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COWI AS

DESIGN AND TESTING OF SAFETY VENTILATING SYSTEMS

- EXPERIENCES FROM ST.OLAVS HOSPITAL, NORWAY

AGENDA

1. Background
 - St.Olavs Hospital
 - The "Rosenborg-scandal"
2. Safety cabinets
 - installation
 - testing
 - why the standard should be upgraded
3. Fume cupboards
 - functional requirements
 - testing
 - why the standard should be upgraded
4. Combined systems
 - design
 - requirements to different actors
5. Summary

ST.OLAVS HOSPITAL

1. Background

1.1 St.Olavs Hospital

1.2 The "Rosenborg-scandal"

2. Safety cabinets

2.1 Exhaust connection

2.2 Other important issues

2.3 Testing

2.4 Testing acc.to EN 12469

3. Fume cupboards

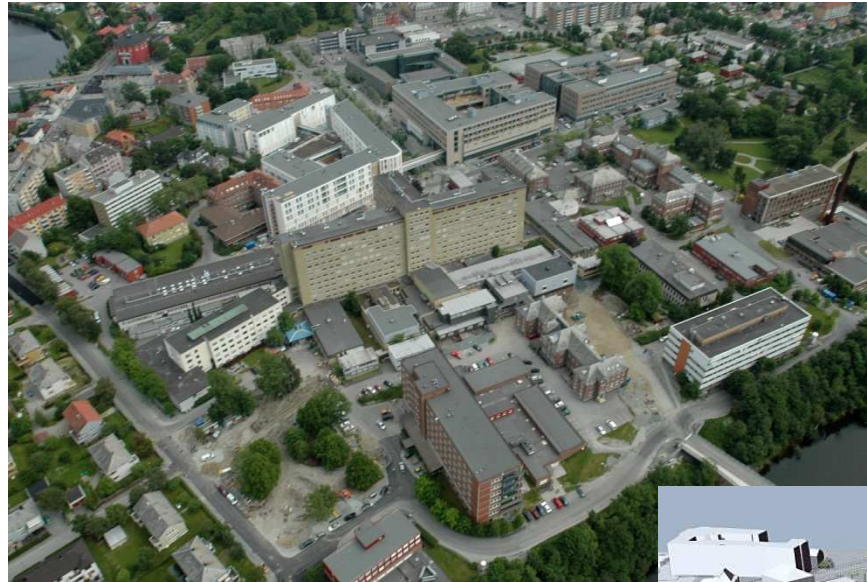
3.1 Functional requirements

3.2 Testing acc.to EN 14175

3.3 Stability

4. Combined systems

5. Summary



