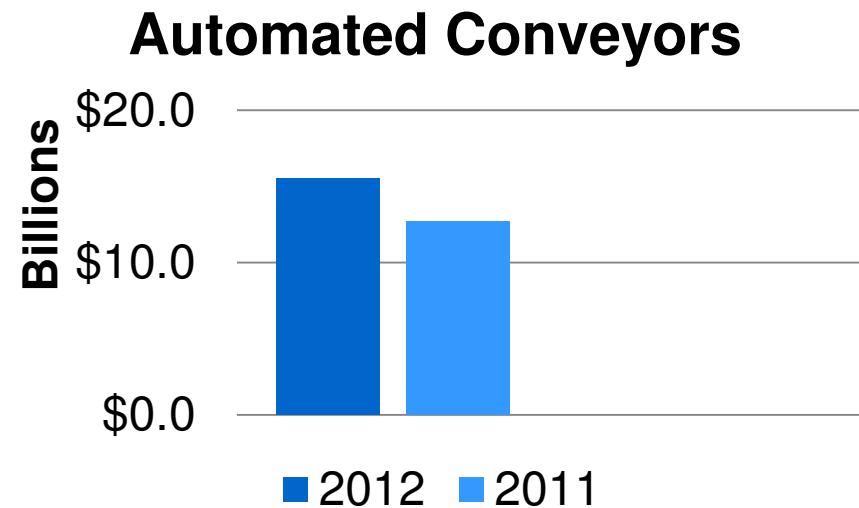




Innovative Products for the Conveyor Industry

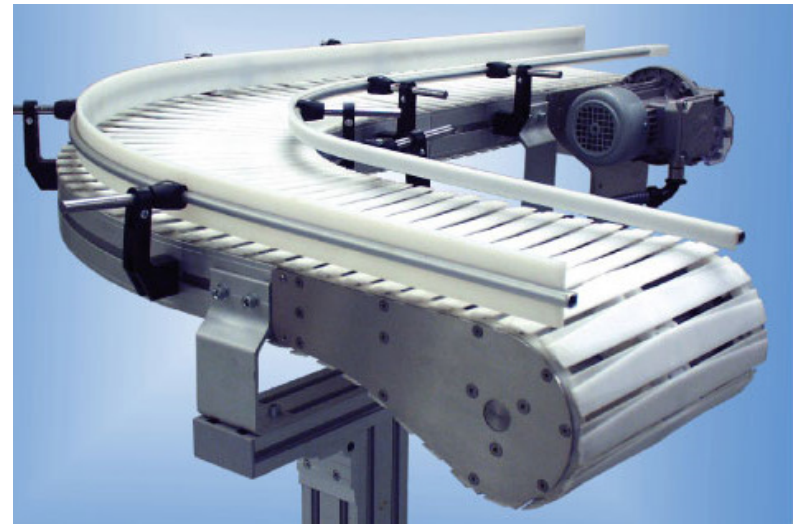
Material Handling Industry

- Global demand for material handling equipment expected to grow >4% thru 2016 to \$123 billion
- Most growth = automated conveyors (globally \$15.5 billion in 2012, up 18% over prior year)



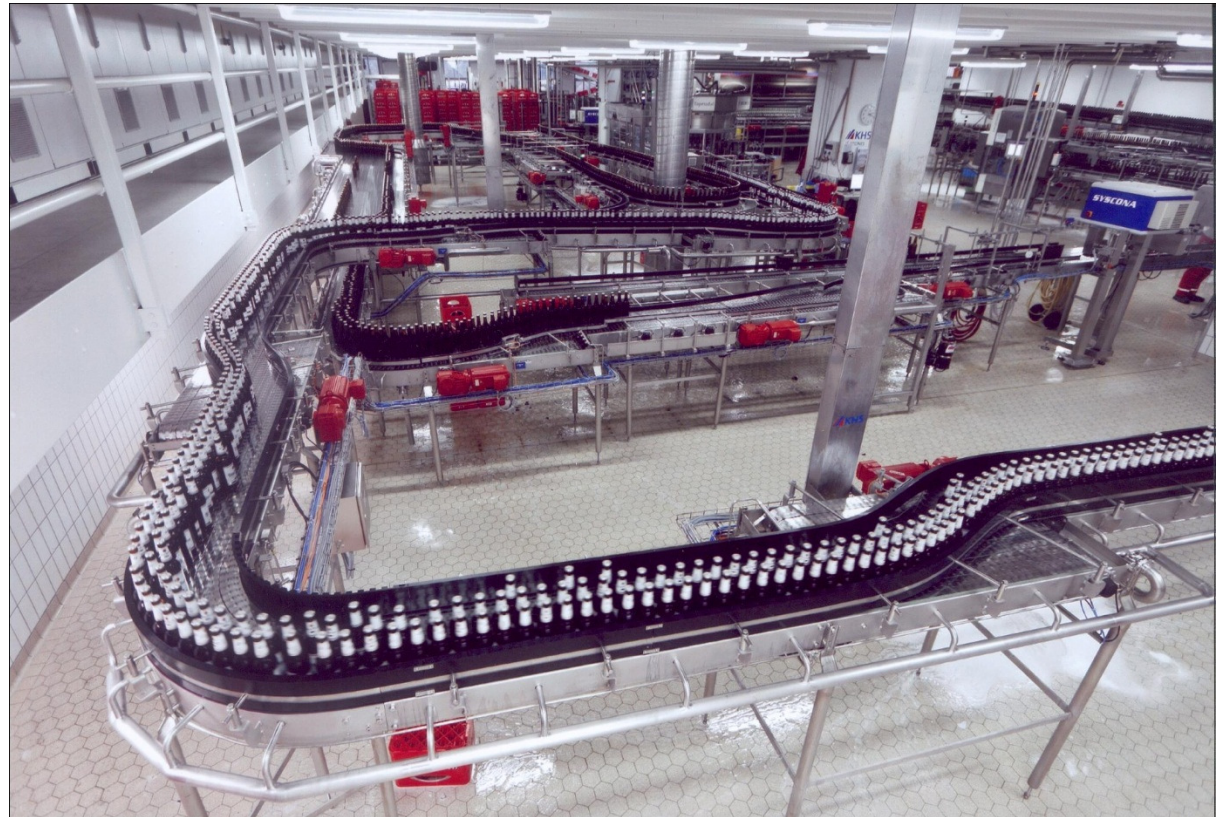
Types of Conveyors

- Chain
- Screw
- Spiral
- Bucket
- Gravity
- Vibrating
- Belt
- Overhead
- Flexible
- Roller
- Drag Chain
- Vertical



Industries that Utilize Conveyors

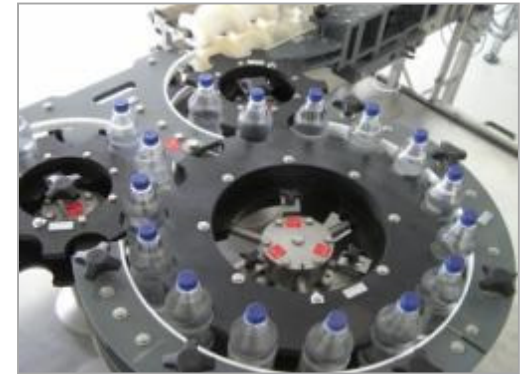
- Packaging
- Pharmaceutical
- Food & Beverage
- Chemical
- Agricultural
- Automotive
- Electronic
- Aerospace
- Semiconductor
- Bulk Mining



