

### Example: Packaging System Survey

A manufacturing company makes two products, one a 150g product in a 30g bottle and the second, a 300g product in a 50g bottle, and sells both in cases of 12 or 24 units. Each product is packed on a standard wooden pallet and stretch wrapped before despatch.

The required data and sales volumes are shown in the table below:

Product Name	Bottle Weight	Bottles per Case	Case Weight	Cases per Pallet	Pallet Weight	Stretch wrap Weight	Annual Volume (units)
150g product 12s	30g	12	150g	75	25kg	160g	20,000
150g product 24s	30g	24	200g	50	25kg	200g	10,000
300g product 12s	50g	12	250g	60	25kg	160g	15,000
300g product 24s	50g	24	300g	40	25kg	200g	7,500

Knowing the quantities and weights of each component allows the total packaging system weight to be calculated. In this example, one case of bottles is defined as the stock keeping unit and the packaging weights are calculated for each case. The proportion of the pallet weights and stretch wrap weights are also added to the total packaging weights for the case so that all of the primary, secondary and tertiary elements of the system are included:

Product Name	Total Bottle Weight	Case Weight	Pallet Weight	Stretch Wrap Weight	Packaging System Weight
150g product 12s	30g x 12	150g	25kg/75	160g/75	0.845kg
150g product 24s	30g x 24	200g	25kg/50	200g/50	1.424kg
300g product 12s	50g x 12	250g	25kg/60	160g/60	1.269kg
300g product 24s	50g x 24	300g	25kg/40	200g/40	2.130kg



Note also that a 'Packaging Ratio' can be derived for the amount of packaging used per product. These ratios are shown in the table below:

Product Name	Annual Volume	Product Weight	Total Product Weight	Packaging System Weight	Packaging Weight placed on Market	Packaging Ratio
150g product 12s	20,000	1.8kg	36,000kg	0.845kg	16,900kg	47%
150g product 24s	10,000	3.6kg	36,000kg	1.424kg	14,240kg	40%
300g product 12s	15,000	3.6kg	54,000kg	1.269kg	19,035kg	35%
300g product 24s	7,500	7.2kg	54,000kg	2.130kg	15,975kg	30%
<b>Weighted Totals</b>			<b>180,000kg</b>		<b>66,150kg</b>	<b>37%</b>

This is useful because it shows which packaging systems are most efficient. Looking at the 'Packaging System Weights' in isolation would suggest that the '300g bottle 24s' contributes the most amount of packaging. While this may be true, it is also the most efficient packaging system as it contains the least amount of packaging per weight of product (30kg of packaging per 100kg of product).

By considering the sales volumes, a weighted ratio can be obtained for all products. The above example gives a weighted packaging ratio of 37% for the four products considered.

So this example has calculated the total packaging system weight for each of the products sold by the company, and also shows which products have the most efficient packaging systems. It also allows an overall weighted packaging ratio calculated for the company's products. This means that benchmarks can be taken for individual products, or the company as a whole.