Igniters: Effective Field Troubleshooting--Part 2

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"Make daily deposits to your box of knowledge, soon it will have many reference cards."--Randal S. Ripley

Last month we went over a lot of general information about igniters and this month we will cover troubleshooting.

Henry HeatinMan, a technician for Heating-is-Us, goes out on a call to a customer that had finished off their basement and upgraded their furnace from an 80% to a new 90% model just this past summer. The customer said the furnace had worked for the first couple of months but now it would not light.

Henry tried to cycle the unit on at the thermostat but it would not come on so he descended to the basement and checked the flash code on the furnace, which was indicating an ignition failure.

He turned the power off and then back on and the unit started working through its sequence of operations as Henry watched and quickly noticed that the igniter was not heating up.

Henry verified the pressure switch had closed with his meter and found power to the igniter leaving him to conclude that the igniter was defective.

Henry removes the igniter and notices a crack with a white corrosive looking build up around the crack. He installs the new igniter and moves on to his next call.

The next year Henry is back to this house for another burnt out igniter that has the same white build up around the crack this time also. Henry knows more about igniters this year and that it is not normal to have to replace the igniter on a yearly basis.

After changing out the igniter Henry performs a room temperature resistance test (RTR) on the igniter by performing an ohms (resistance) test on the igniter with the leads from the igniter to the power source disconnected so that only the resistance of the igniter is measured.

The new igniter RTR should match the specifications for the given igniter you are using.

- The 201 45-400 Ohms
- The 271 40-100 Ohms
- The 601 mini-igniter 25-300 Ohms
- SSN2000 Silicon Nitride Universal igniter 15-30 Ohms @ $77^{O}F$

Used igniters will have a higher resistance reading but should not be more than double the original specifications number.

He will now start up the unit and check the voltage because voltages in excess of 125 volts can cause premature failures and burn out at 132 volts. If high voltage is found, it is time to call an electrician and/or the Power Company to see what can be done to lower the voltage and your amperage draw should not exceed what it is rated for in the specifications sheet.

All of these checks are within the specification sheet so more than likely they are not the cause of the problem.

Now Henry is scratching his head as to what can be causing this problem and decides to look up other causes of premature igniter failure.

He discovers that the hot surface igniter doesn't tolerate contaminates such as: dry wall dust, fiber glass insulation, sealants or any other contaminants in the area can build up on the igniter and become a corrosive coating causing burn outs or cracks but none of these are present.

Cracks can also be caused by the furnace short cycling, high gas pressure, a lack of combustion air and even moisture can contribute to a shortened igniter life.

After reading this it didn't take Henry long to realize it was a lack of combustion air. The equipment had been enclosed in a small room when the basement had been finished and no provisions for combustion air had been made for the non-direct vented furnace that was vented correctly for the original application when the basement was open but not for this new application.

Henry had not seen any change in the flame characteristics while observing the unit due to the door to the room being open while he worked on it. The door was always closed during normal operation and the water heater vent was now to large and over sized, not venting well and had become an air intake when the furnace ran. The furnace was drawing the water heaters moist, corrosive flue gases into the furnace that was affecting the igniter.

The moral of this story is that while igniters certainly do fail, repetitive igniter failures are not a fairly normal event. Perform your RTR test, voltage and amperage checks and look around for chemicals that can emit vapors that are corrosive if burned, excessive vibration or water that can damage the igniter, instead of just continuing to change the igniter each year.

Troubleshooting:
The three most common causes of hot surface igniter failure (Si Carbide) are**:**
Moisture, Heat and Vibration

Voltages exceeding 125 volts can also cause premature failure in light bulbs; so if the customer complains that this is the 3rd time in three years the igniter has failed, you might want to ask about the light bulbs.

If high voltage is found the utility may be able to install a transformer to better regulate the voltage.

Be positive you have the right igniter for the application.

When handling be as gentle as possible when handling and try to always handle by the ceramic holder and not the element because the element is fragile, not out of fear that oil from your skin will cause premature burnout.

When removing a faulty igniter check for a corrosive build up or oxidation; when removing a faulty or installing a new igniter do a visual inspection of the element and ceramic holder for cracks (holder cracks can result in a short to ground).

Do your RTR, voltage and amperage test when installing a new igniter along with checking the outlet gas pressure to be sure the unit is not over-firing.

Watch the igniter for any bright white lines on any of the legs, this is a sign of a crack and could cause a premature failure, so the igniter should be replaced. A crack will show continuity while an "open" will show no continuity.

Silicon carbide igniters to not do so well when touched against the metal casing it can short and/or break almost instantly but a silicon nitride igniter can handle a longer period of time (up to 10 seconds) without ruining the igniter but if the igniter makes contact while on with a lit burner, it will display pock marks in the area that made contact.

Some possible causes of <u>the igniter not glowing include:</u>

- A partially or fully plugged condensate draining system not allowing pressure switch to close
- No voltage in and/or out of the furnace integrated control board or ignition module
- Faulty transformer, thermostat, limit switch or igniter itself

Some possible causes of <u>the igniter glowing but unit not lighting:</u>

- Igniter not properly aligned with the flow of gas from the igniter
- Faulty integrated control or ignition module
- Faulty gas valve, no gas or high inlet pressure (LP) that can cause the valve to lock up
- Reversed polarity
- Poor ground connection—check L1 to the furnace chassis, you should read 120 and if you don't, find out where connection is being broken