RenewAire
Energy Recovery Ventilation



Senior Living Ventilation & Application Guide

FOR ENERGY RECOVERY UNITS

Senior living facilities face a complex ventilation challenge. They must maintain healthy indoor air quality (IAQ), manage room pressures, and keep operational costs under control. These IAQ and ventilation minimums are established by ASHRAE, which has more stringent standards for senior living facilities if they provide health care services on premise.

To achieve ASHRAE ventilation standards, facilities need to regularly exchange stale indoor air with fresh outdoor air to dilute pathogens and other airborne contaminants. However, continuously conditioning outdoor air places can be costly and places an immense strain on mechanical heating and cooling systems. This guide offers an outline of the ventilation requirements for senior living facilities and how to achieve them cost-effectively.

ASHRAE Ventilation Standards

Senior living facilities operate under the guidelines set forth by ASHRAE Standard 62.1 and ASHRAE Standard 170, which serve different environments and operational goals. Standard 62.1 provides the baseline for general commercial and multi-family spaces, including independent and assisted living facilities. This standard focuses on diluting airborne pollutants, VOCs, and odors by prescribing minimum outdoor air supply rates per person and square foot.[1]

In contrast, Standard 170 is a specialized healthcare code designed for clinical environments like nursing homes. It requires far stricter parameters, including positive and negative air pressure relationships, high-efficiency filtration (such as MERV 13 and HEPA), higher total air change rates (ACH), and humidity ranges to control the spread of infectious airborne pathogens.[2]

Senior living facilities may have spaces operating under different standards in the same building. For example, an assisted living facility with a skilled nursing wing, or a continuing care retirement community. Therefore, senior living projects should determine the ventilation requirements according to the function of each space, rather than for the entire building. As always, projects should verify the necessary codes and standards with local jurisdictions.

To demonstrate these differences, the following tables show Standard 62.1 and 170 ventilation requirements for senior living facilities:

ASHRAE STANDARD 62.1 – MINIMUM VENTILATION RATES

Occupancy Category	People Outdoor Air Rate (Rp) CFM/Person	Area Outdoor Air Rate (Ra) CFM/ft²	Default Occupant Density People/1000 ft²	Max CO2 Above Ambient ΔCb.1 (ppm)
Fitness center	20	0.06	20	1200
Cafeteria	7.5	0.18	67	900
Kitchen	7.5	0.12	5	N/A
Lobbies	7.5	0.06	30	1500
Laundry rooms, central	5	0.12	10	N/A
Multipurpose assembly	5	0.06	120	1800
Bedroom/living room	5	0.06	10	600
Break rooms	5	0.06	25	1500
Corridors	–	0.06	2	N/A

1. ASHRAE Standard 62.1-2025, https://bit.ly/4hLOM0G
2. ASHRAE Standard 170-2025, https://bit.ly/4golr92

ASHRAE Standard 170

DESIGN PARAMETERS FOR RESIDENTIAL HEALTH, CARE, AND SUPPORT-SPECIFIC SPACES

ASHRAE 170 is a specialized healthcare standard that builds on the foundation of ASHRAE 62.1. Areas in healthcare facilities that are not covered in Standard 170 should follow Standard 62.1 (e.g. lobbies and staff break rooms). When areas with prescribed rates in both Standard 62.1 and 170 exist, the higher of the two air change rates shall be used.[3]

ASHRAE STANDARD 170 – NURSING HOMES

Function of Space	Pressure Relationship to Adjacent Areas	Min. Outdoor ACH	Min. Total ACH	Min. Filter Efficiencies	Design Relative Humidiy	Design Temperature
Airborne infection isolation room	Negative	2	12	MERV-13	Max 60%	70–78°F
Occupational therapy	–	2	6	MERV-13	–	70–78°F
Physical therapy	Negative	2	6	MERV-13	–	70–78°F
Resident living/activity/dining	–	4	4	MERV-13	Max 60%	70–78°F
Resident room	–	2	2	MERV-13	Max 60%	70–78°F
Resident corridor	–	–	4	MERV-13	–	70–78°F
Toilet/bathing room	Negative	–	10	MERV-13	–	70–78°F

ASHRAE STANDARD 170 – ASSISTED LIVING

Function of Space	Pressure Relationship to Adjacent Areas	Min. Outdoor ACH	Min. Total ACH	Min. Filter Efficiencies	Design Relative Humidiy	Design Temperature
Resident living/activity/dining	–	–	–	MERV-8	–	–
Resident room	–	–	–	MERV-8	–	70–78°F
Resident corridor	–	–	–	MERV-8	–	–
Toilet/bathing room	–	–	–	MERV-8	–	–

