



**GAS IMPORT JETTY AND PIPELINE PROJECT
ENVIRONMENT EFFECTS STATEMENT
INQUIRY AND ADVISORY COMMITTEE**

TECHNICAL NOTE

TECHNICAL NOTE NUMBER: TN 034

DATE: 19 October 2020

LOCATION: Gas Import Jetty Works (FSRU)

EES/MAP BOOK REFERENCE: Whole EES and Technical Reports, and Attachment VIII, section 9.1.2

SUBJECT: Response to RFI 002 - Section 2.1 Seawater use

SUMMARY This Technical Note provides further information on the proposed anti-scalant used on the FSRU.

REQUEST: Provide the product specification of the proposed anti-scalant Altrat 400, and its behaviour in seawater.

NOTE:

1. Copies of the following documents are attached to this technical note:
 - (a) Alpacon Altrat 400 Safety Data Sheet (Attachment 1); and
 - (b) Alpacon Altrat 400 Product Brochure (Attachment 2).
2. When the FSRU is operating in open loop regasification mode, approximately five cubic metres of freshwater would be required per day. When operating in closed loop regasification mode, this is expected to be approximately 30 cubic metres per day. The requirement for additional freshwater under closed loop mode is for provision into the boilers associated with the regasification system to account for water losses due predominantly to evaporation.
3. The freshwater generators installed on the FSRU are Alpha Laval AQUA Blue single stage freshwater generators specifically designed for marine applications. Alpha Laval recommends Alpacon Altrat 400 as the scale control agent (anti-scalant).
4. An evaporator type freshwater generator is considered the market leading technology in the marine industry, with most larger vessels having these types of freshwater generators installed. Anti-scale products are used in these systems to control scaling on the heating surfaces of the evaporator, and to minimise the need for acid cleaning.
5. Discharges from vessels are regulated by IMO conventions such as MARPOL and the ballast water management convention. 'Waste' products such as anti-scale products or other cleaning agents cannot be discharged to sea if they are harmful to the marine environment. The anti-scalant is non-bioaccumulating to marine life and non-toxic.
6. Based on Hoegh experience, the dosing rate for Alpacon Altrat 400 is 0.62 litres per day based on production of 30 cubic metres of freshwater per day. As the dosing rate is based on required freshwater generation, the dosing rate for five cubic metres per day would therefore be 0.10 litres per day.



7. As noted above, although the FSRU can produce 30 cubic metres of freshwater per day, it is expected that approximately five cubic metres per day of freshwater is required when the FSRU is operating in open loop mode.
8. The brine and cooling water are discharged from the freshwater generator through the same stream. The concentration of the anti scalant in this discharge will be 0.387 milligrams per litre based on the dosing rates above.
9. The material safety data sheet for Alpacon Altreat 400 identifies the aquatic toxicity threshold as being 100 milligrams per litre.
10. As the concentration of anti-scalant in the brine discharge would be 0.387 milligrams per litre, this is substantially lower than the safe level with regards to aquatic toxicity in the MSDS and therefore considered a safe dilution factor for discharge to the marine environment.

CORRESPONDENCE: N/A

ATTACHMENTS: 2 attachments:

1. Alpacon Altreat 400 Safety Data Sheet
2. Alpacon Altreat 400 Product Brochure



Attachment 1

Alpacon Altreat 400 Safety Data Sheet



Safety Data Sheet according to WHS Regulations

Printing date 04.05.2020

Version number 12

Revision: 04.05.2020

1 Identification

- **Product identifier**
- **Trade name: Alpacon Altreat 400**
- **Article number:** 9850005681, 9850005682
- **Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
- **Application of the substance / the mixture**
Anti-fouling agent
Antiscalant in desalination plants
- **Details of the supplier of the safety data sheet**
- **Supplier:**
Australian supplier:
Alfa Laval Australia Pty Ltd
Locked Bag 40, Blacktown Business Centre
NSW - NSW-2148 Blacktown
Australia
Visit: 14 Healey Circuit, - NSW - NSW-2148 Huntingwood
Tel switchboard: +61 2 8822 2700 - Fax switchboard: +61 2 8822 2799
www.alfalaval.com.au
australia.info@alfalaval.com
Alfa Laval Tumba AB
Hans Stahles väg 7
S-147 80 Tumba
Sweden
+46 8 530 650 00
info.se@alfalaval.com
- **Further information obtainable from:**
For further questions regarding the safety data sheet, please contact your local Alfa Laval Sales Company which you find at www.alfalaval.com or in section 16 "Other Information" in the end of the safety data sheet
- **Emergency telephone number:**
Call 000 or 112 and ask for poison information.
Australian Poisons Information Centre Tel:13 11 26

2 Hazard(s) Identification

- **Classification of the substance or mixture**
The product is not classified, according to the Globally Harmonised System (GHS).

