

Environmental Product Declaration

Zeolite Supplementary Cementitious Material

Belter Tech and KMI Zeolite

In accordance with ISO 14025 and ISO 21930:2017

Production Facility
Amargosa Valley, NV

Declared Unit = 1 metric tonne

≡ **GLOBAL WARMING POTENTIAL** **76.2** kg CO₂-Eq
Total greenhouse gas emissions from cradle to gate (A1-A3)

☁ **ACID RAIN** **0.53** kg SO₂-Eq
Airborne emissions that enter the atmosphere and transform into acids.

⚙ **ALGAE BLOOM** **0.32** kg N-Eq
Chemicals leaching into aquatic ecosystems.

☁ **SMOG** **15.4** kg O₃-Eq
Harmful low-level ozone created from volatile organic compounds (VOCs)

≡ **OZONE THINNING** **1.2e-6** kg CFC-11-Eq
Ozone thinning caused by human-made chemicals entering the stratosphere.

SmartEPD-2025-061-0439-01.1



Expiration Date

Last Updated

EPD Program Name: **SmartEPD**

May 07, 2025

Refer to the EPD Library at www.smartepd.com for the latest EPD listing information.



General Information

Belter Tech

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Product Name:	Zeolite Supplementary Cementitious Material (SCM)
Declared Unit:	1 metric tonne density = 2.3g/cm3
Declaration Number:	SmartEPD-2025-061-0439-01.1
Date of Issue:	April 15, 2025
Expiration:	April 15, 2030
Last updated:	May 07, 2025
EPD Scope:	Cradle to gate A1 - A3

Market(s) of Applicability:

General Organization Information

Belter Tech is a company focused on sustainable construction solutions, developing and manufacturing building materials from recycled and post-industrial waste. Belter Tech has partnered with KMI Zeolite, a company that mines, mills, and distributes clinoptilolite zeolite in Amargosa Valley, Nevada, to manufacture a Zeolite Supplementary Cementitious Material (SCM).

Further information can be found at: <https://www.kmizeolite.com/concrete> and <https://beltertech.com/>

Limitations, Liability and Ownership

The environmental impact results of Zeolite SCM in this document are based on a declared unit and therefore do not provide sufficient information to establish comparisons. The results shall not be used for comparisons without knowledge of how the physical properties of the Zeolite SCM impact the precise function at the construction level. The environmental impact results shall be converted to a functional unit basis before any comparison is attempted. See Section 3.10 for additional EPD comparability guidelines. Environmental declarations from different programs (ISO 14025) may not be comparable.

Reference Standards

Standard(s):	ISO 14025 and ISO 21930:2017, opt. EN 15804+A2
Core PCR:	Smart EPD® Part A Product Category Rules for Building and Construction Products and Services, 1000, v1.2 v.1.2 Date of issue: March 14, 2025
Sub-category PCR:	Smart EPD® Part B PCR for Supplementary Cementitious Materials, 1000-002, v1.0 Date of issue: May 07, 2024 Valid until: May 07, 2029

Sub-category PCR review panel:

 Contact Smart EPD for more information.

General Program Instructions:

 Smart EPD General Program Instructions v.2.0, March 2025

Verification Information

LCA Author/Creator:

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Verification:

Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071:

 Lucas Pedro Berman |  Senda - Consultoria Ambiental & Energetica

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External

Independent external verification of EPD, according to ISO 14025 and reference PCR(s):

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External

Product Information

Declared Unit:

1 metric tonne density = 2.3g/cm³

Mass:

1000 kg

Product Specificity:

 Product Average

 Product Specific

Product Description

Zeolite Supplementary Cementitious Material (SCM) is a natural zeolite and pozzolanic material used as a substitute for portland cement in concrete mixtures. This Zeolite SCM is composed entirely of Clinoptilolite Zeolite [(Na4K4)(Al8Si40O96).24H2O], a common natural sedimentary zeolite in the western US.

Further information can be found at: <https://www.kmizeolite.com>

Product Specifications

Product Classification Codes:

UNSPSC - 30111500

EC3 - ManufacturingInputs -> CementitiousMaterials ->
SupplementaryCementitiousMaterials

SCM class:	Natural Pozzolans (ASTM C618, AASHTO M 295, CSA A3001, CSA A3002, NMX-C-618)
Natural Pozzolan sub-categories:	Raw natural pozzolan
Relative Density:	2300 m2/kg
Options:	✗ Manufactured SCM (per PCR definition)

Material Composition

Material/Component Category	Origin	% Mass
Clinoptilolite Zeolite	US	100

Packaging Material	Origin	kg Mass
Paper Packaging	US-TX	4.5
Wood Pallets	US-CA	12.3
Plastic Packaging	US-OH, US-TN	2.3

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specifity

Primary Data Year:	2024
Manufacturing Specificity:	✗ Industry Average
	✗ Manufacturer Average
	✓ Facility Specific

Averaging:
Averaging was not conducted for this EPD.

