



**Science & Technology**  
Facilities Council

# **COSHH RISK** **ASSESSMENT** **PROCEDURE**

Rev. 1.3, Issued December 2016

# GUIDELINES FOR CHEMICAL RISK ASSESSMENT

The aim of COSHH risk assessment is to identify those substances and activities where there may be exposure to hazardous substances, used or generated, which may damage health.

**Where there is a risk, action must be taken to eliminate exposure by using a non-hazardous alternative or to reduce exposure below the workplace exposure limit.**

Although not specifically part of a COSHH assessment, consideration should be given to the possible environmental impact of the use, accidental spill and disposal of any chemical.

## Activity Based Assessment

The aim is to assess all factors in a way which identifies whether the activity

- a) is safe to operate,
- b) needs better control (such as ventilation) or protection,
- c) is a significant hazard to health to warrant special containment.

To determine how much of the substance people are likely to be exposed to, the procedure follows a five step process similar to general risk assessment:

- 1. list hazardous substances**
- 2. assess hazard to health from substance and who might be exposed**
- 3. determine suitable control measures**
- 4. implement control measures (eliminate, reduce, isolate, etc.)**
- 5. review**

For every substance being assessed, the hazard ratings can be used to give an indication of the most suitable control approach for that activity and for its associated hazardous substance(s). The approach provides an appraisal of risk, based on the contribution made to that risk by the principal risk factors.

## Storage of Chemicals

Records should be kept of chemicals stored in any area. It is not necessary to do a full Chemical Risk Assessment in this case but the record should note the approximate amount held and the Safety Data sheet. Areas where hazardous substances are stored should be the subject of a general risk assessment taking into account the potential hazards from the substances themselves and any potentially hazardous interactions between incompatible substances. Hazardous liquids stored outside should generally be in a suitable bund.

## Steps 1 and 2a: Assess the health hazard


The first stage is to categorise the health hazard of the substance(s) used in, or generated by, the activity, from knowledge of the hazard statements or risk phrases which can be found on the Safety Data Sheet from the supplier.

The meaning of the hazard statements and risk phrases can be found in Appendix 5.

### Important Note:

The COSHH assessor should now use Hazard Statements in place of R-phrases when determining the Hazard Group. Risk phrases are being phased out from Safety Data Sheets as the legislation that defined them (CHIP regulations) were revoked in June 2015. This document has retained the grouping and definitions for R-Phrases as a source of reference only.

### Hazard Statements (CLP Regulation)

Hazard groups A-E (chemicals causing harm when breathed in)				
A	B	C	D	E
H303, H304, H305, H313, H315, H316, H318, H319, H320, H333, H336 and all H-numbers not otherwise listed	H302, H312, H332, H371	H301, H311, H314, H317, H318, H331, H335, H370, H373	H300, H310, H330, H351, H360, H361, H362, H372	H334, H340, H341, H350
Least Hazardous Substances				More Hazardous Substances
				Special cases
Notes: All phrases/hazard statements now considered a risk on or via the skin.				

### Hazard Group S – skin and eye exposure

Group S was triggered by risk-phrases numbers R21, R24, R27, R34, R35, R37, R38, R41, R43, and R21, R24 or R27 in combination with R39, R48 or R68. However, since most substances and products can irritate or penetrate the skin, there is nearly always a skin risk.

## Risk Phrases (CHIP Regulations – revoked June 2015)

### Hazard groups A-E (chemicals causing harm when breathed in)

A	B	C	D	E
R36 R36/38 R38	R20 R20/21 R20/21/22 R20/22	R23 R23/24 R23/24/25 R23/25	R26 R26/27 R26/27/28 R26/28	Muta cat 3 R40
And all substances that don't have R-phrases in groups B-E	R21 R21/22	R24 R24/25	R27 R27/28	R42 R42/43
	R22	R25	R28	R45
		R34	Carc cat 3 R40	R46
		R35	R48/23 R48/23/24 R48/23/24/25 R48/23/25 R48/24 R48/24/25 R48/25	R49
		R36/37 R36/37/38	R60 R61 R62 R63	
		R37 R37/38		
		R41		
		R43		
		R48/20 R48/20/21 R48/20/21/22 R48/20/22 R48/21 R48/21/22 R48/22		

