Maintain the Clean

A Practical Guide to ASHRAE Standard 170 Air Pressure Requirements

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The Fine Print

This presentation is designed to provide a practical overview of ASHRAE Standard 170 Air Pressure Requirements.

It is not intended to be a substitute for the Standard.

The Fine Print

This presentation, including the system diagrams, has been created by and is the property of Karpinski Engineering.

Learning Objectives

1. Understand how the language of Standard 170 applies to real life scenarios in healthcare facilities
2. Be able to take practical steps to verify compliance with Standard 170 and be prepared for surveyors performing tissue tests
3. Understand the impact room names can have on the design, operation, and compliance of spaces

Standards

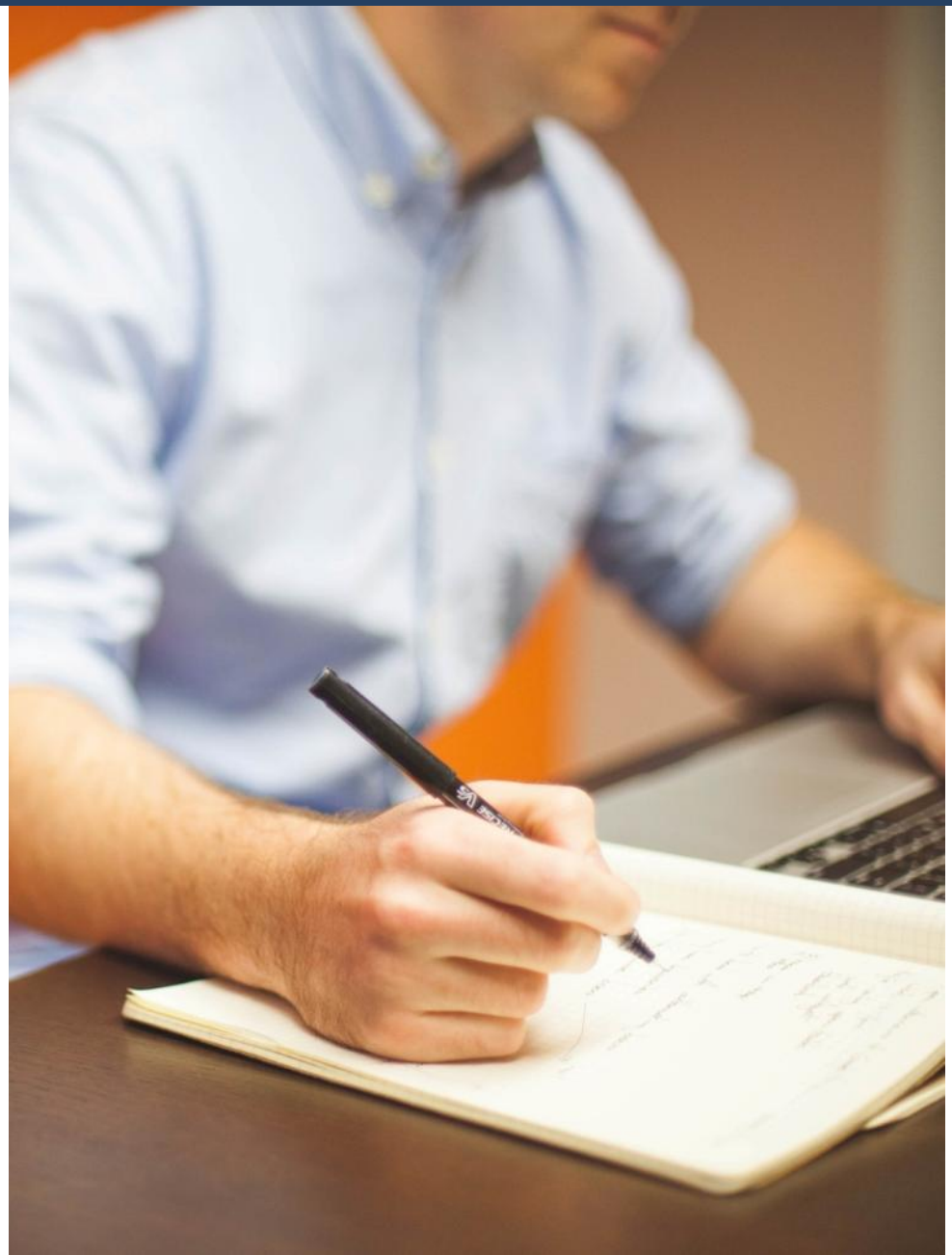
The Facility Guidelines Institute
Guidelines for Design and Construction of Hospitals and Outpatient Facilities

"ASHRAE Standard 170"

ASHRAE | **ASHE** | **ANSI**

FGI Guidelines I Part 4

- All approved addenda
- ASHRAE section 4.1 & 4.2 excluded
- Follow FGI when ASHRAE conflicts
- Follow Addenda when FGI conflicts
- ASHRAE definitions do not apply to FGI



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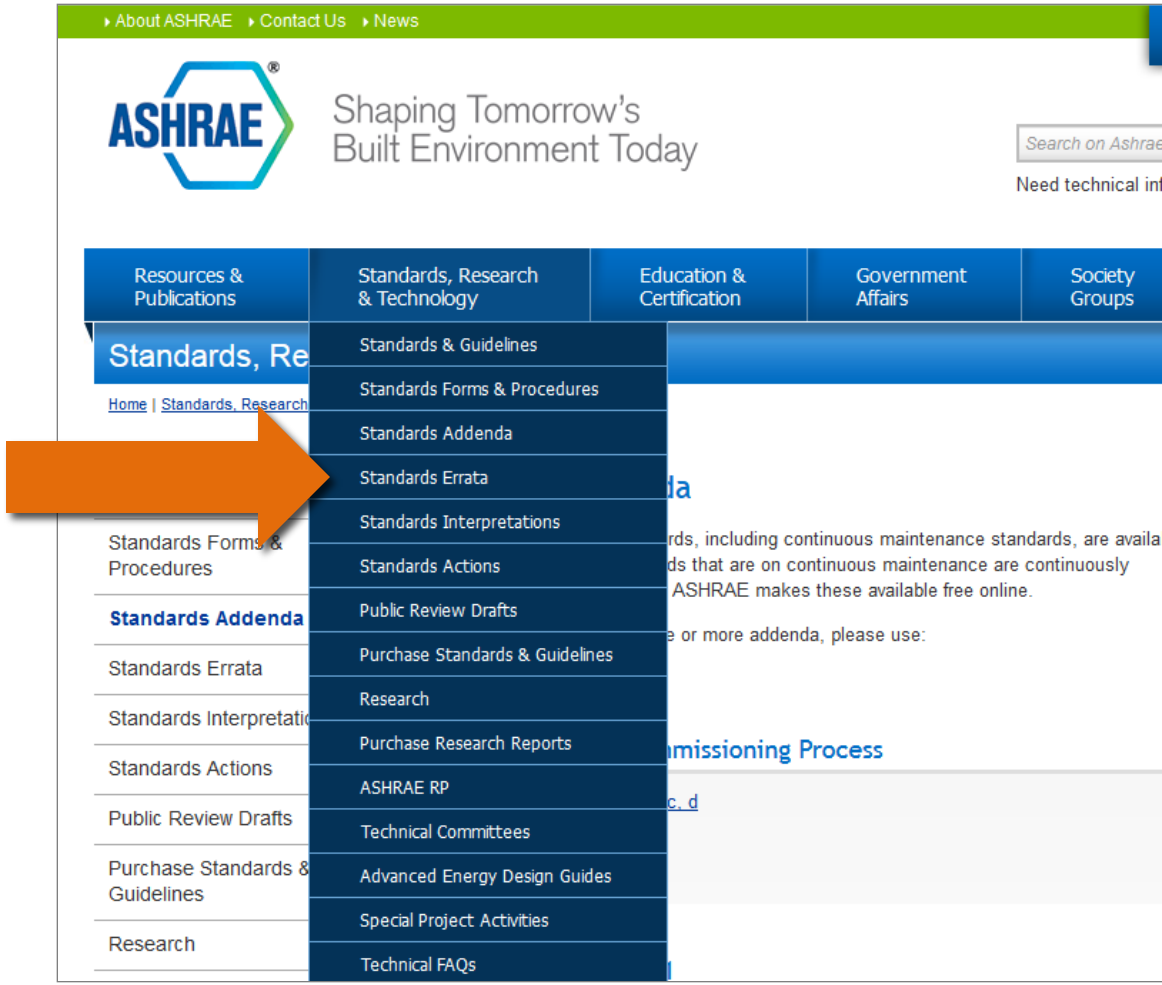
Addenda, Interpretations, Errata

- Free download at ASHRAE.org
- As of Oct 1, 2015:
  - 5 Addenda
  - 7 interpretations
  - Errata sheet dated 7-16-2015



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ASHRAE Standard 170 I Contents

Sections

1. Purpose
2. Scope
3. Definitions
4. Compliance
5. Planning
6. **Systems & Equipment**
7. **Space Ventilation**
8. Planning, Construction & Startup
9. References

Appendix A – Operations & Maintenance

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Part 1 I Purpose Statement

"The purpose of this standard is to define **ventilation design requirements** that provide environmental **control for comfort, asepsis and odor** in healthcare facilities."

Part 2 I Scope

- Patient care areas & related support
- New buildings
- Additions & alterations of existing buildings

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Part 6 I Systems & Equipment

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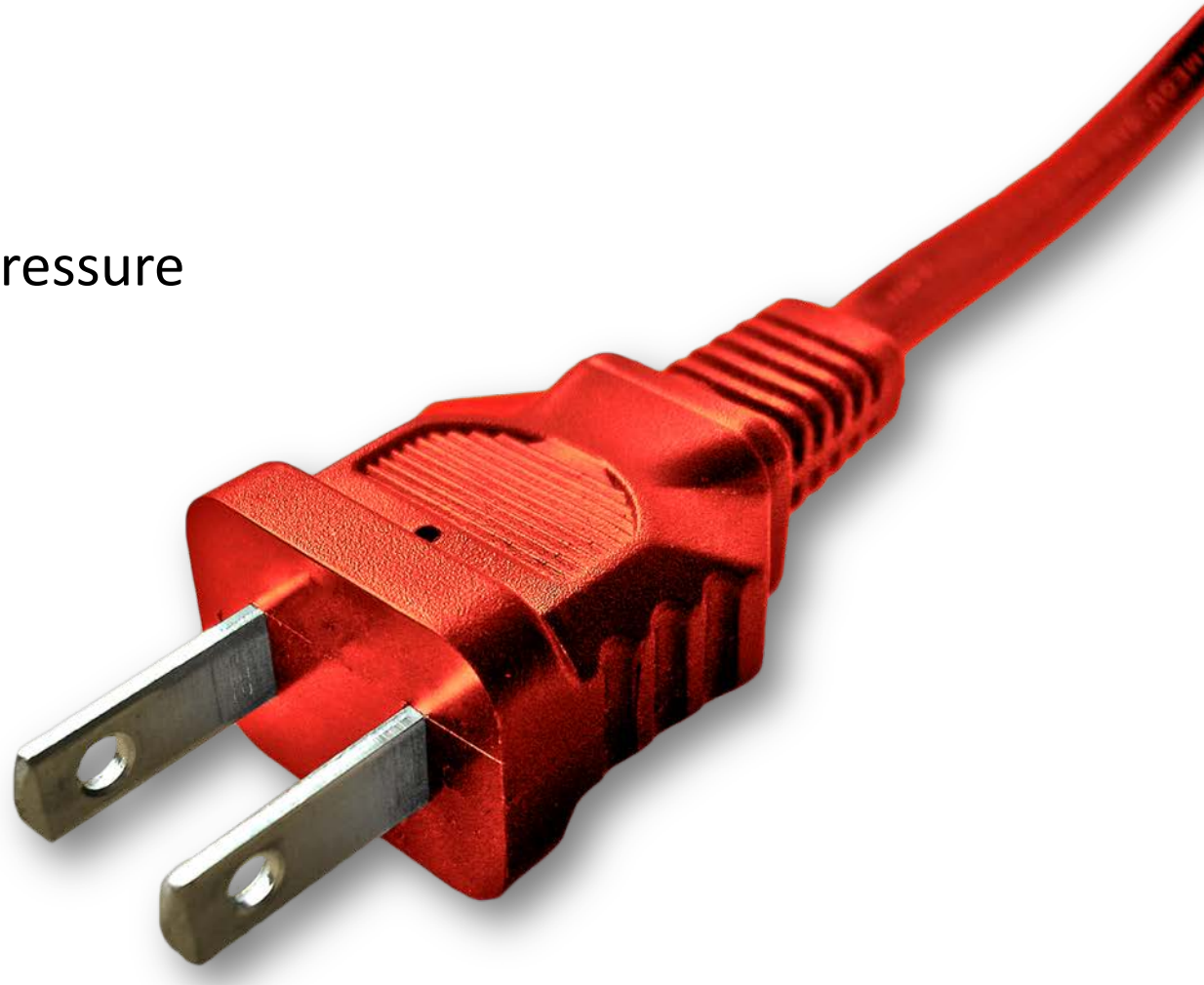
6.1.1 I Emergency Power

