Use Chemicals Safely Seminar

20th October, 2016

Spencer Hotel, IFSC, Dublin 1

Chemical Agents Risk Assessment: a practical side

Michelle McDermott

HEALTH AND SAFETY AUTHORITY

Chemical Agent Risk Assessment

HEALTH AND SAFETY AUTHORITY

CHEMICALS- Identification

READ the label

BUT …. Not all chemicals have labels

- Asbestos

Practical Guidelines on ACM Management and Abatement .

- Carbon Monoxide

www.hsa.ie/eng/.../**Carbon Monoxide** Information Sheet.html

- Wood Dust

http://www.hsa.ie/eng/Publications_and_Forms/Publications/Chemical_and_Hazardous_Substances/Wood%20working%20Information%20Sheet.pdf

- Silica dust

http://www.hsa.ie/eng/Publications_and_Forms/Publications/Chemical_and_Hazardous_Substances/Crystalline_Silica_Dust_Information_Sheet.html

And often overlooked

- Household cleaning chemicals - Probably not an issue in most workplaces but if you work in childcare ……..
- Sensitive risk groups must be considered in initial risk assessment

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Compliance

- www.irishstatutebook.ie
- Safety, Health and Welfare at Work, (Chemical Agents) Regulations 2001
- Safety, Health and Welfare at Work, (Chemical Agents) (Amendment)Regulations 2015

Only the courts can interpret statutory legislation with any authority

Hazardous Properties

Is it solid, liquid, gas ? – properties can vary.

Sources of information include

- SDS & Label e.g. section 2 & 9
- Asbestos Survey
- Incidents
- Equipment Manuals
- Maintenance Requirements
- Regulatory Websites
- Safety Alerts
- Noise Survey
- Etc….

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Level, Type & Duration of Exposure

Consider all routes of exposure

- Dermal & “sk” notation
- Inhalation
- Ingestion
- Injection e.g. hydraulic penetration injury

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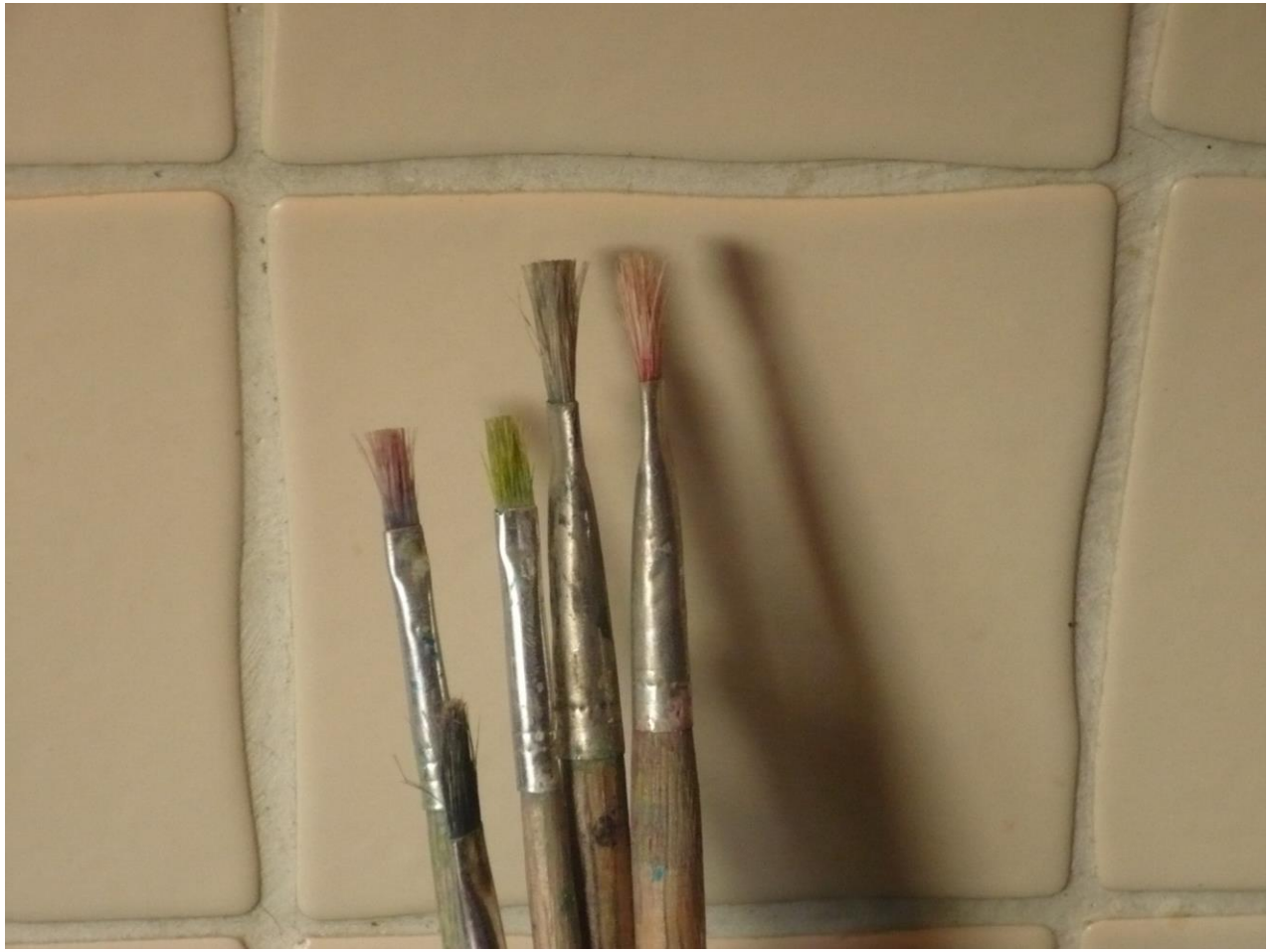
Circumstances of work



