HUSKY®

Essential Guide to Lightweighting

Lightweighting is good business

Lightweighting as a business strategy has been around for a long time. It's a simple concept that makes sense – every gram of resin you remove from a finished preform or closure reduces your production costs and increases your profitability.

It's also a great way to achieve your sustainability goals and make your business future-ready.

But while lightweighting is good business, successfully lightweighting your packaging has its challenges. To ensure the successful implementation of a lightweighting initiative, it's essential to conduct a deep assessment of your needs and goals. It also takes a lot of research, careful planning, preparation, and investment.

At Husky, we have decades of package development and design experience. We've taken this experience and created a guide that gives PET packaging professionals like you the key information you need to strategically and effectively plan and incorporate lightweighting into your operation.

In this guide, we will cover:

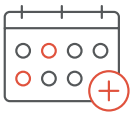
- ✓ Why you should consider lightweighting
- ✓ Why a balanced approach is key to lightweighting success
- ✓ The four main lightweighting methods
- ✓ Real-world examples of successful lightweighting implementations
- ✓ Why you should partner with Husky
- ✓ Husky's lightweighting savings calculator
- ✓ BONUS SECTION – Combine lightweighting and tethered closure strategies for maximum sustainability

Why should you lightweight?

Lightweighting can bring many benefits to your business.

Reduce Part Costs – By reducing the amount of resin required for each part you produce, you lower your overall material and production costs, and create a long-term positive impact on your profitability.

Differentiate Yourself in the Market – Lightweighting gives you the rare opportunity to rethink and redesign how you package your products, and to strategically create packaging that enhances the consumer experience and differentiates you from your competitors.

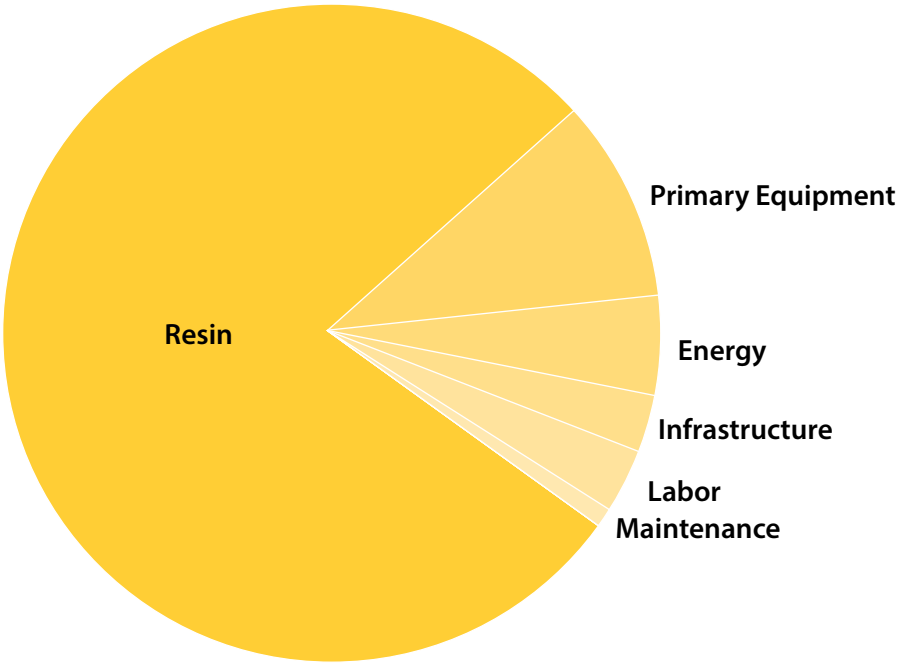


Be Future-Ready – Governments and regulatory bodies all over the world are mandating legislation around the use of single-use plastics. While lightweight beverage packaging is not currently mandatory in most jurisdictions, regulatory trends indicate this could become a reality in the coming years. If tighter regulations come into effect in markets that you serve, developing and implementing a lightweighting strategy today could save your business considerable disruption, time, and costs in the future.

Reach Sustainability Goals – Reducing the amount of plastic in each unit you produce is great for the environment, and for meeting the demands of eco-conscious consumers. Lightweighting also goes hand-in-hand with rPET adoption, providing more sustainable packaging and enabling the circular economy.

