

SAFETY DATA SHEET (SDS)

according to Hazardous Products Regulations (SOR/2015-17)

Ammonia Solution, 20-27% w/w

Revision date: 01/23/2018 (mm/dd/yyyy)

Revision number: 4.0

SECTION 1 Identification

1.1. Product identifier

Product name:	Instrument Quality Ammonia Solution BASELINE Ammonia Solution Instrument Quality Ammonia Solution, 26%	Product number(s):	S010701 S020701 S050701
EU Index number:	007-001-01-2		
Synonyms:	Ammonia water; Ammonium hydrate; Ammonium hydroxide; Aqueous ammonia		
Chemical names:	FR Ammoniaque; DE Ammoniaklösung; NL Ammoniakoplossing; ES Amoníaco acuoso; IT Soluzione di ammoniaca		

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

Identified uses: For laboratory use only. Not for drug, food, or household use.

1.3. Details of the supplier of the safety data sheet

Manufacturer:

SEASTAR CHEMICALS ULC
2061 Henry Avenue West, Sidney, BC V8L 5Z6 CANADA
1-250-655-5880

Email: SCI-QA&RegulatoryAffairs@seastarchemicals.com

1.4. Emergency telephone number

CAN (CANUTEC): 1-613-996-6666 (24-hour)

SECTION 2 Hazard identification

2.1. Classification of the substance or mixture

Classification in accordance 29 CFR 1910 (OSHA HCS) / WHMIS HPR / Regulation (EC) No 1272/2008

Skin corrosion, category 1B

Specific target organ toxicity, single exposure, respiratory irritation, category 3

Aquatic toxicity, acute, category 1

2.2. Label elements

Pictograms:



Signal word: Danger

Hazard statements: **H314:** Causes severe skin burns and eye damage.

H335: May cause respiratory irritation.

H400: Very toxic to aquatic life.

Precautionary statements: **P260:** Do not breathe fume/gas/mist/vapours/spray.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P310: Immediately call a POISON CENTER or doctor.

P301 + P330 + P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3. Other hazards

For the full text of the H-Statement(s) and P-Statement(s) mentioned in this Section, see Section 16.

SAFETY DATA SHEET (SDS)

according to Hazardous Products Regulations (SOR/2015-17)

Ammonia Solution, 20-27% w/w

Revision date: 01/23/2018 (mm/dd/yyyy)

Revision number: 4.0

SECTION 3 Composition/Information on ingredients

3.2. Mixtures

Chemical name	Chemical formula	Weight percent ¹	CAS №	EINECS №
Ammonia solution (Ammonium hydroxide)	NH ₄ OH (NH ₃ aq. solution)	20-27% w/w (as NH ₃)	1336-21-6 (Ammonia 7664-41-7)	215-647-6
Water	H ₂ O	Balance	7732-18-5	231-791-2

¹Weight Percent or percentage by mass (%): 100x (mass solute/mass total solution after mixing). Expressed as % w/w

SECTION 4 First-aid measures

4.1. Description of first aid measures

Inhalation: This chemical is toxic. Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment, use the "buddy" system). Remove source of contamination or move victim to fresh air. If breathing is difficult, trained personnel should administer emergency oxygen. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED) immediately. Avoid mouth-to-mouth contact by using mouth guards or shields. Quickly transport victim to an emergency care facility.

Skin: Avoid direct contact. Wear chemical protective clothing, if necessary. As quickly as possible, remove contaminated clothing, shoes and leather goods. Immediately flush with lukewarm, gently flowing water for at least 30 minutes. If irritation persists, repeat flushing. DO NOT INTERRUPT FLUSHING. If necessary and it can be done safely, continue flushing during transport to emergency care facility. Quickly transport victim to an emergency care facility. Double bag, seal, label and leave contaminated clothing, shoes and leather goods at the scene for safe disposal.

NOTE: Any skin contact will also involve significant inhalation exposure.

