SAFETY DATA SHEET
according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Revision Date 01/26/2015 Version 1.5

SECTION 1. Identification
Product identifier

Product number 105423
Product name Ammonia solution 28-30% for analysis EMSURE® ACS, Reag. Ph Eur

Relevant identified uses of the substance or mixture and uses advised against
Identified uses Reagent for analysis, Chemical production

Details of the supplier of the safety data sheet
Company EMD Millipore Corporation | 290 Concord Road, Billerica, MA 01821, United States of America | General Inquiries: +1-978-715-4321 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5)

Emergency telephone 800-424-9300 CHEMTREC (USA)
+1-703-527-3887 CHEMTREC (International)
24 Hours/day; 7 Days/week

SECTION 2. Hazards identification
GHS Classification

Corrosive to Metals, Category 1, H290
Skin corrosion, Category 1B, H314
Serious eye damage, Category 1, H318
Specific target organ systemic toxicity - single exposure, Category 3, Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS-Labeling

Hazard pictograms

Signal Word Danger

Hazard Statements
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.

Precautionary Statements
P234 Keep only in original container.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/ physician.
P321 Specific treatment (see supplemental first aid instructions on this label).
P330 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P406 Store in corrosive resistant stainless steel container with a resistant inliner.
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. Composition/information on ingredients
Chemical nature Aqueous ammoniacal solution.

Hazardous ingredients
Chemical Name (Concentration)
CAS-No.
ammonia solution (>= 10 % - < 30 % )
1336-21-6
Exact percentages are being withheld as a trade secret.

SECTION 4. First aid measures
Description of first-aid measures
Inhalation
After inhalation: fresh air. Call in physician.

Skin contact
After skin contact: wash off with plenty of water. Immediately remove contaminated clothing. If available swab with polyethylene glycol 400. Call a physician immediately.

Eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist.

Ingestion
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation!). Call a physician immediately. Do not attempt to neutralize.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed
SAFETY DATA SHEET
according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Product number 105423
Product name Ammonia solution 28-30% for analysis EMSURE® ACS, Reag. Ph Eur

SECTION 4. First aid measures

Irritation and corrosion, bronchitis, Cough, Shortness of breath, gastric pain, Unconsciousness, Bloody vomiting, Nausea, collapse, shock
Risk of blindness!

Indication of any immediate medical attention and special treatment needed
No information available.

SECTION 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

Special hazards arising from the substance or mixture
Not combustible.
Ammonia solution itself is not flammable, but can form an ignitable ammonia/air-mixture by outgassing.
Ambient fire may liberate hazardous vapors.
Fire may cause evolution of:
nitrogen oxides

Advice for firefighters

Special protective equipment for fire-fighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information
Cool closed containers exposed to fire with water spray. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders: Protective equipment see section 8.

Environmental precautions
Do not empty into drains.

Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills.
Observe possible material restrictions (see sections 7 and 10).
Take up with liquid-absorbent and neutralizing material (e.g. Chemizorb® OH⁻, Art. No. 101596).
Dispose of properly. Clean up affected area.
SECTION 7. Handling and storage

Precautions for safe handling
Observe label precautions.

Conditions for safe storage, including any incompatibilities
Tightly closed.
Store at +2°C to +25°C (+36°F to +77°F).

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Basis</th>
<th>Value</th>
<th>Threshold limits</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ammonia solution 1336-21-6</td>
<td>ACGIH</td>
<td>Time Weighted Average (TWA): 25 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Short Term Exposure Limit (STEL): 35 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NIOSH/GUIDE</td>
<td>Recommended exposure limit (REL): 25 ppm</td>
<td>18 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Short Term Exposure Limit (STEL): 35 ppm</td>
<td>27 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OSHA_TRANS</td>
<td>PEL:</td>
<td>50 ppm</td>
<td>35 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Z1A</td>
<td>Short Term Exposure Limit (STEL): 35 ppm</td>
<td>27 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

Engineering measures
Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

Individual protection measures
Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

Hygiene measures
Immediately change contaminated clothing. Apply skin-protective barrier cream. Wash hands and face after working with substance.

Eye/face protection
Tightly fitting safety goggles

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.

Other protective equipment:
Protective clothing
Respiratory protection
required when vapors/aerosols are generated.
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.

**SECTION 9. Physical and chemical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>liquid</td>
</tr>
<tr>
<td>Color</td>
<td>colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>stinging</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>0.03 - 0.05 ppm</td>
</tr>
<tr>
<td></td>
<td>Ammonia</td>
</tr>
<tr>
<td>pH</td>
<td>at 68 °F (20 °C) strongly alkaline</td>
</tr>
<tr>
<td>Melting point</td>
<td>ca. -72 °C</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>ca. 90 °F (32 °C)</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No information available.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No information available.</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>15.4 % (V)</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>33.6 % (V)</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>635 hPa</td>
</tr>
<tr>
<td></td>
<td>at 68 °F (20 °C)</td>
</tr>
<tr>
<td>Relative vapor density</td>
<td>No information available.</td>
</tr>
<tr>
<td>Density</td>
<td>0.90 g/cm³</td>
</tr>
<tr>
<td></td>
<td>at 68 °F (20 °C)</td>
</tr>
<tr>
<td>Relative density</td>
<td>No information available.</td>
</tr>
<tr>
<td>Water solubility</td>
<td>at 68 °F (20 °C) soluble</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>log Pow: -1.38 (experimental) (anhydrous substance) Bioaccumulation is not expected.</td>
</tr>
</tbody>
</table>
Autoignition temperature
   No information available.
Decomposition temperature
   No information available.
Viscosity, dynamic
   No information available.
Explosive properties
   Not classified as explosive.
Oxidizing properties
   none
Minimum ignition energy
   380 - 680 mJ
Corrosion
   May be corrosive to metals.