Applications

■ Applications

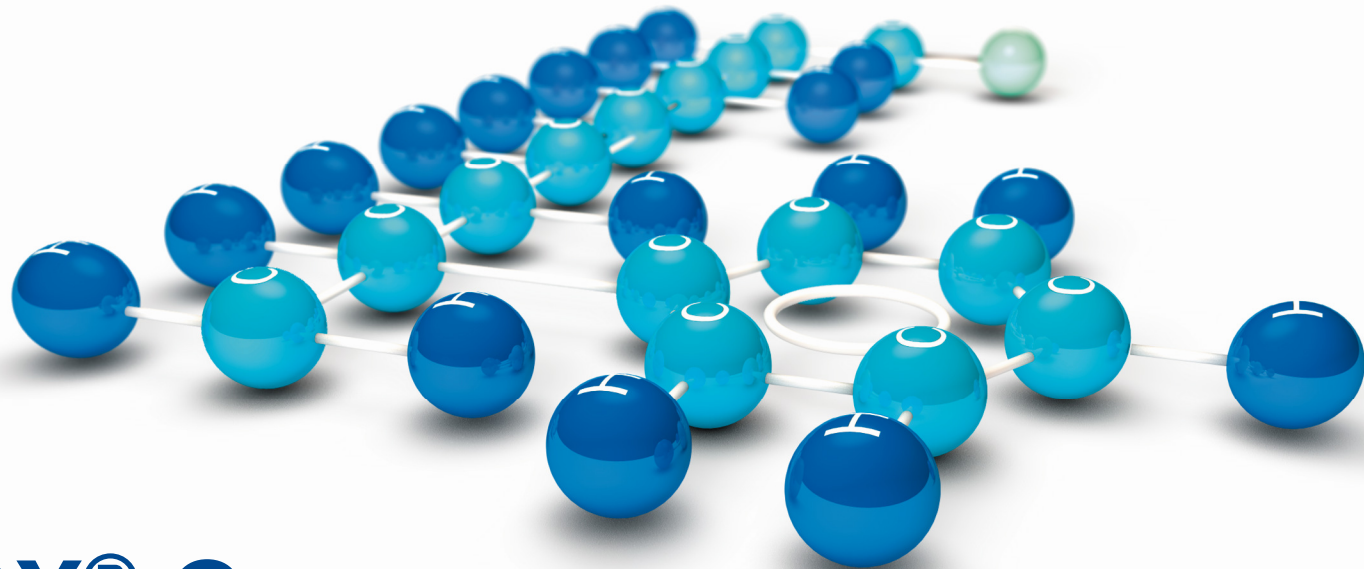
- Straight tracks
- Curve tracks
- Chain guides
- Wear strips
- Guide rails
- Star wheels
- Timing screws
- Rollers
- Bearings
- Pillow blocks
- Sprockets



Engineering Plastics for the Conveyor Industry

- Polystone® M (UHMW-PE)
- Polystone® G (HDPE)
- Sustarin® C (Acetal)
- Sustamid® Nylon
- Sustadur PET
- SustaPEEK
- Detectable Plastics





LUBX[®] C

LubX[®] C – The Smart Solution

- Lux[®] C is a new high-performance sliding material
- Designed and tested for the conveyor and material handling industries



LubX[®] C – The Smart Solution

- Compared to conventional sliding materials, conveying systems equipped with LubX[®] C require considerably less energy
- LubX[®] C has been developed with great care to minimize the friction, but also with consideration to the wear properties against the sliding partner.



LubX® C Product Features

- Coefficient of friction up to 75% less than standard UHMW-PE
- Outstanding dry-running properties
- Energy saving
- FDA Compliant
- Noise reducing
- Eliminates the slip-stick effect (back-sliding)
- Increases process stability
- Specially designed to slide against steel and acetal chains (e.g. chain conveyors)