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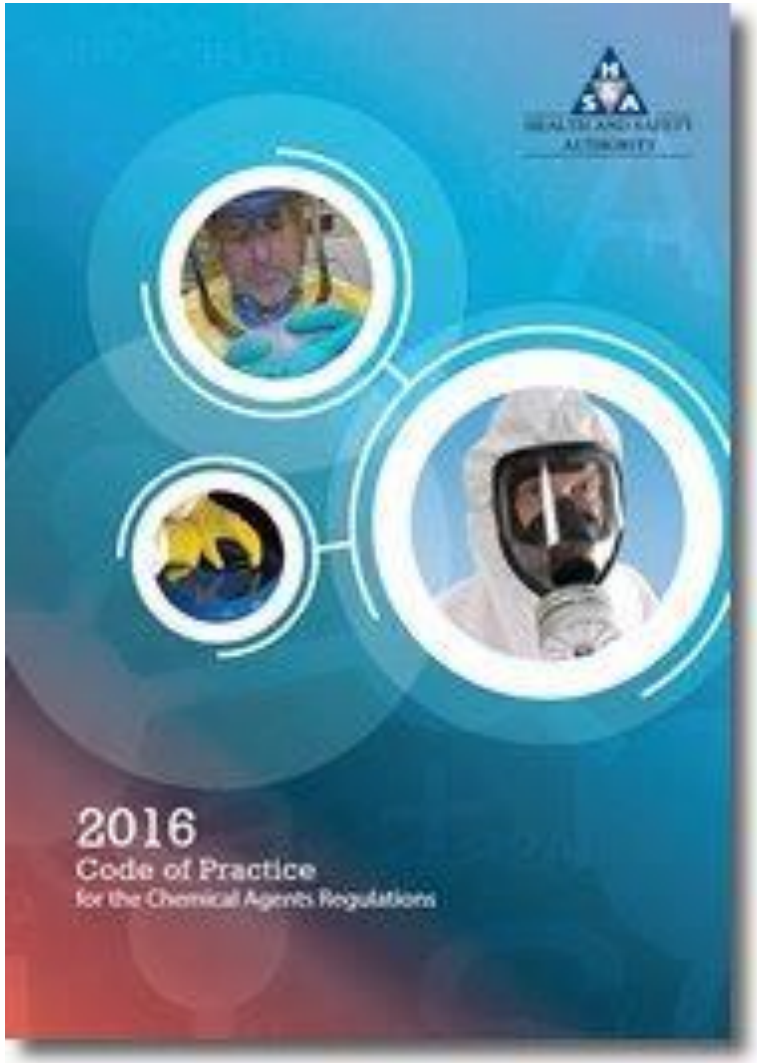
OEL, BLV



Examples from reports

"total inhalable dust ….7.3mg/m3….the results are within the limits.. no risk to employees…"

BUT Wood dust limit is 5mg/m3

&

"We used the standard NIOSH method 12345 **modified with PVA filters ….**"