Space Ventilation & Pressure Relationships

- Aii
- PE
- OR
- C-section



6.1.2.1 I Heating Systems

- Component redundancy
- On-site fuel … Based on facility disaster plan

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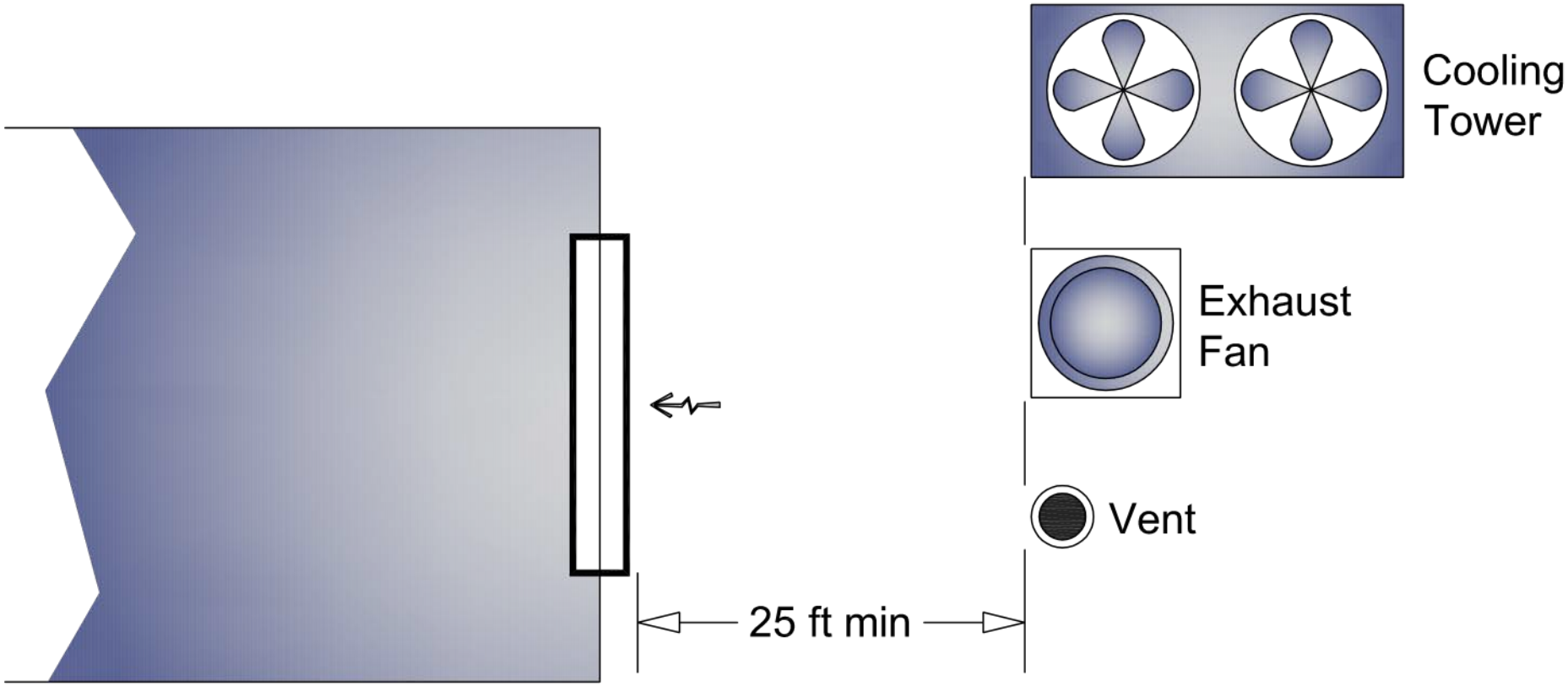
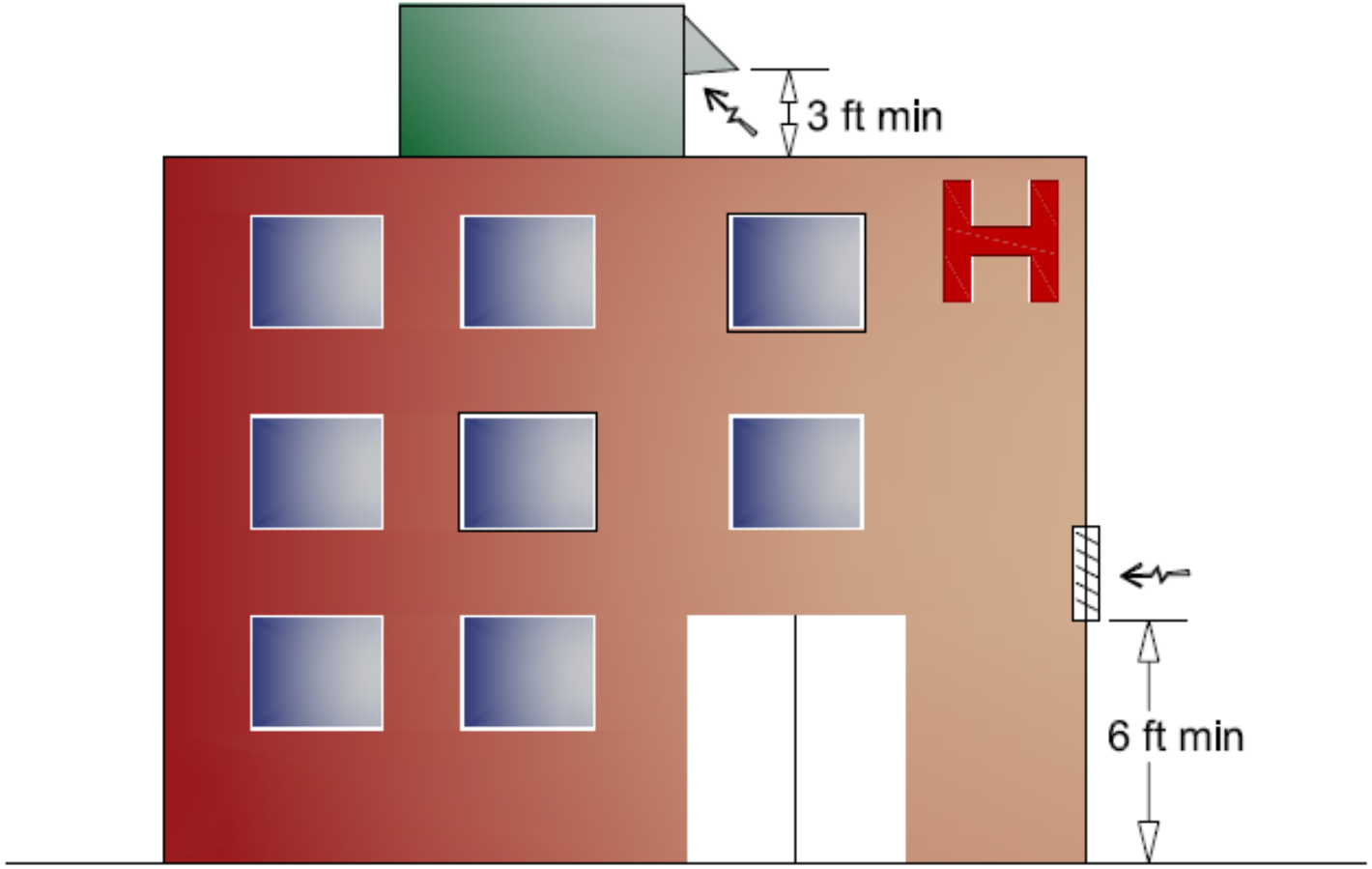
6.1.2.2 I Cooling Systems

