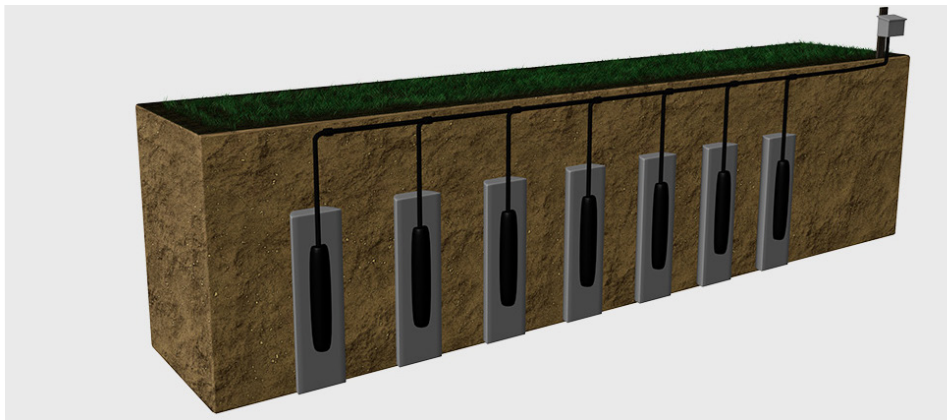


PRODUCT SPECIFICATION RESOURCE

Contains specifications and test reports for ConduCrete CP manufactured by SAE Inc.

ConduCrete CP is manufactured to comply with NSF / ANSI / CAN 60: Drinking Water Treatment Chemicals - Health Effects, and as such is a reliable and safe low permeability conductive compound that prevents aquifer contamination and provides a low resistance, high performance solution for cathodic protection system



CONDU
 **CRETE** CP

saeinc.com
1 877 234 2502 | 705 733 3307
info@saeinc.com





ConduCrete CP Technical Data Sheet

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ConduCrete CP Permeability Testing Results

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Electrical Resistivity Evaluation of
ConduCrete CP Under Applied Loads

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ConduCrete CP SDS

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ConduCrete CP Technical Specifications

Physical Properties

Property	Typical Value		Unit	Test Method
Dry Density (Powder)	1159 1.159 72.40		kg/m ³ g/cm ³ lb/ft ³	SAE Inc. Standard 106 (dependent on compaction)
Wet Density (Hardened State)	1475 1.475 92.08		kg/m ³ g/cm ³ lb/ft ³	SAE Inc. Standard 106
Slurry Density	kg/m ³	g/cm ³	lbs/ft ³	
3.5 US gallons per 55 lb bag	1573	1.573	98.10	SAE Inc. Standard 106
Dry Volume (Powder)	m ³		ft ³	
55 lb bag	0.022		0.778	SAE Inc. Standard 106 (dependant on compaction)
Slurry Volume	m ³		ft ³	
3.5 US gallons per 55 lb bag	0.025		0.868	SAE Inc. Standard 106
Water Permeability	1.46 x 10 ⁻⁶		cm/sec	ASTM D5084 (2.6 psi)
Electrical Corrosion Resistance			%	SAE Inc. Standard 100
Copper	95-100			
Steel	95-100			
Galvanized Steel	95-100			
Compatibility				SAE Inc. Standard 100
Copper	Yes			
Steel	Yes			
Galvanized Steel	Yes			
Environmental Impact	Neutral			Ontario Regulation 558/00 (Leachate Testing) and NSF / ANSI / CAN 60
Carbon Consumption Rate	0.5		kg/ amp-year	SAE Inc. Standard 111

Property	Typical Value	Unit	Test Method
Physical State (Uncured)	Grey Powder		
Physical State (Cured)	Grey Solid		
Odor	None		
Working Time	Approx 30-60	minutes	
Setting Time	24	hours	
Cure Time	28	days	

Electrical Properties

Property	Typical Value	Unit	Test Method
Resistivity	< 1.0	$\Omega \cdot \text{cm}$	Modified ASTM G187-05
Conductivity	> 1.0	S/cm	Modified ASTM G187-05

NSF / ANSI / CAN 60

ConduCrete meets NSF / ANSI / CAN 60: Drinking Water Treatment Chemicals - Health Effects.

<http://info.nsf.org/Certified/PwsChemicals/Listings.asp?Company=C0169859&>

Leachate (TCLP) and NSF / ANSI / CAN 60 Results

Leachate Data (TCLP Procedure) based on Ontario Regulation 558/00. ConduCrete CP was tested to NSF / ANSI / CAN 60, section 8 for backfill applications.

