



UK Health
Security
Agency

Ammonia

Incident management

This document provides information needed for response to a chemical incident, such as physicochemical properties, health effects and decontamination advice.

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Main points

General

Ammonia is a colourless, flammable alkaline gas at room temperature which can readily dissolve in water. It has a pungent urine-like odour.

It reacts with many organic and inorganic compounds, causing fire and explosive hazard.

Health

Irritant and corrosive.

May be harmful by any route of exposure.

Inhalation is the most common route of exposure.

Inhalation causes irritation of the eyes and nose, with sore throat, cough, chest tightness, headache, fever, wheeze tachycardia and confusion.

Ingestion causes immediate burning of the mouth, throat and stomach.

Dermal contact can cause series burns.

Alkaline solutions can damage all layers of the eyes and should be considered an ophthalmic emergency.

Casualty decontamination at the scene

Anhydrous ammonia (liquid or gas) reacts with tissue moisture to form corrosive ammonium hydroxide solution. Following disrobe, improvised wet decontamination should be considered.


Environment

Inform the [Environment Agency](#) where appropriate and avoid release into the environment.

Spillages and decontamination run-off should be prevented from entering watercourses.

Hazard identification

Table 1a. Standard (UK) dangerous goods emergency action codes for ammonia

UN		1005	Ammonia, anhydrous	
EAC		2XE	Use fine water spray. Wear chemical protective clothing with liquid-tight connections for whole body in combination with breathing apparatus [note 1]. Spillages and decontamination run-off should be prevented from entering drains and watercourses. There may be a public safety hazard outside the immediate area of the incident [note 2].	
APP		A(c)	Gas-tight chemical protective suit with breathing apparatus Fire kit intended to protect against flammable liquid [note 3]	
Hazards	2.3	Toxic gases	2.3	
	8	Corrosive substance	8	
HIN		268	Toxic gas, corrosive	

Abbreviations

UN = United Nations number.

EAC = emergency action code.

APP = additional personal protection.

HIN = hazard identification number.

Notes to Table 1

Note 1: Chemical protective clothing with liquid tight connections for whole body (Type 3) conforming to the relevant standards such as BS 8428 or EN 14605 in combination with breathing apparatus conforming to BS EN 137.


Note 2: People should be warned to stay indoors with all doors and windows closed, preferably in rooms upstairs and facing away from the incident. Ignition sources should be eliminated and ventilation stopped. Effects may spread beyond the immediate vicinity. All non-essential personnel should be instructed to move at least 250m away from the incident.

Note 3: Suitable thermal resistant gloves should be worn, such as those conforming to BS EN511 or BS EN407.

References

National Chemical Emergency Centre (NCEC), part of Ricardo-AEA. '[Dangerous Goods Emergency Action Code List](#)' 2023 (viewed on 27 September 2024)

Table 1b. Standard (UK) dangerous goods emergency action codes for ammonia, solution

UN		2073	Ammonia solution, relative density less than 0.88 at 15°C in water, with more than 35% but not more than 50% ammonia	
EAC		2XE	Use fine water spray. Wear chemical protective clothing with liquid-tight connections for whole body in combination with breathing apparatus [note 1]. Spillages and decontamination run-off should be prevented from entering drains and watercourses. There may be a public safety hazard outside the immediate area of the incident [note 2].	
APP		–	–	
Hazards	Class	2.2	Non-flammable, non-toxic gases	
	Sub-risks	–	–	
HIN		20	Asphyxiant gas or gas with no subsidiary risk	

Abbreviations

UN = United Nations number.

EAC = emergency action code.

APP = additional personal protection.

HIN = hazard identification number.

Note to Table 1b

Note 1: Chemical protective clothing with liquid tight connections for whole body (Type 3) conforming to the relevant standards such as BS 8428 or EN 14605 in combination with breathing apparatus conforming to BS EN 137.

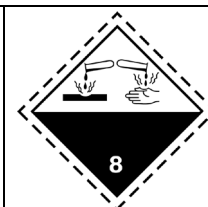
Note 2: People should be warned to stay indoors with all doors and windows closed, preferably in rooms upstairs and facing away from the incident. Ignition sources should be eliminated and ventilation stopped. Effects may spread beyond the immediate vicinity. All non-essential personnel should be instructed to move at least 250m away from the incident.

