
WATER SETTLEMENT REPORT

Waikaka Gold Mines Ltd

JUNE 1, 2022

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1. Executive Summary

Comprehensive settlement testing of representative samples of the water extracted from aircore drill samples of the auriferous wash zone showed that coagulants were effective in flocculating the solids and producing a clear supernatant.

It is recommended that Poly Aluminium Chloride (PAC) be used to coagulate solids prior to the turbid water entering the thickener in the Slimes Treatment Plant before it is returned to the processing plant. The coagulant Magnafloc L1425 should be used as to settle out any solids as turbid water enters the final polishing pond of the settling pond system before the overflow is released to the environment.

2. Introduction

Previous experience by L&M Mining in 2001/2002 suggested that there may be challenges in settling out the solids in the discharge from the plant after processing.

Samples from the wash zone collected during the Bulk Sampling Programme by Waikaka Gold Mines Ltd in 2021 were processed to extract the gold, but tailings samples were not retained for settlement tests. Samples were collected during the Aircore drilling programme in October 2021 for settlement tests.

Tests were carried out at Waikaia using water collected from the Waikaka Stream as dilution water. An assumption was made that the “dirty water” sample collected from the drill was representative of tailings from the plant during production. Each sample was analysed for suspended solids before commencement of each settling test.

Samples were tested in a 200ml glass beaker, by adding a measured volume of coagulant, mixing and observing the settling characteristics over time. Results were recorded and samples photographed after a set time.

Results are tabulated in Table 1 below.

3. Methodology

3.1. Sample Collection

Samples of the water in the auriferous wash zone were collected by the geologist working with the aircore drill operating in October 2021. Samples were collected when the drill bit was within the known wash layer, identified by the geologist, and dirty water was decanted from the gravel sample and retained.

There was no effort made to collect the overflow water from a particular horizon within the wash zone, to leave the wash in the sample bucket for a relatively long time in an attempt to only take the finest sized clay fraction.

3.2. Reagents

Reagents used in the testing were as follows:

- Alum Aluminium Sulphate

Chemiplas

- Magnafloc 1425 Cationic PolyDADMAC coagulant
- PAC Poly Aluminium Chloride
- Magnafloc 338 Anionic Polymer Flocculant

Ixom

- Crystalfloc L3RC Cationic PolyDADMAC coagulant
- Crystalfloc N50 Cationic PolyDADMAC coagulant
- Crystalfloc B680 Anionic Flocculant

3.3. Sample Process

The dirty water sample was thoroughly mixed in the 20 litre pail and a 200 ml sample drawn from it, before any settling had occurred.

The 200ml sample was then diluted in a ratio of 4:1 with water collected from the Waikaka Stream, as this would emulate the gold extraction process, where water is added in the ratio of 4:1.

The thoroughly mixed sample then had a 50ml sub-sample taken from it using a pipette. This sample was transferred to a glass beaker and weighed wet, dried in the oven and weighed dry. Dry weight, divided by wet weight gives the relative density of the initial slurry.

The thoroughly mixed, diluted slurry was then transferred to four 200ml glass beakers.

A measured amount of coagulant was added to each of the beaker samples and each was mixed. The mixing process was the same in each case. The slurry was poured rapidly from the initial beaker to a clean beaker and then back to the original beaker until a total of 20 cycles was reached. Each of the 4 samples was thus mixed until all were complete. The four samples were then mixed in rapid succession using a mixing disk and the timer was started. Observations of the rate of settling of the coagulated solids were taken and recorded, along with observations of the clarity of the supernatant liquid.

At the completion of 15 minutes, a 50ml sample was taken by pipette of the supernatant liquid and that sample was also weighed and dried, with the dried product finally weighed.

The experiments used equipment which was available and did not use a turbidity meter or a filter. It was found that Waikaka Stream water carried dissolved solids or salts. Therefore an allowance was made, when weighing the supernatant liquid, by deducting 0.007g from the final dried weight to compensate

for the dissolved solids, which precipitated out on drying. 0.007g was the average of 5 tests using clean stream water, with a range of 0.004g to 0.010g.

4. Results

4.1. Coagulant

All of the reagents tested produced a clear or nearly clear supernatant, although the cheapest (PAC) was visually assigned “nearly clear”. See Figure 4.

