

## SOLUTION DATA SHEET

# Unleashing the Performance of Tubes and Hoses with Lubrizol TPU



<b>Markets</b>	Hose and tube, all industries (except medical)
<b>Polymer</b>	Pearlthane™ & ESTANE® thermoplastic polyurethane (TPU)
<b>Key Benefits</b>	<ul style="list-style-type: none"> <li>• Excellent flexibility</li> <li>• Very high chemical resistance</li> <li>• Extrusion stability and good processability</li> </ul>

Lubrizol Engineered Polymers has been designing TPU for extrusion applications for decades. The experience of our application laboratory experts jointly with the results from various tests performed to validate the performance attributes of ESTANE and Pearlthane TPU, have led us to define the perfect profile for a long-lasting tube or hose solution.

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contact us at  
<http://go.lubrizol.com/EP>

ESTANE and Pearlthane TPUs are durable, and when applied to hose and tube, this feature comes hand in hand with a very good processability (no drooling) and extrudability (speed performance). In the ESTANE and Pearlthane portfolio you can find polymers with a broad processing window and a high dimensional stability. Our polymers have a wide temperature range in which they can operate effectively without losing mechanical properties or becoming brittle.

When choosing the best polymer for hose and tube applications, key performance attributes like high hydrolysis and abrasion resistance are a must, the polymer used should have excellent resistance to chemical attack with improved aging. Our portfolio also has the technical advantage of **long-term flexibility**, and a high resistance to puncture, burst pressure and kinking.

Pearlthane 11T98, ESTANE 58219, and ESTANE ETE 55DT3 TPU are the selected grades to offer the best results when applied in hose and tube, given their following characteristics:

- a. Excellent flexibility: the polymer should have sufficient flexibility to allow the hose to bend and stretch without cracking or losing its shape. This ensures ease of use (even for smaller coils and those tubes which can allow compact cabling where a small bend radius is required)
- b. Bursting behavior without *ballooning*
- c. Very good resistance to humidity, and in some cases, high resistance to microorganisms
- d. Conformability according to regulatory standards\*

There are added values like **colorability and transparency** thanks to the versatility of Lubrizol TPU. Pearlthane 11T98 TPU is a good solution for transparent tubing, if there are needs to look for an option that is not opaque. See the processing information on this grade below:

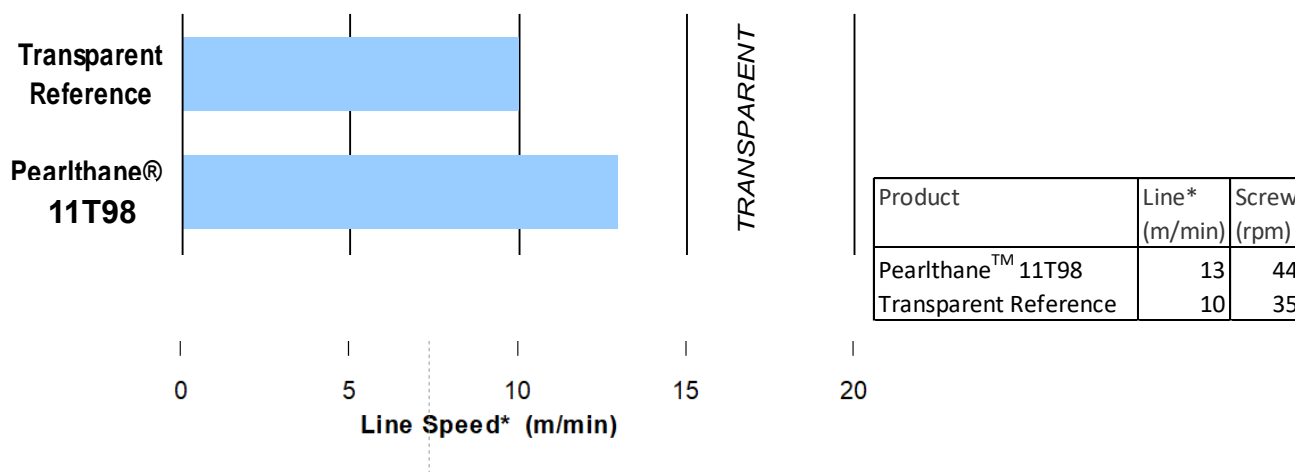


Figure 1: High speed of Lubrizol's Pearlthane 11T98 TPU

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The other grades that complete the Lubrizol Engineered Polymers offering to this market are the following two transparent polyether-based TPU grades:

- ESTANE 58219 TPU with better MFI for extrusion
- ESTANE ETE 55DT3 TPU, a harder material closer to PA 12.

Other material options in the marketplace include PA, in the table that follows some of the key benefits brought by our TPU can be seen:

Advantages of Lubrizol TPU vs PA 11/PA 12
Extreme flexibility with bend radii up to three times
Good vibration resistance, better than polyamide tubing allows compact installations
Light weight
Tube available in several colors for line identification
Reduced fitting time

**Table 1:** Comparison of Lubrizol TPU vs PA 11 and PA 12

Lubrizol TPU is an exceptionally durable material that can withstand very well frequent use, abrasion, and external impacts and it has good resistance to wear and tear, ensuring a longer lifespan for the hose or tube. Bio-based TPU grades, which originate from renewable sources as certified according to ASTM D6866, are also available. New developments include solution that are biomass balanced, and TPU is recyclable.\*\*

For more information on other solutions, you can also visit our web: [www.lubrizol.com/Engineered-Polymers](http://www.lubrizol.com/Engineered-Polymers)

*\* Please consult us for the latest regulatory status.*

*\*\* Recyclability is based on access to a readily available standard recycling program that supports such materials. Products may not be available in all areas.*

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