Flexible Packaging Association

Wal-Mart Scorecard
Multi-Layer, Multi-Material Flexible Packaging

Flexible Packaging Association
Guidance for Determining the "Majority Material"

Preamble

Currently, the only way to designate a multi-layer multi-material flexible structure in the Wal-Mart scorecard is to designate it as a) aseptic package, pouches, cartons, b) metallized Mylar, or c) paperboard bases – aseptic package (all under Mixed Materials), or d) composite cans.

Designating a flexible structure as a), b), c) or d) gives it a Post Consumer Content of 0, a Recycled Value of 0, a CO2 Emissions Per Ton value of 2.5, and a Material Health/Safety rating of Medium.

A more accurate and equitable treatment of a multi-layer multi-material flexible structure takes into account all the major materials that comprise the structure. Such a treatment would change the Post Consumer Content, CO2 Emissions Per Ton, and Material Health/Safety rating for a particular structure. Designating a multi-layer multi-material flexible structure by its majority components should not change the Recycled Value from 0.

Recognize that currently the Wal-Mart scorecard contains background data on only a limited number of polymers, papers, and foils (see below). Background data on the materials includes GHG Emissions, Recycle Rate, Post Consumer Content, and Material Health/Safety. (Much of this data is currently under revision.)

While the more accurate methodology would be to designate all the components in a flexible structure and estimate each one's contribution to data for the composite, that approach has been deemed too complicated for the Phase I version of the scorecard. For Phase I, Wal-Mart has indicated that multilayer structures should be designated by the majority (largest mass % by weight) material that is in the structure. This document proposes an approach to follow to consistently determine the largest mass % of material in a multi-layer multi-material flexible structure. The proposed guidelines pertain to designating multilayer flexible structures that can not be separated (peeled apart) easily.

source reduction
less waste in the *first* place.®

971 Corporate Boulevard • Suite 403 • Linthicum, Maryland 21090
phone: 410.694.0800 • fax: 410.694.0900 • e-mail: fpa@flexpack.org • web: www.flexpack.org

This document proposes an approach to consistently determine the largest mass % by weight of material in a multi-layer multi-material flexible structure for data entered into the Wal-Mart packaging scorecard. It should not be construed as the FPA's endorsement of the methodology or algorithm used in the Wal-Mart packaging scorecard.

Proposed Approach for Determining the Largest Mass % of Material in a Multi-layer Multi-material Flexible Structure for the Wal-Mart (Phase I) Scorecard

Consider all layers in the multilayer structure.

Except for aluminum foil (which has a high specific gravity), ignore layers with thickness on the order of 10 μ (0.4 mils) or less such as

- Ink
- Print
- Metallization
- Coatings, laquers
- Adhesives
- Tie layers

Ignore minor components on the order of 10% or less in blends such as

- Additives: slip, antiblock, antistat
- Colorants

For the layers considered, determine whether the overall structure is majority polymer, paper, or metal foil based on the wt % of each material class in the structure.

If structure is majority polymer

1) Determine what polymer is presented in the greatest wt % and designate that as Polymer X
2) Enter the structure as "Multilayer film – majority Polymer X"
3) Scorecard will/should use the majority polymer when calculating GHG

If structure is majority paper, designate structure as "Multilayer film – majority paper."

If structure is majority metal foil, designate structure as, for example, "Multilayer film – majority aluminum foil."

Until Wal-Mart rewrites the retail link and modeling software to allow the designation "Multilayer film – majority Polymer X," as described under the "Beta System Software" multilayer structures should be designated as Polymer X. This has the effect of the scorecard's granting higher Recycled Value and Post Consumer Content for some multi-layer multi-material structures (depending on their polymer designation) but is the inevitable result of Wal-Mart's insistence on designating a structure as a single (majority) material in the Phase I version of their packaging scorecard.

Examples

Paper-foil pouch
50 gm/m^2 CIS paper // 7 μ foil // 30 μ LLDPE
Paper is frequently cited in weight per area whereas foil and polymers are usually reported as thickness. Ignore adhesive laminating layers (designated by //)
On a weight basis this structure is 50 gm/m^2 CIS paper//19 gm/m^2 foil//27.5 gm/m^2 LLDPE (obtained by converting thickness to weight per unit area by multiplying thickness by density and applying the appropriate unit conversion). Thus structure is majority paper.
Designation: "Multilayer structure - majority paper"

Poly-foil pouch
12 μ PET // 12 μ Al foil // 50 μ LDPE
Ignore adhesive laminating layers (designated by //)
On a weight basis this structure is 17 gm/m^2 PET / 38 gm/m^2 foil / 46 gm/m^2 LDPE.
Thus structure is majority polymer, ~25% PET and ~75% LDPE.
Designation: "Multilayer structure - majority LDPE"

Potato Chip Bag
0.7 mil BOPP (thin sealant layer) / 0.6 mil LDPE laminating layer / 0.7 mil metallized BOPP
Structure is majority polymer.
Ignore metallization and thin sealant layer (less than 10 μ).
Structure is 70% PP and 30% LDPE by thickness. Since resin densities are similar the structure is majority PP by weight also.
Designation: "Multilayer structure - majority PP"

