



ENVIRONMENTAL PRODUCT DECLARATION of **GSA DISPENSER 1,2 cc - 2,0 cc**

1 Our Company: **APTAR ITALIA**

The company was established in 1979 as SAR S.p.A. with headquarters in the industrial district of Sambuceto, in **San Giovanni Teatino (Chieti)**. It is considered by all industries operating in this market field as **the world leader in the production of atomising micropumps and dispensers**.

Starting from 1985 the Chicago-based Pittway Corporation took gradually over the company and the Aptar Group was eventually established in 1993. It is listed on the USA stock exchange and holds the parcel of shares of the packaging companies previously held by Pittway.



In 1999 Aptar took over the US Emson Inc., another producer of atomisers, and Emsar S.p.A. was established as a result of the Emson Inc./SAR S.p.A. integration.

Novares S.p.A., located in Piano della Stazza - Manoppello Scalo (Pescara), was established in



1991 and started its production activity in November 1997. The company took up the world-wide challenge of a more and more competitive market and has been using the most advanced production technologies and automation processes.

Further to the reorganization carried out by the Aptar top management at the end of 2009, both production sites became part of the **Beauty & Home division** in the European region.

On 1st July 2014, the company Novares S.p.A. was merged into Emsar S.p.A., with the subsequent change of the company name into **Aptar Italia S.p.A.**

1,1 Our vision



1,2 Our certifications

Quality

UNI EN ISO 9001

Environment

UNI EN ISO 14001

Social

SA 8000

Safety

OHSAS 18001

Food contact

BRC / IoP

Energy

UNI EN ISO 50001

1,3 Environmental sustainability policy of Aptar

The **Environmental Sustainability Policy** is an important component of our commitment to responsible corporate citizenship.

To achieve the environmental element of **our 2030 Vision** we will:



Comply with requirements of global, national, state, and local statutes, regulations, and standards protecting the environment, human health and safety

Work to minimize our environmental footprint by promoting energy and water conservation; reducing the use of non-renewable natural resources; increasing the reuse and recycling of materials; and striving for landfill free processes

Drive continuous improvement in our environmental sustainability performance by setting goals, measuring, and communicating progress towards those goals

Incorporate environmental sustainability considerations into our business decisions

Monitor emerging environmental trends and keep abreast of regulatory changes

Engage with key stakeholders - including employees, customers, suppliers, and shareholders - for continuous improvement

1,4 Plant and production processes

Aptar Italia produces micro-pumps and dispensers for liquids with highly technological assembly processes through the use of high-speed machines.

The GSA production process starts with a first phase when the plant receives semi-finished components produced by suppliers with different production processes as injection molding, extrusion, vulcanization and then continues with the assembly of the final product at Aptar Italia plants.

In total the GSA has two assembly processes and eleven production processes for the various components.



1,5 The products

The products included in the analysis belong to the **GSA DISPENSER** family with dosage **1,2 cc** and **2,0 cc**.

All GSA family and all GSA options covered with metal surfaces are excluded.

2 Product description

The following table shows the materials of each GSA component typology:

DISPENSER GSA 1,2cc – 2,0cc	Material
Seal	POM
Housing	PP
Piston	LLDPE
Retainer	PP
Stem	PP
Ball	POM
Spring	Stainless Steel
Gasket	PE
Closure	PP
Actuator	PP
Dip Tube	LDPE