**Least hazardous substances**

**more hazardous substances**

**Special cases**

### Hazard group S (chemicals causing harm in contact with skin and eyes)

R21 R20/21 R20/21/22 R21/22	R27 R27/28 R26/27/28 R26/27	R38 R37/38	R48/24 R48/23/24 R48/23/24/25 R48/24/25
R24 R23/24 R23/24/25 R24/25	R34 R35 R36 R36/37 R36/38 R36/37/38	R41 R43 R42/43 R48/21 R48/20/21 R48/20/21/22 R48/21/22	Sk

## Step 2b: Quantity of Material

Activities may range from the use of less than a few grams of a substance (use of a small quantity of typewriter correction fluid) to kilogram or more quantities. Using a few grams of a hazardous substance will represent much less of an exposure risk than using one kilogram:

Quantity/Hazard Rating		
Quantity/volume		Hazard rating
grammes	ml	Small
kilogrammes	l	Medium
tonnes	m <sup>3</sup>	Large

## Step 2c: Physical Characteristics

It is important to identify the physical form of the substance under the conditions of use. Different physical forms present different hazards. For simplicity, the variation of hazard with physical form can be expressed as follows.

Physical characteristic		Hazard rating
Pellet – does not break up	Non-volatile liquids	Low
Granular or crystalline	Volatile liquids Solids with appreciable vapour pressures	Medium
Fine solid or light powder/dust	Highly volatile liquids Gases Aerosols	High

See the appendix 3 'Exposure Potential' for more details.

## Step 2d: Determine the Control Approach

Having identified, for each of the substances used in an activity, the risk factor for each of the three categories, use the table below to determine the most suitable Control Approach (level of containment).

Find the control approach				
The number in the box represents the control approach				
STEP 2B	STEP 2C			
Amount used	Low dustiness or volatility	Medium volatility	Medium dustiness	High dustiness or volatility
Hazard group A				
Small	1	1	1	1
Medium	1	1	1	2
Large	1	1	2	2
Hazard group B				
Small	1	1	1	1
Medium	1	2	2	2
Large	1	2	3	3
Hazard group C				
Small	1	2	1	2
Medium	2	3	3	3
Large	2	4	4	4
Hazard group D				
Small	2	3	2	3
Medium	3	4	4	4
Large	3	4	4	4
Hazard group E				
For all hazard group E substances, choose control approach 4				

## Step 3: Determine Suitable Controls

Using the Control Approach from the previous step (1-4 & S), there are general control measures which are advised for each group:

Control Approach	General Controls document
1	100 – General Ventilation
2	200 & 201 – Local Exhaust Ventilation (Fume Cupboards)
3	300 & 301 – Containment (Glove Boxes)
4	400 – Specialist Control Approaches
S	S100 – Additional precautions for substances which are harmful via skin or eye contact.

The general controls documents can be found in Appendix 4.

More detailed control approaches for specific substances can be found by using the HSE COSHH Essentials website.

## Step 4: Implement Control Measures

Using the advice from the controls documents in Appendix 4, decide what level of control is needed for your task or process. For a process involving multiple substances, use the highest control group. Find out what you already have available and also what additional control measures might then be required. Make sure someone is actioned to implement any of these additional control measures.

Where any substance has additional hazard statements or risk phrases in the range H400-H413 or R50-59 (harm to the environment) procedures for storage, spills and disposal **MUST** be detailed in the assessment.

The completed assessment may be stored in the SHE Group safety database SHE enterprise (see Appendix 3).

### Lone Working (as per SHE Code 1 – Lone Working)

It is not possible to detail all chemicals and their toxicity levels for which lone working would be a significant hazard. The following conditions for chemical lone working are necessarily a pragmatic compromise:

Lone working is prohibited with the following chemicals and their functional derivatives, where they are or could be encountered at levels where they can cause harm, unless the COSHH risk assessments for working with these chemicals has been subject to review by an independent competent person approved by SHE Group.

