

# 11 Management of Hazardous Substances

**Part 1: Directive.** This part provides the direction that **must** be followed in accordance with statute or policy mandated by Defence or on Defence by central Government.

**Part 2: Guidance.** This part provides the guidance and best practice that **should** be followed and will help you to keep to this policy.

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## Amendment Record

1. Amendments will be staffed by HS&EP together with the leading areas, relevant subject matter experts and key stakeholders.

Version No	Date	Text Affected	Authority
1.2	Oct 20	Interim update post-handover of policy from DSA to D HS&EP	D HS&EP
2	Oct 21	Release of single-part structure	D HS&EP

# Part 1: Directive

## Introduction

1. This part provides the Defence policy on the management of substances hazardous to health (including natural or artificial substances and mixtures). It describes how the risk assessment process works and the responsibilities for implementing the resulting actions to reduce the risk so far as is reasonably practicable (SFAIRP) at the point of use.

## Legislation

2. UK Health, Safety and Environmental Protection (UK HS&EP) legislation requires employers to ensure, SFAIRP, the health, safety and welfare of employees and anyone else who may be affected by a work activity. In accordance with the Secretary of State's HS&EP Policy Statement these requirements are to be applied and complied with for all Defence activities, including where legal exemptions exist and overseas. The key legislation that applies to the management of hazardous substances are as follows: (further guidance / references can be found in 'Related Documents'):

- a. [Control of Substances Hazardous to Health Regulations 2002](#).
- b. [Registration, Evaluation, Authorisation and Restriction of Chemicals \(REACH\)](#).
- c. [Control of Lead at Work Regulations 2002 \(CLAW\)](#).
- d. [Health and Safety at Work etc Act](#).

## Scope

3. 'Substances hazardous to health' means a substance (including a preparation) falling into at least one of the following groups:

- a. substances classified by legislation and for which an indication of danger for the substance is very toxic, toxic, harmful, corrosive, or irritant.
- b. substance for which the Health and Safety Executive (HSE) has approved a Workplace Exposure Limit (WEL).
- c. clinical waste (including animal tissue, animal waste, body parts etc).
- d. biological agents e.g. fungi, bacteria (including legionella), moulds, parasites etc.
- e. a dust of any kind, except dust which is a substance within paragraph (a) or (b) above, when present at a concentration of air equal to or greater than:
  - (1) 10 mg/m<sup>3</sup> as a time-weighted average over an 8-hour period, of inhalable dust; or
  - (2) 4 mg/m<sup>3</sup> as a time-weighted average over an 8-hour period of respirable dust.

f. any substance that is not classified in the above points but because of its chemical or toxicological properties and the way it is used or is present in the workplace creates a risk to health.

4. Exposure to any substance hazardous to health must be prevented, or where this is not reasonably practicable, a suitable and sufficient assessment of the risk is conducted, and steps taken to meet the requirements of the regulations. Failure to assess the health risks or to prevent exposures where reasonably practicable to do so is a breach of legislation.

5. The activity involving the hazardous substance where personnel may be exposed dictates the need for a risk assessment (not just the presence of the substance), typical activities may include:

- a. moving / handling;
- b. transportation (including a Dangerous Goods assessment);
- c. use;
- d. maintenance;
- e. storage; and
- f. final disposal.

6. Although the use of lead in the workplace can be assessed using the COSHH process, the Control of Lead at Work Regulations (CLAW) specifies its own control requirements that differ slightly to those in the COSHH regulations. One of the control measures specific to CLAW is the need to ensure that, SFAIRP, staff do not eat, drink, or smoke in any place which is, or is liable to be, contaminated by lead. For any COSHH assessment that includes the use of or exposure to lead, the requirements of CLAW must take primacy over those of the COSHH regulations.

7. Hexavalent Chromium (Cr(VI)) can be assessed using the COSHH process, however, the control requirements differ slightly and therefore similar to lead, the management of Cr(VI) in Defence is covered in more detail in Annex E.

8. The additional information with specific emphasis on lead and Hexavalent Chromium are detailed from the perspective; these are known high risk substances which have the potential to have serious health effects were exposure occurs. This does not detract from other substances hazardous to health, e.g. Asbestos and Legionella etc as they must be considered through assessment in accordance with this chapter.

9. The HSE's [COSHH Essentials](#) online tool can be used as an aid in the process of hazardous substance risk assessments.

10. UK HS&EP legislation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) operates alongside COSHH to ensure information on the hazards of chemicals and how to use them safely will be passed down the supply chain by chemical manufacturers and importers through improved Material Safety Data Sheets (MSDS). This term MSDS is technically still used in legislation e.g. COSHH, however, the term Safety Data Sheet is becoming more commonly referred to by suppliers and is in line with the REACH regulations and as detailed in JSP 515.

## Review and amendments

11. This chapter has been reviewed by the HS&EP Tri-Service WG and approved by the Defence Safety and Environment Committee. The Dir HS&EP team will review it at least once a year. Any suggestions for amendments should be sent to [HSEP-GroupMailbox@mod.gov.uk](mailto:HSEP-GroupMailbox@mod.gov.uk).

## Must and should

12. Where this chapter says '**must**', this means that the action is a compulsory requirement. Where this chapter says '**should**', this means that the action is not a compulsory requirement but is a recommendation of good practice to comply with the policy.

## Glossary of Terms

13. The key terms used in this chapter are explained in the Glossary of Terms (which is Annex D of this chapter).

## Policy Statements

14. Defence has established the following policy statements to provide direction on the management of hazardous substances (including natural or artificial substances and mixtures), which **must** be followed:

- a. **Policy Statement 1 (Page 5)**. The commander or line manager or accountable person (AP) **must** make sure that no activity is conducted which is liable to expose themselves or any person(s) to any substance hazardous to health unless a suitable and sufficient assessment of the risk is conducted, and control measures are implemented.
- b. **Policy Statement 2 (Page 6)**. The commander or line manager or accountable person (AP) **must** make sure that the risks associated with exposure to any substance hazardous to health are evaluated and identify suitable and sufficient control measures, which **must** be implemented and maintained.
- c. **Policy Statement 3 (Page 7)**. Defence acquisition teams and persons responsible for the procurement or provision of hazardous substances (including local purchase) **must** refer to the REACH requirements and obtain the relevant information, and the information **must** be provided to end users.
- d. **Policy Statement 4 (Page 8)**. The commander or line manager or accountable person (AP) **must** make sure that all persons who might be exposed to a hazardous substance have access to all relevant information about the hazardous substance.
- e. **Policy Statement 5 (Page 9)**. The control measures in the risk assessment or as communicated by management **must** be complied with. If the controls in the risk assessment cannot be complied with and the activity must proceed, alternative ways of working **must** be considered, and implemented where reasonably practicable.

f. **Policy Statement 6 (Page 9)**. The accountable person (AP) **must** make sure that systems are in place within their establishment, unit, or platform to identify Health Surveillance (HS) or Health Monitoring (HM) requirements and that suitable and appropriate HS / HM programmes for new and existing staff are developed and implemented.

g. **Policy Statement 7 (Page 10)**. All personnel involved in the disposal of substances **must** comply with instructions provided, as defined in the risk assessment, or as detailed in manufacturers documentation. Hazardous waste information **must** be provided to the holder of substances to make sure disposal procedures are correct.

h. **Policy Statement 8 (Page 10)**. The accountable person (AP) via their commander or line manager **must** make sure that personnel have access to all the relevant resources / equipment and information regarding procedures and arrangements for dealing with emergencies.

#### **Policy Statement 1**

The commander or line manager, or accountable person (AP) **must** make sure that no activity is conducted which is liable to expose themselves or any person(s) to any substance hazardous to health unless a suitable and sufficient assessment of the risk is conducted, and control measures are implemented.

15. Employers **must** not carry out or commission work which is liable to expose persons to a substance hazardous to health unless they provide those persons with suitable and sufficient:

- a. information - a MSDS does not constitute a risk assessment but **must** be used as a source of information when completing risk assessments;
- b. instruction - appropriate level of supervision to ensure those persons are aware of the risk(s) associated with the substance and/or procedures;
- c. training - those persons **must** receive appropriate training to the role assigned to them; and
- d. equipment - includes appropriate documentation defining the safe operation and maintenance of the equipment.

16. The assessment **must** consider activities and processes and **must** NOT just be substance specific. Whilst a substance specific assessment may appear an easier way of doing the assessment it does not enable consideration of the interfaces and additive effects where more than one substance is used in a task. Therefore, the assessment **must**:

- a. fully identify the activity or process;
- b. identify all substances or products being used or produced;
- c. consider who and how many are likely to be exposed for example young persons and those of childbearing age, how and for how long;

- d. include a register to track items in circulation and assist in stock control and waste management;
- e. consider storage of items and the control of hazardous substances. A storage plan may be created, and colour coded to assist in segregation of high-risk items, cages and locked cabinets **must** be implemented where required; and
- f. consider the risk of exposure as recognised in lessons identified from accidents, incidents, and emergencies data.

