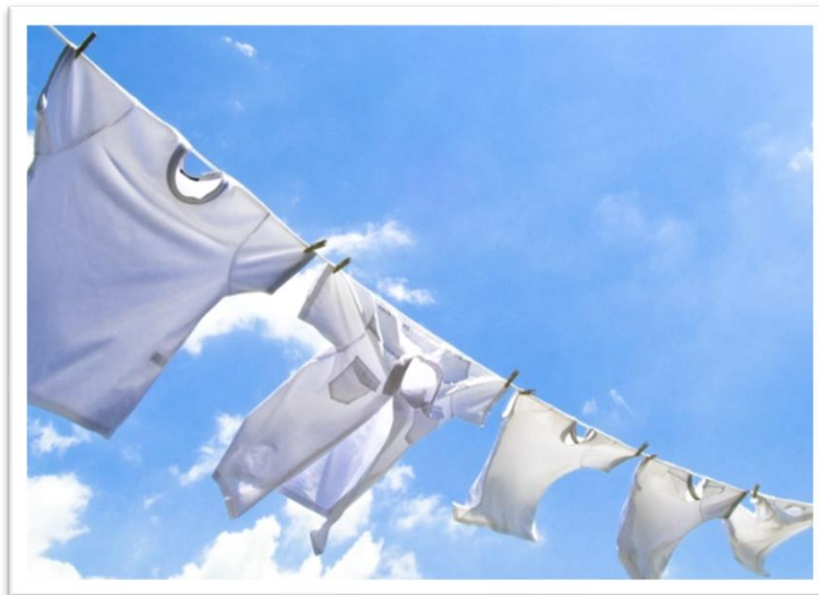


SOLUTION DATA SHEET

UV Resistant & Breathable Pearlbond 920L and 960 TPU For Hot Melt Adhesives



Markets	Technical Textiles, apparel (seam tapes, interlinings, heat-transfer labels), footwear and non-food conveyor belts
Polymer	Pearlbond thermoplastic polyurethane (TPU)
Key Benefits	<ul style="list-style-type: none"> • UV resistance and breathability • Soft and plasticizer-free TPU • Resistant to fungi and microorganisms • Very high hydrolysis resistance • High recovery

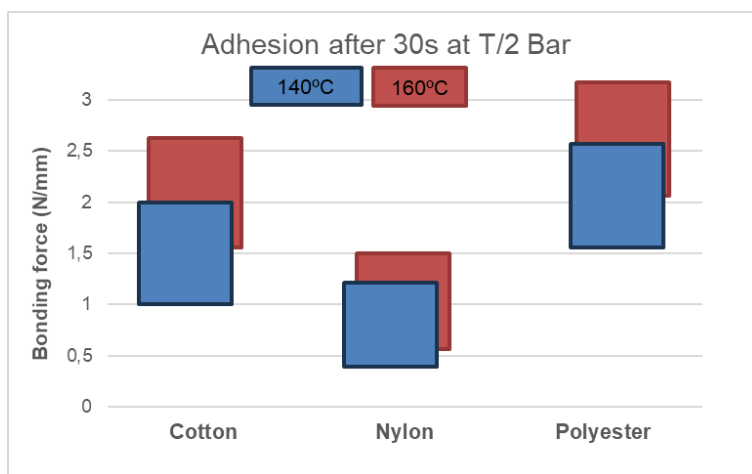
Over the years, Lubrizol has developed a broad range of high-performing thermoplastic polyurethanes for use in the fast moving and demanding hot melt adhesive (HMA) segment. The Pearlbond TPU series has been formulated to provide optimum technical solutions to the most delicate and stringent thermobonding needs. Pearlbond TPUs are known for their very high bonding strength, durability, and easy processing.

The information contained herein is believed to be reliable, but no representations, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications or the results to be obtained. The information is based on laboratory work with small-scale equipment and does not necessarily indicate end product performance. Because of the variations in methods, conditions and equipment used commercially in processing these materials, no warranties or guarantees are made as to the suitability of the products for the applications disclosed. Full-scale testing and end product performance are the responsibility of the user. Lubrizol Advanced Materials, Inc. shall not be liable for and the customer assumes all risk and liability of any use or handling of any material beyond Lubrizol Advanced Materials, Inc.'s direct control. The SELLER MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nothing contained herein is to be considered as permission, recommendation, nor as an inducement to practice any patented invention without permission of the patent owner.

The Pearlbond polymer series has been expanding the solutions available for HMAs for some years given the development of several new products and technologies. These innovations include added values to customers such as soft, plasticizer-free and fast-setting resistant materials.



Pearlbond 960 TPU is part of our soft, thermobonding polymer portfolio. It brings a unique combination of features in terms of softness (69 shore A), very high bonding strength to various substrates and durability. It is UV-stable and resistant to fungi and microorganisms thanks to its combined aliphatic and polyether backbone; this inherently results in improved mechanical properties. Its broad activation temperature range makes it the ideal solution from bonding delicate fabrics –such as leather, cotton, and elastic fibers–, to higher heat-resistant materials, e.g., polyester, polyamide, or metal. An example of the benefits follows below:



Tests according to standard method ASTM D1876. Test Conditions: Pressure 5 bar, time in press: 30 seconds, fabric specimens' size 50mm x 100 mm; Peel strength measured after 24 hours in stock (23°C/50% RH).

