Carbon Footprint Study for FITT S.p.A. Products

Products with "braided" technology

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1. General Information

1.1. Company information

FITT S.p.A. (hereinafter referred to as FITT) is an international leader and a company specialising in the creation of complete fluid transfer systems made of thermoplastic materials, both for the construction sector - civil engineering and infrastructure - as well as for the home, garden and hobby markets.

Founded in 1969, for 50 years FITT has been developing technologically advanced solutions that offer stability, safety, extremely high performance levels and ease of use. From its headquarters in Sandrigo (Vicenza), FITT exports to 100 countries, having a total staff of more than 1,100 employees; the FITT group consists of 18 companies, including 9 production plants in Italy and 3 abroad, logistics centres and sales subsidiaries. In 2023, FITT generated a turnover of €298 million.

Starting in 2019, FITT has embarked on a journey to assess the environmental performance of its products through life cycle analysis (LCA), obtaining in early 2020 the EPD for FITT Bluforce and FITT Bluforce RJ products, in early 2021 the EPD for FITT Sewer and FITT Sewer EVO products, in 2023 the EPD for the FITT Batipro and FITT Interpact M1 products and conducting LCA studies for public dissemination for some gardening products (belonging to the FITT Force, FITT Ikon, FITT NTS and FITT Force Pro families).
Since the end of 2023, FITT has also obtained ISO 14067 certification for calculating the Carbon Footprint of its products using a Systematic Approach.
Finally, in 2024 FITT obtained ISO 14064 certification for the organisation's GHG inventory.

Figure 1 FITT headquarters in Sandrigo

1.2. Product information

The products covered by this report are all braided hoses. This technology involves a reinforcement between the layers of the hose such that a wire mesh is generated.
The product codes under study (Table 1) belong to the REFITTEX, AGAVE, MIMOSA, MINT, PROFY, SUNTEX and TOP GREEN families.

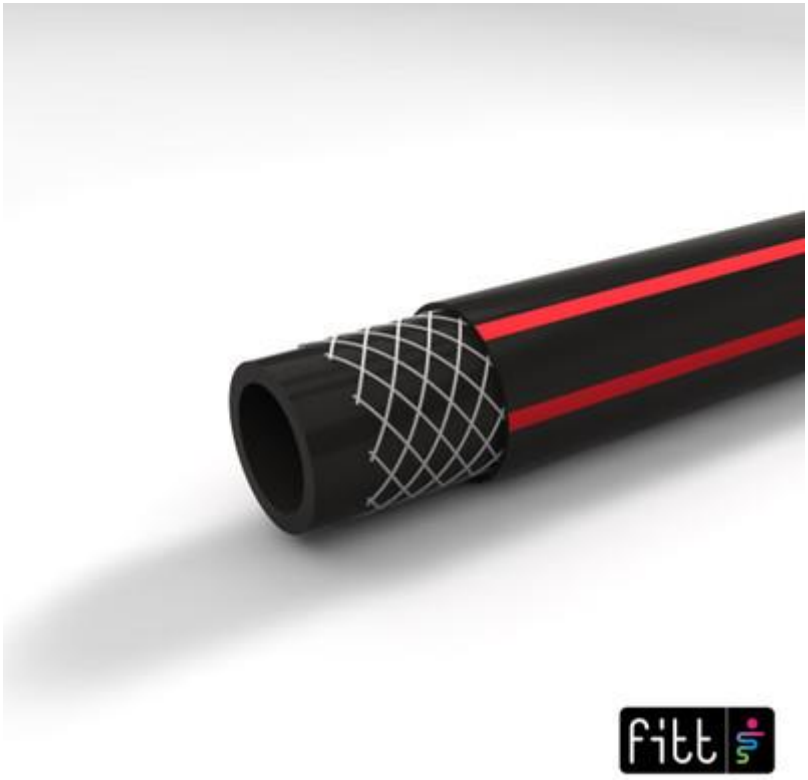

Figure 2 Cross-section of the PROFY family braided hose

All the product codes in these families object of this report are listed below.

Table 1 List of product codes of the two families under study

Product code	Description	Production plant
70000.00980.59007	FITT REFITTEX CRISTALLO 4x10 100m*	Sandrigo
70000.01580.59007	FITT REFITTEX CRISTALLO 5x11 100m*	Sandrigo
70000.02150.59007	FITT REFITTEX CRISTALLO 6x11 50m*	Sandrigo
70000.02250.59007	FITT REFITTEX CRISTALLO 6x12 50m*	Sandrigo
70000.02250.59016	FITT REF.CRISTALLO COMBO 6x12mm 50m*	Sandrigo
70000.02280.59007	FITT REFITTEX CRISTALLO 6x12 100m*	Sandrigo, Monsampolo
70000.04350.59007	FITT REFITTEX CRISTALLO 8x13 50m*	Sandrigo
70000.04525.59007	FITT REFITTEX CRISTALLO 8x14 25m*	Sandrigo
70000.04540.59016	FITT REF.CRISTALLO COMBO 8x14mm 40m*	Sandrigo
70000.04550.59007	FITT REFITTEX CRISTALLO 8x14 50m*	Sandrigo, Monsampolo
70000.04580.59007	FITT REFITTEX CRISTALLO 8x14 100m*	Sandrigo, Monsampolo
70000.05750.59007	FITT REFITTEX CRISTALLO 9x14 50m	Sandrigo
70000.05940.59016	FITT REF.CRISTALLO COMBO 9x15mm 40m*	Sandrigo
70000.05950.59007	FITT REFITTEX CRISTALLO 9x15 50m*	Sandrigo

