

# Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

## E\*STAR

from

***Austin Detonator s.r.o.***

**EPD of multiple products, based on worst-case results**



# AUSTIN POWDER

Programme:	The International EPD® System, <a href="http://www.environdec.com">www.environdec.com</a>
Programme operator:	EPD International AB
EPD registration number:	S-P-11305
Publication date:	2023-11-23
Valid until:	2028-11-22

*An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com)*



## General information

### Programme information

<b>Programme:</b>	The International EPD® System
<b>Address:</b>	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
<b>Website:</b>	<a href="http://www.environdec.com">www.environdec.com</a>
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### Accountabilities for PCR, LCA and independent, third-party verification

#### Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR): PCR 2019:14 CONSTRUCTION PRODUCTS, version 1.3.1.

PCR review was conducted by: The Technical Committee of the International EPD® System. Chair of the PCR review is Claudia A. Peña. The review panel may be contacted via [info@environdec.com](mailto:info@environdec.com).

#### Life Cycle Assessment (LCA)

LCA accountability: LCA Studio s.r.o.  
Ing. et Ing. Tatiana Trecáková, Ph.D., prof. Ing. Vladimír Kočí, Ph.D., MBA,  
Šárecká 1962/5, 16000 Prague 6, Czech Republic, [www.lcastudio.cz](http://www.lcastudio.cz)



#### Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

Third-party verifier: prof. Ing. Silvia Vilčeková, Ph.D., SILCERT, s.r.o.

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes       No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

## Company information

Owner of the EPD: Austin Detonator s.r.o.

Contact: RNDr. Hana Hájková, CSc. hana.hajkova@austin.cz

Description of the organisation: Austin Detonator is a traditional manufacturer of electric, non-electric and electronic detonators for use in quarries, mining of minerals, constructing transport infrastructure including tunnels, and extracting oil and natural gas. At the present Austin Detonator is the leading manufacturer of initiation system in Europe and a top global player. Detonators produced by Austin Detonator are supplied to the world market exclusively for civil (professional and industry) use.

Product-related or management system-related certifications: EN ISO 9001:2015, EN ISO 14001:2015, ISO 45001:2018

Name and location of production are supplied site(s): Austin Detonator s.r.o., Jasenice 712, 755 01 Vsetín, Czech Republic

## Product information

Product name: E\*STAR

Product identification: EC type-examination certificate No.: 1019-204/V/2014, Amendment No.7

Included products: E\*STAR GO, E\*STAR Tunnel, E\*STAR Gold, E\*STAR Gold HD. Cable length: 6 m. For each indicator, the highest result of the included products are declared (i.e., the results of a “worst-case product”, which may be results of one or several of the included products). The products are manufactured by the same company with the same major steps in the core processes.

Product description:

The E\*STAR system is a fit for purpose electronic initiation system suitable for all blasting applications. It provides the highest level of quality, security, control, and precise timing to ensure compliant and consistent blasting results. Detonators are manufactured at Austin Detonator’s detonator factory at Vsetín, Czech Republic. After production they are transported to customer where they are stored at suitable storage facilities, before being transported to the mine, quarry or construction site where they are used in blasting activities by the end user.

UN CPC code: 3545

Other codes for product classification: NACE 20:51 Manufacturing of explosives

Geographical scope: Czech Republic, Europe, Global

## LCA information

Functional unit / declared unit: 1 piece of E\*STAR detonator

Time representativeness: Site specific data from producer are based on 1 year average for process data (reference year 2022). Time scope less than 10-years were applied for background data. Time scope less than 2-years were applied for specific data.