Trail mix SUP

PET	0.6 mil
Mah-PE	0.15 mil
LDPE	1.13 mil
LLDPE	0.23 mil
Mah-PE	0.03 mil
EVOH	0.24 mil
Mah-PE	0.032 mil
LLDPE	0.19 mil
LLDPE	1.08 mil

Structure is majority polymer.
Ignore mah-PE tie layers and thin EVOH layer (both less than 10 μ or 0.4 mils).
(Use 1.28 for PET density, 0.918 for LLDPE density, 0.920 for LDPE density)
Structure is 24% PET, 32% LDPE, 43% LLDPE.
Designation: "Multilayer structure - majority LLDPE"

Cereal liner

HDPE	1.27 mil
tie	0.16 mil
EVOH	0.21 mil
tie	0.13 mil
seal	0.36 mil

Structure is majority polymer.
Ignore mah-PE tie layers and thin EVOH layer as both are less than 10 μ.
Seal layer boarders on being of enough bulk to consider, but it is considerably less bulk than the HDPE layer. If the seal layer is multi-layer multi-material, none of the layers would be of enough bulk to "compete" with the HDPE bulk.
Designation: "Multilayer structure - majority HDPE"

Barrier film

HDPE	20 %
HDPE	20 %
tie	10 %
EVOH	20 %
tie	10 %
LDPE	10 %
LDPE	10 %

Structure is majority polymer.
Ignore tie layers. EVOH is clearly minority polymer, and total LDPE is less than total HDPE.
Designation: "Multilayer structure - majority HDPE"

Tetra Brik
PE / paper / PE / Al foil / PE / PE
Tetra Pak describes the structure as 75% paper, 20% PE, 5% foil
Structure is majority paper.
Designation: "Multilayer structure - majority paper"

Barrier SUP
15μ printed PET / 2μ adhesive / 100μ LLDPE
Structure is majority polymer.
Ignore printing and adhesive layer.
Structure is majority LLDPE.
Designation: "Multilayer structure – majority LLDPE"

Recloseable SUP (cosmetics)
48 gauge printed PET / 48 gauge met-PET / LLDPE blend
Structure is majority polymer. What polymer is majority can only be determined via a dialog between Brand Owner and Converter.

Fresh-cut salad mix

OPP	0.7 mil
adhesive	
70% LLDPE, 30% EVA	0.5 mil
30% MDPE, 70% LLDPE	1.0 mil
50% plastomer, 50% LLDPE	1.0 mil

Structure is majority polymer.
Ignore adhesive layer.
PE's are majority polymers. LLDPE is ~60% of PE containing layers.
Designation: "Multilayer structure - majority LLDPE"

Issues

Issues with this approach:

- CPGs may not have structure composition and should rely on converters to supply details or the structure designation ("multilayer structure – majority X").
- Converters may not have details of different films supplied to them, e.g. sealant films, barrier films, etc. Determination of final structure designation will have to be developed via dialog between converter and supplier.
- Converters should be able to calculate wt % of each material in a structure based on specific gravity or density of each material.

Materials currently listed in the Scorecard

Polymers:

EVA	Nylon	PHA	Starch
HDPE	PEN	PLA	Starpol 2000
LDPE	PET		Starpol 3000
LLDPE	PC		Starpol Wrap 100
MDPE	PS		
PP	PVC		
Beta System ***majority PE, PP,PET, Nylon, Styrenic Resins***			

Metal & Other:

Aluminum
Glass
Steel

Wood & paper:

Coated freesheet	Coated recycled paperboard	Recycled folding boxboard	Dimensional lumber
Uncoated freesheet	Uncoated recycled paperbpoard	Supercalendered	MD fiberboard
Coated groundwood	Coated unbleached Kraft paperboard		Molded pulp pkg
Uncoated groundwood	Uncoated unbleached Kraft paperboard		Wood, cotton, hemp
Bleached corrugated	Uncoated bleached Kraft paperboard		
Unbleached corrugated	Solid bleached sulfate paperboard		
Semi-bleached corrugated			
Mini flute corrugated			
Waxed corrugated			
Wax alternative corrugated			
Preprinted corrugated			

Mixed Materials:

Aseptic pkg	Metallized Mylar
Composite can	Paperboard bases

List of Abbreviations, Acronyms, & Conversion Factors

1 mil = 0.001 inches = 25.4 microns = 100 gauge
mah = maleic anhydride grafted polymer
met = metallized (a thin layer of aluminum is deposited on the surface of the polymer or paper)
PE = polyethylene
PET = polyethylene terephthalate
LDPE = low density polyethylene
LLDPE = linear low density polyethylene
PP = polypropylene
BOPP = biaxially oriented polypropylene
OPP = oriented polypropylene (OPP is usually BOPP rather than mono-oriented PP)
BOPE = biaxially oriented polyethylene
Adh = adhesive
PA = polyamide (nylon)
PC = polycarbonate
PS = polystyrene
HDPE = high density polyethylene
MDPE = medium density polyethylene
EVA = ethylene vinyl acetate
EVOH = ethylene vinyl alcohol
PLA = polylactic acid
PHA = polyhydroxy alkanoate
SBS = solid bleached sulfate (a type of paperboard) – note that styrene-butadiene-styrene polymer is also abbreviated SBS
PVC = polyvinyl chloride
PEN = polyethylene napthalate
GHG = green house gas