



**INTERNATIONAL LABOUR OFFICE**

*PROGRAMME ON SAFETY AND HEALTH AT WORK  
AND THE ENVIRONMENT*

**SAFEWORK**

# **INTERNATIONAL CHEMICAL CONTROL TOOLKIT**

## Draft Guidelines

SafeWork welcomes feedback to further improve this draft. Please send your comment to us by email at [safework@ilo.org](mailto:safework@ilo.org) or by mail at the address at the bottom left of this page.

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## Foreword

The present guidelines outline a scheme for a Workplace Chemicals Control Tool Kit (CCTK) designed for small and medium sized enterprises (SMEs) in developing countries. It has been developed by a team of occupational hygienists assembled by the International Occupational Hygiene Association (IOHA) with representatives from Great Britain, USA, Australia, Southern Africa and Asia. The COSHH Essentials<sup>1</sup>, developed by the United Kingdom's Health and Safety Executive (HSE) to facilitate small business compliance with the UK regulations on control of substances hazardous to health, have been used as a model for developing the CCTK). It is important to note that this document presents a preliminary version of the Guidelines and that additional work is being undertaken by a group of international experts to test and validate the proposed control measures and the selection procedure. The Guidelines should therefore be considered as a model to be improved and should be used with caution.

The secretariat for the team of experts has been provided by the Health and Safety Executive (HSE) in Great Britain. The team included the following experts: Steve Maidment (HSE/BIOH, UK); Noel Tresider (AIOH, South Africa); Rob Ferries (AIOH, South Africa); Richard Gillis (AIOH, representing South East Asia employers); Jerry Lynch (AIHA, USA); Carole Sullilvan (HSE, UK Secretariat); Isaac Obadia (ILO SafeWork)

The main target audience was identified as requiring simple and practical guidance on how to prevent and reduce the risks from chemicals at work. A generic risk assessment based on the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS)<sup>2</sup> defined exposure conditions has been developed to lead the user to an appropriate approach to control. This approach to control, supported by a series of task guidance sheets is believed to offer a simple and practical means of achieving the objective. To facilitate translation of the toolkit into many languages, the task guidance sheets have been developed using a glossary.

The Tool Kit is designed to identify control solutions that provide health protection for the large majority of the working population . However, within any population there will be susceptible groups of individuals such as young and aged workers, as well as child bearing age orpregnant women who may require additional protection when exposed to specific hazardous materials. For these susceptible groups a more precautionary approach may be prudent and contact with hazardous substance of concern either avoided or a greater degree of control provided. This additional control could be provided by adopting a more rigorous control approach that the standard recommendation from the Tool Kit.

Whilst primarily developed for the workplace control of risks to health from airborne contaminants arising from the handling of supplied chemicals, it is recognised that chemicals can also present a risk to safety (fire and explosion) and a risk to the environment. The toolkit has been developed to provide basic advice on the control of these additional risks, but would benefit from future development work in these areas.

Because of the widespread use of pesticides in developing countries, the toolkit includes a direct link from pesticide use to a series of pesticide task guidance sheets, avoiding the use of the risk assessment scheme for these chemical. This should greatly simplify the operation of the toolkit for pesticide users.

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<sup>1</sup> <http://www.coshh-essentials.org.uk>

<sup>2</sup> <http://www.unece.org/trans/danger/publi/ghs/ghs.html>

## INTERNATIONAL CHEMICAL CONTROL TOOLKIT

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## SCOPE

1. Many substances that are used regularly at work will contain chemicals, which if not handled correctly can cause harm. These substances can be solids or liquids and include paints, varnishes, glues, printing inks, cleaning fluids, fuels, fertilisers, feed additives and pesticides as well as the substances that are used in the more established chemical factories. This toolkit gives advice on how these chemicals can be safely handled providing the material supplied has been classified and has the classification on the product label or safety data sheet. The toolkit does not generally apply to process generated dusts and fumes as these are not classified, although many of the solutions described in the toolkit can be successfully be used to control these problems.
2. This toolkit is designed to provide health protection for the large majority of the population regardless of ethnic origin. However within any population there will be susceptible groups of individuals such as children or pregnant women who may require additional protection when exposed to specific hazardous materials. For these susceptible groups a more precautionary approach may be prudent and contact with hazardous substance of concern should either be avoided or a greater degree of control provided. This additional control could be provided by adopting a more rigorous control approach than the standard recommendation from the toolkit.
3. To operate the toolkit, five stages have to be followed. Information gathered for each stage is compiled on a Check Sheet as shown in Annex 1. The following pages have instructions which tell you how to do each stage:

**Stage 1** Find the hazard classification and match it to a hazard group using the table supplied

**Stage 2** Find out how much of the substance you are going to use

**Stage 3** Find out how much of the substance is going to get into the air

**Stage 4** Find the control approach

**Stage 5** Find the task-specific control guidance sheet(s)

## Stage 1 Hazard classification

4. Different substances can harm you in different ways, and some are more poisonous or can cause more harm than others. For example, some substances will only cause minor irritation to your eyes or throat, whilst other substances can make it more difficult to breathe or can kill you. Some effects will be obvious straight away, whilst other effects will take many years to appear. It is important that all these effects are controlled, but substances which can cause more serious effects will need a greater degree of control than less harmful substances.
5. Substances are placed into six different groups. Five groups, from group A to group E tell you how dangerous it is to breathe the substance in. Group A is the safest and group E the most dangerous. The sixth group, group S tells you if it is dangerous to get the substance on the skin or in your eyes. Can you use a substance in a safer hazard group?

To find which hazard groups apply to the substances you use, follow the three simple steps described below.

- Step 1** Table 1 contains a list of common solvents and their hazard groups. If the solvent you use is in Table 1, read off its hazard group or groups and record them on the check sheet.
- Step 2** If the substance is not listed in Table 1, is it a pesticide? If it is, record this on the check sheet and go straight to Step 5 to find the task sheets you need
- Step 3** If the substance has not been identified by either of the above steps, find the substances classification information from the safety data sheet (SDS) or product label. Compare this information against the information in Table 2 and exactly match the classification data against the data for each hazard group A to E. An exact match identifies the appropriate hazard group for inhalation. Then check the classification against the data for hazard group S to see if the substance also falls into hazard group S. A substance can be in both an inhalation hazard group (A - E) and the Skin (S) group. Record the hazard group or groups on the check sheet. *(Currently Table 2 has information to allow either the GHS classification system or the EU R-phrase classification system to be used. The scheme will be simplified if only one classification is used or if the hazard group is provided by the supplier as essential labelling or SDS information.)*

Substance	Hazard group	Volatility
Acetone	A & S	Medium
Butyl acetate	A & S	Medium
Diesel	B & S	Low
Ethyl acetate	A & S	Medium
Hexane	B & S	Medium
Isopropyl alcohol	A & S	Medium
Methanol	C & S	Medium
Methyl ethyl ketone	A & S	Medium
Methyl isobutyl ketone	B & S	Medium
Paraffin (Kerosene)	A & S	Low
Perchloroethylene	C & S	Medium
Petrol	B & S	High
Toluene	B & S	Medium
Trichloroethylene	C & S	Medium
White spirit (Mineral spirit)	B & S	Low
Xylene	A & S	Medium

*Table 1: Hazard group identification for common solvents.*

Hazard Group	EU R-Phrases	GHS hazard classification (class/level)
<b>A</b>	R36, R38, R65, R66 All dusts and vapours not allocated to another band	Acute toxicity (lethality), any route, class 5 Skin irritancy class 2 or 3 Eye irritancy class 2 All dusts and vapours not allocated to another band
<b>B</b>	R20/21/22, R40/20/21/22, R33, R67	Acute toxicity (lethality), any route, class 4 Acute toxicity (systemic), any route, class 2
<b>C</b>	R23/24/25, R34, R35, R37, R39/23/24/25, R41, R43, R48/20/21/22	Acute toxicity (lethality), any route, class 3 Acute toxicity (systemic), any route, class 1 Corrosivity, subclass 1A, 1B or 1C Eye irritancy class 1 Respiratory system irritancy (GHS criteria to be agreed) Skin sensitisation Repeated exposure toxicity, any route, class 2

<b>D</b>	R48/23/24/25, R26/27/28, R39/26/27/28, R40 Carc. Cat. 3, R60, R61, R62, R63, R64	Acute toxicity (lethality), any route, class 1 or 2 Carcinogenicity class 2 Repeated exposure toxicity, any route, class 1 Reproductive toxicity class 1 or 2
<b>E</b>	R42, R45, R46, R49, R68	Mutagenicity class 1 or 2 Carcinogenicity class 1 Respiratory sensitisation
<b>S</b> <b>skin and eye contact</b>	R21, R24, R27, R34, R35, R36, R38, R39/24, R39/27, R40/21, R41, R43, R48/21, R48/24, R66	Acute toxicity (lethality), dermal only, class 1, 2, 3 or 4 Acute toxicity (systemic), dermal only, class 1 or 2 Corrosivity, subclass 1A, 1B or 1C Skin irritation class 2 Eye irritation class 1 or 2 Skin sensitisation Repeated exposure toxicity, dermal only, class 1 or 2

