

# Best Practice Guidelines

## Filtration for Continuing Care Retirement Communities



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## Table of Contents

|                                               |    |
|-----------------------------------------------|----|
| Contributor Acknowledgement .....             | 3  |
| About NAFA .....                              | 4  |
| NAFA Certifications .....                     | 5  |
| Purpose, Scope & Background .....             | 6  |
| NAFA Best Practice Recommendations.....       | 7  |
| Installation, Operation and Maintenance ..... | 8  |
| COVID Special Section .....                   | 11 |
| Glossary .....                                | 12 |
| Bibliography .....                            | 13 |
| Copyright & Usage .....                       | 14 |

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## Filtration for Continuing Care Retirement Communities

NAFA guidelines provide advice on achieving the cleanest air possible based on the design limits of existing HVAC equipment and with consideration of the impact on energy and the environment. Our guidelines are created and updated to collect and supplement existing information. However, we go beyond the “bare minimum,” publishing best practices based on the experience and expertise of our membership, as well as current mandates and research provided by governmental and scientific communities.

For a more complete explanation of principles and techniques found in this guideline, visit [www.nafahq.org](http://www.nafahq.org) to purchase the *NAFA Guide to Air Filtration*. If you have any questions or comments about this publication, please contact NAFA Headquarters.

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# About Us

## **Our Mission:**

The National Air Filtration Association (NAFA) mission is to be the global source for expertise, education & best practices in air filtration.

## **What can NAFA membership do for you?**

NAFA brings together air filter and component manufacturers, sales and service companies, and HVAC and indoor air quality companies. By becoming a member, you can:

- Meet with industry thought leaders
- Strengthen your network
- Share best practices
- Receive up to date industry information
- Access professional development, certification and education

## **Be a part of something bigger**

As a NAFA member, you are a part of a support system that shares the common goals of supporting industry growth and creating healthier communities. Following the coronavirus pandemic, we are more aware than ever of the important role that our members play in a well society. We know that our work is important to maintaining healthy, happy communities.

## **Benefits of Membership**

As a member of NAFA, you'll have access to a host of benefits that offer networking, learning, and advertising opportunities. Here are just a few of our most popular benefits:

- Annual conferences and webinars
- Professional development programs (CAFS and NCT Level I & II certification)
- Air Media magazine
- Best practices guidelines
- Clean Air Award recognition program
- Library of resources, manuals, seminars, and training.
- NAFA advertising and sponsorship programs
- Exposure through NAFA social media and a listing on the NAFA website
- NAFA volunteer and leadership opportunities

...and more!

**Click [here](#) to become a member today!**

# CAFS & NCT Certifications

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Educate your team  
Attract new customers  
Be known as a leader in your industry

Now more than ever, customers seek professionals with the credentials for quality assurance and knowledge to ensure that their complex needs will be met. Addressing this concern, NAFA offers two certification programs to increase the level of education and professionalism in the industry.

## **The NAFA Certified Air Filter Specialist (CAFS) program**

CAFS is the first education and certification program offering an extensive examination on the principles, methods and applications of air filtration. It differentiates professionals who have demonstrated a high level of professionalism and a thorough, up-to-date understanding of air filtration technology. The CAFS exam is pass/fail, and is based on the NAFA Guide to Air Filtration.

## **NAFA Certified Technician (NCT) Program**

This open-book exam is based on the NAFA Installation, Operation, and Maintenance of Air Filtration Systems manual. This program was designed to increase the knowledge of technicians, facility managers, and building owners.

Both certifications are renewable on an annual basis pending successful completion of continued education requirements. While the exams are open to members and nonmembers alike, test fees are dramatically reduced for members. To find out more about the cost, study aids, test dates/locations, and requirements, visit the weblinks below.

[CAFS information page](#)

[NCT information page](#)

# About This Publication

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1

## **PURPOSE**

The popularity of continuing care retirement communities with social activities, restaurants, classes, and other benefits has risen significantly in the last 30 years. Medical advances combined with the increasing number of baby boomers reaching the retirement age have allowed these retirement communities to flourish. Improving environmental controls such as indoor air quality through air filtration can lead to great benefits for the residents, staff, and visitors of the modern retirement community..