3 Calculation of environmental performance

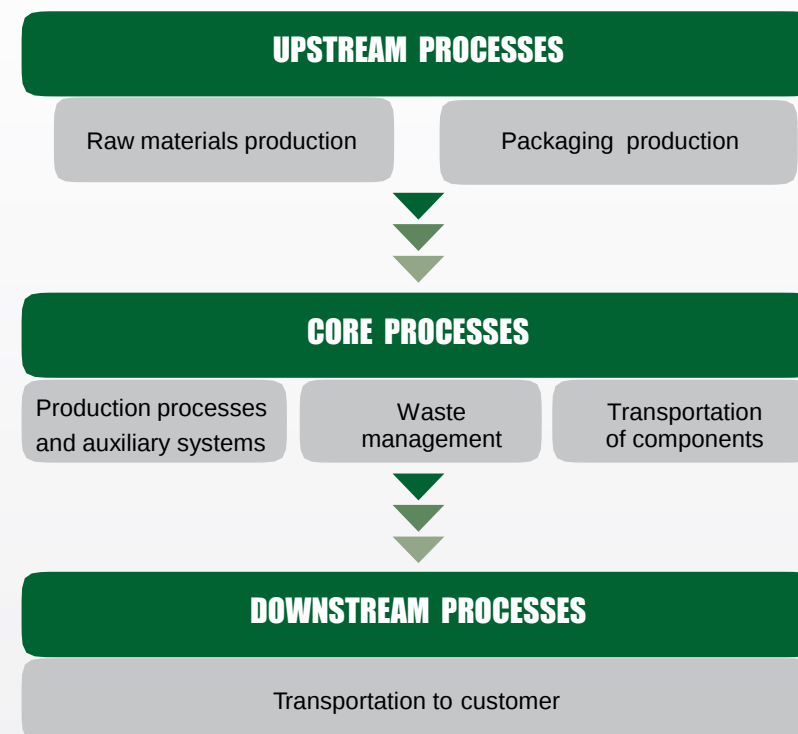
The environmental performance of GSA dispenser was calculated using the **Life Cycle Assessment** methodology starting from the raw materials extraction until the final delivery of the finished product to the customers.

The study was conducted taking into consideration the product category rules published by **International EPD System: CPC 36940 Dispensing Systems**.

SYSTEM BOUNDARIES

The processes constituting the system analyzed were organized in upstream, core and downstream processes in compliance with the requirements of EPD system:

- **UPSTREAM**, considers the raw materials and packaging production;
- **CORE**, considers the production processes and auxiliary systems, waste management and transportation of components;
- **DOWNSTREAM**, considers the product delivery to final customers (B2B market).



3,1 General hypotheses adopted



Raw Materials

The environmental performance associated with the extraction of various types of plastics, metals and rubbers were evaluated considering secondary data from relevant databases (database GaBi Professional 2013).



Production and assembly of components

The environmental performance associated with the activities of production and assembly of components was evaluated considering the primary data from principal suppliers incorporating consumption of raw materials, energy, and waste. Secondary data (database GaBi Professional 2013) were used for the various environmental aspects associated with the production of electricity.



Transportation

The environmental performance associated with transport activities was evaluated in relation to raw materials, components, semi-finished products, finished products and waste. Secondary data were used for the various environmental aspects related to the use of means of transport, load capacity and fuel consumption. Average distances were calculated in order to cover the main reference scenarios.



Packaging

The environmental performance associated to the production of packaging was evaluated considering secondary data from relevant databases (database GaBi professional 2013). End of life scenarios related to the packaging were excluded because they are not directly attributable to Aptar Italia but to the final customer.



Use of dispenser

The environmental performances associated with the use of the dispenser by the end user have not been included in the system boundaries as they do not appear to present significant environmental impacts for the use of the finished product.



End of Life

The environmental performance associated with the end-of-life activities of the dispenser is excluded from the boundaries of the system because it depends on the behaviour of the end users and the collective waste collection service, therefore it is not directly attributable to Aptar Italia.

3,2 Data quality

Specific data

were collected involving the principal suppliers for the following production processes:

- **injection molding** for the production of semi-finished components;
- **winding process** and **metals treatment** for spring production;
- **extrusion process** for dip tube production;
- **vulcanization process** for the production of gasket;
- **assembling process** for module and finished product.

Note

Management activities of waste resulting from the manufacturing process of assembly have been considered referring to the Annexes A6 and A7 of the document "General Program Instructions for the International EPD® System 2.5".

Selected Generic data

were considered for the ball component and its production process, **transportation and packaging production**. In reference to the energy mix scenario was considered (only for the production processes carried out at Aptar Italia) **renewable energy** RECs.



Data not considered

are all maintenance activities related to the molding and assembly production processes as well as the indirect consumption of electricity connected to the structure (lighting, air conditioning) because the contribution is negligible.

Activities like the change of oil and glycol for press maintenance are not considered because they are carried out at a frequency higher than 3 years.

Data relating to the coloring of resins were not considered since they are below the cut-off equal to 1%.

Proxy data

contribution in the EPD document is under 1%.

3,2 Data quality

In this study, an **uncertainty analysis of data** has been conducted with particular attention to thermo-molded components, more specifically taking into consideration a sensitivity control on the energy consumption of the molding process in the three reference months in which data were collected.

