

# ***Uniform Dwelling Code***



***2017 Updates***

***SPS 323***

**HEATING, VENTILATING  
& AIR CONDITIONING  
STANDARDS**

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# UDC HVAC Update Summary

- ▣ **Plan Review and Permit Issuance Process**
- ▣ **Rough Inspection**
- ▣ **Final Inspection**

# *HVAC Code Purpose*

## *Safety, Comfort, Function*

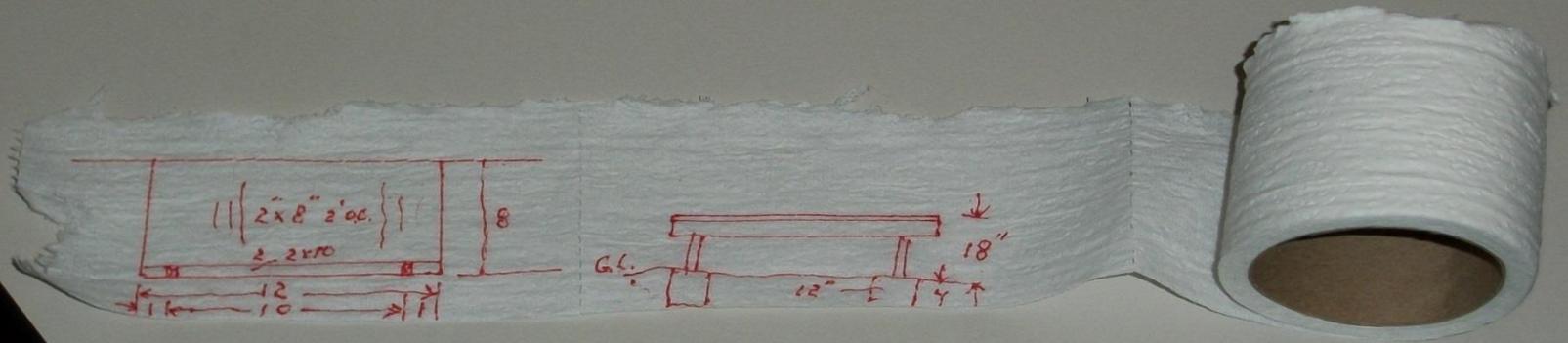
### **SPS 323 HVAC**

- **Scope**
- **Design**
- **Heating Equipment**
- **Delivery System**
- **Chimneys and vents**
- **Fuel Supply Systems**
- **Equipment Location and Operation**

# SMACNA Stds. in 320.24

SMACNA	Sheet Metal and Air Conditioning Contractors' National Association 4201 Lafayette Center Drive Chantilly, VA 20151-1219 <a href="http://www.smacna.org">www.smacna.org</a>
<b>Standard Reference Number</b>	<b>Title</b>
1. Seventh Edition, 1998	Residential Comfort System Installation Standards Manual
2. Seventh Edition, 2003	Fibrous Glass Duct Construction Standards
3. Third Edition, 2005	HVAC Duct Construction Standards — Metal and Flexible

# First Thing - Get Good Plans!

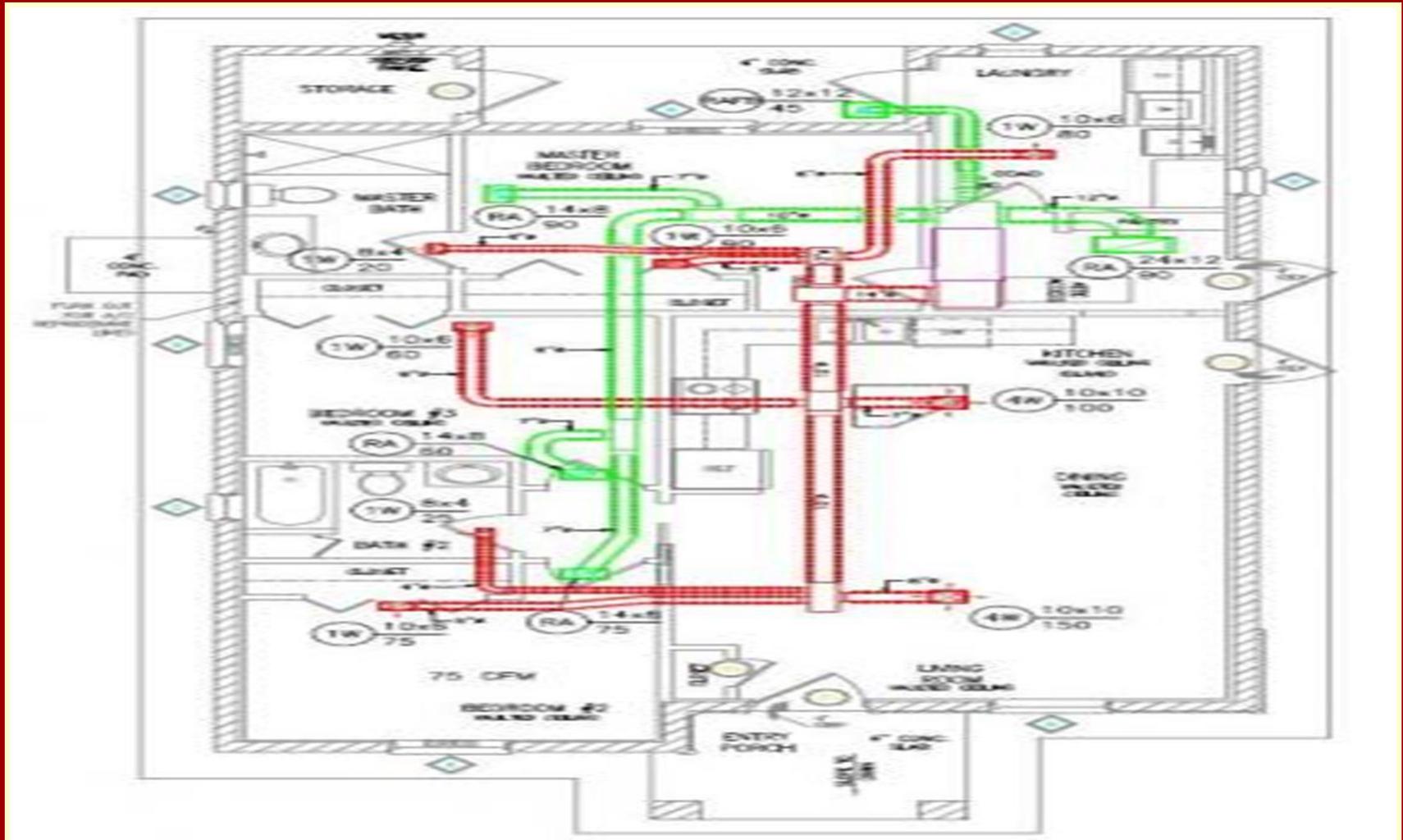


10/28/2016

# ***SPS 320.09 UDC HVAC Plan Review***

- ▣ **Necessary Plan Information to Include:**
  - **Names and Credential #s of HVAC Contractor**
  - **Design Data & Heat Loss Calculations (RESCheck)  
Needed for Sizing Furnace with Designer's  
Signature**
  
  - **Equipment/Component Data**
    - **Fuel Type & Usage Rate; Electrical Data; CFM**
    - **Testing Lab Listing Information**
    - **Location of Installation**
    - **Specifications for Ducts, Support, Insulation, Control**

# Ductwork plans included in plan submittal, reviewed as part of the permit issuance process



# ***Compliance Tools***

For latest version of ***RESCHECK*** :

- SPS 322.31(2)(b) RESCheck v.4.6.2.0, use “IECC 2009” as code ref. for envelope compliance
- Use Wisconsin 2009 UDC for BTU Load Calculations

# Stand Alone Load Calculator

## Based on Calculated UA Value

### How To Use the Heating Equipment Sizing Summary

Heating Equipment Sizing Summary		
General Information		
Project Name/Address	Test House	
County	Marathon	
Design Temperature	-20	Degrees (F)
"Your UA" from ResCheck	238	UA
Conditioned Floor Area	2320	SqFt
Average Wall Height	9	Ft
Infiltration Rate	0.50	ACH (typ 0.50)
Equipment Oversizing Factor	15	%
Load Summary		
Conductive Losses	21420	Btu/Hr
Infiltration Losses	16913	Btu/Hr
Oversizing Factor Losses	5750	Btu/Hr
<b>Total Building Heating Load</b>	<b>44083</b>	<b>Btu/Hr</b>
Enter Items in Yellow to get your total Heat Loss. Print and attach with your completed ResCheck Form		



REScheck Software Version 4.6.2

## Compliance Certificate

Project: Test House

Energy Code: 2009 IECC  
 Location: Wausau, Wisconsin  
 Construction Type: Single-family  
 Project Type: New Construction  
 Orientation: Brdg. faces 0 deg. from North  
 Conditioned Floor Area: 2,320 ft<sup>2</sup>  
 Glazing Area: 10%  
 Climate Zone: 6 (8427 HDD)  
 Permit Date:  
 Permit Number:

Construction Site:                      Owner/Agent:                      Designer/Contractor:

**Compliance: Passes using UA trade-off**

Compliance: **4.0% Better Than Code**                      Maximum UA: 248                      Your UA: 238

The % Better or Worse Than Code Index reflects how close to compliance the house is based on code trade-off rules. It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.

# *SPS 323 Heating, Ventilating and Air Conditioning Plan Review*

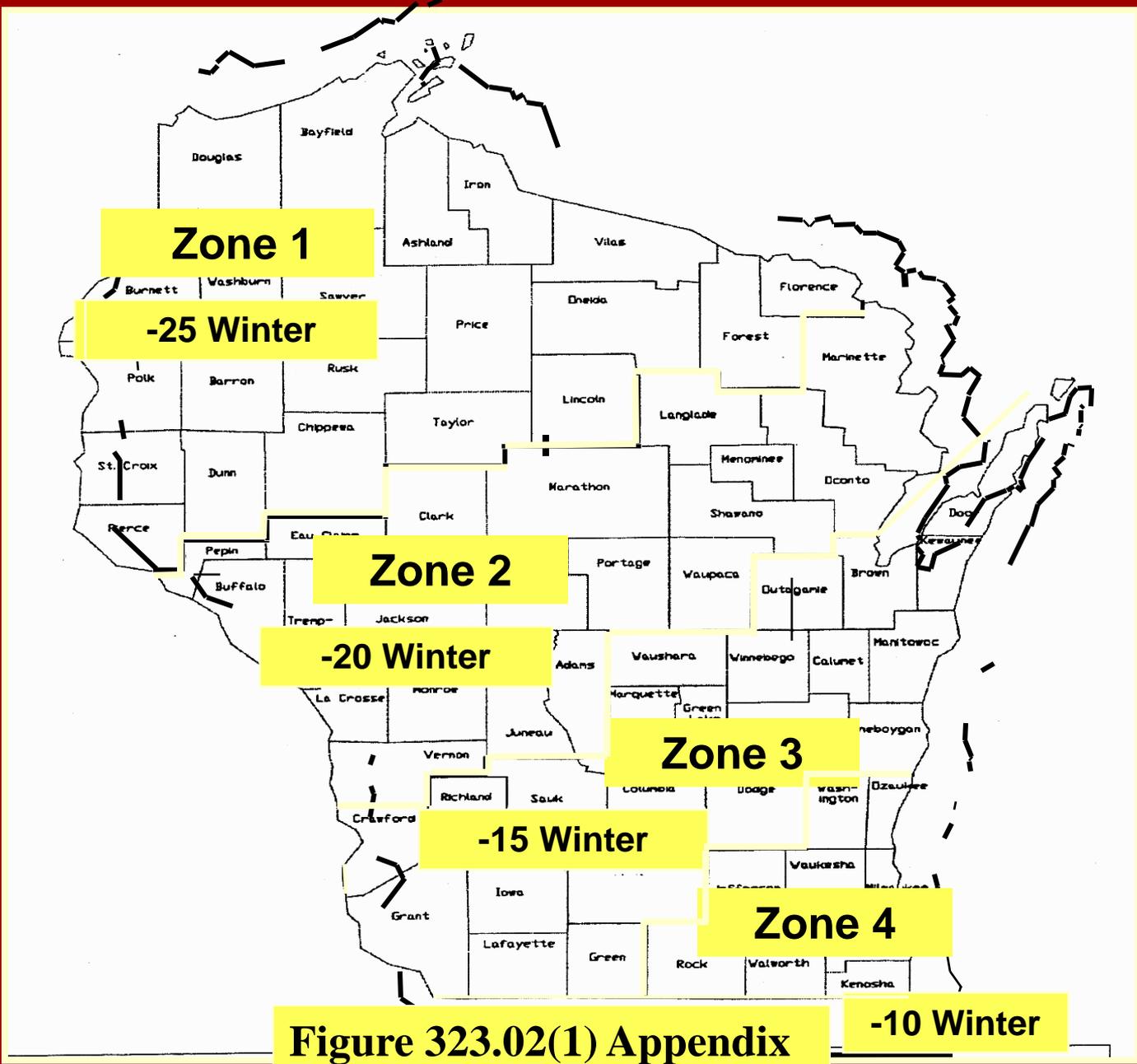
- (1) HEATING AND COOLING SYSTEM DESIGN.
  - (a) The heating and cooling systems shall be designed to maintain the indoor design temperature at the outdoor design condition.
  - (b) *When requested*, room-by-room heat loss and heat gain calculations shall be furnished.

**Needed for special circumstances:** An area that has greater exposure to heat loss

Bonus Room

Four Season Porch

Cantilevered Room



**Zone 1**

**-25 Winter**

**Zone 2**

**-20 Winter**

**Zone 3**

**-15 Winter**

**Zone 4**

**-10 Winter**

**Figure 323.02(1) Appendix**

# *SPS 323.02 Does a “Recreational Dwelling” need a heating system?*

- ❑ No, if it is used only during the non-heating season, and no cooling system is installed, compliance with Ch. 322 would not be required, and no heating system would be required. However, it would have to be retrofitted to meet Ch. 322 & 323 standards before it could be heated and/or cooled and used for year-round use in the future.



