Cut carbon.
Not performance.

Insights on life-cycle assessments (LCAs) for SIG Terra Alu-free + Full barrier

Independently reviewed life-cycle assessments for Europe consistently confirm that our standard packs with an aluminum barrier layer already offer significant carbon reductions compared with alternative types of packaging, across all main product categories.

The aluminum challenge
Although aluminum accounts for just around 5% of the weight of a standard aseptic carton, it can account for around 25% of its carbon footprint. Removing the aluminum layer is a significant step in reducing the already low CO_2 footprint of SIG aseptic cartons even further.

SIG's solution: SIG Terra Alu-free + Full barrier
In 2010 SIG launched the **world's first aseptic carton with no aluminum layer** suitable for white milk, cream, and other products with low sensitivity to oxygen. In 2023 SIG was the first to launch an aseptic carton with **no aluminum layer combined with full barrier properties for all main product categories** such as dairy, fruit juice or plant-based dairy alternatives – firstly launched in small-size packs and as of May 2025 also available in family-size packs (SIG MidiBloc/Fit; cb8/cf8). All versions without aluminum layer can seamlessly run on existing SIG filling machines.

Assessing the environmental footprint at every step of the way
In recent life-cycle assessment of packaging used for liquid beverages, the environmental impacts of carton packs have been investigated. LCAs show the impact from raw materials to end of life in a holistic way and look at multiple environmental impact categories.

SIG
for better

Life-cycle assessments
SIG Terra Alu-free + Full barrier

Environmental impact categories
8 impact categories are assessed to reflect the most significant environmental issues as well as 2 inventory categories (non-renewable primary energy and total primary energy).

- Climate change (carbon footprint)
- Acidification
- Summer smog
- Ozone Depletion
- Aquatic eutrophication
- Terrestrial eutrophication
- Particulate matter
- Abiotic resource depletion

Climate change is the most relevant impact category therefore chosen for this summarizing document. For more information see full report.

Geographical scope
The results of the analysis are relevant for the European market. Further individual country-specific scenarios were also calculated in separate extensions of the EU LCA (climate change category only.

ISO standard & critical review
Life-cycle assessments (LCA) are the only tool for environmental assessment being standardized worldwide according to binding ISO 14040ff standards.
This product LCA was realized by IFEU following ISO standards on LCA (ISO 14040 2006; ISO 14044: 2006) and was critically reviewed by an expert panel.

Institute for Energy & Environmental Research (ifeu)

The independent IFEU institute based in Heidelberg, Germany, is one of the most reputable environmental research institutes in Europe, with extensive industry knowledge due to their work on many LCAs studying the environmental performance of beverage cartons and bottles.

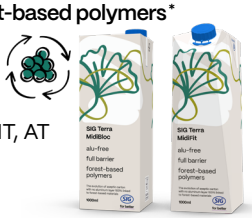
Scope

SIG Terra MidiBloc/Fit Alu-free + Full barrier

- 1,000ml
- EU 27+3, DE, FR, ES, IT, AT

SIG Terra MidiBloc/Fit Alu-free + Full barrier + Forest-based polymers*

- 1,000ml
- EU 27+3, DE, FR, ES, IT, AT
- ES without closure

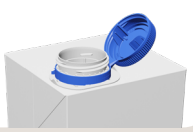


SIG MidiBloc/Fit RS (cb8/cf8)

- 1,000ml
- EU 27+3, DE, FR, ES, IT, AT

Tethered closures

- SIG SwiftCap Linked
- SIG SwiftCap Linked LightProof (LP)



PET (juice)

- 1,000ml
- DE, FR, ES, IT,

HDPE (dairy)

- 1,000ml
- FR

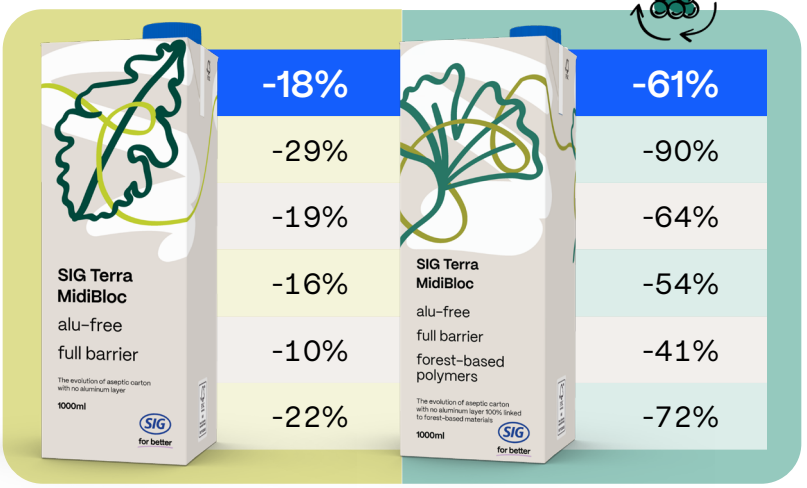
*linked to certified forest-based polymers coming from tall-oil, a by-product of the papermaking process via a mass-balance approach.