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ST.OLAVS HOSPITAL

1. Background

1.1 St.Olavs Hospital

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3. Fume cupboards

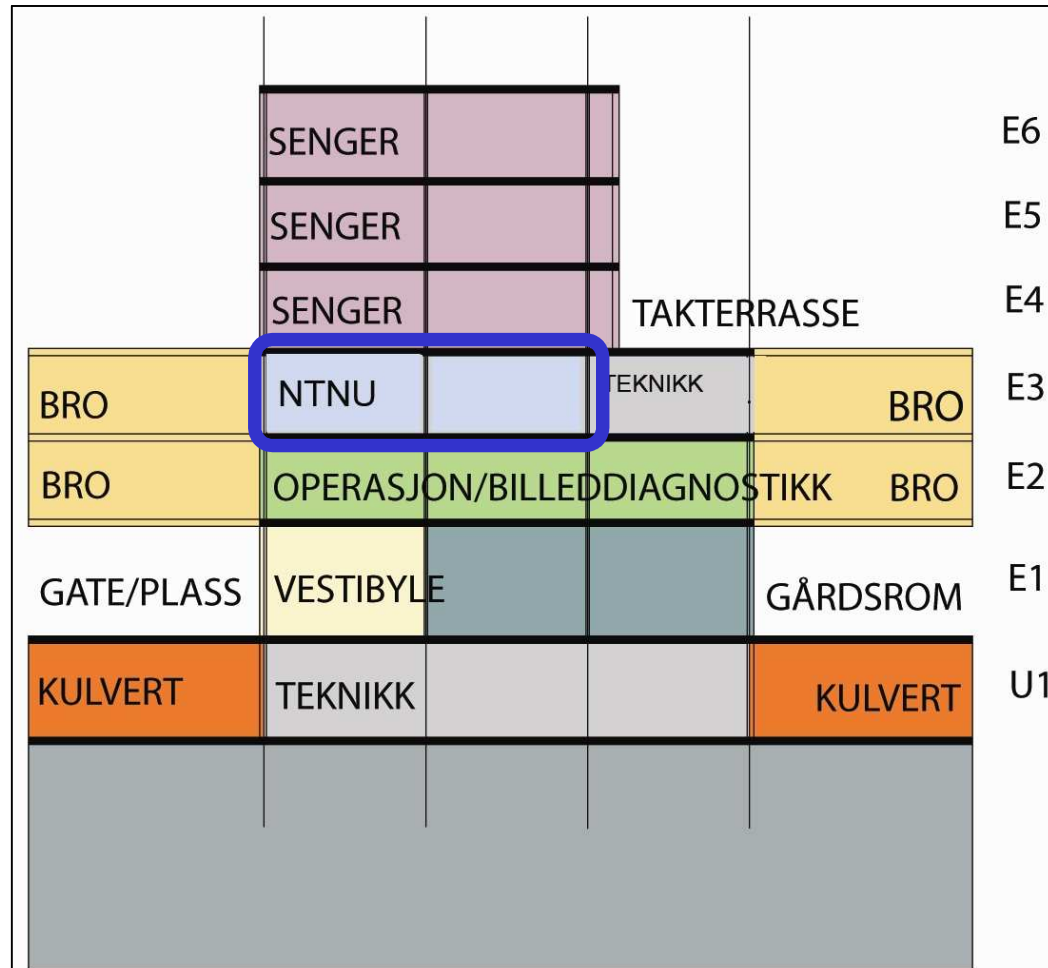
3.1 Functional requirements

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3.3 Stability

4. Combined systems

5. Summary



THE "ROSENBERG-SCANDAL"

1. Background

1.1 St.Olavs Hospital

1.2 The "Rosenborg-scandal"

2. Safety cabinets

2.1 Exhaust connection

2.2 Other important issues

2.3 Testing

2.4 Testing acc.to EN 12469

3. Fume cupboards

3.1 Functional requirements

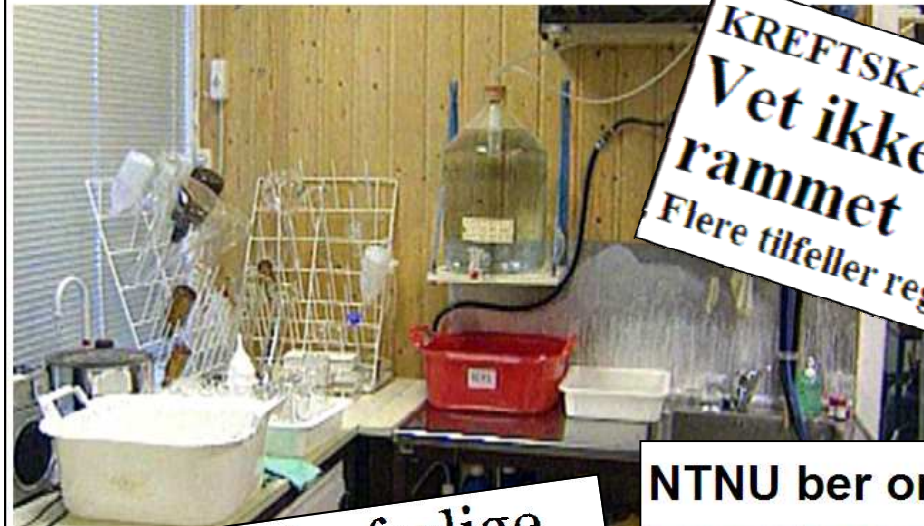
3.2 Testing acc.to EN 14175

3.3 Stability

4. Combined systems

5. Summary

Uløst kreftgåte ved NTNU



KREFTSKANDALEN
Vet ikke hvor mange som er rammet
Flere tilfeller registrert etter VG-oppslag

