

RESIDENTIAL GENERATOR INSTALLATIONS



ELECTRICAL

Optional Standby Systems

Generator installations are to comply with Article 702 of the 2008 National Electric Code.

Guidelines for Portable Generators with Manual Transfer Equipment:

Permanently installed equipment for the connection of a portable generator must comply with Section 702.6 of the 2008 National Electrical Code (NEC). The manual transfer equipment will require an interlock device suitable for the intended use. This device must be installed to prevent the inadvertent interconnection of the normal and the optional system supply. The connection device must be a UL Standard 231 Listed Power Outlet. The back-feeding of electrical outlets within the home is not permitted. Manufacturer's installation information for all equipment is required to be on-site for inspections. Equipment must be installed according to the manufacturer's instructions.

Guidelines for Permanent Generators with Manual Transfer Switches:

Permanently installed generators with permanently installed manual transfer equipment must comply with the provisions for portable generators or use a Listed Transfer Switch or Panel Board. The equipment must be installed so as to allow the user to select the connected loads upon manual transfer. Manufacturer's installation information for all equipment is required to be on-site for inspections. Equipment must be installed according to the manufacturer's instructions.

Guidelines for Permanent Generators with Automatic Transfer Equipment:

Permanently installed generators with automatic transfer equipment must comply with the provisions of Section 702.5 of the 2008 National Electrical Code. The calculated load as determined by Article 220 of the 2008 NEC must not exceed the rating of the generator output. Manufacturer's installation information for all equipment is required to be on-site for inspections. Equipment must be installed according to the manufacturer's instructions.

Required permanent signs for all installations:

702.8 Signs

- (A) Standby. A sign shall be placed at the service-entrance equipment that indicates the type and location of onsite optional standby power sources.
- (B) Grounding. Where the grounded circuit conductor connected to the optional standby power source is connected to a grounding electrode conductor at a location remote from the optional power source, there shall be a sign at the grounding location that shall identify all optional standby power and normal sources connected at that location.

Fuel Gas

616.1 Powered equipment. Permanently installed equipment powered by internal combustion engines and turbines shall be installed in accordance with the manufacturer's installation instructions and NFPA 37.

NATIONAL FIRE PROTECTION ASSOCIATION

(NFPA 37) 3-1.4 Engines Located Outdoors. Engines, and their weatherproof housings if provided, that are installed outdoors shall be located at least 5 ft (1.5 m) from openings in walls and at least 5 ft (1.5 m) from structures having combustible walls. Exception No. 1: Where the adjacent wall of the structure has a fire resistance rating of at least 1 hour. Exception No. 2: Where the weatherproof enclosure is constructed of noncombustible materials, and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure.

(NFPA 58) Container Location.

LP tanks are to be located in accordance with NFPA 58. See attachment for diagrams.



Generator Installation Check List

Per 2008 NEC, Article 702, Optional Standby Systems

Contractor: _____

Permit # _____

Property Address _____

SERVICE SIZE	AMPS
GENERATOR SIZE	KW
GENERATOR	AMPS
SWITCH TYPE	AUTOMATIC/MANUAL

EXAMPLES:

200AMPS
20 KW
85 AMPS

200 Automatic Transfer Switch

NEC. 2008 Article: 702.5(B)(2)(a) Automatic Transfer Equipment

Full Load: The stand by source shall be capable of supplying the **full load** that is transferred by the automatic transfer equipment.

Provide Load Calculations for review. (2008 NEC 220.83 Existing Dwelling):

Square Feet of Living Area	Sq.Ft.
Sq.Ft. of Living Area x 3va	
Kitchen Special @ 1,500	
Refrigerator @	
Laundry @	
Range @	
Water Heater	
Dishwasher	
Garbage Disposal	
Clothes Dryer	
AC/AHU	
Other Loads	
TOTAL	
First 8k @ 100% =	
Remaining @ 40% =	Remaining @ 40% =
TOTAL	

EXAMPLES:

3,726 Sq. Ft
11,178
2 Kitchen special @ 3,000
1 Refrigerator @1,500
1 Laundry @1,500
1 Range @8,000
4,500
1,440
960
5,000
Shedding- See Below*
37,078
First 8k @ 100% = 8,000
Remaining 29078 @ 40% = 11,631
19,631
19631 / 240 = 81.79 amps

Provide Load shedding description and/or schematic.

*The A/C systems are not included in these calculations because they will be added to the load shed portion of the transfer switch.