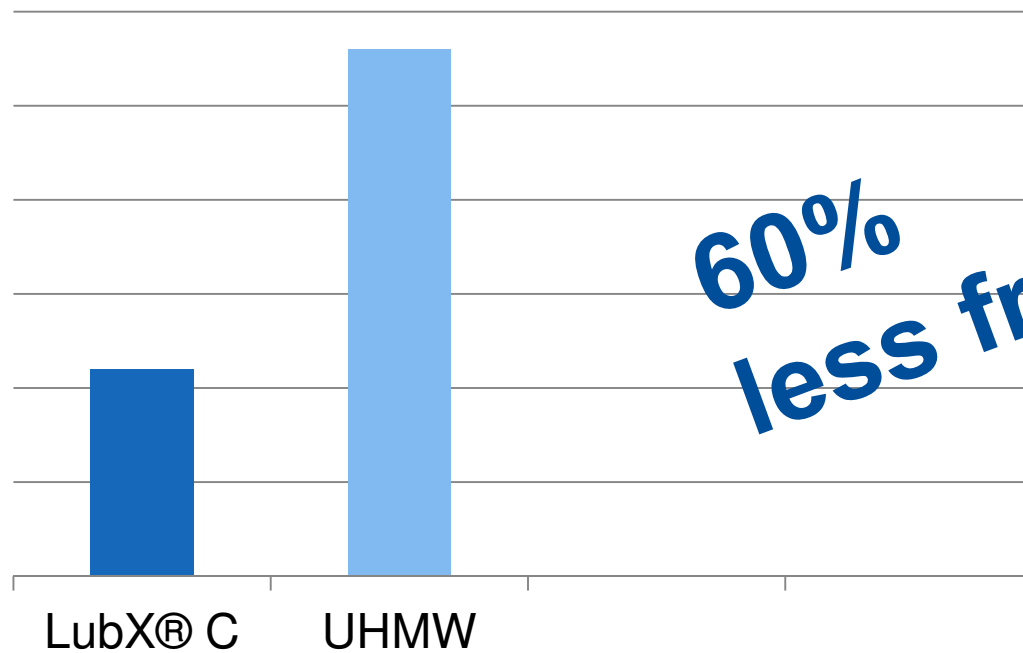
Smart energy saving with LubX® C

Slip-Stick Effect Video



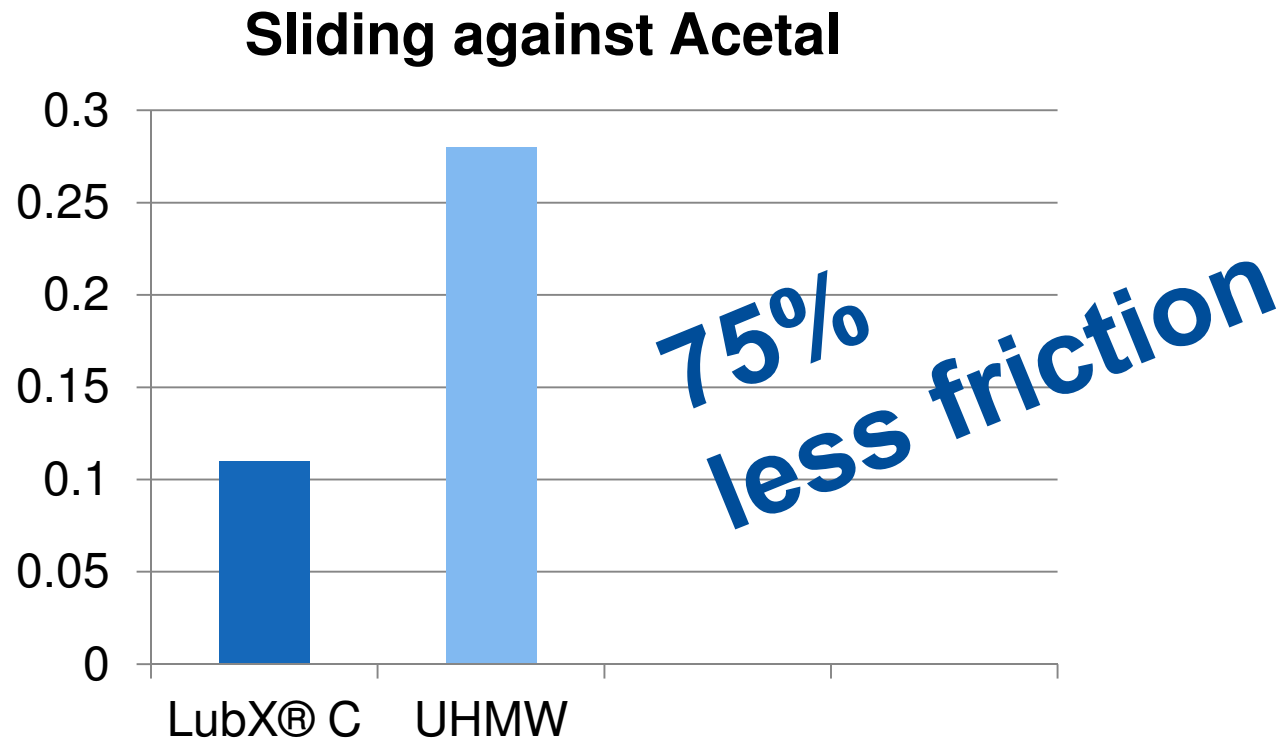
Comparison of Sliding Partners

Sliding against Steel



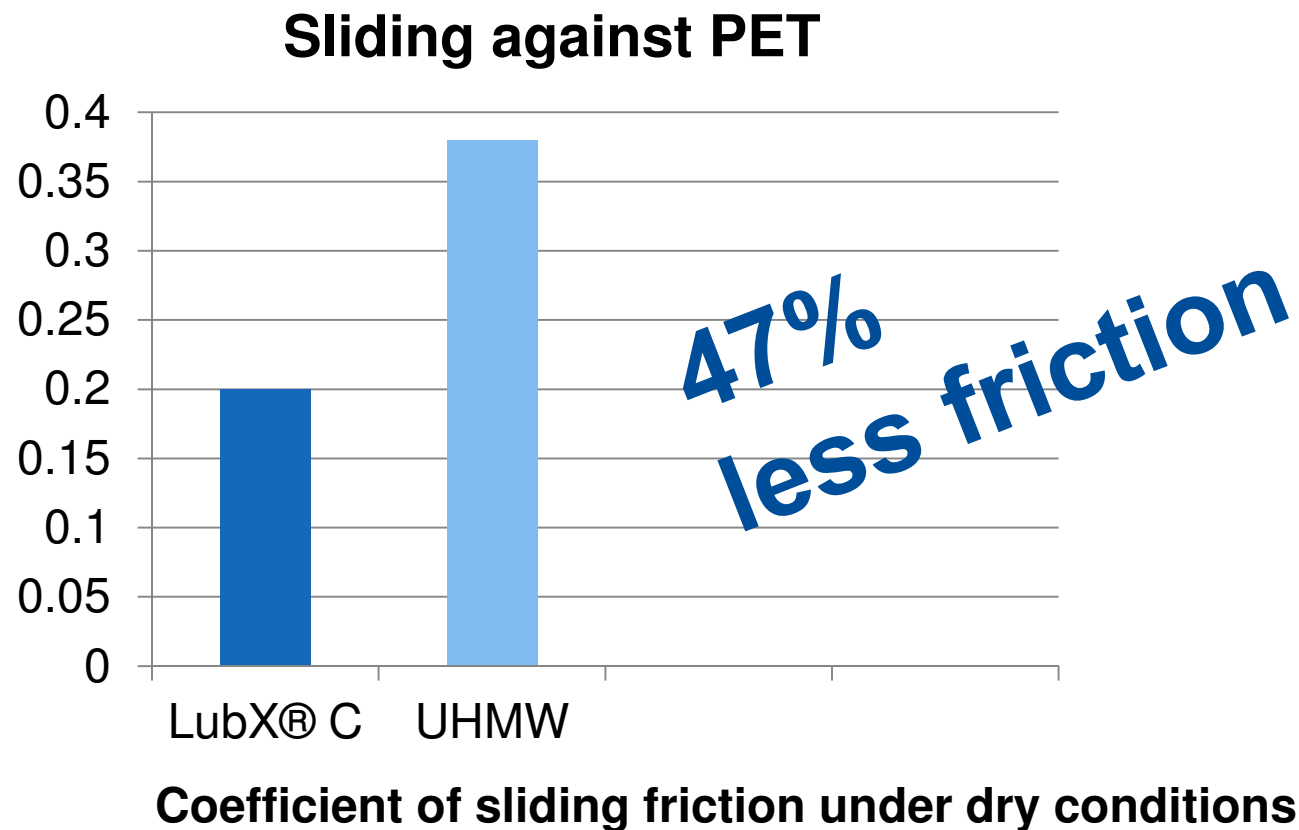
Coefficient of sliding friction under dry conditions

Comparison of Sliding Partners



Coefficient of sliding friction under dry conditions

Comparison of Sliding Partners



LubX[®] C Industry Segments & Applications

■ Industry Segments

- Conveyor
- Packaging / Handling
- Pharmaceutical
- Food Processing

■ Applications

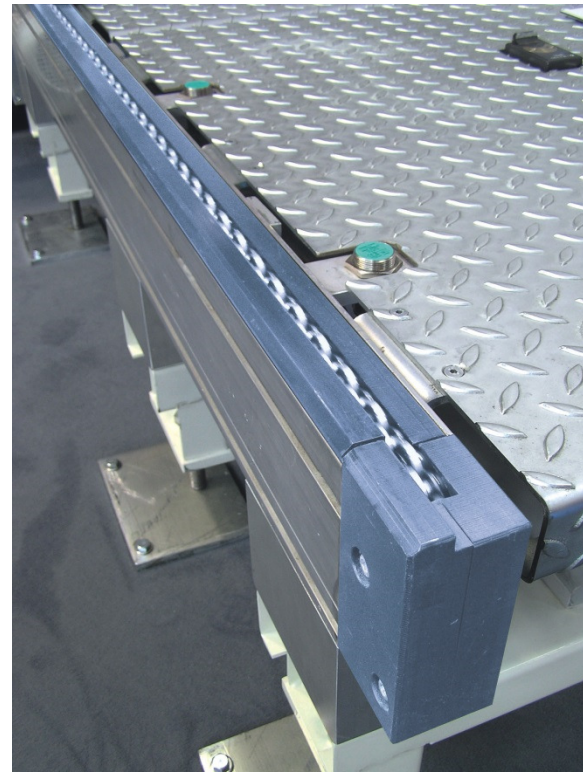
- Chain guides
- Curve tracks
- Wear strips
- Guide rails



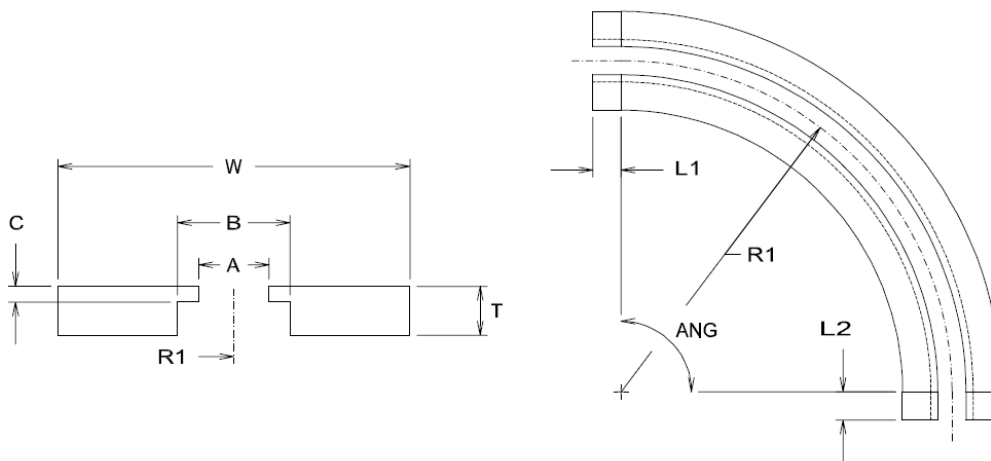
Works best with high-speed conveyors and light weight products!

