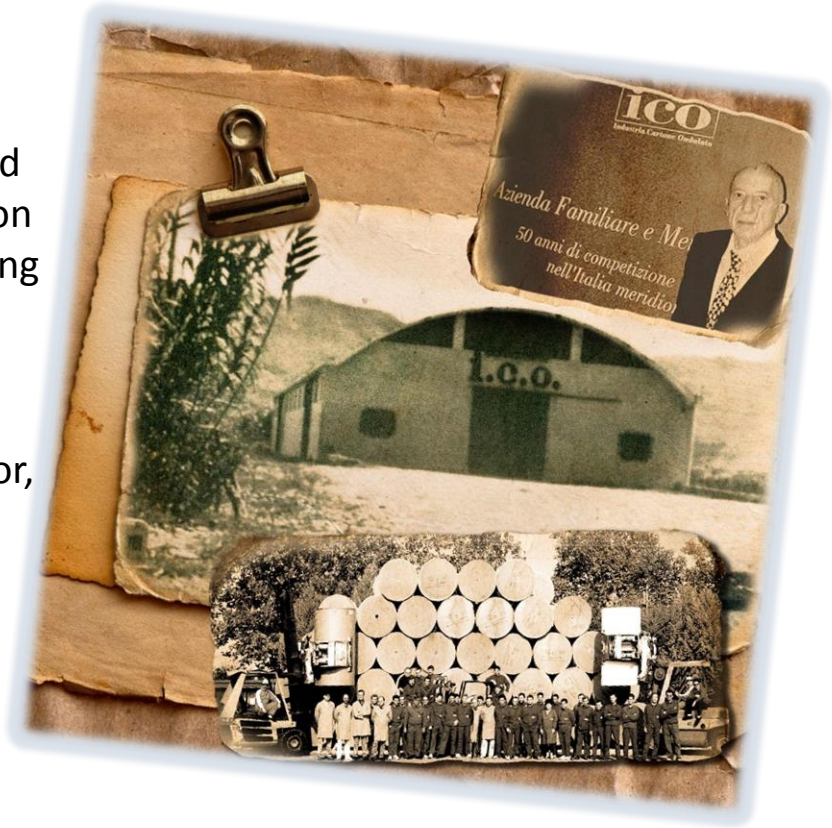
ENVIRONMENTAL PRODUCT DECLARATION

CORRUGATED PAPERBOARD BOXES

CPC CODE	GEOGRAPHICAL SCOPE	APPROVAL DATE	PUBLICATION DATE	VALIDITY DATE	REVISION	REGISTRATION NUMBER
32153 – Containers of paper and paperboard except beverage cartons PCR 2010:17 – Version 2.1	All the World	29/11/2017	21/09/2016	21/09/2019	2.0	S-P-00981

OUR COMPANY

Born in 1952 in Italy as a craftsman company for the production of corrugated paperboard boxes, it was an innovative activity compared to the wooden packaging almost exclusively used at that time. In 1958 it moved from the small premises in the town of Pescara to the adjacent Municipality of San Giovanni Teatino, in the hamlet of Sambuceto, in an area not urbanised.



Over the years the company grew, the small one-man company developed and put into place its first vertical integration at the start of the ’70s with a corrugating machine to produce the paperboard, and the second at the end of the ’70s with the plant for a paper mill for the production of paper for a corrugator, which used recycled paper as its raw material.

Meanwhile (1979) the sole trader company was transformed into a limited company and the first shed was joined by others to house more and more cutting-edge machinery.