- **Label elements**
- **GHS label elements** Void
- **Hazard pictograms** Void
- **Signal word** Void
- **Hazard statements** Void
- **Other hazards** No further relevant information available.
- **Results of PBT and vPvB assessment**
- **PBT:** The product is not, nor contains, a substance that is, PBT.
- **vPvB:** The product is not, nor contains a substance that is, vPvB.

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3 Composition and Information on Ingredients

- **Chemical characterisation: Mixtures**
- **Description:** Polycarboxylate, sodium salt, in water.
- **Dangerous components:** Void

4 First Aid Measures

- **Description of first aid measures**
- **After inhalation:** Supply fresh air; consult doctor if symptoms persists.
- **After skin contact:** Wash with water and soap.
- **After eye contact:**
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
- **After swallowing:**
Rinse out mouth and then drink plenty of water.
If symptoms persist consult doctor.
- **Information for doctor:**
- **Most important symptoms and effects, both acute and delayed**
No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**
Treat symptomatically.

5 Fire Fighting Measures

- **Extinguishing media**
- **Suitable extinguishing agents:** Use fire extinguishing methods suitable to surrounding conditions.
- **For safety reasons unsuitable extinguishing agents:** Not applicable.
- **Special hazards arising from the substance or mixture**
Formation of toxic gases is possible during heating or in case of fire.
- **Advice for firefighters**
- **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.

6 Accidental Release Measures

- **Personal precautions, protective equipment and emergency procedures**
Do not breathe vapour.
- **Environmental precautions:**
Do not allow to enter sewers/ surface or ground water.
Send for recovery or disposal in suitable receptacles.
- **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Dispose of the material collected according to regulations.
- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.

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See Section 13 for disposal information.

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7 Handling and Storage

- **Handling:**
- **Precautions for safe handling**
When using do not eat, drink or smoke.
Avoid contact with skin and eyes.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** Keep container tightly closed.
- **Information about storage in one common storage facility:**
Do not store together with alkalis (caustic solutions).
Store away from metals.
- **Further information about storage conditions:** Store in a cool place.
- **Specific end use(s)**
Antiscalant in desalination plants
Anti-fouling agent
Professional use only.

8 Exposure controls and personal protection

- **Additional information about design of technical facilities:** No further data; see item 7.
- **Control parameters**
- **Ingredients with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:** Use only in well-ventilated areas.
- **Respiratory protection:**
Use suitable respiratory protective device only when aerosol or mist is formed.
Filter P2
- **Protection of hands:**
Use chemical resistant protective gloves
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
- **Material of gloves**
Nitrile rubber, NBR
PVC gloves
Chloroprene rubber (CR)
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

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- **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
- **Eye protection:** Goggles recommended during refilling
- **Body protection:**
Working clothes
When the risk of skin exposure is high (e.g. when cleaning up spillages or if there is risk of splashing):



Protective work clothing

- **Limitation and supervision of exposure into the environment** Avoid release to the environment.

9 Physical and Chemical Properties

- **Information on basic physical and chemical properties**

- **General Information**

- **Appearance:**

· Form:	Fluid
· Colour:	Light brown
· Odour:	Characteristic
· Odour threshold:	Not determined.

- **pH-value at 20 °C:** 8

- **Change in condition**

· Melting point/freezing point:	-20 °C
· Initial boiling point and boiling range:	100 °C

- **Flash point:** Not applicable.

- **Flammability (solid, gas):** Not applicable.

- **Decomposition temperature:** Not determined.

- **Auto-ignition temperature:** Product is not selfigniting.

- **Explosive properties:** Product does not present an explosion hazard.

- **Explosion limits:** Not applicable.

- **Oxidising properties:** Not applicable.

- **Vapour pressure at 20 °C:** 23 hPa
≈23 mbar

- **Density at 20 °C:** 1.3 g/cm³

- **Relative density:** Not determined.

- **Vapour density:** Not determined.

- **Evaporation rate:** Not determined.

- **Solubility in / Miscibility with water:** Fully miscible.

- **Partition coefficient: n-octanol/water:** <-2 log Pow

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- | | |
|----------------------------|---|
| · Viscosity: | |
| Dynamic at 20 °C: | 200 mPas (DIN EN ISO 2555)
Not determined. |
| Kinematic: | Not determined. |
| · Solvent content: | |
| Water: | 100.0 % |
| VOC (EC) | 0.00 % |
| · Other information | No further relevant information available. |

10 Stability and Reactivity

- **Reactivity** The material is stable under recommended storage and handling conditions.
- **Chemical stability**
Stable under normal temperature conditions and under recommended usage and storage.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** None known.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological Information

- **Information on toxicological effects**

- **Acute toxicity**

Oral	LD50	>2,000 mg/kg (rat)
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- **Primary irritant effect:**
- **Skin corrosion/irritation** No irritation based on test (rabbit) on similar products.
- **Serious eye damage/irritation**
Based on available data, the classification criteria are not met.
No irritation based on test (rabbit) on similar products.
Irritating effect.
- **Respiratory or skin sensitisation** No sensitising effects known.
- **Additional toxicological information:**
The product is not subject to classification according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version.
When used and handled according to specifications, the product does not have any harmful effects to our experience and the information provided to us.