17. Processes that use or produce hazardous substances **must** be risk assessed:

- a. in the design and development process to design out or minimise their use or production;
- b. when substances (e.g. dust or vapours) result from a process or activity or which arise as a result of an accident or emergency;
- c. when substances arise as wastes or residues from processes or activities, including scrap material; and
- d. when substances arise as a result of interaction with another process or activity in the vicinity.

18. A template for a COSHH assessment (MOD Form 5011) and for a COSHH master register (MOD Form 5011a) are available on the Defence Intranet. The use of these templates is optional but should be regarded as the preferred and the minimum information required.

#### **Policy Statement 2**

The commander or line manager, or accountable person (AP) **must** make sure that the risks associated with exposure to any substance hazardous to health are evaluated and identify suitable and sufficient control measures, which **must** be implemented and maintained.

19. Competent persons are required throughout the organisation and **must** be involved at all stages of managing risk in a process or activity including evaluation and identification of suitable and sufficient control measures.

20. **Record the significant findings.** The assessor (if not the commander or line manager) should bring the findings of the assessment (taking into account any variation due to local conditions, changes in use and personnel issues and, if appropriate, explain the risks) and the required control measures to manage those risks to the attention of the commander or line manager. The competences required of assessors are described in glossary (Annex D).

21. Risk assessment is not a substitute for making things safe, consider the headings in the order shown according to the hierarchy of risk controls. Do not simply jump to the easiest control measure to implement:

- a. elimination - redesign the job or substitute a substance so that the hazard is removed or eliminated;

- b. substitution - replace the material or process with a less hazardous one; care should be taken to make sure the alternative is safer than the original;
- c. engineering controls - separate the hazard from operators; give priority to measures which protect collectively over individual measures;
- d. administrative controls - these are all about identifying and implementing the procedures you need to work safely, for example, reducing the time workers are exposed to hazards (for example by job rotation); and
- e. provision of personal protective equipment (PPE) or respiratory protective equipment (RPE) - only after all the previous measures have been tried and found ineffective in controlling risks to a reasonably practicable level, must PPE or RPE be used.

22. Risk assessments and associated documents **must** be kept for audit and investigation purposes and be retained for a minimum of 3 years after expiry and in accordance with [JSP 375, Volume 1, Chapter 39](#). However, it is common practice to keep records for 5 years, including the MSDS. For health monitoring, records are to be kept for 30 years.

### **Policy Statement 3**

Defence acquisition teams and persons responsible for the procurement or provision of hazardous substances (including local purchase) **must** refer to the REACH requirements and obtain the relevant information, and the information **must** be provided to end users.

23. Procurers and importers of hazardous substances **must** understand and satisfy the requirement for manufacturers and suppliers to provide information to enable the assessment process to be completed. This information is usually included in the MSDS.

24. Early identification within the supply chain of the potential use or generation of hazardous substances will have a significant impact on the hazard analysis, relevant safety cases and overall project risk management. They **must** be evaluated as to whether a substance can be eliminated, or an alternative, less hazardous substance used whilst maintaining capability.

25. Consideration should be given to design alterations to minimise exposure and the management of residual exposure to be designed into the process / user instructions.

26. Where the need for specific PPE for the end user of a platform or equipment is identified as a result of introducing a hazardous substance; acquisition teams and persons responsible for procurement **must** ensure that the PPE requirement is communicated to Defence Clothing to ensure that the item is available to the end user when the platform or equipment is introduced into service, and that the end user is informed and consulted of the need. Platform and equipment maintenance documentation **must** specify any PPE that is required.

#### **Policy Statement 4**

The commander or line manager, or accountable person (AP) **must** make sure that all persons who might be exposed to a hazardous substance have access to all relevant information about the hazardous substance.

27. Where the information is inadequate to allow a suitable and sufficient assessment to be carried out at the point of use, the user's commander or line manager in conjunction with the supplier (e.g. acquisition team) **must** obtain the relevant information about the materials, exposure routes, potential health effects to make sure the risks are able to be suitably assessed and the control measures to be implemented. These **must** be incorporated into process and user instructions.
28. Should there be concern from a person who might be exposed to the hazardous substance, they have the right to refuse to work with that substance, but this **must** be discussed with their commander or line manager as to what the concerns are and any further safety measures that can be introduced.
29. This information **must** be recorded at the point of use and where appropriate, copied into the safety case documentation. Where actions or controls are identified to reduce exposure there is a statutory requirement to implement those controls.
30. The commander or line manager **must** make sure that monitoring of exposure to hazardous substances within an activity or process is undertaken where an assessment concludes that:
- a. there could be serious risks to health if control measures failed or deteriorated;
  - b. exposure limits might be exceeded;
  - c. control measures might not be working properly; or
  - d. when employees are exposed to certain substances and processes specified in Schedule 5 to the COSHH Regulations.
31. The commander or line manager **must** ensure that those undertaking and interpreting exposure monitoring are competent to do so; where there is any doubt advice should be sought from the Senior Medical Officer, the Defence organisation CESO, Safety Centre or a competent occupational hygienist.
32. The commander or line manager **must** make sure that all control measures identified by the COSHH assessment including any additional arrangements to the emergency procedures are implemented, communicated, monitored, and reviewed. Where appropriate, this information **must** be recorded and copied into the safety case documentation.



### **Policy Statement 5**

The control measures in the risk assessment or as communicated by management **must** be complied with. If the controls in the risk assessment cannot be complied with and the activity must proceed, alternative ways of working **must** be considered, and implemented where reasonably practicable.

33. All personnel **must** comply with instructions provided for the safe use, handling or storage of substances as defined in the risk assessment or as otherwise communicated by management including the correct use of control measures. See JSP 375, Volume 1 Chapter 8.
34. Personnel **must** undertake such training as is required to understand the information and instruction provided on the potential health risks and the exposure controls to be implemented for the safe use, handling and storage of substances and processes used therein.
35. This **must** apply on all of the Defence estate, including shared facilities and lodger units.

### **Policy Statement 6**

The accountable person (AP) **must** make sure that systems are in place within their establishment, unit, or platform to identify Health Surveillance (HS) or Health Monitoring (HM) requirements and that suitable and appropriate HS / HM programmes for new and existing staff are developed and implemented.

36. See JSP 375, Volume 1, Chapter 14 - Health Surveillance and Health Monitoring, and HSE guidance [COSHH Health Surveillance](#), necessary when there is a disease associated with the substance in use e.g. asthma, dermatitis, cancers etc.
37. There is a legal obligation to undertake HS, but not HM. However, it is a hugely beneficial way of collecting information, which could help identify health issues within the workplace and help APs to monitor trends.
38. The AP **must** be given assurance that HS and HM processes are in place via audit, to provide them with confidence that their commanders or line managers are implementing appropriate HS / HM programmes.
39. The majority of Defence civilians in the UK will receive their Occupational Health (OH) support and services from the OH service provider via DBS People Services, according to their role. Service personnel will receive their OH nursing and occupational medicine support from military establishment medical centres. The arrangements for Service personnel to access OH services are contained in Single and Joint Service instructions and publications.
40. Where services through the OH Service Provider (Defence Primary Healthcare (DPHC) / civilian OH contractor) are not available, the AP **must** source and fund suitable equivalent services to provide the required HS / HM.
41. The commander or line manager **must** be aware of the work activities undertaken by their personnel and whether they require HS or HM arrangements (this should be identified by risk assessment).

42. The commander or line manager **must** make sure that where regulation or Defence Policy requires persons to undergo health surveillance that provision is made for that health surveillance and that the requirement is adhered to.

#### **Policy Statement 7**

All personnel involved in the disposal of substances **must** comply with instructions provided, as defined in risk assessment, or as detailed in manufacturers documentation. Hazardous waste information **must** be provided to the holder of substances to make sure disposal procedures are correct.

43. The disposal of hazardous waste information legislation and policy is detailed in JSP 418 (Leaflet 3).

44. All Defence sites **must** have a waste management plan or elimination plan in place which is integrated into the site Environmental Management System (EMS)<sup>1</sup>. In addition to detailing the carrier and consignee details, the waste management plan **must** also contain actions to aid the achievement of waste stream reduction targets.

45. Hazardous waste arising from Defence activities **must** be reduced and minimised. Where the production of waste is unavoidable it **must** be managed in accordance with the EMS.

