

Safety Data Sheet



Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name • Cadmium Sulfate Solution 0.5 M in 29% Ammonium Hydroxide
Product Code • 70482

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified use(s) • Semiconductor Uses

1.3 Details of the supplier of the safety data sheet

Manufacturer • Air Liquide
2700 Post Oak Blvd.
Houston, TX 77056
United States
www.us.airliquide.com
sds@airliquide.com

Telephone (Technical) • 713-896-2896

Telephone (Technical) • 800-819-1704

1.4 Emergency telephone number

Manufacturer • 800-424-9300

Manufacturer • +1 703-527-3887

Section 2: Hazards Identification

EU/EEC

According to Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]
According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

CLP

- Acute Toxicity Oral 3 - H301
- Skin Corrosion 1B - H314
- Acute Toxicity Inhalation 2 - H330
- Germ Cell Mutagenicity 1B - H340
- Carcinogenicity 1B - H350
- Reproductive Toxicity 1B - H360FD
- Specific Target Organ Toxicity Repeated Exposure 1 - H372
- Hazardous to the aquatic environment Acute 1 - H400
- Hazardous to the aquatic environment Chronic 2 - H411

DSD/DPD

- Harmful (Xn)
- Very Toxic (T+)
- Corrosive (C)
- Toxic (T)
- Carcinogenic Substances - Category 2
- Mutagenic Substances - Category 2
- Substances Toxic To Reproduction - Category 2
- Dangerous to the Environment (N)

R22, R26, R34, R45, R46, R48/23/25, R60, R61, R50, R53

2.2 Label Elements

CLP

DANGER



- Hazard statements**
- H301 - Toxic if swallowed
 - H314 - Causes severe skin burns and eye damage.
 - H330 - Fatal if inhaled
 - H340 - May cause genetic defects.
 - H350 - May cause cancer.
 - H360FD - May damage fertility. May damage the unborn child.
 - H372 - Causes damage to organs through prolonged or repeated exposure.
 - H400 - Very toxic to aquatic life
 - H411 - Toxic to aquatic life with long lasting effects

Precautionary statements

- Prevention**
- P201 - Obtain special instructions before use.
 - P202 - Do not handle until all safety precautions have been read and understood.
 - P260 - Do not breathe mist/vapours/spray.
 - P264 - Wash thoroughly after handling.
 - P270 - Do not eat, drink or smoke when using this product.
 - P271 - Use only outdoors or in a well-ventilated area.
 - P281 - Use personal protective equipment as required.
 - P280 - Wear protective gloves/protective clothing/eye protection/face protection.
 - P284 - Wear respiratory protection.
 - P273 - Avoid release to the environment.
- Response**
- P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 - P310 - Immediately call a POISON CENTER or doctor/physician.
 - P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
 - P320 - Specific treatment is urgent (see supplemental first aid instructions on this label).
 - P363 - Wash contaminated clothing before reuse.
 - P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 - P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
 - P330 - Rinse mouth.
 - P331 - Do NOT induce vomiting.
 - P308+P313 - IF exposed or concerned: Get medical advice/attention.
 - P314 - Get medical advice/attention if you feel unwell.
 - P391 - Collect spillage.

- Storage/Disposal**
- P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
 - P405 - Store locked up.
 - P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

- Supplemental information**
- 24 percent of this product consists of an ingredient of unknown toxicity.

DSD/DPD



- Risk phrases**
- R22 - Harmful if swallowed.
 - R26 - Very toxic by inhalation.
 - R34 - Causes burns.
 - R45 - May cause cancer.
 - R46 - May cause heritable genetic damage.

- R48/23/25 - Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
 R50 - Very toxic to aquatic organisms.
 R60 - May impair fertility.
 R61 - May cause harm to the unborn child.
 R53 - May cause long-term adverse effects in the aquatic environment.
- Safety phrases**
- S28 - After contact with skin, wash immediately with plenty of ...
 - S36 - Wear suitable protective clothing.
 - S37 - Wear suitable gloves.
 - S39 - Wear eye/face protection.
 - S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
 - S53 - Avoid exposure - obtain special instructions before use.
 - S57 - Use appropriate containment to avoid environmental contamination.