# ***SPS 320.09 UDC HVAC Plan Review***

- **Plan Review Key Points:**
  - **SPS 323.02(3) Ventilation**
    - **Exhausts must terminate outside the structure**
    - **Mechanical systems must be balanced**
    - **Passive air intake ducts sized to provide at least 40% of the total air that could be exhausted with all exhaust ventilation acting simultaneously**
  - **Note required clearances to combustible materials from appliances**
  - **HVAC Plans should match building plans**

# *SPS 323.09*

## *Dampers, Registers & Grilles*

### *Plan Review and Inspection*

- **At least one return air opening shall be provided for each floor**
  - Return air grilles shall not be located in bath rooms, kitchens garages, utility spaces or a confined space

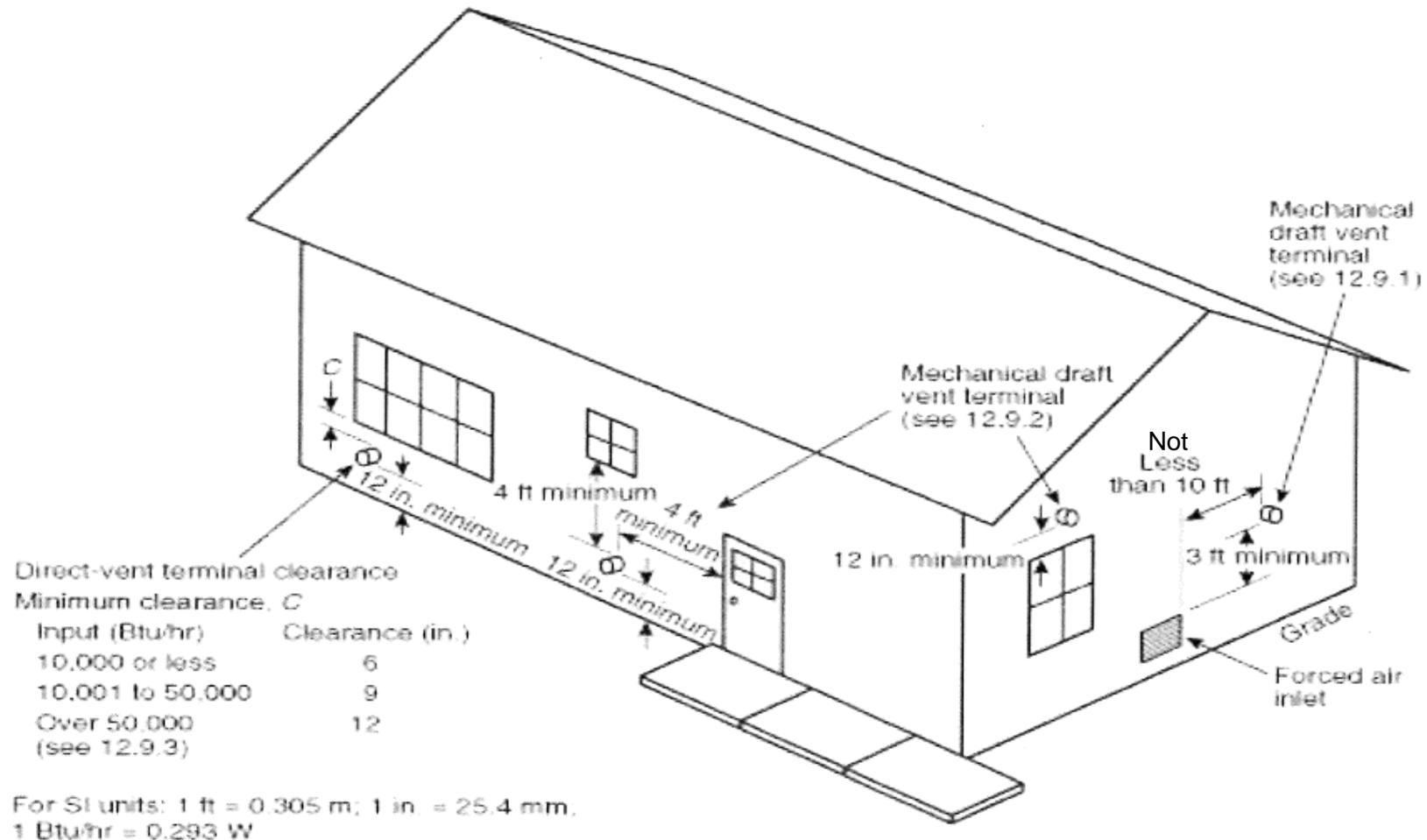
# ***SPS 323.02(3)(4) Infiltration Plan Review***

- ▣ **(a) Infiltration may be considered as makeup air for balancing purposes only where there are no naturally vented space- or water-heating appliances in the dwelling.**
  
- ▣ **(b) For the purpose of complying with this subdivision, naturally vented space- or water-heating appliances are those that take combustion or dilution air from inside the dwelling, including unsealed fireplaces and draft hood appliances with power venting.**

# ***SPS 323.02(3) Ventilation Plan Review***

- ▣ **(a)1. All exhaust vents shall terminate outside the structure**
- ▣ **(d)1. Any room with a toilet, tub or shower shall be provided with 50 cfm intermittent or 20 cfm continuous exhaust ventilation**

# Vents Properly Located



**Exit Terminals of Mechanical Draft and Direct-Vent Venting Systems.**

# *SPS 323.06(1)*

## *Combustion Air*

### *Applications*

#### *Plan Review*

- ▣ **(a) Applies to naturally vented appliances requiring combustion taken from within the building**
- ▣ **(b) Does not apply to direct vent sealed combustion appliances installed per manufacturer instructions & listing**

# ***SPS 323.06(5) Combustion and Make-up Air***

*Defined*

- ▣ **Combustion Air: Air available for fuel burning purposes**
- ▣ **Make-Up Air: Air available for pressure balancing purposes**
- ▣ **Both can be provided simultaneously**  
**Typically provided by mechanical means**  
**(HRVs , etc.)**

# ***SPS 323.06 Methods for Providing Combustion Air***

## ***Plan Review***

- ▣ **Inside the Building**
  - **If vapor retarder is not continuous on exterior walls and ceiling per SPS 322.38**
  - **In accordance with SPS 323.06(3)**
  
- ▣ **Outside the Building**
  - **In accordance with SPS 323.06(4)**
  
- ▣ **Engineered System Approved by the Department**

# *SPS 323.06(3) Combustion Air from Inside the Building*

## *Discontinuous Vapor Barrier*

*EX: Box Sills or Below Grade Walls*

- ▣ Equipment shall be located in a space with a volume  $\geq 50 \text{ ft}^3$ . per 1000 Btu/hr of combined input rating in accordance with SPS 323.06(3)
- ▣ Area can be made up of connected rooms if all of code reqs. are met.
- ▣ Net free area of each opening (between rooms) shall be a minimum of one sq. in. per 1000 Btu/hr of combined input rating, but not less than 100 in<sup>2</sup>.

# ***Combustion Air Drawn From Utility Room***

**Gas-fired furnace** (100,000 BTU input).

**Gas-fired water heater** (33,000 BTU input).

**Utility room** 12' by 5.5' = 66ft<sup>2</sup>

**Remainder of basement** = 934 ft<sup>2</sup>

**Height of room** (from sections dwg) = 7'6"

+ 9.25" Joist Depth

Height = 8.27'

66ft<sup>2</sup> \* 8.27ft = 545ft<sup>3</sup>

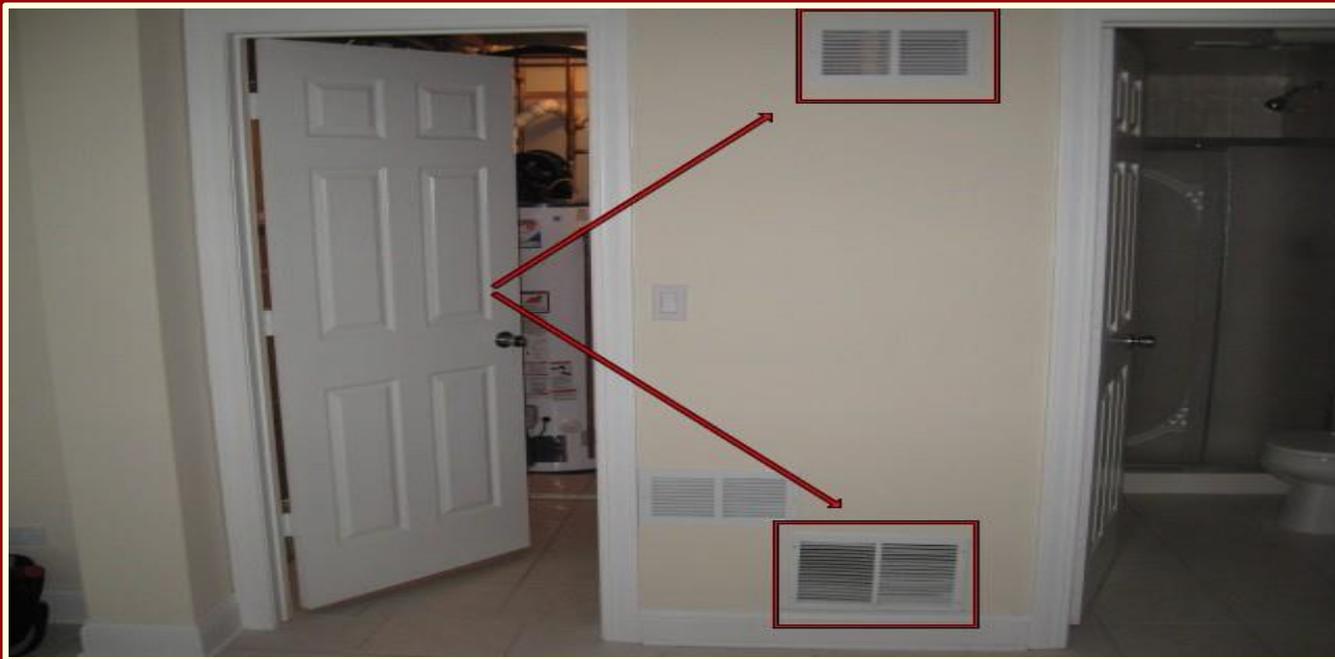
**Min. Vol.** =  $\frac{100,000\text{BTU} + 30,000\text{BTU}}{1000 \text{ BTU}} * 50\text{ft}^3 = 6650 \text{ft}^3$

**545ft<sup>3</sup> < 6650ft<sup>3</sup>    Must Use a Different Method**

# *SPS 323.06(3) Combustion Air from Inside the Building*

## *Inspection*

- (b) When needed to connect rooms, two openings shall be provided:
  - One within 1 foot of the ceiling of the room;
  - One within 1 foot of the floor of the room
  - Follow code reqs. 323.06(5) for net free area



# ***Combustion Air Drawn***

## ***From Utility Room and Whole Basement***

**Volume of Room = 1000ft<sup>2</sup> \* 8.27ft = 8270ft<sup>3</sup>**

**8270 ft<sup>3</sup> > 6650 ft<sup>3</sup> OK**

**Needed: 1 in<sup>2</sup>/1000 BTU**

**Two openings > 100 in<sup>2</sup>**

**100,000 BTU + 33,000 BTU = 133 in<sup>2</sup>**

**1000 BTU**

**2 - 1 ft<sup>2</sup> openings = 144 in<sup>2</sup> each OK**

# *SPS 323.06(4) Combustion Air from Outside the Building Plan Review*

- ▣ **One of 3 Methods of Providing Combustion Air Shall be Used**
  - **(b) Two openings of adequate size directly to outdoors through a horizontal or vertical duct:**
    - ▣ **One opening within 1 foot of the ceiling of the room;**
    - ▣ **One opening within 1 foot of the floor of the room**
      - ▣ **Follow code reqs. for net free area**

# *SPS 323.06(4) Combustion Air from Outside the Building cont'd*

## *Plan Review*

- (c) Where all appliances drawing air from the room for combustion are gas appliances, air may be drawn from the outdoors through a single properly sized opening
  - The opening shall be located within 1 foot of the ceiling of the room
    - Follow code reqs. for net free area
  - Appliances shall have minimum clearances per SPS 323.06(4)(c)4

# *SPS 323.06(4) Combustion Air from Outside the Building cont'd*

## *Plan Review*

- (d) A combination of properly sized openings to the outside and openings to other rooms may be used in accordance with SPS 323.06(4)(d)
  - Equipment shall be located in a space with a volume  $\geq 50 \text{ ft}^3$ . per 1000 Btu/hr of combined input rating
  - Follow code reqs. for net free area
  - Cross-sectional area of a duct, if used, shall be  $\geq$  the required size of the opening

# Single Outdoor Opening

The minimum size of the single opening is determined as follows:

$$\text{Minimum Opening Area} = \frac{133,000 \text{ BTU}}{3,000} = 44 \text{ in}^2$$

Proposed Opening: 8" round duct w/ 50 in<sup>2</sup> OK

Must Not Be Less Than Combined Flue Collar Areas:

Water heater : 3" diam. collar  $3.14(1.5)^2 = 7 \text{ in}^2$  in area.

Furnace: 6" diam. collar  $3.14(3)^2 = 28 \text{ in}^2$  area.

The combined area is  $7 \text{ in}^2 + 28 \text{ in}^2 = 35 \text{ in}^2$  - OK

# Optional Uniform Dwelling Code (UDC) Makeup and Combustion Air Worksheet (1/12/09)

## From Code Commentary 323

**1. Inside Air (Discontinuous Vapor Retarder):** Allows combustion air to be drawn from an inside space if the building has a discontinuous vapor barrier, as is permitted at box sills by s. 322.38(2)(c)2. The space shall provide a room volume of at least 50 cubic feet per 1000 btu/hr combined input rating of all open combustion appliances in that space. **Room Interconnection:** An inside space may include several rooms if connected with **high and low openings**, with each opening providing one square inch of clear opening per 1,000 btu/hr input rating, but not less than 100 square inches each. Remember to apply the above Opening Restriction Factors for louvers on the openings.

**Room Interconnection:**

Net Sq. In Req'd at Input/1,000: \_\_\_\_\_ (Min. 100 in<sup>2</sup>) ÷ \_\_\_\_\_ (Opg. Restr. Factor) = \_\_\_\_\_ sq. in. each opg;

**2. Inside & Outdoor Air (Continuous Vapor Retarder):** If dwelling has a continuous vapor barrier, and therefore cannot use method 1 of taking all air from inside, but per the above table has a room volume of at least 50 cubic feet per 1000 BTU/hr combined appliance input rating, then provide supplemental outside air via a single, direct or ducted, exterior, high opening, sized at one square inch per 5,000 btu/hr combined input rating.

Appl Group# \_\_\_\_\_

**3. Single Outdoor Opening (Gas Appliances Only):** If serving only gas appliances, then provide outdoor air via a single, direct or ducted, exterior, high opening sized at one square inch per 3,000 BTU/hr combined input rating, but not smaller than the combined cross sectional areas of the appliance flue outlets in that space.

Appl Group# \_\_\_\_\_ a. Sizes & areas of flues: \_\_\_\_\_ Total flue area: \_\_\_\_\_ sq in.

\_\_\_\_\_ b. Net Sq. In. Required at Input/3,000: \_\_\_\_\_ sq in..

Greater of a. or b.: \_\_\_\_\_ ÷ \_\_\_\_\_ (Opg. Restr. Factor)= \_\_\_\_\_ sq. in.; Planned Opg. Dim.: \_\_\_\_\_

# Automatic or Gravity Dampers

## SPS 322.47(1) (created)

- ▣ Mechanical ventilation for outdoor air intakes & exhausts require automatic (motorized) or gravity dampers that close when the ventilation system is not operating.



# *About Those Kitchen Hoods: Danger of Untempered Make-Up Air for Combustion*

- **Duct Run For Make –Up Air Should Be Long As Possible to “Temper”**

Fine Method for Typical Exhaust Hoods and Bathroom Fans....However

- **Use of Larger Kitchen Hoods Pose a Real Risk**

Cold “Untempered” Outside Air Can Cause Heat Exchangers to Crack

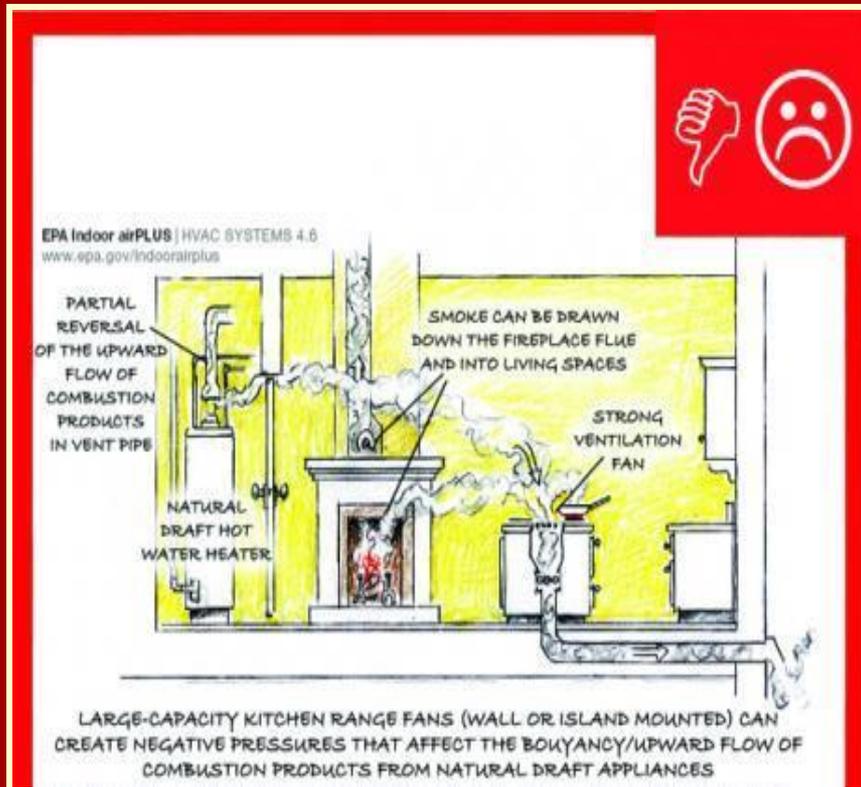
Pre-Mature Equipment Failure

Carbon Monoxide (CO) Health Risk (Backdrafting)

# Large Capacity Range Hoods

Create Negative Pressure

Causing Other Appliances to Backdraft Exhaust



# *Large Kitchen Hoods*

*VS*

# *Typical Range Hood*

*Plan Review*

- ▣ 2000 ft<sup>2</sup> House
- ▣  $2000\text{ft}^2 * 8\text{ft (ceiling ht)}/60 \text{ min} = 266 \text{ cfm} = 1 \text{ ach}$
- ▣ 0.5 ach derived from infiltration
- ▣  $266 \text{ cfm} * 0.5 = 133 \text{ cfm infiltration}$
- ▣ “Traditional” range hood=150-200 cfm
- ▣ Are there appliances requiring combustion air from the inside?

