**2021 Worksheet # 3**

**Medical Air Central Supply Systems:**

**Pages:**

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 1.Aftercoolers, where required, shall be provided with individual \_\_\_\_\_\_\_\_\_\_\_\_\_.

 a. Pressure indicators

 b. Flexible connectors

 **c. Condensate traps**

 d. Shutoff valves

2. Carbon monoxide shall activate a local alarm when the CO level exceeds \_\_\_\_\_\_.

 **a. 10 ppm**

 b. 5 ppm

 c. 15 ppm

 d. 20 ppm

3. Compressors that are monitored for gaseous hydrocarbons shall be monitored on a \_\_\_\_\_\_\_\_\_\_ basis.

 **a. Quarterly**

 b. Monthly

 c. Daily

 d. Annual

4. Dew point shall activate the required alarms when the dew point at system pressure exceeds \_\_\_\_\_\_\_\_\_.

 a. 42℉

 b. 39℉

 **c. 35℉**

 d. 32℉

5. Liquid ring compressor system shall have a reserve medical air standby header (1HR) or a\_\_\_\_\_\_\_\_\_\_\_\_.

 a. Condensate traps

 b. Manifold

 **c. Compressor**

 d. Bulk system

6. Liquid ring compressors, service water and seal water shall be treated to control\_\_\_\_\_\_\_\_\_.

 a. Waterborne pathogens

 b. Chlorine

 c. Hyper chlorination

 d. Both a & b

7. Medical air compressor systems shall have a pressure relief valve set at \_\_\_\_\_\_\_ percent above line pressure.

 a. 40

 **b. 50**

 c. 30

 d. 20

8. Medical air compressor systems shall have a(n) \_\_\_\_\_\_\_\_\_ means to prevent backflow through all off-cycle compressors.

 a. Manual

 **b. Automatic**

 c. Semi-automatic

 d. All of the above

9. Medical air compressors shall be provided with a \_\_\_\_\_ restart function such that the compressors will be restarted after a power interruption.

 a. Manual

 **b. Automatic**

 c. Manual or automatic

 d. None of the above

10. Medical air compressors that are designed to separate the oil-containing section from the compression chamber shall be provided with a coalescing filter with a \_\_\_\_\_\_\_\_.

 a. Shutoff valve

 b. Pressure indicator

 **c. Element change indicator**

 d. All of the above

11. Medical air filters shall be located immediately upstream of the \_\_\_\_\_\_\_\_.

 a. Receiver

 b. After coolers

 **c. Final line regulator**

 d. Pressure indicator

12. Medical air filters shall be sized for 100 percent of the system peak calculated demand and be rated for a minimum of \_\_\_\_\_\_ percent efficiency at \_\_\_\_\_\_\_ micron or greater.

 a. 95% @ .5

 **b. 98% @ 1**

 c. 100% @ .1

 d. None of the above

13. Medical air receivers shall be provided with proper valves that allow the receiver to be \_\_\_\_\_\_\_\_ during service.

 a. Pressurized

 **b. Bypassed**

 c. On line

 d. Painted

14. Medical air shall be sampled at a\_\_\_\_\_ NPS valved sample port downstream of the final line pressure regulator.

 **a. 1/4 inch**

 b. 1/8 inch

 c. 1/2 inch

 d. 3/4 inch

15. Medical air sources shall be used only for \_\_\_\_\_\_\_.

 **a. Human respiratory applications**

 b. Air-operating devices

 c. Instrument air

 d. All of the above

16. Medical air supply systems shall be required to \_\_\_\_\_\_\_\_\_.

 a. Meet the requirements of medical air USP

 b. Have no detectable liquid hydrocarbons

 c. Have less than 25 ppm gaseous hydrocarbons

 **d. All of the above**

17. Receivers for medical air shall be equipped with \_\_\_\_\_\_\_\_\_\_\_\_\_.

 a. Relief valves

 b. Automatic and manual drains

 c. Sight glass

 **d. All of the above**

18. The compressor air intakes shall be located outdoors at a minimum distance of \_\_\_\_\_\_ above the ground.

 a. 10 Feet

 **b. 20 Feet**

 c. 40 Feet

 d. 30 Feet

19. The medical air intake shall be located a minimum of \_\_\_ ft from all vehicular exhausts and noxious fumes.

 a. 20

 **b. 25**

 c. 15

 d. 10

20. The medical air intake shall be minimum 10 ft from all \_\_\_\_\_\_\_\_\_\_.

 a. Doors

 b. Windows

 c. Opening in the building

 **d. All of the above**

21. Where medical air piping systems at different operating pressures are required, the piping shall separate after the \_\_\_\_\_\_\_.

 a. Source valve

 b. Relief valve

 **c. Filters**

 d. Final line regulators

22. Where liquid ring compressors with air-water separators are used, when the liquid level is above the design level, a sensor activates a(n) \_\_\_\_\_\_\_ alarm indicator.

 **a. Local**

 b. Area

 c. Master

 d. All of the above

23. Where liquid ring compressors or water-cooled aftercoolers are used, air receivers shall be equipped with a\_\_\_\_\_\_\_\_\_\_\_\_\_ sensor.

 a. Low water level

 b. High temperature

 c. Low temperature

 **d. High water level**

24. Where Liquid ring air compressors, and compressors having water-cooled heads, or water-cooled aftercoolers are used. They shall have a high-water level alarm sensors located in the \_\_\_\_\_ and \_\_\_\_\_\_that will shut down the compressor systems and activate a local alarm.

 a. Air receivers and water systems

 **b. Air receivers and air-water separator**

 c. Air-water separators and air receiver drain

 d. Any of the above

25. The medical air proportioning system’s supply of oxygen USP and nitrogen NF. What standard shall be used to show the location that air proportioning system to be installed.

 a. NFPA 101

 b. NFPA 90A

 c. NFPA 54

 **d. NFPA 55**

26. What type of connection should be used to connect the medical air compressors or vacuum pumps to their intake and outlet piping?

a. Compression fittings

b. Di-electric

**c. Flexible**

d. Insulation

27. The quality of medical air shall be required to have the following to: Meet USP requirements, \_\_\_\_\_\_ of permanent particulates sized at \_\_\_\_\_\_\_\_.

**a. 1 mg. at 1 micron**

b. 5mg. at 1 micron

c. 10mg. at 5 microns

d. 1mg at 5 microns