Reference

National Chemical Emergency Centre (NCEC), part of Ricardo-AEA. '[Dangerous Goods Emergency Action Code List](#)' 2023 (viewed on 27 September 2024)

Table 1c. Standard (UK) dangerous goods emergency action codes for ammonia, solution

UN		2672	Ammonia solution, relative density between 0.88 and 0.957 at 15°C in water, with more than 10% but no more than 35% ammonia
EAC		2X	Use fine water spray. Wear chemical protective clothing with liquid-tight connections for whole body in combination with breathing apparatus [note 1]. Spillages, contaminated fire and decontamination run-off should be prevented from entering drains and surface and groundwaters.
APP		–	–
Hazards	Class	8	Corrosive substance
	Sub-risks	–	–
HIN		80	Corrosive or slightly corrosive substance



Abbreviations

UN = United Nations number.

EAC = emergency action code.

APP = additional personal protection.

HIN = hazard identification number.



Note to Table 1c

Note 1: Chemical protective clothing with liquid-tight connections for whole body (type 3) conforming to the relevant standards such as BS 8428 or EN 14605, in combination with breathing apparatus BS EN 137

Reference

National Chemical Emergency Centre (NCEC), part of Ricardo-AEA. '[Dangerous Goods Emergency Action Code List](#)' 2023 (viewed on 2 October 2024)

Table 1d. Standard (UK) dangerous goods emergency action codes for Ammonia, solution

UN		3318	Ammonia solution, relative density less than 0.88 at 15°C in water, with more than 50% ammonia	
EAC		2XE	Use fine water spray. Wear chemical protective clothing with liquid-tight connections for whole body in combination with breathing apparatus [note 1]. Spillages and decontamination run-off should be prevented from entering drains and watercourses. There may be a public safety hazard outside the immediate area of the incident [note 2].	
APP		B	Gas-tight chemical protective suit with breathing apparatus [note 3].	
Hazards	Class	2.3	Toxic gases	
	Sub-risks	8	Corrosive substance	
HIN		268	Toxic gas, corrosive	

Abbreviations

UN = United Nations number.

EAC = emergency action code.

APP = additional personal protection.

HIN = hazard identification number.

Note to Table 1d

Note 1: Chemical protective clothing with liquid tight connections for whole body (Type 3) conforming to the relevant standards such as BS 8428 or EN 14605 in combination with breathing apparatus conforming to BS EN 137.





Note 2: People should be warned to stay indoors with all doors and windows closed, preferably in rooms upstairs and facing away from the incident. Ignition sources should be eliminated and ventilation stopped. Effects may spread beyond the immediate vicinity. All non-essential personnel should be instructed to move at least 250m away from the incident.

Note 3: Chemical protective clothing should be gas-tight conforming to BS EN 943 part 2 in combination with breathing apparatus conforming to BS EN 137.

Reference

National Chemical Emergency Centre (NCEC), part of Ricardo-AEA. '[Dangerous Goods Emergency Action Code List](#)' 2023 (viewed on 2 October 2024)



Table 2a. The GB classification, labelling and packaging (CLP) regulation for ammonia, anhydrous

Hazard class and category	Press. Gas	Compressed gas	
	Flam. Gas 2	Flammable gas, category 2	
	Skin Corr. 1B	Skin corrosion, category 1B	
	Acute Tox. 3	Acute toxicity (inhalation), category 3	
	Aquatic Acute 1	Acute hazard to the aquatic environment, category 1	
Hazard statement	H221	Flammable gas	
	H314	Causes severe skin burns and eye damage	
	H331	Toxic if inhaled	
	H400	Very toxic to aquatic life	
Signal words	DANGER		

References

The Health and Safety Executive (HSE). '[GB CLP Regulation](#)' (viewed 27 September 2024)

Table 2b. The GB classification, labelling and packaging (CLP) regulation for ammonia ...%

