





# ENVIRONMENTAL PRODUCT DECLARATION

# OF KNAUF READY-TO-USE FINISHING PLASTER PRODUCTS FOR INTERIOR USE

In accordance with ISO 14025:2006 and ISO 15804+A2:2019/AC:2021 This EPD covers multiple products.

**EPD PROGRAM** 

PROGRAM OPERATOR
CPC CODE
EPD REGISTRATION NUMBER
PUBLICATION DATE
VALID UNTIL
GEOGRAPHICAL SCOPE

The international EPD System, https://environdec.com/

EPD INTERNATIONAL AB 37530 Articles of plaster or of composition based on plaster S-P-09565 2023-10-13 2028-10-13 Global



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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# **▶** Company Information

Knauf is one of the world's leading manufacturers of modern insulation materials, drylining systems, plasters and accessories, thermal insulation composite systems, paints, floor screeds, dry floor systems, and construction equipment and tools.

In Greece, Knauf Gypsopoiia operates with two factories. A factory in Stanos Amphilochia and one in Thessaloniki.

Knauf's factory in Stanos, Amphilochia, Greece, covers 100 acres of land, of which 13 acres is building cover. In the same geographical area, it operates a gypsum quarry (180 acres) owned by the company. The factory operates on a 24-hour basis while a significant part of its production is exported to the Balkan countries, Eastern Mediterranean and North Africa. Knauf has a vertical production from the raw material, gypsum, a product of its own mining that is processed in its facilities into complete structural elements (gypsum, plasterboard) with maximum added value. Inspection of all raw materials is carried out daily by the well-equipped quality control department, before their use in the production lines.

Thessaloniki factory extends over 40 acres of land, of which 10 acres are covered by buildings. It has a state-of-the-art production line of ready-to-use surface treatment materials, a production line of final color coatings, and three lines of metal profiles and dry construction components.

At the Thessaloniki factory, a two-year investment plan of €5 million was completed in May 2021, which included the creation of one of the most modern logistics centers of the Knauf group. The investment takes full advantage of Thessaloniki's strategic position, gaining better access to raw materials and greater penetration in the Balkan and Mediterranean market, while contributing to the company's environmental upgrade. The transport distance of raw materials and finished products was reduced by 400 kilometers, thus reducing the energy footprint of the company's products, while a total of 30 new jobs were created.



#### Product Information

This is an average EPD for Ready-to-use finishing plaster products for interior use produced by Thessaloniki plant in Greece. The LCIA results of the LCA represents the weighted average product. There is no significant differentiation among the environmental performance of each product. The products included are:

- **Knauf Superfinish**
- Knauf Fill & Finish light
- **Knauf Finitura**
- Knauf Readyfix Roll & Spray
- Knauf F2F Filler to Finish



**Knauf Superfinish** is a ready-to-use plasterboard jointing and surface finishing material. Knauf superfinish is an ideal material for troweling after grouting joints (surface quality Q2) as well as for troweling entire surfaces (surface quality Q3 – Q4). It can also be used in interior applications for smoothing various backgrounds such as:

- plasterboard
- fiberboard
- plaster

#### **Properties**

- Ready-to-use material for immediate application
- It has unique processability
- It is laid on the surface with characteristic ease
- It provides surfaces of top flatness in the quality scale from Q2 – Q4
- It is very easy to sand with a machine and by hand with fine sandpaper
- It has great adhesive strength and adhesion



**Knauf Fill & Finish Light** is a light, ready-to-use, general-purpose filling and troweling material. Fill & Finish Light is used for:

- Jointing of AK ends with paper tape for quality level Q1
- Spatula of the joints for quality level Q2
- Plasterboard surface finishing for Q3 quality level

#### **Properties**

- Traditional plaster surface finish for Q3 quality level
- Filling and skim coating material
- Ready to use
- Light weight with great coverage
- For surfaces Q1 Q3
- 20 kg packaging







**Knauf Finitura** is a ready-to-use general-purpose finishing putty for interior spaces. It provides a very smooth finished surface and gives excellent workability with a long processing time. It ensures a perfect final result on backgrounds such as:

- Gypsum plaster
- Traditional plaster
- Plasterboard

#### **Properties**

- Ready-to-use material for immediate application
- It has unique processability
- Great coverage
- Low color absorbency
- It is ideal when a very smooth final surface is required.