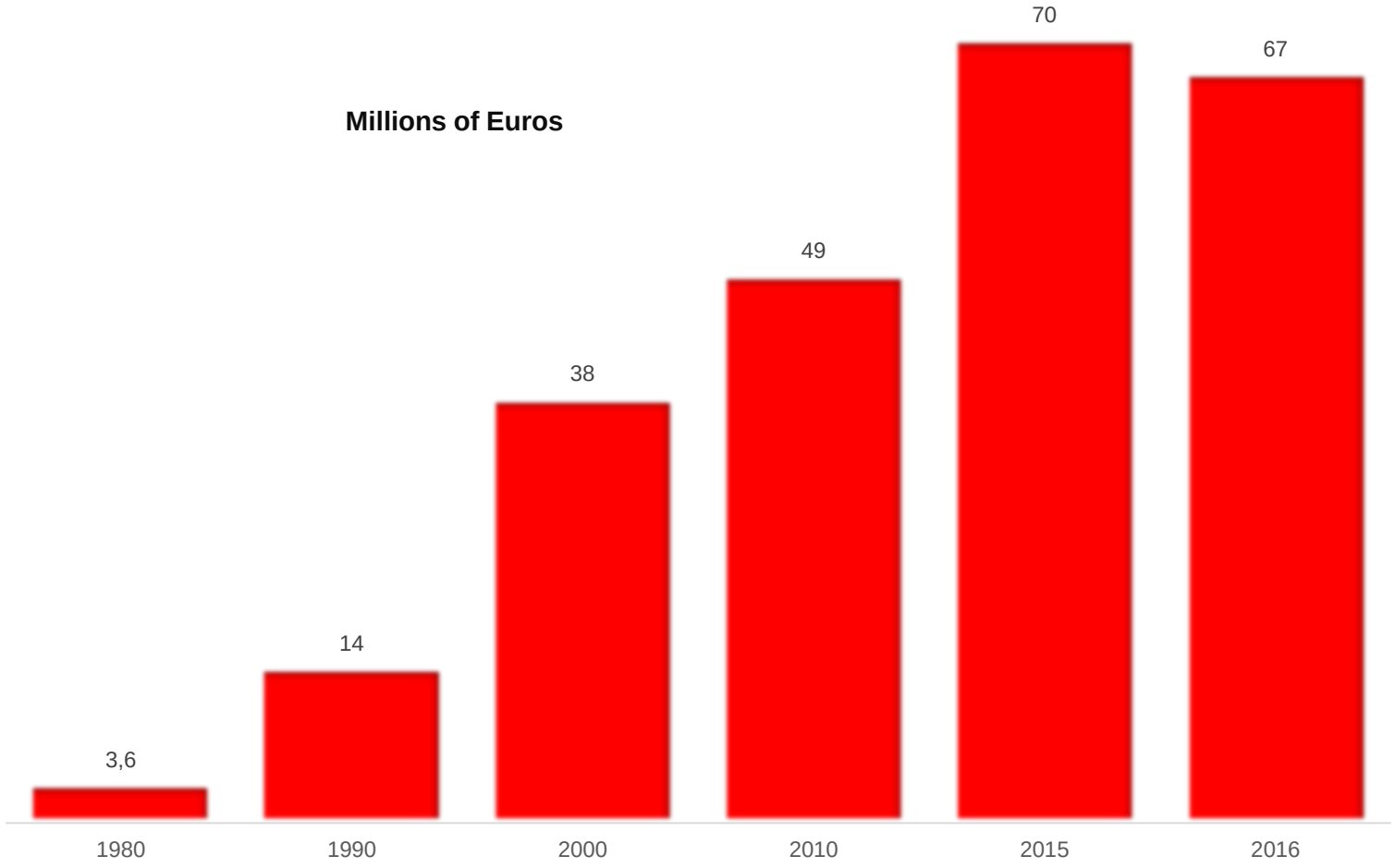
OUR COMPANY

At the end of 2002 a factory was bought in Foggia for the production of corrugated paperboard and cartons, particularly suitable, due to its collocation and equipment, for the production of crates for fruit and vegetables.

In December 2004 the factory in Pianella (PE) was acquired.

Finally, since 1st October 2013 new premises have become an important part of the company: the factory in Alanno (ex Kimberly Clark), made up of a paper mill, that produces high quality tissue paper (TAD technology) and a transformation section for the production of toilet and kitchen paper rolls, napkins and paper handkerchiefs.

TURNOVER IN RECENT YEARS



OUR PRODUCT

This EPD refers to the production of corrugated paperboard cartons with grammage included between 300 and 800 g/m^2.

95% of the paper used comes from recovery and recycling operations (of which at least 90% FSC certified.

In the production process water based inks are used and adhesives with no plasticisers.

The quantity of each varies depending on the number of colours and the graphics, while the quantity of adhesive can vary depending on the type of corrugation (single or double) carried out (B, C, D, E, BC, EB).

The use of the boxes can be multiple but are mainly used for transporting and protecting various items.

METHODOLOGY AND SYSTEM BOUNDARIES

In this section the the characteristics and the results of the assessment of the environmental aspects are illustrated with reference to the LCA methodology (ISO 14040-14044:2006).

The calculation procedures are in compliance with that dictated by the reference standard GPI version 2.5 published by the International EPD® Consortium (IEC) and by the sector PCR (UN CPC 32153 – 2010:17 version 2.1).

This EPD document refers to data gathered in the production premises of ICO s.r.l. located in San Giovanni Teatino (CH) and Pianella (PE), considering an average weighed on the basis of mass production.