Occupational_Hygiene_Report_Writing_Information_Sheet

Difference between Environmental Monitoring and Occupational Hygiene Monitoring

Combined and Sequential Exposure

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Controls and Surveillance

Quantities used and stored

Maintenance and Accidental Release

Storage

Transport

ATEX

Consultation

Training

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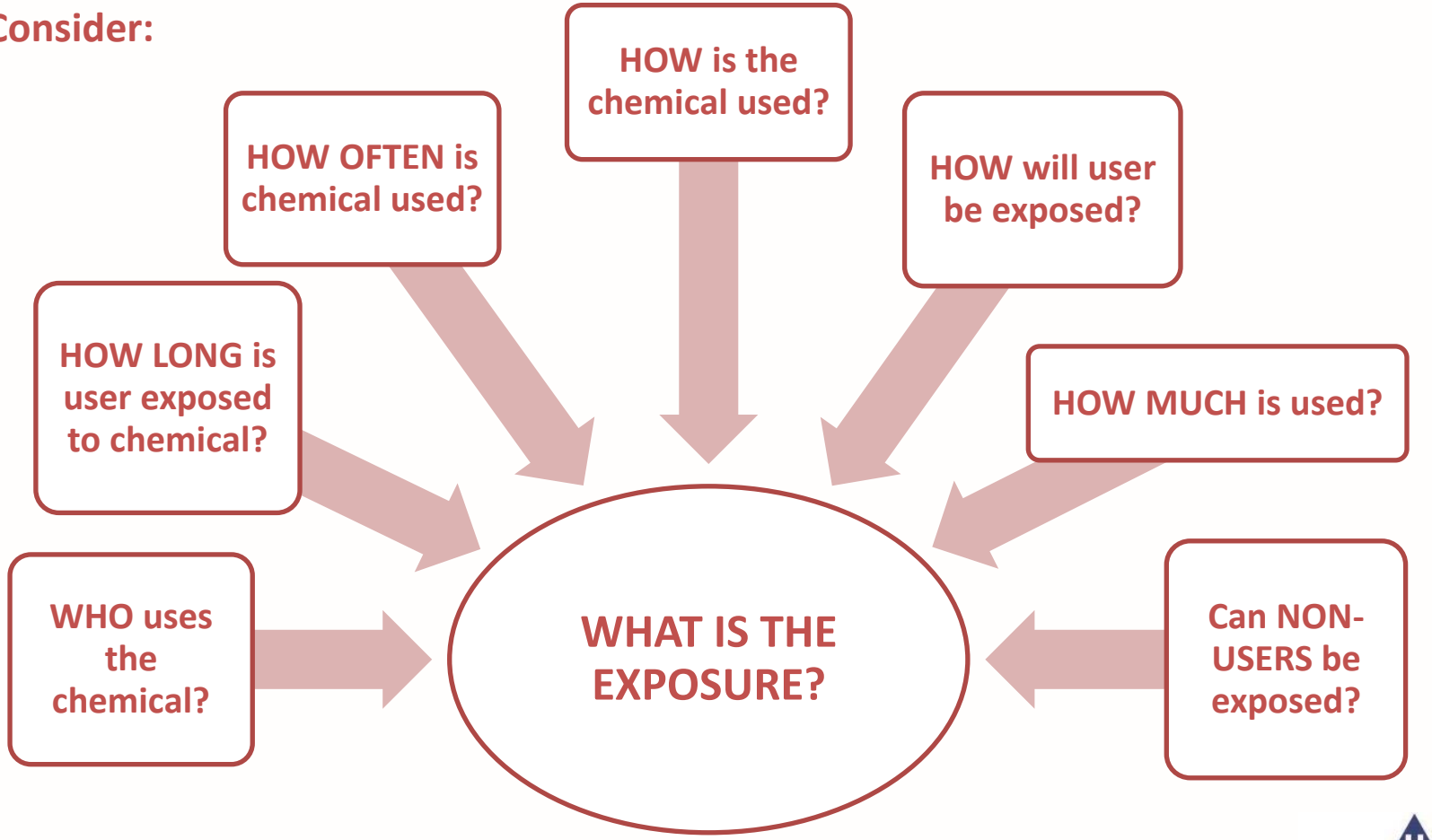
Assess the exposure

Consider:



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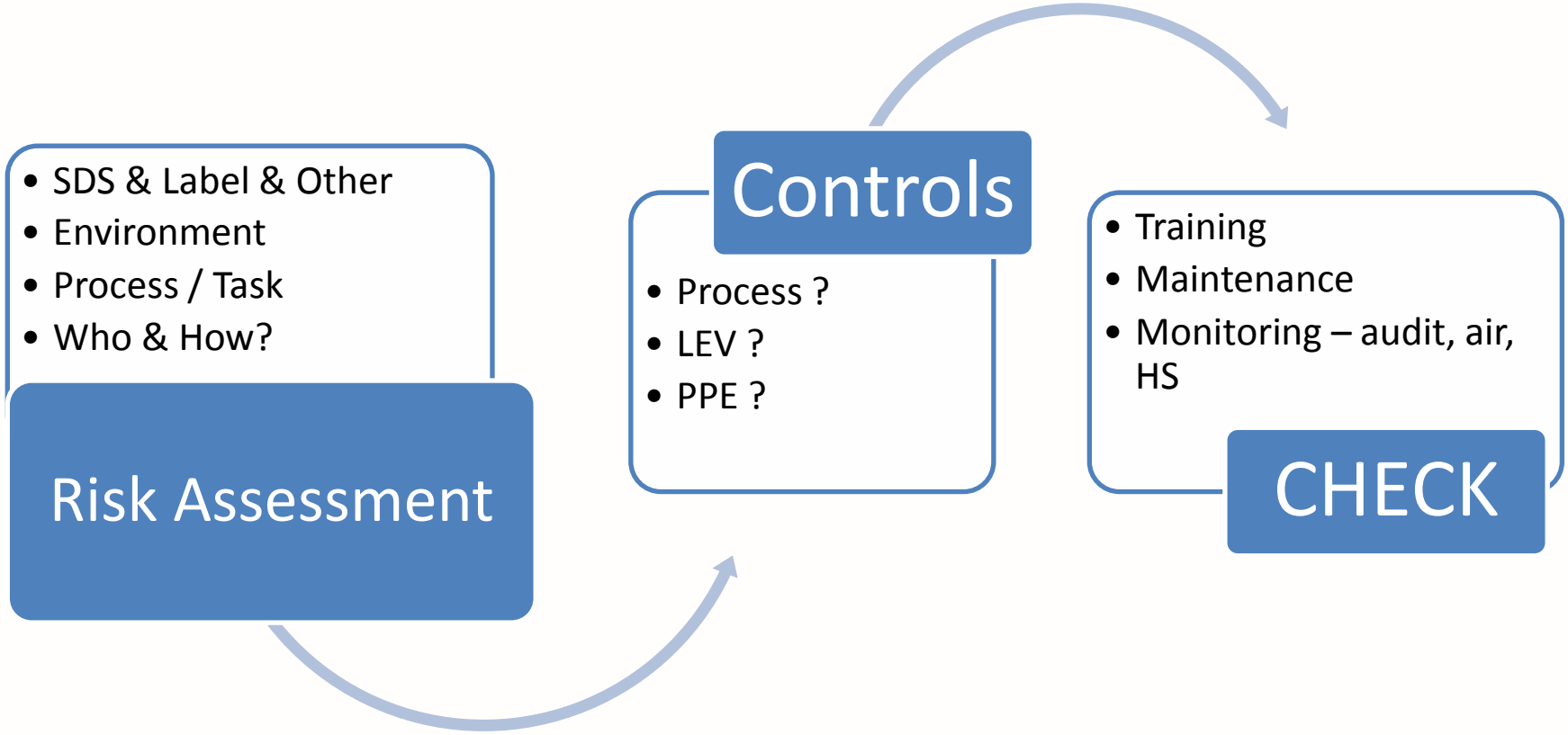
Risk Assessment



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Potential Approaches

Can you combine with other documents ?