Constituent	ConduCrete CP TCLP Concentration (mg/L)	USEPA Maximum Contaminant Level (mg/L)	ConduCrete CP NSF 60 Concentration (mg/L)	NSF 60 Acceptance Criteria (mg/L)
Arsenic	BDL	0.010	BDL	0.001
Barium	0.384	2.000	0.000089	0.200
Boron	0.158	2.000*		
Cadmium	BDL	0.005	BDL	0.0005
Lead	BDL	0.015	BDL	0.0005
Mercury	BDL	0.002	BDL	0.0002
Selenium	BDL	0.50	BDL	0.005
Silver	BDL	0.100**	BDL	

Constituent	ConduCrete CP TCLP Concentration (mg/L)	USEPA Maximum Contaminant Level (mg/L)	ConduCrete CP NSF 60 Concentration (mg/L)	NSF 60 Acceptance Criteria (mg/L)
Uranium	BDL	0.030	BDL	
Fluoride	BDL	2.000**		
Nitrate (as Nitrogen)	BDL	10.000		
Nitrite (as Nitrogen)	BDL	1.000		
Free Cyanide	BDL	0.200		

BDL means the result is "Below the Detection Level" of the analytical procedure

* No MCL established; value shown is USEPA's Lifetime Drinking Water Health Advisory

** No MCL established; value shown is USEPA's Secondary Drinking Water Standard

Soil Analysis Results

Determination of Anions in Soil Procedure was based on SW846-9056A and Determination of Free Cyanide in Soil was based on EPA OIA-1677.

Constituent	ConduCrete CP Concentration (µg/g)
Fluoride	BDL
Nitrate (as Nitrogen)	BDL
Nitrite (as Nitrogen)	BDL
Free Cyanide	BDL

BDL means the result is "Below the Detection Level" of the analytical procedure

The recommended mixing ratio for ConduCrete CP is 3.5 US gallons of water per 55 lb bag of ConduCrete CP.

Published Date: September 2022

ConduCrete CP Permeability Testing

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084 | Constant Volume

Sample Name	ConduCrete CP
Type	Tube
Permeant Fluid	De-aired distilled water
Orientation	Vertical
Sample Preparation	Extruded from cylinder mold and placed into permeameter at as received density and moisture content
Assumed Specific Gravity	1.75

Parameter	Initial	Final	Unit
Height	5.50	5.50	inches
Diameter	3.98	3.98	inches
Area	12.44	12.44	inches ²
Volume	68.05	68.05	inches ³
Mass	1703	1768	grams
Bulk Density	92.4	96.95	pcf
Moisture Content	22.8	29.2	%
Dry Density	75.2	75.2	pcf
Degree of Saturation	76	96	%

B Coefficient Determination

Cell Pressure, psi	90.02	Increased Cell Pressure, psi	95.03	Cell Pressure Increment, psi	5.01
Sample Pressure, psi	87.34	Corresponding Sample Pressure, psi	91.84	Sample Pressure Increment, psi	4.49
				B Coefficient	0.90

B value did not increase with increase in pressure. Final degree of saturation > 95%.

Flow Data

Date	Trial #	Pressure, psi		Manometer Readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R _t	Permeability K, @ 20°C, cm/sec
		Cell	Sample	Z ₁	Z ₂	Z ₁ -Z ₂						
Apr 4 2019	1	90.0	87.3	10.0	8.95	1.05	35	10.55	1.5E-06	19.5	1.013	1.5E-06
Apr 4 2019	2	90.0	87.3	10.0	8.95	1.05	33	10.55	1.4E-06	19.5	1.013	1.5E-06
Apr 4 2019	3	90.0	87.3	10.0	8.95	1.05	36	10.55	1.4E-06	19.5	1.013	1.5E-06
Apr 4 2019	4	90.0	87.3	10.0	8.95	1.05	34	10.55	1.4E-06	19.5	1.013	1.5E-06

PERMEABILITY AT 20° C: 1.46×10^{-6} cm/sec (@ 2.6 psi effective stress)

These results are the summary of results generated from testing conducted by GeoTesting Express located in Acton, MA. Testing was performed from March 2018 to April 2019.

Published Date: April 2022

ConduCrete Leachate Data

ConduCrete is a mixture of Portland cement and powdered carbon and contains no aggregates. Portland cement is a common ingredient in borehole grouts, and powdered carbon presents no environmental concerns. SAE Inc. has received NSF/ANSI Standard 60: Drinking Water Treatment Chemicals – Health Effects certification¹ for ConduCrete indicating that this product has been certified to be safe for use in drinking water wells. A table of toxicity characteristic leaching procedure (TCLP) results for ConduCrete is below. TCLP is a soil sample extraction method for chemical analysis employed as an analytical method to simulate leaching through a landfill. Because the testing methodology is used to determine if a waste is characteristically hazardous, similar conditions are not expected in a typical groundwater environment, and the results would overestimate the amount of leaching that would occur.

