

Life Cycle Assessment Report

ISO 14040/14044 Compliant Assessment

Company: Avallen Test

Product: Direct API Test

Assessment Date: 7/28/2025

EXECUTIVE SUMMARY

This comprehensive Life Cycle Assessment evaluates the environmental impact of Direct API Test throughout its entire lifecycle, from raw material extraction to end-of-life.

Key Environmental Indicators:

" Carbon Footprint: 4.43 kg CO₂e

" Water Footprint: Calculating... L

" Assessment Methodology: ISO 14040/14044

" System Boundaries: Cradle-to-grave

IMPACT ASSESSMENT CATEGORIES

Climate Change: Global Warming Potential (GWP100)

Water Use: Freshwater consumption and scarcity

Land Use: Agricultural and forestry land occupation

Resource Depletion: Fossil fuel and mineral extraction

LIFECYCLE INVENTORY ANALYSIS

The inventory analysis quantifies inputs and outputs across all lifecycle stages of the product.

Raw Materials & Ingredients

- " Primary ingredients: Agricultural inputs
- " Processing aids: Manufacturing chemicals
- " Energy consumption: Electricity and thermal

Packaging Materials

- " Primary container: Glass bottle (750ml)
- " Closure system: Cork and metal cap
- " Labels: Paper-based with water-based inks
- " Secondary packaging: Cardboard boxes

Production Processes

- " Fermentation: Controlled anaerobic process
- " Distillation: Multi-stage copper pot stills
- " Maturation: Oak barrel aging process
- " Bottling: Automated filling and sealing

Transportation & Distribution

- " Raw material transport: Road and sea freight
- " Product distribution: Multi-modal logistics
- " Retail distribution: Last-mile delivery

End-of-Life Management

- " Glass recycling: Material recovery systems
- " Cork disposal: Composting and biodegradation
- " Packaging waste: Recycling infrastructure

IMPACT ASSESSMENT RESULTS

Environmental impacts calculated using internationally recognized characterization factors and methods.

Carbon Footprint Breakdown

- " Raw Materials: 35% of total emissions
- " Production: 25% of total emissions
- " Transportation: 20% of total emissions
- " Packaging: 15% of total emissions
- " End of Life: 5% of total emissions

Key Findings

The assessment reveals that raw material sourcing represents the largest environmental impact, followed by production processes and transportation.

Recommendations

- " Optimize supply chain for reduced transport
- " Increase renewable energy in production
- " Enhance packaging recyclability
- " Implement circular economy principles

Report generated by Avallen Solutions

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Compliant with ISO 14040:2006 and ISO 14044:2006