

THE ULTIMATE GUIDE TO AIR CONDITIONING FOR NYC LUXURY RESIDENTIAL SPACES

CUTTING THROUGH THE TECHNO-BABBLE
TO UNDERSTAND YOUR OPTIONS AND
MAKE THE RIGHT CHOICE



ARISTA



Introduction

New York City is known for diversity and variety—it’s all part of what makes the city such an exciting and interesting place. The living spaces in NYC are just as diverse. They also present unique challenges for selecting an air conditioning system:

- Residential dwellings come in a wide variety of sizes and building types, from brownstones to high-rise penthouse apartments, that each have very different requirements and limitations.
- Unlike the suburbs, where air conditioning units can easily be installed on rooftops and in outdoor space adjacent to buildings, there is little access to exterior space in the city.
- Interior space is an extremely valuable commodity in Manhattan, and no one wants to use premium space for mechanical equipment.
- Landmark designations on some older buildings may restrict the types of systems that can be installed.
- Large buildings may be constructed with a central HVAC system that serves the whole building, or individual tenants within the building may each have separate systems.

So many choices, so little time

Whether you’re undertaking a renovation or just replacing your existing cooling system, choosing a new air conditioning system can be a chore. Like most, you’re probably not an HVAC expert, and it’s easy to get overwhelmed by the web sites and sales literature packed with acronyms and technical terms you don’t fully understand.

With such a wide range of air conditioners on the market, you may be at a loss as to how to decide what’s best for your needs. Even worse, you may be under the gun to make this decision quickly, especially if you’re replacing a failing system in the heat of the summer.

This guide will help you narrow down the options by explaining the types of systems that are best suited for luxury residential spaces and for different building scenarios.

A word about brands

This guide is not intended to recommend specific brands, but rather to familiarize you with the types of equipment technology and their uses in New York City luxury residences. Armed with this information, you’ll be better able to understand and evaluate the recommendations made by builders, contractors and HVAC vendors.

Numerous brands are available within each equipment type category, and the best choice may depend on both the type and system size that you need. When it comes to choosing a brand, your best bet is to consult with an HVAC system design and installation expert, who can provide an impartial recommendation based on experience. Be sure to choose a vendor that works with many different brands, and one that services the equipment they sell and install.

The challenges of air conditioning Manhattan’s luxury residential spaces

Manhattan’s luxury residential spaces are elaborate projects with highly individual requirements. Sizes can range from a couple thousand square feet on a single floor of a building to over 50,000 square feet in a seven-story townhouse. Known to the trade as “commercial grade” residential projects since they require more complex systems, each one must be uniquely designed and engineered to the specific situation. Here are just a few of the common challenges of cooling luxury residential spaces:

- These living spaces are decorated with museum-quality finishes and furnishings, and air quality is a major concern. Humidification, air filtration and purification systems are often needed to work alongside the air conditioning system to preserve and protect the homeowner’s design investments.
- Quiet operation is vital. With people living, sleeping, and entertaining in these spaces, there is little tolerance for the disturbing rattling and vibration that some air conditioning systems can produce.
- Luxury residential settings require high ceilings to maximize light and enhance the grand character of the space. That means designing HVAC systems that don’t require much room between floors for equipment or ductwork.
- Precise controls and remote operation are essential. Elite homeowners demand the utmost precision and flexibility in their temperature and humidity control devices.

Must-have features that enhance air quality

Your heating and air conditioning systems do their part to improve your home’s comfort, but have you considered these add-ons that take comfort and healthy air to the next level?





Central humidifiers.

Are your skin, hair and lips dry and cracking in the winter? Are you plagued by electric shocks every time you touch metal? These are signs that your home needs humidification. Dry air can also increase the chances of illness, and can damage valuable things like furniture, paintings, floors and woodwork.

When the air is too dry, the humidifier adds moisture in the form of water vapor to the air being circulated throughout your home by your HVAC system. Unlike standalone humidifiers, these permanent installations humidify the entire house at once, making them extremely efficient and safe, not to mention out of sight.

Central air cleaners & purifiers.

U.S. Environmental Protection Agency studies have shown that your indoor air can be up to 100 times more polluted than the air outside—even in smoggy, urban areas like NYC. When it comes to removing dangerous microorganisms from the air you breathe, standard HVAC filters don't really do the job. Those filters are designed to protect the equipment from damage, not to protect you and your family from airborne pollutants.

