



UK Health  
Security  
Agency

# Nickel and nickel compounds

## 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

Nickel is a silvery metal at room temperature. It has no odour.

Finely dispersed nickel particles may form explosive mixtures in air. It emits toxic fumes and vapours of nickel carbonyl when heated to decomposition. Highly flammable hydrogen gas is released when nickel undergoes reactions with acids.

## Health

Dyspnoea, pulmonary fibrosis and pulmonary oedema have been reported following inhalation.

Nausea, vomiting, abdominal pain and diarrhoea occur within two hours of significant ingestions. Severe gastrointestinal irritation and kidney injury may follow ingestion of large amounts of nickel.

Skin irritant, sensitised individuals may develop irritation and allergic contact dermatitis.

Also irritating to the eyes; nickel metal may cause mechanical injury as a foreign body.

## Casualty decontamination at the scene



Following disrobe, improvised dry decontamination should be considered for an incident involving nickel or nickel compounds, 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.

## Hazard identification

**Table 1a. Standard (UK) dangerous goods emergency action codes for nickel carbonyl**

<b>UN</b>		1259	Nickel carbonyl	
<b>EAC</b>		2WE	<p>Use fine water spray.</p> <p>Wear chemical protective clothing with liquid-tight connections for whole body 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>	
<b>APP</b>		A(fl)	Fire kit with gas-tight chemical protective suit with breathing apparatus [note 3]. Fire kit intended to protect against flammable liquid	
<b>Hazards</b>	<b>Class</b>	6.1	Toxic substance	
	<b>Sub-risks</b>	3	Flammable liquid	
<b>HIN</b>		663	Highly toxic substance, flammable (flash-point not above 60°C inclusive)	

### Abbreviations

UN = United Nations number.

EAC = emergency action code.

APP = additional personal protection.

HIN = hazard identification number.

### Note to Table 1a

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 250 m away from the incident.

Note 3: Normal fire kit in combination with gas-tight chemical protective clothing conforming to BS EN 943 part 2 in combination with breathing apparatus conforming to BS EN 137.

### References

National Chemical Emergency Centre (NCEC), part of Ricardo-AEA. '[Dangerous Goods Emergency Action Code List](#)'. 2023 (viewed on 18 November 2024)

**Table 1b. Standard (UK) dangerous goods emergency action codes for batteries, nickel-metal hydride**

<b>UN</b>		3496	Batteries, nickel-metal hydride	
<b>EAC</b>		2Y [note 1]	Use fine water spray. Wear normal fire kit in combination with breathing apparatus [note 2]. Danger than the substance can be violently or explosively reactive. Spillages, contaminated fire and decontamination run-off should be prevented from entering drains and surface and groundwaters.	
<b>APP</b>		-	-	
<b>Hazards</b>	<b>Class</b>	9	Miscellaneous dangerous substance and articles	
	<b>Sub-risks</b>	-	-	
<b>HIN</b>		-	-	

### Abbreviations

UN = United Nations number.

EAC = emergency action code.

APP = additional personal protection.

HIN = hazard identification number.

### Note to Table 1b

Note 1: Not applicable to carriage of dangerous goods under the Regulations Concerning the International Carriage of Dangerous




Goods by Rail (RID) or Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR).

Note 2: Normal firefighting clothing is appropriate for example: 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.

### References

National Chemical Emergency Centre (NCEC), part of Ricardo-AEA. '[Dangerous Goods Emergency Action Code List](#)'. 2023 (viewed on 18 November 2024)




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

<b>Hazard class and category</b>	Skin Sens. 1	Skin sensitizer, category 1	
	Carc. 2	Carcinogen, category 2	
	STOT RE 1	Specific target organ systemic toxicity following repeated exposure, category 1	
<b>Hazard statement</b>	H317	May cause an allergic skin reaction	
	H351	Suspected of causing cancer	
	H372	Causes damage to organs through prolonged or repeated exposure	
<b>Signal words</b>	DANGER		

### References

The Health and Safety Executive (HSE). '[GB CLP Regulation](#)' (viewed on 18 November 2024)