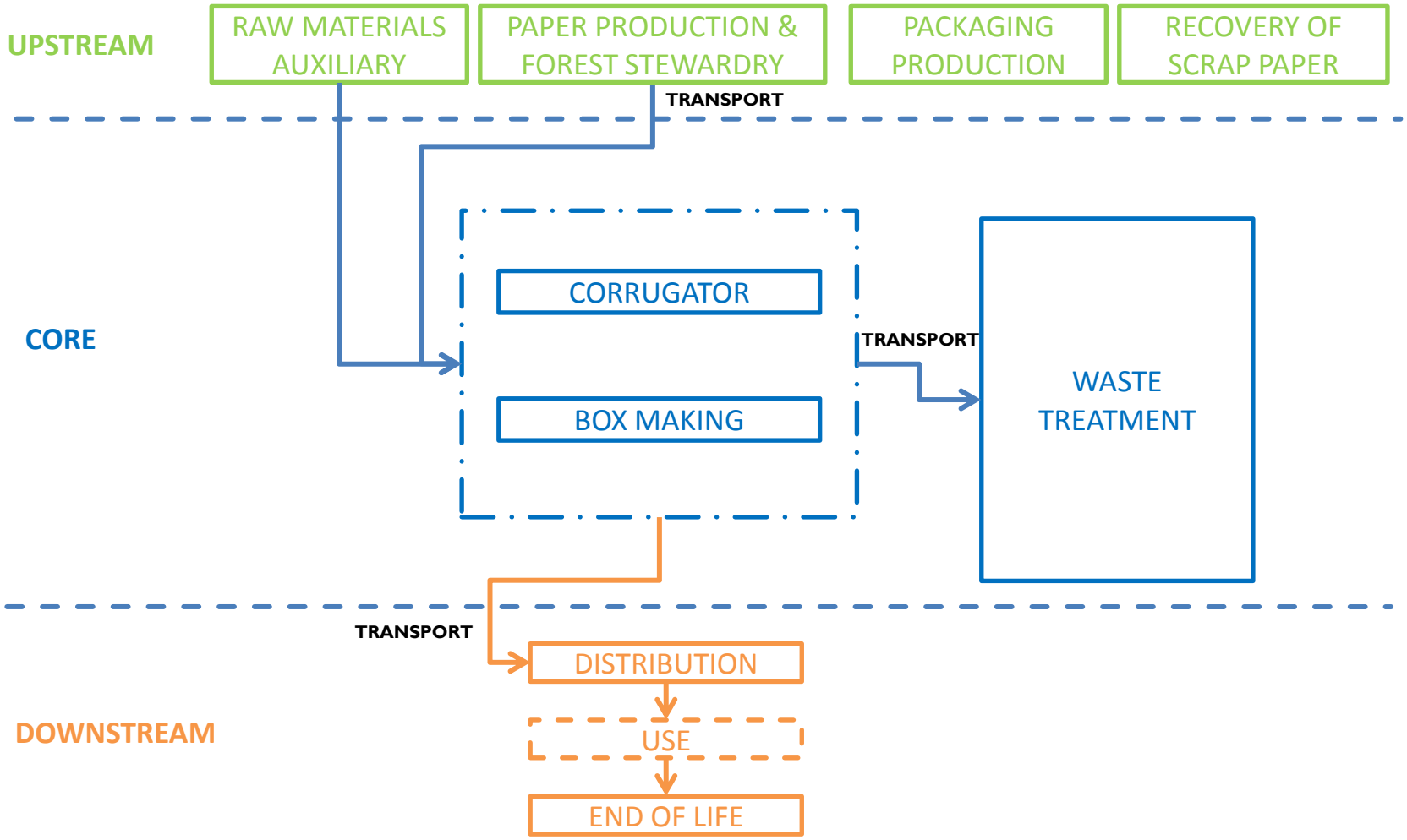
Data collection was carried out on the basis of the entire full-scale production of the year 2016 which was distributed to the whole of Italy.

The sharing of the environmental loads was carried out subdividing the incoming and outgoing flows of the system on the basis of the overall weight of products.

In this study 1 tonne of corrugated paperboard boxes was adopted as the functional unit.

The declared weight is relative to 99% of the weight of finished product.

Boundaries of the production system:



General hypotheses adopted in the LCA study:

Paper production and auxiliary materials: the environmental performances associated with the paper production activities were assessed considering secondary data coming from specific databases (Ecoinvent version 3.0).

Carton production: the environmental performances associated with the corrugated paperboard production activities were assessed considering specific data from the production premises of ICO s.r.l. encompassing consumption of paper, auxiliary materials, electrical energy and waste production. Selected generic data were used for the various environmental aspects associated with the production of electrical energy.