Eye: Avoid direct contact. Wear chemical protective gloves, if necessary. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes, while holding the eyelid(s) open. If a contact lens is present, DO NOT delay irrigation or attempt to remove the lens. Neutral saline solution may be used as soon as it is available. DO NOT INTERRUPT FLUSHING. If necessary, continue flushing during transport to emergency care facility. Take care not to rinse contaminated water into the unaffected eye or onto the face. Quickly transport victim to an emergency care facility. NOTE: Any eye contact will also involve significant inhalation exposure.

Ingestion: NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. If vomiting occurs naturally, have victim rinse mouth with water again. Quickly transport victim to an emergency care facility.

First aid comments: After inhalation exposure, observe for 24 to 72 hours as pulmonary edema may be delayed. Provide general supportive measures (comfort, warmth, rest). Consult a doctor and/or the nearest Poison Control Centre for all exposures. Some first aid procedures recommended above require advanced first aid training. Protocols for undertaking advanced procedures must be developed in consultation with a doctor and routinely reviewed. All first aid procedures should be periodically reviewed by a doctor familiar with the material and its conditions of use in the workplace.

4.2. Most important symptoms and effects, both acute and delayed

Ammonia gas is readily released from ammonia solutions, depending on the concentration of the solution and the temperature. Ammonia gas is a severe respiratory tract irritant, with symptoms such as coughing, breathing difficulty and chest pain. Brief exposure to high concentrations can cause pulmonary edema, a potentially fatal accumulation of fluid in the lungs. Symptoms of pulmonary edema (tightness in the chest and shortness of breath) can develop up to 48 hours after exposure and are aggravated by physical exertion. Ingestion of as little as one teaspoonful (5 mL) of 28% ammonium hydroxide may cause death from shock or asphyxia.

4.3. Indication of any immediate medical attention and special treatment needed

No information available.

SAFETY DATA SHEET (SDS)

according to Hazardous Products Regulations (SOR/2015-17)

Ammonia Solution, 20-27% w/w

Revision date: 01/23/2018 (mm/dd/yyyy)

Revision number: 4.0

SECTION 5 Fire-fighting measures

5.1. Extinguishing media

Ammonium hydroxide will not burn. If ammonia gas is burning, use dry chemical powder or carbon dioxide for small fires and water spray, fog or foam for large fires. Otherwise, use extinguishing media appropriate for the surrounding fire conditions.

5.2. Special hazards arising from the substance or mixture

Ammonium hydroxide solutions are not flammable at normal temperatures. However, ammonia gas may be generated from ammonium hydroxide. Ammonia gas concentrations within the flammable range (15-28%) can be ignited and pose a significant fire and explosion hazard, especially in a confined space. Ammonium hydroxide containing 5% or less ammonia does not produce ammonia gas in the flammable range at any temperature. More concentrated solutions of ammonium hydroxide can give off ammonia gas within the flammable range. A large and intense energy source is necessary to ignite ammonia gas. A number of major fires and explosions involving ammonia gas have occurred in industry. For example, it has been reported that welding operations on a vessel containing ammonium hydroxide caused a violent explosion.

In a fire, ammonium hydroxide will give off very toxic, flammable ammonia gas. Ammonia gas decomposes to flammable hydrogen gas and nitrogen at about 450-500 °C. The main products of combustion in air are nitrogen, with small amounts of toxic and irritating nitrogen dioxide, and ammonium nitrate. Containers may rupture violently due to over-pressurization, if exposed to fire or excessive heat for a sufficient period of time, releasing flammable and toxic gases.

Hazardous combustion products: Ammonia gas, ammonium nitrate, hydrogen, nitrogen/nitrogen dioxide.

5.3. Advice for firefighters

Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective clothing (Bunker Gear) will not provide adequate protection. Chemical protective clothing (e.g. chemical splash suit) and positive pressure self-contained breathing apparatus (NIOSH approved or equivalent) may be necessary.

SECTION 6 Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. Evacuate downwind locations. Ensure cleanup is conducted by trained personnel only. Wear adequate personal protective equipment. Do not touch damaged containers or spilled product unless wearing appropriate protective equipment. Increase ventilation to area or move leaking container to a well-ventilated and secure area. Remove or isolate incompatible materials and other hazardous materials.

