PEOSH

Indoor Air Quality & Mold Training for Asthma Friendly Schools

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IAQ – Mold Training Goals

- Understand PEOSH IAQ standard
- Appreciate Roles and Responsibilities
  - Designated Person /School Nurse /IAQ Team
- Handle Employee complaints
- Performing a Walkthrough Survey
- Using IAQ/TFS checklists & worksheets
- Getting Assistance

IAQ – Mold Training Goals (cont.)

- Recognize basic IAQ problems
  - Mold
  - Chemical Asthma triggers
  - Other IAQ health complications
- Control IAQ
  - Control internal sources of chemicals
  - Control environmental sources
  - Green Cleaning Products

PEOSH IAQ Standard N.J.A.C. 12:100-13

Adopted in 1998 First IAQ Standard in U.S.

Revised May 21, 2007 by PEOSH Advisory Board, IAQ Subcommittee

1. Designated Person
2. Written IAQ Program
3. 48 hrs to remove damp materials

PEOSH IAQ Standard N.J.A.C. 12:100-13

13.1 Scope

13.2 Definitions

13.3 Compliance Program

13.4 Control of Specific Contaminant Sources

13.5 Air Quality During Renovation & Remodeling

13.6 Recordkeeping

13.7 Employer’s Response to Complaints

13.8 IAQ Compliance Documents

PEOSH IAQ Standard
N.J.A.C. 12:100-13.1

Scope: "apply to matters relating to indoor air quality in **buildings** occupied by **public employees** during **regular work hours**."

PEOSH IAQ Standard N.J.A.C. 12:100-13.3

Compliance Program

Employer shall identify and train a Designated Person: person given responsibility [and authority] by the employer to take measures to assure compliance”

Designated Person

Coordinate IAQ Activities

- Prepare and review written IAQ Program
- Establish preventive maintenance procedures
- Track and document maintenance & repair
- Establish control measures for pollutants
- Manage renovation and construction
- Coordinate specific facility operations
- Manage maintenance activities
- Maintain IAQ Records

PEOSH IAQ Standard N.J.A.C. 12:100-13.3

- ✓ Establish a preventative maintenance schedule
- ✓ Ensure inoperable components are replaced or repaired promptly
- ✓ Ensure no microbial growth
- ✓ Implement general or local exhaust ventilation

PEOSH IAQ Standard N.J.A.C. 12:100-13.3

- Check the HVAC system when:
  - Carbon Dioxide (CO2) levels >1,000 ppm
  - Temperature is <68°F->79°F
- Prevent contamination of fresh air supply
- Check natural ventilation portals are maintained
- Promptly investigate all employee IAQ complaints

IAQ Employee Complaints

- Go to the location(s) of the complaint
- Conduct interviews
- Review building operations and maintenance procedures
- Complete PEOSH IAQ Inspection Checklist
- Involve employees through L/MH&SC*
- Communicate outcome and corrective action
- Report all complaints to School Nurse

*Labor-Management Health & Safety Committee

Skills and Authority of Designated Person

- Knowledgeable about NJ IAQ Standard
- Familiar with basic IAQ issues
- Working knowledge of air handling system
- Have a position of authority
- Effectively communicate with management, staff, maintenance, contractors
- Good problem solver
- Available

PEOSH IAQ Standard N.J.A.C. 12:100-13.4

Controls of Specific Contaminant Sources

- If General Ventilation inadequate implement other control measures
- Microbial Contaminants
  - Promptly repair water intrusion
  - Remediate damp/wet material by drying or removal within 48hrs of discovery
  - Remove visible microbial contamination

PEOSH IAQ Standard N.J.A.C. 12:100-13.5

Renovation and Remodeling

- ✓ Evaluate chemical hazards prior to selection or use.
- ✓ Isolate construction areas (scheduling, physical barriers, pressure differentials)
- ✓ Utilize local exhaust ventilation
- ✓ Notify employees 24 hours prior to any construction
- ✓ Construction areas must be cleaned and aired out prior to re-occupancy

"Renovation and remodeling"

building modification involving activities

that include but are not limited to:

removal or replacement of walls, roofing, ceilings, floors, carpet, and components such as moldings, cabinets, doors, and windows; painting; decorating; demolition; surface refinishing; and removal or cleaning of ventilation ducts.

