THE INTERNATIONAL EPD® SYSTEM

Southeast Asia EPD®

Environmental Product Declaration

In accordance with ISO 14025:2006 for:

Nitrea
Prilled Urea Fertilizer

From
PT Pupuk Kujang

Programme
The International EPD® System, www.environdec.com

Regional hub
EPD Southeast Asia, www.epd-southeasia.com

Programme operator
EPD International AB

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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

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Verification and Registration

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden www.environdec.com info@environdec.com	EPD registered through the fully aligned regional hub: **EPD Southeast Asia** www.epd-southeastasia.com
Programme Operator:	EPD Southeast Asia Kencana Tower Level M, Business Park Kebon Jeruk Jl. Raya meruya Ilir No. 89 Jakarta Barat 11620 Indonesia www.epd-southeastasia.com	

Accountabilities for PCR, LCA and independent, third-party verification	
Product Category Rules (PCR)	
PCR: Mineral or Chemical Fertilizers, 2010:20, version 3.0.2 Product Category Classification UN CPC 3461, 3462, 3463, 3464, & 3465	
PCR review was conducted by: The Technical Committee of the Internatonal EPD® System, Chair of the PCR review: Lars-Gunnar Lindfors. The review panel may be contacted via info@environdec.com	
Life Cycle Assessment (LCA)	
LCA accountability: Andika Arif Kurniawan, *Pupuk Kujang; Naliawati Prastiya Ningrum, Pupuk Kujang; Putri Alifa Kholil, Diponegoro University*	Contact person: Naliawati Prastiya Ningrum naliawati.prastiya@pupuk-kujang.co.id Putri Alifa Kholil putrialifa@alumni.undip.ac.id
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: *Gloria FJ Kartikasari, PT Life Cycle Indonesia* gloriafjk@lifecycleindonesia.com Approved by: The International EPD® System	
Procedure for follow-up of data during EPD validity involves third-party verifier: ☐ Yes ☒ No	

Company Information

PT Pupuk Kujang was established on June 9, 1975. PT Pupuk Kujang is a company engaged in the national fertilizer industry. The Company carries out processing activities (transformation processes) of organic and inorganic materials through chemical processes and various activities to support agriculture integrated with trading activities. In addition, it also produces products in the form of goods and/or services that have added value or higher benefits. The PT Pupuk Kujang Cikampek factory was built on 510 hectares of land in Dawuan Village, Cikampek District, Karawang Regency. The main raw materials in the manufacture of urea fertilizer are natural gas, water, and air. The three raw materials are processed to produce ammonia and finally become urea fertilizer. The product serves to meet the need of urea fertilizer for farmers to fertilize plants.

Name and location of PT Pupuk Kujang Company and Production Site:

Urea prilled K1A & K1B production

With the production capacity of both factories is the same, about 570,000 Tonnes/Year urea and 330,000 Tonnes/Year ammonia production rate

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Telephone : (0264) 316141, 317007
Website : www.pupuk-kujang.co.id
Contact person : ekologipupukkujang@gmail.com

Certification owned by PT Pupuk Kujang:

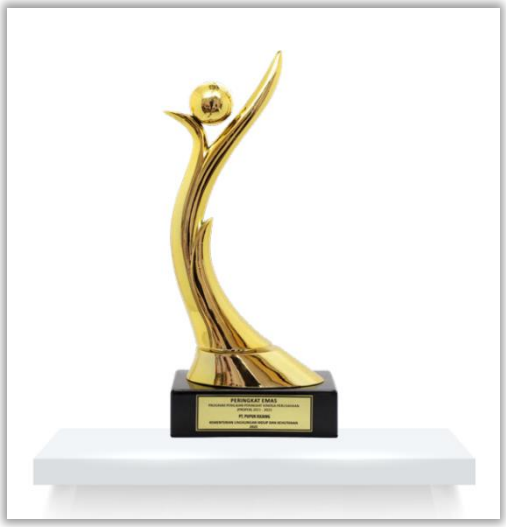
- ISO 14001:2015
- ISO 9001:2015
- ISO 50001:2018
- Green Industry Award 2022
- Gold PROPER 2022
- Asia Responsible Enterprise Award 2022

Details of PT Pupuk Kujang's commitment to sustainable development can be seen in PT Pupuk Kujang's sustainability report can be accessed in :

(www.pupuk-kujang.co.id/publikasi/annual-report-2/624-annual-sustainabilty-report-2022).