Vapour or gas may accumulate in hazardous amounts in low-lying areas especially inside confined spaces, if ventilation is not sufficient. Before entry, especially into confined areas, check atmosphere with an appropriate monitor.

6.2. Environmental precautions

Notify government occupational health and safety and environmental authorities.

6.3. Methods and material for containment and cleaning up

Do not allow into any sewer, on the ground or into any waterway. If the spill is inside a building, prevent product from entering drains, ventilation systems and confined areas.

SMALL SPILLS: Stop or reduce leak if safe to do so. Ventilate the area. Contain and soak up spill with absorbent that does not react with spilled product. Flush area with water. Place used absorbent into suitable, covered, labelled containers for disposal. Contaminated absorbent poses the same hazard as the spilled product.

LARGE SPILLS: Contact supplier, local fire and emergency services for help. Dike spilled product to prevent runoff. Cover the spill surface with the appropriate type of foam to reduce the release of vapour/ammonia gas. Ventilate the area to prevent the gas from accumulating, especially in confined spaces. Knock down gas with fog or fine water spray.

Remove or recover liquid using pumps or vacuum equipment. Flush spill area. Dike and recover contaminated water for appropriate disposal. Store recovered product in suitable containers that are: tightly-covered, corrosion-resistant.

6.4. Reference to other sections

See Section 7 for information on handling. See Section 8 for information on personal protection. See Section 13 for information on disposal.

SAFETY DATA SHEET (SDS)

according to Hazardous Products Regulations (SOR/2015-17)

Ammonia Solution, 20-27% w/w

Revision date: 01/23/2018 (mm/dd/yyyy)

Revision number: 4.0

SECTION 7 Handling and storage

7.1. Precautions for safe handling

Do not use this product once the expiration date is reached. The expiration date defines both the end of the product shelf life and its certification. The expiration date is conditional; products must be stored and transported according to SEASTAR™'s Product Integrity Guidelines.

Plastic bottles should be inspected regularly, specifically HDPE bottles, for any evidence of change to the plastic bottle's ability to deform. The ability to deform is defined by its ductility/plasticity/malleability/embrittlement, or hardening/compressibility. If any change is noticed, carefully and safely transfer or dispose of the product according to your safe handling practices and procedures. Any product disposal must be done according to applicable regulations governing the disposal of the hazardous product.

This material is a TOXIC, CORROSIVE liquid. Ammonium hydroxide readily gives off ammonia gas which is also an EXPLOSION HAZARD, especially in confined spaces. Before handling, it is extremely important that engineering controls are operating and that protective equipment requirements and personal hygiene measures are being followed. People working with this chemical should be properly trained regarding its hazards and its safe use. Maintenance and emergency personnel should be advised of potential hazards.

If ammonium hydroxide is released, immediately put on a suitable respirator and leave the area until the severity of the release is determined. In case of leaks, escape-type respiratory protective equipment should be available in the immediate work area. Immediately report leaks, spills or failures of the engineering controls. Unprotected persons should avoid all contact with this chemical including contaminated equipment.

Consider using a closed handling system for large-scale use of this material. If a closed handling system is not possible, use the smallest possible amounts in a well-ventilated area separate from the storage area. Avoid generating vapours or mists. Prevent the release of vapours, mists or ammonia gas into the workplace air. For large-scale operations consider the installation of an ammonia gas leak detection system with an alarm. For large-scale handling operations use non-sparking ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas of use.

Do not use with incompatible materials such as oxidizing agents (e.g. nitrogen oxide), halogens (e.g. chlorine, fluorine) and heavy metals (e.g. mercury, silver). See Section 10 for more information.

Inspect containers for damage or leaks before handling. Keep only in original container. Cautiously, dispense into sturdy containers made of compatible materials. Pour carefully from the container to avoid splashing and spurling. Stand upwind of all opening, pouring and mixing operations. Use corrosion-resistant transfer equipment. Regularly check storage tanks and transfer equipment for evidence of corrosion or leakage. Have suitable emergency equipment for fires, spills and leaks readily available. Practice good housekeeping. Maintain handling equipment. Comply with applicable regulations.

