



Preparing for Heating Season

Gas Furnaces, Heat Pumps, and Pool Heaters

Gas Furnaces

Tools



**Combustible Gas
Leak Detector**



**Combustion
Analyzer**



Manometer



**Low-Level CO
Detector**

Necessary Skills



Carry out a thorough visual inspection



Examine the surrounding areas, not just the furnace



Use a manometer to set the gas pressure



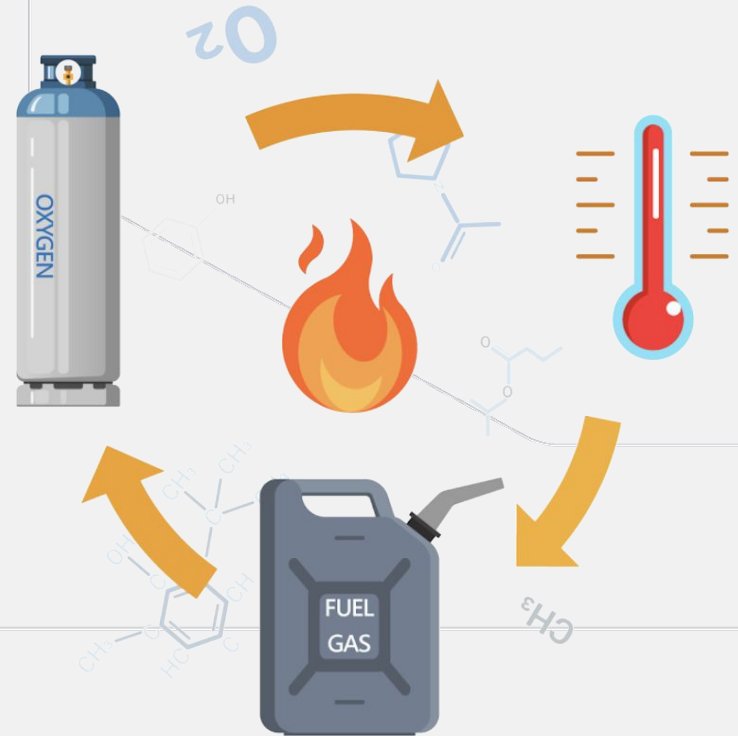
Use a personal CO monitor to measure ambient CO



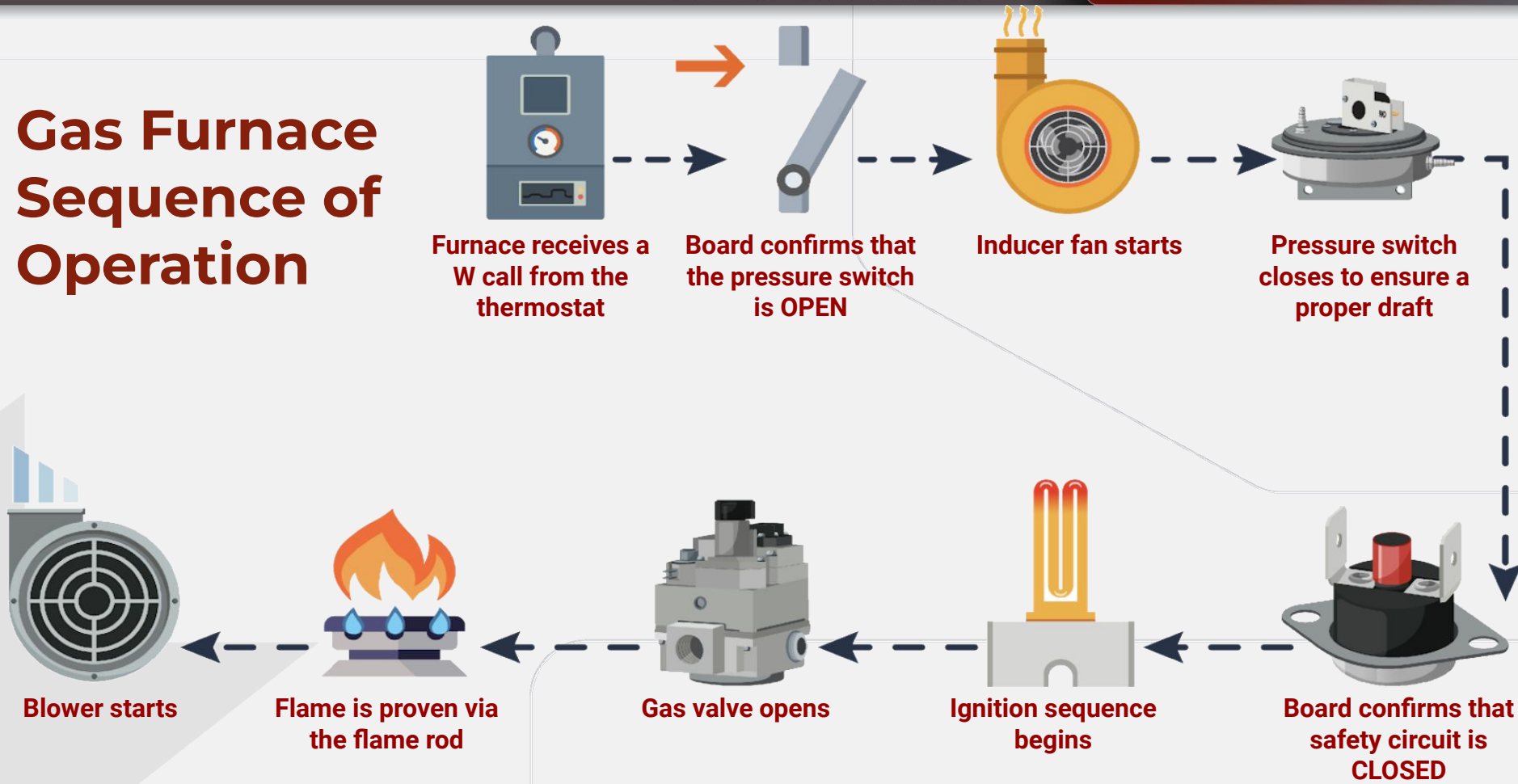
Use a combustible gas leak detector to find gas leaks

