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Overview of Specialty Air and Vacuum

Speaker

SHANNON MCAFEE
MEDICAL & LABORATORY GAS CONSULTANT

Panelists

GREG HOOD
VICE PRESIDENT

PAT COYLE
MEDICAL & LABORATORY GAS CONSULTANT

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Specialty Air and Vacuum

- Not defined – every project has different parameters
- We are going to cover the data you need to collect – the questions you need to ask – to be able to make an equipment selection
- There can be code implications to your selections –

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Codes

NFPA 99: Health Care Facilities –

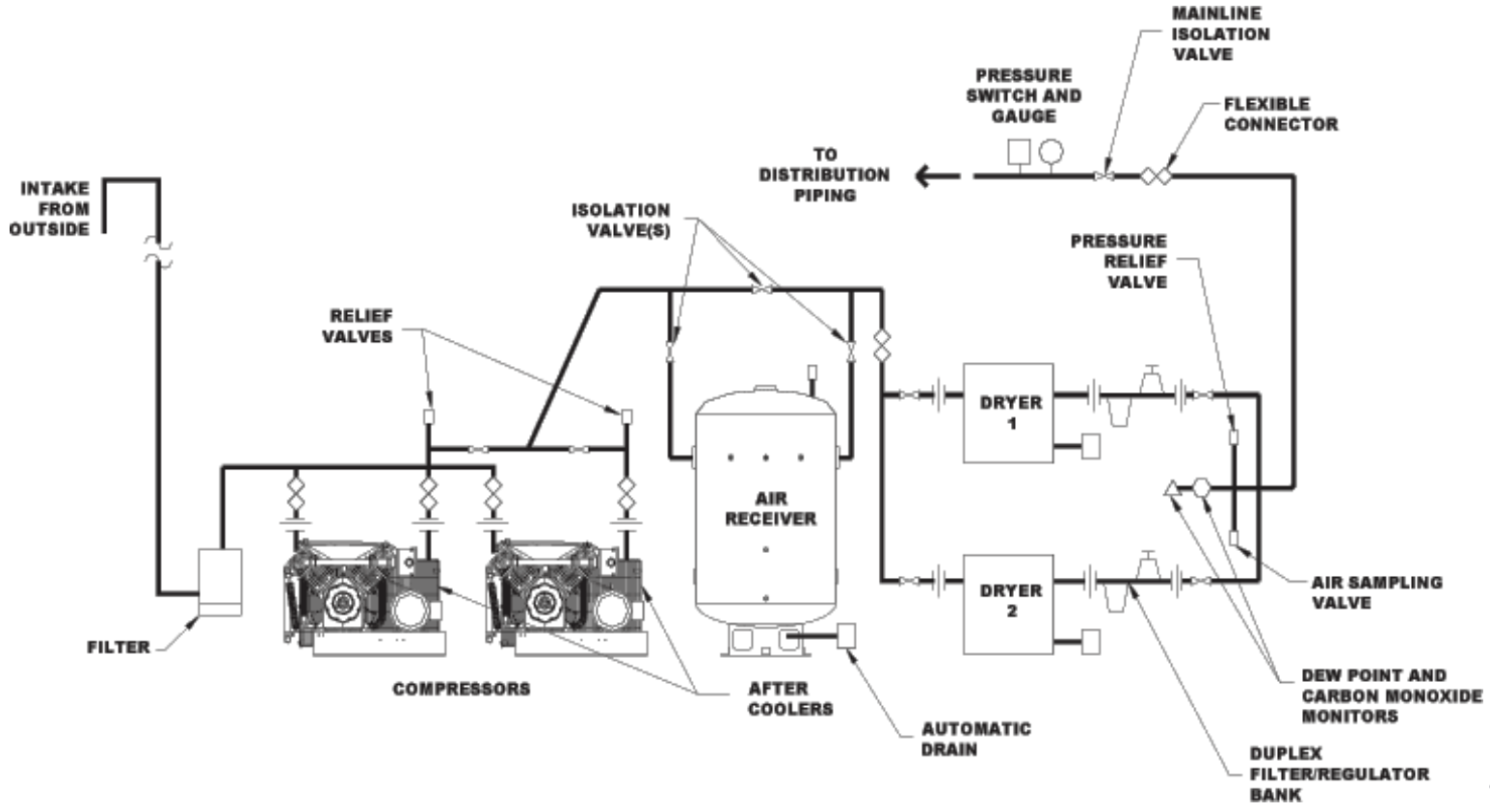
Complete rules for the safe application of electrical systems, gas and vacuum systems, and environmental systems, along with materials and emergency management practices.

The 2018 edition has the most recent developments in medical equipment and processes as well as new methods to reduce fire, explosion, and electrical hazards.

