CHEMBASE TREATMENT – PRODUCT USER GUIDE

Date: September 2026

Rev B5

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REV	DATE	DETAILS
A	18/09/2024	Submission to NTRO
B	10/10/2024	Resubmission to NTRO based on PEP feedback (NTRO email 9/10/2024)
B2	13/02/2025	Clarifying form of hydrated lime (i.e. powder). Update to water % relative to OMC and construction methodology. Not yet submitted to NTRO.
B3	15/05/2026	"Recommended Construction Methodology" (B3) has been revised to align with practical field lime stabilisation application methodology.
B5	28/08/2026	Additional guidelines added as a result of the Lismore Council Observation Trial

	NAME	DATE
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Executive Summary

The treatment of soil has been used for centuries to improve their strength and suitability for construction. These treatments vary depending on the resources available and local regulations. Traditionally lime is the most common additive for improving soil. However, the development of natural organic polymers has brought significant advancements to the road construction industry.

Chembase International Ltd has been at the forefront of this innovation for over 30 years. They have developed an organic polymer additive that is environmentally safe and works effectively in combination with lime and mineral-based activators. This additive provides a sustainable solution for improving problematic soils and has passed all environmental clearances for use in road construction.

Chembase-treated materials show different behaviour compared to conventional stabilised materials. While they meet key engineering properties such as Unconfined Compressive Strength (UCS) and California Bearing Ratio (CBR), they do not exhibit the rigid characteristics that can lead to issues like shrinkage cracking. These materials offer a more flexible and durable alternative, contributing to better long-term performance without the drawbacks of traditional stabilisation methods.

Introduction

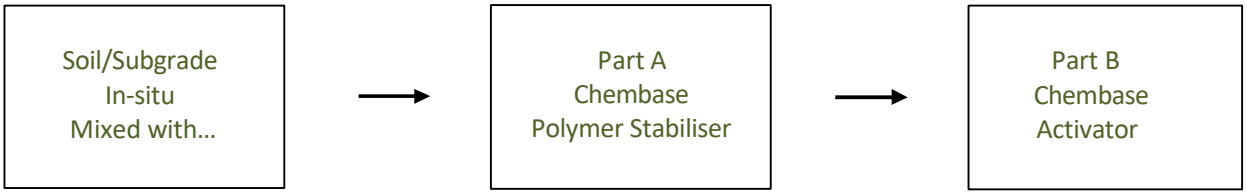
The Chembase Treatment System (CTS)

1. CTS is designed to enhance conventional lime stabilisation of in-situ material/soil in road construction and rehabilitation.
2. **Part 1 the** Polymer is a liquid organic polymer (**APPENDIX A)**.
   Part 2 the Activator is a concentrated ionic liquid (**APPENDIX B)**.
3. CTS has been designed to greatly improve the "Road-Base Layer" and "Sub-Base Layer" utilising the in-situ soil directly beneath the sealed road surface, Chembase treated rural roads do not necessarily need to be sealed with bitumen or asphalt.
4. CTS reacts with clay and hydrated lime to create a matrix which resists water entering the soil profile it also significantly improves stability, increases soil strength (USC and CBR), swell/shrink characteristics and durability.
5. CTS is environmentally friendly; it is produced by nature and is not a manufactured product such as cement, bitumen or asphalt.

The intended purpose of Chembase treatment is to improve the properties of soil/subgrade during road building and maintenance. This product user guide provides advice related to the laboratory mix design and field construction process.

Chembase is developed in Australia by chemical & road construction engineers and used in combination with Hydrated Lime. Chembase mitigates issues related to brittle and cracked materials associated with Lime Stabilisation. The addition of Chembase effectively enhances the stabilisation characteristics by producing a stronger, water resistant flexible road subgrade with improved shrinkage/swell characteristics. Figure 1 below shows the phases of Chembase application.

Figure 1: *Process of Applying Chembase*



Chembase treatment is generally not suitable for non-plastic materials since the reaction will be in-effective in the complete absence of clay minerals.

The Chembase treatment provides the following key benefits:

- Improved resistance to water penetration, reducing volume change.
- Strength improvements measured primarily by CBR
- Retention of strength of lime stabilised material (i.e. long-term strength gain)
- Reduced shrink/swell behaviour

Classification

According to Austroads Guide to Pavement Technology Part 4D: Stabilised Materials, Chembase can be dual categorised as Polymer and Organic, where addition of lime is allowable for enhancement of stiffness. Due to the heat generated with quicklime resulting in high risk to the people and plants, hydrated lime is used with Chembase product.

Subgrade

Subgrade with low to high clay content which is suitable for lime stabilisation as defined in Austroads AGPT04D-19 and/or state authorities' guidelines.

Traffic Loading

In this development stage, Chembase is targeted at lightly trafficked roads. Traffic loading is adopted as defined in Chapter 12 (Design of Lightly Trafficked Pavements) of Austroads AGPT02-17. The Austroads indicative design traffic table (from Chapter 12) is reproduced in **Figure 2**. It should be noted that different local jurisdictions may have their own definitions of 'low volume' or 'lightly trafficked.' Users of this guide should familiarise themselves with the applicable road hierarchies (local, collector, arterial) specific to the relevant local council area.

Figure 2: *Traffic Loading – Lightly-Trafficked Pavements*

Street type	AADT two-way	Heavy vehicles (%)	Initial daily heavy vehicles in design lane (single lane)	Design period (years)	Annual growth rate (%)	Cumulative growth factor[1]	Axle groups per heavy vehicle	Cumulative HVAG over design period	ESA/ HVAG	Indicative design traffic (ESA)
Minor with single lane traffic	30	3	0.9	20	0	20	2.0	13 140	0.2	3×10^3
				40	0	40	2.0	26 280	0.2	5×10^3
Minor with two lane traffic	90	3	1.35	20	0	20	2.0	19 710	0.2	4×10^3
				40	0	40	2.0	39 420	0.2	8×10^3
Local access with no buses	400	4	8	20	1	22.0	2.1	128 480	0.3	4×10^4
				40	1	48.9	2.1	285 576	0.3	9×10^4
Local access with buses	500	6	15	20	1	22.0	2.1	240 900	0.3	8×10^4
				40	1	48.9	2.1	535 455	0.3	1.5×10^5
Local access in industrial area	400	8	16	20	1	22.0	2.3	256 960	0.4	1.5×10^5
				40	1	48.9	2.3	571 152	0.4	3×10^5
Collector with no buses	1200	6	36	20	1.5	23.1	2.2	607 068	0.6	4×10^5
				40	1.5	54.3	2.2	1 427 004	0.6	10^6
Collector with buses	2000	7	70	20	1.5	23.1	2.2	1 180 410	0.6	8×10^5
				40	1.5	54.3	2.2	2 774 730	0.6	2×10^6

Mix Design

Table 1 Outlines the recommended binder and water dosages to be applied during the mix design process.

