

# ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Orica Norway AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-3191-1823-EN
Registration number:	NEPD-3191-1823-EN
ECO Platform reference number:	-
Issue date:	26.10.2021
Valid to:	26.10.2026

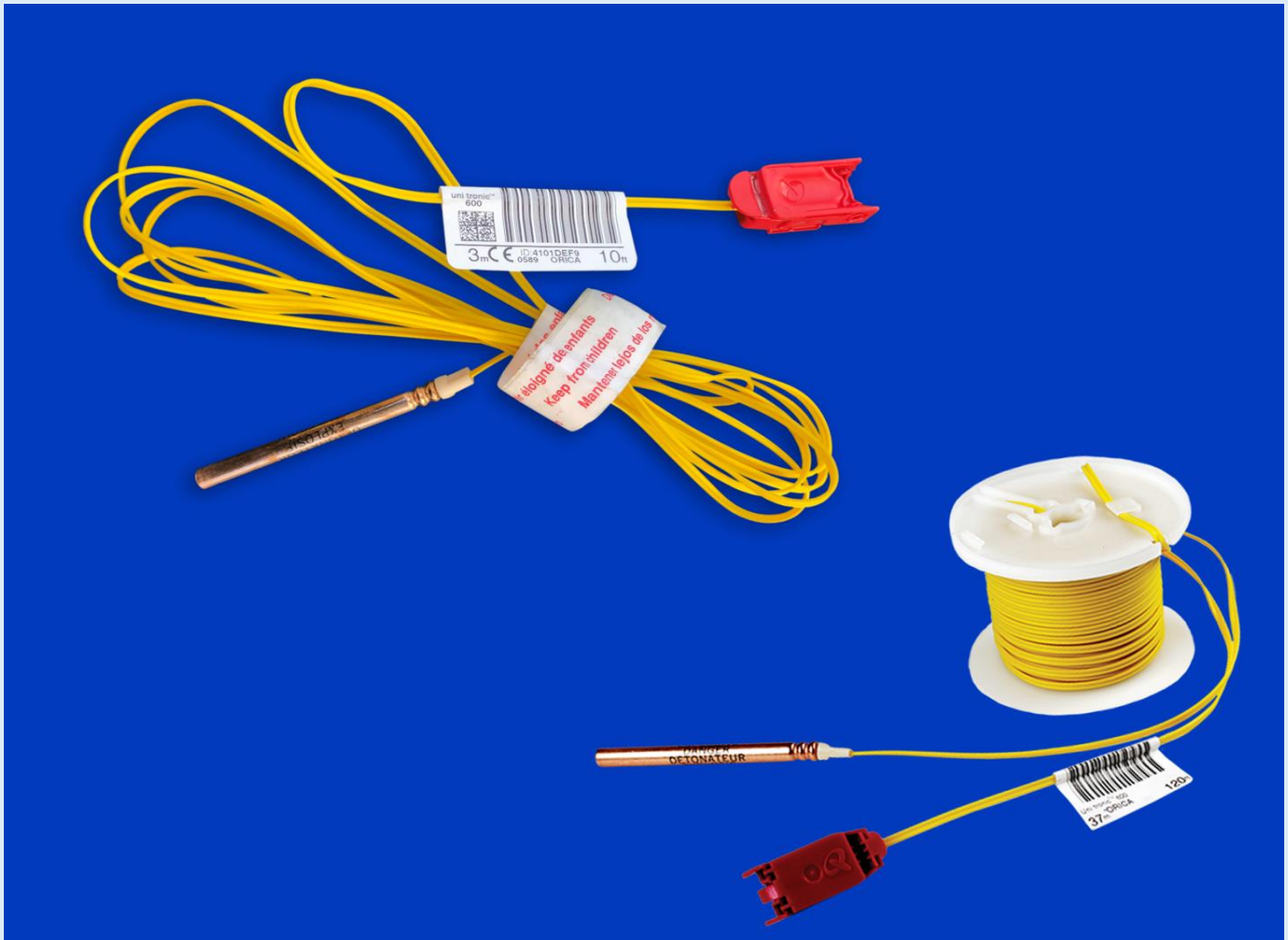
## Electronic detonators

Trade names: i-kon™ II, i-kon™ II RX, uni tronic™ 600, eDev™ II

Orica Norway AS



[www.epd-norge.no](http://www.epd-norge.no)



## General information

### Product:

Electronic detonators  
Trade names: i-kon™ II, i-kon™ II RX, uni tronic™ 600, eDev™ II

### Program operator:

The Norwegian EPD Foundation  
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### Declaration number:

NEPD-3191-1823-EN

### ECO Platform reference number:

### This declaration is based on Product Category Rules:

CEN Standard EN 15804 serves as core PCR  
NPCR 024 version 1.0 Explosives and Initiation Systems (03/2016)

### Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

### Declared unit:

1 ea (detonator) manufactured, installed and used product

### Declared unit with option:

A1-A3, A4, A5

### Functional unit:

### Verification:

The CEN Norm EN 15804 serves as the core PCR. Independent verification of the declaration and data, according to ISO14025:2010

internal  external

Third party verifier:



Julie Lyslo Skullestad, Aase Teknikk  
(independent verifier approved by EPD Norway)

### Owner of the declaration:

Orica Norway AS  
Contact person: Johan Røneid  
Phone: +47 32 22 91 00  
e-mail: johan.roeneid@orica.com

### Manufacturer:

Orica Norway AS

### Place of production:

Canada

### Management system:

ISO 9001

### Organisation no:

981 413 156

### Issue date:

26.10.2021

### Valid to:

26.10.2026

### Year of study:

LCA conducted in 2021. Production data is from 2020.

### Comparability:

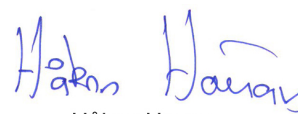
EPD of construction products may not be comparable if they do not comply with EN 15804 and are seen in a building context.

### The EPD has been worked out by:

Mie Fuglseth  
Asplan Viak




Approved



Håkon Hauan  
Managing Director of EPD-Norway

## General information

### Product description:

Electronic detonators are programmable detonators which are manufactured at Orica's detonator factory at Brownsburg, Canada. After production they are transported to customers in Norway and other European countries 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.

### Product specification:

Materials	Amount (%)
Iron	42 %
Plastic	31 %
Copper	20 %
Thermoplastic elastomer	<3 %
Zinc	2 %
Aluminium	<1 %
Primary & secondary explosives in detonator:	(< 1.5 % of tot.)
Lead azide	10- <15 %
PETN	80-95 %

### Energy content of declared products (MJ/ea):

Electronic detonator 0,0005 MJ/ea

### Technical data:

1 ea electronic detonator  
Weight: ca. 11g  
Average cable length: 7m

### EC-type examination certificate:

0589. EXP.2780/18 (i-kon family) / 0589.EXP.2779/18 (unitronic 600) / 0589 Exp 1732-19 (e-dev II)

### Market:

Norway

### Reference service life, product:

Not relevant. Explosives products cannot be used more than once.

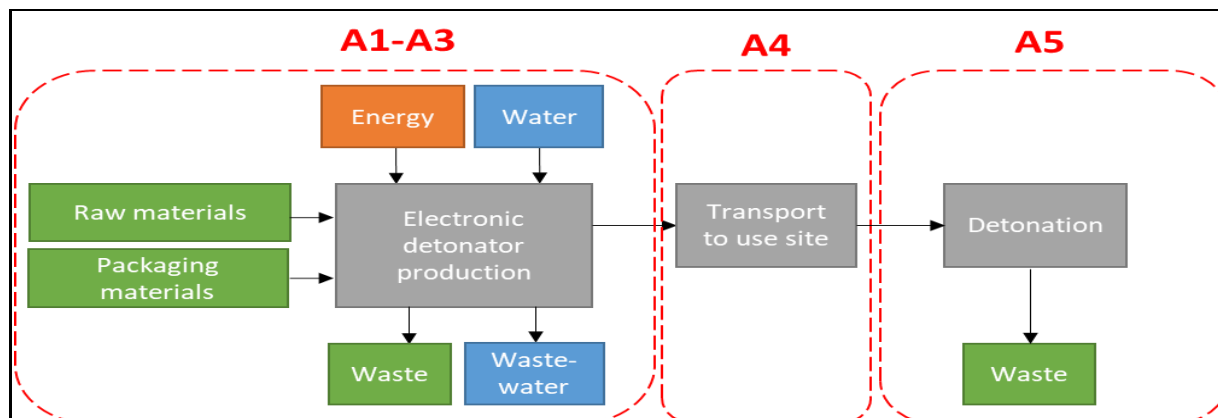
## LCA: Calculation rules

### Declared unit:

1 ea (detonator) manufactured, installed and used product

### System boundary:

The flow chart for production, transport and use of electronic detonator is shown in the figure below.



### Data quality:

Data has been collected in 2020 and is representative of that year. Data for production of detonators (A1-A3) is based on specific consumption data. Generic data is from ecoinvent v3.7, Allocation, Recycled Content and SimaPro v 9. No data is more than 5 years old. Characterization factors from EN15804: 2012 + A1: 2013.

### Cut-off criteria:

All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials and substances

### Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials allocated to the main product in which the material was used.

## LCA: Scenarios and additional technical information

The following information describes the scenarios in the different modules of the EPD.

This declaration is based on a cradle to gate with options assessment, including production at Brownsburg in Canada. Use of electronic detonator at site is included, as it represents the part of the life cycle in which the detonator are fulfilling its intended function (detonation). Transport to a construction site (A4) has been added, to show the importance of this transport. On average, detonators are transported 7700 km from production site to use site. Scenario for detonation at site in Norway has also been added.

