



Nitric Acid

Incident Management

Key Points

Fire

- non-flammable, but may ignite other flammable materials
- strong oxidant that reacts violently with combustible and reducing materials including turpentine, charcoal and alcohol
- emits toxic fumes of nitrogen oxides when heated to decomposition
- in the event of a fire involving nitric acid, use fine water spray and gas tight chemical protective clothing with breathing apparatus

Health

- inhalation causes irritation of the eyes and nose, with sore throat, cough, chest tightness, headache, fever, wheeze, tachycardia and confusion
- in serious cases, corrosive damage to the mucous membranes of both the upper and lower respiratory tract occurs
- ingestion causes immediate pain, with burning in the mouth, throat and stomach
- acids may cause pain, blistering, ulceration and penetrating necrosis
- large or prolonged exposure may result in systemic effects
- ocular exposure causes pain, blepharospasm, lacrimation, conjunctivitis, palpebral oedema and photophobia



Environment

- avoid release to the environment; inform the Environment Agency of substantial incidents where appropriate

Hazard Identification

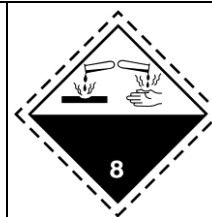
Standard (UK) dangerous goods emergency action codes

Nitrating acid mixture with more than 50 % nitric acid, packaging group I



UN		1796	Nitrating acid mixture with more than 50 % nitric acid, packaging group I	
		2031	Nitric acid, other than red fuming, with more than 70% nitric acid	
EAC		2P	Use fine water spray. Wear chemical protective clothing with liquid-tight connections for whole body in combination with breathing apparatus*. Danger that the substance can be violently or explosively reactive. Spillages and decontamination run-off may be washed to drains with large quantities of water. Due care must, however, still be exercised to avoid unnecessary pollution to watercourses	
APP		B	Gas-tight chemical protective suit in combination with breathing apparatus†	
Hazards	Class	8	Corrosive substance	
	Sub-risks	5.1	Oxidising substances	
HIN		885	Highly corrosive substance, oxidising (fire-intensifying)	
<p>UN – United Nations number, EAC – emergency action code, APP – additional personal protection, HIN – hazard identification number</p> <p>* 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</p> <p>† Chemical protective clothing should be gas-tight conforming to BS EN 943 part 2 in combination with breathing apparatus conforming to BS EN 137</p> <p>Reference</p> <p>Dangerous Goods Emergency Action Code List, National Chemical Emergency Centre (NCEC) Part of Ricardo-AEA. The Stationery Office, 2017.</p>				

Nitrating acid mixture with not more than 50 % nitric acid, packaging group II


UN		1796	Nitrating acid mixture with not more than 50 % nitric acid, packaging group II
		2031	Nitric acid, other than red fuming, with less than 65% nitric acid
EAC		2R	Use fine water spray. Wear chemical protective clothing with liquid-tight connections for whole body in combination with breathing apparatus*. Spillages and decontamination run-off may be washed to drains with large quantities of water, though care must, still be taken to avoid unnecessary pollution to surface and groundwaters
APP		–	–
Hazards	Class	8	Corrosive substance
	Sub-risks	–	–
HIN		80	Corrosive or slightly corrosive substance
<p>UN – United Nations number, EAC – emergency action code, APP – additional personal protection, HIN – hazard identification number</p> <p>* Chemical protective clothing with liquid tight connections for whole body (type 3) conforming to relevant standards such as BS 8428 or EN 14605, in combination with breathing apparatus BS EN137</p> <p>Reference</p> <p>Dangerous Goods Emergency Action Code List, National Chemical Emergency Centre (NCEC) Part of Ricardo-AEA. The Stationery Office, 2017.</p>			





Nitrating acid mixture, spent, with more than 50 % nitric acid, packaging group I