- Cleaning Regime?
- SOP?
- NOP?
- Method Statement ?
- Quality Procedure?
- Laboratory Protocol?

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HAZARD	WHO	RISK (Severity and Likelihood)	CONTROLS IN PLACE	FURTHER ACTION	PRIORITY	ACTION DATE	ACTION BY
Example **Pouring Sodium Hydroxide Solution from bulk tank**	3 process employee	Splashing – skin/eye burns (very likely & extreme harm) Unacceptable Risk	PPE only Face shield gloves	Consider eliminating pouring. Restructure process	1	Immediate	MD

- Area is restricted to those trained in the processes carried out in the Darkroom.
- Only items used for the processing of screens to be kept in this area.
- No food or drink to be consumed in this area.

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HACCP

- Hazard Analysis & Critical Control Point
  - food safety management system
  - identify and control any hazards that could pose a danger to the preparation of safe food.
  - It involves identifying what can go wrong, planning to prevent it and making sure you are doing it.

- A big folder on a shelf is not a food safety management system!
  https://www.fsai.ie/food_businesses/haccp/haccp.html

Are you using chemicals as part of your controls?

Can your chemical agents risk assessment be included?

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Formulation XYZ Risk Assessment		
Add 50l water to Tank A		
Weigh and add 50kg powder to tank		Wear dust mask, wear goggles, wear gloves
Close lid and turn on mixer		No PPE required
Add 5L of solvent directly to tank		Wear half face mask and safety glasses
Weigh and add 34kg powder to tank		Wear dust mask, goggles and wear gloves
Mix and slowly add 10l of solvent to tank		Wear half face mask, eye protection, gloves

Is this compliant ? ? ? ? ? Why Not? Is it realistic? ?????

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Hazard information

- Powder contains silica - Exposure to silica dust during weighing , addition to tank and sweeping – can cause silicosis
- Solvent vapours can cause headaches, dizziness, and defatting of skin
- Process takes approximately 1 hour and is carried out 6 times per day
- There is 1 hour clean up at end of shift – dry sweeping of dust, rinsing of tank using solvent containing benzene which causes cancer
- Manual handling of powder and solvent drums
- There is an annual maintenance and clean of the tank
- In event of malfunction contact Service Technician immediately.

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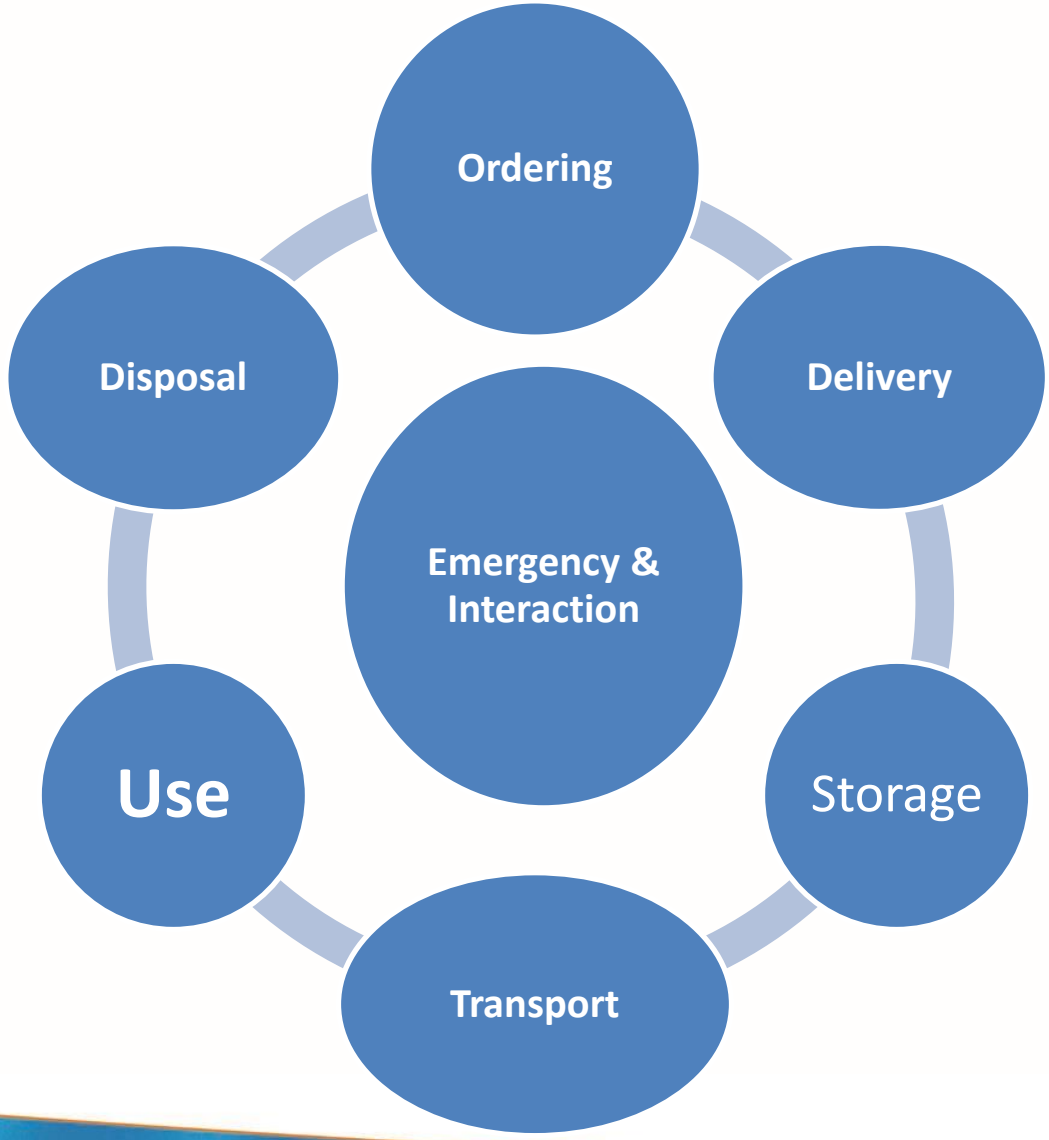
Controls