Sample No		Sample Pulp Density	Reagent	Dose Rate (ppm)	Supernatant clarity observation	Supernatant TSS g/l or kg/m3	Cost/hour @ 125 l/s
10	Wash	0.85%	1425	120	Cloudy	0.25	\$315.90
10	Wash	0.85%	1425	125	nearly clear	0.10	\$329.06
11	Wash	0.87%	L3RC	120	clear	0	\$361.26
11	Wash	0.87%	L3RC	130	clear	0	\$391.37
11	Wash	0.87%	L3RC	140	clear	0	\$421.47
12	Wash	0.76%	N50	170	cloudy	0.001	\$457.47
12	Wash	0.76%	N50	175	cloudy	0.001	\$470.93
12	Wash	0.76%	N50	180	clear	0.001	\$484.38
15	Wash	0.84%	PAC	230	cloudy	0.001	\$103.50
15	Wash	0.84%	PAC	260	nearly clear	0.001	\$117.00
16	Wash	0.93%	PAC	260	slightly cloudy	0	\$117.00
16	Wash	0.93%	PAC	275	nearly clear	0	\$123.75
17	Wash	1.47%	PAC	240	cloudy	0	\$108.00
18	Wash	1.53%	PAC	250	cloudy	0	\$112.50
18	Wash	1.53%	PAC	260	cloudy	0	\$117.00
18	Wash	1.53%	PAC	270	slightly cloudy	0	\$121.50
18	Wash	1.53%	PAC	280	nearly clear	0	\$126.00
19	Wash	1.56%	PAC	300	cloudy	0	\$135.00
19	Wash	1.56%	PAC	310	cloudy	0	\$139.50
19	Wash	1.56%	PAC	320	cloudy	0	\$144.00
20	Wash	1.72%	PAC	190	slightly cloudy	0	\$85.50
20	GLM	8.41%	PAC	200	nearly clear	0	\$90.00
20	GLM	8.41%	PAC	210	nearly clear	0	\$94.50
20	GLM	8.41%	PAC	180	slightly cloudy	0	\$81.00
21	GLM	1.50%	N50	70	Dirty	0	\$188.37
25	Wash	1.58%	PAC	270	Slightly	0	\$121.50

Sample No		Sample Pulp Density	Reagent	Dose Rate (ppm)	Supernatant clarity observation	Supernatant TSS g/l or kg/m3	Cost/hour @ 125 l/s
					dirty		
25	Wash	1.58%	PAC	280	cloudy	0	\$126.00
25	Wash	1.58%	PAC	290	cloudy	0	\$130.50
25	Wash	1.58%	PAC	300	dirty	0	\$135.00
26	Wash	1.59%	PAC	260	cloudy	0	\$117.00
26	Wash	1.59%	PAC	270	cloudy	0	\$121.50
26	Wash	1.59%	PAC	280	cloudy	0	\$126.00
26	Wash	1.59%	PAC	290	cloudy	0	\$130.50
27	Wash	1.57%	ALUM	350	nearly clear	0.0196	\$228.38
27	Wash	1.57%	ALUM	400	nearly clear	0.0156	\$261.00
27	Wash	1.57%	ALUM	450	clear	0.0166	\$293.63
29	Wash	1.62%	1425	120	clear	0	\$315.90
29	Wash	1.62%	1425	130	clear	0	\$342.23
30	Wash	1.59%	1425	90	clear	0	\$236.93
32	Wash	1.65%	1425	80	dirty	0.0146	\$210.60
32	Wash	1.65%	1425	85	cloudy	0.0026	\$223.76
32	Wash	1.65%	1425	90	nearly clear	0	\$236.93
33	Wash	1.52%	ALUM	400	clear	0.0586	\$261.00
33	Carb	1.52%	ALUM	450	clear	0.0696	\$293.63
33	Carb	1.52%	1425	80	clear	0	\$210.60
33	Carb	1.52%	1425	90	clear	0	\$236.93
36	Carb	1.57%	PAC	260	nearly clear	0.0236	\$117.00
37	Wash	0.61%	ALUM	350	clear	0.0506	\$228.38
38	Wash - settled	1.63%	SUPER	180	clear	0.0026	\$0.00
39	Wash	0.95%	ALUM	200	clear	0.0406	\$130.50
40	Wash - settled	0.72%	ALUM	50	clear	0.0116	\$0.00
40	Wash - settled	0.72%	ALUM	100	clear	0.0166	\$65.25

Table 1: Results of coagulant jar tests, as in the methodology description above. Wash is from the auriferous gravel layer, GLM is from the Gore Lignite Measures (local bottom) and Carb is from the carbonaceous layers in the overburden. The cost/hour is based on the estimated 125 l/s (450m³/hr) processing plant water usage.

Sample No	Reagent	Dose Rate (ppm)	Supernatant clarity observation	Supernatant TSS g/l or kg/m3	Cost/hour @ 125 l/s
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Sample No	Reagent	Dose Rate (ppm)	Supernatant clarity observation	Supernatant TSS g/l or kg/m ³	Cost/hour @ 125 l/s
10	1425	120	Cloudy	0.25	\$315.90
11	L3RC	130	clear	0	\$391.37
12	N50	180	clear	0	\$484.38
16	PAC	275	nearly clear	0	\$123.75
27	ALUM	350	nearly clear	0.0196	\$228.38
30	1425	90	clear	0	\$236.93

Table 2: Results of most favourable coagulants (from Table above)

All coagulants produced a clear supernatant with varying dose rates as per Table 1 and Table 2 above. However, the most cost effective was Poly Aluminium Chloride (PAC, Sample 16 in the Tables above).

Alum gave a good clear supernatant.

