

PLASTICS



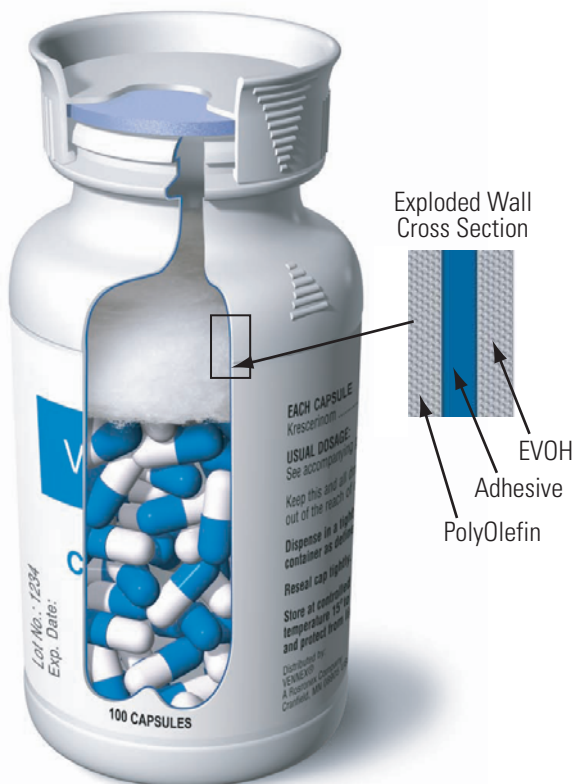
StabilitySolutions™ BARRIER

Alcan Global Pharmaceutical Packaging – Plastics has developed a ground breaking new product for the pharmaceutical industry with its **StabilitySolutions™ BARRIER** container for dry products. Using co-extrusion blow molding capability, this patent pending technology incorporates ethylene vinyl alcohol (EVOH) sandwiched between two layers of high density polyethylene (HDPE). This approach results in pharmaceutical bottles providing remarkable oxygen barrier coupled with the reliable moisture barrier characteristics afforded by mono-layer HDPE containers.

Product Benefits and Features

- Patent pending
- The employed EVOH grade meets Code of Federal Regulations¹ for use in direct contact with food.
- EVOH provides remarkable barrier characteristics to oxygen and other permeating gases.
 - Sandwiching the EVOH layer between two layers of polyolefin protects the EVOH from the adverse influence of relative humidity while at the same time providing the desired moisture barrier characteristics.
 - Target thickness of the EVOH layer is 1.5 mils, but can be tailored to any desired level to provide the optimum in desired oxygen barrier characteristics.
- Adhesive blended into the polyolefin adheres to the EVOH layer.
 - The adhesive may be used up to 10% when blended in HDPE for direct contact with dry food² without free surface fat or oil. With the required extraction efforts, the potential exists to expand the types of food for direct contact.
 - The adhesive may be used up to 5% when blended in PP in direct contact with all food types under Conditions of Use B-H for dry, aqueous, acidic, and low alcohol (up to 15%) foods, and Conditions of Use C-G for fatty and high alcohol (greater than 15% alcohol) foods³.
- Regarding employed HDPE or PP:
 - Grades capable of being extrusion blow molded should be employed
 - Thicknesses of layers can be customized to provide optimized product moisture barrier protection and container physical structural properties
 - Layers can be colored as normally done with mono-layer containers.
- Samples of 75035, White, HDPE / EVOH, 75cc Square WMP containers are available. Other samples can be made if desired.
- Existing extrusion blow molding tooling can be used for creation of high oxygen barrier containers.

Tri-Layer Container



PLASTICS



Technical Details

Container Oxygen Permeation Projections

Example permeation rate of EVOH:

0.01 ccO₂ . mil / 100 in² . day . atm @ 20°C; 65% RH
Since air is 21% O₂, for exposure of a package in air,
multiply the calculated projection by 0.21

cc Permeant = A cc x (1 mil / B mils) / (100 in² / C in²) x day x atm

Where: **A** is the permeation rate of the barrier material in cc's.
 B is the thickness of the barrier material in the container
 C is the surface area of the container

Container: 1 mil thick EVOH layer and 100 in² surface area:

ccO₂ = (0.01 x 1/1) / (100 / 100) = 0.01x day x atm @ 20°C; 65%RH
In air: 0.01 x 0.21 = 0.0021 ccO₂ x day @ 20°C; 65%RH

Container: 1 mil thick EVOH layer and 200 in² surface area:

ccO₂ = (0.01 x 1/1) / (100 / 200) = 0.01 / 0.5 = 0.02 x day x atm @ 20°C; 65%RH
In air: 0.02 x 0.21 = 0.0042 ccO₂ x day @ 20°C; 65%RH

Container: 2 mil thick EVOH layer and 100 in² surface area:

ccO₂ = (0.01 x 1/2) / (100 / 100) = 0.005 x day x atm @ 20°C; 65%RH
In air: 0.005 x 0.21 = 0.00105 ccO₂ x day @ 20°C; 65%RH

Container: 1.8 mil thick EVOH layer and 25 in² surface area:

ccO₂ = (0.01 x 1/1.8) / (100 / 25) = 0.0056 / 4 = 0.0014 x day x atm @ 20°C; 65%RH
In air: 0.0014 x 0.21 = 0.00029 ccO₂ x day @ 20°C; 65%RH

¹ Title 21 Section 177.1360

² Food Type VIII per the Code of Federal Regulations Title 21 Section 176.170(c)


³ per the Code of Federal Regulations Title 21 Section 176.170(c)

ALCAN PACKAGING

GLOBAL PHARMACEUTICAL

Alcan Packaging - Plastics headquarters
4350 Haddonfield Road - Suite 222
Pennsauken, NJ 08109 USA
Phone +1 856-324-3200 or
+1 866-99-ALCAN
Fax +1 856-765-2121
Internet: www.alcanpackaging.com
Email: plasticinnovation@alcan.com

 Des Plaines, Illinois USA
Milville, New Jersey USA
Youngsville, North Carolina USA

 Cayey, Puerto Rico

 Diadema, Brazil

