

## Material Safety Data Sheet

# Concrete Healing Agent – PLA based (CHA-PLA)

EU safety data sheet according to 91/155/EWG

### SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

<b>Product Name:</b>	Concrete Healing Agent - PLA based (CHA-PLA).
<b>CAS No:</b>	N/A
<b>Product Use:</b>	CHA-PLA is a concrete additive to be used in structural and civil engineering.
<b>MSDS Information:</b>	This product is classified as non-hazardous, according to EU directives 2000/54/EC and 67/548/EEC.
<b>Product Code:</b>	N/A
<b>Chemical Family:</b>	N/A
<b>Chemical Name/Synonyms:</b>	N/A
<b>Formula:</b>	This product consists of bacterial spores, organic and inorganic nutrient salts, calcium lactate and poly lactic acid (PLA). Individual compositions of constituents could vary within the CHA mix design ranges.
<b>Supplier/Manufacturer:</b>	Basilisk-Contracting BV Molengraaffsingel 10 2629 JD Delft, The Netherlands T: +31 15 202 6128 E: info@basiliskconcrete.com W: www.basiliskconcrete.com
<b>Emergency Contact:</b>	Supplier/Manufacturer
<b>REACH</b>	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

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### SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

**Product Nature:** Concrete Healing Agent (HA) is a mix of bacterial spores (classified as group 1 biological agent, which means that the microbial agent is unlikely to cause human disease), inorganic salts mixture, calcium lactate, poly lactic acid (PLA), all compounded to granular material.

**Hazardous Substance** None.

On average CHA mix has the following composition:

Ingredient	CAS No.	Weight percentage of product (%)
PLA (Polylactic acid)	26100-51-6	50 - 80
Basilisk Base B <sup>2</sup> * (contains limestone powder)	N/A (1317-65-3/ 546-93-0 /14808-60-7)	0.1 - 2
Nutrients	N/A	10.5 - 43
Water (moist)	7732-18-5	1 - 5

\* Contains bacterial spores from alkaliphilic spore-forming Bacilli, classified as group 1 bacteria. Group 1 bacteria are considered not dangerous and nonpathogenic for humans as defined by the European Parliament (2000) Directive 2000/54/EC on the protection of workers from risks related to exposure to biological agents at work.

### SECTION 3 – HAZARDS IDENTIFICATION AND FIRST AID MEASURES

#### Emergency Overview:

Concrete Healing Agent - PLA based (CHA-PLA) contains compounds which are dangerous if swallowed, inhaled and upon contact with skin or eyes. Based on the bacterial strains and inorganic and organic additives used in CHA-PLA, this product is not hazardous according to EU directive 2000/54/EC and 67/548/EEC.

#### Label elements. Label elements under CLP Pictograms



**Signal words:** Warning - Danger

#### Hazard statements

- H302 Harmful if swallowed, category 4.
- H315 Causes skin irritation, category 2.
- H319 Causes serious eye irritation, category 2A.
- H335 May cause respiratory irritation, category 3.

#### Other hazards PBT

This substance is not identified as a PBT substance.

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### Potential Health Effects/Hazard statements:

<b>Eye Contact:</b>	<b>H319</b> - Causes serious eye irritation.
<b>Skin Contact:</b>	<b>H315</b> - Causes skin irritation.
<b>Inhalation:</b>	<b>H335</b> - May cause respiratory irritation.
<b>Ingestion:</b>	<b>H302</b> - Harmful if swallowed.
<b>Chronic Effects:</b>	No known significant effects.

### Potential Health Effects:

<b>Eye Contact:</b>	May cause eye irritation upon direct contact. Immediately flush eyes thoroughly with water. Continue flushing for 15 minutes. Seek medical attention if eye remains irritating.
<b>Skin Contact:</b>	May cause irritation on prolonged contact. Wash skin with water and pH neutral soap or mild detergent intended for use on skin.
<b>Inhalation:</b>	The CHA-PLA dust could be inhaled if no personal protection is used. In its wet form, mixed with concrete CHA-PLA cannot be inhaled. Repeated exposure of lungs to CHA-PLA dust may lead to allergic sensitization based on the exposure level, duration, and susceptibility of the individual. Subsequent chronic or acute exposure in sensitized persons may cause a respiratory allergic reaction in minutes or delayed, or a mixture of both. Typical symptoms could include respiratory irritation, breathlessness, coughing and difficulty breathing. Immediately remove person to fresh air. If respiratory irritation remains, seek medical attention.
<b>Ingestion:</b>	Excessive ingestion of CHA-PLA could lead to intestinal discomfort (e.g. diarrhea, bloating, cramping, etc.). If some of the CHA-PLA powder enters the mouth, wash out with water immediately. If ingested, drink plenty of water to dilute CHA-PLA. Seek medical attention if any irritation sensation in the mouth or intestinal discomfort occurs.
<b>Chronic Effects:</b>	N/A.

