



EASTOFLEX

amorphous polyolefin

Eastoflex E1003 Amorphous Polyolefin (APO)
as a Replacement for Polyisobutylene
in Hot Melt Sealants



EASTMAN

Eastoflex E1003 APO (propylene-ethylene copolymer) has been evaluated as an economical substitute for low molecular weight polyisobutylene (PIB) in hot melt sealant formulations. PIB is used in sealant formulations to improve low-temperature performance, adhesive properties, and resistance to moisture vapor. Both E1003 and PIB are nonpolar, saturated hydrocarbons with high resistance to moisture vapor. E1003 is generally resistant to oxygen and ozone, and like PIB, it can be blended with other sealant polymers to improve weather resistance.

Selected sealant formulations incorporating *Eastoflex* E1003 APO and PIB are shown in Table 1. Physical and adhesive properties are also given. Results indicate that the formulations containing E1003 exhibit slightly lower tensile strength and lap shear versus the PIB formulations, while weathering, peel strength, and moisture vapor transmission are improved. According to Table 1, the volatile content of the sealant formulations tested appears to be about the same. The results of these evaluations indicate that *Eastoflex* E1003 amorphous polyolefin can be used as a replacement for PIB in nonstructural sealant applications.

Table 1

Properties of Hot-Melt Sealant Formulations Containing *Eastoflex* E1003 vs. Polyisobutylene

Ingredients, g	Insulated Glass Sealant		Window Bedding Compound	
<i>Eastoflex</i> E1003	14	—	35	—
<i>Vistanex</i> LM-MS^a	—	14	—	35
<i>Kalar</i> 5214 butyl rubber ^b	21	21	—	—
Calcium carbonate ^c	25	25	60	60
<i>Eastotac</i> H-130L	35	35	—	—
<i>Indopol</i> H-1900 ^d	5	5	—	—
<i>Hisil</i> 233 ^e	—	—	5	5
Physical Properties				
Needle penetration—ASTM D1321, dmm				
Initial	37	30	38	44
After 7 days @ 140°F	36	28	45	42
Tensile strength—ASTM D412, psi	7	13	—	—
Elongation, %	960	1,080	—	—
Volatility @ 220°C, %	0.50	0.44	0.20	0.25
Moisture vapor transmission rate— ASTM E96-70, g/m ² /24h	13	21	—	—
Glass transition temperature (T _g), °C	–17	–23	–31	–24
Adhesive Properties				
Lap shear—ASTM C961-80, mPa				
Standard deviation	0.15	0.25	—	—
Type failure	0.03	0.04	—	—
180° Peel strength @ room temperature— ASTM C794-80, lb/in.				
Aluminum to glass	Cohesive	Cohesive	—	—
Type failure	—	—	8.2	6.7
Type failure	—	—	Cohesive	Cohesive
1,000h carbon-arc weatherometer aging— ASTM C793-75, appearance				
Type failure	Slight discoloration	Chalking, discoloration	Slight discoloration	Cracking

^aExxon Mobil Chemical

^bElementis Specialties

^cOmya, Inc.

^dBP

^ePittsburgh Plate Glass

Figure 1

Eastoflex E1003 vs. PIB in Sealant Formulations
After 1,000 Hours in Carbon Arc Weatherometer

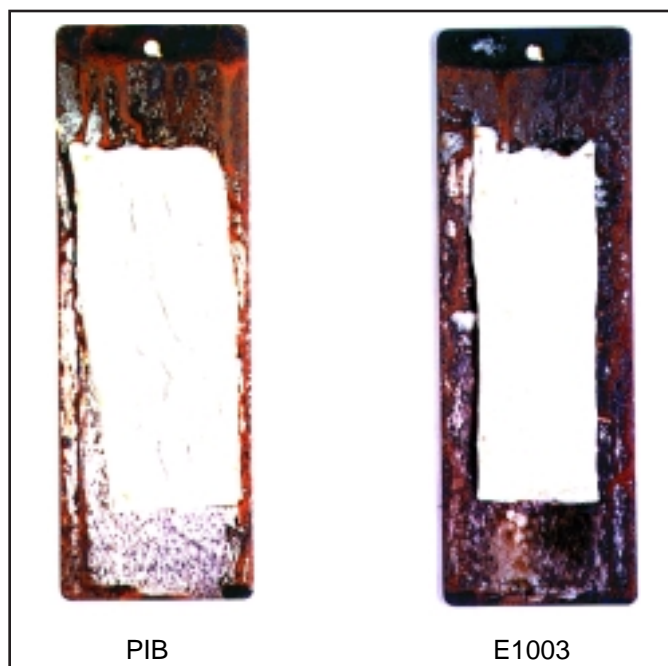


Figure 1 compares the two materials in window bedding formulations after 1,000 hours of accelerated weathering. The ability to resist attack by ozone or oxygen is a very important property of a sealant. Addition of APO hinders oxidative degradation to a sealant as indicated in Figure 1.

For more information concerning *Eastoflex* E1003 amorphous polyolefin, call your Eastman representative at the address shown on the back cover of this publication or email adhesives@eastman.com.

EASTMAN

■ NORTH AMERICA

Eastman Chemical Company Corporate Headquarters

P.O. Box 431
Kingsport, TN 37662-5280 U.S.A.

Telephone:
U.S.A. and Canada, 800-EASTMAN (800-327-8626)
Other Locations (1) 423-229-2000
Fax: (1) 423-229-1673
<http://www.eastman.com>

■ LATIN AMERICA

Eastman Chemical Latin America

9155 South Dadeland Blvd.
Suite 1116
Miami, FL 33156 U.S.A.

Telephone: (1) 305-671-2800
Fax: (1) 305-671-2805

■ EUROPE / MIDDLE EAST / AFRICA

Eastman Chemical B.V.

Customer Service Center
Weena 159-161
3013 CK Rotterdam
NETHERLANDS

Telephone: (31) 10 2402 111
Fax: (31) 10 2404 100

■ ASIA PACIFIC

Eastman Chemical Japan Ltd.

AIG Aoyama Building 5F
2-11-16 Minami Aoyama
Minato-ku, Tokyo 107-0062 JAPAN

Telephone: (81) 3-3475-9510
Fax: (81) 3-3475-9515

Eastman Chemical Asia Pacific Pte. Ltd.

#05-04 Winsland House
3 Killiney Road
Singapore 239519 SINGAPORE

Telephone: (65) 6831-3100
Fax: (65) 6732-4930

Material Safety Data Sheets providing safety precautions that should be observed in handling and storing Eastman products are available online or on request. You should obtain and review the available material safety information before handling any of these products. If any materials mentioned are not Eastman products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed.

Neither Eastman Chemical Company nor its marketing affiliates shall be responsible for the use of this information, or of any product, method, or apparatus mentioned, and you must make your own determination of its suitability and completeness for your own use, for the protection of the environment, and for the health and safety of your employees and purchasers of your products. No warranty is made of the merchantability or fitness of any product, and nothing herein waives any of the Seller's conditions of sale.

Eastman, Eastoflex, and Eastotac are trademarks of Eastman Chemical Company.

© Eastman Chemical Company, 2003.