2.3 Other Hazards

- CLP**
- According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.
- DSD/DPD**
- According to European Directive 1999/45/EC this material is considered dangerous.

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

- OSHA HCS 2012**
- Acute Toxicity Oral 4 - H302
 - Skin Corrosion 1C - H314
 - Serious Eye Damage 1 - H318
 - Germ Cell Mutagenicity 1B - H340
 - Carcinogenicity 1A - H350
 - Reproductive Toxicity 1B - H360
 - Specific Target Organ Toxicity Repeated Exposure 1 - H372

2.2 Label elements

OSHA HCS 2012

DANGER



- Hazard statements**
- Harmful if swallowed - H302
 - Causes severe skin burns and eye damage. - H314
 - Causes serious eye damage - H318
 - May cause genetic defects. - H340
 - May cause cancer. - H350
 - May damage fertility or the unborn child. - H360
 - Causes damage to organs - Blood/Musculoskeletal system/Kidney through prolonged or repeated exposure - H372

Precautionary statements

- Prevention**
- Obtain special instructions before use. - P201
 - Do not handle until all safety precautions have been read and understood. - P202
 - Do not breathe mist/vapours/spray. - P260
 - Wash thoroughly after handling. - P264
 - Do not eat, drink or smoke when using this product. - P270
 - Wear protective gloves/protective clothing/eye protection/face protection. - P280
- Response**
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. - P304+P340
 - Immediately call a POISON CENTER or doctor/physician. - P310
 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. - P303+P361+P353

Specific treatment, see supplemental first aid information. - P321
 Wash contaminated clothing before reuse. - P363
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. - P305+P351+P338
 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician if you feel unwell. - P301+P312
 Do NOT induce vomiting. - P331
 Rinse mouth. - P330
 IF exposed or concerned: Get medical advice/attention. - P308+P313
 Get medical advice/attention if you feel unwell. - P314

- Storage/Disposal**
- Store in a well-ventilated place. Keep container tightly closed. - P403+P233
 - Store locked up. - P405
 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations. - P501

2.3 Other hazards

OSHA HCS 2012

- Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to WHMIS

2.1 Classification of the substance or mixture

WHMIS

- Toxic - D1B
- Other Toxic Effects - D2A
- Corrosive - E

2.2 Label elements

WHMIS



- Toxic - D1B
- Other Toxic Effects - D2A
- Corrosive - E

2.3 Other hazards

WHMIS

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

3.1 Substances

- Material does not meet the criteria of a substance in accordance with Regulation (EC) No 1272/2008.

3.2 Mixtures

Composition				
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive
	CAS:1336-21-6			

Ammonium hydroxide	EC Number: 215-647-6 EU Index: 007-001-01-2	20% TO 24%	Ingestion/Oral-Rat LD50 • 350 mg/kg	EU DSD/DPD: Annex I - R34 N; R50 EU CLP: Annex VI - Skin Corr. 1B, H314; Aquatic Acute 1, H400 OSHA HCS 2012: Acute Tox 4 (Oral); Eye Dam. 1; Skin Corr. 1C
Cadmium Sulfate	CAS: 10124-36-4 EC Number: 233-331-6 EU Index: 048-009-00-9	10% TO 13%	Ingestion/Oral-Rat LD50 • 280 mg/kg	EU DSD/DPD: Annex I - T; R25-48/23/25 T+; R26 Carc.Cat.2; R45 Muta.Cat.2; R46 N; R50-53 Repr.Cat.2; R60-61 EU CLP: Annex VI - Carc. 1B, H350; Muta. 1B, H340; Repr. 1B, H360FD; Acute Tox. 2, H330; Acute Tox. 3, H301; STOT RE 1, H372; Aquatic Acute 1, H400; Aquatic Chronic 1, H410 OSHA HCS 2012: Carc. 1A; Acute Tox. 3 (Oral); Muta. 1B; Repr. 1B; STOT RE 1 (Kidney, Blood, Musculoskeletal system)

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation

- Move victim to fresh air. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical attention immediately.

Skin

- For minor skin contact, avoid spreading material on unaffected skin. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Remove and isolate contaminated clothing. Get medical attention immediately.

