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Pressure Vessels 140-5000L



Owner of the EPD:

IMI International Sp. z o.o.

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EPD Program Operator:

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Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804+A2 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment and their aspects verified by the independent body according to ISO 14025. Basically, comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804+A2.

Life cycle analysis (LCA): A1-A3, A4-A5, C1-C4 and D modules in accordance with EN 15804+A2

(Cradle-to-Gate with options)

The year of preparing the EPD: 2025

Product standards: EN 13831

Service Life: >15 years

PCR: ITB-PCR A

Declared unit: 1 kg

Reasons for performing LCA: B2B

Representativeness: Europe, 2023

MANUFACTURER

Climate Control is leading HVAC solutions provider, with manufacturing sites located across the globe. Company is provider of technologies that deliver energy efficient water-based heating and cooling systems for the residential and commercial building sectors. Throughout the history, company have been at the forefront of HVAC industry innovation. The portfolio of brands has what is needed – a complete range of unique, industry-leading products and services. IMI Climate Control is a part of IMI PLC Group, listed on the London Stock Exchange on FTSE 100 list.



Figure 1 The view of IMI International Sp. z o.o. manufacturing plant located in Olkusz

PRODUCTS DESCRIPTION

Climate Control pressure vessels range features pressure expansion vessels with fixed gas charge for heating, solar, cooling water, and potable water systems (Aquapresso range). IMI offers a range of high-quality pressure vessels for HVAC and hydronic systems. This document is representative for all vessels range produced in Swiss factory – Statico, Aquapresso and vessels cooperating with control units with compressors and pumps (this document applies to vessels only), but as well all variants of intermediate and secondary vessels of specified size. Pressure vessels ensure optimal pressure stability, system efficiency, and longevity across HVAC and potable water applications, setting the industry standard for reliability and performance. Vessels are predominantly made of steel variant components and butyl bag; some additional plastic and brass components are included for the assessment. Vessels are painted with beryllium paint. Suitable for non-aggressive and non-toxic system media with addition of antifreeze agent up to 50%.

Main functions:

- Pressure stabilization in the water systems
- Volume compensation for thermal expansion
- Air and gas separation to maintain system efficiency (Compresso, Transfero)
- Internal inspection possible through dedicated hole or flanged opening.
- Exchangeable diaphragm or bag for extended service life (for G-Vessels type)
- For specific usage temperatures or pressure class check specific product technical sheet

All additional technical information about the product is available on the manufacturer's website and [catalogues](#).

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declared unit is 1 kg of Pressure Vessels – 140-5000L products. Declared unit refer to different numbers and types of vessels; every valve typology contains vessels with different dimensions and weights. However, the same manufacturing process and the similarities of vessels allow a declared unit based on mass unit of products.

System boundary

The life cycle analysis of the declared products covers “Product Stage” A1-A3, A4-A5, C1-C4+D modules in accordance with EN 15804 and ITB PCR A (cradle to gate with options). Energy and water consumption, emissions as well as information on generated wastes were inventoried and were included in the calculation. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804+A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

Allocation

The allocation rules used for this EPD are based on general ITB 's document PCR A. In the modules A1-A3, material losses in the assembly of the products in the factory are defined on the averaged specific values for the site. Input and output data from the production is inventoried and allocated to the production on the mass basis. The declaration covers a wide range of products (averaged). Their production resources and processing stages are basically similar, so it is possible to average the production by product volume.

System limits

99.0% materials and 100% energy consumption were inventoried in a factory and were included in calculation. In the assessment, all significant parameters from gathered production data are considered, utilized energy, and electric power consumption, direct production waste, and available emission measurements. The total of neglected input flows per module A1-A3 does not exceed the permitted maximum of 1 % of energy usage and product mass. Tires consumption for transport was not taken into account. The components like: foils, papers, labels, tapes with a percentage share of less than 0.1% were not included in the calculations. It is assumed that the total sum of omitted processes does not exceed 1% of all impact categories. In accordance with EN 15804 machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

Modules A1 and A2: *Raw materials supply and transport*

The modules A1 and A2 represent the extraction and processing of raw materials (mainly made of steel components and butyl bag; some additional plastic and brass components are included for the assessment) and transport to the production site. For A2 module (transport- inventoried) European averages for fuel data are applied. Production of metal and plastic elements (inputs to production in Füllinsdorf) were inventoried and assessed.

Module A3: *Production*

The product specific manufacturing process is presented in Figure 2. The production process is partially automated and is based on receiving metallurgical materials for production. Vessels are manufactured in the factory in Switzerland. Raw materials - steel and rubber sheets are mechanically reworked on site and assembled with additional components. Some pieces components are coated with chrome and powder, according to the typologies in which they are used.