1. Wear powered respirator with A2P3 filter
2. Wear nitrile rubber gloves to EN374, 1 mm thick. Dispose of after each cycle.
3. The powder is delivered to weighing location by pallet truck.
4. The solvent is piped directly to area beside tank.
5. Powder to be weighed in 10kg batches.
6. In event of spill, continue wearing PPE and use spill material located in area and dispose of waste in chemical shed containers
7. Health surveillance provided– all staff trained on skin checks and lung function questionnaire once per year with follow up as required

Risk Reduction Plan	
1. Correct RPE and training – immediately 2. Eliminate Dry sweeping 3. Investigate elimination of weighing and measuring– can powder be purchased in preweighed bags or automatic dispensing of powder or liquid? 4. Local exhaust ventilation to be investigated 5. Consider monitoring as part of above project – see Code of Practice for Chemical Agents. 6. Alternative methods for cleaning to be investigated	1. New RPE to be purchased and personnel trained - A. N. Other 2. Vacuum with HEPA filter to be purchased by 13 November 2015- A. N. Other 3. - 5 Project for A Baker (advice of a competent occupational hygienist to be sought) Initial report due by 13 December 2015

Risk Reduction Plan	
1. Eliminate Dry sweeping 2. Investigate elimination of weighing and measuring– can powder be purchased in preweighed bags or automatic dispensing of powder or liquid? 3. Local exhaust ventilation to be investigated - Responsibility of A Baker by 13 December 2015 (advice of a competent occupational hygienist to be sought) 4. Consider monitoring as part of above project – see Code of Practice for Chemical Agents. 5. Alternative methods for cleaning to be investigated	1. New RPE purchased and personnel trained - A. N. Other - COMPLETE- 2. Vacuum with HEPA filter to be purchased by 13 November 2015- COMPLETE- risk assessment of use and emptying and training carried out – Documented in Clean up SOP 3. & 4 & 5 - Project for A Baker Initial report due by 13 December 2015 Initial report indicates: • preweighed bags - cost €X, • Automatic dispensing of powder - cost by €Y • Bulk purchase of solvents and a solvent line with in line metering will cost €Z • Possible elimination of RPE so reduction in fit test costs, cost of filters and health surveillance • <u>Alternative cleaning method identified with no benzene – See Carcinogens Regulations, Cost neutral as increased cost of new method off set against reduced disposal (waste is non-hazardous)</u>

Life Cycle Risk Assessment



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Life cycle risk assessment

- Ordering- Consider legislation that may impact supply and use e.g. REACH, active substances, C& L Notification obligations apply regardless of quantity and Get Safety Data Sheet first
- Delivery e.g. ADR, Manual Handling, TREM cards
- Storage e.g. ATEX, compatibles
- Transport e.g. manual handling
- Use – what, where, when, who, how etc.
- Emergency e.g. First Aid, leak, multiple spills down drains etc.
- Disposal e.g. EPA, Local Authority requirements

Chemical Agents Risk Assessment

- Any chemical, in either gas, liquid or solid form, that has the potential to cause harm is referred to as a hazardous or dangerous chemical. Such chemicals include those:
  - Brought directly into the workplace and handled, stored and used for processing, maintenance, repair work e.g. solvents, cleaning agents, glues, resins, paints.
  - Generated by a process or work activity e.g. fumes from welding, flour dust.
  - Generated as waste or residue e.g. fumes from soldering iron, volatiles given off during curing processes, carbon monoxide from engine or motor exhausts.

The source can be your own or another employer in the vicinity. There is unlikely to be SDS available for the latter 2 groups but you need to review each chemical (brought directly and generated) so that you capture the potential hazards and can generate an accurate specific risk assessment.

Chemical Agents Risk Assessment

How you write up the risk assessment is your decision based on your set of circumstances and context of use. You may group chemicals by type/task /activity etc. and / or include as part of a task/activity/protocol/ process/SOP/ Project based risk assessment.

For example, a risk assessment for painting outdoors using a brush would give a certain risk. However, spraying the same paint indoors in a confined space would have a different risk profile and different controls are likely to be needed. It's the same paint, the same Safety Data Sheet but a different type of use, hence a different site/ task /process specific risk assessment.

The crucial point is that in organising your assessment is that you meet the requirements of the legislation. None of the potential hazards are overlooked and the Risk Assessment is an effective tool in controlling the risks in your set of circumstances in your place of work.