Definition of Air Applications in a Healthcare Facility

Medical Air defined by NFPA 99 5.1.3.6.1

Life sustaining breathing air used by hospitals, surgery centers, dental facilities, outpatient clinics. Applications include respirators, ventilators.



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Definition of Air Applications in a Healthcare Facility

Instrument Air is first defined in NFPA 99 3.3.84 and then further defined in 5.1.13.3.4

> Air used as an alternative to Nitrogen intended for the powering of devices unrelated to human respiration. Applications include surgical tools, ceiling arms

- Reciprocating Compressors
- When you need 180psi
- Not oil-free
- Space Saver configuration available

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Definition of Air Applications in a Healthcare Facility

Non-Medical High Pressure Air is normally a less stringent variation of medical air used in Sterile Processing Department to run air guns for drying scopes and also used to run washer stations.

Differences from Medical Air

- Scrolls work for 120 psi requirement
- No redundancy requirement. All compressors can run to meet demand.
- Optional desiccant or refrigerated dryer packages allowed. The dryer will be sized for all compressors running.
- Usually needs 145psi output. This dramatically reduces the SCFM of the scroll.
- The scroll will require more frequent maintenance when operating at this high pressure.

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Definition of Air Applications in a Healthcare Facility

Oil-less Straight Piston Air Compressor

.75HP to 2HP

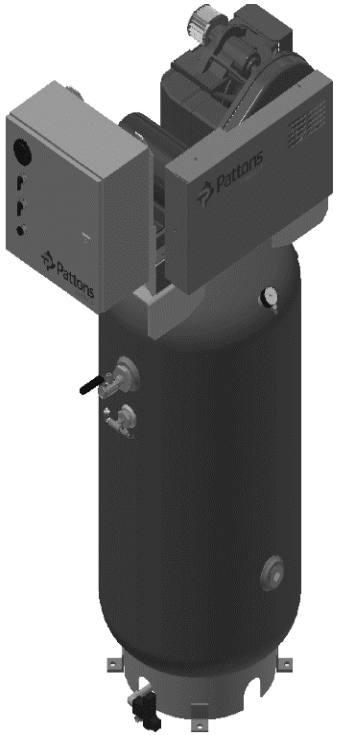
Regenerative Desiccant Dryer

116psi for a 90 psi delivery

Scroll Compressor

2HP to 7.5HP

Refrigerated or Desiccant Dryer



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Definition of Air Applications in a Healthcare Facility

Laboratory Air is normally a less stringent variation of medical air used in industrial and clinical laboratories for sterilizers, controlled experiments, and other laboratory processes.

Differences from Medical Air

- No redundancy requirement. All compressors can run to meet demand
- Optional desiccant or refrigerated dryer packages allowed. The dryer will be sized for all compressors running.
- Operates at higher pressure than 50psi of medical air. Higher pressure requirements affect SCFM output.

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Tips For Sizing Non-Medical Air Compressors

Request the Specification Sheets for Equipment

What delivery pressure is needed?

- Scrolls can be set at 145psig that can meet a delivery of pressure of 125psig. (This usually satisfies washers and air guns in the SPD)
- Reciprocating compressors that use oil will be needed to deliver pressure higher than 180psig
- True Instrument Air that replaces Nitrogen delivers at 180psig. Will need to be reciprocating. Uses a DISS Instrument Air outlet (IA) like Nitrogen

Tips For Sizing Non-Medical Air Compressors

Request the Specification Sheets for Equipment

What SCFM is needed?

- The pressure changes the efficiency of the compressor. Be sure to check the SCFM at the PSIG you need!

System	HP	System Capacity (SCFM)			Specification
		50 psig	100 psig	120 psig	
Duplex	2	14.0	13.0	11.4	68L-22-022-PDS
	3	20.8	19.2	17	68L-22-032-PDS
	5	34.4	32.0	28.2	68L-22-052-PDS
	7.5	50.4	48.0	42.4	68L-22-072-PDS

System	HP	System Capacity (SCFM)	Specification
		145 psig	
Duplex	3	14.2	68L-21-032(A/B/C)-145
	7.5	31	68L-21-074(A/B/C)-145
	10	48	68L-21-104(A/B/C)-145

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Tips For Sizing Non-Medical Air Compressors

Request the Specification Sheets for Equipment

How dry does the air need to be?

- Refrigerator Dryer versus Desiccant Dryer.
- Refrigerator Dryer works best with constant flow.
- Desiccant Dryers work best when flow is not constant can maintain very low dewpoints.
- Desiccant uses purge air which needs to be accounted for in sizing (typically 15%)

- Pattons Medical does still offer the purge saving feature and the lowest dewpoints with their desiccant dryer packages when needed.

