COLONIAL BAG CORPORATION

Can Liner Training Program – Volume II

I. TYPES OF CAN LINERS MADE TODAY:

Trash can liners are usually manufactured using:

A. Linear Low Density Polyethylene
B. High Density Polyethylene
C. Reprocessed (Repro) Polyethylene
D. Hi/Lo Blended Technology (Colonial Bag Exclusive)

A. **LINEAR LOW DENSITY:** (Thickness designated in mils or in terms of strength such as light, medium or heavy).

About 60% of the trash bags sold today are made from Linear Low Density resin of which there are several popular grades: Butene, Hexene and Super Hexene. Butene was the first Linear Low Density resin introduced and it dominated the market during the 1980's until stronger Hexene resins became available. Today, most manufacturers use some variation of Hexene resin or Hexene blend and have adopted terminology such as "Super Resin," "Premium Resin," "Ultra Strong," etc., to designate and differentiate their product. **Colonial Bag**, along with other manufacturers, have developed a line of Super Hexene liners that offer exceptional performance at reduced gauges. Linear Low Density products feature greater tear resistance and are widely accepted in all market segments.

B. **HIGH DENSITY:**
(Thickness designated in microns, such as 16 micron).

The remaining 40% of the market belongs to liners manufactured from High Density Polyethylene. High Density's molecular structure produces greater strength than Linear Low Density, allowing for thinner film to be used. This down gauging results in lower cost per bag and has contributed to the continued growth of the High Density market share. High Density Products feature superior puncture resistance and are surprisingly strong despite their reduced thickness.

Some drawbacks to High Density Liners are:

1) Once punctured, High Density bags are prone to "zippering". Improved resin technology, however, has decreased the "zippering" effect and it is not as dramatic as it was in the past, although some end users continue to perceive it as such.
2) Some customers do not like the "crinkly" feel of High Density.
3) There are still skeptical customers who are not convinced that thinner gauge High Density bags will perform adequately.

C. **REPROCESSED POLYETHYLENE:**
(Thickness designated in mils, such as 1.5 mil).

Some manufacturers offer a line of heavy gauge recycled material ("repro") liners. These liners, although they are much thicker than their Hexene counterparts, are not always as strong as they feel. Despite their thickness, "repro" bags generally perform poorly in Dart Impact and Tear Tests.
Since these bags are made from an ever-changing source of recycled film, their integrity is very inconsistent and can vary dramatically from batch to batch.
Also, since most trash bags end up in landfills, "repro" bags contribute excessive plastic into our waste stream without offering significant performance benefits.

D. **HI/LO BLENDED TECHNOLOGY:**
Colonial Bag's new Hi/Lo series of can liners are made from a proprietary blend of Hexene and High Density resins. Featuring the best properties of both resins, these incredibly strong liners are a perfect substitute for reprocessed type bags. They are competitively priced and offer the consistent, dependable performance that reprocessed style liners frequently fail to deliver, while reducing the amount of waste stream plastic.

II. THICKNESS AND STRENGTH RATINGS:

In the past, it was much easier to tell the difference between can liners. High Density Liners were just being introduced, leaving most of the market to Low Density liners. These liners were designated by thickness such as 1.0 mil Light, 1.5 mil Medium, 2.0 mil Heavy, and 3.0 mil X-Heavy, and all manufacturers used the same uniform technology
for their products.

Around 1980, a stronger material called "Linear Low Density" was introduced. This stronger material allowed manufacturers to start down gauging their products while maintaining performance. Unfortunately, each manufacturer down gauged at their own pace leaving the industry without uniformity. As Linear Low Density resins continued to improve, further down gauging continued, resulting in considerably reduced gauges and the introduction of strength ratings in place of actual mil thickness.

This scenario led to confusion and has made it difficult to make an accurate comparison between manufacturers. Today's market is filled with an abundance of different resins and resin combinations, and film thickness is no longer a satisfactory standard for judging overall strength. Instead of stating the actual gauge thickness, terminology such as "Light," "Medium," "Heavy," and "Extra Heavy," has been adopted. In order to simplify bag selection, Colonial Bag has designated maximum load ratings on all can liners. This method allows the end user to select his can liner by performance vs. terminology.

This leads us to ask:

Why isn't gauge important?

Why Isn't Gauge Important?

The development of improved **LLDPE** resin in the liner industry has completely changed the standard method for selecting the correct can liners. These materials have allowed manufacturers to produce thinner, lighter trash bags which are stronger and more durable than the thicker bags previously made from **LDPE**. This is why gauge is no longer an effective way to determine liner strength. Each manufacturer has its own blend of formulations so the proportions of these materials vary from one producer to another.

The best way to determine the correct liner is to actually test some suggested samples. Some tests that we can conduct in our factory, such as the Elmendorf Tear Test and the Dart Drop Test, can also be helpful in determining the proper liner, but actual field testing provides the best results.

To help customers determine the proper liner, Colonial Bag has developed a "max load" designation for each of our liners. The "max load" refers to the maximum weight in pounds that each bag will hold during normal use.

See the following conversion chart which highlights strength ratings, gauges and microns.

Conversion Chart

LLDPE = Linear Low Density Polyethylene

HDPE = High Density Polyethylene

STRENGTH RATING = A rating that compares today's linear low density bags to their true gauge equals of 15–20 years ago.