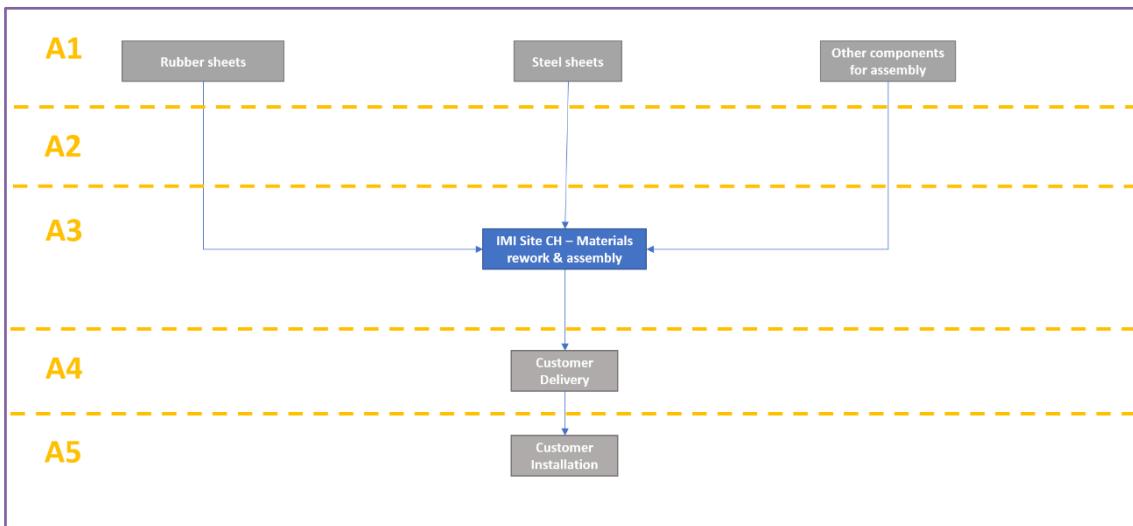


Figure 2 Manufacturing process scheme (A1-A3), with forming/assembly process in Füllinsdorf (A3)

Module A4: transport to consumer

Vehicle transport at distance 500 km is considered (emission standard: Euro 5) with 100% load capacity.

Modules C and D: End-of-life (EOL)

Due to the fact that the declaration covers a wide range of products for various purposes and usage scenarios, it is not possible to directly specify the de-construction technology and the amount of energy for disassembly in C1 module (so this module is very generic based on literature). In the adapted end-of-life scenario, the de-constructed steel products are transported to a metal mill distant by 100 km on > 16t lorry EURO 5 where are used as scrap to produce a new metals. The recycling potential of C3 module is 98% and it is assumed that only 2% of the products will end up in a landfill – C4 module (Table 1). Module D presents credits resulting from the recycling of the scrap (used for steel production), calculated in accordance with the approach developed by World Steel Association.

Table 1 End-of-life scenario for the Pressure Vessels 140-5000L

Material	Material recovery	Recycling	Landfilling
metals	100%	98%	2%
plastics	100%	98%	2%

Electricity at end-of-life (module C) has been modelled using an average EU electricity mix as the location where the product reaches end-of-life is unknown.

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2023 – 31.12.2023 (1 year). The life cycle assessments were prepared for Europe as reference area.

Data quality

The data selected for LCA originate from ITB-LCI questionnaires completed by IMI International Sp. z o. o. and verified during data audit. No data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and

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consistency is judged as good. The background data for the processes come from the following resources database Ecoinvent v.3.10.

Assumptions and estimates

The impacts of the representative products were aggregated using weighted average.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN15804+A2 and E.F. 3.1. Factors. No mass balance approach were used.

Additional information

The manufacturer provided certificates of origin of electricity from renewable energy sources. Electricity (Ecoinvent v.3.10 data) emission factor used is 0.1 kg CO₂/kWh. As a general rule, no particular environmental or health protection measures other than those specified by law are necessary. The product may contain dangerous substances (lead), more then 0,1% by weight, given by the REACH Candidate List.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 kg of Pressure Vessels- 140-5000L produced in Europe. The following life cycle modules (Table 2) were included in the analysis. The following tables 3-6 show the environmental impacts of the life cycle of selected modules (A1-A5+C1-C4+D).

Table 2 System boundaries for the environmental characteristic of the product.