Table 2: Hazard group allocation from classification definitions

## Stage 2 - Scale of use

6. How much of the chemical you use determines how the chemical is handled and affects how much of it you are exposed to. The amount of material handled in a batch (or a day for a continuous process) needs to be identified. Use this information in Table 3 to see if your use is small, medium or large and record it on the check sheet.

Quantity	Solid		Liquid	
	Weight	Typically received in	Volume	Typically received in
Small	Grams	Packets or bottles	Millilitres	Bottles
Medium	Kilograms	Kegs or drums	Litres	Drums
Large	Tonnes	Bulk	Cubic metres	Bulk

Table 3: Quantity of chemical in use.

## Stage 3 - Ability to become airborne

7. The physical form of a chemical affects how likely it is to get into the air. In this scheme we use dustiness for solids and volatility for liquids to define this aspect. The dustier or more volatile the substance, the more it is likely to become airborne. It may be possible to reduce the amount of chemical getting into the air by buying and using the chemical in a different form, for example, can you:

- **Replace fine powders with pellets or less dusty granules?**
- **Use liquids at a lower temperature?**

### **3a: Solids**

8. The dustiness of a solids is classified as low, medium or high. If you are using a solid, find the description below that best fits the substance you are using and record it on the check list.

- **Low:** Pellet like solids that don't break up. Little dust is seen during use e.g. PVC pellets, waxed flakes
- **Medium:** crystalline, granular solids. When used, dust is seen, but settles out quickly. Dust is left on surfaces after use e.g. soap powder.
- **High:** fine, light powders. When used, dust clouds can be seen to form and remain in the air for several minutes e.g. cement, carbon black, chalk dust.

### **3b Liquids**

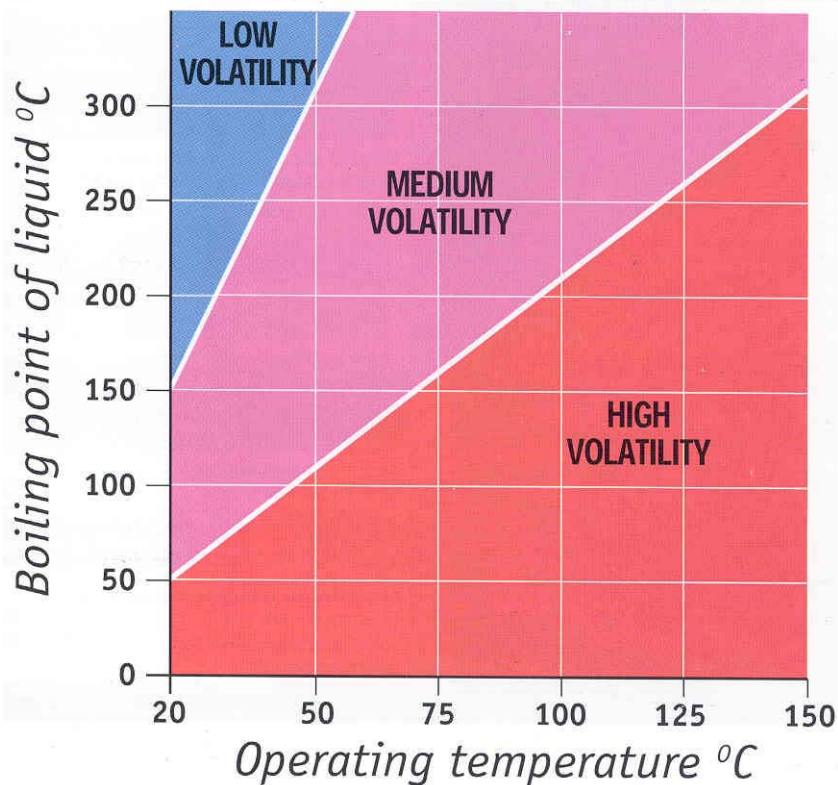
9. To work out the volatility of a liquid, its boiling point needs to be found on the material safety data sheet (MSDS). This can normally be found in Section 9 of the MSDS. This scheme classifies volatility as low, medium or high. For tasks carried out at room temperature, compare the boiling point against the ranges below and record the description that best fits on the check sheet.