12 Ecological Information

- **Toxicity**

- **Aquatic toxicity:**

LC50 (96h)	>100 mg/L (Fish)
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- **Persistence and degradability** Not easily biodegradable
- **Behaviour in environmental systems:**
- **Bioaccumulative potential** Does not accumulate in organisms
- **Mobility in soil** Some mobility in soil can be expected

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- **Results of PBT and vPvB assessment**
- **PBT:** The product is not, nor contains, a substance that is, PBT.
- **vPvB:** The product is not, nor contains a substance that is, vPvB.
- **Other adverse effects** No further relevant information available.

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation** Dispose of waste in an approved waste disposal facility.
- **Uncleaned packaging:**
- **Recommendation:**
Non contaminated packagings may be reused.
Packagings that may not be cleansed are to be disposed of in the same manner as the product.
- **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

14 Transport information

- | | |
|---|-----------------|
| · UN-Number | Void |
| · ADG, ADN, IMDG, IATA | Void |
| · UN proper shipping name | Void |
| · ADG, ADN, IMDG, IATA | Void |
| · Transport hazard class(es) | Void |
| · ADG, ADN, IMDG, IATA | Void |
| · Class | Void |
| · Packing group | Void |
| · ADG, IMDG, IATA | Void |
| · Environmental hazards: | |
| · Marine pollutant: | No |
| · Special precautions for user | Not applicable. |
| · Transport in bulk according to Annex II of Marpol and the IBC Code | Not applicable. |
| · UN "Model Regulation": | Void |

15 Regulatory information

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

Australian Inventory of Chemical Substances

None of the ingredients is listed.

Standard for the Uniform Scheduling of Medicines and Poisons

None of the ingredients is listed.

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· Australia: Priority Existing Chemicals

None of the ingredients is listed.

- **GHS label elements** Void
- **Hazard pictograms** Void
- **Signal word** Void
- **Hazard statements** Void
- **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

LIMITATION OF LIABILITY

This document is only intended to be used as guidance as regards the risks of which we are aware that are associated with the product. Every individual who works with the product or in close proximity of it must receive suitable training. Individuals who come into contact with the product must be capable of using their own judgement as regards conditions or methods for handling, storing and using the product. Alfa Laval is not liable for demands, losses or damage of any kind that arise from flaws or deficiencies in this document or from using, handling, storing or disposing of the product unless it can be proven that Alfa Laval has acted in a grossly negligent manner. Beyond what has been agreed upon and specified in writing with Alfa Laval in the individual case, Alfa Laval makes no promises or assumes any liability, including but not limited to implicit guarantees regarding marketability or appropriateness in terms of both the information provided in this document and the product to which the information refers.

Please contact your local Alfa Laval Sales Company for further questions.

www.alfalaval.com

- **Department issuing SDS:** Alfa Laval Corporate Standards & Regulatory Operations

· Contact:

Please contact your local Alfa Laval Sales Company for further questions.

Argentina: alfa.consulta@alfalaval.com
Australia: australia.info@alfalaval.com
Austria: info.mideurope@alfalaval.com
Belgium: benelux.info@alfalaval.com
Bolivia: alfa.consulta@alfalaval.com
Brazil: alfalaval.br@alfalaval.com
Bulgaria: bulgaria.info@alfalaval.com
Canada: alfacan.info@alfalaval.com
Chile: chile.informacion@alfalaval.com
China: china.info@alfalaval.com
Colombia: info.colombia@alfalaval.com
Croatia: hrvatska.info@alfalaval.com
Czech Republic: czechrepublic.info@alfalaval.com
Denmark: info.nordic.dk@alfalaval.com
Egypt: alme.marketing@alfalaval.com
Estonia: estonia.info@alfalaval.com
Finland: info.fi@alfalaval.com
France: environnement@alfalaval.com
Germany: info.mideurope@alfalaval.com
Greece: greece.info@alfalaval.com
Hungary: info.hu@alfalaval.com
India: india.info@alfalaval.com
Indonesia: alfalindo@alfalaval.com