Central air purification systems remove dust, mold, smog, bacteria and viruses from the air circulated throughout your home's HVAC system. They remove pollutants and microorganisms with a combination of heavy-duty HEPA filters that trap the larger particles like dust, and electrostatic fields that capture the tiniest particles like viruses.

About NYC's brownstone townhouse residences

Manhattan's brownstone townhouses are between four and seven stories high, and can accommodate as much as 50,000 square feet of living space.

One of the advantages of a townhouse is that there is more access to exterior space. Condenser (outdoor) equipment can be installed on rooftops and in courtyard spaces behind the residence. The challenge with townhouse spaces is often carving out the room for the indoor components of the system- the air handlers and ductwork. No one wants to give up the gracious high ceilings in older brownstone buildings, so choosing smaller equipment and finding room in closet space is often the best strategy.

Commonly used systems for luxury townhouses: VRF Technology

The last 5 to 10 years has seen a shift in the type of cooling systems used for Manhattan's luxury townhouses. In the past, simple air-cooled split systems were the norm (similar to those used in suburban homes). Today, a newer, more sophisticated technology called Variable Flow Refrigerant (VRF) systems are installed almost exclusively in these high-end city residences.

Like traditional split systems, VRF systems have outdoor condenser units and indoor fan coil units. They are typically air-cooled and use refrigerant as the cooling medium. But the similarity stops there. This new technology is capable of providing not only cooling, but also heat, and even both simultaneously to different areas within the space. The use of multiple indoor units provides the ability to create zones that can be individually controlled.

What's more, these systems are very quiet and energy-efficient because they run only at the capacity needed for the current conditions. This is very different from tradition systems that can only cycle on and off, running at full blast whenever they turn on.

VRF systems offer substantial advantages over older technology:

- Multiple air handlers provide consistent cooling and superior comfort throughout the space.
- The ability to provide heat as well as cooling, and even both simultaneously to different parts of the space.
- Whisper-quiet operation.
- High-efficiency design that reduces energy usage.
- Smaller air handlers, ducts and pipes that require less ceiling space.
- Longer life span due to more efficient design that reduces wear on parts.
- The cooling flexibility of a water-cooled system without the risk of water pipes running through the space that can cause damage.

About NYC's apartment settings

High-end apartments in New York City can occupy a wide variety of spaces. A NYC luxury apartment could be a 2000 square foot space that's a portion of one floor, up to a large penthouse taking up three floors and 30,000 square feet at the top of a mid or high-rise building.





There's just as much variety in the types of air conditioning systems used to cool them. However, the choice can be limited in some high-rises where there is a building-wide cooling system in place. These will often be water-cooled systems, and you may need to install equipment that can connect to the existing system.

In certain historic landmark buildings, you may also find your options limited due to restrictions on new penetrations through exterior walls. The other challenge with apartment settings is the lack of access to exterior space for outdoor equipment.

Commonly used systems for Manhattan apartments

Package Terminal Air Conditioning (PTAC) units and through-the-wall systems.

You've seen these units in hotel rooms; they look like window air conditioners, but are installed through the wall of the building. You may find these units in older buildings, such as historic landmark buildings in Manhattan.

PTACs are older technology with many drawbacks: cooling no more than a single room, and sometimes not even that much. In some cases, multiple units are required for a large room. Like window units, they cycle on and off frequently, so comfort levels are inconsistent and the units can be quite loud. Some units can provide heat as well as air conditioning, but can't accommodate humidification systems or air purifiers.

However, in an apartment situation where you are not allowed to make new penetrations in exterior walls, you may have little choice but to replace older PTACs with new ones that fit into the existing holes. Your best bet? Look for new units that offer remote control capability. This at least gives you the ability to turn on the unit before you get home, or turn it off from the office so you won't waste energy.

Ductless split system (also called mini-splits).

Split systems get their name because they have two major components: the compressor and condensing unit (often called the outdoor unit) and the evaporator coil and air handling unit (often called the indoor unit).

Ductless systems are typically small and not a practical choice for a large space. But unlike PTAC systems, they can cool interior spaces without an outside wall. These systems are frequently used for room additions or for low-use areas.