Specific chemicals:

- Carbon Monoxide (CO);
- Cyanide (CN);
- Arsenic (As);
- Fluorine gas (F);
- Hydrofluoric Acid (HF); and
- Chromium Cr(VI);

Chemicals whose Safety Data Sheets (SDSs) include the following GHS hazard and precautionary statements:

- H200: Unstable explosive;
- H201: Explosive; mass explosion hazard;
- H202: Explosive: severe projection hazard;
- H203: Explosive: fire, blast or projection hazard;
- H204: Fire or projection hazard;
- H240: Heating may cause explosion;
- H241: Heating may cause a fire or explosion;
- H300: Fatal if swallowed;
- H304: May be fatal if swallowed;
- H310: Fatal in contact with skin;
- H314: Causes severe skin burns and eye damage;
- H318: Causes serious eye damage;
- H330: Fatal if inhaled.
- P310: Immediately call a POISON CENTRE/Doctor;
- P311: Call a POISON CENTRE/Doctor;
- P312: Call a POISON CENTRE/Doctor;
- P315: Get immediate medical advice/attention;
- P340: Remove person to fresh air and keep comfortable breathing; and
- P361: Take off immediately all contaminated clothing.

## Step 5: Review

As always with any safety assessment, they should be reviewed on a regular basis or when circumstances change, such as an update to the Safety Data Sheet.



## **Appendices**

### **1 - COSHH Code Forms**

- A) COSHH Risk Assessment template
- B) Example COSHH Risk Assessment

### **2 - Exposure Potential Details**

### **3 – Adding Assessments into SHE enterprise**

### **4 - General Control Approaches**

- A. 100 – General Ventilation
- B. 200 & 201 – Local Exhaust Ventilation (Fume Cupboards)
- C. 300 & 301 – Containment (Glove Boxes)
- D. 400 – Specialist Control Approaches
- E. S100 – Additional precautions for substances which are harmful via skin or eye contact.
- F. S101 – Selection of personal protective equipment

### **5 – R-phrases and Hazard Statements**

## Appendix 1 - Control of Substances Hazardous to Health

<b>Ref/Title:</b>	<b>Assessed By:</b>	<b>Date Assessed:</b>			
<b>Site:</b>	<b>Dept:</b>	<b>Div:</b>			
<b>Step 1</b>		<b>Step 2</b> <b>What harm?</b> Hazard Group, quantity & physical characteristics			
<b>What's the hazard?</b> Substance/process/risk phrases	<b>Who is exposed?</b>	<b>Hazard Group</b>	<b>Quantity Group</b>	<b>Physical Chars</b>	<b>Control Group (1-4 &amp; S)</b>

Step 3: Controls		Step 4: Action			
What are you already doing	What improvements are required	Who	When	Check	
<b>How have controls reduced exposure:</b>					
Also:	Action taken	Action needed	Who	When	Check
Equipment testing and maintenance					
Supervision					
Instruction and training of staff					
Emergency plans (inc spills) and First Aid					
Health Surveillance of staff					
Workplace and personal monitoring					
Storage and disposal					
<b>Step 5</b> <b>Review date:</b>		<b>SDS attached</b> <input type="checkbox"/>			
<b>Signed:</b>		<b>Approved:</b>			
1. Review your assessment – make sure you are not sliding back  2. Any significant change in the work? Check the assessment and change it if necessary					
Other hazards needing attention:					