Company Vision

PT Pupuk Kujang has a vision to become a chemical industry and agricultural supporter that is competitive on a national scale. Pupuk Kujang upholds the value of change in the increasingly advanced industrial era by always making efforts in developing technology and environmental management of the entire production process. To realize responsible efforts in environmental management as one of the business actors in the fertilizer sector, Pupuk Kujang has various achievements from various innovations carried out, ranging from energy efficiency, emission reduction, implementation of 3R (reduce, reuse, recycle) from B3 waste and domestic waste. Other environmental management efforts, such as water conservation, biodiversity management, and community development-based eco-innovation programs are also carried out. The achievements of PT Pupuk Kujang include winning awards in the **Asia Responsible Enterprise Awards (AREA) 2023** and becoming one of the companies that won the **Gold PROPER 2022** award from the Ministry of Environment and Forestry of the Republic of Indonesia.



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Product Information

Product Name	:	Nitrea
Product Identification	:	Urea is also known as Carbamide, Carbonyldiamide, and Carbamidic Acid with chemical formulation $(NH_2)_2CO$ or CH_4N_2O
Product Description	:	Urea fertilizer, often known as nitrogen (N) fertilizer, contains 46% nitrogen. Urea is produced through a chemical reaction involving ammonia and carbon dioxide, which results in solid urea. PT Pupuk Kujang makes prilled urea that is excellent for annual and seasonal crops. Nitrea is the brand name for PT Pupuk Kujang's non-subsidized prilled urea fertilizer, which is white in color and has a grain size of 1 - 3.35 mm.
Product composition	:	- Nitrogen: min 46.0% (w/w) - Water: 0.5% (w/w) - Biuret (CAS no. 108-19-0): 0.3 – 1.0% (w/w) - Density: 2.31 g/cm^3 - Bulk density: 44 – 49 lb/ft^3 or 750 kg/m^3
UN CPC Code 3461	:	Nitrogenous fertilizers
Geographical Scope	:	Indonesia
Head Office & Production Site	:	Karawang
Agronomic Efficiency Index	:	Agronomic Efficiency Index The Agronomic Efficiency Index (AEI) measures how urea affects rice productivity. Granular urea from Pupuk Kujang has an AEI of 19.8 to 20.3 kg rice/kg N. When applying urea to the rice field together with the Leaf Color Chart application, the AEI will increase to 25,4–27,2 kg rice/kg N.
Uptake Index (UI)	:	Uptake Index (UI) According to PT Pupuk Kujang's R&D team when they conduct a field trial, the Uptake Index (UI) for urea is between 48.0 and 49,2. When urea is applied together with Leaf Color Chart application to a rice crop, the UI will increase to between 61 and 66, and it may even reach up to 75,4 when mixed with 2 tons of manure per hectare.

LCA Information

- **Declared Unit**

  The declared unit used in the study of the urea fertilizer production process of PT Pupuk Kujang is in accordance with the Product Category Rules (PCR) Mineral or Chemical Fertilizer UN CPC 3461, 3462, 3463, 3464 &; 3465 ver 3.0.1, namely 1 ton of urea fertilizer and its packaging.