Table 1*. Recommended Binder and Water Dosage Rates*

Binder	Binder Dosage Amount	Water Dosage Amount
		Column 3
Hydrated Lime	The quantity of lime to be added is calculated from a Lime Demand test of the host material to be treated in accordance with AS 4489.6.1-1997. This range could be1.5% – 4% recommended based on the dry weight of the host material to be treated. Depending on the subgrade and the purity of the commercial lime available in the market further 0.50% may be added as a buffer. ALI (Available Lime Index) of lime is required to be as close to 100% as possible. The lime is added as powder, spread evenly over the area to be treated.	
Chembase Polymer	Approximately **0.32%** of the dry weight of the host material is to be treated. Mixed with water as per Column 3	Approximate 70% of the OMC volume of water required
Chembase Activator	Approximately **0.16%** of the dry weight of the host material is to be treated. Mixed with water as per Column 3	Approximate 30% of the OMC volume of water required

The total amount of water to be added is to be calculated from the difference in field moisture content of the in-situ host material to be treated and the optimum moisture content of the material mix compacted to 100% standard compaction.

Chembase Treatment System

Prior to the commencement of any design or construction work, the site conditions should be thoroughly assessed. At the first stage Visual Assessment must be undertaken to determine the potential risks and/or distresses. The second stage involves assessing the activity of hydrated lime and Chembase Polymer and Activator.

Material Sampling

Prepare a plan for sampling and field testing along the proposed road section considering existing distresses, wheel paths and level of traffic. Collect representative subgrade samples from the marked locations and undertake appropriate field testing. Use the Unified Soils Classification system in identifying the subgrade soil types.

Observe the profile of the holes from which the samples have been taken, take the samples to the depth of the material to be treated, include all material from within the sample including surface road base, gravel, soil and clay, thoroughly mix these materials to provide a true representation of the layer to be treated.

If there is clay or solid soil in large lumps, it must be milled by the testing laboratory to pass through a nineteen-millimetre sieve and mixed evenly through the entire sample prior to beginning all tests.

The key targets for the Chembase treated subgrade are **CBR, UCS, Capillary Rise and Swell/Linear Shrinkage**. Further details on these targets are provided in Table 2.

Table 2: *Test Methods – Chembase Treated Subgrade*

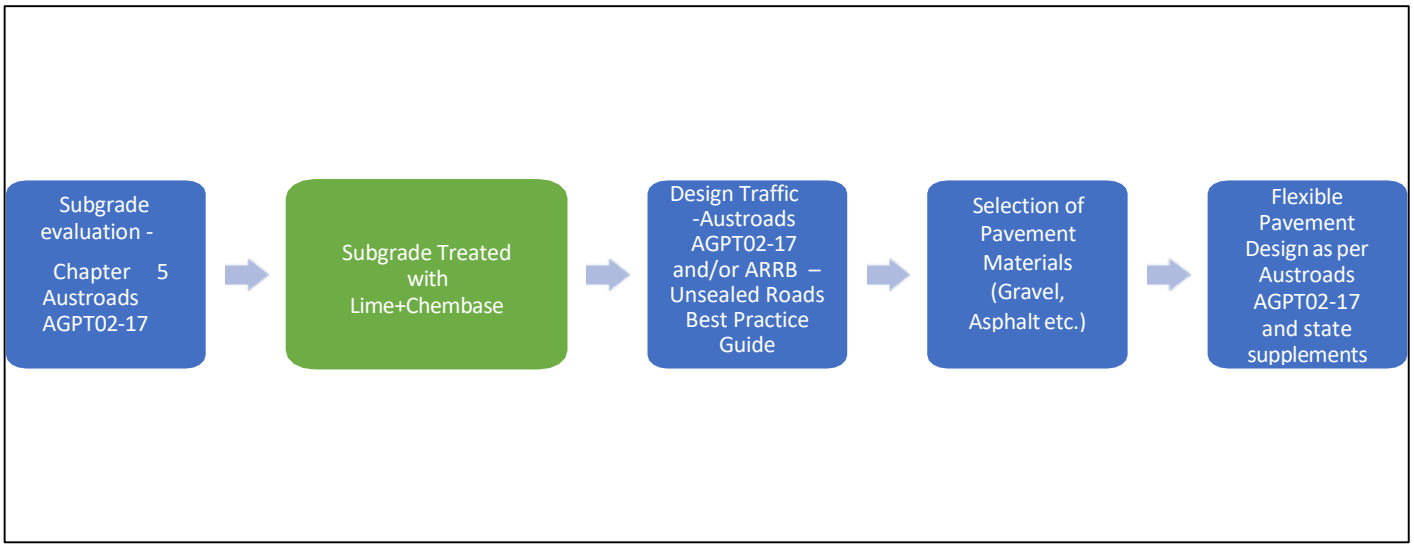
Test	Host Subgrade Material	Lime Stabilisation (Standalone)	Lime Stabilisation + Chembase	Test Method	Targets
Particle size distribution of soil/subgrade –	✓			AS 1289.3.6.3	As per state authorities' guidelines for lime
Liquid limit of soil (in case of significant silt, 0.075mm sieve could be considered)	✓	✓	✓	AS 1289.3.1.1 or 3.1.2	As per state authorities' guidelines for lime stabilisation
Plastic limit and plasticity index of soil				AS 1289.3.2.1 and 3.3.1	
Linear shrinkage of soil				AS 1289.3.4.1	
Standard or modified compaction as required by each state to determine MDD/OMC	✓	✓	✓	AS 1289.5.1.1	As per state authorities' guidelines for lime stabilisation
Determination of the CBR	✓	✓	✓	AS 1289.6.1.1	>CBR10%
Soil moisture content test by Oven drying method				AS 1289.2.1.1	
UCS of compacted treated materials with appropriate curing period		✓	✓	AS 5101.4-2008	UCS 1-2 MPa
Capillary rise	✓	✓	✓	AS 5101.5-2008 (2017) T172 – TfNSW Or an equivalent test as directed by the local authority may be used.	As per state authorities' guidelines for lime stabilisation
Lime Demand Test	✓			As per State Road Authorities	As per state authorities' guidelines for lime stabilisation
DCP up to minimum 1.5m depth from subgrade level	✓			AS 1289.1.2.1.6.4 (b)	As per state authorities' guidelines

Mix Design Procedure

The recommended mix design procedures in the form of process flow charts are provided below. These flow charts will be updated as more testing data is available, improving the performance understanding of the treated subgrade.