Hazard class and category	Skin Corr. 1B	Skin corrosion, category 1B	
	Aquatic Acute 1	Acute hazard to the aquatic environment, category 1	
Hazard statement	H314	Causes severe skin burns and eye damage	
	H400	Very toxic to aquatic life	
Signal words	DANGER		

Reference

The Health and Safety Executive (HSE). '[GB CLP Regulation](#)' (viewed 27 September 2024)

Table 2c. Specific concentration limits for ammonia ...%

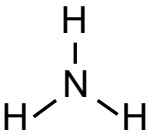
Concentration	Hazard class and category	Hazard statement	
C ≥ 5%	STOT SE 3	H335	May cause respiratory irritation

Reference

The Health and Safety Executive (HSE). '[GB CLP Regulation](#)' (viewed 27 September 2024)

Physicochemical properties

Table 3. Physicochemical properties

CAS number	7664-41-7
Molecular weight	17
Formula	NH ₃
Common synonyms	Hydrogen nitride, azane
State at room temperature	Gas
Volatility	Vapour pressure = 7,500 mmHg at 25°C
Specific gravity	0.60 (air = 1)
Flammability	Reacts with many organic and inorganic compounds, causing fire and explosion hazard
Lower explosive limit	15%
Upper explosive limit	33.6%
Water solubility	Soluble in water
Reactivity	Reacts with many compounds, causing a fire and explosion hazard. Strong base and corrosive. Reacts violently with acids, strong oxidants, halogens and many other substances. Attacks copper, aluminium, zinc and their alloys. Mixtures with mercury, silver and gold oxides are shock-sensitive.
Odour	Pungent suffocating odour of drying urine
Structure	

References

PubChem. Bethesda (MD): National Library of Medicine (US), National Center for Biotechnology Information. '[PubChem Compound Summary for CID 222, Ammonia](#)' (viewed 27 September 2024)

International Labour Organization (ILO). '[International Chemical Safety Card for \(ICSC\) – 0414 Ammonia \(anhydrous\) ICSC 0414](#)'. 2013. (viewed 27 September 2024)

Reported effect levels from authoritative sources

Table 4a. Exposure by inhalation of vapours

ppm	mg/m ³	Signs and symptoms	Reference
16-510	11-354	Hyperventilation (up to 4-hour exposure)	a
50	35	Eye, nasal and throat irritation, lacrimation, cough (1 day /30 mins/day)	b
400	280	Immediate throat irritation	d
500	350	Increased respiratory rate	b, d
2500-4,500	1742-3150	Fatal within 30 minutes	b
>5000	>3483	Rapidly fatal to humans	b

Table 4b. Eye exposure to gaseous ammonia

ppm	mg/m ³	Signs and symptoms	Reference
50-72	35-51	Irritation	b
250	175	Bearable to most for 30-60 minutes	b
698	489	Immediately irritating to the eyes	b

Table 4c. Exposure by skin

%	Signs and symptoms	Reference
5-10	Irritation (ammonium solution)	c
ppm		
10,000	Skin damage	c

Table 4d. Oral exposure

g/L	Signs and symptoms	Reference
24	Death	d

These values give an indication of levels of exposure that can cause adverse effects. They are not health protective standards or guideline values.

References

a. US Environmental Protection Agency (USEPA). '[Toxicological Review of Ammonia Noncancer Inhalation](#)' 2016. (viewed 27 September 2024)

b. Agency for Toxic Substances and Disease Registry (ATSDR). '[Toxicological profile for Ammonia](#) (Draft for Public Comment)' 2004 (viewed 27 September 2024)

c. National Poisons Information Service (NPIS). TOXBASE.' [Ammonium hydroxide \(Ammonia solution\)](#)' 2022. (viewed 27 September 2024)

d. International Programme on Chemical Safety (IPCS) – '[Ammonia \(Environmental Health Criteria 54, 1986\)](#)' (viewed 27 September 2024)

Published emergency response guidelines

Table 6. Acute exposure guideline levels (AEGLs)

	Concentration (ppm)				
	10 minutes	30 minutes	60 minutes	4 hours	8 hours
AEGL-1 [note 1]	30	30	30	30	30
AEGL-2 [note 2]	220	220	160	110	110
AEGL-3 [note 3]	2700	1600	1100	550	390

Notes to Table 6

Note 1: Level of the chemical in air at or above which the general population could experience notable discomfort.