# *Large Cap. Hoods: Danger of Untempered Make-Up Air for Combustion*

- **323.04(1)(b) requires installation and maintenance of gas fueled appliances comply with the listing and requirements of NFPA 54, National Fuel Gas Code**
- **Must Address the Manufacturer's Supply Rate of the Furnace, and Design Temp for the Area**
- **Rule of Thumb Assumption: 20% Outside Supply Air  
80% Return Supply Air**

**Do Not Exceed 20% Outside Air Supply**

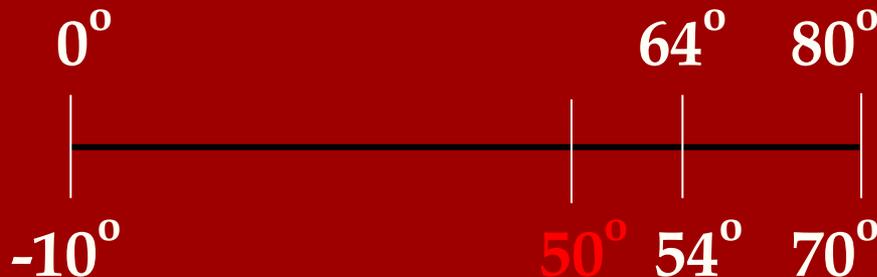
- **Many Furnace Manufacturers Will Not Back Warranties If Supply Air is Less Than 50°F**

# *Danger of Untempered Make-Up Air for Combustion*

**Given:** Total Furnace Air Supply 2000 cfm  
20% Outside Supply Air (cold)  
80% Return Supply Air (warm)

**Design Temp**  $-10^{\circ}\text{F}$  **Room Temp**  $70^{\circ}\text{F}$   $T_d = 80^{\circ}\text{F}$

$$\frac{400 \text{ cfm}}{2000 \text{ cfm}} * (0^{\circ}\text{F}) + \frac{1600 \text{ cfm}}{2000 \text{ cfm}} * (80^{\circ}\text{F}) = 64^{\circ}\text{F}$$



# Addressing the Issue Tempered Make-Up Air

Untempered make-up air not addressed in  
the code per se BUT.....

**Install Furnace Per the Listing**

**If not... It's a Risky Gambit That Can  
Cause a Heat Exchanger to Crack**

**Whose Responsible?**

# Addressing the Issue Tempered Make-Up Air

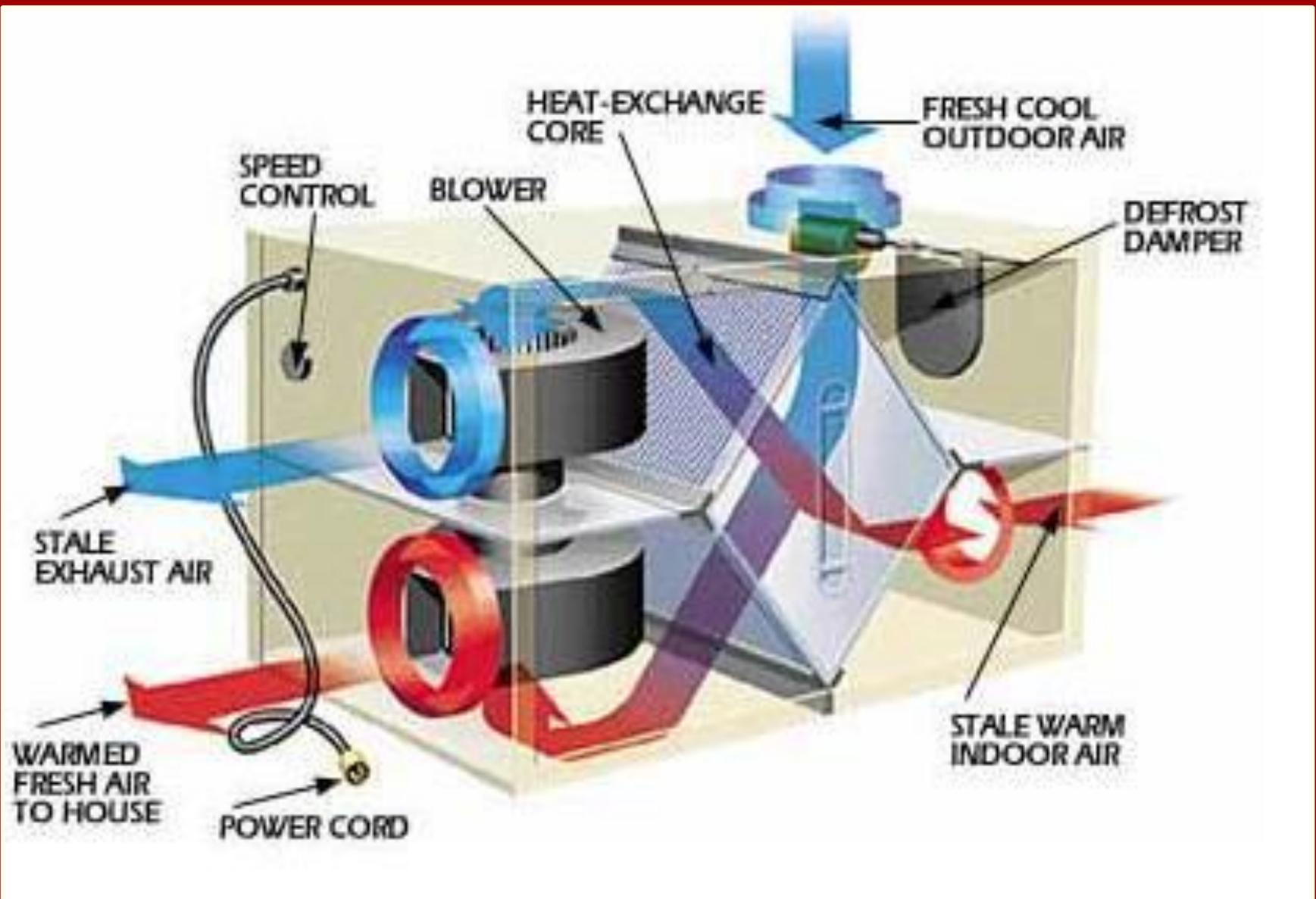
- ▣ **Maintain Adequate Duct Length From Intake to Furnace**  
(rule of thumb, as far away as possible)
- ▣ **In Line Duct Heater (installed per listing)**



# *HRV: Heat Recovery Ventilator*



# HRV: Heat Recovery Ventilator



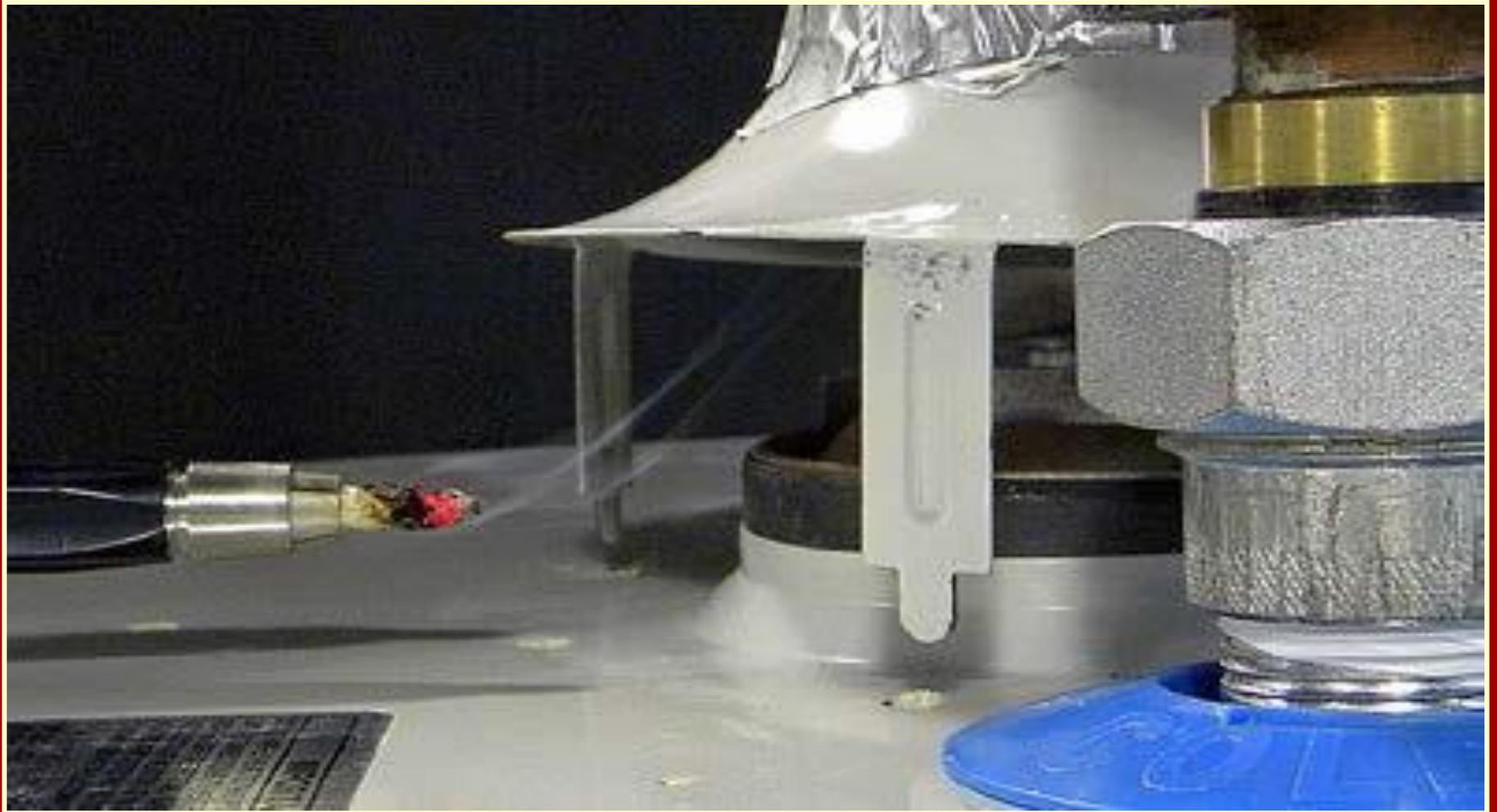
# *SPS 323.062 Mechanical Draft Systems*

- ▣ Where a mechanical draft system, such as a fan, is used, provision shall be made to prevent the flow of fuel to the main burners when the draft system is not performing to assure safety of the system
- ▣ Applies to direct vent – power vent systems

# *Auto Shut Off Helps In Situations Like This One*

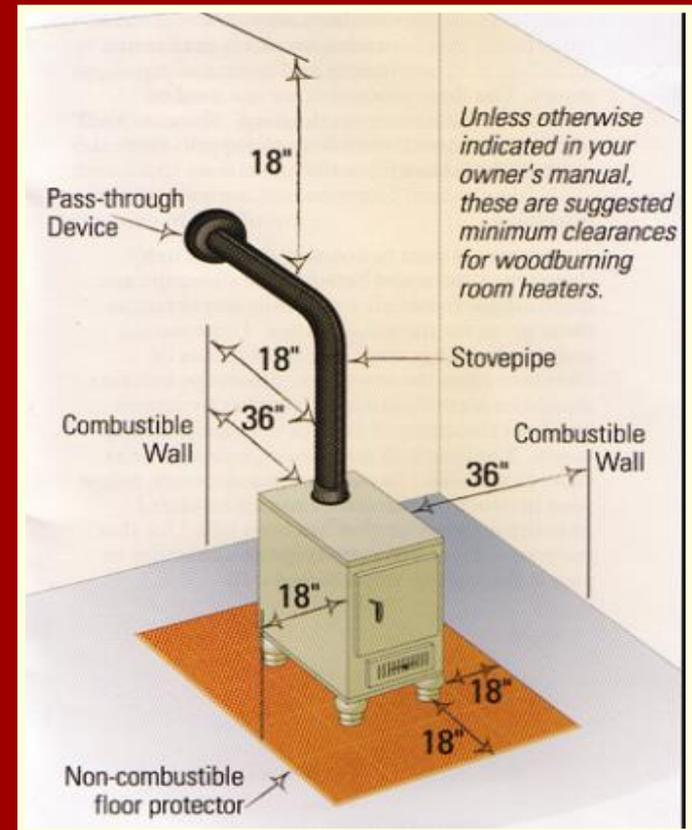
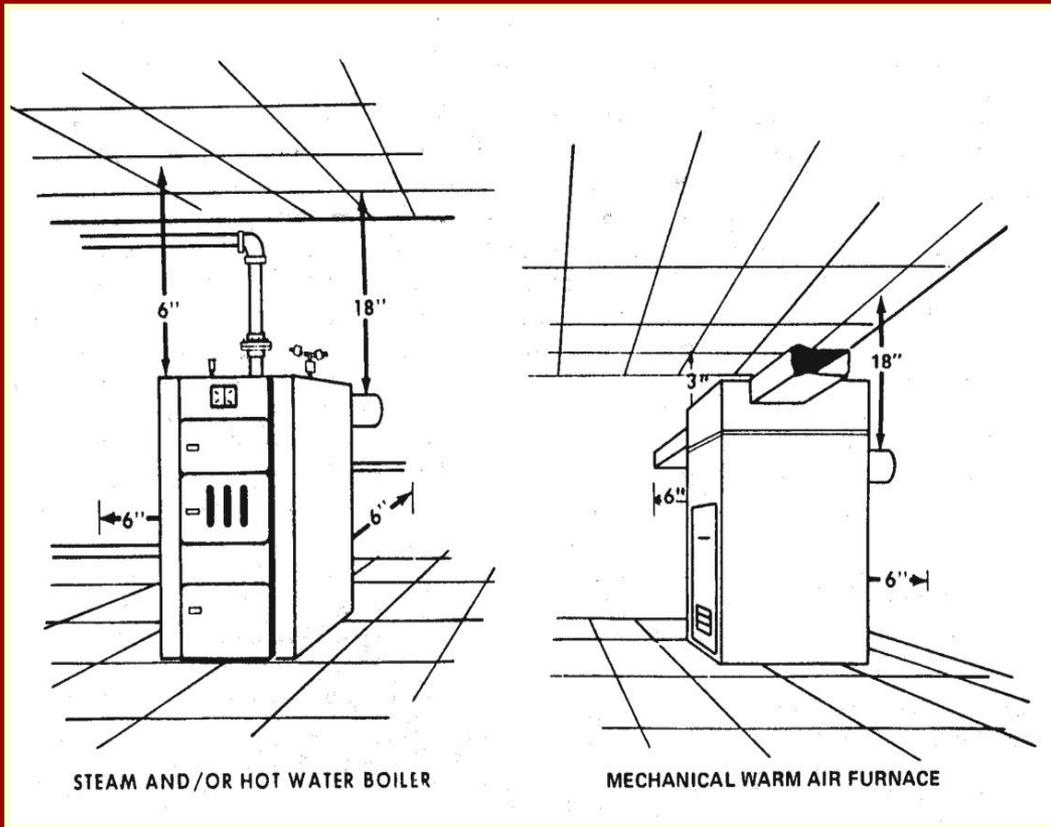


*Naturally drafted water heater installed. Requires combustion safety testing*



# SPS Tables 323.04 - A & B

## Check Installation Clearances



# *SPS 323.04(6) Equipment Location*

## *Plan Review / Inspection*

- ▣ (a) Except as noted in code, no space heating or water-heating appliance shall be installed in a bedroom, bathroom, closet, or garage unless listed for such installation.