Note: Manual Transfer Equipment NEC. 702.5(B)(1)

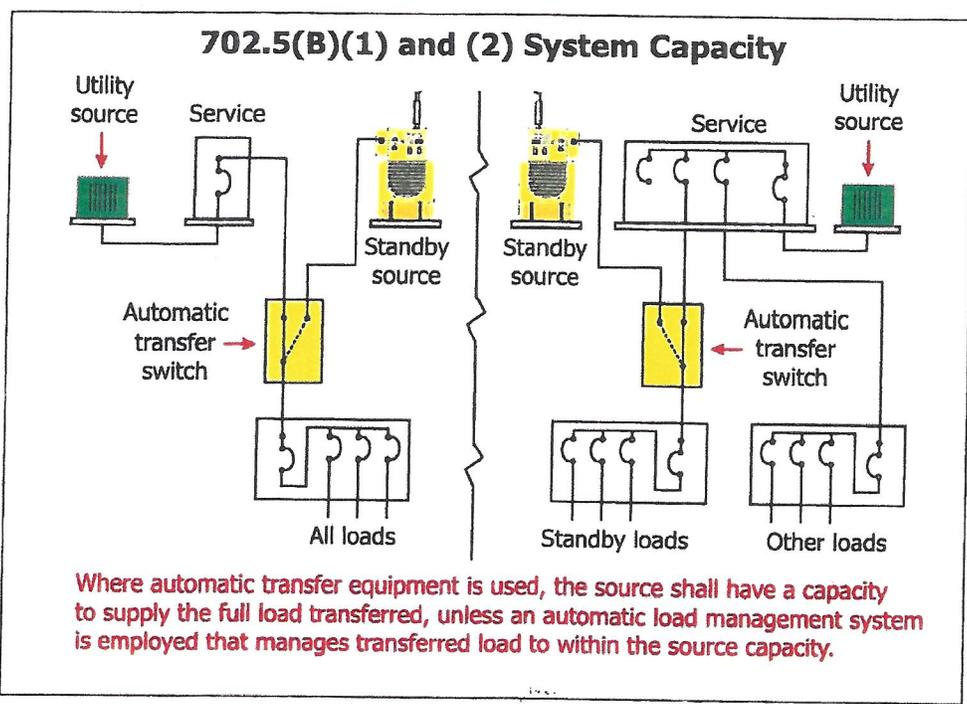
702.5

Capacity and Rating
NEC, p. 611

Proposal 13-168
Log 2741
ROP, p. 782

Comment 13-255
Log 114
ROC, p. 470

REVISION!



Analysis and Effect

Recent natural disasters and events have resulted in the increase in generator installations for commercial and industrial applications and, specifically, for residential applications. These revisions provide clear direction about the capacity requirements of an optional standby source that uses automatic transfer. Substantiation with the proposal indicated that automatic transfer equipment is being installed with generators that have a capacity much less than the total load (often an entire panelboard) being transferred. There have been significant inconsistencies in interpretation of the minimum requirements that apply to automatic transfer switches applied in these situations. The revisions now require the standby source to have a minimum capacity to supply the full load that is transferred by an automatic transfer switch, unless there is a load management system employed that controls the amount of connected load on the standby power source. This revision provides needed clarification that should result in designs and installations of optional standby systems that provide sufficient source capacity that is directly related to the type of transfer equipment selected and load management system employed.

Change at a Glance

Where optional standby sources are installed using automatic transfer equipment, the source must be able to carry the entire load served, unless automatic load management systems are installed.

Code Language

702.5

Capacity and Rating

(A) Available Short-Circuit Current. Optional standby system equipment shall be suitable for the maximum available short-circuit current at its terminals.

(B) System Capacity. The calculations of load on the standby source shall be made in accordance with Article 220 or by another approved method.

(1) Manual Transfer Equipment. Where manual transfer equipment is used, an optional standby system shall have adequate capacity and rating for the supply of all equipment intended to be operated at one time. The user of the optional standby system shall be permitted to select the load connected to the system.

