



UK Health
Security
Agency

n-Hexane

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

n-Hexane is highly flammable and reacts with strong oxidants, causing a fire and explosion hazard. It can attack some plastics, rubber and coatings and emits acrid smoke and fumes when heated to decomposition.

Health

The major routes of exposure to n-hexane are inhalation, ingestion, and skin contact.

Inhalation may cause asphyxia, bronchospasm, and pulmonary oedema. Aspiration into the lungs causes pneumonitis or acute lung injury. Wheezing, breathlessness, and fever may occur.

Ingestion may cause gastrointestinal upset and occasionally diarrhoea.

Eye exposure can cause pain, watering and photophobia.

Skin exposure can cause irritation; drying and cracking due to defatting action may occur. Prolonged contact can cause blistering, dermatitis and burns.

Casualty decontamination at the scene

Following disrobe, improvised dry decontamination should be considered for an incident involving n-Hexane, unless casualties are demonstrating signs or symptoms of exposure to caustic or corrosive substances.

Environment

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

Spillages, contaminated fire and decontamination run-off should be prevented from entering drains and surface and groundwaters.

Hazard identification

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

UN		1208	Hexanes	
EAC		3YE	<p>Use normal foam: protein-based foam that is not alcohol resistant. Wear normal fire kit in combination with breathing apparatus [note 1].</p> <p>Danger that the substance can be violently or explosively reactive.</p> <p>Spillages, contaminated fire, and decontamination run-off should be prevented from entering drains and surface and groundwaters.</p> <p>There may be a public safety hazard outside the immediate area of the incident [note 2].</p>	
APP		-	-	
Hazards	Class	3	Flammable liquids and desensitised liquid explosives	
	Sub-risks	-	-	
HIN		33	Highly flammable liquid (flash-point below 23°C)	

Abbreviations

UN = United Nations number.

EAC = emergency action code.

APP = additional personal protection.

HIN = hazard identification number.

Notes to Table 1

Note 1: Normal firefighting clothing is appropriate: self-contained open circuit positive pressure compressed air breathing apparatus conforming to BS EN 137 worn in combination with fire kit conforming to BS EN 469, fire fighters' gloves conforming to BS EN 659 and firefighters' footwear conforming to BS EN 15090 (Footwear for firefighters) type F3- Hazmat and structural firefighting [CH - marking for chemical resistance] or alternatively firefighters' boots conforming to Home Office Specification A29 (rubber boots) or A30 (leather boots). Leather footwear including those conforming to A30 may not provide adequate chemical resistance therefore caution should be exercised in the use of these boots.

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.

References

National Chemical Emergency Centre (NCEC), part of Ricardo-AEA. '[Dangerous Goods Emergency Action Code List](#)'. 2025 (viewed on 03 February 2025)

Table 2. The GB classification, labelling and packaging (CLP) regulation for n-Hexane

Hazard class and category	Flam. Liq. 2	Flammable liquid, category 2	
	Repr. 2	Reproductive toxicity, category 2	
	Asp. Tox. 1	Aspiration hazard, category 1	
	STOT RE 2	Specific target organ toxicity following repeated exposure, category 2	
	Skin Irrit. 2	Skin irritation, category 2	

	STOT SE 3	Specific target organ toxicity following single exposure, category 3	
	Aquatic Chronic 2	Chronic hazard to the aquatic environment, category 2	
Hazard statement	H225	Highly flammable liquid and vapour	
	H361f	Suspected of damaging fertility	
	H304	May be fatal if swallowed and enters airways	
	H373	May cause damage to organs through prolonged or repeated exposure	
	H315	Causes skin irritation	
	H336	May cause drowsiness or dizziness	
	H411	Toxic to aquatic life with long-lasting effects	
Signal words	DANGER		

Table 2b. Specific concentration limits for n-Hexane

Concentration	Hazard class and category	Hazard statement	
C ≥ 5%	STOT RE 2	H373	May cause damage to organs through prolonged or repeated exposure

References

The Health and Safety Executive (HSE). '[GB CLP Regulation](#)' (viewed on 04 February 2025)

Physicochemical properties

Table 3. Physicochemical properties

CAS number	110-54-3
Molecular weight	86.2
Formula	C ₆ H ₁₄
Common synonyms	Hexane, hexyl hydride, dipropyl
State at room temperature	Colourless liquid
Volatility	120 mmHg at 20°C
Specific gravity	0.66 at 20°C (water = 1)
Vapour density	3 (air = 1)
Flammability	Highly flammable
Lower explosive limit	1.1%
Upper explosive limit	7.5%
Water solubility	Insoluble
Reactivity	Easily ignited by heat, spark, or flames. Vapours may form explosive mixtures with air. Vapours are heavier than air and may travel along the ground. It is possible for vapours to ignite from a distance. Reacts with strong oxidants causing a fire and explosion hazard. Attacks some plastics, rubber and coatings.
Odour	Gasoline/petrol like odour
Structure	

