

Example 8-25**Question**

An up-flow air-handling unit with a furnace and air conditioning coil is located on a platform in the garage of an existing house. The platform is used as a return air plenum. The air-handling unit is being replaced and the platform is being repositioned to the corner of the garage (3ft away from the current location). What requirements apply to this alteration?

Answer

The mandatory requirements apply to this alteration. In particular, §150(m) prohibits raised platforms or building cavities from being used to convey conditioned air (including return air and supply air). When the platform is relocated, it is being altered, and the mandatory requirement applies. A sheet metal or other suitable duct must be installed to carry the return air to the replaced air handler. This requirement would not apply if the platform were not being altered.

In addition, the prescriptive duct sealing requirements apply per §152(b) because the air handler is being replaced, unless one of a few exceptions applies.

Example 8-26**Question:**

What is meant by the term "air handler"?

Answer:

The term "air handler" is used to identify the system component that provides the central system forced air movement for the ducted heating or cooling space-conditioning system. The term "air handler" may be properly used to identify various types of central system forced air-moving components that must meet the functional requirements for different types of space-conditioning systems. For instance: A "gas furnace" air handler includes a gas combustion heat exchanger, and the central system fan, but does not include a DX cooling coil; An "electric furnace" air handler has electric heating coils, and the central system fan, but does not include a DX cooling coil; A "fan-coil unit" air handler for a split system heat pump has a DX cooling/heating coil, and the central system fan; A hydronic heat pump air handler includes the air-side DX coil, compressor, water-cooled condenser, and the central system fan. There are other air handler configuration variations as well.

Example 8-27**Question**

I have a residential building that was made in the 1920's. It has a freestanding gas furnace and I want to change it to an electric wall heater. Is this permitted?

Answer

No. §152(b)1Cii states that the new space-conditioning system be limited to natural gas, liquefied petroleum gas, or the existing fuel type unless it can be demonstrated that the TDV energy use of the new system is more efficient than the existing system. For your situation you would have to use gas or a heat pump for compliance.

Example 8-28

Question

What are the Standards requirements for Duct Sealing, Duct Insulation, Refrigerant Charge (RC), Cooling Coil Airflow (CCA), Fan Watt Draw (FWD), Saturation Temperature Measurement Sensors (STMS) and Temperature Measurement Access Holes (TMAH), Hole for the placement of a Static Pressure Probe (HSPP) or Permanently installed Static Pressure Probe (PSPP) for the following changeout scenarios in an existing home?

1. New or replacement outdoor condensing unit and/or indoor cooling or heating coil only (no duct alteration).
2. New or replacement furnace heat exchanger only (no duct alteration).
3. New or replacement air handler unit only (no duct alteration).
4. New or replacement entire duct system only (no air handler alteration).
5. New or replacement entire duct system and air handler only.
6. New or replacement entire duct system and outdoor condensing unit, and/or indoor cooling and/or heating coil (no air handler alteration).
7. New or replacement entire duct system, outdoor condensing unit, indoor cooling or heating coil, and air handler (i.e. entire space conditioning system).
8. New or replacement entire duct system and packaged air conditioner or heat pump (i.e. entire space conditioning system).
9. New or replacement packaged air conditioner or heat pump (no duct alteration).
10. More than 40 ft of new or replacement ducts installed (but not replacing the entire duct system as in #4 above) in unconditioned space (no other alteration).

Answer

1. Duct sealing (§152(b)1E), RC, CCA \geq 300 CFM/ton, TMAH.
2. Duct sealing (§152(b)1E), RC, CCA \geq 300 CFM/ton, TMAH.
3. Duct sealing (§152(b)1E), RC, CCA \geq 300 CFM/ton, TMAH.
4. Duct sealing < 6 percent (§152(b)1Di), Duct Insulation, CCA \geq 300 CFM/ton.
5. Duct sealing < 6 percent (§152(b)1Di), Duct Insulation, RC, CCA \geq 300 CFM/ton, TMAH.
6. Duct sealing < 6 percent (§152(b)1Di), Duct Insulation, RC, CCA \geq 300 CFM/ton, TMAH.
7. Duct sealing < 6 percent (§152(b)1Di), Duct Insulation, RC, CCA \geq 350 CFM/ton, FWD \leq 0.58 watt/CFM, TMAH, STMS, and either HSPP or PSPP.
8. Duct sealing < 6 percent (§152(b)1Di), Duct Insulation.
9. Duct sealing (§152(b)1E).
10. Duct sealing (§152(b)1Dii), Duct Insulation.

