

## Study Session

# 3

## 2018 IFGC Sections 305 through 310 General Regulations II

**OBJECTIVE:** To gain an understanding of the general code requirements governing the installation and location of equipment and appliances, access to appliances, electrical requirements, condensation provisions for high efficiency appliances and clearances to equipment.

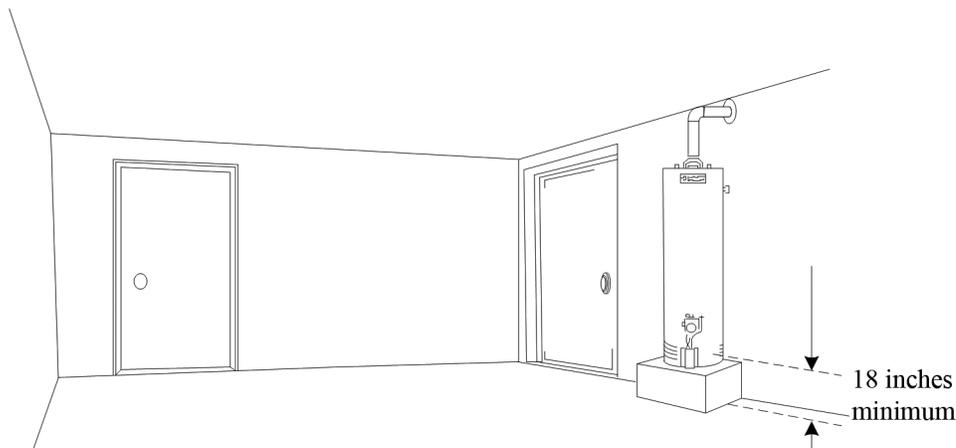
**REFERENCE:** Sections 305 through 310, 2018 *International Fuel Gas Code*

- KEY POINTS:**
- Under what circumstances are appliance locations restricted?
  - When are appliances required to have their ignition source located 18 inches above the floor?
  - When is the ignition source of an appliance permitted to be located at the floor level in a hazardous location?
  - When does the code require a boiler or furnace room to be separated from other occupancies?
  - Appliances are required to be installed what distance above the adjoining grade level?
  - What requirements apply to appliances serving repair garages?
  - What are the access requirements to appliances and equipment installed in a room?
  - What are the access requirements to appliances and equipment installed in attics?
  - What are the access requirements to appliances and equipment installed in under-floor spaces?
  - What code or standard governs the requirements for luminaires when an appliance is located in an attic or under floor space?
  - Under what condition is an access ladder required?
  - When is a working platform required for appliances located on roofs?
  - When are guards required around a working platform when equipment is located on the roof of a building?
  - What alternatives are allowed in place of a required guard?

- KEY POINTS:**
- (Cont'd)**
- Condensate piping serving condensing appliances shall be of what material?
  - What is the minimum internal diameter for a condensate drain line?
  - When are condensate drain lines required to be trapped?
  - When are auxiliary drain pans required?
  - When is a condensate pump required to shut down the appliance if the pump fails?
  - When are reduced clearances permitted?
  - Is gas piping permitted to be used as a grounding electrode?
  - What are the bonding requirements for CSST gas piping?

**Code Text:** *Equipment and appliances having an ignition source shall be elevated such that the source of ignition is not less than 18 inches (457 mm) above the floor in hazardous locations and public garages, private garages, repair garages, motor fuel-dispensing facilities and parking garages. For the purpose of this section, rooms or spaces that are not part of the living space of a dwelling unit and that communicate directly with a private garage through openings shall be considered to be part of the private garage. See the exception for appliances that are listed as flammable vapor ignition resistant.*

**Discussion and Commentary:** By definition, an ignition source is a flame, spark or hot surface capable of igniting flammable vapors. Because flammable vapors are heavier than air and collect near the floor of a garage or hazardous location, the code requires any source of ignition that is part of an appliance to be elevated at least 18 inches above the floor. Note that the minimum elevation distance is measured to the lowest ignition source and not to the base of the appliance. Appliances that are listed as flammable vapor ignition resistant are designed to control the intake of combustion air and prevent the escape of any ignited vapors to outside the combustion chamber. With safeguards built in to the appliance, elevation of the ignition source is not necessary.