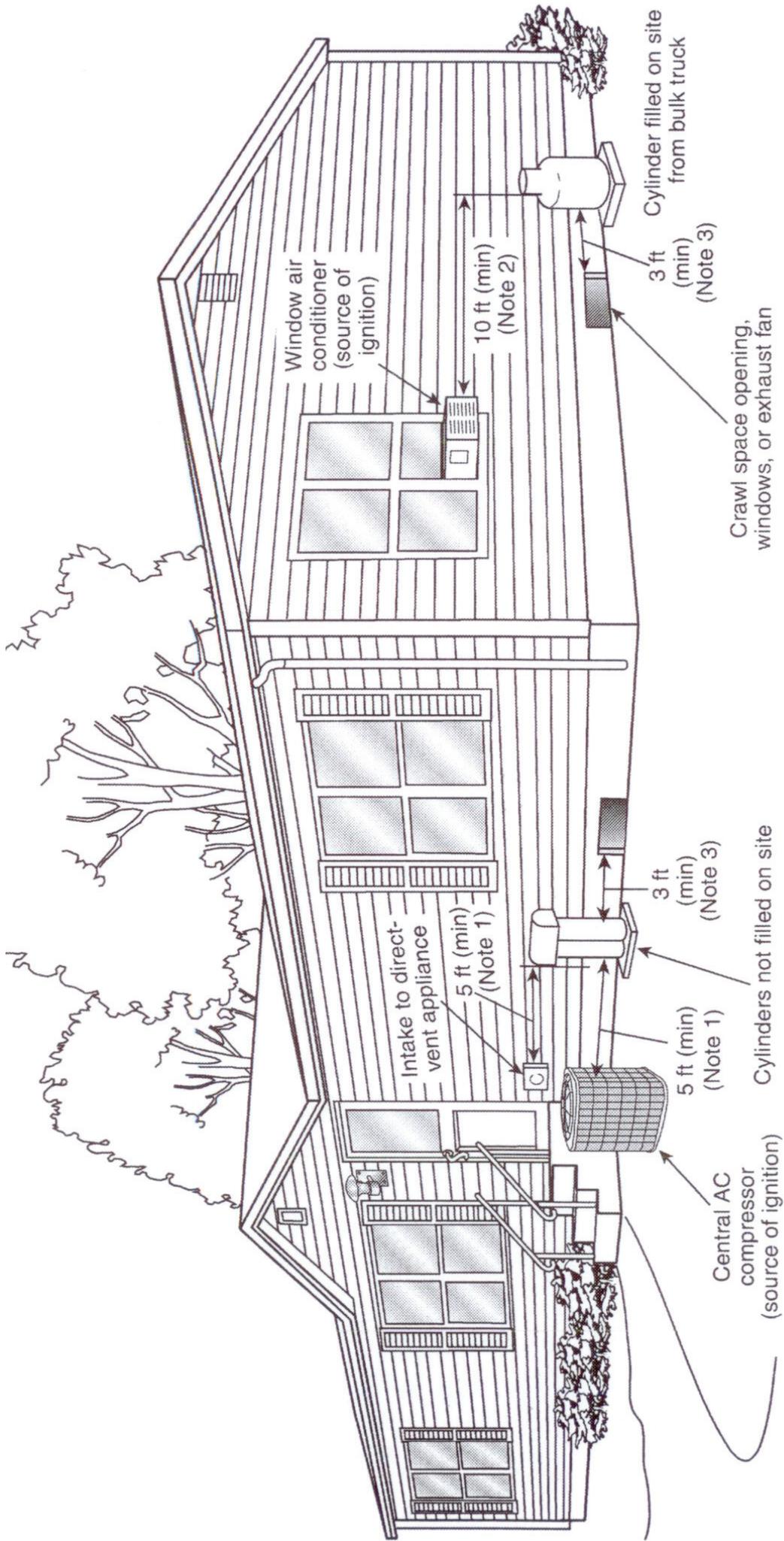
(2) Automatic Transfer Equipment. Where automatic transfer equipment is used, an optional standby system shall comply with (2)(a) or (2)(b).

(a) Full Load. The standby source shall be capable of supplying the full load that is transferred by the automatic transfer equipment.

(b) Load Management. Where a system is employed that will automatically manage the connected load, the standby source shall have a capacity sufficient to supply the maximum load that will be connected by the load management system.

Summary of Change

This section has been revised and reorganized to provide a logical layout and clarify the requirements. The revisions include rearranging the requirements into a list format that conforms to Section 2.1.5.1 of the *NEC Style Manual*.