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)																	
Product stage			Construction process		Use stage								End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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	
MD	MD	MD	MD	MD	MND	MND	MND	MND	MND	MND	MND	MD	MD	MD	MD	MD	

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Table 3 Life cycle assessment (LCA) results for specific product – environmental impacts of (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	9.67E-01	1.50E-01	1.04E-01	1.22E+00	8.34E-02	1.37E-03	6.87E-03	1.67E-02	6.77E-02	1.30E-02	-6.70E-02
Greenhouse potential - fossil	eq. kg CO ₂	9.54E-01	1.49E-01	1.03E-01	1.21E+00	8.31E-02	1.37E-03	6.85E-03	1.66E-02	6.76E-02	1.30E-02	-7.06E-02
Greenhouse potential - biogenic	eq. kg CO ₂	5.27E-03	8.25E-05	7.19E-04	6.07E-03	2.84E-04	3.69E-06	1.85E-05	5.68E-05	7.10E-05	2.71E-06	-8.15E-03
Global warming potential - land use and land use change	eq. kg CO ₂	6.23E-03	4.72E-05	1.74E-04	6.45E-03	3.26E-05	2.14E-07	1.07E-06	6.52E-06	1.12E-05	2.06E-06	-1.17E-02
Stratospheric ozone depletion potential	eq. kg CFC 11	9.52E-09	2.99E-09	7.74E-09	2.02E-08	1.92E-08	7.53E-12	3.77E-11	3.85E-09	7.65E-01	1.59E-01	-1.00E-08
Soil and water acidification potential	eq. mol H ⁺	4.94E-03	2.94E-04	9.32E-04	6.16E-03	3.37E-04	1.45E-05	7.25E-05	6.75E-05	5.26E-04	1.09E-04	-1.83E-03
Eutrophication potential - freshwater	eq. kg P	1.10E-04	9.80E-06	1.30E-04	2.50E-04	5.59E-06	2.36E-06	1.18E-05	1.12E-06	6.97E-07	8.81E-08	-6.04E-05
Eutrophication potential - seawater	eq. kg N	1.17E-03	6.92E-05	1.18E-04	1.36E-03	1.02E-04	2.05E-06	1.03E-05	2.04E-05	1.77E-03	3.69E-04	-7.86E-04
Eutrophication potential - terrestrial	eq. mol N	1.51E-02	7.47E-04	1.30E-03	1.72E-02	1.11E-03	1.79E-05	8.95E-05	2.22E-04	3.37E-03	6.98E-04	-8.92E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	3.67E-03	4.95E-04	4.49E-04	4.61E-03	3.40E-04	5.15E-06	2.57E-05	6.80E-05	7.36E-04	1.52E-04	-1.61E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	4.41E-06	4.90E-07	1.08E-05	1.58E-05	2.95E-07	5.16E-10	2.58E-09	5.89E-08	3.39E-08	2.95E-09	-1.40E-04
Abiotic depletion potential - fossil fuels	MJ	1.56E+01	2.09E+00	1.74E+00	1.95E+01	1.23E+00	2.16E-02	1.08E-01	2.47E-01	6.86E-02	1.24E-02	-4.24E+00
Water deprivation potential	eq. m ³	1.95E-01	1.00E-02	1.05E-01	3.10E-01	5.70E-03	4.14E-04	2.07E-03	1.14E-03	2.25E-03	2.90E-04	-1.93E+00

Table 4 Life cycle assessment (LCA) results for specific product – additional impacts indicators (DU: 1 kg)

Indicator	Unit	A1-A3	A4-A5	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA

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Table 5 Life cycle assessment (LCA) results for specific product - the resource use (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.77E+00	4.03E-02	3.66E+00	6.47E+00	1.77E-02	1.78E-03	8.90E-03	3.54E-03	4.45E-03	2.27E-04	-3.87E+00
Consumption of renewable primary energy resources used as raw materials	MJ	2.23E-02	0.00E+00	0.00E+00	2.23E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	2.79E+00	4.03E-02	3.66E+00	6.49E+00	1.77E-02	1.78E-03	8.90E-03	3.54E-03	4.45E-03	2.27E-04	-3.87E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.32E+01	2.09E+00	1.23E+00	1.65E+01	1.23E+00	2.16E-02	1.08E-01	2.47E-01	-3.73E+00	-6.01E-01	-3.73E+00
Consumption of non-renewable primary energy resources used as raw materials	MJ	2.51E+00	0.00E+00	4.20E-01	2.93E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.79E+00	6.13E-01	-7.27E-01
Total consumption of non-renewable primary energy resources	MJ	1.57E+01	2.09E+00	1.65E+00	1.95E+01	1.23E+00	2.16E-02	1.08E-01	2.47E-01	6.86E-02	1.24E-02	-3.00E+00
Consumption of secondary materials	kg	1.09E+00	9.15E-04	1.40E-03	1.09E+00	4.14E-04	1.88E-06	9.40E-06	8.27E-05	7.66E-05	5.59E-06	-1.10E+00
Consumption of renew. secondary fuels	MJ	7.48E-04	9.29E-06	6.12E-05	8.19E-04	4.56E-06	9.49E-09	4.75E-08	9.11E-07	1.01E-06	7.59E-08	-3.90E-06
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	-7.19E-07								
Net consumption of freshwater	m ³	7.56E-03	2.83E-04	3.25E-03	1.11E-02	1.55E-04	6.21E-05	3.11E-04	3.10E-05	6.96E-05	1.09E-05	-2.24E-02