46. Hazardous Waste **must** be stored in the correct specification containers. These **must** be located in a secure/controlled area with spill prevention/containment measures.

47. Defence contracting organisations, **must**, when letting contracts for waste services, provide assurance that waste service providers, throughout the supply chain, are appropriately licensed.

#### **Policy Statement 8**

The accountable person (AP) via their commander or line manager **must** make sure that personnel have access to all the relevant resources / equipment and information regarding procedures and arrangements for dealing with emergencies on their establishment / unit / platform.

48. The AP via their commander or line manager are responsible for making sure that all Defence personnel and visitors within their area of responsibility have received adequate training and / or been briefed in the local emergency procedures for example a Unit Spill Response Plan, to understand what action is required of them in the event of an emergency or disaster.

49. For Defence personnel, visitors and contractors, who may have a disability, medical condition etc. (temporary or permanent) which may affect their ability or the ability of others to respond or react to an emergency; a risk assessment (JSP 375, Volume 1, Chapter 8) should be conducted and a Personal Emergency Evacuation Plan (PEEP) produced to ensure their timely evacuation without assistance from the Emergency Services unless their assistance has been pre-agreed. Further details can be found in JSP 375, Volume 1, Chapter 1.

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<sup>1</sup> Arrangements might be included in other documents rather than a specific EMS.

50. Any additional emergency procedures specific to the risk assessment **must** be clearly documented and recorded on the COSHH assessment form; these are in addition to the existing emergency arrangements. Emergency Services information needs to be building location specific and available out of normal working hours. These may include notification to the local fire service of substances held at the establishment / unit / platform, to aid them in awareness of hazards should they need to attend.

## Part 2: Guidance

This part provides the guidance and best practice that **should** be followed using the Plan, Do, Check, Act approach and will help you to keep to this policy.

### PLAN - identify problems and opportunities

1. Like any health and safety assessment, a COSHH assessment **should** begin with a thorough walk-around observation of all areas and processes in the workplace, including waste storage and disposal systems (the COSHH Assessment Process Flowchart is at Annex A of this chapter).
2. The requirement following substances directly identified, is to design and operate processes and activities to minimise emission, release and spread of substances hazardous to health, by considering the following:
  - a. consider ways to achieve and maintain control of exposures where prevention is not deemed practicable (decisions **should** be recorded), e.g. ventilation systems, containment, substituting materials;
  - b. disposal and other similar issues following an incident have been considered and documented;
  - c. this information may also inform the final equipment disposal requirements allowing the risk from such activities to be considered and planned for early on the equipment life cycle;
  - d. identify all potentially exposed groups (including cleaners and maintenance);
  - e. list significant sources of exposure and how people could be exposed;
  - f. reduce number of sources;
  - g. reduce emission rate;
  - h. segregation of large sources;
  - i. enclosure of sources;
  - j. Local Exhaust Ventilation (LEV);
  - k. lessons learned, and resultant amended work processes should controls prove inadequate; or
  - l. organise the work to minimise the number of people exposed and the duration, frequency, and level of exposure.
3. Consider all relevant routes of exposure - inhalation, skin absorption and ingestion - when developing control measures, consider the following:
  - a. how does contaminant get into the air?
  - b. how does contaminant get onto skin, eyes, and other soft tissue?

- c. looking at the process which is the greater exposure risk (consider the environment the process is in); and
  - d. how could contaminant get into water?
4. Control exposure by measures that are proportionate to the health risk, consider the following:
- a. what are the long and short term health effects?
  - b. is there a need for measuring exposures to ensure that assessments are valid and that the control measures implemented are effective in reducing exposures?
  - c. is there enough information to decide the risk to health?
  - d. have Workplace Exposure Limits (WEL) been assigned?
  - e. is health surveillance required?
  - f. are the proposed control measures likely to be sufficient to control exposure adequately, i.e. below the WELs?
  - g. how often will the control measures be reviewed and by whom?
5. Choose the most effective and reliable control options which minimise the escape and spread of substances hazardous to health, consider the following:
- a. can the process or substance be eliminated / substituted?
  - b. can process be modified to reduce spread, emissions and use less of substance?
  - c. minimising numbers of personnel involved in the activity.
  - d. maintaining good hygiene practices, e.g. cleaning of workplaces to reduce the potential for exposures via ingestion for example.
  - e. are the working methods compatible with the control measures?
  - f. have the control measures been integrated with the work process?
6. Where adequate control of exposure cannot be achieved by other means, provide, in combination with other control measures, suitable PPE, consider the following:
- a. list types, required specifications and where use is required.
  - b. RPE, which **must** fit correctly and be worn correctly. (Fit testing required - see JSP 375, Volume 1, Chapter 15.)
  - c. is it compatible with the task?
  - d. have the wearers received training and information about the equipment and how to look after it?

e. correct storage will be needed to reduce the risk of contamination and further incidental exposure (see JSP 515).

f. who is going to be responsible for checking and maintaining the equipment?

7. Inform and train all employees on the hazards and risks from the substances with which they work, and the use of control measures developed to minimise the risks, consider the following:

a. ensure information about the health risks, the control measures etc are communicated to those carrying out the task, and that any training required to carry out the task has been completed and recorded.

b. use of control measures by employees, ensuring it is part of work instructions.

8. Ensure that the introduction of control measures does not increase the overall risk to health and safety, consider the following:

a. emergency procedures, including for example fire and evacuation and spillage plan/procedures, are in place and demonstrated on a regular basis.

b. assess proposed control measures to ensure that no new risks are introduced or that they are adequately controlled such that the overall risk of exposure is minimised.

## **DO - implement potential solutions**

### **Assessing the Risk**

9. Assess the risks, identify what could cause harm in the workplace, who it could harm and how, and what you will do to manage the risk.

10. The Health and Safety Executive (HSE) guidance is explicit that where there is a practical cost-effective solution, then the solution **should** be adopted. Where specific controls have been identified but it is not reasonably practicable to implement them, there is a requirement for the justification for rejection to be recorded and included in the activity, process, or project documentation. However, if such controls are not practicable given the working environment or where adequate control of exposure cannot be achieved by other means or if there is a temporary failure of control measures, then PPE or RPE will need to be used. The use of PPE or RPE will often be required for maintenance operations for which the risk of exposure must be COSHH assessed.

11. The assessment **should** consider activities and processes and **should** NOT just be substance specific. Whilst substance specific assessment may appear an easier way of doing the assessment it does not enable consideration of the interfaces and additive effects where more than one substance is used in a task.

12. Therefore, the assessment **should**:

a. fully identify the activity or process;

b. identify all substances or products being used or produced;

c. consider who and how many are likely to be exposed, how and for how long;

d. a COSHH register will help track items in circulation and assist in stock control and waste management;

e. consider storage of items and the control of hazardous substances. A storage plan may be created, and colour coded to assist in segregation of high-risk items, cages and locked cabinets used where required; and

f. consider exposure resulting from accidents, incidents, and emergencies.

13. The management of COSHH risks **should** be controlled using the following in order of priority:

a. elimination of the hazard;

b. substitution of the hazard (alternative substances or procedures);

c. hazard control (e.g. physical protective measures, engineering control);

d. provision of safety procedures or Safe Systems of Work; and

e. provision of personal and / or respiratory protective equipment.

14. Where substances are purchased from outside the EU or the hazard is a by-product of a process (e.g. fume from welding or wood dust from machining), this information may not be readily accessible (HSE advice sheets cover some processes but not all). In these cases, assistance / advice **should** be sought from a competent person (e.g. an occupational hygienist) on the properties of the substance or process. It is not acceptable to allow substances or processes into use without proper assessment of the health risks.

15. The assessment **should** consider all routes by which exposures to hazardous substances may occur (inhalation, skin contact, ingestion, eye contact etc) and under all circumstances, hence assessors **should** have working knowledge of these processes and activities in order to complete the required 'suitable and sufficient' assessment. It **should** also consider if any end users might be more vulnerable, i.e. pregnant workers, young persons.

16. There are a number of inter-related factors that can affect the risk from exposure:

a. the type of damage or harm that the substance can cause, and the amount needed to cause it;

b. how much of the substance is likely to be: ingested, get airborne and breathed in, or come into contact with the skin or eyes;

c. the duration of exposure and environmental conditions;

d. the amount being used and its physical properties i.e. its dustiness or volatility; and

e. interaction with other substances (synergistic effects, simultaneous or sequential exposure).

17. The Material Safety Data Sheet (MSDS) for most substances procured by Defence and classified as 'hazardous' are available from JSP 515. The [Hazardous Stores Information System \(HSIS\)](#) is only accessible via the Defence intranet. Any changes or updates to the substances used **should** be passed to the Defence Movements and Transport Policy Division so that the HSIS database can be updated.

