ENVIRONMENTAL PRODUCT DECLARATION

ECOLEAN® AIR ASEPTIC PACKAGES

ECOLEAN PRODUCTION SITE: TEDA, CHINA

ecolean
a lighter approach to packaging

IN ACCORDANCE WITH ISO 14025
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EPD®

ECOLEAN LIGHTWEIGHT PACKAGING HAS BECOME A HEAVYWEIGHT ARGUMENT

Ecolean was founded in 1996 in Helsingborg, Sweden, and innovation has always been fundamental for Ecolean. The Ecolean concept is to use a minimal amount of raw materials to produce a unique flexible lightweight package, and a filling system for liquid food products.

Ecolean is established on the market as a full system supplier producing both filling machines and lightweight packages. Ecolean presently employs more than 450 people. Ecolean has its headquarter in Helsingborg, Sweden and production sites in Sweden as well as China and Pakistan. The production of filling machines and manufacturing of packaging material takes place in Helsingborg. The package forming plants in Sweden, China and Pakistan convert the packaging material film into a range of hermetically sealed ready-to-fill packages in a variety of different sizes.

Ecolean has commercial activities in 20 countries, the largest markets being China, Pakistan and Vietnam.

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THE IMPORTANCE OF A LIFE-CYCLE APPROACH

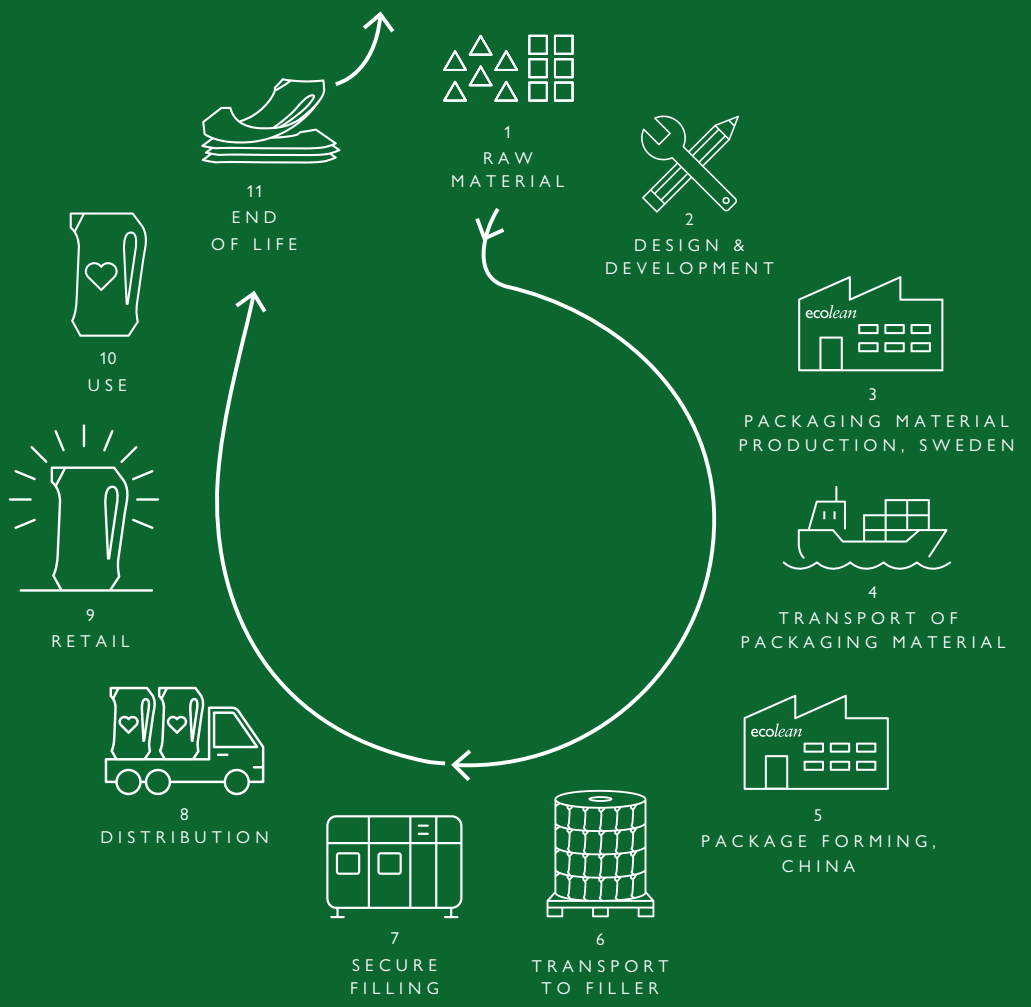
By using the life-cycle approach, Ecolean can identify the areas with the most environmental impact and work to reduce it. The fundamental premise behind the Ecolean production process is the minimisation and efficient use of raw materials and energy, from the very start.

Ecolean believes in using less raw material. Reducing the amount of packaging material used, transported and disposed of, benefits the entire product life-cycle.