Transport: the environmental performances associated with the transport activities were assessed in comparison with paper and auxiliary materials (upstream phase), finished product and waste (core and downstream).
Selected generic data were used for the various environmental aspects associated with the means of transport, loading capacity and fuel consumption. Average distances were calculated so as to cover the main reference scenarios.

Box use phase the environmental performances associated with the activities of use of the box by the final user have not been put in the confines of the system in that there is no particular environmental impact from the use of the finished product.

End of life: the environmental performances associated with the management activities for box end of life are referred to an average Italian scenario which envisages a conferring for recycling (79.7 %), incineration for energy production (9 %) and disposal in a landfill (11.3 %).

There are no other countries involved since sales take place directly in Italian territory.

In this study the environmental benefits deriving from the activity of energy saving and recycling of materials is not considered.

ENVIRONMENTAL PERFORMANCE DECLARATION

Quality of the data collected in the LCA study:

The specific data of the LCA study were collected at the two factories of ICO s.r.l. for the following production processes:

- Corrugator;
- Box production;
- Starch glue production;
- Transport into and out of the factories;

The generic data were considered for the production process of paper and auxiliary materials (ink and vinyl adhesive) as well as for the production of electrical energy and natural gas (scenario of the Italian national energy mix)

Data not considered: in the LCA study the maintenance activities linked with the production processes of corrugated paperboard, ink, diesel for forklifts, vinyl adhesive and mineral oil were not considered since they fall into the 1% cut-off.

Proxy Data: in this LCA study it is pointed out that the contribution of other generic data is lower than the required limit of 10%.

N.B.: the waste management activities deriving from the production process of assembly were considered in light of that described in attachments A7 to the document *«General Programme Instructions for the International EPD® System 2.5»*

ENVIRONMENTAL PERFORMANCE DECLARATION

Content of materials and substances:

	Flute B		Flute C		Flute D		Flute E		Flute BC		Flute EB	
	Mass (t)	%	Mass (t)	%	Mass (t)	%	Mass (t)	%	Mass (t)	%	Mass (t)	%
Paper	1.000	98%	1.000	99%	1.000	97%	1.000	96%	1.000	98%	1.000	97%
Starch adhesive	0.015	1%	0.010	1%	0.021	2%	0.031	3%	0.016	2%	0.029	3%
Ink	0.005	1%	0.004	0%	0.006	1%	0.007	1%	0.004	0%	0.005	0%
Vinyl adhesive	0.001	0%	0.001	0%	0.001	0%	0.001	0%	0.001	0%	0.001	0%
Total	**1.021**		**1.014**		**1.027**		**1.038**		**1.020**		**1.035**	

COMPARISON WITH OTHER ENVIRONMENTAL PRODUCT DECLARATIONS

Any possible comparisons with other environmental product declarations are to be made exclusively taking into consideration the regulations for ***Product Category issued by the International EPD System: CPC 32153*** **Containers of paper and paperboard except beverage cartons – Version 2.1 (2016-10-11).**

«Further comparisons made without reference to the regulations identified in the product category above may not be deemed valid».

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

Comparison of EPD must always take place with due caution; particular attention must be paid to the system confines and the source of the data used.

VALIDITY OF THE ENVIRONMENTAL PRODUCT DECLARATION

This EPD is valid for 3 years starting from the date of its publication and it will be updated in case of significant changes in the environmental performance (± 10%).

The geographical validity of this EPD is understood at the international level.

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

The tables shown in this section present different indicators of environmental impact for 1 tonne of corrugated paperboard.

The environmental indicators consist of 4 different categories of environmental impact:

- Global warming (expressed in kg CO_2 equivalent);
- Acidification (expressed in g SO_2 equivalent);
- Eutrophication (expressed in g PO_4 equivalent);
- Photochemical smog (expressed in g C_2H_4 equivalent);

Methodology adopted: complying with the requirements of the International EPD® System

Software adopted: SimaPro 8.3.0.0 with Ecoinvent 3.0

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table B flute

Total resource consumption (data per tonne)

Resources for the production of energy vectors B flute				
Renewable resources [MJ/t] B flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Biomass	252,78	51,44	4,28	308,50
Hydroelectric	6,91	8,72	0,09	15,72
Geothermal	73,37	13,55	0,48	87,40
Wind	0,10	0,34	0,01	0,45
Solar	333,16	74,05	4,86	412,07
Total	252,78	51,44	4,28	308,50
Non renewable resources [kg/t] B flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Coal	136,32	9,77	2,17	148,26
Oil	29,57	1,58	10,96	42,11
Natural gas	121,85	15,00	0,72	137,57
Peat	2,00	0,02	0,01	2,03
Uranium	< 0,01	< 0,01	< 0,01	< 0,01
Total	289,74	26,37	13,86	329,97