Product code	Description	Production plant
70000.05980.59007	FITT REFITTEX CRISTALLO 9x15 100m*	Sandrigo
70000.06550.59003	FITT REFITTEX CRISTALLO 10x15 50m*	Sandrigo
70000.06925.59007	FITT REFITTEX CRISTALLO 10x16 25m	Sandrigo
70000.06945.59016	FITT REF.CRISTALLO COMBO 10x16mm 35m*	Sandrigo
70000.06950.59007	FITT REFITTEX CRISTALLO 10x16 50m*	Sandrigo, Monsampolo
70000.08850.59007	FITT REFITTEX CRISTALLO 12x17 50m	Sandrigo
70000.08925.59007	FITT REFITTEX CRISTALLO 12x18 25m*	Sandrigo
70000.08950.59007	FITT REFITTEX CRISTALLO 12x18 50m*	Sandrigo, Monsampolo
70000.16450.59007	FITT REFITTEX CRISTALLO 12.5x19 50m*	Sandrigo
70000.16850.59007	FITT REFITTEX CRISTALLO 12.5x17.5 50m*	Sandrigo
70000.17020.59016	FITT REF.CRIST.COMBO 12.5x18.5mm 20m*	Sandrigo
70000.17050.59065	FITT REFITTEX CRISTALLO 12.5x18.5 50m*	Sandrigo
70000.17625.59007	FITT REFITTEX CRISTALLO 13x19 25m*	Sandrigo
70000.17650.59007	FITT REFITTEX CRISTALLO 13x19 50m*	Sandrigo, Monsampolo
70000.17750.59007	FITT REFITTEX CRISTALLO 13x20 50m*	Sandrigo
70000.20950.59007	FITT REFITTEX CRISTALLO 15x21 50m*	Sandrigo
70000.21520.59016	FITT REF.CRISTALLO COMBO 16x22mm 20m*	Sandrigo
70000.21525.59007	FITT REFITTEX CRISTALLO 16x22 25m*	Sandrigo
70000.21550.59007	FITT REFITTEX CRISTALLO 16x22 50m*	Sandrigo
70000.30950.59007	FITT REFITTEX CRISTALLO 19x25 50m*	Sandrigo
70000.31125.59007	FITT REFITTEX CRISTALLO 19x26 25m*	Sandrigo
70000.31145.59016	FITT REF.CRISTALLO COMBO 19x26mm 35m*	Sandrigo
70000.31150.59007	FITT REFITTEX CRISTALLO 19x26 50m*	Sandrigo
70000.31350.59007	FITT REFITTEX CRISTALLO 19x27 50m*	Sandrigo
70000.32350.59007	FITT REFITTEX CRISTALLO 20x28 50m	Sandrigo
70000.33050.59007	FITT REFITTEX CRISTALLO 22x30 50m	Sandrigo
70000.42925.59007	FITT REFITTEX CRISTALLO 25x33 25m*	Sandrigo
70000.42925.59016	FITT REF.CRISTALLO COMBO 25x33mm 25m*	Sandrigo
70000.42950.59007	FITT REFITTEX CRISTALLO 25x33 50m*	Sandrigo
70000.43125.59007	FITT REFITTEX CRISTALLO 25x34 25m*	Sandrigo
70000.43150.59007	FITT REFITTEX CRISTALLO 25x34 50m*	Sandrigo
70000.44225.59003	FITT REFITTEX CRISTALLO 30x38 25m*	Sandrigo
70000.44250.59003	FITT REFITTEX CRISTALLO 30x38 50m*	Sandrigo
70000.53625.59000	FITT REFITTEX CRISTALLO 32x40 25m*	Sandrigo
70000.53650.59000	FITT REFITTEX CRISTALLO 32x40 50m*	Sandrigo
70000.53925.59003	FITT REFITTEX CRISTALLO 32x42 25m*	Sandrigo
70000.62825.59003	FITT REFITTEX CRISTALLO 38x48 25m*	Sandrigo
70000.63125.59003	FITT REFITTEX CRISTALLO 40x50 25m*	Sandrigo
70000.64225.59003	FITT REFITTEX CRISTALLO 50x60 25m*	Sandrigo
70014.01480.59070	FITT REF.CRIST. BLACK 5x10.5 100m	Sandrigo
70027.31130.59000	FITT REFITTEX CRISTALLO PLUS 19x26 30m	Sandrigo
70027.31180.59000	FITT REFITTEX CRISTALLO PLUS 19x26 100m	Sandrigo
71301.20620.59025	FITT AGAVE 5/8" 20m KIT*	Sandrigo
71301.20625.59000	FITT AGAVE 5/8" 25m*	Sandrigo
71301.20650.59000	FITT AGAVE 5/8" 50m*	Sandrigo
71301.30625.59000	FITT AGAVE 3/4" 25m*	Sandrigo
71301.30650.59000	FITT AGAVE 3/4" 50m*	Sandrigo
71300.16615.59000	FITT MIMOSA 1/2" 15m*	Sandrigo

Product code	Description	Production plant
71300.16620.59025	FITT MIMOSA 1/2" 20m KIT*	Sandrigo, Monsampolo
71300.16625.59000	FITT MIMOSA 1/2" 25m*	Sandrigo, Monsampolo
71300.16650.59000	FITT MIMOSA 1/2" 50m*	Sandrigo, Monsampolo
71300.16671.59000	FITT MIMOSA 1/2" 150m	Sandrigo
71300.20615.59000	FITT MIMOSA 5/8" 15m*	Sandrigo
71300.20625.59000	FITT MIMOSA 5/8" 25m*	Sandrigo
71300.30620.59025	FITT MIMOSA 3/4" 20m KIT*	Sandrigo, Monsampolo
71300.30625.59000	FITT MIMOSA 3/4" 25m*	Sandrigo
71300.30650.59000	FITT MIMOSA 3/4" 50m*	Sandrigo, Monsampolo
71300.42925.59052	FITT MIMOSA 1" 25m*	Sandrigo, Monsampolo
71300.42950.59052	FITT MIMOSA 1" 50m*	Sandrigo, Monsampolo
71017.16615.59064	FITT MINT 1/2" 15m*	Sandrigo
71017.16620.59025	FITT MINT 1/2" 20m KIT*	Sandrigo
71017.16625.59064	FITT MINT 1/2" 25m*	Sandrigo, Monsampolo
71017.16650.59064	FITT MINT 1/2" 50m*	Sandrigo, Monsampolo
71017.20615.59035	FITT MINT 5/8" 15m KIT*	Sandrigo, Monsampolo
71017.20615.59064	FITT MINT 5/8" 15m*	Sandrigo, Monsampolo
71017.20625.59064	FITT MINT 5/8" 25m*	Sandrigo, Monsampolo
71017.20650.59064	FITT MINT 5/8" 50m*	Sandrigo, Monsampolo
71017.20659.59095	FITT MINT COMBO 5/8" 64m*	Sandrigo
71017.30625.59064	FITT MINT 3/4" 25m*	Sandrigo
71017.30650.59064	FITT MINT 3/4" 50m*	Sandrigo
71017.42925.59052	FITT MINT 1" 25m	Sandrigo
71308.18815.59000	FITT SUNTEX 5/8" 15m KIT	Sandrigo
71308.18825.59000	FITT SUNTEX 5/8" 25m KIT	Sandrigo
71308.18825.59037	FITT SUNTEX 5/8" 25m	Sandrigo
71308.18850.59000	FITT SUNTEX 5/8" 50m	Sandrigo
71308.22425.59000	FITT SUNTEX 3/4" 25m	Sandrigo
71308.22425.59020	FITT SUNTEX 3/4" 25m KIT	Sandrigo
71308.22450.59000	FITT SUNTEX 3/4" 50m	Sandrigo
71309.42925.59052	FITT SUNTEX 1" 25m	Sandrigo
71309.42950.59052	FITT SUNTEX 1" 50m	Sandrigo
71202.20615.11137	FITT TOP GREEN 5/8" 15m	Sandrigo
71202.20650.11137	FITT TOP GREEN 5/8" 50m	Sandrigo
71202.30625.11137	FITT TOP GREEN 3/4" 25m	Sandrigo
71048.30650.59010	FITT PROFY 3/4" 50m NO DRINKING WATER	Monsampolo
90500.00125.07110	FITT PROFY 1/2" MT 25*	Monsampolo
90500.00150.07110	FITT PROFY 1/2" MT 50*	Monsampolo
90500.00325.07110	FITT PROFY 3/4" MT 25*	Monsampolo
90500.00350.07110	FITT PROFY 3/4" MT 50*	Monsampolo
90500.00425.07110	FITT PROFY 1" MT 25*	Monsampolo
90500.00450.07110	FITT PROFY 1" MT 50*	Monsampolo

1.3. Product Category Rules (PCR)

For the purpose of conducting this study, no reference is made to any PCR or sector studies, as these are not available for the type of product analysed.

1.4. Study information

The following standards were applied when conducting this study:

- ISO 14040:2006+A1:2020 Environmental management – Life cycle assessment – Principles and framework;
- ISO 14044:2006+A2:2020 Environmental management – Life cycle assessment – Requirements and guidelines;
- ISO 14067:2018 Environmental management – Carbon footprint – Principles, requirements and guidelines

2. Objectives of the study

The objective of this study is to assess the potential environmental impacts related to greenhouse gas emissions (Carbon Footprint), as described by UNI EN ISO 14067:2018, associated with the life cycle of the hoses under study.

This analysis, based on the integration of internationally recognised models for the management of environmental aspects, the analysis and quantification of the environmental impacts of a production system and the systematic approach of data collection and calculation model construction (ISO 14040, ISO 14044 and ISO 14067), are aimed at quantifying potential environmental impacts in terms of Carbon Footprint.