Samples numbered 1 through 9 were excluded from the table as they had been carried out using insufficient and inconsistent mixing energy. All subsequent samples were subjected to the consistent rapid beaker transfer as described in Section 3.3 above.

The following images show selected experiment results, photographed 15 minutes after mixing.



Figure 1: Sample 10, after addition of 23, 24, and 25ml of .001% solution of Magnafloc 1425 to each 200ml sample of dirty water. Note that supernatant is still quite dirty.



Figure 2: Sample 11. Photograph after 15 minutes of samples where 24, 26 and 28ml of 0.001% solution of Crystalfloc L3RC was added. Clear supernatant.

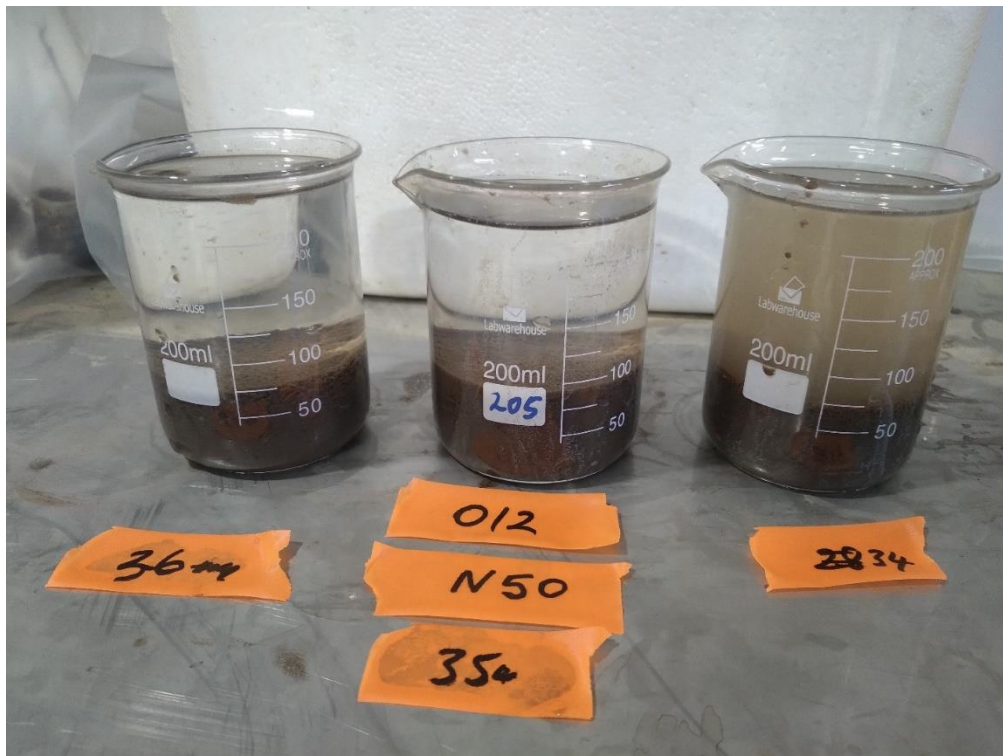


Figure 3: Sample 12. 34, 35 and 36 ml of 0.001% solution of Crystalfloc N50 added to 200ml of diluted dirty water. Supernatant is clear.