System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	ND
	A5	Assembly / Install	ND

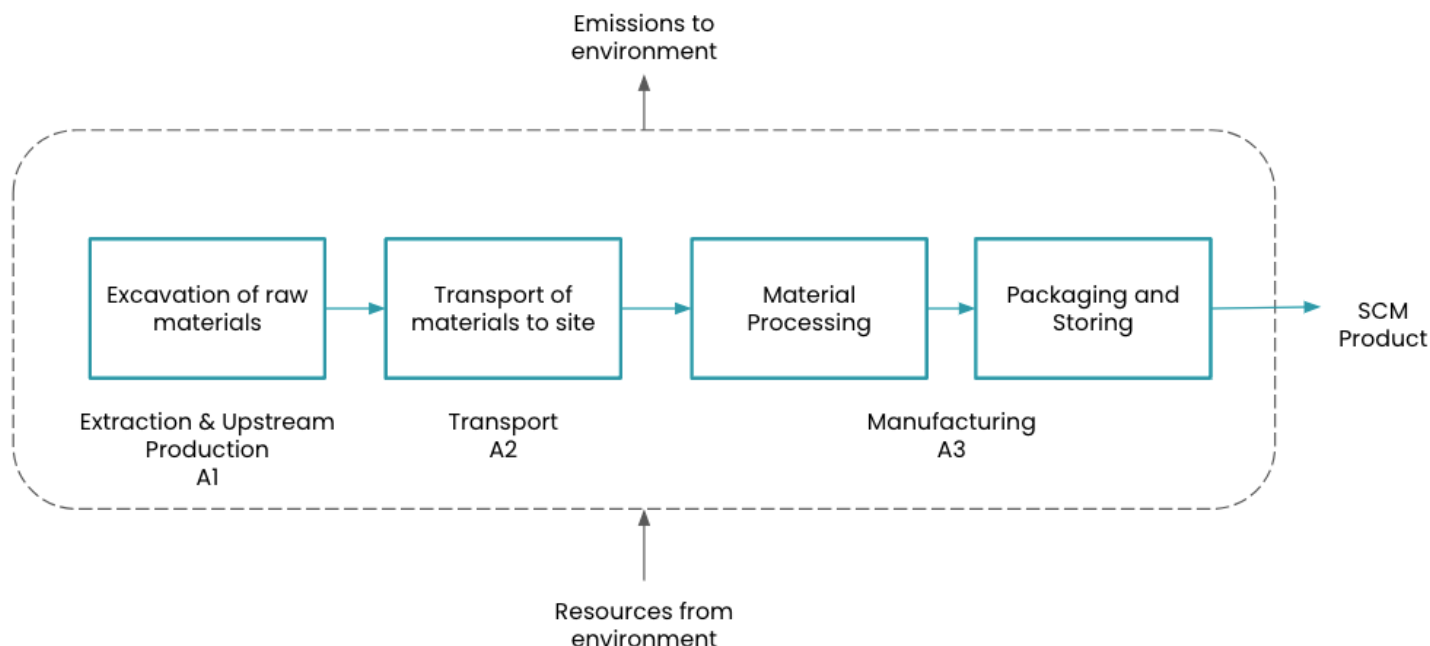
Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND
End of Life	C1	Deconstruction	ND
	C2	Transport	ND
	C3	Waste Processing	ND
	C4	Disposal	ND
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	ND

Note:
ND = Module not declared

Plants

 KMI Zeolite 5390 Nye County Rd #266, Amargosa Valley, NV, USA

Product Flow Diagram



Software And Database

LCA Software:

Pathways Software v. 1.0

LCI Foreground Database(s):

LCI Background Database(s):

Ecoinvent v. 3.10 | US LCI v. FY21.Q3.01

A foreground LCI database is the database used to model the primary, site-specific data collected for this EPD. A background LCI database is the database used to model generic or non-specific data.

Data Quality

The key requirement for data quality is that data be as accurate and representative as possible. The requirements are based on the ISO 14040:2006 and ISO 14044:2006 standard. To fulfill these requirements and to ensure reliable results, primary data in combination with representative, secondary literature, and consistent background life cycle inventory (LCI) information from Ecoinvent version 3.10 (Wernet, et al., 2016) and other sources were used.