PEOSH IAQ Standard
N.J.A.C. 12:100-13.6

Recordkeeping

- ✓ Written IAQ Program
- ✓ Designated Person competence
- ✓ Written Preventive Maintenance Program
- ✓ Maintenance Log (Date, What, Who)
- ✓ Complaint Investigations

IAQ Preventive Maintenance

- Equipment List & Operation Manuals, Blueprints
- Master Schedule & Manufacturer Recommendations
- Maintenance Contracts
- Documentation Inspection/Maintenance: checklists, Work Order & Maintenance Log, Repair Documentation

IAQ Typical Inspection Protocol

- ☑ Fan belts operate properly and in good condition
- ☑ Filters are installed properly and replaced as scheduled
- ☐ Dampers are open as designed and not blocked
- ☑ Motor functions properly
- ☑ Diffusers are opened
- ☑ Condensate pan drains remove condensate properly
- ☐ Supply and exhaust system are properly balanced

IAQ - PM Documentation

- Name of person(s) and date
- Reason for Inspection/Repair(s)
- Activity(s) performed
- Item(s) repaired/replaced
- Time spent on activity
- Observations

PEOSH IAQ Standard N.J.A.C. 12:100-13.6

Recordkeeping

- Maintained for 3 years
- Available to employees and representatives

  ASAP or within 10 working days
- Available immediately during PEOSH inspection

PEOSH IAQ Standard
N.J.A.C. 12:100-13.7

Employer's Response to [PEOSH] Complaint

PEOSH will send a letter for response:

- Statement that the complaint is NOT founded

or

- Study of issue initiated and complaint founded
- Remediation measures already completed
- Remediation planned and completion time

Must comply with Uniform Construction Code, N.J.A.C. 5:23

PEOSH IAQ Standard N.J.A.C. 12:100-13.8

IAQ Compliance Documents

- ✓ As-built construction documents
- ✓ HVAC System Commissioning Report
- ✓ HVAC Testing, Adjusting, and Balancing Reports
- ✓ Operations and Maintenance Manuals
- ✓ Water Treatment Logs
- ✓ Operator Training Materials

*Must provide to PEOSH upon request (if available)

Other Standards Related to IAQ

Air Contaminants Standards
(29 CFR 1910.1000, Tables Z-1, Z-2)

Access to Employee Exposure and Medical Records Standard
(29 CFR 1910.1020)

Other Standards Related to IAQ

Federal and State Asbestos Standards

- (General Industry 29 CFR 1910.1001 and Construction 29 CFR 1926.1101)
- AHERA - U.S. EPA/NJDHSS (Schools K-12)
- NJ Uniform Construction Code-Subchapter 8, NJ Dept. of Community Affairs (NJDCA)

"Acceptable IAQ"

From ASHRAE: "no known contaminants at harmful concentrations as determined by Authorities and at which a **substantial majority (80% or more)** of the people exposed do not express dissatisfaction"

* American Society of Heating, Refrigeration, and Air-Conditioning Engineers

“Sick Building Syndrome”

Substantial number of occupants experience health and comfort problems related to working indoors.

Symptoms do not fit the pattern of any particular illness, are difficult to trace to any specific source and relief from these symptoms upon leaving the building.

“Building-related Illness”

specific medical conditions of known etiology

documented by physical signs and laboratory findings

sensory irritation when caused by known agents, respiratory allergies, asthma, infections, humidifier fever, Legionnaires Disease

signs and symptoms characteristic of exposure to chemical or biological substances

Sick Building Syndrome (SBS) vs. Building-Related Illness (BRI)

SBS

Symptoms:

- No identifiable illness
- No specific source
- Varies by individual
- Comfort related
- Feel better on the weekend or vacation

BRI

Symptoms:

- Symptoms identifiable by physician / lab findings
- Common symptoms
- Air monitoring useful
- May not improve on weekends or vacation

Basics: Factors Affecting IAQ

- Building occupant activities
- General Indoor sources
- Construction and renovation activities
- Design and condition of HVAC
- Outdoor sources
- Unidentified Sources

IAQ Basics: Indoor Sources

- Mold (result of water intrusion)
- CO2 (primarily from occupants)
- Perfume, cologne, air fresheners
- Cleaning / disinfecting products
- Plants & Flowers
- Off gassing from new materials
- Stale air from unventilated storage closets
- Lab chemicals & animals

IAQ Basics: Outdoor Sources

- Exhaust vents near make up air intakes
- Vehicles idling and other sources near air intakes and open doors or windows
- Pollen from outdoor plants
- Pollution from nearby facilities & construction
- Infiltration of general outdoor contaminants

Mold is the
1 Asthma Trigger
in NJ schools

major contributor
to student absenteeism

What is Mold?