# *SPS 323.04(6) Equipment Location*

## *Plan Review / Inspection*

- ▣ (b) Appliances installed in garages: Burners and ignition devices shall be located at least 18 inches above the floor and shall be protected or located so the furnace is not subject to damage from a vehicle.



# *SPS 323.04(6)(c)2. Equipment Location Exceptions Plan Review / Inspection*

- Water heaters may be installed in a closet located in a bathroom or bedroom where:
  - The closet is used exclusively for the water heater,
  - The enclosed space has a weatherstripped solid door with a self-closing device,
  - All air for combustion is obtained from the outdoors.



# *SPS 323.045 Solid Fuel Burning Appliances*

## *Plan Review / Inspections*

- ▣ (2)(b) Garages. Solid-fuel-burning appliances may not be installed in a garage unless listed for that application.



- ▣ (3)(a) Chimneys:
  - 1. Factory-Built Listed Assemblies
  - 2. Masonry Chimneys constructed per 321.30
    - ▣ Additional requirements and conditions apply



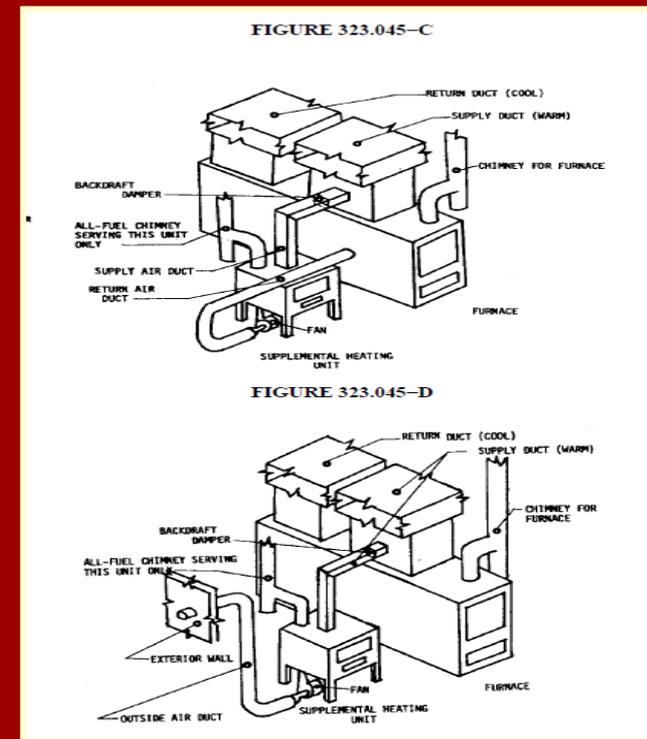
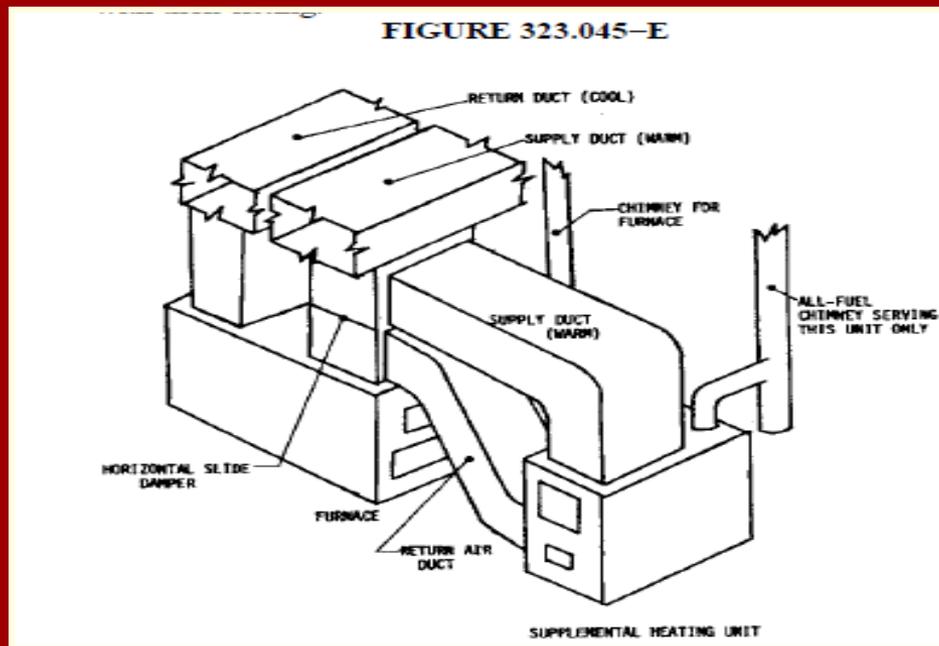
# *SPS 323.045 Solid Fuel Burning Appliances - continued*

- ▣ (3)(b) Wood-burning equipment shall not be connected to a flue serving a fireplace or other equipment.
  - Note that this section does not allow co-venting of solid-fuel appliances. Each fireplace, woodstove, or other solid-fuel appliance must be vented to its own flue.



# SPS 323.045 Solid Fuel Burning Appliances - continued

- ▣ (8) Supplemental solid fuel burning units connected to a furnace shall be connected per Figures 323.045-C to E.



# *SPS 323.05 Safety Controls*

- ▣ High limit, maximum outlet temperature and similar safety controls shall be provided on heating equipment.



# *SPS 323.07(3)*

## *Changes in Duct Sizing*

### *Inspection*



- ▣ Where duct sizes are changed, the slope angle of the transition duct shall not exceed 45°

# Downdrafting Vents Not Permitted



# *Duct Air Flow Issue?*

## *Inspection*

- Couldn't understand why there was no airflow to the room
- Was like this for a number of years and went through several heating contractors

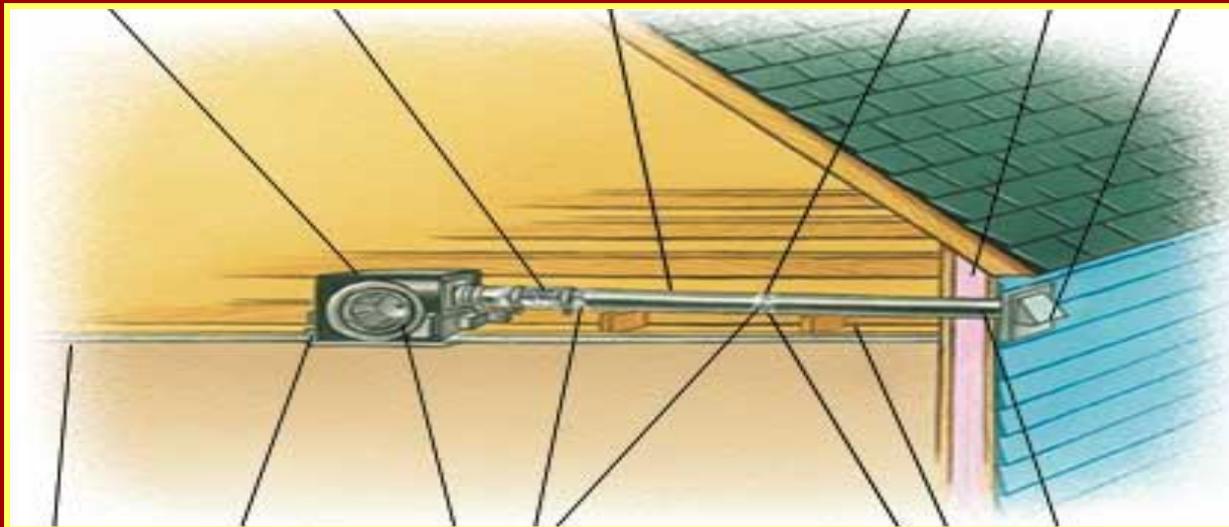


# *SPS 323.08(3)*

## *Exterior Ducts*

### *Inspections*

- ▣ **Ducts which are located in garages, storage attics and similar spaces susceptible to physical damage, shall be constructed of galvanized steel or corrosion-resistive metal**



# Supply Ducts In Garages

## SPS 323.09(1)(b)

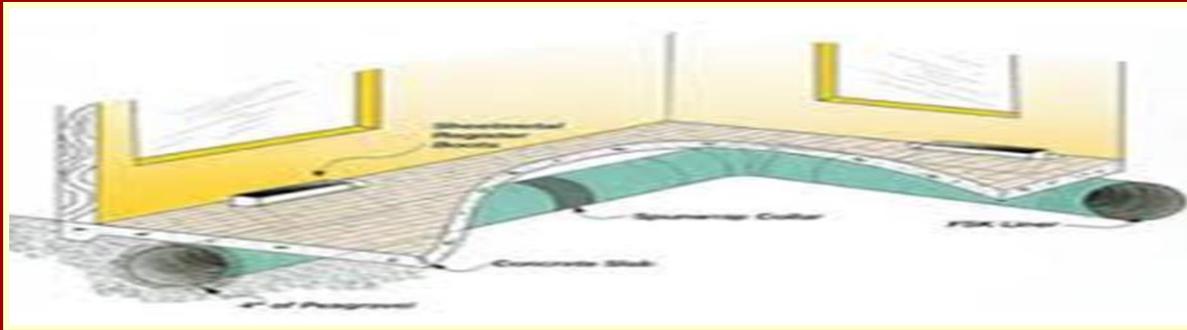
- ▣ May not terminate in a garage unless a backdraft damper is provided



# SPS 323.08(4)

## *Underground Ducts*

- Ducts, plenums and fittings constructed of metal encased in concrete or ceramic, may be installed in the ground



- Supply air ducts shall be insulated with a moisture proof material having a resistance value of at least R-8 unless contained completely within the dwelling thermal envelope

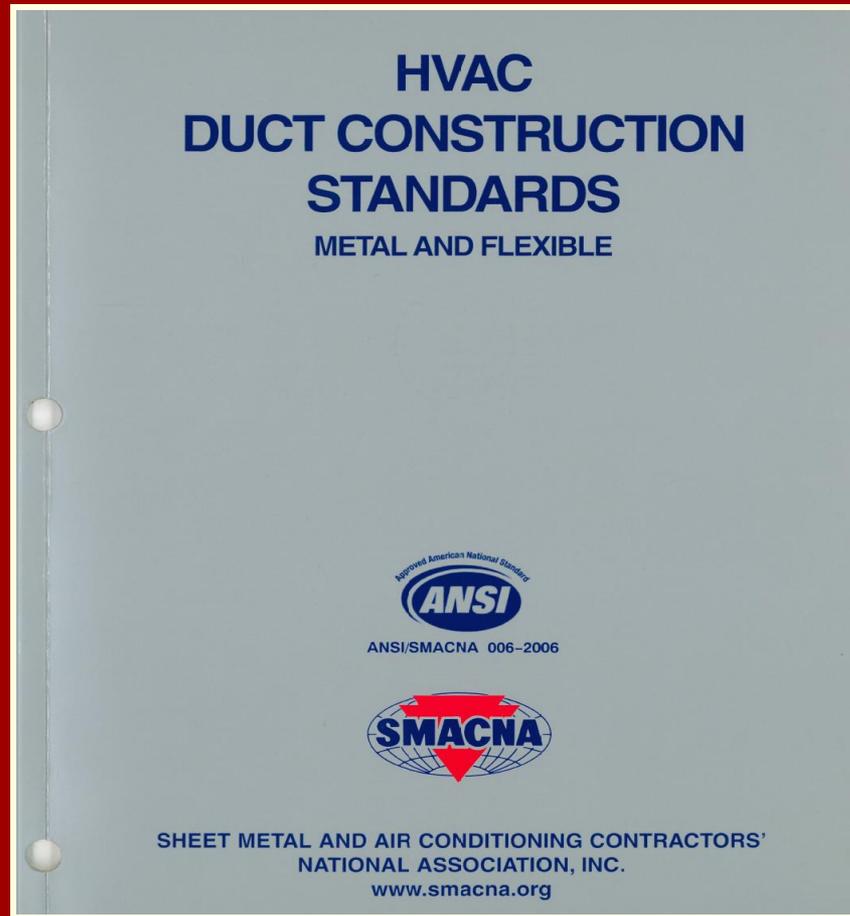
# *SPS 323.08*

## *Duct Construction – cont'd*

### *Inspection*

- ▣ **Sheet metal ducts minimum thicknesses listed in Table 323-08-A**
- ▣ **Ductwork shall be fastened in place and braced to prevent lateral displacement in accordance with Table 323-08-B**
- ▣ **Joints & Seams shall be securely fastened or locked.**

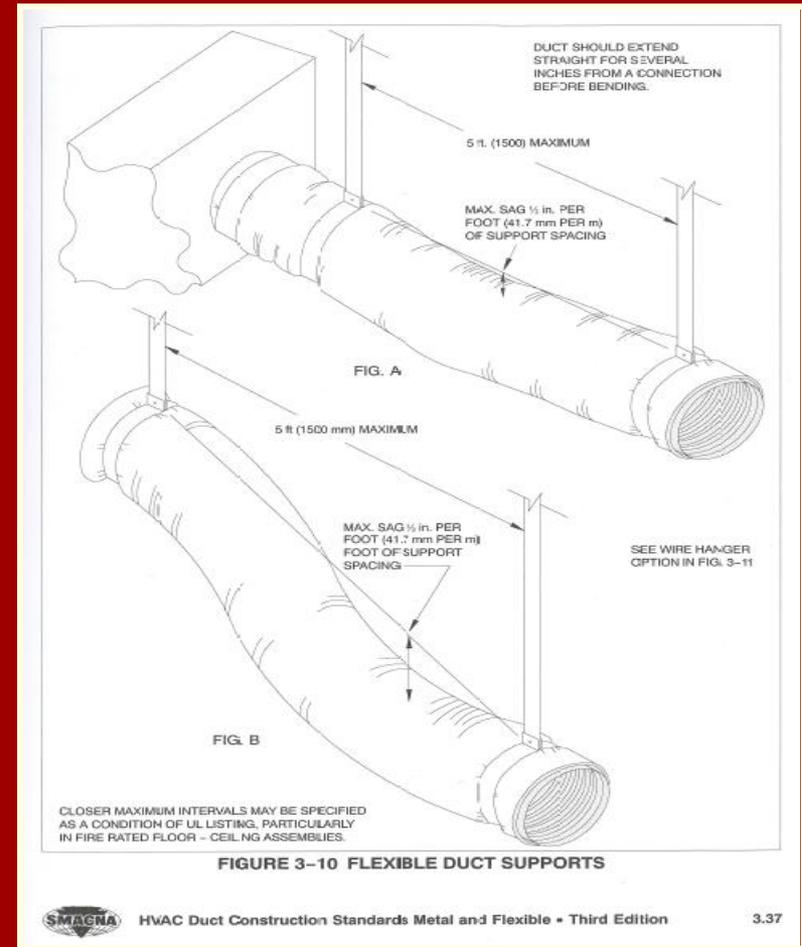
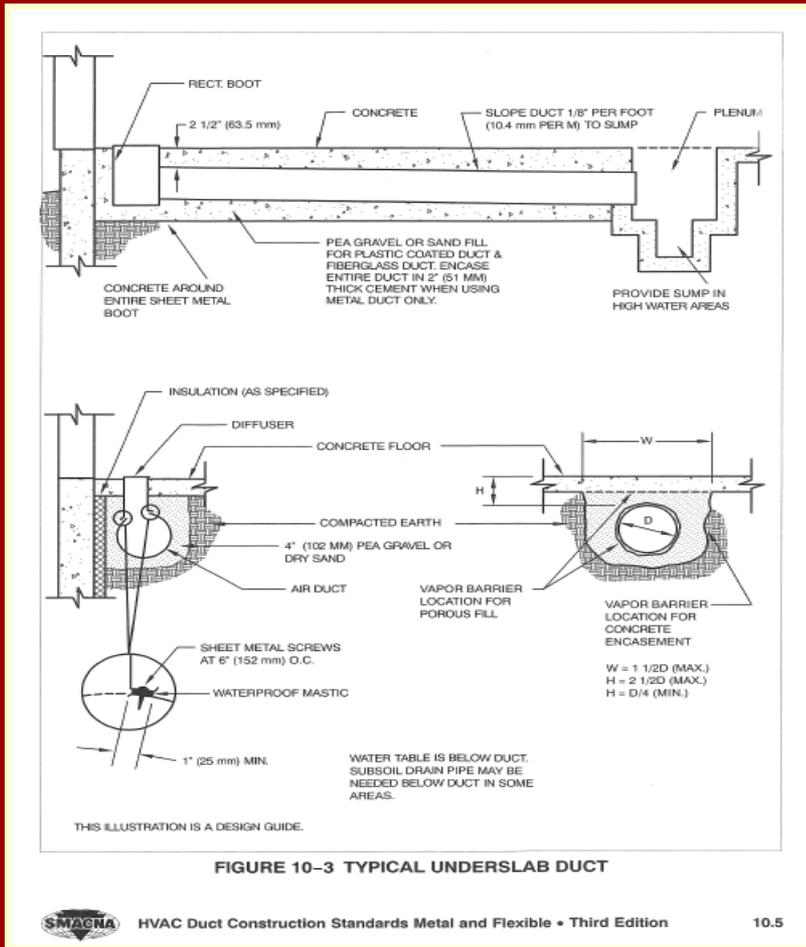
# Don't Forget Adopted and Referenced Standards



Referenced in SPS 323.07(5) Duct Construction

# Underslab Duct Construction

# Flexible Duct Supports



**Joints & Seams shall be securely fastened or locked.**



# NOT: Cutting Through Top Plate Correction Requires Engineered Analysis



# Ducts Properly Supported per Table 323.08-B



# *SPS 323.08*

## *Duct Construction – cont'd*

### *Inspection*



**Figure 1.** Sheet metal supply plenum sealed with mastic. A flexible, fireproof canvas collar was installed to provide sound/vibration attenuation.