The flow chart in **Figure 3** indicates a general flexible pavement design approach by Austroads (AGPT02-17). The green cell is specifically for the Chembase application for subgrade.

Figure 3: *General Flexible Pavement Design Approach by Austroads*

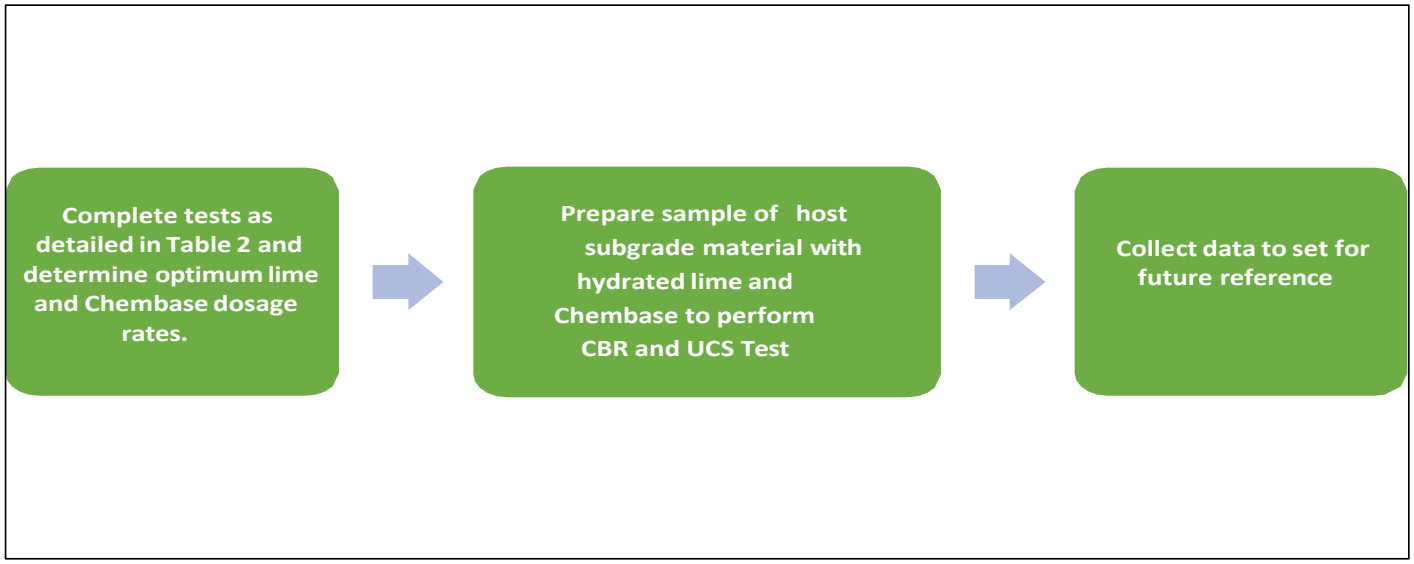


The flow chart in

Figure 4 shows the general design mix approach to determine optimum dosage rates, and CBR and UCS testing for the Chembase treated subgrade.

For the Chembase treated subgrade, CBR and UCS test results are expected to achieve higher results compared to the subgrade which is treated/stabilised only with lime.

Figure 4: General design mix approach to determine optimum dosage rates



Recommended Construction Specification

Subgrade

Pavement design is to be undertaken as per the Austroads guide AGPT02-17.

The general design steps, incorporating Chembase treatment, are:

- Determine design traffic loading.
- Assessment of subgrade up to a minimum depth of 1.5m as per relevant regional standard/supplement.
- Host material assessment undertaking Lime Demand, Classification and Compaction tests.
- Establish Mix Designs at the laboratory (percentage Lime + percentage Chembase product (Polymer and Activator)
- Construct to 100% of standard compaction or equivalent of modified compaction.
- Proof-rolling 100% of constructed area.
- Soft pockets shall be replaced and reconstructed.
- Remove oversized larger than 75 millimetres.
- Adopt QA process with an Inspection and Testing Plan

Recommended Construction Methodology

The Chembase treatment is applied to in-situ subgrade to form a stable, strong water-resistant layer. Both the Chembase Polymer and Chembase Activator are supplied to the site in a liquid form.

Before any field work commences the subgrade material to be treated with Chembase must be thoroughly assessed and their reactions with lime and Chembase must be validated, checked and approved by Chembase and/or road agency engineers. The general construction methodology is as per the Austroads guide AGPT08-19. The high-level step-by-step process may involve the following activities. These processes, including on-site management of water and dosage rates, will be refined as experience is gained through field trials and projects.

Site Preparation

- Ensure all safety precautions are in place.
- Hold a meeting with all contractors, machinery operators, workers and traffic control personnel. An agenda should set out as follows:
    - Intent of the project
    - Review final specifications and limits of work
    - Verify environmental controls, site condition assessments and appropriate safety standards
    - To include understanding of the WH&S of using the product.
    - Staging areas
    - Traffic management
    - Schedule coordination
    - Characteristics / Intent of the product
    - The amount of Chembase Polymer and Chembase Activator to be mixed with water.
    - How product is to be applied
    - How conformance is to be checked
    - Description of a good outcome
    - Any other questions

Mark out the road area to be treated as per the Austroads guide AGPT08-19.

Organic matter must firstly be removed from the soil to be treated (grass, plants, roots, leaves, and (twigs)

Application Steps:

1. Prepare surface

Lightly scarify the surface using a road grader with rippers to allow even spreading of lime, Chembase Polymer, Chembase Activator and water. Assess the moisture content of the materials to be stabilised at the time of construction. This can be made by engineering judgement by on-site engineer, or more accurately by measurement.

2. Hydrated Lime

Hydrated lime is to be spread directly over the scarified road.

The amount of Hydrated lime required is calculated from the results of the lime demand test. A bulk spreading truck is ideal for the hydrated lime application. The lime amount per square metre of road surface is calculated according to the depth of material to be treated.

A stabilising machine can mix a maximum amount of 12 kg/m² per mixing run. If this amount is exceeded the machine will create a mound of lime in front of the machine which will not be mixed correctly into the soil/material.

Single Application.

If only one lime application is required, the lime is spread then the Chembase Polymer is mixed with water and sprayed directly onto the lime, then thoroughly mixed with a stabilising machine.