Note 2: Level of the chemical in air at or above which there may be irreversible or other serious long-lasting effects or impaired ability to escape.

Note 3: Level of the chemical in air at or above which the general population could experience life-threatening health effects or death.

NR = Not reported due to insufficient data

Reference

US Environmental Protection Agency (EPA) '[Acute Exposure Guideline Levels](#)' (viewed 27 September 2024)

Exposure standards, guidelines or regulations

Table 7. Occupational standards

	LTEL (8-hour reference period)		STEL (15-min reference period)	
	ppm	mg/m ³	ppm	mg/m ³
WEL	25	18	35	25

Abbreviations

WEL = workplace exposure limit.

LTEL = long-term exposure limit.

STEL = short-term exposure limit.

Reference

Health and Safety Executive (HSE). '[EH40/2005 Workplace Exposure Limits Fourth Edition](#)' 2020 (viewed on 27 September 2024)

Table 8. Public health standards and guidelines

Drinking water standard	Indicator parameter: 0.5 µg/L (as ammonium)
WHO guideline for drinking water quality	No guideline value specified
WHO air quality guideline	No guideline value specified

Reference

[The Private Water Supplies \(England\) Regulations \(2016\)](#) and [The Private Water Supplies \(Wales\) Regulations \(2017\)](#) (viewed on 27 September 2024)

[The Water Supply \(Water Quality\) Regulations \(2018\)](#) (Water, England and Wales) (viewed on 27 September 2024)

Health effects

Exposure by any route may be dangerous; however, the most common route of exposure is inhalation.

Table 9. Signs or symptoms of acute exposure

Route	Signs and symptoms
Inhalation	<p>Irritation of eyes and nose, with sore throat, cough, chest tightness, headache, fever, wheeze, tachycardia and confusion. Chemical pneumonitis, tachypnoea, dyspnoea and stridor due to laryngeal oedema may follow. Pulmonary oedema with increasing breathlessness, wheeze, hypoxia and cyanosis may take up to 36 hours to develop. Optic neuropathy has been reported following acute inhalation.</p> <p>In serious cases, corrosive damage to the mucous membranes of both the upper and lower respiratory tract occurs.</p> <p>High concentrations of ammonia gas may also cause suffocation.</p> <p>Prolonged exposure may result in systemic effects.</p>
Ingestion	<p>Ingestion of corrosives can cause immediate pain, with burning in the mouth, throat and stomach. This may be followed by abdominal pain, vomiting, haematemesis and dyspnoea. Pain and oedema may make swallowing difficult, causing drooling. Haemorrhagic or hypovolaemic shock and airway obstruction from laryngeal and/or epiglottic oedema are features of severe cases.</p> <p>Stridor and respiratory complications (including pneumonitis, pulmonary oedema, acute respiratory distress syndrome and pulmonary necrosis) can develop following aspiration of corrosive materials.</p> <p>The presence of oropharyngeal burns does not correlate well with the presence of oesophageal injuries, but generally more extensive oral burns are associated with multiple site involvement. Gastric or oesophageal perforation may occur in the early stages of severe cases. Stricture formation is a potential late complication, usually occurring between 2 weeks and 2 months post exposure, although it may not be clinically apparent for several years. Severe injury can cause pyloric stenosis and a small, scarred, immobile stomach.</p> <p>Alkalis often damage the oesophagus. However, ingestion of large volumes can also involve the stomach and small intestines.</p> <p>Ulceration may be sufficiently severe to cause perforation with complications including mediastinitis, pneumonitis and cardiac injury. The depths of the burns are usually much greater with alkalis, and may continue to develop</p>