Mold is an ubiquitous,
naturally occurring type of fungus which
reproduces by spores released into the air.

It emits spores.
Some emit micotoxins or other odorous vapors.
May produce airborne dust and mold.

Requirements for Mold Growth

Water - intrusion or relative humidity >60%

Temperature between 40-100 ˚F

Oxygen

Organic matter

Source of spores

Health Effects – Routes of Exposure

Respiration – vapors, mycotoxins emitted, spores, mold, dust

Skin Contact – mold, dust and splashes on exposed skin during clean up operations

Ingestion – on hands, on foods, splashes into mouth during clean up operations

Health Effects Associated with Mold Exposure

Irritation from odor or emissions

Other – general muscle aches & fatigue, headache, fever, cough, congestion

Health Effects Associated with Mold Exposure

Allergic Reactions –

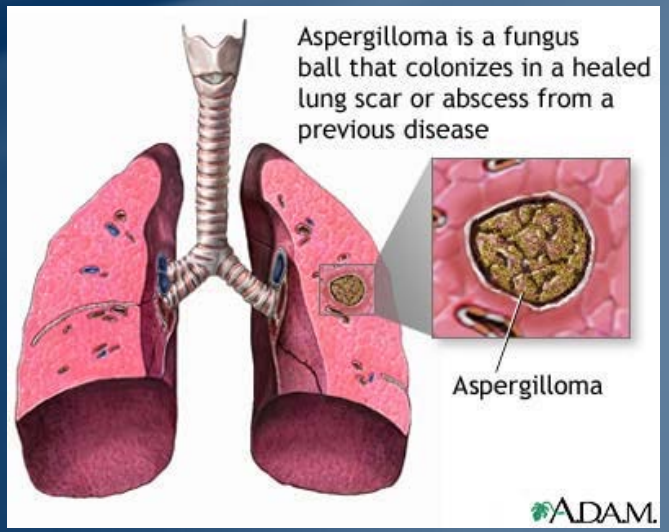
- Respiratory – Asthma, Sinusitis, Hypersensitivity Pneumonitis (delayed)

- Skin – dermatitis, rash, itching, red blotches

Health Effects Associated with Mold Exposure

Fungal Infections of the respiratory tract in immunocompromised persons

- Invasive Pulmonary Aspergillosis
- Allergic Bronchopulmonary Aspergillosis
- Aspergilloma



Severity of Health Effects

Dependent on:

- type of mold,
- amount of exposure to mold & emissions,
- susceptibility/sensitivity of the person,
- underlying health conditions.