SECTION 10. Stability and reactivity

Reactivity
   See below

Chemical stability
   Ammonia solution itself is not flammable, but can form an ignitable ammonia/air-mixture by outgassing.

Possibility of hazardous reactions
   A risk of explosion and/or of toxic gas formation exists with the following substances:
   Oxidizing agents, Phosgene, Oxides of phosphorus, Mercury, acids, Nitric acid, Oxygen, sulfur dioxide, hydrogen sulfide, silver compounds, nitrogen oxides, nitrogen tetrachloride, hydrogen peroxide, silver, Lead, Zinc, Heavy metals, Heavy metal salts, strong alkalis, Acrolein, antimony hydride, Boron, hydrogen bromide, chlorates, Hydrogen chloride gas, chromium(VI) oxide, chromyl chloride, dimethylsulfate, Ethylene oxide, Hydrogen fluoride, halogens, halogen-halogen compounds, halogen oxides, carbon dioxide, Acids

Conditions to avoid
   Heating.

Incompatible materials
   Aluminum, Lead, Copper, various metals, metal alloys, Nickel, silver, Zinc

Hazardous decomposition products
   in the event of fire: See section 5.

SECTION 11. Toxicological information

Information on toxicological effects
   Likely route of exposure
      Inhalation, Eye contact, Skin contact, Ingestion
   Acute oral toxicity
      LDLO human: 43 mg/kg (29% solution) (RTECS)
      Symptoms: gastric pain, Bloody vomiting, If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.
Skin irritation
Rabbit
Result: Severe irritations
(29% solution) (RTECS)
Dermatitis Necrosis
Mixture causes burns.

Eye irritation
Rabbit
Result: Severe irritations
(29% solution) (RTECS)
Mixture causes serious eye damage. Risk of blindness!

Sensitization
Sensitization test: Guinea pig
Result: negative
(anhydrous substance) (IUCLID)

Genotoxicity in vitro
Ames test
Salmonella typhimurium
Result: negative
(anhydrous substance) (IUCLID)
Ames test
Escherichia coli
Result: negative
(anhydrous substance) (IUCLID)

Specific target organ systemic toxicity - single exposure
Mixture may cause respiratory irritation.

Specific target organ systemic toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
Regarding the available data the classification criteria are not fulfilled.

Carcinogenicity
IARC
No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA
No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP
No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

ACGIH
No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Further information
Systemic effects:
Nausea, collapse, shock, Shortness of breath, Unconsciousness
Further data:
Handle in accordance with good industrial hygiene and safety practice.

Ingredients

ammonia solution
No information available.

SECTION 12. Ecological information

Ecotoxicity

Toxicity to fish
LC50 Oncorhynchus mykiss (rainbow trout): 0.53 mg/l; 96 h (anhydrous substance) (Lit.)

Toxicity to daphnia and other aquatic invertebrates
EC50 Daphnia magna (Water flea): 24 mg/l; 48 h (anhydrous substance) (Lit.)

Toxicity to bacteria
EC50 Photobacterium phosphoreum: 2 mg/l; 5 min (anhydrous substance) (Lit.)

Persistence and degradability

Biodegradability
Not readily biodegradable.

Bioaccumulative potential

Partition coefficient: n-octanol/water
log Pow: -1.38
(experimental)
(anhydrous substance) Bioaccumulation is not expected.

Mobility in soil
No information available.

Additional ecological information

Biological effects:
Harmful effect due to pH shift.
Forms toxic mixtures in water, dilution measures notwithstanding.
Further information on ecology
Discharge into the environment must be avoided.

Ingredients

ammonia solution
No information available.

SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.
SECTION 14. Transport information

Land transport (DOT)
- UN number: UN 2672
- Proper shipping name: AMMONIA SOLUTION
- Class: 8
- Packing group: III
- Environmentally hazardous: --

Air transport (IATA)
- UN number: UN 2672
- Proper shipping name: AMMONIA SOLUTION
- Class: 8
- Packing group: III
- Environmentally hazardous: --
- Special precautions for user: no

Sea transport (IMDG)
- UN number: UN 2672
- Proper shipping name: AMMONIA SOLUTION
- Class: 8
- Packing group: III
- Environmentally hazardous: --
- Special precautions for user: yes
- EmS F-A  S-B

SECTION 15. Regulatory information

United States of America

SARA 313
The following components are subject to reporting levels established by SARA Title III, Section 313:
- Ingredients
  - ammonia solution 1336-21-6 28 %

SARA 302
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
Clean Water Act
The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:
Ingredients
ammonia solution

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:
Ingredients
ammonia solution

DEA List I
Not listed

DEA List II
Not listed

US State Regulations
Massachusetts Right To Know
Ingredients
ammonia solution

Pennsylvania Right To Know
Ingredients
ammonia solution

New Jersey Right To Know
Ingredients
ammonia solution

California Prop 65 Components
This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Notification status
TSCA:
All components of the product are listed in the TSCA-inventory.

DSL:
All components of this product are on the Canadian DSL.

KOREA:
Not in compliance with the inventory

SECTION 16. Other information

Training advice
Provide adequate information, instruction and training for operators.

Labeling
Hazard pictograms

Signal Word
Danger

Hazard Statements
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.
H400 Very toxic to aquatic life.

Precautionary Statements
Prevention
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Full text of H-Statements referred to under sections 2 and 3.
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.

Key or legend to abbreviations and acronyms used in the safety data sheet
Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Revision Date: 01/26/2015

The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.

All rights reserved. Millipore and the “M” Mark are registered trademarks of Merck KGaA, Darmstadt, Germany.