



Multifamily Facility Management Services

INSULATE THE BUILDING STRUCTURE

Description:

Insulation directly reduces heat loss and can be an important way to improve building efficiency. Adding insulation is most cost effective when there is little or no insulation currently. Below is a list of potential areas which can be insulated to improve building efficiency:

Insulate Accessible Attic

Buildings built before 1940 often have a 12-18 inch space above the ceiling joists. The key to insulating this space is to seal attic bypasses first. Bypasses are leaks in the building's envelope that allow heated air to escape around insulation. Failure to seal bypasses reduces the effectiveness of insulation by as much as 30%. Most bypasses occur where the flues, chimney, plumbing vent stacks, exhaust fans, ducts, recessed lights and wiring penetrate into the attic; at the tops of open wall cavities; or at the attic access hatch. Bypasses can be sealed with compressed fiberglass insulation, caulk or other inexpensive materials.

Once bypasses are sealed, the attic space is easily insulated by blowing cellulose or loose fill fiberglass into the accessible cavity. When insulating the attic, the roof cavity needs to be adequately ventilated to minimize the risk of condensation. As a general rule, if the roof is pitched less than four feet from eaves to peak, one square foot of outside ventilation is required for every 150 square feet of attic floor space. With a vapor barrier and a steeper pitched roof, the recommended ratio is one square foot of ventilation for every 300 square feet. This ventilation needs to be evenly distributed.

Insulate Inaccessible Attic

Most multifamily and small commercial buildings have roofs that are flat or slightly inclined, with little or no accessible air space that can be insulated. If a building was built after about 1970, the roof joist cavity will typically have six inches of fiberglass and adding more is not worthwhile at this time. However, if a building is older, the roof joist cavity may only have one or two inches of insulation. In this situation, additional insulation may be cost effective and the best option is to apply the insulation above the roof deck.

If the roof is in poor condition, it is best to wait until re-roofing to install insulation. One option is to install tapered insulation below the new roof membrane, creating a gentle slope to aid

drainage. Untapered insulation can also be applied at much less cost, but the advantages of a naturally draining roof are lost. Another system, which is applied to the exterior of a flat roof, is a sprayed-on urethane covered with a sprayed-on coating, such as silicone. If a roof is in good condition, one option is to simply insulate over it. At least one manufacturer produces a special insulation system for just this purpose. Some of these over-the-roof insulation systems are quite heavy, so it is important to have an expert assess the load bearing capacity of the roof before deciding on this option.

Condensation can be a concern with any of these exterior roof insulation systems if there is already some insulation in the joist space, and this space is not ventilated. To guard against such problems, the R-value of the insulation installed over the roof deck should be at least twice that of the entire roof assembly below it (including deck, cavity, existing insulation, ceiling). This will ensure that the dew point temperature does not occur in the cavity itself.

Insulate Frame Walls

Some multifamily and small commercial buildings have frame walls with an accessible cavity large enough to accommodate insulation. The walls are blown full by drilling holes in the interior or exterior for each stud cavity on each floor. (Interior drilling is recommended only when there is no vapor barrier present.) Suitable insulation includes cellulose, short-fiber fiberglass and mineral wool. Before insulating, it is highly advisable to seal all interior cracks around windows, baseboards and electrical fittings in the walls to block the flow of warm, moist air into the cavity. Otherwise excess moisture can condense in the walls.

Insulate Masonry Walls

Masonry walls are commonly found on buildings built before the 1940's and are expensive and difficult to insulate. Generally, expanded polystyrene rigid board insulation is applied to the exterior of the building and covered with a trowled-on cement or synthetic plaster. An entirely different option is to insulate from the inside: a frame wall can be built and insulated with batts, or else rigid board insulation can be applied without new framing. Interior methods are generally less effective and more costly than exterior options. However, if a building needs extensive interior renovation, this can be a viable option. Even if insulating masonry walls is not cost-effective at this time, it may become economically feasible as energy costs increase.

How to Implement:

Insulation work is best completed by a trained and experienced contractor who is familiar with the best techniques for adding insulation to multifamily or small commercial buildings.

Adding insulation to the envelope will keep the building warmer, and retain more moisture as well. This increases the need to reduce moisture-producing sources. The use of humidifiers in the building should be reduced or eliminated. If the moisture levels in certain rooms are known to be high (for example, in kitchens and bathrooms) exhaust fans should be installed, ideally operated on a humidistat. To reduce moisture build-up in walls and attics, all cracks and openings to these spaces should be properly sealed. In addition, vapor barrier paints may be applied to exterior walls or to the ceiling of the top story.