The Environmental Product Declaration (EPD) is an independently verified and registered document, based on verified life-cycle assessment (LCA) data. By using EPDs in accordance with the international EPD system, Ecolean can communicate the environmental performance of its products in a transparent way.

This EPD follows the Product Category Rules (PCR) for Packaging UN CPC 36490 2019:13, version 1.1, as well as the principles and procedures of ISO 14025:2006. The EPD has been externally verified by an independent verifier approved by the technical committee of EPD International. The environmental impacts of different EPDs can be compared only taking into account all the technical information supporting the declared/functional unit definition as requested by the PCR.

This EPD covers the production of packages for the Chinese, South Korean and Vietnamese markets. The packaging material is produced in Sweden and transported to the Chinese plant where the packages are printed and formed.



ECOLEAN® AIR ASEPTIC

UNIQUE, EYE-CATCHING AND CONVENIENT TO USE

125 ml

200 ml

250 ml

Total weight	125 ml	200 ml	250 ml
gram/package	5.0	6.0	6.5
Height (mm)	130	165	185
Width (mm)	103	103	103
Depth (mm)	0.544	0.544	0.544

Ecolean Air Aseptic packaging brings healthy, flavourful and exciting food products to people all over the world – without the limitations of refrigerated distribution. These products can travel long distances, handle harsh environments and withstand long-term storage at ambient temperatures.

The Ecolean® Air Aseptic lightweight package is suitable, with its unique and eye-catching shape, for filling products such as; white milk, flavoured milk, drinking yoghurts, juice drinks, nectars, ice tea etc.

Ecolean® Air Aseptic packages, produced in the plant in China are available in three different sizes: 125 ml, 200 ml and 250 ml. In addition to these sizes, the Ecolean product range also consists of 500 ml, 750 ml and 1000 ml for ambient distribution. These sizes are however, not manufactured in China and not included in this report.

PRODUCTION PLANT CERTIFICATES

Packaging material and packaging forming production, Sweden:
ISO 14001, BRC Packaging, ISO 22000, Halal, FDA/IMS

Packaging forming production, China:
ISO 9001, ISO 14001, ISO/FSSC 22000, QS-Mark

Ecolean® Air Aseptic
The package format is a stand-up pouch, with a multilayer structure including light and gas barriers that protects its content. The Ecolean® Air Aseptic package is produced in a three step process. First, a multilayer film is produced in a co-extrusion process at Ecolean's manufacturing plant in Sweden. The film is then shipped by boat to the converting plant in China, where the film is printed. In the final step, the film is folded and converted into hermetically sealed, ready-to-fill packages on reels. At the customer site, these reels are inserted into an Ecolean filling machine and filled with liquid food products.

Sterilisation of aseptic packages
In order to ensure the highest possible food safety, Ecolean has chosen a non-chemical sterilisation alternative in order to insure that food contact surfaces are never exposed to any chemicals. The inside of the package is sterilised under secure and controlled conditions with the use of electron-beam technology at the Ecolean package converting site.

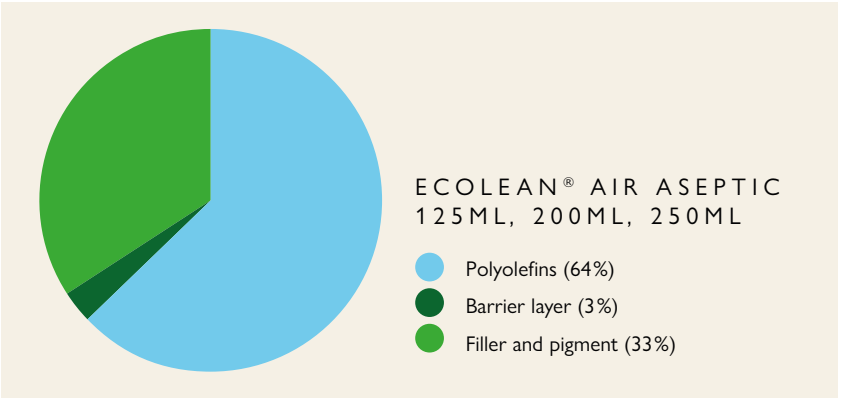
Materials
The packages are made of:
- Polyolefins (PE, PP)
- Dolomite
- Pigments for colour and light protection
- Barrier layer (EVOH) to protect the content from oxygen

All raw material used are of food grade quality. The packages are free from substances of very high concern (SVHC). The products contains no substances from the REACH Candidate list (of 17.01.2023). The packaging material does not contain any biodegradable materials.

Certifications
The Certification to the Standard verifies technical performance, assists manufacturers' fulfilment of legal obligations, and helps provide protection to the consumer. Ecolean production and products are in compliance with relevant legislation.

ISO/FSSC 22000 specifies requirements for a food safety management system where an organisation in the food chain needs to demonstrate its ability to control food safety hazards in order to ensure that food is safe at the time of human consumption.