Component redundancy – larger than 400 Tons

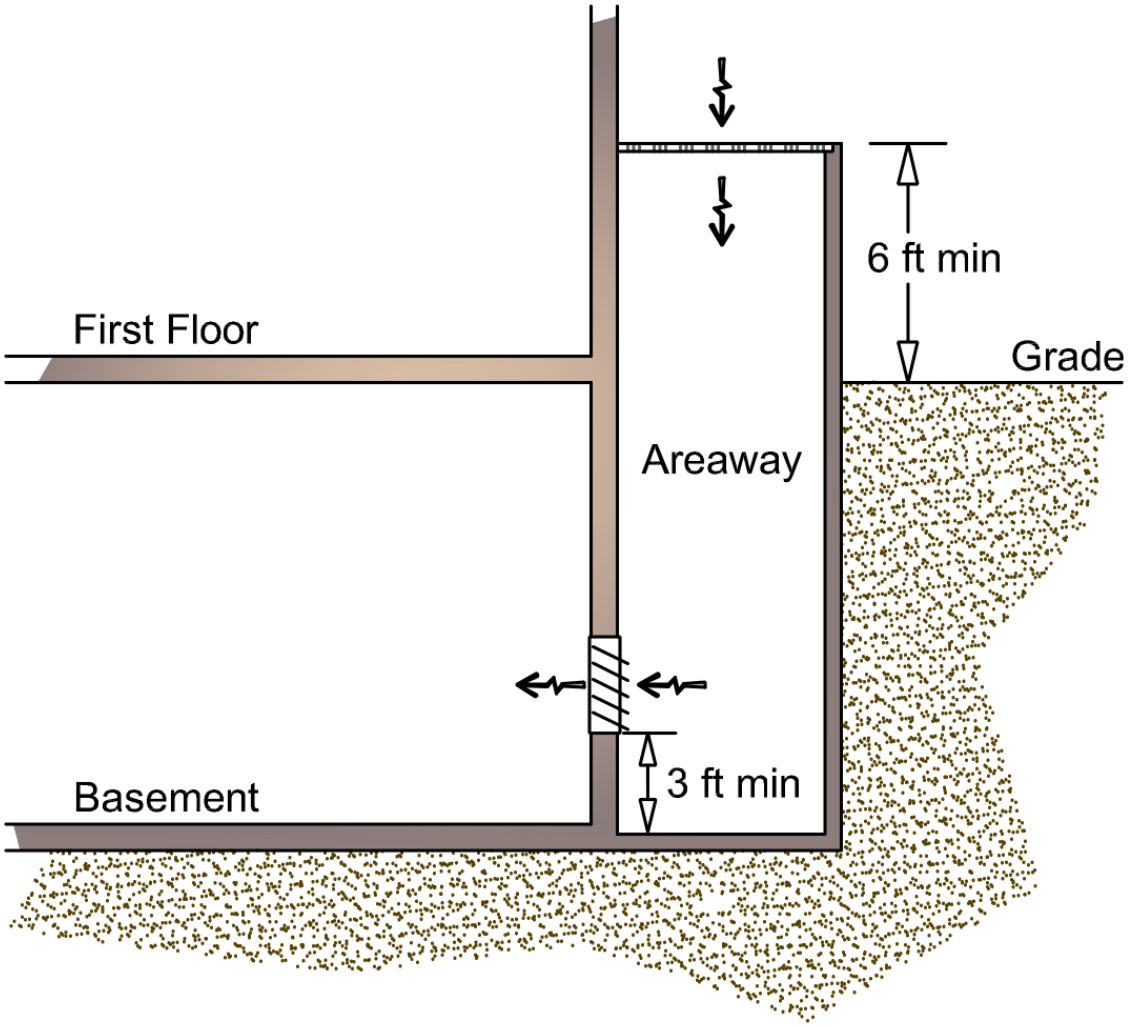
6.3.1 I OA Intakes



6.3.1 I OA Intakes

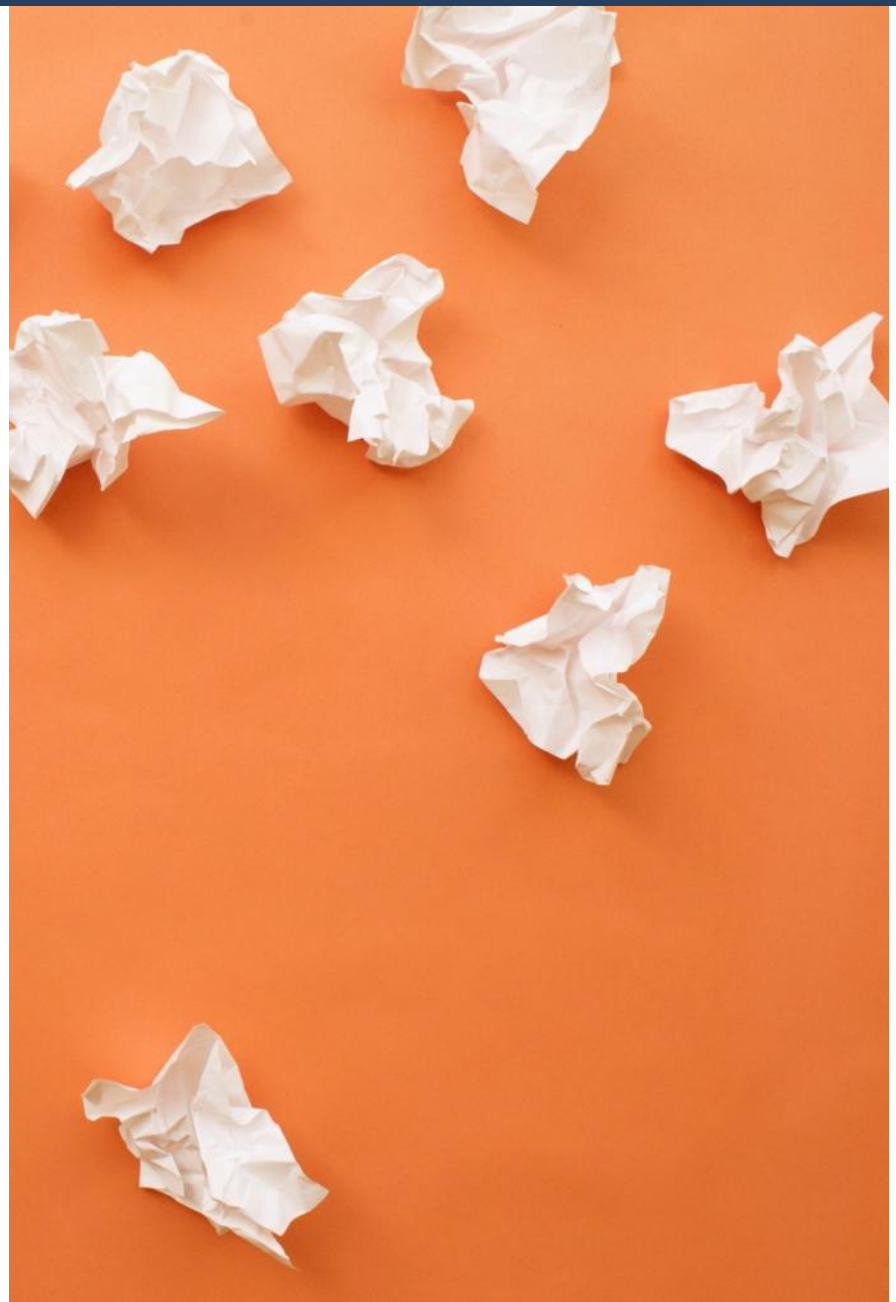


6.3.1 I OA Intakes



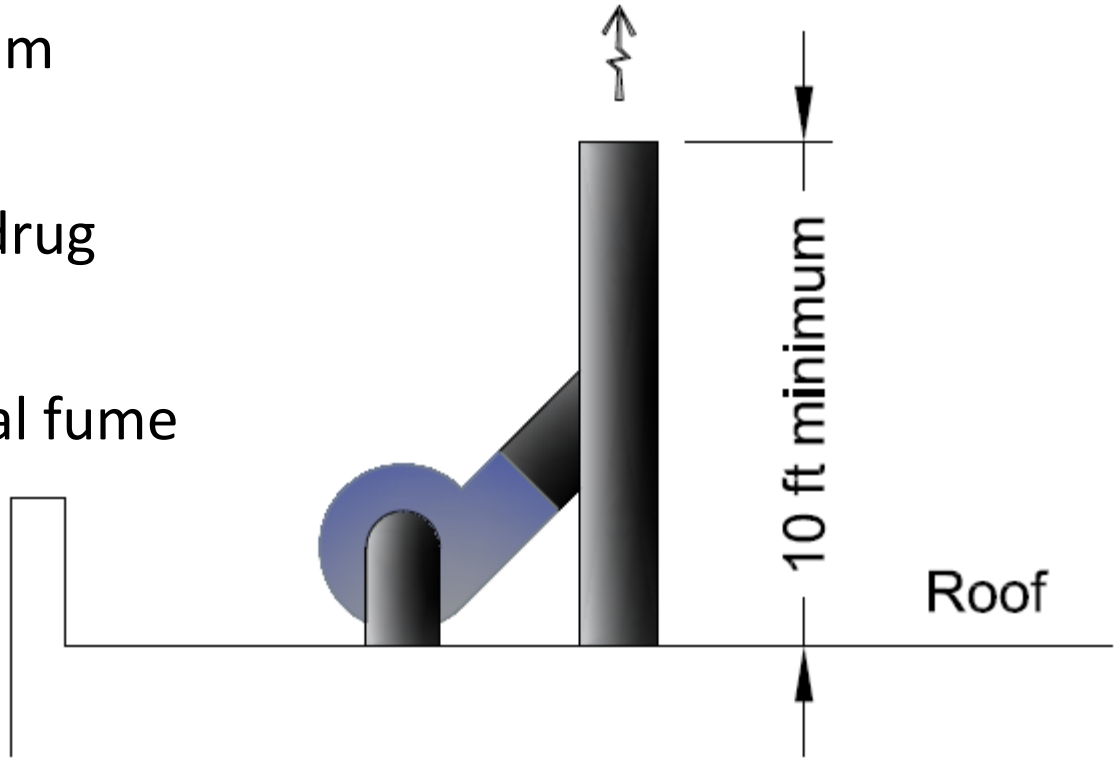
6.3.2 I Exhaust Discharges

Entirely revised in Addendum D



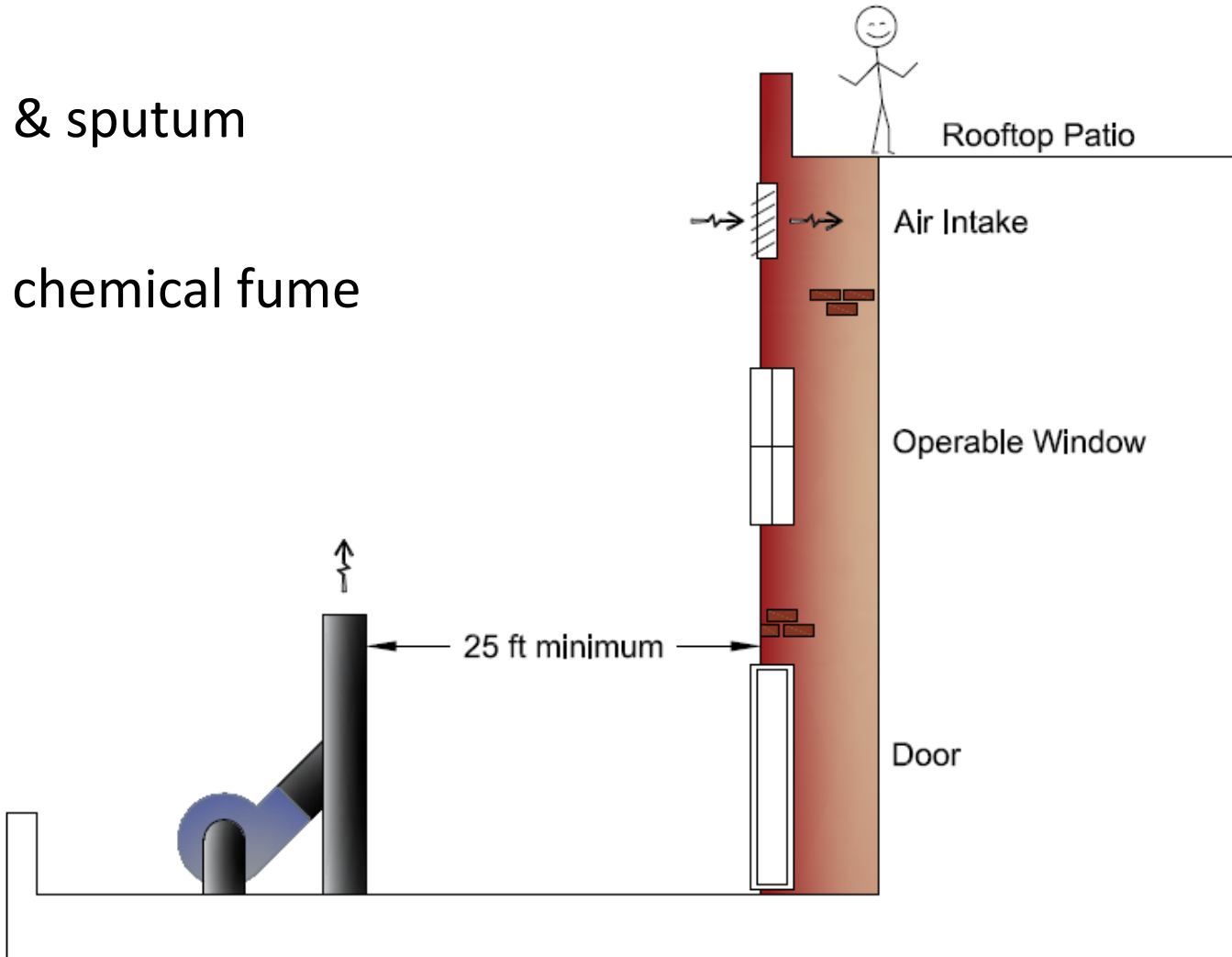
6.3.2.2 I Exhaust Discharge Height

1. Aii
2. Bronchoscopy & sputum collection
3. Pharmacy hazardous-drug hoods
4. Lab work area chemical fume hoods



6.3.2 I Exhaust Discharge Location

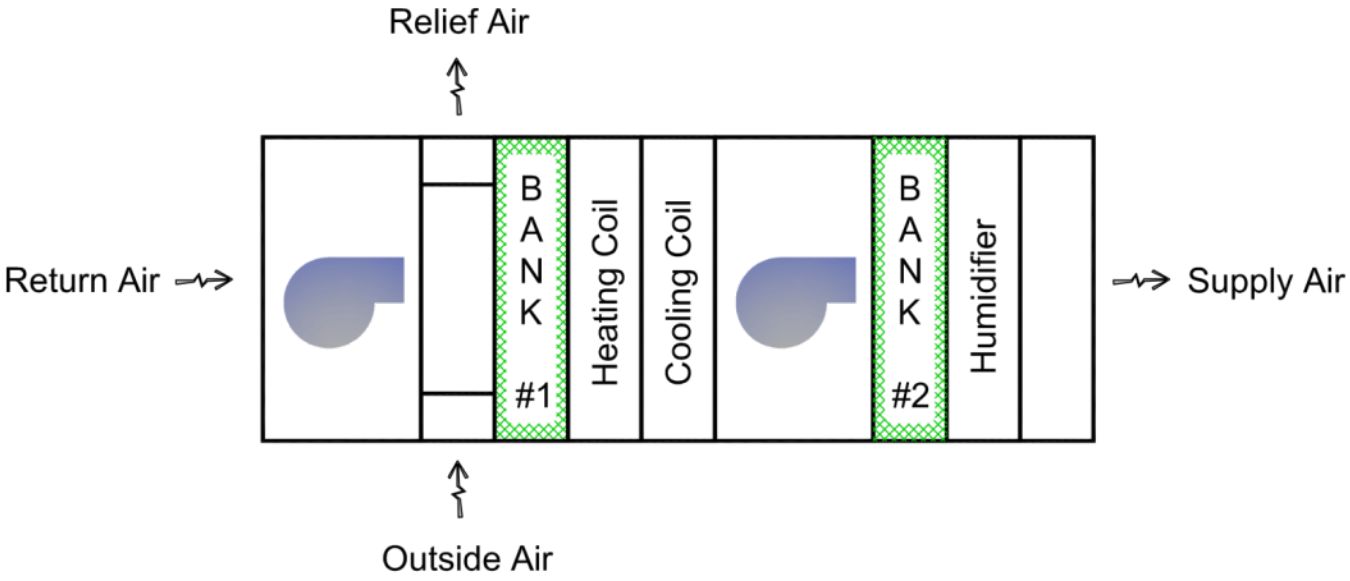
1. Aii
2. Bronchoscopy & sputum collection
3. Lab work area chemical fume hoods



6.4 I Filtration

Table 6.4 addresses minimum filter efficiencies

- Based on **space designation** (e.g., ORs, recovery spaces)
- Designates minimum efficiency reporting value (MERV) for **each filter bank**



6.3.3 I Radiant Heating

Use restricted for Aii, PE, OR, burn unit & procedure rooms

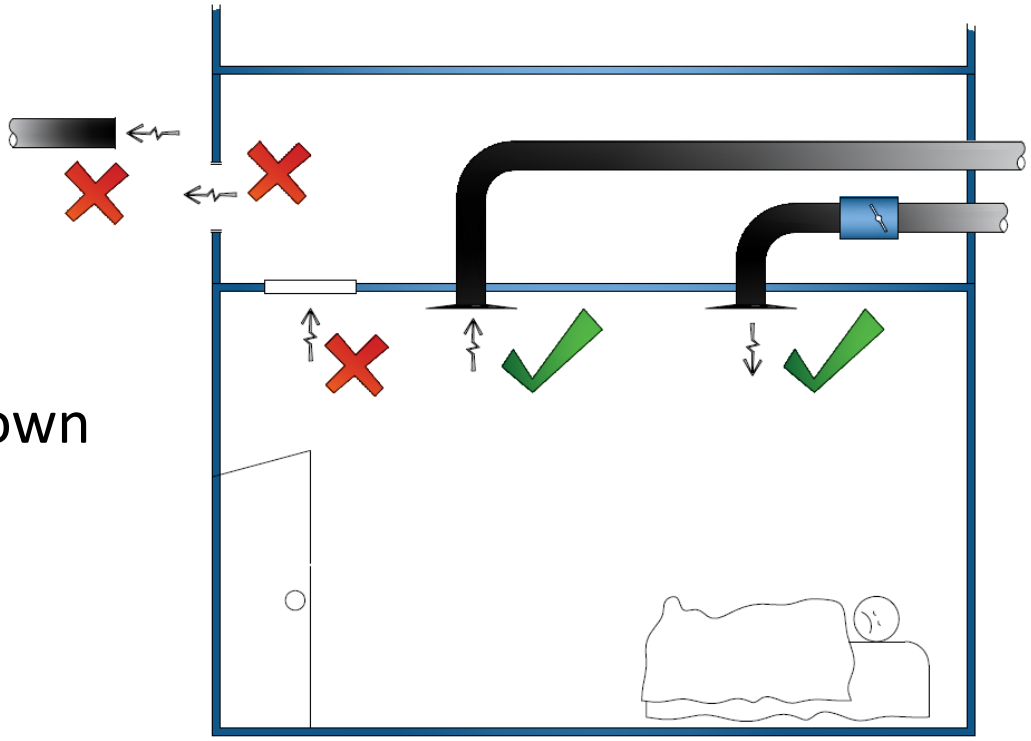
6.6 I Humidifiers

Only approved type is **steam**

Photo courtesy of Karpinski Engineering

6.7.1 I Fully Ducted HVAC

1. Rooms with pressure relationship in Table 7-1
2. Recovery rooms
3. CCU/ICU
4. Intermediate care/step-down
5. Burn units
6. Inpatient facility – patient care areas



6.7.2 I Air Distribution Devices

Table 6.7.2 addresses supply air outlets

- **Space designation** (e.g., ORs, protective environment rooms, burn units)
- **Supply air outlet classification** for each space designation (e.g., primary supply diffusers Group E, nonaspirating)

6.8 I Energy Recovery Systems

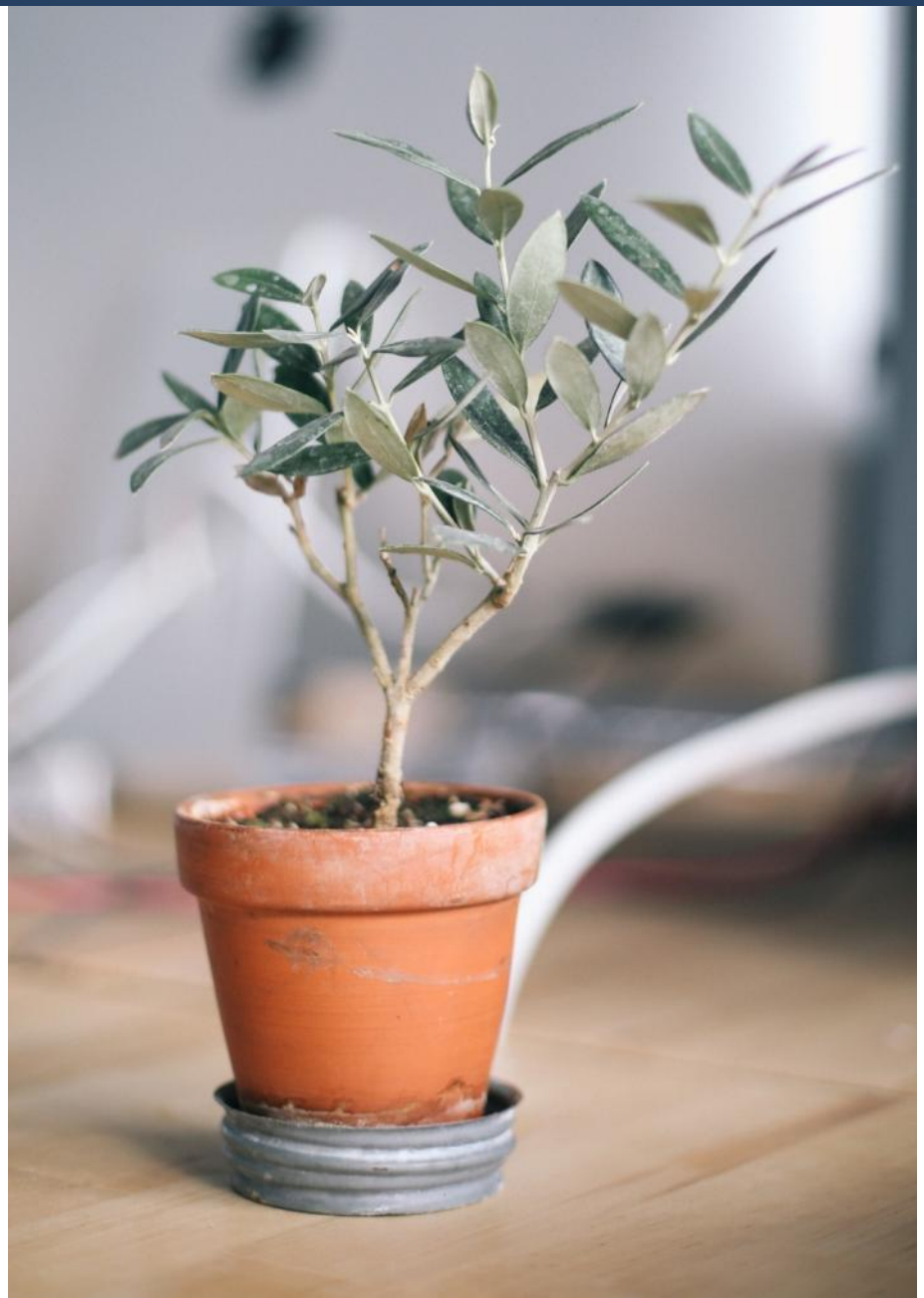
Read the requirements carefully

6.9 I Insulation & Duct Lining

Lining allowed – but restricted

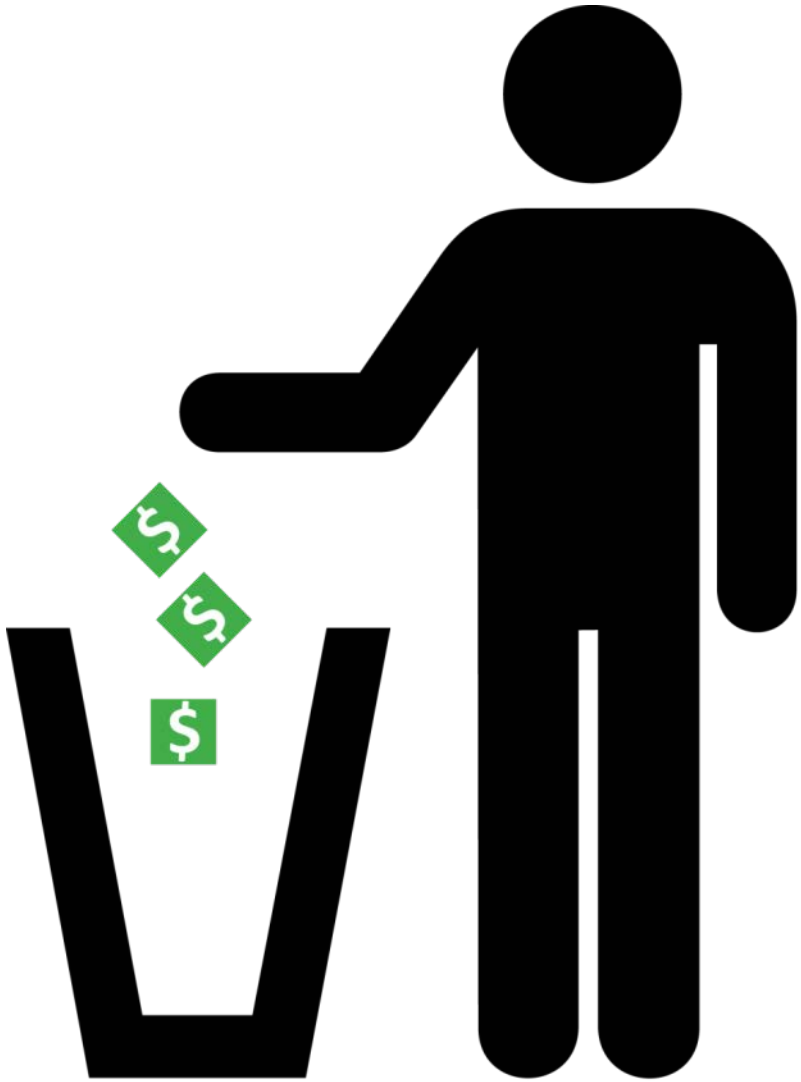
7.1 I Space Ventilation

- Occupied mode VAV/load shedding
- Maintain pressure & air changes per hour (ACH)