- **Time Representativeness**

  Generic data: The 15% generic data used was taken from 2011-2021

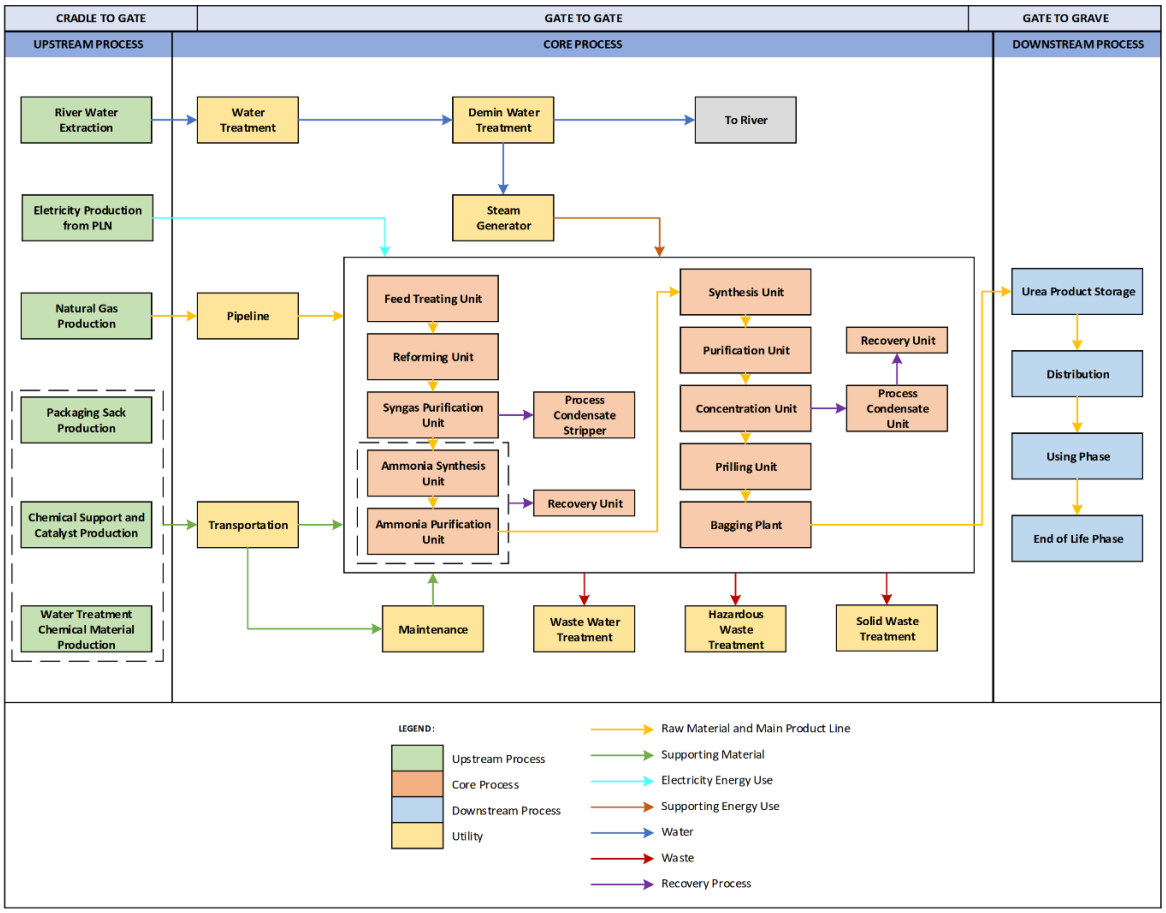
  Specific data: The specific data used is 2021

- **Database and LCA Software used**

  Software used: SimaPro *software Developer* version 9.4.0.2

  Database: Ecoinvent 3.8 – allocation, cut-off by classification - system

- **System Diagram**



Cradle-to-Grave System Boundaries		
Upstream Process	Core Process	Downstream Process
• Natural gas extraction • Water extraction • Catalyst and supporting chemical production • Production of urea fertilizer packaging • Impact due to the production of electricity and fuels used in upstream module	• Transportation of raw materials and supporting materials • Ammonia production • Urea production • Maintenance process • Utilities or production supporting unit • Waste generated from the production process and the waste third parties treatment • Impact due to the production of electricity and fuels used in core module	• The process of transportation and distribution from the factory to distributors and farmers • The use of urea fertilizer by farmers • Final processing of urea fertilizer packaging waste • Impact due to the production of electricity and fuels used in downstream module

Details of processes that are not included in the system boundary:

1. Production process of equipment, buildings, and other materials
2. Personnel business trips
3. Personnel travel to and from the office
4. Research and development activities
5. Lighting activities, laboratories, and office activities
6. Emergency activities such as fire suppression systems

- Assumptions

1. Catalyst waste generation is obtained by dividing the weight of the catalyst by the period of use of the catalyst.
2. Data in the distribution process (grave) uses one distribution channel, namely Line 3 in Indramayu Regency which gets urea directly from Line 2 (Factory Area).
3. The calculation of air emissions from the transportation process including the fertilizer distribution process is carried out based on the provisions stated in the Guidelines for the Implementation of the National Greenhouse Gas Inventory Methodology for the Calculation of Greenhouse Gas Emission Levels of the Ministry of Environment in 2012 and journal which includes CO2, CH4, N2O, SO2, NOx, PM, and CO parameters.
4. Air emissions resulting from fertilizer use are calculated based on the IPCC Intergovernmental Panel on Climate Change guidebook of 2019 (improvement from the 2006 version).

