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Engineering for a sustainable future...

What Architects Need to Know About:

Packaged Rooftop Units

Overview

A Packaged Rooftop Unit (RTU) is a heating and cooling system contained in one outdoor unit. A package unit is typically installed on top of the building in light commercial and commercial applications. RTUs can use gas for heating or heat-pump technology to heat the conditioned space.

Packaged Rooftop Unit

In general, the most cost effective and popular heating and cooling system being used on commercial and retail buildings today are packaged roof top units. These units, which vary in size combined heating and cooling in one unit. These units are both economical to use and operate. However, these units have a short life cycle of 10 to 15 years.

The mechanical engineer, as part of the heating and cooling design, will determine the number of rooftop units based upon the heating and cooling "load" of the building. The "load" is based upon the building envelope, number of occupants, lights and internal equipment heat.

The building structure, as well as the location of the zones, will determine the exact location of the units on the roof. Although the roof structural design factors in the weight of the roof top units and may limit the final locations. Another consideration is building sight-lines. Rooftop equipment can conflict with the architect's aesthetic vision of the building so alternate locations, or equipment screening, may be required

During the build out of the space, the units will be hoisted onto the roof using a crane. The units are then set on curbs that are flashed into the existing roof. Once electrical power is provided the unit is ready to operate, as these units are basically "plug and play" equipment.

Energy Efficiency

Packaged rooftop units are becoming more efficient with each new code cycle. The California Energy Code, Title 24, sets the minimum efficiency requirements for these units. Marketplace competition is driving the efficiencies even higher. Units are now available with seasonal efficiencies of 19 or higher. These high available efficiencies can increase the over-all energy performance of the building, since air conditioning systems in California can consume up to 50% of the over-all energy use of the building.

SEER's over 19

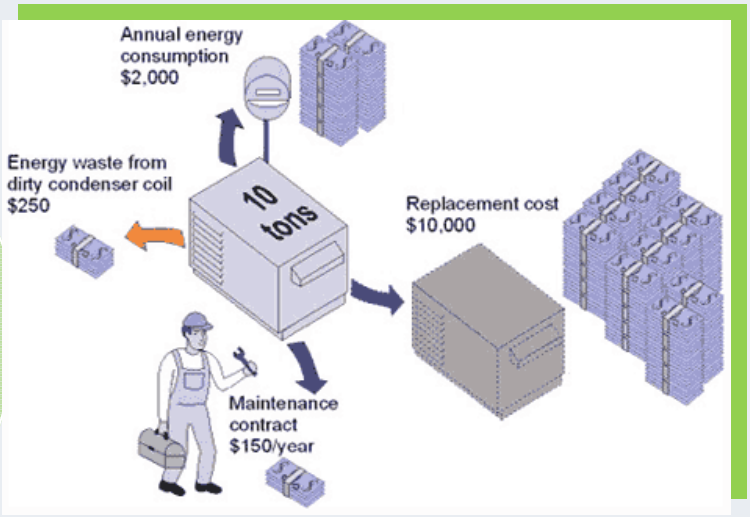
Aesthetics
Packaged rooftop units are not pretty, unless you happen to be a mechanical engineer. Equipment sight lines should be considered to avoid an eyesore in an otherwise aesthetically pleasing building elevation. Strategically locating the units can avoid this issue in many cases. Equipment screening can also be employed to hide the units from critical site lines. Painting of the units to match the adjacent walls may be an option in some cases.

Screened Rooftop Units

Specific Architectural Issues
There are a number of architectural considerations for packaged rooftop systems which should be discussed with your engineers.

Pros:
1. Low installation cost
2. Simplicity of operation and maintenance
3. Minimal impact on building interiors as no mechanical room space is required in the building.

Cons:
1. The life expectancy of these units is 10 to 15 years. This means the owner will have expensive replacement costs in the near future. The long term life cycle costs of these units is quite high due to this fact.
2. Vibration and noise from these units can be a concern in light, wood frame buildings. Make sure you review noise and vibration concerns with your engineer for you particular application.
3. Aesthetically unpleasing appearance which can be a consideration in certain applications such as residential areas or where adjacent properties are higher than the equipment locations.
4. The units present relatively heavy structural point loads so exact locations need to be carefully coordinated with your structural engineer.
5. In some cases units are ducted horizontally on the roof. If this is the case, make sure you review duct and piping support details with your engineer to ensure they are coordinated with the projects roofing details.
6. A packaged rooftop unit is typically a “single zone” unit controlled by a single room thermostat. Make sure your engineer has provided enough separate zones to meet your clients expectations for individual room/area temperature controls.



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