7.2. Conditions for safe storage, including any incompatibilities

Store in a cool, well-ventilated area, out of direct sunlight and away from heat sources. Do not store below ground level or in confined spaces. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Keep storage area separate from work areas. Post warning signs. Inspect periodically for damage or leaks.

Keep quantities stored as small as possible. For large-scale storage of this material consider the installation of an ammonia leak detection system with an alarm. Store away from incompatible materials, such as chlorine or copper. See Section 10 for more information.

Inspect all incoming containers to make sure they are properly labelled and not damaged. Always store in original labelled container. Protect the label and keep it visible. Keep containers tightly closed when not in use and when empty. Protect from damage. Store empty containers separately. Empty containers may contain hazardous residues. Keep closed.

Walls, floors, shelving, fittings, lighting and ventilation systems in storage area should be made from carbon steel or stainless steel which do not react with ammonium hydroxide. Storage facilities should be made of fire-resistant materials. Store this material according to applicable occupational health and safety regulations and fire and building codes. Have appropriate fire extinguishers and spill clean-up equipment in storage area.

7.3. Specific end use(s)

No information available.

SAFETY DATA SHEET (SDS)

according to Hazardous Products Regulations (SOR/2015-17)

Ammonia Solution, 20-27% w/w

Revision date: 01/23/2018 (mm/dd/yyyy)

Revision number: 4.0

SECTION 8 Exposure controls/Personal protection

8.1. Control parameters

Chemical name	Limit value type	Exposure limit value	Source
Ammonia, as NH ₃	TLV-TWA, REL-TWA	25 ppm (18 mg/m ³)	USA ACGIH, USA NIOSH
	PEL-TWA	50 ppm (35 mg/m ³)	USA OSHA
	TLV-STEL, REL-STEL	35 ppm (27 mg/m ³)	USA ACGIH, USA NIOSH
	IDLH	300 ppm	USA NIOSH
Water	None listed.	None listed.	Not applicable

8.2. Exposure controls

NOTE: Exposure to this material can be controlled in many ways. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. This general information can be used to help develop specific control measures. Ensure that control systems are properly designed and maintained. Comply with occupational, environmental, fire, and other applicable regulations.

Engineering Controls: Engineering control methods to reduce hazardous exposures are preferred. Methods include mechanical ventilation (dilution and local exhaust), process or personnel enclosure, control of process conditions, and process modification (e.g. substitution of a less hazardous material). Administrative controls and personal protective equipment may also be required. Because of the high potential hazard associated with ammonium hydroxide, stringent control measures such as enclosure or isolation may be necessary for large-scale handling operations.

For large-scale handling operations, use non-sparking, corrosion-resistant ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas of use. Consider the installation of an ammonia leak detection system with an alarm. Supply sufficient replacement air to make up for air removed by exhaust systems.

Walls, floors, shelving, fittings, lighting and ventilation systems should be made from carbon steel or stainless steel which do not react with ammonia or ammonium hydroxide. Have a safety shower and eye-wash fountain readily available in the immediate work area.

Personal Protective Equipment: If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protective equipment including approved respiratory protection. Have appropriate equipment available for use in emergencies such as spills or fire.

If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Refer to the CSA Standard Z94.4-11, "Selection, Use and Care of Respirators," available from the Canadian Standards Association.

Eye / Face protection: Wear chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. A face shield may be necessary.

Skin protection: Chemical protective gloves, coveralls, boots, and/or other chemical protective clothing. An impervious full-body encapsulating suit and respiratory protection may be required in some operations. Have a safety shower and eye-wash fountain readily available in the immediate work area. Choose body protection according to the amount and concentration of the substance at the work place.