MATERIAL COMPOSITION



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ENVIRONMENTAL PRODUCT DECLARATION

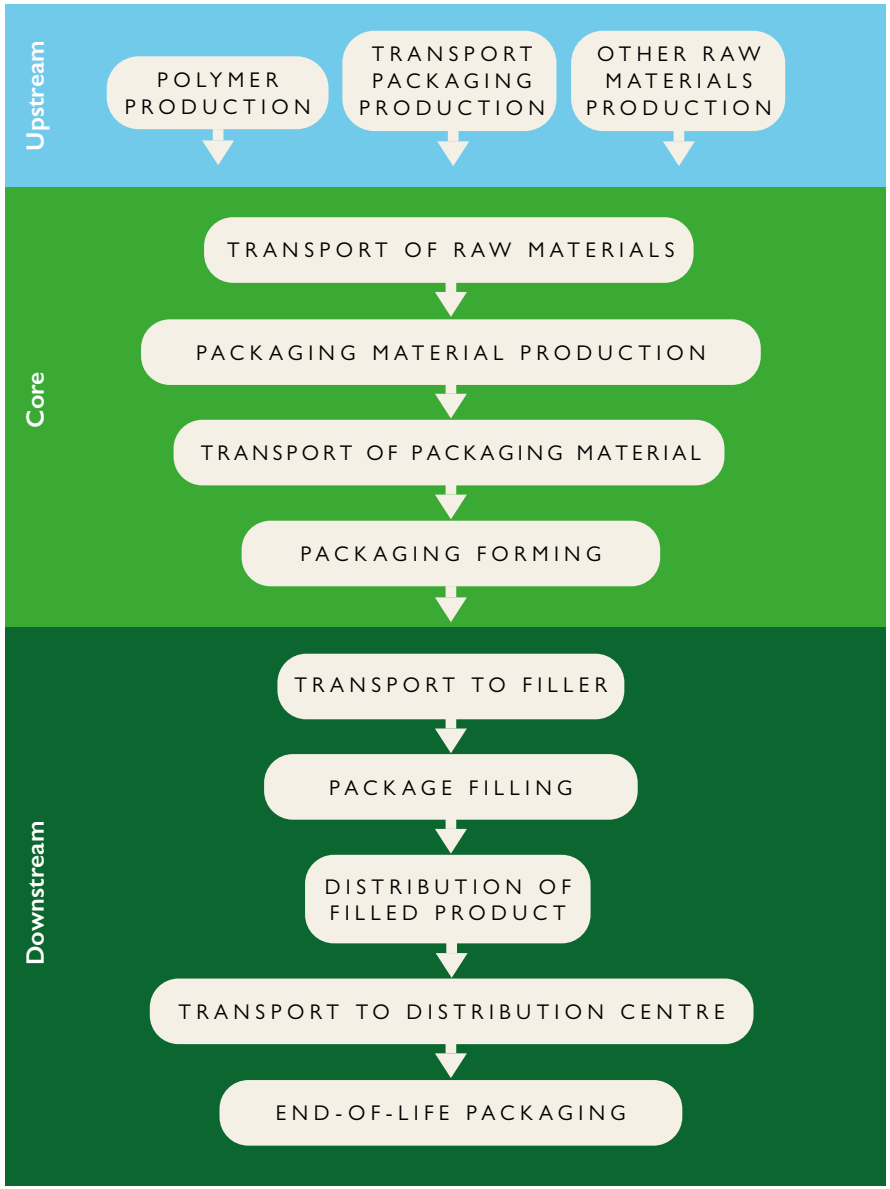
MAIN DATA BASE FOR GENERIC DATA

This EPD's boundary is cradle to grave.

Upstream
The upstream processes include all production for raw materials used in the packaging production. The upstream process is identical for all markets analysed.

Core
The core processes include transportation of raw materials to the Ecolean site in Helsingborg, Sweden, where the packaging material film is manufactured. The film reels are covered by plastic wrapping and placed on wooden pallets. The film reels are transported by boat from Helsingborg harbour to Tianjin harbour, China. The material is transported by truck to the Ecolean package forming plant in TEDA, Tianjin. Here the film is printed and formed into packages and sterilised before the ready-to-fill packages are wound on reels. The core process also includes waste treatment for production waste and impacts due to the production of the electricity and fuels used in the production process.

Amounts of raw materials and energy consumption, as well as transport distances have been taken directly from the production sites of Ecolean, Sweden and China, in 2021. Other site specific data from the Ecolean sites in Sweden and China, has been used for the manufacturing of packaging material and the converting process (chemicals and water) and refers to year 2021. Since 2017, Ecolean has sourced renewable hydropower electricity for its production plants in Sweden, and renewable biogas for production heating processes at the Helsingborg plant through a Guarantee of Origin. Since 2020, Ecolean has purchased renewable energy by buying International Renewable Energy Certificates (I-RECs) also for the production site in China. Database data from the Sphera LCA for experts 2023.1 software has been used for the production of electricity (Swedish electricity from hydropower 14.2 g CO_2-eq/kWh and Chinese electricity, assumed equal to Japanese electricity from wind 16.3 g CO_2-eq/kWh). Chemicals (ink, etc.) are used in minimal amounts. The core process is identical for all markets analysed.



Infographics showing the boundaries and stages in the described LCA process.