2

## **SCOPE**

Continuing care retirement communities consist of three main areas of care – independent living, assisted living, and skilled nursing. This air filtration guideline recommends the removal of particulate contaminants by using MERV 13 filtration in independent living, MERV 14 filtration in assisted living and skilled nursing, and isolated use of HEPA and molecular filtration throughout the facilities. The recommendations in this guideline are considered by NAFA to be “best practice” in contrast to “minimum standards ” put forth by other organizations. They serve to provide the conscientious facility manager with the necessary guidelines to make measurable differences of air quality in their building.

3

## **BACKGROUND: WHY IS CLEANER AIR SO CRUCIAL ?**

Removing unpleasant odors and VOCs can improve the experience for residents, staff, and visitors. However, since occupants of retirement communities spend 85-90% of their time indoors, favorable indoor air quality is also a must for good health. In 2015, researchers from the EU-funded GERIE research project proved correlation between poor air quality and negative health effects on residents in retirement communities.

The elderly are more vulnerable to air-polluting substances because of the body’s inability to cope with harmful air pollutants as they age:

- Many residents have inflammatory disorders such as allergies and asthma, occasionally appearing among those who have not experienced symptoms before. Age related changes in immune function can have a significant impact on asthma and allergies.
- Indoor particles below 2.5 microns in size can be significant contributors to chronic diseases such heart disease, bronchitis, and higher rates of mortality.

For facility managers, creating a comfortable lifestyle for their residents has always been a big challenge. Following the additional challenges presented by COVID 19, we know that air-quality and infection control are just as important as it would be in a hospital. Taking necessary steps for cleaner air is more important than ever! Therefore, in addition to our standard best practice recommendations, we are pleased to include in this guide our tips on minimizing COVID 19 risks and the preventative steps necessary to keep our retirement communities safe and healthy.

# NAFA Best Practice Recommendations

1

## INDEPENDENT LIVING

Independent living communities are for highly independent seniors who require less medical attention. Residents live in private apartments or homes with increased security, transportation services, and recreational activities. Installing a MERV 13 filter in the independent living quarters is recommended. MERV 13 filters will remove 90% or greater of particles in the 3 to 10 micron range. Many times the independent living apartments will have dedicated split systems allowing for an easy upgrade to MERV 13 filters.

For residents who have pulmonary issues such as allergies and asthma, using a stand alone air purifier with a HEPA filter and molecular filtration can be an effective air quality control. HEPA filters remove 99.97% of particles down to .3 microns in size. Molecular filtration will remove harmful volatile organic compounds and odors. Be sure to provide units that use a true HEPA filter, molecular filtration, and strong enough motor to get at least 6 air changes per hour (ACH) in the square footage of the room. Stay away from air purifiers which create high levels of ozone as a by-product. Ozone is a lung irritant and can make the situation worse for residents.

2

## ASSISTED LIVING

Assisted living usually consists of a studio or 1 bedroom apartment with scaled down kitchen facilities. Once the resident moves from independent living to assisted living there is a greater need for indoor air quality controls. Residents in assisted living might have their immune system compromised as they age. Allergies & asthma can turn into chronic obstructive pulmonary disease (COPD). Filtration can be an important component of managing the air quality for patients with COPD(5). Other pulmonary diseases such as emphysema can be very challenging to patients and staff.

The HVAC systems in assisted living facilities should be upgraded to MERV 14 filtration which removes 90% of particles in the 1.0 – 3.0 micron range. Stand alone HEPA air purifiers can be used to remove 99.97% of particles down to .3 microns in size. Molecular filtration should be used for the removal of odors and volatile organic compounds.

3

## SKILLED NURSING

Skilled nursing facilities consist of minimally furnished rooms with a bathroom, hospital beds, and 24-hour medical staff. Residents in these areas are almost completely immobile, either recovering from a short-term illness or injury, or being treated for a chronic illness. It is important that these residents are made as comfortable as possible since they are in these rooms almost 24 hours a day. Infection control is just as important in these areas as it would be in many areas of a hospital. MERV 14 filtration in the HVAC systems and will remove 90% of particles in the 1.0 – 3.0 micron range.

Molecular Filtration can remove many odors and or gaseous contaminants that may be found in skilled nursing facilities. However, it is important to note that source control is always the first recommendation.

# Installation, Operation & Maintenance

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The following identifies some of the more important factors to consider when installing, operating and maintaining an HVAC Filtration system. As a supplement to manufacturers' guidelines, see NAFA's Installation, Operation and Maintenance of Air Filtration Systems manual or consult a NAFA CAFS.

## Installation of Filters & System Integrity

Maintaining integrity of the filter system is vital for the efficacy of the HVAC system and imperative for air filtration performance as unfiltered air by-pass is a key contributor to poor IAQ.