## COSHH Risk Assessment sample for a single substance

Ref/Title: 001/UHV Cleaning Facility		Assessed By: Gareth Baker		Date Assessed: 01/04/2010		
Site: Daresbury		Dept: Technology		Div: Vac Technology Group		
Step 1				Step 2: What harm Hazard Group, quantity & physical characteristics		
What's the hazard? Substance/process/risk phrases		Who is exposed?	2a Hazard Group	2b Quantity Group	2c Physical Chars	2d Control Group (1-4 & S)
UHV ultrasonic cleaning using Triklone (1,1,2-trichloroethene) Risk phrases: R45, R68, R36/38 (Xi), R67, R52/53		UHV staff (4)	E & S	Large	Medium	4 & S
Step 3: Controls – how do they reduce the hazards				Step 4: Action		
What are you already doing		What improvements are required		Who	When	Check
Specialist cleaning plant used. This has solvent re-cycling capability. Work flow arranged so as to reduce open working to a minimum. Consumption monitored so as to ensure compliance with environmental requirements. Personal and area monitoring is in place.						
<b>How have controls reduced exposure:</b> This reduces exposure of staff to minimum and monitoring will ensure that controls are keeping exposure below stated limits.						
Also:	Action taken	Action needed		Who	When	Check
Equipment testing and maintenance	Kerry cleaned and refilled 4 times a year. Annual check of thermostats. Extraction fans checked 4 times a					

	year				
Supervision					
Instruction and training of staff	<Names of persons trained to operate>				
Emergency plans (inc spills); First Aid	Spillage contained in immediate area by bund; evacuate area; normal fire drill; BA used whilst pumping liquid into drums.  Eye irrigation, emergency shower for skin contact				
Health Surveillance of staff					
Workplace and personal monitoring	Personal and Area Monitoring				
Storage and Disposal	Drums stored outside in bunded area. Dirty solvent re-cycled				

Distribution List:	Signed:	Date:

<b>Step 5</b> <b>Review date:</b> <b>1/4/2012</b> <b>SDS attached</b> <input type="checkbox"/>		1. Review your assessment – make sure you are not sliding back 2. Any significant change in the work? Check the assessment and change it if necessary
Other hazards needing attention: Manual handling of drums; Use of Crane – see general risk assessment		

## Appendix 2 - Exposure Potential Details

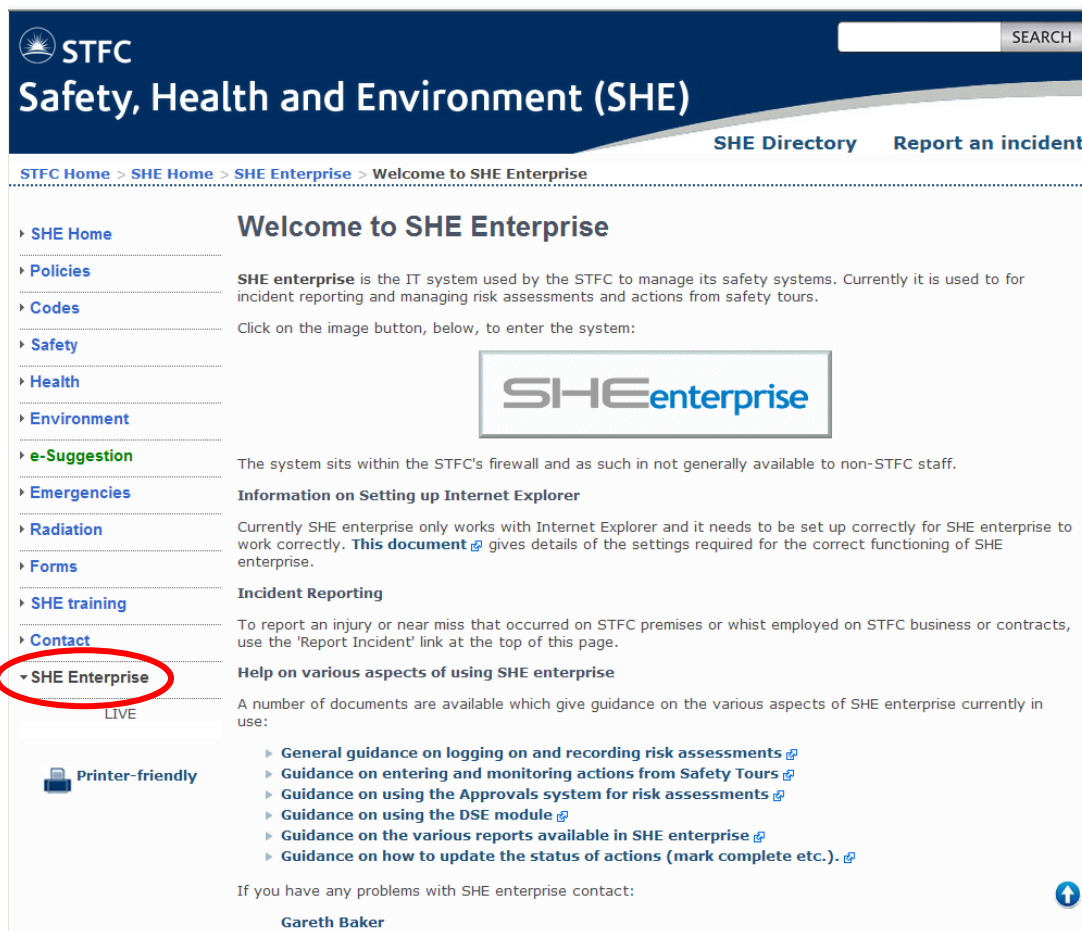
		Solid	Liquid
Determinant	Dustiness	Volatility	
Low	Pellet - does not break up		
Medium	Granular or crystalline		
High	Fine solid and light powder		
Determinant	Amount	Amount	
Small	Grams	Millilitres	
Medium	Kilograms	Litres	
Large	Tonnes	Cubic metres	

