

ADJUSTING BURNERS FOR PROPER HIGH & LOW FIRE CYCLING

- First you must understand for the dryer to operate properly, the fan/heater unit has to cycle properly. Cycling is accomplished by turning on and off the solenoids on the gas pipe train. This keeps the plenum at a constant temperature. If a burner does not cycle it will cause numerous types of problems. **As a general rule we would like to see the burner cycle 4 to 7 times per minute.**
- You can tell if the burner is cycling in many different ways. One is that when a burner cycles it is really switching between two different gas pressures. To maintain a constant temperature we cycle a few degrees above and a few degrees below the burner setpoint. When it is on low fire the gas pressure on the gauge will be at a low point, but when it changes to high fire you can see the pressure on the gauge increase. As it cycles the pressures rise and fall with the cycles.
- Another way to see if the burner is cycling is to listen to the solenoids. When a solenoid is energized it gives a “Snapping” sound as it closes. When it closes, gas is passed through the solenoid. So when you hear a solenoid “snap” closed, the gas pressure on the gauge should start to rise. In most cases, when the solenoids close you can also hear the “ROAR” of the burner increase. This is due to the increase in gas going to the burner.
- **YOUR GOAL** is to adjust the gas pressures to ensure that the burner cycles properly. There are two different regulators on the pipe train. There is a main regulator that controls the entire amount of gas that goes through the pipe train. You have to ensure that the pipe train is getting enough gas to reach the burner set point. For example, if your burner setpoint is 225 degrees Fahrenheit and the regulator is adjusted too low, you will never reach the goal of 225 degrees. In this case the burner will never cycle. The burner will be on high flame all the time, because it is trying to reach the 225 degree set point and can not. **So the first thing to make sure of is, the main regulator is adjusted high enough to reach the burner set point.**
- If you are assured that there is enough fuel pressure to reach the setpoint, now you have to determine the low pressure settings. When a burner cycles this is what happens. Let’s say your plenum setpoint is 225 degrees. Every solenoid on the pipe train is turned at this point, because it is trying to get enough gas to the burner to reach 225 degrees. So at initial start up, all the solenoids on the pipe train are turned on and gas is flowing through them. The “Cycling” occurs when you have reached the set point. **When the set point is reached the dryer turns off the high pressure solenoid.** When looking at a pipe train, this is the solenoid that is on the top. The high pressure solenoid is turned off, and this makes all the gas flow through the low pressure solenoid. This solenoid is located on the lower section of the pipe train, and is accompanied with a small ball valve. **When you are on low flame, all the gas is flowing through this valve and solenoid.** By turning the ball valve up or down you will be adjusting all the gas going into the burner.
- There is a preset differential that is how many degrees the burner must drop before it returns to high flame. Usually this is 10 degrees. So your burner has hit the set point and now switches to low flame. The ball valve on the low pressure side must be turned down low enough to allow the temperature to start gradually falling in the plenum. To cycle it **must** drop the full 10 degrees (215 degrees), and then it will automatically kick back to high flame. When it returns to high flame it should pick the heat back up to the set point (225 degrees).
- **One of the hardest things to understand is that it must drop the full 10 degrees.** If it does not drop the full 10 degrees the dryer will run on low flame forever and will not cycle. Cycling occurs when the burner falls 10 degrees below the set point. **The most common reason why a burner will not cycle is that the low gas pressure is so high that the plenum temperature will not drop 10 degrees.** In some cases the gas pressure when on low flame is so high that the plenum temperature keeps climbing even when it’s on low flame. You have to cut this pressure back enough to allow the plenum temperature to drop the full 10 degrees.