18. The MSDS is the principal source of information for most substances and forms the basis of the assessment process; therefore, assessments cannot be easily completed if this information is not available. Manufacturers and suppliers have a legal requirement to provide that information. Users and maintainers have a legal requirement to apply the information.

19. [COSHH Essentials](#) is a simple to use online system that is menu led using the information provided in the MSDS to produce generic advice. It can be used as a simple initial assessment to identify and record significant findings. However, as it is a legal requirement that the risk assessment be 'suitable and sufficient', the generic information provided **should** only be used as guidance to assist in completing the full risk assessment.

20. Information on the COSHH Essentials process is available on the HSE website<sup>2</sup>. Users of the online system **should** note that COSHH Essentials assessments are only held on the database for 30 days from completion but **should** be downloaded and stored electronically to provide an auditable record.

21. COSHH Essentials follows a step by step process resulting in a recommended control approach. Supporting this are Control Guidance Sheets that the HSE have produced. Whilst it is not expected that these approaches will apply in all cases, the principles **should** be used with suitable adjustments to enable appropriate controls to be implemented. The assessment summary and Control Guidance Sheets **should** provide the user with enough information to identify if specialist help is required to complete a full COSHH risk assessment. If COSHH Essentials has been used the output **should** be saved and if necessary, kept with the MOD Form 5011.

22. The completed assessment **should** be recorded using MOD Form 5011 and passed to the commander, line manager or project leader for implementation of the control measures and inclusion on the establishment / unit / platform COSHH Master Register (MOD Form 5011a).

23. Where specialist advice is required, or training identified, specialist groups (e.g. establishment safety advisers, safety focal points, area safety groups, relevant CESO organisations) **should** be contacted who have access to Defence occupational hygiene support and environmental health professionals.

## **CHECK - assess the results**

### **Review and measure performance**

24. Assess how well the risks are being controlled and if you are achieving a safe working environment. In some circumstances formal audits may be useful, however there **should** be continual review of control measures to ensure effectiveness.

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<sup>2</sup> HSE website: [www.hse.gov.uk](http://www.hse.gov.uk).



25. An initial review **should** take place shortly after implementation, in order to check the effectiveness of control measures.
26. Subsequent reviews **should** be undertaken:
- a. should an accident or incident occur;
  - b. when there has been a significant change in the activity or process (location, duration, quantity etc);
  - c. there is reason to suspect that the assessment is no longer valid;
  - d. there is a change in personnel e.g. the operator or line manager; and
  - e. at a frequency based on the risk but normally not exceeding every two years.
27. Each review **should** include the manager's assessment of the effectiveness of control measures, and any further controls that may be required.
28. Check and review regularly all elements of control measures for their continuing effectiveness, consider the following:
- a. arrange exposure monitoring and health surveillance where required;
  - b. checks of LEV systems, to follow LEV engineer guidance booklet and log into logbook each time before use, to check all of the system in between statutory testing and examination;
  - c. maintenance of control measures including statutory examination and testing by competent engineers;
  - d. review written instructions and operating procedures, do they encourage use of controls and training; and
  - e. check process regularly for signs of effectiveness / failure, e.g. visible dust on surfaces = possible leakage.

## **ACT - implement improved solutions**

### **Review the performance**

29. Learn from any accidents or incidents, ill health data, errors and relevant experience picked up through the risk assessments and control measures in place.
30. Revisit plans, policy documents and risk assessments and take appropriate amendment action on any lessons identified, including from audit and inspection.

### **Retention of Records**

31. All records including the establishment / unit / platform register, risk assessments, etc. **should** be kept in accordance with [JSP 375, Volume 1, Chapter 39](#).

## Related Documents

32. The following documents **should** be consulted in conjunction with this chapter:

a. **JSP 375, Volume1:**

- (1) Chapter 08 - Risk Assessment;
- (2) Chapter 14 - Health Surveillance and Health Monitoring;
- (3) Chapter 15 - Personal Protective Equipment and Respiratory Protective Equipment; and
- (4) JSP 515 - Hazardous Stores Information System.

b. **Forms:**

- (1) MOD Forms 5011 and 5011a.

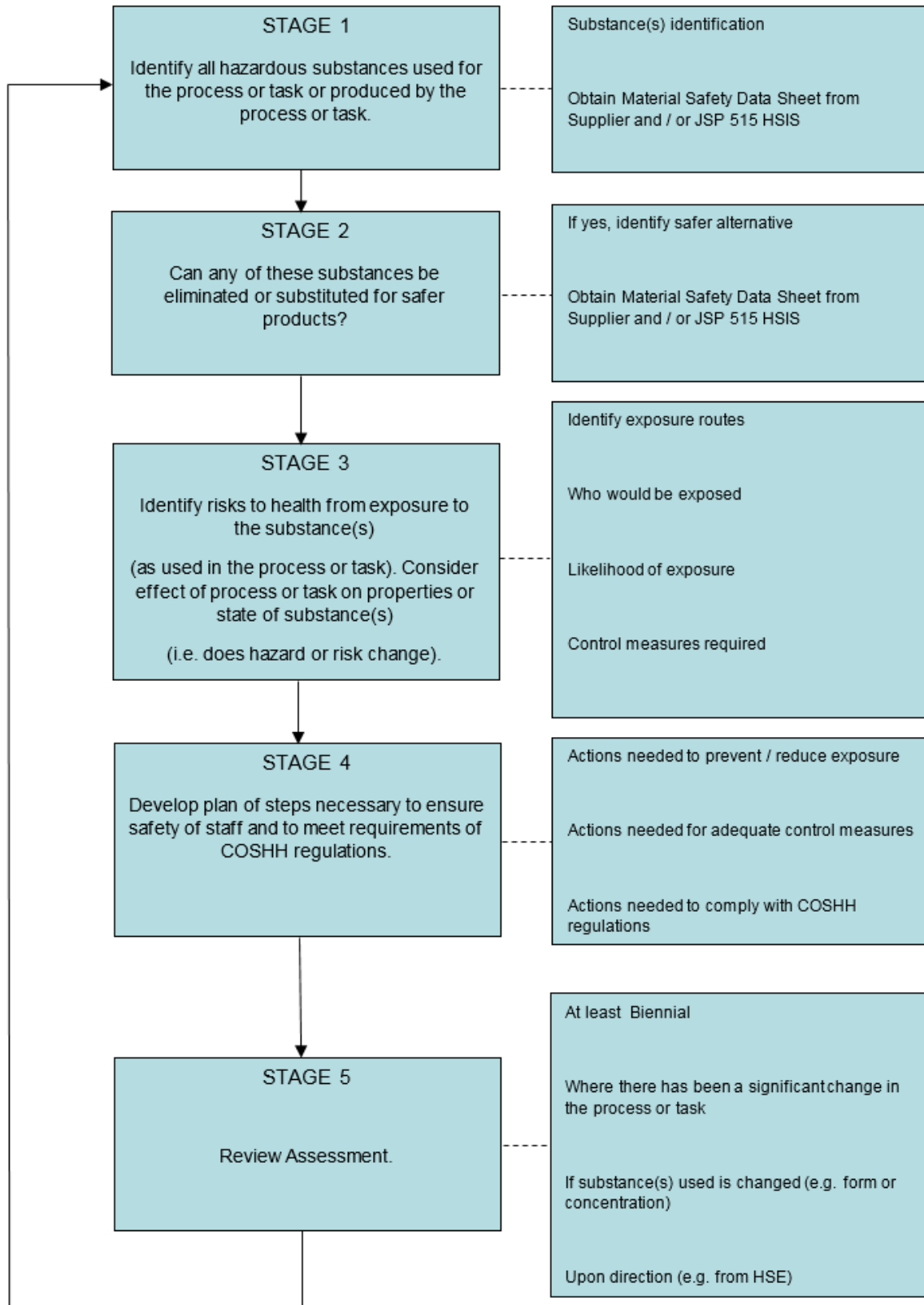
c. **Other Defence Publications:**

- (1) DSA 01.1 - Defence Policy for Health, Safety and Environmental Protection;
- (2) DSA 01.2 Chapter 2 - Requirement for Safety and Environmental Management Systems in Defence;
- (3) DSA 01.2 Chapter 4 - Risk Management in Health, Safety & Environmental Protection;
- (4) JSP 515 - Hazardous Stores Information System; and
- (5) JSP 418, Part 2, Leaflet 5 - Management of Hazardous Substances and Restricted Materials.