What Happens in a Gas Furnace?

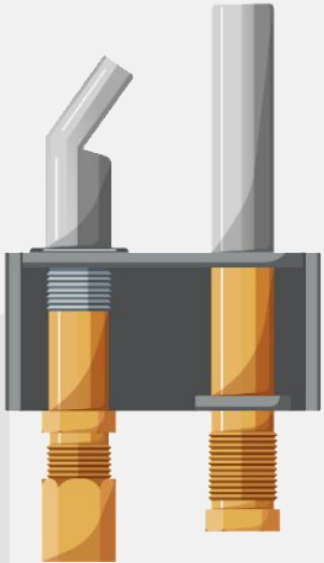
- **Combustion:** the rapid oxidation of fuel, resulting in the release of **HEAT**
- That fuel is natural gas, and we need a proper mixture of natural gas and oxygen for combustion to happen



Gas Furnace Sequence of Operation



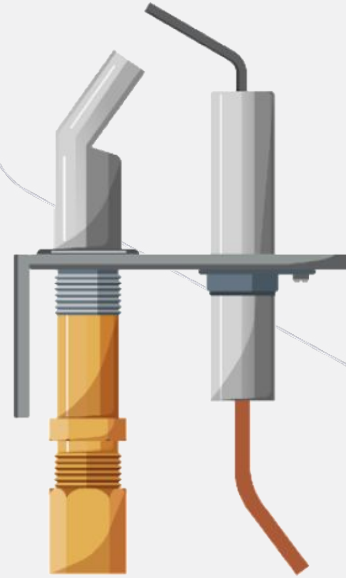
Ignition Types



Standing Pilot



**Direct Spark
(DS)**



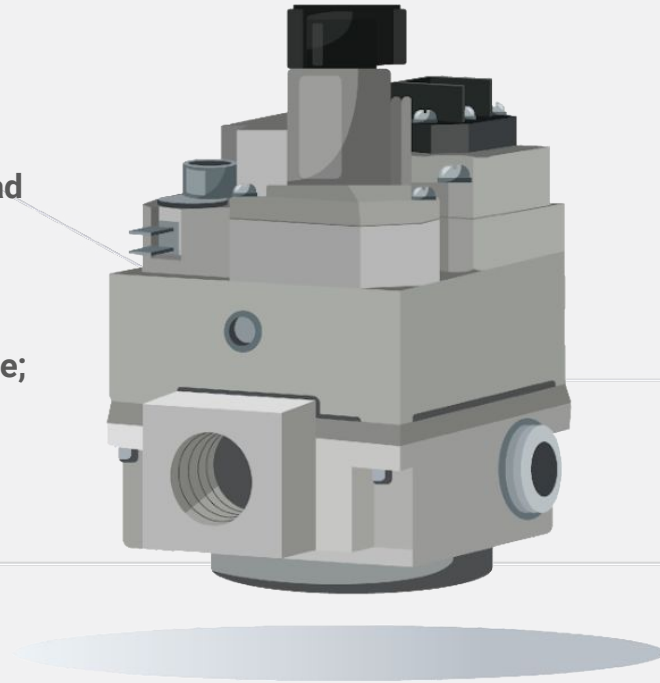
**Intermittent
Spark (ISI)**



**Hot Surface
(HSI)**

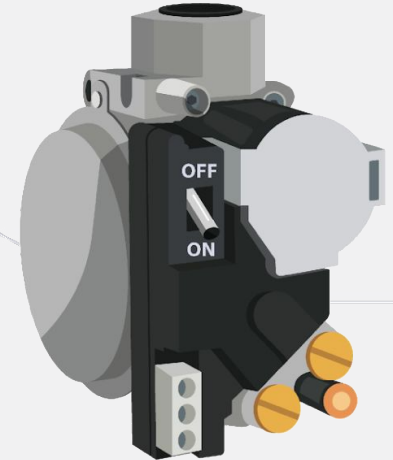
Adjusting a Standard Gas Valve

1. Shut off the gas cock.
2. Remove the inlet and outlet plugs.
3. Replace the inlet and outlet plugs with brass adapters with barb fittings.
4. Attach a manometer to the barb fittings and open the gas cock. P1 will read inlet pressure, and P2 will read manifold pressure.
5. Remove the cap covering the adjustment screw.
6. Use a flat-head screwdriver on the adjustment screw to adjust the pressure; turn it clockwise to increase the manifold pressure.
7. After adjusting the gas pressure, close the gas cock.
8. Remove the fittings and replace them with the inlet and outlet plugs.
9. Get your combustible gas meter and coat the ports in soap bubbles. Open the gas cock to begin checking for leaks.



Adjusting a Gemini Gas Valve

1. Shut off the gas cock.
2. Loosen the ports a couple of turns using a small allen wrench; DON'T remove the ports.
3. Place tubing adaptors (or surgical tubing) over the loose port screws.
4. Attach your manometer by connecting to barb fittings on the adaptors or by connecting the surgical tubing directly to the manometer. Open the gas cock. P1 will read inlet pressure, and P2 will read manifold pressure.