**Knauf Readyfix Roll & Spray** is a ready-to-use grouting and plastering material. Knauf Readyfix is applied for internal use in:

- Concrete
- Plasterboard
- Fiberboard
- Cement based and Gypsum plasters substrates

#### **Properties**

- Special formulation for skimming surfaces with traditional plaster or concrete.
- It develops all its strengths after drying
- Rubs easily
- Perfect workability
- Can be applied with roller or airless
- Up to 4mm in one layer



**Knauf F2F** is a white ready-to-use grouting and finishing material. F2F is applied indoors for:

- Plasterboard grouting (surface Q1)
- For spatulating the joints (surface Q2)
- As skim coat on plasterboard constructions in order to achieve surface quality level Q3 & Q4.

#### **Properties**

- White color
- Rubs easily
- Spreads easily
- For surfaces Q1-Q4





### **▶** Content Declaration

Material	Percentage (%) by mass	Mass (kg) per declared unit			
Calcium carbonate	60-65	0,60-0,65			
Water	30-35	0,30-0,35			
Other minerals & additives	5-10	0,05-0,10			

# ▶ Packaging Materials

Packaging material	Mass (kg) per declared unit
Polypropylene backets	3,93E-02
Wooden pallets	2,62E-02
Stretch film	2,06E-04

No substance in the "Candidate List of Substances of Very High Concern (SVHC) for authorization" exceeds 0.1% wt in the final products.





#### System Boundaries

X= Included, MND= Module Not Declared																	
	Pro	duct sta	age		struction tage						End-of-life stage				Resource recovery stage		
	Raw Materials Supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction and demolition	Transport	Waste processing for reuse, recovery and/or recycling	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	А3	A4	A5	В1	В2	В3	B4	B5	В6	B <i>7</i>	C1	<b>C2</b>	СЗ	<b>C4</b>	D
Modules declared	X	X	x	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	х	X	X	х
Geography	GLO	GLO	GR										EU	EU	EU	EU	EU
Variation- products		<10%											-	-	-	-	-
Variation- sites	No	t relev	ant										-	-	-	-	-

# **A1: Raw Material Supply**

The production starts with the material supply. This stage includes the mining and processing of raw materials, the generation of electricity and fuels required for the manufacturing and the recycling process of secondary materials. For ready-to-use products, calcium carbonate and water are the main raw materials in the feed, following by some other additives such as clay, cellulose, perlite, vinyl acetate, acrylic copolymers other minor additives.

# A2: Transportation of raw materials to manufacturer

Transportation is relevant to delivery of raw materials from the supplier to the gate of manufacturing plant. Raw materials are transported by truck and vessels from different countries all over the world.

# **A3: Manufacturing**

Manufacturing of plaster products includes the introduction and homogenization of solid raw materials (blending) in a solid mixer and then the mixing with water in a liquid mixer. Finally, the products are packaged in polypropylene buckets.



#### C1: De-construction, demolition

The deconstruction and demolition of the product takes place with the demolition of the whole building. It is assumed that energy for the plaster is minor compared to the other materials of the building, thus the environmental impact of this module is set to be zero.

#### **C2: Transportation of waste**

A distance of 100 km by lorry 16-32 tonnes from construction/demolition sites to disposal sites has been chosen as a conservative assumption.

#### C3: Waste processing for reuse, recovery and/or recycling

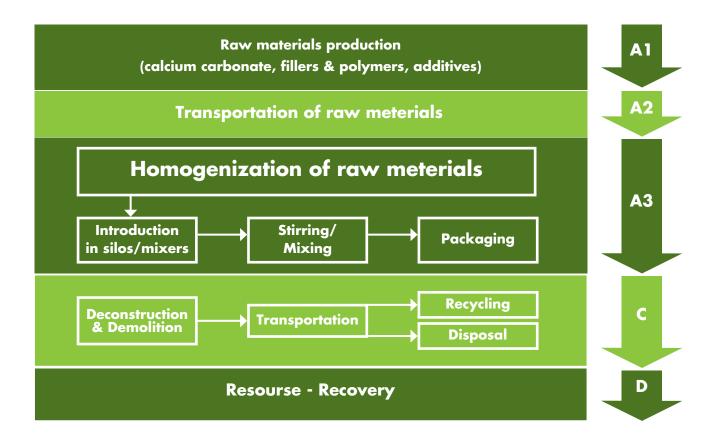
It is assumed that plaster products will be 100% landfilled after its life cycle, thus the environmental impact of this module is set to be zero.

