

Gas Residential Water Heating: *key installation challenges faced when installing high efficiency units*

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Areas of Concern

Venting

Combustion air

Backflow

CEE Specifications

Storage (<75,000 Btu/h)	
Tier 0	>0.62 EF
Tier 1	>0.67 EF
Tier 2	>0.80 EF

Tankless (>50,000 and <200,000 Btu/h)	
Tier 1	>0.82 EF

Venting Categories

		Dew Point	
		non-condensing	condensing
Vent Pressure	non-positive	I	II
	positive	III	IV

Source: National Fuel Gas Code (NFPA 54)

Category I Appliances

- non-positive vent static pressure
 - if vent leakage occurs, room air sucked into lower pressure flue.
- flue gas temperature above dewpoint
 - avoids condensation in the vent.

Category II Appliances

- operate with a non-positive vent static pressure
- vent gas temperature may cause excessive condensation in the vent
- don't exist

Category III appliances

- a positive vent pressure and
- flue gas temperature above the dew point
 - avoids condensate in the vent

Category IV appliances

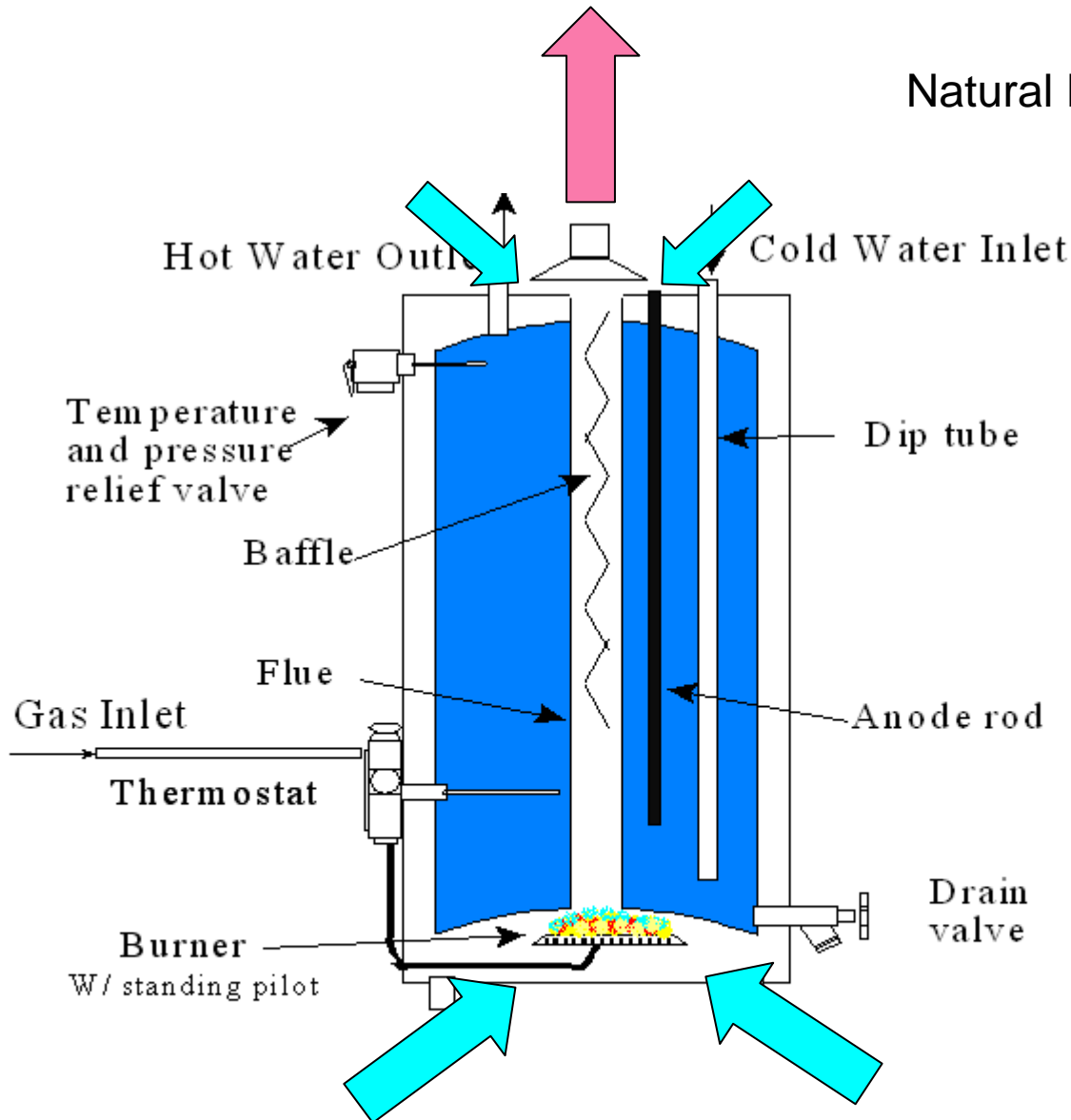
- operate with a positive vent static pressure
- flue gas temperature below the dew point,
 - causes condensation in the vent