Route	Signs and symptoms
	<p>some time after exposure.</p> <p>Systemic features following corrosive ingestion may include circulatory collapse, metabolic acidosis, hypoxia, respiratory failure, acute renal failure, severe electrolyte imbalances, haemolysis and disseminated intravascular coagulation (DIC).</p>
Eyes	<p>Pain, blepharospasm, lacrimation, conjunctivitis, oedema and photophobia may occur. Acid and alkaline solutions may cause corneal burns and limbal ischaemia (whitening/blanching around the edge of the cornea where it meets the sclera).</p> <p>Alkaline solutions in particular may penetrate and damage all layers of the eye and should be considered an ophthalmic emergency.</p> <p>Aerosols sprayed directly into the eye may cause corneal damage.</p>
Dermal	<p>Alkali exposures may initially be painless, but can result in extensive tissue damage.</p> <p>Symptoms are more likely to occur following direct contact with solid or liquid corrosive materials although features can also occur through contact with corrosive gases and fumes.</p> <p>Alkalis can directly damage tissue by the saponification of fats and the solubilisation of proteins and collagen. This causes liquefaction burns and necrosis with a softening of the tissues which can further lead to deep tissue penetration and full thickness burns.</p> <p>Dermal alkali injuries may be initially painless, leading to a delay in treatment. Alkali injuries can also progress over several hours and it can be difficult to assess the extent of the resulting burn due to quickly developing skin discolouration. Recurring skin breakdown over extended periods after the initial injury may complicate and delay recovery.</p> <p>Large or prolonged exposure may result in systemic effects.</p>

Reference

National Poisons Information Service (NPIS). TOXBASE '[Ammonium hydroxide](#)' 2022 (viewed on 27 September 2024)

Decontamination at the scene

Chemical specific advice

The approach used for decontamination at the scene will depend upon the incident, location of the casualties and the chemicals involved. Therefore, a risk assessment should be conducted to decide on the most appropriate method of decontamination.

Anhydrous ammonia (liquid or gas) reacts with tissue moisture to form corrosive ammonium hydroxide solution. Following disrobe, improvised wet decontamination should be considered.

People who are processed through improvised decontamination should subsequently be moved to a safe location, triaged and subject to health and scientific advice. Based on the outcome of the assessment, they may require further decontamination.

Emergency services and public health professionals can obtain further advice from the UK Health Security Agency (UKHSA) Radiation, Chemicals and Environment Directorate using the 24-hour chemical hotline number: 0344 892 0555.

Disrobe

The disrobe process is highly effective at reducing exposure to HAZMAT/CBRN material when performed within 15 minutes of exposure.

Therefore, disrobe must be considered the primary action following evacuation from a contaminated area.

Where possible, disrobing should be conducted at the scene and by the casualty themselves. Disrobing should be systematic to prevent transfer of contaminant from clothing to skin. Clothing should not be pulled over the head if possible.

Clothing stuck to the casualty by the contaminant should not be forcefully removed, as this risks causing further harm.

Consideration should be given to ensuring the welfare and dignity of casualties as far as possible. Immediately after decontamination the opportunity should be provided to dry and dress in clean robes or clothes.

Improvised decontamination

Improvised decontamination is an immediate method of decontamination prior to the use of specialised resources. This should be performed on all contaminated casualties unless medical advice is received to the contrary. Improvised dry decontamination should be considered for an incident involving chemicals unless the agent appears to be corrosive or caustic.

Unprotected first responders and members of the public should not approach casualties incapacitated by exposure to administer improvised decontamination, as they may be exposed to contaminants and become a casualty themselves.

Important note: Improvised decontamination should continue until more structured interventions such as Interim or Specialist Operational Response are present.

Improvised dry decontamination

Any available dry absorbent material can be used such as kitchen towel, paper tissues (for example blue roll) and clean cloth.

Exposed skin surfaces should be blotted first and then rubbed, starting with the face, head, and neck, and moving down and away from the body.

Blotting and rubbing should not be too aggressive, as it could drive contamination further into the skin.

Casualties should also blow their nose to remove contaminants from the nasal cavities.

All waste material arising from decontamination should be left in situ, and ideally bagged, for disposal at a later stage.

Improvised wet decontamination

Wet decontamination should be used if contamination with a caustic chemical substance is suspected.

Water should only be used for decontamination where casualty signs and symptoms are consistent with exposure to caustic or corrosive substances such as acids or alkalis.

Wet decontamination may be performed using copious amounts of water from any available source such as taps, showers, water bottles, fixed installation hose-reels and sprinklers to gently rinse the affected skin. Other natural sources of water may be considered unless this creates greater risks to the individuals affected. Wet wipes or baby wipes may be used as an effective alternative.

