

# Air Sealing At Room Air Conditioners

## Low-cost measures to increase cooling efficiency and improve the building envelope.

tech overview

applicable building types multifamily and commercial implementation anytime

- fast facts
- improves comfort & satisfaction
  - reduces noise
  - improves indoor air quality
  - improves heating system efficiency
  - improves building envelope



costs & benefits\*

GHG Savings



Tenant Experience Improvements



Utility Savings



Capital Costs



Maintenance Requirements



\*ratings are based on system end use, see back cover for details.



## getting to know room AC systems

Room air conditioners (ACs) are a common form of air conditioning found in New York City. By adopting a small number of inexpensive maintenance routines, room ACs can improve comfort and save energy by providing efficient and effective cooling.

### how do room ACs work?

Room ACs are compact electrical appliances that improve comfort by removing heat and moisture from indoor spaces. Room ACs work similar to the way refrigerators do, using a refrigerant to absorb heat from the indoors and eject it to the outdoors.

"Room ACs" is an umbrella term for any kind of packaged air conditioner that contains all cooling components within the unit. Room ACs are the most common cooling technology found in New York City (NYC) multifamily buildings and are also found in some commercial spaces. While there are many different types of room AC units, this tech primer focuses on the three most prevalent in NYC: 1) window ACs, 2) through-wall ACs (also known as sleeve ACs), and 3) packaged terminal ACs (PTACs), units that can provide both heating and cooling.

Window units are installed within open window frames, while sleeve and PTAC units are installed in wall penetrations, typically located below windows. All three styles create gaps in the building envelope (the barrier between the inside and outside of a building) that provide pathways for air, heat and moisture to both infiltrate and exfiltrate the building, which negatively impacts comfort and energy performance.

This tech primer will outline simple, low-cost measures and maintenance practices to ensure gaps around ACs are well sealed in order to improve efficiency, reduce drafts and moisture buildup, and maintain a consistent indoor temperature.



Typical Window AC (exterior view)



Typical Sleeve AC (exterior view)



Typical PTAC (interior view)

#### Assess

Consult a qualified service provider if questions arise about Room AC upgrades.

#### Coordinate Retrofits With Regular Building Maintenance

Although room AC sealing can be conducted anytime, implementing room AC sealing in conjunction with regular maintenance work makes gaining access to individual apartments easier.

*Staff should educate residents on efficient use of room ACs.*

#### Training and Maintenance

Knowledgeable staff are fundamental to maintaining room AC efficiency. Trained staff should develop and maintain a building-wide AC checklist to identify and resolve problems created by poorly installed ACs.

*Energy savings can only be sustained with regular maintenance and end-user engagement.*

## how to upgrade room ACs

Sealing gaps around each AC unit as well as implementing a simple but consistent maintenance routine will improve room AC performance and reduce air and moisture infiltration.

### retrofit solutions

There are multiple steps to improving room ACs:

- A Conduct a Survey**– Any room AC retrofit must start with a tenant survey to collect information on the total number and types of air conditioners used throughout the building, the quality of the installations, condition of AC sleeves (where applicable), and whether or not residents require assistance for seasonal AC removal (where applicable).
- B Seal All AC Units**– Given the number of penetrations in the building envelope produced by room air conditioners, it is vital that gaps around these units be well sealed in order to minimize air and moisture leakage.
- Sleeve ACs and Packaged Terminal ACs (PTACs) are installed in frames (known as sleeves) penetrating the building envelope. Methods to seal gaps between the exterior and interior space include:
    - Ensure that the AC unit is appropriately sized for the sleeve.
    - Ensure that trim kits are properly installed and gasketed per the manufacturer’s guidelines.
    - Seal all edges between the sleeve and the wall with caulk.
  - Piping to PTACs often have penetrations through floors or walls. Seal all piping penetrations with fire-rated caulk.
  - Improving the quality of window AC installations will reduce air, moisture, and heat infiltration. Sealing techniques include replacing the common plastic accordion panels (where most heat loss occurs) with rigid insulation boards, properly sealed in place, and installing weather-stripping or closed cell spray foam.
  - Sealing AC units will not only improve efficiency and reduce drafts, but also help reduce noise infiltration, improve indoor air quality by reducing pollutants and odor, and deter insects and other pests from entering.