Availability of LubX[®] C

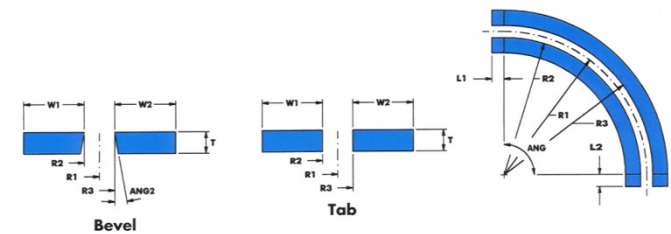
- Available in sheets: 1/4" – 4" thick
- Color: Blue-Grey



Machined Tracks & Curves (standard & custom)



Curves



880 Bevel Flat Curves 2 pc

Part #	Angle deg	R1 (in)	R2 (in)	R3 (in)	T (in)	W1/W2 (in)
28031	30	18	17.188	18.813	3/8	1.00
28032	30	24	23.188	24.813	3/8	1.00
28033	30	30	29.188	30.813	3/8	1.00
28041	45	18	17.188	18.813	3/8	1.00
28042	45	24	23.188	24.813	3/8	1.00
28043	45	30	29.188	30.813	3/8	1.00
28061	60	18	17.188	18.813	3/8	1.00
28062	60	24	23.188	24.813	3/8	1.00
28063	60	30	29.188	30.813	3/8	1.00
28091	90	18	17.188	18.813	3/8	1.00
28092	90	24	23.188	24.813	3/8	1.00

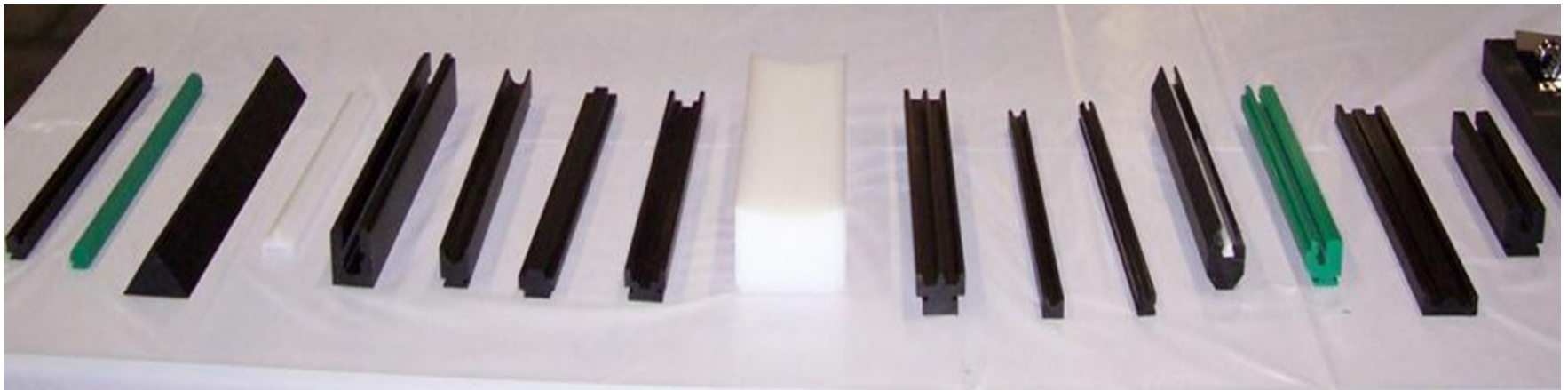
880 Tab Flat Curves 2 pc

Part #	Angle deg	R1 (in)	R2 (in)	R3 (in)	T (in)	W1/W2 (in)
21031	30	18	17.125	18.875	3/8	1.50
21032	30	24	23.125	24.875	3/8	1.50
21033	30	30	29.125	30.875	3/8	1.50
21041	45	18	17.125	18.875	3/8	1.50
21042	45	24	23.125	24.875	3/8	1.50
21043	45	30	29.125	30.875	3/8	1.50
21061	60	18	17.125	18.875	3/8	1.50
21062	60	24	23.125	24.875	3/8	1.50
21063	60	30	29.125	30.875	3/8	1.50
21091	90	18	17.125	18.875	3/8	1.50
21092	90	24	23.125	24.875	3/8	1.50

Tangents L1 and L2 zero unless specified

Materials: Polystone M NAT
 Polystone M Gry Oil
 Polystone M Blk Repro
 Sustamid 6G MOS2

Machined Profiles



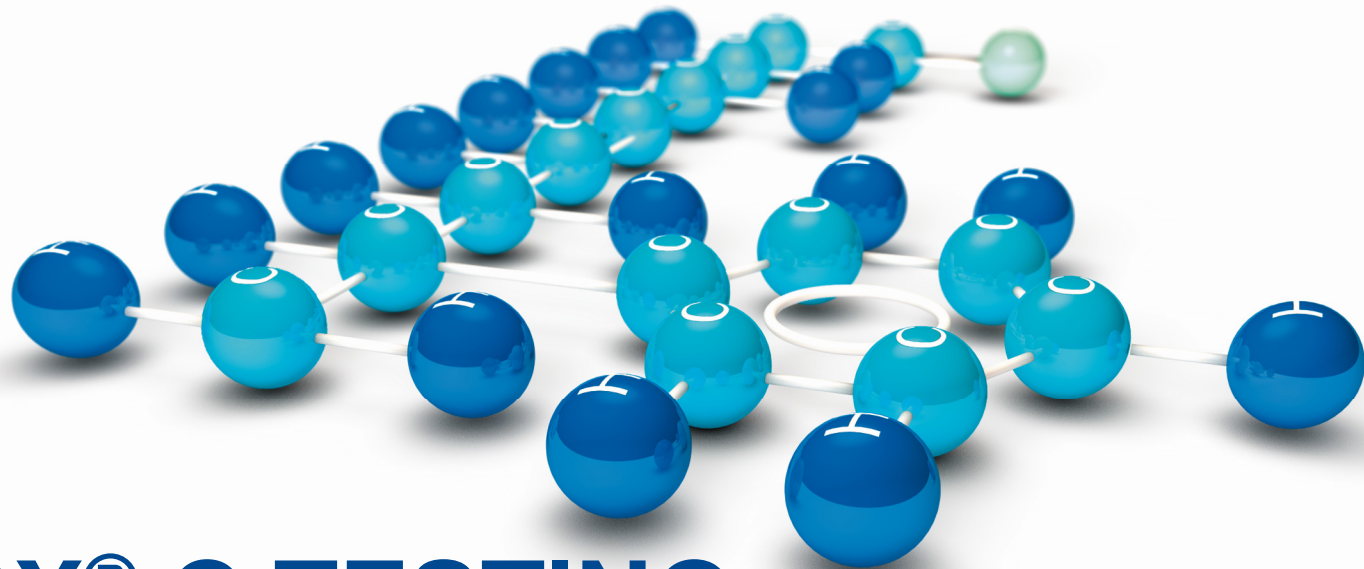
LubX® C Competition

■ Nolu S: Emerson / System Plast

- “Nolu S is a unique compound of UHMW and a solid lubricant.”
- “It drastically reduces the coefficients of friction while maintaining characteristics of UHMW.”

