

EN 15804+A2 EPD



ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2.
Owner of the Declaration – ProAir Heat Recovery Ventilation Systems Ltd.

Declaration number: EPDIE-22-85
Issue date 12th September 2022
Valid to 12th September 2027

EPD Programme - EPD Ireland
Programme Operator - Irish Green Building Council
www.epdireland.org

ProAir
HEAT RECOVERY VENTILATION SYSTEMS
Irish Innovation in Indoor Air

ProAir Heat Recovery Ventilation Unit

ProAir PA600LI and ProAir PA600PLI

1. General information

PROGRAMME OPERATOR	OWNER OF DECLARATION
Irish Green Building Council 19 Mountjoy Square, Dublin D01 E8P5 info@igbc.ie	ProAir Heat Recovery Ventilation Systems Ltd. T/A ProAir Systems Polkeen Industrial Estate, Castlegar, Tuam Road, Galway. H91 WYR8, Republic of Ireland +353 (0) 91 73 9442, info@proair.ie, www.proair.ie
DECLARATION NUMBER	MANUFACTURER ADDRESS
EPDIE-22-85	Polkeen Industrial Estate, Castlegar, Tuam Road, Galway. H91 WYR8, Republic of Ireland
ECO PLATFORM EPD	DECLARED UNIT
Yes	One ProAir PA600LI or PA600PLI Heat Recovery Ventilation Unit
APPLICABLE PRODUCT CATEGORY RULES	DECLARED PRODUCT
1. EN 15804:2012+A2:2019 2. Product Category Rules : Part A Implementation and use of I.S. EN 15804:2012+A1 and + A2, and CEN TR 16970:2016 in Ireland for the development of Environmental Product Declarations (issued 05.03.2022), Version 2.1.	One ProAir PA600LI or PA600PLI Heat Recovery Ventilation Unit
DATE OF ISSUE	SCOPE OF EPD
12th September 2022	Cradle to grave, and Module D.
DATE OF EXPIRY	LCA CONSULTANT OR PERSON RESPONSIBLE FOR LCA
12th September 2027	Ecoreview, Kilkenny, Ireland. +353 (087) 258 9783 www.ecoreview.ie
TYPE OF EPD: SINGLE OR MULTI PRODUCT	LCA SOFTWARE AND DEVELOPER IF APPLICABLE
Single product EPD	Ecochain LCA tool version 3.5.13 (2022)
PRODUCT CLASSIFICATION OR NACE CODE	NAME AND VERSION OF INVENTORY USED
Heat Recovery Ventilation Unit	Ecoinvent version 3.6
COMPARABILITY	
Environmental Product Declarations from different programmes may not be directly comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See clause 5.3 of EN 15804:2012+A2:2019	
The CEN Norm /EN 15804 serves as the core PCR	
Independent verification of the declaration according to ISO 14025	

Internally Externally

SIGNATURE OF PROGRAMME OPERATOR	SIGNATURE VERIFIER
Pat Barry - CEO - Irish Green Building Council 	Marcel Gómez Ferrer - Marcel Gómez Consultoria Ambiental

2. Scope and Type of EPD

Scope

This is a cradle to grave, and Module D, EPD. The Modules that are declared are shown in the table below.

PRODUCT STAGE			CONSTRUCTION ON PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse – Recovery – Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MDT	MDT	MDT	OP	OP	OP	OP	OP	OP	OP	OP	OP	MDT	MDT	MDT	MDT	MDT

