

## Study Session

# 3

## 2018 IMC Sections 304.6 through 312 General Regulations II

**OBJECTIVE:** To gain an understanding of the general code requirements governing the support of piping, access and service to appliances and equipment, the disposal of condensate, and reductions to the required clearances to combustible materials.

**REFERENCE:** Sections 304.6 through 312, 2018 *International Mechanical Code*

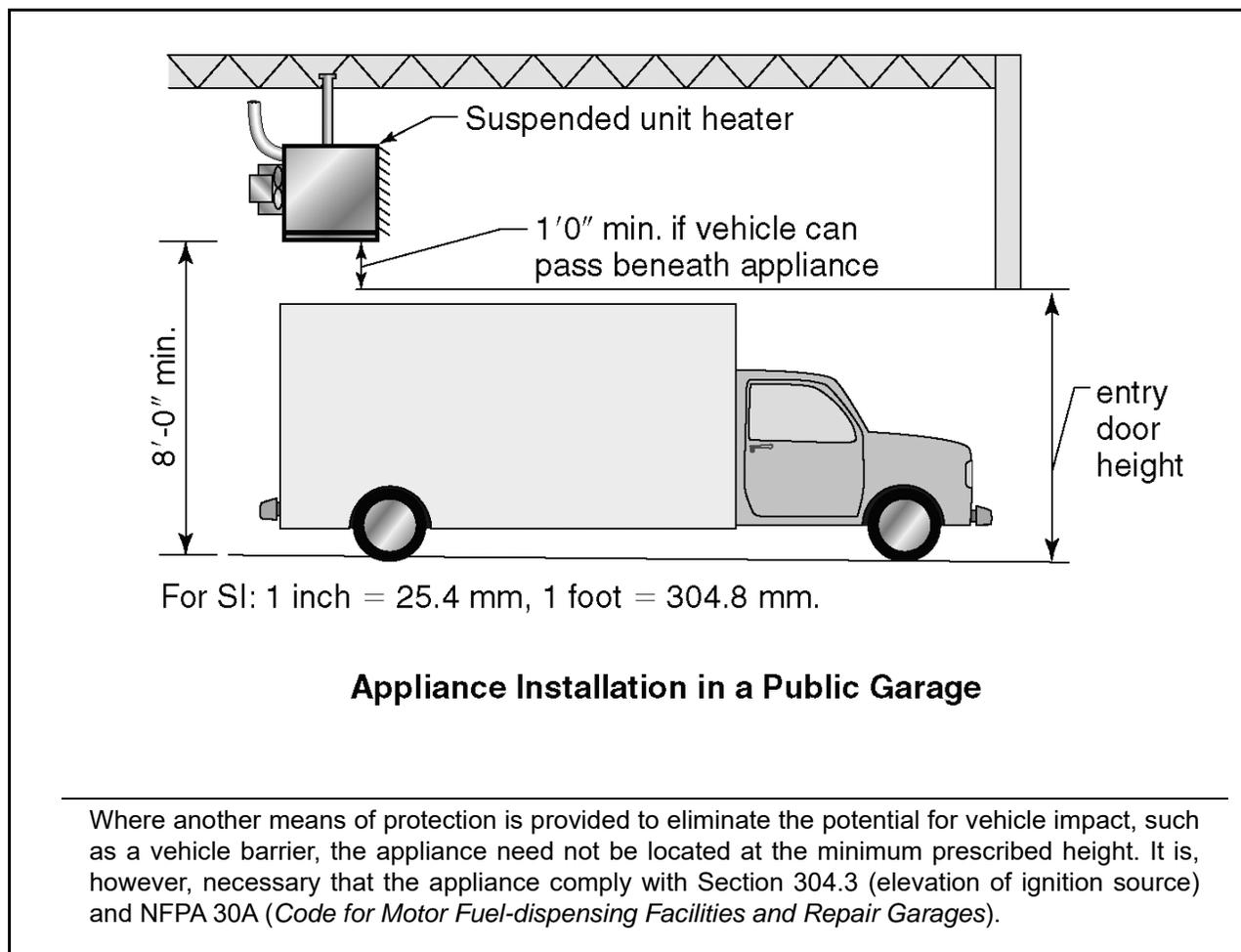
- KEY POINTS:**
- If a motor vehicle is able to pass under an appliance, what additional requirement has to be met?
  - How high above the floor does an appliance have to be installed in a private garage? When does the exception apply?
  - What regulates the protection for boiler rooms and furnace rooms?
  - What governs the clearances from combustibles to heat-producing equipment and appliances? Is it possible to reduce such clearances?
  - What is the requirement for the placement of equipment and appliances at grade level?
  - If equipment or appliances are suspended above grade, what is the minimum required clearance?
  - What loads are taken into account when determining the strength of pipe hangers and supports?
  - Pipe hangers and supports are required to be of compatible material to prevent what from occurring?
  - Which code table is used for regulating the spacing of supports? Is there another standard that may be used for the installation of supports?
  - Clearances around appliances and equipment are for what purposes?
  - What is the minimum size required for a working space adjacent to an appliance? What side of the appliance is it required to be located on?