Life Cycle Module Description

After the Clinoptilolite Zeolite is transported from an offsite mine to the KMI Zeolite manufacturing facility, the zeolite goes through a series of processing steps, including crushing, screening, and dust collection. The final Zeolite SCM product is then packaged and sold.

LCA Discussion

Allocation Procedure

Allocation was performed following the hierarchy outlined in ISO 14044:2006 and SmartEPD SCM PCR. The primary allocation method was mass-based allocation, distributing environmental burdens among Zeolite SCM, granular material, stockpile powder, and baghouse dust based on production output ratios. When feasible, direct assignment of energy and material flows to specific unit processes was prioritized to minimize allocation uncertainties.

Sensitivity analysis of allocation approaches was considered, and mass allocation was determined to be the most appropriate due to the relative market values of the co-products.

Cut-off Procedure

The system boundary follows a cradle-to-gate approach, encompassing A1 (Raw Material Extraction & Processing), A2 (Transport), and A3 (Manufacturing) per ISO 21930:2017. Consistent with SmartEPD SCM PCR, the cut-off rule of 1% of total mass, energy, or environmental significance per unit process was applied, with a cumulative cut-off threshold of 5% of overall impact.

All known and material flows were included. Proxy data were used where primary data were unavailable, following data quality requirements outlined in ISO 14044:2006. No known flows were excluded, ensuring completeness of material and energy inputs.

Renewable Electricity

Energy Attribute Certificates (EACs) such as
Renewable Energy Certificates (RECs) or Power
Purchase Agreements (PPAs) are included in the
baseline reported results: ✗ No

Results

Environmental Impact Assessment Results

IPCC AR6 GWP 100, TRACI 2.1

per 1 metric tonne of product density = 2.3g/cm³.

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Impact Category	Method	Indicator	A1	A2	A3	A1 - A3
GWP-total	IPCC AR6 GWP 100	ND	1.93e+1	1.04e+1	4.65e+1	7.62e+1
ODP	TRACI 2.1	ND	3.66e-7	1.58e-7	7.02e-7	1.23e-6
AP	TRACI 2.1	ND	1.50e-1	4.00e-2	3.40e-1	5.30e-1
EP	TRACI 2.1	ND	2.10e-1	3.00e-2	7.00e-2	3.20e-1
POCP	TRACI 2.1	ND	3.08e+0	1.31e+0	1.11e+1	1.54e+1
HTP-c	TRACI 2.1	ND	7.46e-6	1.61e-8	9.25e-6	1.67e-5
HTP-nc	TRACI 2.1	ND	5.11e-6	6.45e-8	2.92e-6	8.09e-6
ETP-fw	TRACI 2.1	ND	3.08e+2	1.61e+0	2.51e+2	5.61e+2
PM	TRACI 2.1	ND	9.00e-2	1.23e-3	6.00e-2	1.50e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Resource Use Indicator

per 1 metric tonne of product density = 2.3g/cm³.

Indicator	Unit	A1	A2	A3	A1 - A3
PERE	MJ	ND	ND	ND	ND
PERM	MJ	ND	ND	ND	ND
PERT	MJ	ND	ND	ND	ND
PENRE	MJ	ND	ND	ND	ND
PENRM	MJ	ND	ND	ND	ND
PENRT	MJ	ND	ND	ND	ND
RPRE	MJ	5.11e+2	-2.50e-14	3.32e+1	5.44e+2
RPRM	MJ	2.17e+2	ND	ND	2.17e+2
RPRT	MJ	ND	ND	ND	ND
NRPRE	MJ	3.44e+2	-2.28e-13	6.24e+2	9.68e+2
NRPRM	MJ	8.66e+1	ND	ND	8.66e+1
NRPRT	MJ	ND	ND	ND	ND
ADP-fossil	MJ	ND	ND	ND	ND
SM	kg	5.20e-1	ND	2.40e-1	7.60e-1
RSF	MJ	4.07e+0	ND	6.60e-4	4.07e+0
NRSF	MJ	ND	ND	4.49e+4	4.49e+4
FW	m ³	2.00e+3	ND	8.00e-2	2.00e+3
RE	MJ	1.20e-1	ND	9.00e-2	2.10e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Waste and Output Flow Indicators

per 1 metric tonne of product density = 2.3g/cm3.