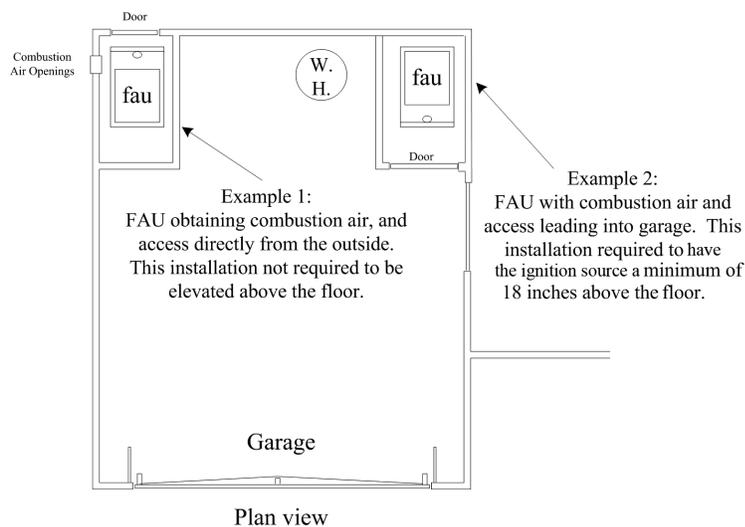


The ignition source of an appliance must be elevated a minimum of 18 inches above the floor of a garage.

Examples of appliance ignition sources include the burners of a furnace, dryer or water heater; burner igniters or electrical relays; switches; contacts; and electrical motors, which can create a spark.

**Code Text:** *In residential garages where appliances are installed in a separate, enclosed space having access only from outside of the garage, such appliances shall be permitted to be installed at floor level, provided that the required combustion air is taken from the exterior of the garage.*

**Discussion and Commentary:** Appliances that are installed in residential garages and have an ignition source are permitted to be installed at floor level only if the appliance is in an enclosed space without any openings or access into the garage. Access to the appliance enclosure must be from outside the garage. Combustion air also must be obtained directly from the outside. This separation adequately isolates the ignition source from the garage area, and elevation of the appliance is not necessary.

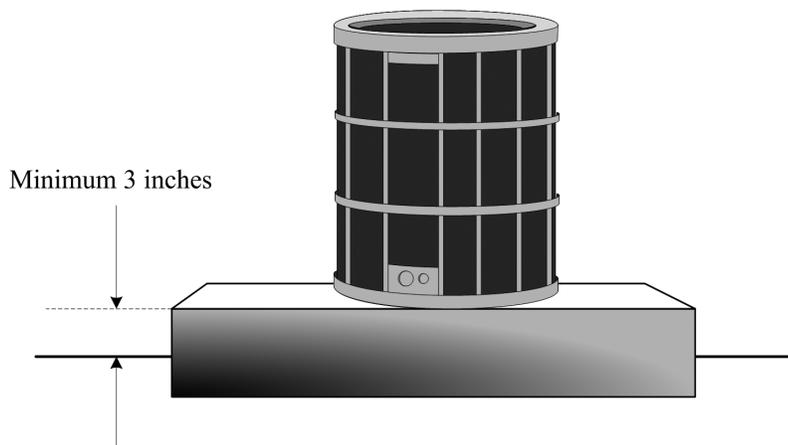


Water heaters that are listed as flammable vapor ignition resistant are exempt from the requirement to elevate the ignition source 18 inches above the floor and are permitted to be located in a garage at floor level without separation.

**Code Text:** *Equipment and appliances installed at grade level shall be supported on a level concrete slab or other approved material extending not less than 3-inches (76 mm) above adjoining grade or shall be suspended not less than 6 inches (152 mm) above adjoining grade. Such supports shall be installed in accordance with the manufacturer's installation instructions.*

**Discussion and Commentary:** Appliances installed outdoors or underneath a building are subject to deterioration and corrosion when installed on soil or rocks. The IFGC requires equipment be elevated to provide safe operation and to prolong the life of the appliance. When supported by a level concrete slab on the ground, the appliance must maintain a clearance of at least 3 inches above grade. Equipment suspended underneath a building or supported by brackets on the side of a building requires a minimum clearance of 6 inches above the ground.

Equipment must be a minimum of 3 inches above adjoining grade on a level concrete slab or other approved material.



There are “manufactured slabs” available that are made of materials other than concrete. These manufactured products are widely accepted but require the approval of the code official.