Figure 1: Adhesion of Pearlbond™ 960 TPU

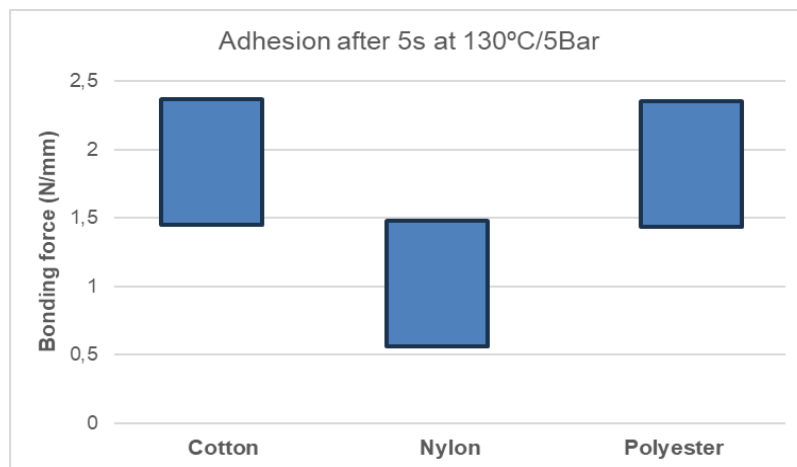
Pearlbond 960 TPU brings the added value of breathability with color stability and can be applied in a multitude of highly demanding end-uses such as apparel, automotive, aerospace, electronics, filtration, outdoor applications, among others.

Pearlbond 920L TPU has been specifically engineered for application processes where TPU was not applied before due to its high viscosity. This new grade with low viscosity can now be applied using gravure,

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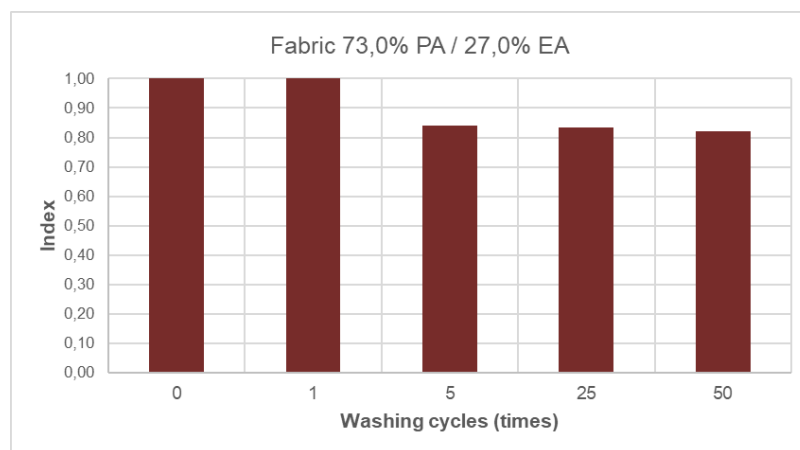
slot die, or roller equipment. Additionally, it can be ground, extruded into a film through blown extrusion, or formed into meshes via melt blowing.

This material exhibits excellent adhesion to various fabrics and offers high wash resistance.



Tests according to standard method ASTM D1876. Test Conditions: Pressure 5 bar, time in press: 5 seconds, fabric specimens' size 50mm x 100 mm; Peel strength measured after 24 hours in stock (23°C/50% RH).

Figure 2: Adhesion of Pearlbond™ 920L TPU



Test based on AATCC LP-1 2018.

Figure 3: Index of retained adhesion of Pearlbond™ 920L TPU after washing at 60°C

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Physical Properties	Pearlbond 920L	Pearlbond 960*	Unit	Test Method
MFI range	80 - 100	1-12	dg/min	ISO 1133
MFI Conditions	190°C; 2.16Kg	177°C; 2.16Kg		N.A.
Hardness (5 sec)	A/3: 82	A/3: 82	Shore A	ISO 868 / ASTM D-2240
Specific Gravity	1.11	1.08	g/cm ³	ISO 2781 / ASTM D-792
Tensile Strength	> 20	>25	MPa	ISO 527
Ultimate Elongation	> 800	>400	%	ISO 527
Tensile Stress at:				
- 100 % Elongation	> 3	>1.5	MPa	ISO 527
- 300 % Elongation	> 6	>2.5	MPa	ISO 527
Activation temperature	95 - 105	100	° C	Film 50 microns Kofler bank after 3 min.

**Properties after 3 weeks of curing.*

Table 1: Summary of the properties of both grades

Pearlbond TPU 920L and 960 grades provide better UV resistance and durability, ensuring consistent performance and protection against environmental elements. These add to the usual high performance of Pearlbond polymers and bring the added aesthetic appeal and durability over time, enhancing the longevity and visual quality of outdoor gear and goods.

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