Initial hypothesis

observation of the press average energy consumption considering the most representative energy values for the molding process.

Alternative hypothesis

widening of energy consumption value to improve the data accuracy with statistic formula to identify upper-limit with $+3 \sigma/\sqrt{n}$ and lower limit with $-3 \sigma/\sqrt{n}$

The following analysis shows that the percent (%) variation of the data considered in the study is under 10% although a wide range of values was considered in comparison with the initial hypothesis.

SENSITIVITY CONTROL ON UNCERTAINTY OF MOLDING DATA

Component: Housing GSA 2,0 cc	Average energy consumption			Total average
	March	October	November	
Initial hypothesis, kWh	43,20	39,33	39,71	40,75
Alternative hypothesis, kWh	41,89	38,46	31,02	37,12
Deviation, kWh	-1,31	-0,87	-8,69	-3,65
Deviation, %	-3,04	-2,21	-21,89	-8,95
Sensitivity, %	3,04	2,21	21,89	8,95

3,2 Data quality

In order to determine the reliability of the calculation related to the identification of the range of environmental impact, the study presents a second focus on the quality of the data on which we decided to analyze the various thermo-molded components applying a criterion for statistical computing with intervals placed respectively at $+2\sigma$ and -2σ .

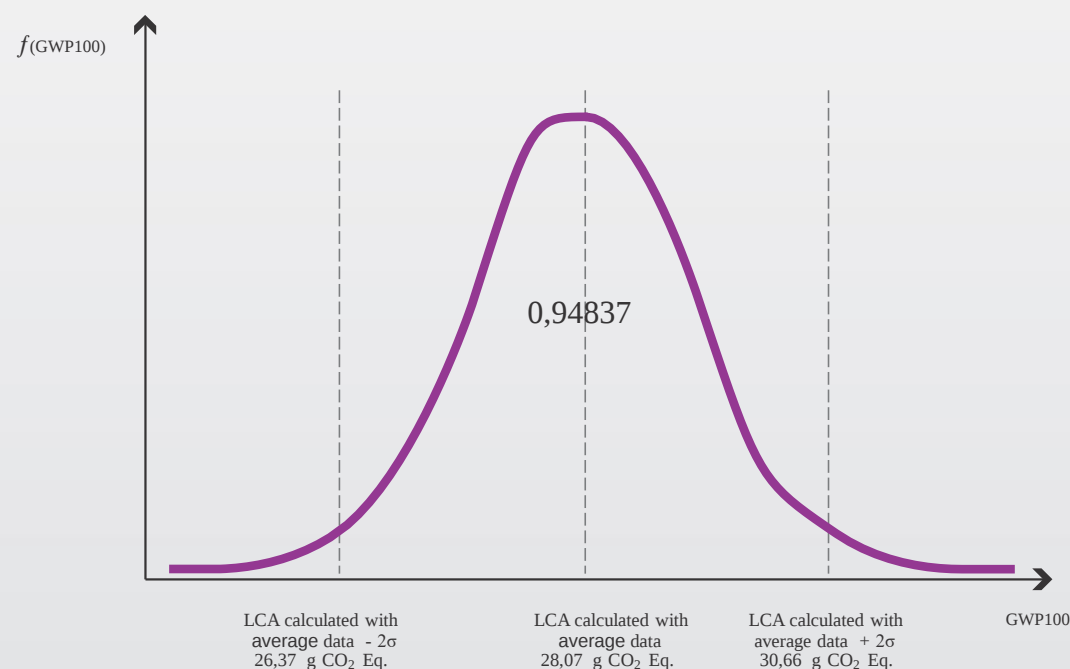
Taking into consideration the standard normal distribution, the probability that the LCA average value (calculated with energy average values for each component) is present between the limits shown in the figure can be calculated with the following procedure:

- 1) $Pr = (26,37 \leq x \leq 30,66) \rightarrow$
 $Pr = \frac{26,37-28,07}{1,01} \leq \frac{x-\mu}{\sigma} \leq \frac{30,66-28,07}{1,01}$
- 2) $Pr = (-1,68 \leq Z \leq 2,56) = Pr(Z \leq 2,56) - Pr(Z \leq -1,6)$
- 3) $Pr = (Z \leq 2,56) - (1 - Pr(Z < -1,68))$
- 4) $0,99477 (1 - 0,95352) = 0,94837$
- 5) 0,94837 real $\approx$ 0,95445 theoretical

This procedure can be repeated for any other results obtained from the LCA study, confirming a range of possible impacts very close to the example presented.