Water Heater Venting

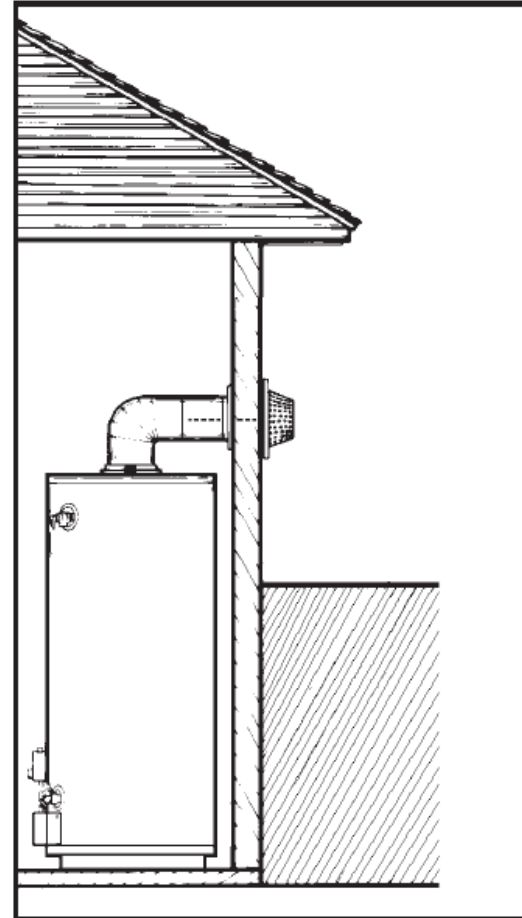
- **Atmospheric**
- **Direct Vent**
- **Power Vent**
- **Power Direct Vent**