Eye

- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye. Get medical attention immediately.

Ingestion

- If swallowed, rinse mouth with water (only if the person is conscious) Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Give plenty of water to drink. Do not use mouth-to-mouth method if victim ingested the substance. Obtain medical attention immediately if ingested.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician

- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media

- LARGE FIRES: Dry chemical, CO₂, alcohol-resistant foam or water spray.
SMALL FIRES: Dry chemical, CO₂ or water spray.

Unsuitable Extinguishing Media

- Halogens should not be used due to potential reaction with the Ammonium Hydroxide component.

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards

- Containers may explode when heated.
Contact with metals may evolve flammable hydrogen gas.

Hazardous Combustion Products

- When involved in a fire, this product may decompose and produce toxic gases (including carbon, nitrogen, cadmium and sulfur oxides, ammonia gas and ammonium nitrate).

5.3 Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
Wear positive pressure self-contained breathing apparatus (SCBA).
SMALL FIRES: Move containers from fire area if you can do it without risk.
Runoff from fire control may cause pollution.
LARGE FIRES: Cool containers with flooding quantities of water until well after fire is out.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions

- Ventilate enclosed areas. Do not walk through spilled material. Wear appropriate personal protective equipment, avoid direct contact. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Emergency Procedures

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Do not get water inside container.

6.2 Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures

- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
Dike to collect large liquid spills.
A vapor suppressing foam may be used to reduce vapors.
Use water spray to reduce vapors or divert vapor cloud drift.
Neutralize residue with appropriate neutralizing agent. Test area with litmus paper to ensure neutralization is complete.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Handle and open container with care. Use only with adequate ventilation. Use caution when combining with water; DO NOT add water to corrosive liquid, ALWAYS add corrosive liquid to water while stirring to prevent release of heat, steam and fumes. Wear appropriate personal protective equipment, avoid direct contact. Do not breathe mist, vapours, spray. Do not get in eyes, on skin, or on clothing. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Keep container tightly closed. Store in a cool, dry, well-ventilated place. Keep away from incompatible materials. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines		
	Result	Spain
Cadmium Sulfate (10124-36-4)	TWAs	0.01 mg/m ³ TWA [VLA-ED] (manufacturing, commercialization, and use restrictions under REACH, inhalable fraction, as Cd); 0.002 mg/m ³ TWA [VLA-ED] (manufacturing, commercialization, and use restrictions under REACH, respirable fraction, as Cd)

Exposure Control Notations

Italy

•Cadmium Sulfate (10124-36-4): **Carcinogens:** (Category 2 Carcinogen)

Spain

•Cadmium Sulfate (10124-36-4): **Carcinogens:** (Suspected human carcinogen) | **Mutagens:** (Suspected human mutagen) | **Reproductive Toxins:** (known human reproductive toxin with classification from animal data)

8.2 Exposure controls

Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

Respiratory

- Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face

- Wear chemical splash safety goggles.

Skin/Body

- Wear appropriate gloves.

Environmental Exposure Controls

- Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways. Follow best practice for site management and disposal of waste.

Key to abbreviations

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

Material Description			
Physical Form	Liquid	Appearance/Description	Clear, colorless liquid with an ammonia odor.
Color	Clear, colorless.	Odor	Ammonia
Odor Threshold	17 ppm		
General Properties			
Boiling Point	100 to 105 C(212 to 221 F)	Melting Point	Data lacking
Decomposition Temperature	Data lacking	pH	10 to 12
Specific Gravity/Relative Density	1.2 to 1.3 Water=1	Water Solubility	Soluble
Viscosity	Data lacking	Explosive Properties	Data lacking
Oxidizing Properties:	Data lacking		
Volatility			
Vapor Pressure	Data lacking	Vapor Density	Data lacking
Evaporation Rate	Data lacking		
Flammability			
Flash Point	Data lacking	UEL	Data lacking
LEL	Data lacking	Autoignition	Data lacking

Flammability (solid, gas)	Data lacking		
Environmental			
Octanol/Water Partition coefficient	Data lacking		

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

- Contact with metal may result in evolution of very flammable hydrogen gas, posing a fire hazard.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization will not occur.