7.1 I Space Ventilation

- Unoccupied VAV/load shedding
- Reduce ACH & maintain pressure relationships

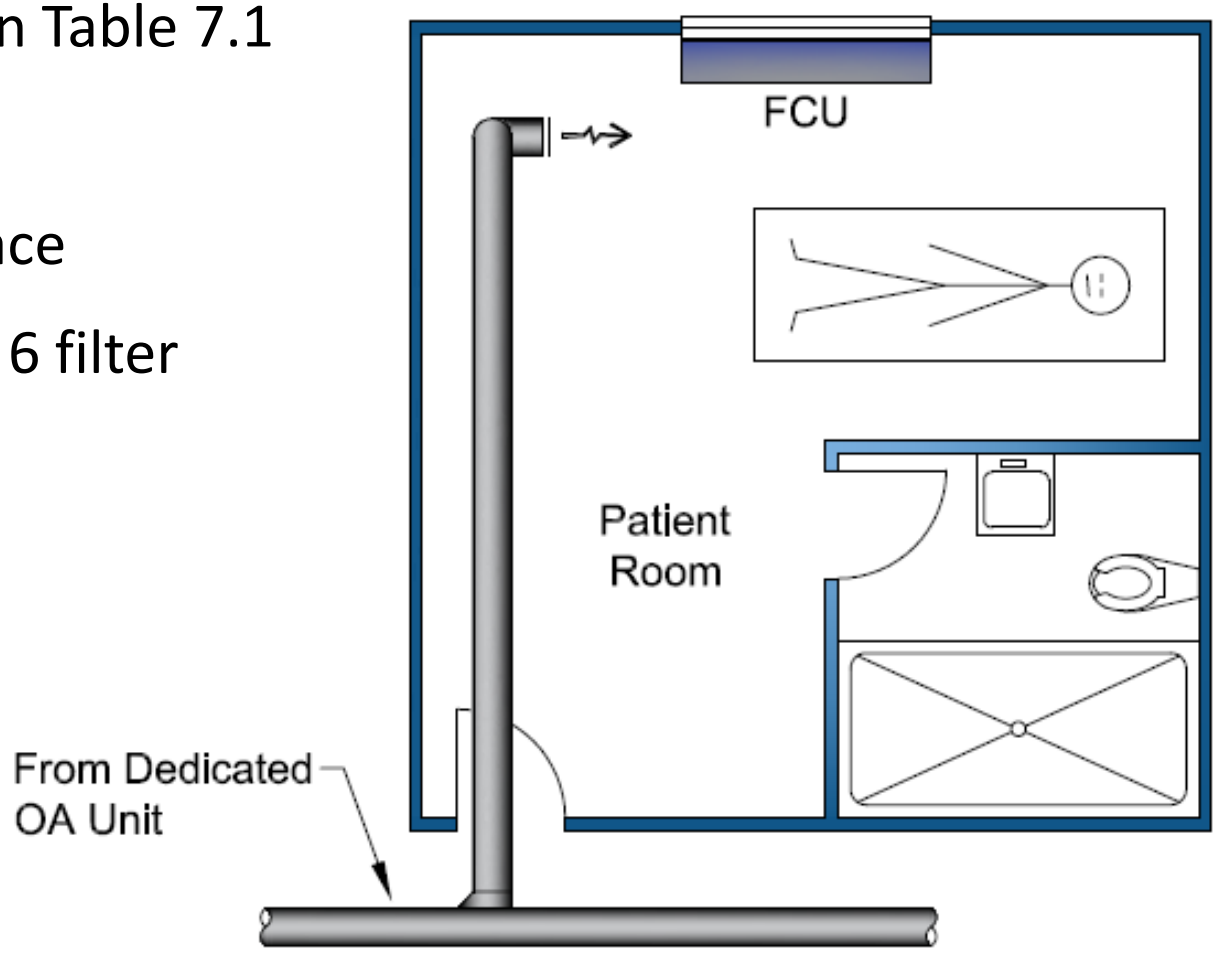


7.1 I Space Ventilation

Switching of room pressure prohibited

7.1 I Recirculating Room Unit

1. Where allowed in Table 7.1
2. No brick vents
3. Serves single space
4. Minimum MERV 6 filter



7.1 I Space Ventilation

Table 7.1

- Design parameters for space ventilation, humidity, and temperature
- **NR = No Requirement**

Space Function	Pressure Relationship to Adjacent Areas
Operating Room	Positive
Aii Room	Negative
Recovery Room	NR