Atmospherically Vented Water Heater

Natural Draft drives venting

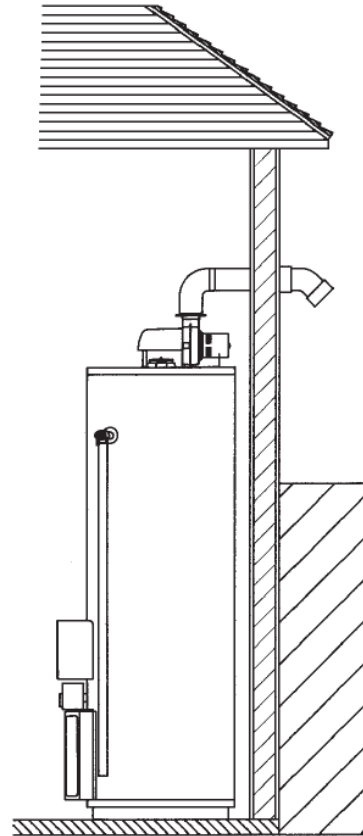


Direct Vent



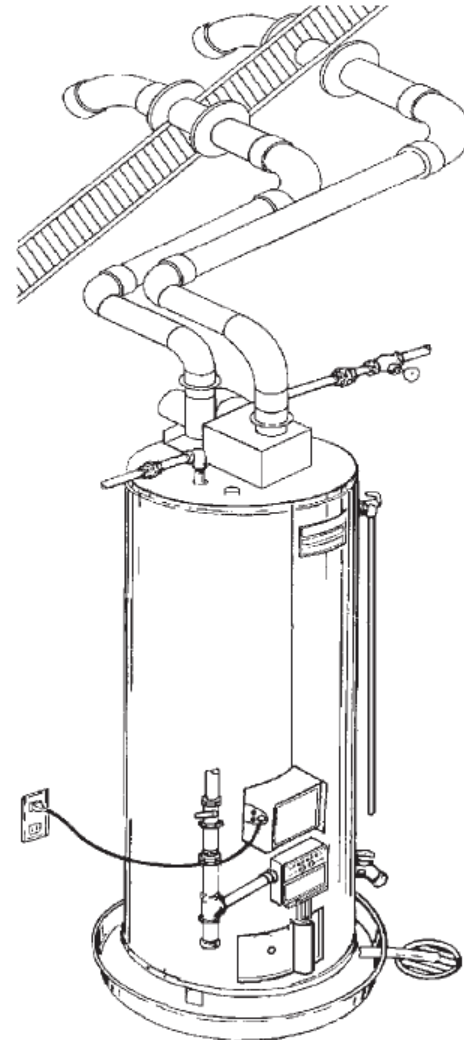
Source: AOSmith

Power Vent



Source: AOSmith

Power-Direct Vent



Source: AOSmith

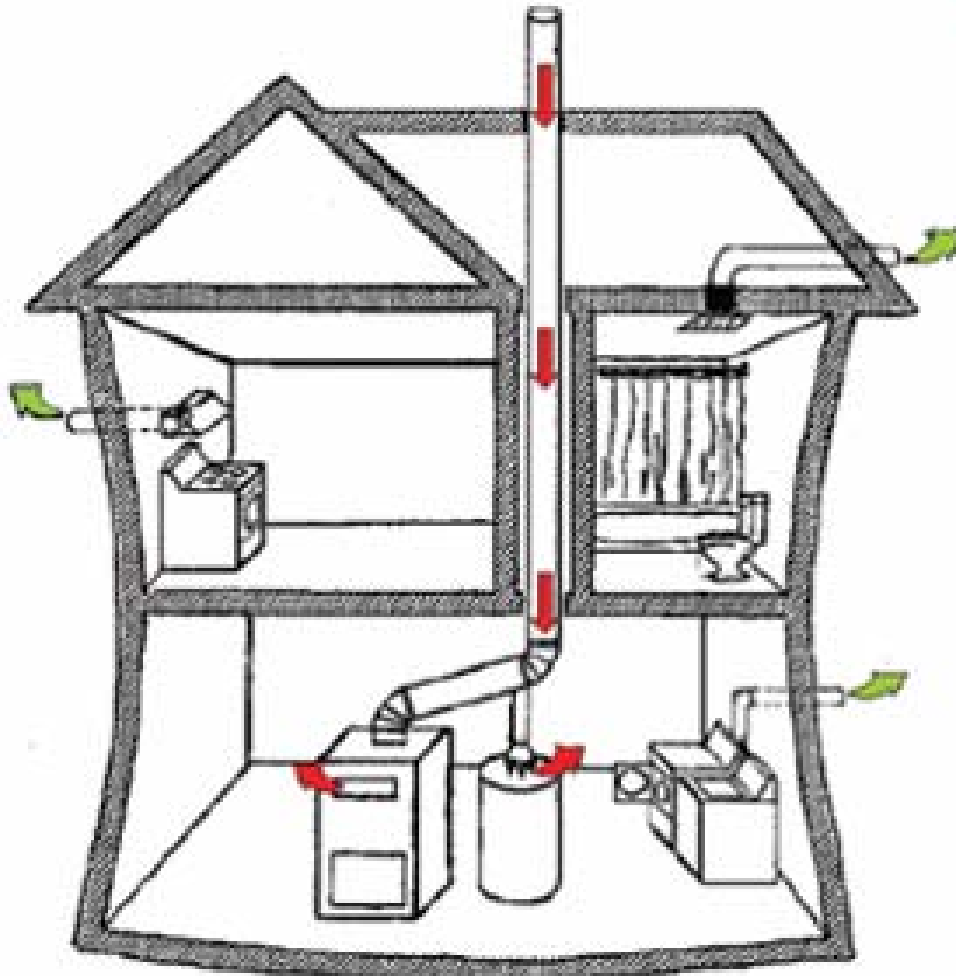
Water Heater Venting

		Vent Category			
		I	II	III	IV
Water Heater	Natural Draft	Tier 0 Tier 1(?)			
	Direct Vent	Tier 0(?)			
	Power Vent			Tier 0 Tier 1	Tier 2
	Power Direct Vent			Tier 0 Tier 1	Tier 2