UN		1826	Nitrating acid mixture, spent, with more than 50 % nitric acid, packaging group I	
EAC		2W	Use fine water spray. Wear chemical protective clothing with liquid-tight connections for whole body in combination with breathing apparatus*. Danger that the substance can be violently or explosively reactive. Spillages and decontamination run-off should be prevented from entering drains and surface and groundwaters	
APP		B	Gas-tight chemical protective suit in combination with breathing apparatus†	
Hazards	Class	8	Corrosive substance	
	Sub-risks	5.1	Oxidising substances	
HIN		885	Highly corrosive substance, oxidising (fire-intensifying)	
<p>UN – United Nations number, EAC – emergency action code, APP – additional personal protection, HIN – hazard identification number</p> <p>* Chemical protective clothing with liquid tight connections for whole body (type 3) conforming to relevant standards such as BS 8428 or EN 14605, in combination with breathing apparatus BS EN137</p> <p>† Chemical protective clothing should be gas-tight conforming to BS EN 943 part 2 in combination with breathing apparatus conforming to BS EN 137</p> <p>Reference</p> <p>Dangerous Goods Emergency Action Code List, National Chemical Emergency Centre (NCEC) Part of Ricardo-AEA. The Stationery Office, 2017.</p>				




Nitrating acid mixture, spent, with not more than 50 % nitric acid, packaging group II

UN		1826	Nitrating acid mixture, spent, with not more than 50 % nitric acid, packaging group II	
EAC		2X	Use fine water spray. Wear chemical protective clothing with liquid-tight connections for whole body in combination with breathing apparatus*. Spillages and decontamination run-off should be prevented from entering drains and watercourses	
APP		–	–	
Hazards	Class	8	Corrosive substance	
	Sub-risks	–	–	
HIN		80	Corrosive or slightly corrosive substance	
<p>UN – United Nations number, EAC – emergency action code, APP – additional personal protection, HIN – hazard identification number</p> <p>* 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</p> <p>Reference</p> <p>Dangerous Goods Emergency Action Code List, National Chemical Emergency Centre (NCEC) Part of Ricardo-AEA. The Stationery Office, 2017.</p>				

kNitric acid, other than red fuming, with at least 65% but not more than 70% nitric acid

UN		2031	Nitric acid, other than red fuming, with at least 65% but not more than 70% nitric acid	
EAC		2R	Use fine water spray. Wear chemical protective clothing with liquid-tight connections for whole body in combination with breathing apparatus*. Spillages and decontamination run-off may be washed to drains with large quantities of water, though care must, still be taken to avoid unnecessary pollution to surface and groundwaters	
APP		-	-	
Hazards	Class	8	Corrosive substance	
	Sub-risks	5.1	Oxidising substances	
HIN		85	Corrosive or slightly corrosive substance, oxidising (fire-intensifying)	
<p>UN – United Nations number, EAC – emergency action code, APP – additional personal protection, HIN – hazard identification number</p> <p>* Chemical protective clothing with liquid tight connections for whole body (type 3) conforming to relevant standards such as BS 8428 or EN 14605, in combination with breathing apparatus BS EN137</p> <p>Reference Dangerous Goods Emergency Action Code List, National Chemical Emergency Centre (NCEC) Part of Ricardo-AEA. The Stationery Office, 2017.</p>				

Nitric acid, red fuming

UN		2031	Nitric acid, red fuming	
EAC		2PE	Use fine water spray. Wear chemical protective clothing with liquid-tight connections for whole body in combination with breathing apparatus*. Danger that the substance can be violently or explosively reactive. Spillages and decontamination run-off may be washed to drains with large quantities of water. Due care must, however, still be exercised to avoid unnecessary pollution to watercourses. There may be a public safety hazard outside the immediate area of the incident [†]	
APP		B	Gas-tight chemical protective suit in combination with breathing apparatus [‡]	
Hazards	Class	8	Corrosive substance	
	Sub-risks	5.1	Oxidising substances	
		6.1	Toxic substances	
HIN		856	Highly corrosive substance, oxidising (fire-intensifying)	

UN – United Nations number, EAC – emergency action code, APP – additional personal protection, HIN – hazard identification number

* 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



[†] People should stay indoors with windows and doors closed, ignition sources should be eliminated and ventilation stopped. Non-essential personnel should move at least 250 m away from the incident

[‡] 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

Dangerous Goods Emergency Action Code List, National Chemical Emergency Centre (NCEC) Part of Ricardo-AEA. The Stationery Office, 2017.