# *Duct - Register Connection Issue?*

Requires  
Proper  
Shoebox  
per  
ASHRAE  
Standard



# *SPS 323.09 Dampers, Registers & Grilles*

## *Plan review and Inspection*

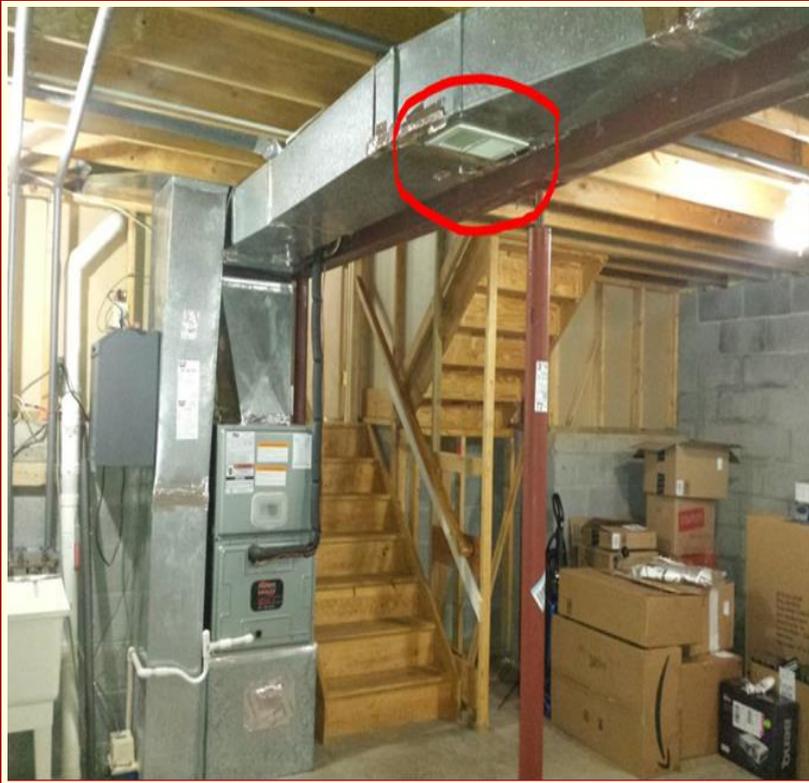
- ▣ **Volume duct dampers shall be provided to permit balancing of the system**
  - **Provide in each branch or zone duct not in the main trunk**

**Dampers Must Have a  
Locking Device to Maintain  
A Fixed Position**

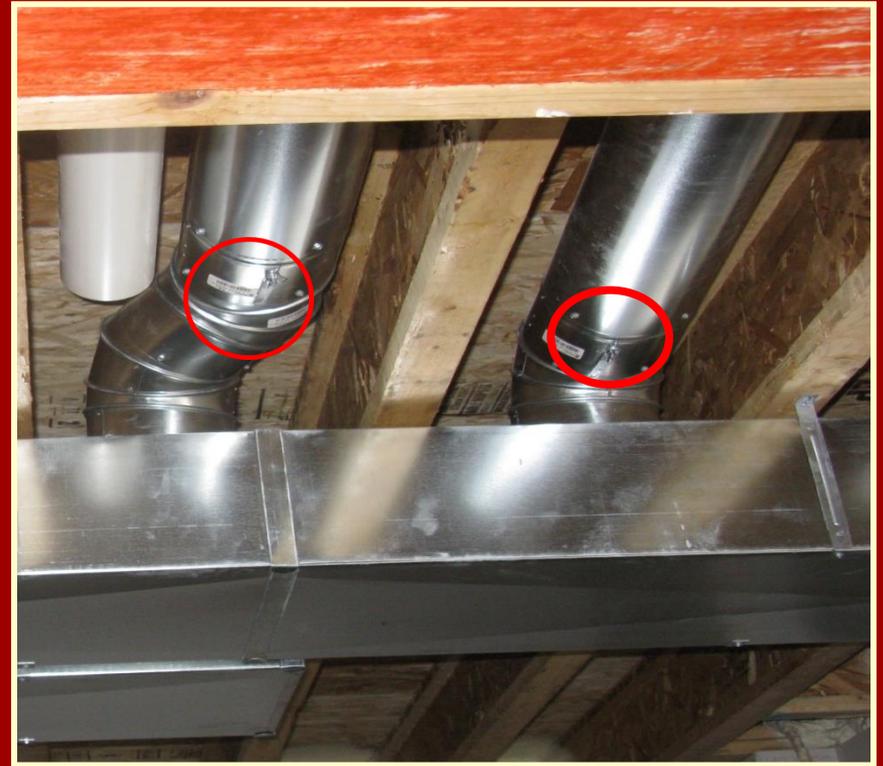


# Register dampers do not satisfy requirement for volume duct damper

## Volume dampers shall be accessible



# Volume Dampers Required in Each Branch or Zone Ducts



# Supply Ducts Properly Sealed

**UL 181A Tape** (for Rigid Ducts)

Sealed Ducts in Unconditioned Space Required per  
322.43



# Return Ducts Properly Sealed

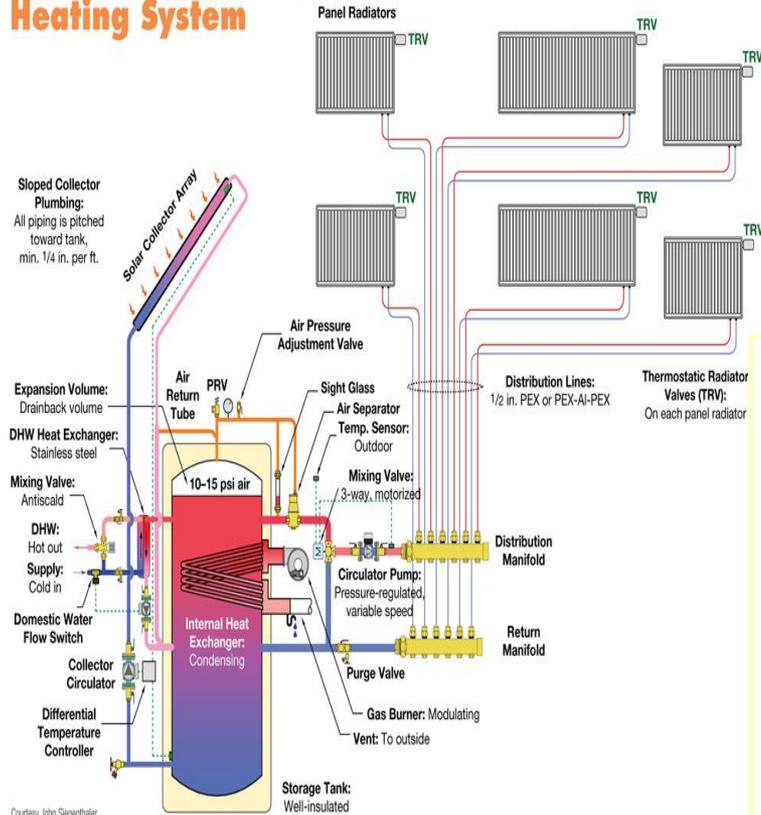


# *SPS 323.10 Piping - cont'd*

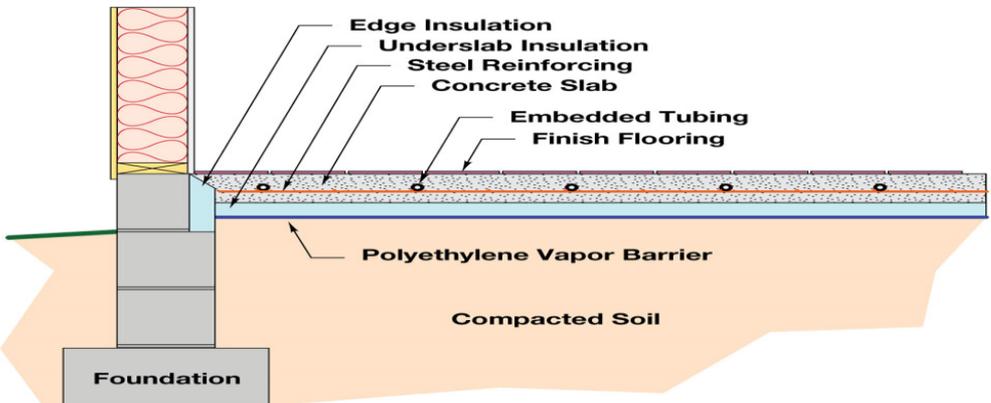
- ▣ (4) Steam & Hot Water Pipes:
  - No pipe carrying a fluid at a surface temperature  $> 250^{\circ}\text{F}$  shall be placed within 1 inch of any combustible material, pass through a combustible floor, ceiling or partition unless the pipe is protected by a metal sleeve 1 inch larger in diameter than the pipe or with approved pipe covering

# Hydronic Heating Systems Not Yet Explicitly Addressed In SPS 323

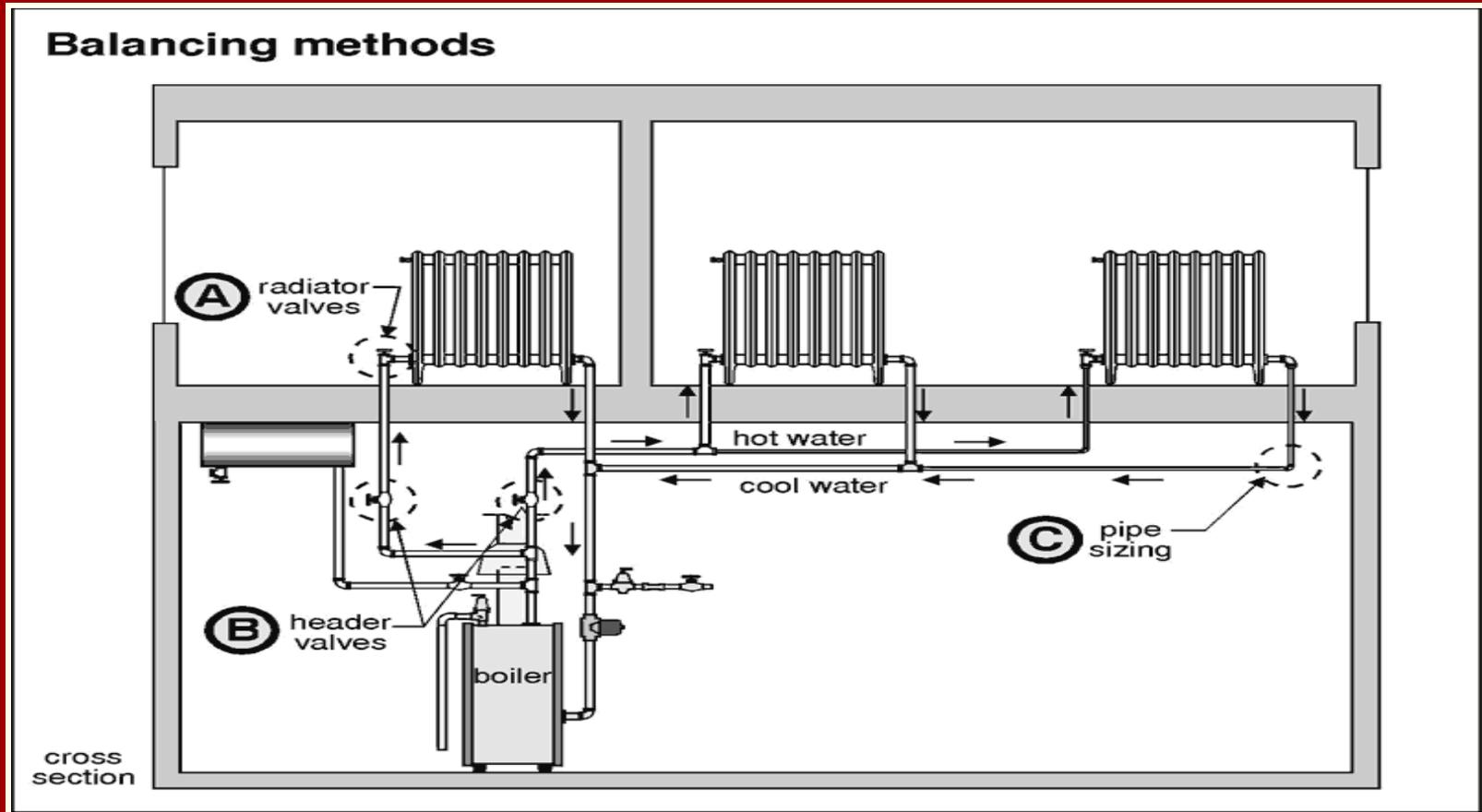
## Typical Solar Hydronic Heating System



## Hydronic In-Slab System



# SPS 323.10 Pipe Balancing

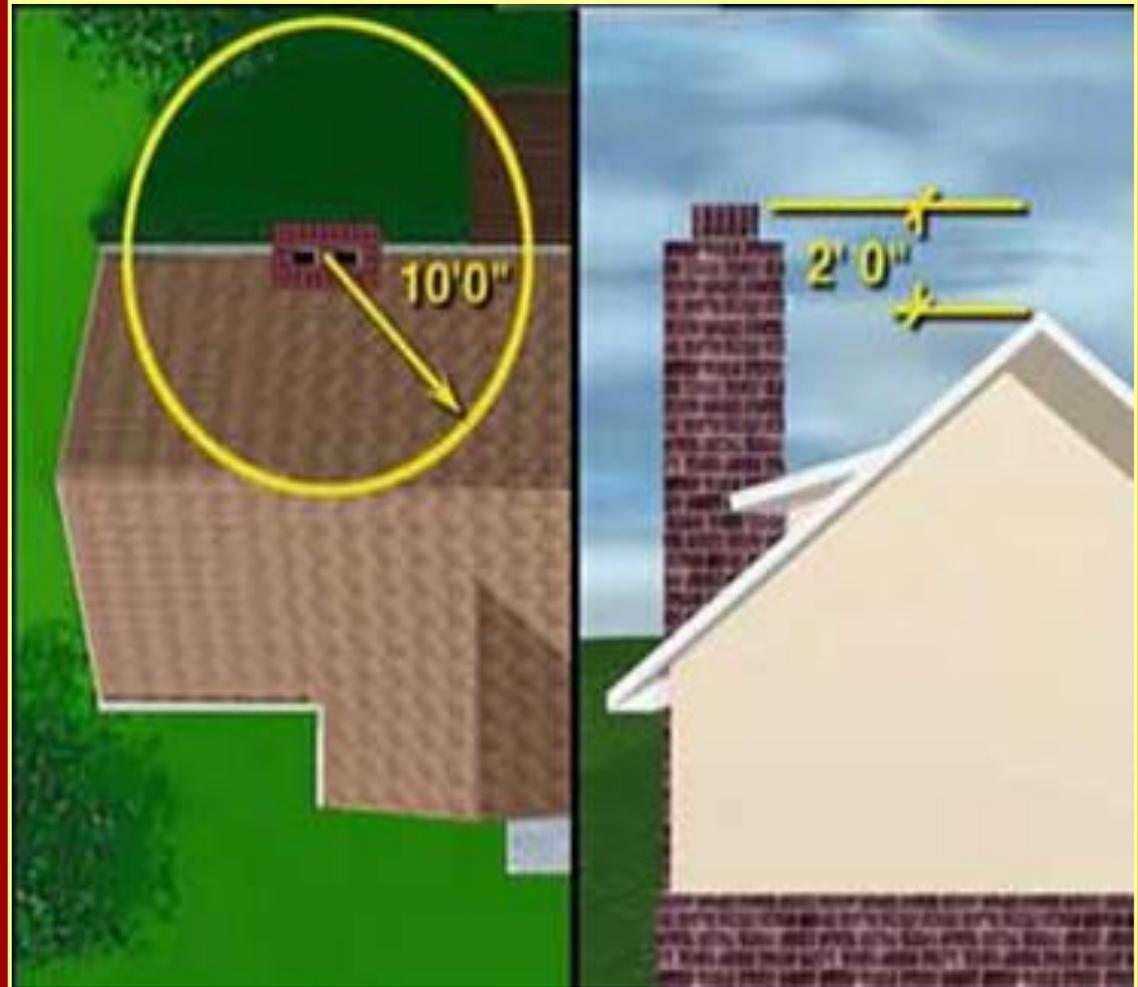


**Balancing Would Apply To Hydronic Underfloor Systems As Well**

# *SPS 323.11 Appliance Vents*

## *Plan Review and Inspection*

- **Masonry chimneys shall extend at least 3 feet above the highest point where the chimney pass through the roof of the building, and at least 2 feet higher than any ridge, peak, wall or roof within 10 feet horizontally**



