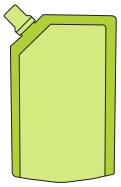
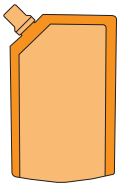
STREAMLINED LIFE CYCLE ASSESSMENT*

SPOUTED POUCH COMPARISON

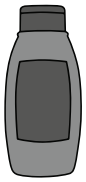
Shampoo is often sold in a rigid package, but with more companies looking to find ways to reduce their environmental impacts, some are considering the use of flexible packaging as a solution. In this streamlined LCA, two separate SUP samples are presented as an alternative. The difference between the 2 SUPs is based on the materials used and post-consumer recycled (PCR) content included in the structure. A product volume of 1 liter (33.8 fl. oz) was used for the comparison.



PCR METALIZED SPOUTED SUP



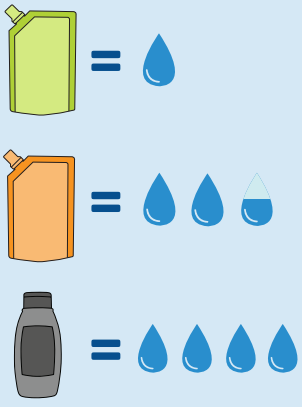
TRADITIONAL SPOUTED SUP



HDPE BOTTLE W/ FLIP TOP

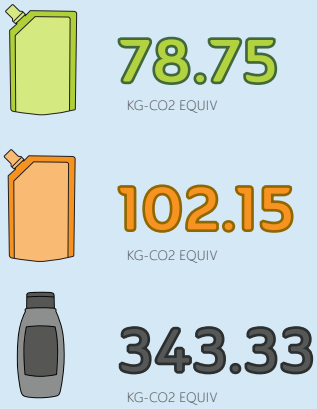
Water Consumption

The spouted pouches result in substantial reduction in water use (-73.93%) vs. the HDPE bottle. The bottle uses more material & blow molding which uses water to cool, leading to the higher overall water use. The PCR options result in nearly half the water usage as the traditional spouted pouch. The overall water usage for PCR is less than the water needed in the polymerization in the production of virgin plastic.



Greenhouse Gas Emissions

The spouted pouches resulted in far less GHG emissions than the HDPE bottle. The SUP options all utilize layers of materials that are adhesively laminated with an injection molded spout. Again, the lower weight of the pouches is the main driver in overall emissions reductions, with the PCR spouted pouch option having lower emissions than the traditional spouted pouch.



Fossil Fuel Consumption

The pouch options result in a significant reduction in fossil fuel use compared to the HDPE bottle. The traditional spouted pouch uses more fossil fuel than the PCR metalized SUP since it leverages a slightly heavier structure (20.73g vs. 19.14g). Additionally, the structure that contains PCR has a further reduction over the traditional SUP since it utilizes a large overall percentage of PCR material.

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*All environmental impact metrics were developed using the streamlined life cycle assessment tool, EcoImpact-COMPASS®

END OF USE SUMMARY

SOURCE REDUCTION BENEFITS

According to the U.S. EPA Waste Hierarchy, the most preferred method for waste management is source reduction and reuse.

A major benefit of flexible packaging is the high product-to-package ratio that it offers.

RECOVERY BENEFITS

POST-CONSUMER RECYCLED (PCR) METALIZED SPOUTED SUP

1x

amount of material ending up as municipal solid waste

TRADITIONAL SPOUTED SUP

1.2x

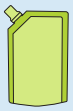
amount of material ending up as municipal solid waste

RIGID HDPE BOTTLE W/ FLIP TOP CLOSURE

4.1x

amount of material ending up as municipal solid waste

High material efficiency:



0.5662 G/FL. OZ.

(G OF PKG/FL. OZ.)

Low material efficiency:

2.51 G/FL. OZ.

(G OF PKG/FL. OZ.)

The HDPE bottle results in substantially more material being discarded at the end of life when taking into consideration estimated current recycling rates for HDPE bottles (18%) vs. the PE-based SUP options, where no recycling credit was given for the pouches, since they are multi-material.

IMPLICATIONS

The results show that the spouted pouch variations all have lower environmental impacts including fossil fuel usage, GHG emissions, and water usage in this scenario than the rigid HDPE bottle. The spouted pouch options have a considerably better material efficiency value. This is largely driven by the pouches utilizing about 20-25% of the amount of material as the rigid bottle option.

FORMAT	FOSSIL FUEL CONSUMPTION (MJ-EQUIV)	GHG EMISSIONS (KG-CO^2 EQUIV)	WATER CONSUMPTION (L)	MATERIAL EFFICIENCY (G OF PKG/FL. OZ.)	PKG LANDFILLED (G)/1,000 KG PRODUCT)
PCR METALIZED SPOUTED SUP 	1439.43 (-83.49%)	78.75 (-77.06%)	30,385 (-73.93%)	0.5662g / fl. oz.	17,363 (-73.1%)
TRADITIONAL SPOUTED SUP 	2200.36 (-74.77%)	102.15 (-70.25%)	70,142 (-39.82%)	0.6359g / fl. oz.	19,495 (-69.7%)
HDPE BOTTLE W/ FLIP TOP 	8720.3	343.33	116,549	2.51g / fl. oz	64,428

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*For more information and methodologies of assessments, please visit **www.flexpack.org** or **www.glenroy.com** to download Glenroy's "A Streamlined Life Cycle Assessment Comparison for Glenroy® Stand-up Pouch with Fitment Options vs. Rigid PET (with pump) & HDPE Bottles for Shampoo" report.*