■ Oil-Filled and Dry Slide: Quadrant

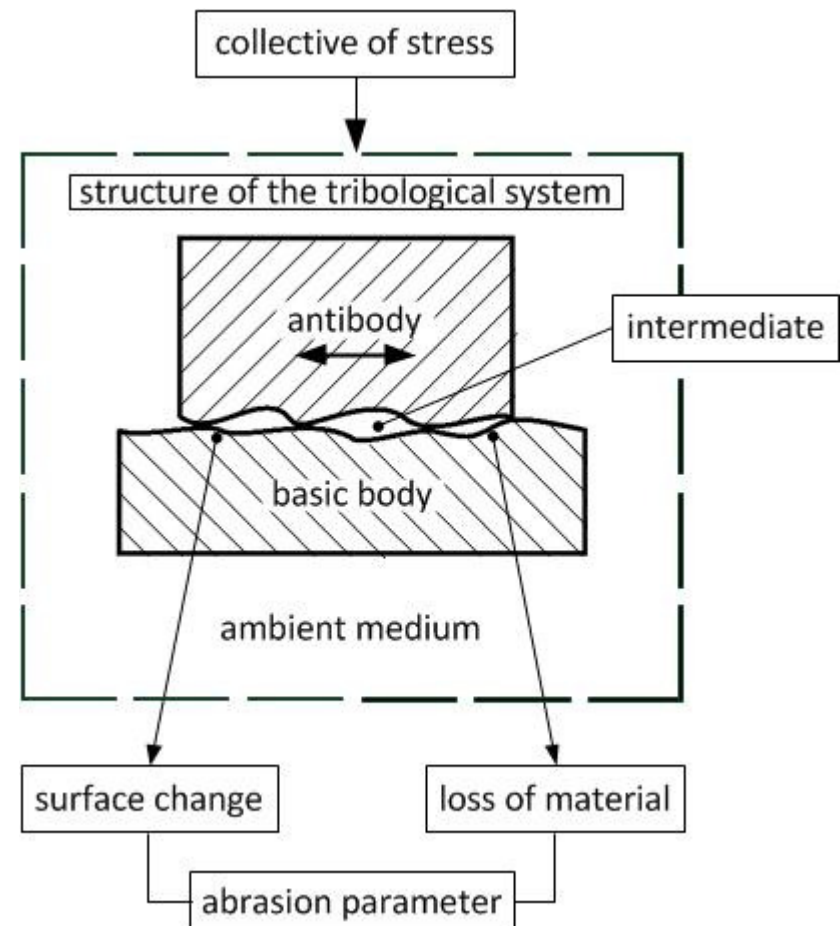
- “Modified with special lubricants, **TIVAR® DrySlide** has the lowest coefficient of friction of any of the TIVAR® products.”
- “This advanced product uses **oil filled** polymers to lubricate mating surfaces with a dynamic coefficient of friction formula of less than 0.14.”



LUBX[®] C TESTING

What is Tribology

- **Tribology** is the science and engineering of interacting surfaces in relative motion
 - Includes the study and application of the principles of friction, lubrication and wear
- Measurements: sliding coefficient of friction, temperature, wear, roughness and contact surface



What is Tribology

- **Friction:**

interaction between the contacting areas of the material bodies, which counteracts a relative movement

- **Wear & Tear:**

progressive loss of material from the surface of a solid body caused by mechanical causes (contact with a solid or liquid)

- **Lubrication:**

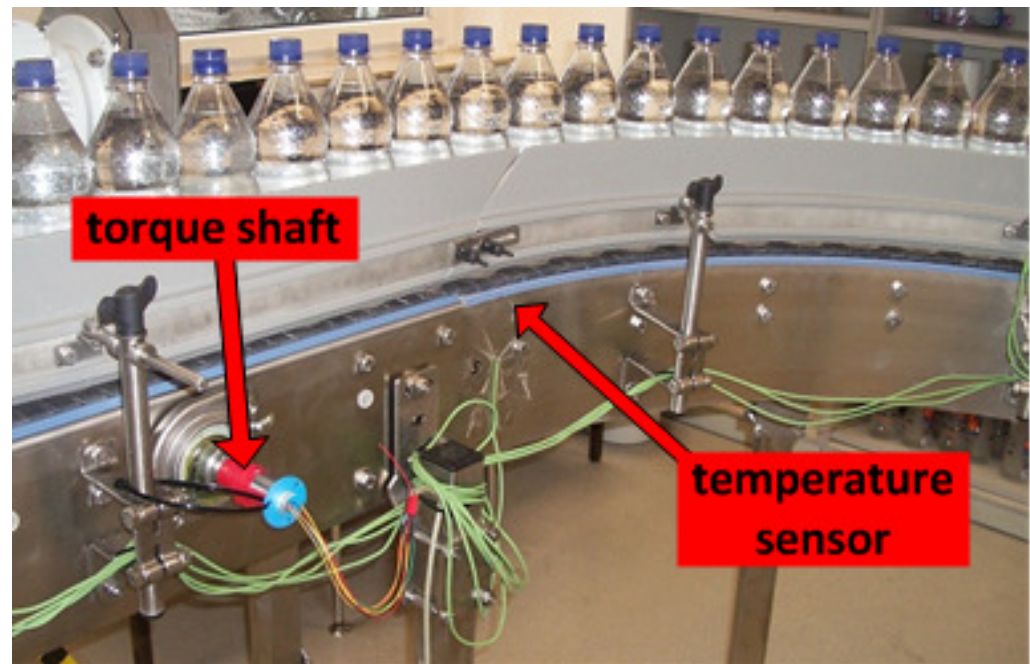
reduction in friction and wear by complete or partial separation of material bodies

Bottle Conveying System - Krones



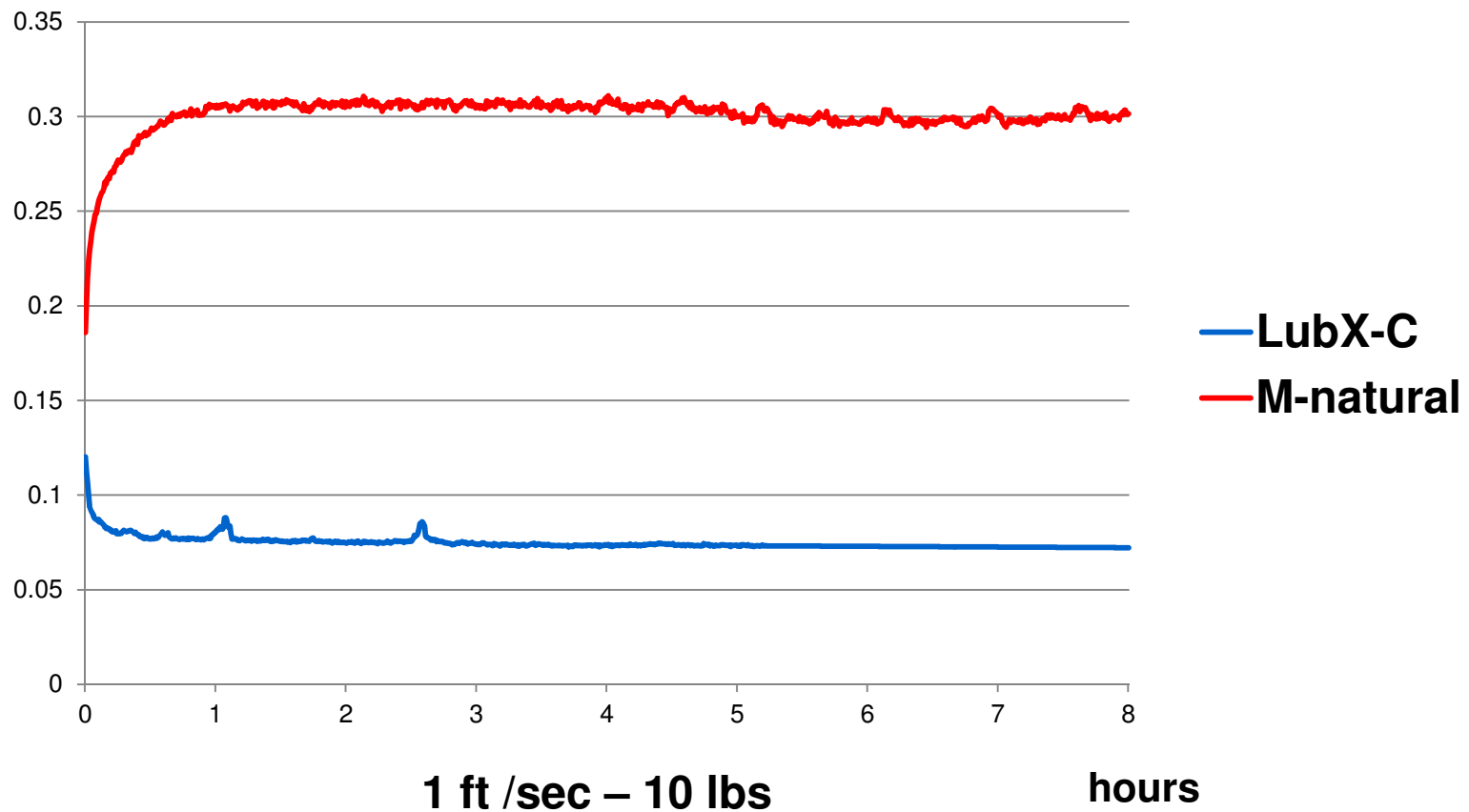
Practical Test Apparatus (Bottle Conveying System)

