SAFETY DATA SHEET

According to Federal register/Vol. 77, No 58, March 26, 2012 /rules & regulations

Safety Data Sheet compliant with OSHA Hazardous Communication Standard, 2012 (OSHA-HCS)

SECTION 1: Identification of substance / mixture and of the company / undertaking

1.1 Product identifier
   Trade name: Anodamine HPFG
   Alternative Names: Surface-active polyamines.
   Relevant Identified uses of the substance / mixture and uses advised against

1.2 Identified Uses
   High-pressure boiler metal passivation scale and corrosion inhibition for industrial water treatment.

1.3 Details of the supplier of the safety data sheet
   Supplier: Anodamine Inc, 2590 Oakmont Drive, Building 300, Round Rock, Texas, USA 78665
   Telephone and Fax: Tel: + 1 (512) 244 2318

   Contact details of person responsible for SDS
   Technical Support Services contact (info@anodamine.com)
   Tel: + 1 (512) 244 2318

1.4 Emergency telephone number
   For USA: Chemtrec: +1-800-424-9300
   For Canada: CanuTec: 613-996-6666
   e-mail: ers@chemtelinc.com

   Opening Hours: 24 hours
   Other Comments (e.g. Language of the phone service): English

SECTION 2: Hazards Identification

2.1 Classification of the substance or mixture
   GHS-US classification: Not classified
   Additional Information: For full text of Hazard statements: See Section 16

2.2 Label elements
   GHS-US labelling:
   Hazard Pictogram: No hazard pictograms required
   Signal Word: No signal word required
   Hazard Statements: No hazard phrases required
   Precautionary Statements:
   Response: None
   Storage: None
   Disposal: None

2.3 Other Hazards
   Supplemental Hazard Information: None
   Not a PBT or vPvB

2.4 Unknown Acute toxicity (GHS-US)
   No data available

SECTION 3: Composition / Information on ingredients

3.2 Mixture:
   Chemical Characterisation: Surface Active Polyamines

   Remarks: No hazardous ingredients present according to OSHA-GHS 2012.

SECTION 4: First Aid Measures

4.1 Description of first aid measures
   General Notes: Immediately call doctor/physician if required.
   Inhalation: No effects or symptoms are expected when handling the product. No respiratory PPE is required. Remove to fresh air if irritation occurs get medical attention.
   Skin Contact: Remove contaminated clothing and shoes and immediately wash affected area with plenty of soap and rinse area with large amounts of water. Get medical aid if required.
   Eye Contact: Remove any contact lenses and continue flushing eyes with plenty of soap and water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed.
   Ingestion: Do NOT induce vomiting. If victim is conscious and alert, wash out mouth with water, give several glasses of water. Get medical aid immediately if necessary.

4.2 Most important symptoms and effects, both acute and delayed
   Refer to section 11 for more information on health effects and symptoms.
SECTION 5: Fire-fighting measures

5.1 Extinguishing media:
- Suitable extinguishing media: Use water fog or spray, dry chemical foam or carbon dioxide
- Unsuitable extinguishing media: None known

5.2 Special Hazards arising from the substance / mixture: Under fire conditions it may produce irritating fumes and/or gases if heated to 600 °C (1112 °F) or above. Thermal decomposition products may release toxic and/or hazardous fumes or gases including carbon oxides (CO & CO2), amine.

5.3 Advise for fire fighters:
- Wear self-contained breathing apparatus and acid resistant clothing

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
- For non emergency personnel:
  - Protective Equipment
  - Emergency Procedures
  - Use personal protection recommended in section 8
  - Evacuate the spill area safely to permit authorised personnel to handle the spill.

- For Emergency Responders
  - Emergency responders must wear the proper personal protective equipment (and have appropriate fire-suppression equipment) suitable for the situation to which they are responding.

6.2 Environmental precautions:
- Avoid release to the environment. Collect leaking substance with suited acid proof containers. Do not allow entering into drain or surface waters. Collect contaminated material in suited acid proof containers. Dispose of contaminated material and its container as waste according to local regulations.

Water Spill: The material will not cause any adverse environmental impact if it riches waterways however avoid release in to waterways. The product is considered non-hazardous to aquatic environment based on third-party test results.