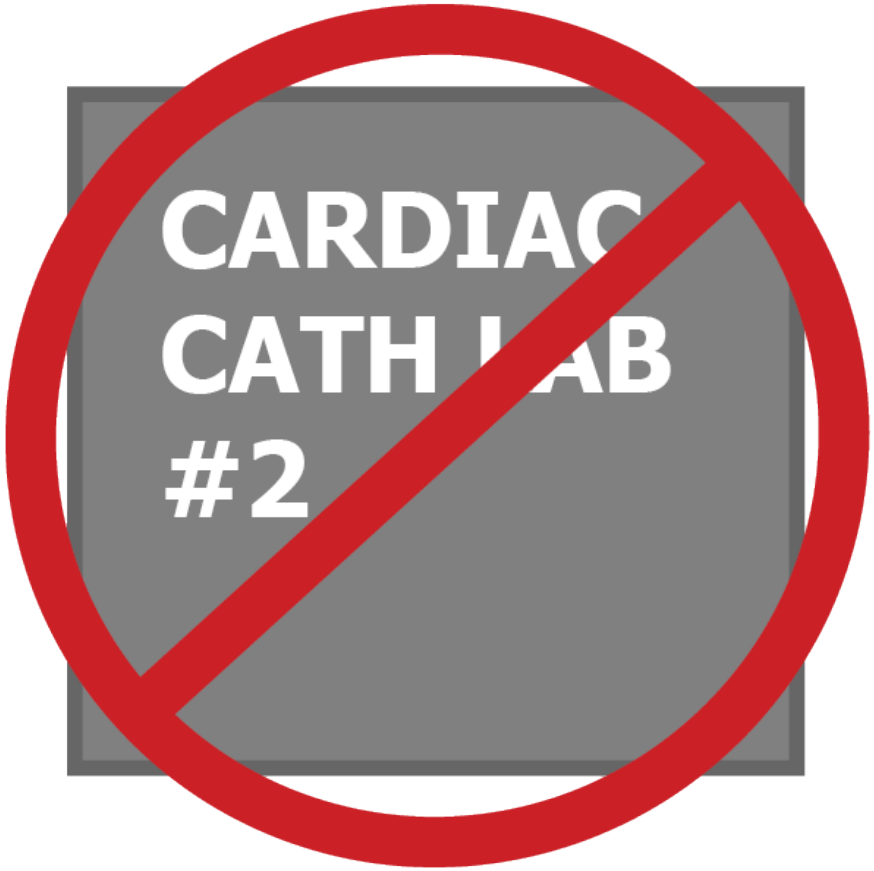
Examples from Table 7.1

7.1 I Room Names

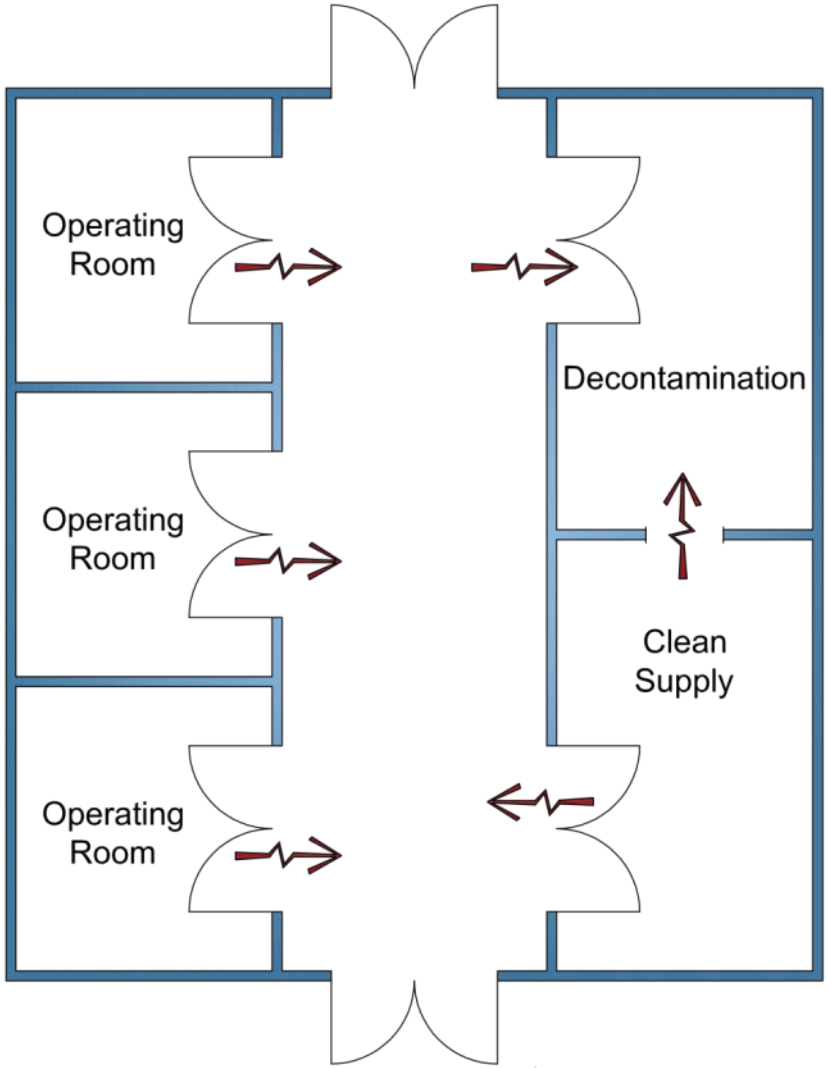
Room names can have a huge impact

- Procedure
- Isolation
- Triage
- Decontamination/soiled

Match at all locations

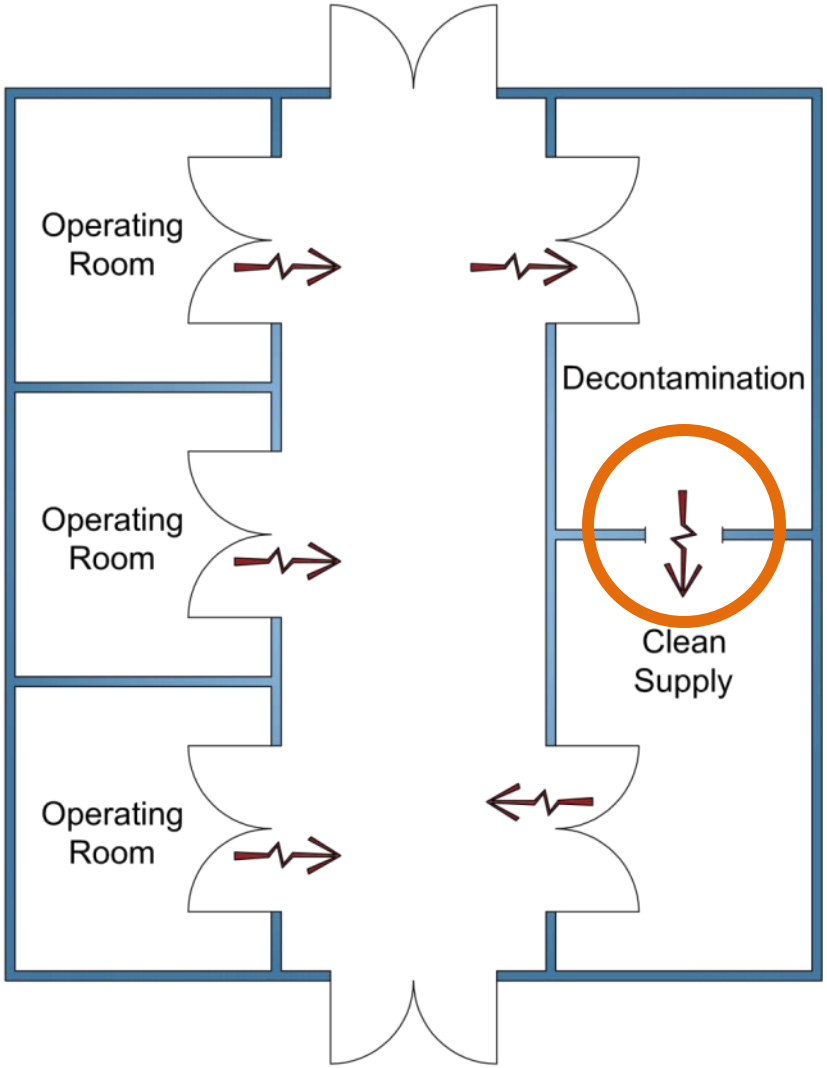


7.1 I Impact of Surrounding



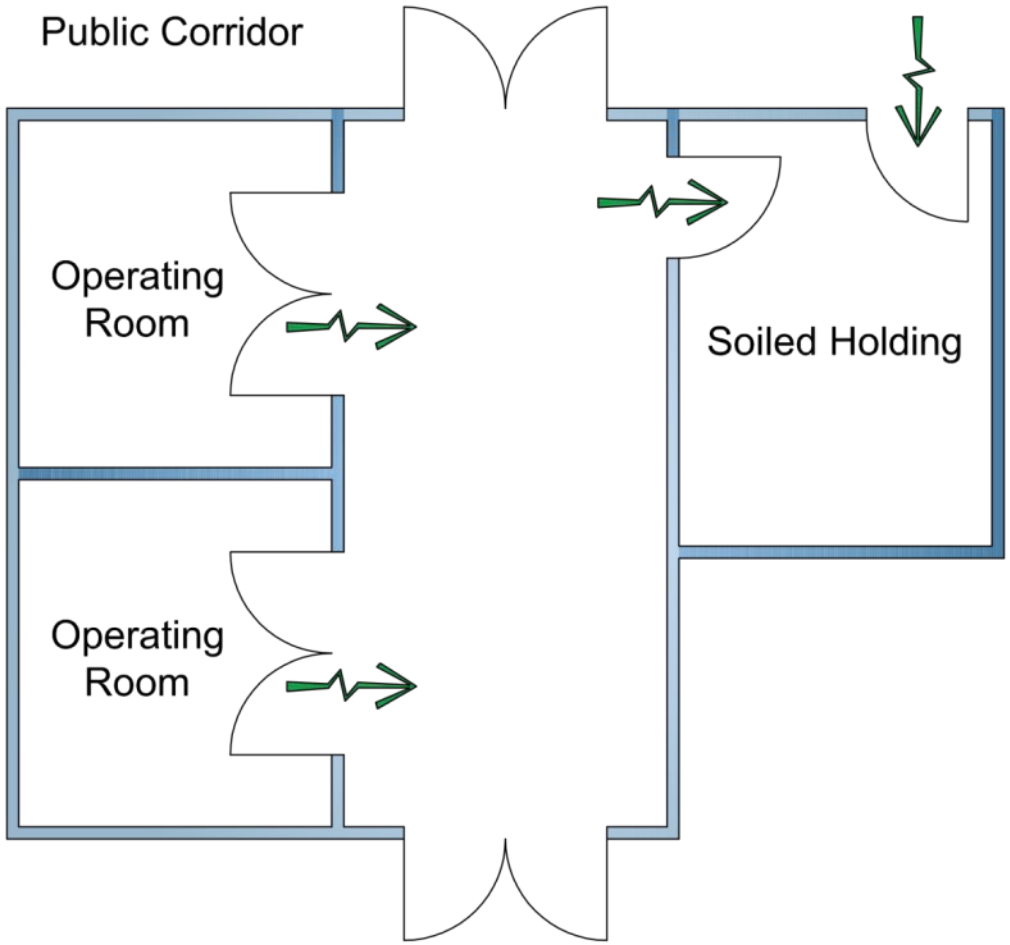
Compliant

7.1 I Impact of Surrounding



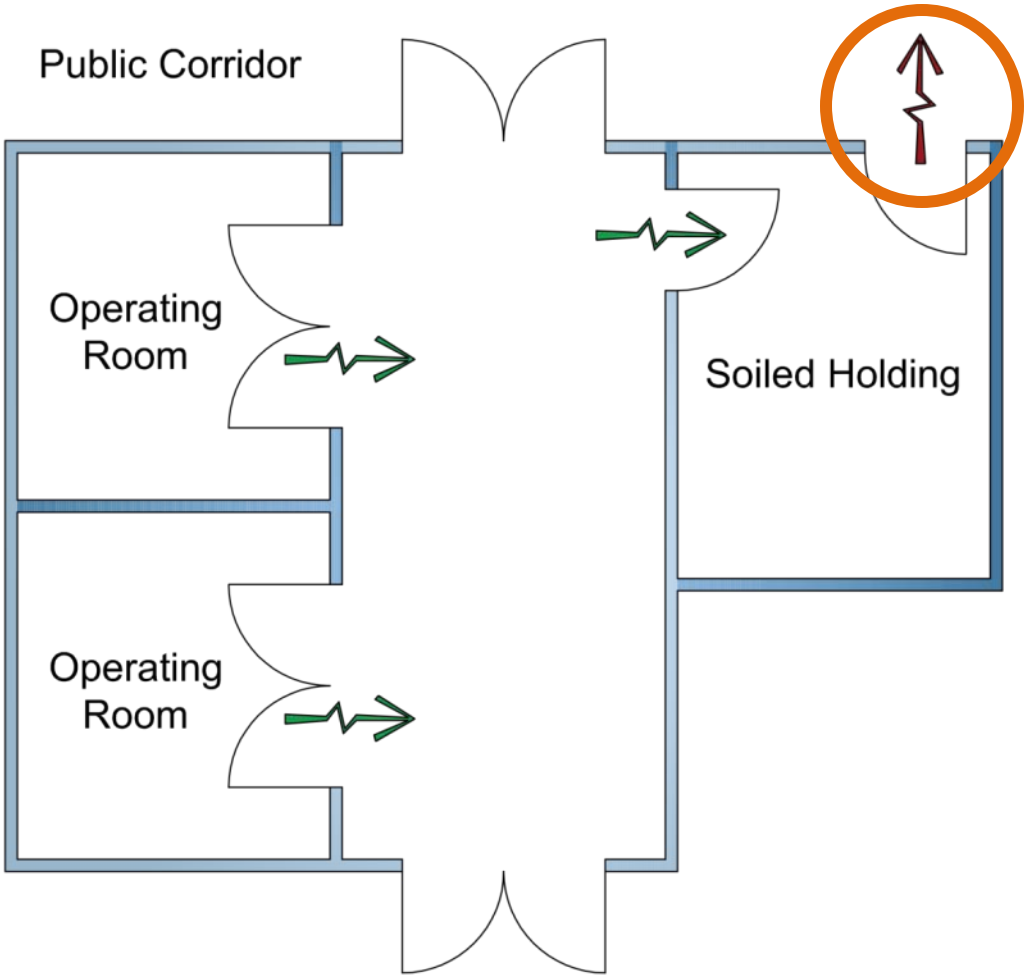
Typical

7.1 I Impact of Surrounding



Compliant

7.1 I Impact of Surrounding



Typical

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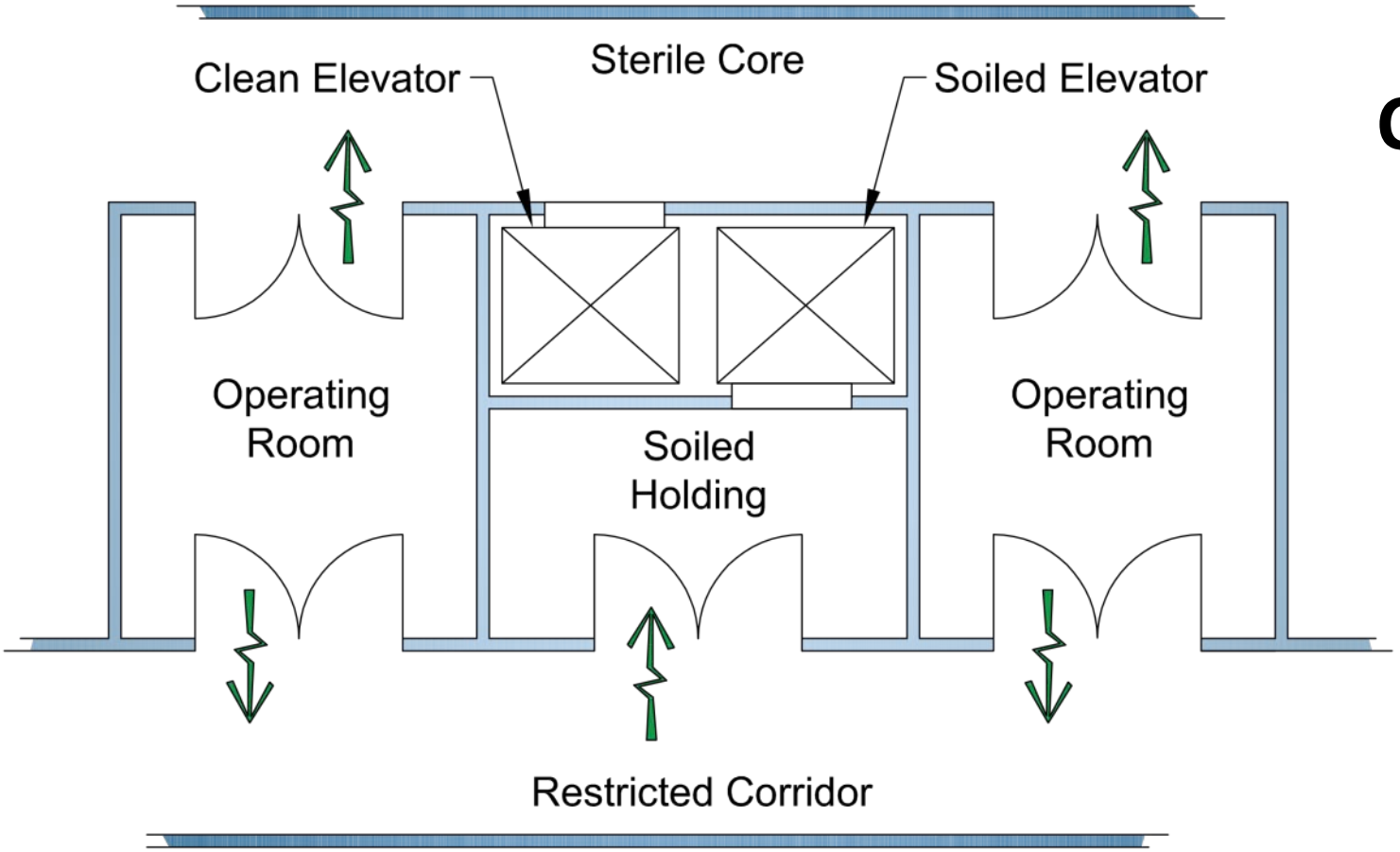
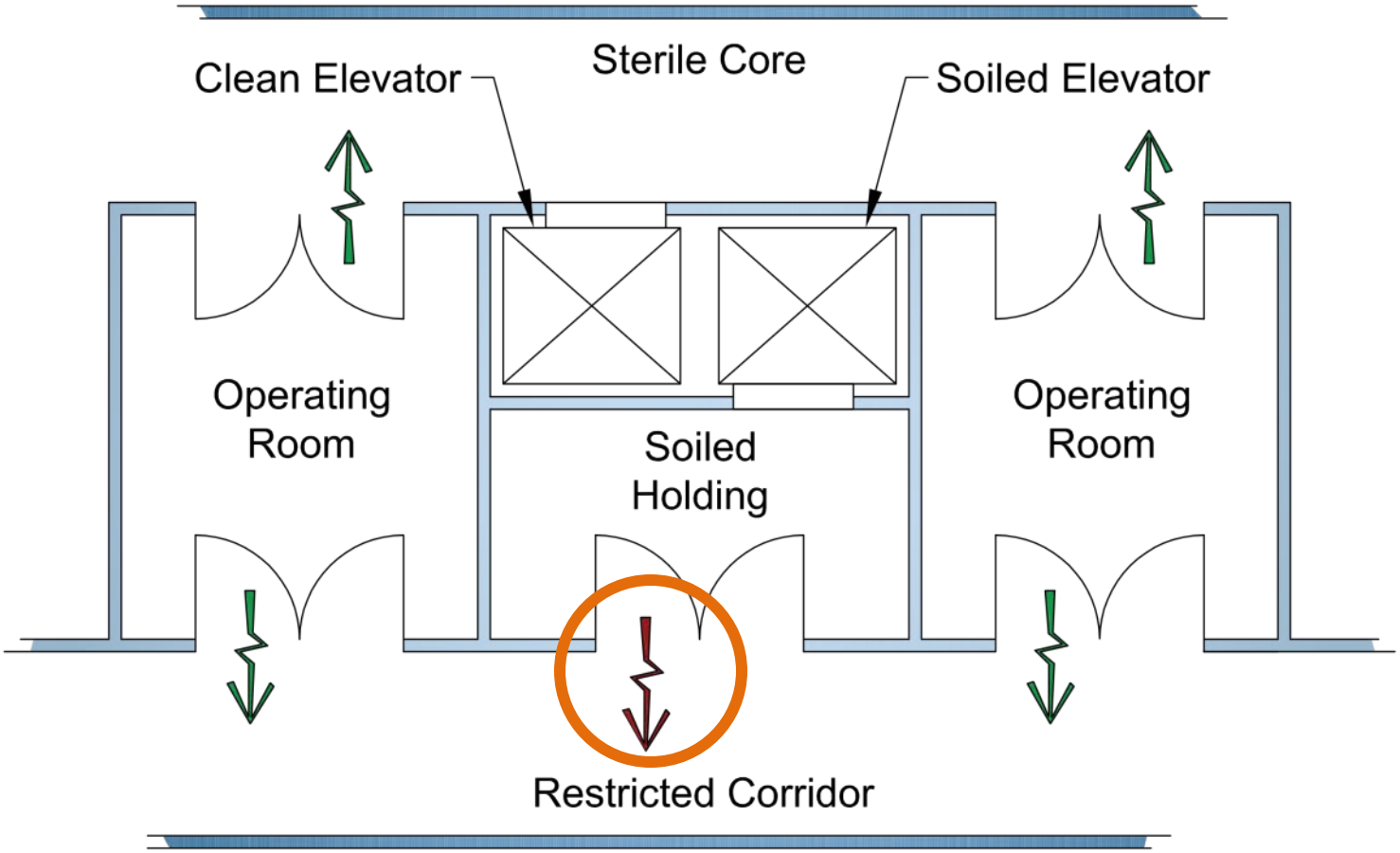


