



The **US Pyramid Project** is a **501(c)3** dedicated to solving the global freshwater crisis.

# Cube Lifespan, Materials & Manufacturing

*Our Patent was developed & is exclusively owned by the USPP.*

## Summary

The Cube is designed to last **20 Years**

Each Cube contains **\$9-\$17 of Plastic** per Cube.

Assuming a 10% loss and assuming the highest market price, each Cube is projected to cost a maximum of **\$20 per Cube** and potentially cost as low as **\$12 per Cube**.





# Our Goal to Restore the Colorado River

## Picking the Right Plastic

Plastics suitable for our desalination Cube must:

- Handle hot saltwater (80–145°F)
- Have good heat retention/ insulation
- Be moldable
- Be Environmentally Safe.
- Be Transparent or Mostly Translucent



### Conclusion:

The top recommendation was **PP-R (Polypropylene Random Copolymer)** due to its balance of properties.



## Calculating the Plastic

The total plastic volume for one desalination cube, based on the components you listed, is **532.625 cubic inches** (approximately **8.73 liters** or **0.308 cubic feet**).

Here's the breakdown of the calculations (all dimensions in inches, volumes in cubic inches):

- **Cube Top & Bottom:**  $(\frac{1}{2}'' \times 12'' \times 12'') \times 2$   
→ Each piece:  $0.5 \times 12 \times 12 = 72 \text{ in}^3$   
→ Total for 2 pieces:  $72 \times 2 = \mathbf{144 \text{ in}^3}$
- **Cube SAM (Surface Area Maximizer) Trays:**  $(11'' \times 11'' \times \frac{1}{8}'') \times 13$   
→ Each piece:  $11 \times 11 \times 0.125 = 15.125 \text{ in}^3$   
→ Total for 13 pieces:  $15.125 \times 13 = \mathbf{196.625 \text{ in}^3}$
- **Cube Sidewalls:**  $(12'' \times 16'' \times \frac{1}{4}'') \times 4$   
→ Each piece:  $12 \times 16 \times 0.25 = 48 \text{ in}^3$   
→ Total for 4 pieces:  $48 \times 4 = \mathbf{192 \text{ in}^3}$

**Grand total volume** =  $144 + 196.625 + 192 = \mathbf{532.625 \text{ in}^3}$

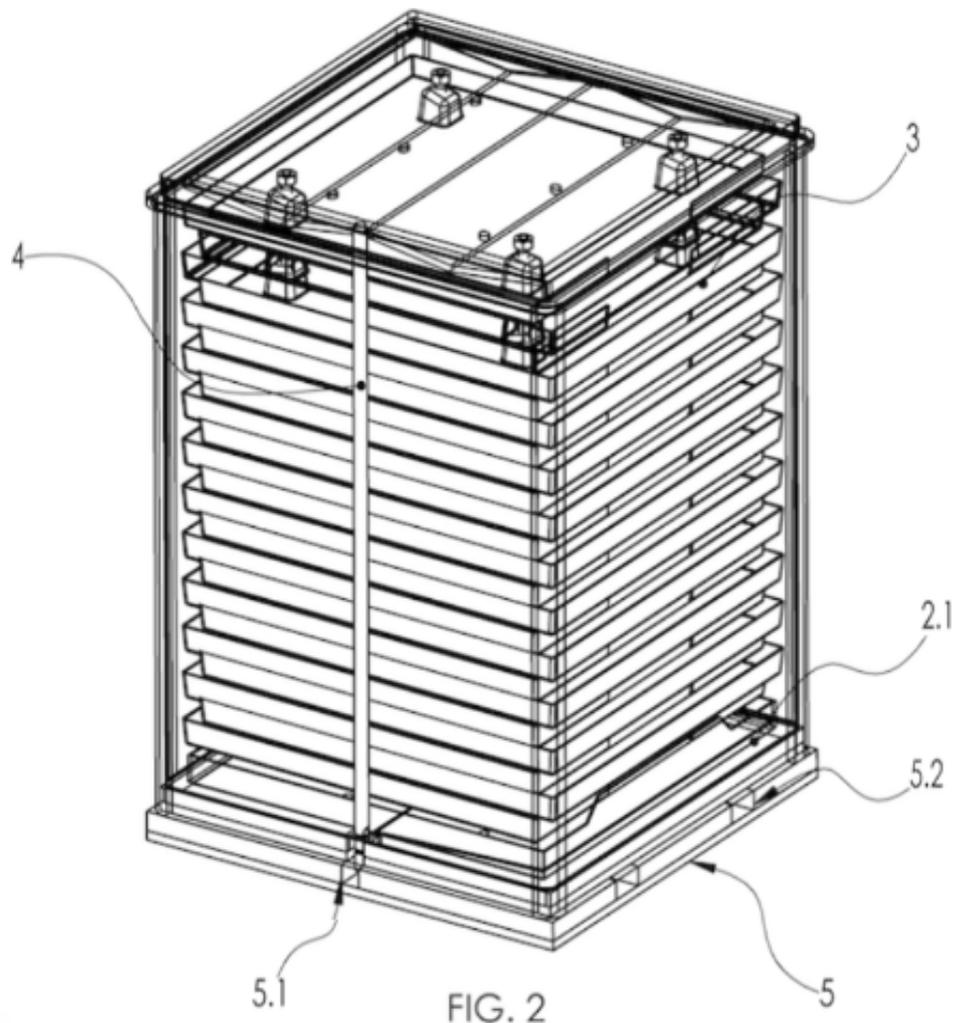
For estimating plastic weight (and thus cost)