**KEY POINTS:  
(Cont'd)**

- Where an appliance is in a room, what is the minimum width of the passageway and door to access the equipment?
- What is the minimum required size of an attic access opening where an appliance is located in the attic space?
- What is the maximum distance from an attic access opening to an appliance located in the attic?
- What is the minimum required size of the access opening serving an appliance located under the floor? How close is it required to be to the appliance?
- When appliances requiring access are installed on roofs, at what height is permanent access required?
- What is the maximum height of any obstruction to rooftop access? What is the maximum slope permitted for a roof used for access purposes?
- What are the minimum requirements for permanent ladders used to provide access?
- Ladders over 30 feet in height are required to comply with what additional provisions?
- How are by-products of condensing appliances to be handled and controlled?
- What type of material is required for the condensate piping? What is the minimum size required?
- What is the minimum size of the drain line? What limitation applies?
- What is required when drain pipes are manifolded together?
- When are auxiliary drain pans required?
- In the case where an auxiliary pan cannot be used, what is required?
- When is a condensate pump required to shut down the appliance if the pump fails?
- Reduced clearances are to be achieved through the use of what type of material?
- Spacers used for reduced clearances shall be of what type of material?
- For listed and labeled appliances, what governs the reduction of required clearances to combustible assemblies or combustible materials?
- Where required clearances are not listed in Table 308.4.2, is linear interpolation permitted? Is extrapolation below the range of the table permitted?
- What resources are to be used for determining the size of heating and cooling systems?
- What alternatives may be used for determining design loads?