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table B flute

Total resource consumption (data per tonne)

Material resources B flute				
Non renewable resources [kg/t] B flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Gravel	97,35	3,73	50,27	151,35
Iron	4,62	0,30	0,76	5,68
Limestone (CaCO3)	12,48	0,43	1,95	14,86
Sodium Chloride	4,15	0,07	0,14	4,36
Other materials	22,51	0,25	0,65	23,41
Total	141,11	4,78	53,77	199,66
Renewable resources [kg/t] B flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Wood	677,21	1,11	0,27	678,59
Secondary resources [kg/t] B				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Materials (wiping paper)	939,00	0,00	0,00	939,00
Energy	-	-	-	-
Flows of energy recovered [MJ/t] B flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Energy recovered	-	-	-	-

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table C flute

Total resource consumption (data per tonne)

Resources for the production of energy vectors C flute				
Renewable resources [MJ/t] C flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Biomass	251,48	58,94	4,28	314,70
Hydroelectric	6,90	9,89	0,08	16,87
Geothermal	72,91	15,55	0,48	88,94
Wind	0,10	0,46	0,01	0,57
Solar	331,39	84,84	4,85	421,08
Total	251,48	58,94	4,28	314,70
Non renewable resources [kg/t] C flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Coal	135,56	11,36	2,18	149,10
Oil	29,40	1,80	10,97	42,17
Natural gas	121,60	19,39	0,73	141,72
Peat	1,99	0,04	0,01	2,04
Uranium	< 0,001	< 0,001	<0,001	< 0,001
Total	288,55	32,59	13,89	335,03

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table C flute

Total resource consumption (data per tonne)

Material resources C flute				
Non renewable resources [kg/t] C flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Gravel	96,87	4,38	50,27	151,52
Iron	4,56	0,37	0,76	5,69
Limestone (CaCO3)	12,37	0,50	1,95	14,82
Sodium chloride	4,15	0,07	0,14	4,36
Other materials	22,33	0,30	0,65	23,28
Total	140,28	5,62	53,77	199,67
Renewable resources [kg/t] C flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Wood	677,66	1,29	0,27	679,22
Secondary resources [kg/t] C				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Materials (wiping paper)	983,00	0,00	0,00	983,00
Energy	-	-	-	-

Flows of energy recovered [MJ/t] C flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Energy recovered	-	-	-	-

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table D flute

Total resource consumption (data per tonne)

Resources for the production of energy vectors D flute				
Renewable resources [MJ/t] D flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Biomass	254,55	42,55	4,28	301,38
Hydroelectric	6,93	7,33	0,09	14,35
Geothermal	74,00	11,19	0,48	85,67
Wind	0,10	0,20	0,01	0,31
Solar	335,58	61,27	4,86	401,71
Total	254,55	42,55	4,28	301,38
Non renewable resources [kg/t] D flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Coal	137,37	7,90	2,18	147,45
Oil	29,82	1,33	10,97	42,12
Natural gas	122,19	9,83	0,73	132,75
Peat	2,00	0,02	0,01	2,03
Uranium	< 0,001	< 0,001	< 0,001	< 0,001
Total	291,38	19,08	13,89	324,35

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table D flute

Total resource consumption (data per tonne)

Material resources D flute				
Non renewable resources [kg/t] D flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Gravel	97,99	2,96	50,27	151,22
Iron	4,71	0,22	0,76	5,69
Limestone (CaCO3)	12,61	0,35	1,95	14,91
Sodium chloride	4,16	0,06	0,14	4,36
Other materials	22,74	0,19	0,65	23,58
Total	142,21	3,78	53,77	199,76
Renewable resources [kg/t] D flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Wood	678,04	0,90	0,27	679,21
Secondary resources [kg/t] D flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Materials (wiping paper)	963,00	0,00	0,00	963,00
Energy	-	-	-	-

Flows of energy recovered [MJ/t] D flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Energy recovered	-	-	-	-

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table E flute

Total resource consumption (data per tonne)

Resources for the production of energy vectors E flute				
Renewable resources [MJ/t] E flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Biomass	257,67	34,36	4,28	296,31
Hydroelectric	6,95	6,04	0,09	13,08
Geothermal	75,11	9,01	0,48	84,60
Wind	0,11	0,06	0,01	0,18
Solar	339,84	49,47	4,86	394,17
Total	257,67	34,36	4,28	296,31
Non renewable resources [kg/t] E flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Coal	139,19	6,17	2,18	147,54
Oil	30,24	1,09	10,97	42,30
Natural gas	122,79	5,08	0,73	128,60
Peat	2,00	0,01	0,01	2,02
Uranium	< 0,001	< 0,001	< 0,001	< 0,001
Total	294,22	12,35	13,89	320,46