The study was developed by applying the company's CFP Systematic Approach, verifying that the products under study fall within its scope. The contents of this study may be the subject of Business to Business (B2B) or Business to Consumer (B2C) communication, in accordance with ISO 14026.

The results presented in this report refer uniquely to the practices and assumptions made by FITT. They were therefore not calculated to be compared with those of other companies, as even for similar products, any differences in methodological choices, assumptions, data quality and choice of databases may produce non-comparable results.

3. Purpose of the study

3.1. Declared unit

In this study, in line with the requirements of ISO 14067, the entire life cycle of products will be considered, except for some intermediate stages. For this reason, a *declared unit* is used. The stated unit is equal to 1m of a piping system, including sales packaging and any accessories.
The reference flow is equal to the entire sales unit divided by the length of the hose under study (§1.2).

3.2. System boundaries

The system boundaries include the entire life cycle of the analysed products, following a *"from cradle to grave"* approach. It is emphasised that the construction, maintenance and decommissioning of infrastructures, understood as buildings and machinery, as well as the occupation of industrial land, have not been taken into account, as their contribution to the environmental impact relative to the functional unit is considered negligible.
A diagram of the system boundaries can be found at Figure 3.
The product is manufactured at the Italian factories of FITT S.p.A. (see Table 1 for details on the plants involved and the processes conducted in them).

The following life cycle phases are included in this study:

- **Upstream.** In this module, it was considered:
  - Extraction and production of PVC resin and all other components that are part of the compound for the in-house production of PVC granules;
  - Extraction and production of the materials that make up the fittings and nozzle in the KIT;
  - Extraction and production of the materials that make up the finished product packaging;
  - Production of electricity and other fuels used in the upstream phase;
  - Transport of raw materials from the extraction site to FITT's facilities;
- **Core.** In this module, it was considered:
  - Impacts due to the production of electricity and fuels used in FITT's manufacturing processes;
  - Management of waste generated by the production process part of an internal re-granulation cycle;
  - Atmospheric emissions generated by the production process
  - Management of plant waste.
- **Downstream.** In this module, it was considered:
  - Distribution of finished products from the production plant to the end customer;
  - End-of-life management of products.

The interpretation of the results has allowed to identify those processes related to upstream raw material production and end-of-life management as the most important (accounting for more than 80% of the total impacts).

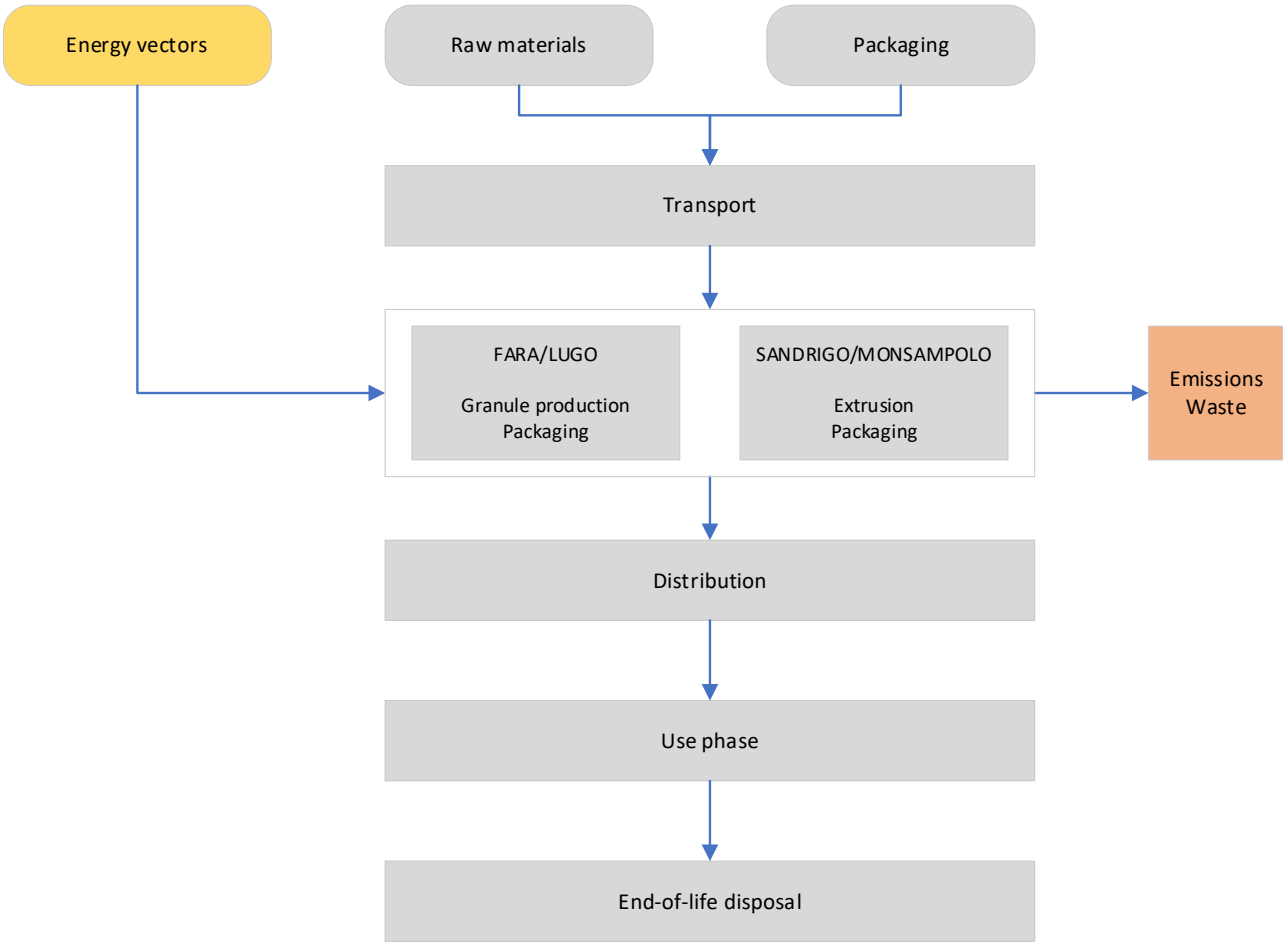

Figure 3 Diagram of the production process of the product under study

3.3. Impact category

The methodology chosen to assess the potential environmental impacts of the products in this study is the IPCC method adapted as required by the ISO 14067. Specifically, the IPCC 2021 - GWP100a method is used, in its latest available version.

The impact categories in this method are as follows:

- CF Total: represents the sum of all GHG fluxes below;
- CF Fossil: represents greenhouse gas emissions from fossilised material (e.g. natural gas, diesel, etc.);
- CF Biogenic: represents greenhouse gas emissions from biomass (e.g. combustion or aerobic/anaerobic degradation of biomass, enteric emissions, etc.);
- CF dLUC: represents greenhouse gas emissions associated with the use and transformation of land use by anthropogenic activities;
- CF Aircraft: represents greenhouse gas emissions associated with aviation activities;
- CF Uptake: represents the removals of greenhouse gases of biogenic origin from the atmosphere and incorporated into the raw material.

The CF category iLUC, whose quantification is not mandatory according to ISO 14067, is excluded from the study.

3.4. Assumptions and Limitations

In conducting this study, primary data were used wherever possible. Where access to this type of data was not possible, secondary data from the Ecoinvent v3.10 database (Frischknecht R., 2005) and/or highly relevant published articles were used.

In conducting this study, no specific assumptions were made.

3.5. Exclusion Criteria

The criterion chosen for the initial inclusion of input and output elements is based on the definition of a 1% cut-off level, both in terms of mass, energy and environmental impact. This means that a process has been neglected if it is potentially responsible for less than 1% of the total mass, primary energy and total impact. Consequently, this threshold value was used to avoid collecting unknown data, but not to disregard data that was nevertheless available. This choice is confirmed by similar LCA studies reported in the literature (Humbert et al., 2009).