Downstream
The downstream processes include transport of the ready-to-fill packages to a customer, where the filling of the product takes place. At the customer site (a dairy or beverage producer) the packages enter an Ecolean filling machine for aseptic products. The packages are cut open, filled with the product and sealed in the machine. The impact from the production of the filled product, (e.g. milk, juice, etc.) is not part of the scope for this EPD.

Data for the filling process (the consumption of electricity, steam, chemicals and water) is based on direct measurements, provided by Ecolean (2020). For the production of the energy and chemicals used in the filling process, database data from the Sphera LCA for experts 2023.1 software has been applied.

The downstream processes also include transport from the filling site to a distribution centre and finally packaging end-of-life.

The end-of-life scenario for the flexible plastic packages depends on local conditions. The package should be sorted and recycled as plastic packaging when appropriate system is available, or sent for energy recovery depending on local systems. The last option would be landfill. The package can be recycled, used for injection moulding into some plastic details. In line with the PCR, only the transport to the recycling site is taken into consideration.

The Chinese market
For the transport of the packages to Ecolean's customers, 1,200 km by truck has been applied. This is an estimation which should represent an average for a customer in China. The Chinese electricity mix corresponds to a GWP-factor of 804 g CO_2-eq/kWh. For the transport of the filled packages for distribution, an estimated distance of 150 km was used. The weight of the product (e.g. milk, juice, etc.) was not included.

The mix of incineration, material recycling and landfill for the primary packaging depends upon the market. Due to lack of available data, the mix for China has been based on global statistics (Ellen MacArthur Foundation). The assumptions made for the end-of-life are 14% incineration, 14% recycling and 72% landfill.

The South Korean market
For the transport of the packaging to Ecolean's customers, 1,274 km by ship and 400 km on truck has been applied as an estimation. The South Korean electricity mix corresponds to a GWP-factor of 612 g CO_2-eq/kWh. For the transport of the filled packages for distribution, an estimated distance of 150 km was used. The weight of the product (e.g. milk, juice, etc.) was not included.

The mix of incineration, material recycling and landfill for the primary packaging depends upon the market. Due to lack of available data, the mix for South Korea has been based on global statistics (Ellen MacArthur Foundation). The assumptions made for the end-of-life are 14% incineration, 14% recycling and 72% landfill.

The Vietnamese market
For the transport of the packaging to Ecolean's customers, 3,960 km by ship and 65 km on truck has been applied as an estimation. The Vietnamese electricity mix (assumed equal to Thai electricity mix) is used for the filling process and corresponds to a GWP-factor of 583 g CO_2-eq/kWh. For the transport of the filled packages for distribution, an estimated distance of 150 km was used. The weight of the product (e.g. milk, juice, etc.) was not included.

The mix of incineration, material recycling and landfill for the primary packaging depends upon the market. Due to lack of available data, the mix for Vietnam has been based on global statistics (Ellen MacArthur Foundation). The assumptions made for the end-of-life are 14% incineration, 14% recycling and 72% landfill.

Geographic scope
The Upstream and Core processes in this EPD relate to the plants located in Helsingborg, Sweden and TEDA, China. The Downstream process is calculated for three different markets: China, South Korea and Vietnam.

Functional unit
The functional unit for this PCR is 1 packaging product unit. The packages are used for liquid food and are filled in an Ecolean filling machine for aseptic distribution.

Cut off criteria
All raw material inputs and outputs larger than 1% have been included.