• High	Boiling point below 50°C
• Medium	Boiling point between 50 and 150°C
• Low	Boiling point above 150°C

10. For tasks carried out above room temperature, in addition to the boiling point you will need to know the process temperature. These two pieces of information are used to decide volatility from the graph below. Read across from the boiling point and up from the process temperature. The section in which the two lines meet on the graph will tell you the volatility. If you fall on a dividing line, select the higher volatility.



**Graph to select volatility of liquid**



#### **Stage 4 Selection of the control approach**

11. The check sheet will now contain all the information that is needed to work out how to control the substance. The control approach is found by first going to the hazard group to which the chemical has been allocated. Read across from the scale of use to the appropriate volatility/dustiness column. The number in the box identifies the control approach. Record the control approach number on the check sheet.

- If the material is a pesticide, go straight to the task index at Stage 5 and follow the advice on the Control Cards that best match what you are doing.
- If the material is not a pesticide, but has a hazard group A to E, use the information recorded on the check sheet to identify the control approach needed from Table 4.
  - Firstly read the hazard group from the check sheet and find the part of the table that applies to that hazard group. (The table is divided into five sections, one for each of hazard bands A to E).
  - Secondly, find the row for the amount used within that part of the table.
  - Finally, read across that row until you reach the dustiness or volatility description that is recorded on the check sheet. The number in the box

is the control approach needed. Record this number on the check sheet.

- If the substance also has a hazard group S recorded, this will also be needed in Stage 5 to find the control guidance sheets that apply.

Amount used	Low dustiness or volatility	Medium volatility	Medium dustiness	High dustiness or volatility
<b>Hazard group A</b>				
Small	1	1	1	1
Medium	1	1	1	2
Large	1	1	2	2
<b>Hazard group B</b>				
Small	1	1	1	1
Medium	1	2	2	2
Large	1	2	3	3
<b>Hazard group C</b>				
Small	1	2	1	2
Medium	2	3	3	3
Large	2	4	4	4
<b>Hazard group D</b>				
Small	2	3	2	3
Medium	3	4	4	4
Large	3	4	4	4
<b>Hazard group E</b>				
<b>For all hazard group E, substances, choose control approach 4</b>				

Table 4: Control approach selection

## Stage 5 Find the task-specific control guidance sheet(s).

- Your check sheet should have identified the substance you are handling as a pesticide or it will have identified a control approach 1 - 4. It may also have identified the need for skin protection. For each of the control needs identified, go to the appropriate section below to find the task guidance sheets you need.

### ***Pesticides***

- If the material has been identified as a pesticide, find the task control sheet or sheets from Table 5 that best describe the task or tasks you are doing.

Task description	Task control sheet
Concentrate dilution	<a href="#">P100</a>
Application (spraying and dusting)	<a href="#">P101</a>
Fumigation	<a href="#">P102</a>
Using poison baits?	<a href="#">P103</a>
Disposing of used containers?	<a href="#">P104</a>

Table 5: Pesticide task guidance sheets

## Control Approach 1 - 4

14. Table 6 contains the index of task guidance sheets for control approaches 1 - 4. For each control approach there is a general sheet which sets out the principles of the control approach and a set of dedicated guidance sheet or sheets for common activities or processes. To use Table 6, go to the section of the table that matches the control approach identified on your check sheet and look down the index of tasks. Select the task sheet or sheets that best describe the task or tasks you are doing. If you cannot find a sheet that matches what you are doing, select the general sheet for the control approach and apply the principles described to your particular task. For example, if your check sheet identifies that you need to apply control approach 2, go to section 2 of table 6 and look down the index of sheets in the 200 series. If you are weighing out powders you will find that task sheet 211 applies, but if you are doing something that is not on the list you should use the general task sheet 200.