**Table 2b. The GB classification, labelling and packaging (CLP) regulation for nickel powder [particle diameter <1mm]**

<b>Hazard class and category</b>	Skin Sens. 1	Skin sensitizer, category 1	
	Carc. 2	Carcinogen, category 2	
	STOT RE 1	Specific target organ systemic toxicity following repeated exposure, category 1	
	Aquatic Chronic 3	Hazardous to the aquatic health, chronic category 3	-
<b>Hazard statement</b>	H317	May cause an allergic skin reaction	
	H351	Suspected of causing cancer	
	H372	Causes damage to organs through prolonged or repeated exposure	
	H412	Harmful to aquatic life with long lasting effects	
<b>Signal words</b>	DANGER		

### References

The Health and Safety Executive (HSE). '[GB CLP Regulation](#)' (viewed on 18 November 2024)

**Table 2c. The GB classification, labelling and packaging (CLP) regulation for tetracarbonylnickel (Nickel carbonyl)**









<b>Hazard class and category</b>	Flam. Liq. 2	Flammable liquid, category 2	
	Acute Tox. 2	Acute toxicity (inhalation), category 2	
	Carc. 2	Carcinogen, category 2	
	Aquatic Acute 1	Hazardous to the aquatic health, acute category 1	
	Aquatic Chronic 1	Hazardous to the aquatic health, chronic category 1	
	Repr. 1B	Reproductive toxicity, category 1B	
<b>Hazard statement</b>	H225	Highly flammable liquid or vapour	
	H330	Fatal if inhaled	
	H351	Suspected of causing cancer	
	H400	Very toxic to aquatic life	
	H410	Very toxic to aquatic life with long lasting effects	
	H360D	May damage the unborn child	
<b>Signal words</b>	Danger		



### References

The Health and Safety Executive (HSE). '[GB CLP Regulation](#)' (viewed on 18 November, 2024)



**Table 2d. The GB classification, labelling and packaging (CLP) regulation for nickel sulphate**

<b>Hazard class and category</b>	Acute Tox. 4	Acute toxicity (inhalation, ingestion), category 4	
	Skin Irrit. 2	Skin irritant, category 2	
	Skin Sens. 1	Skin sensitizer, category 1	
	Resp. Sens. 1	Respiratory sensitizer, category 1	
	Muta. 2	Germ cell mutagen, category 2	
	STOT RE 1	Specific target organ toxicity following repeated exposure, category 1	
	Aquatic Acute 1	Hazardous to the aquatic health, acute category 1	
	Aquatic Chronic 1	Hazardous to the aquatic health, chronic category 1	

	Carc. 1A	Carcinogen, category 1A	
	Repr. 1B	Reproductive toxicity, category 1B	
<b>Hazard statement</b>	H302	Harmful if swallowed	
	H315	Causes skin irritation	
	H317	May cause an allergic skin reaction	
	H332	Harmful if inhaled	
	H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled	
	H341	Suspected of causing genetic defects	
	H372	Causes damage to organs through prolonged or repeated exposure	
	H400	Very toxic to aquatic life	
	H410	Very toxic to aquatic life with long lasting effects	
	H350i	May cause cancer by inhalation	
	H360D	May damage the unborn child	
<b>Signal words</b>	Danger		

### References

The Health and Safety Executive (HSE). '[GB CLP Regulation](#)' (viewed on 18 November, 2024)

**Table 2e. Specific concentration limits for nickel sulphate**

Concentration	Hazard class and category	Hazard statement	
$C \geq 0,01 \%$	Skin Sens. 1	H317	May cause an allergic skin reaction
$C \geq 1 \%$	STOT RE 1	H372	Causes damage to organs through prolonged or repeated exposure
$C \geq 20 \%$	Skin Irrit. 2	H315	Causes skin irritation
$0,1 \% \leq C < 1 \%$	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 18 November 2024)