Mold Prevention and Remediation Program

1. Utilize prevention techniques to minimize the potential for mold and fungal growth,

2. Identify, control and remediate areas with fungal growth, and

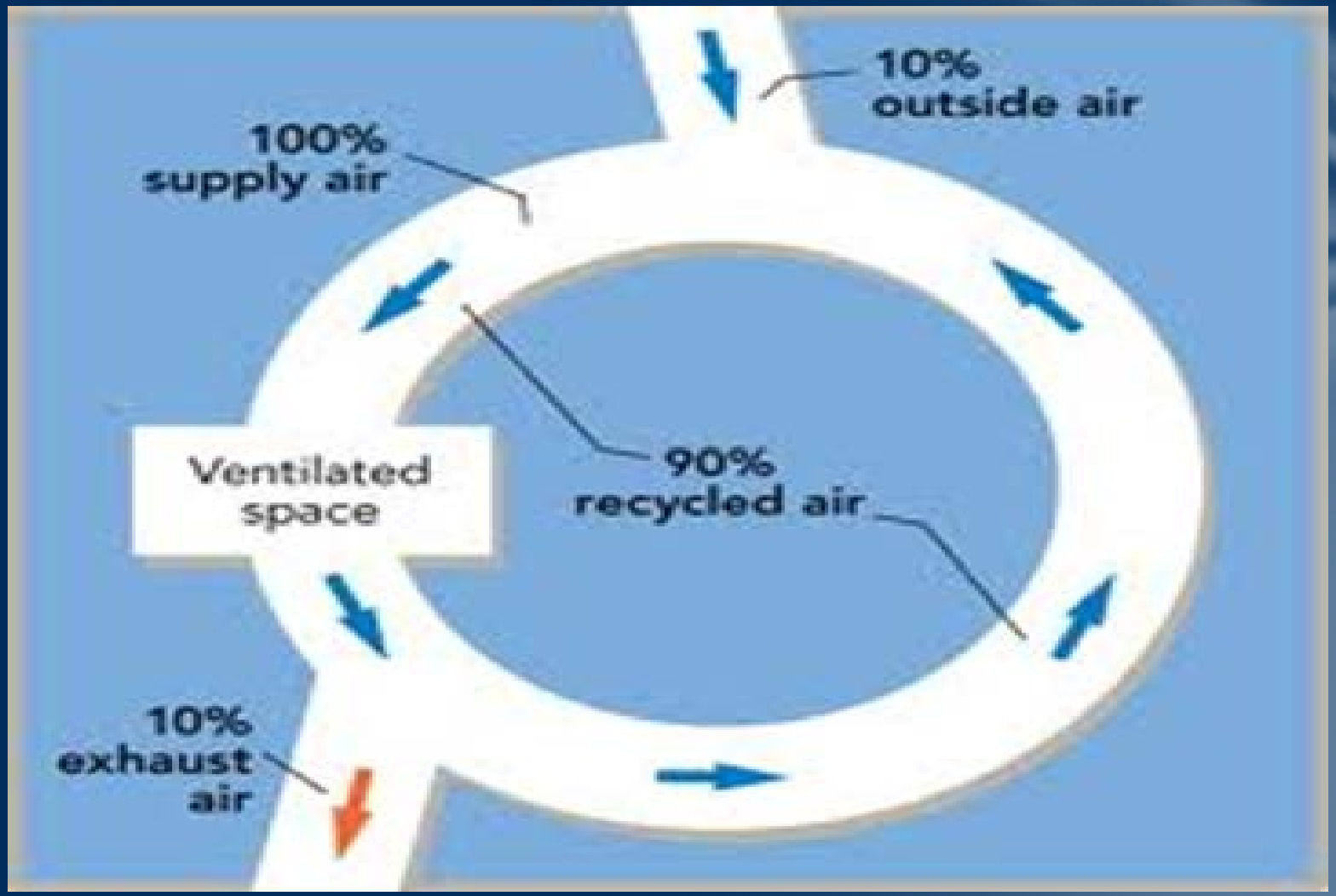
3. protect all employees and students

