TransMineral USA, Inc.

SAFETY DATA SHEET (SDS)

Section 1. Identification

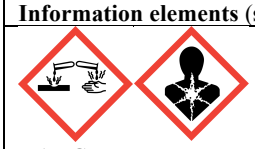
Product identifier	**NHL 3.5**
Other means of identification	St. Astier Natural Hydraulic Lime or CAS 85117-09-5
Recommended use and restrictions on use	Plasters and mortars
Initial supplier identifier	TransMineral USA, Inc. 201 Purrington Road, Petaluma, CA 94952, Telephone: (707) 769-0661
Emergency telephone number/restriction on use	USA - Chemtrec 1-800-424-9300

Section 2. Hazard identification

Classification of hazardous product (name of the category or subcategory of the hazard class)

Skin corrosion (Category 1C)
Eye damage (Category 1)
Carcinogenicity (Category 1)
Specific target organ toxicity – repeated exposure (Category 1), Organs

Information elements (symbols, signal words, hazard statements and precautionary statements of the category/subcategory)



DANGER
When this product is humid or mixed with water – H314 Causes severe skin burns and eye damage.
H350 May cause cancer.
H372 Causes damage to organs (lungs) through prolonged or repeated exposure (inhalation).
P201 Obtain special instructions before use. P202 Do not handle until all safety precautions have been read and understood. P260 Do not breathe dusts or mists. P264 Wash hands/nails/face thoroughly after handling. P270 Do not eat, drink or smoke when using this product. P280 Wear protective gloves/ protective clothing/ eye protection/ face protection. P405 Store locked up. P501 Dispose of contents/container into safe container in accordance with local, regional or national regulations. P308+P313 IF exposed or concerned: Get medical attention. P314 Get medical attention if you feel unwell. P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. P363 Wash contaminated clothing 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. P310 Immediately call a doctor.
KEEP OUT OF REACH OF CHILDREN.

Other hazards known	None

Section 3. Composition/information on ingredients

Chemical name (common name/synonyms)	CAS number or other	Concentration (%)
Calcium Oxide	1305-78-8	< 1
Calcium Dihydroxide	1305-62-0	15-65
Calcium Carbonate	1317-65-3	10-40
Calcium Silicate	10034-77-2	10-45
Aluminum Oxide	1344-28-1	0.5-5
Silica, Crystalline (Quartz)	14808-60-7	7-13
May also contain Magnesium oxide, Potassium oxide, Sodium oxide, Ferric oxide, ...	---	< 1

Section 4. First-aid measures

Inhalation	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a doctor.
Ingestion	IF SWALLOWED: Immediately call a doctor. DO NOT INDUCE VOMITING. NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Rinse mouth thoroughly with water. Have victim drink two glasses of water. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration.
Skin contact	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. (15-20 minutes).
Eye contact	IF IN EYES: Rinse cautiously with water for several minutes. (15-20 minutes). Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a doctor.
Most important symptoms and effects (acute or delayed)	NHL lime does not have acute toxicity in respect of oral, skin, or respiratory exposure. The substance is classified as an irritant for the skin and respiratory ways and presents a risk of serious eye damage. No deadly effects are suspected; the principal danger is restricted to localized effects. (effects pH)
Indication of immediate medical attention/special treatment	In all cases, call a doctor. Do not forget this document.

Section 5. Fire-fighting measures

Specific hazards of the hazardous product (hazardous combustion products)

This product is non-combustible. It does not emit any toxic substances in case of fire.

Suitable and unsuitable extinguishing media

In case of fire: Use carbon dioxide, chemical powder agent and appropriate foam to extinguish surrounding products.

Special protective equipment and precautions for fire-fighters

Avoid powders and dust dispersion. Use respiratory equipment. Use extinguishing methods taking in to account the local circumstances and the surrounding environment. If possible, avoid discharging the water used for extinguishing fire into the environment.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non emergency personnel
- Ensure adequate ventilation
- Avoid release of dust as much as possible.
- Keep away persons not wearing appropriate protective equipment.
- Avoid all contact with skin, eyes and clothing – wear appropriate protective equipment (see Section 8).
- Avoid inhaling dust – ensure adequate ventilation or wear respiration masks – wear appropriate protective clothing (see Section 8).

For emergency personnel
- Avoid release of dust as much as possible
- Ensure adequate ventilation.
- Keep away persons not wearing appropriate protective equipment
- Avoid all contact with skin, eyes and clothing–wear appropriate protective equipment (see Section 8).
- Avoid inhaling dust – ensure adequate ventilation or wear respiration masks – wear appropriate protective clothing (see Section 8).