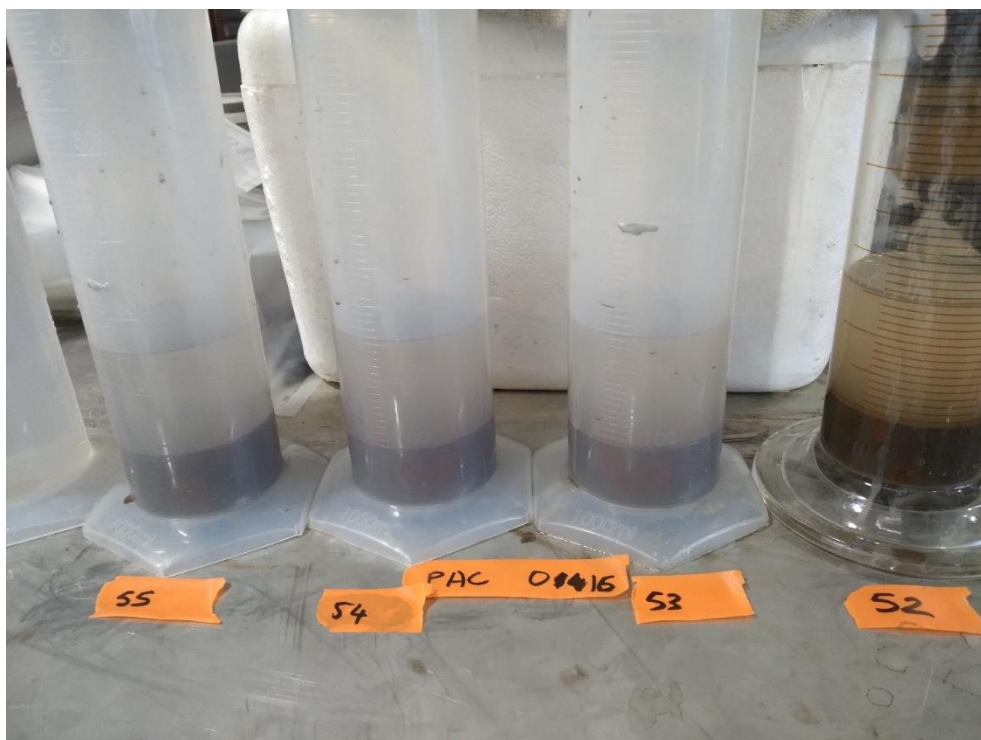


Figure 4: Sample 16. 52, 53, 54, and 55ml of 0.001% Poly Aluminium Chloride (PAC) added to 200ml of diluted dirty water. Nearly clear supernatant, although hard to see in the plastic measuring cylinders.

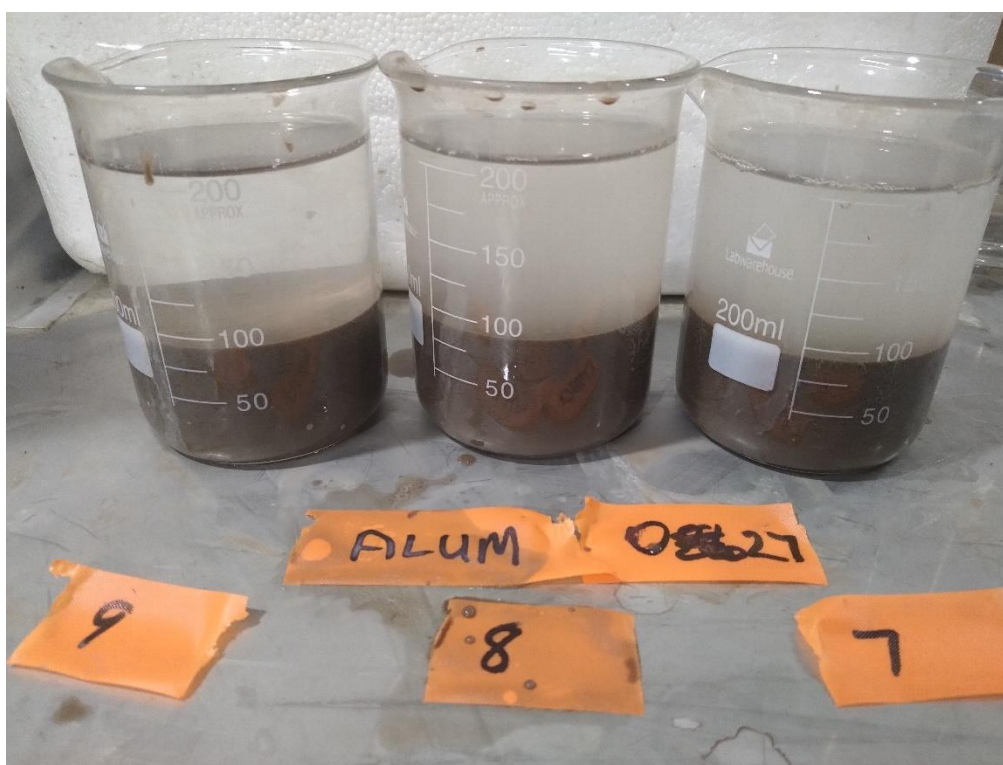


Figure 5: Sample 27. 7, 8 and 9 ml of 1% solution of Aluminium Sulphate (Alum) added to 200ml of diluted dirty water.



Figure 6: Sample 30. 1.8, 2.0, 2.2 and 2.4 ml of 1% solution of Magnafloc 1425 mixed with diluted dirty water

4.2. Flocculants

Anionic flocculants were added to the mixed and coagulated slurries to see if it made a significant difference to :

- Clarity of supernatant
- Speed of settling, because flocs were bigger
- Volume of settled solids (ie that there may be increased compression).

Experiments were conducted using a 1:1000 dilution of the powdered flocculant, generally Magnafloc 338, although Crystalfloc B680 was also trialled.

The results have not been tabulated.

The addition of flocculant to the slurry which had been dosed with coagulant, in general increased the settling velocity.

Flocculant was also trialled as a standalone reagent, at the recommendation of one of the suppliers, but it did not work at all.

Only 1 ml of 0.001% flocculant was added to each 200ml sample (5 ppm) following coagulation, and the flocculant was mixed gently with a stirring rod. Higher doses of flocculant were added but no significant differences were observed to the rate of settling, or the size of flocs observed. Lower doses of less than 1mm of).001% diluted flocculant were not trialed, although the same effect could be achieved with a dose rate as low as 1 ppm (0.2ml added to 200ml sample)

The 5ppm dose rate will result in an hourly cost of \$21.89, which may be reduced to \$4.38 per hour, if only 1 ppm is required.