- Limitations

  Output parameters in several tools that produce emissions in the production process have limited sampling results carried out only once every 6 months and limited emission parameters.

- Cut-off Rules

  Based on Product Category Rules (PCR) Mineral or Chemical Fertilizer UN CPC 3461, 3462, 3463, 3464 & 3465 ver 3.0.1, inventory data from the fertilizer production process of at least 99% of the total flow must be covered, so the minimum and the permissible cut-off is less than 1% of the total flow which means there is no significant effect on the overall yield.

- Data Quality

Data type	Upstream Module	%	Core Module	%	Downstream Module	%
Primary Data	1	**4**	69	**85**	23	**62**
Secondary Data	27	**96**	12	**15**	14	**38**
Total	28	100	81	100	37	100

Content Declaration

Product

Product components	CAS No.	%	Environmental / hazardous properties
Nitrogen		46.0 (min)	Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation
Water		0.5 (max)	Not classified as a hazardous chemical
Biuret	108-19-0	0.3 – 1.0	Causes severe skin burns and eye damage

Packaging

Distribution Packaging:

Urea fertilizer products are distributed in 50 kg packaging sacks and tied to a pallets on the tailgate of flat deck trucks.

Consumer Packaging:

Urea products are packaged in packs of 50 kg with materials in linear low-density polyethylene (LLDPE) 40 grams and polypropylene (PP) output materials 96 grams.

Recycled Material

The product does not contain any recycled material.

Environmental Performance

- Potential Environmental Impact

No	Impact Categories	Category Indicators	Impact Assessment per Ton Urea			TOTAL
			Upstream	Core	Downstream	
1	Global Warming Potential	Kg CO2 eq / Ton	1.38E+02	6.80E+02	3.79E+03	4.61E+03
	Global Warming Potential- Fossil	Kg CO2 eq / Ton	1.37E+02	6.79E+02	3.79E+03	4.61E+03
	Global Warming Potential - Biogenic	Kg CO2 eq / Ton	3.70E-01	9.11E-01	9.35E-03	1.29E+00
	Global Warming Potential- Land Transformation	Kg CO2 eq / Ton	3.26E-02	2.10E-01	1.98E-03	2.45E-01
2	Ozone Depletion Potential	Kg CFC11 eq / Ton	6.95E-04	2.85E-06	2.26E-06	7.00E-04
3	Acidification Potential	mol H+ eq / Ton	4.06E-01	1.00E+00	2.48E+02	2.49E+02
4	Eutrophication Potential					
	a. Eutrophication, freshwater	Kg P eq / Ton	7.69E-03	2.13E-01	1.66E-03	2.22E-01
	b. Eutrophication, marine	Kg N eq / Ton	1.65E-01	1.56E+01	1.22E+02	1.38E+02
	c. Eutrophication, terrestrial	mol N eq / Ton	1,80E+00	3.48E+00	1.11E+03	1.12E+03
5	Abiotic Depletion:					
	a. Abiotic Depletion of Mineral and Metal	Kg Sb eq / Ton	2.59E-04	3.26E-04	4.07E-06	5.89E-04
	a. Abiotic Depletion of Fossil Fuels	MJ / Ton	3.38E+04	1.19E+03	1.44E+02	3.51E+04
6	Photochemical Ozone Formation	Kg NMVOC eq / Ton	7.13E-01	8.31E-01	1.09E+01	1.24E+01
7	Water Scarcity Footprint	m3 depriv. / Ton	2.08E+02	-2.63E+01	1.44E-01	1.81E+02

Impact calculations are carried out in various impact indicators that have been determined in the **General Programme Instruction International EPD System**. The method used in impact calculation is **EN 15804: 2012** using SimaPro software, by calculating the impact **per product declared unit**.

- Use of Resources

Resources use based on life cycle invntory (LCI) per declared unit

Parameter		Unit	Upstream	Core	Downstream	Total
Primary Energy Resources - Renewable	*Use as Energy Carrier*	MJ, *net calorific value*	20.41	49.23	0.70	70.34
	Used as Raw Materials	MJ, *net calorific value*	0.00	0.00	0.00	0.00
	Total	MJ, *net calorific value*	20.41	49.23	0.70	70.34
Primary Energy Resources - Non-Renewable	*Use as Energy Carrier*	MJ, *net calorific value*	447.13	1,190.54	143.53	1,781.20
	Used as Raw Materials	MJ, *net calorific value*	33,359.58	0.00	0.00	33,359.58

