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Laboratory Safety Webinar for Organisations

A practical overview of best storage practice

25 July 2022

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Richard Greenwood

Guest Speaker

25 July 2022

Richard Greenwood

MSc Bioinorganic Chem

Richard is a full time Consultant

Accredited Member of the Australasian Institute of Dangerous Goods Consultants

Professional Profile

Consults in workplace chemical hazards and safety.

Historical Engagement

Significant engagement in:

+ Chemical safety and hazards classification for over 20 years
+ Interpretation of and compliance with the Occupational Health and Safety and Dangerous Goods (Storage and Handling) Regulations
+ Globally Harmonized System of Classification and Labelling of Chemicals (the GHS) in 2002
+ National Work Health and Safety Regulations

Globally Harmonised System

Classification and labelling of chemicals.

Internationally consistent terms and information on labels and Safety Data Sheets (SDS).

Australia adopted the 3rd Revised edition.

Created by the United Nations to give a worldwide methodology of chemical classification.

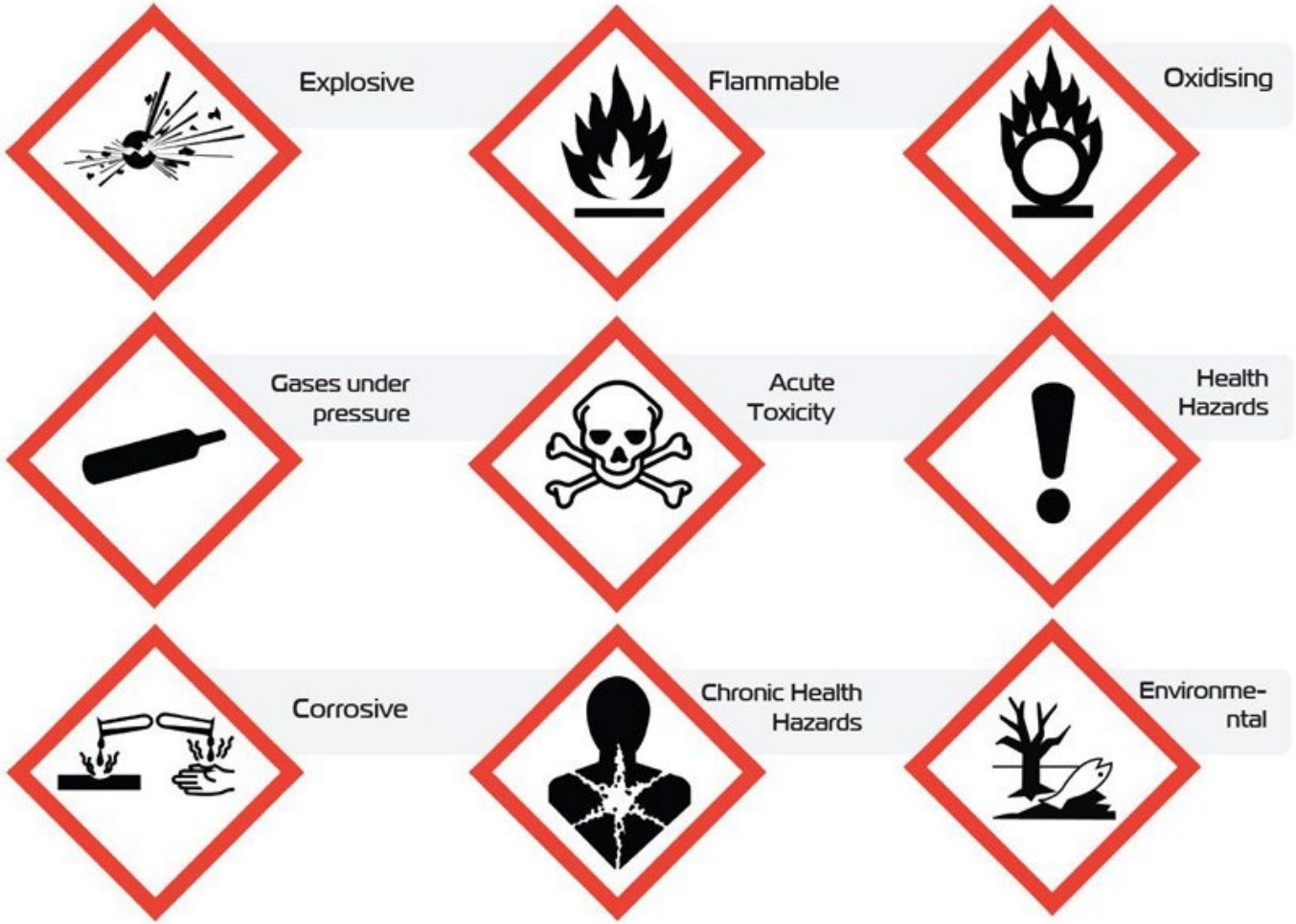
Ensures that users are provided with practical, reliable, easily understood info on chemical hazards.