References

World Health Organization. International Programme on Chemical Safety '[International Chemical Safety Card entry for n-Hexane](#)' ICSC 0279, 2024 (viewed on 03 February 2025)

PubChem. Bethesda (MD): National Library of Medicine (US), National Center for Biotechnology Information. '[PubChem Compound Summary for CID 8058, n-Hexane](#)' (viewed on 03 February 2025)

Reported effect levels from authoritative sources

Table 4. Exposure by inhalation of vapours

ppm	mg/m ³	Duration	Signs and symptoms	Reference
500	1,760	3-5 minutes	Cough, phlegm and bronchitis	a
1500	5,280	10 minutes	Upper respiratory irritation, nausea and headache	b
5000	17,600	10 minutes	Dizziness, drowsiness, vertigo and giddiness	b, c

Table 5. Dermal exposure

mL	Duration	Signs and symptoms	Reference
1.5	5 minutes	Stinging/burning sensation and transient erythema	c

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. Agency for Toxic Substances and Disease Registry (ATSDR). '[Toxicological Profile for n-Hexane \(Draft for Public Comment\)](#)' 2024 (viewed on 03 February 2025)
- b. International Programme on Chemical Safety (IPCS). '[Hexane, n-. Poisons Information Monograph 368](#)' World Health Organization (WHO) 1990 (viewed on 03 February 2025)
- c. International Programme on Chemical Safety (IPCS). '[Environmental Health Criteria 122, n-Hexane](#)' World Health Organization (WHO) 1991 (viewed on 03 February 2025)

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]	NR	NR	NR	NR	NR
AEGL-2 [note 2]	4,000 [note 4]	2,900 [note 4]	2,900 [note 4]	2,900 [note 4]	2,900 [note 4]
AEGL-3 [note 3]	12,000 [note 6]	8,600 [note 5]	8,600 [note 5]	8,600 [note 5]	8,600 [note 5]

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.

Note 4: This value is greater than 10% of the lower explosive limit of 11,000 ppm. Safety considerations against the hazard(s) of explosion(s) must be taken into account.

Note 5: This value is greater than 50% of the lower explosive limit of 11,000 ppm. Extreme safety considerations against the hazard(s) of explosion(s) must be taken into account.

Note 6: This value is greater than 100% of the lower explosive limit of 11,000 ppm. Extreme safety considerations against the hazard(s) of explosion(s) must be taken into account.

NR = Not reported due to insufficient data

Reference

US Environmental Protection Agency (EPA). '[Acute Exposure Guideline Levels](#)' (viewed on 03 February 2025)

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	20	72	-	-

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 03 February 2025)

Table 8. Public health standards and guidelines

Drinking water standard	No value specified
WHO guideline for drinking water quality	No value specified
UK indoor air quality guideline	No value specified
WHO indoor air quality guideline	No value specified
WHO air quality guideline	No value specified

Health effects

Toxicity will vary depending on the route of exposure. Systemic toxicity most commonly occurs after inhalational exposure however it can also occur after ingestion and prolonged skin contact.

Table 9. Signs or symptoms of acute exposure

Route	Signs and symptoms
Inhalation	<p>Inhalation may result in asphyxia, bronchospasms, pulmonary oedema, acute respiratory distress syndrome (ARDS) and lipid pneumonia.</p> <p>Systemic toxicity can occur after inhalation. Drowsiness which may lead to coma, ataxia, convulsions, cardiac arrhythmias, and respiratory distress. Cardiac arrhythmias (in particular ventricular fibrillation) appear to be due to sensitisation of the myocardium to catecholamines. This may be further precipitated by exercise following exposure. Direct inhalation of aerosols also may cause death due to bradycardia and cardiac arrest from vagal stimulation by rapid chilling of the larynx.</p>
Ingestion	<p>Ingestion can cause gastrointestinal upset. Diarrhoea, gastrointestinal bleeding and damage or perforation is rare.</p> <p>Systemic features include drowsiness leading to coma, ataxia, convulsions, cardiac arrhythmias, and respiratory collapse. Rarely: abnormal LFTs, acute kidney injury, myocarditis, intravascular haemolysis, and disseminated intravascular coagulation.</p>
Aspiration into lungs	<p>Aspiration can occur as a consequence of ingestion and may cause pneumonitis or acute lung injury. Initial features include choking, gasping, coughing and haemoptysis. Signs and symptoms may progress over 24 to 48 hours with wheeze, breathlessness, bronchospasm, hypoxia, fever and leukocytosis. Chest x-ray changes include patchy shadowing and pulmonary oedema (may be delayed for 24 to 72 hours). In severe cases shock and cardiorespiratory arrest can occur.</p>
Eyes	<p>Pain, watering, conjunctivitis, oedema, and photophobia may occur.</p>
Skin	<p>Brief exposure can cause irritation, drying and cracking of the skin.</p> <p>Prolonged exposures may cause transient pain with erythema, blistering, necrosis, partial thickness burns and possibly full thickness burns.</p> <p>Dermatitis may develop after repeated exposures.</p>

