

CSA  
Group

Z316.5-15

## Fume hoods and associated exhaust systems

Presenter:

Wayne Wood, CIH, ROH,  
MScA

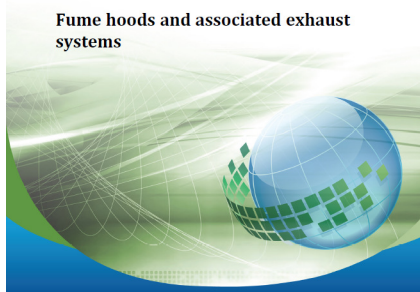
Director EHS, McGill  
University

The graphic features a blue and green globe with a grid pattern, set against a background of green and blue wavy lines and a grid pattern.



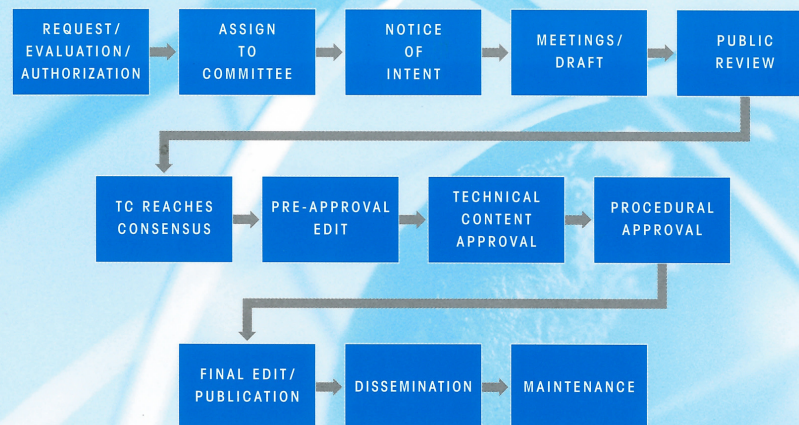
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## Our agenda



- CSA - the standard-setting process
- The stakeholders
- The Z316.5-15 technical subcommittee
- Content of Z316.5-15
- Z316.5-04 and sustainability
- Q&A

### CSA's STANDARDS DEVELOPMENT PROCESS



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## Stakeholders

Fume hoods and associated exhaust systems



- Manufacturers
- Certifiers
- Architects
- Engineers
- Owners/Users
- Occupational Hygienists
- Regulators



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### Subcommittee on Fume Hoods

W. Wood	McGill University, Montréal, Québec	Chair
B.C. Peat	H.E.P.A. Filter Services Inc., Concord, Ontario	Vice-Chair
R. Chopowick	CONTEST, Ottawa, Ontario	
D.J. Driscoll	Parkin Architects Limited, Toronto, Ontario	
E. Hempell	Health Canada, Ottawa, Ontario	
S. Hood	TFGBAL Group, Vancouver, British Columbia	
J.E. Minogue	University of Guelph, Environmental Health & Safety, Guelph, Ontario	
C.M. Nielsen	CSMLS, Hamilton, Ontario	
A. Ostojic	WorkSafe BC, Vancouver, British Columbia	
G. Shirliff-Hinds	University of Toronto, Toronto, Ontario	
A. Sinnamon	Mott Manufacturing Limited, Brantford, Ontario	
D. Kolozsvari	CSA Group, Toronto, Ontario	Project Manager

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Fume hoods and associated exhaust systems





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## Contents

(partial)

- ✓ Scope
- ✓ Design and Construction
- ✓ Selection
- ✓ Hood placement
- ✓ Installation
- ✓ Testing
- ✓ Maintenance
- ✓ Training
- ✓ Decommissioning



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## Exclusions

- ✓ Ductless hoods excluded by definition
- ✓ Biological Safety Cabinets not covered
- ✓ Additional requirements for perchloric acid and some nuclear substances





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## Sustainability Issues

- Energy consumption
- Life cycle
- Decontamination and decommissioning
- Safety performance



