

Greenhouse gas emissions basis for reporting

Our greenhouse gas (GHG) emissions are reported in accordance with the GHG Protocol. Accurate and transparent GHG reporting is also an essential prerequisite to meet the criteria of the Science Based Targets initiative (SBTi).

This section provides a detailed description of GHG reporting boundaries and other relevant aspects, including a breakdown of emissions by reporting category. Additional information related to our management approach and performance targets is included elsewhere in this Annual Report (see Climate+ →).

Reporting boundaries

The reporting boundary for our Scope 1, 2, and 3 GHG emissions covers all production facilities under SIG Group’s operational control, excluding smaller production units such as our special filling machine parts plants in Aachen (Germany), our joint venture, and offices (unless they are directly attached to a production facility).

In line with the GHG Protocol, we have restated our Scope 3 GHG emissions data for previous years in line with our recalculation policy, which follows GHG Protocol requirements.

Data related to the bag-in-box, spouted pouch, and chilled carton businesses has been incorporated into our GHG reporting, starting from our 2020 baseline. This is the baseline year for our science-based Net Zero target and accompanying targets on near- and long-term GHG emissions reductions for SIG Group that were approved by the SBTi in 2023.

Some categories of Scope 3 emissions cannot be supported with measured activity data and, in these cases, we estimated emissions based on spend or assumptions based on equivalence with other operations or technologies where more accurate data is available. Additional sources that inform our data collection and materiality assessment of relevant GHG categories include: our internal life-cycle assessment (LCA) tool, following the ISO 14040 and ISO 14044 international standards, and the LCA studies for bag-in-box and spouted pouch that we commissioned in 2022, and 2023, and 2024.

Inventory boundaries

The inventory boundaries of our GHG accounting take into consideration all relevant GHG Protocol standards.

Our GHG accounting includes all six GHGs covered by the Kyoto Protocol as required by the GHG Protocol: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃). These are typically included in the emissions factors we use and converted using IPCC 2021 conversion factors.

Scope 2 emissions from purchased electricity are reported using a market-based approach. We also report Scope 2 emissions according to the location-based approach using grid average emissions factors for each country (see footnote to table below).

Scope 1 and 2 data are collected and reported for the production of sleeves and spouts for aseptic and chilled cartons, and packaging materials for spouted pouch and bag-in-box solutions. Assembly, offices, and training centers are excluded due to their limited relevance for Scope 1 and 2.

Scope 1 and 2 emissions for SIG Group (thousand metric tons of CO₂ equivalent)

	2020	2021	2022	2023	2024
Scope 1	28.6	27.4	24.1	19.0	20.1
Scope 2 (market-based) ¹	62.5	43.7	48.1	0.5	0.0
Total	91.1	71.1	72.2	19.5	20.1

Our data collection and calculation procedures for Scope 3 follow a materiality assessment for each category.

For emissions related to recycling, we use the A 0:100 allocation as recommended by the GHG Protocol, which means that recycled materials such as production waste (Category 5) or used products (Category 12) are cut off at the sorting plant/next processing step. The same applies to waste that is incinerated for energy recovery. Biogenic carbon emissions can be released from the liquid packaging board or laminated carton board used in our carton packs, depending on their treatment after use, and these are reported separately.

We use emissions factors to convert activity data into GHG emissions in all cases where we do not receive GHG emissions from third parties (such as travel agents). The emissions factors are checked for completeness and accuracy annually, and are updated regularly. The sources of emissions factors that we use are: authorities such as the International Energy Agency (IEA) or the UK Department for Environmental & Rural Affairs (DEFRA); life-cycle inventory databases such as ecoinvent; life-cycle inventory information that is used in our LCA tool; and average datasets from industry associations. For purchased goods we collect supplier specific emission factors for A-materials where possible to increase the share of supplier-specific data (see details on Category 1).

¹ Location-based emissions (based on the electricity grid average amount) totaled 178.4 thousand metric tons of CO₂ equivalent in 2024.