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**Topic:** Appliances in Rooms

**Category:** General Regulations

**Reference:** IFGC 306.2

**Subject:** Access and Service Space

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**Code Text:** *Rooms containing appliances shall be provided with a door and an unobstructed passageway measuring not less than 36 inches (914 mm) wide and 80 inches (2032 mm) high. An exception for dwelling units permits a door and passageway not less than 24 inches wide.*

**Discussion and Commentary:** A door and passageway measuring 3 feet 0 inches by 6 feet 8 inches provide adequate space to access an appliance for service and repair, and to remove or replace the appliance without removing permanent construction or other obstructions. Although this is a common size door in commercial applications, the code recognizes that dwelling units often have smaller spaces and appliances. A 24-inch wide access passageway is adequate to service residential appliances. The height of the passageway in this case need only be sufficient to remove the largest appliance. Note that a 30-inch deep level working space is required in front of the appliance, but this space may include the doorway with the door open, provided the working space has a height of not less than 30 inches.

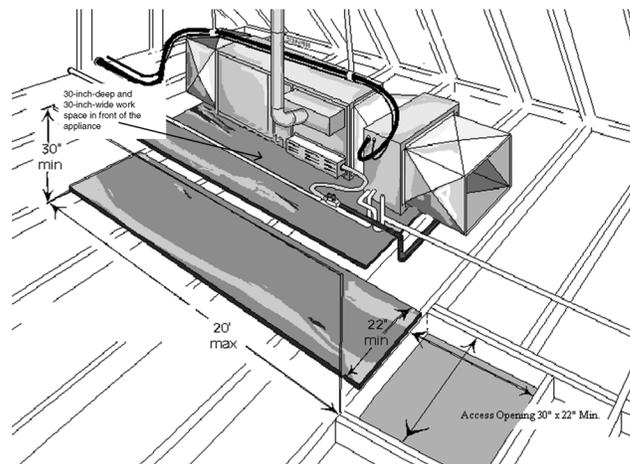


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In addition to the prescribed access passageway, a level working space measuring 30 inches by 30 inches is required in front of the control side of appliances for service and repair to the appliance.

**Code Text:** Attics containing appliances shall be provided with an opening and unobstructed passageway large enough to allow removal of the largest appliance. The passageway shall not be less than 30 inches (762 mm) high and 22 inches (559 mm) wide and not more than 20 feet (6096 mm) in length measured along the centerline of the passageway from the opening to the appliance. The passageway shall have continuous solid flooring not less than 24 inches (610 mm) wide. A level service space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the appliance. The clear access opening dimensions shall be a minimum of 20 inches by 30 inches (508 mm by 762 mm), and large enough to allow removal of the largest appliance. See the exceptions for 1) service permitted at the access opening and 2) increased length of passageway to 50 feet where 6-foot height is provided.

**Discussion and Commentary:** Access to equipment in attics is required to permit inspection, service, maintenance or removal. The passageway allows for personnel to access equipment and exit safely. Typically, the installation of appliances in attics must be considered in the building design process. Not only is adequate space required, but the attic design must accommodate solid flooring for the passageway without obstructions such as truss web members, ducts or pipes. In addition, the design of structural members must account for the dead and live load of equipment, the passageway and service personnel.



The listing for certain types of equipment may prohibit installation in attics.

**Code Text:** *Under-floor spaces containing appliances shall be provided with an access opening and unobstructed passageway large enough to remove the largest appliance. The passageway shall not be less than 30 inches (762 mm) high and 22 inches (559 mm) wide, nor more than 20 feet (6096 mm) in length measured along the centerline of the passageway from the opening to the appliance. A level service space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the appliance. If the depth of the passageway or the service space exceeds 12 inches (305 mm) below the adjoining grade, the walls of the passageway shall be lined with concrete or masonry extending 4 inches (102 mm) above the adjoining grade and having sufficient lateral-bearing capacity to resist collapse. The clear access opening dimensions shall be a minimum of 22 inches by 30 inches (559 mm by 762 mm), and large enough to allow removal of the largest appliance. See the exceptions for 1) service permitted at the access opening and 2) unlimited length of passageway where height of 6 feet is provided.*

**Discussion and Commentary:** Appliances are often installed in attics or under-floor spaces (crawl spaces) in order to better utilize the building’s finished floor area. However, it is important to provide access to equipment in these limited-space areas to allow for inspection, service, maintenance and removal of the appliances. Similar to the attic access provisions, appliance installations in under-floor spaces require an unobstructed passageway that is limited to 20 feet in length when the height is at least 30 inches. Although the length of the passageway is unlimited if the ceiling height is at least 6 feet, crawl spaces typically have headroom that is less than 6 feet. As with attics, the code permits the service and removal of an appliance through the access opening without the need for a passageway or a 30-inch by 30-inch level working space.