10.4 Conditions to avoid

- Exposure to heat or freezing temperatures.

10.5 Incompatible materials

- This product is incompatible with oxidizers, heavy metals and their salts, halogens, interhalogens, nitromethane, strong mineral acids, dimethyl sulfate, acrolein, acrylic acid, chlorosulfuric acid, propiolactone, propylene oxide. Corrosive to copper, copper alloys, aluminum alloys, galvanized surfaces. Due to the Cadmium Sulfate in this product, contact with aluminum and magnesium may cause a violent reaction.

10.6 Hazardous decomposition products

- Combustion: Carbon, cadmium, nitrogen and sulfur oxides, ammonia gas and ammonium nitrate. Hydrolysis: Ammonium hydroxide dissolves in water with mild release of heat.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

		Components
Ammonium hydroxide (20% TO 24%)	1336-21-6	Acute Toxicity: Ingestion/Oral-Rat LD50 • 350 mg/kg; <i>Gastrointestinal:Other changes; Liver:Other changes; Kidney, Ureter, and Bladder:Other changes;</i> Irritation: Eye-Rabbit • 44 µg • Severe irritation
Cadmium Sulfate (10% TO 13%)	10124-36-4	Acute Toxicity: Ingestion/Oral-Rat LD50 • 280 mg/kg; Multi-dose Toxicity: Ingestion/Oral-Rat TDLo • 315 mg/kg 3 Week(s)-Intermittent; <i>Reproductive Effects:Paternal Effects:Spermatogenesis; Reproductive Effects:Paternal Effects:Testes, epididymis, sperm duct; Related to Chronic Data:Changes in testicular weight;</i> Mutagen: DNA damage • Unreported Route-Human • Lung (Somatic cell) • 7.8 µmol/L 20 Hour(s); DNA damage • Unreported Route-Rat • Liver (Somatic cell) • 30 µmol/L; Reproductive: Ingestion/Oral-Rat TDLo • 35230 mg/kg (1-19D preg); <i>Reproductive Effects:Specific Developmental Abnormalities:Cardiovascular (circulatory) system; Reproductive Effects:Effects on Newborn:Weaning or lactation index; Reproductive Effects:Effects on Newborn:Growth statistics (e.g., reduced weight gain)</i>

GHS Properties	Classification
	EU/CLP • Acute Toxicity - Inhalation 2 - ATEmix (inhl) = 0.2923 mg/l; Acute Toxicity -

Acute toxicity	Oral 3 - ATEmix (oral) = 869.565 mg/kg OSHA HCS 2012 • Acute Toxicity - Oral 4 - ATEmix (oral); 869.565 mg/kg
Aspiration Hazard	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Carcinogenicity	EU/CLP • Carcinogenicity 1B OSHA HCS 2012 • Carcinogenicity 1A
Germ Cell Mutagenicity	EU/CLP • Germ Cell Mutagenicity 1B OSHA HCS 2012 • Germ Cell Mutagenicity 1B
Skin corrosion/Irritation	EU/CLP • Skin Corrosion 1B OSHA HCS 2012 • Skin Corrosion 1C
Skin sensitization	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
STOT-RE	EU/CLP • Specific Target Organ Toxicity Repeated Exposure 1 OSHA HCS 2012 • Specific Target Organ Toxicity Repeated Exposure 1
STOT-SE	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Toxicity for Reproduction	EU/CLP • H360D - May damage the unborn child; H360F - May damage fertility; Toxic to Reproduction 1B OSHA HCS 2012 • Toxic to Reproduction 1B
Respiratory sensitization	EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Serious eye damage/Irritation	EU/CLP • Classification criteria not met OSHA HCS 2012 • Serious Eye Damage 1

Potential Health Effects

Inhalation

Acute (Immediate)

- Fatal if inhaled. May cause corrosive burns - irreversible damage.

Chronic (Delayed)

- Repeated or prolonged exposure to corrosive fumes may cause bronchial irritation with chronic cough.

Skin

Acute (Immediate)

- Causes severe skin burns and eye damage.