Resistance of Materials for Protective Clothing: Guidelines for ammonium hydroxide less than 30%:

RECOMMENDED (resistance to breakthrough longer than 8 hours): butyl, neoprene and nitrile rubber; Viton®; Viton®/Butyl rubber; Saranex®; Microchem® 4000; Tychem® F, Thermopro, Responder® CSM, TK, and Reflector.

RECOMMENDED (resistance to breakthrough longer than 4 hours): polyvinyl chloride (PVC); Silver Shield® - PE/EVAL/PE.

CAUTION, use for short periods only (resistance to breakthrough within 1 to 4 hours): natural rubber; Tychem® CPF3 and BR/LV.

NOT RECOMMENDED for use (resistance to breakthrough less than 1 hour and/or poor degradation rating): polyvinyl alcohol (PVAL); Barrier® - PE/PA/PE.

Inhalation / Ventilation: NIOSH RECOMMENDATIONS FOR AMMONIA CONCENTRATIONS IN AIR:

Up to 300 ppm: Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against ammonia; or Any air-purifying, full facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection

SAFETY DATA SHEET (SDS)

according to Hazardous Products Regulations (SOR/2015-17)

Ammonia Solution, 20-27% w/w

Revision date: 01/23/2018 (mm/dd/yyyy)

Revision number: 4.0

against ammonia; or Any self-contained breathing apparatus with a full facepiece; or Any supplied-air respirator with a full facepiece.

Emergency or planned entry into unknown concentrations or IDLH conditions: Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode; or Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus.

Escape: Any air-purifying, full facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against ammonia; or Any appropriate escape-type, self-contained breathing apparatus.

Personal Hygiene: Remove contaminated clothing immediately. Keep contaminated clothing in closed containers. Discard or launder before rewearing. Inform laundry personnel of contaminant's hazards. Do not eat, drink, or smoke in work areas.

SECTION 9 Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state:	Liquid	Vapour pressure:	19.1% w/w: 29.5 kPa (221.3 mmHg)
Colour:	Colourless	(partial pressure at 21.1 °C)	23.9% w/w: 47.4 kPa (355.2 mmHg)
Molecular weight:	NH ₄ OH: 35.04 g/mol	Vapour density: (at 21.1 °C)	0.588 (ammonia gas) (air=1)
	[NH ₃ (aq.): 17.03 g/mol]	Density: (at 20 °C)	20% w/w: 0.9229 g/mL
	H ₂ O: 18.02 g/mol		26% w/w: 0.9040 g/mL
Odour:	Strong odour – ammonia-like	Solubility:	Soluble in all proportions in water with mild liberation of heat.
Odour threshold:	17 ppm (detection, geometric mean for ammonia gas)	Partition coefficient:	Log P(oct) = -2.66 (est.)
pH:	11.1 (0.1 N); 11.6 (1 N)	Auto-ignition temperature:	651 °C (1204 °F) (25% solution) 850 °C (1562 °F) (ammonia gas)
Melting/freezing point:	20% w/w: -34.9 °C (-30.8 °F)	Decomposition temperature:	NH ₄ OH: Not available NH ₃ gas: 448.9-498.9 °C (840-930 °F)
	24% w/w: -44.5 °C (-48.1 °F)		
	25% w/w: -72.4 °C (-98.3 °F)	Viscosity:	No information available
Boiling point:	25% w/w: 38 °C (100.4 °F) 29.4% w/w: 27.2 °C (81 °F)	Evaporation rate:	The evaporation of ammonia gas from solutions increases with the concentration of the solution.
Flash point:	Not flammable under normal conditions.	Upper flammable (explosive) limit (UFL/UEL):	25-28% (ammonia gas)
Flammability:	Not applicable		
Lower flammable (explosive) limit (LFL/LEL):	15-16% (ammonia gas)		

9.2. Other information

No information available.

SECTION 10 Stability and reactivity

10.1. Reactivity

Ammonium hydroxide dissolves in water with mild release of heat. See Section 10.5 for incompatible materials.

10.2. Chemical stability

Normally stable. Ammonia gas may be given off under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous polymerization has not been reported. See Section 10.5 for incompatible materials.