## SECTION 4 – FIRST AID MEASURES

### Precautionary statements

P261	Avoid breathing dust/mist/spray.
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.
P280	Wear protective gloves/protective clothing/eye protection/face protection (FFP3 class filter minimum).
P301 + P330 + P312	IF SWALLOWED: rinse mouth. Call a poison center or doctor/physician if you feel unwell.
P302 + P352 (P321)	IF ON SKIN: Wash with plenty of soap and water.
P332 + P313	If skin irritation occurs: Get medical advice/attention.
P362	Wash contaminated clothing before reuse.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/attention.
P405	Store locked up.
P501	Dispose of contents to hazardous or special waste collection point.

### First aid measures

<b>Eye Contact:</b>	Immediately flush eyes thoroughly with water. Continue flushing for 15 minutes. Seek medical attention if eye irritation persists.
<b>Skin Contact:</b>	Wash skin with water and pH neutral soap or mild detergent intended for use on skin. Disinfect with alcohol. Get medical attention when skin irritation develops or persists.

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<b>Inhalation:</b>	Immediately remove person to fresh air. If respiratory irritation remains or breathing becomes difficult, seek medical attention.
<b>Ingestion:</b>	If CHA-PLA powder enters the mouth, wash out with water immediately. Seek medical attention if any irritation sensation in the mouth or intestinal discomfort occurs. If CHA-PLA is ingested, first rinse mouth, thereafter drink plenty of water to dilute CHA-PLA. Get medical advice whether or not evacuation of stomach or inducing of vomiting is necessary.
<b>Chronic Effects:</b>	N/A.

### Advice to medical personnel:

There could be a risk of inflammatory reaction of skin after contact, especially when contacted skin area contains open wounds.

## SECTION 5 – FIRE EXPLOSION DATA / FIRE FIGHTING MEASURES

<b>Flammability:</b>	Not Flammable.
<b>Flash Point:</b>	N/A.
<b>Lower Explosive Limit:</b>	N/A.
<b>Upper Explosive Limit:</b>	N/A.
<b>Auto ignition Temperature:</b>	N/A.
<b>Sensitivity To Static Discharge:</b>	N/A.
<b>Sensitivity To Impact:</b>	N/A.
<b>Extinguishing Media:</b>	Water, foam, carbon dioxide, dry powder.
<b>Special Fire-Fighting Procedures:</b>	None.
<b>Hazardous Combustion Products:</b>	None.
<b>Unusual Fire/ Explosion Hazards:</b>	None.

## SECTION 6 – STABILITY AND REACTIVITY

<b>Stability:</b>	Stable.
<b>Reactivity:</b>	No possible reactions known.
<b>Hazardous Decomposition:</b>	Will not occur.
<b>Hazardous Polymerization:</b>	Will not occur.
<b>Incompatibility:</b>	CHA-PLA contains alkaliphilic bacterial spores and nutrients which react with water to produce a mild caustic solution, pH 8 to pH 10 (compatible with concrete). Wet CHA-PLA and in its product state concrete is mild to strong alkaline. As such it is incompatible with acids, ammonium salts, and aluminum metal. Aluminum powder and other alkali and alkaline earth elements can react under liberation of hydrogen gas in wet CHA-PLA or CHA-PLA in concrete mixture (due to the strong alkaline conditions in concrete).
<b>Products evolved when subjected to heat or combustion:</b>	Carbon dioxide, calcium oxide, water vapor.

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### SECTION 7 – ACCIDENTAL RELEASE MEASURES

In case CHA-PLA material is released or spilled, vacuum or brush and collect spilled material. Collect waste in suitable container (for re-use if possible) and wash surface with water. Avoid high pressure rinsing or dispersion of CHA-PLA dust into the air. Maintain good housekeeping practices. CHA-PLA dust is biodegradable and may be discharged into sewer. No special disposal method required, except that it be in accordance with current local, state/provincial and federal regulations.

### SECTION 8 - HANDLING AND STORAGE

- Handling:** Avoid breathing CHA-PLA dust. Remove dusty clothing or clothing which is wet from CHA-PLA/concrete fluids and launder before reuse. Wash thoroughly after handling or exposure to dust or wet CHA-PLA/concrete fluids.
- Storage:** Store in original packaging, not opened, at temperatures between 0 to 40 °C.