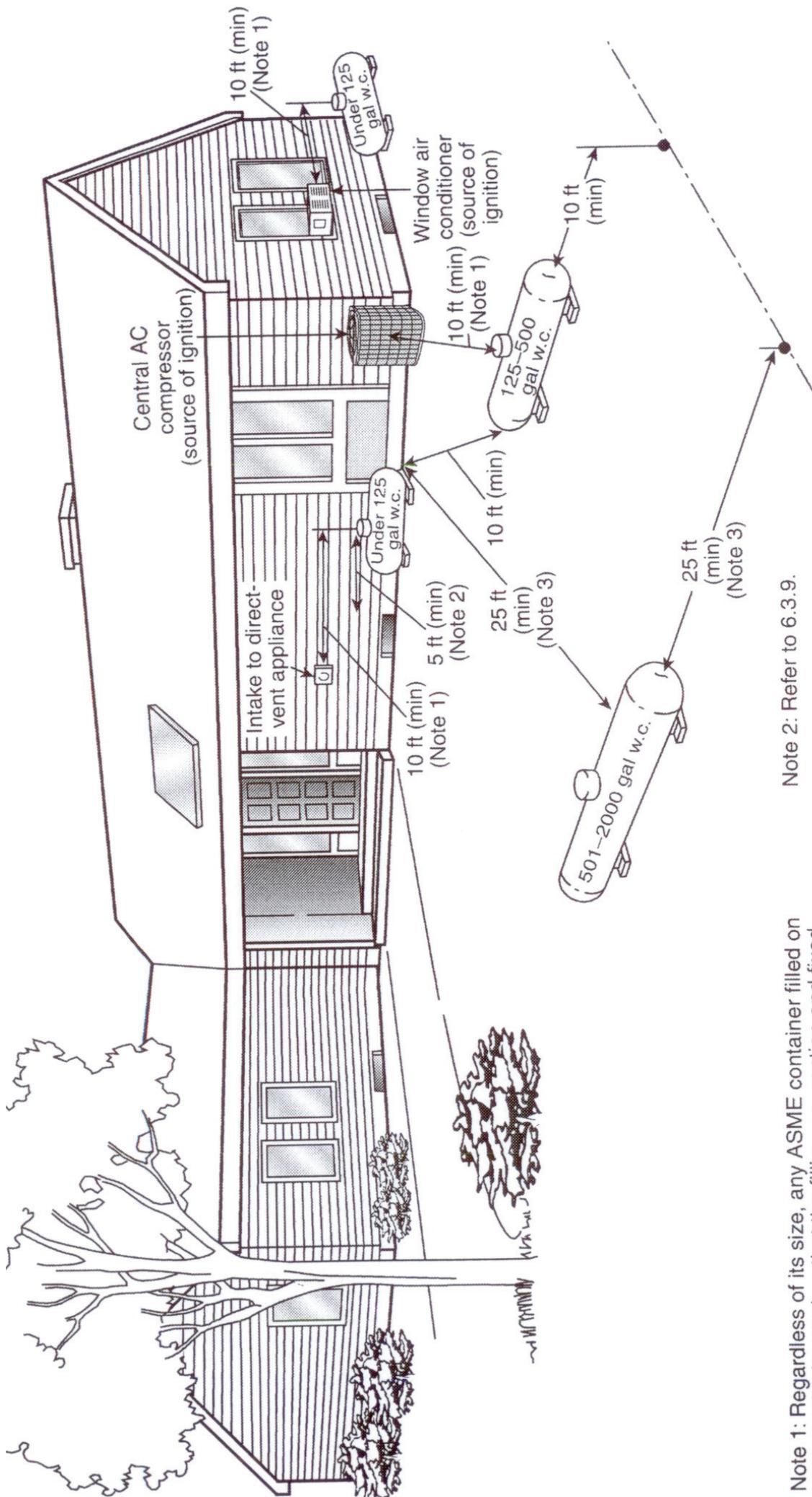


For SI units, 1 ft = 0.3048 m

Note 1: 5 ft minimum front relief valve in any direction away from any exterior source of ignition, openings into direct-vent appliances, or mechanical ventilation air intakes. Refer to 6.3.7(2).

Note 2: If the cylinder is filled on site from a bulk truck, the filling connection and vent valve must be at least 10 ft from any exterior source of ignition, openings into direct-vent appliances, or mechanical ventilation air intakes. Refer to 6.3.10.

