



Silicone-Treated-Surface UHMW-PE Tapes

ROI: Reducing Energy Consumption in Belt Conveyor Systems

Belt conveyors, supported by slider beds, move raw materials through the processing and manufacturing cycle. Belt conveyors also move finished products through the distribution cycle.

Problem

Longer belt distance increases the amount of energy required to power the system. Heavier products cause the belt to drag across the bed, slowing the entire system. The increased contact between the belt and the underlying slider bed causes wear on both the belt and the bed, decreasing the life of the conveyor components.

Typical responses to the above include regular maintenance of belt drive motors to improve efficiency, regular cleaning of slider beds, replacement of motors, replacement of slider beds, and possibly the replacement of the entire conveyance system

Recommended Solution

A simple solution is often the best. A properly cleaned slider bed lined with pressure sensitive, silicone-infused UHMW-PE both improves product movement and reduces energy requirements.

How it Works

UHMW-PE is characteristically abrasion resistant and very slick, with a low coefficient of friction. The addition of silicone to the UHMW-PE resin blend helps maintain abrasion resistance while improving the already low coefficient of friction. Heavy products, which normally increase belt contact and slow the system, move more freely. Energy requirements are reduced because the plastic allows the conveyor belt to function efficiently.

The Product

Crown Plastics Co., Harrison, OH manufactures **DuraSurf™ STS** (Silicone-Treated-Surface) UHMW-PE tapes for the material handling industry. Thin-gauged, adhesive-backed DuraSurf™ STS tapes are a cost effective, easy-to-apply solution for improving product movement and reducing energy requirements in conveyor belt / slider bed systems.

Continuous, compression molded DuraSurf™ STS tapes are available .031" (.787mm), .062" (1.575mm), .093" (2.362mm), and .125" (3.175mm) thick with a maximum roll width of 24" (610mm). Standard roll lengths are 50' (15.24m) and 100' (30.49m).

The Application

Slider beds can be covered full width or covered in sections. Either application has potential benefits. For example, a 24" wide x 100' long bed can be coated 1 of 2 ways: (1) apply the plastic as a 24" wide strip x the full 100' length of the bed (or in shorter segments, if that's easier), or (2) apply the plastic in 3" wide strips with 4" spaces between them. Product movement increases with either application. Energy savings also improves with either, with possibly better savings with the narrow strips (see Case Study Statistics below). The narrow strip application uses 50% less material (meaning 50% less in material cost).

Additional Benefits

Silicone-treated DuraSurf™ STS UHMW-PE is anti-static conductive and UV stabile. Black in color, the resin contains a 1% carbon load. The carbon renders the plastic conductive. Combined with the black pigmentation, it also makes the plastic UV stabile.

Thin-gauged and applied with a peel 'n' stick pressure sensitive adhesive, DuraSurf™ STS is cost efficient. Installation labor is minimal. Conveyance downtime is greatly reduced. Existing systems are not replaced. Instead, system efficiency is augmented and improved.

Conveyor component life is extended because wear and tear on the system is reduced.

Case Study Statistics

2010: Installation and testing of DuraSurf™ STS on a 48" wide x 100' conveyor belt demonstrated an energy cost reduction of 31.9%. Similar tests on an out-feed conveyor demonstrated an energy reduction of 31.7%. Both systems were 100% covered with STS adhesive-backed tape.

2012: Distribution center tests on a 24" wide x 180' conveyor demonstrated a 16.2% energy cost reduction when the system was 100% covered. A similar system coated with 3" strips installed 4" apart demonstrated a 20% energy cost reduction, even with 50% less material.

Material Properties

MECHANICAL PROPERTIES	ASTM Test	Units Metric (U.S.)	UHMW Thickness Gauges		
			.030"	.060"	.125"
Density	D792	gm/cc	0.93	0.93	0.93
Tensile Strength @ Yield	D638	MPa(psi)	23(3300)	20(2964)	22(3227)
Tensile Strength @ Break	D638	MPa(psi)	53(7740)	49(7056)	44(6373)
Elongation @ Break	D638	%	460	463	466
Youngs "E" Modulus	D638	MPa(psi x 105)	725(1.05)	731(1.06)	672(.97)
Izod Impact Strength	D256 ⁽¹⁾	J/m(ft-lb/in notch)	*	*	80(16.8)
Hardness Shore "D"	D2240	-	65	65	65
Water Absorbtion	D570	%	Nil	Nil	Nil
Rel. Solution Viscosity	D4020	dl/gm	2.3-3.5	2.3-3.5	2.3-3.5
Coefficient of Friction	D1894-96	Static	.16	.16	.16
Coefficient of Friction	D1894-96	Dynamic	.14	.13	.14

(1) Izod Impact: Samples have 2(15° +/- 1/2°) notches on opposite sides to a depth of 5mm

THERMAL PROPERTIES	ASTM Test	Units Metric (U.S.)	UHMW Thickness Gauges		
			.030"	.060"	.125"
Crystalline Melting Range	Polarizing	°C(°F)	136(276)	134(273)	134(273)
Crystallinity	D3417-96	%	48	47	50
Coefficient of Linear Expansion					
20° to 100° C	D696	K ⁻¹	*	*	1.5 x 10 ⁻⁴
-20° to -100° C	D696	K ⁻¹	*	*	9.18 x 10 ⁻⁵

ELECTRICAL PROPERTIES	ASTM Test	Units Metric (U.S.)	UHMW Thickness Gauges		
			.030"	.060"	.125"
(For Conductive Black Only)					
Volume Resistivity	D257	Ohms/cm	5.9544x10 ⁷	1.4516x10 ⁷	>2x10 ⁷
Dielectric Strength	D150	Kv/cm(V/mil)	*	*	142
Dielectric Constant	D150		2.481	2.454	2.542
Surface Resistivity	D257	Ohms	10 ³	10 ³	10 ³
Static Decay		Seconds	<.01	<.01	<.01
Dissipation Factor					
At 50Hz	D150		0.0594	0.0213	0.0082
At 10KHz	D150		0.1085	0.0690	0.0022
At 5MHz	D150		0.1035	0.2340	0.0034

Comparison of Dynamic Coefficient of Friction on Polished Steel

Material	UHMW-PE	Nylon 6	Nylon 6/6	Nylon MoS2	PTFE	Acetal Polymer
Dry	.10 - .22	.15 - .40	.15 - .40	.12 - .20	.04 - .25	.15 - .35
Water	.05 - .10	.14 - .19	.14 - .19	.10 - .12	.04 - .08	.10 - .20
Oil	.05 - .08	.02 - .11	.02 - .11	.08 - .10	.04 - .05	.05 - .10

* No reading could be taken due to material thickness

FOR MORE INFORMATION

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DOWNLOAD **DURASURF™ STS** DATA SHEET

Click link <http://www.crownplastics.com/products/industrial>, then select *DuraSurf STS (PDF)* data sheet from list in right-hand column.

TO REQUEST DURASURF™ STS SAMPLES

Email to Marketing@CrownPlastics.com

Crown Plastics uses Avery Dennison™ pressure sensitive adhesives.