The TCLP results are compared to the Maximum Contaminant Level (MCL) established by the U.S. Environmental Protection Agency (USEPA) for each constituent in the table below. The MCL is the highest level of a contaminant that is allowed in drinking water. For those constituents detected in the leachate, none exceeded USEPA regulatory standards for drinking water. Certification to NSF/ANSI Standard 60 ensures that ConduCrete meets USEPA drinking requirements. Additionally, because of TCLP conditions, these constituents would not be expected to present a risk for migration in a typical groundwater environment.

Constituent	ConduCrete TCLP Concentration (mg/L)	USEPA Maximum Contaminant Level (mg/L)
Arsenic	BDL	0.010
Barium	0.384	2.000
Boron	0.158	2.000*
Cadmium	BDL	0.005
Lead	BDL	0.015
Mercury	BDL	0.002
Selenium	BDL	0.050
Silver	BDL	0.100**
Uranium	BDL	0.030

Constituent	ConduCrete TCLP Concentration (mg/L)	USEPA Maximum Contaminant Level (mg/L)
Fluoride	BDL	2.000**
Nitrate (as Nitrogen)	BDL	10.000
Nitrite (as Nitrogen)	BDL	1.000
Free Cyanide	BDL	0.200

BDL means the result is "Below the Detection Level" of the analytical procedure

* No MCL established; value shown is USEPA's Lifetime Drinking Water Health Advisory

** No MCL established; value shown is USEPA's Secondary Drinking Water Standard

¹ Certification available at: <http://info.nsf.org/Certified/PwsChemicals/Listings.asp?Company=C0169859&Standard=060>

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Report Data Reviewed and APPROVED by



Rylan Boyd, P.Eng. | Engineering Manager | SAE Inc

saeinc.com

1 877 234 2502 | 705 733 3307
info@saeinc.com

Electrical Resistivity Evaluation of ConduCrete CP under Applied Loads

1. INTRODUCTION

- 1.1 This test method is based on the standard test method ASTM G187-05 "Standard Test Method for Measurement of Soil Resistivity Using the Two-Electrode Soil Box Method", with modifications specified in this document to provide information about ConduCrete CP under load conditions.
- 1.2 The test procedure involves the measurement of the electrical resistance of the powder material through a loading fixture which was designed by SAE Inc. for testing purposes.

2. EQUIPMENT REQUIRED

- 2.1 Loading fixture: consists of a top portion and a bottom portion, both being cylindrical columns having flat faces which are perpendicular to the axis of load application. The faces of the columns are held inside a snugly fitting transparent plastic sleeve to contain the powder during application of the load and lowering of the upper platen.
- 2.2 Programmable DC power supply: for measurement of the resistance of the sample and fixture
- 2.3 Twelve-ton Hydraulic Shop Press

3. TEST SETUP

- 3.1 The fixture column has a diameter of 47.61 mm (1.87 inches) which provided a test area of 1780 mm². The upper column was measured to have a weight of 3617.95 g, measured before testing on a calibrated balance.
- 3.2 One loading condition and three replicates were tested. Electrical resistance measurements were taken at 0 minutes, 1.5 minutes and 3.0 minutes after the load has been applied.

- 3.3 The test load is 1780 N (400 lbf / 1000 kPa) on the applied area of 1780 mm².
- 3.4 A “short circuit” resistance was determined as the electrical resistance of the fixtures with the platens in direct contact, under the specified load condition.
- 3.5 This resistance was subtracted from the measured resistance to provide a corrected resistance, of the powder sample itself.
- 3.6 Resistivity of the material is calculated as follows:

$$\rho = \frac{AR}{d}, \text{ ASTM G187-05 equation (1)}$$

where,

p = Resistivity, ohm·cm

R = Resistance, ohms

A = Cross-sectional area, cm²

d = Thickness of the material under load (distance between electrodes), cm

4. PROCEDURE

- 4.1 Weigh out 10.0 g of sample ConduCrete CP
- 4.2 Assemble the brass platans/acrylic die fixture (both brass platans in acrylic sleeve).
- 4.3 To get the “short circuit” resistance of the fixture, place the entire fixture between the platens of the 12-ton hydraulic shop press and connect leads to the DC power supply. Place a nonconductive sheet between the top brass plug and the top platen of the test stand. Lower the top platen of the test stand and apply a given pressure of 1000 kPa, record the resistance and release.
- 4.4 Remove the sample fixture and the top brass platan and funnel the ConduCrete CP sample into the acrylic sleeve and replace the brass platan. Replace the entire fixture into the press and include the nonconductive sheet.
- 4.5 Lower the top platen and apply a given pressure of 1000 kPa, record the sample height and release. The applied pressure of 1000 kPa equates to a pressure of 145 pounds per square inch on the sample material.
- 4.6 Following the same test method as above apply a pressure of 1000 kPa, hold this force for a given period of time, and record the resistance and height of the sample and release. The resistance reading is the total resistance of the sample under pressure.
- 4.7 The measured sample resistance is calculated by subtracting the short circuit resistance from the total resistance.
- 4.8 Calculation of resistivity: Resistivity is defined mathematically as the product of sample area and resistance divided by sample height:

$$\rho = \Omega \times \frac{\text{area}}{\text{height}}$$

- 4.9 Calculate the resistivity by multiplying the measured resistance by the sample area. Divide this product by the measured sample height.

Example: **Dimensional Analysis**

$$\text{Resistivity } (\rho) = \text{ohm } (\Omega) \times \frac{\text{cm}^2}{\text{cm}} = \text{ohm} \times \text{cm} = \text{resistance} \times \text{length}$$

- 4.10 Using metric units, the final resistivity measurement should be reported in units of “ohm centimeters”.

5. RESULTS

Tables 1 and 2 below provide a detailed report of the data including measured resistances, short circuit resistances and sample heights under load.

Table 1: Short Circuit Resistances under Loading Conditions

Applied Load (kPa)	Resistance at Measurement Times (Ω)			Average Resistance (Ω)
	0 min	1.5 min	3.0 min	
1000	0.116	0.116	0.116	0.116

Table 2: Electrical Resistivity with an Applied Load of 1000 kPa

Sample	Applied Load (kPa)	Time (min)	Resistance (Ω)	Corrected Resistance ¹ (Ω)	Sample Height (mm)	Resistivity ($\Omega \cdot \text{cm}$)	Average Resistivity ($\Omega \cdot \text{cm}$)
1	1000	0.0	0.142	0.025	5.11	0.872	0.769
	1000	1.5	0.139	0.022	5.11	0.767	
	1000	3.0	0.136	0.019	5.11	0.668	
2	1000	0.0	0.133	0.016	5.67	0.510	0.570
	1000	1.5	0.136	0.019	5.67	0.600	
	1000	3.0	0.136	0.019	5.67	0.601	
3	1000	0.0	0.136	0.019	5.55	0.614	0.613
	1000	1.5	0.136	0.019	5.55	0.612	
	1000	3.0	0.136	0.019	5.55	0.612	

6. CONCLUSIONS

ConduCrete CP was measured to have an average electrical resistivity of $0.651 \Omega \cdot \text{cm}$ at an applied load of 1000 kPa.

¹ The corrected resistance is the measured resistance less the average short circuit resistance listed for that load in Table 1. This assumes perfect contact between the platens and the material causing additive resistance, and no interfacial effect is taken into account which may not be applicable in some applications.

Published Date: October 2022

SAFETY DATA SHEET

SECTION 1 | PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Identifier
Synonyms
Product Description
Recommended Use

ConduCrete

ConduCrete, ConduCrete DM100, ConduCrete CP, ConduCrete Pro, ConduPlug
Grey Conductive Carbonaceous Concrete
Grounding and Cathodic Protection Systems

COMPANY IDENTIFICATION

Supplier

SAE Inc
691 Bayview Drive
Barrie, Ontario, Canada L4N 9A5
+1 705 733 3307
www.saeinc.com

SECTION 2 | HAZARDS IDENTIFICATION

2.1 CLASSIFICATION OF THE MIXTURE

Skin Irritation Cat. 2; H315
Eye Damage Cat. 1; H318
Specific Target Organ Toxicity, Single Exposure, Cat. 3; H335
Carcinogenicity Cat. 1; H350 (inhalation)



LABELLING

Symbols



Signal Word

Danger

Hazard Statements

H315: Causes skin irritation
H318: Causes serious eye damage
H335: May cause respiratory irritation
H350: May cause cancer by chronic inhalation

Precautionary Statements

Prevention

P260: Do not breathe dusts
P264: Wash hands thoroughly after handling
P270: Do not eat, drink, or smoke when using this product
P271: Use only outdoors or in a well-ventilated area

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Response

P302 + P352: IF ON SKIN: Wash with plenty of water.
P321: Specific treatment: Caustic burns must be treated promptly by a doctor.
P332 + P313: If skin irritation occurs: Get medical advice / attention.
P362 + P364: Take off contaminated clothing and wash it before reuse.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P402: Store in a dry place.

