

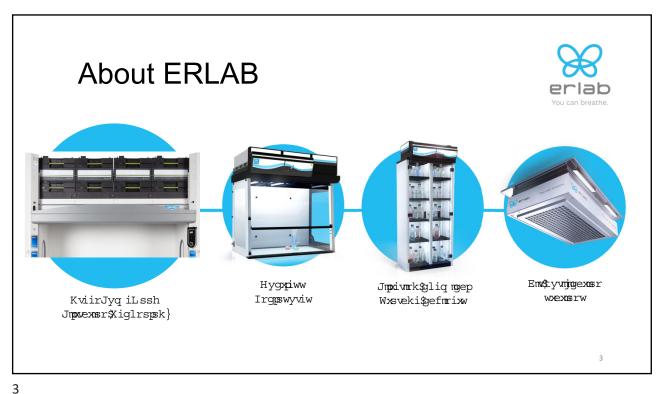
### **About Erlab**





Geoff Cmar – Regional Sales Engineer

ABOUT ERLAB – Erlab is a global leader in air filtration solutions. Since 1968 we have been protecting laboratory personnel from harmful chemical and bioaerosol emissions, improving the air we breathe both inside and out. We have a long-storied history starting with the invention of what is now know as ductless fume hood technology. Today, we continue to invent and improve upon the technologies we deliver with significant investments into our R&D employing several PhD's in molecular sciences, filtration and bio-aerosols.





# Chemical Handling Risk Assessment





SEFA 9A compliant review:

- Chemicals
- Quantities
- Processes
- Container type: open or closed
- Temperatures

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### Standards



- ANSI Z9.5
  - Ductless Hoods
    - Chemical Risk Assessment is required
    - Redundant Safety Filter
    - Automatic detection of filter breakthrough
    - Detection of filter breakthrough at <25% TLV
    - · Chemical list with capacity
  - · Ducted Hood
    - Uses dilution to eliminate pollution.
    - Takes 450 feet from stack to achieve 1% concentration levels.
    - allowed to entrain up to 20% of allowable concentrations under normal operating condition for routine emission events and 100% for emergency emission events.
      Appendix 3- Evaluating the Performance of Laboratory Exhaust System – Design Criteria Development

# NFPA 45 2023 (draft)



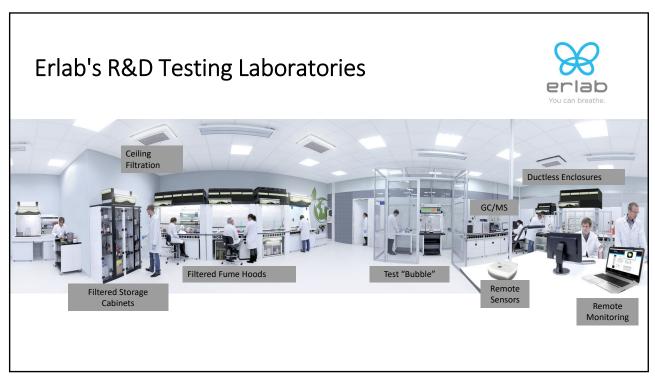
- Second Revision draft completed, publishing Jan 2023
- Fully incorporates "Ductless Hoods", not "Ductless Enclosure"
  - Traditional fume hood superstructure with Airfoil and Plenum
  - Redundant Safety filter
  - Automatic detection
  - · Chemical List with capacity
  - · Signage and labeling on each hood
  - 4" air gap between top of hood and ceiling
  - · Annual reviews of usage

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### **Ductless Hoods Standards Harmonization?**



Subject	ANSI Z9.5-2022	NFPA45-2023 draft	CSA Z316.5-2020	AFNOR NF X 15 -211 2009
Application Review	Required	Per SEFA-9A RP	Required	Required
Chemical Lists	Required w/Capacity	Required w/Capacity	Required	Required w/Capacity
Fume Hood Structure	Same as ducted FH	Same as ducted FH, otherwise "Ductless Enclosure"	Same as ducted FH	Not specified, filtration test standard only
Layers of Filtration	2 Layers (redundant)	2 Layers (redundant)	2 Layers (redundant)	Class 1 = 2 layers Class 2 = 1 layer
Breakthrough Detection	Continuous & automatic	Continuous & automatic	Continuous & automatic	Class 1 = Continuous & automatic
Detection Accuracy	<25% TLV	As per ANSI Z9.5	Fraction of OEL	<1% TLV
Containment Testing	ASHRAE 110 Std. or as set by owner	ASHRAE 110 Std. as specified by owner	References ASHRAE 110 Std.	AFNOR XP X 15-206 Std.
Monitoring/Alarming	Audible & Visual	Audible & Visual	Audible & Visual	Not specified



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# **Approved Chemical Lists**

- Hundreds of chemicals, (represents thousands of chemicals within their chemical families)
- 98% of the commonly used chemicals,
- Required by SEFA 9 RP and AFNOR NF X 15-211



### Materials and Processes Not Allowed



Not retained well: gaseous @ STP and low molecular weight.