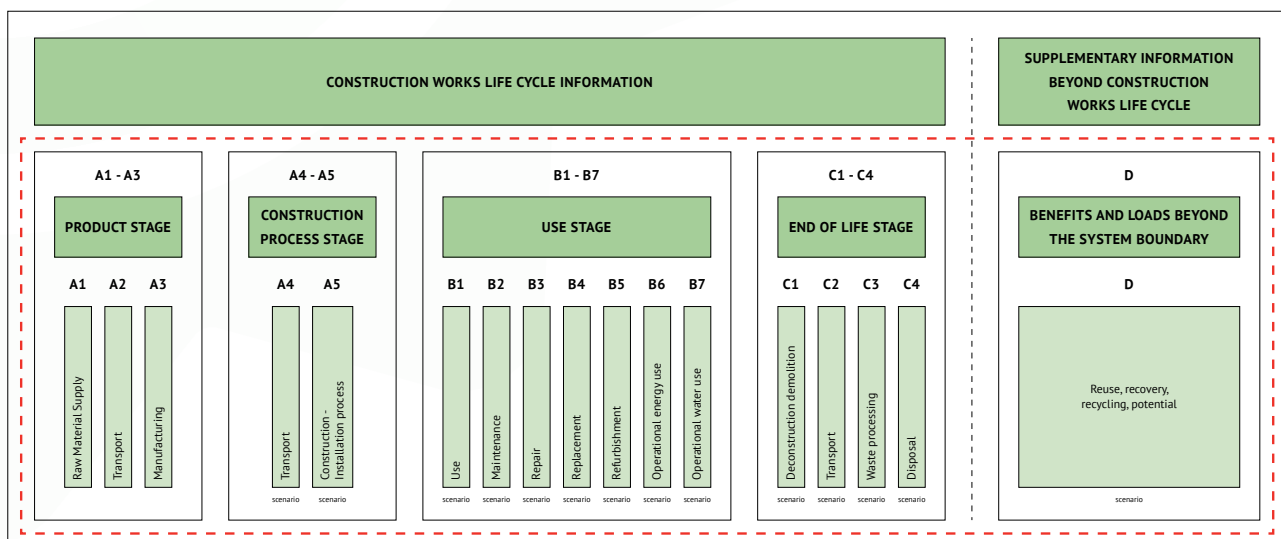
X = Module declared; ND = Module not declared; MDT = Mandatory; OP = Optional.

Declared Functional Unit

One ProAir PA600PLI / PA600LI Heat Recovery Ventilation Unit.

System Boundaries

This LCA covers the Product (A1 - A3), Construction Process (A4 - A5), Use (B1-B7), End of Life (C1 - C4), and benefits and loads beyond the system boundary (D).



3. Detailed product description

The ProAir PA600LI/PA600PLI Heat Recovery Ventilation system is used in residential units, small offices, classrooms, etc. It supplies fresh air and extracts stale air on a continuous basis throughout the building. It is designed to operate continuously at a low rate to minimise the electrical energy consumption. It removes excess moisture from the premises, and prevents the build up of condensation and consequent mould. It has two low energy electrical fans and it operates silently. It uses G4 grade air filters and has touch screen control. It is best placed within the thermal envelope of the building say at high level in a utility room or hot press in order to save on floor space. If this is not an option it may be placed in the attic.

Main features:

- Heat Recovery Ventilation unit is suitable for residential and small commercial up to 180 - 220m²
- Heat Exchanger: Counter-flow pure polypropylene plates
- Fans: Two R3G190 Backward curved impellers
- Air Handling Unit body: Expanded polyethylene with metal coverings
- Air Filters: G4 Pleated panels on supply and extract
- Control: 0-10v input variable speed, with timed boost over-ride
- Max Airflow: 323 m³/hr @ 100PA

Full technical details on these products can be found at: <https://www.proair.ie/products/proair-pa600li/>

The main materials used in the ProAir 600 PLI/LI are:

Material	kg per FU	Post consumer recycled material (%)	Pre-consumer recycled material (%)
PE foam	4 - 7	0	0
PVC and PVC fixings	1 - 2	0	0
Silicone sealant	0.5 - 1.5	0	0
Galvanised steel	3 - 5	0	0
Hydrocarbon sealant	1 - 2	0	0
Electric motor	2 - 3	0	0
Steel	0.05 - 0.15	0	0
Mild steel	0.1 - 0.4	0	0
Copper	0.1 - 0.2	0	0
Brass	0.01 - 0.04	0	0
Aluminium	3 - 5	0	0
Cardboard	0.1 - 0.4	0	0
LDPE	0.5 - 0.9	0	0
PCB	0.2 - 0.5	0	0
Neoprene	0.1 - 0.2	0	0
Polycarbonate	0.001 - 0.01	0	0
PP synthetic fibre	0.1 - 0.3	0	0
Polypropylene	4.5 - 6	0	0
Packaging	0	0	0