A positively sealed filtration system will prevent unfiltered air bypass, maintain system pressure, and provide consistent filtration system efficiency. After each filter installation, the system must be checked to ensure that there are no possible leaks ord around the filters. This includes filter frames, fastening devices, caulking and gaskets.

NAFA recommends having a NAFA Certified Air Filtration Specialist (CAFS) inspect the installation for system integrity at least annually.

When changing or modifying the model or design of a filter system consult the manufacturer's specifications of the air handling system. Consideration must be given for:

- Size
- Fit
- Media area
- Airflow rate
- Initial and final pressure drop of the new filter system

## Maintenance

A preventive maintenance program should include a monthly inspection of the filtration system. Use the following checklist as a starting point:

- Filters
- Filter hardware
- Fastening devices
- Caulking
- Gaskets
- Ductwork

Removing and replacing damaged or defective filters, filter hardware, gaskets, and duct insulation will keep unfiltered air from bypassing the filter system. Keeping the coils and blower clean and free from dirt and debris will improve airflow, increase system efficiency, reduce electrical consumption, and maintain overall design performance. Scheduled filter maintenance will keep the HVAC system working efficiently with clean, conditioned air and a reduction in contaminant levels.

Additional information regarding maintenance of HVAC and filter systems may be found in the ANSI/ASHRAE/ACCA Standard 180, "Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems."

# Installation, Operation & Maintenance (continued)

## Monitoring of Airflow and Pressure Drop

As a filter loads with contaminants the resistance to air flow through the filter increases. This increase is referred to as “pressure drop” or “differential pressure.”

As an example, in a draw-through system, as the filters load and the resistance increases, the fan pressure is lower on the downstream side. Hence the pressure “drop” downstream of the filters.

This drop or differential can be measured with a pressure sensing device such as a manometer or magnehelic gauge. All HVAC units should have a pressure-sensing device installed to accurately monitor the pressure drop across the filter bank. In extreme temperature conditions, a magnehelic gauge is recommended over a manometer. When a filter has exceeded its useful life based on pressure drop or Life Cycle Costing, it should be replaced. Leaving a filter in service after this point may increase operational and energy costs and could damage the HVAC system.

Most molecular filters, over time, will not increase in pressure drop. Some particulate media, when impregnated with sorbent, could increase in pressure drop. This is not indicative of the service life of the sorbent. Service life of a molecular filter is a function of types and concentration of contaminants and filter design. Most manufacturers offer testing services to determine remaining filter service life. It is important to note that as the media life decreases, so does the efficiency of the molecular filter. Molecular filters are often recommended for change out before media is 100% spent.

## Filter Service

The servicing of filtration products is a dirty business. It is best practice that service technicians have a safe work environment and use the correct personal protective equipment (PPE). Outer layer clothing should be weather appropriate in line with the climatic conditions. PPE includes:

- Eye protection
- Masks
- Gloves
- Coveralls
- Safety Boots
- Hearing Protection
- Hard Hat



In addition, service technicians should have a good working knowledge of:

- HVAC systems
- Ladder safety
- Confined space entry
- Risk management
- Shut down procedures
- Lock-out procedures



The use of specialized procurement devices (pictured above) should be used for safely adding, and removing product from difficult access points, such as a roof.

# Installation, Operation & Maintenance (continued)

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## Training

The servicing of air filtration products is becoming more technical and requires specialized skills. It is for this reason that NAFA introduced the Certified Technician (NCT) Program in 1999 to increase expertise and professionalism to the air filtration industry. The NCT enables facility managers and building owners the opportunity to certify their employees on all aspects of filtration service and Indoor Air Quality.



For additional information visit the NAFA website: [www.nafahq.org](http://www.nafahq.org) or contact a local NAFA member.

## Disposal

Particulate filters should be disposed of in a careful and safe manner. Spent carbon in molecular filters may sometimes be returned to the manufacturer for reactivation. NAFA recommends that technicians performing the work be certified to NAFA Certified Technicians (NCT) standards.

