

✓ **CARBONCALPCF.COM**
VERIFIED

Ref: BA-PCF-2026-GSK-0894

Industrial Composite Flange Gasket

Functional Unit: 1.0 unit (0.350 kg)

Boundary: Cradle-to-Gate

Standard: GHG Protocol + 2026 LSR

Supply: Europe / Mfr: Other

TOTAL PRODUCT FOOTPRINT

1.239

kg CO₂e per unit

Carbon Intensity



3.54 kg CO₂e/kg

Net mass basis (0.350 kg product)

Top Material Hotspot



EPDM Polymer

39.55% of total (0.490 kg CO₂e)

Dominant GHG Scope



Scope 3 (81.4%)

1.009 kg CO₂e upstream supply chain

Inventory Completeness



98.4%

Exceeds ≥95% 2026 GHG threshold

GHG Protocol Scope Allocation

100% Boundary



Scope 3 Upstream Supply

1.009 kg (81.4%)

Scope 2 Electricity (Grid)

0.162 kg (13.1%)

Scope 1 Thermal Gas / Fuels

0.068 kg (5.5%)

Material Mass Share vs. Carbon Contribution

Contribution Analysis

EPDM Synthetic Rubber (0.200 kg)	39.55% CO ₂ e 57.1% Mass
304 Stainless Steel Insert (0.100 kg)	25.42% CO ₂ e 28.6% Mass
Purchased Electricity (0.410 kWh)	13.07% CO ₂ e Factory Grid
Carbon Black & Curatives (0.050 kg)	8.56% CO ₂ e 14.3% Mass
Natural Gas Vulcanization (0.330 kWh)	5.40% CO ₂ e Direct Burner
Inbound Transport (1,000 km Road)	2.72% CO ₂ e Heavy Duty Freight



Cradle-to-Gate Stage Disaggregation

Process Flow



Stage 1: Raw Materials Extraction & Refining

EPDM polymer, 304 SS strip, carbon black

0.911 kg CO₂e
73.53% share



Stage 2: Inbound Logistics

1,000 km road transit across Euro-corridor

0.034 kg CO₂e
2.72% share



Stage 3: Factory Production & Vulcanization

Molding, 175°C thermal curing, blanking, grid power

0.230 kg CO₂e
18.57% share



Stage 4: Finishing, Packaging & Plant Waste

Cardboard packaging, LDPE film, scrap incineration

0.064 kg CO₂e
5.18% share



Critical Carbon Hotspot Insights

Audit Highlights

🕒 **Raw Materials Drive 73.5% of Cumulative Footprint**

The upstream production of petrochemical EPDM elastomer (0.490 kg CO₂e) and austenitic stainless steel (0.315 kg CO₂e) represents nearly three quarters of the entire product life cycle emissions.

⚡ **Manufacturing Grid Carbon Intensity Hotspot**

Assembly is situated in the "Other" regional grid at **0.395 kg CO₂e/kWh**—nearly double the Western EU average (0.210 kg CO₂e/kWh), making electrical stamping and waterjet cutting responsible for 13.1% of emissions.

↗ **Road Freight Inbound Penalty (1,000 km)**

Heavy diesel trucking accounts for 0.0337 kg CO₂e per gasket. While modest (2.7%), high shipment volumes over this distance represent an immediate target for modal rail conversion.

✓ **Strategic Decarbonization
Roadmap**

Target: -23.8% CO₂e

-10.2% Total

High-Recycled 304 Stainless Steel

Procure cold-rolled stainless steel with certified 80%+ post-consumer scrap content, abating 0.126 kg CO₂e per finished unit.

-11.8% Total

Green Power Purchase Agreement (PPA)

Transition plant electricity to certified solar/wind PPAs, compressing Scope 2 footprint from 0.162 kg to <0.015 kg CO₂e.

-1.8% Total

Multimodal Electrified Rail Freight

Replace 1,000 km standard diesel road transit with electrified European rail lines, cutting logistics emissions by 68%.



2026 Accounting & LSR Verification

Audit Ready

Biogenic & Removals

0.000 kg CO₂e (100% synthetic fossil/mineral matrix; no biogenic removals credited per LSR rules).

Land Use Change (LUC)

0.000 kg CO₂e (zero direct or statistical land use impact triggered).

Scope 3 Coverage Rate

98.4% (Passes >95% threshold requirement with full primary supplier BOM).

LCI Dataset Quality

Ecoinvent v3.10 & UK DEFRA 2025/2026 conversion factors verified.