Indicator	Unit	A1	A2	A3	A1 - A3
HWD	kg	1.54e+0	ND	8.90e-1	2.44e+0
NHWD	kg	4.96e+1	ND	3.19e+1	8.15e+1
RWD	kg	ND	ND	ND	ND
HLRW	kg	5.41e-5	ND	6.41e-5	1.18e-4
ILLRW	kg	1.25e-4	ND	2.34e-4	3.59e-4
CRU	kg	0	0	0	0
MFR	kg	2.00e-2	ND	5.04e-3	2.00e-2
MER	kg	6.68e-4	ND	1.17e-5	6.79e-4
MNER	kg	ND	ND	ND	ND
EEE	MJ	6.00e-2	ND	7.00e-2	1.30e-1
EET	MJ	ND	ND	ND	ND

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

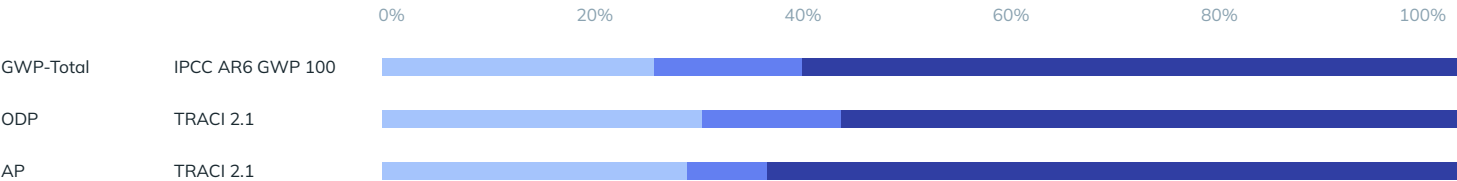
Interpretation

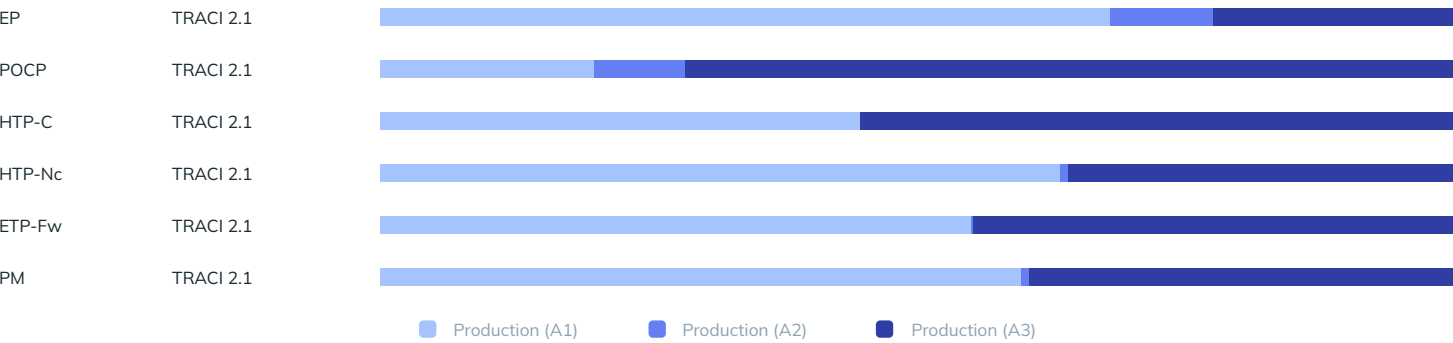
The LCA results demonstrate that the manufacturing stage (A3) is the dominant contributor across impact categories, particularly for global warming potential (GWP), accounting for more than 60% of total emissions, primarily due to diesel combustion in mining and processing. Raw material extraction (A1) contributes between 20-30% of GWP. Transportation (A2) represents contributes <15%, as the facility is located in proximity to key supply sources.

The results should not be used for direct comparisons with other Zeolite SCM products, as variations in system boundaries, allocation methods, and regional electricity grids can significantly influence impact outcomes. However, the study provides a reliable cradle-to-gate environmental profile that can inform decision-making within the defined boundaries.

The environmental impact results of products in this document are based on a declared unit and therefore do not provide sufficient information to establish comparisons. The results shall not be used for comparisons without knowledge of how the physical properties of the product impact the precise function at the construction level. The environmental impact results shall be converted to a functional unit basis before any comparison is attempted.

A manufacturer shall not make claims based on an industry-average EPD which leads the market to believe the industry-average is representative of manufacturer-specific or product-specific results.





References

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- ISO. (2006b). *14044:2006/Amd.1:2017/Amd.2:2020 – Environmental management — Life cycle assessment — Requirements and guidelines*. Geneva: International Organization for Standardization.
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- Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., & Weidema, B. (2016). The ecoinvent database version 3 (part I): overview and methodology. *The International Journal of Life Cycle Assessment*, 1218-1230.