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Definition of Vacuum Applications in a Healthcare Facility

Medical Vacuum is

typically used for evacuation in surgical procedures found in same facilities as medical air

Lab Vacuum is

normally a less stringent variation of medical vacuum used in industrial laboratories, clinical laboratories, universities, and health testing facilities

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Lab Vacuum - All pumps are allowed to run

- Dry rotary claw and lubricated rotary vane vacuum technologies
- Automatic purge system on all pumps for protection and long life.
- Multiple configurations in fully packaged systems

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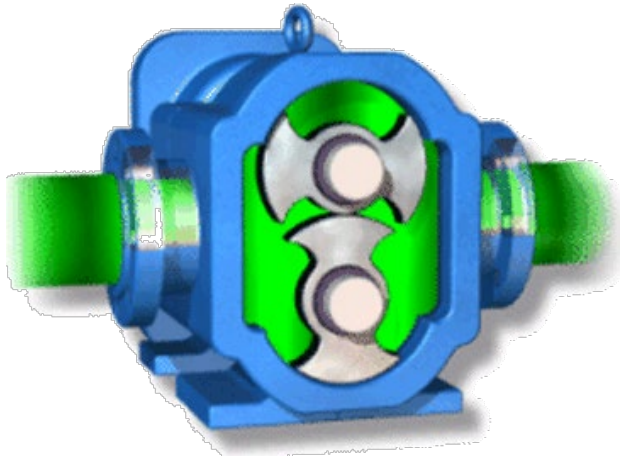
Contactless Claw Technology

Key Considerations:

- Gear Oil Replacement
- Good candidate for VFD (energy efficiency alternative)
- Vacuum Level considerations 24"Hg
- Low Maintenance
- Higher Cost of Equipment
- Noise Considerations



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Lubricated Rotary Vane Technology

Key Considerations:

- Lower Maintenance Required on Vanes
- Deeper Vacuum Levels achieved
- Affordable Pump
- Relatively Quiet Operation
- Not allowed as WAGD evac pump by code

Replace Oil Every 1,000 hrs.

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Alarms

- Alarms are not required by laboratories. However, it is still useful to have alarms to monitor the equipment.
- Pattons Medical Systems also allow for Remote Monitoring over Ethernet/Internet Network.
- BacNet and MODBUS Protocols are also options for connection and communicating with the facilities Building Management System (BMS).
- Instrument Air is required to be alarmed at the master panel and area alarms

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Special Considerations for Dental NFPA 99 Chapter 15: Dental Gas and Vacuum Systems

Dental Scope for Pattons Medical is 12 chairs or more. Smaller than 12 chairs most equipment is purchased as a kit from a dental provider.

Dental scope for our equipment is large facilities, teaching institutions, or Dental Surgery.

- Sizing is based on number of users not number of outlets or chairs.
- Standard Oxygen Manifolds can be used.

Alarms

Not all dental equipment come ready to be alarmed.

Pattons Medical Vac provides a Normally Open / Closed connection in their control panel that would allow us to wire back to our Master alarm and provide a "General Fault" alarm ONLY.

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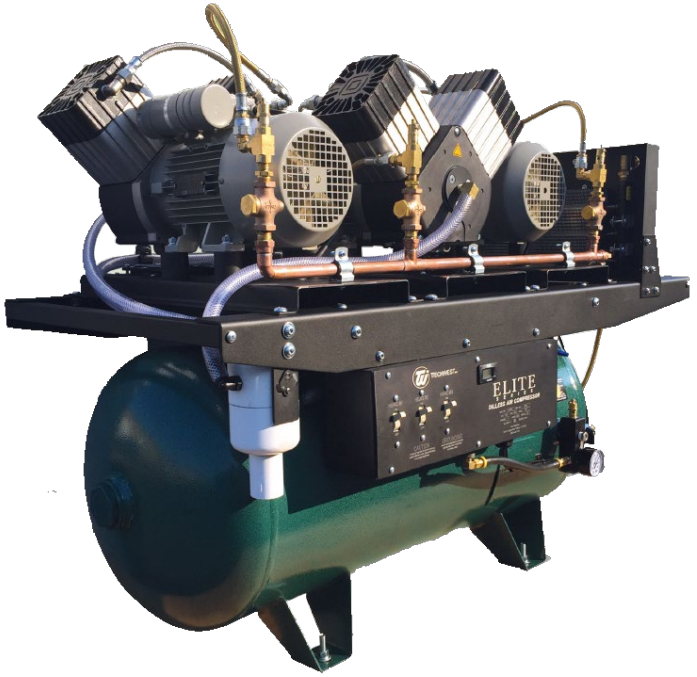
Definition of Air Applications in a Healthcare Facility

Dental Air is 100% Oil-Free, Dry Air (Dew Point -25 degrees or lower). Primarily used for use in blowing away saliva so teeth are dry and can also provide air pressure to operate handpieces and syringes on the dental unit.