# SPS 323

## Appliance Vents – cont'd

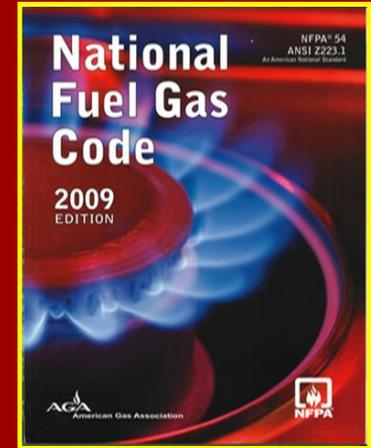
### Plan Review and Inspection

#### ■ Sizing:

- SPS 323.11(3) Vents for new or replacement equipment shall be sized to adequately exhaust combustion products from the dwelling

(NFPA 54 Stds. Nat. Fuel Gas Code recommended)

- SPS 323.12 Masonry chimneys shall conform to the requirements of SPS 321.30
- SPS 323.13 Factory-built chimneys or vents shall be of an approved type (NFPA 54 Stds. recommended)



# *SPS 323.13/ 323.14 Type “B”, “BW” & “L” Vents Plan Review and Inspection*

- ▣ **B:** Factory made & listed for gas-fired appliances, double wall
- ▣ **BW:** May be used with a vented recessed wall heater
- ▣ **L:** Gas or oil-fired



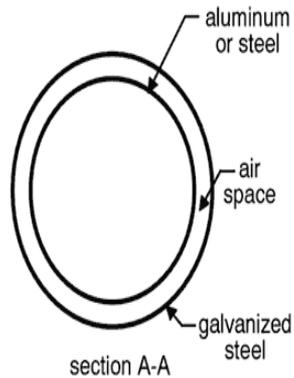
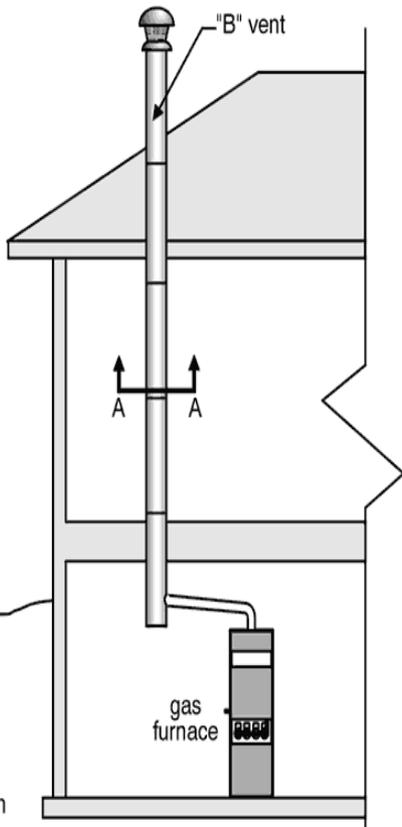
# SPS 323.13/ 323.14

## Type "B" & "L" Vents

### Plan Review and Inspection

Type "B" vent

**GAS**



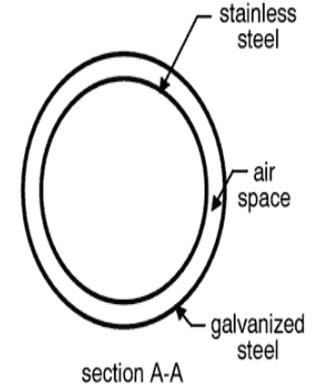
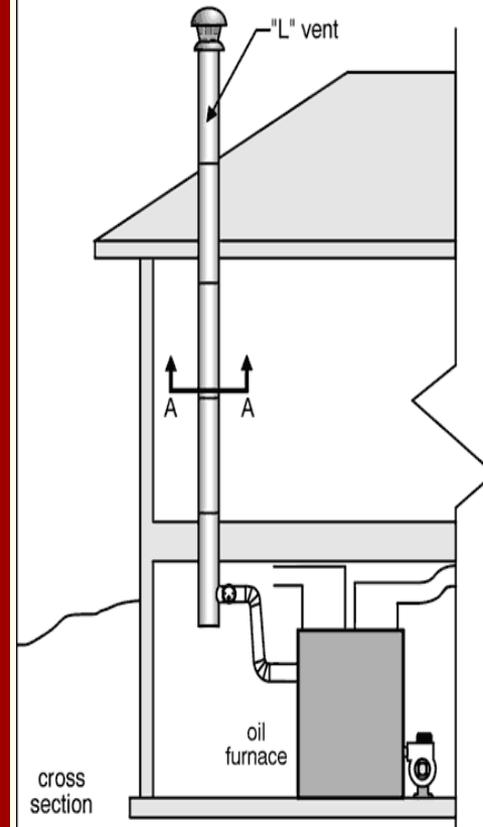
typically used for natural gas  
or propane appliances

usually tested up to 500 F

cross  
section

Type "L" vent

**OIL**



typically used for oil but can  
also be used for natural gas

usually tested up to 1000 F

cross  
section

# *SPS 323.14 Gas Vents*

## *Inspections*

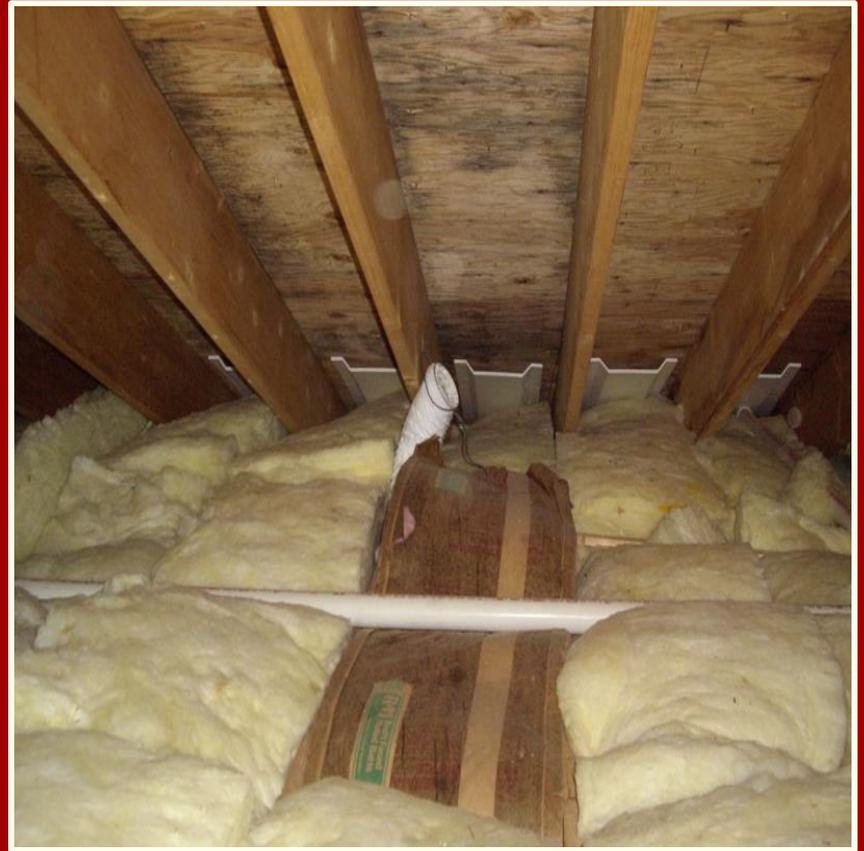
- ▣ **(2) Clothes Dryers**
  - **(a) Gas-fired clothes dryers shall be provided with metal venting that terminates outside the structure**
  - **(b) Where dryer vent pipe is concealed, a rigid metal vent pipe per SPS 323.15(2)(e) shall be used**

# *SPS 323.02(3)*

## *Ventilation - Issues*



**Bath Exhaust into  
Kitchen Hood Duct**



**Unvented Bath Exhaust  
Notice Mold On Roof Deck**

# *“Power Venting”*



# SPS 323.14(3) (a) – (g)

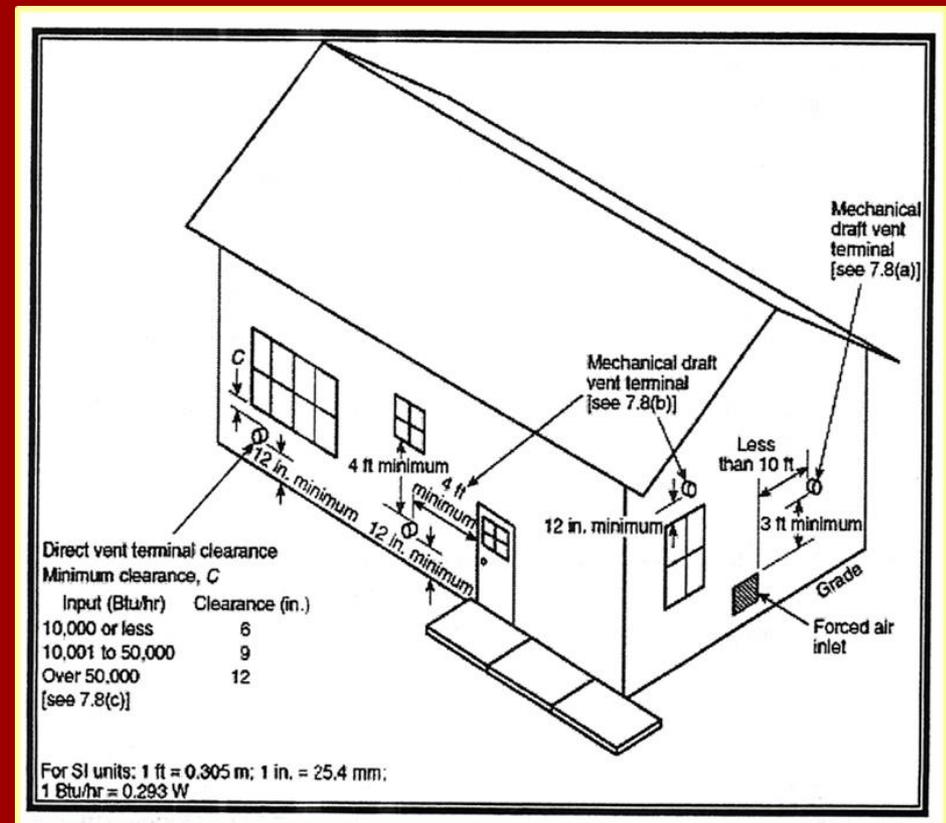
## Proper Vent Locations

Plan Review and Inspection

### Example

(a) A venting system shall terminate at least 3 feet above any forced air inlet located within 10 feet horizontally

■ Exception: direct vent appliance combustion air intake



# *SPS 323.15/ 323.045(4)*

## *Chimney Connectors*

### *Inspection*

- **(a) Proper material and thicknesses per Table 323.045-A**

#### METAL THICKNESS FOR PIPE CONNECTORS

TABLE 323.045-A

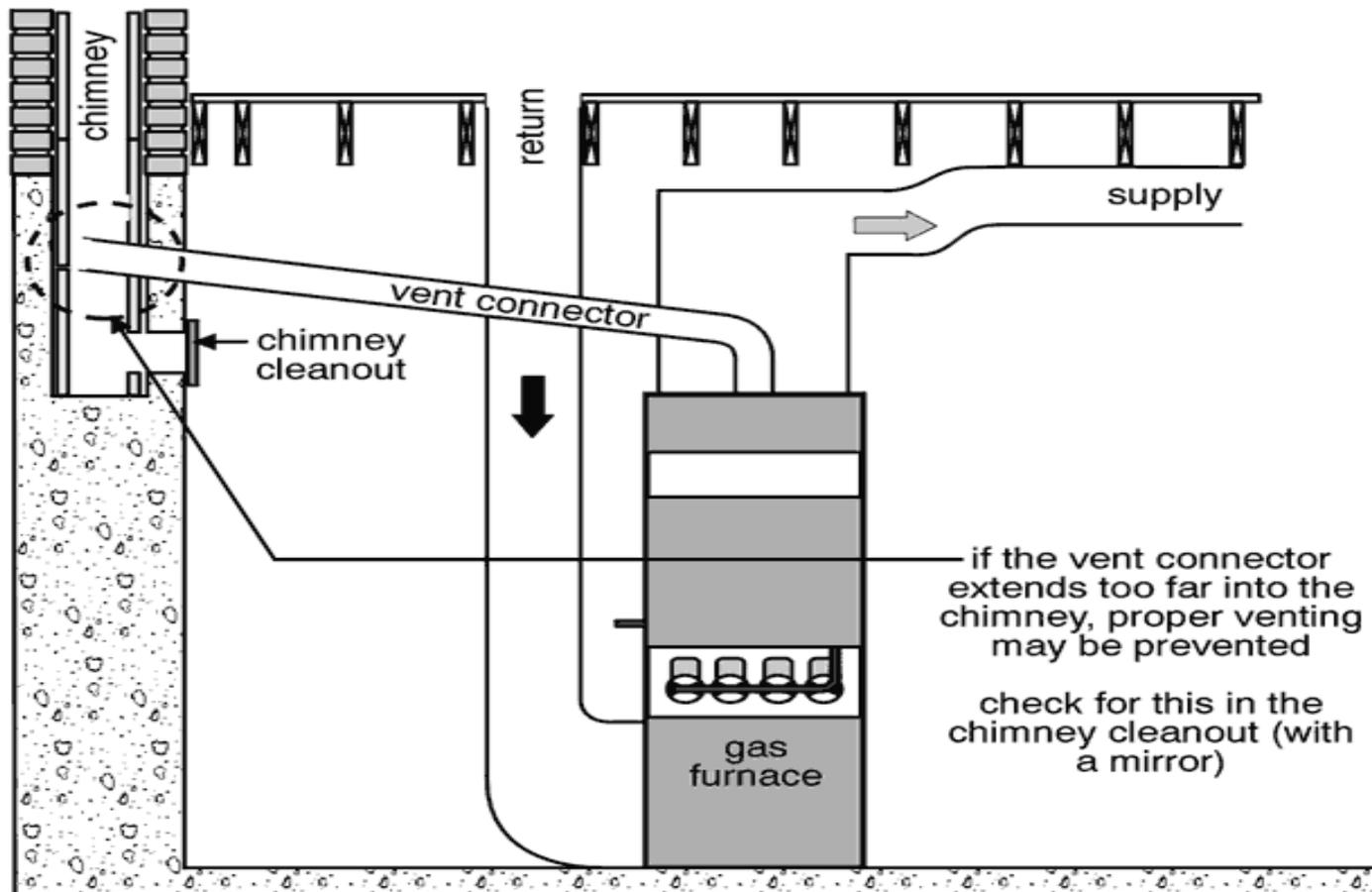
Diameter of Connector (inches)	Sheet Gage No.	Minimum Thickness (inches)
6 to 10	24	0.023
over 10 to 16	22	0.029
over 16	16	0.056