**You care about your residents and employees.  
You care about the environment and your community.  
You care about the fiscal health of your institution.  
Indoor air quality matters.**

### **COSTS OF POOR AIR QUALITY**

Lost productivity  
Decreased Health  
Increased absenteeism  
Increased Equipment Maintenance/Replacement  
Increased Energy

### **BENEFITS OF IMPROVED AIR QUALITY**

Reduced absenteeism  
Increased productivity  
Improved health, wellness and satisfaction

## KEY RECOMMENDATIONS FOR YOUR HVAC SYSTEM

- Run the HVAC whenever the space is occupied.
- Direct the clean/cleaned air into the breathing zone in each occupied space.
- Return air vents should pull air from the room and not directly from the clean air inlet.
- Maintain temperature and humidity design set points.
- Set the HVAC system to bring in as much outside ventilation air as possible.

## KEY RECOMMENDATIONS FOR FILTER MAINTENANCE

- To achieve the recommended MERV 13-equivalent or better levels of performance (which removes  $\geq 85\%$  of 1-3  $\mu\text{m}$  particles), a combination of filters/air cleaners can be used.
- Use only air cleaners for which evidence of effectiveness and safety is clear.
- When upgrading filters, carefully monitor to ensure your current system can handle the upgrade (e.g. pressure drop).
- Upgrading both pre-filters and filters may cause unacceptable pressure drop. It may not be necessary to upgrade both.
- Consider using the AHAM Clean Air Delivery Rate (CADR) for sizing air-cleaners for your space.
- Confirm filters are sealed in their frames, preferably with gaskets to prevent filter bypass.
- Personnel changing filters should wear PPE. Dispose of spent filters immediately and in a safe manner.

### DID YOU KNOW?

Studies with SARS CoV-1 have shown that toilet flushing can generate airborne droplets and aerosols that could contribute to transmission of pathogens. Remember to:

- Keep toilet room doors closed, even when not in use.
- Encourage putting the toilet seat lid down, if there is one, before flushing.
- Keep bathroom fans running continuously and vent separately, where possible.

# Glossary

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***Air Filter/Air Cleaning:*** A device used for the removal of particulate or gaseous impurities from the air.

***ANSI:*** American National Standards Institute: As the voice of the U.S. standards and conformity assessment system, ANSI empowers its members and constituents to strengthen the U.S. marketplace position in the global economy while helping to assure the safety and health of consumers and the protection of the environment.

***ASHRAE:*** American Society of Heating, Refrigerating and Air Conditioning Engineers. ASHRAE is an international organization that sets standards and guidelines for the heating, ventilating, air conditioning, and refrigeration industry.

***ACH:*** Air changes per hour computed by taking the cubic area of a space and dividing by the cubic feet per hour of air supplied to it.

***HEPA:*** High Efficiency Particulate Air filter – describes a filter that achieves a minimum of 99.97% efficiency on 0.3 micrometer particles or similar challenge.

***HVAC&R:*** Heating, Ventilating, Air Conditioning and Refrigeration.

***IAQ:*** Indoor air quality describes the quality of air supplied to an interior space. The goal of IAQ is to provide air that is clean and healthy to building occupants.

***MERV:*** Minimum Efficiency Reporting Value refers to the efficiency of a filter when tested in accordance with ANSI/ASHRAE Standard 52.2 2012.

***NAFA:*** Registered acronym for the National Air Filtration Association, the trade association for air filter manufacturers and distributors, worldwide.

***Pressure Drop:*** Describes the drop in static pressure of the air from the upstream side of a filter to the downstream side.

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# Copyright & Usage

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As a global source for expertise, education & best practices in air filtration, we provide these guidelines with one important goal in mind: **To support best practices and ensure the cleanest air possible for our employees, our customers, and our community.** While the information provided is the property of NAFA and is protected by copyright and intellectual property laws, we strongly encourage the use and dissemination of this information - in print or electronically - to those within our industry.

These guidelines were created through the hard work and care of experts in the industry... your peers. By reading these guidelines you agree not to reproduce, broadcast, or otherwise distribute the information within these guidelines for commercial purposes without the prior written consent of NAFA. If such permissions are granted, you also agree to include in any printed/electronic uses the phrase, "Used with permission of The National Air Filtration Association®."

## **Disclaimer**

The information contained in this guideline is intended for reference purposes only. NAFA has used its best efforts to assure the accuracy of information and industry practices. NAFA encourages the user to work with a NAFA Certified Air Filter Specialist (CAFS), to ensure that these guidelines address user specific equipment and facility needs. Issues regarding health information, including COVID- 19, may be superseded by new developments in the field of industrial hygiene or by new information revealed by experts in science/ medicine. Users are therefore advised to regard these recommendations as general guidelines and to determine whether new information is available.

Send questions to: [nafa@nafahq.org](mailto:nafa@nafahq.org)