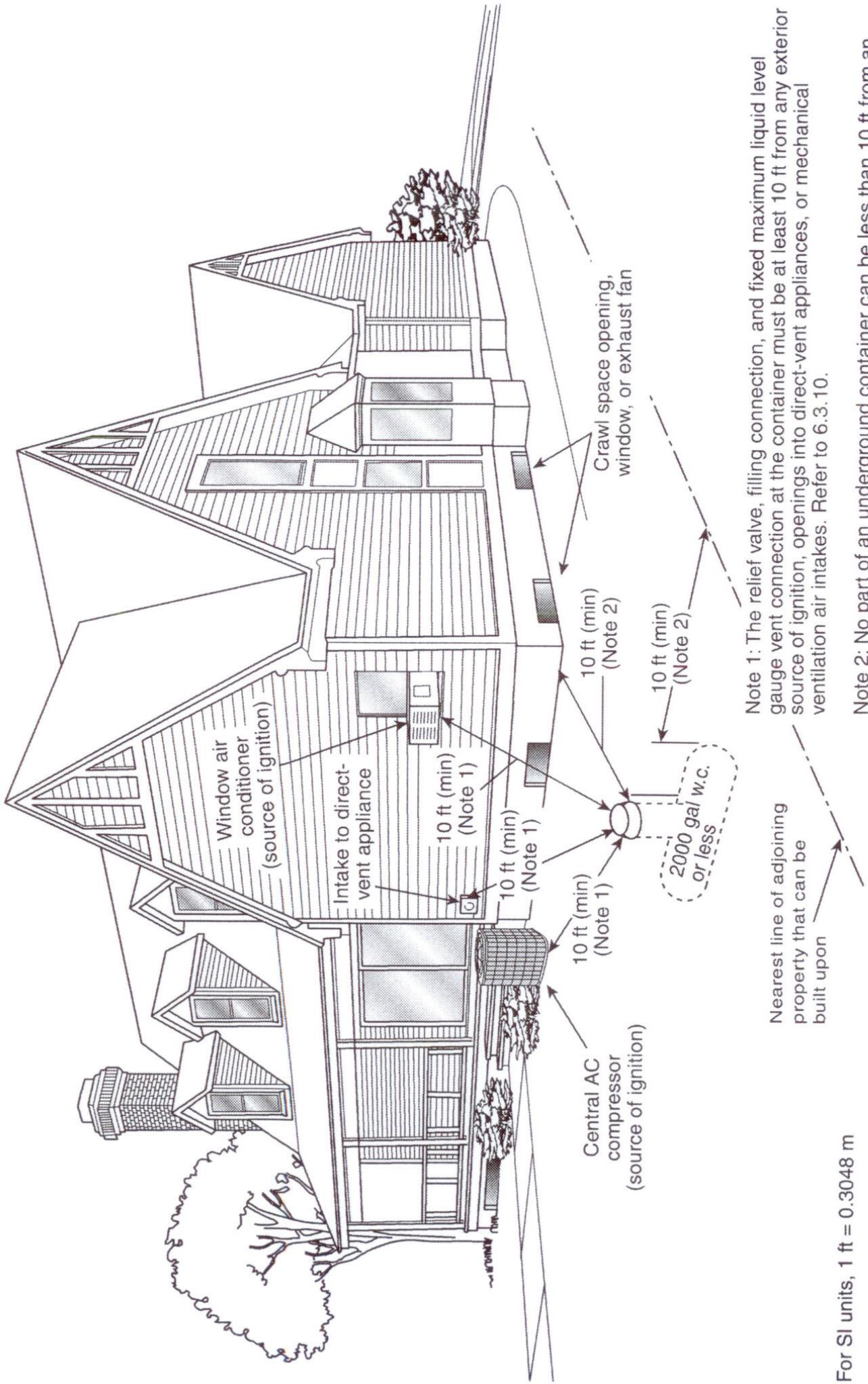
Note 3: Refer to 6.3.7(1).



Note 2: Refer to 6.3.9.

Note 3: This distance can be reduced to no less than 10 ft for a single container of 1200 gal (4.5 m³) water capacity or less, provided such container is at least 25 ft from any other LP-Gas container of more than 125 gal (0.5 m³) water capacity. Refer to 6.3.3.

Note 1: Regardless of its size, any ASME container filled on site must be located so that the filling connection and fixed maximum liquid level gauge are at least 10 ft from any external source of ignition (e.g., open flame, window AC, compressor), intake to direct-vented gas appliance, or intake to a mechanical ventilation system. Refer to 6.3.10.



For SI units, 1 ft = 0.3048 m