Safety Data Sheet

Product Name	Activator M12
Revision	3
Last Reviewed	10/01/2022

1. Identification

Product Name	M12 ACTIVATOR LIQUID
Chemical Name	2-Hydroxybutanedioic Acid
Other Names	Malic Acid
Chemical Formula	$C_4H_6O_5$
Manufacturers Code	
CAS Number	6915-15-7
UN Number	N/A
Recommended Use	For use in activating sodium chlorite solutions for the production of chlorine dioxide/ ASC and for solution pH adjustment. Please refer to product labels and instructions provided for correct usage and applications
Restrictions on Use	None known. Not recommended for any use other than described on label

Contact Details of Chemical Manufacturer

Company	Grayson Australia (Tecnica Pty Ltd) ABN 72 006 828 879
Office Address	U4 9 Newcastle Rd, Bayswater VIC Australia 3153
Postal Address	PO Box 134, Bayswater VIC Australia 3153
Telephone	+61 3 8727 6900
Facsimile	N/A
Email	info@graysonaustralia.com
Website	www.graysonaustralia.com

Emergency Contacts

Do NOT contact these organisations for product information. Contact for emergency assistance only.

Immediate Medical Danger	000 (Australia) Use the emergency number for your state/country
Fire	000 (Australia) Use the emergency number for your state/country
Poisons Information Centre	13 11 26 Poison Information Centre

During business hours for non-urgent emergency or hazard details

Chemical Information	+61 3 8727 6900 or info@graysonaustralia.com

2. Hazards Identification

Global Harmonised System (GHS) Classification

GHS Classification Classified as HAZARDOUS in accordance with GHS criteria for labelling and classifying of chemicals

Signal Word Warning

Hazard Classes

Corrosive to Metals: Category 1
Skin Corrosion/Irritation: Category 2
Serious Eye Damage/Irritation: Category 2A

GHS Pictograms Corrosive

Dangerous Goods Class Non-Dangerous Goods

GHS Hazard Statements

H290	May be corrosive to metals
H302	Harmful if swallowed
H315	Causes skin irritation
H318	Causes serious eye irritation
H332	Harmful if inhaled

Non-GHS Statements (Aus)

AUH071	Corrosive to respiratory tract

Precautionary Statements

Prevention statements

P101	If medical advice is needed, have product container or label at hand
P102	Keep out of reach of children
P103	Read label before use
P234	Keep only in original container
P261	Avoid breathing dust/fume/gas/mist/vapours/spray
P264	Wash hands thoroughly after handling
P270	Do not eat, drink or smoke when using this product
P271	Use only outdoors or in a well-ventilated area
P272	Contaminated work clothing should not be allowed out of the workplace
P280	Wear protective gloves, clothing, eye and face protection
P284	In case of inadequate ventilation wear respiratory protection.

Response Statements

P301	**IF SWALLOWED:**
+ P312	- Call a POISON centre or doctor/physician if you feel unwell.
+ P321	- Specific treatment (shown in First Aid Measure on this SDS)

	+ P330	- Rinse Mouth
	+ P331	- Do not induce vomiting
	P303	**IF ON SKIN (or hair):**
	+ P321	- Specific treatment (shown in First Aid Measure on this SDS)
	+ P332	- Wash with plenty of soap and water
	+ P353	+P314- If skin irritation occurs: Get medical attention/advice
	+ P362	- Take off contaminated clothing and wash before reuse
	P304	**IF INHALED:**
	+ P312	- Call a POSION centre or doctor/physician if you feel unwell
	+ P340	- Remove person to fresh air and keep comfortable for breathing
	P305	**IF IN EYES:**
	+ P313	- Get medical advice/attention
	+ P321	- Specific treatment (shown in First Aid Measure on this SDS)
	+P337	- If eye irritation persists: seek immediate medical attention
	+P338	- Remove contact lenses, if present and easy to do. Continue rinsing
	+P351	-Rinse cautiously with water for several minutes
Storage Statements		
	P406	- Store in a corrosion resistant container with a resistant inner liner
Disposal Statements		
	P501	- Dispose of contents/container in accordance with local/regional/ national/international regulations.