The following aspects have been excluded from this study:

- Packaging in which raw materials are transported from the extraction site to the FITT's plants (as demonstrated in previous studies conducted by the company for similar products);
- Manufacture of production equipment, buildings and other capital goods (if not already included in secondary data);
- The energy consumption related to the logistics management of the San Pietro in Gù plant, as motivated by a sensitivity analysis conducted on the "braided" technology.

3.6. Allocation process

The need to allocate the flows in and out of a product system between the system itself and other external systems can arise in two cases (Marson et. al., 2023):

- In the case of simultaneous products and in the case of co-products (co-product allocation). This type of allocation was applied to distribute the consumptions of energy and from other flows (general consumption) among the entire production of the various plants. For this allocation, in accordance with the hierarchy proposed by the standard, a physical principle (mass) was adopted. This assumption was analysed by considering the deviation from previous studies, with more precise monitoring of energy consumption. It is considered that the level of uncertainty introduced in this way is acceptable with respect to the objectives of the study. It is also emphasised that company initiatives are currently being planned to improve the quality of this data;
- In the case of subsequent products, i.e. in the case of materials entering a recycling process (end-of-life allocation/allocation procedure of reuse, recycling, recovery). The so-called cut-off end-of-life allocation approach was used for this case study, as it is widely used in LCA studies in the plastics sector.

3.7. Data quality requirements

The data required for the study were collected in accordance with the following requirements:

- Time coverage: primary data cover a 12-month period (January 2023 - December 2023);
- Where general data and databases were used, representative versions of the situation in 2023 or, in any case, no older than 10 years were used;
- Geographical coverage: the geographical area of origin of the data relates to the Italian, European or global situation based on the place of origin of the raw materials;
- Technology coverage: the data collected refer to the state of the art of the technologies used for the production of materials;
- Accuracy: the data collected refer to actual consumption and measurements for the period in question;
- Completeness: it can be considered that the measured or estimated mass flow percentage is about 98% of the total;
- Representativeness: the degree to which the data set reflects the actual population concerned is high, since the data are collected directly at the sites of interest. The data collected at the plant relate to production consumption, the product bill of materials, and information on the transport of both raw materials and for finished product distribution;
- Consistency: the methodology of the study is uniformly applied to the different components of the analysis;
- Reproducibility: the data was collected through the use of data collection sheets, which contain all the necessary information that allows even a third party to reproduce the results in the study report;
- Source of data: as previously explained, the data were derived from primary sources (where primary data could not be found, secondary data from internationally recognised databases were used);
- Uncertainty of information: uncertainty concerning data and assumptions was tested by means of an uncertainty analysis.

Where the data used refer to estimates, from specific sites or averages, this is highlighted in the description phase of the inventory analysis.

3.8. Critical Review Considerations

Since it is envisaged that the results of the study may be used to support an assertion intended for B2B communication, it is necessary to conduct a critical review as defined by ISO 14067. The objective of the critical review is to verify that the Carbon Footprint study meets the requirements for methodology, data, interpretation and reporting and that it is consistent with the principles and requirements of the ISO 14067 Standards, with a reasonable level of assurance.

4. Inventory analysis

The inventory analysis phase includes data collection and processing in order to quantify the input and output elements of the product system under consideration.

4.1. BOM

[information withheld for reasons of confidentiality]

4.2. Procurement of raw materials

[information withheld for reasons of confidentiality]

4.3. Energy carriers and plant consumption

[information withheld for reasons of confidentiality]

4.4. Distribution

[information withheld for reasons of confidentiality]

4.5. End-of-life scenario

[information withheld for reasons of confidentiality]

4.6. Data quality assessment

The quality level of the study data was calculated by adopting the weighted average of three quality parameters:

- Ter - Technological representativeness: the degree to which the data relate to the technology that is actually used in the process under consideration;
- Gr - Geographical representativeness: the degree to which the data relate to the actual geographical location where the processes take place;
- Tir - Temporal representativeness: the degree to which the data refer to as current a time span as possible.

The calculation was applied to all products in the study, considering the average of contributions in the CF Total category. Once the most relevant processes were identified, they were re-proportioned on a 100% basis to obtain the actual weights to be applied to the score (on a scale of 1 to 5) attributed to each of the three parameters.

The scores from 1 to 5 correspond to the quality levels identified in EN 15804 Annex E (Table E.2), in this order: Very Poor, Poor, Fair, Good and Very Good.

The following table shows the weights obtained and the score given to the qualitative parameters in order to be able to proceed with the semi-quantitative evaluation of the quality level of the study.

Table 2 Data quality assessment for the product under study

Contribution	Ter	Gr	Tir	Medium	Contribution in CF-Total	DQR
Raw materials	4	4	4	4,00	45,0%	1,80
Packaging	4	4	4	4,00	1,9%	0,08
Transport in	4	4	4	4,00	4,9%	0,20
Production	5	5	5	5,00	30,1%	1,51
Distribution	4	4	4	4,00	5,6%	0,22
End of life	4	3	4	3,67	12,4%	0,46
Total						**4,26**

The final DQR (Data Quality Rating) obtained by combining weights and scores is 4.26, corresponding to a quality level of “very good”.

5. Analysis of impacts

Table 3 Results from the entire life cycle of the products under study

Product	CF Total [kg CO2e]	CF Fossil [kg CO2e]	CF Biogenic [kg CO2e]	CF Aircraft [kg CO2e]	CF dLUC [kg CO2e]	CF Uptake [kg CO2e]
FITT REFITTEX CRISTALLO 4x10 100m*	0,3464	0,3398	0,0366	0,0000	0,0061	-0,0360
FITT REFITTEX CRISTALLO 5x11 100m*	0,3987	0,3910	0,0424	0,0000	0,0070	-0,0417
FITT REFITTEX CRISTALLO 6x11 50m*	0,3542	0,3475	0,0379	0,0000	0,0062	-0,0373
FITT REFITTEX CRISTALLO 6x12 50m*	0,4426	0,4342	0,0475	0,0000	0,0077	-0,0468
FITT REF.CRISTALLO COMBO 6x12mm 50m*	0,4430	0,4342	0,0509	0,0000	0,0077	-0,0499
FITT REFITTEX CRISTALLO 6x12 100m*	0,4414	0,4329	0,0502	0,0000	0,0076	-0,0494
FITT REFITTEX CRISTALLO 8x13 50m*	0,4562	0,4476	0,0478	0,0000	0,0076	-0,0468
FITT REFITTEX CRISTALLO 8x14 25m*	0,5391	0,5288	0,0576	0,0000	0,0093	-0,0566
FITT REF.CRISTALLO COMBO 8x14mm 40m*	0,5442	0,5335	0,0622	0,0000	0,0093	-0,0608
FITT REFITTEX CRISTALLO 8x14 50m*	0,5567	0,5465	0,0565	0,0000	0,0093	-0,0556
FITT REFITTEX CRISTALLO 8x14 100m*	0,5548	0,5446	0,0557	0,0000	0,0093	-0,0548
FITT REFITTEX CRISTALLO 9x14 50m	0,4779	0,4688	0,0515	0,0000	0,0083	-0,0508
FITT REF.CRISTALLO COMBO 9x15mm 40m*	0,5856	0,5743	0,0665	0,0000	0,0103	-0,0655
FITT REFITTEX CRISTALLO 9x15 50m*	0,5814	0,5702	0,0644	0,0000	0,0103	-0,0635
FITT REFITTEX CRISTALLO 9x15 100m*	0,5871	0,5759	0,0713	0,0000	0,0103	-0,0703
FITT REFITTEX CRISTALLO 10x15 50m*	0,5115	0,5014	0,0585	0,0000	0,0091	-0,0575
FITT REFITTEX CRISTALLO 10x16 25m	0,6309	0,6187	0,0733	0,0000	0,0110	-0,0721
FITT REF.CRISTALLO COMBO 10x16mm 35m*	0,6367	0,6241	0,0729	0,0000	0,0110	-0,0713
FITT REFITTEX CRISTALLO 10x16 50m*	0,6352	0,6231	0,0675	0,0000	0,0110	-0,0664
FITT REFITTEX CRISTALLO 12x17 50m	0,6204	0,6089	0,0703	0,0000	0,0106	-0,0694
FITT REFITTEX CRISTALLO 12x18 25m*	0,7583	0,7437	0,0852	0,0000	0,0131	-0,0838
FITT REFITTEX CRISTALLO 12x18 50m*	0,7625	0,7481	0,0832	0,0000	0,0131	-0,0819
FITT REFITTEX CRISTALLO 12.5x19 50m*	0,8546	0,8386	0,0920	0,0000	0,0147	-0,0907
FITT REFITTEX CRISTALLO 12.5x17.5 50m*	0,6202	0,6081	0,0672	0,0000	0,0107	-0,0658
FITT REF.CRIST.COMBO 12.5x18.5mm 20m*	0,7828	0,7670	0,0971	0,0000	0,0136	-0,0949
FITT REFITTEX CRISTALLO 12.5x18.5 50m*	0,7751	0,7600	0,0867	0,0000	0,0136	-0,0852