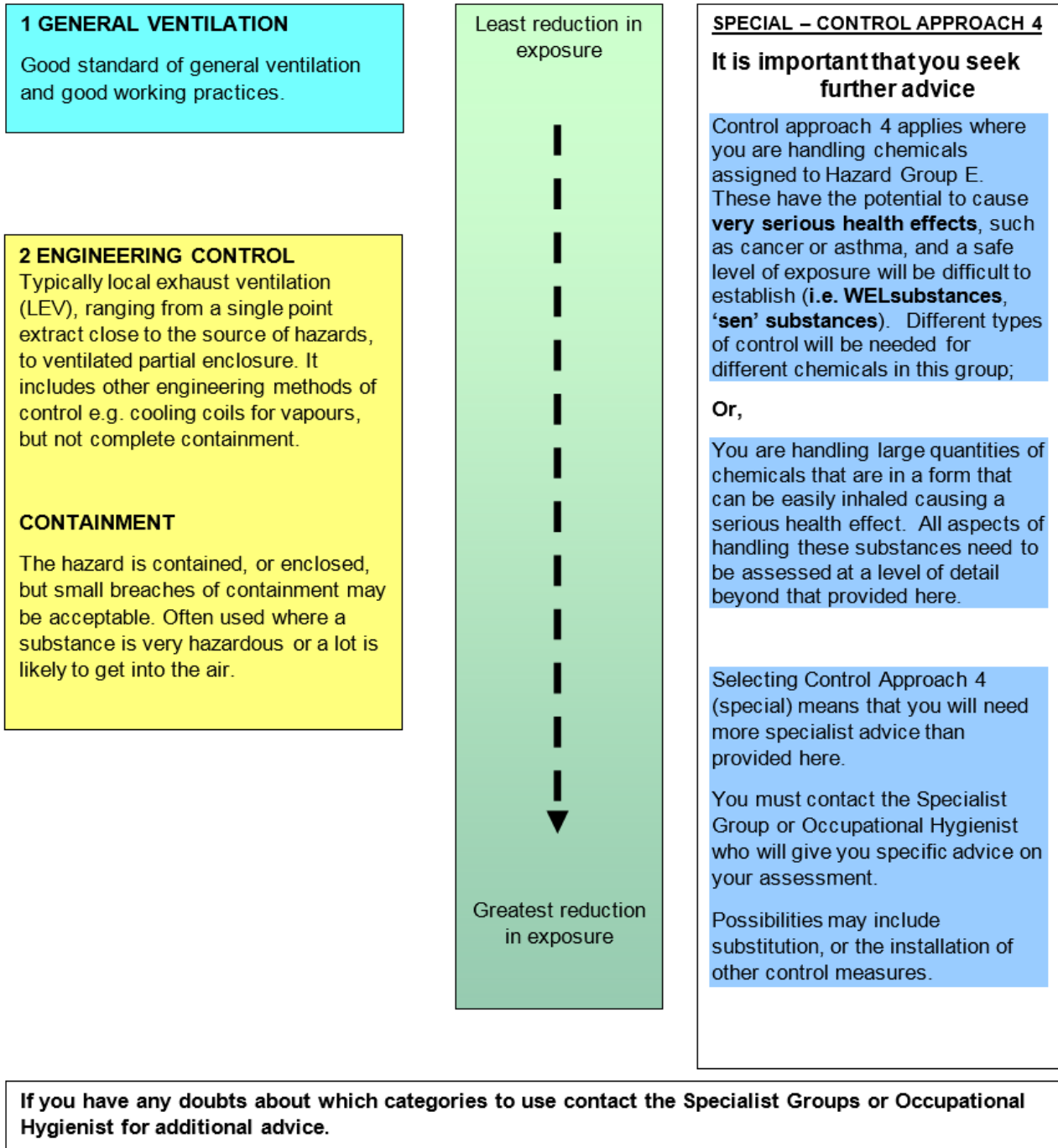
d. **HSE Guidance:**

- (1) [HSE L5 - Control of substances hazardous to health](#);
- (2) [HSE HSG 97 - A Step by Step guide to COSHH Assessments](#);
- (3) [HSE HSG 258 - Controlling airborne contaminants at work - A guide to local exhaust ventilation \(LEV\)](#);
- (4) [HSE HSG 53 Respiratory Protective Equipment at Work](#);
- (5) [HSE EH40/2005 - Workplace Exposure Limits](#);
- (6) [HSE INDG 136 - Working with substances hazardous to health](#); and
- (7) [HSE INDG 346 - Chromium and you](#).

## COSHH ASSESSMENT PROCESS FLOWCHART



## IDENTIFYING CONTROL APPROACHES



## COSHH ASSESSOR COMPETENCE REQUIREMENTS

1. Those persons most likely to be competent assessors will usually have:
  - a. A basic understanding of the COSHH Regulations, or have access to someone who does. The assessor or their adviser will need a good working knowledge of the content and principles of the Approved Code of Practice (ACOP) and relevant guidance;
  - b. The ability to systematically gather relevant information about how exposure may occur and the risks to health from that exposure. This requires the ability to:
    - (1) understand the significance of what is being observed during the process, particularly if it is different from written procedures;
    - (2) identify where operational conditions may influence the way the process is carried out and how this may affect the risk to health / exposure;
    - (3) identify and review technical literature where relevant;
    - (4) ask relevant questions of operators, supervisors, managers, advisers etc and draw all the information together from all sources in a systematic way, to estimate likelihoods and consequences; and
    - (5) form valid and justifiable conclusions about the risks to health.
  - c. The ability to specify the actions required to comply with the regulations. This involves:
    - (1) asking fundamental questions about whether exposures need to occur (i.e. can process or substances be eliminated);
    - (2) having an appreciation of the range of possible control measures and the actions required to maintain those control measures; and
    - (3) ability to look critically at existing arrangements and identify where they may not be appropriate and / or effective (assistance may be required from specialists).
2. Understand their limitations - the assessor **should** know or be aware of where expertise that is likely to be required during the assessment process can be sourced, and to know at what stage that expertise will need to be involved, e.g. air monitoring (exposure monitoring) **should** only be carried out by professionally trained persons.
3. Occupational hygiene advice on the selection and fit testing of respiratory protective equipment **should** be sought where its use has been identified.

4. Make a report effectively communicating the findings about the risks and the precautions to be taken to all stakeholders (therefore the assessor **should** be in such a position that all stakeholders can be identified, and the information provided).

## **GLOSSARY OF TERMS**

Absorption	Uptake of material into the body, e.g. the blood, cells, organs, etc. Skin, inhalation, ingestion, and injection are routes by which substances can enter the body (see also Inhalation and Ingestion).
Accident	An unplanned or unforeseeable event that caused injury or occupational disease to a person or which caused/had the potential to cause a RIDDOR Dangerous Occurrence (see also Incident).
Accountable Person (AP)	This means a person has been appointed and their Terms of Reference state they are responsible for making sure there are suitable and sufficient systems in place for the control of HS&EP risks on their Establishment / Unit / Platform. This term is used in place of CO, HoE, OC, Station Commander etc or as decreed by the Military Commands / Defence organisations.
Additive / Synergistic	Substances said to be additive are those having or relating to an effect that is the sum of individual effects. Those said to be synergistic in their effects when they act either on the same organs or by the same mechanisms so that the overall effect is considerably greater than the sum of the individual effects. This may arise from mutual enhancement of the effects of the constituents or because one substance 'potentiates' another causing it to act in a way it would not if used on its own.
Advice	Providing specific and practical direction on the action(s) to be taken to ensure compliance. Advice stops short of telling a participant exactly what to do, but if followed, should contribute to enabling a compliant solution.
As Low As Reasonably Practicable (ALARP)	When risks are tolerable and have been reduced to a level where applying further controls would be extremely disproportionate to the benefit that would be gained. The term means essentially the same thing as So Far As Is Reasonably Practicable (SFAIRP) and at their core is the concept of 'reasonably practicable'.
Assessment	The formal review of a Safety document or other written product.
Carcinogenic	A substance is said to be carcinogenic if, after inhalation, ingestion or penetration of the skin occurs, it may induce cancer in humans or increase its incidence.