NTNU ber om unnskyldning



Jobber i helsefarlige omgivelser ved NTNU



KREFTSKANDALEN:
Helsepolitikere krever uavhengig gransking

Skandalen Rosenberg

SAFETY CABINETS CLASS A2

1. Background

1.1 St.Olavs Hospital

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3.1 Functional requirements

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3.3 Stability

4. Combined systems

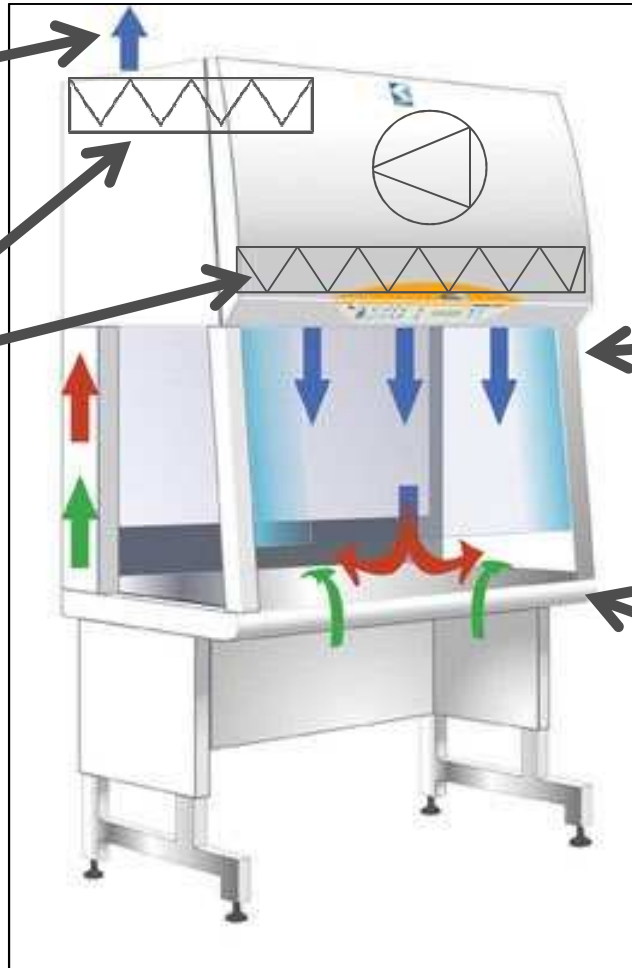
5. Summary

Constant
air flow

Filtration

Downflow for
product protection

Inflow for
personnel
protection



SAFETY CABINETS

1. Background

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5. Summary

Exhaust connections

- canopy connection

- low floor height creates some challenges



SAFETY CABINETS

Other important issues:

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3. Fume cupboards

3.1 Functional requirements

3.2 Testing acc.to EN 14175

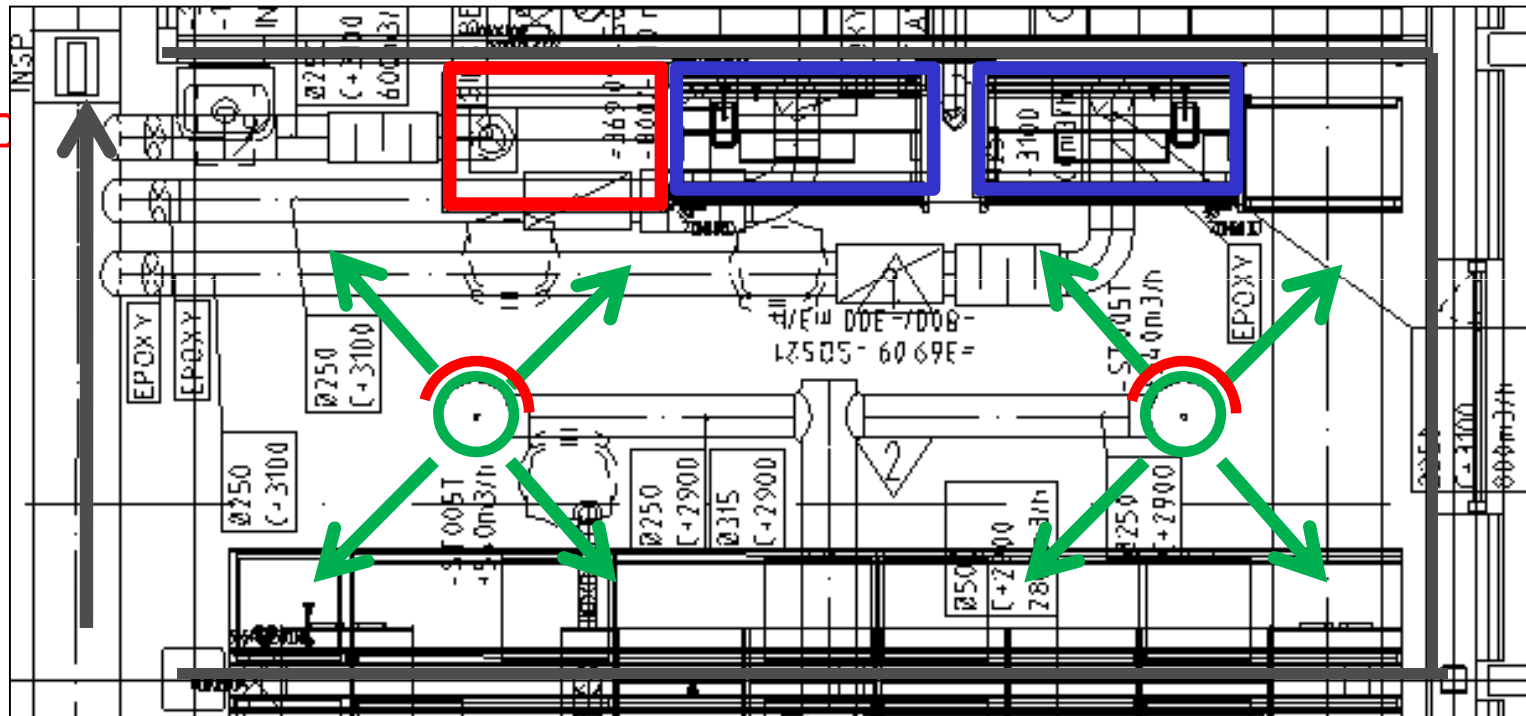
3.3 Stability

4. Combined systems

5. Summary

- distance to air supply valves
- distance to the wall and other safety cabinets
- distance to fume cupboards
- distance to walking zone

5. Summary



SAFETY CABINETS

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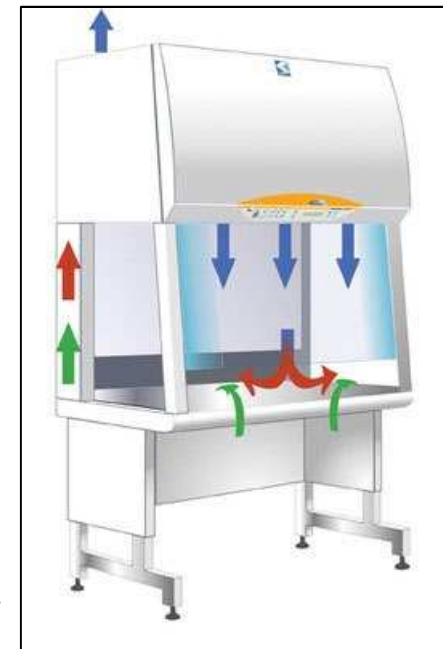
5. Summary

On-site testing, before
commisioning:

- validation on-site, including
testing of downflow and inflow
according to EN 12469

- downflow: air velocity measured
in 8 positions in a grid inside
(be aware of UV-lights)

- inflow: measured air volume/area



SAFETY CABINETS

Guidelines from Nordic R3:

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3. Fume cupboards

3.1 Functional requirements

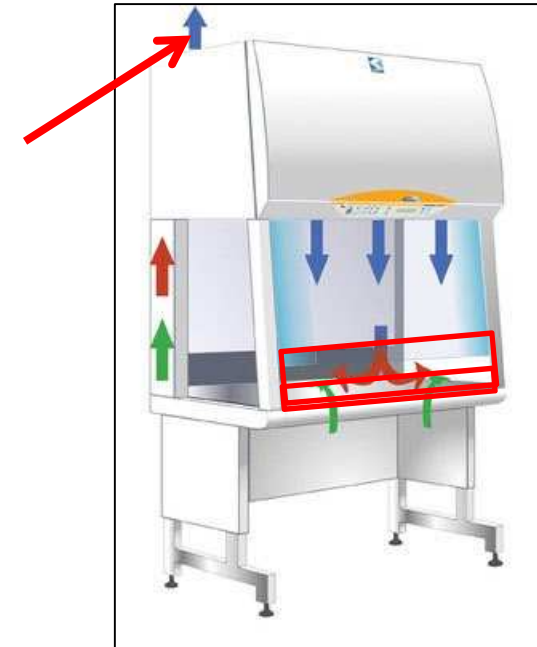
3.2 Testing acc.to EN 14175

3.3 Stability

4. Combined systems

5. Summary

1. measure in the work access opening (20 cm height) with a funnel
2. measure as described in EN 12469
3. measure in the work access opening (5-10 cm height)



SAFETY CABINETS

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3.3 Stability

4. Combined systems

5. Summary

Testing on-site, before commisioning:

- sound measurement with the actual working conditions

- KI-discus-test of all cabinets, to show how the cabinet works in the specific environment

SAFETY CABINETS

On-site testing according to EN 12469

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5. Summary

- downflow ok

- inflow – can not be measured in the canopy exhaust connection, and the requirement "no individual measure values should derive more than 20% from the mean value" can never be met

- inflow was measured according to the guidelines from Nordic R3, alt. 3 – this should be the new standardized method