IAQ
Ventilation System

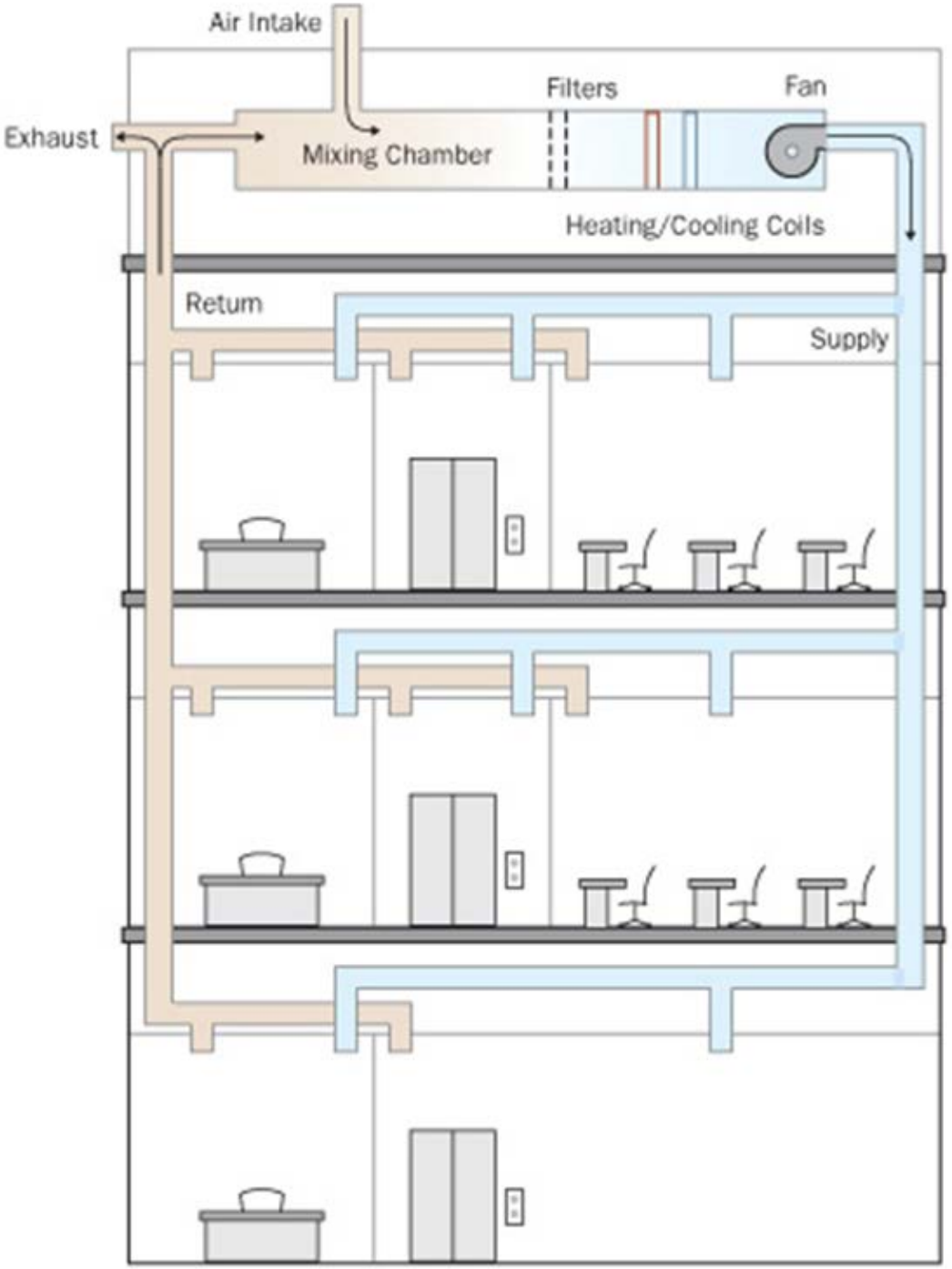
Heating Ventilation and Air Conditioning (HVAC)

- Regulates the temperature and humidity for comfort
- Supplies general dilution ventilation to decrease indoor pollutants

