



An introduction to Occupational Hygiene

What is an Occupational Hygienist, and what do we do?

To illustrate the point of how a hygienist works, I will take you for a brief walk through two Laboratories where you get to be the hygienists and answer the questions.

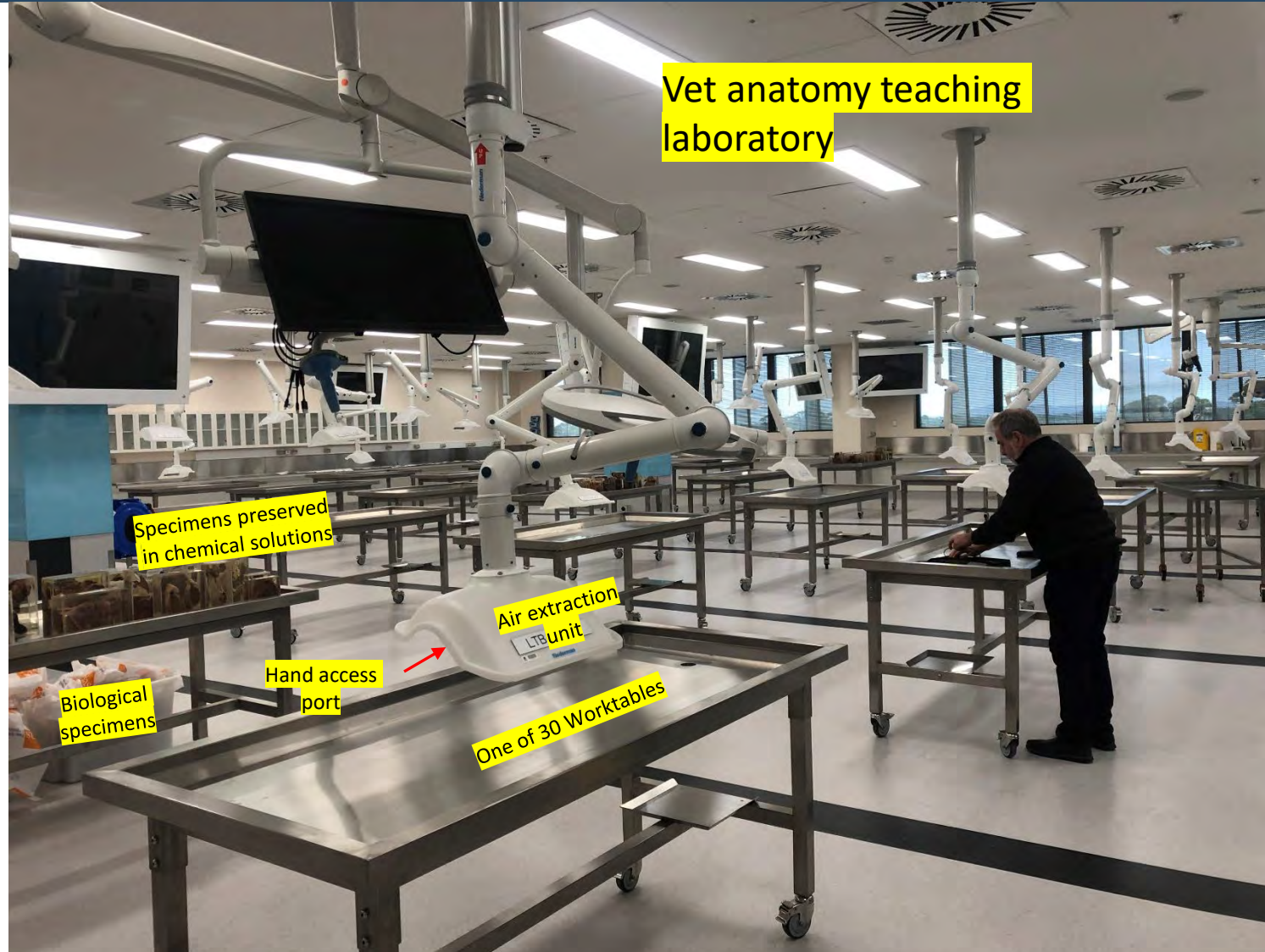


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Vet anatomy teaching
laboratory

Specimens preserved
in chemical solutions

Biological
specimens

Hand access
port

Air extraction
unit

One of 30 Worktables

Formaldehyde

CAS number:50-00-0

Chemical formula:H₂CO

TWA: 0.1 ppm (0.12 mg/m³)

STEL: 0.3 ppm (0.37 mg/m³)

Biological issues

Anthrax.

Avian influenza.

Brucellosis.

Hantavirus.

Hendra virus.