Route	Signs and symptoms
	Systemic toxicity may arise but is rare.

References

National Poisons Information Service (NPIS). TOXBASE '[Petroleum distillates - inhalation](#)' 2021 (viewed on 03 February 2025)

National Poisons Information Service (NPIS). TOXBASE '[n-Hexane](#)' 2021 (viewed on 03 February 2025)

National Poisons Information Service (NPIS). TOXBASE '[Chemicals Splashed or Sprayed into the Eyes - features and management](#)' 2021 (viewed on 03 February 2025)

National Poisons Information Service (NPIS). TOXBASE '[Petroleum distillates - skin contact](#)' 2021 (viewed on 03 February 2025)

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.

Following disrobe, improvised dry decontamination should be considered for an incident involving n-hexane unless casualties are demonstrating signs or symptoms of exposure to caustic or corrosive substances.

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, Climate and Environmental Hazards 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 a more structured intervention, such as an Interim Operational Response is conducted, or Specialist Operational Response are present.

Improvised dry decontamination

Improvised dry decontamination should be considered for an incident involving n-hexane unless casualties are demonstrating obvious signs of chemical burns or skin irritation.

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.

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 03 February 2025)

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 03 February 2025)

Joint Emergency Service Interoperability Programme. [‘Initial Operational Response \(IOR\) to Incidents Suspected to Involve Hazardous Substances or CBRN Materials’](#) 2024 (viewed on 03 February 2025)

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

Once body surface contaminants have been removed or if the 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.

The area should be well ventilated.

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

Clinical decontamination following surface contamination

Avoid contaminating yourself.

Carry out decontamination in a well-ventilated area, preferably with its own ventilation system.

The patient should remove soiled clothing and wash him/herself if possible.

Contaminated clothing should be removed, double-bagged, sealed and stored safely to prevent escape of volatile substances.

Decontaminate open wounds first and avoid contamination of unexposed skin. Wash hair and all contaminated skin with liberal amounts of water (preferably warm) and soap.

Pay special attention to skin folds, fingernails, and ears.

Dermal exposure

Decontaminate (as above) the patient following surface contamination.

If features of systemic toxicity are present manage as per ingestion.

Chemical 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.

Cover affected area with a clean non-adherent dressing.

Chemical burns should be reviewed by a burns specialist. Excision or skin grafting may be required.

Carry out other 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 1,000mL 0.9% saline or equivalent crystalloid (for example, by an infusion bag with a giving set) for a minimum of 10 to 15 minutes irrespective of initial conjunctival pH. 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 at 15 to 30 minutes after irrigation and use further irrigation if necessary.

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.

Carry out other supportive measures as indicated by the patient's clinical condition.

Ingestion and Inhalation

Maintain a clear airway and ensure adequate ventilation.

Administer oxygen to achieve adequate oxygenation.

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.

Gastric lavage should not be undertaken due to the increased risk of aspiration.

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

Perform a 12-lead ECG in all patients who require assessment.

Carry out other measures as indicated by the patient's clinical condition.

Clinical decontamination and first aid references

National Poisons Information Service (NPIS). TOXBASE '[n-Hexane](#)' 2021 (viewed on 03 February 2025)

National Poisons Information Service (NPIS). TOXBASE '[Chemicals Splashed or Sprayed into the Eyes - features and management](#)' 2021 (viewed on 03 February 2025)

National Poisons Information Service (NPIS). TOXBASE '[Petroleum distillates - skin contact](#)' 2021 (viewed on 03 February 2025)

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.

This document from the UKHSA Radiation, Chemicals, Climate and Environmental Hazards Directorate reflects understanding and evaluation of the current scientific evidence as presented and referenced here.

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First published: 2016

Update: November 2016 Health Effects, Decontamination at the Scene & Clinical Decontamination and First Aid

Full document update: February 2025

For queries relating to this document, please contact chemcompendium@ukhsa.gov.uk or enquiries@ukhsa.gov.uk

Publishing reference: GOV-18202



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