GS 2,00 cc 28/400 (less weight configuration)

Press	Component	Average value (x) (kWh)	$x+2\sigma$ (kWh)	$x-2\sigma$ (kWh)
200 T Hydraulic	Retainer	22,89	26,90	18,87
200 T Hydraulic	Piston	20,29	24,27	16,30
250 T Hydraulic	Housing	38,46	41,34	37,30
170 T Hydraulic / Electric	Stem	16,75	29,75	3,75
150-280-320 T Hydraulic	Actuator K2	25,33	40,08	10,59
150-200-250 T Hydraulic	Closure 3N	17,00	25,49	8,51



3,3 Declared unit

DECLARED UNIT: 1 GSA dispenser dosage 1,2cc e 2,0cc.

The tables show the less and greater weight product configurations as representative unit.

GSA 1,2 cc 28/415 Less weight	weight (grams)	%
Housing (PP)	2,75	21
Piston (LLDPE)	0,40	3
Retainer (PP)	1,14	9
Stem (PP)	0,49	4
Ball (POM)	0,10	1
Seal (POM)	0,20	2
Spring (Stainless Steel)	0,69	5
Gasket (PE)	0,10	1
Closure (PP)	3,68	29
Actuator (PP)	2,15	17
Dip Tube (LDPE)	1,13	9
Packaging (cardboard + plastic film)	0,001	<1
TOTAL	12,83	100

GSA 1,2 cc 28/415 Greater weight	weight (grams)	%
Housing (PP)	2,75	21
Piston (LLDPE)	0,40	3
Retainer (PP)	1,14	9
Stem (PP)	0,49	4
Ball (POM)	0,10	1
Seal (POM)	0,20	2
Spring (Stainless Steel)	0,69	5
Gasket (PE)	0,10	1
Closure (PP)	4,15	31
Actuator (PP)	2,15	16
Dip Tube (LDPE)	1,13	8
Packaging (cardboard + plastic film)	0,001	<1
TOTAL	13,30	100

Note

The annex section shows the various environmental impacts of the entire GSA family with dosage 1,2cc and 2,0cc.

Our goal is to consider a minimum and a maximum environmental impact for the GSA dispenser (respectively with less weight and greater weight configuration).

For all other types of combinations the environmental impact will be incorporated within the range calculated.



3,4 Content of materials and chemicals

GSA 1,2 cc 28/415 Less weight	weight (grams)	%
PP	10,21	80
LDPE	1,13	9
Stainless Steel	0,69	5
LLDPE	0,40	3
POM	0,30	2
PE	0,10	1
Packaging (cardboard + plastic film)	0,001	<1
TOTAL	12,83	100

GSA 1,2 cc 28/415 Greater weight	weight (grams)	%
PP	10,68	80
LDPE	1,13	8
Stainless Steel	0,69	5
LLDPE	0,40	3
POM	0,30	3
PE	0,10	1
Packaging (cardboard + plastic film)	0,001	<1
TOTAL	13,30	100

Note

The GSA dispenser is in compliance with the European Council Regulation number 1907/2006 (REACH) operating in the context of the management of hazardous and chemicals substances.



4 Comparisons with other environmental product declaration

Any comparisons with other environmental product declarations should only be carried out taking into account the rules for **Product Category issued by the International EPD® System: CPC 36940 Dispensing Systems**.

Further comparisons made without reference to the rules identified in the above product category will not be considered valid.

EPDs belonging to the same product category but coming from different programmes may not be comparable.



4 Validity of environmental product declaration

This EPD is valid for three years from the date of its publication and is subject to updating in case of significant changes in environmental performance ($\pm 10\%$).

The geographical validity of EPD is to be understood internationally.