3. Composition/Information on Ingredients

Ingredients

Chemical Entity	2-Hydroxybutanedioic Acid
Chemical Formula	$C_4H_6O_5$ (in aqueous solution)
Common Names	Malic Acid
Chemical Family	Organic Acid
CAS#	6915-15-7
UN#	N/A
Concentration Range	10%-30%
Chemical Entity	Water
Chemical Formula	H_2O
Common Names	Water, aqua, dihydrogen monoxide
Chemical Family	Inorganic Compound
CAS#	7732-18-5
UN#	N/A
Concentration Range	>60%

4. First Aid Measures

Generic Advice

Seek medical attention or advise from Poison Information Centre, a doctor or physician if exposure has occurred. If any abnormal symptoms are noticed while being exposed or previously exposed to chemical, seek medical advice. If a victim feels unwell, it is necessary to immediately seek medical attention. It is NOT normal to become unwell or experience any symptoms through

	normal use; if any symptom occurs while using this product treat immediately and appropriately while seeking advice from medical professional or Poison Information Centre.
If Swallowed	Do NOT induce vomiting. If the victim is conscious- rinse mouth of victim liberally. Give a glass of water. If the victim is unconscious or having seizures do not give anything into their mouth. Seek medical attention.
If on Skin and/or Hair	Flush exposed site with water immediately. Do not stop washing for a minimum of 15 min. Do not stop earlier unless directed by the Poisons Information Centre or a doctor. Soap may be used to help remove insoluble material. Contaminated clothing should be removed and washed before leaving the site or being re-worn. Seek medical advice.
If Inhaled	Move person away from away from the chemical into fresh air. If normal breath does not quickly return seek immediate medical attention. If breathing stops provide artificial respiration. A qualified medical professional may provide oxygen through a face mask. Do not re-enter exposure zone to avoid additional victims until the area is assured to be safe. Ensure clothing and other areas of the victims body have not been contaminated. Apply appropriate first aid as outlined in this section if additional exposures have occurred.
If in Eyes	Flush open eyes with running water for at least 15 min. Do not stop earlier unless directed by the Poisons Information Centre or a doctor. Immediate medical attention is necessary.

Important Symptoms of Exposure

	Malic acid is a week acid that can cause irritation to all parts of the body when exposed.
Acute	Irritation to digestive tract, skin, respiratory system and eyes.
Delayed	Long term exposures can cause burns, irritation and dermatitis.

5. Fire-Fighting Measures

Extinguishing Media Suitable	Substance is not flammable. Use any extinguisher adequate for surrounding fire and compatible with chemicals in vicinity.
Non-suitable	None known.
Hazards from material	Acid may volatise and become a corrosive noxious gas at elevated temperatures. Containers may decompose from heat expose leading to release corrosive liquid.

Flash Point	Non-combustible
Special Equipment	Fire fighters should wear a self contained breathing apparatus to avoid breathing vapours. Protective clothing capable of withstanding acids should be worn.
Special Precautions	Material is irritating. Fire fighting water will dulite chemical but will likely remain slightly acidic. Use caution with run-off and avoid spillage into waterways or drains.
Hazchem Code	N/A

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

Non-Emergency Personnel	Only fully trained and equipped personnel should attempt to contain or clean a spill. In the event of large spills, untrained or ill equipped persons should evacuate. Small spills may be contained and controlled by non professionals IF they are wearing all protective clothing and follow clean up instructions. PPE must meet or exceed specifications set by Australian Standards. If release of chemical occurs ground will become slippery; take care near spills. Suitable protective equipment should be worn including a vapour respirator suited for acid gas, face shield, heavy duty nitrile gloves, acid rated coveralls and shoes. Ensure ventilation is adequate and if metal /acid contact has occurred turn off ignition sources. If unsure about how to manage a small spill, immediately contact a chemical spill expert.
Emergency Responders	Use suitable protection while responding to release event. All PPE should meet or exceed Australian Standards. All release management strategies should be implemented. If uncontained from site, affected parties should be notified. **PPE required (minimum)** Eyes- Face Shield or Goggles Gloves- Use Heavy duty nitrile Respiratory Protection- Acid Gas rated respirator if fuming Suit- Various are suitable Footwear- Acid proof footwear or booty is required

Environmental Precautions

Precautions	Do not allow the product to enter waterways, drains, sewers or to be released uncontained into the environment. If this occurs contact the EPA and the local waste & water authorities to report the release.
Effect of release	Product will acidify water bodies and streams. Will cause damage to life that is exposed to solution unless significantly diluted.