Improvised decontamination should not involve overly aggressive methods to remove contamination as this could further damage affected tissues and drive the contamination further into the skin.

Where appropriate, seek professional advice on how to dispose of contaminated water and prevent run-off going into the water system.

Additional notes

Following improvised decontamination, remain cautious and observe for signs and symptoms in the decontaminated person and in unprotected staff.

If water is used to decontaminate casualties this may be contaminated, and therefore hazardous, and a potential source of further contamination spread.

All materials (paper tissues and so on) used in this process may also be contaminated and, where possible, should not be used on new casualties.

The risk from hypothermia should be considered when disrobe and any form of wet decontamination is carried out.

People who are contaminated should not eat, drink or smoke before or during the decontamination process and should avoid touching their face.

When vulnerable people are affected by a hazardous substance, they may need additional support to remove themselves, their clothing or the substance.

Casualties should remain in the area and should not leave to seek care at a hospital, as this presents a contamination risk. Further care will be administered on site by the appropriate emergency services.

Interim wet decontamination

Interim decontamination is the use of standard Fire and Rescue Service equipment to provide a planned and structured decontamination process prior to the availability of purpose-designed decontamination equipment.

Decontamination at the scene references

Home Office. '[Initial operational response to a CBRN incident.](#)' Version 2.0 2015 (viewed on 27 September 2024)

National Health Service England. '[Emergency Preparedness, Resilience and Response \(EPRR\): Guidance for the initial management of self-presenters from incidents involving hazardous materials.](#)' 2019 (viewed on 27 September 2024)

Joint Emergency Service Interoperability Programme. '[Initial Operational Response IOR to Incidents Suspected to Involve Hazardous Substances or CBRN Materials](#)' 2024 (viewed on 27 September 2024)

Clinical decontamination and first aid

Clinical decontamination is the process where trained healthcare professionals, using purpose-designed decontamination equipment, treat contaminated persons individually.

[Detailed information on clinical management](#) can be found on TOXBASE.

Important notes

The area should be well ventilated. anhydrous ammonia (liquid or gas) reacts with tissue water to form the strongly alkaline solution, ammonium hydroxide.

Alkaline solutions in particular may penetrate and damage all layers of the eye and should be considered an ophthalmic emergency.

Once body surface contaminants have been removed or if your patient was exposed by ingestion or inhalation, the risk that secondary care givers may become contaminated is very low. Secondary carers should wear standard hospital PPE as a precaution against secondary contamination from vomit and body fluids.

If the patient has not been decontaminated following surface contamination, secondary carers must wear appropriate NHS PPE for chemical exposure to avoid contaminating themselves.

For comprehensive clinical advice consult [TOXBASE](#) directly.

Clinical decontamination following surface contamination

Carry out decontamination after resuscitation.

This should be performed in a well-ventilated area, preferably with its own ventilation system.

Avoid contaminating yourself with this product.

Contaminated clothing should be removed, double-bagged, sealed and stored safely.

Decontaminate open wounds first and avoid contamination of unexposed skin.

Any particulate matter adherent to skin should be removed and the patient washed with copious amounts of water under low pressure for at least 10 to 15 minutes, or until pH of skin is normal (pH of the skin is 4.5-6 although it may be closer to 7 in children, or after irrigation).

Pay particular attention to skin folds, fingernails and ears.

The earlier irrigation begins, the greater the benefit.

Dermal exposure

Decontaminate (as above) the patient following surface contamination.

Following decontamination, recheck the pH of affected areas after a period of 15–20 minutes and repeat irrigation if abnormal. Burns with strong solutions may require irrigation for several hours or more.

Attention should be paid to avoiding hypothermia during prolonged irrigation with cool fluids.

Once the pH is normal and stabilised, treat as for a thermal injury.

Burns totalling more than 15% of body surface area in adults (more than 10% in children) will require standard fluid resuscitation as for thermal burns.

Moderate/severe chemical burns should be reviewed by a burns specialist; excision or skin grafting may be required.

Note alkalis in particular may penetrate deeply within a few minutes.