Product	CF Total [kg CO2e]	CF Fossil [kg CO2e]	CF Biogenic [kg CO2e]	CF Aircraft [kg CO2e]	CF dLUC [kg CO2e]	CF Uptake [kg CO2e]
FITT REFITTEX CRISTALLO 13x19 25m*	0,7931	0,7781	0,0869	0,0000	0,0137	-0,0856
FITT REFITTEX CRISTALLO 13x19 50m*	0,7924	0,7775	0,0854	0,0000	0,0136	-0,0841
FITT REFITTEX CRISTALLO 13x20 50m*	0,9509	0,9324	0,1067	0,0000	0,0169	-0,1052
FITT REFITTEX CRISTALLO 15x21 50m*	0,9017	0,8841	0,1012	0,0000	0,0158	-0,0994
FITT REF.CRISTALLO COMBO 16x22mm 20m*	0,9312	0,9124	0,1117	0,0000	0,0162	-0,1091
FITT REFITTEX CRISTALLO 16x22 25m*	0,9347	0,9168	0,1054	0,0000	0,0162	-0,1037
FITT REFITTEX CRISTALLO 16x22 50m*	0,9203	0,9024	0,1030	0,0000	0,0162	-0,1013
FITT REFITTEX CRISTALLO 19x25 50m*	1,1082	1,0866	0,1334	0,0000	0,0194	-0,1312
FITT REFITTEX CRISTALLO 19x26 25m*	1,2944	1,2697	0,1544	0,0000	0,0224	-0,1521
FITT REF.CRISTALLO COMBO 19x26mm 35m*	1,3067	1,2807	0,1619	0,0000	0,0225	-0,1583
FITT REFITTEX CRISTALLO 19x26 50m*	1,2949	1,2699	0,1450	0,0000	0,0224	-0,1425
FITT REFITTEX CRISTALLO 19x27 50m*	1,4728	1,4436	0,1757	0,0000	0,0267	-0,1733
FITT REFITTEX CRISTALLO 20x28 50m	1,6501	1,6195	0,1754	0,0000	0,0276	-0,1725
FITT REFITTEX CRISTALLO 22x30 50m	1,7147	1,6808	0,1971	0,0000	0,0308	-0,1940
FITT REFITTEX CRISTALLO 25x33 25m*	1,8926	1,8562	0,2461	0,0000	0,0328	-0,2425
FITT REF.CRISTALLO COMBO 25x33mm 25m*	1,9613	1,9213	0,2382	0,0000	0,0334	-0,2315
FITT REFITTEX CRISTALLO 25x33 50m*	1,8613	1,8251	0,2175	0,0000	0,0327	-0,2139
FITT REFITTEX CRISTALLO 25x34 25m*	2,1899	2,1460	0,2773	0,0000	0,0388	-0,2722
FITT REFITTEX CRISTALLO 25x34 50m*	2,1624	2,1201	0,2471	0,0000	0,0388	-0,2436
FITT REFITTEX CRISTALLO 30x38 25m*	2,2212	2,1777	0,2657	0,0000	0,0390	-0,2611
FITT REFITTEX CRISTALLO 30x38 50m*	2,2302	2,1869	0,2563	0,0000	0,0389	-0,2519
FITT REFITTEX CRISTALLO 32x40 25m*	2,4016	2,3548	0,3461	0,0000	0,0416	-0,3409
FITT REFITTEX CRISTALLO 32x40 50m*	2,4549	2,4057	0,2969	0,0000	0,0424	-0,2900
FITT REFITTEX CRISTALLO 32x42 25m*	3,0261	2,9673	0,3710	0,0000	0,0532	-0,3653
FITT REFITTEX CRISTALLO 38x48 25m*	3,5443	3,4749	0,4468	0,0000	0,0620	-0,4394
FITT REFITTEX CRISTALLO 40x50 25m*	3,7568	3,6824	0,4894	0,0000	0,0651	-0,4801
FITT REFITTEX CRISTALLO 50x60 25m*	4,5581	4,4681	0,5944	0,0000	0,0795	-0,5839
FITT REF.CRIST. BLACK 5x10.5 100m	0,3264	0,3213	0,0352	0,0000	0,0044	-0,0345
FITT REFITTEX CRISTALLO PLUS 19x26 30m	1,2874	1,2791	0,1409	0,0000	0,0225	-0,1551

Product	CF Total [kg CO2e]	CF Fossil [kg CO2e]	CF Biogenic [kg CO2e]	CF Aircraft [kg CO2e]	CF dLUC [kg CO2e]	CF Uptake [kg CO2e]
FITT REFITTEX CRISTALLO PLUS 19x26 100m	1,2981	1,2731	0,1409	0,0000	0,0224	-0,1384
FITT AGAVE 5/8" 20m KIT*	0,6985	0,6892	0,0662	0,0000	0,0074	-0,0643
FITT AGAVE 5/8" 25m*	0,5901	0,5813	0,0622	0,0000	0,0073	-0,0607
FITT AGAVE 5/8" 50m*	0,6014	0,5926	0,0610	0,0000	0,0073	-0,0595
FITT AGAVE 3/4" 25m*	0,8659	0,8530	0,0970	0,0000	0,0107	-0,0948
FITT AGAVE 3/4" 50m*	0,8641	0,8513	0,0950	0,0000	0,0107	-0,0930
FITT MIMOSA 1/2" 15m*	0,3502	0,3463	0,0354	0,0000	0,0024	-0,0339
FITT MIMOSA 1/2" 20m KIT*	0,4398	0,4361	0,0313	0,0000	0,0024	-0,0300
FITT MIMOSA 1/2" 25m*	0,3511	0,3474	0,0301	0,0000	0,0025	-0,0290
FITT MIMOSA 1/2" 50m*	0,3595	0,3560	0,0270	0,0000	0,0024	-0,0260
FITT MIMOSA 1/2" 150m	0,3436	0,3403	0,0304	0,0000	0,0024	-0,0295
FITT MIMOSA 5/8" 15m*	0,4375	0,4331	0,0417	0,0000	0,0030	-0,0403
FITT MIMOSA 5/8" 25m*	0,4477	0,4436	0,0353	0,0000	0,0030	-0,0342
FITT MIMOSA 3/4" 20m KIT*	0,7445	0,7377	0,0583	0,0000	0,0044	-0,0560
FITT MIMOSA 3/4" 25m*	0,6784	0,6717	0,0587	0,0000	0,0045	-0,0565
FITT MIMOSA 3/4" 50m*	0,6579	0,6515	0,0550	0,0000	0,0044	-0,0530
FITT MIMOSA 1" 25m*	1,0771	1,0671	0,0923	0,0000	0,0070	-0,0893
FITT MIMOSA 1" 50m*	1,0826	1,0719	0,1021	0,0000	0,0075	-0,0989
FITT MINT 1/2" 15m*	0,3373	0,3333	0,0379	0,0000	0,0026	-0,0365
FITT MINT 1/2" 20m KIT*	0,4398	0,4362	0,0325	0,0000	0,0027	-0,0316
FITT MINT 1/2" 25m*	0,3457	0,3420	0,0310	0,0000	0,0029	-0,0301
FITT MINT 1/2" 50m*	0,3409	0,3373	0,0297	0,0000	0,0028	-0,0288
FITT MINT 5/8" 15m KIT*	0,5563	0,5517	0,0420	0,0000	0,0034	-0,0408
FITT MINT 5/8" 15m*	0,3930	0,3885	0,0421	0,0000	0,0032	-0,0407
FITT MINT 5/8" 25m*	0,3887	0,3845	0,0357	0,0000	0,0032	-0,0346
FITT MINT 5/8" 50m*	0,4048	0,4006	0,0345	0,0000	0,0032	-0,0336
FITT MINT COMBO 5/8" 64m*	0,3817	0,3773	0,0335	0,0000	0,0031	-0,0322
FITT MINT 3/4" 25m*	0,6397	0,6331	0,0569	0,0000	0,0050	-0,0552
FITT MINT 3/4" 50m*	0,6458	0,6390	0,0592	0,0000	0,0050	-0,0574