- determination of the coefficient of friction takes place under real conditions
- different material pairings are possible
- measurement of the temperature
- measurement of the chain tensile force with the aid of a torque shaft



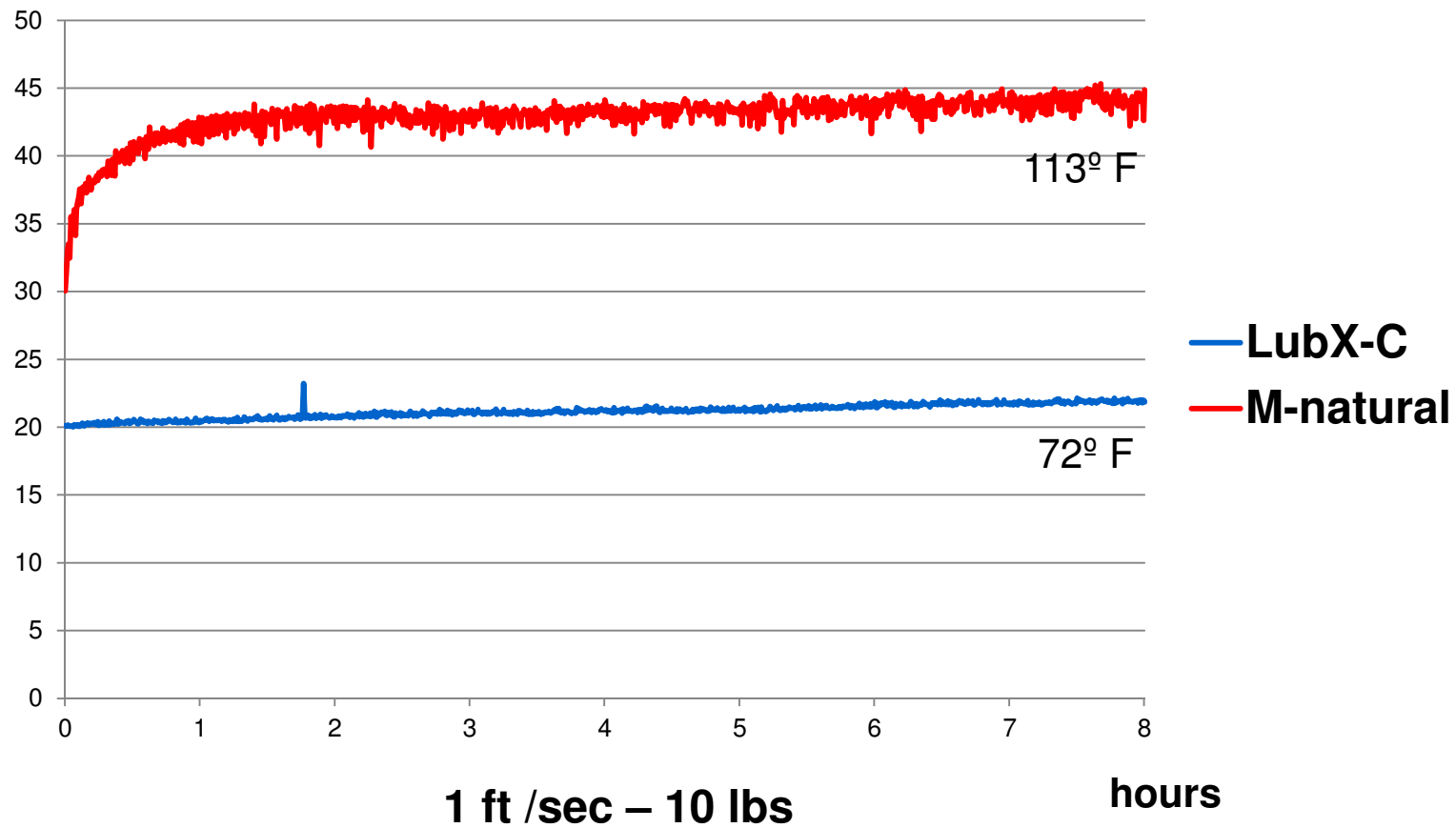
LubX-C / Polystone® M Natural (UHMW-PE) against Acetal