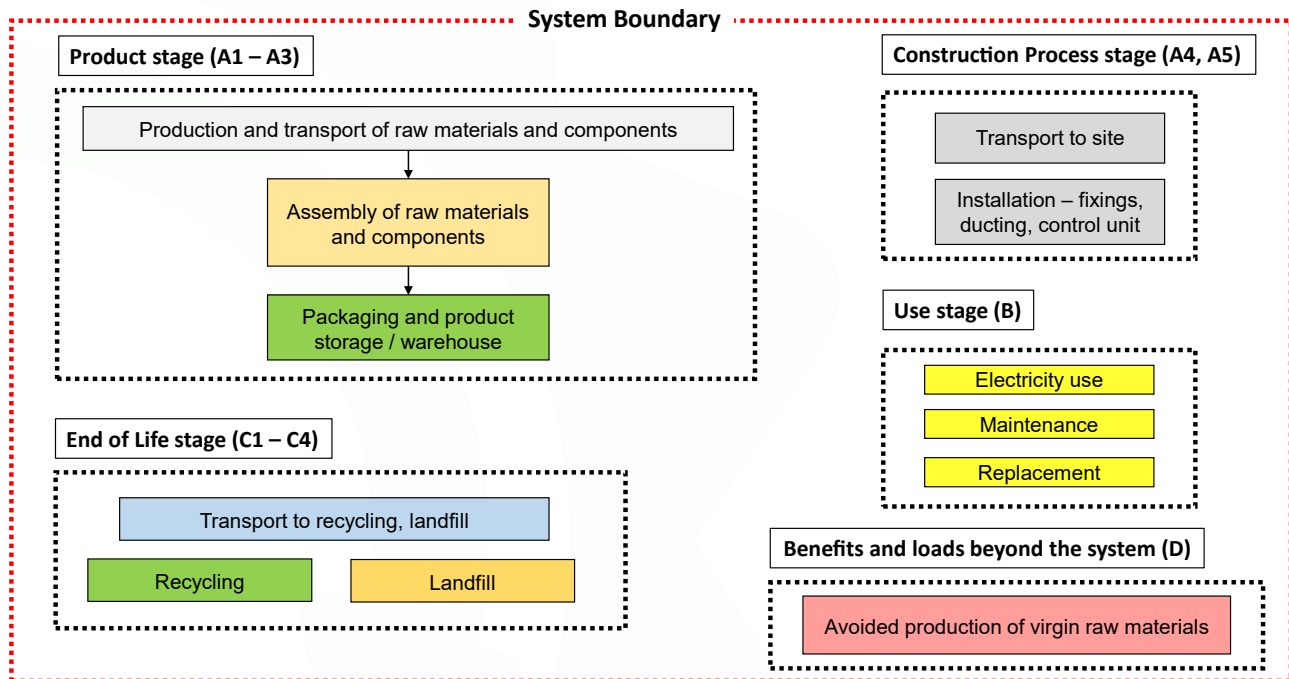
The units are delivered to site in company vans. No product packaging is used.

3.1 Manufacturing Process Description

Component parts are assembled manually on an assembly line. The raw materials of the constituent components mostly comprise: PE, PVC, PP (fibre), neoprene, aluminium, mild steel, galvanised steel, copper, silicone & hydrocarbon sealants, and printed circuit boards.

Electricity is used for lighting, heating and power for power tools.

The manufacturing process flowchart is shown below:





4.A. LCA results

Core Environmental impact per one ProAir PA600LI / ProAir PA600PLI Heat Recovery Ventilation Unit

