

Mechanical Ventilation Review Worksheet

1. List at least 3 common indoor air pollutants:
2. What are some reasons that paying attention to ventilation is important?
 - A.) People spend up to 90% of their time indoors and there are 2-5 times the pollutant indoors than outdoors.
 - B.) Poor indoor air has a serious impact on occupants' health and productivity
 - C.) Fresh air ventilation is energy intensive because it exchanges heated or cooled indoor air with unconditioned outdoor air (up to 30% of heating and cooling load in a building!).
 - D.) All of the above
3. What is a major benefit of a tight envelope during the cooling season in Chicago, IL (Climate Zone 5A – “Cool/Humid”)?
4. What is the best first step to reducing indoor air pollutants when contemplating a new construction project?
 - A.) Source control – select materials to minimize chemical pollution sources
 - B.) Double the minimum required ventilation rate.
 - C.) Select windows that leak a little bit to ensure airflow
5. What is the leading cause of lung cancer among non-smokers?
 - A.) radon gas
 - B.) hemp insulation
 - C.) particulates
 - D.) None of the above
6. What is the catch phrase favored by the modern building scientists? Seal _____, ventilate _____.
7. Infiltration is air moving _____ the building. Exfiltration is air moving _____ the building.

8. Natural ventilation relies upon:

- A.) fans
- B.) winds or convection
- C.) outdoor conditions
- D.) Both B and C

9. Match the descriptions with the three different factors that affect how mechanical ventilation functions:

Filters
Controls
Fresh Air

removes and dilutes pollutants
maximizes efficiency
removes particulates

10. Given the following three categories of ventilation rates, which of the three can be used by itself?

- A.) Square Footage Requirements
- B.) Per Occupant Requirement
- C.) Air Change Per Hour Requirement

11. What are three types of ventilation controls for commercial buildings?

- A.) Demand Control Ventilation, Energy Recovery, Economizing
- B.) Square Footage, Per Occupant, Air Changes Per Hour
- C.) Occupancy Sensors, Vacancy Sensors, Dawn to Dusk Sensors

12. In your own words, what were early ventilation designs usually based on?

13. What are ASHRAE's options for calculating the required minimum ventilation rate?

- A.) CFM per person rate + CFM per sq. ft. rate = minimum ventilation rate.
- B.) Air change rate based on default occupant densities.
- C.) Mass-balance of fresh air vs contaminant generation rates.
- D.) All of the above

14. What are two areas that are required to have energy-saving ventilation controls because of their high-exhaust design?
- A.) Vehicle Garages
 - B.) Commercial Kitchens
 - C.) Classrooms
 - D.) Offices
15. What type of ventilation calculation might require that the Contaminants of Concern (CoCs) be identified?
- A.) Ventilation Rate Procedure
 - B.) Indoor Air Quality Procedure
 - C.) Demand Control Ventilation
16. (True or False) Economizers can help businesses save money by reducing sick days.
17. IECC Ventilation Controls are the:
- A.) The minimum requirements for efficiency
 - B.) Industry best practices
 - C.) The most economic options for controlling fresh air
18. In general, when are Energy Recovery Ventilation system required?
- A.) High outdoor air percentage air handlers.
 - B.) For low occupancy systems where minimal ventilation is required by square footage calculations.
 - C.) Energy Recovery Ventilation is always required by code when ventilation is present.
19. Dry bulb temperature only economizer control is:
- A.) Problematic since it can bring in excess humidity and increase latent loads.
 - B.) Uses a lower maximum temperature limit that reduces hours of operation.
 - C.) Has a lower first cost because of the less complex sensors and controls required.
 - D.) All of the above.