Commander	Refers to any military person responsible for planning activities and making sure personnel are safe. This term refers to a role rather than the rank of commander.
Competent Person	Competence can be described as the combination of training, skills, experience, and knowledge that a person has and their ability to apply them to perform a task safely. Other factors, such as attitude and physical ability, can also affect someone's competence.
Control Measures	A method for reducing exposure to external influences, e.g. substitution, engineering control, respiratory protective equipment. The right combination is crucial. No measures, however practical, can work unless they are used properly.
Defence organisations	Refers to Military Commands, Top Level Budgets (TLBs), Defence Nuclear Organisation (DNO) and Enabling Organisations (EOs) collectively.
Dust	Created when solid materials are broken down into fine particles. The smaller the dust, the longer it remains in the air and the easier it is to inhale.
Environment	Surroundings which a system or organisation effects, including air, water, land, natural resources, flora, fauna, and their interrelation with humans (third parties).
Establishment	A geographical Area of Responsibility (AoR) with a fixed boundary, where access to or egress from a place of work can be controlled. Government property in the form of a building, group of buildings within a site, or group of sites, garrison or garrisons, base or training area of an estate, facility, range, or exercise area.
Fume	Created when solid materials (usually metals) vaporise when subjected to high temperatures. The metal vapour rapidly cools and condenses into an extremely small particle, with particle size generally less than one micrometre in diameter.
Gas	Substance similar to air which becomes airborne at room temperature and, because they are able to diffuse or spread freely, can travel very far, very quickly.
Guidance / Guidance Material	Advice or information aimed at providing a consistent approach to an issue or subject as given by an authority in order to provide additional explanation, assist in application of a regulation or help illustrate meaning. Will assist in compliance as part of good practice.



Hazard	Is the actual or potential condition that can cause injury, both immediate and delayed, illness or death of personnel or damage or loss of equipment or property.
Health, Safety and Environmental Protection (HS&EP)	An umbrella term for the laws, rules, guidance, and processes designed to help protect employees, the public and the environment from harm in the workplace within the Ministry of Defence
Health surveillance	Systematic, close overview of an individual's health.
Health and Safety Executive (HSE)	Is a non-departmental public body of the United Kingdom. It is the body responsible for the encouragement, regulation and enforcement of workplace health, safety, and welfare, and for research into occupational risks in England and Wales and Scotland.
Incident	An unplanned or unforeseeable event which causes loss or damage to property, plant or equipment, or the environment due to shortfall in safety measures (see also Accident and Near Miss).
Ingestion	Taking in of material via the mouth.
Inhalation	The process or act of breathing in, taking air and sometimes other substances into your lungs.
Likelihood	Estimate of the probability or frequency of a risk occurring in a specified time period, based on the description of its cause, event and consequences.
Line Manager	Refers to civilian personnel responsible for planning activities, supervising activities, and making sure personnel are safe. In parts of Defence this means the 'delivery manager'.
Management System	A system to establish policy and objectives or to achieve those objectives.
Maintenance	The combination of all technical and administrative actions, including supervision actions, inspection, testing, servicing, and classification as to serviceability intended to retain an item in a state in which it can perform a required function.
Material Safety Data Sheet (MSDS)	An important document that contains the information necessary for the safe supply, handling, and use of hazardous substances and should contain the information necessary to undertake a risk assessment as required by COSHH. This term is still used in legislation e.g. COSHH, however, the term Safety Data Sheet (SDS) is becoming more commonly referred to by suppliers and is in line with the REACH regulations and as detailed in JSP 515.

Military	The word 'military' covers all the Services, including Regular, Reserve and Cadet Forces.
Mist	Tiny liquid droplets that are formed from liquid materials by atomisation and condensation processes such as spraying. Many mists are a combination of several hazardous ingredients.
Must	Where this chapter says 'must', this means that the action is a compulsory requirement.
Notification	To Inform of something in a formal or official manner.
Operation	A sequence of coordinated actions with a defined military purpose and authorised by a formal order.
Organisation	Company, operation, firm, enterprise, institution or associations, or part thereof, whether incorporated or not, public, or private, that has its own functions and administration. For organisations with more than one operating unit, a single operating unit may be defined as an organisation.
Overseas	In or to a foreign country outside UK territorial waters.
Policy	A course or principle of action to be adopted.
Reasonably Practicable	A narrower term than 'physically possible' ... a computation must be made by the owner in which the quantum of risk is placed on one scale and the sacrifice involved in the measures necessary for averting the risk (whether in money, time or trouble) is placed in the other, and that, if it be shown that there is a gross disproportion between them – the risk being insignificant in relation to the sacrifice – the defendants discharge the onus on them. (Definition set by Court of Appeal in <i>Edwards vs National Coal Board</i> [1949]) (HSE).
Regulation	A 'rule or authoritative direction' having the effect of law, placing restriction on another organisation, or defining overarching mandatory activities or conditions that are to be met without exception. The act of regulating is the enforcement of compliance with a rule or authoritative direction prescribed by those delegated such authority.
Risk	The level of risk is determined from a combination of the likelihood of a specific undesirable event [hazard] occurring and the severity of the consequences, for example, how often is it likely to happen, how many people could be affected and how bad would the likely injuries or ill health effects be.

Risk Assessment	The process for measuring (estimating) the magnitude of the risk as part of mitigating it to ALARP and informing any decision on whether or not that risk is tolerable.
Risk Management	Process that encompasses systematic hazard identification, risk assessment, hazard risk matrix, risk reduction and risk monitoring, evaluation, and review.
Safe	Freedom from unacceptable or intolerable conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment.
Safety	The freedom from unacceptable risks of harm to personnel and material at all times.
Safety Case	A structured argument, supported by a body of evidence that provides a compelling, comprehensible, and valid case that a system is safe for a given application in a given operating environment.
Severity	Is the degree of injury, numbers of personnel affected, property damage, or other factors that could occur as a result of a hazard being realised.
Should	Where this chapter says 'should' this means that the action is not a compulsory requirement but is considered best practice to comply with the Policy.
So Far As Is Reasonably Practicable	Legal phrase used in Health and Safety at Work Act etc 1974, which is alternatively referred to as ALARP, the degree of risk where the trouble, time and money needed to reduce that risk starts to become disproportional to the derived benefit.
Subject Matter Expert	The individual or organisation most directly concerned with a specific subject. Whilst the sponsor of the subject remains ultimately accountable for the subject, an SME is responsible for the completeness and technical accuracy of the information they provide and for notifying the sponsor when the information changes or requires amendment. The SME may appoint additional SMEs to assist in providing information.
Time Weighted Average (TWA)	This term applies to exposure to airborne concentrations of substances averaged over a time period. The two periods used are: long term (8 hours) and short term (15 minutes). Short term exposure limits (STEL) are set to help prevent effects, such as eye irritation, which may occur after exposures of a few minutes.

Vapour	Gaseous state of substances that are either liquids or solids at room temperature. They are formed when solids or liquids evaporate.
Workplace Exposure Limits (WELs)	Are occupational exposure limits (OELs) set under COSHH in order to help protect the health of workers. They are concentrations of hazardous substances in the air averaged over a specified period of time referred to as a time weighted average (TWA).
Young person	<p>In this chapter a young person is defined as:</p> <p>(a) a person aged 16 years, from the date on which he attains that age until and including the 31st August which next follows that date.</p> <p>(b) a person aged 16 years and over who is undertaking a course of full-time education at a school or college which is not advanced education.</p> <p>(c) a person aged 16 years and over who is undertaking approved training that is not provided through a contract of employment.</p> <p>For the purposes of paragraphs (b) and (c) the person:</p> <p>(a) must have commenced the course of full-time education or approved training before attaining the age of 19 years; and</p> <p>(b) must not have attained the age of 20 years.</p>

## MANAGEMENT OF HEXAVALENT CHROMIUM (Cr(VI)) IN DEFENCE

### Introduction

1. There are a large number of Hexavalent Chromium (Cr(VI)) compounds, all of which are hazardous to health and most are known carcinogens. This Annex addresses the management of Cr(VI) in Defence, it subsumes the information that was previously provided in the Defence Instruction Notice (DIN) 2020DIN06-024.
2. There are three areas of concern regarding Cr(VI) in Defence:
  - a. Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) authorised Cr(VI) compounds which are managed using REACH.
  - b. Legacy materials containing Cr(VI) which are managed under Control of Substances Hazardous to Health (COSHH).
  - c. Cr(VI) generated through the welding, braising or high temperature operation of chromium containing alloys.

### Roles and Responsibilities Summary

3. This information applicable to anyone who may be working in the presence of Cr(VI) and its compounds, as described at paragraph 23, and anyone who authorises such work.
4. Authorisers are responsible for:
  - a. assessing the risks to health and any precautions needed for protection;
  - b. preventing any exposure to Cr(VI) or, where this cannot be reasonably be achieved, adequately control exposure;
  - c. maintaining all fume and dust controls in efficient working order;
  - d. providing fit testing of any tight-fitting respirators;
  - e. finding out how much chromium staff may be exposed to, normally through a monitoring programme, and informing staff of the results;
  - f. arranging any necessary health checks; and
  - g. informing, instructing, and training all colleagues who may be exposed to Cr(VI).
5. If you may be working in the presence of Cr(VI), you should:

- a. be aware of where Cr(VI) can be found, as detailed in this Annex and the associated risk assessments;
- b. use extraction equipment or any other control measures correctly;
- c. use the protective clothing and equipment provided;
- d. always use the washing facilities provided;
- e. if you have to wear a respirator, ensure it fits properly, is clean, and that the filter is changed regularly;
- f. report defects in enclosures, extraction equipment, or other control measures; and
- g. don't eat or drink in work areas where Cr(VI) may be present.