*SPS 323.15/ 323.045(4)*  
*Chimney Connectors – cont'd*  
*Inspection*

- **(b) Clearance to Combustibles**
- **(c) Connectors and chimneys shall be readily accessible for cleaning and inspection**
- **(d)(1) Chimney connectors: no more than two 90 degree elbows**

# SPS 323.15/ 323.045(4)(d)6. Chimney Connectors - cont'd Inspection

## Vent connector extends too far into chimney



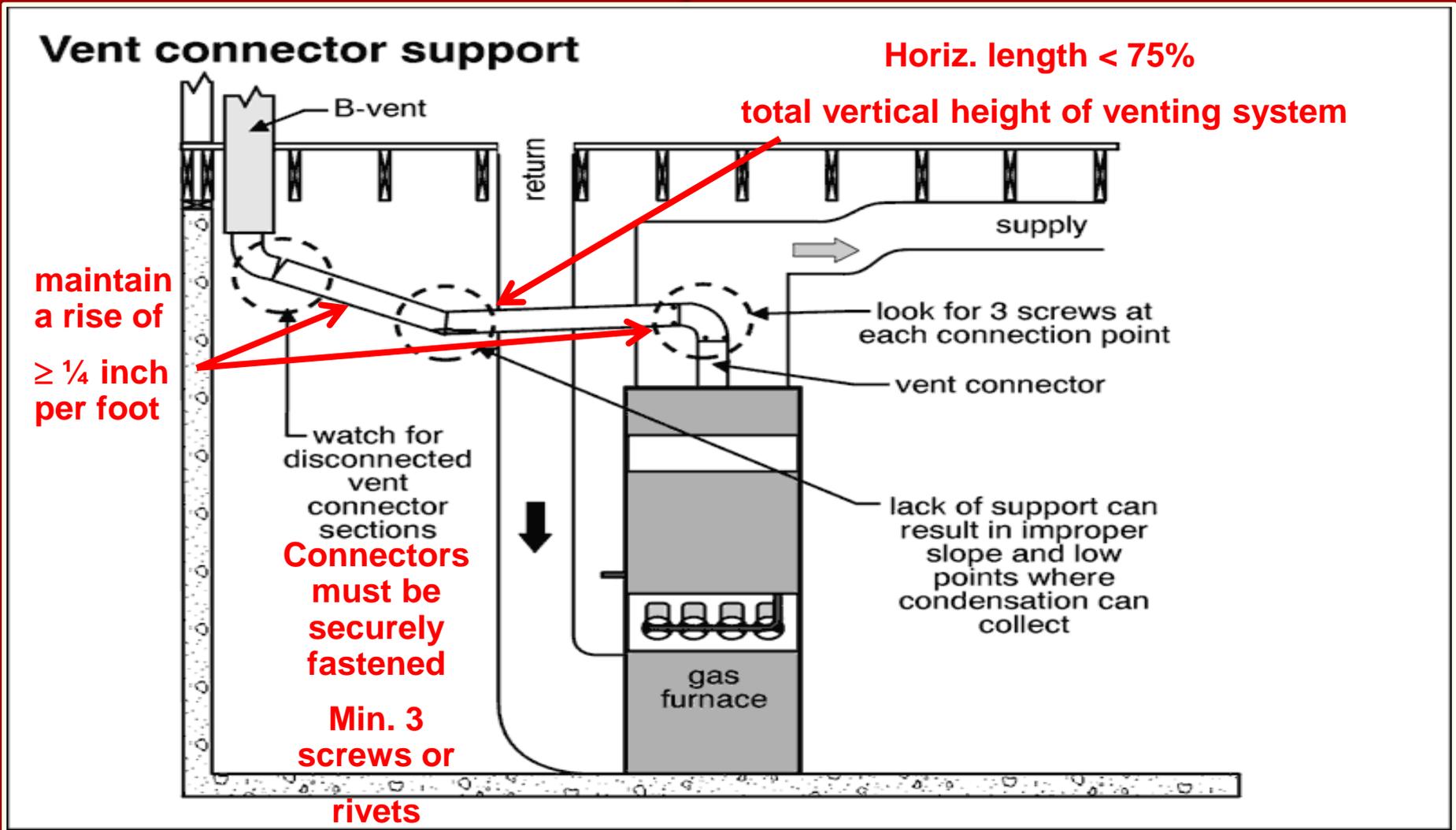
# *SPS 323.15/ 323.045(4)(d)6. Chimney Connectors - cont'd Inspection*

**Improper fuel exhaust venting.  
This is a Life Safety Issue.**



02/04/2011

# SPS 323.15/ 323.045(4)(d)4 Chimney Connectors - cont'd Inspection



# *SPS 323.15/ 323.045(4)(e)*

## *Chimney Connectors – cont'd*

### *Inspection*

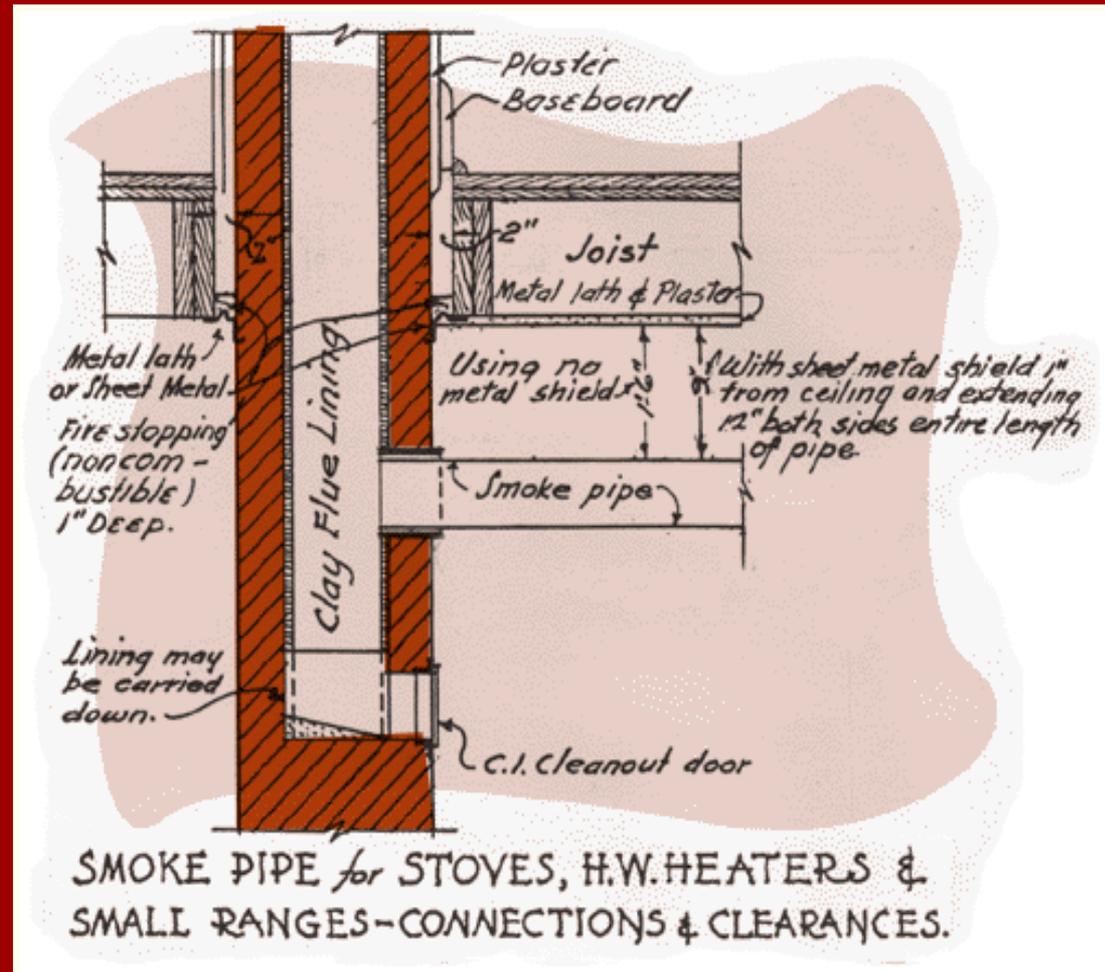
- **Connectors for appliances shall not pass through walls or partitions constructed of combustible material unless they are guarded at the point of passage**



# SPS 323.15(2)(f) Chimney Connectors - cont'd

## Inspections

- Single wall metal connectors shall be installed with clearance to combustibles per Table 323.15-C
- Clearance reduction per Table 323.04-B



# Fire Safety Issue.....

**SPS 323.15(2)(f)  
Clearance to  
combustibles?**

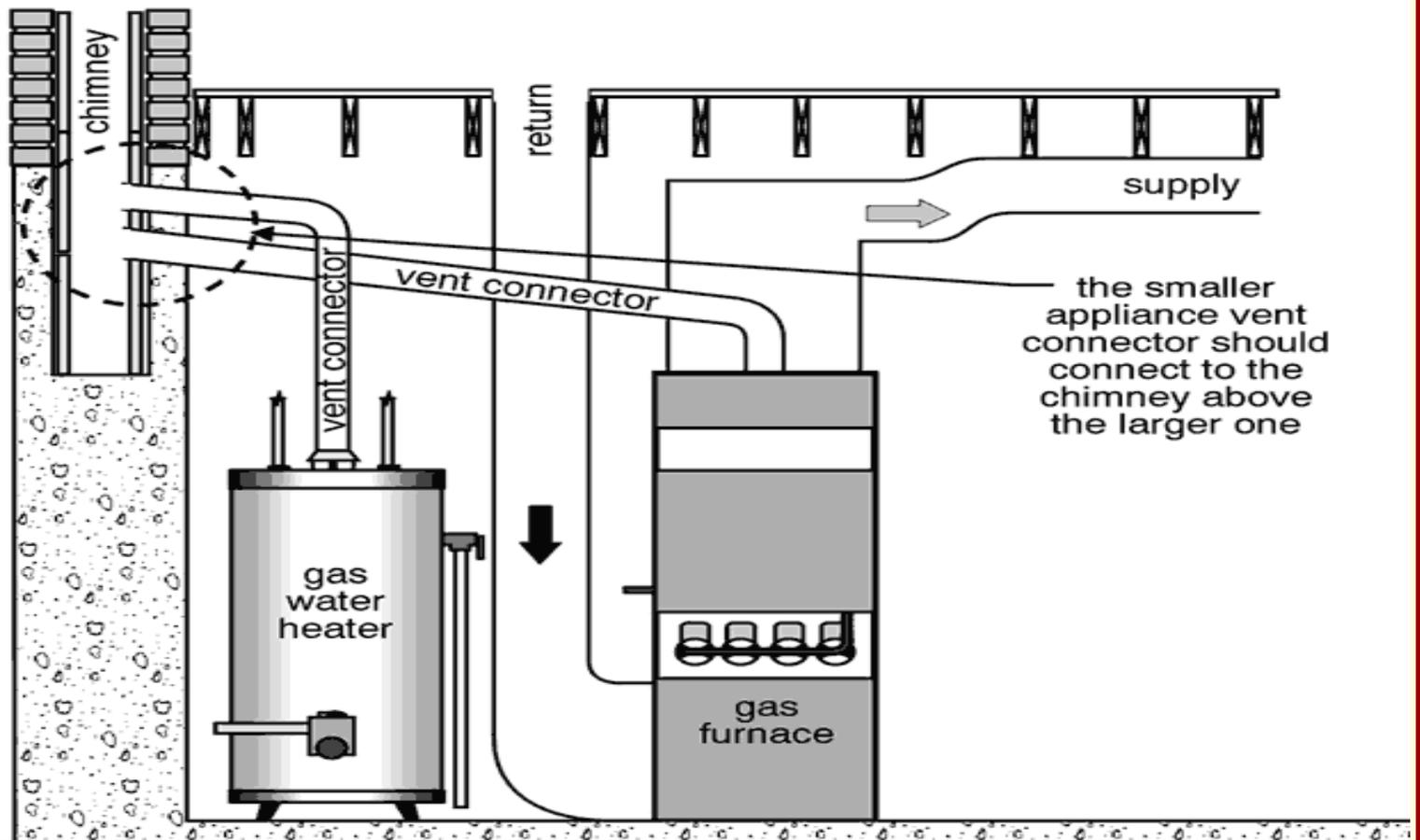
**Improper clearances for gas  
venting, burning floor joist.**

01/03/2013 16:27



# *SPS 323.155 Multiple Appliance Venting*

## **Chimney/vent connections**



# *SPS 323.156 Condensate Drains Inspection*

- ❑ **Condensate from heating equipment shall drain into the sanitary drain system**



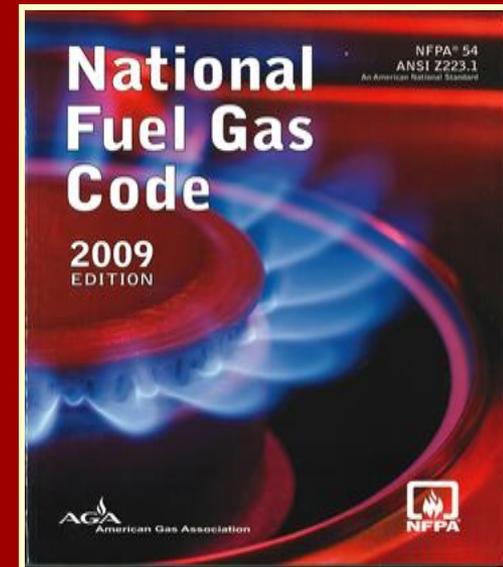
# ***SPS 323.16 Fuel Storage***

## ***Inspection***

- **LP gas storage tanks shall be constructed, installed & maintained per SPS 340**
  - **Incorporates NFPA 58 by reference**
  - **LP gas storage tanks shall not be located inside dwellings**
  - **LP gas storage tanks shall have welded steel supports and be permanently installed on concrete pads or foundations**

# *SPS 323.16(3) Gas Piping Inspection*

- Gas piping systems, extending from the point of delivery to the connection with each gas-fired appliance or device, shall be installed to conform with NFPA 54
  - Corrugated stainless steel gas piping is allowed, install per listing and manufacturer specifications.