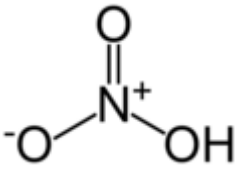
Classification, labelling and packaging (CLP)***Nitric acid ...%**

Hazard class and category	Ox. Liq. 2	Oxidizing liquid, category 2	
	Skin Corr. 1A	Skin corrosion, category 1A	
Hazard statement	H272	May intensify fire; oxidiser	
	H314	Causes severe skin burns and eye damage	
Supplementary Hazard Statement Code	EUH071	Corrosive to the respiratory tract	
Signal words	DANGER		
* Implemented in the EU on 20 January 2009			
Reference			
European Commission. Harmonised classification – Annexe VI to Regulation (EC) No. 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures. http://echa.europa.eu/information-on-chemicals/cl-inventory-database (accessed 05/2017).			

Specific concentration limits

Concentration	Hazard class and category	Hazard statement	
5 % ≤ C < 20 %	Skin Corr. 1B	H314	Causes severe skin burns and eye damage
65 % ≤ C < 99%	Ox. Liq. 3	H272	May intensify fire; oxidiser
C ≥ 99%	Ox. Liq. 2	H272	May intensify fire; oxidiser
C ≥ 20 %	Skin Corr. 1A	H314	Causes severe skin burns and eye damage
Reference			
European Commission. Harmonised classification – Annexe VI to Regulation (EC) No. 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures. http://echa.europa.eu/information-on-chemicals/cl-inventory-database (accessed 05/2017).			

Physicochemical Properties

CAS number	7697-37-2
Molecular weight	63
Formula	HNO ₃
Common synonyms	Hydrogen nitrate
State at room temperature	Liquid
Volatility	Vapour pressure: 63.1 mmHg at 25°C
Specific gravity Vapour density	1.5 at 20°C (water = 1) 2.2 (air = 1)
Flammability	Non-flammable, but may enhance the combustion of other substances
Lower explosive limit	Not applicable
Upper explosive limit	Not applicable
Water solubility	Soluble in water
Reactivity	Strong oxidant that reacts violently with combustible and reducing materials including turpentine, charcoal and alcohol. Reacts violently with bases and is corrosive to most metals, wood, paper and cloth. Also reacts violently with organic compounds.
Reaction or degradation products	Emits toxic fumes of nitrogen oxides when heated to decomposition.
Odour	Characteristic choking odour
Structure	
References	<p>Hazardous Substances Data Bank. Nitric acid No. 1665 (last revision date 14/02/2012). US National Library of Medicine: Bethesda MD. http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB (accessed 01/2017)</p> <p>International Programme on Chemical Safety. International Chemical Safety Card entry for Nitric acid. ICSC 0183, 2006. World Health Organization: Geneva.</p> <p>Nitric acid (HAZARDTEXT™ Hazard Management). In Klasco RK (Ed): TOMES® System, Truven Healthcare Analytics Inc, Greenwood Village CO, US. RightAnswer.com Inc, Midland MI, US. http://www.rightanswerknowledge.com (accessed 01/2017).</p>

Reported Effect Levels from Authoritative Sources

Exposure by ingestion

mg/kg	Signs and symptoms	Reference
430	Lethal dose	a
%		
20-30	Corrosion injury reported	a
<p>These values give an indication of levels of exposure that can cause adverse effects. They are not health protective standards or guideline values</p> <p>References</p> <p>a Bundesinstitut für Risikobewertung (BfR), Health risks of nitric acid-containing cleaning products, 2010.</p>		

Exposure by inhalation

ppm	mg/m ³	Signs and symptoms	Reference
2-25	5.16-64.5	mucous membrane irritation and pneumonitis (8 hours)	a
100	258	Immediately dangerous to life and health	a
<p>These values give an indication of levels of exposure that can cause adverse effects. They are not health protective standards or guideline values</p> <p>References</p> <p>a European Commission Committee for Risk Assessment (RAC), Annex 1- Background document to RAC opinion on nitric acid, 2013.</p>			