Other Hazards

Dusts from this product, when combined with water or sweat, produce a corrosive alkaline solution.

SECTION 3 | COMPOSITION / INFORMATION ON INGREDIENTS**3.1 MIXTURE**

Chemical Name	CAS No.	Wt. %	GHS Classification
Calcined Petroleum Coke	64743-05-1	50-90	Not classified
Portland Cement	65997-15-1	10-50	Skin Irritation 2: H315 / Eye damage 1: H318 / STOT SE 3: H335
Calcium Oxide	1305-78-8	0.03-1.5	Skin irritation 2: H315 / Eye damage 1: H318
Crystalline Silica	14808-60-7	0.01-0.75	Carc. 1: H350

SECTION 4 | FIRST AID MEASURES**4.1 PRECAUTIONS**

First aid providers should avoid direct contact with this chemical. Wear chemical protective gloves, if necessary. Take precautions to ensure your own safety before attempting rescue, (e.g. wear appropriate protective equipment).

4.2 EYE

Do not rub eyes. Immediately flush eyes with running water for several minutes while forcing eyelids open during flushing. Remove contact lenses, if present and easy to do. Continue rinsing. If irritation persists or if concerned seek medical attention. Take care not to rinse contaminated water into the unaffected eye or onto face.

4.3 SKIN

Wash affected areas with non-abrasive pH neutral soap and lukewarm running water and remove contaminated clothing. Launder contaminated clothing before reuse. Seek medical attention for rashes, burns, irritation, dermatitis, and prolonged unprotected exposures to wet cement, cement mixtures, or liquids from wet cement. Burns should be treated promptly by a doctor.

4.4 INHALATION

If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Seek medical help if coughing or other symptoms persist. If large amounts were inhaled immediate medical attention is required. Call a poison control center or doctor. If the individual is not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.

4.5 INGESTION

Rinse mouth. Do NOT induce vomiting. Get medical attention if symptoms occur. If large amounts were ingested obtain medical attention immediately or transport victim to an emergency treatment center.

4.6 MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

4.6.1 Inhalation

High concentration of airborne dusts are severely irritating to the upper respiratory tract with symptoms such as coughing, sneezing and shortness of breath. Long-term inhalation exposure to dusts containing respirable size crystalline silica can cause silicosis and lung cancer.

4.6.2 Eye Contact

Severely irritating in contact with eyes. Causes eye damage which may be permanent and may cause blindness. Solid particles react with moisture in the eye to form clumps of moist compound which may be difficult to remove.

4.6.3 Skin Contact

Dusts from this product, when combined with water or sweat, produce an irritating alkaline solution and burning of the skin. Symptoms include pain, burns, skin dryness, cracking and eczema.

4.6.4 Ingestion

Severely irritating to the mouth, throat, and gastro-intestinal system if swallowed. Symptoms may include severe pain and burning of the mouth, throat, esophagus and gastrointestinal tract with nausea, vomiting and diarrhea. If aspiration into the lungs occurs during vomiting, severe lung damage may result.

4.7 INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

Corrosive material; get immediate medical advice / attention if inhaled, if swallowed or if in eyes.

SECTION 5 | FIRE FIGHTING MEASURES

5.1 FLASH POINT

Carbonic matter: May burn if exposed to temperature above 1290 °F (700 °C)

5.2 SUITABLE EXTINGUISHING MEDIA

Use extinguishing media appropriate to the surrounding fire conditions. Water Fog, Dry Chemical, Foam, or Carbon Dioxide.

5.3 UNSUITABLE EXTINGUISHING MEDIA

Do not use water jet as an extinguisher, as this will spread the fire or cause scattering of the corrosive solution.

5.4 SPECIAL HAZARDS

Products of combustion may contain carbon monoxide, carbon dioxide and sulfur oxides. Bulk powder of this product may heat spontaneously when damp with water. Corrosive: reacts with water releasing heat and forming an alkaline solution. Firefighters must wear full protective equipment including self-contained breathing apparatus with chemical protection clothing when exposed to decomposition products.

5.5 EXPLOSION DATA

Powders and dusts may cause an explosion hazard under certain conditions: these conditions are unlikely during normal use.

SECTION 6 | ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

Wear adequate personal protective equipment, including an appropriate respirator as indicated in Section 8 if there is a risk of exposure to dust / fume at levels exceeding the exposure limits. Isolate spill area, preventing entry by unauthorized persons. Do not touch spilled material. Do not breathe dusts.

6.2 ENVIRONMENTAL PRECAUTIONS

Avoid waste releases to the environment and prevent material from entering sewers, natural waterways or storm water management systems.