Precautions for the protection of the environment

Contain spillages. Keep product dry if possible. Use covers to avoid creation of dust, if possible. Avoid large, uncontrolled spillages into waterways and drains (pH increase). All spillages in waterways must be notified to the Environmental Agency or other competent Authority.

Methods and materials for containment and cleaning up
- Label all receptacles where dust has been collected
- Impede or limit dust formation and dispersion
- Keep product dry if possible
- Collect product mechanically and in dry condition.
- Use a vacuum suction unit or shovel into bags.
- Harden the product before disposal as described in Section 13

Section 7. Handling and storage

Precautions for safe handling

Protective measures
- Avoid contact with skin, eyes and respiratory airways. Wear appropriate protective equipment (see Section 8 of this document).
- Do not wear contact lenses when handling this product. It is also recommended to keep eye drops on hand.

Keep formation or dispersion of dust to a minimum. Enclose dust sources and use extraction equipment (dust collection at handling point).

General advice on occupational hygiene
- Avoid inhalation, ingestion and contact with skin and eyes.
- Appropriate barrier creams can be used.
- Wash hands after each manipulation.
- General measures of hygiene at work are essential to ensure safe handling of the product. These include:
- Good personal practices, regular cleaning of the place of work, no alcohol drinking, eating or smoking at the place of work.
- Shower and change clothing at the end of work. Do not bring home any contaminated clothing. Separate work clothing from other clothing. Clean them separately.

Conditions for safe storage, including any incompatibilities

Safe storing conditions :
- Keep away from children reach.
- Store in a dry place.
- Bulk storage has to be in dedicated silos.

Incompatible materials:
- Strong acids and azotate composites.
- Organic matter.
- Avoid contact with air and moisture.
- Do not use aluminium for transport or storage if there is a risk of contact with water.

Section 8. Exposure controls/Personal protection

Control parameters (biological limit values or exposure limit values and source of those values)

Exposure limits: ACGIH – TLV-TWA & PEL-TWA – No value for the ingredients or the product itself.

CAS	PEL-TWA	STEL	ACGIH-TWA	STEL
1305-78-8	5 mg/m^3	---	2 mg/m^3	---
1305-62-0	5 mg/m^3	---	5 mg/m^3	---
1317-65-3/471-34-1	5 mg/m^3	---	---	---
10034-77-2	---	---	---	---
1344-28-1	5 mg/m^3	---	10 mg/m^3	---
14808-60-7	0.1 mg/m^3	---	0.025 mg/m^3	---

Appropriate engineering controls

Exposure Controls:
To control potential risks, avoid generating dust. Wear protective equipment. Eyes protection equipment (goggles or visors for example) are necessary unless contact with the eyes is avoided by the nature and type of application (closed process for example). In any case protection of the face, protective clothing and safety shoes must be worn. Refer to the Exposure Scenario annex available.

Appropriate technical controls:
If the product application generates dust, use enclosures, local ventilation or other technical methods to maintain dust limits below the maximum recommended.

Individual protection measures and personal protective equipment:

Eye and face protection
Do not wear contact lenses.
Wear tight fitting goggles with side shields or large vision full goggles. It is also recommended to carry eyewash.

Skin protection:
As NHLs are classified as irritant for the skin, dermal exposure has to be reduced to the minimum as much as possible.
Chemically protective gloves (impervious), and other protective clothing to prevent prolonged or repeated skin contact, must be worn during all handling operations.
Wear protective clothes offering total protection for the skin (long trousers, long sleeves, close fitting at openings) and shoes resistant to caustic products.

Respiratory protection:
Local ventilation is recommended to keep dust levels below indicated maximum values. Respiratory protection is required if the concentrations are higher than the exposure limits. Use a NIOSH approved respirators if the exposure limits are unknown.

Thermal hazards: The product does not present any thermal hazards.

Environmental exposure controls:
Before discharging into the atmosphere, filter all discharges from ventilation and other extraction systems. Contain spillages. All spillages in watercourses must be notified to the Environment Agency or other competent Authority.
For detailed information on risk management measures adequately controlling exposure of the environment refer to the Exposure Scenario annex available.

Section 9. Physical and chemical properties

Appearance, physical state/color	White to gray powder	**Vapor pressure**	Not applicable
Odor	Odorless	**Vapor density**	Not applicable
Odor threshold	Not applicable	**Relative density**	2.66
pH	~ 12 - 13	**Solubility**	1.5 g/l @20°C
Melting/freezing point	>450°C (840° F)	**Partition coefficient - n-octanol/water**	Not applicable
Initial boiling point/range	Not applicable	**Auto-ignition temperature**	Not applicable
Flash point	Not applicable	**Decomposition temperature**	Not applicable
Evaporation rate	Not applicable	**Viscosity**	Not applicable
Flammability (solids and gases)	Not applicable	**VOC**	Not applicable
Upper and lower flammability/explosive limits	Not applicable	**Other**	None known

Section 10. Stability and reactivity

Reactivity

In aqueous media Ca(OH)2 disassociates, forming Calcium cat ions and hydroxyl anions (when below the water solubility limit).