Leptospirosis.

Bat Lyssavirus

Q-fever



You have 4 hours to examine the laboratory and make recommendations

(Time is money and the client is not made of gold)

An idea would be to measure the extraction unit to see if it's working to an appropriate level?



Is this extraction hood working for the student or against them?



Hand access point

Do you think a transparent hood would be a better option?



Transparent hood

Hand access point



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The client said they engaged design architects to put the system together.

My thoughts on the matter, architects normally deal with qualitative aspects of the design, eg, how does the finished aspect look. If they are dealing with the system of work; maybe, they should have engaged a hygienist.

Nederman states:

Particular attention needs to be paid to the exhaust fans selection when other ancillary equipment is on a common exhaust system.



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The second laboratory has an interesting issue:





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RED LEAD

Lead(II,IV) oxide – Pb_2O_4



Workplace exposure standard (TWA) = **0.05 mg/m³**

Remembering Formaldehyde (TWA) = **0.1 mg/m³**



Health monitoring

Guide for lead (inorganic)

Requires a registered medical practitioner supervising the health monitoring program.



Storage issues!



Environmental issues!





Ventilation

- We have recently had a spate of COVID infections in our office. We would like to confirm whether our ventilation is adequate for the current pandemic. Is our ventilation system adequate?





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Our Approach

- Discuss requirements with key stakeholders
- Inspect office area
- Review mechanical ventilation system
- Assess air handing units (AHU)
- Undertake air flow / ventilation assessment
- Review against current standards and guidelines





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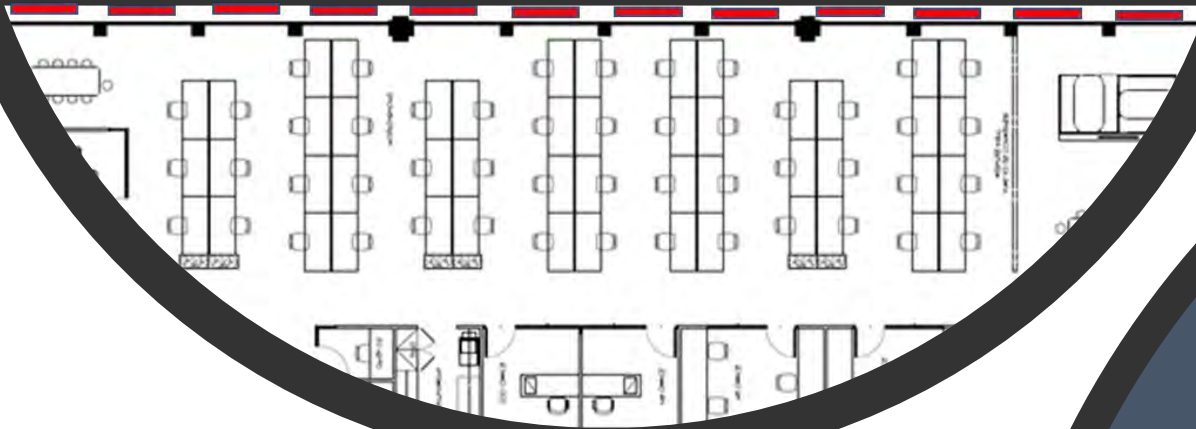
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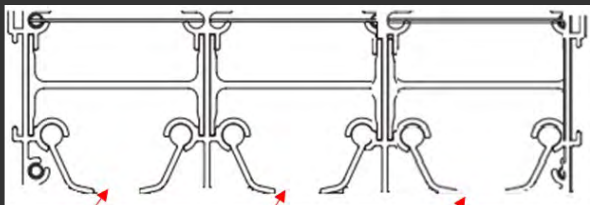
LRN
GLOBAL



Slotted Linear Diffusers (SLD) positioned around the perimeter of the office



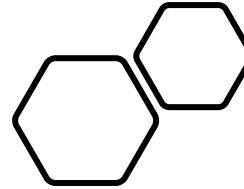
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Case Study