How much can you save by lightweighting?

Lightweighting is one of the best ways to significantly reduce production costs. For most beverage packaging operations, resin typically accounts for about 80% to 90% of the overall cost.



Husky's lightweighting solutions can help customers achieve resin savings of 10% or more per unit. And with the average cost for PET in 2021 estimated to be approximately $850 USD per metric ton*, reducing your resin usage can result in considerable cost savings for your operation.

Resin Savings %	**Resign Weight Savings** (Based on 1 metric ton of resin)	**Cost Savings** (Based on $850 USD per ton)
2.5	25 kg (55.12 lbs.)	$21.25
5	50 kg (110.23 lbs.)	$42.50
7.5	75 kg (165.35 lbs.)	$63.75
10	100 kg (220.46 lbs.)	$85

To see how much you can save, try Husky's Lightweighting Savings Calculator.

*https://www.statista.com/statistics/1171088/price-polyethylene-terephthalate-forecast-globally

A balanced approach to lightweighting

Lightweighting is a proven, viable way to lower production costs and reduce resin usage. But lightweighting beyond what is necessary can be too much of a good thing – that is – lightweighting to the point of negatively impacting a package's functionality, consumer experience, performance or shelf life.

When considering how to lightweight your packaging, it's important to take a balanced approach.

That means lightweighting to achieve the lightest packaging possible, while maintaining bottle performance, package integrity and product freshness.

That's why, when you are assessing how to lightweight your packaging, it's important to work with a provider with experience and expertise in successfully helping companies create packaging that balances sustainability, cost savings, performance and consumer experience.

Lightweighting methods

There are four main lightweighting methods:

1. New neck and closure
2. Existing neck and closure
3. Body
4. Base

Tooling scope and packaging line impact

When making any changes to your packaging line operation, it's important to remember that changing one aspect could affect other components of your operation.

For example, depending on what you are trying to achieve with your lightweighting system – i.e. – to minimize downtime, increase product protection, or minimize investment – your tooling will require stack parts and possibly plate assemblies.

So, when implementing a lightweighting conversion, it's important to be mindful of the complete process and to work with a partner with experience optimizing the conversion scope.

METHOD 1
Lightweighting your existing neck and closure system

PCO 1881 - 5.76 g

Lightweight PCO 1881 - 0.62 g Savings

Switching from a PCO 1881 neck finish to a lightweight PCO 1881 neck can result in resin savings of 0.62 grams per unit.

Whatever neck finish you use, it's likely you can save resin by lightweighting the neck. If you are using a standard neck finish, one way you can save on resin is by converting the existing neck to the newest lightweight version. This has three main advantages:

1. It lightweights your package
2. You can keep the same preform body
3. Your closure can remain the same

Changing to a lightweight version of the same neck design lets you reduce the amount of resin used for producing each unit, while eliminating the time-consuming exercise of redesigning your package and switching to a completely different closure. This is the simplest to execute of all the lightweighting methods and allows you to maintain your package's existing design, which ensures operational consistency and an uninterrupted consumer experience. For the closure, we can achieve further weight reduction with the use of sophisticated simulation tools, and in some cases, we can generate weight reduction with a tethered closure.

METHOD 2
New lightweight neck and closure system

You can achieve greater resin savings for your neck and closure dispensing systems by converting to a new lightweight dispensing system.

For example, depending on your application, you could switch from a PCO 1881 to the new 26/22 CSD GME30.40 neck finish, which provides savings of almost 1.5 grams of resin between the neck finish and closure.

PCO 1881 - 5.76 g

Lightweight GME30.40 System - 1.48 g Savings

By changing from a PCO 1881 neck and closure dispensing system to a lightweight GME30.40 dispensing system, you can achieve 1.48 grams of resin savings per unit.

The lightweight GME30.40 dispensing system can incorporate a tethered closure, which allows for considerable market differentiation, as well as compliance with any forthcoming legislation.

Include a tethered closure for a win-win solution

If you decide to design a new lightweight neck and closure system, you could achieve even greater benefits by incorporating a tethered closure system.

