

SOLUTION DATA SHEET

Aliphatic TPU for automotive, electronics, and sports and recreation applications



Markets	Transportation, industrial, electronics, compounding, sports and recreation
Polymer	Estane® and Pearlthane™ aliphatic thermoplastic polyurethane (TPU)
Key Benefits	<ul style="list-style-type: none"> • Less yellowing, even in clear and transparent parts • Improved processing performance • Superior chemical and hydrolysis resistance

For a high-class aesthetic finish, whether moulding or extruding light and/or dark coloured parts, manufacturers, designers and OEMs can rely on Estane Engineered Polymer aliphatic TPUs for unique staining resistance and strong colour stability upon UV exposure. Latest developments have focused on the improvement of the TPU structure and formulation to offer an aliphatic TPU solution with better thermal stability, chemical and hydrolysis resistance.

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Estane D91T86 is the most recent aliphatic TPU grade, with a 90 Shore A hardness. It resulted from the work developed by R&D to improve the mechanical properties, elastic behaviour and rebound performance of other TPU grades in the Pearlthane™ and Estane aliphatic product portfolio. The key objective was to enhance the aesthetic design of moulded parts. Like other aliphatic TPU from Lubrizol, this grade has a long-term performance that ensures a superior chemical, hydrolysis and blooming resistance, while being a cost-effective manufacturing solution that includes fast cycling, high flow, and low-density properties.

In the staining test performed as per figure no. 1 below, **Estane D91T86** showed an improved staining resistance after 3 hours, versus other grades from the same product range and a competitive material, as illustrated below:

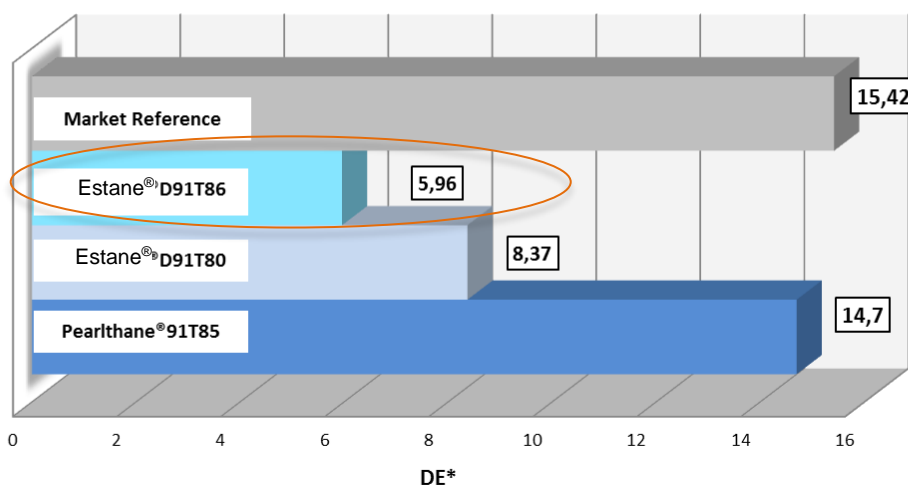


Figure 1: Test of staining resistance after 3 hours.

Weatherability is an important feature for the selection of a material that will be used in outdoor applications. Main weathering forces that may cause degradation are sunlight, high temperature and moisture. The Xenon Arc test is a weathering test that reproduces sunlight's full spectrum, which is critical for products that are sensitive to long-wave UV, visible light and infrared. Both Estane D91T86 and Estane D91T80 achieved better results than the market reference in the test using the Xenon Arc Test Method UV Light can be seen below:

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Yellowness Index of Aliphatic TPU grades						
	Estane D91T80		Estane D91T86		Market Reference	
	Initial	Final	Initial	Final	Initial	Final
YI	18.25	16.85	16.62	13.99	20.55	17.30
DE	0.64		1.44		1.67	

Table 1: Yellowness Index of Aliphatic TPU grades under test performed using Xenon Arc Test Method UV Light.

Summary of benefits obtained by using aliphatic TPU:

1. **Long-term performance:**
 - Superior abrasion/scratch resistance
2. **High-class finish aesthetics:**
 - Non-yellowing
 - Strong colour stability upon UV exposure
 - Adequate for both light and dark colours
 - Unique staining resistance
3. **Cost-effective manufacturing solution:**
 - Fast cycling
 - High Flow
 - Low density
 - Lower rejects



For more information, please visit our web: www.lubrizol.com/Engineered-Polymers

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