#### C4: Disposal

As it is mentioned above, plaster products will be 100% landfilled after its life cycle.

D: Reuse-Recovery-Recycling potential

Since the product is 100% landfilled, the benefits and loads resulting from reuse and recycling is zero.







#### LCA Information

**Declared unit:** The declared unit is 1 kg of plaster products. The composition of each product of the category slightly differs in raw materials that have a very low mass contribution. These differentiations lead to a maximum difference in environmental indicators less than 10%.

**Goal and Scope:** This EPD evaluates the environmental impacts of the production of 1 kg of plaster products from Cradle to gate with module C1-C4 and D.

**System Boundary:** The system boundaries are set to be cradle to gate (A1-A3) with modules C+D. Cut-off rules: The cut-off criteria adopted is as stated in "EN 15804:2012+A2:2019". Where there is insufficient data for a unit process, the cut-off criteria are 1% of the total mass of input of that process. The total of neglected input flows per module is a maximum of 5% of energy usage and mass. The cut-off rule was used in some defoaming agents (Agitan 480), biocidal products (Acticide SR) & preservatives (Mergal 721), wastes generated in the manufacturing process, such as nylon films and IBC tanks and metal handles in packaging materials. Total mass is approximately 0,5%.

**Allocations:** Wherever possible, allocation was avoided by dividing the unit process to be allocated into two or more sub-processes and collecting the input and output data related to these sub-processes. Where allocation cannot be avoided, the inputs and outputs of the system were partitioned between its different products or functions in a way that reflects the underlying physical or economic relationships between them. In this case, the allocation concerns the electricity for lighting and the diesel consumption for other general utilities in the manufacturing plant and it is based on the mass of the final products.

#### **Assumptions:**

Transportation: In modules A2 and C2, a EURO5 lorry 16-32 metric ton was utilized for road transportation and a bulk carrier for dry goods for sea transportation.

Module C1: It is assumed that energy for plaster demolition is minor compared to the other materials of the building, thus the environmental impact of this module is set to be zero.

Module C2: A conservative assumption of 100 km by lorry 16-32 metric ton was used.

Module C3 - Module C4: There is no provision for plaster waste reuse/recycling and it is 100% landfilled.

**Data quality:** ISO 14044 was applied in terms of data collection and quality requirements. The impact of the production of raw materials recovered from Ecoinvent database v.3.8. The data concerning the modules A2 (Transportation) and A3 (Product manufacturing) were provided by Knauf and they were extracted from the company's SAP system, production files and invoices. Regarding electricity mix, the latest (2021) national residual electricity mix as published in DAPEEP SA was utilized. The emission factor for natural gas is provided from National Inventory Report of 2021 for Greece. The end-of-life are based on the most representative scenarios for this product. Background data for these stages are retrieved from Ecoinvent v.3.8.

Geographical Scope: Worldwide

**Time representativeness:** Data obtained refers to the year 2021.

Software used: OpenLCA v.1.10.3





## **► Environmental Performance**

ENVIRONMENTAL IMPACTS	Unit	A1-A3	C1	C2	С3	<b>C4</b>	D
GWP-total	kg CO2 eq	3,90E-01	0,00E+00	1,66E-02	0,00E+00	1,18E-02	0,00E+00
GWP-fossil	kg CO2 eq	3,79E-01	0,00E+00	1,66E-02	0,00E+00	1,17E-02	0,00E+00
GWP-biogenic	kg CO2 eq	1,00E-02	0,00E+00	5,86E-06	0,00E+00	1,89E-05	0,00E+00
GWP-luluc	kg CO2 eq	2,44E-04	0,00E+00	6,53E-06	0,00E+00	4,49E-05	0,00E+00
GWP-GHG	kg CO2 eq	3,73E-01	0,00E+00	1,65E-02	0,00E+00	1,16E-02	0,00E+00
ODP	kg CFC-11 eq	3,64E-08	0,00E+00	3,85E-09	0,00E+00	2,78E-09	0,00E+00
АР	mol H+ eq	1,96E-03	0,00E+00	6,75E-05	0,00E+00	8,38E-05	0,00E+00
EP-freshwater	kg P eq	9,22E-05	0,00E+00	1,07E-06	0,00E+00	1,97E-06	0,00E+00
EP-marine	kg N eq	3,61E-04	0,00E+00	2,03E-05	0,00E+00	2,87E-05	0,00E+00
EP-terrestrial	mol N eq	3,94E-03	0,00E+00	2,22E-04	0,00E+00	3,11E-04	0,00E+00
POCP	kg NMVOC eq	1,38E-03	0,00E+00	6,80E-05	0,00E+00	8,90E-05	0,00E+00
ADPe	kg Sb eq	9,23E-06	0,00E+00	5,78E-08	0,00E+00	3,95E-08	0,00E+00
ADPf	WJ	7,64E+00	0,00E+00	2,51E-01	0,00E+00	2,18E-01	0,00E+00
WDP	m3 eq	1,89E-01	0,00E+00	1,20E-03	0,00E+00	6,09E-03	0,00E+00