What We Know



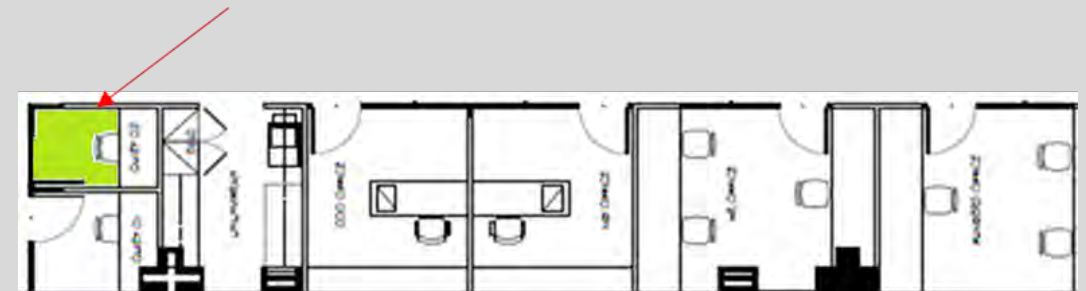
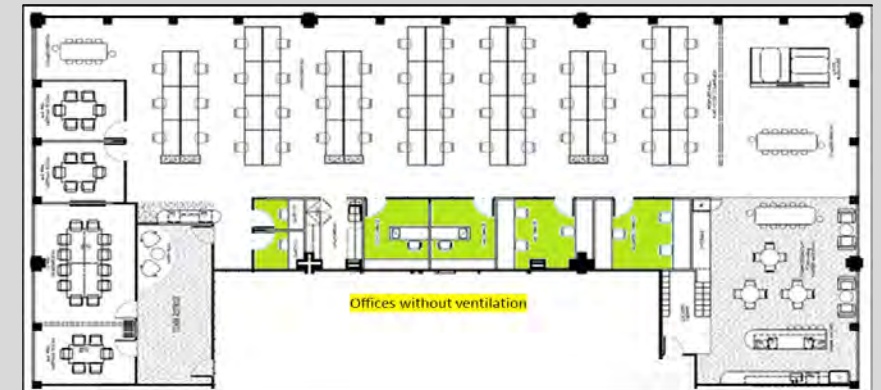
- Multi storey commercial building
- Approximately 30 to 50 persons occupying floor space
- A number of staff have been infected with COVID-19
- There is a fulltime facility manager maintaining the building
- The air handling units are used across tenancies
- AS1668.2 2012 – requirements
- National Construction Code (NCC) Handbook requirements 2021 – Indoor air quality
- ASHRAE 62.1 Ventilation for acceptable air quality 2021

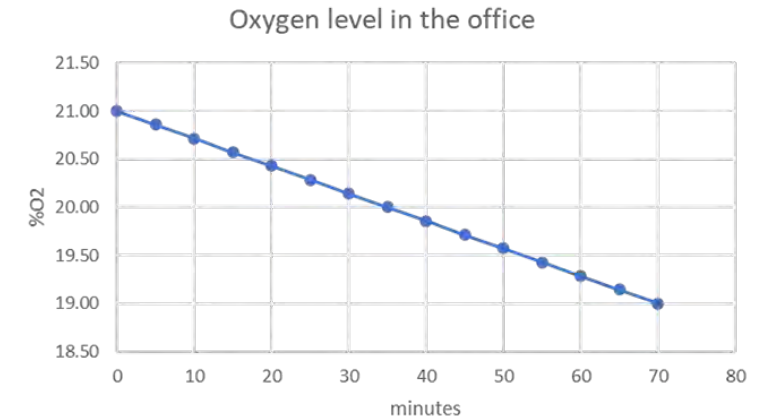
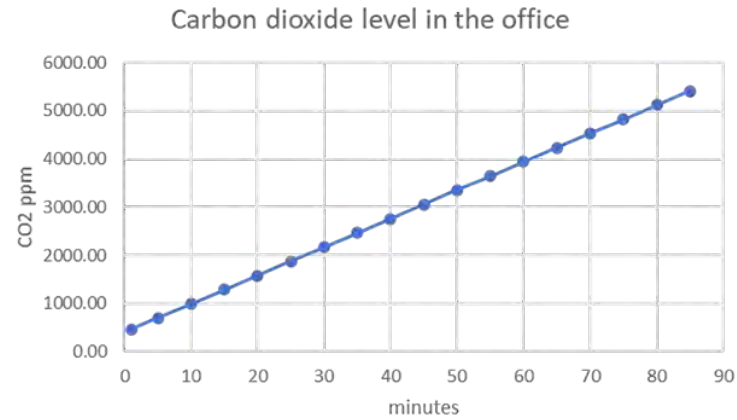
| AS 1668.2 - 2012 Appendix A. | | |
|------------------------------|----------------|------------|
| Offices | m ² | per person |
| Art rooms | 5 | 10 L/s. |
| Board rooms | 1 | 10 L/s. |
| Committee rooms | 1 | 10 L/s. |
| Computer rooms | 25 | 10 L/s. |
| Conference rooms | 25 | 10 L/s. |
| Drafting rooms | 5 | 10 L/s. |
| Office areas | 10 | 10 L/s. |
| Waiting areas | 2 | 10 L/s. |



