



HVAC & IAQ
Effects of Poor IAQ
and
Importance of ACR the NADCA Standard

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Presenter

2021 FALL TECHNICAL CONFERENCE

SESSION SPOTLIGHT



HVAC and IAQ
RICHARD LANTZ, ASHRAE, CMI



Disclaimer

This presentation is not intended to be a comprehensive program covering all aspects of this topic. All technicians are encouraged to read and follow all applicable standards, codes and regulations related to this topic.

- ✓ It is the responsibility of each individual contractor to follow local building codes and licensing requirements and to work safely in accordance with OSHA guidelines.
- ✓ It is the contractor's responsibility to take proper precautions on each project to prevent cross contamination. Always take the health and safety of the building occupants into consideration before you conduct any cleaning procedures.
- ✓ All of the following tips are only general tips. They do not cover every situation and it is your responsibility to adapt these tips to the individual system you are working on.
- ✓ The Instructor is not responsible in any way for the work you perform after viewing this slide show. You are responsible for your own work.
- ✓ The views and opinions following are the instructors opinions and not necessarily the official position of the National Air Duct Cleaners Association.

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What We'll Learn

- HVAC System
- Good IAQ
- Poor IAQ and Building Occupants
- Importance of ACR to Improve IAQ

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The main purposes of a Heating, Ventilation and Air-Conditioning (HVAC) system is to help maintain good indoor air quality through adequate ventilation with filtration and provide thermal comfort.

HVAC unit

HVAC ductwork

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The features of the HVAC system will depend on several variables, which may include:

- ❖ building codes in effect at the time of the design
- ❖ budget that was available for the project
- ❖ planned use of the building
- ❖ subsequent modifications
- ❖ age of the design
- ❖ climate

RETURN AIR

OUTDOOR AIR

MIXING SECTION

FILTER

PREHEAT COIL

FAN

HEATING COIL

COOLING COIL

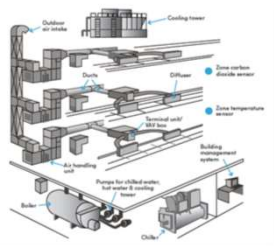
REHEAT COIL

SUPPLY AIR



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HVAC systems range in complexity from stand-alone units that serve individual rooms to large, centrally controlled systems serving multiple zones in a building.



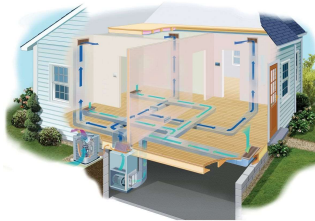


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TYPES OF HVAC SYSTEMS

Single Zone

A single air handling unit can only serve more than one building area if the areas served have similar heating, cooling, and ventilation requirements.



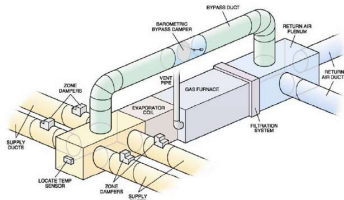


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TYPES OF HVAC SYSTEMS

Multiple Zone

Multiple zone systems can provide each zone with air at a different temperature by heating or cooling the airstream in each zone.



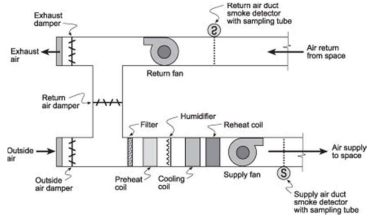


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TYPES OF HVAC SYSTEMS

Constant Volume

Constant volume systems, as their name suggests, generally deliver a constant airflow to each space.



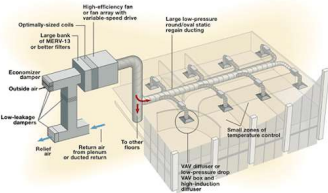


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TYPES OF HVAC SYSTEMS

Variable Air Volume

Variable air volume systems maintain thermal comfort by varying the amount of heated or cooled air delivered to each space, rather than by changing the air temperature.