### SECTION 9 - EXPOSURE CONTROLS AND PERSONAL PROTECTION

- Eye Protection:** Safety glasses with side shields, or goggles, should be worn when engaged in activities where CHA-PLA dust, wet cement, or concrete could contact the eye. In extremely dusty environments and unpredictable environments, wear unvented or indirectly vented goggles to avoid eye irritation or injury.
- Skin Protection:** Avoid direct skin contact CHA-PLA dust, particles or CHA-PLA mixed with wet concrete products. Do not allow contact of CHA-PLA with skin for any period of time. Wear rubber gloves and watertight boots to eliminate skin contact with CHA-PLA. If contact occurs, promptly wash affected area with soap and water. If prolonged exposure to CHA-PLA or CHA-PLA containing concrete products might occur, wear impervious clothing. Do not rely on barrier creams; barrier creams should not be used in place of gloves! Periodically and at the end of a work day, wash areas that came in contact with CHA-PLA or CHA-PLA containing concrete fluids with a pH-neutral soap. If irritation occurs, immediately wash the affected area and seek treatment. Clothing saturated with CHA-PLA dust and/or CHA-PLA containing concrete fluid should be removed immediately and replaced with clean, dry clothing.
- Respiratory Protection:** Use a protective mask (FFP 3 grade according to EN 149: 2001) during the handling of CHA-PLA powder or liquids. Avoid actions that cause CHA-PLA dust to become airborne. If so, use local or general ventilation to control exposures to below applicable exposure limits in working area for dust (i.e. >5 - 10 mg particles/m<sup>3</sup> based on limestone content and/or >10.000 colony forming units (CFU)/m<sup>3</sup> air or >1.000 CFU of Gram-negative bacteria/m<sup>3</sup> air). Otherwise, an approved particulate respirator, or supplied air respirator, appropriate for the airborne concentrations should be used. Selection and use of the respiratory protective equipment must be in accordance with applicable regulations and good industrial hygiene practices. In addition, in confined spaces/working areas use local or general ventilation to control exposures to below applicable exposure limits.

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### SECTION 10 - PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b>	Yellowish round to irregular particles with diameter of 0,1 – 8 mm.
<b>Odor:</b>	No distinct odor to slight yeast extract odor.
<b>Odor Threshold:</b>	N/A
<b>Physical State:</b>	N/A
<b>pH (as a solid):</b>	N/A
<b>pH in water:</b>	7 - 9
<b>Solubility In Water:</b>	N/A
<b>Vapor Pressure:</b>	N/A
<b>Vapor Density:</b>	N/A
<b>Boiling Point:</b>	N/A
<b>Freezing Point:</b>	N/A
<b>Melting Point:</b>	N/A
<b>Specific Gravity (H<sub>2</sub>O = 1.0):</b>	1,0 – 1,5
<b>Dust fraction</b>	< 0.5% - 3%
<b>Evaporation Rate:</b>	not applicable
<b>O/W Coefficient:</b>	not applicable

### SECTION 11 - TOXICOLOGICAL INFORMATION

<b>Acute Exposure:</b>	CHA-PLA can cause irritation or inflammation to skin, eyes and upper respiratory tract. Ingestion can cause irritation of the throat due the alkaline nature of CHA-PLA.
<b>Chronic Exposure:</b>	Pro-longed exposure to CHA-PLA could cause inflammation/irritation of the tissue lining the interior of the nose and the cornea (white) of the eye.
<b>Remark:</b>	Pro-longed exposure by inhalation of limestone could cause cancer, because of present silica-crystalline quartz - but content of limestone in CHA-PLA is <2% (silica-crystalline quartz is <0,04%) and therefore exposure to CHA-PLA is not likely to result in cancer.

**For CHA-PLA no individual test results regarding toxicological data are available. The toxicological influences mentioned are deducted from CHA-PLA physical properties and similar biological agents.**

**Individual toxicological information of compounds ≥1% content:**

#### **Poly-lactic acid**

##### **Toxicity to Animals:**

Ingestion	No data available.
Skin Contact	No data available.
Eye Contact	No data available.
Inhalation	No data available.

##### **Effects on Humans:**

Ingestion	No data available.
Skin Contact	No data available.
Eye Contact	No data available.
Inhalation	No data available.
Chronic toxicity	Not a reported carcinogen by IARC, NTP, ACGIH, OSHA.
Human experience	No data available.

#### **Basilisk Base B<sup>2</sup> (limestone powder)**

##### **Toxicity to Animals:**

Ingestion	Crystalline Silica: Oral Rate LD50 > 22,500 mg/kg bw.
Skin Contact	No data available.
Eye Contact	No data available.
Inhalation	No data available.

