single zone units or split systems. Duct leakage testing only applies when all of the following are true:

1. The system is constant volume.
2. It serves less than 5,000 ft² of conditioned space.
3. 25 percent or more of the duct surface area is located in the outdoors, unconditioned space, a ventilated attic, in a crawl space or where the U-factor of the roof is greater than the U-factor of the ceiling except where the roof meets with the requirements of §143(a)1C.

Where duct sealing and leakage testing is required, the ducts must be tested by a HERS certified agency to demonstrate a leakage rate of no more than 6 percent of fan flow.

§149(b)1D requires that duct sealing apply to new ducts on existing systems AND existing ducts on existing systems that are being either repaired or replaced. Where an entirely new duct system is being installed, and meets the criteria previously described it must meet or exceed the leakage rate of no more than 6 percent of fan flow.

If the new ducts are an extension of an existing duct system the combined system (new and existing ducts) must meet:

1. A leakage rate of < 15 percent of fan flow, or
2. A reduction in leakage rate of > 60 percent (as compared to the existing ductwork) with all “accessible” leaks demonstrated through visual inspection to have been sealed, or
3. All accessible leaks shall be sealed and verified through a visual inspection by a certified HERS rater.

There is an exception for ducts that are connected to existing ducts with asbestos insulation or sealant.

These requirements also apply to cases where existing HVAC equipment is either repaired or replaced. With exceptions for ducts that are insulated or sealed with asbestos and an existing duct system that has previously been leakage tested by a certified California HERS rater see http://www.energy.ca.gov/HERS/.

One can avoid sealing the ducts by insulating the roof, all exterior walls and sealing the attic vents as part of a larger remodel, thereby creating a conditioned space within which the ducts are located, and no longer meets the criteria of §144(k).

Example 4-20

Question

A new 20 ton single zone system with new ductwork serving an auditorium is being installed. Approximately ½ of its ductwork on the roof. Does it need to be leak tested?

Answer

Probably not. Although this system meets the criteria of being single zone and having more than ¼ of the duct surface area on the roof, the unit probably serves more than 5,000 ft² of space. Most 15 and 20 ton units will serve spaces that are significantly larger than 5,000 ft². If the space is 5,000 ft² or less the ducts do need to be leak tested per §144(k).

Example 4-21

Question

A new 5 ton single zone system with new ductwork serving a 2,000 ft² office is being installed. The unit is a down discharge configuration and the roof has insulation over the deck. Does the ductwork need to be leak tested?

Answer

Probably not. Although this system meets the criteria of being single zone and serving less than 5,000 ft² of space, it does not have ¼ of its duct area in one of the spaces listed in §144(k). With the insulation on the roof and not on the ceiling, the plenum area likely meets the criteria of indirectly conditioned so no leakage testing is required.

Example 4-22

Question

A 5 ton single zone packaged rooftop unit with existing ductwork serving a 2,000 ft² office is being replaced. The unit is a down discharge configuration but the ductwork runs between an uninsulated roof and an insulated dropped ceiling. Does the ductwork need to be leak tested?

Answer

Most likely it will. This system meets the criteria of being single zone and serving less than 5,000 ft² of space. It also likely has more than ¼ of its duct area in the space between the uninsulated roof and the insulated ceiling. This space does not pass the U-factor criteria (i.e., the U-factor of the roof is more than the U-factor of the ceiling. Per §149(b)1D the ductwork will need to be sealed and leak tested to provide leakage < 15 percent of fan flow.

4.4.3 Acceptance Requirements

The Standards have acceptance requirements where duct sealing and leakage testing is required by §144(k).

These tests are described in the Chapter 10, Acceptance Requirements, and the Reference Nonresidential Appendix NA7.