coefficient of friction



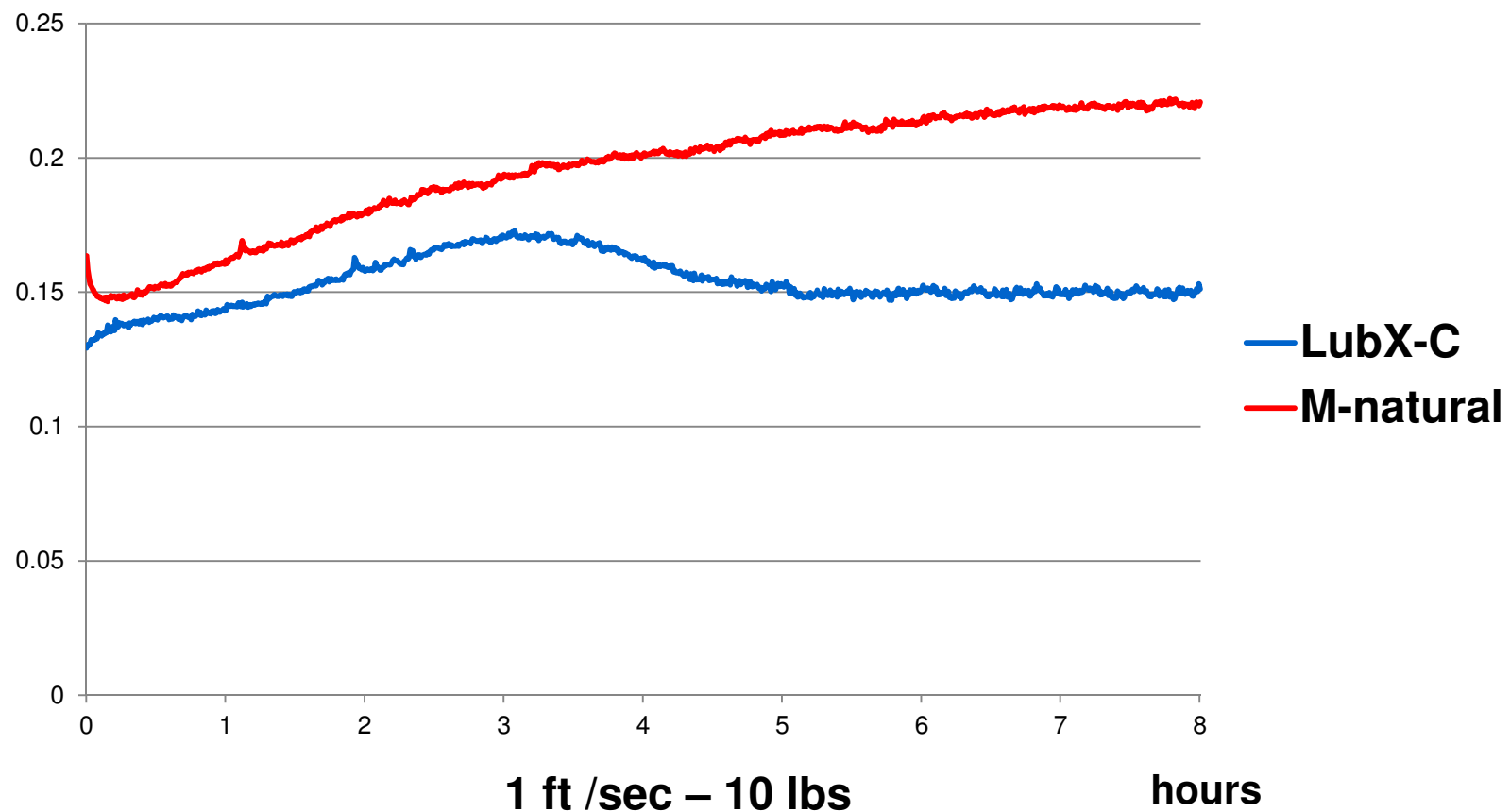
LubX-C / Polystone® M Natural (UHMW-PE) against Acetal

temperature



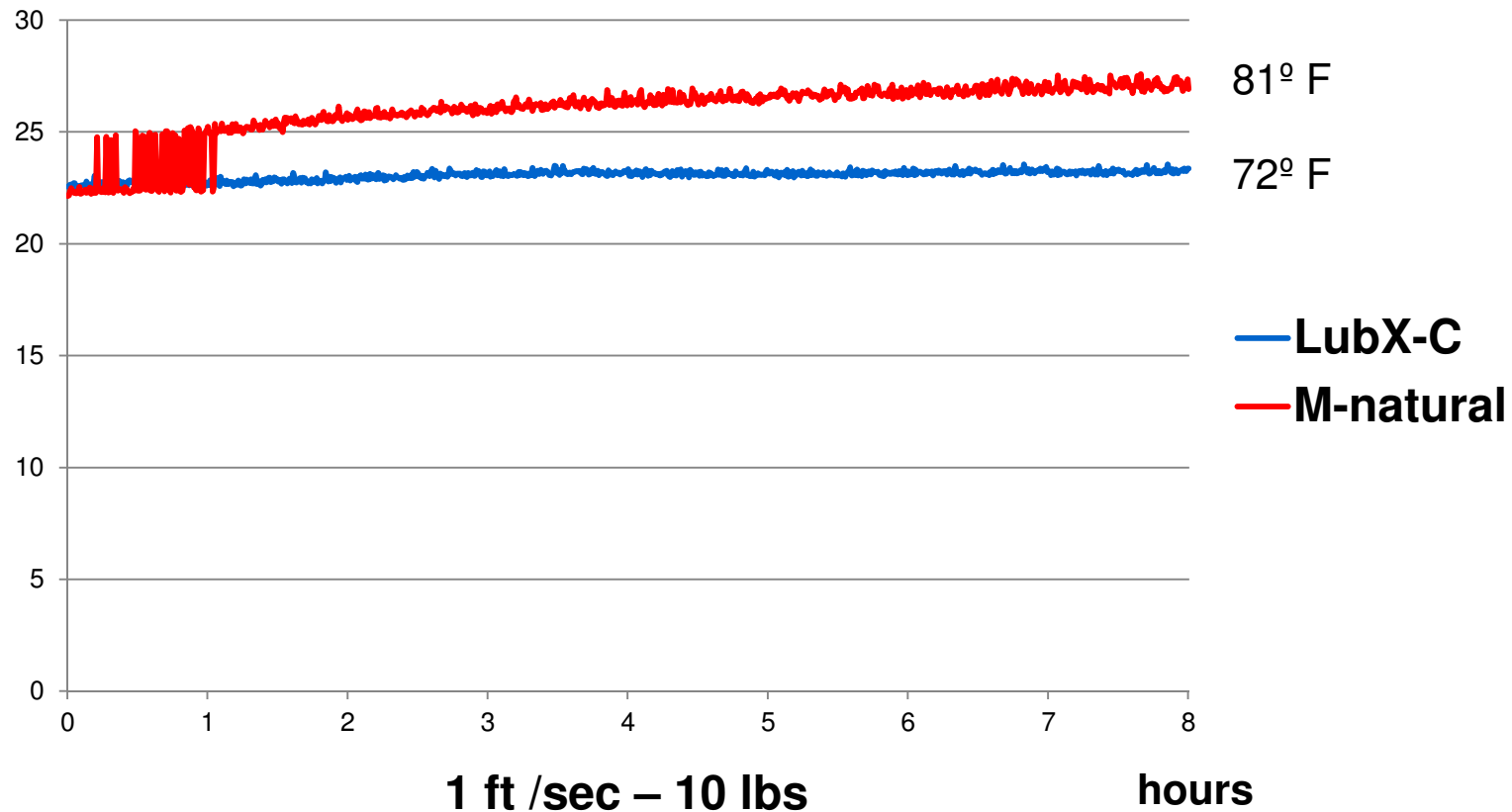
LubX-C / Polystone® M Natural (UHMW-PE) against Steel