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Israel: israel.info@alfalaval.com
Italy: alfalaval.italia@alfalaval.com
Latvia: latvia.info@alfalaval.com
Lithuania: lithuania.info@alfalaval.com
Malaysia: malaysia.info@alfalaval.com
Mexico: mexico.info@alfalaval.com
The Netherlands: benelux.info@alfalaval.com
New Zealand: newzealand.info@alfalaval.com
Norway: info.no@alfalaval.com
Peru: ventas.peru@alfalaval.com
Philippines: philippines.info@alfalaval.com
Poland: poland.info@alfalaval.com
Portugal: portugal.info@alfalaval.com
Qatar: alme.marketing@alfalaval.com
Romania: romania.info@alfalaval.com
Russia: moscow.response@alfalaval.com
Singapore: al.singapore@alfalaval.com
Slovak Republic: slovakia.info@alfalaval.com
Slovenia: slovenija.info@alfalaval.com
South Africa: info.sa@alfalaval.com
Spain: info.spain@alfalaval.com
Sweden: info.se@alfalaval.com
Switzerland: info.mideurope@alfalaval.com
Taiwan: taiwan.info@alfalaval.com
Thailand: thailand.info@alfalaval.com
Turkey: turkey@alfalaval.com
Ukraine: ukraine.info@alfalaval.com
United Arab Emirates: alme.marketing@alfalaval.com
United Kingdom: general.uk@alfalaval.com
United States: customerservice.usa@alfalaval.com
Venezuela: venezuela.info@alfalaval.com
Vietnam: vietnam.info@alfalaval.com

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VOC: Volatile Organic Compounds (USA, EU)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative

*** Data compared to the previous version altered.**



Attachment 2

Alpacon Altreat 400 Product Brochure



ALPACON ALTREAT 400

Scale inhibitor for fresh water generators and desalination plants

Cost-effective recovery of fresh water from seawater is critical to a wide range of industries such as the power, chemical, marine, oil and gas industries. During the distillation process, the formation of scale on heat transfer surfaces can significantly reduce heat transfer efficiency and increase operation and maintenance costs.

Scale formation depends on temperature, concentration and pH, but generally takes the form of:

- calcium carbonate,
- magnesium hydroxide, and,
- calcium sulphate.

Conventional scale inhibition methods, such as the use of sulphuric acid and polyphosphates, have given rise to a new generation of antiscalants based on polycarboxylic acids.

Concept

Alpacon Altreat 400 scale inhibitor is a polycarboxylic acid that controls inorganic scale formation. Small amounts of this copolymer, based on maleic acid, effectively handles large quantities of dissolved salts, thus preventing precipitation, settling and baking onto heat transfer surfaces.

Alpacon Altreat 400 also impairs crystal growth, modifying the crystal structure to create a soft sludge byproduct that does not adhere to heat transfer surfaces.

Alpacon Altreat 400 readily dissolves in any type of water. The typical dosage to feedwater ranges from a minimum of two parts per million (ppm) to a maximum of 10 ppm, depending on the quality of the seawater.

This versatile antiscalant effectively performs at the range of temperatures encountered during mechanical vapour compression and during single and multi-effect distillation processes.

Test results demonstrate that Alpacon Altreat 400 is more effective than other scale inhibitors under variable conditions, including water type, temperature and run time.



Features and benefits

- Highly concentrated liquid delivers substantial savings since up to 40% less solution than other polymaleates is required to achieve the same effect.
- Highly effective, but gentle, solution does not harm the environment or heat exchanger tubes, plates, gaskets or glue.
- Highly versatile scale inhibitor delivers effective performance while operating in temperatures up to 80°C.
- Helps maintain heat transfer rates, thus improving process performance, reducing energy costs and prolonging heat exchanger lifetime.
- Increases the efficiency and performance of the equipment, reducing total operation and maintenance costs.
- Certified drinking water treatment chemical by NSF and KIWA.

Instructions for use

Normal dosing rate 2–10 ppm (max. 10 ppm), depending on the properties of the water to be treated.

Ensure adequate mixing at chemical tank before dosing into the system.

Recommended operating temperatures: 50°–80°C.

Storage

Keep container tightly closed and in a cool place.

Personal protection

Use safety goggles and protective gloves.

First aid measurements

General: Remove contaminated clothing.

Skin: Wash thoroughly with soap and water.

Eyes: Wash affected eyes for at least 15 minutes under running water with eyelids held open.

Inhalation: If difficulties occur after vapour/aerosol has been inhaled, remove to fresh air and seek medical attention.

Ingestion: Rinse mouth and then drink plenty of water.

Technical specification

Appearance:	Light brown liquid
Density:	Approx. 1,3 g/cm ³
Viscosity:	600 mm ² /s at 23°C
Flash point:	>100°C
pH:	Approx. 8 at 20°C
Miscibility with water:	In all proportions

Content

Polymerised acid, modified as sodium salt in water.

Ordering information

Part No. 25 litre plastic can	985 00056-82
Part No. 200 litre plastic drum	985 00056-81

How to contact Alfa Laval

Contact details for all countries are continually updated on our web site. Please visit www.alfalaval.com to access the information direct.