Chronic (Delayed)

- Repeated or prolonged exposure to corrosive materials will cause dermatitis.

Eye

Acute (Immediate)

- Causes serious eye damage.

Chronic (Delayed)

- Repeated or prolonged exposure to corrosive materials or fumes may cause conjunctivitis.

Ingestion

Acute (Immediate)

- Toxic if swallowed. May cause irreversible damage to mucous membranes.

Chronic (Delayed)

- Repeated or prolonged exposure to corrosive materials or fumes may cause gastrointestinal disturbances.

Other

Chronic (Delayed)

- Renal dysfunction is one of the characteristic signs of cadmium poisoning, and many cadmium workers have developed proteinuria, renal glucosuria, and aminoaciduria. Cadmium poisoning shows renal injury manifested by tubular and glomerular dysfunction and bone injury consisting of a combination of osteomalacia and osteoporosis.

Mutagenic Effects

- Cadmium Sulfate induces DNA single strand breaks at nontoxic concentration; it also induces DNA double strand breaks at concentration that are closely correlated with cytotoxicity. Mutagenic properties of Cadmium Sulfate were analyzed by the method of sister chromatid exchanges in lymphocytes of human peripheral blood taken from 4

donors. No significant increase was found in the mean frequency of sister chromatid exchanges in lymphocytes exposed to 1.6 and 6.2 ppm.

Carcinogenic Effects

- Repeated and prolonged exposure may cause carcinogenic effects.

Carcinogenic Effects		
	CAS	IARC
Cadmium Sulfate	10124-36-4	Group 1-Carcinogenic

Reproductive Effects

- Offspring from female rats exposed to Cadmium Sulfate via inhalation had significant reductions in birth weights. Cadmium is known to affect male fertility in several species. Acute parenteral administration of cadmium to rodents and rabbits and intratesticular administration to dogs result in severe testicular damage, including testicular atrophy and lowered androgen levels. In most strains and species, the dose levels causing testicular damage are below those that cause other signs of toxicity. There is often recovery of androgen production after cadmium withdrawal, but germinal epithelium recovery is rare. In vivo administration of Cadmium causes marked inhibition of choline acetyl transferase activity in spermatozoa, a change known to be associated with impaired sperm function and sterility.

Key to abbreviations

LD = Lethal Dose

TD = Toxic Dose

Section 12 - Ecological Information

12.1 Toxicity

- Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.

12.2 Persistence and degradability

- Material data lacking.

12.3 Bioaccumulative potential

- Material data lacking.

12.4 Mobility in Soil

- Material data lacking.

12.5 Results of PBT and vPvB assessment

- No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects

- No studies have been found.

Section 13 - Disposal Considerations

13.1 Waste treatment methods

Product waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste

- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	UN3289	Toxic liquid, corrosive, inorganic, n.o.s. (cadmium sulfate, ammonium hydroxide)	6.1,8	II	NDA
TDG	UN3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S. (cadmium sulfate, ammonium hydroxide)	6.1,8	II	Potential Marine Pollutant
IMO/IMDG	UN3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S. (cadmium sulfate, ammonium hydroxide)	6.1,8	II	NDA
IATA/ICAO	UN3289	Toxic liquid, corrosive, inorganic, n.o.s. (cadmium sulfate, ammonium hydroxide)	6.1,8	II	NDA

14.6 Special precautions for user • None known.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code • Not relevant.

Section 15 - Regulatory Information

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

SARA Hazard Classifications • Acute, Chronic

State Right To Know				
Component	CAS	MA	NJ	PA
Ammonium hydroxide	1336-21-6	Yes	Yes	Yes
Cadmium Sulfate	10124-36-4	Yes	Yes	Yes

Inventory						
Component	CAS	Canada DSL	Canada NDSL	China	EU EINECS	EU ELNICS
Ammonium hydroxide	1336-21-6	Yes	No	Yes	Yes	No
Cadmium Sulfate	10124-36-4	Yes	No	Yes	Yes	No

Inventory (Con't.)		
Component	CAS	TSCA
Ammonium hydroxide	1336-21-6	Yes
Cadmium Sulfate	10124-36-4	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