Land spill: None

Air Spill: None known

6.3 Methods and material for containment and cleaning up:
- Contain large spills with containment walls and transfer the material to appropriate containers for reclamation or disposal. Collect by sweep, scoop or vacuum and remove. Flush spill area with water. The spill area may be slippery. Soak up liquid residue with suitable absorbent such as clay or saw dusts

6.4 References to other sections: Refer section 13 for disposal consideration

SECTION 7: Handling and storage

7.1 Precautions for safe handling:
- Protective measures
  - Avoid repeated contact with skin and eyes. Avoid inhalation of vapours or fumes.
  - Do not open the containers until ready for use. Close the containers properly.
  - Handle in accordance with good industrial hygiene and safety practices as mentioned in section 8.2. These practices include using appropriate personal protection, avoiding unnecessary exposure and removal of material from eyes, skin and clothing. Do not eat, drink or smoke when handling this product.
  - Observe all recommended safety precautions until container is cleaned, reconditioned or destroyed. The reuse of this material's container for non-industrial purposes is prohibited and any reuse must be in consideration of the data provided in this material safety data sheet.
Advice on general occupational Hygiene

Keep personal protective equipment in a clean place, away from the work area. Use clean and correctly maintained personal protective equipment. Always wash your hands after handling the product.

Do NOT eat or drink in the workplace.

7.2 Conditions for safe storage including any incompatibilities:

Technical measures and storage conditions Take all necessary precautions to avoid the accidental release of the product outside due to the rupture of containers or transfer systems. Ensure there is a suitable retention system. Storage facilities should be dry.

Packing Material:
Suitable packing and storage material SS 304 or 316, original containers or metal containers with glass, PVC, PP, PE or GRP lining

Unsuitable packing and storage material None.

Requirements for storage rooms and vessels Storage should be done in original containers. Store the containers in cool and dry place at ambient temperature at temperature > 37 °F (freezing protection) or < 180 °F typically ensure a useable shelf life of 3-5 years. Even after freezing, thawing allows re-use of the product without limitations

Advice on common storage No special restriction on storage with other products

Storage Class 12

Further information on storage conditions Shelf life: 3-5 years

7.3 Specific end Use(s) Refer section 1.2

SECTION 8: Exposure control / personal protection

8.1 Control Parameters
No specific occupational exposure limit is known or established on components present in the product.

8.2 Exposure controls
Appropriate engineering controls No specific additional engineering controls are required. Provide good natural or artificial ventilation.

Personal Protection equipment
Eye / face protection Use safety glasses or chemical goggles. Have eye wash facilities immediately available at any location where eye contact can occur.

Skin protection Wear natural rubber or latex gloves. Wear suitable protective clothing including boots and safety glasses – acid resistant chemical clothing is not required. Wash thoroughly after handling. Although this product does not present a significant skin concern, minimize skin contamination by following good industrial practice.

Hand Protection: Other skin protection:

Respiratory protection Avoid breathing vapour / mist. Use approved respiratory protection equipment when air borne exposure is excessive. Consult respirator manufacturer to determine the appropriate type of equipment for a given application. Observe respirator use limitations specified by the manufacturer. In case of insufficient ventilation, wear suitable respiratory equipment

Environmental Protection Control
Avoid direct discharge into drains

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance Liquid

Colour Clear liquid to light straw colour

Odour Characteristic or limited

Odour Threshold Not available

pH ~6.0 of 2% solution at 25 °C
SAFETY DATA SHEET

According to Federal register/Vol. 77, No 58, March 26, 2012 /rules & regulations

Freezing point / range < 37 °F
Initial boiling point / range >100 °C (Similar to water)
Flash point Not available
Evaporation rate Not determined
Flammability (solid, gas) Not flammable or combustible
Upper/lower flammability or explosive limit Not applicable
Vapour Pressure Same as water
Vapour Density Not available
VOC content No data available
Specific gravity@ 25C 0.98
Solubility(ies) Miscible in water
Partition coefficient (N-Octanol / Water) No data available
Auto ignition temperature Not applicable
Decomposition temperature Not available
Viscosity No data available
Explosive Properties No data available
Oxidising Properties No data available
Percentage of Volatile components 1% of non-hazardous active in water steam phase at > 250 °C

9.2 Other information Please refer technical datasheet

SECTION 10: Stability and reactivity

10.1 Reactivity
Reacts with acids, metals and strong oxidising agents
Hazardous polymerisation None

10.2 Chemical Stability
Stable under recommended storage and handling conditions.

10.3 Possibility of hazardous reactions
Hazardous polymerization is not expected to occur under normal temperature and pressure.

