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, 2015 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?
- 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?
KEY POINTS: (Cont’d)

- 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?
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.
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.

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.

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.
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.
For both attic and under floor installations, a light fixture (luminaire) and a receptacle outlet are required at the appliance location for use during the service or repair of the equipment. The switch controlling the light fixture must be located at the entry to the passageway.