d$$

(Expansion/Contraction)

Then, simply allow "breathing room" as you install the material segments, by slotting fastener holes and restricting or pinning only one end of the sheet.

Linebacker is ideal for wear applications such as:

- * Aggregate
- * Construction
- * Mining
- * Pulp & Paper
- * Steel
- * Forestry

PROCESSING CAPABILITIES

- * Plasma Profiling
- * Oxy Fuel Profiling
- * Laser Profiling
- * Forming
- * Drilling
- * Welding

EASY TO INSTALL

Order from a variety of thicknesses, or ask us to match your application needs quickly and correctly to realize the most effective results.

THICKNESS	WEIGHT	
	48" x 120"	60" x 120"
1/4"	50 lbs	63 lbs
3/8"	75 lbs	94 lbs
1/2"	100 lbs	125 lbs
3/4"	150 lbs	188 lbs
1"	200 lbs	250 lbs
1-1/4"	250 lbs	N/A
1-1/2"	300 lbs	N/A
1-3/4"	350 lbs	N/A
2"	400 lbs	N/A

Tolerances +/- 10%
NOTE: Special sizes and material processing quoted upon request.

SHEET THICKNESS	TYPICAL SPACING OF FASTENERS AROUND PERIMETER OF SHEET	
	1/4"	6"
3/8"	8"	10"
1/2", 5/8", 3/4"	10"	12"
1" and over	12"	15"

NOTE: Never put holes closer than 2" to the edge of a sheet.

Note: The data contained in this document is accurate at time of printing, and intended for use as a general guide.



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