10.4 Conditions to avoid
None.

10.5 Incompatible materials
Strong acids and oxidizers

10.6 Hazardous decomposition products
Carbon oxide fumes (CO, CO₂)

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Toxicological results bioassays on corrosion inhibitor Anodamine HPFG. (19 September 2014)

<table>
<thead>
<tr>
<th>Investigative Species</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Daphnia Pulex</strong></td>
<td></td>
</tr>
<tr>
<td>24 hour 100 g/l</td>
<td>LC50 95 % Lower Confidence Limit: 80.32 – 124.50 ppm</td>
</tr>
<tr>
<td>48 hour 75.79 g/l</td>
<td>LC50 95 % Upper Confidence Limit: 66.45 – 86.44 ppm</td>
</tr>
<tr>
<td><strong>Pimephales Promelas</strong></td>
<td></td>
</tr>
<tr>
<td>48 hour 139 g/l</td>
<td>LC50 95 % Lower Confidence Limit: 55,755.86 ppm</td>
</tr>
<tr>
<td>96 hour 136.6 g/l</td>
<td>LC50 95 % Upper Confidence Limit: 43,433.46 ppm</td>
</tr>
</tbody>
</table>

Environmental Protection Agency’s Trimmed Spearman-Karber statistical program was used to analyze all data.
Both the lethal and sub-lethal endpoints were statistically calculated according to their respective EPA guidelines. The Chronic Freshwater organisms were calculated according to EPA-821-R-02-013, October 2002 Fourth Edition. The Chronic Marine and Estuarine organisms were calculated according to EPA-821-R-02-014, October 2002 Third Edition. The Acute Freshwater and Marine organisms were calculated according to EPA-821-R-02-012, October 2002 Fifth Edition.

Acute oral toxicity Species: rat
Route of administration: oral
LD₅₀: >5000 mg/kg
Not classified for acute oral toxicity as per OSHA-GHS
SAFETY DATA SHEET

According to Federal register/Vol. 77, No 58, March 26, 2012 /rules & regulations

regulation

Acute inhalation toxicity  No test data available

Acute dermal toxicity  Species: rat
Route of administration: Dermal
LD50: >5000 mg/kg
Not classified for acute dermal toxicity as per OSHA-GHS regulation

Skin irritation  Species: Rabbit
Exposure: 4 hour
Result: Not irritating
Not classified for skin irritation as per OSHA-GHS regulation

Acute dermal toxicity  Species: rat
Route of administration: Dermal
LD50: >5000 mg/kg
Not classified for acute dermal toxicity as per OSHA-GHS regulation

Serious eye damage / irritation  Species: Rabbit
Result: Not irritating
Not classified for Eye irritation/damage as per GHS regulation

Respiratory irritation  No data available

Sensitisation  Species: Guinea Pig
Result: Not sensitizing
Not classified for skin/respiratory sensitization as per OSHA-GHS regulation

Repeated dose toxicity  No classification is required for Repeated dose toxicity

Germ cell mutagen city  Negative results obtained in Ames, CHO HGPRT forward mutation and micronucleus tests.

Carcinogenicity  Not expected to be a carcinogen

Reproductive toxicity  No classification is required for Reproductive toxicity

Specific target organ toxicity – single exposure (STOT SE)  No data available

Specific target organ toxicity – repeated exposure (STOT RE)  No data available

Aspiration hazard  No data available

SECTION 12: Ecological information

12.1 Toxicity  Toxicity on Fish: Species: Pimephales promelas
Duration: 96 h
LC50: >100mg/l

Toxicity on Invertebrates: Species: Daphnia magna
Duration: 48 h
EC50: >100 mg/l

Toxicity on Algae: Species: Algae
Duration: 72 h
EC50: >100 mg/l
(Data extrapolated from similar products or equivalent analogues)

12.2 Persistence and degradability  Test Method
OECD 301D (Ready Biodegradability: Closed Bottle Test) 28 d

Degree of Removal  91%

12.3 Bio accumulative potential  No data available
12.4 Mobility in Soil

No data available

12.5 Results of PBT and vPvB assessment

This substance does not fulfil the criteria for PBT or vPvB

12.6 Other adverse effects

No information available

### 13. Disposal considerations

#### 13.1 Waste treatment methods

All local and national regulations should be followed. Consult regulatory officials for disposal requirement. For small quantities flush away with plenty of water. For large quantities send to special waste disposal system and burn in proper incinerator. This product should not be dumped in public storage and sewers / waterways.

#### 13.2 US EPA RCRA Status

This material when discarded is not a hazardous waste as that term is defined by the Resource, Conservation and Recovery Act (RCRA), 40 CFR 261.

- **13.2.1 US EPA RCRA**
  - Hazardous waste number: Not applicable

- **13.2.2 Compound/Characteristic**
  - Not applicable

#### 13.3 Disposal considerations

- Incineration

### SECTION 14: Transport information

The product does not meet for classification as dangerous good according to local or International transport regulations. The product is classified as not dangerous goods.