Double Application.

If more than 12Kg/m^2 is required two spreading runs of the spreader will be required, the lime spread by the first run must be thoroughly mixed into the in-situ soil before the second spreading run. After the second run of lime is applied the Chembase Polymer water mixture is sprayed directly over the lime and then mixed thoroughly into the lime soil mix from the previous mixing.

Should the lime spreader have a mechanical failure during application the lime already spread can be left on the road for up to twenty-four hours then spreading may continue. If the lime spreader is unable to continue after twenty-four hours the lime that has been spread is to be mixed into the soil to avoid wastage by wind or rain.

3. Stabiliser application (Part 1.)

The Chembase Polymer is mixed in a water spray tanker at a rate calculated from the laboratory tests of the in-situ material with 70% of the available water calculated from the difference in moisture contents and the optimum moisture content of the material to be treated as determined by the material sample laboratory tests. The amount of the Chembase Polymer, water mixture is to be spread at a rate per square metre determined by the Chembase calculator.

The water is added to the water cart first and then the Chembase Polymer is pumped to the water cart from IBCs to ensure even mixing within the tanker. The Chembase Polymer mixes well with water and will fully disperse with minimal agitation.

Nozzles on the water cart spray bar must spray downwards directly onto the road for even spraying. The spray fixture should not have nozzles that spray up into the air as this is affected by wind and does no deliver even distribution of the Chembase Polymer/water mixture (Figure 5a). There is the possibility that some of the treatment will be blown off the sides of the construction section (Figure 5b). The Chembase Polymer can be added directly through a stabilser however, it is advised that the Chembase Activator should not be added by the same process as it can react in the pipes/nozzles causing blockages.

Figure 5: *Water cart spray equipment*

a) Spray bar - good		b) Upward/fan sprayer - bad

Spray the Chembase Polymer/water mixture evenly over the lime on the road area to be treated. The mixture has the consistency of water as the volume of Chembase Polymer is a very small proportion of the mixture.

Connect the Chembase Polymer/water supply directly to the stabilising machine; to enable the mixture to be sprayed directly through the mixing drum, this will ensure a more consistent outcome and better mixing.

Important: Do not exceed the Optimum Moisture Content (OMC) by more than 10%. Reduce water quantities if the road has received above-average rainfall before treatment.

Should the spray tanker have a mechanical failure during application of the Chembase Polymer, water mixture areas that have been sprayed can be left on the road for up to twenty-four hours then spraying may continue. If the later cart is unable to continue after twenty-four hours the Chembase Polymer that has been sprayed is to be mixed into the soil to avoid wastage.

4. First mixing process.

Once the hydrated lime and the Chembase Polymer/water mixture is spread over the area to be treated it is mixed thoroughly into the in-situ material to the predetermined depth with a plant capable of mixing the product efficiently to the required depth. Optimally, a stabiliser is the machine of choice, however graders with tines or a rotary mixer is acceptable for farm roads etc.

Where the application is carried out over non continuous application, an overlap of the areas treated of at least 75 mm, but no more than 150 mm must occur to ensure a uniform mix over the entire surface. However, the overlap areas shall not receive hydrated lime or Chembase Polymer and Chembase Activator twice. The Chembase stabiliser is to be fully incorporated into the material on site and a visual inspection of the surface carried out after the incorporation. Where the inspection indicated that the material application or moisture content is not uniform additional passes over the material may be required.

5. Activator application (Part 2.)

The Chembase Activator is mixed in a water tanker at a rate calculated from the laboratory tests of the in-situ material with the remaining 30% of the water calculated from the difference in moisture contents and the optimum moisture content of the material to be treated as determined by the material sample laboratory tests.

The water is added to the spray tanker first and then the Chembase Activator is pumped into the cart under pressure to ensure even mixing within the tanker. The Chembase Activator also mixes well with water and will fully disperse with minimal agitation.

Care must be taken to avoid mixing Chembase Polymer with Chembase Activator inside the same spray tankers or containers as these products react instantly and may block spray nozzles and cause damage to the machinery. Ideally separate tankers should be used to avoid possible damage. Similarly, the Chembase Activator should not be added directly through a stabilser, if this has been used for Chembase Polymer product, as it can react in the pipes/nozzles causing blockages.

The Chembase Activator and water mixture is sprayed over the hydrated lime at a predetermined rate per square metre calculated from in-situ soil tests. Care must be taken to prevent exceeding the optimum moisture content.

Should the spray tanker have a mechanical failure during application of the Chembase Activator, water mixture, areas that have been sprayed can be left on the road for up to six hours, before spraying the remaining Chembase Activator. The previously sprayed activator that was left for some hours must first be lightly sprayed with water to soften and improve its workability before mixing.

6. Second mixing process

Once the Chembase Activator/water mixture is spread over the area previously treated with lime and Chembase Polymer the treated area is mixed thoroughly into the in-situ material to the predetermined depth with a plant capable of mixing the product efficiently to the required depth. Optimally, a stabiliser is the machine of choice, however graders with tines or a rotary mixer is acceptable for farm roads etc.

The Chembase Activator is to be fully incorporated into the material on site and a visual inspection of the surface carried out after the incorporation. Where the inspection indicated that the material application or moisture content is not uniform additional passes over the material may be required.

7. Compaction and finishing

After all the above steps have been completed the road shall be shaped and formed by a road grader providing sufficient crossfall from the centre of the road to its outside edge to allow adequate flow of water due to rain. The layer should then be compacted to 100% of standard compaction utilising several types of compaction machines weighing a minimum of twenty tonnes each, such as heavy pad foot roller, heavy smooth drum vibrating roller and pneumatic wheel rollers.

An Inspection and Testing Plan must be followed to record the QA data to validate the design and specification.

The treated road may be used by traffic after a curing period of 48 hours; this period may be reduced if approved by the construction engineer.

The safety and environmental certificates of the Chembase products are provided in **Appendix A.**

References

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APPENDIX A

Section 1 - Identification of The Material and Supplier

Chembase International Pty Ltd ACN 169 434 020
Level 2, Suite 65, 48 George Street
Parramatta NSW 2150 AUSTRALIA
Phone: +61 2 8566 3344 (business hours)
Email: info@chembase.com.au

Chemical nature: Solution of various alkaline salts and surfactants
Trade Name: **Chembase Polymer Stabiliser**
Product Use: Engineering product/Soil and road base Polymer Stabiliser
Creation Date: **July 2019**
This version issued: **July 2025** and is valid for 5 years from this date.
Poisons Information Centre: Phone 13 1126 from anywhere in Australia

Section 2 - Hazards Identification

Statement of Hazardous Nature
This product is classified as: Not hazardous according to the criteria of SWA.