Task description	Task control sheet
<b>Control Approach 1</b>	
General principles	<a href="#">100</a>
Sack, bottle and drum storage	<a href="#">101</a>
Bulk storage	<a href="#">102</a>
Removing waste from air cleaning unit	<a href="#">103</a>
<b>Control Approach 2</b>	
General principles	<a href="#">200</a>
Ventilated workbench or cupboard	<a href="#">201</a>
Ventilated booth	<a href="#">202</a>
Removing waste from air cleaning unit	<a href="#">203</a>
Conveyor transfer	<a href="#">204</a>
Sack filling	<a href="#">205</a>
Sack emptying	<a href="#">206</a>
Charging reactor or mixer from sack or keg	<a href="#">207</a>

IBC filling and emptying	<a href="#">208</a>
Drum filling	<a href="#">209</a>
Drum emptying with a drum pump	<a href="#">210</a>
Weighing solids	<a href="#">211</a>
Mixing liquids with liquids or solids	<a href="#">212</a>
Mixing solids	<a href="#">213</a>
Sieving	<a href="#">214</a>
Screening	<a href="#">215</a>
Spray painting	<a href="#">216</a>
Pickling / Plating bath	<a href="#">217</a>
Vapour degreasing bath	<a href="#">218</a>
Tray drying oven	<a href="#">219</a>
Pelletising	<a href="#">220</a>
Tablet press	<a href="#">221</a>
<b>Control Approach 3</b>	
General principles	<a href="#">300</a>
Glove box	<a href="#">301</a>
Removing waste from extraction unit	<a href="#">302</a>
Transferring solids	<a href="#">303</a>
High throughput sack emptying	<a href="#">304</a>
Drum filling	<a href="#">305</a>
Drum emptying	<a href="#">306</a>
IBC filling and emptying (solids)	<a href="#">307</a>
IBC filling and emptying (liquids)	<a href="#">308</a>
Tanker filling and emptying (solids)	<a href="#">309</a>
Tanker filling and emptying (liquids)	<a href="#">310</a>
Keg filling	<a href="#">311</a>
Transferring liquid by pump	<a href="#">312</a>
Filling small containers (packets and bottles)	<a href="#">313</a>
Weighing solids using a load cell	<a href="#">314</a>
Weighing liquids using a load cell	<a href="#">315</a>
Mixing solids	<a href="#">316</a>
Mixing liquids with liquids or solids	<a href="#">317</a>
Vapour degreasing bath	<a href="#">318</a>

Control Approach 4	
General principles	<a href="#">400</a>

Table 6: Inhalation task guidance sheets

## Skin and respiratory protection

15. If the substance has been allocated to the skin hazard group, then you will need to read sheet [Sk100](#).
16. If you are undertaking a task where the guidance sheets suggests that respiratory protective equipment is appropriate (such as cleaning up a spill), then you should look at sheet [R100](#)

	Task control sheet
How to reduce skin contact with hazardous substances	<a href="#">Sk100</a>
Selection and use of respiratory protective equipment	<a href="#">R100</a>

Table 7: Skin task guidance sheets

## Safety and environmental issues

17. The above series of task guidance sheets are designed to protect human health against the harmful effects caused by high exposures to hazardous substances. However many substances can also cause harm by burning, or can harm the environment if they escape from the factory. The equipment used to process the substances can also harm you. Where appropriate flammability and explosivity needs are identified on the task guidance sheets.
18. To protect you from harm from the machinery the guidance sheets often refer to a system of work called a 'permit to work' for maintenance activities. One of the key features of a permit to work system is a 'lock-out / tag-out' control system, which prevents the operation of machinery whilst maintenance is undertaken. The key features of this system are described in **sheet [S100](#)**.
19. If you discharge waste materials to land, air or water, **task control sheets [E100](#), [E200](#) and [E300](#)** may be useful as they give advice on how to reduce damaging emissions. Table 8 lists the safety and environmental task guidance sheets.

Sheet description	Task control sheet
<b>Safety</b>	
Key features of Lock-out/tag-out system	<a href="#">S100</a>
<b>Environment</b>	
Control of emissions to air	<a href="#">E100</a>

Control of emissions to water	<a href="#">E200</a>
Safe disposal of solid waste	<a href="#">E300</a>

**Table 8: Safety and Environmental task control sheets**

## ANNEX 1

# Chemical Control Toolkit Checklist

Task Description: .....

Date: .....

Is material a pesticide? Yes / No

If Yes: Task Sheets Needed

P100	P101	P102	P103	P104
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If No, complete Stages 1 - 5

Stage 1: Hazard bands:

A	B	C	D	E	S
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Stage 2: Scale of use

Small	Medium	Large
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Stage: 3 Ability to become airborne

Low	Medium	High
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Stage 4: Control approach needed

100	200	300	400
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Stage 5: Inhalation Task Sheets

			R100					
			Sk100					
			E100	E200	E300			
			S100					