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ eq.]	2.44E+02	9.10E-01	3.36E+01	2.79E+02	2.26E+00	7.40E+02	0.00E+00	0.00E+00	0.00E+00	4.12E+01	0.00E+00	3.11E+03	0.00E+00	0.00E+00	3.00E-01	1.03E+01	2.86E+00	-2.59E+02
GWP-fossil	[kg CO ₂ eq.]	2.42E+02	9.09E-01	2.17E+01	2.65E+02	2.26E+00	7.45E+02	0.00E+00	0.00E+00	0.00E+00	4.14E+01	0.00E+00	3.07E+03	0.00E+00	0.00E+00	3.00E-01	1.04E+01	2.86E+00	-2.57E+02
GWP-biogenic	[kg CO ₂ eq.]	1.23E+00	5.37E-04	1.20E+01	1.32E+01	1.03E-03	-5.17E+00	0.00E+00	0.00E+00	0.00E+00	-2.81E-01	0.00E+00	3.29E+01	0.00E+00	0.00E+00	1.49E-04	-7.25E-02	2.62E-03	-9.88E-01
GWP-luluc	[kg CO ₂ eq.]	1.03E+00	3.41E-04	1.85E-03	1.04E+00	1.26E-03	7.51E-01	0.00E+00	0.00E+00	0.00E+00	6.35E-02	0.00E+00	2.88E+00	0.00E+00	0.00E+00	1.30E-04	1.86E-02	1.17E-04	-1.27E+00
ODP	[kg CFC-11 eq.]	1.99E-05	2.04E-07	2.29E-06	2.24E-05	4.84E-07	2.32E-04	0.00E+00	0.00E+00	0.00E+00	2.59E-06	0.00E+00	1.43E-04	0.00E+00	0.00E+00	6.64E-08	4.53E-07	6.90E-08	-1.54E-05
AP	[mol H+ eq.]	2.01E+00	4.91E-03	3.83E-02	2.05E+00	6.62E-03	4.21E+00	0.00E+00	0.00E+00	0.00E+00	4.52E-01	0.00E+00	1.35E+01	0.00E+00	0.00E+00	8.61E-04	5.86E-02	2.01E-03	-1.29E+00
EP-freshwater ^[1]	[kg P eq.]	2.69E-02	8.16E-06	1.53E-04	2.71E-02	2.54E-05	2.84E-02	0.00E+00	0.00E+00	0.00E+00	3.64E-03	0.00E+00	8.05E-02	0.00E+00	0.00E+00	2.75E-06	6.00E-04	6.51E-06	-1.36E-02
EP-marine	[kg N eq.]	2.61E-01	9.67E-04	2.51E-02	2.88E-01	1.18E-03	1.06E+00	0.00E+00	0.00E+00	0.00E+00	4.34E-02	0.00E+00	1.92E+00	0.00E+00	0.00E+00	1.63E-04	9.25E-03	6.03E-03	-2.10E-01
EP-terrestrial	[mol N eq.]	3.05E+00	1.09E-02	1.00E-01	3.16E+00	1.33E-02	1.16E+01	0.00E+00	0.00E+00	0.00E+00	5.36E-01	0.00E+00	2.26E+01	0.00E+00	0.00E+00	1.83E-03	1.11E-01	7.50E-03	-2.39E+00
POCP	[kg NMVOC eq.]	9.08E-01	3.47E-03	3.34E-02	9.45E-01	5.12E-03	3.46E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-01	0.00E+00	5.87E+00	0.00E+00	0.00E+00	6.99E-04	2.84E-02	2.71E-03	-7.45E-01
ADP-minerals&metals ^[2]	[kg Sb eq.]	4.47E-02	2.23E-05	1.58E-04	4.49E-02	1.11E-04	1.18E-02	0.00E+00	0.00E+00	0.00E+00	5.21E-03	0.00E+00	1.26E-02	0.00E+00	0.00E+00	1.08E-05	3.17E-04	2.42E-06	-1.72E-03
ADP-fossils ^[2]	[MJ] ncv	3.58E+03	1.37E+01	3.45E+02	3.94E+03	3.35E+01	1.44E+04	0.00E+00	0.00E+00	0.00E+00	8.14E+02	0.00E+00	4.42E+04	0.00E+00	0.00E+00	4.48E+00	1.33E+02	5.26E+00	-3.25E+03
WDP ^[2]	m ³ world eq. deprived	7.02E+01	4.65E-02	3.34E+00	7.36E+01	1.20E-01	3.62E+02	0.00E+00	0.00E+00	0.00E+00	1.43E+01	0.00E+00	3.44E+02	0.00E+00	0.00E+00	1.37E-02	1.69E+00	2.26E-01	-3.20E+01

GWP-total = Global Warming Potential total; GWP-fossil= Global Warming Potential fossil fuels (GWP-fossil); GWP-biogenic= Global Warming Potential biogenic; GWP-luluc= Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP =Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&fossils = Abiotic depletion potential for non-fossil resources; ADP-fossils= Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential, deprivation-weighted water consumption.

The measurement of environmental impacts uses the recommended default LCIA methods for the PEF 3.0 method. These methods include amongst others: USEtox® 2.0, ReCiPe (2016), CML-2001, EDIP 2003, IPCC.

^[1]To express EP freshwater as kg of PO43- eq, multiply the value for kg P eq. by 3.067

^[2]The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

ND = Module not declared; INA = Indicator not assessed.