SUSTAINABLE LABS CANADA  
LABORATOIRES ÉCOLOGIQUES DU CANADA



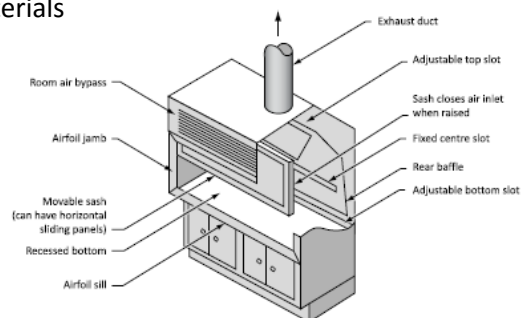
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## Design and construction

- ✓ Construction materials
- ✓ Electrical Safety
- ✓ Sash opening
- ✓ Work surface
- ✓ Services
- ✓ Alarm
- ✓ Ducts, fan, stacks
- ✓ Filters
- ✓ Markings



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## Stack location: a case study

Before:



After:



Now:





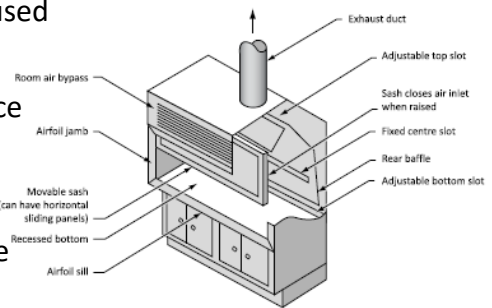
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### Fume hoods and associated exhaust systems



## Selection Criteria

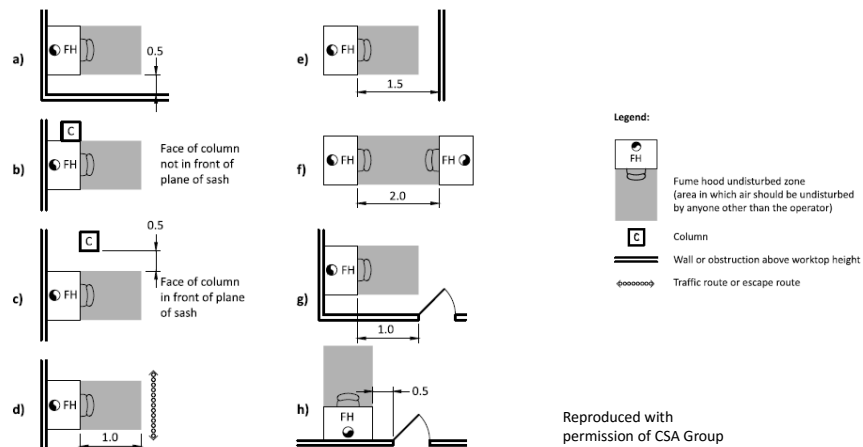
- ✓ Quantities being used
- ✓ Manner used
- ✓ Chemical resistance
- ✓ Toxicity
- ✓ Thermal stress
- ✓ Explosions and fire
- ✓ Ergonomics