ENVIRONMENTAL PERFORMANCE – ECOLEAN® AIR ASEPTIC THE CHINESE MARKET

INDICATORS	Acronyms	Unit per functional unit (1 package)	Ecolean® Air Aseptic											
			Air Aseptic 125 ml				Air Aseptic 200 ml				Air Aseptic 250 ml			
			Upstream	Core	Downstream	Total	Upstream	Core	Downstream	Total	Upstream	Core	Downstream	Total
Climate Change - total	GWP-total	kg CO_2 eq	1.03E-02	3.27E-03	3.26E-03	1.68E-02	1.23E-02	3.92E-03	3.66E-03	1.98E-02	1.33E-02	4.26E-03	3.87E-03	2.14E-02
Climate Change - fossil	GWP-fossil	kg CO_2 eq	1.03E-02	3.21E-03	3.25E-03	1.68E-02	1.23E-02	3.84E-03	3.65E-03	1.98E-02	1.33E-02	4.17E-03	3.86E-03	2.13E-02
Climate Change - biogenic	GWP-biogenic	kg CO_2 eq	2.57E-04	6.10E-05	5.55E-06	3.24E-04	3.07E-04	7.53E-05	6.50E-06	3.89E-04	3.32E-04	8.37E-05	7.02E-06	4.23E-04
Climate Change - land use and land use change	GWP-luluc	kg CO_2 eq	6.64E-08	4.37E-06	6.34E-06	1.08E-05	7.67E-08	5.20E-06	7.37E-06	1.26E-05	8.31E-08	5.65E-06	7.93E-06	1.37E-05
Ozone depletion	ODP	kg CFC-11 eq	4.77E-13	3.67E-14	4.43E-16	5.15E-13	5.68E-13	4.57E-14	5.10E-16	6.14E-13	6.20E-13	5.09E-14	5.44E-16	6.72E-13
Acidification	AP	mole H+ eq	6.79E-05	8.63E-05	6.21E-06	1.60E-04	8.05E-05	1.03E-04	6.42E-06	1.90E-04	8.77E-05	1.11E-04	6.55E-06	2.06E-04
Eutrophication aquatic freshwater	EP-freshwater	kg P eq	3.86E-07	3.20E-08	3.54E-08	4.53E-07	4.59E-07	3.97E-08	4.24E-08	5.41E-07	4.98E-07	4.41E-08	4.59E-08	5.88E-07
Eutrophication aquatic marine	EP-marine	kg N eq	8.22E-06	2.05E-05	1.22E-06	2.99E-05	9.76E-06	2.45E-05	1.28E-06	3.55E-05	1.06E-05	2.65E-05	1.32E-06	3.84E-05
Eutrophication terrestrial	EP-terrestrial	mole N eq	8.53E-05	2.22E-04	1.41E-05	3.21E-04	1.01E-04	2.64E-04	1.50E-05	3.80E-04	1.10E-04	2.86E-04	1.55E-05	4.11E-04
Photochemical ozone formation	POCP	kg NMVOC eq	4.00E-05	5.80E-05	3.56E-06	1.02E-04	4.75E-05	7.03E-05	3.72E-06	1.21E-04	5.13E-05	7.60E-05	3.82E-06	1.31E-04
Depletion of abiotic resources - minerals and metals	ADP-minerals & metals	kg Sb eq	2.46E-08	1.44E-09	1.06E-10	2.61E-08	2.91E-08	1.76E-09	1.16E-10	3.09E-08	3.18E-08	1.95E-09	1.21E-10	3.38E-08
Depletion of abiotic resources - fossil fuels	ADP-fossil	MJ	3.28E-02	3.46E-02	2.17E-02	8.90E-02	3.89E-02	4.12E-02	2.33E-02	1.03E-01	4.22E-02	4.46E-02	2.42E-02	1.11E-01
Water scarcity	WDP	m^3 world eq	1.41E-04	1.24E-04	6.27E-04	8.92E-04	1.57E-04	1.47E-04	6.51E-04	9.55E-04	1.70E-04	1.59E-04	6.65E-04	9.94E-04
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ	8.12E-03	2.15E-02	2.84E-03	3.25E-02	9.62E-03	2.44E-02	3.00E-03	3.70E-02	1.05E-02	2.66E-02	3.10E-03	4.02E-02
Use of renewable primary energy resources used as raw materials	PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ	8.12E-03	2.15E-02	2.84E-03	3.25E-02	9.62E-03	2.44E-02	3.00E-03	3.70E-02	1.05E-02	2.66E-02	3.10E-03	4.02E-02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ	1.58E-01	4.22E-02	2.17E-02	2.22E-01	1.88E-01	5.07E-02	2.33E-02	2.62E-01	2.03E-01	5.52E-02	2.42E-02	2.83E-01
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ	1.72E-01	0.00E+00	0.00E+00	1.72E-01	2.05E-01	0.00E+00	0.00E+00	2.05E-01	2.22E-01	0.00E+00	0.00E+00	2.22E-01
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ	3.30E-01	4.27E-02	2.17E-02	3.94E-01	3.93E-01	5.13E-02	2.33E-02	4.67E-01	4.25E-01	5.59E-02	2.42E-02	5.05E-01
Use of secondary material	SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non renewable secondary fuels	NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	FW	m^3	7.97E-05	2.97E-05	1.70E-05	1.26E-04	9.41E-05	3.55E-05	1.77E-05	1.47E-04	1.03E-04	3.87E-05	1.81E-05	1.60E-04
Hazardous waste disposed	HWD	kg	1.86E-12	-1.03E-11	9.46E-12	1.03E-12	2.21E-12	-1.06E-11	9.48E-12	1.05E-12	2.38E-12	-1.16E-11	9.53E-12	2.95E-13
Non-hazardous waste disposed	NHWD	kg	2.08E-05	8.59E-06	2.37E-03	2.40E-03	2.44E-05	9.93E-06	2.84E-03	2.87E-03	2.59E-05	1.08E-05	3.08E-03	3.11E-03
Radioactive waste disposed	RWD	kg	2.64E-08	5.35E-08	2.14E-07	2.94E-07	2.93E-08	6.28E-08	2.22E-07	3.14E-07	3.19E-08	6.80E-08	2.27E-07	3.27E-07
Components for re-use	CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	MFR	kg	0.00E+00	2.73E-03	0.00E+00	2.73E-03	0.00E+00	2.98E-03	0.00E+00	2.98E-03	0.00E+00	3.13E-03	0.00E+00	3.13E-03
Material for energy recovery	MER	kg	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05
Exported electrical energy	EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy	EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

All results in the EPD are written in logarithmic base of ten. Reading example: 5.2E-03 = $5.2*10^{-3}$ = 0.0052.