Combustion Air

- energy efficient houses are built tighter
- harder to ensure enough air flow
- important for water heaters that use house air
- can cause spillage or backdrafting

Backdrafting

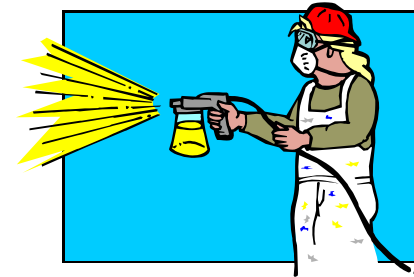
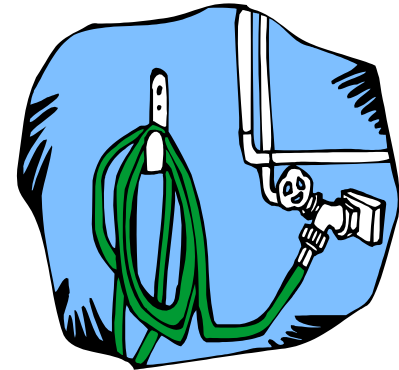


Source: GAMAazine: Tight Homes
Can Affect Combustion
Appliances, 07/24/2006

<http://www.achrnews.com>

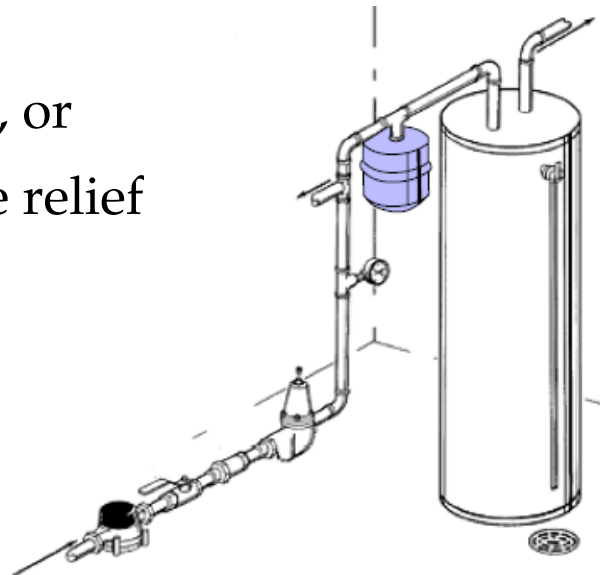
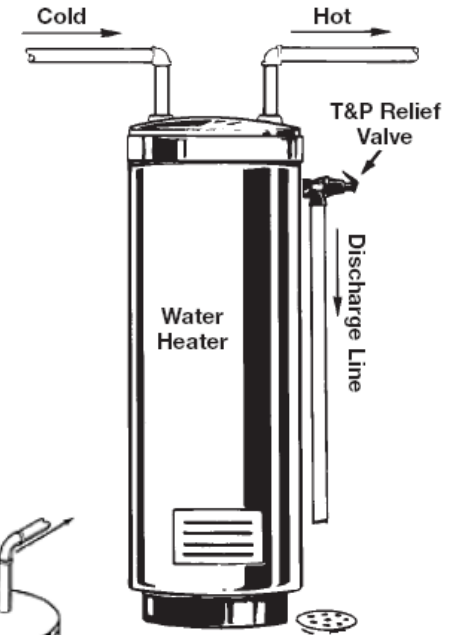
Backflow Prevention

- unwanted reversal of flow in a water distribution system.
- over half of the nation's cross connections involve unprotected garden hoses. (American Backflow Prevention Association)
- protect the public drinking water system from contamination by any privately owned plumbing system
- means water cannot flow back into the water supply
- regulations relatively new
- many installers don't know about regulation



Water Heaters & Backflow Preventers

- Water expands as it's heated
- No backflow preventer
 - pressure dissipates into city water main
- Backflow preventer
 - expansion tank is needed, or
 - temperature and pressure relief valve opens
 - water heater damaged



Source: www.watts.com