ASHRAE STANDARD 170 – RESIDENTIAL SUPPORT SERVICES

Function of Space	Pressure Relationship to Adjacent Areas	Min. Outdoor ACH	Min. Total ACH	Min. Filter Efficiencies	Design Relative Humidiy	Design Temperature
Clean linen storage	Positive	–	2	MERV-8	–	72–78°F
Dietary storage	–	–	2	MERV-8	–	72–78°F
Food preparation center	–	2	10	MERV-8	–	72–78°F
Hair salon	Negative	–	10	MERV-8	–	70–78°F
Laundry, central and personal	Negative	2	10	MERV-8	–	–
Medication room	–	2	4	MERV-8	Max 60%	70–75°F
Soiled linen sorting and storage	Negative	–	10	MERV-8	–	–
Warewashing	Negative	–	10	MERV-8	–	–

3. ASHRAE Standard 170-2025, https://bit.ly/4golr92

Critical Engineering Design Considerations
FOR SENIOR LIVING FACILTIES

HUMIDITY AND TEMPERATURE CONTROL

To satisfy ASHRAE Standards 62.1 and 170, senior living facilities must continuously deliver high volumes of outdoor air while maintaining an optimal range of temperature and humidity. Low humidity can cause dry skin, exacerbate asthma symptoms, and weaken the body's mucosal immune system. Excess humidity makes breathing and heat regulation more difficult, and can lead to mold growth, dust mites and damage to building materials.[4]

- **Ideal Relative Humidity (RH):** Standards generally require maintaining indoor relative humidity between 30% and 60% (with 40%–60% being the optimal target buffer). This relative humidity range prevents dry mucous membranes, suppresses airborne virus survival, and protects building materials from mold or shrinkage.[4]
- **Temperature Range:** Resident living spaces are typically designed to maintain a controlled heating/cooling envelope between 70°F and 78°F (21°C–26°C).[5]

BUILDING PRESSURE & ODOR MIGRATION

Maintaining proper pressure relationships is critical to limiting cross-contamination, virus transmission, and odor migration.

- **Negative Pressure Zones:** Airborne infection isolation rooms, physical therapy spaces, restrooms, soiled linen rooms, janitor closets, and commercial kitchens must maintain negative pressure with 100% exhaust directly to the outdoors (no recirculation).[5]
- **Positive Pressure Zones:** Clean supply storage, medication rooms, and resident suites should be kept slightly positive relative to adjacent corridors to block airborne pollutants from entering.[5]

LOW VELOCITY DISTRIBUTION & SOUND CONTROL

Air distribution and noise should be designed to avoid discomfort for senior residents. Older adults have reduced capacity for body temperature regulation[6] and poor sleep caused by drafts and noise can exacerbate chronic conditions and cognitive impairment.[7]

- **Low Air Velocity:** Elderly occupants are especially susceptible to draft-induced discomfort. Air supply diffusers in living quarters must be engineered for low discharge velocities (<50 FPM) to avoid direct cold drafts over beds and seating.[8]
- **Acoustic Attenuation:** HVAC systems serving sleeping quarters should target a Noise Criterion (NC) rating of 25 to 30. Attenuators, sound-lined ductwork, and remote fan placement prevent mechanical rumble from disturbing resident sleep patterns.[9]

CONTROLS, MONITORING, & SERVICEABILITY

With air quality monitoring and control systems, facilities can ensure they are continually achieving optimal IAQ conditions.

- **IAQ & Pressure Monitoring:** Premium ventilation controls offer CO2 and pressure monitoring for IAQ and room pressurization without the need for expensive building management systems.
- **Non-Disruptive Maintenance Access:** Air handlers and filter racks should be located in mechanical rooms or corridor plenums so facility technicians can service equipment without entering private resident living areas.



SENIOR LIVING CASE STUDY:
Scan to see how one senior living facility simplified HVAC design, achieved full ASHRAE compliance, and reduced energy demand with ERVs.