5. Costs

Ixom (quoted 4/5/2022)

Crystalfloc L3RC - \$6.69/kg in IBC

Crystalfloc N50 (L3RC alternative) - \$5.98/kg in IBC

Superfloc No price given. Experiment (38) did not work successfully, and produced a dirty supernatant.

Crystalfloc B600 series polymer - \$8.45/kg in 25 kg bags, order quantity 10 bags

Aluminium Sulphate \$4985/tonne or \$4-99/kg

Alum (aluminium sulphate) liquid at around ~\$1450 per IBC delivered

Alum is about 620g/L of active content

Chemiplas (quoted 22 April 2022)

Currently the bulk PAC deliveries are approx. NZ\$1,000/t (24t batches), and approx. NZ\$1.40/kg for IBC tanks.

Magnafloc 1425 is approx. NZ\$5.85/kg delivered in IBC's.

The cost per hour displayed in Table 1 and Table 2 are based on estimated water usage of the gold processing plant of 125 l/s (450m³/hr). It is assumed that the full flow from the plant will need to be treated, which gives a worst case scenario. Some of the solids will settle out without need of coagulation in the primary settling pond. This could not be duplicated in the experiments carried out as all the sediment in the samples were subjected to the actions of the coagulant.

Coagulant use, and therefore cost, should reduce in full production, but no allowance has been made for that here.

6. Conclusions and Recommendations

As anticipated before the test programme commenced, a clear supernatant was achieved with most of the coagulants tested, although the dosing rate was higher than hoped. Prior knowledge of L&M Mining's dosing programme during their active mining in 2001/2002 produced an expectation that the reagents would be effective. L&M had been able to comply with their consent conditions using a combination of cationic coagulant (L3RC) combined with an anionic flocculant (B680) and their dose rate was high. Water discharged to the Waikaka Stream was clean and complied with the consent conditions.

It was hoped that the dose rate could be considerably reduced as Waikaka Gold Mines Ltd were targeting only the wash layer, whereas L&M Mining included a certain amount of clay-rich top dilution as a result of their mining methodology. However, it would appear from the experiments carried out by Waikaka Gold Mines Ltd show that a reasonably high dose rate of coagulant is required to ensure a clear supernatant (Table 1).

It is recommended that PAC be adopted in the commercial process. It is the cheapest, but is effective, particularly when the supernatant liquid does not need to be 100% clear as it is returning to the plant as processing water.

However, the small amount of overflow from the polishing pond will need to be clean and one of the PolyDADMAC coagulants could be used here. They are more expensive, per unit, but the flow rate overflowing the polishing pond is minimal and will thus require only a small amount of coagulant. Magnafloc 1425 is recommended based on price. It was used effectively at Waikaia by Waikaia Gold Ltd and produced a very clean supernatant which met the consent conditions.

7. Appendices:

MSDS for Polyaluminium Chloride

MSDS for Magafloc L1425

SAFETY DATA SHEET



Revision date: 03-Feb-2022

Revision Number 6

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product identifier

Product Name LIQUIPAC (POLYALUMINIUM CHLORIDE)

Product Code(s) 000000015710

Other means of identification

Synonyms Liquipac * Liquid PAC * Liquid polyaluminium chloride * PAC solution * Polyaluminium chloride solution * Liquipac 1210A

Recommended use of the chemical and restrictions on use

Recommended use Flocculating agent for potable water and industrial water treatments.

Uses advised against No information available.

Details of the supplier of the safety data sheet

Supplier

Ixom Operations Pty Ltd (Incorporated in Australia)
NZBN: 9429041465226 Address: 166 Totara Street
Mt Maunganui South
New Zealand

Telephone Number: +64 9 368 2700

Facimile: +64 9 368 2710

For further information, please contact

Contact Point Product Safety Department

Emergency telephone number

Emergency Telephone 0 800 734 607 (ALL HOURS)

Please ensure you refer to the limitations of this Safety Data Sheet as set out in the "Other Information" section at the end of this Data Sheet.

2. HAZARDS IDENTIFICATION

Not classified as a Dangerous Good under NZS 5433 Transport of Dangerous Goods on Land; NON-DANGEROUS GOODS.

Classified as hazardous according to criteria in the Hazardous Substances (Hazard Classification) Notice 2020.