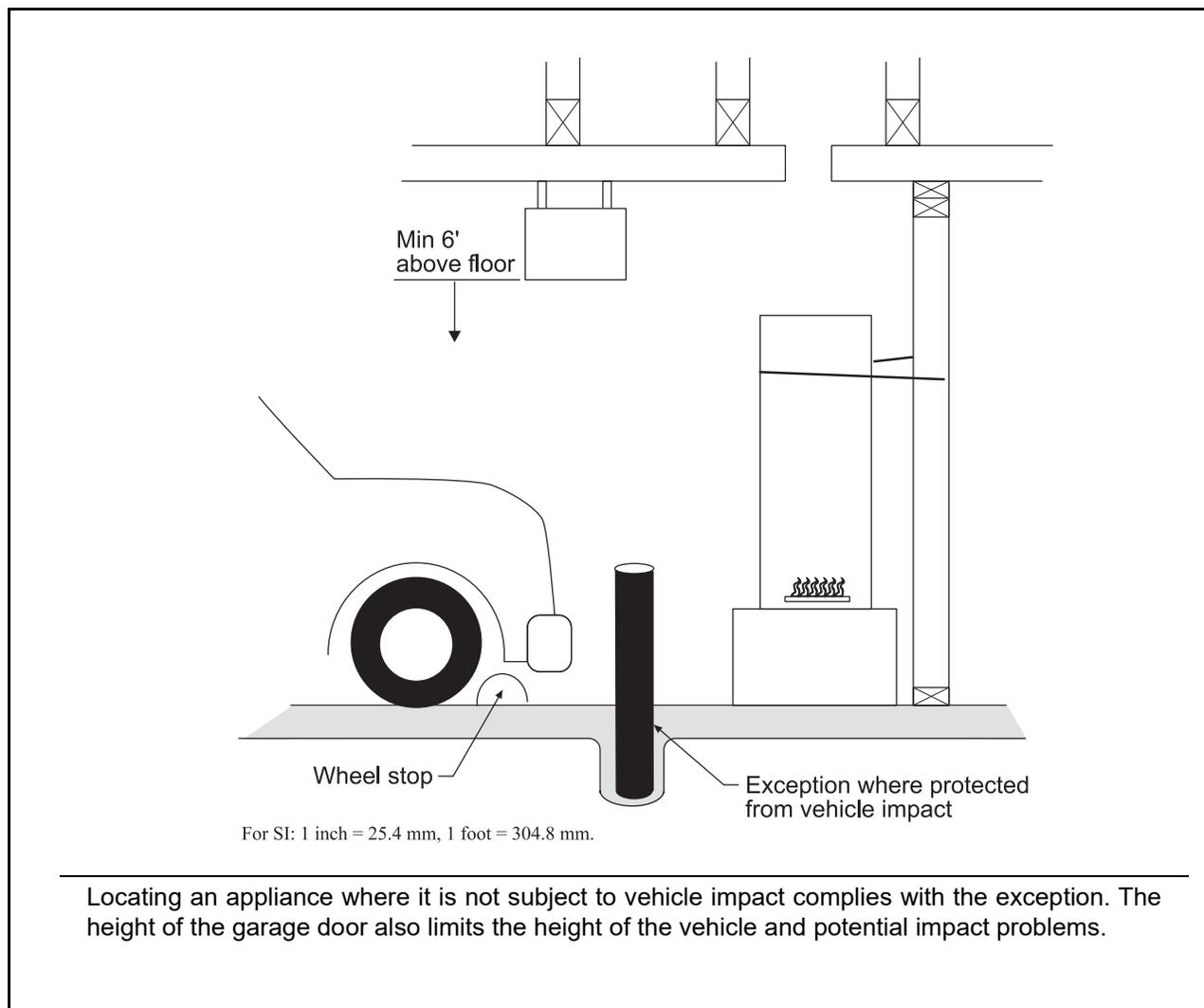
**Code Text:** *Appliances located in public garages, motor fuel-dispensing facilities, repair garages or other areas frequented by motor vehicles, shall be installed not less than 8 feet (2438 mm) above the floor. Where motor vehicles are capable of passing under an appliance, the appliance shall be installed at the clearances required by the appliance manufacturer and not less than 1 foot (305 mm) higher than the tallest vehicle garage door opening. See the exception for appliances protected from motor vehicle impact.*

**Discussion and Commentary:** Protection of suspended appliances is necessary, as impact from a vehicle could not only cause damage to the appliance, but also initiate a fire or explosion. The 8-foot (2438 mm) measurement is intended to prevent vehicle impact; however, the requirement for the 1 foot (305 mm) minimum clearance above the tallest vehicle garage door opening should assure the necessary protection.