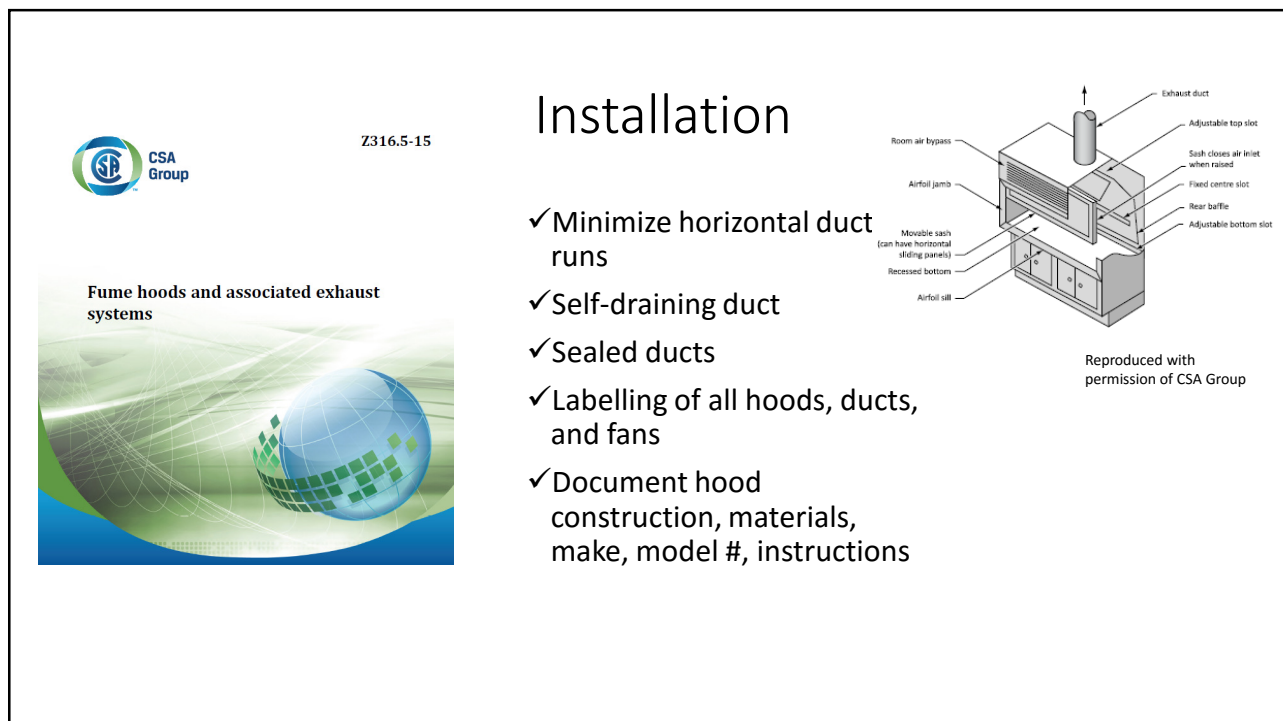
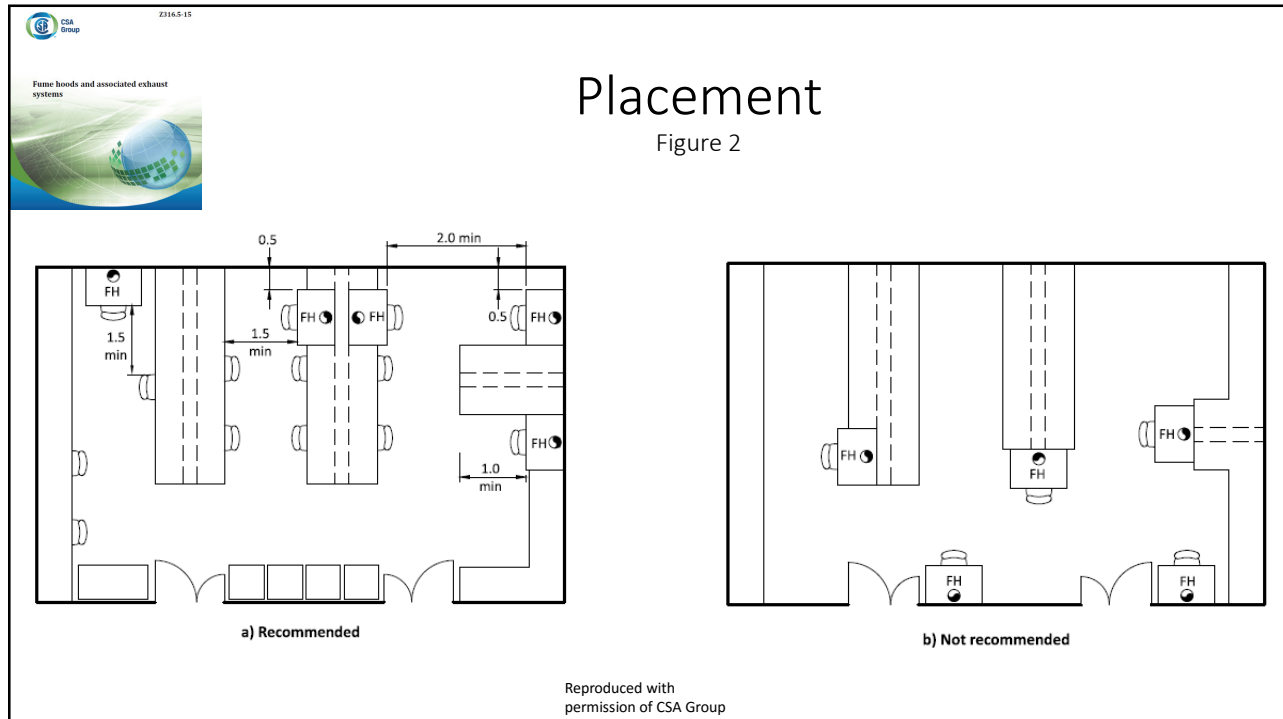