Chemical stability

The product is stable at ambient temperature and within the normal application and storing conditions.

Possibility of hazardous reactions

The substance produces an exothermic reaction in contact with acids. Heated above 580°C, the Calcium dihydroxide decomposes, producing Calcium Oxide (CaO) quick lime and water (H2O): $Ca(OH)2 \longrightarrow CaO + H2O$. The Calcium Oxide reacts with the water and generates heat. This could be a risk in the presence of flammable materials.

Conditions to avoid (static discharge, shock or vibration)

Minimize exposure to air and humidity to avoid degradation.

Incompatible materials

NHLs produce an exothermic reaction in contact with acids to form salts.
In presence of humidity the NHLs react with aluminium and brass producing hydrogen $Ca(OH)2 + 2Al + 6H2O \longrightarrow Ca[Al(OH)4]2 + 3\ H2$

Hazardous decomposition products

None to our knowledge. Complementary information: Calcium dihydroxide reacts with Carbon dioxide forming Calcium Carbonate which is a natural occurring material.

Section 11. Toxicological information

Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact)

When this product is humid or mixed with water – Causes severe skin burns and eye damage. May cause cancer. Causes damage to organs (lungs) through prolonged or repeated exposure (inhalation).

Symptoms related to the physical, chemical and toxicological characteristics

Skin irritation, redness, stinging, pain; Eye irritation, redness, tearing.

Delayed and immediate effects (chronic effects from short-term and long-term exposure)

Respiratory or skin sensitisation - No data available.
Based upon the known effects (pH modification) and on the basic human need for calcium in food, NHLs are considered as not producing a sensitisation effect to the skin. None of its components are known to have a sensitisation effect (ie: calcium carbonate calcium silicate and calcined clay mineral). The definition "sensitising" is not justified.

Germ cells mutagenicity
Bacterial reverse mutation tests (Ca(OH)2 and CaO, Tests d'Ames, OCDE 471) : negative. Mammalian chromosome aberration test [Ca(OH)2]: negative. By cross reference these results are applicable to NHLs. None of the components of NHL is known as genotoxic. Considering the pH effect, there is no mutagenicity. The definition "genotoxic" is not justifiable.

Carcinogenicity
IARC: Group 1: Agent is carcinogenic to humans – inhaled from occupational sources (also in NIOSH-C, MAK, NTP-RoC, Prop 65).
NOTE: The European Regulation on Chemicals has published and imposed a set of regulations described in REACH (**R**egistration, **E**valuation, **A**uthorization, and restriction of **CH**emical substances). Per NEPSI (European Network for Silica) recommendation, REACH formatted FDS (MSDS) does not list Crystalline Silica (Quartz) as a cancer risk in Saint-Astier NHL. The reason is that OEL (Occupational Exposure Limit) considers that exposure to a "maximum" breathable dust, at the time of mortar preparation, of less than 0.005mg of Crystalline Silica per m3 of air is NOT considered a health risk.

Reproductive toxicity
Calcium (administered as Ca-carbonate) is not toxic to reproduction (experimental studies on mice). The pH effect does not present a risk to reproduction. Clinical studies on humans and animals with different calcium slats have not shown any effect on reproduction or developmental. NHLs are not toxic for reproduction or development. The definition "toxic to reproduction" is not justified.

Specific toxicity for target organs (STOT)-single exposure
Calcium dihydroxide does not have specific toxicity for any exposure medium (dermal, oral, inhalation)

Specific toxicity for target organs (STOT)-repeated exposure
The toxicity of Calcium ingested is specified by the maximum tolerable limit (UL) for adults: UL = 2500 mg of Ca corresponding to 36 mg of Ca per kg of body weight for an adult weighing 70kg (Data from CSAH: Comité Scientifique en matière d'Alimentation Humaine). The toxicity of NHLs by skin absorption is not considered pertinent due to its insignificant absorption and the primary effect of local irritation (effect pH).
The toxicity due to inhalation (localised effects, mucous irritation) due to the CaO and the Ca(OH)2 is determined by SCOEL (Scientific Committee on exposure levels) as follows: DNEL = 1 mg / m³ breathable dust (see section 8.1) and VLEP (8h) = 1 mg / m³. The definition "toxic after repeated exposure" is not justified.

Hazards due to ingestion
Ingesting large quantity causes burns in the mouth, oesophagus, digestive track, nausea and vomit.