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table E flute

Total resource consumption (data per tonne)

Material resources E flute				
Non renewable resources [kg/t] E flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Gravel	99,13	2,25	50,27	151,65
Iron	4,87	0,14	0,76	5,77
Limestone (CaCO3)	12,86	0,27	1,95	15,08
Sodium Chloride	4,17	0,06	0,14	4,37
Other materials	23,17	0,14	0,65	23,96
Total	144,20	2,86	53,77	200,83
Renewable resources [kg/t] E flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Wood	678,43	0,71	0,27	679,41
Secondary resources [kg/t] E flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Materials (wiping paper)	993,00	0,00	0,00	993,00
Energy	-	-	-	-

Flows of energy recovered [MJ/t] E flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Energy recovered	-	-	-	-

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table BC flute

Total resource consumption (data per tonne)

Resources for the production of energy vectors BC flute				
Renewable resources [MJ/t] BC flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Biomass	253,20	39,24	4,28	296,72
Hydroelectric	6,92	6,81	0,09	13,82
Geothermal	73,52	10,31	0,48	84,31
Wind	0,10	0,14	0,01	0,25
Solar	333,74	56,50	4,86	395,10
Total	253,20	39,24	4,28	296,72
Non renewable resources [kg/t] BC flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Coal	136,57	7,20	2,18	145,95
Oil	29,63	1,23	10,97	41,83
Natural gas	121,93	7,95	0,73	130,61
Peat	2,00	0,01	0,01	2,02
Uranium	< 0,001	< 0,001	< 0,001	< 0,001
Total	290,13	16,39	13,89	320,41

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table BC flute

Total resource consumption (data per tonne)

Material resources BC flute				
Non renewable resources [kg/t] BC flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Gravel	97,50	2,67	50,27	150,44
Iron	4,65	0,19	0,76	5,60
Limestone (CaCO3)	12,51	0,32	1,95	14,78
Sodium chloride	4,15	0,06	0,14	4,35
Other materials	22,56	0,17	0,65	23,38
Total	141,37	3,41	53,77	198,55
Renewable resources [kg/t] BC flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Wood	677,87	0,82	0,27	678,96
Secondary resources [kg/t] BC flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Materials (wiping paper)	871,00	0,00	0,00	871,00
Energy	-	-	-	-

Flows of energy recovered [MJ/t] BC flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Energy recovered	-	-	-	-

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table EB flute

Total resource consumption (data per tonne)

Resources for the production of energy vectors EB flute				
Renewable resources [MJ/t] EB flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Biomass	257,09	57,25	4,28	318,62
Hydroelectric	6,95	9,62	0,09	16,66
Geothermal	74,91	15,10	0,48	90,49
Wind	0,11	0,43	0,01	0,55
Solar	339,06	82,40	4,86	426,32
Total	257,09	57,25	4,28	318,62
Non renewable resources [kg/t] EB flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Coal	138,85	11,01	2,18	152,04
Oil	30,16	1,75	10,97	42,88
Natural gas	122,68	18,38	0,73	141,79
Peat	2,00	0,03	0,01	2,04
Uranium	< 0,001	< 0,001	< 0,001	< 0,001
Total	293,69	31,17	13,89	338,75

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Table EB flute

Total resource consumption (data per tonne)

Material resources EB flute				
Non renewable resources [kg/t] EB flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Gravel	98,93	4,24	50,27	153,44
Iron	4,84	0,36	0,76	5,96
Limestone (CaCO3)	12,81	0,49	1,95	15,25
Sodium chloride	4,17	0,07	0,14	4,38
Other materials	23,08	0,29	0,65	24,02
Total	143,83	5,45	53,77	203,05
Renewable resources [kg/t] EB flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Wood	678,36	1,25	0,27	679,88
Secondary resources [kg/t] EB flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution	Total
Materials (wiping paper)	942,00	0,00	0,00	942,00
Energy	-	-	-	-

Flows of energy recovered [MJ/t] EB flute				
Typology	UPSTREAM	CORE	DOWNSTREAM distribution and end of life	Total
Energy recovered	-	-	-	-

