

carboncalcpcf.com

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53.06 kgCO₂e

TOTAL CARBON FOOTPRINT

53.06 kgCO₂e

TOTAL FOOTPRINT

20.02 kgCO₂e/kg

CARBON INTENSITY (PER KG)

Steel (recycled)

TOP MATERIAL HOTSPOT

Use Phase

PRIMARY EMISSION STAGE

Lifecycle Stage Breakdown

Raw Material Acquisition & Processing	15.36% (8.15 kgCO ₂ e)
Manufacturing	7.02% (3.72 kgCO ₂ e)
Transport (Upstream & Downstream)	24.11% (12.80 kgCO ₂ e)
Use Phase	52.77% (28.00 kgCO ₂ e)
End-of-Life	0.75% (0.40 kgCO ₂ e)

Material Carbon Impact (Total: 8.15 kgCO₂e)

Steel (recycled) (1.5 kg)	3.30 kgCO ₂ e
ABS Plastic (0.8 kg)	2.80 kgCO ₂ e
Lithium-ion Battery (0.1 unit)	1.20 kgCO ₂ e
PCBA (0.05 unit)	0.75 kgCO ₂ e
Cardboard Packaging (0.2 kg)	0.10 kgCO ₂ e

Key Insights (Emission Hotspots)

- **Use Phase Dominance:** The product's operational energy consumption over its 5-year lifespan accounts for 52.77% of its total footprint, making it the largest emission hotspot.
- **Significant Logistics Impact:** Transport, particularly downstream last-mile delivery, contributes significantly, representing 24.11% of total emissions.
- **Material Choices Matter:** Raw material acquisition and processing constitute 15.36% of the PCF, with Steel (recycled) identified as the top material impactor.

Action Plan for Reduction

- **Optimize Use Phase:** Focus on improving the energy efficiency of the product and educate users on sustainable usage practices.
- **Decarbonize Logistics:** Explore cleaner transport modes (e.g., rail, sea freight for longer distances), optimize routes, and invest in electric or alternative fuel vehicles for last-mile delivery.
- **Innovate Materials:** Continue to investigate and integrate lower-carbon materials, prioritize suppliers with robust decarbonization strategies, and increase the use of recycled and sustainably sourced inputs.
- **Advance Circularity:** Leverage the existing advanced take-back program and high recyclability, further exploring closed-loop systems and product-as-a-service models.

Report Generated: May 24, 2026 | Standard: GHG Protocol | System Boundary: Cradle-to-Grave

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