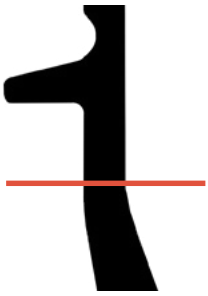
Tethered closures ensure the closure always stays connected to the bottle, without impeding drinking or pouring functionality.

With tethered closures, you can differentiate your product, achieve greater sustainability, and future-proof your business by being prepared to meet the compliance of any forthcoming legislation.

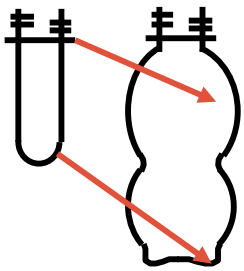
For more on tethered closures, see the BONUS section on page 14.

METHOD 3
Body Redesign

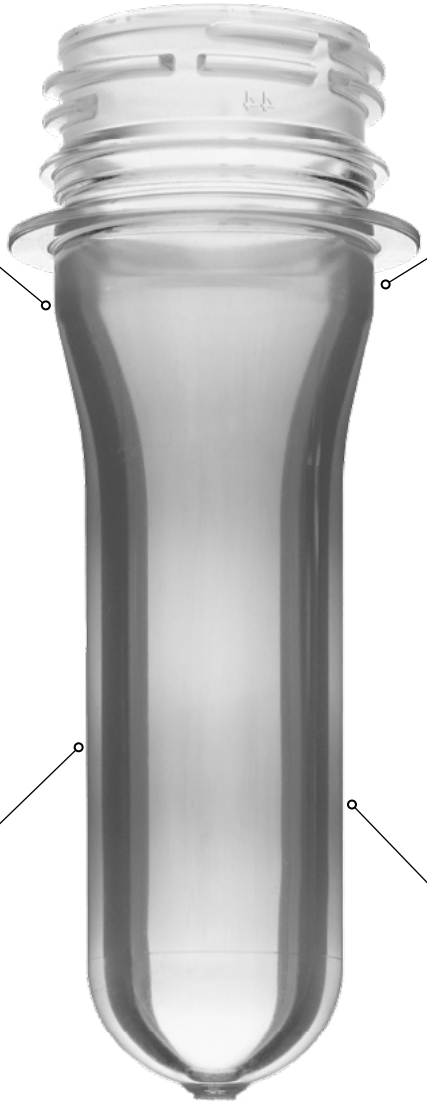
The third method for lightweighting entails making changes to the body of the preform to use less resin. This can be done in two ways – by thinning the preform walls or by modifying the design.

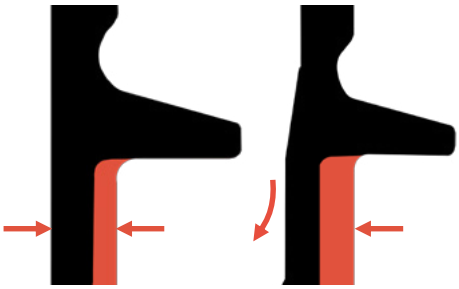


1. **Parting Line Position**
Recent tooling developments have led to greater flexibility in positioning the parting line, which opens a range of design solutions while optimizing the mold replacement components.

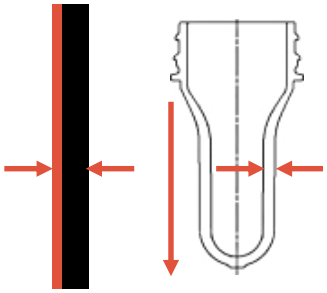


2. **Stretching Ratios**
The improvements made on blow molding equipment offer extended possibilities for stretch ratios and container design, which support lightweighting capabilities. This increased stretching also allows for greater flexibility in package design while using less resin.