In a ductless split system, the outdoor and indoor units are connected by a small conduit with refrigerant and electrical lines. The outdoor unit is typically installed under a window on the outside of the building, or in a mechanical room if available. The indoor unit can be wall mounted, or in the ceiling if there is adequate clearance. Multi-zone systems are available that combine one outdoor unit with multiple small indoor units to cool several rooms individually. Since they don't require ducts, they are often quick and easy to install.

Ductless split systems are quieter than PTACs, since the condenser is outside, but indoor units can have noisy fans (especially for multi-zone units with an indoor unit in each room). However, some brands have packages available to muffle sound.

Ducted Split systems.

These systems are similar to those used to cool many suburban homes, and can be designed to cool a space as large as 10,000 square feet. A ducted system does not require a separate indoor unit in each room. Instead, one central indoor unit removes heat from the air and circulates it throughout the space through a series of ducts.

The indoor unit can be installed in the ceiling if there is adequate clearance, or in a closet space. Sometimes the indoor unit is also connected to a furnace or heat pump that supplies heat to the space. The outdoor unit, which releases the heat absorbed from the air, is typically installed under a window on the outside of the building, or in a mechanical room if available.

Split systems are quieter than PTACs, since the condenser is outside, but large indoor air handlers can be loud. It's best to avoid installing the indoor units in bedrooms and dining rooms where noise is least desirable. However, some brands have packages available to muffle sound.

As little as 5 years ago, these systems accounted for 75% of new residential air conditioning installations in the city. Today, their popularity is down to about 25% due to the development of VRF technology.

Variable Flow Refrigerant (VRF) systems.

VRF systems are the HVAC system of choice in Europe, Japan, China and other parts of the world, and the technology is becoming popular in the US over the past 10 years. They are being installed almost exclusively in Manhattan's brownstone townhouses, and are increasingly used in apartment settings where possible.

Like traditional split systems, VRF systems are air-cooled and refrigerant-based, using outdoor condenser units and indoor fan coil units. But the





similarity stops there. This new technology is capable of providing not only cooling, but also heat, and even both simultaneously to different areas within the space. The use of multiple indoor units provides the ability to create zones that can be individually controlled. What's more, these systems are very quiet and energy-efficient because the variable-speed compressor runs only at the capacity needed for the current conditions.

The benefits include:

- Consistent cooling and superior comfort, even for very large spaces, without the risk of damage from water-based systems.
- Ability to cool some areas (living room where you're entertaining) and warm others (the baby's room) at the same time.
- Extremely quiet operation.
- Reduced energy consumption with more efficient design.
- Multiple smaller units and small pipes require less ceiling space.
- Longer life span due to more efficient design that reduces wear on parts.

The difficulty with using VRF systems for apartments is the lack of space for outdoor equipment. Installers need to carve out interior space to build a waterproof mechanical room with louvers to provide access to outdoor air. That's one reason the physical size of the condenser unit is becoming a major differentiator between different brands of VRF systems, as well as other types of air-cooled systems used in the city. If a unit is physically smaller while providing the same cooling power, that means you don't have to give up as much living space for the equipment.

Water-cooled systems

Some large buildings, typically 30+ story high-rises, have base cooling systems that serve the entire building. These water-cooled systems are used for many reasons: their flexibility and adaptability, and because they require less space than installing numerous separate air-cooled systems throughout the building. If your apartment building has a water-cooled base system, you'll need to install equipment in your space that ties into the building's base system.

Water-cooled systems, as the name implies, use chilled water rather than refrigerant to remove heat from the air in your space. Chilled water is pumped from a large chiller unit that serves the whole building (probably located in the basement or a mechanical room) through pipes to fan coil units in each apartment. Fan coils circulate air from the space over the chilled water-cooling coils. The chilled coils absorb heat from the air, then the treated air is returned back into the space. The water returns to the chiller, where it is cooled again.

In a residential setting where quiet operation is needed, you may be able to avoid having air handlers (which can be noisy) in each room by using variable air volume (VAV) technology. VAV boxes take the entire volume of cooled air that's produced from a central fan coil unit and direct varying amounts as needed to different rooms in your space using a series of ducts. Using VAV technology is a way to create customized, zoned air conditioning using a water-cooled system.