4.B. LCA results

Resource use per one ProAir PA600LI / ProAir PA600PLI Heat Recovery Ventilation Unit

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	4.70E+02	2.08E-01	8.94E+01	5.59E+02	7.18E-01	1.26E+03	0.00E+00	0.00E+00	0.00E+00	5.30E+01	0.00E+00	7.74E+03	0.00E+00	0.00E+00	7.62E-02	1.64E+01	9.80E-02	-5.31E+02
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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	4.70E+02	2.08E-01	8.94E+01	5.59E+02	7.18E-01	1.26E+03	0.00E+00	0.00E+00	0.00E+00	5.30E+01	0.00E+00	7.74E+03	0.00E+00	0.00E+00	7.62E-02	1.64E+01	9.80E-02	-5.31E+02
PENRE	[MJ]	3.31E+03	1.45E+01	3.80E+02	3.70E+03	3.55E+01	1.79E+04	0.00E+00	0.00E+00	0.00E+00	8.70E+02	0.00E+00	4.72E+04	0.00E+00	0.00E+00	4.75E+00	1.41E+02	5.59E+00	-3.45E+03
PENRM	[MJ]	5.11E+02	0.00E+00	0.00E+00	5.11E+02	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	0.00E+00	0.00E+00
PENRT	[MJ]	3.82E+03	1.45E+01	3.80E+02	4.22E+03	3.55E+01	1.79E+04	0.00E+00	0.00E+00	0.00E+00	8.70E+02	0.00E+00	4.72E+04	0.00E+00	0.00E+00	4.75E+00	1.41E+02	5.59E+00	-3.45E+03
SM	[kg]	0.00E+00	0.00E+00	4.69E+02	4.69E+02	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	0.00E+00	0.00E+00
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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	3.04E+00	1.58E-03	4.93E-02	3.09E+00	4.75E-03	1.12E+01	0.00E+00	0.00E+00	0.00E+00	4.33E-01	0.00E+00	5.87E+00	0.00E+00	0.00E+00	5.33E-04	7.52E-02	5.51E-03	-3.07E+00

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water.

ND = Module not declared; INA = Indicator not assessed.



4.C. LCA results

Output flows and waste categories per one ProAir PA600LI / ProAir PA600PLI Heat Recovery Ventilation Unit

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	1.72E-02	3.28E-05	3.34E-05	1.72E-02	9.29E-05	1.59E-01	0.00E+00	0.00E+00	0.00E+00	3.78E-03	0.00E+00	8.81E-03	0.00E+00	0.00E+00	1.20E-05	1.06E-04	8.44E-06	-3.31E-03
NHWD	[kg]	5.45E+01	5.95E-01	1.35E+01	6.86E+01	1.02E+00	1.32E+02	0.00E+00	0.00E+00	0.00E+00	5.66E+00	0.00E+00	1.72E+02	0.00E+00	0.00E+00	1.77E-01	1.28E+00	2.11E+01	-3.70E+01
RWD	[kg]	9.71E-03	9.26E-05	6.20E-05	9.87E-03	2.22E-04	4.59E-02	0.00E+00	0.00E+00	0.00E+00	1.49E-03	0.00E+00	2.01E-01	0.00E+00	0.00E+00	3.02E-05	4.15E-04	3.14E-05	-1.23E-02
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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

ND = Module not declared; INA = Indicator not assessed.



4.D. LCA results

Additional Environmental impact per one ProAir PA600LI / ProAir PA600PLI Heat Recovery Ventilation Unit