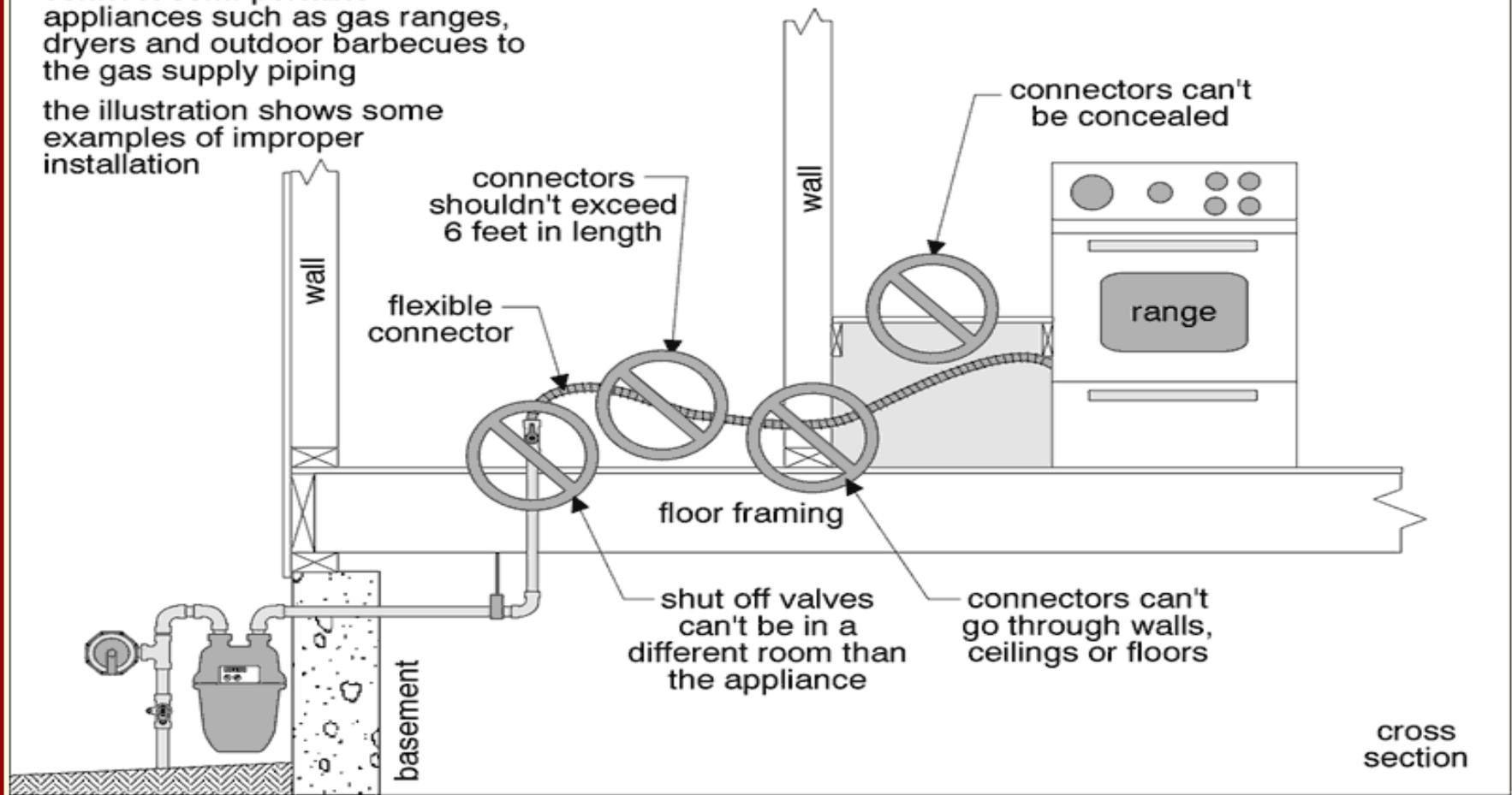
# SPS 323.16(3) Gas Piping - cont'd

## Inspections

### Flexible gas appliance connectors

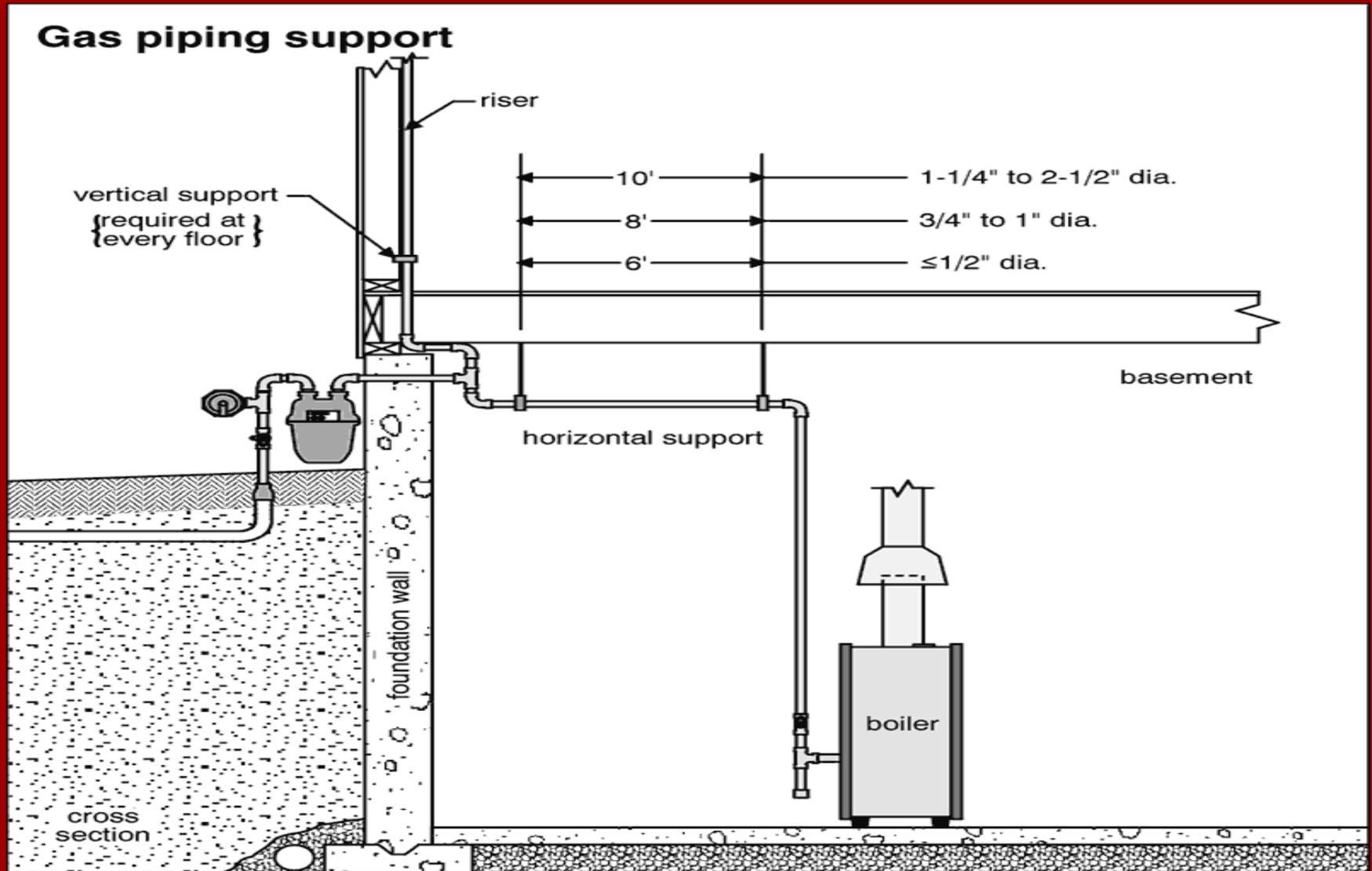
flexible connectors are used to connect semi-portable appliances such as gas ranges, dryers and outdoor barbecues to the gas supply piping

the illustration shows some examples of improper installation



# SPS 323.16 Gas Piping - cont'd

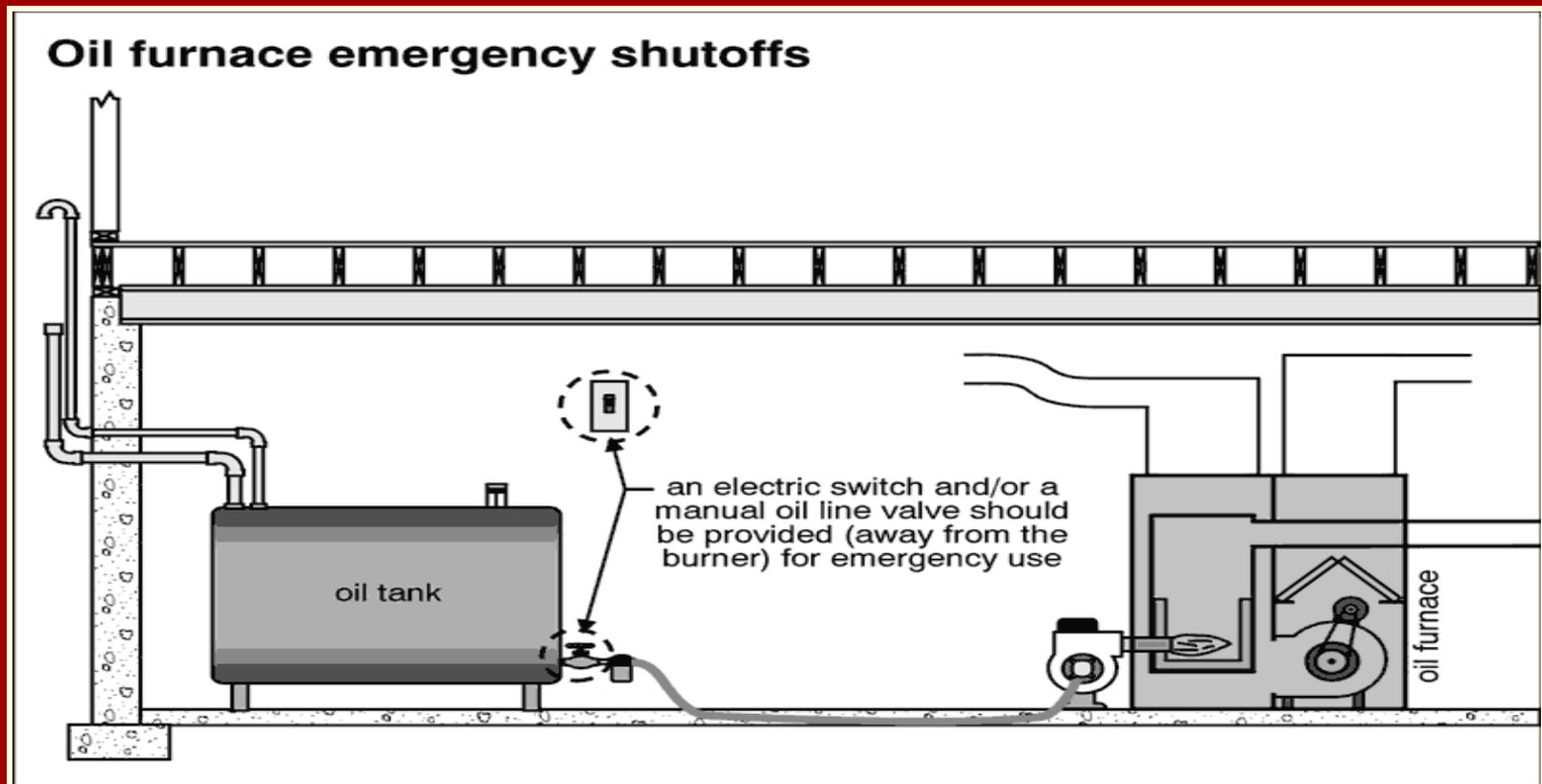
## Inspection



# *SPS 323.16(4) Shutoff & Control Devices*

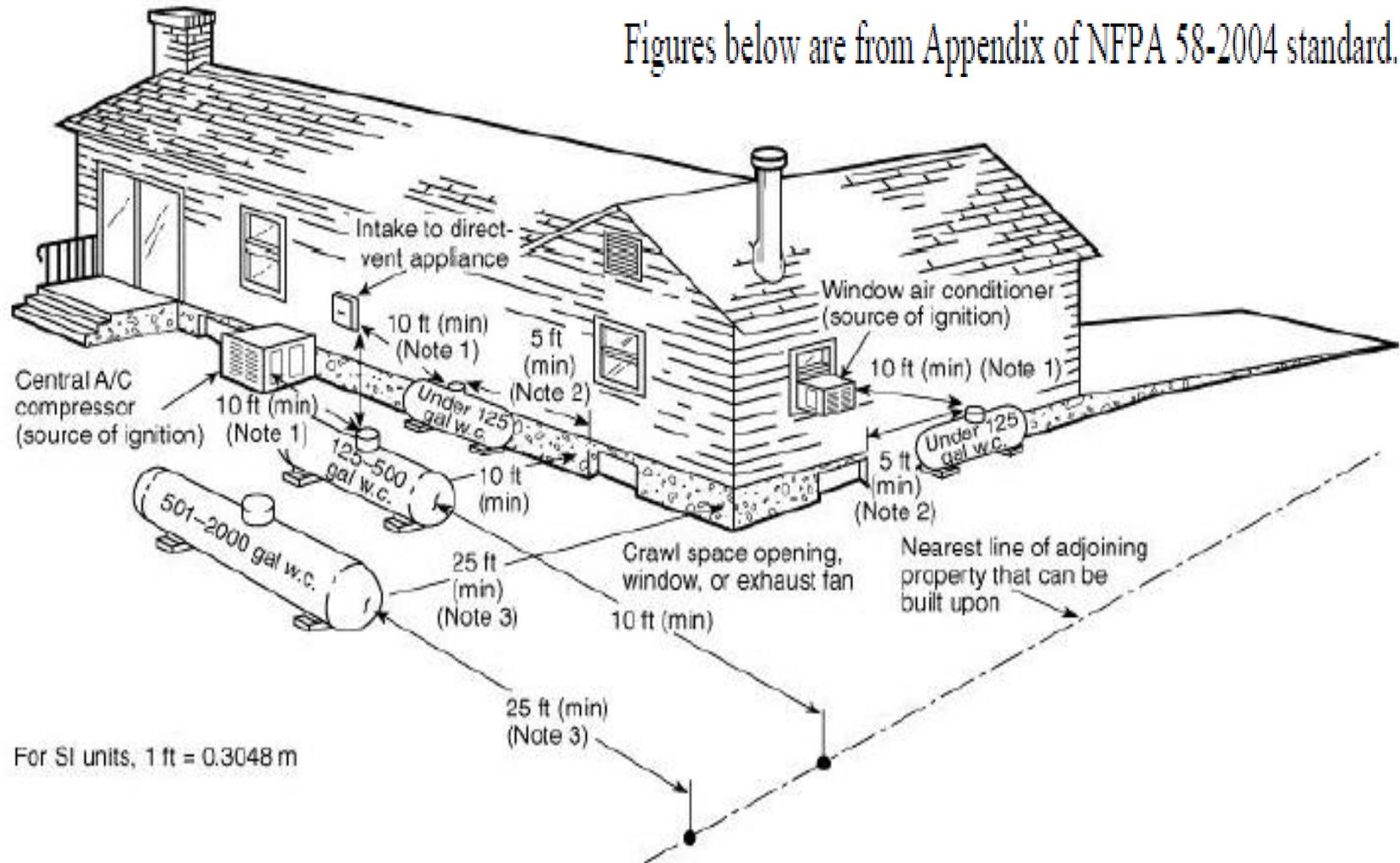
## *Inspection*

- (a) Any oil-fired appliance shall have an accessible, approved manual shutoff valve upstream of any connector



# Setbacks From Fuel Sources to Potential Sources of Ignitions

Figures below are from Appendix of NFPA 58-2004 standard.



# SPS 323.18 (1)

## Equipment Listing - Maintenance

- Regular maintenance actions for equipment shall be clearly stated on an accessible label
- Maintenance instructions shall be furnished requiring preventive maintenance for efficient operation
- Installation manuals shall be provided



Consumers having these furnaces should immediately contact Blue-ray Systems, Inc. to receive this free safety label, as well as copies of publications which describe the proper procedures for maintenance and service.

Blue-ray can be reached by calling 800-338-9681 or by writing to:  
Blue-ray Systems, Inc.  
P.O. Box 1262  
Havertown, PA 19083

### WARNING

YOUR BLUE-RAY HEATING EQUIPMENT MUST BE SERVICED ANNUALLY BY A QUALIFIED TECHNICIAN. FAILURE TO SERVICE THIS EQUIPMENT PROPERLY MAY LEAD TO EMISSION OF CARBON MONOXIDE, WHICH CAN CAUSE INJURY OR DEATH.

IF YOUR BLUE-RAY HEATING EQUIPMENT EMITS UNUSUAL ODORS, PULSATEE, OR REQUIRES SERVICE, PLEASE CALL A QUALIFIED BLUE-RAY SERVICE TECHNICIAN OR CALL (800) 338-9681 FOR THE NAME OF A QUALIFIED TECHNICIAN NEAR YOU.

DO NOT REMOVE FROM HEATING EQUIPMENT

*SPS 323.18 (2) Operation  
Last But Not Least  
Inspection*

- ▣ **(2) Final Test Required. The installer shall test and balance every heating, ventilating and air conditioning system**

# *Thank You*

*Lenny Kanter*

*UDC Engineering Consultant*

*Department of Safety and Professional  
Services*

*608 261 6541 voice*

*608 267 9723 fax*

*[robert.kanter@wi.gov](mailto:robert.kanter@wi.gov)*