Items to note

- Is the full life cycle of the chemical covered? E.g. delivery, storage, transport, uses (different risks associated with decanting IPA from a large container compared to spraying it directly on a glove), spill, emergency, and disposal (See Figure 1).
- The risk assessment is not simply copying the information from a Safety Data Sheet. A Hazard Assessment is based on intrinsic properties while a Risk Assessments relates given hazard to actual exposure.
- A compliant Safety Data Sheet(s) will have information but consideration needs to be given to other documentation available e.g. manuals for equipment to ensure compatibility of chemical and its use with the equipment, maintenance requirements.
- Consultation with staff- not just training needs to take place, i.e. What are they actually doing?
- Sensitive risk groups need to be taken into account e.g. those that are young, pregnant or breastfeeding.
- Consider how others apart from the users could be affected.

Items to note

- Combined and /or sequential exposure needs to be taken into account.
- Consider inadvertent ingestion and dermal exposure as well as inhalational.
- Consider welfare facilities to wash hands / change clothes to prevent ingestion and bringing dust/residues on working clothes home
- The risk assessment should specifically refer to the precautions / controls which are in use e.g.
  - be specific regarding ventilation and PPE requirements (not just EN374 but actual glove type e.g. nitrile/butyl rubber/neoprene,
  - Record and assign responsibility for measures that have been taken and are to be taken in relation to the requirements of these Regulations and who is responsible for them,
  - consideration of health surveillance (consult with your occupational health service provider).

Items to note

- Is there a risk assessment of maintenance activities which could involve exposure e.g. filter changing?
- Bear in mind that 2 different mixtures with technical equivalency (e.g. meet quality requirements) may not have the same safety hazards.
- A risk assessment of a single chemical in isolation is unlikely to meet the requirement of the regulations as chemicals are rarely used in isolation. Interactions, reactions and combined and sequential exposure must also be considered. A single generic risk assessment with generic precautions e.g. “chemicals can cause irritation, wear suitable gloves” tells you very little about the level, type and duration of exposure, the circumstances of work or the quantities involved or the specific precautions that need to be taken.

NEXT STEP

- If you wish to evaluate your risk assessment process (and since the requirements of the legislation must be met), you should review assessments against *The Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001 as amended* (download from www.irishstatutebook.ie). The *Safety Health and Welfare at Work (Carcinogens) Regulations 2001* as amended may also be relevant.

Further Information

- Please download the full texts from www.irishstatutebook.ie .
- Safety Health and Welfare at Work (Chemical Agents) Regulations 2001
- Safety Health and Welfare at Work (Chemical Agents) (Amendment) Regulations 2015
- Safety Health and Welfare at Work (Carcinogens) Regulations 2001
- Safety Health and Welfare at Work (Carcinogens) (Amendment) Regulations 2015

Further Information

- Guidelines to the Safety, Health and Welfare at Work Chemical Agents Regulations 2001 *(this is being updated)*
- HSA- Your Steps to Chemical Safety
- https://besmart.ie/learn-more/hazard-control-and-training-info/

Thank You

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On the move-considerations for the transport of dangerous goods

Jean Shannon

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Dangerous Goods Transport Legislation

United Nations Model Regulations

Road (ADR) **Rail (RID)** **Inland Waterways(ADN)** **Sea (IMDG Code)** **Air (ICAO)**

Directive 2008/68/EC

European Agreement – ADR

National Legislation

Regulations 2011 - 2015

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Participants/Duty Holders

Unloader

Consignor

CONTRACT OF CARRIAGE

Tank container/portable tank operator

Packer

Carrier

Driver and Vehicle Crew

Filler

Consignee

Dangerous Goods Safety Adviser (DGSA)

Loader

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Training Requirements

- **DGSAs** must hold appropriate certification (valid for 5 years)
  - may specialise in multi-modal transport
- **Drivers** must participate in a mandatory training course with examination - training certificate valid for 5 years
- **All participants** must receive training appropriate to responsibilities and duties before assuming them
  - general awareness
  - function specific
  - safety (and security)

Note that training for those operating under **ADR exemptions** (e.g. LQ exemption) should include relevant elements of all three…

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Incident, Moscow, 2013

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Incident, Moscow, 2013

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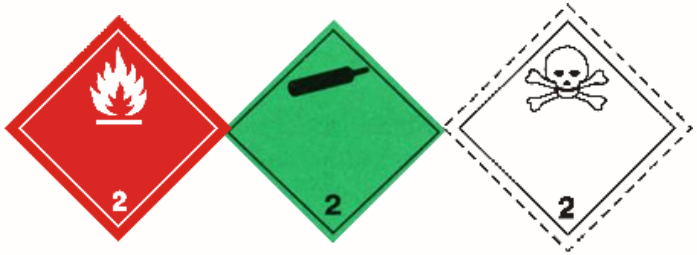
ADR Danger / Class Labels

1. Explosives

2. Gases

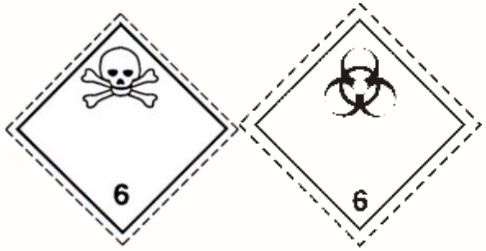


3. Flammable liquids

4. Flammable solids

5.Oxidising /org. peroxide

6. Toxic / Infectious



7. Radioactive

8. Corrosive (acid/base)

9. Miscellaneous

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New Class 9 label (No. 9A)

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Classification for transport

- Responsibility of Consignor
- For substances/mixtures already classified – use available data
  - Determine UN number, proper shipping name and class
  - Packing group indicates the level of danger, PGI, PG II, or PG III
  - Tunnel code: tunnels and dangerous goods are assigned a code restricting movement through tunnels

UN number, name (PSN) and hazard class, packing group, tunnel code

E.g. UN1230, Methanol, 3 (6.1), PGII, (D/E)

- Self classification

  (DGSA/laboratory testing/ADR/UN Manual of T&C)

Packaging

DGs may only be carried in appropriate packaging – generally "UN" approved.