5. Remove the brass caps from your low and high fire adjustments.
6. Use a flat-head screwdriver to make adjustments; to increase gas pressure, rotate the screwdriver clockwise as necessary.
7. After adjusting the gas pressure, close the gas cock.
8. Disconnect the manometer and adaptors, tubing, or fittings. Tighten down the ports.
9. Get your combustible gas meter and coat the ports in soap bubbles. Open the gas cock to begin checking for leaks.



Biggest Hazards



Gas Leaks

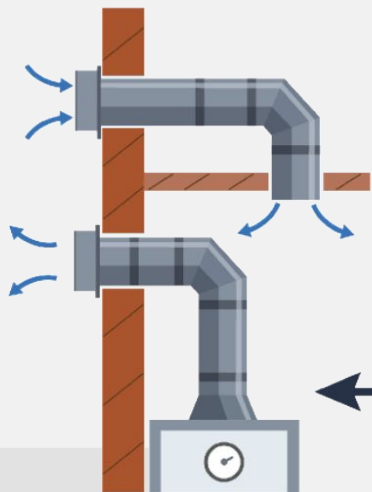


**Carbon Monoxide
(CO)**

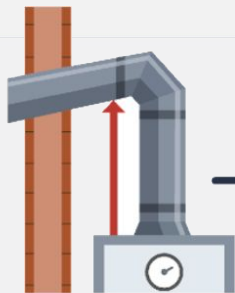


Flame Rollout

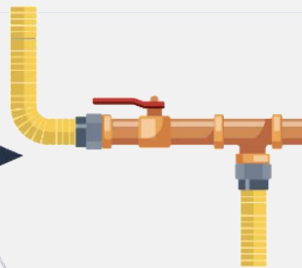
BIG THINGS to Look Out For



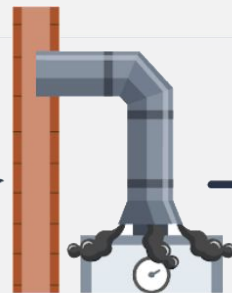
Improper combustion air



Improper venting



Poor gas line installation



Back drafting or orphaned water heaters



Improper or inadequate CO monitoring



High ambient CO during operation



Improper gas pressure settings



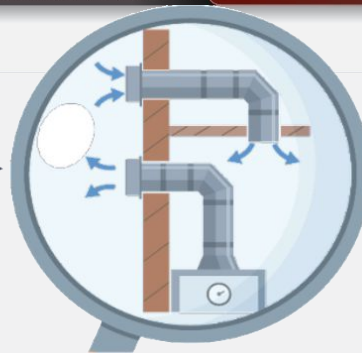
Inspect and clean burners



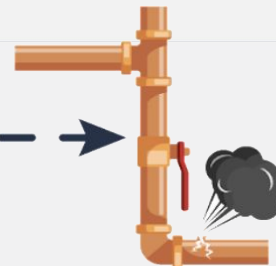
Check existing CO monitors & advise customer to install a low-level CO monitor



Inspect and clean flame rod



Inspect venting, combustion air, and combustion zone



Inspect piping and check for gas leaks

Service Sequence



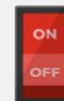
Check temperature rise and adjust airflow to the middle of the manufacturer's specs



Measure inlet & manifold pressure; adjust to the middle of the manufacturer's specs



Measure CO levels around furnace and in the space



Run the system and inspect the flame; look for displacement when the blower starts