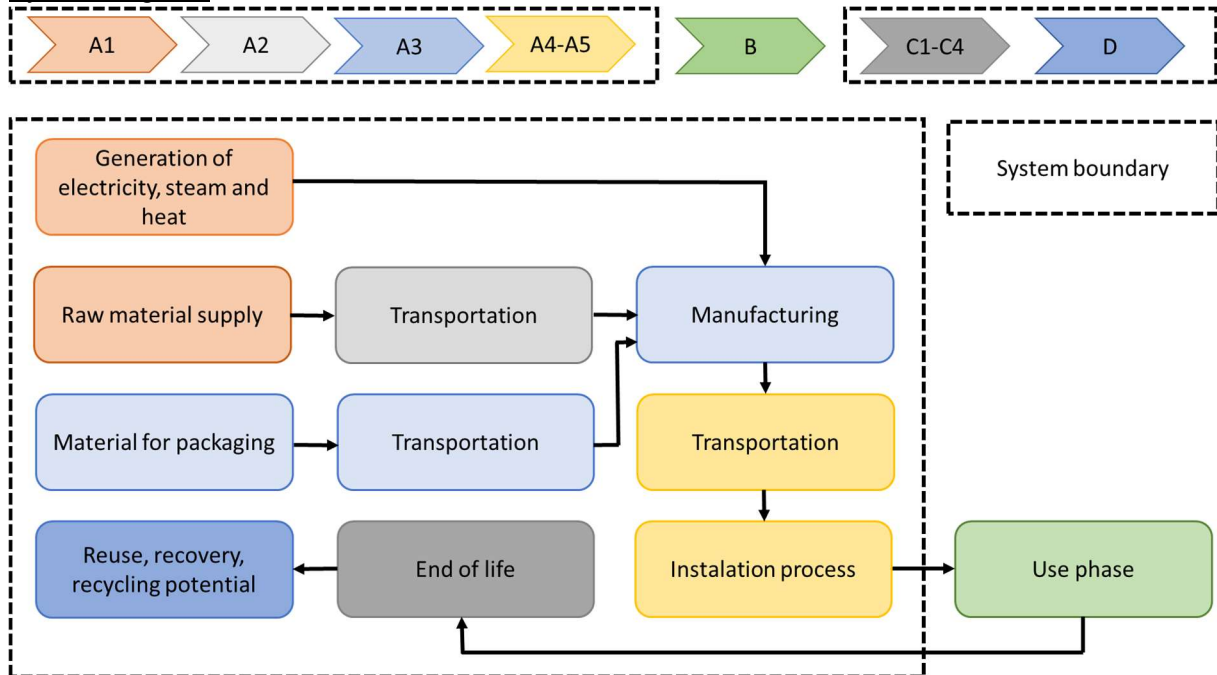
Database(s) and LCA software used: LCA for Experts (Sphera), Sphera database andecoinvent database

Description of system boundaries:

This EPD is based on system boundary cradle to gate (A1-A3) with modules C1-C4, module D and optional modules A4 and A5.

The system boundary covers the production of raw materials, all relevant transport down to factory gate, manufacturing by Austin Detonator, Czech Republic, transport to the customer and process of unpacking, treatment of produced waste and detonation, treatment of residual waste from detonator after detonation.

**System diagram:**



**Module A1** covers the production of materials and components for Austin Detonator and also it includes fuels and energy carriers (electricity, thermal energy). This consists of the production of input materials and components.

**Module A2** covers the transport of materials and components into the site of production Austin Detonator. Generic DB processes with site-specific parameters for distance were used.

**Module A3** covers on-site operated processes dealing with the detonator production and packaging. These processes are under the operational control of Austin Detonator, and these are specific processes modelled based data collection. The internal transport of product detonators to company warehouse is also covered in this module.

**Module A4** covers the transport of product from the site of production Austin Detonator to the site of installation (considered average distance to the customer 1800 km). Generic DB processes with site-specific parameters for distance were used.

**Module A5** covers the phase of treatment and disposal of waste generated from the unpacking and installation of electronic detonator. In this module the process of detonation of electronic detonator is also considered.

**Module C2** covers the transport of residual waste after detonation to landfill. Generic DB processes with estimated general distances were used. Estimated distance for the transport of waste to landfill was set at 50 km.

**Module C4** covers the process for landfilling of residual waste from detonator.

**Module D** covers declared benefits and loads regarding to recycling potential and energy recovery from incineration of packaging materials.

Modules C1 and C3 are considered as irrelevant.