Published Emergency Response Guidelines

Emergency response planning guideline (ERPG) values

White fuming nitric acid

	Listed value (ppm)	Calculated value (mg/m ³)
ERPG-1*	1 ⁽¹⁾	2.58
ERPG-2 [†]	10	25.8
ERPG-3 [‡]	78	201

* Maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined, objectionable odour

† Maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action

‡ Maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects

(1) Odour should be detectable near ERPG-1

Reference
American Industrial Hygiene Association (AIHA). 2016 Emergency Response Planning Guideline Values. <https://www.aiha.org/get-involved/AIHAGuidelineFoundation/EmergencyResponsePlanningGuidelines/Documents/2016%20ERPG%20Table.pdf>

Acute exposure guideline levels (AEGs)

	ppm				
	10 min	30 min	60 min	4 hours	8 hours
AEGL-1*	0.16	0.16	0.16	0.16	0.16
AEGL-2 [†]	43	30	24	6.0	3.0
AEGL-3 [‡]	170	120	92	23	11

* Level of the chemical in air at or above which the general population could experience notable discomfort

† 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

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

Reference
US Environmental Protection Agency. Acute Exposure Guideline Levels. <http://www.epa.gov/oppt/aegl/pubs/chemlist.htm> (accessed 05/2017).

Exposure Standards, Guidelines or Regulations

Occupational standards

	LTEL (8-hour reference period)		STEL (15-min reference period)	
	ppm	mg/m ³	ppm	mg/m ³
WEL	-	-	1	2.6
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, 2 nd Edition, 2011.				

Public health guidelines

Drinking water standard WHO guideline value	Guideline value not given
Air quality guideline	Guideline value not given
Soil guideline values and health criteria values	Guideline value not given

Health Effects

Major route of exposure

- Corrosive by inhalation, ingestion, eye contact and skin contact

Immediate signs or symptoms of acute exposure

Route	Signs and symptoms
Inhalation	<p>Inhalation causes irritation of the 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. Severe inhalation injuries may result in persistent hoarseness, pulmonary fibrosis and chronic obstructive airway disease</p> <p>Prolonged exposure may result in systemic effects.</p>
Ingestion	<p>Ingestion causes 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>Acids tend to damage the stomach, with ulceration, gangrene, haemorrhage and perforation. However, in severe cases extensive areas of the gastrointestinal tract may be involved. Gastric or oesophageal perforation may occur in the early stages of severe cases. Severe injury can cause pyloric stenosis and a small, scarred, immobile stomach</p> <p>Systemic features may include circulatory collapse, metabolic acidosis, hypoxia, respiratory failure, acute renal failure, haemolysis and disseminated intravascular coagulation (DIC)</p>

Dermal	<p>Symptoms are more likely to occur following direct contact with solid or liquid corrosive materials although features can also occur via contact with corrosive gases or fumes.</p> <p>Acids may cause pain, blistering, ulceration and penetrating necrosis. Coagulation burns may develop, which can be self-limiting and superficial with the destruction of the surface epithelium and sub-mucosa forming a leathery crust which limits the spread of the product.</p> <p>Large or prolonged exposure may result in systemic effects</p>
Ocular	<p>Ocular exposure causes pain, blepharospasm, lacrimation, conjunctivitis, palpebral oedema and photophobia</p>
Reference TOXBASE. Nitric acid, 12/2014. http://www.toxbase.org (accessed 05/2017). TOXBASE. Corrosives – inhalation, 05/2017. http://www.toxbase.org (accessed 05/2017). TOXBASE. Corrosives – ingestion, 06/2016. http://www.toxbase.org (accessed 05/2017). TOXBASE. Skin decontamination – corrosives, 05/2017. http://www.toxbase.org (accessed 05/2017).	

Decontamination at the Scene

Summary

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.

Nitric acid is highly corrosive. Therefore, following disrobe, improvised wet decontamination should be considered (see below for details on wet decontamination).

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 Public Health England (Centre for Radiation, Chemical and Environmental Hazards) 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, disrobe at the scene should be conducted by the casualty themselves and should be systematic to avoid transferring any contamination from clothing to the skin. Consideration should be given to ensuring the welfare and dignity of casualties as far as possible.