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Water and electrical energy consumption in the factory (data for 1t)

flute typology	Indicator	UPSTREAM	CORE	DOWNSTREAM distribution	Total
B	Direct water consumption [m3/t]	0,000	0,095	0,000	**0,095**
B	Total water consumption [m3/t]	1.783,96	283,56	32,03	**2.099,55**

flute typology	Indicator	UPSTREAM	CORE	DOWNSTREAM distribution	Total
C	Direct water consumption [m3/t]	0,000	0,073	0,000	**0,073**
C	Total water consumption [m3/t]	1.773,13	325,73	32,03	**2.130,89**

flute typology	Indicator	UPSTREAM	CORE	DOWNSTREAM distribution	Total
D	Direct water consumption [m3/t]	0,000	0,124	0,000	**0,124**
D	Total water consumption [m3/t]	1.798,77	233,64	32,03	**2.064,44**

flute typology	Indicator	UPSTREAM	CORE	DOWNSTREAM distribution	Total
E	Direct water consumption [m3/t]	0,000	0,176	0,000	**0,176**
E	Total water consumption [m3/t]	1.824,71	187,64	32,03	**2.044,38**

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Water and electrical energy consumption in the factory (data per tonne)

flute typology	Indicator	UPSTREAM	CORE	DOWNSTREAM distribution	Total
BC	Direct water consumption [m3 /t]	0,000	0,102	0,000	**0,102**
BC	Total water consumption [m3/t]	1.787,48	215,02	32,03	**2.034,53**

flute typology	Indicator	UPSTREAM	CORE	DOWNSTREAM distribution	Total
EB	Direct water consumption [m3/t]	0,000	0,166	0,000	**0,166**
EB	Total water consumption [m3/t]	1.819,89	316,26	32,03	**2.168,18**

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Classification and characterisation of polluting emissions (data per tonne)

	UNIT	Greenhouse effect (GWP_{100}) B flute	Greenhouse effect (GWP_{100}) C flute	Greenhouse effect (GWP_{100}) D flute	Greenhouse effect (GWP_{100}) E flute
UPSTREAM	[kg CO_2 eq./t]	735,0	732,00	740,0	749,0
CORE	[kg CO_2 eq./t]	79,1	98,70	55,9	34,5
DOWNSTREAM distribution	[kg CO_2 eq./t]	37,5	37,5	37,5	37,5
Total	**[kg CO_2 eq./t]**	**851,6**	**868,2**	**833,4**	**821,0**

	UNIT	Greenhouse effect (GWP_{100}) BC flute	Greenhouse effect (GWP100) EB flute
UPSTREAM	[kg CO_2 eq./t]	736,0	747,0
CORE	[kg CO_2 eq./t]	47,4	94,2
DOWNSTREAM distribution	[kg CO_2 eq./t]	37,5	37,5
Total	**[kg CO_2 eq./t]**	**820,9**	**878,7**

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Classification and characterisation of polluting emissions (data per tonne)

	UNIT	Greenhouse effect (GWP_{100}) of biogenic origin B flute	Greenhouse effect (GWP_{100}) of biogenic origin C flute	Greenhouse effect (GWP_{100}) of biogenic origin D flute	Greenhouse effect (GWP_{100}) of biogenic origin E flute
UPSTREAM	[kg CO_2 eq./t]	4,48	4,45	4,50	4,53
CORE	[kg CO_2 eq./t]	0,48	0,53	0,39	0,31
DOWNSTREAM distribution	[kg CO_2 eq./t]	0,00	0,00	0,00	0,00
Total	**[kg CO_2 eq./t]**	**4,96**	**4,98**	**4,89**	**4,84**

	UNIT	Greenhouse effect (GWP_{100}) of biogenic origin BC flute	Greenhouse effect (GWP_{100}) of biogenic origin EB flute
UPSTREAM	[kg CO_2 eq./t]	4,48	4,53
CORE	[kg CO_2 eq./t]	0,36	0,53
DOWNSTREAM distribution	[kg CO_2 eq./t]	0,00	0,00
Total	**[kg CO_2 eq./t]**	**4,84**	**5,06**

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Classification and characterisation of polluting emissions (data per tonne)

	UNIT	Acidification B flute	Acidification C flute	Acidification D flute	Acidification E flute
UPSTREAM	[kg SO_2 eq./t]	2,640	2,600	2,680	2,750
CORE	[kg SO_2 eq./t]	0,264	0,324	0,194	0,129
DOWNSTREAM distribution	[kg SO_2 eq./t]	0,187	0,187	0,187	0,187
Total	**[kg SO_2 eq./t]**	**3,091**	**3,111**	**3,061**	**3,066**

	UNIT	Acidification BC flute	Acidification EB flute
UPSTREAM	[kg SO_2 eq./t]	2,650	2,740
CORE	[kg SO_2 eq./t]	0,168	0,311
DOWNSTREAM distribution	[kg SO_2 eq./t]	0,187	0,187
Total	**[kg SO_2 eq./t]**	**3,005**	**3,238**