- 1. Acetylene
- 2. Carbon Dioxide
- 3. Carbon Monoxide
- 4. Ethane
- 5. Ethylene Oxide
- 6. Helium and all Noble Gases
- 7. Hydrogen
- 8. Methane
- 9. Nitrogen Monoxide
- 10. Propylene
- 11. Propyne, Propane
- 12. SOx and NOx

#### Applications not recommended:

- Perchloric Acid, Radioisotope or Acid Digestion Hoods
- Highly exothermic reactions
- Mercury Well retained but remains extremely toxic (TLV = 0.05 ppm) and difficult to detect
- High Toxicity compounds (e.g. organophosphorus)
- Lethal (e.g. Hydrogen Cyanide)

Applications that require specialty ducted hoods are likely not good candidates for filtration.

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### **Chemical Listing**



Chemical name	Formula	CAS number	Suitable filter	Retention capacity (g)	Vapor pressure	MM (g/mol)	Boiling point (°C)	NIOSH 8h
AMINOCYCLOHEXANE	C6H11NH2	108-91-8	Neutrodine Unisorb	630	1.2 kPa	99	135	10 ppm
AMINOETHANE	C2H7N	75-04-7	Neutrodine Unisorb	114	116 kPa	45	17	10 ppm
aminomethane	CH5N	74-89-5	Neutrodine Unisorb	36	353 kPa	31	-7	10 ppm
AMMONIA (30% solution)	NH3	7664-41-7	PF Ammonia + Neutrodine Unisorb	384	1003 kPa	17	-33	25 ppm
AMMONIUM CHLORIDE	NH4Cl	12125-02-9	PF + HEPA or Neutro- dine Unisorb		0.13 kPa	53,49	-	10 mg/m <sup>3</sup>
AMMONIUM CHLORIDE FUME	NH4Cl	12125-02-9	PF + HEPA or Neutro- dine Unisorb	-	0.13 kPa	53,49	-	10 mg/m <sup>3</sup>
AMYL ALCOHOL N	C5H12O	71-41-0	Neutrodine Unisorb	3416	0.259 kPa	88	138	-
ANHYDROUS HYDROGEN BRO- MIDE	HBr	10035-10-6	Neutrodine Unisorb	1626	0.15 kPa	80,91	-66	-
ANILINE	C6H5NH2	62-53-3	Neutrodine Unisorb	1944	0.09 kPa	93	184	
AQUA FORTIS	HNO3	7697-37-2	Neutrodine Unisorb	1608	6.39 kPa	63	120	2 ppm

# **Enhancing Safety**





#### Performance & Compliance

#### Documentation

Ductless fume hoods must be accompanied by a booklet containing an exhaustive list of the chemical agents, that the manufacturer certifies, can be handled in the fume hood:

- The name of the chemical agent, its formula, its CAS number, its boiling point, its molecular weight, its vapor pressure, etc.
- The reference of the adapted filter and its retention capacity in accordance with the NF X 15-211 standard.
- The type of air quality monitoring recommended to control filter efficiency

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# Thank you







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#### **Enhancing Safety** 100°C From 3 to 4 100°C From 3 to 4 100°C From 3 to 4 Recrystallization in Water Recrystallization in Water Recrystallization in Water Acetanilide Benzoic Acid Adipic Acid BEAKER BEAKER BEAKER From 151 to 250 ml (or g) From 151 to 250 ml (or g) From 151 to 250 ml (or g) From 21 to 30 min. From 21 to 30 min. From 21 to 30 min. 100% Opened Opened handlings/month **EVAPORATION** BEAKER Opened 100% 100°C From 3 to 4 From 26 to 50 ml (or a) Water From 21 to 30 min handlings/month 100°C From 3 to 4 WEIGHING Activated Carbon BEAKER Opened 100% From 6 to 10 ml (or g) From 21 to 30 min. THIN LAYER CHROMATOGRAPHY Acetic Acid 23°C From 3 to 4 TLC DEVELOPING TANK Closed 100% From 0 to 5 ml (or g) From 5 to 10 min. handlings/month handlings/month 23°C From 3 to 4 handlings/month 23°C From 3 to 4 handlings/month 23°C From 3 to 4 THIN LAYER CHROMATOGRAPHY Ethyl Acetate TLC DEVELOPING TANK 100% From 0 to 5 ml (or g) From 5 to 10 min THIN LAYER CHROMATOGRAPHY Hexane TLC DEVELOPING TANK 100% From 0 to 5 ml (or g) From 5 to 10 min. WEIGHING From 51 to 75 ml(or g) TUBE Opened From 5 to 10 min handlings/month WEIGHING 23°C From 3 to 4 Acetaminophen TUBE Opened From 51 to 75 ml(or g) From 5 to 10 min. handlings/month 23°C From 3 to 4 handlings/month 23°C From 3 to 4 WEIGHING 100% From 51 to 75 ml(or g) From 5 to 10 min Opened 99% From 0 to 5 ml (or g) From 5 to 10 min. handlings/month THIN LAYER CHROMATOGRAPHY Silica Gel (on TLC plate) TLC DEVELOPING TANK 100% 23°C From 3 to 4 handlings/month From 6 to 10 ml (or g) From 21 to 30 min 15

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