10.4. Conditions to avoid

High temperatures, open flames, electric sparks, welding.

SAFETY DATA SHEET (SDS)

according to Hazardous Products Regulations (SOR/2015-17)

Ammonia Solution, 20-27% w/w

Revision date: 01/23/2018 (mm/dd/yyyy)

Revision number: 4.0

10.5. Incompatible materials

NOTE: Chemical reactions that could result in a hazardous situation (e.g. generation of flammable or toxic chemicals, fire or detonation) are listed here. Many of these reactions can be done safely if specific control measures (e.g. cooling of the reaction) are in place. Although not intended to be complete, an overview of important reactions involving common chemicals is provided to assist in the development of safe work practices.

OXIDIZING AGENTS (e.g. perchlorates, chlorates, hydrogen peroxide, chromic trioxide, nitrogen oxides, calcium or sodium hypochlorite) - can react with generation of heat. Reaction may become violent or explosive.

HEAVY METALS AND THEIR SALTS (e.g. silver, gold, lead, mercury or zinc, especially halide salts) - may form shock-sensitive compounds that may explode when dry.

HALOGENS (e.g. chlorine, bromine, fluorine or iodine) or INTERHALOGENS (e.g. bromine pentafluoride, chlorine trifluoride) - can react violently or form explosive chemicals.

NITROMETHANE - Increases the sensitivity of nitromethane to detonation. Form salts which are explosive when dry.

STRONG MINERAL ACIDS (e.g. sulfuric acid, hydrochloric acid, hydrofluoric acid or nitric acid) - reaction is exothermic (gives off heat); mixture becomes boiling hot and reaction may become violent.

DIMETHYL SULFATE - reacts violently.

ACROLEIN, ACRYLIC ACID, CHLOROSULFURIC ACID, PROPIOLACTONE or PROPYLENE OXIDE - mixing with 28% ammonium hydroxide in a closed container caused the temperature and pressure to rise.

10.6. Hazardous decomposition products

Ammonia gas (decomposes at 450-500 °C into hydrogen gas and nitrogen), ammonium nitrate, nitrogen/nitrogen dioxide.

10.7. Corrosivity to metals:

Dilute ammonium hydroxide solutions initially rapidly attack aluminum alloys. The attack rate drops as the concentration and pH increase. Ammonium hydroxide solutions (10-30%) are corrosive at normal temperatures to type 5052 aluminum and Cast B-356 aluminum, types 1075 and 1085 carbon steel, ductile cast iron, copper and copper alloys, bronze, high silicon bronze, low silicon bronze, silicon copper, aluminum bronze, architectural bronze, naval bronze, 90-10 copper-nickel, 70-30 copper nickel, brass, admiralty brass, naval brass, yellow brass, cartridge brass, nickel (4-27%) and nickel-base alloys, Monel, zinc, zinc alloys, galvanized surfaces and tantalum. Ammonium hydroxide solutions are not corrosive at concentrations up to 30% at normal temperatures to stainless steels (such as types 303, 304, 306, 316, 347, 17-4 PH, 403, 410, 430 and 440), type 3003 aluminum, nickel-base alloys, Hastelloy B and C, Inconel 600 and 690, Incolloy 800 and 825, types 1010 and 1020 carbon steel, cast iron (unspecified), high nickel cast iron (25%), high silicon cast iron, Carpenter 29 Cb-3 (10-30%), titanium and zirconium.