Plastic volume is often converted to weight using material density, since bulk resin is priced per kg.

- Convert to  $\text{cm}^3$ :  $532.625 \text{ in}^3 \times 16.387064 \approx 8,728 \text{ cm}^3$
- Typical densities ( $\text{g}/\text{cm}^3$ ):
  - PP-R or PP:  $\sim 0.90\text{--}0.91$
  - HDPE:  $\sim 0.94\text{--}0.96$
  - ABS:  $\sim 1.04\text{--}1.06$
  - PVC:  $\sim 1.38\text{--}1.40$  (rigid)

Using a rough average of  $0.95 \text{ g}/\text{cm}^3$  (good midpoint for PP-R/HDPE-focused builds):

→ Estimated weight  $\approx 8,728 \text{ cm}^3 \times 0.95 \approx \mathbf{8.29 \text{ kg}}$



Bulk prices (approximate, based on early 2026 market rates) for ABS, PVC, and HDPE, assuming calculations for a cube structure's plastic volume. Here's a summary table of the plastics and their approximate bulk prices per kg (in USD, reflecting global averages from early 2026 data; prices can vary by supplier, quantity, grade, and region—e.g., lower in Asia, higher in Europe/North America):

<b>Plastic Type</b>	<b>Key Properties Discussed</b>	<b>Approximate Bulk Price (USD/kg)</b>
PP-R (Polypropylene Random Copolymer)	Recommended for heat/insulation needs; moldable, safe for environment.	\$1.05–1.30
ABS (Acrylonitrile Butadiene Styrene)	Durable, impact-resistant; suitable for structural parts.	\$1.65–1.95
PVC (Polyvinyl Chloride)	Cost-effective, corrosion-resistant; good for pipes/tubing.	\$0.80–1.00
HDPE (High-Density Polyethylene)	Tough, chemical-resistant; ideal for containers.	\$0.95–1.15
MABS (Methyl Methacrylate ABS, transparent)	Clear variant of ABS; less common, higher cost.	\$2.20–2.80
Clear Rigid PVC	Excellent transparency; cheaper than MABS but may limit max heat tolerance.	\$0.90–1.10

Using our earlier bulk price ranges (early 2026 USD/kg for resin/granules), here are the approximate costs of the Plastic per Cube:

Plastic Type	Est. Weight (kg) at 0.95 g/cm <sup>3</sup> density	Approx. Material Cost Range (USD)
PP-R	~8.3 kg	\$8.70 – \$10.80
ABS	~8.3 kg (but density ~1.05 → ~9.2 kg)	\$15.20 – \$17.90
PVC (rigid)	~8.3 kg (but density ~1.4 → ~12.2 kg)	\$9.80 – \$12.20
HDPE	~8.3 kg	\$7.90 – \$9.50

This is raw material cost only—doesn't include processing (injection molding, extrusion, assembly waste, etc.), **which can add 10-20%**.