Parameter		Unit	Upstream	Core	Downstream	Total
	Total	MJ, *net calorific value*	33,806.71	1,190.54	143.53	35,140.78
Secondary material		kg	0.00	0,00	0,00	0,00
Renewable Secondary Fuels		MJ, *net calorific value*	0.00	0,00	0,00	0,00
Non-Renewable Secondary Fuels		MJ, *net calorific value*	0.00	0,00	0,00	0,00
Net use of Fresh Water		m3	8.70	-1.30	0.01	7.41

- Waste Production

Parameter	Unit	Upstream	Core	Downstream	Total
Hazardous Waste Disposed	kg	311.35	18.81	0.08	330.23
Non-Hazardous Waste Disposed	kg	0.0018	0.03	0.55	0.58
Radioactive Waste Disposed	kg	0.00	0.00	0.00	0.00

- Output Flows

Parameter	Unit	Upstream	Core	Downstream	Total
Components for Reuse	kg	0.00	12.64	2.18	14.82
Material for Recycling	kg	0.00	0.13	0.00	0.13
Materials for Energy Recovery	kg	0.00	0.00	0.00	0.00
Exported energy, electricity	MJ	0.00	0.00	0.00	0.00
Exported energy, geothermal	MJ	0.00	0.00	0.00	0.00

Contact Information

EPD Owner

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References

Asosiasi Pengusaha Truk Indonesia (Indonesian Trucking Association). 2016. Tantangan & Strategi Truk Angkutan Barang dalam Menciptakan Keunggulan Bersaing. Acuan Rasio BBM Per Jenis Truk. Supply Chain Indonesia.

General Programme Instructions of the International EPD® System. Version 3.01.

Intergovernmental Panel on Climate Change. 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Kementerian Lingkungan Hidup. 2012. Pedoman Penyelenggaraan Inventarisasi Gas Rumah Kaca Nasional, Buku II Volume 1, Metodologi Perhitungan Tingkat Emisi Gas Rumah Kaca Pengadaan dan Penggunaan Energi.

Kementerian Lingkungan Hidup dan Kehutanan. 2021. Pedoman Penyusunan Laporan Penilaian Daur Hidup (LCA).

Peraturan Menteri Lingkungan Hidup Nomor 1 tahun 2021 tentang Program Penilaian Peringkat Kinerja Perusahaan dalam Pengelolaan Lingkungan Hidup.

Peraturan Dirjen Pengendalian Pencemaran dan Kerusakan Lingkungan Kementerian Lingkungan Hidup dan Kehutanan RI No. P.14/PPKL/SET/DIK.0/9/2018 tentang Materi Pelatihan Penilaian Daur Hidup.

Sofiah, I., Yani, M., dan A. Ismayana, 2018. Dampak Pemanasan Global Pengolahan Hasil Perikanan Menggunakan Metode Life Cycle Assessment (LCA): Analisis Gate-To-Gate. Journal of Agroindustrial Technology, 28(1).

Standar Nasional Indonesia ISO 14040:2016. Manajemen Lingkungan Penilaian Daur Hidup (Prinsip dan Kerangka Kerja).

Standar Nasional Indonesia ISO 14044:2017. Manajemen Lingkungan Penilaian Daur Hidup (Persyaratan dan Panduan).

The International EPD® System Product Category Rules (PCR) Mineral or Chemical Fertilizer UN CPC 3461, 3462, 3463, 3464 & 3465 ver 3.0.2.

Wijono, A. (2017). Dampak Pengurangan Emisi Kendaraan Pada Pemakaian Campuran Biodiesel 30%. Seminar Nasional Sains dan Teknologi. Fakultas Teknik Universitas Muhammadiyah.

Differences Versus Previous Versions

Product name revision from Nitrea™ Granular Urea Feritilzer to Nitrea Prilled Urea Fertilizer page #Cover 2023-09-25

Contact person (author name) correction Nalia Prastiya to Naliawati Prastiya Ningrum in Verification and Registration page #2 2023-09-25

Product information granulated/granular word changes to Prilled page #5 2023-09-25

Agronomic Efficiency Index (AEI) and Uptake Index (UI) narration editorial correction in Product Information page #5 2023-09-25

Contact Information (LCA author and contact person name) correction Nalia Prastiya to Naliawati Prastiya Ningrum in Contact Information page #12 2023-09-25

Website product information editorial correction 2023-09-25

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