10.8. Corrosivity to non-metals:

At normal temperatures, ammonium hydroxide solutions attack plastics, such as polyvinylidene chloride (Saran), polybutylene terephthalate, polyethylene terephthalate, isophthalic acid and general-purpose thermoset polyesters and polyurethane (rigid); and elastomers, such as polyacrylate, polyurethane, natural rubber, synthetic isoprene, hard rubber and polysulfide. At normal temperatures, ammonium hydroxide solutions do not attack plastics such as Teflon and other fluorocarbons like ethylene tetrafluoroethylene (ETFE; Tefzel), ethylene chlorotrifluoroethylene (ECTFE; Halar), chlorotrifluoroethylene (CTFE; Kel-F) and polyvinylidene fluoride (PVDF; Kynar), chlorinated polyvinyl chloride (CPVC), polyvinyl chloride (PVC), polypropylene, nylon, acrylonitrile-butadiene-styrene (ABS), styrene-acrylonitrile (SAN), polyetherether ketone (Peek), chlorinated polyether (Penton), high density polyethylene (HDPE), ultra high molecular weight polyethylene (UHMPE), crosslinked polyethylene (XPE), polyphenylene oxide (Noryl), bisphenol A-fumarate and chlorinated thermoset polyesters, thermoset epoxy, thermoset vinyl ester and ethylene vinyl acetate; elastomers such as nitrile rubber (NBR; nitrile Buna N), ethylene propylene (EP); ethylene propylene diene (EPDM), Viton A and other fluorocarbons like Chemraz and Kalrez, chloroprene (CR; neoprene), butyl rubber (butyl rubber (isobutylene isoprene; IIR), chlorosulfonated polyethylene (Hypalon; CSM), low density polyethylene, nylon 11, flexible polyvinyl chloride and ethylene vinyl acetate (EVA); and coatings such as such as coal tar epoxy, epoxy polyamide, epoxy (general purpose and chemical resistant), polyester, urethanes, vinyls at room temperature.

SAFETY DATA SHEET (SDS)

according to Hazardous Products Regulations (SOR/2015-17)

Ammonia Solution, 20-27% w/w

Revision date: 01/23/2018 (mm/dd/yyyy)

Revision number: 4.0

SECTION 11 Toxicological information

11.1. Information on toxicological effects

RTECS#: BQ9625000

Acute toxicity:

Oral LD50: 350 mg/kg (rat); 91 mg/kg (mouse)

Dermal LD50: No information available.

Inhalation LC50: No information available.

Other information: No information available.

Exposure routes:

Inhalation: May be fatal if inhaled. Ammonia gas is readily released from ammonia solutions, depending on the concentration of the solution and the temperature. Ammonia gas is a severe respiratory tract irritant, with symptoms such as coughing, breathing difficulty and chest pain. Brief exposure to high concentrations can cause pulmonary edema, a potentially fatal accumulation of fluid in the lungs. Symptoms of pulmonary edema (tightness in the chest and shortness of breath) can develop up to 48 hours after exposure and are aggravated by physical exertion.

Skin: Ammonia solutions are corrosive and are capable of producing severe burns, blisters, ulcers and permanent scarring, depending on the concentration of the solution and the duration of contact. May cause brown skin discolouration and possible hardening of the outer skin layer. If respiratory protection is not used, skin exposure may result in fatal inhalation health effects.

Eye: Ammonia solutions are corrosive and are capable of producing severe eye burns, and permanent injury, including blindness, depending on the concentration of the solutions and duration of contact. Exposures which cause eye injury are also expected to cause harmful effects to the skin and respiratory system.

Ingestion: Ammonia solutions can cause burns to the lips, tongue, throat, esophagus and stomach; abdominal pain; nausea; vomiting; diarrhea and death. Exposure may cause death from shock or asphyxia and as little as one teaspoonful (5 mL) of 28% NH₄OH solution has been recorded as fatal.

Germ cell mutagenicity: The available information is insufficient to conclude that ammonium hydroxide is mutagenic.

Carcinogenicity: Ammonium hydroxide is not known to be a carcinogen. The International Agency for Research on Cancer (IARC) has not evaluated the carcinogenicity of this chemical. The American Conference of Governmental Industrial Hygienists (ACGIH) has not assigned a carcinogenicity designation to this chemical. The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens.

Reproductive toxicity: Ammonium hydroxide is not known to cause reproductive toxicity.

Additional information: May cause dermatitis, liver and kidney damage, chronic bronchitis and olfactory fatigue (the odour and irritation effects are detected at higher concentrations). Prolonged or repeated exposure may cause corneal damage and the development of cataracts and glaucoma. To the best of our knowledge, the chronic toxicity of this substance has not been fully investigated.