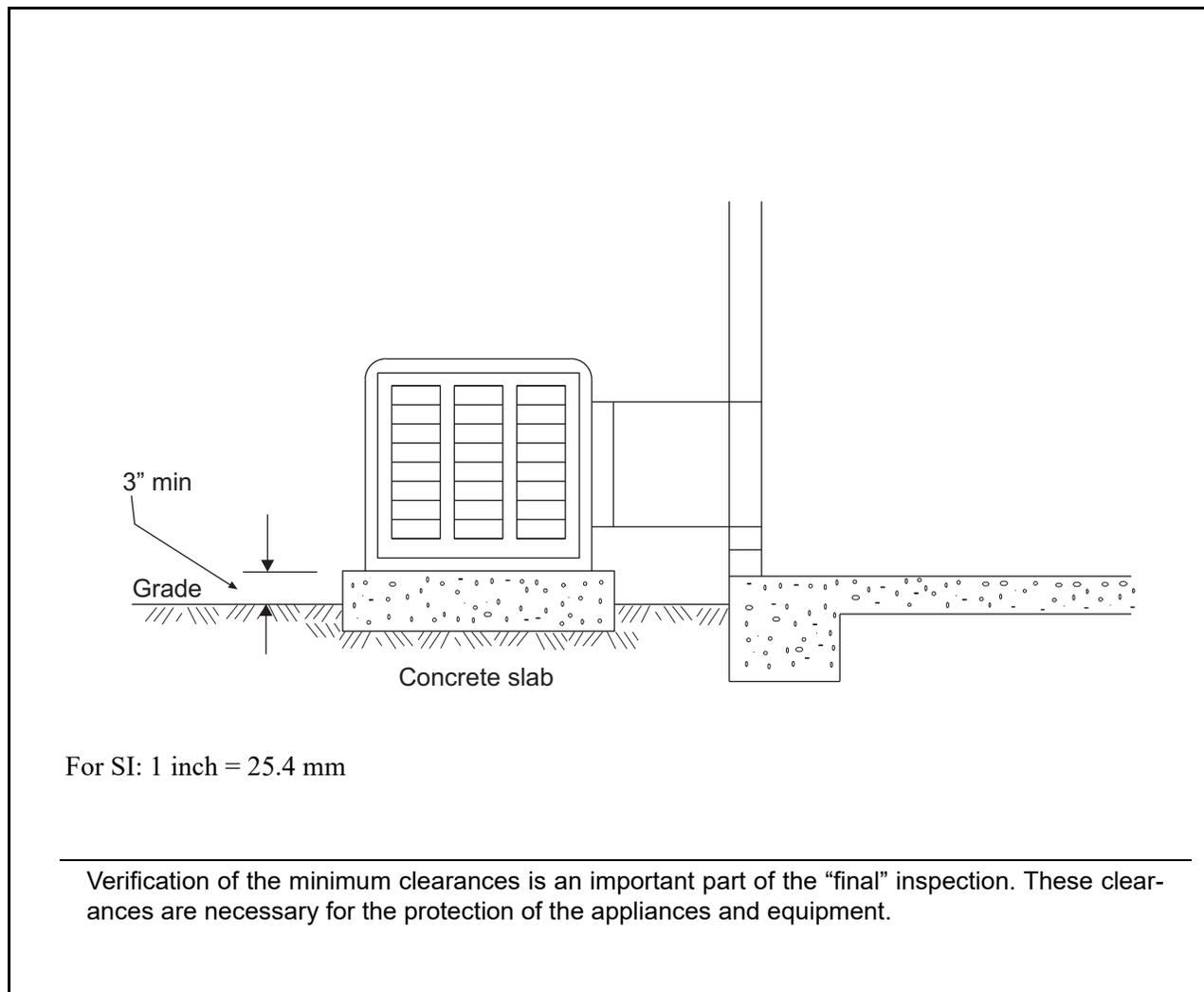
**Code Text:** *Appliances located in private garages and carports shall be installed with a minimum clearance of 6 feet (1829 mm) above the floor. See the exception addressing appliances that are protected from motor vehicle impact and installed in accordance with Section 304.3 (elevation of ignition source).*

**Discussion and Commentary:** The limitation addressing appliance clearance in private garages and carports applies when the appliance is located in an area where impact from a vehicle may occur. It is possible, however, that the 6-foot minimum height requirement may not be adequate when considering the height of sport/utility and recreational vehicles.