Uses **pictograms, signal words and statements** to communicate this info.

Different to the Australian Dangerous Goods Code

This code is more about safety of transportation than effect on and protection of the uses like the GHS system is.

Dangerous Goods Storage in the Laboratory



What Richard Greenwood does, and has done...

Richard has an extensive history of delivering consultancy, auditing and training services to a wide range of industries, SMEs and large manufacturing clients

What Richard does

Current Services offered:

+ Review your Site or design compliance with Australian Standards for storage and handling of various dangerous goods and applicable legislative requirements.
+ Compliance for Hazardous Chemicals and the GHS for Classification on Labelling and Safety Data Sheet requirements for chemical suppliers, manufacturers and importers.
+ Training in GHS Classification and Labelling requirements.
+ Training for workplaces in understanding chemical hazards.
+ Training Courses in Dangerous Goods Storage, Handling and Transport, tailored to your needs, staff and materials.

What Richard has done

Previous engagements to:

+ Deliver national training for Safe Work Australia on the Globally Harmonized System of Classification and Labelling, extended in 2013 and repeated in 2014
+ Develop a system for GHS Classification based on use of available data, including identifying areas of shortfall.
+ Present at HAZMAT 2009, 2012, 2013, 2016 and 2018 MC at HAZMAT 2015.
+ Contribute to public comment on Work Health and Safety Legislation, including working with the Plastics and Chemical Industry Association [PACIA] response.
+ Perform Dangerous Goods/Hazardous Chemicals audits on manufacturing sites, warehouses, distribution centres and general workplaces and laboratories.

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Main Presentation

Speaker: Richard Greenwood

25 July 2022

Insights into safety issues for laboratory chemical storage

Richard Greenwood
richard@rgchem.com.au

Rg 111
RG Chemical Safety
Consultant and Trainer

Chemical Segregation in Workplace Regulation

Requirement to segregate spill containment of chemicals which are not compatible:

“compatible, for 2 or more substances, mixtures or items, means that the substances, mixtures or items do not react together to cause a fire, explosion, harmful reaction or evolution of flammable, toxic or corrosive vapour.”
WHS, Victorian and WA Dangerous Goods Storage Regulations

FLAMMABLE LIQUIDS

Vapour is what burns –

- Ventilation of storage, seals on containers,
- Flash Point is temperature where there is sufficient vapour to burn (typically a few percent)
- Spill spread gives faster vapour release
- Typically also have health effects

Ignition Sources –

- Sparks, Hot work, Non-electrically safe equipment
- Growth of electronic equipment in Stores is a problem

Chemical Storage Cabinets for flammable liquids

Contain liquid spills

- Spill bund under bottom shelf

Keep vapour in.

- Self closing and latching doors,
- Shelf above bund has drainage holes only
- Option for ventilation (extract from lower bung hole)

Fire protection.