Product	CF Total [kg CO2e]	CF Fossil [kg CO2e]	CF Biogenic [kg CO2e]	CF Aircraft [kg CO2e]	CF dLUC [kg CO2e]	CF Uptake [kg CO2e]
FITT MINT 1" 25m	1,1073	1,0948	0,1038	0,0000	0,0095	-0,1008
FITT SUNTEX 5/8" 15m KIT	0,9735	0,9599	0,1018	0,0000	0,0113	-0,0995
FITT SUNTEX 5/8" 25m KIT	0,9206	0,9074	0,0941	0,0000	0,0112	-0,0922
FITT SUNTEX 5/8" 25m	0,8458	0,8327	0,0940	0,0000	0,0112	-0,0922
FITT SUNTEX 5/8" 50m	0,8460	0,8330	0,0936	0,0000	0,0112	-0,0918
FITT SUNTEX 3/4" 25m	1,1549	1,1371	0,1280	0,0000	0,0153	-0,1255
FITT SUNTEX 3/4" 25m KIT	1,2990	1,2828	0,1282	0,0000	0,0154	-0,1274
FITT SUNTEX 3/4" 50m	1,1569	1,1391	0,1296	0,0000	0,0153	-0,1272
FITT SUNTEX 1" 25m	1,6896	1,6631	0,1907	0,0000	0,0224	-0,1866
FITT SUNTEX 1" 50m	1,6874	1,6611	0,1860	0,0000	0,0224	-0,1821
FITT TOP GREEN 5/8" 15m	0,4292	0,4241	0,0475	0,0000	0,0037	-0,0461
FITT TOP GREEN 5/8" 50m	0,4263	0,4216	0,0393	0,0000	0,0037	-0,0382
FITT TOP GREEN 3/4" 25m	0,6383	0,6310	0,0657	0,0000	0,0055	-0,0639
FITT PROFY 3/4" 50m NO DRINKING WATER	1,4392	1,4274	0,0955	0,0000	0,0095	-0,0933
FITT PROFY 1/2" MT 25*	0,5688	0,5626	0,0514	0,0000	0,0048	-0,0500
FITT PROFY 1/2" MT 50*	0,5415	0,5354	0,0492	0,0000	0,0048	-0,0478
FITT PROFY 3/4" MT 25*	1,2774	1,2659	0,1029	0,0000	0,0093	-0,1007
FITT PROFY 3/4" MT 50*	1,1444	1,1327	0,0957	0,0000	0,0093	-0,0933
FITT PROFY 1" MT 25*	2,0999	2,0807	0,2106	0,0000	0,0153	-0,2067
FITT PROFY 1" MT 50*	2,3454	2,3272	0,1877	0,0000	0,0153	-0,1848

Table 4 Results broken down by life cycle stages of the products studied [kg CO2e - CF Total]

Product	Raw materials	Packaging	Transport in	Production	Distribution	Use phase	End of life
FITT REFITTEX CRISTALLO 4x10 100m*	0,1790	-0,0032	0,0176	0,0986	0,0177	0,0000	0,0366
FITT REFITTEX CRISTALLO 5x11 100m*	0,2081	-0,0040	0,0205	0,1148	0,0170	0,0000	0,0423
FITT REFITTEX CRISTALLO 6x11 50m*	0,1829	-0,0024	0,0181	0,1011	0,0159	0,0000	0,0386
FITT REFITTEX CRISTALLO 6x12 50m*	0,2273	-0,0038	0,0226	0,1261	0,0224	0,0000	0,0480
FITT REF.CRISTALLO COMBO 6x12mm 50m*	0,2273	-0,0058	0,0227	0,1261	0,0214	0,0000	0,0512
FITT REFITTEX CRISTALLO 6x12 100m*	0,2252	-0,0074	0,0225	0,0931	0,0169	0,0000	0,0911
FITT REFITTEX CRISTALLO 8x13 50m*	0,2271	-0,0044	0,0223	0,1248	0,0389	0,0000	0,0474
FITT REFITTEX CRISTALLO 8x14 25m*	0,2782	-0,0053	0,0274	0,1536	0,0273	0,0000	0,0579
FITT REF.CRISTALLO COMBO 8x14mm 40m*	0,2780	-0,0073	0,0277	0,1535	0,0298	0,0000	0,0625
FITT REFITTEX CRISTALLO 8x14 50m*	0,2756	-0,0047	0,0273	0,1145	0,0252	0,0000	0,1189
FITT REFITTEX CRISTALLO 8x14 100m*	0,2752	-0,0049	0,0273	0,1201	0,0156	0,0000	0,1215
FITT REFITTEX CRISTALLO 9x14 50m	0,2492	-0,0044	0,0245	0,1373	0,0189	0,0000	0,0523
FITT REF.CRISTALLO COMBO 9x15mm 40m*	0,3046	-0,0073	0,0303	0,1685	0,0220	0,0000	0,0675
FITT REFITTEX CRISTALLO 9x15 50m*	0,3047	-0,0067	0,0302	0,1685	0,0198	0,0000	0,0650
FITT REFITTEX CRISTALLO 9x15 100m*	0,3046	-0,0137	0,0303	0,1685	0,0264	0,0000	0,0712
FITT REFITTEX CRISTALLO 10x15 50m*	0,2717	-0,0067	0,0268	0,1498	0,0112	0,0000	0,0586
FITT REFITTEX CRISTALLO 10x16 25m	0,3271	-0,0083	0,0326	0,1810	0,0239	0,0000	0,0747
FITT REF.CRISTALLO COMBO 10x16mm 35m*	0,3271	-0,0083	0,0326	0,1810	0,0311	0,0000	0,0733
FITT REFITTEX CRISTALLO 10x16 50m*	0,3265	-0,0061	0,0323	0,1611	0,0265	0,0000	0,0949
FITT REFITTEX CRISTALLO 12x17 50m	0,3134	-0,0101	0,0311	0,1735	0,0413	0,0000	0,0713
FITT REFITTEX CRISTALLO 12x18 25m*	0,3865	-0,0090	0,0386	0,2147	0,0411	0,0000	0,0863
FITT REFITTEX CRISTALLO 12x18 50m*	0,3851	-0,0099	0,0384	0,1855	0,0408	0,0000	0,1227
FITT REFITTEX CRISTALLO 12.5x19 50m*	0,4309	-0,0107	0,0429	0,2397	0,0594	0,0000	0,0924
FITT REFITTEX CRISTALLO 12.5x17.5 50m*	0,3179	-0,0066	0,0315	0,1760	0,0346	0,0000	0,0667
FITT REF.CRIST.COMBO 12.5x18.5mm 20m*	0,3999	-0,0139	0,0404	0,2222	0,0361	0,0000	0,0982
FITT REFITTEX CRISTALLO 12.5x18.5 50m*	0,3998	-0,0107	0,0398	0,2222	0,0376	0,0000	0,0865
FITT REFITTEX CRISTALLO 13x19 25m*	0,4021	-0,0083	0,0401	0,2234	0,0473	0,0000	0,0885
FITT REFITTEX CRISTALLO 13x19 50m*	0,3996	-0,0096	0,0398	0,1715	0,0241	0,0000	0,1669
FITT REFITTEX CRISTALLO 13x20 50m*	0,4951	-0,0124	0,0493	0,2759	0,0359	0,0000	0,1072