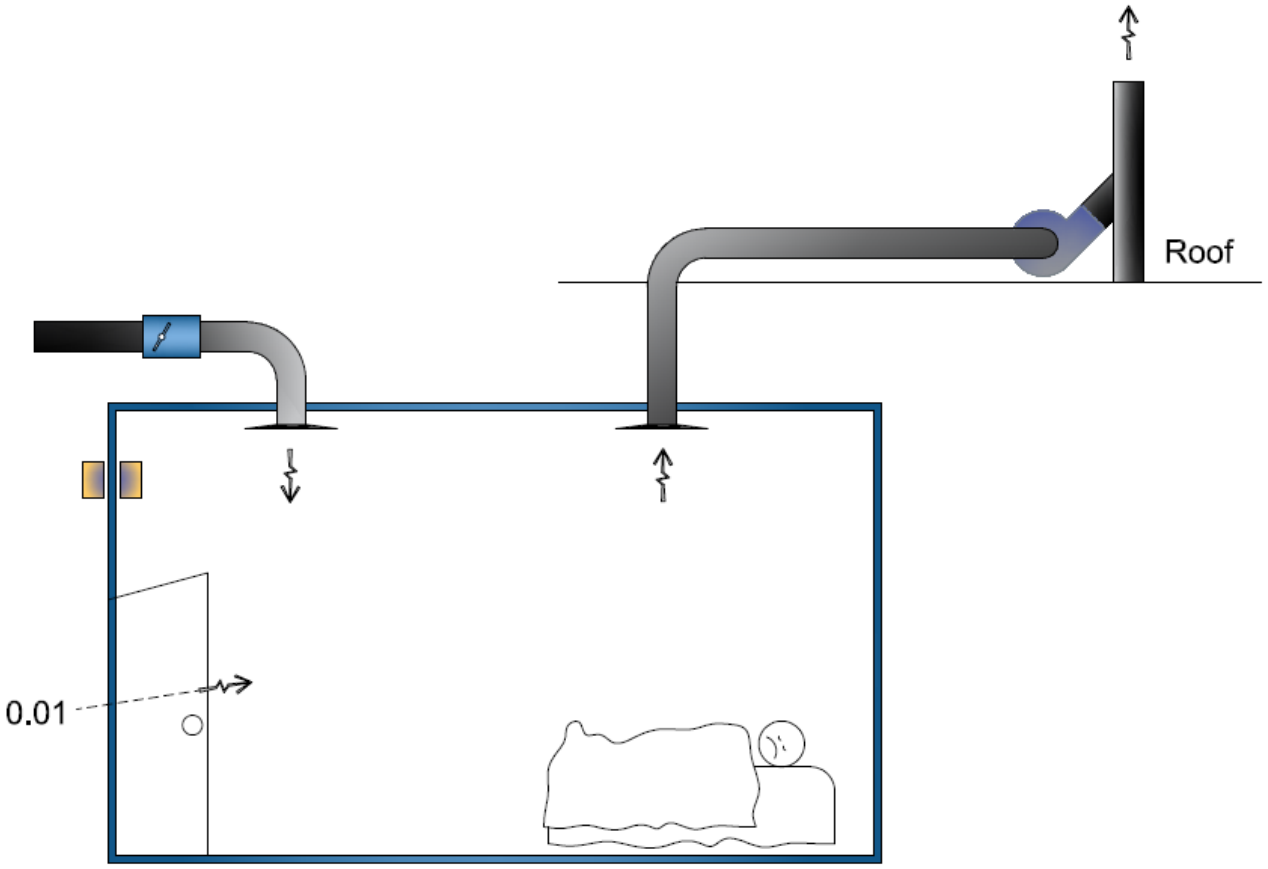
Compliant

7.1 I Impact of Surrounding



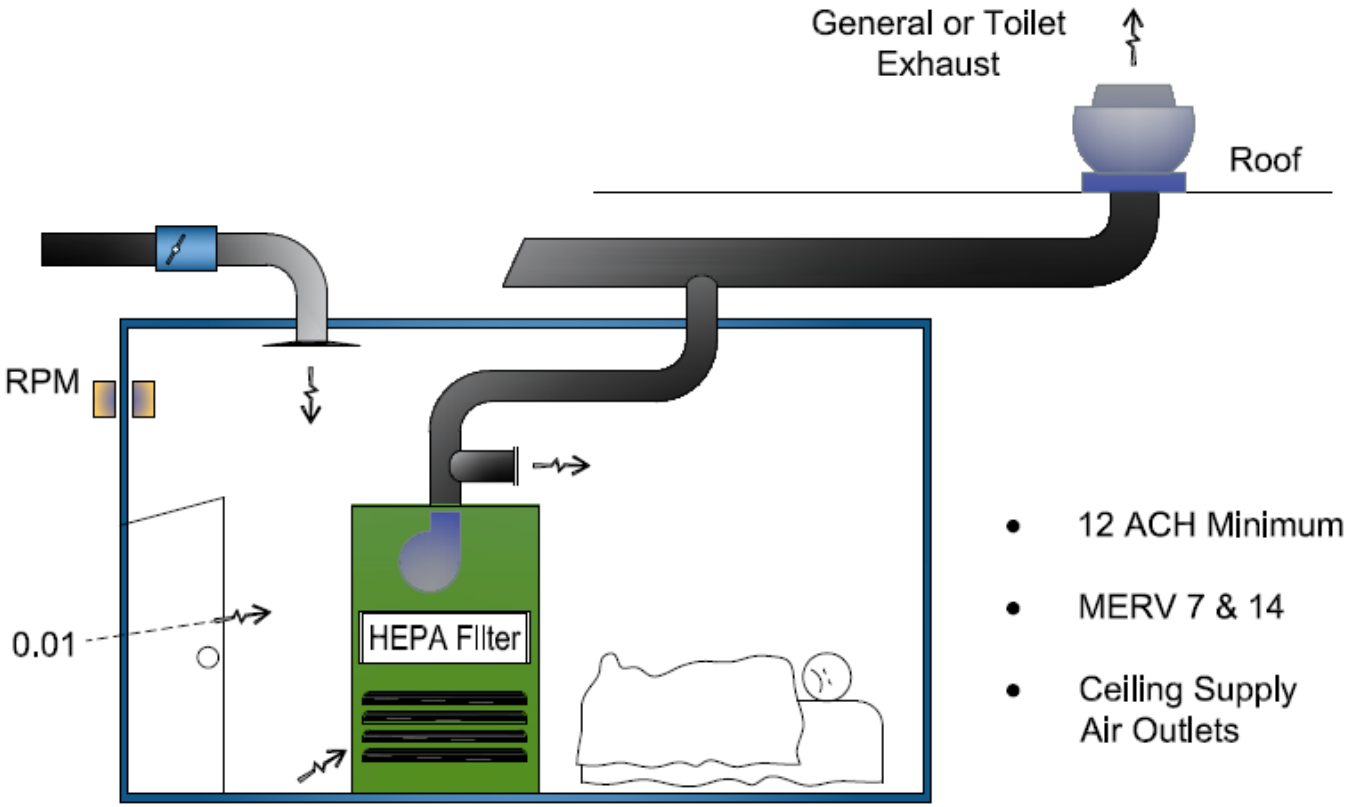
Typical

7.2.1 I Airborne Infection Isolation (Aii)



Minimum Requirements

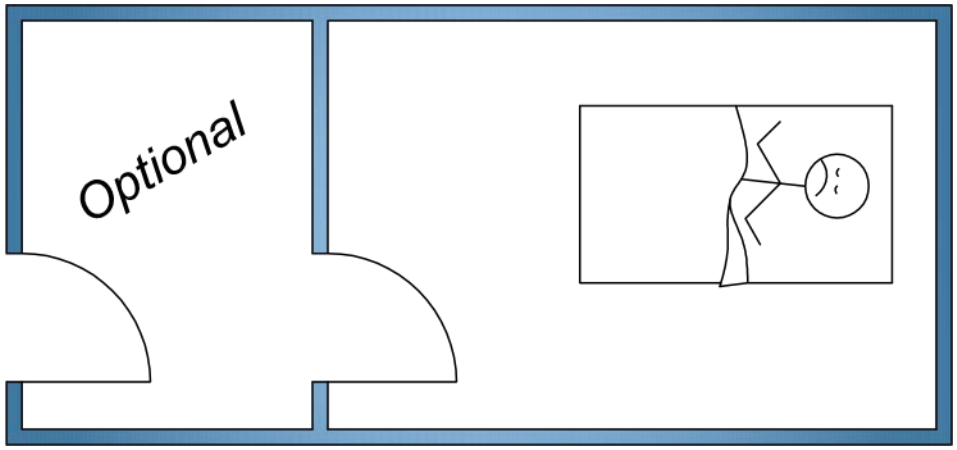
7.2.1 I Airborne Infection Isolation (Aii)