coefficient of friction



LubX-C / Polystone® M Natural (UHMW-PE) against Steel

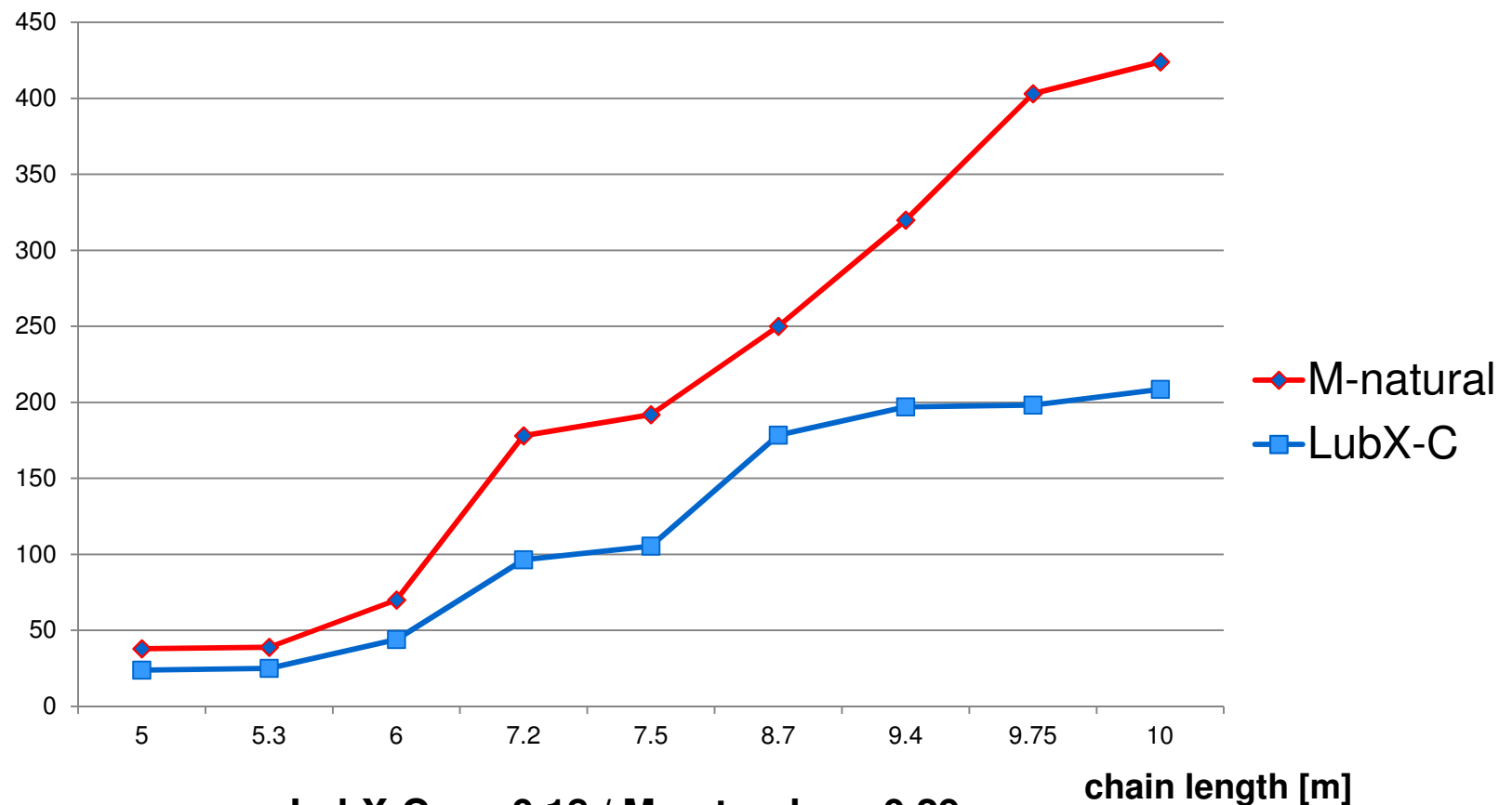
temperature



Energy input LubX-C / Polystone® M Natural (UHMW-PE) against Acetal

performance [W]

3.5 ft / sec – 30 lbs



LubX-C: $\mu = 0,18$ / M-natural: $\mu = 0,29$

Selling Tools

■ Product Samples

■ Education

- News Letters
- Presentations
- Webinars

■ Joint Sales Calls

■ Specifications

■ Technical Support



RÖCHLING
Engineering Plastics

RÖCHLING

news & knowledge

October | 2012

LubX® - High Performance Sliding Material for Material Handling

LubX® - High Performance Sliding Material

With LubX® C, Röchling Engineering Plastics offers a new high performance material, which has outstanding dry-running properties at their disposal. It has been especially developed for applications in material handling and automation technologies. Compared with conventional sliding materials, conveying systems equipped with LubX® C need considerably less energy. The considerably lower coefficient of friction of LubX® C eliminates the possibility of the slip-stick effect (back sliding) almost completely and thus increases process stability.

Tribological systems:
In the development of LubX® C, great care has not only been taken to minimize the coefficient of friction of the sliding materials, but also to consider the tribological system of the sliding partners in an integrated manner. The individual motion and transport segments of different conveying systems were analyzed, and the relative movements of the elements and the frictional forces arising at the points of contact examined. These frictional forces have a decisive impact on the performance of the conveying system.

Energy efficiency:
With energy prices rising in the long term, lowering energy costs plays an increasingly more important role in the project planning of production, storage and logistic processes. When utilizing components with optimized sliding properties in conveying processes, the conveying power required – and thus the energy applied – may be reduced to a minimum.

Product Features:

- Coefficient of friction up to 75% less than standard UHMW-PE
- Outstanding dry-running properties
- Energy saving
- FDA Compliant
- Noise reducing
- Eliminates the slip-stick effect (back-sliding)

Comparison of sliding properties
Coefficients of sliding friction under dry conditions

Sliding against Acetal



75% less friction

Sliding against Steel



60% less friction

Sliding against PET



67% less friction

*Validated on the application-related Röchling tribology test stand

Röchling Engineering Plastics offers the most comprehensive product line in the USA and Canada including:

- Polystone® M (UHMW-PE)
- Sustamid® Nylon
- Polystone® P (Polypropylene)
- Sustarin® Acetal
- Polystone® G (HDPE)
- Susta HPM's

Saves Energy & Reduces Noise

up to 75%
less friction




Available as:
Sheets: 1/4" to 4" thick
Color: Blue-Grey

The values indicated result from numerous measurements for an approximation of the values and are based on best knowledge. They serve as information about our products and are presented as a guide to choose from a range of materials. This does not include an assurance of specific properties or the suitability for particular applications purposes that are highly varying. Since the properties also depend on the dimension of the manufactured products and the design of the application (e.g. including by segments), the actual values of the properties of a particular product may differ from indicated values.

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Prospects & Lead Research

■ Online Sources

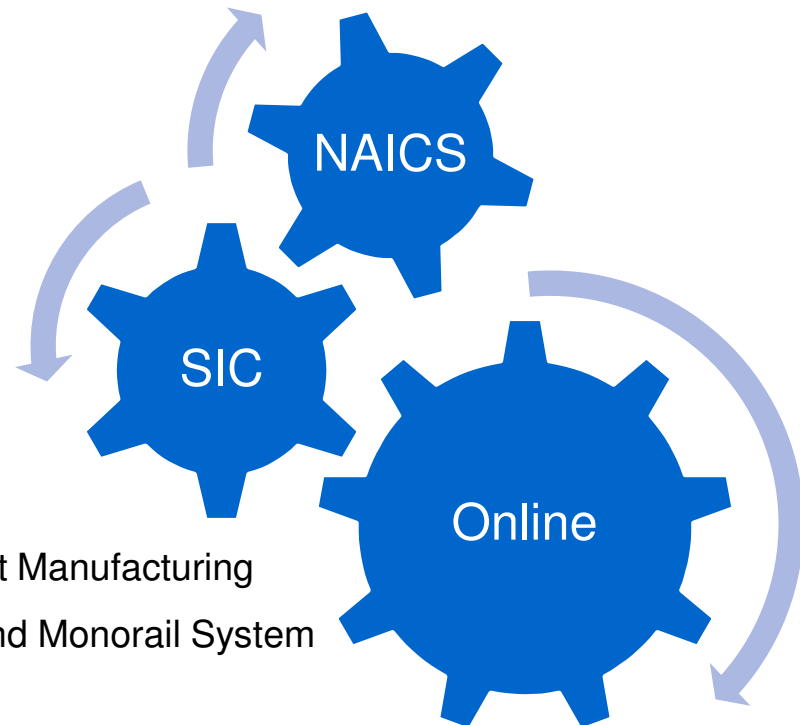
- <http://www.mhpn.com/>
- <http://mhlnews.com/>
- <http://www.cemanet.org/>
- <http://www.packworld.com/>
- <http://www.packagingdigest.com>

■ NAICS Codes

- 333922: Conveyor and Conveying Equipment Manufacturing
- 333923: Overhead Traveling Crane, Hoist, and Monorail System

■ SIC Codes

- 3531: Construction machinery
- 3535: Conveyors and conveying equipment
- 3537: Industrial trucks and tractors



Market Development & Sales Contacts

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