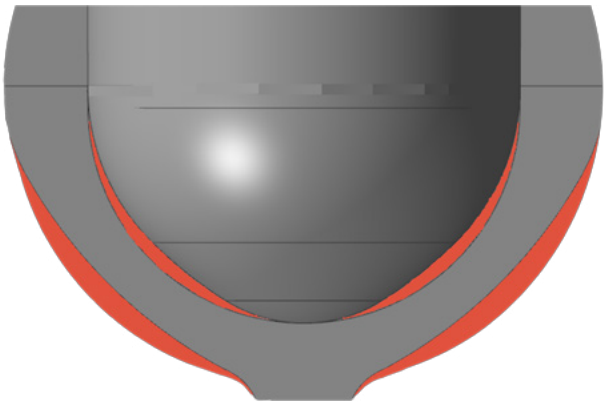


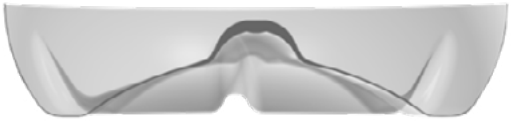
3. **Underside of Support Ledge**
The underside of the support ledge can be made thinner and the inner wall of the package under the support ledge can be redesigned and optimized to allow for a reduction in the amount of resin required.



4. **Body Wall Thickness**
Reducing the body wall thickness is one of the most common and effective ways to lightweight a package.

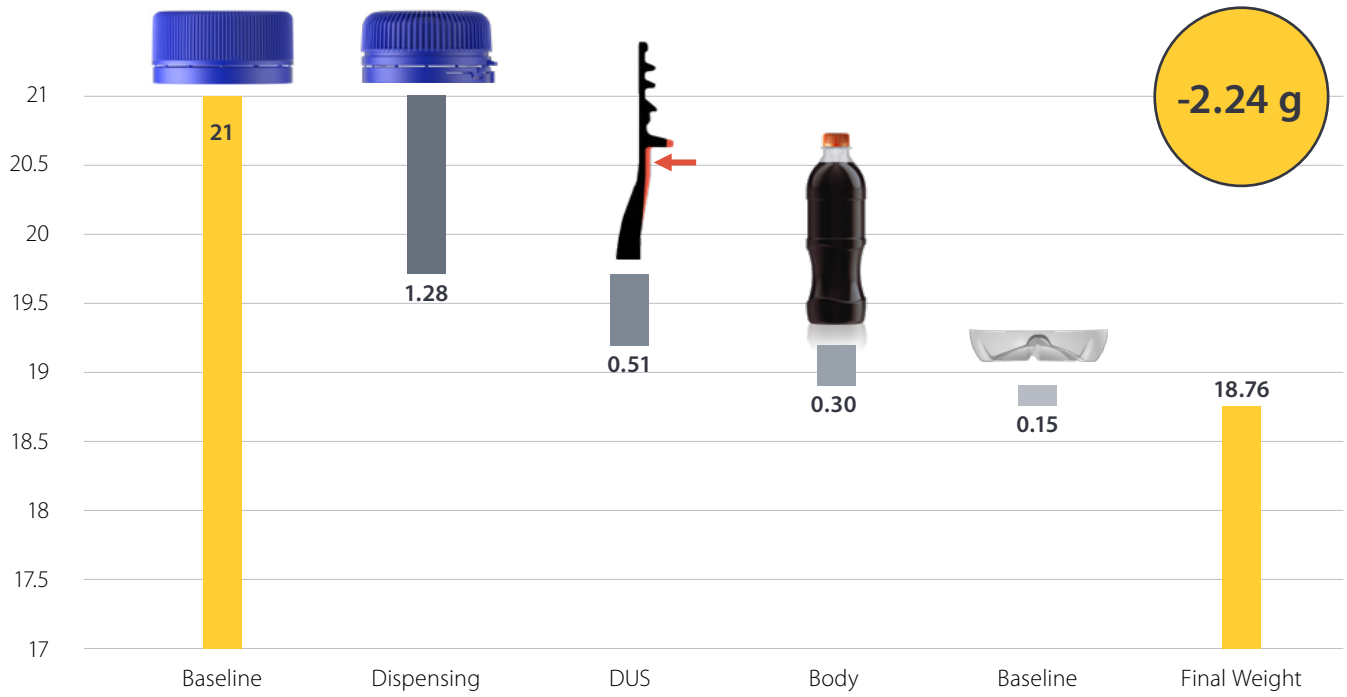
METHOD 4
Base Redesign





The fourth method involves redesigning the base of the preform to use less resin. Husky has developed a proprietary design called EcoBase, which minimizes resin usage in the bottle base and reduces the overall package weight by up to 2.5%, all while achieving the same level of base performance.