SECTION 12 Ecological information

12.1. Toxicity

Bluegill (*Lepomis macrochirus*): LC50 = 0.024-0.093 mg/L/48H; *Daphnia magna*: EC50 = 0.66 mg/L/48H at 22 °C

12.2. Persistence and degradability

Persistent.

12.3. Bioaccumulative potential

Bioaccumulation is not anticipated for inorganic compounds that are miscible with water.

12.4. Mobility in soil

No information available.

12.5. Results of PBT and vPvB assessment

Not applicable for inorganic substances.

SAFETY DATA SHEET (SDS)

according to Hazardous Products Regulations (SOR/2015-17)

Ammonia Solution, 20-27% w/w

Revision date: 01/23/2018 (mm/dd/yyyy)

Revision number: 4.0

12.6. Other adverse effects

No information available.

SECTION 13 Disposal considerations

13.1. Waste treatment methods

Review local/regional/international regulations or requirements prior to disposal. Store material for disposal as indicated in Storage Conditions.

Contaminated packaging: Dispose of as unused product.

SECTION 14 Transport information

14.1. UN number	UN2672
14.2. UN proper shipping name	AMMONIA SOLUTION
14.3. Transport hazard class(es)	8
Hazards label(s):	8
14.4. Packing group	III
14.5. Environmental hazards	Yes
Marine pollutant:	Yes
14.6. Special precautions for user	
ADR/RID hazard identification number:	80
ADR/RID tunnel code:	E
IMDG EMS number:	F-A, S-B
IMDG Category:	A

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable.

SECTION 15 Regulatory information

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

OSHA Hazards: CAS #1336-21-6 meets criteria for hazardous material, as defined by 29 CFR 1910.1200.

SARA:

302: This material contains Ammonium hydroxide (CAS# 1336-21-6), which is subject to the reporting requirement of 500 lbs RQ (Ammonia, CAS# 7664-41-7).

313: This material contains Ammonium hydroxide (CAS# 1336-21-6), which is subject to the reporting requirements of Section 313 of SARA Title III.

311/312: This material contains Ammonium hydroxide (CAS# 1336-21-6).

Right To Know Lists:

Massachusetts: CAS# 1336-21-6 is listed, 50 lbs RQ.

Pennsylvania: CAS# 1336-21-6 is listed, E (environmental hazard).

New Jersey: CAS# 1336-21-6 is listed, RTK# 0103.

California Prop. 65: CAS# 1336-21-6 is not subject to this act. CAS# 7732-18-5 is not subject to this act.

Inventory Status:

Canada DSL/NDL Inventory List: CAS# 1336-21-6 is listed. CAS# 7732-18-5 is listed.

US TSCA Inventory List: CAS# 1336-21-6 is listed. CAS# 7732-18-5 is listed.

EC Inventory List: CAS# 1336-21-6 is listed, EC# 215-647-6. CAS# 7732-18-5 is listed, EC# 231-791-2.

15.2. Chemical safety assessment

Not applicable.

SAFETY DATA SHEET (SDS)

according to Hazardous Products Regulations (SOR/2015-17)

Ammonia Solution, 20-27% w/w

Revision date: 01/23/2018 (mm/dd/yyyy)

Revision number: 4.0

SECTION 16 Other information

Full text of H-Statement(s) and P-Statement(s):

H314: Causes severe skin burns and eye damage.

H335: May cause respiratory irritation.

H400: Very toxic to aquatic life.

P260: Do not breathe fume/gas/mist/vapours/spray.

P264: Wash thoroughly after handling.

P271: Use only in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P310: Immediately call a POISON CENTER or doctor.

P301 + P330 + P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.

P304 + P340: IF INHALED: Remove person to fresh air and keep 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.

P363: Wash contaminated clothing before reuse.

P391: Collect spillage.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P405: Store locked up.

P501: Dispose of contents/container according to federal, regional and local government requirements.

Date modified: 01-2018, Supersedes 07-2014, 05-2014, 04-2011

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