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UN Package Testing and Marking

UN mark identifies packaging as tested and approved

Code provides further important information, e.g.
4G - type of package
Y - packing group suitability
S – packaging intended for solids or inner packagings

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Labelling/Additional Marking

Provides immediate warning to all (e.g. handlers/ users/emergency services)

Packaging must be labelled with

- Hazard class label(s) (min 100mm)
- UN number
- additional marks as necessary

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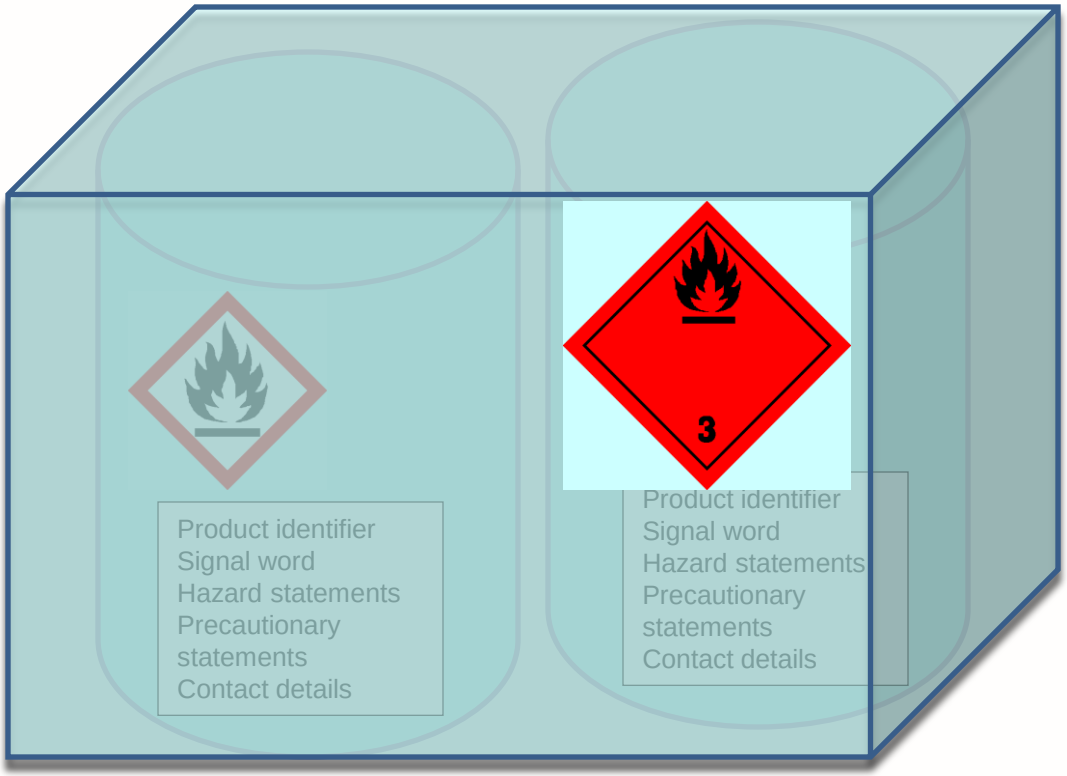
CLP Article 33

Classified for transport and supply

Outer & Inner packaging



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Overpacks

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Vehicle/tank marking and placarding

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Exemptions

- Summarised in published ADR Guide for Business
- Some exemptions very complex
- If in doubt, always seek the advice of a DGSA

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Exemptions

National Exemptions	• National regulations • Carriage within the state only
ADR Exemption 1.1.3.1 (c)	• Carriage by enterprises which is **ancillary to their main activity**
Small load exemption	• Can carry up to specific threshold quantities with minimal requirements
Limited and Excepted Quantities	• LQ – small quantities, up to 5 Kg or 5 litres • EQ – very small quantities, 1 – 30 g / ml per inner packaging
Special Provisions	• Prohibitions, exemptions , explanations re classification, additional marking…
CA Authorisations	• CA Exemptions and Approvals, multilateral agreements (MLAs)

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ADR Exemption 1.1.3.1 (c)

Carriage of DG by enterprises which is **ancillary to their main activity**, e.g. carriage of oxygen and acetylene cylinders for welding/maintenance/repair work

- Cylinders must be ADR compliant/marked and labelled
- Specific quantity limits
- Secured in vehicle/unlikely to leak/all valves shut
- Risk assessment to determine requirement for additional measures
- Open or ventilated vehicles
- Signs/labels on vehicle
- Hazard awareness training

Note that this exemption **does not apply** to logistics companies, couriers etc.