<table>
<thead>
<tr>
<th></th>
<th>US DOT (Road &amp; Air) ADR/RID/GGVSE Canada TDG</th>
<th>Mexican regulation for Land transport of Hazardous materials and wastes</th>
<th>(IMDG-Code/GGVSee)</th>
<th>ICAO-IATA/DGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.1 UN Number</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>14.2 UN Proper Shipping Name</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
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<tr>
<td>14.3 Transport Hazard Class</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>14.4 Packing Group</td>
<td>-</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>14.5 Environmental hazards</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>14.6 Special precautions for user</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:</td>
<td>Not available</td>
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</tbody>
</table>

### 15. Regulatory information

#### Inventory status

All components are on the following inventories:

- US TSCA
- Canadian DSL
- EU EINECS

#### US Federal Regulations

**US TSCA (12b)**

This product does not contain any chemical substances subjected to the US Toxic Substance Control Act (TSCA) 12 (b) export reporting requirements.

Product is compliance with TSCA regulation.

**SARA Hazard Notification:**

- Hazard Categories Under Title III Rules (40 CFR 370) Not applicable
- SARA Section 311/312 Hazard Categories Not applicable
SAFETY DATA SHEET

According to Federal register/Vol. 77, No 58, March 26, 2012 /rules & regulations

SARA Title III Section 302
Extremely Hazardous Substances
None

SARA Title III Section 313
Toxic Chemicals
This product does not contain any chemical with known CAS numbers that exceeds the threshold (De Minimis) reporting levels established SARA Title III, Section 313.

US EPA CERCLA
Hazardous Substances (40 CFR 302)
None

Not applicable

CERCLA Reportable Quantity
Not applicable

California proposition 65
To the best of our knowledge, this product does not contain any of the listed chemicals, which the state of California has found to cause cancer, birth defects or other reproductive harm.

Hazardous air pollutants (Clean Air Act)
The product does not contain any hazardous air pollutants as listed under section 112 of the Clean Air Act

Clean water act (CWA)
None listed

The product does not contains any chemicals which are listed as a carcinogen by IARA, NTP & OSHA

NFPA Rating

HMIS
Health: 1
Flammability:0
Physical hazards:0
Special Hazard: NA

HAZCOM Standard Status
This material is not considered to be hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Other International regulations

Canada:
Canadian WHMIS classification
Not regulated or classified

National Pollutants Release Inventory (NPRI)
The product does not contain any components listed on Environment Canada’s NPRI

Priority Substances List 1 and Priority Substances List 2 (PSL1 and PSL2)
The product does not contain any components listed on Environment Canada’s PSL1 and PSL2

EU regulations

Classification according to Regulation (EC) No. 1272/2008 [CLP]
Not a hazardous substance or mixture according Regulation (EC) No. 1272/2008

Classification according to Directive 67/548/EEC
Not classified

SVHC or restricted substances list as per REACH regulation
No substances on this list have been intentionally added to the product. Concentration of impurities, if any, is expected to be below 0.1%.
SAFETY DATA SHEET

According to Federal register/Vol. 77, No 58, March 26, 2012 /rules & regulations

Water Hazard Class (Germany)  WGK: Slightly water endangering

SECTION 16:  Other information

Indication of changes  All sections revised to meet OSHA-GHS requirements
Last revision date  -

Procedure used to derive the classification according GHS Revision no: 3 (adopted guidance by OSHA)

**Classification**
- Not classified

**Judgement**
- On basis of weight of evidence

Abbreviations and acronyms
- CSR = Chemical Safety Report
- DNEL = Derived No Effect Level
- LD50 = Median lethal dose
- PNEC = Predicted No Effect Concentration
- STEL = Short term exposure limit
- TLV = Threshold limits
- TWA = time weighted average
- IATA = International Air Transport Association
- IMDG = International Maritime Dangerous Goods Code
- PBT = Persistent Bioaccumulative Toxic
- vPvB = very Persistent and very Bioaccumulative
- GHS = OSHA = Occupational Safety and Health Administration
- IARC = International Agency for Research
- NTP = The National Toxicology program
- TSCA = US Toxic Substance Control Act

Key literature references for data
- Environmental properties and safety assessment of organic surface-active polyamines detergent and water treatment applications----W.E. Gledhill and T.C.J. Feijtel

Relevant Risk Phrases (in full)
- Not applicable

Relevant H Statements (in full)
- Not applicable

Further information
- -

Although the information and recommendations are presented in good faith and believed to be correct as of the date hereof, Anodamine Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Anodamine Inc, be responsible for damages of any nature whatsoever resulting from the use of or reliance upon this information. No representations or warranties, either expressed or implied, of merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information or the product to which this information refers. The data here is based on literature information.

*For all-purpose the English version is final*

Version No: 1 US-GHS 2014