Cut off rules: The cut-off criterion was chosen based on the used PCR. According to the used PCR, more than 95 % of flows were included.

Allocations: Specific inputs and outputs were measured or calculated for specific product. The allocation of common inputs (thermal energy) and outputs (waste, emissions) is based on the general allocation rule what represents the proportion of production of every specific product in overall production expressed in pieces.

Electricity mix: Sphera DB process of Czech residual grid mix is used for production process in Austin Detonator.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	x	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	GLO	GLO	CZE	EU	EU	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Specific data used	>99%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	>10%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	NR					-	-	-	-	-	-	-	-	-	-	-	-

## Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Iron	0,02758	51,80	0
Copper	0,00989	0	0
Plastics	0,03772	0	0
Zirconium	0,00001	0	0
Thermoplastic elastomer	0,00150	0	0
Electronic modul	0,00100	0	0
Silicone	0,00168	0	0
Pentrite	0,00082	0	0
Others	0,00014	0	0
<b>TOTAL</b>	<b>0,08033</b>	<b>17,71</b>	<b>0</b>
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Paper and cardboard	0,01146	14,27	0,38
Plastics	0,00023	0,29	0
Cotton	0,00002	0,03	0
Metals	0,00019	0,24	0
<b>TOTAL</b>	<b>0,01191</b>	<b>13,73</b>	<b>0,37</b>

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per 1 pc of E*STAR detonator
Lead diazide	236-542-1	13424-46-9	0,127

## Results of the environmental performance indicators

### Mandatory impact category indicators according to EN 15804

Results per 1 pc of E*STAR detonator									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO <sub>2</sub> eq.	4,06E-01	1,87E-02	1,26E-03	0,00E+00	1,96E-04	0,00E+00	2,90E-03	-1,51E-03
GWP-biogenic	kg CO <sub>2</sub> eq.	-2,20E-02	-2,77E-04	2,82E-02	0,00E+00	-2,90E-06	0,00E+00	-3,58E-05	-2,11E-06
GWP-luluc	kg CO <sub>2</sub> eq.	3,50E-04	1,73E-04	4,24E-08	0,00E+00	1,81E-06	0,00E+00	2,49E-06	-9,99E-08
GWP-total	kg CO <sub>2</sub> eq.	3,84E-01	1,86E-02	2,95E-02	0,00E+00	1,95E-04	0,00E+00	2,87E-03	-1,51E-03
ODP	kg CFC 11 eq.	6,41E-09	1,64E-15	8,26E-16	0,00E+00	1,71E-17	0,00E+00	4,87E-15	-6,75E-15
AP	mol H <sup>+</sup> eq.	1,98E-03	2,56E-05	8,47E-06	0,00E+00	2,68E-07	0,00E+00	8,83E-06	-1,64E-06
EP-freshwater	kg P eq.	1,04E-04	6,81E-08	2,44E-10	0,00E+00	7,14E-10	0,00E+00	4,60E-07	-3,68E-10
EP-marine	kg N eq.	3,32E-04	9,25E-06	7,68E-07	0,00E+00	9,70E-08	0,00E+00	2,06E-06	-5,13E-07
EP-terrestrial	mol N eq.	3,54E-03	1,10E-04	3,79E-05	0,00E+00	1,15E-06	0,00E+00	2,26E-05	-5,56E-06
POCP	kg NMVOC eq.	1,23E-03	2,23E-05	6,41E-06	0,00E+00	2,34E-07	0,00E+00	6,52E-06	-1,49E-06
ADP-minerals&metals*	kg Sb eq.	5,64E-05	1,21E-09	7,58E-12	0,00E+00	1,27E-11	0,00E+00	7,74E-11	-9,22E-11
ADP-fossil*	MJ	9,01E+00	2,54E-01	2,09E-03	0,00E+00	2,66E-03	0,00E+00	4,34E-02	-2,77E-02
WDP*	m <sup>3</sup>	2,72E-01	2,15E-04	7,27E-04	0,00E+00	2,26E-06	0,00E+00	-1,71E-05	-5,42E-05
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; 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&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