Environmental impacts per  $1\ kg$  of plaster products for interior use

<sup>&</sup>lt;sup>2</sup> The results of these environmental impact indicators shall be used with care as the uncertainties of these results are high or as there is limited experienced with the indicator.

RESOURCE USE	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	1,29E+00	0,00E+00	3,54E-03	0,00E+00	5,47E-03	0,00E+00
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	WJ	1,29E+00	0,00E+00	3,54E-03	0,00E+00	5,47E-03	0,00E+00
PENRE	MJ	7,64E+00	0,00E+00	2,51E-01	0,00E+00	2,18E-01	0,00E+00
PENRM	WJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	WJ	7,64E+00	0,00E+00	2,51E-01	0,00E+00	2,18E-01	0,00E+00
SM	kg	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
NRSF	WJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	4,40E-03	0,00E+00	2,80E-05	0,00E+00	1,42E-04	0,00E+00

Resource use per  $1\ kg$  of plaster products for interior use



<sup>&</sup>lt;sup>1</sup> GWP-GHG indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide emissions and uptake and biogenic carbon stored in the product, with characterization factors (CFs) based on IPCC (2013).

# ENVIRONMENTAL PRODUCT DECLARATION OF KNAUF READY-TO-USE FINISHING PLASTER PRODUCTS FOR INTERIOR USE



OUTPUT FLOWS AND WASTE CATEGORIES	Unit	A1-A3	C1	C2	сз	C4	D
HWD	kg	6,97E-06	0,00E+00	6,56E-07	0,00E+00	4,14E-07	0,00E+00
NHWD	kg	4,77E-02	0,00E+00	1,29E-02	0,00E+00	6,51E-01	0,00E+00
RWD	kg	1,26E-05	0,00E+00	1,70E-06	0,00E+00	1,33E-06	0,00E+00
CRU	kg	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
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	WJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output flows and waste categories per 1 kg of plaster products for interior use

ADDITIONAL IMPACTS	Unit	A1-A3	C1	C2	C3	C4	D
PM	Disease incidence	1,30E-08	0,00E+00	1,16E-09	0,00E+00	5,37E-09	0,00E+00
IRP	kBq U235 eq	3,10E-02	0,00E+00	1,29E-03	0,00E+00	1,14E-03	0,00E+00
ETP-FW	CTUe	1,56E+01	0,00E+00	1,89E-01	0,00E+00	1,79E-01	0,00E+00
НТР-с	CTUh	3,38E-10	0,00E+00	6,33E-12	0,00E+00	6,38E-12	0,00E+00
HTP-nc	CTUh	9,59E-09	0,00E+00	2,06E-10	0,00E+00	1,54E-10	0,00E+00
SQP	dimensionless	6,25E+00	0,00E+00	1,69E-01	0,00E+00	2,31E-01	0,00E+00

Additional impacts per 1 kg of plaster products for interior use



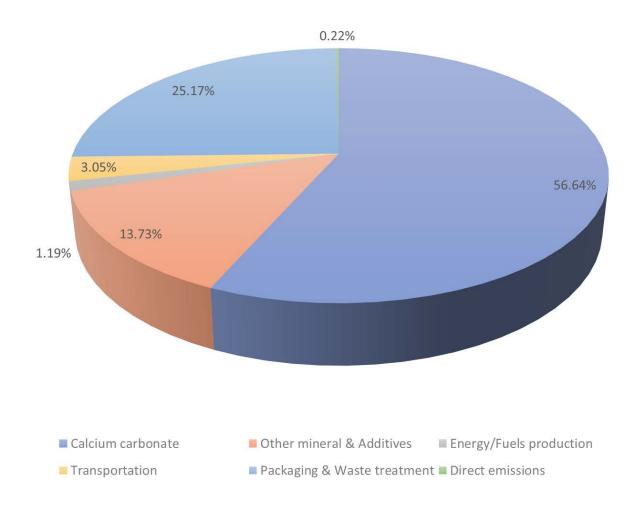
<sup>&</sup>lt;sup>3</sup> Ionizing radiation potential (IRP) impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.



