

Pilots and thermocouples

Pilot;

Standing pilot lights have been phased out as minimum efficiency ratings have risen on furnaces, so if you have a pilot light then your furnace is probably 20 or more years old, which exceeds the normal life expectancy of a furnace, so you may want to consider replacing your furnace in the near future, just a note. Standing pilot lights are still common on unit heaters, boilers and most water heaters. The purpose of the pilot is to ignite the gas from the burners on a call for heat. There is normally only one pilot but the number of burners it must light varies on the size or type of furnace you have. Typically each burner has a pilot transfer on it, and all the transfers are lined up to form a nice transfer line from the pilot to the gas coming out of the burner, a pilot is placed somewhere along this transfer line. If one of these burner transfers are not in line correctly, or if they become plugged with debris or rust, the pilot may delay igniting the burner gas until it builds up enough to find the pilot and ignite, sometimes causing a mild to loud exploding sound. The burners should be cleaned every couple years to prevent this.

Thermocouple;

If the pilot was to go out, and there was a demand for heat, the burners would dump raw, un-ignited gas into the furnace causing a dangerous situation. Originally a pilot sentry system was installed on furnaces using a thermocouple, later this was incorporated into the main gas control valve, which you probably have now. A thermocouple is a simple device; it is made of two dissimilar metals (conductors) that touch in two different places, the hot point (the tip) and the cold point (the end). When there is a temperature difference between these two points voltage is generated, a thermocouple produces about .075 volts. It is important that the thermocouple tip is in the pilot flame 3/8" to 1/2", too much or too little will not produce the proper voltage. The voltage produced by the thermocouple is used to energize a magnetic coil that will hold the safety contacts closed, allow a circuit to the main gas valve to complete and fire. If the pilot goes out, the thermocouple goes bad, or is not heated properly; the voltage will stop, de-energizing the magnetic coil and open the contacts preventing the main gas valve from firing. When you turn your gas valve selector to "pilot" and push down to allow pilot gas you are holding the safety valve closed, then when you light the pilot and continue to hold it down for 60 seconds, which allows the thermocouple to heat up and generate the necessary voltage, you can let up on the selector and the voltage generated will hold the safety contacts closed. Turn the selector back to "on" and the burners should fire on a call for "heat".

Tip; the thermocouple is an electrical connector, when tightening the threaded end into the gas valve take care not to over tighten which will break the connector off the end. You should just hand tighten and then snug with a 3/8" wrench.