6.3 METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP

Move containers from spill area. Avoid dust generation and prevent wind dispersal. Material can be picked up by sweeping, shoveling, mopping or vacuuming. Vacuum dust with equipment fitted with a HEPA filter and place in a closed labelled waste container.

6.4 REFERENCE TO OTHER SECTIONS

See Section 8 for information on selection of personal protective equipment. See Section 13 for information on disposal of spilled product and contaminated absorbents.

SECTION 7 | HANDLING AND STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING

Before handling, it is important that engineering controls are operating, protective equipment requirements and personal hygiene measures are being followed. People working with this material should be trained regarding its hazards and its safe use. Do not breathe dusts. Wash hands and exposed skin thoroughly after handling. Use only outdoors or in a well-ventilated area. Contaminated work clothing should not be allowed out of the workplace. Prevent eye contact. Wear eye protection. Do not use this product in a confined space without adequate local exhaust ventilation.

7.2 CONDITIONS FOR SAFE STORAGE

Store in a dry, well-ventilated area, away from incompatible materials, such as strong oxidizing agents; other strong oxidants. Keep containers closed. Protect from moisture / humidity and from damage or water. Do not store near food and beverages or smoking materials.

ConduCrete must be stored in unopened bags clear of the ground in cool, dry conditions. Storage should be such that no dampness or moisture is allowed to reach ConduCrete either from the ground, walls or from the environment. This becomes particularly important during the humid season and in coastal regions when atmospheric air conditions higher amount of moisture in it. Do not store ConduCrete in a building where walls, roof and floor are not completely weatherproof. Do not stack against the wall. Do not store ConduCrete bags on the floor; place on a wooden pallet or plastic sheet.

Plastic is effective as a barrier to keep the ConduCrete from absorbing moisture. Do not keep bags on the ground for temporary storage at work site. Pile on raised by platform e.g. skid and cover with plastic. If no skid is available place ConduCrete on plastic sheet. ConduCrete bags can be torn or otherwise damaged by careless or rough handling, by sharp edges, by nails sticking out of the wooden pallets, by dropping from excessive heights, by the forks of forklift trucks, etc. ConduCrete bags being transported on trucks should also be protected from rain, drizzle, sea spray, and splashes from puddles and potholes, etc. Shelf life is limited by direct contact with moisture and/or elevated levels of humidity.

SECTION 8 | EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 CONTROL PARAMETERS

Occupational Exposure Limits

Ingredient	ACGIH TLV (8-hr. TWA)	U.S. OSHA PEL (8-hr. TWA)	Ontario (Canada) TWA
Calcined Petroleum Coke (Particles not otherwise specified)*	10 mg/m ³ (total dust) 3 mg/m ³ (respirable)	15 mg/m ³ (total dust) 5 mg/m ³ (respirable)	10 mg/m ³ (total dust) 3 mg/m ³ (respirable)
Portland Cement (respirable)*	1 mg/m ³	15 mg/m ³ (total dust) 5 mg/m ³ (respirable)	1 mg/m ³
Calcium Oxide	2 mg/m ³	5 mg/m ³	2 mg/m ³
Crystalline Silica (Quartz)	0.025 mg/m ³ (respirable)	0.05 mg/m ³ quartz (respirable)	0.1 mg/m ³ (respirable) Designated Substance

* value for particulate matter containing no asbestos and less than 1% crystalline silica

8.2 OTHER EXPOSURE LIMITS

Ingredient	NIOSH REL	NIOSH IDLH (Immediately Dangerous to Life or Health)
Portland Cement	10 mg/m ³	5000 mg/m ³
Calcium Oxide	2 mg/m ³	25 mg/m ³

8.3 EXPOSURE CONTROLS

8.3.1 Engineering Controls

Dust should be controlled at point of operation. General mechanical and local exhaust ventilation to maintain airborne concentrations below occupational exposure limits. Handle in accordance with good industrial hygiene and safety practice. Ensure regular cleaning of equipment, work area and clothing. If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protective equipment including approved respiratory protection. Have equipment available for use in emergencies such as spills or fire.

8.3.2 Personal Protection

Workers must comply with the Personal Protective Equipment requirements of the workplace in which this product is handled.

8.3.3 Eye / Face Protection

Wear approved safety glasses with side-shields or chemical safety goggles. Wear a face-shield or full-face respirator when needed to prevent exposure to airborne dusts. The use of contact lenses is not recommended.

8.3.4 Skin Protection

Wear chemical protective gloves, suit, and boots to prevent skin exposure. Evaluate resistance under conditions of use and maintain protective clothing carefully. Contact safety supplier for specifications.

