

## HVAC equipment does not belong on the rooftop

by Werner H. Gumpertz, P.E.

**R**oofing professionals often avoid talking about placing heating, ventilating and air-conditioning (HVAC) equipment on roofs. Many know the equipment is not suitable for full weather exposure but allow it to be placed on the rooftop anyway.

Coolers, air exchanges and other air-conditioning equipment should be relocated from the rooftop for a number of reasons, including:

1. Most HVAC housing is not designed in accordance with well-established roof system design concepts for flashings. In fact, the housing usually is flimsy and does not have watershedding capabilities, waterproof louvers, weather-resistant finishes or maintenance-friendly design. Many rooftop-mounted HVAC units cause repeated roof system leaks.

2. HVAC equipment is difficult to inspect, maintain and replace because most units stand only 12 inches (305 mm) or less above a roof system's surface.

3. Roof membranes are not designed as high-traffic walking or work surfaces. Unfortunately, while repairing HVAC equipment, some maintenance crews abuse roof system surfaces by spilling oils, setting closure doors on their sharp edges and dropping tools.

4. Because many equipment installers do not consult roofing professionals before installing HVAC units on roof systems, membranes often are cut carelessly and almost never flashed around equipment supports. In addition, equipment placement sometimes impedes water flow.

5. HVAC units unnecessarily deteriorate prematurely because of exposure to severe weather. Such weather also reduces maintenance capabilities—in the snow, mechanics often cannot access units or are reluctant to perform detailed maintenance work. In addition, storage of replacement parts sometimes is unavailable.

6. Rooftop equipment is sabotaged easily by thieves looking for valuable components, such as fan motors.

7. HVAC equipment is unsightly, especially after it has deteriorated.

8. Utility lines scattered haphazardly across a roof system's surface can be dangerous. If pipes lack roller supports, their thermal movement often will "push" their support anchors and damage the roof membrane.

9. HVAC equipment usually is installed without adequate structural support, which risks damage to and collapse of the building's structural roof components.

*Building owners and roofing contractors will benefit when mechanical equipment is designed properly, placed in protected locations and maintained regularly.*

Roofing professionals should be concerned about the problems associated with placing HVAC equipment on roof systems. Standard procedures for putting equipment in penthouses or other protected locations should be developed—possibly by the American Society of Heating, Refrigerating & Air Conditioning Engineers Inc. (ASHRAE). Among other things, enclosing equipment will help maintenance personnel be more prompt and careful when checking the equipment and performing preventative maintenance.

Finally, ASHRAE can help by providing guidelines as to where HVAC equipment should be placed (i.e., on the ground or in penthouses) to perform most effectively.

### In closing

Building owners and designers should consider moving HVAC equipment off the roof. HVAC equipment is valuable, and the expenses of servicing and prematurely replacing it significantly exceed the costs of placing equipment on the ground or in penthouses. Also, opening exposed equipment, no matter what the weather, risks water intrusion.

Experience shows that many roofing problems occur because of inadequate flashing design or installation; traffic from workers and their equipment only adds to these problems. Therefore, the absence of equipment should extend a roof system's life.

In addition, many designers are not concerned about equipment flashings' special needs, such as the importance of ensuring drainage and waterproofing continuity with mechanical units. The author has seen many claims of leaking roof systems that turned out to be equipment leaks, holes in equipment housing or perforated pipes.

Roofing contractors who insist HVAC equipment be removed from rooftops are saving themselves from many possible complications. For example, if a roof system is damaged by HVAC maintenance mechanics, the contractor might be blamed.

Building owners and roofing contractors will benefit when mechanical equipment is designed properly, placed in protected locations and maintained regularly. **PR**

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