GHS Classification

SIGNAL WORD

Warning

Water Treatment Chemicals (Subsidiary Hazard) Group Standard 2020

Approval Number: HSR002684

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 2

Serious eye damage/eye irritation

Category 2

Label elements**Hazard statements**

H302 - Harmful if swallowed

H315 - Causes skin irritation

H319 - Causes serious eye irritation

Precautionary Statements - Prevention

Wash hands thoroughly after handling

Do not eat, drink or smoke when using this product

Wear protective gloves / protective clothing / eye protection / face protection

Precautionary Statements - Response

Specific treatment (see First aid on this SDS)

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

If eye irritation persists: Get medical advice/attention

IF ON SKIN: Wash with plenty of soap and water

Call a POISON CENTER or doctor/physician if you feel unwell

Take off contaminated clothing and wash before reuse

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

Rinse mouth

Precautionary Statements - Storage

No storage statements

Precautionary Statements - Disposal

Dispose of contents/container in accordance with local, regional, national, and international regulations as applicable

Other hazards which do not result in classification**3. COMPOSITION/INFORMATION ON INGREDIENTS****Mixture**

Chemical name	CAS No.	Weight-%
Polyaluminium chloride	1327-41-9	30-60
Water	7732-18-5	to 100

4. FIRST AID MEASURES**Description of first aid measures****General advice**

For advice, contact a Poisons Information Centre (e.g. phone Australia 13 11 26; New Zealand 0800 764 766) or a doctor.

Emergency telephone number

Poisons Information Center, New Zealand: 0800 764 766

Inhalation

Remove to fresh air. Call a physician if symptoms occur.

Eye contact

Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids.

	Consult a physician.
Skin contact	Wash skin with soap and water. Call a physician if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

Most important symptoms and effects, both acute and delayed

Symptoms Irritation.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE FIGHTING MEASURES**Suitable Extinguishing Media**

Suitable Extinguishing Media Use extinguishing agent suitable for type of surrounding fire.

Unsuitable extinguishing media

Specific hazards arising from the chemical

Specific hazards arising from the chemical Non-combustible.

Special protective actions for fire-fighters

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions, protective equipment and emergency procedures**

Personal precautions Avoid contact with skin and eyes. Avoid breathing vapors or mists. Ensure adequate ventilation. Evacuate personnel to safe areas. Do not touch or walk through spilled material. Use personal protective equipment as required. Wash thoroughly after handling.

For emergency responders Use personal protection recommended in Section 8.

Environmental precautions

Environmental precautions See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.

Precautions to prevent secondary hazards

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Avoid contact with skin and eyes. Avoid breathing vapors or mists. Ensure adequate ventilation. Do not eat, drink or smoke when using this product. Use personal protection equipment. Wash thoroughly after handling.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Keep container closed when not in use.

Incompatible materials Calcium hypochlorite. Alkalies. Metals. Cyanides.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Limits No value assigned for this specific material by the New Zealand Workplace Health & Safety Authority. However, Workplace Exposure Standard(s) for constituent(s):

Aluminium, as Al: Soluble salts WES-TWA 5 mg/m³

As published by the New Zealand Workplace Health & Safety Authority.

WES - TWA (Workplace Exposure Standard - Time Weighted Average) - The eight-hour, time-weighted average exposure standard is designed to protect the worker from the effects of long-term exposure.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Appropriate engineering controls

Engineering controls Apply technical measures to comply with the occupational exposure limits.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Personal Protective Equipment (PPE) (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Individual protection measures, such as personal protective equipment

The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

OVERALLS, SAFETY SHOES, CHEMICAL GOGGLES, GLOVES.



Eye/face protection	Goggles.
Hand protection	Impervious gloves.
Skin and body protection	Boots. Wear suitable protective clothing. Overalls.
Respiratory protection	If determined by a risk assessment an inhalation risk exists, wear a suitable mist respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716.
Environmental exposure controls	No information available.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Liquid
Appearance	Clear
Color	Pale Amber
Odor	Mild
Odor threshold	No information available.

Property	Values	Remarks • Method
pH	2.6 ± 0.3 @25°C	None known
Melting point / freezing point	ca. -12.0°C	None known
Boiling point / boiling range	No data available	None known
Flash point	Not applicable	None known
Evaporation rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limit in Air		None known
Upper flammability or explosive limits	Not applicable	
Lower flammability or explosive limits	Not applicable	
Vapor pressure	No data available	None known
Vapor density	No data available	None known
Relative density	1.20 (10.1% Al ₂ O ₃ , 20°C)	None known
Water solubility	Miscible in water	None known
Solubility(ies)	No data available	None known
Partition coefficient	No data available	None known
Autoignition temperature	Not applicable	None known
Decomposition temperature	No data available	None known
Kinematic viscosity	No data available	None known
Dynamic viscosity	No data available	None known

Other information

10. STABILITY AND REACTIVITY

Reactivity

Reactivity Reacts with calcium hypochlorite. Reacts with alkalis. Reacts with metals. Reacts with cyanides.

Chemical stability

Stability Stable under normal conditions.

Explosion data

Sensitivity to mechanical impact None.

Sensitivity to static discharge None.

Possibility of hazardous reactions

Possibility of hazardous reactions Mildly corrosive to metals.

Conditions to avoid

Conditions to avoid None known based on information supplied.

Incompatible materials

Incompatible materials Calcium hypochlorite. Alkalis. Metals. Cyanides.

Hazardous decomposition products

Hazardous decomposition products Hydrogen chloride.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Information on likely routes of exposure

Product Information No adverse health effects expected if the chemical is handled in accordance with this Safety Data Sheet and the chemical label. Symptoms or effects that may arise if the chemical is mishandled and overexposure occurs are:

Inhalation May cause irritation.