## Additional mandatory and voluntary impact category indicators

Results per 1 pc of E*STAR detonator									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG <sup>1</sup>	kg CO <sub>2</sub> eq.	4,07E-01	1,89E-02	1,26E-03	0,00E+00	1,98E-04	0,00E+00	2,91E-03	-1,51E-03
Particulate matter	Disease incidences	2,89E-08	2,02E-10	5,73E-11	0,00E+00	2,11E-12	0,00E+00	8,74E-11	-1,54E-11
Ionising radiation, human health	kBq U235 eq.	4,13E-02	4,75E-05	1,72E-05	0,00E+00	4,98E-07	0,00E+00	7,58E-05	-3,62E-04
Ecotoxicity fresh water	CTUe	5,12E+01	1,79E-01	2,83E-03	0,00E+00	1,88E-03	0,00E+00	3,27E-02	-1,66E-03
Human toxicity, cancer	CTUh	1,31E-07	3,61E-12	2,83E-10	0,00E+00	3,78E-14	0,00E+00	1,83E-12	-2,89E-13
Human toxicity, non-cancer	CTUh	1,67E-05	1,59E-10	9,92E-08	0,00E+00	1,67E-12	0,00E+00	1,51E-10	-6,42E-12
Land Use	Pt	4,35E+00	1,06E-01	5,71E-04	0,00E+00	1,11E-03	0,00E+00	3,81E-03	-1,34E-03

## Resource use indicators

Results per 1 pc of E*STAR detonator									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1,29E+00	1,80E-02	4,94E-04	0,00E+00	1,88E-04	0,00E+00	3,91E-03	-2,09E-03
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
PERT	MJ	1,29E+00	1,80E-02	4,94E-04	0,00E+00	1,88E-04	0,00E+00	3,91E-03	-2,09E-03
PENRE	MJ	9,01E+00	2,55E-01	2,09E-03	0,00E+00	2,67E-03	0,00E+00	4,34E-02	-2,77E-02
PENRM	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
PENRT	MJ	9,01E+00	2,55E-01	2,09E-03	0,00E+00	2,67E-03	0,00E+00	4,34E-02	-2,77E-02
SM	kg	1,40E-02	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
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

<sup>1</sup> This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero.



FW	m <sup>3</sup>	4,65E-02	1,98E-05	1,71E-05	0,00E+00	2,08E-07	0,00E+00	4,39E-07	-3,35E-06
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

## Waste indicators

Results per 1 pc of E*STAR detonator									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	-7,39E-09	9,42E-13	5,98E-14	0,00E+00	9,88E-15	0,00E+00	3,64E-12	-3,24E-12
Non-hazardous waste disposed	kg	6,65E-03	3,67E-05	2,37E-04	0,00E+00	3,85E-07	0,00E+00	4,57E-02	-7,55E-06
Radioactive waste disposed	kg	3,88E-04	3,29E-07	1,11E-07	0,00E+00	3,45E-09	0,00E+00	5,12E-07	-2,47E-06

## Output flow indicators

Results per 1 pc of E*STAR detonator									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	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
Material for recycling	kg	4,00E-03	0,00E+00	9,70E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	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
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-6,12E-03
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,11E-02

## Additional environmental information

If it is necessary to calculate the results to mass in kg, conversion factor is 10,84.

## References

General Programme Instructions of the International EPD<sup>®</sup> System. Version 4.1.

Product Category Rules (PCR) document for Construction Products (PCR 2019:14 Version 1.3.1., 2023-07-08)

ISO 14020:2000 Environmental labels and declarations — General principles, 2000-09

ISO 14025: EN ISO 14025:2006-11: Environmental labels and declarations - Type III environmental declarations — Principles and procedures

ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework, 2006-07

ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines, 2006-07

EN 15804+A2:2019/AC:2021 European Committee for Standardization: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products, 2021

Ecoinvent: ecoinvent database, [www.ecoinvent.org](http://www.ecoinvent.org)

Sphera: software LCA for Experts, Sphera solutions, [www.sphera.com](http://www.sphera.com)

