

Safety Data Sheet

Section 1. Identification

Product name : EnDURE™ Aluma Seal 144
Product code : 425966
Uses advised against : Consumer, private households, general public
Product type : Liquid.
Validation date : 1/23/2014.

| Manufacturer - Supplier | Telephone no.: | Fax no. | Emergency phone: |
|--|----------------------|---------------------|--|
| Enthone Inc 350 Frontage Road West Haven, CT 06516 | Tel: (203) 934-8611 | Fax:(203) 799-8179 | DOMESTIC NORTH AMERICA 800-424-9300 INTERNATIONAL, CALL +1 703-527-3887 (collect calls accepted) |
| Cookson Enthone Chemistry Trading (Shanghai) Co., Ltd. Rm 201, No.388 of Muhua North Road, Fengxian District, Shanghai | Tel: 86-21-6390 0600 | Fax: 86-21-50912810 | Tel: 0532-8388 9090 (24- hour) |
| Enthone Chemistry A Division of Cookson Singapore Pte Ltd 26 Tuas West Road Singapore 638382 | Tel: (65) 6861 1773 | Fax: (65) 68611145 | Tel: (65) 6861 1773 |
| ENTHONE SDN. BHD. Lot 34 & 36 Lorong IKS Juru 7 Taman Perindustrian Ringan Juru 14100 Simpang Ampat Seberang Perai Selatan Penang, Malaysia | Tel: 60 - 4 507 7787 | Fax: 60 4 507 0621 | Tel: 60 4 507 7787 |
| Enthone Korea 1Ra 310, Sihwa Industrial Complex, 1247-9, Jungwang-Dong, Siheung-Si, Gyeonggi-Do, Korea | Tel: 82-31-432-4100 | 82-31-433-1478 | Tel: 82-31-432-4100 |
| Enthone Inc. Taiwan Branch 2F, B Building, No. 10, Lu-Shing Street, Luchu Hsiang, 338 Taoyuan, Taiwan | Tel: 03-312-0280 | Fax: 03-312-0380 | Tel: 886-937408981 |
| Alent Japan Company - Enthone 480-28 Higashitoyoda, Hiratsuka, Kanagawa 254-0082, Japan | Tel: 81-463-51-4330 | Fax: 81-463-55-2588 | Tel: 81-(0)463-51-4330 |
| Enthone India A Division of Cookson India Pte. Ltd Developed Plot no 16, North Phase, SIDCO Industrial estate, Ambattur, Chennai - 600098. | Tel: 91-44-26252666 | Fax: 91-44-26258627 | Tel: 91-44-26252666 |

Section 2. Hazards identification

Classification of the substance or mixture : ACUTE TOXICITY: ORAL - Category 4
 GERM CELL MUTAGENICITY - Category 2
 CARCINOGENICITY - Category 1A
 AQUATIC TOXICITY (ACUTE) - Category 2

GHS label elements

Continued on next page

Section 2. Hazards identification

Symbol :



Signal word :

Danger

Hazard statements :

Harmful if swallowed.
May cause cancer.
Suspected of causing genetic defects.
Toxic to aquatic life.

Precautionary statements

Prevention :

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust or mist. Use personal protective equipment as required. Avoid release to the environment. Keep out of reach of children. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. If medical advice is needed, have product container or label at hand.

Response :

IF SWALLOWED: Rinse mouth. IF exposed or concerned: Call a POISON CENTER or doctor/physician if you feel unwell. Get medical attention/advice.

Storage :

Store locked up.

Disposal :

Dispose of contents and container in accordance with all local, regional, national and international regulations.

Other hazards which do not result in classification : Not available.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

| Ingredient name | % | CAS number |
|-----------------|------|------------|
| Nickel Salt | 1-10 | - |

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in section 8.