Eye contact Causes serious eye irritation.

Skin contact Causes skin irritation.

Ingestion Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

Symptoms Irritation.

Acute toxicity

Numerical measures of toxicity

No information available.

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Polyaluminium chloride	681 mg/kg (Rat)	-	-

Water	> 90 mL/kg (Rat)	-	-
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See section 16 for terms and abbreviations

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation	Causes skin irritation. Classification is based on mixture calculation methods based on component data.
Serious eye damage/eye irritation	Causes serious eye irritation. Classification is based on mixture calculation methods based on component data.
Respiratory or skin sensitization	No information available.
Germ cell mutagenicity	No information available.
Carcinogenicity	No information available.
Reproductive toxicity	No information available.
STOT - single exposure	No information available.
STOT - repeated exposure	No information available.
Aspiration hazard	No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity	Keep out of waterways.
Terrestrial ecotoxicity	There is no data for this product.

Chemical name	Algae/aquatic plants	Fish	Crustacea
Polyaluminium chloride	-	LC50: ≈186mg/L (96h, Danio rerio)	-

Persistence and degradability

Persistence and degradability	No information available.
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Bioaccumulative potential

Bioaccumulation	No information available.
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Mobility

Mobility in soil	No information available.
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Other adverse effects

Other adverse effects	No information available.
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13. DISPOSAL CONSIDERATIONS

Waste treatment methods**Waste from residues/unused products**

Dispose of product in packaging/container in a way that is consistent with the Hazardous Substances (Disposal) Notice 2017 and the Act, and Hazardous Substances (Amendments and Revocations) Notice 2020. Treat the chemical using a method that changes the characteristics or composition of the chemical so that the chemical is no longer a hazardous chemical; or export the chemical from New Zealand as waste.

Contaminated packaging

Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. TRANSPORT INFORMATION**ROAD AND RAIL TRANSPORT**

Not classified as a Dangerous Good under NZS 5433 Transport of Dangerous Goods on Land; NON-DANGEROUS GOODS.

IATA

Not classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air; NON-DANGEROUS GOODS.

IMDG

Not classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; NON-DANGEROUS GOODS.

15. REGULATORY INFORMATION**Safety, health and environmental regulations/legislation specific for the substance or mixture****New Zealand****National regulations**

See section 8 for national exposure control parameters

International Inventories**NZIoC**

All the constituents of this material are listed on the New Zealand Inventory of Chemicals.

TSCA

Contact supplier for inventory compliance status.

DSL/NDSL

Contact supplier for inventory compliance status.

EINECS/ELINCS

Contact supplier for inventory compliance status.

ENCS

Contact supplier for inventory compliance status.

IECSC

Contact supplier for inventory compliance status.

KECL

Contact supplier for inventory compliance status.

PICCS

Contact supplier for inventory compliance status.

AIIC

All the constituents of this material are listed on the Australian Inventory of Industrial Chemicals.

Legend:

NZIoC - New Zealand Inventory of Chemicals

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AIIC - Australian Inventory of Industrial Chemicals

International Regulations

The Montreal Protocol on Substances that Deplete the Ozone Layer Not applicable

The Stockholm Convention on Persistent Organic Pollutants Not applicable

The Rotterdam Convention Not applicable

16. OTHER INFORMATION

Prepared By This Safety Data Sheet has been prepared by Ixom Operations Pty Ltd (Toxicology and SDS Services).

Issuing Date: 03-Feb-2022

Reason(s) For Issue: 5 Yearly Revised Primary SDS

Revision Note:

The symbol (*) in the margin of this SDS indicates that this line has been revised.

Key or legend to abbreviations and acronyms used in the safety data sheet

Legend Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation
C	Carcinogen		

Key literature references and sources for data used to compile the SDS

Agency for Toxic Substances and Disease Registry (ATSDR)
U.S. Environmental Protection Agency ChemView Database
European Food Safety Authority (EFSA)
EPA (Environmental Protection Agency)
Acute Exposure Guideline Level(s) (AELG(s))
U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
U.S. Environmental Protection Agency High Production Volume Chemicals
Food Research Journal
Hazardous Substance Database
International Uniform Chemical Information Database (IUCLID)
Japan GHS Classification
Australian Industrial Chemicals Introduction Scheme (AICIS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
National Library of Medicine's PubMed database (NLM PUBMED)
National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
Organization for Economic Co-operation and Development Environment, Health, and Safety Publications
Organization for Economic Co-operation and Development High Production Volume Chemicals Program
Organization for Economic Co-operation and Development Screening Information Data Set
RTECS (Registry of Toxic Effects of Chemical Substances)
World Health Organization

Disclaimer

This SDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Ixom Operations Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Ixom representative or Ixom Operations Pty Ltd at the contact details on page 1.

Ixom Operations Pty Ltd's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.