Not a Dangerous Good according to Australian Dangerous Goods (ADG) Code, IATA or IMDG/IMSBC criteria.

SUSMP Classification: None allocated.
ADG Classification: None allocated. Not a Dangerous Good according to Australian Dangerous Goods (ADG) Code, IATA or IMDG/IMSBC criteria.
UN Number: None allocated

GHS Signal word: NONE. Not hazardous.
PREVENTION
P264: Wash contacted areas thoroughly after handling.
P280: Wear protective gloves, protective clothing and eye or face protection.
RESPONSE
P363: Wash contaminated clothing before reuse.
P301+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353: IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water.
P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P370+P378: Not combustible. Use extinguishing media suited to burning materials.
STORAGE
P410: Protect from sunlight.
P402+P404: Store in a dry place. Store in a closed container.
P403+P235: Store in a well-ventilated place. Keep cool.
DISPOSAL
P501: If they can not be recycled, dispose of contents to an approved waste disposal plant and containers to landfill (see Section 13 of this SDS).

Emergency Overview

Physical Description & Colour: Liquid, no data regarding colour.
Odour: No data.
Major Health Hazards: no major health hazards.

Section 3 - Composition/Information on Ingredients

Ingredients	CAS No	Conc, %	TWA (mg/m^3)	STEL (mg/m^3)
Potassium hydroxide	1310-58-3	1-3	2	Peak
Sodium hydroxide	1310-73-2	0.5-1.0	2	Peak
Other nonhazardous ingredients including water	secret	to 100	not set	not set

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other non- hazardous ingredients are also possible.
The **SWA TWA** exposure value is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5-day working week. The **STEL** (Short Term Exposure Limit) is an exposure value that may be equalled (but should not be exceeded) for no longer than 15 minutes and should not be repeated more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The term "peak "is used when the TWA limit, because of the rapid action of the substance, should never be exceeded, even briefly.

Section 4 - First Aid Measures

General Information:
You should call The Poisons Information Centre if you feel that you may have been poisoned, burned or irritated by this product. The number is 13 1126 from anywhere in Australia (0800 764 766 in New Zealand) and is available at all times. Have this SDS with you when you call.

Inhalation: First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Skin Contact: Flush contaminated area with lukewarm, gently flowing water for at least 20-30 minutes, by the clock. DO NOT INTERRUPT FLUSHING. If necessary, keep emergency vehicle waiting (show paramedics this MSDS and take their advice). Under running water, remove contaminated clothing, shoes and leather goods (e.g. watchbands and belts). If irritation persists, repeat flushing. Seek medical attention.

Eye Contact: Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 20-30 minutes, by the clock, while holding the eyelid(s) open. Neutral saline solution may be used as soon as it is available.

DO NOT INTERRUPT FLUSHING. If necessary, keep emergency vehicle waiting (show paramedics this MSDS and take their advice). Take care not to rinse contaminated water into the unaffected eye or onto face. If irritation persists, repeat flushing. Call a Poisons Information Centre or a doctor urgently. Take special care if exposed person is wearing contact lenses.

Ingestion: If product is swallowed or gets in mouth, do NOT induce vomiting; wash mouth with water and give some water to drink. If symptoms develop, or if in doubt contact a Poisons Information Centre or a doctor.

Section 5 - Fire Fighting Measures

Fire and Explosion Hazards: The major hazard in fires is usually inhalation of heated and toxic or oxygen deficient (or both), fire gases. There is no risk of an explosion from this product under normal circumstances if it is involved in a fire.

This product is likely to decompose only after heating to dryness, followed by further strong heating.

Fire decomposition products from this product may be toxic if inhaled. Take appropriate protective measures.
Extinguishing Media: Not combustible. Use extinguishing media suited to burning materials.
Fire Fighting: If a significant quantity of this product is involved in a fire, call the fire brigade.

Flash point:	Will not burn until water component is driven off.
Upper Flammability Limit:	Does not burn.
Lower Flammability Limit:	Does not burn.
Autoignition temperature:	Does not burn.
Flammability Class:	Does not burn.

Section 6 - Accidental Release Measures

Accidental release: In the event of a major spill, prevent spillage from entering drains or water courses. Wear full protective chemically resistant clothing including eye/face protection, gauntlets and self-contained breathing apparatus. See below under Personal Protection regarding Australian Standards relating to personal protective equipment. Suitable materials for protective clothing include rubber, Viton, Nitrile, butyl rubber, Barricade, neoprene, Teflon, polyethylene, PE/EVAL, Saranex and Responder. Eye/face protective equipment should comprise, as a minimum, protective goggles. If there is a significant chance that vapours or mists are likely to build up in the cleanup area, we recommend that you use a respirator. Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned below (section 8).

Stop leak if safe to do so and contain spill. Absorb onto sand, vermiculite, or other suitable absorbent material. If spill is too large or if absorbent material is not available, try to create a dike to stop material spreading or going into drains or waterways. Sweep up and shovel or collect recoverable product into labelled containers for recycling or salvage and dispose of promptly. Recycle containers wherever possible after careful cleaning. After spills, wash area preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. This material may be suitable for approved landfill. Ensure legality of disposal by consulting regulations prior to disposal. Thoroughly launder protective clothing before storage or re-use. Advise laundry of nature of contamination when sending contaminated clothing to laundry.

Section 7 - Handling and Storage

Handling: Keep exposure to this product to a minimum, and minimise the quantities kept in work areas. Check Section 8 of this SDS for details of personal protective measures and make sure that those measures are followed. The measures detailed below under "Storage" should be followed during handling to minimise risks to persons using the product in the workplace. Also, avoid contact or contamination of product with incompatible materials listed in Section 10.

Storage: Store packages of this product in a cool place. Make sure that containers of this product are kept tightly closed. Keep containers dry and away from water. Keep containers of this product in a well-ventilated area. Protect this product from light. Make sure that the product does not come into contact with substances listed under "Incompatibilities" in Section 10. Some liquid preparations settle or separate on standing and may require stirring before use. Check packaging - there may be further storage instructions on the label.

Section 8 - Exposure Controls and Personal Protection

The following Australian Standards will provide general advice regarding safety clothing and equipment:
Respiratory equipment: **AS/NZS 1715**, Protective Gloves: **AS 2161**, Occupational Protective Clothing: AS/NZS 4501 set 2008, Industrial Eye Protection: **AS1336** and **AS/NZS 1337**, Occupational Protective Footwear: **AS/NZS2210**.