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Small Load Exemption

Reduced requirements imposed when DG carried below certain threshold quantities (listed in Table 1.1.3.6.3 of the ADR)

Quantity limits depend on the TRANSPORT CATEGORY of the DG (ranging from 0 to 4)

Transport Category	Max total quantity per transport unit (Kg/litres)
0	0
1	20
2	333
3	1000
4	Unlimited

Two scenarios:

- **(A) All DG the same or within the same transport category**
- **(B) DG carried belong to different transport categories**

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Small Load Exemption

(A) All DG the same or within the same transport category

UN No. 3343, Nitroglycerin mixture, desensitized…	**TC 0**	0
Most PG I, Class 2 toxic	**TC 1**	20
Most PG II, Class 2 flammable	**TC 2**	333
Most PG III, Class 2 groups A and O	**TC 3**	1000
Empty, uncleaned packagings, safety devices	**TC 4**	Unlimited

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Small Load Exemption

Ethanol Solution, UN No. 1170, PG III, TC3

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Small Load Exemption

(B) DGs carried belonging to different transport categories

Transport Category	Multiplying Factor
1	50
1*	20
2	3
3	1
Sum of DG must not exceed 1000	

Small Load Exemption – worked example

Company distributing paints and lacquers

- Flammable liquids
  (PG II and PG III)
- Corrosive cleaning liquid

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Small load Exemption – worked example

Dangerous Goods	Transport Category	Quantity (litres or Kg)	Multiplying Factor	Total
Paint Group A PG III	3	400	1	400
Paint Group B PG II	2	20	3	60
Lacquer PG II	2	100	3	300
Cleaning fluid PG III	3	50	1	50
Total				**810**

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Small load Exemption – worked example

Dangerous Goods	Transport Category	Quantity (litres or Kg)	Multiplying Factor	Total
Paint Group A PG III	3	400	1	400
Paint Group B PG II	2	20	3	60
Lacquer PG II	**2**	**200**	**3**	**600**
Cleaner PG III	3	50	1	50
Total				**1,110**

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Small Load Exemption

Two important requirements are:

- The consignment must be accompanied by a **transport document**
- The driver and crew, although not required to be certified, must have received **training** in accordance with Chapter 1.3 of the ADR, i.e. must receive general awareness, function specific and safety training

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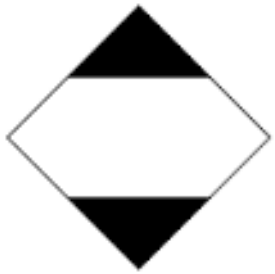
Limited Quantities

- Specified small quantities in packages
  (e.g. 5 Kg / 5 litres per inner package)
- Gross mass limit 30 Kg /20 Kg
- Packaging does not have to be UN approved
- Minimal **relevant** provisions apply



No limit to the total quantity per shipment

- Transport units 12 tonnes carrying 8 tonnes of LQ packages must display mark as PLACARD
- Not required if the vehicle requires blank orange plates (other DG carried)

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Load security still applies !

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Load security

Guidelines:

- EU Best Practice for Cargo Securing
- IRU international guidelines for safe load securing

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Exemptions - summary

If unsure, the following options are available:

- ADR Guide for business
- DGSA
- Chemicals Helpdesk

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Dangerous Goods Safety Adviser

I am a PARTICIPANT under the regulations, how do I know if I need to formally appoint a DGSA???

- Do my activities concern quantities of dangerous goods in each transport unit below the threshold quantities of the various ADR exemptions?
- Do **all three** of the following criteria apply to me?
    1. My main or secondary activity is not the carriage of dangerous goods (and related activities)
    2. I only occasionally carry/load/unload dangerous goods
    3. My activities do not create a significant danger or risk to persons or the environment

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Dangerous Goods Safety Adviser

Examples:

1. I own a building company occasionally carry small amounts of fuel for use in machinery

- My main or secondary activity is not the carriage of dangerous goods (and related activities)
- I only occasionally carry/load/unload dangerous goods
- My activities do not create a significant danger or risk to persons or the environment

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Dangerous Goods Safety Adviser

Examples:

2. My company only unloads at the final destination (Consignee) ???

- Supermarket
- Petrol station

- Port terminal
- Warehouse providing service to store DG
- Companies with responsibility for the unloading operation

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Dangerous Goods Safety Adviser

HSA guidance available:

- Guidance on the appointment of a DGSA
- ADR Guide for Business
- Guidance on the duties of a DGSA

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Dangerous waste

Clinical waste

Chemical waste

Batteries

Aerosols

Asbestos

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Waste chemicals – public amenity site

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Provisions for Waste

- Few provisions specifically for waste
- New provisions in ADR from 2009 for the classification of waste when the composition is not precisely known

- ADR 2.1.3.5.5 – assignment of UN number and PG based on the **consignors knowledge of the waste** (if in doubt, highest danger level taken)
- Technical name not required on the transport document

E.g. UN 3264, corrosive liquid, acidic, inorganic, N.O.S., 8, II, (E), waste in accordance with 2.1.3.5.5

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Information is available

- Guidance on the carriage by road of asbestos containing materials (ACMs) including asbestos waste
- New ADR provisions for the carriage of lithium batteries for disposal or recycling (ADR Main Changes Report 2015)
- Industry notice on the packaging of waste laboratory chemicals (“lab smalls”)
- Industry notice on the carriage of waste aerosols

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Waste Aerosols – SP 327, P207?

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Clinical waste

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Chemical waste

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Overpacks for hazardous waste

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Spencer Hotel, IFSC, Dublin 1

Chemicals Helpdesk

- All chemical related queries
- chemicals@hsa.ie
- 1890 289 389
- Scope

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