## Physicochemical properties

Table 3a. Physicochemical properties of nickel

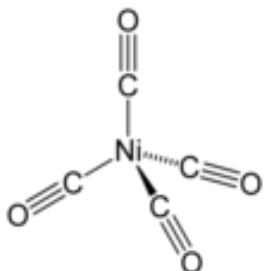
<b>CAS number</b>	7440-02-0
<b>Molecular weight</b>	58.7
<b>Formula</b>	Ni
<b>Common synonyms</b>	-
<b>State at room temperature</b>	Silvery metal
<b>Volatility</b>	1 mm Hg at 1,810°C
<b>Specific gravity</b>	8.9 (water = 1)
<b>Flammability</b>	Flammable as dust
<b>Lower explosive limit</b>	-
<b>Upper explosive limit</b>	-
<b>Water solubility</b>	Insoluble
<b>Reactivity</b>	Finely dispersed particles may form explosive mixtures in air. Reacts violently with acids and strong oxidants.
<b>Reaction or degradation products</b>	Emits toxic fumes and vapours of nickel carbonyl and nickel (II) oxide when heated to decomposition. Highly flammable hydrogen gas is evolved when nickel undergoes reactions with acids.
<b>Odour</b>	Odourless

### References

World Health Organization. International Programme on Chemical Safety. 'International Chemical Safety Card entry for Nickel'. ICSC 0062, 2017. (viewed on 18 November 2024)

PubChem. Bethesda (MD): National Library of Medicine (US), National Center for Biotechnology Information. 'PubChem Compound Summary for CID 935, Nickel' (viewed on 18 November 2024)

**Table 3b. Physicochemical properties of nickel carbonyl**

<b>CAS number</b>	13463-39-3
<b>Molecular weight</b>	170.7
<b>Formula</b>	C <sub>4</sub> NiO <sub>4</sub>
<b>Common synonyms</b>	Nickel tetracarbonyl
<b>State at room temperature</b>	Colourless to yellow liquid
<b>Volatility</b>	400 mm Hg at 25.8°C
<b>Specific gravity</b>	1.3 (water=1)
<b>Vapour density</b>	5.9 (air=1)
<b>Flammability</b>	Flammable
<b>Lower explosive limit</b>	2%
<b>Upper explosive limit</b>	34%
<b>Water solubility</b>	Insoluble in water
<b>Reactivity</b>	May explode on heating above 60°C. The substance may spontaneously ignite on contact with air. Reacts violently with oxidants causing fire and explosion hazard.
<b>Reaction or degradation products</b>	Decomposes on contact with acids to produce carbon monoxide. Oxidises in air forming deposits which become peroxidised causing fire hazard.
<b>Odour</b>	Musty or sooty
<b>Structure</b>	

### References

World Health Organization. International Programme on Chemical Safety.

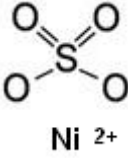
'[International Chemical Safety Card entry for Nickel carbonyl](#)'. ICSC 0064, 2017.

(viewed on 18 November 2024)

PubChem. Bethesda (MD): National Library of Medicine (US), National Center for Biotechnology Information.' [PubChem Compound Summary for CID 26039, Nickel carbonyl](#)'

(viewed on 18 November 2024)

**Table 3c. Physicochemical properties for nickel sulphate**

<b>CAS number</b>	7786-81-7
<b>Molecular weight</b>	154.76
<b>Formula</b>	NiSO <sub>4</sub>
<b>Common synonyms</b>	Nickelous sulphate Nickel(2+) sulphate
<b>State at room temperature</b>	Pale green to yellow crystals
<b>Volatility</b>	-
<b>Specific gravity</b>	3.7 (at 20°C)
<b>Flammability</b>	Non-flammable
<b>Lower explosive limit</b>	-
<b>Upper explosive limit</b>	-
<b>Water solubility</b>	Freely soluble in water
<b>Reactivity</b>	Reacts with oxidants generating fire and explosion hazard
<b>Reaction or degradation products</b>	Emits fumes of sulphur trioxide and nickel monoxide when heated to decomposition. The solution is a weak acid in water
<b>Odour</b>	Odourless
<b>Structure</b>	