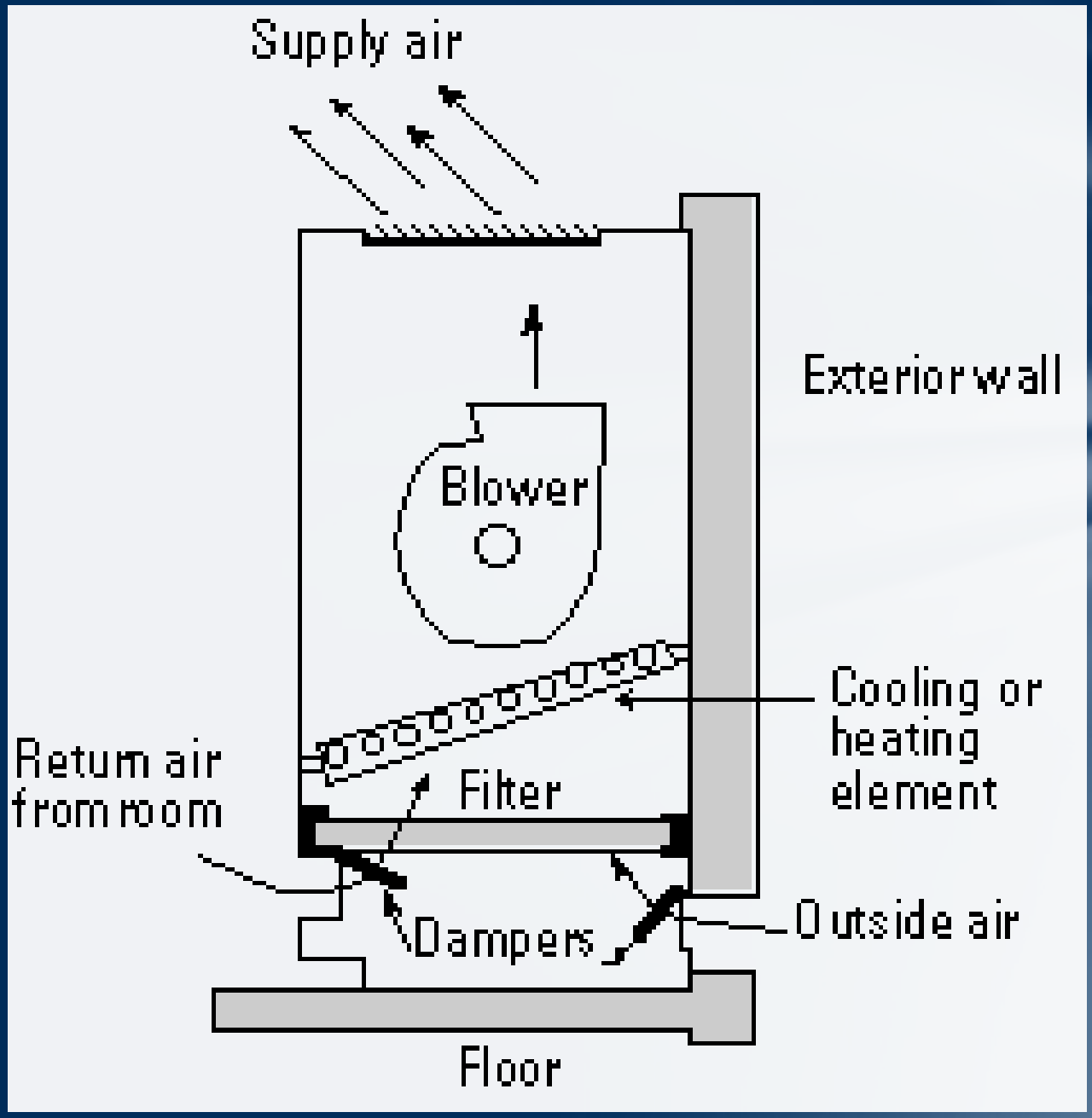
IAQ Basic Ventilation System



IAQ Basic Ventilation System



IAQ Ventilation System


Supply air
Exterior wall
Blower
Cooling or
heating
element
Return air
from room
Filter
Dampers
Outside air
Floor