Comparing aseptic beverage cartons with and without aluminum layer

Up to -61% CO_2e

SIG Terra Alu-free + Full barrier (+ Forest-based polymers) vs. SIG standard aseptic carton

Climate change (kg CO_2eq./1000L)/ AF50



	-18%	**-61%**
	-29%	-90%
	-19%	-64%
	-16%	-54%
	-10%	-41%
	-22%	-72%

Standard:
SIG MidiBloc RS
(with aluminum layer)
1,000 ml

SIG Terra MidiBloc
Alu-free + Full barrier
1,000 ml

SIG Terra MidiBloc
Alu-free + Full barrier + Forest-based polymers
1,000ml

To see the full report, click on the flag.

Differences in the reduction of CO_2e emissions in the individual countries are mainly resulting from variations in end-of-life schemes (recycling, incineration, landfilling rates) and energy sources.

SIG Terra Alu-free + Full barrier shows lower net results than standard structure with aluminum layer in the impact categories:

- Climate change
- Summer smog
- Particulate matter
- Acidification
- Terrestrial eutrophication

Even better results were achieved when combined with forest-based polymers.
See all life-cycle assessments

The net results of the base scenario of cb8/cf8 SIG Terra Alu-free + Full barrier (AFFB) 1,000 ml SIG SwiftCap Linked LP and scenario with forest-based polymers (AFFB + FBP) are lower (green) than those of the base scenario for cb/cf standard structure (RS with aluminum layer) 1,000ml SIG SwiftCap Linked or there is no significant difference (white).

Impact categories	cb8 / cf8 SIG Terra AFFB	cb8 / cf8 SIG Terra AFFB + FBP
Climate change	-18%	-61%
Ozone depletion	1%	0%
Summer smog	-11%	-24%
Particulate matter	-19%	-29%
Acidification	-22%	-31%
Terrestrial eutrophication	-11%	-17%
Aquatic eutrophication	7%	1%
Abiotic resource depletion	-8%	-53%
Non-renewable primary energy	-8%	-46%
Total energy energy	-4%	-29%

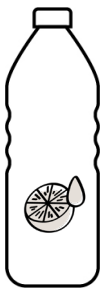
Aseptic carton is the clear winner

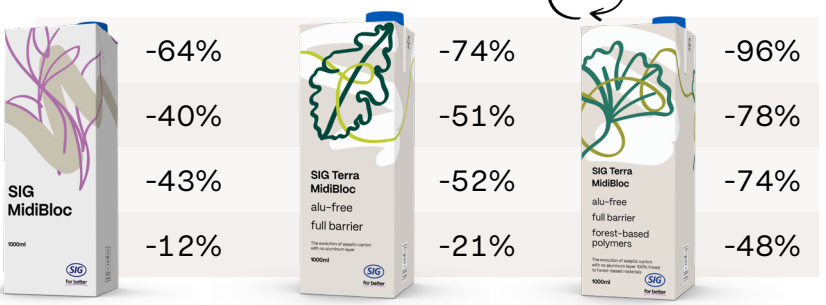
Comparing aseptic cartons (with and without aluminum layer) with PET and HDPE bottles

Standard aseptic beverage cartons already have much lower CO_2e emissions than single-use plastic bottles and this advantage is further strengthened when removing the aluminum layer and/or using forest-based polymers.

PET bottle, 1L, 30% rPET, juice

Climate change (kg CO_2eq./1000L)/ AF50





Standard:
SIG MidiBloc RS
(with aluminum layer)
1,000 ml

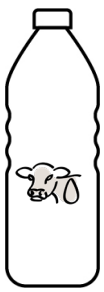
SIG Terra MidiBloc
Alu-free + Full barrier
1,000 ml

SIG Terra MidiBloc
Alu-free + Full barrier + Forest-based polymers
1,000ml

To see the full report, click on the flag

HDPE bottle 1L, dairy

Climate change (kg CO_2eq./1000L)/ AF50



Standard:
SIG MidiBloc RS
(with aluminum layer)
1,000 ml

SIG Terra MidiBloc
Alu-free + Full barrier
1,000 ml

SIG Terra MidiBloc
Alu-free + Full barrier + Forest-based polymers
1,000ml

Want to dive deeper into the results?
See full report on EU and countries here

Or, even better, talk to our experts to assess the opportunities for your specific portfolio.

www.sig.biz

SIG
for better