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### Basilisk Base B<sup>2</sup> (continued)

#### Effects on Humans:

Ingestion	No adverse effects expected for normal, incidental ingestion. If a large amount is swallowed, may cause gastrointestinal irritation, discomfort and blockage.
Skin Contact	Exposure to pulverized dust may cause dryness and irritation. This material is not known to cause sensitization
Eye Contact	Exposure to pulverized dust may cause irritation.
Inhalation	Exposure to pulverized dust may cause irritation in nose, throat and lungs.
Chronic toxicity	This product contains trace amounts of crystalline silica. Prolonged or repeated inhalation of respirable crystalline silica can cause silicosis, as serious lung disease. This product is not listed as carcinogenic by OSHA, IARC, NTP, ACGIH, or the EU Directives. This product may contain trace amounts of crystalline silica quartz which is listed by IARC as "Carcinogenic to Humans" (Group1) and "Known to be a Human Carcinogen" by NTP.
Human experience	-

#### Nutrients

#### Toxicity to Animals:

Ingestion	Oral mouse LDLo: 140 mg/kg.
Skin Contact	No data available.
Eye Contact	No data available.
Inhalation	No data available.

#### Effects on Humans:

Ingestion	Ingestion of large amounts may cause gastrointestinal tract irritation/disturbance.
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Inhalation	May cause respiratory tract irritation. Low hazard for usual industrial handling.
Chronic toxicity	Not a reported carcinogen by IARC, NTP, ACGIH, OSHA.
Human experience	Nuisance dust.

## SECTION 12 - ECOLOGICAL INFORMATION

**Ecotoxicity:** CHA-PLA material is considered to be harmless for the environment since CHA-PLA does not contain dangerous substances. CHA-PLA is not recognized for unusual toxicity to plants or animals. Any negative environmental effect could be related to the alkaline nature of the product.

**Remark:** For CHA-PLA, no individual ecotoxicity test results are available.

#### Individual toxicological information of compounds $\geq 1\%$ content:

#### Poly-lactic acid

Mobility	Not available.
Persistence and degradability	Not available, product is expected to be readily biodegradable.
Bioaccumulation	No data available, no bioaccumulation expected.
Ecotoxicity effects	No data available.

#### Basilisk Base B<sup>2</sup> (limestone powder)

Mobility	Inorganic. Slightly soluble in water.
Persistence and degradability	Inorganic. Upon dilution, rapidly decomposes into compounds indistinguishable from natural dissolved magnesium, calcium and silica.
Bioaccumulation	Inorganic. This material shows no bioaccumulation effect or food chain concentration toxicity.
Ecotoxicity effects	Because of the elevated pH of this product, it might be expected to produce some ecotoxicity upon exposure to certain aquatic organisms and aquatic systems in high concentrations.

#### Nutrients

Mobility	Not available.
Persistence and degradability	Biodegradable.
Bioaccumulation	Not available.
Ecotoxicity effects	Not available.

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## SECTION 13 - DISPOSAL CONSIDERATIONS

Dispose of waste material according to local, provincial, state, and federal regulations. Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system. If CHA-PLA is mixed with concrete allow to harden (set concrete is considered stable waste).

Dispose CHA-PLA (waste products) in an approved landfill.

Dispose of waste material according to local, provincial, state and federal regulations.

## SECTION 14 - TRANSPORT INFORMATION

**Hazardous materials description** CHA-PLA is not hazardous under EU regulations.

**Hazard Class:** IATA: not classified.

ADR: not classified.

IMO: not classified.

**Identification Number:** Not applicable.

**Required Label Text:** Warning.

**Label elements. Label elements under CLP**

**Pictograms**



## SECTION 15 - REGULATORY INFORMATION

**Safety, health and environmental regulations/legislation specific for the substance or mixture**

Not applicable.

**Chemical Safety Assessment**

A chemical safety assessment has not been carried out for the substance or the mixture by the supplier.

## SECTION 15 - OTHER INFORMATION

**Approval Date or Revision Date:** 19-10-2018

**Date Of Previous MSDS:** 18-08-2017

**MSDS Number:** Not applicable

CHA-PLA is a concrete additive to be used in structural and civil engineering. This product provides self-healing capabilities to concrete by use of bacterial spores of alkaliphilic bacteria, that become active upon prolonged contact with water and air. Upon activation of the concrete healing bacteria, limestone is biologically produced, resulting in crack repair and extended concrete structure life.

While the information provided in this material safety data sheet is believed to provide a useful summary of the potential hazards of CHA-PLA, one cannot anticipate and provide all of the information that might be needed in every situation. The data listed in this MSDS does not address hazards that may be posed by other materials mixed with CHA-PLA. Users of CHA-PLA and mix products should review other relevant material safety data sheets before working with CHA-PLA.



## **Material Safety Data Sheet Concrete Healing Agent**

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