8.3.5 Respiratory Protection

Approved respiratory protective equipment (RPE) is required if other controls are unable to maintain occupational exposure below the legislated limits. An approved respirator, NIOSH N95 rating or higher, must be available in case of accidental releases. Proper respiratory selection should be determined by adequately trained personnel and based on the contaminant(s), the degree of potential exposure and published respirator protection factors.

A respiratory protection program that meets the regulatory requirement, such as OSHA's 29 CFR 1910.134, ANSI Z88.2 or Canadian Standards Association (CSA) Standard Z94.4, must be followed whenever workplace conditions warrant a respirator's use.

8.3.6 Other Protection

Have a safety shower and eyewash station readily available in the work area.

Every attempt should be made to avoid skin and eye contact. Do not get powder inside boots, shoes, or gloves. Do not allow wet, saturated clothing to remain against the skin. Promptly remove clothing and shoes that are dusty or wet. Wash clothing and shoes thoroughly before reuse.

Do not eat, drink, or smoke where this material is handled, stored and processed. Wash hands thoroughly before eating, drinking, and smoking. Remove contaminated clothing and protective equipment before entering eating areas.

8.3.7 Environmental Exposure Controls

Emissions from ventilation or work process equipment should be monitored to ensure they comply with the requirements of environmental protection legislation.

SECTION 9 | PHYSICAL / CHEMICAL PROPERTIES

9.1 INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Solid, grey powder
Odor	Odorless
Odor Threshold	Not applicable
pH	12-13 (slurry)
Melting Point / Freezing Point	Not applicable
Initial Boiling Point and Boiling Range	Not applicable
Flash Point	Not applicable
Flammability	Not flammable or combustible
Auto-ignition temperature	>1292 °F, >700 °C
Upper / Lower Flammability or Explosive Limits	Not applicable
Explosive Properties	Not applicable
Oxidizing Properties	Not applicable
Sensitivity to Mechanical Impact	Not applicable
Sensitivity to Static Discharge	Not applicable
Vapor Pressure	Not applicable
Vapor Density	Not applicable
Density	64 lbs/ft ³ , 1021 kg/m ³ (powder) (dependent on compaction)
Solubility	Slightly soluble in water
Partition Coefficient (n-octanol / water)	Not applicable
Decomposition Temperature	>2400 ° F, >1316 °C
Viscosity	Not applicable

SECTION 10 | STABILITY AND REACTIVITY

10.1 REACTIVITY

Reacts slowly with water forming hydrated compounds, releasing heat and forming an alkaline solution. Once cured ConduCrete has a neutral pH.

10.2 CHEMICAL STABILITY

This product is stable in a closed container under normal conditions of storage and use.

10.3 POSSIBILITY OF HAZARDOUS REACTIONS

Aqueous solutions are alkaline and may corrode aluminum.

10.4 CONDITIONS TO AVOID

Avoid unintentional contact with water / moisture and with strong acids, strong oxidizing agents and other incompatible materials. Avoid generation of dust. Avoid extreme heat and open flames. May burn if exposed to temperature above 1290 °F (700 °C).

10.5 INCOMPATIBLE MATERIALS

Oxidants	Incompatible with strong oxidizing agents
Strong Acids	Incompatible with strong acids; may react vigorously
Water	Reaction generates heat
Aluminum	Calcium oxide is corrosive to aluminum metal May react with Ammonium salts

10.6 HAZARDOUS DECOMPOSITION PRODUCTS

In contact with water and moisture, generates corrosive calcium hydroxide.

SECTION 11 | TOXICOLOGICAL INFORMATION

11.1 LIKELY ROUTES OF EXPOSURE

Eye and skin contact. Inhalation of dust.

11.2 ACUTE TOXICITY DATA

Data not available for the mixture.

11.2.1 Skin Corrosion / Irritation

Based on information for Portland cement and calcium oxide: Causes skin irritation. May cause caustic burns when in prolonged contact with the skin. Irritating or corrosive to mouth, throat and gastro-intestinal tract.

11.2.2 Serious Eye Damage / Irritation

Based on information for Portland cement and calcium oxide: Causes serious eye damage and possible blindness. Damage may be permanent if treatment is not immediate.

11.2.3 Specific Target Organ Toxicity Single Exposure

Breathing dusts causes respiratory irritation. Inflammation of the respiratory passages, ulceration and perforation of the nasal septum and pneumonia has been attributed to the inhalation of dust containing calcium oxide.

11.2.4 Aspiration Hazard

This material is corrosive; if aspiration into the lungs occurs during vomiting, severe lung damage may result.