CURRENT INDUSTRY DESIGNATION	VIRGIN LLDPE MIL THICKNESS RANGE	OLD FASHIONED STRENGTH RATING	HDPE EXPRESSED IN MICRONS	HDPE EXPRESSED IN MILS
Refuse Wt. Light —	.30 to .45	1.0	6	.23
Light	.40 to .50	1.25	7	.27
Medium	.45 to .65	1.50	8 to 11	.31 to .43
Heavy	.58 to .80	2.0	12 to 14	.47 to .55
Tuff or X-Heavy	.70 to 1.0	3.0	16 to 19	.62 to .75
Super Tuff or XX-Heavy1.1 to 2.0	4.0	20 to 24	.79 to .94	

Definitions And Formulas

Here are some definitions and formulas that you may find useful:

MIC — Short for micron, one millionth of a meter, or one thousandth of a millimeter. Used to designate the thickness of high density bags.

MIL — A unit of measurement in thousandths of an inch, i.e., .001 mil = one thousandth of an inch or 1 mil. Used to designate the thickness of linear low density bags.

To convert microns to mil, divide the micron by 25.4 to arrive at the true mil thickness.

To convert mil to microns, multiply the mil by 25.4 to arrive at the true micron thickness.

Different Styles of Can Liners

GUSSETED STYLE

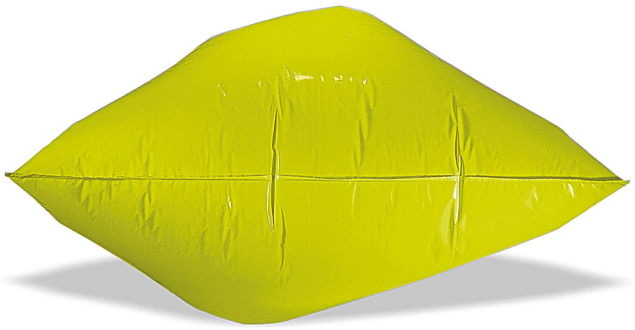
A flat style bag manufactured with both sides tucked in to form gussets. Where indented, you have to seal through four layers of film while the middle of the bag has only two layers. This leads to an inherently weak bottom seal.

Designated in three dimensions, i.e., 23 x 17 x 46

FLAT STYLE

Just as the name infers, a flat bag is simply a two-dimensional bag with a bottom seal. Flat bottom bags are generally leakproof but are very clumsy to handle. Also, they do not conform very well to the shape of most trash receptacles.

Designated in two dimensions, i.e., 40 x 46



X-SEAL STYLE

Colonial Bag was instrumental in developing the high-tech X-SEAL trash bag, now on the leading edge of trash bag engineering.

Designed without gussets, the X-SEAL eliminates gaps along the seal where leaks can occur. This unique design allows the bag to conform to your container's shape and distributes the weight of the refuse evenly around the bag. X-SEAL liners maximize the bag's carrying capacity and virtually eliminate leaks.

The high-performance, super strong X-SEAL bag is an effective answer to those leaking bag problems — and the X-SEAL saves you time and money in clean up costs too!

Designated in two dimensions, i.e., 40 x 46

Unique X-SEAL design eliminates seal "gaps" for a virtually leak-proof liner.

III. SELLING VS. TAKING AN ORDER

Questions that an order taker may ask (which are important by the way) and additional questions that you can use to help sell your liners.

Order taker

1. What size are you using?
2. What thickness are you using?
3. What color?
4. What quantity do you use?

Seller

1. Are the liners working up to your expectations?
2. Can I see the carton?
3. Can I view the application?
4. Do the bags fit properly?
5. Can I have a sample?
6. Have you ever tried high-density?

If you need to measure a receptacle to determine proper bag size, use the formula below.

Measuring Instructions to Determine Proper Bag Size for Any Receptacle

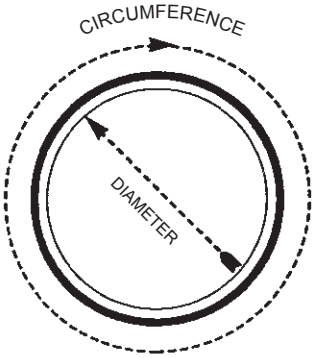
FOR ROUND RECEPTACLES

WIDTH OF BAG REQUIRED =
diameter of receptacle x 3.14 (pi) ÷ 2

HEIGHT OF BAGS REQUIRED =
1/2 diameter of receptacle + 6" (for overhang) + height of receptacle

DIAMETER is the distance across the top of the receptacle

CIRCUMFERENCE is the distance around the top of the receptacle

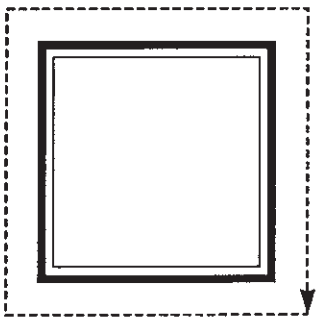


Example: Container is 30" tall with a diameter of 24".
Width: 24 x 3.14 = 75.36 ÷ 2 = 37.6
Height: 30 + 12 + 6 = 48
Bag Required: 38 x 48

FOR SQUARE OR RECTANGLE RECEPTACLES

WIDTH OF BAG REQUIRED =
the total of all four sides ÷ 2

HEIGHT OF BAGS REQUIRED =
1/2 the smallest of the four sides + 6" (for overhang) + height of receptacle



Example: Container is 22 x 16 x 44
Width: 22 + 22 + 16 + 16 ÷ 2 = 38
Height: 44 + 8 + 6 = 58
Bag Required: 38 x 58

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