SWA Exposure Limits	**TWA (mg/m³)**	**STEL (mg/m³)**
Potassium hydroxide	2	Peak
Sodium hydroxide	2	Peak

No special equipment is usually needed when occasionally handling small quantities. The following instructions are for bulk handling or where regular exposure in an occupational setting occurs without proper containment systems.
Ventilation: This product should only be used in a well-ventilated area. If natural ventilation is inadequate, use of a fan is suggested.
Eye Protection: Your eyes must be completely protected from this product by splash resistant goggles with face shield. All surrounding skin areas must be covered. Emergency eye wash facilities must also be available in an area close to where this product is being used.
Skin Protection: Because of the dangerous nature of this product, make sure that all skin areas are completely covered by impermeable gloves, overalls, hair covering, apron and face shield. See below for suitable material types.

Protective Material Types: We suggest that protective clothing be made from the following materials: rubber, Viton, nitrile, butyl rubber, Barricade, neoprene, Teflon, polyethylene, PE/EVAL, Saranex, Responder.
Respirator: Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned above.
Safety deluge showers should, if practical, be provided near to where this product is being handled commercially.

Section 9 - Physical and Chemical Properties:

Physical Description & colour:	Liquid, no data regarding colour.
Odour:	No data.
Boiling Point:	Approximately 100°C at 100kPa.
Freezing/Melting Point:	Approximately 0°C.
Volatiles:	Water component.
Vapour Pressure:	2.37 kPa at 20°C (water vapour pressure).
Vapour Density:	As for water.
Specific Gravity:	No data.
Water Solubility:	Miscible.
pH:	Approx 8.5.
Volatility:	No data.
Odour Threshold:	No data.
Evaporation Rate:	As for water.
Coeff Oil/water Distribution:	No data
Autoignition temp:	Does not burn.

Section 10 - Stability and Reactivity

Reactivity: This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf-life properties.
Conditions to Avoid: This product should be kept in a cool place, preferably below 30°C. Keep containers tightly closed. Containers should be kept dry. Keep containers and surrounding areas well ventilated. Protect this product from light.
Incompatibilities: strong acids.
Fire Decomposition: This product is likely to decompose only after heating to dryness, followed by further strong heating. Combustion forms carbon dioxide, and if incomplete, carbon monoxide and possibly smoke. Water is also formed. May form nitrogen and its compounds, and under some circumstances, oxides of nitrogen. Occasionally hydrogen cyanide gas in reducing atmospheres. Potassium compounds, sodium compounds. Carbon monoxide poisoning produces headache, weakness, nausea, dizziness, confusion, dimness of vision, disturbance of judgment, and unconsciousness followed by coma and death.
Polymerisation: This product will not undergo polymerisation reactions.

Section 11 - Toxicological Information

Local Effects:
Target Organs: There is no data to hand indicating any target organs.

Classification of Hazardous Ingredients

Ingredient	Risk Phrases
Potassium Hydroxide • Acute toxicity – category 4 • Skin corrosion – category 1A	>=2%Conc<5%: C; R34
Sodium Hydroxide • Skin corrosion – category 1A	>=0.5%Conc<2%: Xi; R36/38

Potential Health Effects

Inhalation:
Short Term Exposure: Available data indicates that this product is not harmful. In addition, product is unlikely to cause any discomfort or irritation. If liquid enters nasal passages, it will cause pain and burn nasal membranes. Patients with inhalation burns may develop acute pulmonary oedema.
Long Term Exposure: No data for health effects associated with long term inhalation.
Skin Contact:
Short Term Exposure: This product is not expected to be hazardous through skin contact. May be mildly irritating under certain circumstances.
Long Term Exposure: No data for health effects associated with long term skin exposure.
Eye Contact:
Short Term Exposure: Product may cause eye irritation, but symptoms are expected to gradually disappear after contact ceases.
Long Term Exposure: No data for health effects associated with long term eye exposure.
Ingestion:
Short Term Exposure: Significant oral exposure is unlikely. Available data shows that this product is not harmful. However, this product may be irritating to mucous membranes but is unlikely to cause anything more than transient discomfort.
Long Term Exposure: No data for health effects associated with long term ingestion.
Carcinogen Status:
SWA: No significant ingredient is classified as carcinogenic by SWA.
NTP: No significant ingredient is classified as carcinogenic by NTP.
IARC: No significant ingredient is classified as carcinogenic by IARC.

Section 12 - Ecological Information

This product is not expected to have significant environmental effects. Salts, acids and bases are typically diluted and neutralised when released into the environment in small quantities. Organic compounds found in this product are likely to naturally degrade.

Section 13 - Disposal Considerations

Disposal: This product may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. If neither of these options is suitable in-house, consider controlled incineration, or contact a specialist waste disposal company.

Section 14 - Transport Information

UN Number: This product is not classified as a Dangerous Good by ADG, IATA or IMDG/IMSBC criteria. No special transport conditions are necessary unless required by other regulations.

Section 15 - Regulatory Information

AICS: All of the significant ingredients in this formulation are compliant with NICNAS regulations.

The following ingredients: Potassium hydroxide, Sodium hydroxide, are mentioned in the SUSMP.

Section 16 - Other Information

This SDS contains only safety-related information. For other data see product literature.

Acronyms:

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail (7th edition)
AICS	Australian Inventory of Chemical Substances
SWA	Safe Work Australia, formerly ASCC and NOHSC
CAS number	Chemical Abstracts Service Registry Number
Hazchem Code	Emergency action code of numbers and letters that provide information to emergency services especially firefighters
IARC	International Agency for Research on Cancer
NOS	Not otherwise specified
NTP	National Toxicology Program (USA)
SUSMP	Standard for the Uniform Scheduling of Medicines & Poisons
UN Number	United Nations Number

THIS SDS SUMMARISES OUR BEST KNOWLEDGE OF THE HEALTH AND SAFETY HAZARD INFORMATION OF THE PRODUCT AND HOW TO SAFELY HANDLE AND USE THE PRODUCT IN THE WORKPLACE. EACH USER MUST REVIEW THIS SDS IN THE CONTEXT OF HOW THE PRODUCT WILL BE HANDLED AND USED IN THE WORKPLACE.

IF CLARIFICATION OR FURTHER INFORMATION IS NEEDED TO ENSURE THAT AN APPROPRIATE RISK ASSESSMENT CAN BE MADE, THE USER SHOULD CONTACT THIS COMPANY SO WE CAN ATTEMPT TO OBTAIN ADDITIONAL INFORMATION FROM OUR SUPPLIERS.