### References

World Health Organization. International Programme on Chemical Safety. [International Chemical Safety Card entry for Nickel sulphate. ICSC 0063, 2017.](#) (viewed on 18 November 2024)

PubChem Bethesda (MD): National Library of Medicine (US), National Center for Biotechnology Information. '[PubChem Compound Summary for CID 24586, Nickel sulfate](#)' (viewed on 18 November 2024)

## Reported effect levels from authoritative sources

**Table 4. Exposure by ingestion**

mg/kg	Signs and symptoms	Chemical	Reference
0.014	Dermatitis in nickel sensitive individuals	Nickel sulphate	a
7.1	Vomiting, cramps, diarrhoea, giddiness, headache and weariness.	Nickel sulphate/nickel chloride	a

**Table 5. Exposure by inhalation**

mg/m <sup>3</sup>	Signs and symptoms	Chemical	Reference
382	Alveolar wall damage, pulmonary oedema, tubular necrosis, acute respiratory distress syndrome (ARDS) and death.	Metallic nickel	a

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 Nickel](#)'. 2024 (viewed on 18 November 2024)

## Published emergency response guidelines

**Table 6. Acute exposure guideline levels (AEGLs) for nickel carbonyl**

	Concentration (ppm)				
	10 minutes	30 minutes	60 minutes	4 hours	8 hours
<b>AEGL-1</b> [note 1]	NR	NR	NR	NR	NR
<b>AEGL-2</b> [note 2]	0.10	0.072	0.036	0.0090	0.0045
<b>AEGL-3</b> [note 3]	0.466	0.32	0.16	0.040	0.020

### 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 recommended due to insufficient data

### Reference

US Environmental Protection Agency (EPA) '[Acute Exposure Guideline Levels](#)' (viewed on 18 November 2024)



## Exposure standards, guidelines or regulations

**Table 7. Occupational standards**

WEL	LTEL (8-hour reference period)		STEL (15-min reference period)	
	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
<b>Nickel and its inorganic compounds (except nickel tetracarbonyl): water-soluble nickel compounds (as Ni)</b>	-	0.1	-	-
<b>Nickel and water-insoluble nickel compounds (as Ni)</b>	-	0.5	-	-
<b>Tetracarbonylnickel (as Ni)</b>	-	-	0.1	0.24

### 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 19 November 2024)

**Table 8. Public health standards and guidelines**

<b>Drinking water standard</b>	20 µg/L
<b>WHO guideline for drinking water quality</b>	70 µg/L
<b>UK indoor air quality guideline</b>	No value specified
<b>WHO indoor air quality guideline</b>	No value specified
<b>WHO air quality guideline</b>	No safe level of exposure can be recommended. The estimated unit risk of cancer per 1µg/m <sup>3</sup> air concentration is 3.8 × 10 <sup>-4</sup> . Concentrations corresponding to an excess life time risk of 1: 10000, 1: 100000 and 1: 1000000 are 250, 25 and 2.5 ng/m <sup>3</sup> , respectively.

**Reference**

[The Private Water Supplies \(England\) Regulations \(2016\)](#) and [The Private Water Supplies \(Wales\) Regulations 2017](#) (viewed on 18 November 2024)

[The Water Supply \(Water Quality\) Regulations \(2018\)](#) (Water, England and Wales) (viewed on 18 November 2024)

World Health Organization. [Guidelines for Drinking-water Quality, 4th Edition Incorporating First and Second Addendum](#) 2022 (viewed on 18 November 2024)

WHO Regional Office for Europe. '[Air Quality Guidelines for Europe, European Series, No. 91, 2nd Edition](#)', 2000 (viewed on 18 November 2024)

## Health effects

Nickel metal and inorganic salts are also absorbed by inhalation and sometimes through the skin. Nickel carbonyl is rapidly absorbed and can cause toxicity.