## Hazard Categories

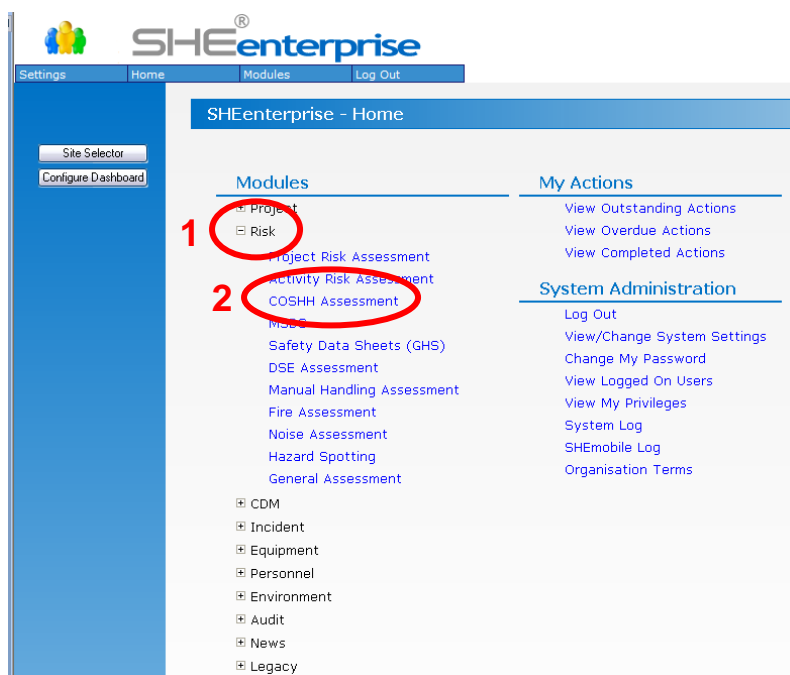
- A – skin and eye irritants
- B – harmful on single exposure
- C – severely irritating and corrosive. Skin sensitisers
- D – very toxic on single exposure. Harmful to reproduction
- E – cause cancer by genetic damage. Cause occupational asthma
- S – harmful by skin or eye contact