OUR RESPONSIBILITY FOR PRODUCTS SOLD IS SUBJECT TO OUR STANDARD TERMS AND CONDITIONS, A COPY OF WHICH IS SENT TO OUR CUSTOMERS AND IS ALSO AVAILABLE ON REQUEST.

Please read all labels carefully before using product.

This SDS is prepared in accord with the SWA document "Preparation of Safety Data Sheets for Hazardous Chemicals - Code of Practice" (Feb 2016)

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http://www.kilford.com.au/ Phone (02) 8321 8866

Section 1 - Identification of The Material and Supplier

Chembase International Pty Ltd ACN 169 434 020
Level 2, Suite 65, 48 George Street
Parramatta NSW 2150 AUSTRALIA

Phone: +61 2 8566 3344 (business hours)
Email: info@chembase.com.au

Chemical nature: Solution of Metal Salts
Trade Name: **Chembase Activator**
Product Use: Soil Polymer Stabiliser.
Creation Date: **July 2019**
This version issued: **July 2025** and is valid for 5 years from this date.
Poisons Information Centre: Phone 13 1126 from anywhere in Australia

Section 2 - Hazards Identification

Statement of Hazardous Nature
This product is classified as: Not hazardous according to the criteria of SWA.

Not a Dangerous Good according to Australian Dangerous Goods (ADG) Code, IATA or IMDG/IMSBC criteria.

SUSMP Classification: None allocated.
ADG Classification: None allocated. Not a Dangerous Good according to Australian Dangerous Goods (ADG) Code, IATA or IMDG/IMSBC criteria.
UN Number: None allocated

GHS Signal word: WARNING
Serious eye irritation Category 2/2A
HAZARD STATEMENT:
H319: Causes serious eye irritation.
PREVENTION
P262: Do not get in eyes, on skin, or on clothing.
P264: Wash contacted areas thoroughly after handling.
P281: Use personal protective equipment as required.
RESPONSE
P301+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
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.
P370+P378: Not combustible. Use extinguishing media suited to burning materials.
STORAGE
P410: Protect from sunlight.
P402+P404: Store in a dry place. Store in a closed container.
P403+P235: Store in a well-ventilated place. Keep cool.
DISPOSAL
P501: If they can not be recycled, dispose of contents to an approved waste disposal plant and containers to landfill (see Section 13 of this SDS).

Emergency Overview

Physical Description & Colour: Blue liquid
Odour: No odour.
Major Health Hazards: May cause serious damage to eyes.

Section 3 - Composition/Information on Ingredients

Ingredients	CAS No	Conc, %	TWA (mg/m^3)	STEL (mg/m^3)
Aluminium sulfate	10043-01-3	30-50	2	not set
Other nonhazardous ingredients	secret	to 100	not set	not set

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other nonhazardous ingredients are also possible.

The **SWA TWA** exposure value is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5day working week. The **STEL** (Short Term Exposure Limit) is an exposure value that may be equalled (but should not be exceeded) for no longer than 15 minutes and should not be repeated more than 4 times per day. There should be at least 60 minutes between successive exposures at the **STEL**. The term "peak "is used when the **TWA limit**, because of the rapid action of the substance, should never be exceeded, even briefly.

Section 4 - First Aid Measures

General Information:
You should call The Poisons Information Centre if you feel that you may have been poisoned, burned or irritated by this product. The number is 13 1126 from anywhere in Australia (0800 764 766 in New Zealand) and is available at all times. Have this SDS with you when you call.

Inhalation: First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.
Skin Contact: Wash gently and thoroughly with water (use non-abrasive soap if necessary) for 5 minutes or until Chemical Substances is removed.
Eye Contact: Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 15 minutes or until the product is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately. Take special care if exposed person is wearing contact lenses.
Ingestion: If product is swallowed or gets in mouth, do NOT induce vomiting; wash mouth with water and give some water to drink. If symptoms develop, or if in doubt contact a Poisons Information Centre or a doctor.

Section 5 - Fire Fighting Measures

Fire and Explosion Hazards: The major hazard in fires is usually inhalation of heated and toxic or oxygen deficient (or both), fire gases. There is no risk of an explosion from this product under normal circumstances if it is involved in a fire.
This product is likely to decompose only after heating to dryness, followed by further strong heating.
Fire decomposition products from this product may be toxic if inhaled. Take appropriate protective measures.
Extinguishing Media: Not combustible. Use extinguishing media suited to burning materials.
Fire Fighting: If a significant quantity of this product is involved in a fire, call the fire brigade.

Flash point:	Will not burn until water component is driven off.
Upper Flammability Limit:	Does not burn.
Lower Flammability Limit:	Does not burn.
Autoignition temperature:	Does not burn.
Flammability Class:	Does not burn.

Section 6 - Accidental Release Measures

Accidental release: In the event of a major spill, prevent spillage from entering drains or water courses. Wear full protective chemical resistant clothing including eye/face protection, gauntlets and self-contained breathing apparatus. See below under Personal Protection regarding Australian Standards relating to personal protective equipment. Suitable materials for protective clothing include rubber, Viton, Nitrile, butyl rubber, Barricade, neoprene, Teflon, polyethylene, PE/EVAL, Saranex and Responder. Eye/face protective equipment should comprise, as a minimum, protective goggles. If there is a significant chance that vapours or mists are likely to build up in the cleanup area, we recommend that you use a respirator. Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned below (section 8).

Stop leak if safe to do so and contain spill. Absorb onto sand, vermiculite or other suitable absorbent material. If spill is too large or if absorbent material is not available, try to create a dike to stop material spreading or going into drains or waterways. Sweep up and shovel or collect recoverable product into labelled containers for recycling or salvage, and dispose of promptly. Recycle containers wherever possible after careful cleaning. After spills, wash area preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. This material may be suitable for approved landfill. Ensure legality of disposal by consulting regulations prior to disposal. Thoroughly launder protective clothing before storage or re-use. Advise laundry of nature of contamination when sending contaminated clothing to laundry.

Section 7 - Handling and Storage

Handling: Keep exposure to this product to a minimum, and minimise the quantities kept in work areas. Check Section 8 of this SDS for details of personal protective measures, and make sure that those measures are followed.

The measures detailed below under "Storage" should be followed during handling in order to minimise risks to persons using the product in the workplace. Also, avoid contact or contamination of product with incompatible materials listed in Section 10.