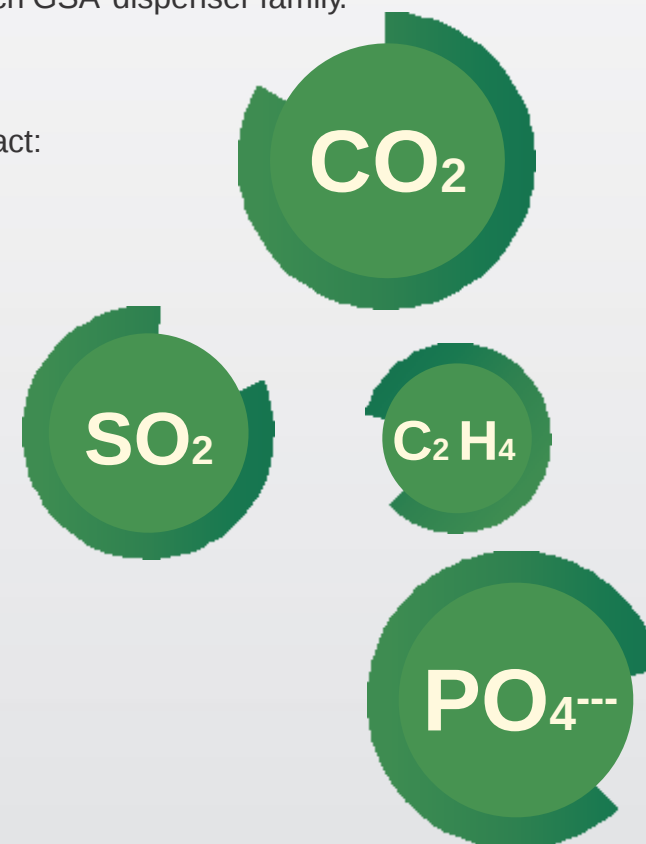
5 Environmental impact indicators

The tables in this section show different environmental impact indicators for the **GSA dispenser 1,2 cc and 2,0 cc** regarding the combinations with less weight configuration.

Additional environmental data in relation to different families and variants (less weight and greater weight) are present in the attachments from which it is possible to identify a range of environmental impacts for each GSA dispenser family.

The **environmental indicators** are based on 4 different categories of environmental impact:

- Global warming potential (g CO₂ equivalent);
- Acidification potential (g SO₂ equivalent);
- Eutrophication potential (g PO₄⁻⁻⁻ equivalent);
- Photochemical ozone creation potential (g C₂H₄ equivalent).



Metodology: CML Baseline (version Jan 2016)

Software: GaBi 6.0 (PE International)

DISPENSER GSA 1,2 cc (28/415)
(less weight configuration)

UPSTREAM PROCESSES

Raw materials
production

Packaging

CORE PROCESSES

Production
processes and
Auxil. systems

Waste
management

Transportation

DOWNSTREAM PROCESSES

Transportation of finished product

TOTAL

**

IMPACT CATEGORY
for 1 Dispenser GSA 1,2cc (28/415)

Global Warming Potential (g CO ₂ eq)	25,200	4,160	0,103	29,463
Acidification potential (g SO ₂ eq)	0,079	0,030	0,003	0,112
Photochemical Ozone Creation Potential (g C ₂ H ₄ eq)	0,007	<0,001	<0,001	0,007
Eutrophication potential (g PO ₄ ⁻⁻⁻ eq)	0,006	0,001	<0,001	0,007

MATERIAL RESOURCES
for 1 Dispenser GSA 1,2cc (28/415)

Inert rock (g)	50,200	5,820	0,005	56,025
Iron ore (g)	0,242	<0,001	<0,001	0,242
Limestone (g)	0,405	0,075	<0,001	0,480
Quartz sand (g)	0,162	0,007	<0,001	0,169
Crude oil (g)	9,880	0	0	9,880
Natural gas (g)	7,660	0	0	7,660
Others (g)	1,309	0,175	<0,001	1,484
Non Renewable (g)				75,940
Renewable (g)	0	0	0	0

ENERGY RESOURCES
for 1 Dispenser GSA 1,2cc (28/415)

Crude Oil (g)	0,120	0,345	0,031	0,496
Hard coal (g)	1,240	0,470	<0,001	1,710
Lignite (g)	1,810	0,078	<0,001	1,888
Natural Gas (g)	0,650	0,502	0,002	1,154
Peat (g)	0,004	<0,001	<0,001	0,004
Uranium (g)	<0,001	<0,001	<0,001	<0,001
Non Renewable energy resources (g)				5,252
Geothermic (MJ)	<0,001	0,039	<0,001	0,039
Hydroelectric (MJ)	0,005	0,055	<0,001	0,060
Solar (MJ)	0,031	0,023	<0,001	0,054
Waves (MJ)	<0,001	<0,001	<0,001	<0,001
Wind power (MJ)	0,006	0,004	<0,001	0,010
Primary forest (MJ)	<0,001	<0,001	<0,001	<0,001
Renewable Fuels (MJ)	<0,001	<0,001	<0,001	<0,001
Renewable energy resources (MJ)				0,163