- | | | |
|----------------------|------------|----------|
| • Cadmium Sulfate | 10124-36-4 | D1A, D2A |
| • Ammonium hydroxide | 1336-21-6 | E |

Canada - WHMIS - Ingredient Disclosure List

- | | | |
|-------------------|------------|-------|
| • Cadmium Sulfate | 10124-36-4 | 0.1 % |
|-------------------|------------|-------|

• Ammonium hydroxide	1336-21-6	1 %
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Environment**Canada - CEPA - Priority Substances List**

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

China**Environment****China - Ozone Depleting Substances - First Schedule**

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

China - Ozone Depleting Substances - Second Schedule

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

China - Ozone Depleting Substances - Third Schedule

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

Other**China - Annex I & II - Controlled Chemicals Lists**

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

China - Dangerous Goods List

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

China - Export Control List - Part I Chemicals

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

Europe**Other****EU - CLP (1272/2008) - Annex VI - Table 3.2 - Classification**

• Cadmium Sulfate	10124-36-4	T; R25-48/23/25 T+; R26 Carc.Cat.2; R45 Muta.Cat.2; R46 N; R50-53 Repr.Cat.2; R60-61
• Ammonium hydroxide	1336-21-6	C; R34 N; R50

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Concentration Limits

• Cadmium Sulfate	10124-36-4	0.01%≤C: Carc.Cat.2; R:45 10%≤C: T; R:25 0.1% ≤C<10%: Xn; R:22 7%≤C: T; R:48/23/25 0.1%≤C<7%: Xn; R:48/20/22
• Ammonium hydroxide	1336-21-6	5%≤C<10%: Xi; R:36/37/38 10%≤C: C; R:34

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Labelling

• Cadmium Sulfate	10124-36-4	T+ N R:45-46-60-61-25-26-48/23/25-50/53 S:53-45-60-61
• Ammonium hydroxide	1336-21-6	C N R:34-50 S:(1/2)-26-36/37/39-45-61
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Notes - Substances and Preparations		
• Cadmium Sulfate	10124-36-4	E
• Ammonium hydroxide	1336-21-6	B
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Safety Phrases		
• Cadmium Sulfate	10124-36-4	S:53-45-60-61
• Ammonium hydroxide	1336-21-6	S:(1/2)-26-36/37/39-45-61

Germany

Environment

Germany - TA Luft - Types and Classes

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

Germany - Water Classification (VwVwS) - Annex 1

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

Germany - Water Classification (VwVwS) - Annex 2 - Water Hazard Classes

• Cadmium Sulfate	10124-36-4	ID Number 564, hazard class 3 - severe hazard to waters
• Ammonium hydroxide	1336-21-6	ID Number 211, hazard class 2 - hazard to waters

Germany - Water Classification (VwVwS) - Annex 3

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

Other

Germany - Specifically Regulated Chemicals in TRGS

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

Portugal

Other

Portugal - Prohibited Substances

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

United Kingdom

Environment

United Kingdom - Pollution Inventory - Schedule 1 - Thresholds for Releases to Air

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

Other

United Kingdom - Workplace Exposure Limits (WELs) - Substances in Review

• Cadmium Sulfate	10124-36-4	Not Listed
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• Ammonium hydroxide	1336-21-6	Not Listed
United Kingdom - List of Dangerous Substances in Water		
• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	1000 lb final RQ; 454 kg final RQ

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

• Cadmium Sulfate	10124-36-4	Not Listed
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• Ammonium hydroxide	1336-21-6	Not Listed
U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)		
• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed
U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)		
• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Female		
• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Male		
• Cadmium Sulfate	10124-36-4	Not Listed
• Ammonium hydroxide	1336-21-6	Not Listed

United States - Pennsylvania

Labor

U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List		
• Cadmium Sulfate	10124-36-4	
• Ammonium hydroxide	1336-21-6	
U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances		
• Cadmium Sulfate	10124-36-4	
• Ammonium hydroxide	1336-21-6	Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Last Revision Date	• 07/October/2014
Preparation Date	• 07/October/2014
Disclaimer/Statement of Liability	• To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

Key to abbreviations

NDA = No data available