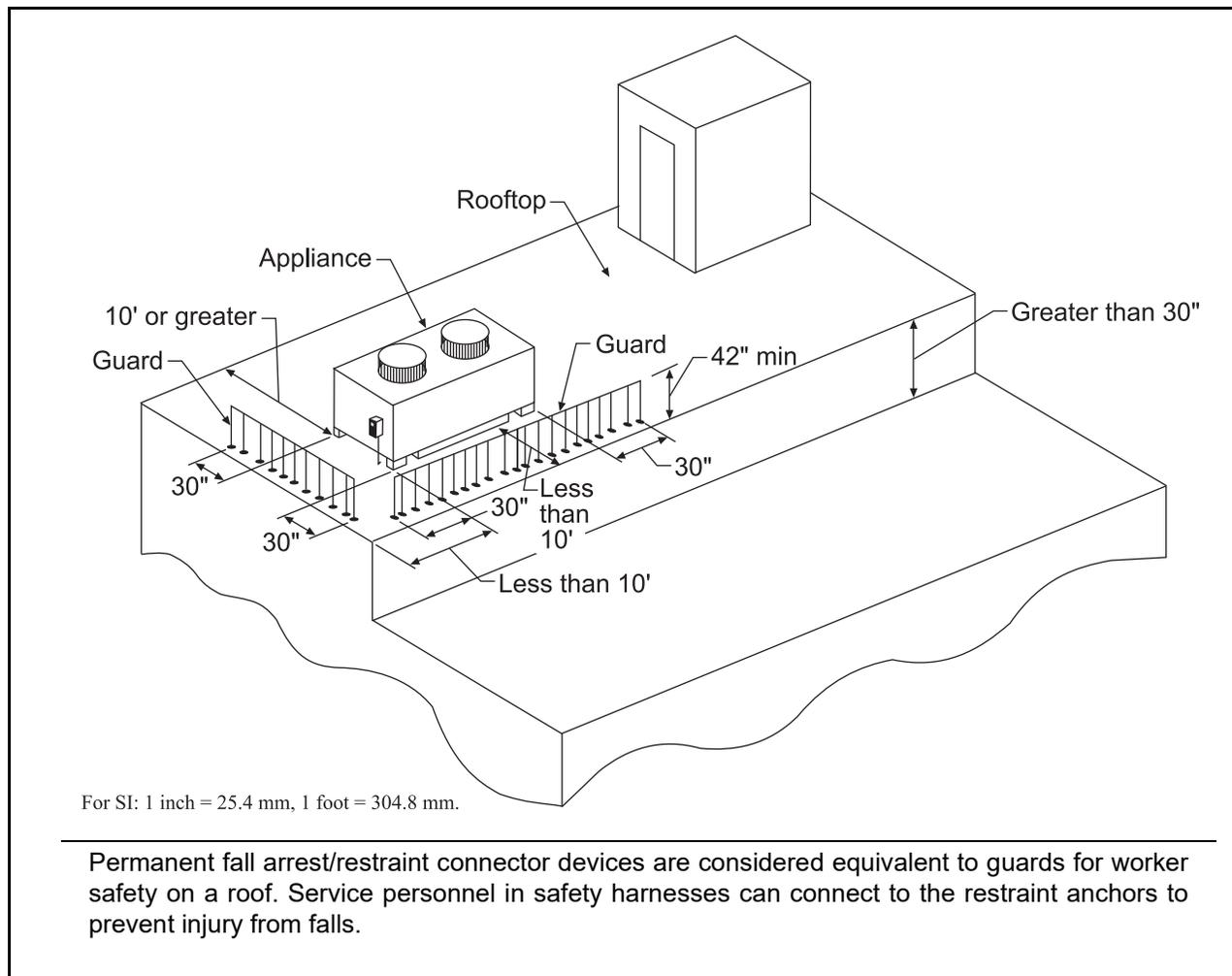
**Code Text:** *Equipment and appliances installed at grade level shall be supported on a level concrete slab or other approved material extending not less than 3 inches (76 mm) above adjoining grade or shall be suspended not less than 6 inches (152 mm) above adjoining grade.*

**Discussion and Commentary:** Where located on grade in exterior locations, the equipment or appliances must be a minimum of 3 inches above the adjacent grade. Where suspending the equipment or appliance, a minimum clearance of 6 inches is mandated. Under both conditions, the resulting clearance will help protect the appliance or equipment from damage and prevent soil or water contact, and must comply with the manufacturer's instructions.