Product	Raw materials	Packaging	Transport in	Production	Distribution	Use phase	End of life
FITT REFITTEX CRISTALLO 15x21 50m*	0,4654	-0,0133	0,0462	0,2584	0,0446	0,0000	0,1004
FITT REF.CRISTALLO COMBO 16x22mm 20m*	0,4766	-0,0144	0,0479	0,2647	0,0440	0,0000	0,1124
FITT REFITTEX CRISTALLO 16x22 25m*	0,4766	-0,0127	0,0475	0,2647	0,0521	0,0000	0,1065
FITT REFITTEX CRISTALLO 16x22 50m*	0,4765	-0,0132	0,0473	0,2646	0,0424	0,0000	0,1027
FITT REFITTEX CRISTALLO 19x25 50m*	0,5746	-0,0230	0,0571	0,3158	0,0501	0,0000	0,1337
FITT REFITTEX CRISTALLO 19x26 25m*	0,6696	-0,0251	0,0666	0,3695	0,0579	0,0000	0,1559
FITT REF.CRISTALLO COMBO 19x26mm 35m*	0,6696	-0,0301	0,0671	0,3695	0,0689	0,0000	0,1618
FITT REFITTEX CRISTALLO 19x26 50m*	0,6696	-0,0194	0,0664	0,3695	0,0642	0,0000	0,1447
FITT REFITTEX CRISTALLO 19x27 50m*	0,7796	-0,0274	0,0778	0,4319	0,0346	0,0000	0,1763
FITT REFITTEX CRISTALLO 20x28 50m	0,8512	-0,0227	0,0832	0,4627	0,1005	0,0000	0,1752
FITT REFITTEX CRISTALLO 22x30 50m	0,8947	-0,0265	0,0894	0,4968	0,0633	0,0000	0,1970
FITT REFITTEX CRISTALLO 25x33 25m*	0,9610	-0,0530	0,0967	0,5343	0,1051	0,0000	0,2485
FITT REF.CRISTALLO COMBO 25x33mm 25m*	0,9789	-0,0422	0,0986	0,5442	0,1448	0,0000	0,2369
FITT REFITTEX CRISTALLO 25x33 50m*	0,9609	-0,0339	0,0961	0,5342	0,0871	0,0000	0,2170
FITT REFITTEX CRISTALLO 25x34 25m*	1,1152	-0,0548	0,1124	0,6216	0,1188	0,0000	0,2767
FITT REFITTEX CRISTALLO 25x34 50m*	1,1151	-0,0340	0,1118	0,6216	0,1010	0,0000	0,2469
FITT REFITTEX CRISTALLO 30x38 25m*	1,1628	-0,0416	0,1156	0,6416	0,0769	0,0000	0,2660
FITT REFITTEX CRISTALLO 30x38 50m*	1,1628	-0,0393	0,1154	0,6416	0,0948	0,0000	0,2549
FITT REFITTEX CRISTALLO 32x40 25m*	1,2192	-0,0956	0,1233	0,6778	0,1284	0,0000	0,3484
FITT REFITTEX CRISTALLO 32x40 50m*	1,2151	-0,0574	0,1226	0,6778	0,2022	0,0000	0,2946
FITT REFITTEX CRISTALLO 32x42 25m*	1,5610	-0,0716	0,1564	0,8675	0,1428	0,0000	0,3701
FITT REFITTEX CRISTALLO 38x48 25m*	1,8102	-0,0823	0,1799	1,0086	0,1772	0,0000	0,4506
FITT REFITTEX CRISTALLO 40x50 25m*	1,8898	-0,1113	0,1883	1,0560	0,2460	0,0000	0,4880
FITT REFITTEX CRISTALLO 50x60 25m*	2,3032	-0,1211	0,2297	1,2882	0,2603	0,0000	0,5979
FITT REF.CRIST. BLACK 5x10.5 100m	0,1770	-0,0040	0,0166	0,1011	0,0005	0,0000	0,0351
FITT REFITTEX CRISTALLO PLUS 19x26 30m	0,6982	-0,0284	0,0682	0,3782	0,0313 (*)	0,0000	0,1399 (*)
FITT REFITTEX CRISTALLO PLUS 19x26 100m	0,6982	-0,0173	0,0678	0,3782	0,0313	0,0000	0,1399
FITT AGAVE 5/8" 20m KIT*	0,3784	-0,0118	0,0289	0,1872	0,0453	0,0000	0,0703
FITT AGAVE 5/8" 25m*	0,2928	-0,0114	0,0271	0,1872	0,0330	0,0000	0,0615
FITT AGAVE 5/8" 50m*	0,2928	-0,0107	0,0270	0,1872	0,0448	0,0000	0,0603