- C Establish a Seasonal Maintenance Policy**– Even well sealed window and sleeve ACs can lead to serious air leaks and drafts, especially during the winter season when not in use. Mitigating these air leaks requires the implementation of a maintenance schedule and participation of all building tenants to ensure ACs are either removed or covered during winter.
- **Implement a Winter Removal Policy for Window ACs:** Typical accordion gates supplied by manufacturers do not provide a strong seal and are susceptible to damage and tears. In order to maintain a tight building seal, it is vital to remove window ACs during winter and for tenants to keep windows closed and locked. Seasonal storage for AC units should be provided in a basement or other area.
  - **Provide Insulated Covers for Sleeve ACs:** In lieu of AC removal, insulated covers are proprietary products that fit over sleeve ACs to provide additional insulation and protection against drafts and air leaks during winter. The maintenance schedule should include seasonal installation of these covers.



Photo: Steven Winter Associates

Window AC with air leak at accordion panel

- D Engage End Users**– Staff and management should educate residents on efficient use of room ACs by providing training that includes instructions to operate each type of AC unit. Knowledgeable staff can identify poorly installed ACs as well as improper AC use and take the appropriate steps to resolve the problem.



# costs & benefits of room AC retrofits\*

## Greenhouse Gas (GHG) Savings



A small amount of GHG savings can be achieved by sealing room ACs and implementing a maintenance routine. Savings are dependent on the type of fuel used for heating and cooling, as well as the overall quality of the building envelope.

## Tenant Experience Improvements



Room AC installation improvements moderately increase tenant satisfaction. Residents will experience a more comfortable living space with less drafts, reduced noise infiltration, and improved interior air quality.

## Utility Savings



A small amount of utility savings can be achieved by implementing a room AC optimization program that allows units to run more efficiently and effectively.

## Capital Costs



The cost of sealing AC units is low but time consuming. It is important that work be coordinated in conjunction with planned apartment inspections or other apartment work in order to maximize efficiency.

## Maintenance Requirements



Keeping room AC units performing at their best requires simple but consistent maintenance. Building staff should maintain and regularly update the room AC survey and carry out any sealing work during regularly scheduled maintenance visits or tenant turnovers.

*\*The Costs & Benefits rating system is based on a qualitative 1 to 4 scale where 1 (lowest) is lowest and 4 (highest) is highest. Green correlates to savings and improvements, orange correlates to costs and requirements. Ratings are determined by industry experts and calculated relative to the system end use, not the whole building.*

Note: Assumes existing A/C installations are poorly installed.

## Take Action

This document is one of more than a dozen High Performance Technology Primers prepared by Building Energy Exchange and the Retrofit Accelerator to introduce decision-makers to solutions that can help them save energy and improve comfort in their buildings. Access the complete library of Tech Primers here: [be-exchange.org/tech-primers](http://be-exchange.org/tech-primers)

The NYC Retrofit Accelerator's team of Efficiency Advisors offers free, personalized advisory services to help streamline the process of making energy efficiency improvements to your building. The High Performance Retrofit Track (HPRT) of the Retrofit Accelerator can help you design and implement a 10-15 year capital plan to reduce your building's energy use by 40-60%.

HPRT participants commit to accomplishing deep energy reductions by holistically upgrading all major building systems, including the heating system, cooling system, and the building envelope.

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The Building Energy Exchange (BE-Ex) is a center of excellence dedicated to reducing the effects of climate change by improving the built environment. BE-Ex accelerates the transition to healthy, comfortable, and energy efficient buildings by serving as a resource and trusted expert to the building industry.

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