ENVIRONMENTAL PERFORMANCE – ECOLEAN® AIR ASEPTIC THE SOUTH KOREAN MARKET

INDICATORS	Acronyms	Unit per functional unit (1 package)	Ecolean® Air Aseptic											
			Air Aseptic 125 ml				Air Aseptic 200 ml				Air Aseptic 250 ml			
			Upstream	Core	Downstream	Total	Upstream	Core	Downstream	Total	Upstream	Core	Downstream	Total
Climate Change - total	GWP-total	kg CO_2 eq	1.03E-02	3.27E-03	2.84E-03	1.64E-02	1.23E-02	3.92E-03	3.22E-03	1.94E-02	1.33E-02	4.26E-03	3.41E-03	2.10E-02
Climate Change - fossil	GWP-fossil	kg CO_2 eq	1.03E-02	3.21E-03	2.84E-03	1.64E-02	1.23E-02	3.84E-03	3.21E-03	1.93E-02	1.33E-02	4.17E-03	3.41E-03	2.09E-02
Climate Change - biogenic	GWP-biogenic	kg CO_2 eq	2.57E-04	6.10E-05	3.34E-06	3.22E-04	3.07E-04	7.53E-05	3.76E-06	3.86E-04	3.32E-04	8.37E-05	3.99E-06	4.20E-04
Climate Change - land use and land use change	GWP-luluc	kg CO_2 eq	6.64E-08	4.37E-06	2.48E-06	6.92E-06	7.67E-08	5.20E-06	2.93E-06	8.21E-06	8.31E-08	5.65E-06	3.17E-06	8.91E-06
Ozone depletion	ODP	kg CFC-11 eq	4.77E-13	3.67E-14	2.47E-15	5.17E-13	5.68E-13	4.57E-14	2.52E-15	6.16E-13	6.20E-13	5.09E-14	2.55E-15	6.74E-13
Acidification	AP	mole H+ eq	6.79E-05	8.63E-05	6.46E-06	1.61E-04	8.05E-05	1.03E-04	7.44E-06	1.91E-04	8.77E-05	1.11E-04	7.98E-06	2.07E-04
Eutrophication aquatic freshwater	EP-freshwater	kg P eq	3.86E-07	3.20E-08	3.33E-08	4.51E-07	4.59E-07	3.97E-08	3.99E-08	5.38E-07	4.98E-07	4.41E-08	4.32E-08	5.86E-07
Eutrophication aquatic marine	EP-marine	kg N eq	8.22E-06	2.05E-05	1.66E-06	3.04E-05	9.76E-06	2.45E-05	1.89E-06	3.61E-05	1.06E-05	2.65E-05	2.02E-06	3.91E-05
Eutrophication terrestrial	EP-terrestrial	mole N eq	8.53E-05	2.22E-04	1.87E-05	3.25E-04	1.01E-04	2.64E-04	2.14E-05	3.87E-04	1.10E-04	2.86E-04	2.28E-05	4.18E-04
Photochemical ozone formation	POCP	kg NMVOC eq	4.00E-05	5.80E-05	4.69E-06	1.03E-04	4.75E-05	7.03E-05	5.36E-06	1.23E-04	5.13E-05	7.60E-05	5.72E-06	1.33E-04
Depletion of abiotic resources - minerals and metals	ADP-minerals & metals	kg Sb eq	2.46E-08	1.44E-09	5.14E-11	2.61E-08	2.91E-08	1.76E-09	5.62E-11	3.09E-08	3.18E-08	1.95E-09	5.88E-11	3.38E-08
Depletion of abiotic resources - fossil fuels	ADP-fossil	MJ	3.28E-02	3.46E-02	2.05E-02	8.78E-02	3.89E-02	4.12E-02	2.17E-02	1.02E-01	4.22E-02	4.46E-02	2.24E-02	1.09E-01
Water scarcity	WDP	m^3 world eq	1.41E-04	1.24E-04	3.06E-04	5.71E-04	1.57E-04	1.47E-04	3.33E-04	6.37E-04	1.70E-04	1.59E-04	3.46E-04	6.76E-04
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ	8.12E-03	2.15E-02	1.47E-03	3.11E-02	9.62E-03	2.44E-02	1.56E-03	3.56E-02	1.05E-02	2.66E-02	1.62E-03	3.87E-02
Use of renewable primary energy resources used as raw materials	PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ	8.12E-03	2.15E-02	1.47E-03	3.11E-02	9.62E-03	2.44E-02	1.56E-03	3.56E-02	1.05E-02	2.66E-02	1.62E-03	3.87E-02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ	1.58E-01	4.22E-02	2.05E-02	2.21E-01	1.88E-01	5.07E-02	2.17E-02	2.60E-01	2.03E-01	5.52E-02	2.24E-02	2.81E-01
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ	1.72E-01	0.00E+00	0.00E+00	1.72E-01	2.05E-01	0.00E+00	0.00E+00	2.05E-01	2.22E-01	0.00E+00	0.00E+00	2.22E-01
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ	3.30E-01	4.27E-02	2.05E-02	3.93E-01	3.93E-01	5.13E-02	2.17E-02	4.66E-01	4.25E-01	5.59E-02	2.24E-02	5.03E-01
Use of secondary material	SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non renewable secondary fuels	NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	FW	m^3	7.97E-05	2.97E-05	9.61E-06	1.19E-04	9.41E-05	3.55E-05	1.03E-05	1.40E-04	1.03E-04	3.87E-05	1.06E-05	1.52E-04
Hazardous waste disposed	HWD	kg	1.86E-12	-1.03E-11	1.05E-12	-7.38E-12	2.21E-12	-1.06E-11	1.12E-12	-7.31E-12	2.38E-12	-1.16E-11	1.15E-12	-8.09E-12
Non-hazardous waste disposed	NHWD	kg	2.08E-05	8.59E-06	2.37E-03	2.40E-03	2.44E-05	9.93E-06	2.84E-03	2.87E-03	2.59E-05	1.08E-05	3.08E-03	3.11E-03
Radioactive waste disposed	RWD	kg	2.64E-08	5.35E-08	1.14E-06	1.22E-06	2.93E-08	6.28E-08	1.14E-06	1.23E-06	3.19E-08	6.80E-08	1.14E-06	1.24E-06
Components for re-use	CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	MFR	kg	0.00E+00	2.73E-03	0.00E+00	2.73E-03	0.00E+00	2.98E-03	0.00E+00	2.98E-03	0.00E+00	3.13E-03	0.00E+00	3.13E-03
Material for energy recovery	MER	kg	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05
Exported electrical energy	EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy	EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