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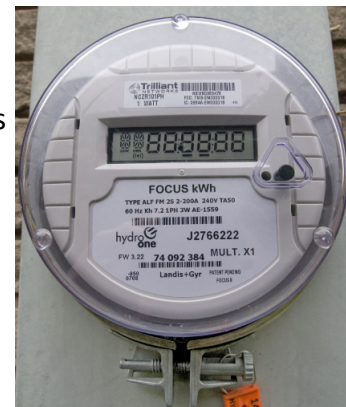
## Placement

Figure 1











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## Face Velocity



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Face velocity range	Conditions
>.75 m/s (> 150 fpm)	Excessive turbulence
0.65 – 0.75 m/s (120 – 150 fpm)	Potential for turbulence. High cost.
0.5 – 0.6 m/s (100-120 fpm)	Effective but costly
0.4 – 0.5 m/s (80 -100 fpm)	Effective and cost effective
0.3 – 0.4 m/s (60 - 80 fpm)	Effective under ideal conditions
< 0.3 (<60 fpm) standard hood	Not recommended.
< 0.3 (< 60 fpm) high performance hood	Performance tests critical.



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## Dormant Hoods

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- ✓Inactive and not containing hazardous materials
- ✓Risk assessment before making hood dormant
- ✓Provide visible or audible alert that hood is active





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## Testing

- ✓ Flexibility in testing regime
- ✓ Allows for variations in intended use
- ✓ System tests vs. performance tests
- ✓ Manufacturer test
- ✓ Installation test
- ✓ Periodic site test



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## System Testing

Provides info on the state of a hood at 1 point in time:

- i) face velocity profile;
- ii) room cross-draft measurements
- iii) variable air volume (VAV) function assessment





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## Performance Testing



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Provides info on the ability of a hood to capture, contain, and exhaust.

- i) Airflow visualization analysis
- ii) Tracer gas containment (ASHRAE 110)



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## Test Result Classification

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Classification	A	B	C	D
		With valid benchmark data	With no valid benchmark data	
<b>General</b>				
Inspection	✓	✓	✓	✓
<b>System tests</b>				
Face velocity	✓	✓	✓	✓
Room cross draft	✓	✓	✓	✓
VAV function*	✓	✓	✓	✓
<b>Performance tests</b>				
Airflow visualization	✓	✓	✓	
Tracer gas containment	✓			

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## Maintenance

- ✓ Daily (user)
- ✓ Monthly (GFCI)
- ✓ 6 month
  - ☐ fan, motor, belt, shaft, bearings, machine guards
- ✓ Annual
  - ☐ Sash, liner, controls
  - ☐ Duct integrity and stack stability
  - ☐ Makeup air, hood performance
  - ☐ Calibration of airflow monitor
  - ☐ Filters, scrubbers, fire suppression



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## Training

- ✓ Hood users
  - ☐ Components, uses and limitations
  - ☐ Recommended and required safe operation procedures
  - ☐ User maintenance
- ✓ Maintenance personnel
  - ☐ Components, uses and limitations
  - ☐ Routine and preventive maintenance
  - ☐ Shutdown safety protocols
  - ☐ Testing protocols







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## Decommissioning

- ✓ History of substances previously used → PPE and Decon method
- ✓ Perchloric acid special requirements
- ✓ Removal of residues
- ✓ Disconnection of services
- ✓ Proper disposal of components
  - ☐ Haz waste
  - ☐ E-waste
  - ☐ Regular trash
- ✓ Documentation



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To access the standard or to watch a video overview:

<http://shop.csa.ca/en/canada/medical-laboratory-systems/z3165-15/invt/27020942015>



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