

medical gas solutions for life

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## An Overview on Medical Air Packages





#### SHANNON MCAFEE VICE PRESIDENT SALES AND BUSINESS DEVELOPMENT







#### **Review of Definition** and **Code Requirements**

Medical Air is defined in (NFPA) National Fire Protection Code 99 2018 in 5.1.3.6.1 to have the following characteristics:

- 1. It shall be supplied from cylinders, bulk containers, or medical air compressor sources, or it shall be reconstituted from Oxygen USP and oil-free, dry nitrogen NF.
- 2. It shall meet the requirements of medical air USP.
- 3. It shall have no detectable liquid hydrocarbons
- 4. It shall have less than 25ppm gaseous hydrocarbons.
- 5. It shall have equal to or less than 1mg/m3 of permanent particulates sized 1 micron or larger in the air at normal atmospheric pressure.



#### **Medical Air Delivery**

Facilities can use a Medical Air Compressor Package or a Medical Air Manifold to provide Medical Air.

The air is delivered through distribution piping system that ends with a medical air outlet in the room.







#### **Medical Air Outlets**

Outlet locations and quantities are governed by American Institute of Architectural (AIA) Guidelines for Design and Construction of Hospitals and Healthcare Facilities



#### **Calculating the Demand**

Many studies have been done determining the load required for medical air compressors. The sizing can be calculated using several methods.

The U.S. Typical method is the standard calculation for medical air in the United States. To calculate by this method the following steps are taken:

- 1. Count all outlets which will be served by this system by occupancy.
- 2. Multiply by simultaneous use factor
- 3. Add the sum of all occupancy
- 4. Add the number of ventilators

Calculator found on <a href="https://www.pattonsmedical.com/design-expert/">https://www.pattonsmedical.com/design-expert/</a>



Quantity		Value	SUF	SCFM
Ventilators **	Unit(s)	2.3	100%	
Pediatric Croup Tents	Unit(s)	2.0	50%	



#### "Oversized" Compressors

This sizing process attempts to size by "worst case scenario". Meaning that all rooms would be occupied and using some amount medical air. Ventilators being the largest consumer of medical air especially adds to the total. During "normal" times the compressor will be largely oversized, but will be there if you need it.





#### Medical Air is only for Breathing and Breathing Devices – NFPA 99 5.1.3.6

Medical air is used for human respiration and calibration of medical devices for respiratory equipment

NO BLOWING OFF SCOPES NO IN CENTRAL STERILE NO RUNNING BOOM BRAKES NO SUPPLY TO ORTHOPEDIC EQUIPMENT







#### **Pure Air**

The air has to maintain standards of purity and dryness. Oil-free compressors are used to eliminate the potential for hydrocarbons.

Scroll is the most specified compressor technology for medical air.

Oil free reciprocating and rotary screw are also acceptable.

Monitoring equipment such as a dewpoint monitor and CO monitor further ensures the purity.



### Redundancy Required – NFPA 5.1.3.6.3.9 (B)

Medical air compressors shall be sufficient to serve the peak calculated demand with the largest single air compressor out of service

The redundancy also applies to filtration and dryers as well.

The pumps run in rotation based on demand to even run life on all compressors.





#### Lower Operating Costs

Multiplex smaller hp air compressors, such as 15 or 20 hp scroll machines

- Reduce electrical consumption when demand is low
- Smaller foot print.
- Less expensive installation with pre-piped and wired skids
- Allows for expandability keeping capital cost down

\*Allow compressors to increase package capacity in urgent needs.







#### **Smaller Footprint**

Multiplexing multiple scroll air compressors takes dramatically less space, saves considerable money on installations and has lower capital costs than VSD rotary screws.

Pattons Medical can have a complete medical air package with multiple scrolls shipped as a complete single point connection package. In new construction, this will save the contractor any additional piping and electrical wiring for components. There would be a braze for the inlet/outlet and one wiring connection.

For replacement equipment, the skids can be broken apart to fit through a 30" door and have unions for the connections when put in place.





#### **Desiccant Dryers**

- Maintain the requirement of a maximum dewpoint of 0°C
- Demand based purging to reduce compressor run times outside of hospital demand
- Perform well in low-flow conditions that is common with medical air demand.
- Cartridges of desiccant eliminate desiccant breakdown – no particulate failure of outlets
- Cartridges are more efficient resulting in smaller dryers
- Dryer can be mounted horizontal or vertical to achieve smaller footprints



### **Desiccant Dryers Purging**

Desiccant dryers require a purge to regenerate the desiccant to continue the ability to dry the air.

In Industrial applications, this purge is activated by a timer as the air compressor is running continuously.

For Medical packages the dewpoint is monitored through the dewpoint sensor.

Demand based purging does not take place until the dewpoint reaches -10°C.

This almost eliminates the air compressor running for purge outside of demand.







When replacing equipment or expanding, it's important to meet with a medical gas specialist to conduct a medical gas survey. Our team can confirm the outlet counts, interview respiratory therapist, ensure your equipment meets NFPA code, and answer any questions you may have.

Find your rep at <a href="https://www.pattonsmedical.com/sales-representative-search/">https://www.pattonsmedical.com/sales-representative-search/</a>



# Thank You



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