## Appendix 3 – Adding COSHH Assessment to SHE enterprise

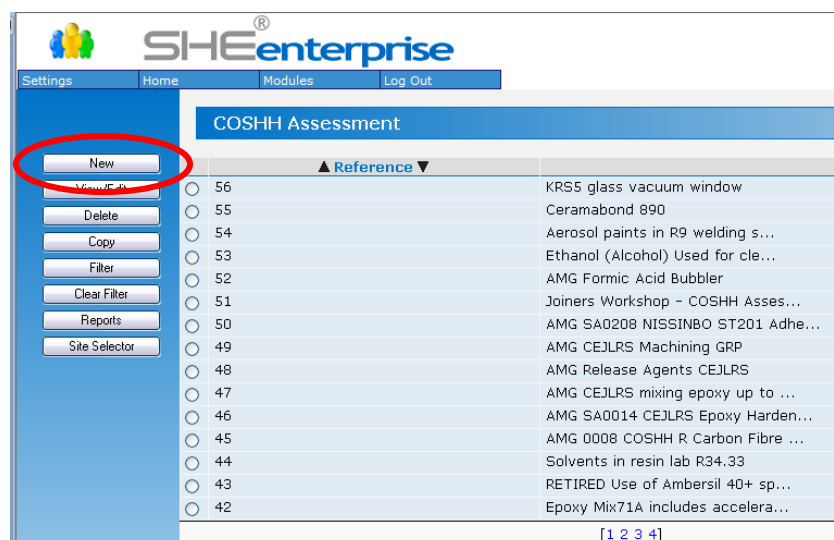
The completed COSHH Assessment can be attached to a record in the STFC's safety database SHE enterprise. This can be accessed from the SHE Group website:



If you are accessing the system from an STFC corporate id then clicking on the large SHEenterprise logo will bring up a separate window and log you into SHE enterprise:



Click on Risk (1) to open up the list of modules and then COSHH Assessment (2) will bring up the current list of COSHH assessments in the system:



Click on the New button to create a new record:

The screenshot shows the 'Record Details' form for a new COSHH Assessment. The form is divided into sections for mandatory fields (\*), optional fields, and organizational data. The mandatory fields section includes Site (Chilbolton), Reference (Auto Ref), and Description. The optional fields section includes Approved For Portal? and Project Risk Assessment Reference. The organizational data section includes Directorate, Department, Division, Location, Assessor, Title, Assessment Date, and Activity Or Process I.D. And Work Method. The form also includes a 'System Assigned' checkbox and a 'Browse' button for the Description field. The bottom of the form shows the username 'gjb25 [All Site]', version '20.6.0', and 'SHE Software Limited'.

Complete the basic top level information and organisational data. Only the (\*) fields are mandatory. Scroll down and do an initial "Save/Update Record", then expand the Attachment section and click "Add" to attach the completed COSHH Assessment.



The screenshot shows the SHEenterprise web interface. At the top, there is a navigation bar with 'Settings', 'Home', 'Modules', and 'Log Out'. The 'Modules' menu is expanded, showing options like 'Substance', 'Assessment', 'PPE & Conclusion', 'Actions', 'Related Policy/Guidance/Method Statements', and 'Attachments'. The 'Attachments' section is active, displaying a table with columns 'Name of File', 'Date of Creation', 'Description', and 'User Created'. The table is empty, with the message 'There are no records to display'. Above the table, there are buttons for 'Add', 'View/Download', and 'Delete'. The 'Add' button is circled in red and labeled with a red '2'. Below the table, there is a 'Save/Update Record' button, which is circled in red and labeled with a red '1'. The footer shows 'Username: gjb25 [All Site]', 'Version: 20.6.0', and 'SHE Software Limited'.

This will bring up the Attachment dialog:

The screenshot shows the 'Attachments Details' dialog box. It has a title bar with the URL 'http://hsweb3.dl.ac.uk/?Action=AddNew&FormType=popup&ModNumb=attachments&LinkID=60...'. The dialog contains several fields: 'Browse For File' with a 'Browse...' button, 'File Name' with a text input field, and 'Description' with a large text area. Below these, there are two read-only fields: 'User Created Record' showing 'gjb25' and 'Available Attachment Storage (MB)' showing '98,938.46'. At the bottom, there are 'Save/Update Record' and 'Cancel' buttons. The dialog is set against a light blue background with a white border.

The 'File Name' is usually the given name of the file without any extension (.pdf or .doc). Click 'Save/Update Record' and the file will be attached to the COSHH Assessment record. Click 'Save/Update Record' to save the COSHH Assessment.