4. Schnakel Engineers, "Enhanced HVAC Infection Control," https://bit.ly/3UfUzSp
5. ASHRAE Standard 170-2025, https://bit.ly/4golr92
6. CDC, "Heat and Older Adults (Aged 65+)," https://bit.ly/4gNQZHP
7. NIH, "Sleep and Older Adults," https://bit.ly/4zyeQTg
8. DePinto, D., The Illustrated Book of Basic Heating, Ventilating, and Air Conditioning, https://bit.ly/4c89Rig
9. Commercial Acoustics, "Noise Criteria (NC) Rating Chart," https://bit.ly/4gtaww1

HVAC Zoning

FOR DIFFERENT SENIOR LIVING NEEDS

Managing senior living facilities means balancing vastly different ventilation and climate control needs. Residents may want a warm bedroom or apartment, rehab therapists need cooler spaces for physical therapy, and skilled-nursing units demand precise environmental controls to prevent infections. With smart zoning, you can customize airflow, filtration, and temperatures for every unique zone. This targeted approach ensures resident comfort, supports staff productivity, and significantly reduces energy bills.



Zoning in Multi-Family and Senior Suites: *Compact, low-profile ERVs provide independent airflow control for individual apartments and bedrooms—delivering quiet, draft-free ventilation.*

VENTILATION APPROACHES FOR SENIOR LIVING FACILITIES

Space Type	Key Design Challenges & Code Drivers	Typical Airflow Range (CFM)	Pressurization Approach	System Architecture & Equipment
Residential Suites	Acoustics; Odor Containment; Occupant Comfort	30–130	Neutral, Slight (-)	Distributed Low-Profile; Compact ERVs
Corridors, Passageways	Odor Migration Prevention; Egress Pressurization	120–700	Continuous (+)	Light-Commercial ERVs
Dining, Common Areas	Peak Latent Loads; CO2 Accumulation; High Occupancy	750–4,950	Balanced, DCV	Centralized Commercial ERVs or DOAS
Memory Care, Skilled Nursing	Infection Control; Pathogen Removal; Strict RH Control	375–3,300	Continuous (+)	Commercial ERVs or DOAS with Filtration
Fitness, Activity Areas	Elevated Respiration Rates; High Moisture/Latent Loads	500–2,000	Dedicated (-)	High-Exhaust Commercial ERVs or DOAS

HOW ERVs HELP ACHIEVE ASHRAE STANDARDS

Energy recovery ventilators (ERVs) can help senior living facilities achieve ASHRAE outdoor air requirements efficiently by reducing the demands on heating and cooling infrastructure. By capturing thermal energy and moisture from outgoing exhaust air, ERVs pre-condition incoming outdoor air, making continuous high-volume ventilation economically and operationally viable.

Reducing the Ventilation Heating and Cooling Load

- ASHRAE 62.1 and 170 require continuous fresh air supply (typically 15–20 CFM per person or 2+ outdoor ACH) to dilute bioaerosols, CO2, and odors.
- RenewAire ERVs recycle the energy from outgoing airstreams without cross-contamination, reducing heating and cooling loads on HVAC systems up to 70%.[10]
- Lower heating and cooling demands means facilities can downsize their HVAC equipment, saving on upfront capital costs.
- Premium controls offer CO2 demand-controlled ventilation (DCV) as well as duct and room pressure sensing for VAV systems and room pressurization.

Sustained Relative Humidity Control

- ASHRAE 170 and health department codes cap indoor humidity at 60% RH to inhibit mold, bacteria, and dust mite proliferation.
- RenewAire ERVs feature a static plate core that transfers latent energy (moisture) between airstreams, helping to keep indoor humidity between the recommended 30–60% RH, even in humid or dry weather.[11]



HE20RT
Commercial ERV

10. RenewAire, "Net-Zero Buildings," https://bit.ly/3LODcUs
11. RenewAire, "How ERVs Work," https://bit.ly/4wQ8lmS

Equipment Specification

SELECTING THE RIGHT ERV

Once space-by-space airflow requirements and pressure strategies are defined, selecting the optimal ERV involves matching airflow capacity, unit footprint, and acoustic targets. The matrix below outlines primary equipment classes tailored for senior living environments.



RenewAire ERVs

- **High ROI:** With a short payback and high rate of return, RenewAire ERVs generate significant savings. A small capital investment will result in decades of HVAC energy savings.
- **Reliable Operation and Warranty:** Our ERVs feature a 25+ year operational lifespan across all climate zones and include a 10-year warranty on the static-plate core to guarantee long-term performance.