Methods and Materials for Containment and Cleaning Up

Containment	Material leak should be contained in a bunded area. Drains and other exit points should be covered until material is neutralised and diluted. If it is safe to do so, the leak source should be repaired to prevent further leaks/spills.
Neutralisation	Acid should be neutralised using either sodium bicarbonate, calcium carbonate, sodium carbonate or a suitable, commercially available acid neutraliser. Neutralisation can be confirm by testing spill pH is at least 7 . Neutraliser should be applied from outside to the centre of the spill, mix well.
Material Removal	Using an absorbent such as sand, dry earth or non-flammable commercial absorbent materials the majority of the material should be collected and stored in an appropriate container. The material should be disposed in at a chemical waste handling facility.
Clean up	For very small leaks or after the majority of chemical material has been neutralised and removed, the chemical can be cleaned off using water. Ensure waste water does not have a pH below 6 (neutralise as above if this occurs). Water will readily dilute acid. Observe all environmental requirements.

7. Handling and Storage

Precautions for Safe Handling

PPE required when interacting with chemical includes glasses/face shield, chemical resistant, durable clothing that covers all skin, nitrile gloves and and durable shoes. Chemical should only be used in a bunded area with care to avoid spills. Chemical should not be mixed with any other material other than those specified on label or by instruction of Grayson Australia. Appropriate equipment only to be used when moving chemical.

General Warnings

Eating, drinking and smoking within work areas or in the vicinity of this chemical is prohibited. Wash hands after use. Any contaminated clothing and protective equipment should be removed prior to entering eating areas.

Conditions for Safe Storage, including any incompatibilities

Material should be kept inside the provided container, with the lid firmly shut until point of use. Material is incompatible with many chemicals, chemicals that react with acids should not be stored nearby. Chemical should be in a bunded area. Keep chemical in a dry, cool place suitable for chemical storage.

8. Exposure Controls and Personal Protection

Control Parameters

Exposure Limits	Australia: TWA No limit allocated - Safe Work Australia STEL No limit allocated- Safe Work Australia Other: TWA No limit allocated- OSHAB STEL No limit allocated- OSHAB

Biological Limits	No data found

Engineering Controls

Use only in a well ventilated area; if possible use local exhaust ventilation. Minimise operator contact where possible.

Individual Protection Measures, such as Personal Protective Equipment (PPE)

General	All PPE should meet or exceed Australian Standards requirements. PPE required depends on level of interaction, PPE appropriate to emergency situations will be different to adjusting dosing equipment. Risk assessments should be undertaken to evaluate the hazard level for chemical interactions and apply policies enforcing suitable PPE for the individual situation.
Eye and face	Wear a face shield or googles when interacting with the product to prevent splashing into eyes or face.
Respiratory	Ensure air is well ventilated and sprays of solution are not inhaled.
Hands	Heavy duty nitrile gloves should be worn when interacting with chemical.
Clothing	Chemically impervious apron or acid prood coveralls should be used when interacting with chemical. Normal clothing will not provide adequate protection as chemical will burn skin upon contact.

9. Physical and Chemical Properties

Appearance

Clear, colourless liquid

Odour

Odourless

Odour Threshold

Odourless

pH

1 to 2

Melting/Freezing Point

Not available

Initial Boiling Point and Boiling Range

Not available

Flash Point

N/A

Evaporation Rate

N/A

Flammability

Not flammable

Upper/Lower Flammability or Explosive Limits

N/A

Vapour Pressure

Not Available

Vapour Density

Not Available

Solubility

Extremely soluble in water

Partition Coefficient: n-octanol/water

Not available

Auto-ignition Temperature

N/A

Decomposition Temperature

Not available

Viscosity

Not available

Release of Invisible Flammable Vapours and Gases

Generally not flammable. Contact with metal reacts and evolves H_2 gas.