Differences from Medical Air

- Reciprocating Oil-free Compressor
- Refrigerated Dryer
- Redundancy not required
- Sized Based on Number of Chairs and Hygienists and Dentists
- Hygienists use 3cfm/chair
- Dentists use 2cfm/chair



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Dental Vacuum

- Not as deep as vacuum as medical 7-10”
- Oil-free Turbine type
- VFD
- Sizing Based on number of chairs, hygienists, and dentists
- Hygienists ½ a user
- Dentists 1 user
- Multiply # of users for sizing chart
- Code requires an amalgam separator

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Benefits of Oil-Free Turbine Type Dental Vacuum

Traditional dental vacuums use small lubricated rotary vane pumps ganged together to meet demand.

- Much larger footprint
- More piping and electrical work for a more expensive install
- Turbine type provides more SCFM per HP and has the added benefit of being VFD.
- Oil-free means less maintenance and lower operating costs for the facility. NO LEAKS – NO OIL ON THE FLOOR

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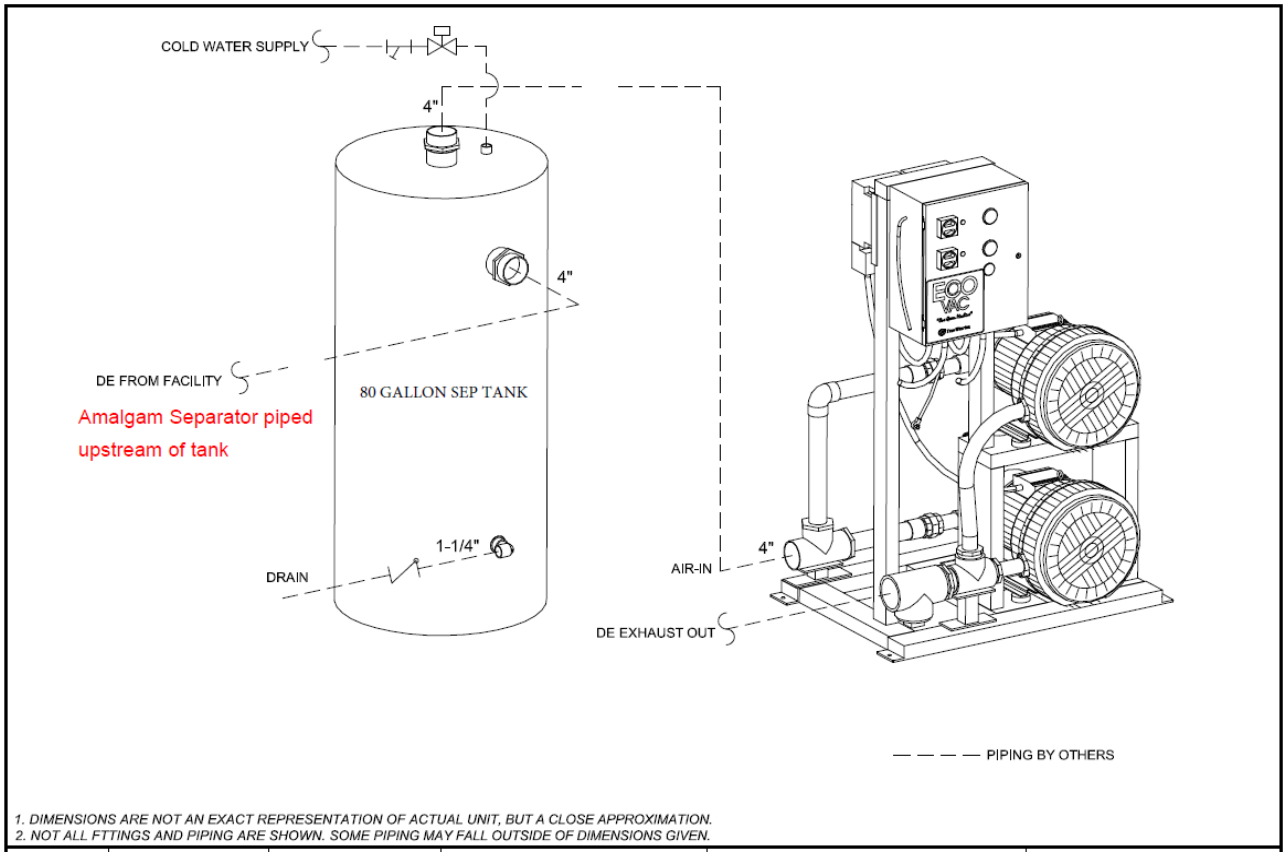
Dental Vacuum

Amalgam Separator: Now required by code. Separator is installed on vacuum line before the vacuum system tank. Flows into and out of the separator then into the tank. This Amalgam Separator removes the concentrations of solid and soluble mercury & silver (fillings).



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Dental Outlets

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Thank You

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