Storage: Store packages of this product in a cool place. Make sure that containers of this product are kept tightly closed. Keep containers dry and away from water. Keep containers of this product in a well-ventilated area. Protect this product from light. Make sure that the product does not come into contact with substances listed under "Incompatibilities" in Section 10. Some liquid preparations settle or separate on standing and may require stirring before use. Check packaging - there may be further storage instructions on the label.

Section 8 - Exposure Controls and Personal Protection

The following Australian Standards will provide general advice regarding safety clothing and equipment:

Respiratory equipment: **AS/NZS 1715**, Protective Gloves: **AS 2161**, Occupational Protective Clothing: AS/NZS 4501 set 2008, Industrial Eye Protection: **AS1336** and **AS/NZS 1337**, Occupational Protective Footwear: **AS/NZS2210**.

SWA Exposure Limits	**TWA (mg/m³)**	**STEL (mg/m³)**
Aluminium sulfate	2	not set

No special equipment is usually needed when occasionally handling small quantities. The following instructions are for bulk handling or where regular exposure in an occupational setting occurs without proper containment systems.
Ventilation: This product should only be used where there is ventilation that is adequate to keep exposure below the TWA levels. If necessary, use a fan.
Eye Protection: Protective glasses or goggles must be worn when this product is being used. Failure to protect your eyes may lead to severe harm to them or to general health. Emergency eye wash facilities must also be available in an area close to where this product is being used.
Skin Protection: You should avoid contact even with mild skin irritants. Therefore, you should wear suitable impervious elbow-length gloves and facial protection when handling this product for lengthy periods. See below for suitable material types.
Protective Material Types: There is no data that enables us to recommend any type except that it should be impermeable.
Respirator: Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned above.
Eyebaths or eyewash stations and safety deluge showers should, if practical, be provided near to where this product is being handled commercially.

Section 9 - Physical and Chemical Substances Properties:

Physical Description & colour:`	Blue liquid
Odour:	No odour.
Boiling Point:	Approximately 100°C at 100kPa.
Freezing/Melting Point:	Approximately 0°C
Volatiles:	Water component.
Vapour Pressure:	2.37 kPa at 20°C (water vapour pressure).
Vapour Density:	As for water.
Specific Gravity:	Approx. 1.23
Water Solubility:	Completely soluble in water.
pH:	Approx. 2.7
Volatility:	No data.
Odour Threshold:	No data.
Evaporation Rate:	As for water.
Coeff Oil/water Distribution:	No data
Autoignition temp:	Does not burn
Volatility:	No data.
Odour Threshold:	No data.
Evaporation Rate:	As for water.
Coeff Oil/water Distribution:	No data
Autoignition temp:	Does not burn.

Section 10 - Stability and Reactivity

Reactivity: This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf-life properties.
Conditions to Avoid: This product should be kept in a cool place, preferably below 30°C. Keep containers tightly closed. Containers should be kept dry. Keep containers and surrounding areas well ventilated. Protect this product from light.
Incompatibilities: strong acids, strong bases, strong oxidising agents.
Fire Decomposition: This product is likely to decompose only after heating to dryness, followed by further strong heating. Combustion forms carbon dioxide, and if incomplete, carbon monoxide and possibly smoke. Water is also formed. May form oxides of sulfur (sulfur dioxide is a respiratory hazard) and other sulfur compounds. Most will have a foul odour. Aluminium compounds. Carbon monoxide poisoning produces headache, weakness, nausea, dizziness, confusion, dimness of vision, disturbance of judgment, and unconsciousness followed by coma and death.
Polymerisation: This product will not undergo polymerisation reactions.

Section 11 - Toxicological Information

Local Effects:
Target Organs: There is no data to hand indicating any particular target organs.

Classification of Hazardous Ingredients

Ingredient — Risk Phrases

Aluminium Sulfate

- Eye irritation – category 2A

Potential Health Effects

Inhalation:
Short Term Exposure: Available data indicates that this product is not harmful. In addition, product is unlikely to cause any discomfort or irritation.
Long Term Exposure: No data for health effects associated with long term inhalation.
Skin Contact:
Short Term Exposure: Available data indicates that this product is not harmful. It should present no hazards in normal use. However, product may be irritating, but is unlikely to cause anything more than mild transient discomfort.
Long Term Exposure: No data for health effects associated with long term skin exposure.
Eye Contact:
Short Term Exposure: This product is a severe eye irritant. Symptoms may include stinging and reddening of eyes and watering which may become copious. Other symptoms such as swelling of eyelids and blurred vision may also become evident. If exposure is brief, symptoms should disappear once exposure has ceased. However, lengthy exposure or delayed treatment is likely to cause permanent damage.
Long Term Exposure: No data for health effects associated with long term eye exposure.
Ingestion:
Short Term Exposure: Significant oral exposure is considered to be unlikely. Available data shows that this product is not harmful. However, this product may be irritating to mucous membranes but is unlikely to cause anythingmore than transient discomfort.
Long Term Exposure: No data for health effects associated with long term ingestion.
Carcinogen Status:
SWA: No significant ingredient is classified as carcinogenic by SWA.
NTP: No significant ingredient is classified as carcinogenic by NTP.
IARC: No significant ingredient is classified as carcinogenic by IARC

Section 12 - Ecological Information

This product is unlikely to adversely affect the environment. Salts, acids, and bases are typically diluted and neutralised when released to the environment in small quantities.

Section 13 - Disposal Considerations

Disposal: Containers should be emptied as completely as practical before disposal. If possible, recycle product and containers either in-house or send to recycle company. If this is not practical, send to a commercial waste disposal site.

Section 14 - Transport Information

UN Number: This product is not classified as a Dangerous Good by ADG, IATA or IMDG/IMSBC criteria. No special transport conditions are necessary unless required by other regulations.

Section 15 - Regulatory Information

AICS: All the significant ingredients in this formulation are compliant with NICNAS regulations.
The following ingredients: Potassium hydroxide, Sodium hydroxide, are mentioned in the SUSMP.

Section 16 - Other Information

This SDS contains only safety-related information. For other data see product literature.

Acronyms:

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail (7th edition)
AICS	Australian Inventory of Chemical Substances
SWA	Safe Work Australia, formerly ASCC and NOHSC
CAS number	Chemical Abstracts Service Registry Number
Hazchem Code	Emergency action code of numbers and letters that provide information to emergency services especially firefighters
IARC	International Agency for Research on Cancer
NOS	Not otherwise specified
NTP	National Toxicology Program (USA)
SUSMP	Standard for the Uniform Scheduling of Medicines & Poisons
UN Number	United Nations Number

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Poisons Information Centre: **13 1126** from anywhere in Australia, (**0800 764 766** in New Zealand)