Section 4. First aid measures

Description of necessary first aid measures

Inhalation :

Get medical attention. If it is suspected that mists are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Move exposed person to fresh air. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Keep person warm and at rest. If unconscious, place in recovery position and get medical attention immediately. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Continued on next page

Section 4. First aid measures

- Ingestion** : Get medical attention. Move exposed person to fresh air. Wash out mouth with water. Keep person warm and at rest. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Remove dentures if any. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. If unconscious, place in recovery position and get medical attention immediately. Never give anything by mouth to an unconscious person. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs.
- Skin contact** : Get medical attention. Flush contaminated skin with plenty of water. In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Continue to rinse for at least 15 minutes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Eye contact** : Get medical attention if irritation occurs. Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open.

Over-exposure signs/symptoms

See section 11 for more detailed information on health effects and symptoms.

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that mists are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Personnel should wear protective clothing. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Section 5. Fire-fighting measures

Extinguishing media

- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Specific hazards arising from the chemical** : In a fire or if heated, a pressure increase will occur and the container may burst. This material is toxic to aquatic life. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
metal oxide/oxides
- Special precautions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Remark** : Not available.

Continued on next page

Section 6. Accidental release measures

- Personal precautions, protective equipment and emergency procedures** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Methods and materials for containment and cleaning up

- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

- Precautions for safe handling** : Avoid exposure - obtain special instructions before use. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Put on appropriate personal protective equipment (see section 8). Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not ingest. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Be sure area is equipped with all necessary emergency equipment including fire extinguishers, and spill response materials. Empty containers retain product residue and can be hazardous. Do not reuse product container. Avoid release to the environment.
- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

| Ingredient name | Exposure limits |
|-----------------|---|
| Nickel Salt | ACGIH TLV (United States, 3/2012). Notes: as Ni TWA: 0.1 mg/m ³ , (as Ni) 8 hour(s). Form: Inhalable fraction |

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Continued on next page

Section 8. Exposure controls/personal protection

- Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. The user must check that the final choice of type of glove selected for handling this product is the most appropriate and takes into account the particular conditions of use, as included in the user's risk assessment.
- Eye protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. Avoid contact with eyes. Use safety eyewear designed to protect against splash of liquids.
- Skin protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Avoid contact with skin and clothing. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

Section 9. Physical and chemical properties

- Physical state** : Liquid.
- Color** : Green.
- Odor** : Acidic.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point** : Not available.
- Boiling point** : 100°C (212°F)
- Flash point** : Not available.
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : Not available.
- Vapor density** : Not available.
- Relative density** : 1.07

Continued on next page

Section 9. Physical and chemical properties

Solubility : Soluble in the following materials: cold water and hot water.
 Octanol/water partition coefficient : Not available.
 Decomposition temperature : Not available.
 Auto-ignition temperature : Not available.
 Viscosity : Not available.

Section 10. Stability and reactivity

Chemical stability : The product is stable.
 Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.
 Conditions to avoid : Avoid exposure - obtain special instructions before use. Avoid release to the environment.
 Incompatibility with various substances : Reactive with oxidizing agents, alkalis.
 Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
 Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Routes of entry : Inhalation. Ingestion.

Potential health effects

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure. May cause cancer if inhaled. Risk of cancer depends on duration and level of exposure.
 Ingestion : Harmful if swallowed. May cause cancer if swallowed. Risk of cancer depends on duration and level of exposure.
 Skin : May cause skin irritation.
 Eyes : May cause eye irritation.

Chronic toxicity

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.
 Mutagenicity : Contains material which can cause heritable genetic effects.

Numerical measures of toxicity

Acute toxicity estimates

| Route | ATE value |
|-------|-----------|
| Oral | 350 mg/kg |

| Product/ingredient name | Result | Species | Dose | Exposure |
|-------------------------|-----------|---------|-----------|----------|
| Nickel Salt | LD50 Oral | Mouse | 410 mg/kg | - |
| | LD50 Oral | Rat | 350 mg/kg | - |
| | LD50 Oral | Rat | 350 mg/kg | - |

Section 12. Ecological information

Ecotoxicity : This material is toxic to aquatic life.