The downside of water-cooled air conditioning is having water pipes running through your walls, which can pose an increased risk as opposed to refrigerant-based systems like split systems or VRF. Leaking or even ruptured water pipes can cause extensive damage to your space and furnishings.

Understanding efficiency ratings

These are the energy efficiency ratings commonly used for air conditioners, what they mean and what numbers you should look for:

EER (Energy Efficiency Ratio) is a measurement of the cooling output of an air conditioner calculated under specific test conditions that represent peak load during the highest temperatures of the season. A higher number means a more energy efficient system. Look for an EER rating greater than 11.6 and up to 14.5, for high-efficiency operation when the weather is at its hottest.

SEER (Seasonal Energy Efficiency Ratio) measures the energy efficiency of cooling equipment, calculated based on a seasonal average as opposed to specific laboratory conditions. This number gives you the most accurate assessment of the unit's efficiency over the course of the year. A higher the SEER rating means the unit is more energy efficient. Today's units have SEER ratings as high as 23.

Air conditioner energy efficiency ratings are a bit like miles per gallon (MPG) ratings for cars. Using this analogy, you can think of the SEER rating like the MPG for city driving, and the EER rating like the MPG for highway driving. It's a good idea to look at both to get an accurate idea of the unit's performance under different operating conditions.

IEER (Integrated Energy Efficiency Ratio) This newer measurement uses a weighted average of the unit's efficiency at various capacities and under different conditions. Some new energy-efficiency standards are focusing on this measurement, which is most useful for VRF systems and water-cooled chiller systems that are designed for partial load performance. Look for an IEER rating greater than 18.0 and as high as 21.





Size does matter

One of the worst mistakes you can make when purchasing new air conditioning equipment is choosing a unit that's the wrong size for your space. Especially if your old unit was not providing adequate heating or air cooling, you may be tempted to go with a more powerful unit thinking you'll get more comfortable conditions.

The truth is, when it comes to air conditioners, bigger is not necessarily better. A unit that's oversized for the space runs inefficiently, providing inconsistent temperatures, higher humidity, and consuming more electricity. It also breaks down more frequently and ends up with a shorter life span.

When you're choosing new equipment, make sure your HVAC company properly evaluates the load conditions for your space, taking into account new energy-efficiency upgrades being made during the renovation process.

Don't forget about maintenance

Once your new system is up and running, you may be tempted to forget about it for awhile. To keep your new system operating reliably for years to come, it needs regular maintenance from the beginning of its life.

At the beginning of each cooling season, and possibly more often depending on your usage, schedule an appointment with an expert HVAC service company. Your technician will inspect your system to make sure everything is operating correctly, check electrical connections and controls, test refrigerant charge, change filters and clean the coils.

Your best bet is to invest in a maintenance contract that's customized based on your equipment and the needs of your space. You'll often get the best price this way, and you'll establish a relationship with a service provider that knows you and your equipment.



ABOUT ARISTA



Whether you're responsible for the installation of a new HVAC system or inherited legacy equipment, Arista has the experience to service and maintain any system throughout its lifecycle. Across the tri-state area, we're recognized as one of the region's most respected and referred HVAC experts. When you purchase a preventive maintenance service agreement from Arista, you're backed by an industry leader with that has earned its reputation through decades of trustworthy business conduct and quality service.

Peace of mind at a fair price

Your account is managed by a senior Arista technician and backed by an expert staff of over 160 highly trained professionals. Arista boasts a comprehensive program of continuous staff training and professional development on state-of-the-art practices and processes.

Arista clients also enjoy these benefits:

- Quick-to-respond, accessible workforce and a fleet of 100+ vehicles
- 24/7 emergency standby service
- 30,000 sq. ft. corporate warehouse facility stocked with over 55,000 parts
- Industry recognition as the only NY state company to earn both the prestigious MSCA STAR and GreenStar designations
- LEED Accredited Professionals to assist in making smarter HVAC choices

Questions? Call Arista today.

We hope you've found this guide to be a handy reference as you evaluate the types of service contracts available to you.

We invite you to call us for a quote on your equipment purchase or service needs. We think you'll agree that hearing what we have to say will be one of the best decisions you make in researching HVAC maintenance contracts. Reach an Arista HVAC specialist today at 718-937-4001 or email info@aristair.com.