**Any discrepancies in the total values compared to the sum of the single contributions are the effect of rounding

DISPENSER GSA 1,2 cc (28/415)
(less weight configuration)

UPSTREAM PROCESSES

Raw materials
production

Packaging

CORE PROCESSES

Production
processes and
Auxil. systems

Waste
management

Transportation

DOWNSTREAM PROCESSES

Transportation of finished product

TOTAL

**

WASTE
for 1 Dispenser GSA 1,2cc (28/415)

Hazardous (g)	<0,001	0,053	<0,001	0,053
Not hazardous (g)	2,768	2,149	<0,001	4,917
Waste to landfill (%)*	0%	3%	0%	3%
Waste to recycle (%)*	0%	97%	0%	97%
Radioactive waste (g)*	0	0	0	0

SECONDARY RESOURCES
for 1 Dispenser GSA 1,2cc (28/415)

Materials (g)	<0,001	<0,001	<0,001	<0,001
Energy (g)	<0,001	<0,001	<0,001	<0,001
Recovered energy flows (MJ)	0	0	0	0
Energy content of product (MJ)	0,549	<0,001	<0,001	0,549

WATER CONSUMPTION
for 1 Dispenser GSA 1,2cc (28/415)

Total amount of water (kg)	12,454	9,540	0,057	22,051
Direct amount of water used in the core process (kg)	0	2,88E-05	0	2,88E-05

• Waste treatment options have been considered only for core processes

** Any discrepancies in the total values compared to the sum of the single contributions are the effect of rounding

Under Annex 1 are shown the results of environmental impact for the other GSA version having less and greater weight

DISPENSER GSA 1,2 cc (28/415)
 (greater weight configuration)

UPSTREAM PROCESSES

 Raw materials
production

Packaging

CORE PROCESSES

 Production
processes and
Auxil. systems

 Waste
management

Transportation

DOWNSTREAM PROCESSES

Transportation of finished product

TOTAL

**

IMPACT CATEGORY

for 1 Dispenser GSA 1,2cc (28/415)

Global Warming Potential (g CO ₂ eq)	25,800	4,190	0,107	30,097
Acidification potential (g SO ₂ eq)	0,081	0,030	0,003	0,114
Photochemical Ozone Creation Potential (g C ₂ H ₄ eq)	0,008	<0,001	<0,001	0,008
Eutrophication potential (g PO ₄ ⁻⁻⁻ eq)	0,006	0,001	<0,001	0,007

MATERIAL RESOURCES

for 1 Dispenser GSA 1,2cc (28/415)

Inert rock (g)	51,900	5,820	0,005	57,725
Iron ore (g)	0,242	<0,001	<0,001	0,242
Limestone (g)	0,412	0,076	<0,001	0,488
Quartz sand (g)	0,162	0,006	<0,001	0,168
Crude oil (g)	10,242	0	0	10,242
Natural gas (g)	7,941	0	0	7,941
Others (g)	1,218	0,158	<0,001	1,377
Non Renewable (g)				78,183
Renewable (g)	0	0	0	0

ENERGY RESOURCES

for 1 Dispenser GSA 1,2cc (28/415)

Crude Oil (g)	0,643	0,353	0,032	1,028
Hard coal (g)	1,260	0,470	<0,001	1,730
Lignite (g)	1,860	0,078	<0,001	1,938
Natural Gas (g)	1,164	0,503	0,002	1,669
Peat (g)	0,003	<0,001	<0,001	0,003
Uranium (g)	<0,001	<0,001	<0,001	<0,001
Non Renewable energy resources (g)				6,368
Geothermic (MJ)	<0,001	0,039	<0,001	0,039
Hydroelectric (MJ)	0,005	0,055	<0,001	0,060
Solar (MJ)	0,031	0,023	<0,001	0,054
Waves (MJ)	<0,001	<0,001	<0,001	<0,001
Wind Power (MJ)	0,007	0,004	<0,001	0,010
Primary forest (MJ)	<0,001	<0,001	<0,001	<0,001
Renewable Fuels (MJ)	<0,001	<0,001	<0,001	<0,001
Renewable energy resources (MJ)				0,164

