



SAFETY

AIRM Presentation

Occupational Hygiene

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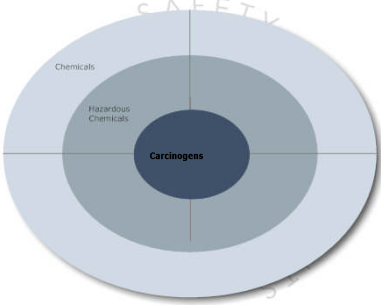
Aims

- Occupational / Industrial Hygiene
- Specialist

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What Are hazardous Chemicals



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Water (H₂O)



- **Three States**
 - Ice (Solid)
 - Water (Liquid)
 - Steam (Gas)
- **Is H₂O a "Hazardous Chemical Agent"**

Consider the following?



- **Packaged Chemicals**
- **Chemical processes**
- **Wastes**
- **Environment**



Packaged Dangerous Goods



- **Brought into a premises**

Chemical Process

- Products produced as part of the process
- Intermediates
- Finished goods



Wastes

- Produced by the process



Environment

- Natural processes
 - Radon



Legislation



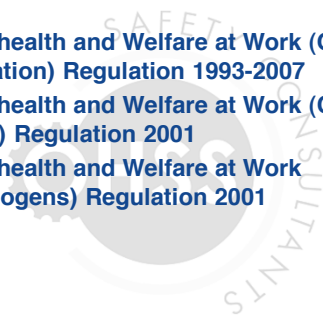
- Safety health and Welfare at Work Act 2005
- Chemicals Act



Legislation



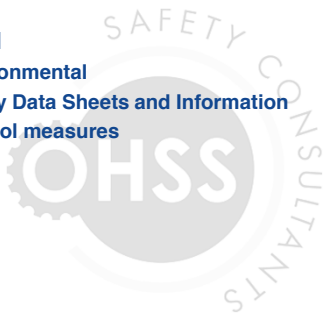
- Safety health and Welfare at Work (General Application) Regulation 1993-2007
- Safety health and Welfare at Work (Chemical Agents) Regulation 2001
- Safety health and Welfare at Work (Carcinogens) Regulation 2001



Chemicals Act



- REACH
 - Environmental
 - Safety Data Sheets and Information
 - Control measures



G APPS



- **Chapter 1 - Workplace**
 - Chapter 1 Para 6
 - Ventilation of enclosed places of work
 - Chapter 1 Para 7
 - Room Temperature
- **Chapter 2 – Use of Work Equipment**
 - Inspection of work equipment
 - Plant which may deteriorate during service
- **PART 8,EXPLOSIVE ATMOSPHERES AT PLACES OF WORK**
 - Equipment
- **Chapter 3 – Personal Protective Equipment**
 - Adequacy and Effectiveness

Chemical Agents Regulations 2001



- **Risk Assessment Regulation 4**
 - Determine whether any hazardous chemical agents are present at the workplace
 - assess any risk to the safety and health of employees arising from the presence of those chemical agents
 - their hazardous properties
 - information provided by the supplier of the hazardous chemical agent including information contained in the relevant safety data sheet
 - the level, type and duration of exposure
 - the circumstances of work involving such agents and the quantities stored and in use in the workplace
 - any occupational exposure limit value or biological limit value
 - any activity including maintenance and accidental release
 - In the case of activities involving exposure to several hazardous chemical agents, the risk shall be assessed on the basis of the risk presented by all such chemical agents in combination
 - Any risk assessment made under this Regulation shall be recorded in writing.
 - Where, as a result of such risk assessment, a further detailed risk assessment is deemed to be unnecessary the employer may include a justification for this decision

Carcinogens Regulations



- **Older Style Directive**



Asbestos Regulations 2006-2010



- Identify presence of asbestos in buildings
 - Type of product
 - Type of fibre
 - Condition
 - Quantity
- Risk assess likely exposures
- Asbestos Management Plan

What are Occupational Exposure Limit Values



- Limit at which the average person may be exposed and not be EXPECTED to develop and illness
- They are not a target
- Reduced to as low a level as is reasonably practicable

2010 Code of Practice to the Chemical Agents Regulations 2001



- 8 Hour Time Weighted Averages
- Short term exposure limit values (STEL)
- Notification of planned changes

Other Guidance



- ACGIH Handbook
- EH40 UK
- NIOSH

What? No OELV!



- So what do you do?
- NOEL
- NAOEL
- Chemical intermediates and actives

Sampling



- Types (Personal)
 - Air Sampling
 - Skin sampling
 - Biological monitoring
- Environmental
 - Static Sampling
- Real time Monitoring

How to sample?



- Gases, Vapours, Dusts, Fume
- Active Sampling
- Passive sampling
- Wipe Sampling

Sample Media



- Filters
- Sorbent tubes
- Gel tubes
- Bubblers
- Dependent on the contaminant, reactivity

Calibration



- Flow rates
- Equipment

Sample Positioning



- Breathing Zone
- Exceptions
 - Welding
 - Colophony

Sampling Time



- Filter loading
- Process
- Analytical test method

Work Place Considerations



- Operative activities
- Interference

Sample transport and stability



- Similarly Exposed Groups
- Statistical Approach
- Judgmental Sampling



Analysis



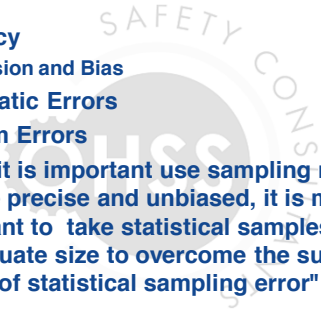
- Laboratory status
 - ISO-17025
- Sample Collection
- -Competence?



Approximating the Truth



- Accuracy
 - Precision and Bias
- Systematic Errors
- Random Errors
- "While it is important use sampling methods that are precise and unbiased, it is more important to take statistical samples that are of adequate size to overcome the substantial effects of statistical sampling error"



Sample Size



- Client: "I want you to take 3 samples...."
- Client: "You need to measure....."
- Client: "I want you to undertake a one day survey...."
- Graphic

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How Many Samples?



-

Determine Sample Size
Confidence Level: 95% 99%
Confidence Interval:
Population:

Sample size needed:

Determine Sample Size
Confidence Level: 95% 99%
Confidence Interval:
Population:

Sample size needed:

Regulatory and Others



- Notices: "Carryout monitoring...."
- "Sampling of dust in air....."

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What does Sampling Prove?



- Define Aims
- What are you trying to prove?
- Validating a risk assessment
- Validating control measures

Summary



- Regulations
- Enforcement
 - Government (Criminal)
 - Insurance
 - Professional bodies
 - Corporate
- Legal (Civil)
- "Stick a pump on him"