Other supportive measures as indicated by the patient's clinical condition.

Ocular exposure

Remove contact lenses if present.

Anaesthetise the eye with a topical local anaesthetic (for example, oxybuprocaine, amethocaine or similar). However, do not delay irrigation if local anaesthetic is not immediately available.

Immediately irrigate the affected eye thoroughly with 1,000 mL 0.9% saline (e.g. by an infusion bag with a giving set) for a minimum of 10 to 15 minutes irrespective of initial conjunctival pH.

Amphoteric solutions are available and may be used. A Morgan Lens may be used if anaesthetic has been given. Aim for a neutral conjunctival pH of 7 to 7.2. The conjunctivae may be tested with indicator paper. Retest 15 to 30 minutes after irrigation and use further irrigation if necessary

Repeated instillation of local anaesthetics may reduce discomfort and help more thorough decontamination; however, prolonged use of concentrated local anaesthetics is damaging to the cornea

Any particles lodged in the conjunctival recesses should be removed.

Repeated instillation of local anaesthetics may reduce discomfort and help more thorough decontamination. However, prolonged use of concentrated local anaesthetics is damaging to the cornea.

Patients with corneal damage, those who have been exposed to strong acids or alkalis and those whose symptoms do not resolve rapidly should be discussed urgently with an ophthalmologist.

Other supportive measures as indicated by the patient's clinical condition.

Ingestion

Maintain airway and establish haemodynamic stability.

In severely affected patients especially those with tachypnoea, stridor or upper airway damage, critical care input is essential. A supraglottic-epiglottic burn with erythema and oedema is usually a sign that further oedema will occur that may lead to airway obstruction.

Children are at increased risk of airway obstruction and treating clinicians should have a low threshold for establishing a protected airway.

Do not attempt gastric lavage.

Do not give neutralising chemicals as heat produced during neutralisation reactions may increase injury.

Monitor vital signs and cardiac rhythm; check the capillary blood glucose.

Monitor blood pressure, pulse and oxygen saturation.

Consider the use of water or milk (maximum initial volume = 100 to 200mL in an adult; 2mL/kg in a child) as diluents for symptomatic benefit early after corrosive ingestion provided the patient does not have swallowing or breathing problems (but caution is necessary following large ingestions where mucosal damage or perforation may have already developed). There is experimental evidence to suggest that early dilution therapy with water or milk reduces acute

alkali injury of the oesophagus but administration of large volumes of fluid should be avoided as they may induce vomiting and increase the risk of oedema.

Perform 12 lead ECG in all patients that require assessment.

Other supportive measures as indicated by the patient's condition.

Inhalation

Maintain a clear airway and adequate ventilation

Give oxygen if required

If appropriate, remove from exposure and decontaminate patient.

In severely affected patients, especially those with tachypnoea, stridor or upper airway damage, critical care input is essential with urgent assessment of the airway. A supraglottic-epiglottic burn with erythema and oedema is usually a sign that further oedema will occur that may lead to airway obstruction

Children are at increased risk of airway obstruction and treating clinicians should have a low threshold for establishing a protected airway.

Monitor respiratory rate and oxygen saturation

Perform a 12 lead ECG in all patient who require assessment

Other supportive measures as indicated by the patient's clinical condition

Clinical decontamination and first aid references

National Poisons Information Service (NPIS) TOXBASE '[Ammonium hydroxide](#)' (viewed 27 September 2024)

National Poisons Information Service (NPIS) TOXBASE 'Chemicals splashed or sprayed into the eyes – Features and clinical management' (January 2020)

National Poisons Information Service (NPIS) TOXBASE 'Skin decontamination – corrosives' (January 2020)

National Poisons Information Service (NPIS) TOXBASE 'Corrosives – ingestion' (June 2022)

National Poisons Information Service (NPIS) TOXBASE 'Corrosives – inhalation'
(January 2020)

About the UK Health Security Agency

UKHSA is responsible for protecting every member of every community from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats. We provide intellectual, scientific and operational leadership at national and local level, as well as on the global stage, to make the nation health secure.

UKHSA is an executive agency, sponsored by the [Department of Health and Social Care](#).

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