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	1.46E-05	5.43E-08	1.93E-07	1.48E-05	1.07E-07	5.46E-05	0.00E+00	0.00E+00	0.00E+00	2.33E-06	0.00E+00	3.28E-05	0.00E+00	0.00E+00	1.64E-08	4.26E-07	3.70E-08	-1.34E-05
IRP ^[1]	kBq U235 eq	1.10E+01	5.99E-02	4.84E-02	1.11E+01	1.46E-01	4.08E+01	0.00E+00	0.00E+00	0.00E+00	1.67E+00	0.00E+00	1.44E+02	0.00E+00	0.00E+00	1.96E-02	5.82E-01	2.07E-02	-1.55E+01
ETP-fw ^[2]	CTUe	1.64E+04	1.08E+01	1.92E+02	1.66E+04	3.06E+01	1.28E+04	0.00E+00	0.00E+00	0.00E+00	3.36E+03	0.00E+00	3.27E+04	0.00E+00	0.00E+00	3.78E+00	2.97E+02	2.43E+01	-5.51E+03
HTP-c ^[2]	CTUe	6.91E-07	3.06E-10	6.19E-09	6.97E-07	1.06E-09	6.87E-07	0.00E+00	0.00E+00	0.00E+00	8.52E-08	0.00E+00	7.88E-07	0.00E+00	0.00E+00	1.16E-10	6.35E-09	2.34E-10	-4.36E-07
HTP-nc ^[2]	CTUe	1.35E-05	1.11E-08	1.69E-07	1.37E-05	3.05E-08	1.09E-05	0.00E+00	0.00E+00	0.00E+00	3.76E-06	0.00E+00	2.86E-05	0.00E+00	0.00E+00	3.82E-09	3.66E-07	9.09E-09	-4.40E-06
SQP ^[2]	dimensionless	9.78E+02	8.76E+00	2.94E+01	1.02E+03	1.65E+01	3.09E+03	0.00E+00	0.00E+00	0.00E+00	1.60E+02	0.00E+00	1.01E+04	0.00E+00	0.00E+00	2.67E+00	4.39E+01	1.25E+01	-5.48E+02

PM = Potential incidence of disease due to PM emissions, IRP = Potential Human exposure efficiency relative to U235, ETP-fw = Potential Comparative Toxic Unit for ecosystems; HTP-c: Potential Comparative Toxic Unit for humans, HTP-nc = Potential Comparative Toxic Unit for humans, SQP = Potential soil quality index.

^[1] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuelcycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

^[2] The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

ND = Module not declared; INA = Indicator not assessed.

5. Calculation rules

The measurement of environmental impacts in this EPD uses the LCIA methodologies recommended for PEF3.0.

The process descriptions and input quantities detailed and used in this study are a true representation of the actual processes and quantities used in the manufacturing and use of the products. The references of all sources, both primary and public sources and literature, have been documented in the LCA report. The 'polluter pays' and 'modularity' principles have been followed. The following processes have been excluded:

- Manufacture of equipment used in production, in buildings or any other capital good
- Transportation of personnel to the plant
- Transportation of personnel within the plant
- Research and development activities
- Long-term emissions

In addition, to facilitate the reproducibility of this LCA, a full set of data records has been generated which can be accessed via the LCA tool. This data portfolio contains a summary of all the data used in this LCA.

Cut-off criteria

The cut-off criteria of section 6.3.6 of EN15804:2012+A2:2019 have been followed, where 99% of the total energy and materials are included, and the total neglected input flows for the modules reported on in the LCA are less than 5% of the energy usage and mass.

Data Quality

The dataset is representative for the production processes used in 2021. The data Quality Level, according to Table E.1 of EN 15804:2012+A2:2019, Annex E, is as follows:

- Geographical representativeness: Very Good
- Technical representativeness: Good
- Time representativeness: Very Good

Allocations

Allocation of energy and electricity types and amounts to the various manufacturing processes has been provided by the manufacturers along with production waste. Allocation of impacts to the products is based on the product composition mass.

Flows related to human activities such as employee transport are excluded. The construction of capital assets such as buildings, manufacture of machines and transportation systems are also excluded since the related flows are assumed to be negligible compared to the manufacture of the building material when compared to these systems over a full lifetime of operation.

6. Scenarios and additional technical information

A4. Transport to site

The transport to market is based on the transport from the ProAir Systems manufacturing site in Galway, by a mean distance (covering three return journeys) of 167km to the construction site.

Parameter	Value / Description
Road transport	Transport, freight, light van, 3.5 to 7.5 metric ton, EURO6 engine
Distance, road	167 km
Capacity utilisation road freight	46% (% assumed in the Ecoinvent V 3.6 database)

The units are transported to the customers' site in the ProAir Systems company (installation) vans. No product packaging is used.