**Any discrepancies in the total values compared to the sum of the single contributions are the effect of rounding

DISPENSER GSA 1,2 cc (28/415)
(greater weight configuration)

UPSTREAM PROCESSES

Raw materials
production

Packaging

CORE PROCESSES

Production
processes and
Auxil. systems

Waste
management

Transportation

DOWNSTREAM PROCESSES

Transportation of finished product

TOTAL

**

WASTE
for 1 Dispenser GSA 1,2cc (28/415)

Hazardous (g)	<0,001	0,054	<0,001	0,054
Not hazardous (g)	2,788	2,191	<0,001	4,979
Waste to landfill (%)*	0%	3%	0%	3%
Waste to recycle (%)*	0%	97%	0%	97%
Radioactive waste (g)*	0	0	0	0

SECONDARY RESOURCES
for 1 Dispenser GSA 1,2cc (28/415)

Materials (g)	<0,001	<0,001	<0,001	<0,001
Energy (g)	<0,001	<0,001	<0,001	<0,001
Recovered energy flows (MJ)	0	0	0	0
Energy content of product (MJ)	0,512	<0,001	<0,001	0,512

WATER CONSUMPTION
for 1 Dispenser GSA 1,2cc (28/415)

Total amount of water (kg)	12,954	9,540	0,060	22,554
Direct amount of water used in the core process (kg)	0	2,88E-05	0	2,88E-05

* Waste treatment options have been considered only for core processes

** Any discrepancies in the total values compared to the sum of the single contributions are the effect of rounding

Under Annex 1 are shown the results of environmental impact for the other GSA version having less and greater weight

6 Company information and certification body

APTAR ITALIA S.p.A. CONTACTS

The study of **Life Cycle Assessment** and the present **environmental product declaration (EPD)** have been conducted internally by the **Quality - Environment - Safety Department of Aptar Italia S.p.A.**

The business contacts for information about this study are:

- **Eng. Nando Marino Cutarella** (nando.cutarella@aptar.com)
- **Industrial Ecologist Michele Del Grosso** (michele.delgrosso@aptar.com)

Web site: www.aptar.com

CERTIFICATION BODY

PCR review was conducted by:

Technical Committee of the International EPD® System – Chair: Adriana Del Borghi – contact: info@environdec.com

Independent verification of the declaration and data, according to ISO 14025:2006

☐ EPD process certification ☒ EPD verification

Document valid until 08/11/2020

Third party verifier: RINA Services S.p.A. – Via Corsica, 12 – 16128 Genova (GE) – www.rina.org

Accredited by ACCREDIA 001H

7 Informations about the program and additional informations

REFERENCES

International EPD® System, General Programme Instructions (EPD), version 2.5 of 05/11/2015;

PCR 2013:09; CPC 36490 – PCR for DISPENSING SYSTEMS; version 2.0 of 24/11/2016;

LCA study of 22/10/2018;

Reference year of data: 2017;

Registration number: S-P-00744.

UPDATING FROM LAST VERSION

The GSA family product is based on a range included +/- 10% and the reference product has been identified in GSA 1,2cc 28/415 (less and greater weight combination). All the GSA versions are included into the representative environmental impact of the version above.

The environmental performances, compared to previous years, has been improved thanks to:

- replacement of HVAC systems in Aptar Italia production departments with consequent reduction in energy consumption;
- use (12%) of renewable energy from photovoltaic panels in the extruding extraction process;
- optimization of energy consumption in the molding department with improvements made to the presses.

Further data improvements have been based on updating of GaBi database (year 2017).

For the acidification potential, please notice the use of non-baseline characterization factors.

ANNEX 1

This section provides information about the range of environmental impact of GSA dispenser family on each closure combination.

The closure families and component variants considered for **dispenser GSA 1,2 cc and 2,0 cc** are the following:

GSA 1,2cc	GSA 2,0cc	GSA 1,2cc	GS 2,0cc	GSA 1,2cc	GSA 2,0cc	GSA 1,2cc	GSA 2,0cc
24/410	27/230	Actuator		Gasket		Dip Tube	
24/415	28/400	Greater weight	Less weight	Greater weight	Less weight	Greater weight	Less weight
27/230	28/410	K2	K2	GS 13	GS 13	120 mm	120 mm
28/400	28/415						
28/410							
28/415							