Table 6 Life cycle assessment (LCA) results for specific product – waste categories (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	4.21E-02	2.73E-03	5.85E-03	5.07E-02	1.38E-03	1.68E-04	8.38E-04	2.77E-04	1.90E-04	8.87E-10	-4.28E-02
Non-hazardous waste	kg	1.03E+00	6.42E-02	2.40E-01	1.33E+00	2.46E-02	1.13E-02	5.65E-02	4.92E-03	1.40E-02	2.32E-03	-6.26E-01
Radioactive waste	kg	1.12E-04	8.00E-07	1.94E-06	1.15E-04	9.21E-08	3.25E-09	1.62E-08	1.84E-08	3.80E-07	6.60E-08	-3.42E-01
Components for re-use	kg	0.00E+00										
Materials for recycling	kg	2.05E-01	1.61E-05	3.31E-01	5.36E-01	3.82E-06	1.45E-07	7.26E-07	7.64E-07	1.81E-02	8.25E-08	-1.64E-05
Materials for energy recovery	kg	5.50E-02	4.67E-08	1.30E-07	5.50E-02	3.09E-08	2.33E-10	1.17E-09	6.18E-09	9.98E-09	1.03E-09	-3.42E-09
Exported Energy	MJ	9.00E-03	3.02E-03	1.14E-03	1.32E-02	0.00E+00	6.92E-05	3.46E-04	0.00E+00	8.25E-02	1.26E-02	-3.32E-04

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Verification

The process of verification of this EPD is in accordance with ISO 14025 and ISO 21930. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 and ITB PCR A

Independent verification corresponding to ISO 14025 (sub clause 8.1.3.)

external

internal

External verification of EPD: Halina Prejzner, PhD. Eng.

LCI audit and verification: Michał Chwedaczuk, M.Sc. Eng.

LCA, LCI audit and input data verification: Michał Piasecki, PhD., D.Sc., eng.

Note 1: The declaration owner has the sole ownership, liability, and responsibility for the information provided and contained in EPD. Declarations of construction products may not be comparable if they do not comply with EN 15804+A2. For further information about comparability, see EN 15804+A2 and ISO 14025.

Note 2: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products' performance. ITB acts as the independent, third-party verification organization (see ISO 17025/17065/17029). ITB-EPD program is recognized and registered member of The European Platform - Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

Normative references

- ITB PCR A General Product Category Rules for Construction Products (v.1.6.,2023)
- PN-EN 12266-1:2012 - Badania armatury metalowej – Część 1: Próby ciśnieniowe, procedury badawcze i kryteria odbioru -- Wymagania obowiązkowe
- ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- ISO 14067:2018 Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- ISO 20915:2018 Life cycle inventory calculation methodology for steel products
- KOBiZE Wskaźniki emisjyjności CO₂, SO₂, NO_x, CO i pyłu całkowitego dla energii elektrycznej. December 2023
- World Steel Association 2023 Life Cycle inventory methodology report for steel products

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CERTIFICATE № 790/2025 of TYPE III ENVIRONMENTAL DECLARATION

Products:

Pressure Vessels - 140-5000I

Manufacturer:

IMI Hydronic Engineering Switzerland AG
Mühlerainstrasse 26, 4414 Füllinsdorf, Switzerland

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

EN 15804+A2

Sustainability of construction works.

Environmental product declarations.

Core rules for the product category of construction products.

This certificate, issued on 13th June 2025 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physics, Acoustics
and Environment Department


Agnieszka Winkler-Skalna, PhD



Deputy Director
for Research and Innovation


Krzysztof Kućzyński, PhD

Warsaw, June 2025