11.3 CHRONIC TOXICITY

11.3.1 Specific Target Organ Toxicity Repeated Exposure

Prolonged and repeated breathing of dust may cause lung disease. The extent and severity of lung injury correlates with the length of exposure and dust concentration. Inflammation of the respiratory passages, ulceration and perforation of the nasal septum and pneumonia has been attributed to the inhalation of dust containing calcium oxide.

May contain crystalline silica. Long-term exposure to fine airborne crystalline silica dust may cause silicosis, a form of pulmonary fibrosis that can cause shortness of breath, cough and reduced lung function. Exposure may also cause chronic obstructive pulmonary disease (COPD) and weight loss. In severe cases, there may be effects on the heart and death from heart failure. Particles with diameters less than 1 micrometer are considered most hazardous.

11.3.2 Respiratory and/or Skin Sensitization

Not known to be a respiratory or skin sensitizer. Based on information for Portland cement: causes exertional dyspnea (breathing difficulty), wheezing, chronic bronchitis. Repeated or prolonged contact with skin may cause dermatitis. Repeated or prolonged contact may cause skin sensitizing.

Based on information for calcium oxide: repeated or prolonged contact with skin may cause dermatitis.

11.3.3 Germ Cell Mutagenicity

Not available.

11.3.4 Reproductive Effects

Not available.

11.3.5 Developmental Effects

Not available.

11.3.6 Carcinogenicity

Portland cement, a component of ConduCrete, contains crystalline silica which is considered a hazard by inhalation. The International Agency for Research on Cancer (IARC) has classified crystalline silica as a Group 1 substance, carcinogenic to humans. This classification is based on the findings of laboratory animal studies (inhalation and implantation) and epidemiology studies that were considered sufficient for carcinogenicity.

11.3.7 Interaction with Other Chemicals

Not available.

SECTION 12 | ECOLOGICAL INFORMATION

12.1 ECOTOXICITY

The environmental hazard of the product is considered to be limited.

12.2 PERSISTENCE AND DEGRADABILITY

High persistence in soil as degradation is not expected to be a significant fate in organisms or the environment.

12.3 BIOACCUMULATION POTENTIAL

Low bioaccumulation potential as negligible water solubility restricts route of exposure to the aquatic environment.

12.4 MOBILITY IN SOIL

Mobility is insignificant due to negligible water solubility and vapor pressure. May incorporate within soil for extended periods of time.

12.5 OTHER ADVERSE EFFECTS

None. Attempts to quantify unalkylated PAH, sulfur, and metal leachate values remained below detection limits under freshwater test conditions.

SECTION 13 | DISPOSAL CONSIDERATIONS

13.1 WASTE DISPOSAL

Reuse or recycle material and containers whenever possible to minimize the generation of waste. All Federal, Provincial / State, and Local regulations regarding health and pollution must be followed for disposal.

13.2 CONTAMINATED PACKAGING

Since emptied containers may retain product residue, follow label warnings even after container is emptied.

SECTION 14 | TRANSPORT INFORMATION

This product is not classified as a Hazardous Material under U.S. DOT or Canadian TDG regulations. This material is not classified as dangerous under ADR, RID, ADNR, IMDG and IATA regulations.

SECTION 15 | REGULATORY INFORMATION

SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS / LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE

15.1 USA

15.1.1 TSCA Status

Substances are listed on the TSCA inventory or are exempt.

15.1.2 California Proposition 65

This product contains, or may contain, trace quantities of a substance known to the state of California to cause cancer. ConduCrete may contain 0.01-0.75 wt% of crystalline silica (CAS No. 14808-60-7).

15.1.3 OSHA HazCom 2012 Hazards

Skin Irritation Cat. 2

Eye Damage Cat. 1

Specific Target Organ Toxicity, Single Exposure, Cat. 3

Carcinogenicity Cat. 1 (inhalation)

15.2 CANADA

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* and the SDS contains all the information required by the *Controlled Products Regulations*.

15.2.1 WHMIS 1988 Classification

D2A - Other toxic effects (mixture containing low amounts of crystalline silica).

E - Corrosive - Mixture containing calcium oxide; pH > 12 (possible skin irritant in slurry form)

15.2.2 NSNR Status

Substances are listed on the DSL or are exempt

SECTION 16 | OTHER INFORMATION

16.1 REVISION DATE

September 9, 2023

16.2 HMIS HAZARD RATINGS

Health: 2

Flammability: 1

Physical Hazard: 0

16.3 NFPA RATINGS



16.4 ADDITIONAL INFORMATION

This safety data sheet is believed to provide a useful summary of the hazards of ConduCrete as it is commonly used but cannot anticipate and provide all the information that might be needed in every situation. It relates specifically to the product designated and may not be valid for the product when used within any other materials or products or in a particular process.

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