**Code Text:** *Guards shall be provided where various components that require service and roof hatch openings are located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The guard shall extend not less than 30 inches (762 mm) beyond each end of components that require service. The top of the guard shall be located not less than 42 inches (1067 mm) above the elevated surface adjacent to the guard. The guard shall be constructed so as to prevent the passage of a 21-inch-diameter (533 mm) sphere. See the exception where fall restraint devices are installed.*

**Discussion and Commentary:** The provision requiring guards is intended to protect service personnel from the possibility of a dangerous fall while accessing or serving elevated appliances or equipment. The minimum 30-inch extension of the guard is provided to add an increased level of protection for service, installation or maintenance personnel. The scope of this requirement is limited to locations where equipment or appliances are installed within 10 feet of a roof edge or other elevated walking surface and the vertical drop to the level below exceeds 30 inches.



**Topic:** Interval of Support

**Category:** General Regulations

**Reference:** IMC 305.4, Table 305.4

**Subject:** Piping Support

**Code Text:** *Piping shall be supported at distances not exceeding the spacing specified in Table 305.4, or in accordance with ANSI/MSS SP-58.*

**Discussion and Commentary:** As an alternative to Table 305.4, the Manufacturer's Standardization Society of the Valve and Fitting Industry (MSS) Standard SP-58, Pipe Hangers and Supports, may be used for determining the maximum permitted horizontal and vertical piping support spacing. The limit on support spacing is intended to reduce any sag or stress that could develop.

**TABLE 305.4  
PIPING SUPPORT SPACING<sup>a</sup>**

| PIPING MATERIAL  | MAXIMUM HORIZONTAL SPACING (feet)         | MAXIMUM VERTICAL SPACING (feet) |
|--|---|---------------------------------|
| ABS pipe   | 4   | 10 <sup>c</sup>                 |
| Aluminum pipe and tubing   | 10  | 15                              |
| Cast-iron pipe <sup>b</sup>  | 5   | 15                              |
| Copper or copper-alloy pipe  | 12  | 10                              |
| Copper or copper-alloy tubing  | 8   | 10                              |
| CPVC pipe or tubing, 1 inch and smaller  | 3   | 10 <sup>c</sup>                 |
| CPVC pipe or tubing, 1 <sup>1</sup> / <sub>4</sub> inches and larger               | 4   | 10 <sup>c</sup>                 |
| Lead pipe  | Continuous                                | 4                               |
| PB pipe or tubing  | 2 <sup>2</sup> / <sub>3</sub> (32 inches) | 4                               |
| PE-RT 1 inch and smaller   | 2 <sup>2</sup> / <sub>3</sub> (32 inches) | 10 <sup>c</sup>                 |
| PE-RT 1 <sup>1</sup> / <sub>4</sub> inches and larger                              | 4   | 10 <sup>c</sup>                 |
| PEX tubing 1 inch and smaller  | 2 <sup>2</sup> / <sub>3</sub> (32 inches) | 10 <sup>c</sup>                 |
| PEX tubing 1 <sup>1</sup> / <sub>4</sub> inches and larger                         | 4   | 10 <sup>c</sup>                 |
| Polypropylene (PP) pipe or tubing, 1 inch and smaller                              | 2 <sup>2</sup> / <sub>3</sub> (32 inches) | 10 <sup>c</sup>                 |
| Polypropylene (PP) pipe or tubing, 1 <sup>1</sup> / <sub>4</sub> inches and larger | 4   | 10 <sup>c</sup>                 |
| PVC pipe   | 4   | 10 <sup>c</sup>                 |
| Steel tubing   | 8   | 10                              |
| Steel pipe   | 12  | 15                              |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. See Section 301.18.

b. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.

c. Mid-story guide.

Using Table 305.4 sometimes requires knowledge of both the type of piping materials and the size of the pipe being supported. For some types of piping materials, as the pipe diameter increases, the maximum permitted distance between supports also increases.

**Code Text:** *Appliances, controls devices, heat exchangers and HVAC system components that utilize energy shall be accessible for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other appliances, venting systems or any other piping or ducts not connected to the appliance being inspected, serviced, repaired or replaced.*

**Discussion and Commentary:** The minimum clearances around appliances are established in the manufacturer’s installation instructions. This section supplements those requirements by ensuring that appliances are located so they can be inspected, serviced and repaired or replaced without the need for removing or disconnecting any other appliances or any permanent construction in order to perform these anticipated tasks.