All results in the EPD are written in logarithmic base of ten. Reading example: 5.2E-03 = $5.2*10^{-3}$ = 0.0052.

ENVIRONMENTAL PERFORMANCE – ECOLEAN® AIR ASEPTIC THE VIETNAMESE MARKET

INDICATORS	Acronyms	Unit per functional unit (1 package)	Ecolean® Air Aseptic											
			Air Aseptic 125 ml				Air Aseptic 200 ml				Air Aseptic 250 ml			
			Upstream	Core	Downstream	Total	Upstream	Core	Downstream	Total	Upstream	Core	Downstream	Total
Climate Change - total	GWP-total	kg CO_2 eq	1.03E-02	3.27E-03	2.96E-03	1.65E-02	1.23E-02	3.92E-03	3.36E-03	1.95E-02	1.33E-02	4.26E-03	3.57E-03	2.11E-02
Climate Change - fossil	GWP-fossil	kg CO_2 eq	1.03E-02	3.21E-03	2.95E-03	1.65E-02	1.23E-02	3.84E-03	3.35E-03	1.95E-02	1.33E-02	4.17E-03	3.56E-03	2.10E-02
Climate Change - biogenic	GWP-biogenic	kg CO_2 eq	2.57E-04	6.10E-05	3.66E-06	3.22E-04	3.07E-04	7.53E-05	3.89E-06	3.86E-04	3.32E-04	8.37E-05	4.03E-06	4.20E-04
Climate Change - land use and land use change	GWP-luluc	kg CO_2 eq	6.64E-08	4.37E-06	4.18E-06	8.62E-06	7.67E-08	5.20E-06	4.35E-06	9.63E-06	8.31E-08	5.65E-06	4.46E-06	1.02E-05
Ozone depletion	ODP	kg CFC-11 eq	4.77E-13	3.67E-14	3.37E-15	5.18E-13	5.68E-13	4.57E-14	3.42E-15	6.17E-13	6.20E-13	5.09E-14	3.45E-15	6.75E-13
Acidification	AP	mole H+ eq	6.79E-05	8.63E-05	2.15E-05	1.76E-04	8.05E-05	1.03E-04	2.42E-05	2.08E-04	8.77E-05	1.11E-04	2.56E-05	2.25E-04
Eutrophication aquatic freshwater	EP-freshwater	kg P eq	3.86E-07	3.20E-08	3.51E-08	4.53E-07	4.59E-07	3.97E-08	4.14E-08	5.40E-07	4.98E-07	4.41E-08	4.46E-08	5.87E-07
Eutrophication aquatic marine	EP-marine	kg N eq	8.22E-06	2.05E-05	4.50E-06	3.32E-05	9.76E-06	2.45E-05	5.12E-06	3.93E-05	1.06E-05	2.65E-05	5.47E-06	4.25E-05
Eutrophication terrestrial	EP-terrestrial	mole N eq	8.53E-05	2.22E-04	4.98E-05	3.57E-04	1.01E-04	2.64E-04	5.67E-05	4.22E-04	1.10E-04	2.86E-04	6.05E-05	4.56E-04
Photochemical ozone formation	POCP	kg NMVOC eq	4.00E-05	5.80E-05	1.29E-05	1.11E-04	4.75E-05	7.03E-05	1.46E-05	1.32E-04	5.13E-05	7.60E-05	1.56E-05	1.43E-04
Depletion of abiotic resources - minerals and metals	ADP-minerals & metals	kg Sb eq	2.46E-08	1.44E-09	1.14E-10	2.61E-08	2.91E-08	1.76E-09	1.16E-10	3.09E-08	3.18E-08	1.95E-09	1.18E-10	3.38E-08
Depletion of abiotic resources - fossil fuels	ADP-fossil	MJ	3.28E-02	3.46E-02	1.97E-02	8.71E-02	3.89E-02	4.12E-02	2.12E-02	1.01E-01	4.22E-02	4.46E-02	2.21E-02	1.09E-01
Water scarcity	WDP	m^3 world eq	1.41E-04	1.24E-04	3.15E-04	5.80E-04	1.57E-04	1.47E-04	3.41E-04	6.45E-04	1.70E-04	1.59E-04	3.54E-04	6.84E-04
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ	8.12E-03	2.15E-02	3.68E-03	3.33E-02	9.62E-03	2.44E-02	3.72E-03	3.78E-02	1.05E-02	2.66E-02	3.76E-03	4.08E-02
Use of renewable primary energy resources used as raw materials	PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ	8.12E-03	2.15E-02	3.68E-03	3.33E-02	9.62E-03	2.44E-02	3.72E-03	3.78E-02	1.05E-02	2.66E-02	3.76E-03	4.08E-02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ	1.58E-01	4.22E-02	1.98E-02	2.20E-01	1.88E-01	5.07E-02	2.13E-02	2.60E-01	2.03E-01	5.52E-02	2.21E-02	2.81E-01
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ	1.72E-01	0.00E+00	0.00E+00	1.72E-01	2.05E-01	0.00E+00	0.00E+00	2.05E-01	2.22E-01	0.00E+00	0.00E+00	2.22E-01