A5. Installation on site

Installation on site comprises:

1. travel to site for pre-installation measurement, the installation operation itself, and commissioning and testing. It is assumed that 36 litres of diesel are used for these three sets of journeys, per ventilation unit.
2. use of installation materials, such as ducting, cabling, connectors, switches, etc. A summary of the main materials used in the installation of one ProAir PA600PLI or ProAir PA600LI unit is given in the table below:

Material	kg per FU	Post consumer recycled material (%)	Pre-consumer recycled material (%)
PVC	120 - 180	0	0
Polypropylene	1 - 2	0	0
Glass wool	2 - 3	0	0
Galvanised steel	6 - 9	0	0
Aluminium	0.5 - 1.5	0	0
Steel	0.2 - 0.5	0	0
Stainless steel	2 - 5	0	0
Packaging	0	0	0

B1 - B7 Use Stage

In the Use Stage, only two modules are modelled: module B4 (replacement) and module B6 (operational energy). Modules B1, B2, B3, B5 (use, maintenance, repair, and refurbishment) are assumed to be negligible, and are considered to have zero impact. It is assumed that module B1 'Use' is covered by the activities in modules B4 and B6.

B4. Replacement Stage

Over the 20-year life of the ProAir PA600LI or ProAir PA600PLI, 3 replacement fans are used, and 38 replacement filters.

B6. Operational Energy Stage

Over the 20-year life of the ProAir PA600LI or ProAir PA600PLI, the unit uses 5,680 kWh electricity. Electricity is assumed to be average low-voltage, Ireland.

C1. De-construction demolition

In the deconstruction/demolition phase C1 it is assumed that the HRVUs are removed manually from the building, thus no energy or materials are required for module C1, and the impacts are assumed to be zero in C1. It is assumed that the HRVUs are sent for disassembly and the components are sent for recycling of the particular material type as appropriate, for plastics and metals.

It is assumed that the remaining components/materials are not suitable for recycling, and are sent to landfill.

C2. Transport

In the transport phase C2, it is assumed that the removed materials travel 50km to recycling or landfill, as appropriate.

C3. Waste processing

In the C3 phase, it is assumed that the HRV units and the installed components (such as: ducting, wiring, switches, etc.) are shredded for recycling or landfilling.

It is assumed that 100% of the metals, plastics and PCBs are recycled. The remaining materials are assumed to be landfilled.

C4. Disposal

In C4, the mass of material per unit that goes to landfill is the mass of the HRV units, less the mass of recyclable materials (metals, plastic and PCBs) per unit.

D. Reuse – Recovery – Recycling potential

Benefits arise from the displacement of virgin raw materials (plastics and metals) by the re-use of these recycled plastics and metals. The benefits from the re-use of materials obtained from recycling the PCBs is not included in this module.

Declaration of biogenic carbon content at the production gate

There is no biogenic carbon contained in any of the materials in the ventilation units, or installation materials.

Additional Technical Information

No product packaging is used. The units are transported to the customers' site in the ProAir company (installation) vans.

7. Mandatory additional information on release of dangerous substances to indoor air, soil and water

None of the substances contained in the product are listed in the "Candidate List of Substances of Very High Concern for authorisation", or they do not exceed the limit for registration with the European Chemicals Agency.

8. Other optional additional environmental information

N/A.

9. References

- [1] ISO 14040: Environmental management - Life cycle assessment – Principles and Framework', International Organization for Standardization, ISO14040:2006.
- [2] ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO14044:2006.
- [3] ISO 14025: Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures', International Organization for Standardization, ISO14025:2006.
- [4] I.S. EN 15804:2012+A2:2019,; Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products', EN 15804:2012+A2:2019.
- [5] Ecochain, Version 3.5.13 (2022), web: <http://app.ecochain.com>.
- [6] Product Category Rules : Part A Implementation and use of I.S. EN 15804:2012+A1 and + A2, and CEN TR 16970:2016 in Ireland for the development of Environmental Product Declarations (issued 05.03.2022), version 2.1.
- [7] CML - Department of Industrial Ecology, CML-IA Characterisation Factors, Dated August 2016, Leiden University, Leiden, Netherlands Available at: <https://www.universiteitleiden.nl/en/research/research-output/science/cml-ia-characterisation-factors>
- [8] Ministerie van Verkeer en Waterstaat, 8 maart 2004, Toxiciteit heeft z'n prijs, Schaduw prijzen voor (eco-) toxiciteit en uitputting van abiotische grondstoffen binnen DuboCalc.
- [9] PEF methodology final draft.pdf (europa.eu)

10. Annex

N/A.