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BASIC COMPONENTS OF AN HVAC SYSTEM

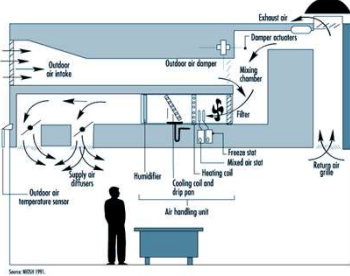
The basic components of an HVAC system that delivers conditioned air to maintain thermal comfort and indoor air quality are:

- ❖ air filter
- ❖ outdoor air intake
- ❖ heating and cooling coils
- ❖ mixed-air plenum and outdoor air control
- ❖ humidification and/or de-humidification equipment




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BASIC COMPONENTS OF AN HVAC SYSTEM



Source: NADCA (2011)





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Testing and Balancing

Testing and balancing involves the testing, adjusting, and balancing of HVAC system components so that the entire system provides airflow rates that are in accordance with the design specifications. Typical components and system parameters tested include:

- ❖ all supply, return, exhaust, and outdoor airflow rates
- ❖ fan speeds and power consumption
- ❖ control settings and operation
- ❖ filter or collector resistance
- ❖ air temperatures

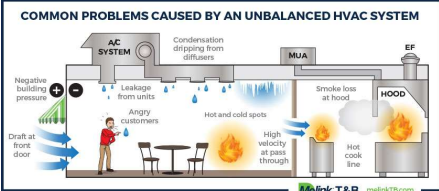




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Testing and Balancing

COMMON PROBLEMS CAUSED BY AN UNBALANCED HVAC SYSTEM



Meirink T&B meirinkT&B.com

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Testing and Balancing

The Associated Air Balance Council recommends the following guidelines in determining whether testing and balancing is required:

- ❖ When space has been renovated or changed.
- ❖ When HVAC equipment has been replaced or modified.
- ❖ When control settings have been readjusted.
- ❖ After the air conveyance system has been cleaned.
- ❖ When accurate records are required to conduct an IAQ investigation.
- ❖ When you are unable to obtain design documents or appropriate air exchange rates for compliance with IAQ standards or guidelines.

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Effects of Poor IAQ

The effects of poor indoor air quality are often felt almost immediately.


- ❖ Dizziness and fatigue
- ❖ Headaches and migraines
- ❖ Common health effects include:
- ❖ Coughing and shortness of breath
- ❖ Irritation of the eyes, nose or throat

Many different indoor air pollutants, including dust mites, mold, pet dander and tobacco smoke can compromise one's ability to breathe or even trigger asthma attacks.

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Effects of Poor IAQ



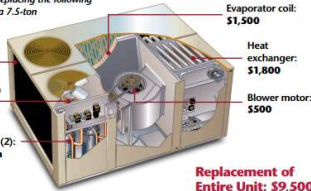
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Benefits of HVAC System Cleaning

Another key benefit of HVAC system cleaning and maintenance is extended equipment life.

Typical costs of replacing the following components on a 7.5-ton rooftop unit.



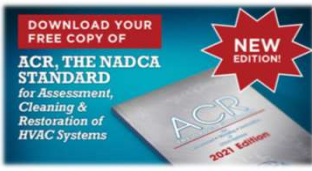
Evaporator coil:	\$1,500
Heat exchanger:	\$1,800
Blower motor:	\$500
Condenser fan motor (2):	\$350 each
Compressor (2):	\$1,200 each
Condenser coil:	\$1,500
Replacement of Entire Unit: \$9,500	

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ACR, The NADCA Standard 2021

This document is written for use by anyone involved in the HVAC cleaning and restoration industry including specifiers, consultants, and contractors. Users of the document should stay updated and informed about changes in the industry, and implement changes in technology and procedures, as appropriate, while following applicable federal, state, provincial, and local laws and regulations.




DOWNLOAD YOUR FREE COPY OF ACR, THE NADCA STANDARD for Assessment, Cleaning & Restoration of HVAC Systems 2021 Edition




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ACR, The NADCA Standard 2021

- ❖ Specifies proper cleaning of components
- ❖ Includes Customizable Scope of Work & Guidance
- ❖ Outlines Qualifications for HVAC Cleaning Contractors
- ❖ Specifies requirements to protect safety of building occupants
- ❖ Specifies cleanliness verification to verify success of the cleaning project






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CONCLUSION

- Main purposes of a Heating, Ventilation and Air-Conditioning (HVAC) system are to help maintain good indoor air quality
- Dirty HVAC systems is the number one contributor to **Poor IAQ**
- **ACR the NADCA Standard 2021** is the internationally recognized as the **Global Standard of Care** for the HVAC cleaning and restoration industry

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**Thank you
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