- Robust, fire resistant construction to allow for initial response and escape
- Do not situate near ignition sources (or ventilate)

Ignition Source Separation

If a spill occurs, cabinet may be full of vapour (heavier than air)

- Vapour will spread low from open cabinet.
- Official accepted ‘hazardous area’ with potential to contain ignitable vapours is 3m laterally, 1m above.
- Greatest risk is ignition sources at or near floor level, particularly permanently sited equipment

Safety Considerations:

- Vapour is released only when trained personnel are present and can respond.
- Extraction ventilation can be fitted, but the bung should not be left open.

CORROSIVE SUBSTANCES

Severe damage to skin (eyes*) and metals.

Body Contact Issues
– PPE, Eye wash, first aid response, shower

Equipment maintenance issues – inspection and replacement, including storage racking

Acids react with alkalis to produce heat.

Reaction with metals produces flammable hydrogen gas.

Some release corrosive vapours (ventilation)

*Eye damage alone does not classify as DG Corrosive.

Reaction between Acids and Bases

When is segregation justified? Between concentrated acids and bases, when the reaction may produce dangerous quantities of heat

There is no general justification for segregation of dilute solutions.

How dilute? How much heat?

2M HCl and 2M NaOH – how much hotter do they actually get?

Answer: Less than 14°C (hazardous in production quantities)

Exceptions, due to reactivity or toxicity of other components:

- Cyanides and dilute acids
- Reactive metals and dilute acids
- Bleach solutions (or pool chlorines) and dilute acids

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OXIDISING AGENTS

React dangerously with many other substances, including leaves, dust, dirt, metals, rust, contaminants all flammable and combustible materials

Reacts dangerously with Nonhazardous Chemicals

- Solid materials react slowly. Solutions react faster
- Keep storage areas clear (easy cleaning)
- Ensure isolation, including spill collection, drains
- Store waste with care
- Different families of oxidisers may react together, and may need separated storage and waste streams

Isolation – How close can storage cabinets be?

Isolation is high in the hierarchy of controls. It may be provided by sufficient distance, including consideration of drainage direction, or via a suitably designed storage device.

SO, Isolation is segregation distance or a cabinet, and cabinets of incompatible materials can be adjacent, but access and spills must be managed accordingly.

When should I use a storage cabinet?

The previous Safety in Laboratories, Storage standard (AS2243.10) advised use of cabinets where storage exceeds set levels (L/kg)

- Class 3 10, max pack size 5
- Com Liq 50, max pack size 20
- Class 4 20, max pack size 10
- Class 5 20, max pack size 10
- Class 6.1* 50, max pack size 20
- Class 8 liq 20, max pack size 20
- Class 8 sol 50, max pack size 20

* Not PG I.

This table has been removed from the recent update.

Alternatives to Storage Cabinets

Storage in tubs or trays for containment:

- Water based dilute solutions, low reactivity materials
- No flammable, toxic or corrosive vapours.
- Solids, low reactivity, separate from liquids
- Ensure access does not create additional hazard through removing from deep tubs.

Storage on shelves

- Nonhazardous materials, esp. materials with no spill hazard

Do not store corrosive or irritant materials at or above head height.

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Meet Westlab

Your friendly team members at Westlab

25 July 2022

Our People

The secret sauce to our unbeatable service is an exceptional, positive and driven team.

William Crick
Business Development Manager

Mark Bourke
Field Specialist

Rochelle Crick
Customer Support

Jessica Thomas
Customer Support

JULY is Safety Month

Online Deals very week on selected Products

SPECIAL on Dangerous Goods Storage Cabinets

Modulab 4-in-10 Metal Cabinet

Modulab Non-Metal Cabinet

PolyChem Corrosive Cabinet

Discover the Westlab Chemical Range

Discover the wide range of chemicals designed for lab techs

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Q & A Session

Speaker : Richard Greenwood

25 July 2022

1800 358 101

4 Cargo Way
Mitchell Park VIC 3355

westlab.com.au

Want more information on any of the topics covered today?

westlabsalesteam@westlab.com.au

Or call Mark Bourke - 0412 265 735

Please let us know if you have any urgent needs or upcoming Projects that you think Westlab could help you with.