### Transport from production site to use site (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance (km)	Fuel consumption (l/tkm)
Truck	50 %	Lorry	1540	0,4
Train	n/a	Container ship	5775	n/a
Airplane	n/a	Freight aircraft	385	n/a

### Detonation of explosives (A5)

Waste	Unit	Amount
Nickel metal hydride battery	kg	2,30E-02
Waste cable	kg	5,11E-02

### Additional information

Unused detonators are classified as explosives and must only be handled by personnel with approvals/licences to handle such products. Remaining plastic/wire from used (detonated) detonators should be collected and treated as general residual waste.

## LCA: Results

The LCA results show environmental impacts, resource use and outflows calculated according to EN 15804: 2012 + A1: 2013. The results are per 1 unit electric detonator, including an average wiring cable length, manufactured, and used in detonation of explosives. Transport in A4 is 7700 km to a construction site.

### System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Detonation	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

### Environmental impact

Parameter	Unit	A1-A3	A4	A5
GWP	kg CO <sub>2</sub> -eqv	3,32E-01	2,86E-02	7,79E-03
ODP	kg CFC11-eqv	3,59E-08	6,32E-09	5,97E-09
POCP	kg C <sub>2</sub> H <sub>4</sub> -eqv	1,24E-04	5,04E-06	6,92E-06
AP	kg SO <sub>2</sub> -eqv	2,52E-03	1,86E-04	1,38E-04
EP	kg PO <sub>4</sub> --eqv	2,23E-03	3,14E-05	5,37E-05
ADPM	kg Sb-eqv	3,33E-04	6,43E-08	2,53E-07
ADPE	MJ	5,32E+00	4,14E-01	6,02E-02

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources

### Resource use

Parameter	Unit	A1-A3	A4	A5
RPEE	MJ	9,52E-01	3,43E-03	2,10E-02
RPEM	MJ	0,00E+00	0,00E+00	0,00E+00
TPE	MJ	9,52E-01	3,43E-03	2,10E-02
NRPE	MJ	4,24E+00	4,14E-01	6,02E-02
NRPM	MJ	1,08E+00	0,00E+00	0,00E+00
TRPE	MJ	5,32E+00	4,14E-01	6,02E-02
SM	kg	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00
W	m <sup>3</sup>	5,88E-03	2,97E-05	1,93E-04

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water

### End of life - Waste

Parameter	Unit	A1-A3	A4	A5
HW	kg	1,28E-03	2,58E-05	1,48E-04
NHW	kg	1,20E-01	1,17E-02	2,10E-03
RW	kg	1,13E-05	2,82E-06	3,22E-06

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

### End of life - Output flow

Parameter	Unit	A1-A3	A4	A5
CR	kg	0,00E+00	0,00E+00	0,00E+00
MR	kg	5,64E-03	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00
ETE	MJ	0,00E+00	0,00E+00	0,00E+00

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: 9,0 E-03 =  $9,0 \cdot 10^{-3} = 0,009$

### Additional requirements

#### Greenhouse gas emission from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity in production.

Data source	Amount	Unit
Canadian (Quebec) production mix, ecoinvent v3.7 (Sep 2021)	2,80E+01	g CO <sub>2</sub> -eqv/kWh

#### Dangerous substances

- The product contains no substances given by the REACH Candidate list
- The product contains substances given by the REACH Candidate list that are less than 0,1 % by weight.
- The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List, see table.
- The product is classified as hazardous waste.\*

\*Explosive products are not disposed of as waste, but are subject to local regulations and handled accordingly. Definition of hazardous waste is given by the European list of Waste (LoW)

Name	CAS no.	Amount*
Lead azide	13424-46-9	0,1 to 1%
Pentaerythritol tetranitrate (PETN)	78-11-5	1 to 5%
Lead picrate	25721-38-4	< 0,1%
Nitrocellulose	9004-70-0	< 0,1%
Lead oxide (PbO <sub>2</sub> )	1309-60-0	< 0,1%

\*Share of delay and explosive elements

#### Indoor environment





Not relevant. No tests have been carried out on the product concerning indoor climate.

#### Carbon footprint

Carbon footprint has not been worked out for the product.

## Bibliography

ISO 14025:2010	<i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i>
ISO 14044:2006	<i>Environmental management - Life cycle assessment - Requirements and guidelines</i>
EN 15804:2012+A1:2013	<i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i>
ISO 21930:2007	<i>Sustainability in building construction - Environmental declaration of building products</i>
Ecoinvent v3.7, September 2021	Swiss Centre of Life Cycle Inventories. <a href="https://www.ecoinvent.org/">https://www.ecoinvent.org/</a>
SimaPro	LCA software, developed by PRé Sustainability <a href="https://simapro.com/">https://simapro.com/</a>
NPCR 024 2016 ver. 1.0	<i>Explosives and Initiation Systems</i>
Mie Fuglseth	<i>LCA Report 07.10.2021</i>

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