Our Scope 3 emissions include the following categories:¹

Category 1: purchased goods and services

Category 1 emissions account for the largest share of our value chain GHG emissions. This category includes all materials used to produce and ship our cartons (including sleeves, closures, and straws) and our bag-in-box and spouted pouch solutions (including film, bags, pouch, and fitments), as well as the materials used to manufacture filling machines and other related equipment.

Services, information and communications technology, and items such as office equipment are excluded as they represent a very small share in this category.

We aim to increase the share of specific emissions factors from suppliers. The share of specific data in this category for SIG Group is 57% in 2024 (60% in 2023).

Category 3: fuel and energy-related activities

Category 3 covers the upstream emissions related to purchased electricity and energy carriers at the production facilities that are reported under Scope 1 and 2. Purchased electricity is reported under Scope 2. All other energy carriers, including small amounts of diesel purchased to fuel our own trucks and cars, are reported under Scope 1.

Category 4: upstream transportation and distribution

Category 4 covers all transportation activities for materials delivered to our production plants and all purchased outbound transportation. In some cases, customers arrange this transportation themselves and the resulting emissions are reported in Category 9 accordingly.

For our aseptic carton business, packs are shipped as empty sleeves to SIG customers. Deliveries of straws and closures do not contribute significantly to this category and are not reported. Inter-company transportation is considered to be negligible.

We have not established an inventory of the transportation activities related to raw material shipments for our bag-in-box, spouted pouch, and chilled carton businesses. Instead, we use best available estimates informed by the transportation data that is available for the main commodities for our aseptic carton business.

For our bag-in-box and spouted pouch businesses, we exclude some limited inter-company transportation from our reporting as the contribution to Category 4 is small. For the shipment of relevant products – bag-in-box, pouches, and films – to customers, we estimate distances for overland transportation and use a conservative assumption for sea freight. Based on our materiality analysis, we also include transportation of fitments. In most cases, customers arrange this transportation themselves and the resulting emissions are reported accordingly in Category 9.

For our chilled carton business, we calculate emissions from transportation of materials to our production plants and transportation of our sleeves to customers based on weight, average transportation distances, and means of transportation (such as road, rail, or sea).

Filling machines, equipment and spare parts are excluded from Category 4 for all our businesses, as well as closures for our chilled carton business, as they do not significantly contribute to this category.

Category 5: waste generated in operations

Category 5 includes emissions related to recycling, thermal treatment, or landfill of waste from our operations (measured as non-product output), and hazardous waste.

For our aseptic carton business, all production wastes (>99%) undergo further treatment and recycling as they are well sorted. Emissions related to the transportation of waste material from our plants to waste processing facilities are included.

For our bag-in-box and spouted pouch businesses, we determine an average waste volume that is considered to undergo further treatment.

For our chilled carton business, data on non-product output in waste categories and treatments paths is available and used in our calculations.

Category 6: business travel

Category 6 includes flights, public transportation, and the use of rental cars for business travel. Data on business travel is well documented in Europe, but less so in other regions. The number of employees per region is used as a basis for extrapolation. Flights are relatively well documented and account for 86% for SIG Group.

For our bag-in-box and spouted pouch businesses, we have collected data on business travel and used the approach we already established for our aseptic carton business to report reasonable estimates for all flights based on number of employees.

Category 9: downstream transportation and distribution

For our carton business, Category 9 covers transportation of our packs from our plants to customers' facilities that is not purchased by us, the distribution of filled packs from customers' facilities to retailers, and onward transportation from retailers to end-consumers.

For our bag-in-box and spouted pouch businesses, we have used a similar model for both food service and household applications.

Secondary and tertiary packaging for packed products are excluded as this relates predominantly to the product and not its primary packaging.

¹ Other categories are excluded because they are either not material or not applicable to our business: Category 2 (capital goods), Category 7 (employee commuting), Category 8 (upstream leased assets), Category 13 (downstream leased assets), Category 14 (franchises), Category 15 (investments).

Category 10: Processing of sold products

For our aseptic and chilled carton businesses, we have an established system-based business model whereby the packs that we produce (including sleeves, closures, and fitments) are filled and packed on SIG machines (which we report in Category 11), with service solutions also provided by SIG.