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**.

Improvised dry decontamination

- any available dry absorbent material can be used such as kitchen towel, paper tissues (eg blue roll) and clean cloth
- exposed skin surfaces should be blotted and rubbed, starting with the face, head and neck and moving down and away from the body

- rubbing and blotting should not be too aggressive, or it could drive contamination further into the skin
- all waste material arising from decontamination should be left in situ, and ideally bagged, for disposal at a later stage

Improvised wet decontamination

- 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 any available source of water such as taps, showers, fixed installation hose-reels and sprinklers
- when using water, it is important to try and limit the duration of decontamination to between 45 and 90 seconds and, ideally, to use a washing aid such as cloth or sponge
- improvised decontamination should not involve overly aggressive methods to remove contamination as this could 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 etc) 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
- 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/clothes

Interim wet decontamination

Interim decontamination is the use of standard fire and rescue service (FRS) equipment to provide a planned and structured decontamination process prior to the availability of purpose-designed decontamination equipment.

Decontamination at the scene references

National Ambulance Resilience Unit. Joint Emergency Services Interoperability Programme (JESIP). Initial operational response to a CBRN incident. Version 1.0, September 2013.

NHS England. Emergency Preparedness, Resilience and Response (EPRR). Chemical incidents: planning for the management of self-presenting patients in healthcare settings. April 2015.

Clinical Decontamination and First Aid

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

Detailed information on clinical management can be found on TOXBASE – www.toxbase.org.

Important note

- if the patient has not been decontaminated following surface contamination, secondary carers must wear appropriate NHS PPE for chemical exposure to avoid contaminating themselves. The area should be well ventilated

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
- do **not** apply neutralising chemicals as heat produced during neutralisation reactions may cause thermal burns, and increase injury
- 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 10–15 minutes, or until the pH of the skin is normal (pH of the skin is 4.5–6, although it may be closer to 7 in children, or after irrigation). **The earlier irrigation begins, the greater the benefit**
- pay particular attention to mucous membranes, moist areas such as skin folds, fingernails and ears

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
- 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
- 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 (eg 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 (eg by an infusion bag with a giving set). A Morgan Lens may be used if anaesthetic has been given. Irrigate for 10–15 minutes irrespective of initial conjunctival pH. Aim for a final conjunctival pH of 7.5–8.0. The conjunctivae may be tested with indicator paper. Retest 20 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
- **patients with corneal damage, those who have been exposed to strong acids or alkalis and those whose symptoms do not resolve rapidly should be referred urgently to an ophthalmologist**
- other supportive measures as indicated by the patient's clinical condition

Inhalation

- maintain a clear airway and ensure adequate ventilation
- give oxygen if required
- perform a 12-lead ECG in all patients who require assessment
- other supportive measures as indicated by the patient's clinical condition

Ingestion

- **maintain airway and establish haemodynamic stability**
- **in severely affected patients critical care input is essential. Urgent assessment of the airway is required. A supraglottic-epiglottic burn with erythema and oedema is usually a sign that further oedema will occur that may lead to airway obstruction**
- do **not** attempt gastric lavage
- do **not** give neutralising chemicals as heat produced during neutralisation reactions may increase injury
- the use of water or milk (maximum initial volume = 100 - 200 mL in an adult; 2 mL/kg in a child) as diluents in the management of corrosive ingestion may be of some symptomatic benefit (**but caution is necessary following large ingestions where mucosal damage / 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

- monitor blood pressure, pulse and oxygen saturation
- perform a 12 lead ECG
- other supportive measures as indicated by the patient's condition

Health effects and decontamination references

TOXBASE	http://www.toxbase.org (accessed 05/2017)
TOXBASE	Nitric acid, 12/2014
TOXBASE	Corrosives – inhalation, 05/2017
TOXBASE	Corrosives – ingestion, 06/2016
TOXBASE	Skin decontamination – corrosives, 05/2017
TOXBASE	Chemicals splashed or sprayed into the eyes, 02/2014

This document from the PHE Centre for Radiation, Chemical and Environmental Hazards reflects understanding and evaluation of the current scientific evidence as presented and referenced here.

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