## Cr(VI) residues

6. Cr(VI) residue has been found around gas turbine propulsion systems.

7. Hexavalent Chromium can present as white, yellow, orange, or dark brown powder residues. They have been found in association with high chromium alloys, particularly high temperature nickel and stainless-steel alloys. They can be formed when such alloys are brazed or welded. It is also possible that small amounts of Cr(VI) can be formed if these alloys are heated above ~300°C in the presence of catalysing agents such as calcium barium and magnesium, which can be found in greases and anti-seize compounds.

8. This is a developing picture, potentially across all equipment, where high chrome alloys are exposed to high temperatures. It **must** be noted that the presence of staining is not necessarily indicative of the presence of Cr(VI) and the lack of visible staining does indicate that there is no Cr(VI) present on a surface. Until the risks associated with high chrome alloys have been fully assessed, any such alloys which are subject to temperatures over 300°C should be treated as having Cr(VI) present.

## Cr(VI) in the supply chain

9. Cr(VI) has been used in paints, sealants, jointing compounds, pre-treatments and many other products as catalysts and corrosion inhibitors. The list of compounds that are subject to REACH authorisation is given at paragraph 12. There are a number of Cr(VI) compounds that are not subject to authorisation. There are many examples in aircraft, land vehicles, ships, weapons, and equipment where Cr(VI) has been used in the past and, whilst no longer applied, or procured, could still be present. In this case these are covered under COSHH and the additional REACH safety and reporting requirements do not apply. (for further information then please contact the DE&S Quality, Safety & Environmental Protection ([QSEP](#)) team). In many cases these compounds are still present on legacy equipment within Defence.

10. Since July 2017, certain Cr(VI) compounds have been banned from use under Annex XIV of the Registration, Evaluation, Authorisation and Restriction of Chemical substances (REACH) Regulation (EC) No 1907/2006, due to their carcinogenic properties. As a result, these chemicals now require authorisation before use based on specific use cases and supply chain availability.

11. After a transition period the EU REACH Regulations were brought into UK law under the European Union (Withdrawal) Act 2018. REACH, and related legislation, were replicated in the UK with the necessary changes to make it operable in a domestic context and the key principles of the EU REACH Regulations were retained. The domestic regime operating in the UK since the 1 January 2021, is known as UK REACH. Please visit <https://www.hse.gov.uk/brexit/reach-guidance.htm> for more information.

12. The following are the Cr(VI) components that are subject to authorisations, there are a number of Cr(VI) compounds not subject to authorisation and these can be found on the UK REACH Authorisations list (annex XIV) at this link: <https://www.hse.gov.uk/reach/authorisation-list.htm>.

- a. [Strontium Chromate](#).
- b. [Potassium Hydroxyoctaoxodizincatedichromate](#).
- c. [Potassium dichromate](#).
- d. [Sodium dichromate](#).
- e. [Dichromium tris\(chromate\)](#).
- f. [Chromium Trioxide](#).

13. The existing authorisations permit selective uses of Cr(VI) with the implementation of appropriate risk management measures. Noting that although Chromium Trioxide is yet to be authorised it is anticipated that similar arrangements will be required within the near term. The Control of Substances Hazardous to Health (COSHH) 2002 and REACH Regulations form part of the legal framework to control the use and exposure to hazardous substances, including Cr(VI), within the workplace. However, the requirements for the use of Cr(VI) under a REACH authorisation exceed the requirements for the management of Cr(VI) under COSHH as it currently stands.

14. Recent changes to these authorisations have resulted in extra safety and reporting requirements from those at risk of exposure, known as Downstream Users (DUs). DUs are defined as organisations or individuals who use a substance, either on its own or in a mixture in their industrial or professional activities, across Defence this is likely to include some service personnel.

15. To ensure the safety and wellbeing of personnel, Defence has a responsibility to manage hazardous substances and restricted materials (HSRM) in accordance with legislative and policy requirements. It is the Delivery Team and/or Equipment Authority responsibility to ensure these requirements are met through Risk Assessments, Safety Data Sheets and MOD Technical Dossiers in accordance with the Acquisition Safety and Environmental Management System (ASEMS) and JSP 418. In addition, Delivery Teams and/or Equipment Authorities are required to communicate with the relevant Original Equipment Manufacturers (OEMs) and DU's, to make sure that the supply of new equipment is compliant with REACH, including any authorisation requirements.

16. The OEMs are the authorisation holders who form part of the consortia for each respective authorisation and ultimately responsible for the REACH Cr(VI) authorisations in place for the products they supply. It is their responsibility under REACH to provide information to the Delivery Team and/or Equipment Authority often through Safety Data Sheets. However, it is essential that DUs i.e. Military commands, make sure the necessary risk assessments are carried out, controls are put in place and any monitoring requirements of the individual authorisations are completed. This includes any additional exposure data monitoring is submitted within the authorisation timelines, in addition to, their REACH Cr(VI) reporting obligations.

17. The Chief Environment and Safety Officer (CESO) or equivalent, points of contact (PoC) should collate this REACH Cr(VI) data for each of the sites, units or platforms affected and submit to DE&S Quality, Safety & Environmental Protection ([QSEP](#)) for submission to the external regulator. Noting a justification is still required for chromates used, that are below the reporting threshold.

18. The fulfilment of these terms to supply and control Cr(VI) products is a legal requirement and is essential that Delivery Teams and/or Equipment Authorities comply with the requirements in the authorisations and thus the products to which they apply. This also includes the use of new 'old stock' or repurposing old stock in a new build, if not covered by the authorisation under REACH. In instances where this has occurred, work should stop immediately and be reported to QSEP.

19. If there is a requirement to use chromates outside the authorisation in the interests of Defence or a security concern under the authorisations, there is potential for a REACH Defence exemption (this will be directed through QSEP to the Secretary of State, who will make the final decision). However, this must be requested with an accompanying submission pack a minimum of 4-6 months prior to use. Noting that in many cases the health and safety requirements under the authorisation would still apply. Failure to comply under REACH authorisation or apply for a Defence exemption is a breach of regulation and may result in certain chromate products being no longer available.

20. DE&S Quality, Safety & Environmental Protection ([QSEP](#)) has notified the European Chemicals Agency (ECHA) (pre Jan 2020) and the Health and Safety Executive (post Jan 2020) of the location of all known Cr(VI) across Defence.

### **Cr(IV) related health hazards**

21. The adverse effects on health associated with exposure to chromium vary according to valency state and water solubility, but it is the Cr(VI) compounds (chromium VI) which are of most concern.



22. The health hazards associated with Cr(VI) relate to inhalation/ingestion of dust, mist, and spray, or contact with the skin and eyes.
23. **Respiratory effects.** There is an increased risk of lung cancer from exposure to chromium VI compounds. Other effects associated with the inhalation of dust, mist, or spray from Cr(VI) compounds are:
- a. chemical irritation causing wheeze;
  - b. the development of breathing difficulties (including wheeze and/or a cough at night) that gets better at the weekend or while on holiday, and then returns when at work; and
  - c. irritation of the inside of the nose which may progress to an ulcer or unusual bleeding inside the nose.
24. **Skin effects.** The effects of Cr(VI) compounds on the skin include: (a) irritant reactions which may progress to an ulcer. This is particularly the case where skin cuts and abrasions already exist.
25. The skin should be checked regularly (with help from an Occupational Health team if required), as any red and inflamed skin should be considered something worthy of referral to Occupational Health, if employees are working in Cr(VI) generating work processes.
26. **Eye effects.** Direct contact and contamination of the eyes can result in irritation, and possibly ulceration. Again, any eye irritation or any problems in any aspect of vision, in those working in Cr(VI) generating processes, should be referred to an appropriate Occupational Health provider for review.

## People at risk of Cr(VI)

27. People at risk of exposure include those:
- a. working on articles previously coated with Cr(VI) paints, e.g. cutting, drilling, filing fettling abrading or machining painted articles.
  - b. conducting 'hot work' on high chrome alloys, such as welding and brazing or handling parts that are subject to high temperatures in normal use.
  - c. handling the Cr(VI) containing substances at paragraph 9 covered by the existing Cr(VI) authorisations that support the use of certain products in the aerospace and other industries.
  - d. maintaining gas turbines (e.g. aviation and maritime engines) where high chromium heat resisting alloy components are exposed to high temperatures (~300 °C and above).