- 12 ACH Minimum
- MERV 7 & 14
- Ceiling Supply Air Outlets

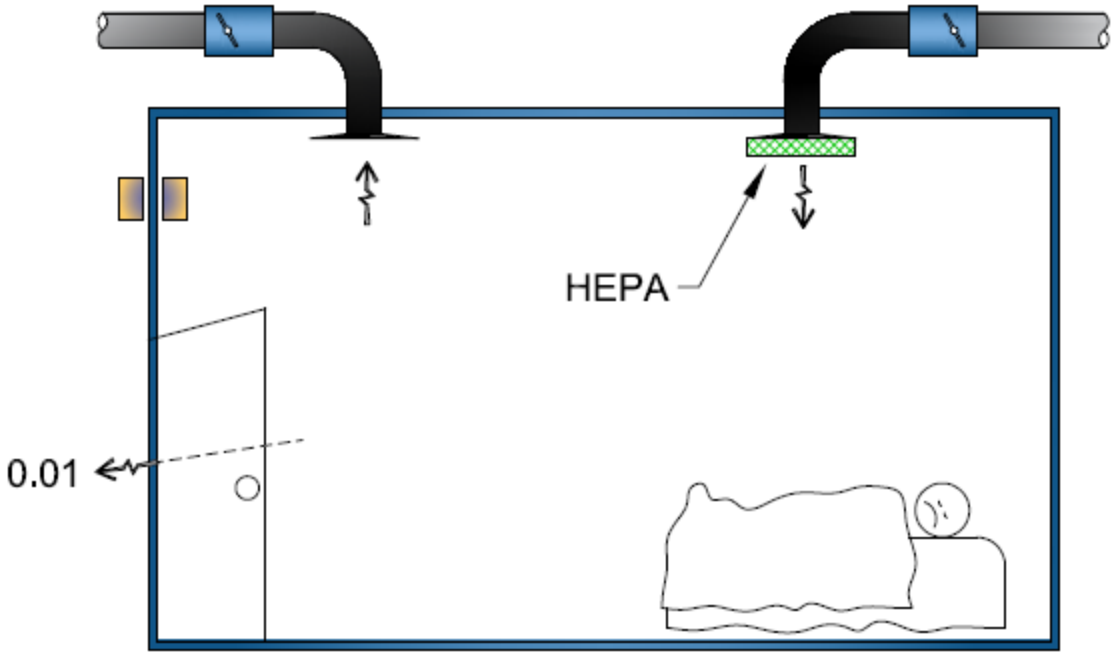
Retrofit

7.2.1 I Airborne Infection Isolation (Aii)



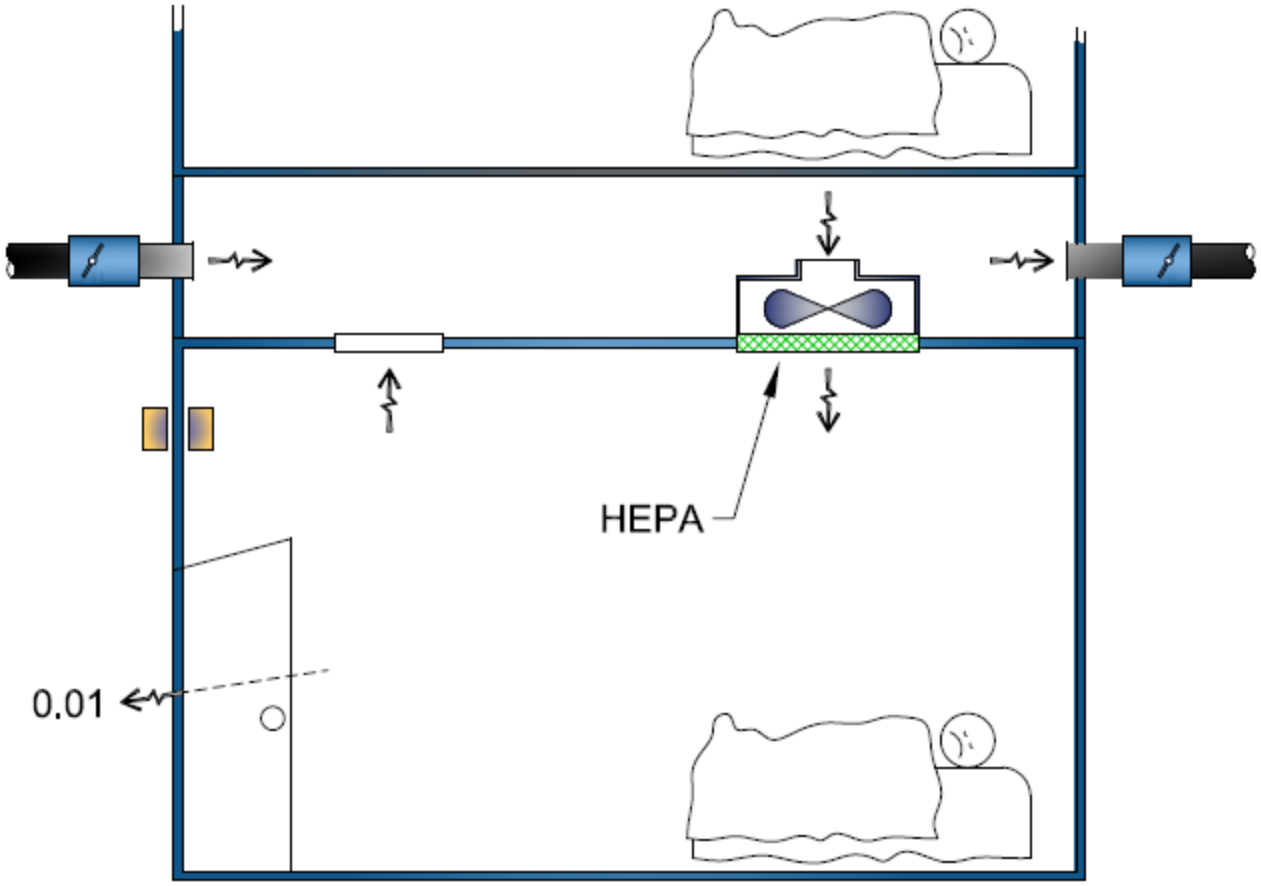
Anterooms not required

7.2.2 I Protective Environment Rooms



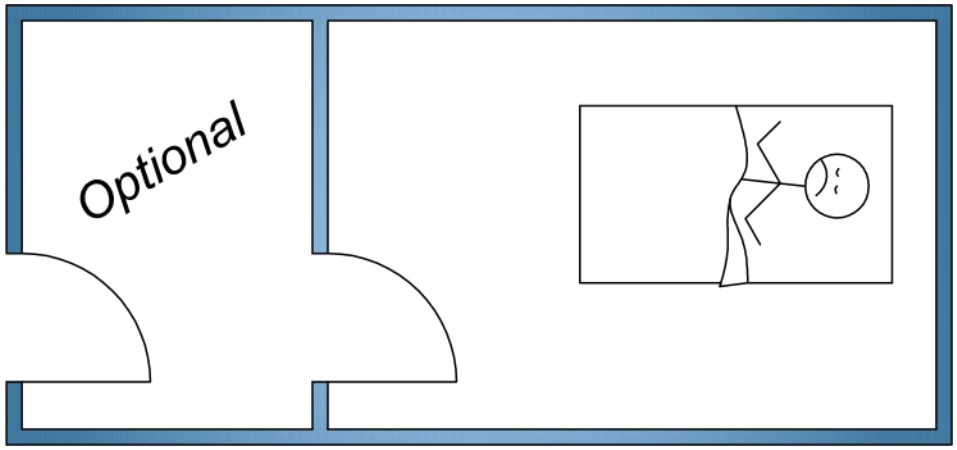
Minimum Requirements

7.2.2 I Protective Environment Rooms



Retrofit

7.2.2 I Protective Environment Rooms

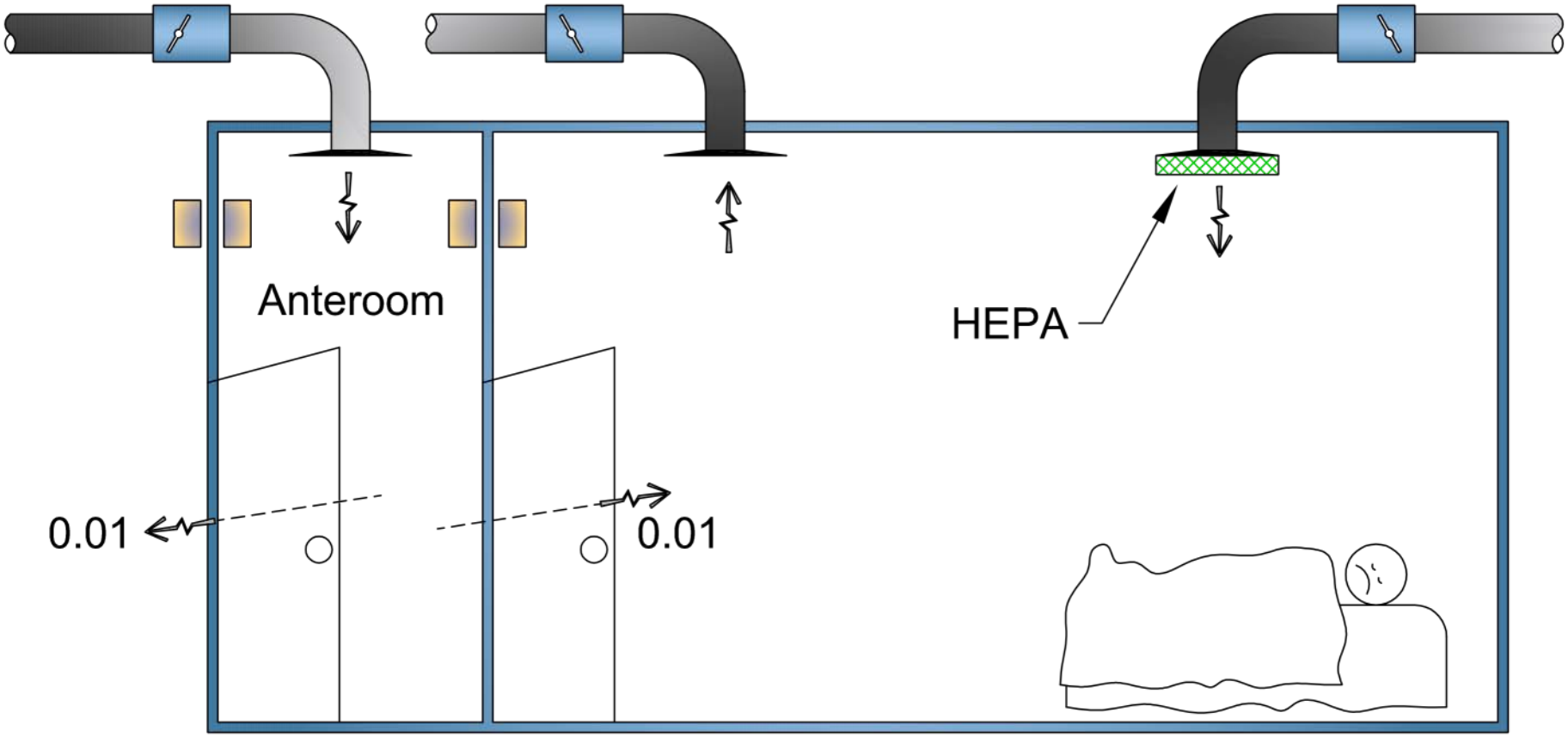


Anterooms not required

7.2.3 I Combination Aii/PE Rooms

For immune-suppressed patients with infectious disease

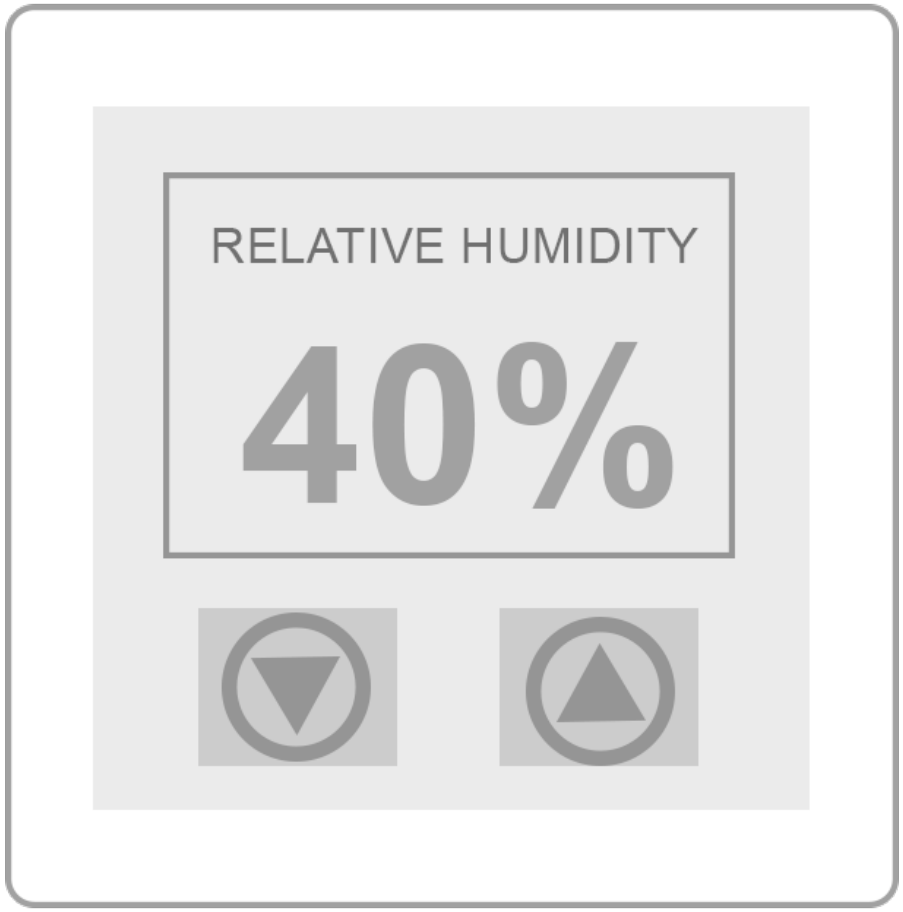
7.2.3 I Combination Aii/PE Rooms



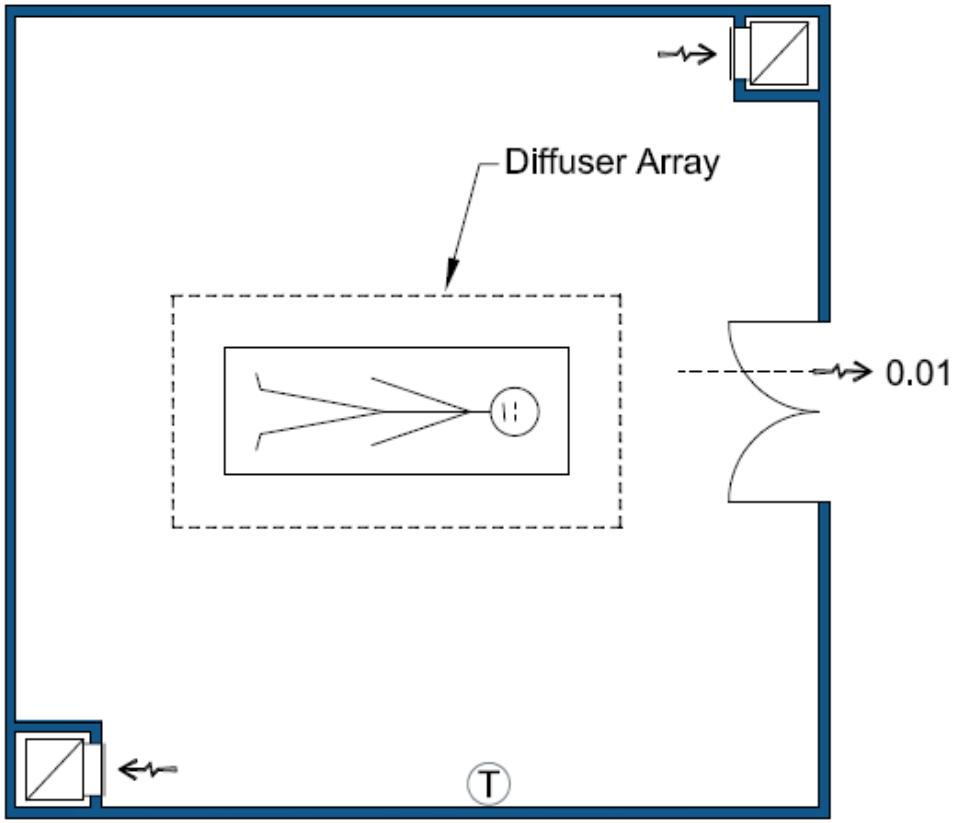
Minimum Requirements

7.3.1 I Burn Unit

Individual humidity control required – when humidifiers are used to meet Table 7.1

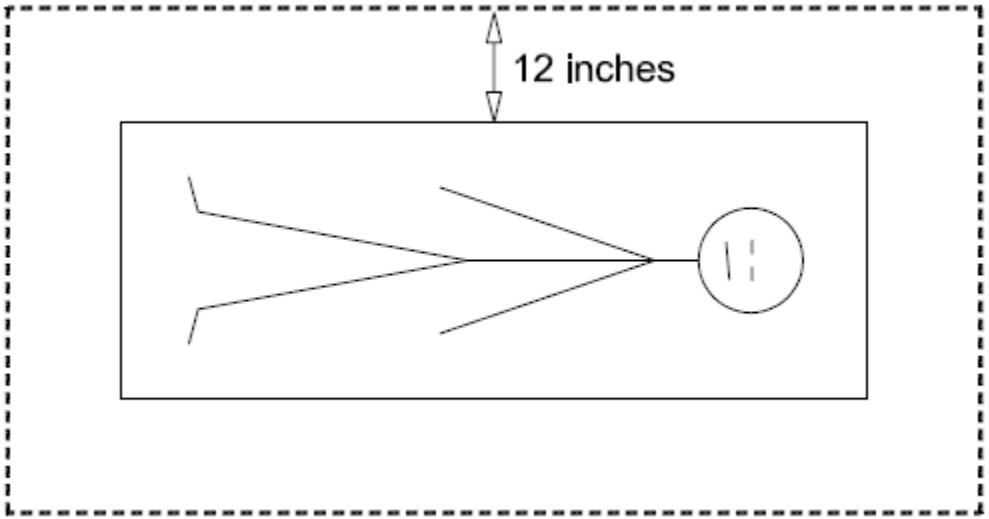


7.4.1 I OR (B&C), Cystoscopic & C-Section



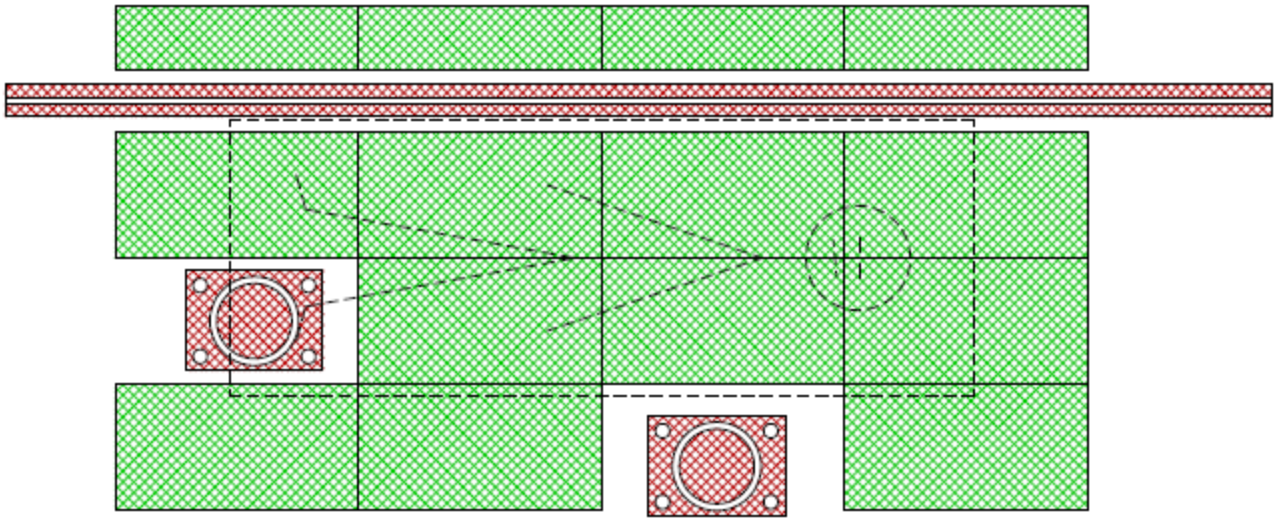
Only one air distribution method mentioned in the Standard