A similar system-based model is not widely established for our bag-in-box and spouted pouch businesses. Therefore, we have added Category 10 to our GHG inventory to capture all emissions related to the processing of packaging materials produced in our bag-in-box and spouted pouch operations.

For the entire packaging material product portfolio of our bag-in-box and spouted pouch businesses, we estimate emissions for product treatment related to the processing depth of the product (how close it is to the end product).

For products delivered as formed bag-in-box and spouted pouches, this is the filling and closing process. For laminates and films delivered to customers to make bag-in-box and spouted pouch products, this is filling. For laminates and films delivered for use by customers for other purposes, emissions are based on the production of bags.

The bag-in-box and spouted pouch production process includes the application of fitments. The share of fitments delivered for applications other than bag-in-box and spouted pouch production is minor, and related emissions are excluded from reporting as they are not material.

The emissions factors for the treatment steps are taken from utility consumptions from the produced equipment and from preliminary results of the LCAs we commissioned in 2022, 2023, and 2024.

We calculate and report Category 10 emissions based on sales data.

Category 11: use of sold products

For our aseptic and chilled carton businesses, Category 11 covers the use of our filling machines and applicators to mount closures on the filled cartons, which occurs at customers' facilities. All new and refurbished filling machines that are manufactured and sold for the reporting year are characterized by average electricity demand and the need for pressurized air, steam, and hydrogen peroxide for the estimated lifetime capacity of the machine/device using the emissions factors of the reporting year.

Emissions from the use phase of our cartons relate primarily to the food products inside the cartons and are excluded. Filling machines for our aseptic cartons that are installed in SIG service centers for demonstration purposes are not included.

For our bag-in-box and spouted pouch businesses, we provide filling machines and other related equipment. These machines fill pre-made bag-in-box packaging which already includes spouts and fitments when it arrives at a customer's filling location. We also provide horizontal form-fill-seal equipment. These machines combine film and fitments and fill product in a single machine at a customer's manufacturing site. For both these types of machines, average consumption data has been used to approximate lifetime emissions.

For machines or equipment which are sold to customers with a publicly available RE100 or Science Based Targets initiative 1.5°C pledge an adjustment is made by subtracting the difference of the lifetime and the customer's target year for achieving 100% renewable electricity for electricity related emissions.

Category 12: end-of-life treatment of sold products

For our aseptic and chilled carton businesses, used beverage cartons usually end up in household waste streams or collection and recycling schemes, which both vary locally. For each country that SIG cartons are shipped to, we compile data covering recycling rates, landfill rates (managed or unmanaged), and incineration rates (with or without energy recovery). The amount of waste is allocated to different forms of treatment based on the weight of delivered packages and spouts per country and the rates for the respective country. Biogenic greenhouse gas emissions related to the different end-of-life treatments for the liquid packaging board in our cartons are determined and reported separately.

For our bag-in-box and spouted pouch businesses, we use scenarios based on our household waste model as a conservative proxy for industrial and food service applications to estimate emissions from end-of-life treatment where we cannot assume household waste is the endpoint. For semi-manufactured products (films and fitments), we also apply our household model since we consider this the more conservative estimation.

SIG filling machines and equipment are generally in use for decades and are mainly refurbished or recycled at end-of-life so their contribution to this category is considered to be negligible.

Scope 3 emissions for SIG Group by category (metric tons CO₂ equivalent)

Category	2020	2021	2022	2023	2024
1 Purchased goods and services	1,262,398	1,310,278	1,304,437	1,248,964	1,341,785
3 Fuel and energy-related activities	23,720	19,655	18,842	5,129	5,191
4 Upstream transportation and distribution	139,550	135,082	119,209	118,590	132,187
5 Waste generated in operations	769	848	879	833	909
6 Business travel	8,460	7,803	8,441	12,796	11,998
9 Downstream transportation and distribution	66,082	66,583	71,286	64,660	64,494
10 Processing of sold products	1,494	536	2,801	833	729
11 Use of sold products	172,879	183,515	192,833	226,310	180,907
12 End-of-life treatment of sold products	274,542	280,710	294,078	268,482	280,285
12 Biogenic carbon	153,039	161,340	154,740	151,794	163,112