## Appendix 4 – General Control Approaches

## Appendix 5 – Hazard Statements & R-phrases

### CLP-GHS Hazard (H) statements

H-stmt	Phrase	Group
300	Fatal if swallowed	D
301	Toxic if swallowed	C
302	Harmful if swallowed	B
304	May be fatal if swallowed and enters airways	A
310	Fatal in contact with skin	D
311	Toxic in contact with skin	C
312	Harmful in contact with skin	B
314	Causes severe burns and eye damage	C
315	Causes skin irritation	A
317	May cause an allergic skin reaction	C
318	Causes serious eye damage	C
319	Causes serious eye irritation	A
330	Fatal if inhaled	D
331	Toxic if inhaled	C
332	Harmful if inhaled	B
334	May cause allergy or asthma symptoms or breathing difficulties if inhaled	E
335	May cause respiratory irritation	C
336	May cause dizziness or drowsiness	A
340	May cause genetic defects ( <i>route if relevant</i> )	E
341	Suspected of causing genetic defects ( <i>route if relevant</i> )	E
350	May cause cancer ( <i>route if relevant</i> )	E
351	Suspected of causing cancer ( <i>route if relevant</i> )	D
360	May damage fertility or the unborn child ( <i>effect if known, route if relevant</i> )	D
361	Suspected of damaging fertility or the unborn child ( <i>effect if known, route if relevant</i> )	D
362	May cause harm to breast-fed children	D
370	Causes damage to organs ( <i>organ if known, route if relevant</i> )	C
371	May cause damage to organs ( <i>organ if known, route if relevant</i> )	B
372	Causes damage to organs through prolonged or repeated exposure ( <i>organ if known, route if relevant</i> )	D
373	May cause damage to organs through prolonged or repeated exposure ( <i>organ if known, route if relevant</i> )	C
EU66	Repeated exposure may cause skin dryness or cracking	A
EU70	Toxic by eye contact	E
EU71	Corrosive to the respiratory tract	C

## CHIP R-phrases

R-no	Phrase	Group	Note
20	Harmful by inhalation	B	
21	Harmful in contact with skin	B	
22	Harmful if swallowed	B	
23	Toxic by inhalation	C	
24	Toxic in contact with skin	C	
25	Toxic if swallowed	C	
26	Very toxic by inhalation	D	
27	Very toxic in contact with skin	D	
28	Very toxic if swallowed	D	
34	Causes burns	C	
35	Causes severe burns	C	
36	Irritating to eyes	A	
37	Irritating to respiratory system	C	1
38	Irritating to skin	A	
39	Danger of very serious irreversible effects	-	2
40	Limited evidence of a carcinogenic effect	D	3
41	Risk of serious damage to the eyes	C	
42	May cause sensitisation by inhalation	E	
43	May cause sensitisation by skin contact	C	4
45	May cause cancer	E	
46	May cause heritable genetic damage	E	
48	Danger of serious damage to health by prolonged exposure	+1	5
49	May cause cancer by inhalation	E	
60	May impair fertility	D	1
61	May cause harm to the unborn child	D	1
62	Risk of impaired fertility	D	1
63	Possible risk of harm to the unborn child	D	1
64	May cause harm to breastfed babies	D	1
65	Harmful: may cause lung damage if swallowed	A	
66	Repeated exposure may cause skin dryness or cracking	A	
67	Vapours may cause drowsiness and dizziness	A	
68	Possible risk of irreversible effects	E	6

**Notes:** All phrases now considered a risk on or via the skin.

- 1 Based on evidence, experts can reduce Group from D to C or from C to B.
- 2 Combination phrase. No impact of header number - use the Group for the other R-numbers.
- 3 Old data sheets have R40 as a combination phrase. If so, treat as (2).
- 4 As (1), but retain skin sensitisation in mixtures to a concentration of 0.1%.
- 5 Combination phrase. Group for R-numbers in combination rises from B to C or from C to D.
- 6 If a combination phrase, as (2); otherwise Group E.