Numerical measures of toxicity (ATE; LD_{50} & LC_{50})

CAS 1305-62-0 LD_{50} Oral - Rat – 7340 mg/kg; LC_{50} Inhalation - Rat - None 4 h; LD_{50} Dermal - Rabbit - None
ATE not available in this document.

Section 12. Ecological information

Ecotoxicity (aquatic and terrestrial information)

Toxicity	In water environment and in the soil, exposure to NHLs means exposure to Calcium and hydroxide ions.
Acute/chronic toxicity to fish	LC50 (96h) for fresh water fish : 50,6 mg/l (Calcium dihydroxide) LC50 (96h) for Salt water fish : 457 mg/l (Calcium dihydroxide)
Acute/chronic toxicity to aquatic invertebrates	EC50 (48h) for fresh water invertebrates : 49,1 mg/l (Calcium dihydroxide) EC50 (96h) for salt water invertebrates: 158 mg/l (Calcium dihydroxide)
Acute/chronic toxicity to aquatic plants	EC50 (72h) for fresh water plants : 184,57 mg/l (Calcium dihydroxide) NOEC (72h) for salt water plants : 48 mg/l (Calcium dihydroxide)
Toxicity to micro-organisms such as bacteria	In high concentration because of increases in temperature and pH, calcium oxide is used for the disinfection of sewage sludges
Chronic toxicity to aquatic organisms	NOEC (14d) for seawater invertebrates : 32 mg/l (Calcium dihydroxide)
Toxicity to soil dwelling organisms	EC10/LC10 or NOEC for soil macro organisms : 2000 mg/kg of dry soil (Calcium dihydroxide) EC10/LC10 or NOEC for soil micro organisms : 12000 mg/kg of dry soil (Calcium dihydroxide)
Toxicity to terrestrial flora	NOEC (21d) for terrestrial plants : 1080 mg/kg (Calcium dihydroxide)
General effects	The product modifies the pH Although this product is useful for the modification of the pH of the water (acidity reduction), a dosage of over 1g/l can be harmful to aquatic life A pH value > 12 will decrease rapidly due to dilution and carbonation
Persistence and degradability	Not relevant (inorganic substance)
Bioaccumulative potential	Not relevant (inorganic substance)
Mobility in soil	Calcium dihydroxide reacts with moisture and/or Carbon dioxide forming Calcium Carbonate and water $Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 + H_2O$ which is sparingly soluble presenting a low mobility in most soils
Results of PBT and vPBvB evaluations	Not relevant (inorganic substance)
Other adverse effects	Not identified

Section 13. Disposal considerations

Information on safe handling for disposal/methods of disposal/contaminated packaging

Dispose of contents/container into safe container in accordance with local, regional or national regulations.

Section 14. Transport information

UN number; Proper shipping name; Class(es); Packing group (PG) of the TDG/49 CFR Regulations

NOT REGULATED

UN number; Proper shipping name; Class(es); Packing group (PG) of the IMDG (maritime)

NOT REGULATED

UN number; Proper shipping name; Class(es); Packing group (PG) of the IATA (air)

NOT REGULATED

Special precautions (transport/conveyance)	None
Environmental hazards (IMDG or other)	None
Bulk transport (usually more than 450 L in capacity)	Possible

Section 15. Regulatory information

Safety/health Canadian regulations specifics	Refer to Section 2 for the appropriate classification. This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations (HPR).
Environmental Canadian regulations specifics	Refer to Section 3 for ingredient(s) of the DSL

Safety/health/environmental outside regulations specifics

United States OSHA information: This product is regulated according to OSHA (29 CFR).
United States EPA (Environmental Protection Agency) information: 40 CFR Refer to the ingredients listed in Section 3 & Sections 12; 13 & 14.
United States TCSA information: Refer to the ingredients listed in Section 3.
National Fire Protection Association (NFPA):
HEALTH: 3 FLAMMABILITY: 0 INSTABILITY: 0 SPECIAL HAZARDS: Refer to Section 2 & 3.
HAZARD SCALE: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe
California Proposition 65: This product contains Silica, Crystalline (Quartz) that is known to the State of California to cause cancer or other reproductive harm.

Section 16. Other information

Date of the latest revision of the safety data sheet	February 16, 2016, version 1
References	Safety Data Sheets from manufacturer/supplier & from Canadian Centre for Occupational Health and Safety, CCOHS.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
ATE	Acute toxicity estimate
CAS	Chemical Abstract Service
CFR	Code of Federal Regulations
DSL	Domestic Substance List
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods Code
LC	Lethal concentration
LD	Lethal Dosage
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program (U.S.A.)
OSHA	Occupational Safety and Health Administration (U.S.A.)
PEL	Permissible Exposure Limit
STEL	Short-term Exposure Limit
TDG	Transport of dangerous goods in Canada
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
WHMIS	Workplace Hazardous Materials Information System