Product	Raw materials	Packaging	Transport in	Production	Distribution	Use phase	End of life
FITT AGAVE 3/4" 25m*	0,4290	-0,0215	0,0399	0,2746	0,0480	0,0000	0,0961
FITT AGAVE 3/4" 50m*	0,4290	-0,0172	0,0400	0,2746	0,0428	0,0000	0,0949
FITT MIMOSA 1/2" 15m*	0,1376	-0,0139	0,0220	0,1623	0,0074	0,0000	0,0350
FITT MIMOSA 1/2" 20m KIT*	0,2132	-0,0090	0,0227	0,1527	0,0217	0,0000	0,0385
FITT MIMOSA 1/2" 25m*	0,1395	-0,0096	0,0197	0,1409	0,0201	0,0000	0,0404
FITT MIMOSA 1/2" 50m*	0,1389	-0,0077	0,0204	0,1476	0,0267	0,0000	0,0335
FITT MIMOSA 1/2" 150m	0,1376	-0,0110	0,0219	0,1623	0,0029	0,0000	0,0300
FITT MIMOSA 5/8" 15m*	0,1672	-0,0160	0,0270	0,1997	0,0182	0,0000	0,0413
FITT MIMOSA 5/8" 25m*	0,1672	-0,0114	0,0269	0,1997	0,0305	0,0000	0,0348
FITT MIMOSA 3/4" 20m KIT*	0,3411	-0,0161	0,0373	0,2550	0,0608	0,0000	0,0663
FITT MIMOSA 3/4" 25m*	0,2481	-0,0209	0,0404	0,2983	0,0539	0,0000	0,0587
FITT MIMOSA 3/4" 50m*	0,2457	-0,0155	0,0369	0,2669	0,0531	0,0000	0,0709
FITT MIMOSA 1" 25m*	0,3953	-0,0314	0,0659	0,4850	0,0511	0,0000	0,1112
FITT MIMOSA 1" 50m*	0,4153	-0,0387	0,0497	0,3679	0,0909	0,0000	0,1974
FITT MINT 1/2" 15m*	0,1257	-0,0151	0,0204	0,1373	0,0315	0,0000	0,0375
FITT MINT 1/2" 20m KIT*	0,2113	-0,0086	0,0221	0,1373	0,0324	0,0000	0,0453
FITT MINT 1/2" 25m*	0,1357	-0,0082	0,0173	0,1052	0,0236	0,0000	0,0722
FITT MINT 1/2" 50m*	0,1322	-0,0059	0,0183	0,1144	0,0269	0,0000	0,0550
FITT MINT 5/8" 15m KIT*	0,2744	-0,0068	0,0239	0,1327	0,0187	0,0000	0,1134
FITT MINT 5/8" 15m*	0,1576	-0,0152	0,0224	0,1425	0,0268	0,0000	0,0588
FITT MINT 5/8" 25m*	0,1571	-0,0108	0,0225	0,1448	0,0200	0,0000	0,0551
FITT MINT 5/8" 50m*	0,1591	-0,0100	0,0218	0,1369	0,0305	0,0000	0,0665
FITT MINT COMBO 5/8" 64m*	0,1532	-0,0062	0,0241	0,1623	0,0144	0,0000	0,0338
FITT MINT 3/4" 25m*	0,2459	-0,0183	0,0385	0,2621	0,0553	0,0000	0,0562
FITT MINT 3/4" 50m*	0,2459	-0,0173	0,0387	0,2621	0,0574	0,0000	0,0590
FITT MINT 1" 25m	0,4448	-0,0285	0,0661	0,4369	0,0852	0,0000	0,1028
FITT SUNTEX 5/8" 15m KIT	0,5397	-0,0163	0,0458	0,2372	0,0612	0,0000	0,1060
FITT SUNTEX 5/8" 25m KIT	0,4940	-0,0105	0,0447	0,2372	0,0589	0,0000	0,0963
FITT SUNTEX 5/8" 25m	0,4255	-0,0105	0,0434	0,2372	0,0570	0,0000	0,0932
FITT SUNTEX 5/8" 50m	0,4255	-0,0103	0,0434	0,2372	0,0575	0,0000	0,0928

Product	Raw materials	Packaging	Transport in	Production	Distribution	Use phase	End of life
FITT SUNTEX 3/4" 25m	0,5814	-0,0148	0,0594	0,3245	0,0777	0,0000	0,1267
FITT SUNTEX 3/4" 25m KIT	0,7253	-0,0161	0,0609	0,3245	0,0777 (*)	0,0000	0,1267 (*)
FITT SUNTEX 3/4" 50m	0,5814	-0,0162	0,0594	0,3245	0,0795	0,0000	0,1283
FITT SUNTEX 1" 25m	0,8510	-0,0250	0,0865	0,4743	0,1140	0,0000	0,1887
FITT SUNTEX 1" 50m	0,8510	-0,0216	0,0865	0,4743	0,1132	0,0000	0,1840
FITT TOP GREEN 5/8" 15m	0,1847	-0,0168	0,0246	0,1810	0,0086	0,0000	0,0471
FITT TOP GREEN 5/8" 50m	0,1847	-0,0109	0,0245	0,1810	0,0083	0,0000	0,0387
FITT TOP GREEN 3/4" 25m	0,2708	-0,0219	0,0373	0,2746	0,0126	0,0000	0,0650
FITT PROFY 3/4" 50m NO DRINKING WATER	0,4827	-0,0108	0,0480	0,2211	0,4916	0,0000	0,2066
FITT PROFY 1/2" MT 25*	0,2503	-0,0083	0,0249	0,1146	0,0321	0,0000	0,1552
FITT PROFY 1/2" MT 50*	0,2503	-0,0069	0,0249	0,1146	0,0409	0,0000	0,1178
FITT PROFY 3/4" MT 25*	0,4827	-0,0197	0,0480	0,2211	0,0705	0,0000	0,4748
FITT PROFY 3/4" MT 50*	0,4827	-0,0108	0,0480	0,2211	0,1004	0,0000	0,3031
FITT PROFY 1" MT 25*	0,7867	-0,0605	0,0779	0,3603	0,0783	0,0000	0,8572
FITT PROFY 1" MT 50*	0,7867	-0,0455	0,0778	0,3603	0,1088	0,0000	1,0574

Values within the "Packaging" life cycle stage are negative due to the materials used being derived from biomass (this uptake from the atmosphere is fully offset by emissions at the end of life considering the complete release of the contained carbon into the atmosphere).

Values with (*) in Table 4 are the object of a manual correction of the result due to the product not being distributed in the reference year. The approach used is that of similarity.

5.1. Sensitivity analysis

In order to confirm the soundness of the assumptions and choices made, a sensitivity analysis was carried out to understand the impact of these assumptions and, if necessary, to reason about the choices made.
The sensitivity analysis conducted in this case focuses on the treatment of consumptions at the San Pietro in Gù logistics hub, a warehouse that almost entirely handles the distribution of flexible products (the technologies included are knitted, braided, NTS and spiral).
Specifically, the additional contribution of the consumption of the logistics site in San Pietro in Gu, for the distribution of products with NTS technology, was calculated.

The results of this sensitivity analysis (monitoring the CF Total flow), show a maximum positive variance of 0.24%, well below the 1% cut-off threshold adopted.
Therefore, the basic choice of not associating any consumption with the management of logistics generated by the San Pietro in Gù site is confirmed. This assumption is valid for NTS, Knitted, Braided and Spiral technologies.

6. Uncertainty analysis

The uncertainty analysis was conducted in order to identify the incidence of uncertainty related to the input data on the results of the study. Uncertainty analysis in fact means the systematic study of the propagation of input uncertainty on output uncertainty. If the uncertainty of the process data is specified, e.g. in the form of a Gaussian distribution with a certain standard deviation, which may differ for different sections of the process data, then the uncertainty analysis will produce the standard deviations or confidence intervals for the inventory results (Heijungs et al., 2005).
In a Carbon Footprint study, as in the case of LCA studies, there are at least two types of uncertainty involved: one is the normal uncertainty associated with the determination of a parameter in a given system, and the other refers to the choice of the value of that parameter to represent a value in another similar system (Steen B., 1997). Very often, uncertainty about the quality of a specific input or output cannot be derived from the available information, since there is a source of information that provides the average value, without any indication of the uncertainty of that value.
Therefore, with reference to the Ecoinvent database, a simplified procedure was developed to quantify the uncertainty of these data: this simplified approach involves a qualitative assessment of data quality indicators, based on a pedigree matrix. This matrix was introduced and developed by Pedersen Weidema & Wasnae (Weidema et al.,1996) and is so called (pedigree matrix) since the data quality indicators refer to the history or origin of the data, like a family tree that reports the genealogy (pedigree) of an individual (Weidema et al., 1996).
A probability distribution had to be assigned to each of these processes; since the inventory items found to be significant all came from the Ecoinvent database, the lognormal probability distribution was assumed.
A Monte Carlo simulation was then conducted using a number of runs of 500 as the stopping criterion, whereby a series of values are randomly sampled on the basis of the distribution, and the results of the product Carbon Footprint are recalculated for each parameter.
The statistical results of the uncertainty analysis can be found at Table 5.

Table 5 Results of uncertainty analysis

GHG flow	CV [%]
CF Total	1.85

Table Index

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