10. Stability and Reactivity

Reactivity

Chemical is a weak acid. Under ambient conditions & contained in supplied container the chemical should not react unless foreign material is added to container. High temperatures may form acidic vapours

Chemical Stability

Chemical is stable under normal ambient conditions.

Possibility of Hazardous Reactions

Excessive temperatures may vaporise gas and increase container pressure. This may result in uncontrolled acid gas vapour escaping. If uncontrolled release occurs with sodium chlorite, hazardous levels of chlorine dioxide may occur.

Conditions to Avoid

High temperatures should be avoided.

Incompatible Materials

Can react with bases. Metals, carbonates, organics, chlorinated compounds, peroxides and oxidising compounds. Sodium chlorite when uncontrolled release occurs.

Hazardous Decomposition Products

Contact with sodium chlorite yields chlorine dioxide. Maleic anhydride carbon monoxide and carbon dioxide can also evolve.

11. Toxicological Information

Acute Toxicity

Toxicity is the result of corrosive abilities of acid. High exposures will cause rapid incapacitation via serve corrosive damage to biological tissues.
Oral: LD50 1600mg/kg (mouse)
Dermal: No Data Found
Inhalation No Data Found

Skin Corrosion/Irritation

Irritant to skin. Permanent effects may result

Serious Eye Damage/Irritation

Can cause severe burns to eyes. If severe, blindness may result.

Respiratory or Skin Sensitisation

Sensitisation of respiratory system and/or skin is possible from exposure.

Germ Cell Mutagenicity

No Data Found.

Carcinogenicity

No Data Found

Reproductive Toxicity

No data Found.

Specific Target Organ Toxicity (STOT)- Single Exposure

Respiratory tract irritation and damage

Specific Target Organ Toxicity (STOT)- Repeated Exposure

No data found

Aspiration Hazard

No data found

12. Ecological Information

Toxicity

Due to thecorrosive and acidic properties of malic acid this chemical is chemical is expected to be toxic to the aquatic environment and to any ecosystem where the chemical is uncontained.

Data:

No data found

Persistence and Biodegradability

Although not biodegradable, persistence is unlikely as it will readily become dilute upon contact with water and neutralise to form salts. Natural alkaline minerals/materials will assist in this process.

Bio accumulative Potential

No data available.

Mobility in Soil

Is mobile in soils. However will quickly diminish in strength due to neutralisation.

Other Adverse Effects

No other effects to ecosystems known.

13. Disposal Considerations

Disposal Containers and Methods

Container should be disposed of at a specialised chemical waste handling facility.

Physical/Chemical Properties that may Affect Disposal Options

Material is corrosive and may react with other disposed chemicals inc metals, bases, oxidisers, peroxides, carbonates and chlorinated substances.

Effect of Sewage Disposal

Do not add directly to waste water/sewage supplies. Acidifies aqueous solutions and may result in escape of chemical into environment.

Special Precautions for Incineration or Landfill

This product is suitable for landfill through an approved handler of chemical wastes. Incineration is not recommended as malic acid is relatively stable and

may form noxious gases. Always contact local authorities to ensure disposal meets local, state and national regulations.

14. Transport Information

UN number

None Allocated

Proper Shipping or Technical Name

Malic Acid Solution

Transport Hazard Class

N/A

Packing Group

N/A

Environmental Hazards for Transport Purposes

Hazardous to environment if release occurs. Follow release instructions in SDS and seek professional chemical response advice for action.

Special Precautions for User

None known.

Additional Information

Transport only in provided containers

Hazchem or Emergency Action Code

N/A

15. Regulatory Information

Poisons Schedule Number

None Allocated

AICS

Listed

16. Other Information

Abbreviations Used

H_2	-Hydrogen (flammable/explosive gas)
$C_4H_6O_5$	-Malic Acid
LC50	-Lethal concentration results in 50% tested population lethality
LD50	-Lethal dose which results in 50% tested population lethality
OSHAB	-Occupational Safety and Health Appeals Board
PPE	-Personal protective equipment
SDS	-Safety data sheet
STEL	-Short term exposure limit
STOT	-Specific target organ toxicity
TWA	-Time weighted average

Revision History and Changes Made

Date of last preparation	10/01/2022
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Reason for revision	General Update
Previous revisions	2