**Table 9a. Signs or symptoms of acute exposure to nickel**

Route	Signs and symptoms
<b>Inhalation</b>	Dyspnoea, pulmonary fibrosis and pulmonary oedema have been reported. In severe cases acute respiratory distress syndrome (ARDS) may occur
<b>Ingestion</b>	Small ingestions of dilute solutions may produce no symptoms. GI upset occurs within two hours in more significant ingestions, possibly associated with headache, fatigue, dizziness and myalgia.  Severe gastrointestinal irritation may follow ingestion of large amounts. Acute kidney injury is likely
<b>Eyes</b>	Irritant to the eyes. Nickel metal may cause mechanical injury as a foreign body.
<b>Dermal</b>	Skin irritant. Sensitised individuals may develop irritation and contact dermatitis with a burning sensation and pruritis followed by erythema. There may be ulceration and eruptions may spread to related areas.

### Reference

National Poisons Information Service (NPIS). TOXBASE. [Nickel and nickel salts](#), 2020 (viewed on 18 November 2024)

**Table 9b. Signs or symptoms of acute exposure to nickel carbonyl**

Route	Signs and symptoms
<b>Inhalation</b>	<p>Immediate – headache, dizziness, respiratory tract irritation, cough, pharyngitis, chest pain, mild and transient dyspnoea, paraesthesia, nausea, vomiting, and abdominal pain. Confusion and convulsions are reported in some cases.</p> <p>Between the immediate and delayed phase there can be a period, between 12 to 72 hours after exposure where the patient is asymptomatic, including in fatal exposures.</p> <p>Delayed – may be up to a week after exposure. Symptoms may initially resemble a flu-like illness. Nausea, diarrhoea, cough, dyspnoea, chest pain, cyanosis, tachycardia , acute kidney injury and pyrexia leading to interstitial pneumonitis, ARDS, and cerebral and pulmonary oedema.</p> <p>Leucocytosis and myalgia may also occur. Myocarditis occurs occasionally. Severe exposures may produce weakness and nonspecific neurological symptoms lasting up to 6 months.</p>
<b>Eyes</b>	Nickel carbonyl can be severely irritating to the eye.

**Reference**

National Poisons Information Service (NPIS). TOXBASE. [Nickel carbonyl](#), 2024 (viewed on 18 November 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.

Following disrobe, improvised dry decontamination should be considered for an incident involving nickel or nickel compounds, 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 nickel and its compounds 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.

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 18 November 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 18 November 2024)

Joint Emergency Service Interoperability Programme. [‘Initial Operational Response IOR to Incidents Suspected to Involve Hazardous Substances or CBRN Materials’](#) 2024 (viewed on 18 November 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

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.

The area should be well ventilated.

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 and wash any exposed area.

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 soap and copious amounts of water under low pressure for at least 10 to 15 minutes.

Pay particular attention to mucous membranes, moist areas such as skin folds, fingernails and ears.

The earlier irrigation begins, the greater the benefit.

## Dermal exposure

Decontaminate (as above) the patient following surface contamination.

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

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

## Ocular exposure

If symptomatic immediately irrigate the affected eye thoroughly.

At home – use lukewarm water, trickled into the eye or in a small cup held over the eye socket. An eye dropper is an alternative.

In hospital - Immediately irrigate the affected eye thoroughly with 1000 mL 0.9% saline or equivalent crystalloid (for example via an infusion bag with a giving set) for a minimum of 10 to 15 minutes. A Morgan Lens may be used if anaesthetic has been given.

If symptoms persist seek medical assistance.

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.

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

Check and record pupil size.

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

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

## Clinical decontamination and first aid references

National Poisons Information Service (NPIS).TOXBASE '[Nickel and Nickel Salts](#)' 2020 (viewed on 18 November 2024)

Compendium of chemical hazards: nickel and nickel compounds

National Poisons Information Service (NPIS). TOXBASE. [Nickel carbonyl](#), 2024 (viewed on 18 November 2024)

National Poisons Information Service (NPIS). TOXBASE '[Eye irritants – features and management](#)' 2022 (viewed on 18 November 2024)

National Poisons Information Service (NPIS). TOXBASE '[Skin decontamination – irritants](#)' 2019 (viewed on 18 November 2024)

# 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 Environment Directorate reflects understanding and evaluation of the current scientific evidence as presented and referenced here.

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