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ	3.30E-01	4.27E-02	1.98E-02	3.92E-01	3.93E-01	5.13E-02	2.13E-02	4.65E-01	4.25E-01	5.59E-02	2.21E-02	5.03E-01
Use of secondary material	SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non renewable secondary fuels	NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	FW	m^3	7.97E-05	2.97E-05	9.64E-06	1.19E-04	9.41E-05	3.55E-05	1.03E-05	1.40E-04	1.03E-04	3.87E-05	1.06E-05	1.52E-04
Hazardous waste disposed	HWD	kg	1.86E-12	-1.03E-11	6.84E-12	-1.59E-12	2.21E-12	-1.06E-11	6.83E-12	-1.59E-12	2.38E-12	-1.16E-11	6.86E-12	-2.37E-12
Non-hazardous waste disposed	NHWD	kg	2.08E-05	8.59E-06	2.37E-03	2.40E-03	2.44E-05	9.93E-06	2.84E-03	2.87E-03	2.59E-05	1.08E-05	3.08E-03	3.11E-03
Radioactive waste disposed	RWD	kg	2.64E-08	5.35E-08	6.64E-08	1.46E-07	2.93E-08	6.28E-08	7.54E-08	1.67E-07	3.19E-08	6.80E-08	8.01E-08	1.80E-07
Components for re-use	CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	MFR	kg	0.00E+00	2.73E-03	0.00E+00	2.73E-03	0.00E+00	2.98E-03	0.00E+00	2.98E-03	0.00E+00	3.13E-03	0.00E+00	3.13E-03
Material for energy recovery	MER	kg	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05	0.00E+00	5.84E-05
Exported electrical energy	EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy	EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

All results in the EPD are written in logarithmic base of ten. Reading example: 5.2E-03 = $5.2*10^{-3}$ = 0.0052.

PROGRAMME-RELATED INFORMATION AND VERIFICATION

Product Category Rules (PCR):
PCR 2019:13 Packaging (1.1), UN CPC 36490.

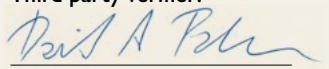
Product group classification:
UN CPC 36490

Reference year for data:
2021

Geographic scope:
China, South Korea, Vietnam

The PCR review was conducted by:
The Technical committee of the International EPD® System.
Contact via info@environdec.com

Independent verification of the declaration and data, according to ISO 14025:2006:
☐ EPD Process Certification (internal) ☑ EPD Verification (external)

Third party verifier:

David Althoff Palm

Dalemarken AB
david@dalemarken.se
Approved by the International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:
☐ Yes ☑ No

EPDs within the same product category but from different programmes may not be comparable. The environmental impacts of different EPDs can be compared only taking into account all the technical information supporting the declared/functional unit definition as requested by the PCR. The intended use for this EPD is for business to business communication.

CONTACT INFORMATION

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www.ecolean.com
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The EPD owner has the sole ownership, liability and responsibility of the EPD.

LCA practitioner:
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www.ecolean.com
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Programme operator:
The International EPD® System
EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden
www.environdec.com

References:
General Programme Instructions of the International EPD® System.
Version 3.01, dated 2019-09-18.
Packaging UN CPC 36490 2019:13,
version 1.1 of 2020-12-17.
Reach: EU REACH Regulation (EC) No 1907/2006
LCA report: LCA Report Ecolean Packaging EPD 2023-05-30.

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