What we Found

- Poor ventilation in various office and break out areas
- Meets AS1668.2 requirements for air quantity
- Does not meet ASHRAE 62.1 ventilation requirements
- Does Not meet NCC ventilation requirements
- There is a difference between air quantity and air quality observed by various standards





Modelling our findings

| ASHRAE 62.1 – dealing with Covid-19 | |
|-------------------------------------|----------------|
| Location | Suggested ACPH |
| Offices | 2-3 |
| Schools | 5-6 |
| Restaurants | 6-8 |

| CO2 trigger point= level Averaged over an 8-hour day = 850ppm | |
|---|-------------------------------------|
| Table 4.1 Various CO ₂ level limits and recommendations | |
| Comments | CO ₂ concentration (ppm) |
| Australian occupational exposure limit (SWA 2011b) | 5000 |
| ASHRAE 62.1 recommendation (occupant comfort) | 1000 |
| AS 1668.2 recommendation (for CO2 controlled ventilation) | 800 - 600 |
| NCC IAQ Verification Method (as an indicator for body odour) | 850 |
| Typical outdoor air range | 400 - 300 |



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Case Study 2





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Facts

- ✓ Production line environment
- ✓ Approximately 30 workers
- ✓ Use of insecticides to control fungal and microbial growth - TriPlus
- ✓ Recent experiences of headaches, nausea and other such symptoms amongst workers

The Environment

- ✓ Large warehouse type process
- ✓ Natural ventilation
- ✓ Some extraction
- ✓ Personal protection used – disposable overalls, P2 masks and nitrile gloves



Fluency Agitator



Treaters



Drying tables



SDS - TriPlus

- Various areas to review
- Composition/Information on ingredients
- Toxicology
- Hazards Identification – Hazard statements
- Exposure controls



Product Name: TriPlus Insecticidal Seed Treatment
Page 1 of 6
Issued: 11 July 2017

Section 1 – Identification of The Material and Supplier

| | |
|--|---|
| Australis Crop Protection Pty Ltd Shop 4, 30 Heber Street Moree, NSW 2400 | Phone 0417 329 133 (all hours) Fax 3337 9882 |
|--|---|

Chemical Nature: Multi active ingredient insecticidal seed treatment.
Trade name: TriPlus Insecticidal Seed Treatment.
APVMA Code: Not registered – experimental insecticide.
Product use: Insecticidal seed treatment for cotton as per the label.
Creation date: 11 July 2017
This version issued: July 2017

Section 2 – Hazards Identification

Statement of Hazardous nature
This product is classified as: Hazardous according to Safe Work Australia (SWA).
Not subjected to the ADG code when transported in Australia by Road or Rail in packages 500 kg (L) or less; or in IBC's (refer to SP AU01). However if transported by Air or Sea, this provision does not apply. Then the product is classed as Dangerous (Class 9 Environmentally Hazardous) by IATA and IMDG respectively. See details below and in Section 14 of this SDS.

Globally Harmonised System (GHS) classification of the substance/mixture:
Acute Toxicity – Oral – Hazard Category 4.
Hazardous to the Aquatic Environment – Long term hazard: Hazard Category 2.

Signal Word: WARNING.

Hazard Statements:
H302 Harmful if swallowed.
H410 Toxic to Aquatic life with long lasting effects.

Precautionary statements:

Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash hands, arms, and face thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P281 Use personal protective equipment as required.

Response:
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if feel unwell.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P330 Rinse mouth.

Product Name: TriPlus Insecticidal Seed Treatment
Page 2 of 6
Issued: 11 July 2017

Major Health Hazards: Product is harmful if swallowed. Thiodicarb is an anti-cholinesterase compound. Symptoms of acute exposure to cholinesterase-inhibiting compounds may include the following: numbness, tingling sensations, incoordination, headache, dizziness, tremor, nausea, abdominal cramps, sweating, blurred vision, difficulty breathing or respiratory depression, and slow heartbeat. Very high doses may result in unconsciousness, incontinence, and convulsions or fatality.

Section 3 – Composition/Information on Ingredients

| Ingredients: | CAS NUMBER | PROPORTION |
|--|-------------|------------|
| CHEMICAL | | |
| Imidacloprid | 138261-41-3 | 350 g/L |
| Thiodicarb | 59669-26-0 | 250 g/L |
| Fipronil | 120068-37-3 | 50 g/L |
| Other ingredients determined not to be hazardous | | Balance |



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What we Found

- Poor extraction along the drying table
- Only natural ventilation for the dilution of contaminants
- TriPlus was major cause to the health impacts of workers
- PPE not sufficiently adequate
- Decontamination procedure not adequate
- Work practices contributing to exposure of dusts, fumes or vapour