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Classification and characterisation of polluting emissions (data per tonne)

	UNIT	Eutrophication B flute	Eutrophication C flute	Eutrophication D flute	Eutrophication E flute
UPSTREAM	[kg PO_4^{3-} eq./t]	2,000	1,960	2,040	2,130
CORE	[kg PO_4^{3-} eq./t]	0,049	0,057	0,039	0,029
DOWNSTREAM distribution	[kg PO_4^{3-} eq./t]	0,048	0,048	0,048	0,048
Total	**[kg PO_4^{3-} eq./t]**	**2,097**	**2,065**	**2,127**	**2,207**

	UNIT	Eutrophication BC flute	Eutrophication EB flute
UPSTREAM	[kg PO_4^{3-} eq./t]	2,010	2,110
CORE	[kg PO_4^{3-} eq./t]	0,035	0,055
DOWNSTREAM distribution	[kg PO_4^{3-} eq./t]	0,048	0,048
Total	**[kg PO_4^{3-} eq./t]**	**2,093**	**2,213**

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

Classification and characterisation of polluting emissions (data per tonne)

	UNIT	Formation of photochemical oxidants B flute	Formation of photochemical oxidants C flute	Formation of photochemical oxidants D flute	Formation of photochemical oxidants E flute
UPSTREAM	[kg PO_4^{3-} eq./t]	0,161	0,161	0,162	0,163
CORE	[kg PO_4^{3-} eq./t]	0,017	0,021	0,012	0,008
DOWNSTREAM distribution	[kg PO_4^{3-} eq./t]	0,006	0,006	0,006	0,006
Total	**[kg PO_4^{3-} eq./t]**	**0,184**	**0,188**	**0,180**	**0,177**

	UNIT	Formation of photochemical oxidants BC flute	Formation of photochemical oxidants EB flute
UPSTREAM	[kg PO_4^{3-} eq./t]	0,161	0,163
CORE	[kg PO_4^{3-} eq./t]	0,010	0,019
DOWNSTREAM distribution	[kg PO_4^{3-} eq./t]	0,006	0,006
Total	**[kg PO_4^{3-} eq./t]**	**0,177**	**0,188**

INDICATORS OF PRODUCT ENVIRONMENTAL IMPACT

B – C – D – E – EB – BC flute

INDICATOR	UNIT	UPSTREAM	CORE	DOWNSTREAM distribution	Total
Non hazardous waste	[kg/t]	0,00	0,33	0,00	**0,33**
Hazardous waste	[kg/t]	0,00	5,45	0,00	**5,45**
Radioactive waste	[kg/t]	0,00	0,00	0,00	**0,00**

VARIATIONS COMPARED TO THE PREVIOUS EPD

	B	C	D	E	BC	EB
GWP100	-8,7%	-5,0%	-11,1%	-14,0%	-12,5%	-6,9%
AP	-15,8%	-11,9%	-18,4%	-19,0%	-22,1%	-14,8%
EP	+104,9%	+114,6%	+96,3%	+93,0%	+97,2%	+95,6%
POCP	-14,3%	-5,0%	-14,3%	-19,0%	-18,2%	-9,5%

The variation of the results between 2015 and 2016 is attributable to the updating of the databases used, as well as to the improvement of the calculation model and the processes considered within the software used.

COMPANY AND CERTIFICATION BODY INFORMATION

ICO S.R.L. COMPANY CONTACTS

The Life Cycle Assessment (LCA) study and this environmental product declaration (EPD) were entirely conducted by the Quality – Environment – Safety Management of ICO s.r.l.

The company references for information about this study are:

- Mr Alfredo Giangiacomo (alfredo.giangiacomo@ico.it)
- Web site: www.ico.it
- For further information: www.environdec.com

CERTIFICATION BODY:

Revision of PCR carried out by:
Technical Committee of the International EPD® System – Review Chair: Lars Gunnar Lindfors - contact: info@environdec.com

Independent verification of the declaration and data, in accordance with the ISO 14025:2006 standard

☐ Certification of EPD process ■ EPD verification

Date of validity: 21/09/2019

Third party verifying body: RINA Services SpA – Via Corsica, 12 – 16128 Genova (GE) – www.rina.org
Accredited by ACCREDIA 001H

ADDITIONAL INFORMATION

REFERENCES

International EPD System, *General Programme Instructions for the International EPD® System 2.5*

PCR 32153–2010:17 version 2.1 (2016-10-11) Containers of paper and paperboard except beverage cartons

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LCA study «Corrugated paperboard cartons» Revision 01 of 6th September 2017