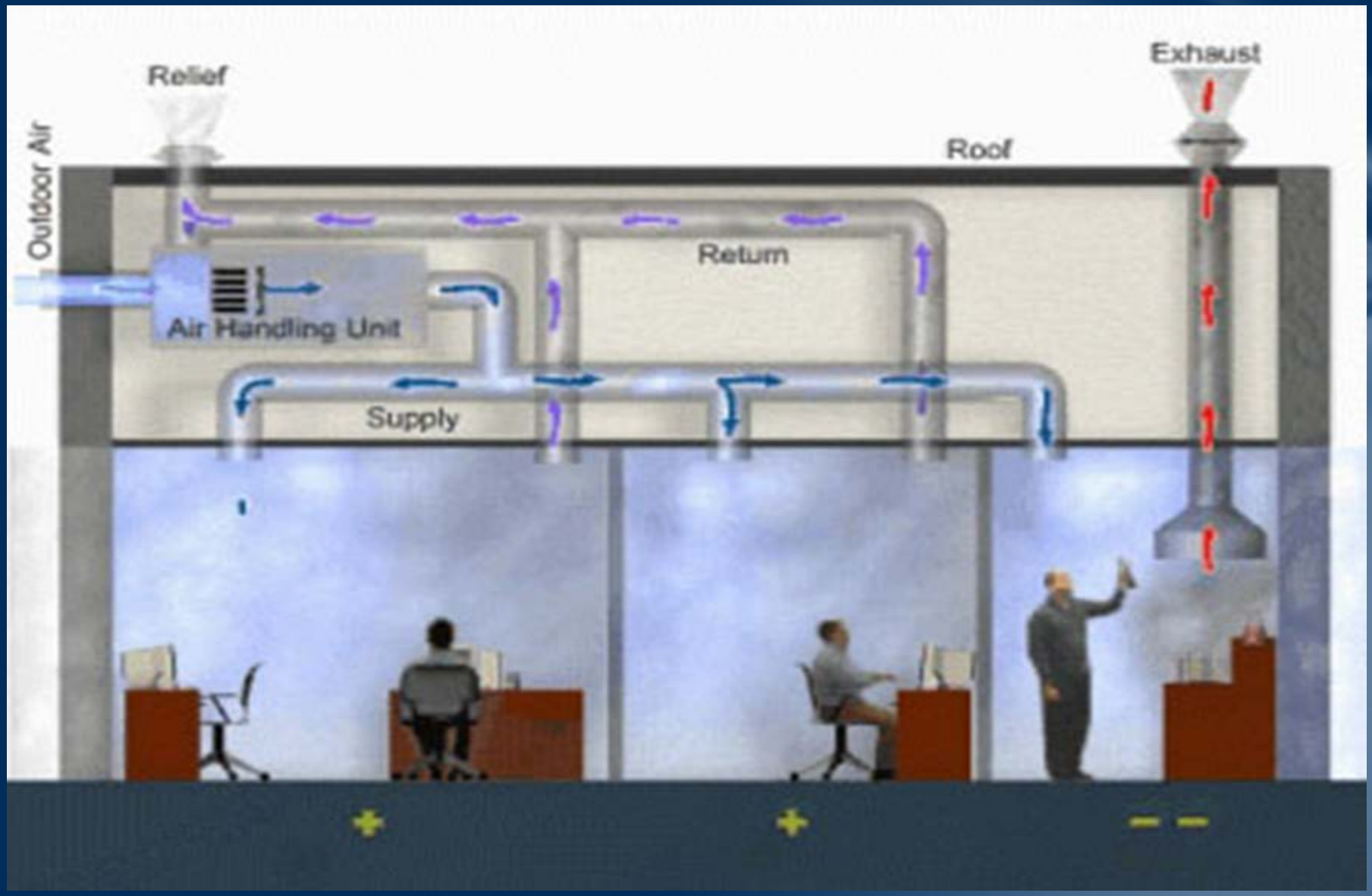
IAQ Ventilation System

Local Exhaust Systems

- Hazardous contaminant removal
- Point of exhaust (hood) close to source
- Make up air requirements may be greater than for general ventilation
- Room should have negative pressure

Lab / Vo-tech

IAQ Ventilation System



IAQ - Ventilation System

General (Dilution) Ventilation System

- Balanced system of supply & return air
- Control exchange of inside air with fresh air
- Filter, temper & humidify supply air
- Maintain rooms at slight positive pressure
- Maintain building at slight positive pressure

Primary Goal: Comfort

IAQ - Ventilation System

Air Handling Unit (AHU)

Air Filters

- Use filters that meet HVAC manufacturer's and operating specifications
- Minimum Efficiency Rating Value (MERV) of between 8 and 13
- Below 13 may remove small bacterial or fungal spores
- Check that are proper size, in good condition, clean and not clogged

MERV Table

MERV	Particle size	Typical controlled contaminant [2]	Typical Application [2]
17–20[3]	< 0.3 μm	Virus, carbon dust, sea salt, smoke	Electronics & pharmaceutical manufacturing cleanroom
13–16	0.3–1.0 μm	Bacteria, droplet nuclei (sneeze), cooking oil, most smoke and insecticide dust, most face powder, most paint pigments	hospital & general surgery
9–12	1.0–3.0 μm	Legionella, Humidifier dust, Lead dust, Milled flour, Auto emission particulates, Nebulizer droplets	Superior residential, better commercial, hospital laboratories
5–8[4]	3.0–10.0 μm	Mold, spores, dust mite debris, cat and dog dander, hair spray, fabric protector, dusting aids, pudding mix	Better residential, general commercial, industrial workspaces

IAQ - Ventilation System

Air Handling Unit (AHU)

- Temperature Control
- Humidification - add moisture
- Dehumidification - reduce moisture
- Maintain RH below 60% in all occupied spaces and plenums

IAQ Ventilation System

Air Handling Unit (AHU)

Cooling Coils and Drain Pans

- Coils condense water vapor into drain pans
- Drain pipes must remove water from the AHU

IAQ Ventilation System

Ducts

- Move the supply air (filtered and conditioned) air to occupied areas
- Repair leakage especially at joints
- Do not make paths for utilities through ducts

IAQ Ventilation System

Fans

- Force the supply air to ventilated areas
- Ensure fan belts are operating properly
- Ensure the rotation is in correct direction
- Ensure there are no obstructions in the Fan

* Safety hazard – maintain guards & use lockout procedure

IAQ Ventilation System

Dampers

Control airflow

- Check condition of dampers and controls
- Ensure all dampers are operable and meet design specifications
- Clean screens and grilles

IAQ Ventilation System

Air Handling Unit

Return Air Plenum *

- Maintain all exhaust systems that pass through plenum
- Prevent contamination of the plenum
- Ensure air flow is not blocked

* Space above ceiling tiles is often used as return air plenum

Questions & Answers