

PCR Overview: Plastic Containers Molded with Post-Consumer Regrind

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HDPE

Empire/Emco has supplied HDPE bottles molded with 25% PCR content since 2004, beginning with industrial/chemical customers such as Eastman Kodak Company.

As clean, reliable sources for post consumer regrind have expanded; we have increased PCR content to 50% for salon and mass market health and beauty lines. We currently supply the salon market, for example, with a one liter pearlescent cream-colored bottle molded from 50% PCR/50% virgin HDPE.

Empire's engineering department has sampled bottles ranging from 25% to 100% PCR content with no dimensional or performance issues. Shrinkage variations may be .001" to .002" different due to the wide range of brands of HDPE blended into PCR during the recycling stage, although not enough to affect SPI dimensions and closure interface.

Limitations

1. Cleaning process during recycling to eliminate colorant, deco inks, label adhesives, and contaminants dulls and perceptively grays / yellows the resin. This reduces the brightness and richness of bottles molded with PCR. (virgin natural HDPE resin pellets are bright and natural, whereas PCR pellets are dull and hazy-even from reliable clean streams of PCR such as with our major supplier, KW Plastics).

This is important in sampling and educating key personnel such as Q/C and Q/A, as well as Sales/Marketing, as regardless of color (natural, white, color, pearl) a 100% virgin HDPE bottle set beside a PCR blended bottle (even at 25% PCR) will appear brighter and richer.

2. Batch to batch of PCR resin produces variations in molding from run to run. The PCR stream is in constant flux so that we have established enhanced incoming Q/C procedures on raw material to ensure quality. Just the same one run may be more pristine than the next.
3. PCR bottles molded in Natural have a slight gray or yellowness (especially on bottom at parting line where there is more plastic). They also may have streaking, as well as intermittent bright flecks of green or blue from the colorant of previous bottles. For this reason industrial products use 25%, as the greater the PCR content the greater the probability. Labeling / decorating helps mask these imperfections. Colorant helps mask these properties as well.
4. PCR resin is more expensive than virgin due to collection, recycling process versus producing virgin. Typically PCR increases bottle cost by 3 to 6%.

Practice

"Aveda "(salon and spa products) use 80% - 95% PCR. "Aveda's" HDPE bottles are molded in a full range of earth tone colors including beige, brown, green, blue, grey and black. In our opinion, the added benefit of these colors, beyond promoting Aveda's all natural formulas and striking packaging design, is to mask any imperfections or inconsistencies in the PCR resin stream including the dullness (whereas a bright pink color will appear dull, an earth tone color will not).

Guideline

Final color sampling is recommended at the target PCR levels for customer approval.

PET

“Aveda”, S.C Johnson, and several other major brands have played key roles in commercially developing and expanding the use of PCR in PET containers. PET bottles molded with 25% and 50% PCR content have become common with national brands as reliable streams of PCR have increased. “Aveda” pioneered 100% post-consumer PET for the Health & Beauty market.

PCR PET containers have excellent clarity with a slight grey hue. In many cases the grey hue is imperceptible in the body of the container and noticeable only by inspecting the thread area. With the addition of many products, or the addition of colorant to the container for transparent or opaque colors, the grey hue disappears.

The quality of PCR PET packaging depends upon the PCR stream. Major brands have developed clean, reliable sources which maximizes the quality. Smaller volume users are faced with greater issues such as variations in clarity, and intermittent colored specks, batch to batch. In all cases though, the fact that the majority of PET containers being recycled are clear, makes them less susceptible to specks than HDPE.

PET PCR is more expensive than virgin PET due to collection, recycling process versus producing virgin. PCR increases PET bottle cost by 5% or more.

Guideline

Final color sampling is recommended at the target PCR levels for customer approval.