CASE STUDY #1
10% weight reduction for a 500ml carbonated soft drink bottle



In this example, a Husky customer wanted to lightweight a 500ml carbonated soft drink (CSD) bottle that used a 21-gram PCO 1881 preform, which is a common preform design for packaging premium 500ml CSD applications.

Husky's lightweighting approach

Starting with the neck, Husky worked with the customer to convert the existing finish to a GME30.40, which saved the customer 1.28 grams of PET per package.

After reviewing the existing bottle and bottling line, Husky engineers worked with the filling line equipment OEM to adjust the transition area beneath the support ledge, resulting in an additional 0.5-gram PET savings.

Husky then worked with the OEM on the bottle body and found an opportunity to lightweight the body of the package by an additional 0.3 grams.

Finally, Husky added an EcoBase design that reduced the resin in the base by another 0.15 grams.

Results

Starting with a 21-gram bottle, Husky worked with the customer and OEM partner to achieve a 2.24-gram (or 10.67%) PET weight reduction across the entire package, all while maintaining the customer's expected bottle performance.

CASE STUDY #2
More than $1 million USD in savings

In this example, a Husky customer was using a PCO 1881 neck finish for a 300ml carbonated soft drink (CSD) bottle and wanted to see how they could lightweight to save on the production of the 800 million units produced annually.

Husky's lightweighting approach

Husky worked with the customer to review available options and recommended converting the existing neck and closure dispensing system to the 26/22 CSD GME30.40 solution. Husky then partnered with the customer to ensure a successful implementation of the lightweighting solution.

Results

By converting to the 26/22 CSD GME30.40 solution, Husky helped this customer reduce the package weight by 1.48 grams per unit. With 800 million units produced annually, this translates to a savings of 1,184 metric tons of resin, 3,011 metric tons of carbon emissions, and $1 million USD in production costs. With these savings, Husky estimates the customer will recoup its investment within two years.

Why Husky?

Equipment plays a tremendous role in the lightweighting potential of an application.

When selecting your equipment provider, you need to ensure you partner with a company that has the experience and expertise in converting to a lightweight system, that knows how to create effective package design, has the tooling resources to help you modify your molds, and can help you set up a seamless operation.

Husky

At Husky, we have the people, tools and resources to enable you to build a complete, integrated lightweight dispensing system that produces quality products and helps you achieve your business and sustainability goals.

Our technology enables our customers to lightweight the complete package, providing industry-leading options and flexibility. We have the preform to bottle design optimization capabilities, in-house expertise, and tooling conversion services to produce high-quality, lighter weight applications to ensure the success of any lightweighting project.

We work closely with our OEM partners to continuously refine and evolve our injection molding technology, helping customers achieve greater resin and cost savings, while maintaining the highest requirements for package performance and consumer experience. All our projects are ROI-focused, with some approaches offering quick turnarounds, allowing customers to recoup their investment in as little as a few weeks.

Get Started Today – Try Husky's Lightweighting Calculator

If you are ready to start your lightweighting project, Husky is here to help. Get started by contacting us today, or try our instant lightweighting calculator to quickly and accurately estimate the cost savings you could achieve through lightweighting.

Calculate Your Savings!

BONUS: The ultimate combo – lightweighting and tethered closures

If you are considering lightweighting your package, now is the perfect time to start developing your tethered closure strategy.

The European Union has passed legislation mandating the use of tethered closures for single-use plastic containers (SUP). The state of South Australia has passed its own comprehensive legislation on SUP. Canada is developing legislation, and we expect tethered closures to be mandated in other major markets moving forward.

Lightweighting and tethered closures go hand-in-hand. Both initiatives are great for achieving your sustainability targets, future-proofing your business by getting a head start on any forthcoming legislation, and limiting disruption to your operation by executing two strategies at the same time.

It also demonstrates your company's innovative and forward-thinking approach to packaging and helps to differentiate your products against your competition.

To learn more about how you can develop your tethered closures strategy, check out Husky's Essential Guide to Tethered Closures, or contact us.

Download Our Guide

With Husky, you can convert to a lightweight dispensing system in as little as 6 weeks. Contact us to book your conversion assessment to see how much you can save.

Get in Touch »

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