7.4.1 I OR (B&C), Cystoscopic & C-Section



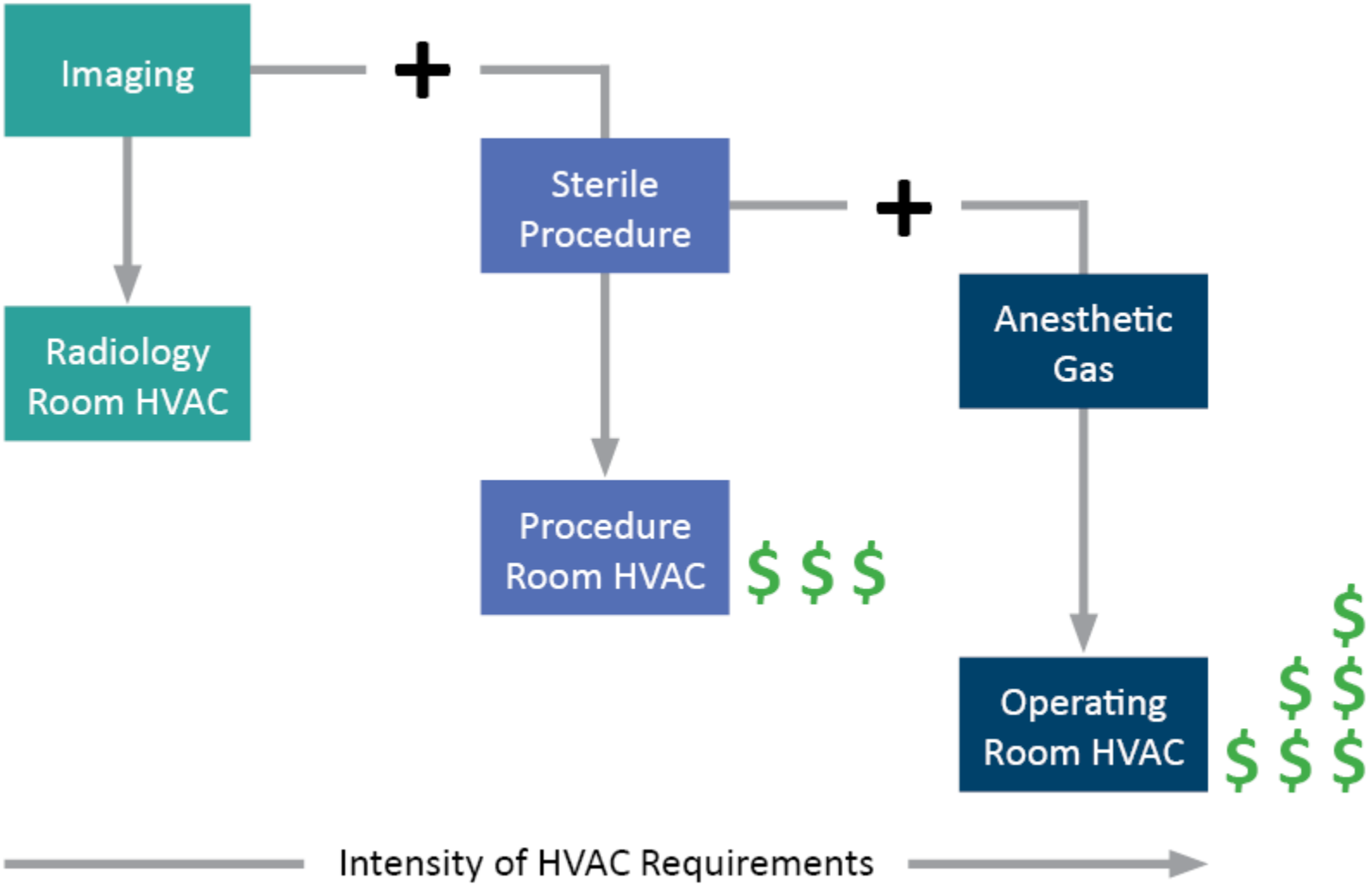
Primary supply diffusers … 25 to 35 fpm

7.4.1 I OR (B&C), Cystoscopic & C-Section

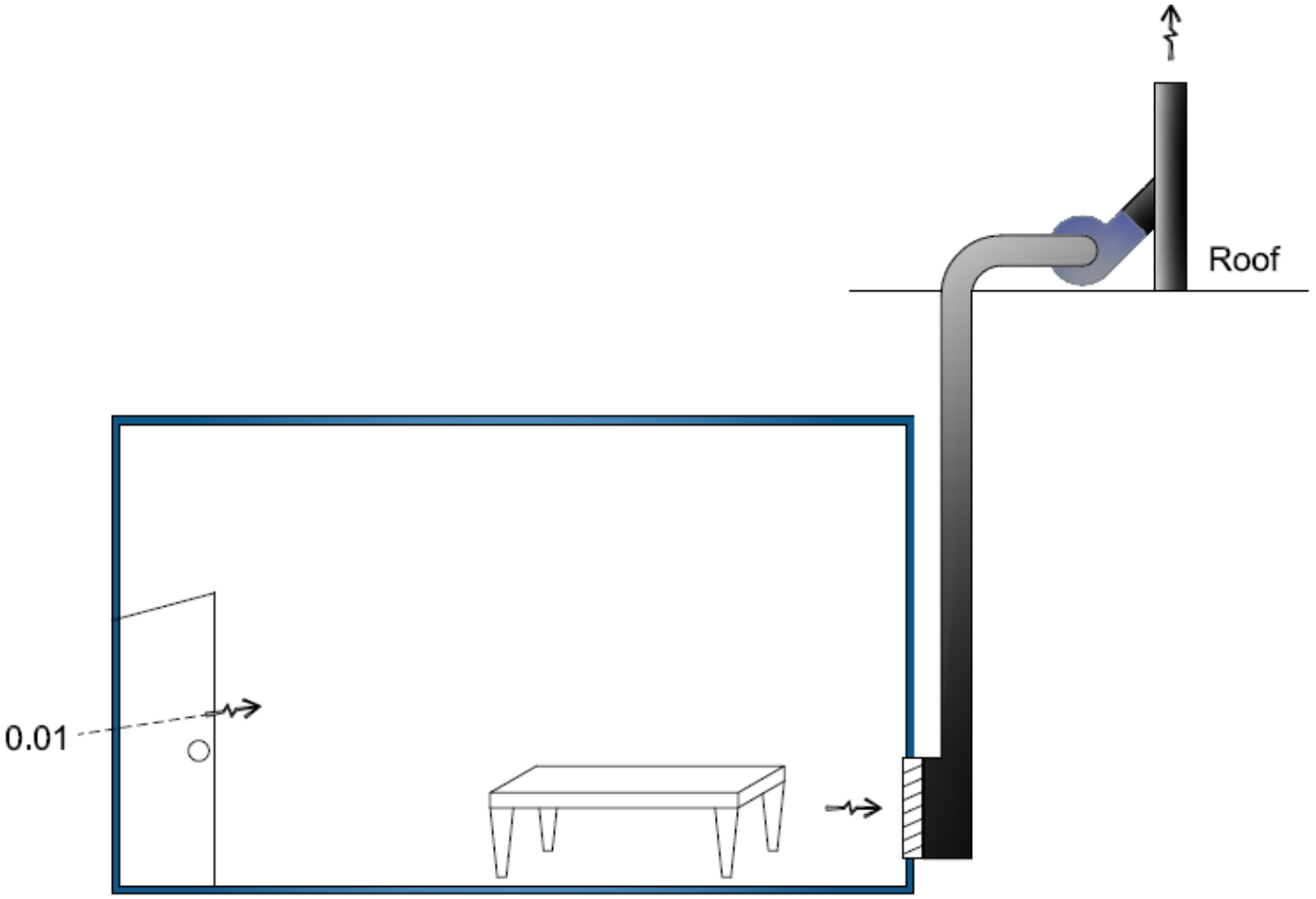


Primary supply diffusers … 70%

7.4.3 I Imaging Procedure Room

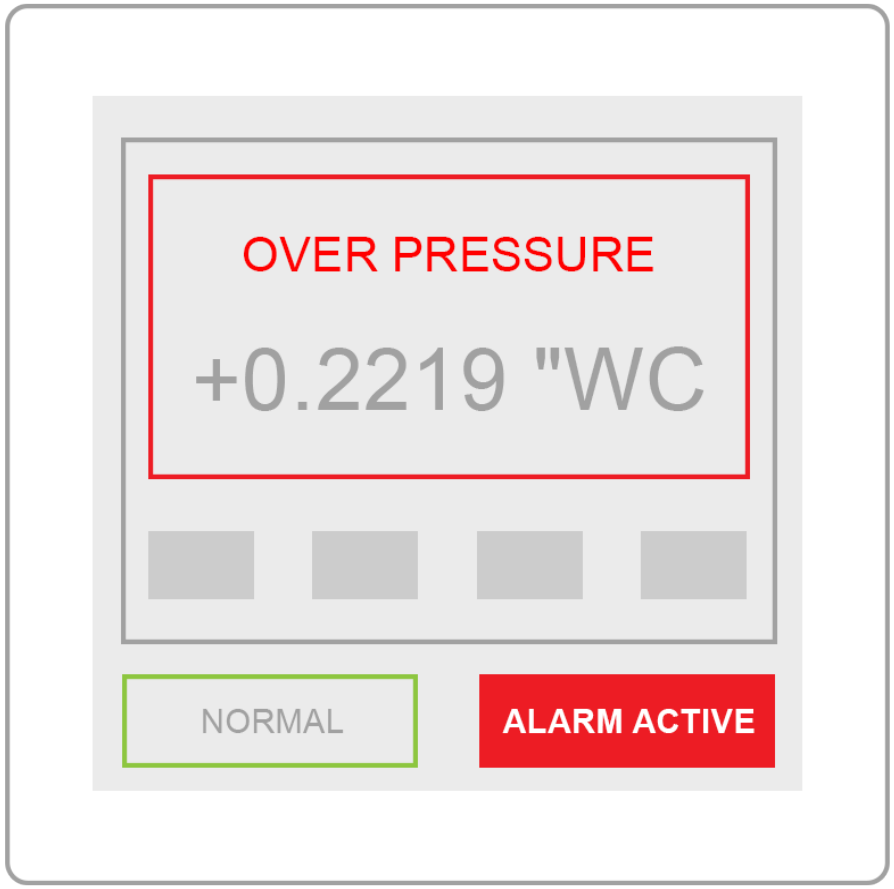


7.5.1 I Morgue & Autopsy Rooms



Part 7 I Room Pressure Monitors

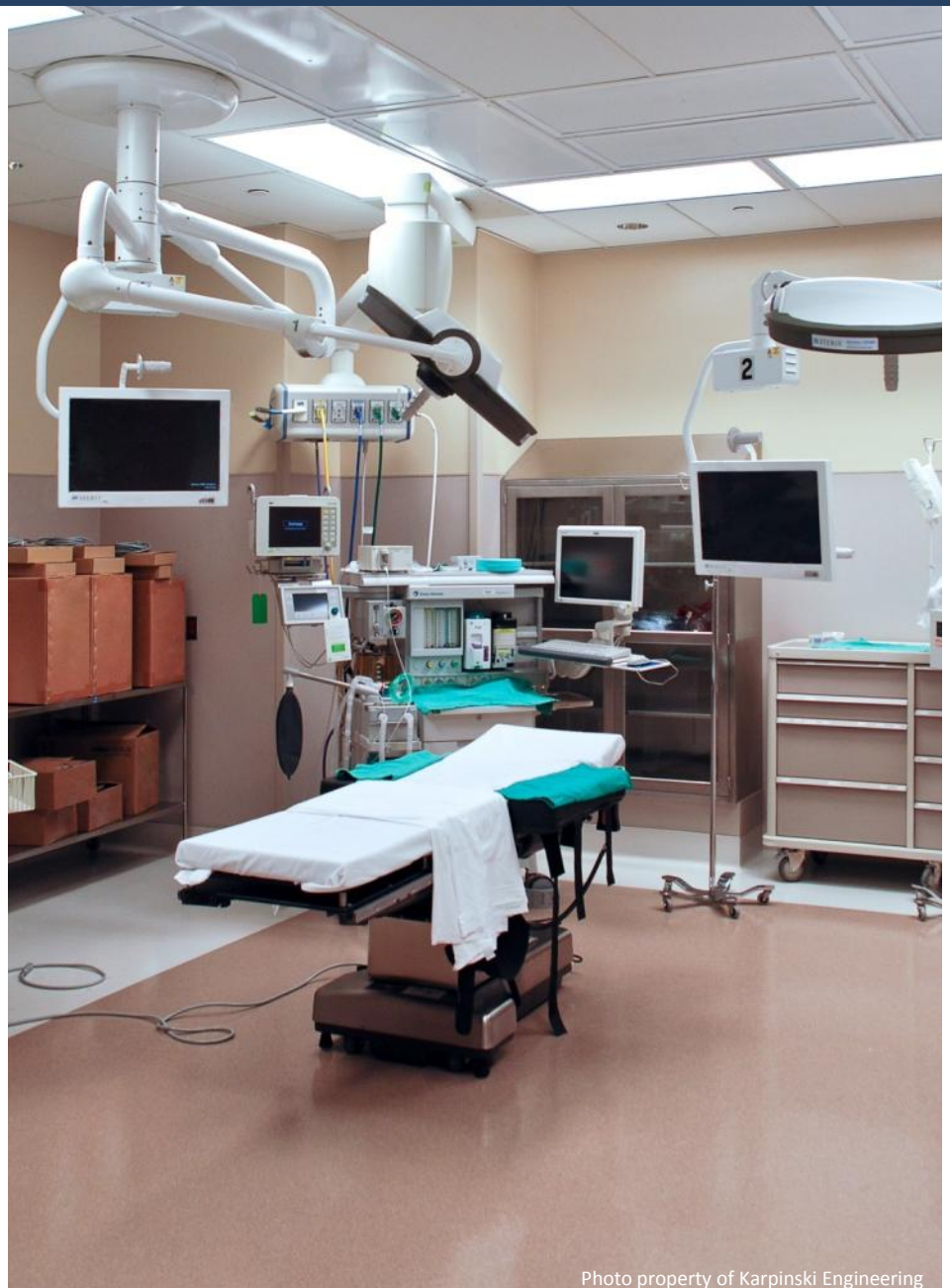
- Permanent, local device to monitor air pressure
- Visually indicates pressure condition
- Required for:
  - Aii
  - PE
  - Combined Aii/PE



Part 7 I Spaces Requiring 0.01”

Required for:

- Operating rooms
- Aii
- PE
- Combined Aii/PE
- Morgue/Autopsy
- Bronchoscopy



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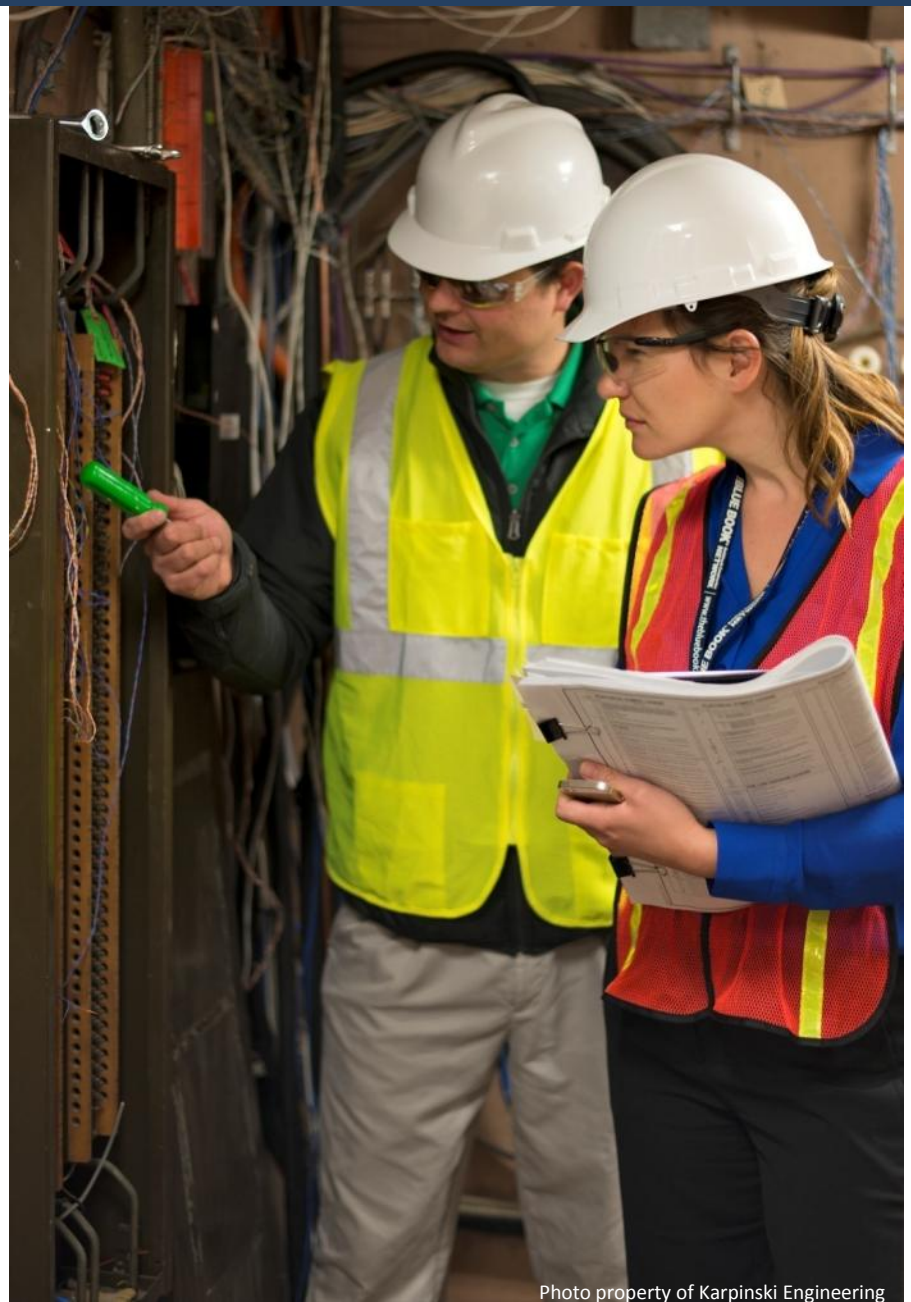
Part 8 I Planning, Construction & System Startup

- Maintenance access
- O&M procedures
- Duct cleanliness



Appendix A

- O&M in healthcare facilities
- Special maintenance for HVAC Units

Questions

Resources

- www.ashrae.org
  - Standards Addenda
  - Standards Errata
  - Standards Interpretations
- www.fgiguidelines.org
- www.techstreet.com
  - My Tracker | Sends alerts when your selected documents are updated
- www.karpinskieng.com
  - Blog posts on ASHRAE Standard 170 issues

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