

## Bottle Shape vs Plastic Consumption

A Technical Infographic Guide | Packaging Decoded

### 1. Same Volume. Different Plastic Use.

All bottles represent the same 300 ml fill volume. However, geometry directly influences surface area and resin consumption.

Bottle Type	Geometry Complexity	Material Efficiency
Round	Lowest surface area	★★★★★
Oval	Moderate surface increase	★★★★
Square	High surface + corners	★★★
Sculpted Premium	Highest surface complexity	★★

### 2. Wall Thickness & Reinforcement Impact

Non-cylindrical bottles require structural reinforcement to pass top load and drop tests.

- Corners require thickness compensation
- Flat panels need ribbing reinforcement
- Bases are thickened for load-bearing performance
- Preform weight increases to maintain minimum thickness

### 3. Gram-Weight Comparison Example (300 ml PET Example)

Bottle Type	Avg Gram Weight	Extra Plastic vs Round	% Increase
Round	24 g	0 g	Baseline
Square	28 g	+4 g	+16%
Sculpted	30 g	+6 g	+25%

### 4. Annual Production Impact (2 Million Units Example)

If annual production is 2,000,000 units:

- Square bottle adds ~8,000 kg extra plastic annually
- Sculpted bottle adds ~12,000 kg extra plastic annually
- At ₹120/kg resin → ₹1,440,000 additional cost
- At 2.5 kg CO<sub>2</sub>/kg PET → 30,000 kg additional CO<sub>2</sub> footprint

### Strategic Insight

Bottle shape is not just a design decision. It is a material, cost, and sustainability decision.