End of Safety Data Sheet

Section 1: Identification of the Substance/Mixture and of Supplier

Product name: **CRYSTAL CLEAR**

Recommended use: Eliminates suspended dirt and organic matter that encourages bacteria and algae growth. Restores sparkle and clarity to your pool and spa.

Supplier: Space Industries Limited

Street Address: 160 Plunket Ave,
Wiri, Auckland
New Zealand

Telephone Number: + 64 9 262 3902

Facsimile: + 64 9 262 3948

E-mail: orders@spaceindustries.co.nz

Website: www.spaceindustries.co.nz

Emergency Telephone: 0800 764 766 (all hours)

Date of preparation: March 2021

Section 2: Hazards Identification

Hazard Classification: Contains no hazardous chemicals

Section 3: Composition/information on ingredients

Product Description: Swimming pool clarifier

Component(s): Magnafloc LT425

CAS Number: 026062-79-3

Proportion: 10-25%

Section 4: First Aid Measures

Show this Safety Data Sheet to a Doctor

Inhalation: Remove to fresh air and keep at rest in a position comfortable for breathing.

Skin Contact: Remove/take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.

Eye Contact: Irrigate eyes with generous quantities of water for 15 minutes. Remove contact lenses, if present and easy to do. Seek immediate medical attention.

Ingestion: DO NOT induce vomiting, give nothing by mouth in cases of unconsciousness or convulsion. Call physician immediately. If unconscious rinse mouth out with water. Give 600ml to drink immediately and repeated drinks at the rate of cup full.

For advice, contact the Poisons Information Centre 0800 764 766 or a doctor

Section 5: Fire Fighting Measures

Specific Hazards:	The product is not flammable, but may decompose in a fire to liberate toxic phosgene gas.
Suitable Extinguishing Media:	Extinguish fires with water spray, foam, carbon dioxide or dry chemical powder.
Fire-fighting advice:	Fire fighters should wear a self contained breathing apparatus and full protective clothing along with protective equipment.

Section 6: Accidental Release Measures

Emergency Procedures	Spillages are slippery. Keep spectators away – rope off the area. Avoid accidents, clean up immediately. Ensure adequate ventilation. Wear protective equipment to prevent skin and eye contamination.
Methods and Materials for Containment and Clean Up	Carefully scoop up or shovel up uncontaminated product for re-use. Sweep up contaminated material and dispose of in an area approved by local authority by-laws. Residues may be safely flushed to drain, if permitted. Do not incinerate – the by product can be hazardous.

Section 7: Handling and Storage

Handling:	• Ensure an eye bath is available and ready for use. • Observe good personal hygiene practices and recommended procedures. • Do not breathe in dust. • Wash hands thoroughly after handling. • Do not eat, drink or smoke when using this product. • Store away from foodstuffs. • Avoid eye and skin contact.
Storage:	• Keep only in original container. • Store in a cool, dry, well-ventilated area. • Keep containers tightly closed when not in use. • Inspect regularly for deficiencies such as damage or leaks. • Protect against physical damage.

Section 8: Exposure Controls/Personal Protection

Occupational Exposure Limits:	No value assigned for this specific material by the New Zealand Occupational Safety and Health Service (OSH).
Engineering Control Measures:	Use in well ventilated area.
Personal Protective Equipment:	Wear rubber or plastic gloves to protect hands

Section 9: Physical and Chemical Properties

Physical state: Colour: Odour: Boling/melting Point: Specific Gravity/Bulk Vapour Pressure: Flash Point (°C): Percent Volatilise: Flammability Limits: Autoignition Temperature: PH 1% Solution:	Liquid Straw Odourless to slightly aminic >100°C 1.1g/cm ³ Not tested >100°C Not available Not tested Not tested 6.5%
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Section 10: Stability and Reactivity

Stability:	Product is stable under normal conditions of use, storage and temperature. The product is fully soluble in water.
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Section 11: Toxicological Information

Ingestion:	Harmful if swallowed
Eye contact:	May cause eye irritation
Skin contact:	May cause some slight skin irritation, especially prolonged exposure.
Inhalation:	May cause coughing

Section 12: Ecological Information

Environmental fate, persistence and degradation:	Avoid contaminating waterways. Biodegradable
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Section 13: Disposal Considerations

• Recycle wherever possible. Special hazard may exist - specialist advice may be required. • Consult approved Waste Management Company for disposal options. • Treat and neutralise residue at an approved site. • Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed. • Puncture containers to prevent re-use and bury at an authorised landfill. Do not incinerate.
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Section 14: Transport Information

Road and Rail Transport:	Classified as a non - dangerous Good according to NZS 5433:1999 Transport of Dangerous Goods on Land.
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Section 15: Regulatory Information

Classification:	None
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Section 16: Other Information

.Issue Date: March 2021

Note: All information given by Space Industries Ltd is offered in good faith and is, to the best of our knowledge, true and accurate. However, since conditions of use are beyond our control, all information relevant to usage is offered without warranty or guarantee and should not be construed as a representation that the product is suitable for any particular purpose or application.