Aquatic and terrestrial toxicity

| Product/ingredient name | Test | Result | | |
|-------------------------|------|-----------------------------------|--|----------|
| Nickel Salt | - | Acute EC50 0.8 mg/L | Algae | 48 hours |
| | - | Acute EC50 5 mg/L | Algae | 48 hours |
| | - | Acute EC50 350 ug/L Fresh water | Algae - Green algae - Scenedesmus subspicatus - Exponential growth phase | 72 hours |
| | - | Acute EC50 360 ug/L Fresh water | Algae - Green algae - Scenedesmus subspicatus - Exponential growth phase | 96 hours |
| | - | Acute LC50 2580 ug/L Marine water | Crustaceans - Harpacticoid copepod - Tisbe holothuriae | 48 hours |
| | - | Chronic NOEC 90 ug/L Fresh water | Daphnia - Water flea - Daphnia magna - <=24 hours | 21 days |

Conclusion/Summary : Not available.

Persistence/degradability

| Product/ingredient name | Test | Result |
|-------------------------|------|--------|
| Not available. | | |

Conclusion/Summary : Not available.

| Product/ingredient name | Aquatic half-life | Photolysis |
|-------------------------|-------------------|------------|
| Not available. | | |

Bioaccumulative potential

| Product/ingredient name | LogP _{ow} | BCF |
|-------------------------|--------------------|-----|
| Not available. | | |

Mobility : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Continued on next page

Section 14. Transport information

| Regulatory information | UN number | Proper shipping name | Classes | PG* Label | Additional information |
|------------------------|----------------|----------------------|---------|-----------|------------------------|
| DOT Classification | Not regulated. | - | - | - | - |
| IMDG Class | Not regulated. | - | - | - | - |
| IATA-DGR Class | Not regulated. | - | - | - | - |
| UN Class | Not regulated. | - | - | - | - |

PG* : Packing group

Section 15. Regulatory information

China

List of Toxic Chemicals Severely Restricted for Importing & Exporting by China

None of the components are listed.

Korea

a. Regulation according to ISHA

ISHA Article 37 : None of the components are listed.

ISHA Article 38 : None of the components are listed.

b. Regulation according to TCCA

TCCA Toxic chemicals : Not applicable

TCCA Observational chemicals : None of the components are listed.

TCCA Article 32 (Banned) : None of the components are listed.

TCCA Article 32 (Restricted) : None of the components are listed.

c. Dangerous Materials Control Act : Not available.

Europe

Safety, health and environmental regulations specific for the product : No known specific national and/or regional regulations applicable to this product (including its ingredients).

Japan

Poisonous and Deleterious Substances

Ingredient name

Status

None of the components are listed.

ISHL

ISHL Class : Class 2

Working Conditions Act; Health and Safety Act : Article 57.

ISHL Prevention of Tetraalkyl Lead Poisoning : Not listed

Continued on next page

Section 15. Regulatory information

ISHL Harmful Substances Subject to Obtaining Permission for Manufacturing : Not listed

ISHL Harmful Substances, Prohibited for Manufacturing : Not listed

ISHL Chemicals requiring notification : Listed

ISHL Dangerous Substances : Not listed

List of Specially Controlled Industrial Waste : Not listed

Pollutant Release and Transfer Registers (PRTR) : Specified Class 1

Fire Service Law - Obstructive materials : Not listed

Taiwan

International lists

United States TSCA : TSCA 5(a)2 proposed significant new use rules: No products were found.
TSCA 5(a)2 final significant new use rules: No products were found.
TSCA 12(b) one-time export: No products were found.
TSCA 12(b) annual export notification: No products were found.

United States inventory (TSCA 8b) : All components are listed or exempted.

Section 16. Other information

History

Validation date : 1/23/2014.
Supersedes Date : 3/27/2013.
Prepared by : T. Valverde
(203)-799-4940
Enthone Inc
350 Frontage Road
West Haven, CT 06516
Phone: (203) 934-8611
Fax: (203) 799-8179
www.enthone.com

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Continued on next page

Section 16. Other information

4.1b1161