# **▶** Interpretation

As it is presented below, emissions from calcium carbonate production have the most important contribution in GWP indicator, accounting for 56,64%. Packaging and waste treatment contribute 25,17%, while production of other minerals and additives account for 13,73% of the total emissions. Transportation of raw materials and production of energy and fuels for the manufacturing stage attribute 3,05% and 1,19% respectively. Finally, direct emissions from fuels combustion do not contribute to a high level (only 0,22%).

#### Contribution in GWP indicator



### ► Additional information

The EPD does not give information on release of dangerous substances to soil, water and indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available.





# Programme related information









**Programme** 

Website

The international EPD System www.environdec.com

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Accountabilities for PCR, LCA and third-party verification Product Category Rules (PCR)

ISO standard ISO 21930 and CEN standard EN 15804 serve as the core Product Category Rules (PCR)

#### **Product Category Rules (PCR):**

PCR 2019:14 Construction products, version 1.2.5

PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact

#### **Life Cycle Assessment (LCA)**



LCA Accountability: ENVIROMETRICS S.A. 3 Kodrou str., 152 32, Athens, Greece

email: info@envirometrics.gr www.envirometrics.gr

# Owner of the EPD



KNAUF GYPSOPOIIA A.V.E.E Headquarters: 10 Evripidou st., Kallithea, Athens

Factory: Agrotemachio 592, PO Box 136 Nea Magnisia, Thessaloniki

email: knauf@knauf.gr www.knauf.gr

#### Third party verification

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

X EPD verification by accredited certification body Third party verification: Business Quality Verification P.C



5, Konitsis Street, Marousi Attica, GR 15125

email: info@bqv.gr www.bav.gr

BQV is an approved certification body accountable for third-party verification The certification body is accredited by: Hellenic Accreditation System SA (E.S.Y.D), Accreditation No. 1218 Procedure for follow-up during EPD validity involves third party verifier









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

EPDs within the same product category but registered in different EPD programmes 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 characterization factors); have equivalent content declarations; and be valid at the time of comparison.

#### References

General Programme Instructions of the International EPD® System. Version 4.0, 2021-03-29

PCR 2019:14 v.1.2.5 Construction products. EPD System. Date 2022-11-01

EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works -

Environmental Product Declarations — Core rules for the product category of construction products

ISO 14020:2000 Environmental labels and declarations — General principles

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

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

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

**Ecoinvent / Ecoinvent Centre**, www.Ecoinvent.org

**Residual Energy Mix 2021** from Renewable Energy Sources Operator & Guarantees of Origin (DAPEEP SA)





#### List of abbreviations

Life Cycle assessment

**EPD** Environmental Product Declaration

PCR Product category rules

GLO Global Europe

**RoW** Rest of the world

GWP-total
GWP-fossil
GWP-biogenic
Global Warming Potential total
Global Warming Potential fossil
Global Warming Potential biogenic

**GWP-Iuluc** Global Warming Potential land use and land use change

ODP Ozone Depletion Potential
AP Acidification Potential

**EP-freshwater EP-marine**Eutrophication potential, fraction of nutrients reaching freshwater end compartment
Eutrophication Potential fraction of nutrients reaching marine end compartment

**EP- terrestrial** Eutrophication potential, Accumulated Exceedance

**POCP** Formation potential of tropospheric ozone photochemical oxidants

ADPe Abiotic depletion potential for non-fossil resources
ADPf Abiotic depletion potential for fossil resources

WDP Water use

PERE Use of renewable primary energy excluding 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 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

NRSF Use of renewable secondary fuels
Use of non-renewable secondary fuels

FW
HWD
Use of net fresh water
Hazardous waste disposed
Non-hazardous waste disposed
RWD
Radioactive waste disposed
CRU
Components for re-use
MFR
Materials for recycling

MER Materials for energy recovery

**EE** Exported Energy

PM Particulate matter emissions
IRP lonizing radiation, human health

ETP-FWEcotoxicity, freshwaterHTP-cHuman toxicity, cancerHTP-ncHuman toxicity, non-cancer

SQP Land use related impacts/Soil quality









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