FUME CUPBOARDS

Functional requirements

1. Background

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4. Combined systems

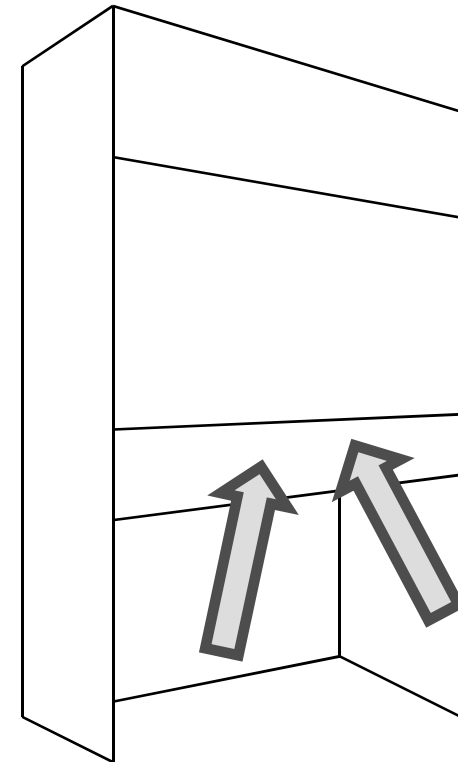
5. Summary

- air velocity: $0,55 \text{ m/s} \pm 10\%$,
which means $0,5 - 0,6 \text{ m/s}$

- min velocity by opening:
 $0,3 \text{ m/s}$

- response time: 2 sek

- max velocity by closing:
 $0,8 \text{ m/s}$



FUME CUPBOARDS

Testing of fume cupboards according to EN 14175

1. Background

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2.3 Testing

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3. Fume cupboards

3.1 Functional requirements

3.2 Testing acc.to EN 14175

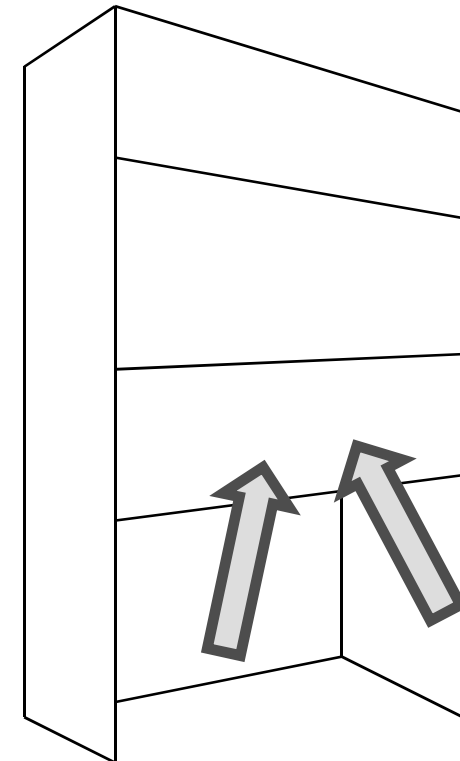
3.3 Stability

4. Combined systems

5. Summary

- inflow velocity
- exhaust air volume
- pressure drop
- flow pattern
- air velocity in the room
- alarm system
- containment
- sound pressure level

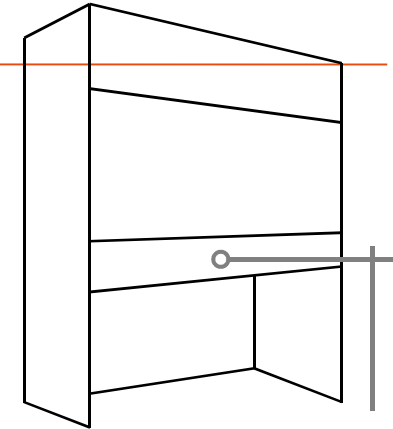
STABILITY??



FUME CUPBOARDS

Testing of stability

1 measuring point, logging



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3. Fume cupboards

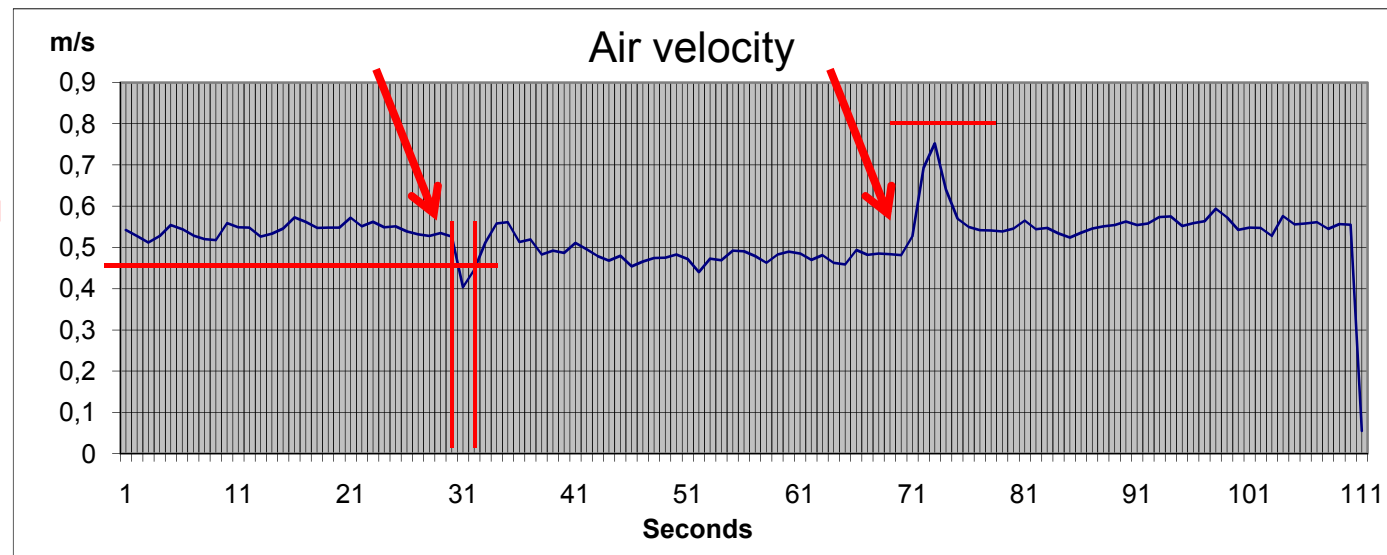
3.1 Functional requirements

3.2 Testing acc.to EN 14175

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4. Combined systems

5. Summary



FUME CUPBOARDS

Testing of another, common fume cupboard:

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2.3 Testing

2.4 Testing acc.to EN 12469

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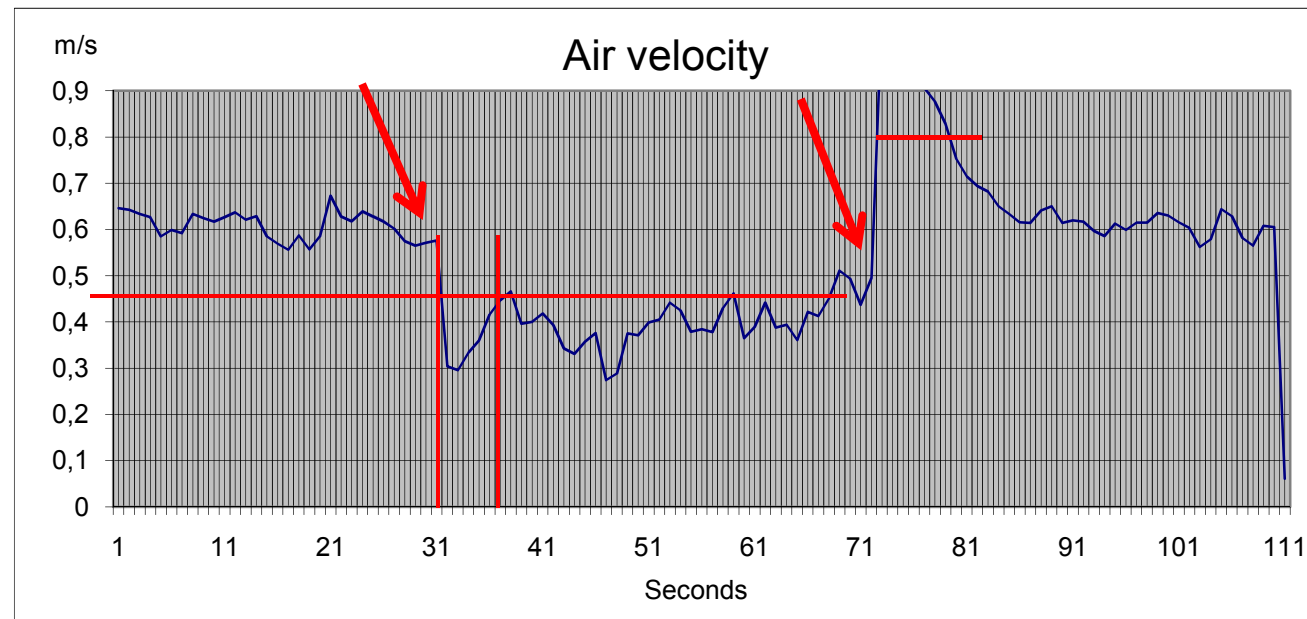
3.1 Functional requirements

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5. Summary



Stability logging should be required for all fume cupboards!

COMBINED SYSTEMS

1. Background

1.1 St.Olavs Hospital

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4. Combined systems

5. Summary

Safety ventilating systems for laboratories with safety cabinets and fume cupboards require BOTH stability AND quick response

- important to keep the totality in mind
- essential with great competence (= knowledge + experience) in all parts

SUMMARY

1. Background

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2.3 Testing

2.4 Testing acc.to EN 12469

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5. Summary

Safety cabinets to be tested according to EN 12469, but the inflow procedure should follow Nordic R3 guidelines, alternative 3

Fume cupboards to be tested according to EN 14175, but the stability should also be verified

The systems require great attention to planning, construction, component choice and placement ...

... but most important - the totality ☺