Notes: RC with CCA \geq 300 CFM/ton is required in climate zones 2, 8-15. CCA \geq 350 CFM/ton and FWD with HSPP or PSPP are required in climate zones 10-15 only for a completely new or replacement entire space conditioning system. Duct sealing is required in climate zones 2, 9-16. New or replacement ducts must meet the mandatory requirements of §150(m) for collars, joints, and plenum connections, and the Duct Insulation requirements of Package D in §151(f)10. Duct sealing, RC, CCA, FWD, STMS, TMAH, HSPP and PSPP must be verified by a HERS rater. An entirely new duct system can include existing parts of the original duct system (e.g., register boots, air handler, coil, plenums, etc.) if those parts are accessible and they can be sealed, as described in the Duct Sealing and Insulation section above. All Non-setback thermostats must be replaced with setback thermostats meeting the requirements of Standards Section 112(c).

8.5 Water Heating

8.5.1 Replacement Water Heaters

152(b)1G

Replacement water heaters must be either gas, LPG or the existing fuel type. The only exceptions are when it can be demonstrated that the TDV energy use of the new system is less than the existing system or when the water heater is being replaced as part of an alteration that is complying via the performance method. In other words, additional calculations are required if the replacement water heater is not either gas, LPG or the existing fuel type. The main intent of this requirement is to restrict the switch from gas to electric resistance water heaters.

When a water heater is replaced, then the mandatory requirements also apply to the water heater itself as well as any other components that are replaced. The water heater must be certified by the Energy Commission for minimum efficiency. New pipes must be insulated wherever insulation is required by the mandatory requirements.

8.5.2 Additions

§ 152(a), Exception No. 2

If an addition increases the number of water heaters serving a dwelling unit, then compliance for the addition may be determined using any of the compliance approaches under certain conditions. The “addition alone” compliance may be used for one additional water heater if either:

1. The additional unit is a 50 gallon or less, gas storage or gas instantaneous, nonrecirculating water heater with an EF equal to or greater than the federal minimum standards as defined in the Prescriptive Requirements section of Chapter 5,
2. The home does not have natural gas or propane available and the additional water heater is a 50gallon or less electric water heater, or electric instantaneous with an EF equal to or greater than the federal minimum standards, or
3. A water-heating system determined by the Executive Director of the Energy Commission to use no more energy than the one

specified in the first bullet above; or if no natural gas is connected to the building, a water-heating system determined by the Executive Director to use no more energy than the one specified in the second bullet above.

If either of the first two conditions is met, water heating calculations are not required with any of the compliance approaches, and no credit is allowed or penalty taken. Computer compliance calculations are used to determine the alternative described in the third bullet.

In order to receive credit for a water heating alteration that exceeds minimum efficiency requirements, or to use a water heater that does not meet either of the two conditions listed above, two options are available. The existing-plus-addition performance compliance method or the whole building compliance approach may be used. See the Vendor's Compliance Software User Manual.

8.5.3 Alterations to Systems

If it takes an extended period of time for hot water to get to a point of use or if a cold water surge comes along after warm water is turned the best remedy is usually altering the distribution system. Turning up the temperature setting on the water heater will only waste more energy. Most of these alternatives will save water and some will save energy, but before any alteration to the distribution is done, the energy performance of that medication must be confirmed.

With one exception, any alteration to the hot water distribution system must be analyzed using the performance approach to assure that the energy use of the system has not been increased. The exception to this rule is the installation of a manually controlled demand recirculation system. All other alterations, including automated controlled demand recirculation, must use the performance approach to verify energy equivalency.

Example 8-27

Question

An existing 1,500 ft² single family residence is getting a 500 ft² addition. A new 50 gallon gas water heater will replace the existing water heating system. How do the water heating requirements apply?

Answer

Since this is an alteration to an existing water heating system, no water heating calculations are required, but the mandatory measures apply. The water heater must have an EF equal to or greater than the federal minimum standards, or R-12 insulation wrap. The first 5 ft. of hot and cold pipes must be insulated. Building energy compliance for the addition may be demonstrated for either the addition alone or for the existing-plus-addition.

Example 8-28

Question

An existing 2,000ft² single family residence has one 50 gallon gas water heater, and a 600 ft² addition with a new instantaneous gas water heater is proposed. How does this comply?