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Polyethylene vs Biodegradable Bags: Mechanical Properties Comparison

Background: Customer is looking to replace a polyethylene bag with a biodegradable alternative; however, the mechanical properties must be comparable.

Purpose: To evaluate the mechanical properties of the submitted film and compare to EcoFilm and EcoWorks in similar film thicknesses.

Materials: Submitted Customer Film
 1 mil EcoFilm
 2 mil EcoFilm
 3 mil EcoWorks 10
 Oakland Series 500 Force Test Stand
 Elmendorf Tear Tester
 Micrometer

Method: ASTM D882
 ASTM D1922
 ASTM D6988

Procedure: All tests were carried out according to their standard procedures.

Results:

Mechanical Properties

<u>Property</u>		<u>Test Method</u>	<u>Units</u>	<u>EcoFilm</u>	<u>EcoFilm</u>	<u>EcoWorks</u>	<u>Customer's Film</u>
Caliper		ASTM D6988	mil	1.00	2.00	3.00	3.00
Breaking Factor	MD	ASTM D882	lbs/in	6.20	10.80	13.94	10.81
	TD	D882		6.35	10.31	15.11	9.87
Tensile Strength at Break	MD	ASTM D882	psi	6103.00	4805.50	4291.15	4014.75
	TD	D882		6048.50	4685.90	4873.20	3656.45
Elongation at Break	MD	ASTM D882	%	602.97	793.61	635.63	762.92
	TD	D882		679.75	812.08	749.71	895.73
Yield Strength	MD	ASTM D882	psi	674.80	1551.26	1891.47	1820.59
	CD	D882		1537.60	1602.35	1761.63	1698.87
Tear Strength	MD	ASTM D1922	mN	1192.90	4991.33	6215.62	1859.98
	CD	D1922		2668.32	5399.43	1679.48	10202.40



Conclusion: The tensile strength of the submitted film is comparable to the strength of both EcoFilm and EcoWorks. The cross direction tear resistance of the submitted film is significantly greater than both EcoFilm and EcoWorks; however the opposite is true for machine direction. Overall, 2 mil EcoFilm and 3 mil EcoWorks 10 appear to be comparable alternatives for the submitted polyethylene film from Customer.

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