## Prevention and control of exposure to Cr(VI)

28. All work with, or exposure to, Cr(VI) **must** be managed by undertaking and recording a suitable risk assessment in accordance with this chapter which mandates all hazardous materials should be managed using risk assessment and compliance with Control of Substances Hazardous to Health (COSHH) 2002 and REACH Regulations.

29. **Risk assessment.** An assessment of the health risks arising from the handling of Cr(VI) containing substances or activities where Cr(VI) may be present **must** be undertaken, together with the precautions necessary to prevent or adequately control them. This may require air sampling and biological monitoring.

30. **Prevention of exposure.** This should always be considered first. It may be possible to substitute the Cr(VI) containing substance with another less hazardous substance able to achieve the performance specifications required.

31. **Control of exposure.** Where Cr(VI) containing substances need to be used or are anticipated to be found during maintenance activities, exposure **must** be adequately controlled by a suitable combination of engineering and process control measures, along with the use of personal protective equipment (PPE), as appropriate. The provision of adequate control depends on:

- a. keeping personal exposures as low as is reasonably practicable and to below the workplace exposure limits (WELs) assigned for chromium and its compounds. As per the Health and Safety Executive's guidance<sup>3</sup>, these are as follows:
  - (1) for chromium (VI) products, 0.01 milligrams per cubic metre of air averaged over an 8-hour period (0.01 mg/m<sup>3</sup> 8-hr TWA).
  - (2) for process generated chromium (VI) compounds (e.g. welding fumes), 0.025 milligrams per cubic metre of air averaged over an 8-hour period (0.025 mg/m<sup>3</sup> 8-hr TWA).
- b. high standards of housekeeping to prevent or minimise contamination;
- c. the proper use of suitable PPE to avoid skin or eye contact and, where necessary, prevent inhalation of dust, mist, or spray;
- d. good personal hygiene standards. Skin conditions, cuts, and abrasions, in particular, should be protected from contamination; and
- e. careful handwashing before eating, drinking, and smoking, with care to ensure domestic/dining areas adjacent to Cr(VI) containing work processes are kept clean (with regular confirmation of cleanliness - CESOs and Occupational Hygiene can advise).

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<sup>3</sup> EH40/2005 (Fourth Edition 2020)

32. **Engineering control systems** may comprise total enclosure of the process or use of local exhaust ventilation systems. Work methods **must** not raise Cr(VI) containing dust and the use of compressed air for cleaning should be prohibited. Use wet wipes or a vacuum cleaner (with high-efficiency particulate air (HEPA) filters) to trap and remove the suspected Cr(VI) containing substances where possible.

33. Further specific measures which may be required by the risk assessment, include:

- a. minimising the number of persons exposed and periods of exposure;
- b. prohibiting smoking, eating, and drinking in contaminated areas;
- c. regularly cleaning work surfaces by a suitable safe method, to minimise contamination;
- d. the provision of suitable washing and changing facilities near at hand;
- e. demarcating potentially contaminated areas and displaying suitable warning signs; and
- f. safe storage, handling, and disposal of Cr(VI) containing substances.

34. **Personal Protective Equipment (PPE)**. Where PPE is identified as a control measure in the risk assessment this may include, but should not be limited to:

- a. facial PPE - a half-face mask with safety glasses/goggles which has been fit tested (QLFT), or a full-face mask which has been fit tested (QNFT), whereby the correct filtration will be determined based upon the known hazard;
- b. disposable chemical resistant gloves (EN 374-3 or equivalent);
- c. disposable coveralls with hood (Type 5/6 for particulate/limited splash, and Type 4 or Type 3 for chemical/liquid protection, depending on the hazard); and
- d. boot coverings.

## Maintenance of control measures

35. The maintenance of control measures should be covered as part of the risk assessment. All control measures should be maintained in efficient working order and good repair at all times.

36. Engineering control measures, especially extract ventilation systems, **must** be examined, and tested by a competent person and appropriate records kept, including but not limited to commissioning certificates and inspection/testing records. It is recommended that all engineering control measures in use also receive frequent visual inspections at least weekly.

37. Preventative maintenance procedures should indicate which engineering control measures are required for the work to be carried out, by whom, and how any defects found will be put right.

38. PPE should also be properly maintained, replaced as necessary, cleaned, and suitably stored when not in use.

39. Respiratory protective equipment (RPE) should be regularly maintained in accordance with the manufacturer's instructions to ensure that it remains effective. Maintenance includes replacing filters, cleaning, disinfection, examination, repair, testing, and record keeping.

## **Exposure monitoring**

40. The need for Exposure Monitoring is well defined in COSHH Regulations (Regulation 10). It offers an additional way to 'ring-fence' the hierarchy of control, and thus assure the effectiveness of those controls. This may be considered useful in circumstances where a risk assessment highlights that Cr(VI) may be a significant hazard to health.

41. Subject to a suitable and sufficient risk assessment, the Duty Holder may request support from an appropriate Occupational Health provider to assist in the periodic measurement of potential Cr(VI) exposure in the population at risk (PAR).

42. Any request to Occupational Health, for Exposure Monitoring, should be made following an appropriate Occupational Hygiene assessment, in order to further establish the risk to employees in light of an appropriate risk assessment review (with subject matter expert (SME) advice on the PAR and how best to reduce risk to As Low As Reasonably Practicable (ALARP)).

43. Occupational Hygiene specialists will then work in conjunction with Occupational Medicine to offer a suitable biological monitoring process to assist in ensuring the health and wellbeing of all potentially exposed employees.

44. Be aware that an Exposure Monitoring programme should be accompanied by an appropriate information and education package to ensure all relevant employees understand the programmes purpose, its scope, and outcomes. As Exposure Monitoring for Cr(VI) involves biological monitoring, it is essential that employees have all necessary information required to give informed consent. Early/proactive information and support, together with support throughout the process, yields better engagement and retention.

45. In the case of Cr(VI), Exposure Monitoring involves urine sampling in those identified as being PAR by the risk assessment. Where this is necessary, the Duty Holder is advised to establish a suitably qualified and experienced 'Tiger-team' to deliver a periodic programme with Occupational Hygiene and Occupational Health advisors included.

46. Where Exposure Monitoring is instigated, either as a result of a risk assessment review or as a result of a significant uncontrolled release of Cr(VI), the AP is to prioritise the health and wellbeing of the workforce and ensure appropriate information flow, education and wellbeing support for all employees associated with the work process.

47. The Duty Holder may also need to consider appropriate public relations support.

## Health surveillance

48. The need for health surveillance and its extent should be determined as part of the risk assessment, where health surveillance is a separate regulated activity under COSHH (Regulation 11). Its purpose is to identify disease before there is a loss of function (disablement) in any one employee.
49. Where health surveillance is necessary it should be carried out under the direction of a suitably qualified health professional, e.g. occupational health doctor or nurse (where Armed Forces Primary Care have suitably qualified and experienced assets).
50. Appropriate health surveillance may include initial health assessment along with periodic health assessment. Line managers should seek occupational health support to establish the most appropriate health surveillance strategy, suitable for their risk assessment. This will link with exposure monitoring where appropriate.
51. Regular skin inspection of hands and forearms should be carried out by an occupational health professional or, where appropriate, by a suitably trained responsible person (within the workforce).
52. An effective system should be provided for reporting to a responsible person any skin complaint, nasal or respiratory symptoms, or other effects which may be attributable to exposure to Cr(VI) pigments. Care should be taken to respond to reports appropriately and in a timely fashion.
53. An appropriate occupational medical opinion should be sought where ill-health effects are identified, so that prompt remedial action can be taken.
54. Personnel should be informed of the results of any tests for Cr(VI) and the results of any health surveillance. Care should be taken to ensure appropriate information is passed to the employer on a group basis (with individual information passed where appropriate and advised by an occupational health professional cognisant of relevant data protection regulations). Health surveillance data will be stored securely in the appropriate health record (for Service Persons this is the integrated medical record - in Defence Medical Information Capability Programme (DMICP)).
55. Where a suitably qualified health professional reports occupationally attributable health effects related to Cr(VI), the Duty Holder must immediately conduct a risk assessment review (including a review of the effectiveness of all elements in the hierarchy of control) to establish the PAR and that risk is ALARP. This risk assessment review may include a consideration with respect to periodic Exposure Monitoring (as above), to ensure the continued health and wellbeing of employees. The Duty Holder therefore needs a low-threshold to involve Occupational Hygiene SMEs where any line manager or responsible person reports cases that may be attributable to Cr(VI) exposure.