RENEWAIRE PRODUCT MATRIX

Model	CFM Range	Indoor	Rooftop	Sound Tier	Key Features
RESIDENT SUITES					
SL75	30–130	✓		Low (< NC-30)	Ultra-slim ceiling profile, EC motorized impellers
EV Premium S	30–130	✓		Low (< NC-30)	High-efficiency EC motorized impellers
CORRIDORS & PASSAGEWAYS					
HE05	120–375	✓		Moderate (< NC-35)	Compact, low-profile; continuous pressurization
COMMON & DINING AREAS					
HE07	166–694	✓	✓	Moderate (< NC-35)	High-exhaust commercial design with EC motorized impellers
HE20	500–2,200	✓	✓	Attenuated	Direct-drive EC impellers for demand control ventilation
HE3X	750–3,300	✓	✓	Attenuated	TEFC premium efficiency motors
HE4X	1,000–4,400	✓	✓	Attenuated	TEFC premium efficiency motors
DN2	375–1,650	✓	✓	Attenuated	High-volume OA; precise RH control
FITNESS & ACTIVITY ROOMS					
HE15	369–1,621	✓	✓	Attenuated	Direct-drive EC impellers for demand control ventilation
MEMORY CARE & SKILLED NURSING					
DN2	375–1,650	✓	✓	Attenuated	High-volume OA; precise RH control
DN3	750–3,300	✓	✓	Attenuated	High-volume OA; precise RH control

Senior Living Ventilation Design Workflow

A STEP-BY-STEP APPROACH TO SYSTEM SELECTION

1 CLASSIFY FACILITY & STANDARD

Determine which standard applies based on type of facility and space.

Patient care, resident care, healthcare support spaces (nursing homes, skilled nursing wings, clinical)

Apply ASHRAE 170

Non-healthcare/ residential spaces (independent living, assisted living, admin)

Apply ASHRAE 62.1

2 IDENTIFY SPACE TYPES

List and categorize all spaces in the facility:

- Residential suites
- Common areas
- Lobbies
- Corridors
- Cafeterias
- Physical therapy
- Clinical spaces
- Medication rooms
- Kitchens
- Clean linen storage
- Soiled linen & laundry

3 DETERMINE VENTILATION RATES

Use the applicable standard to determine ventilation rates.

ASHRAE 170

CFM = (Area Length × Width × Height × ACH) ÷ 60

ASHRAE 62.1

Vbz = (Rp × Pz) + (Ra × Az)

- Vbz: Breathing-zone outdoor airflow
- Rp (People Rate): CFM/person
- Pz (Zone Population): Peak occupancy
- Ra (Area Rate): outdoor airflow rate per unit area
- Az (Zone Area): floor area

4 ESTABLISH PRESSURE RELATIONSHIPS

Set pressure relationships based on function of space, infection control needs, and odor management objectives.

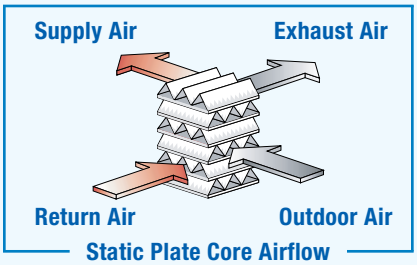
Positive Pressure (clean supply, medication rooms)

Neutral Pressure (resident rooms, common areas)

Negative Pressure (isolation rooms, kitchens, bathrooms)

5 EVALUATE EXHAUST AIR CLASSIFICATION & ENERGY RECOVERY OPTIONS

Decide on which type of energy recovery is suitable for the facility (e.g. wheels vs. static plate core designs).



Consider:

- Exhaust air classification
- Cross-contamination potential
- Recirculation and energy transfer rules
- Code requirements

6 SELECT SYSTEM ARCHITECTURE & CONTROLS

Choose the best system approach for the facility's needs, considering zoning, space type, operations, and energy efficiency.

- **Centralized system:** (central ERVs/DOAS)
- **Distributed system:** (suite or zone-based ERVs/DOAS)
- **Controls strategy:** (DCV, demand-based scheduling, BMS integration)

Key considerations:

- Zoning and phasing
- Occupancy variation
- Energy efficiency
- Maintainability
- Space and installation constraints

7 SELECT & SIZE EQUIPMENT

Use the calculated airflow and system requirements to select your equipment.



Evaluate:

- Airflow capacity
- External static pressure
- Acoustics (NC criteria)
- Indoor or outdoor installation
- Frost control (climate dependent)
- Controls and integration
- Service access and clearances

NEED PRODUCT APPLICATION & SIZING SUPPORT?

Partner with Fatma Aouani, Western Regional Sales Director, for help with system sizing, or connect with your local RenewAire Sales Rep.

FAouani@RenewAire.com | RenewAire.com/Senior-Living/

Soler&Palau Ventilation Group

Member of the S&P Group Family of Brands

RenewAire® Energy Recovery Ventilation

2026 © RenewAire LLC