2.5 BURNER OPERATING CHARACTERISTICS

Procedure:

Following the tests in 2.5, the combustion chamber shall be wiped with a clean white rag to verify that there is no carbon.

On designs intended for operation at a minimum rate, tests in section 2.5.1, 2.5.4 and 2.5.7 are to be repeated.

A minimum of 2 ignition attempts are required to demonstrate compliance with each test condition.

If the manifold pressure does not increase as a result of the increased pressure condition, the increased condition does not need to be tested.

Section 2.5.1 Flashback

1. Flashback shall be verified at the following conditions:

    a. Reduced inlet test pressure of 3.5 inches on natural gas and 8.0 inches on propane.

    b. Normal inlet test pressure of 7.0 inches on natural gas and 11.0 inches on propane.

    c. During any test condition in the standard.

    d. When the pressure to the appliance is adjusted to deliver 1/3 of full input rating. This is to be accomplished by reducing the pressure in a manual valve external to the appliance. If the design shuts off prior to achieving the 1/3 rate, the test shall be conducted at the lowest rate in which the controls will permit burner operation. This test does not apply to heaters equipped with snap acting controls. These controls are equipped with manual valves that do not permit reduction in the manifold pressure when turned from full on to off position.

    e. This test shall be repeated using either 1400 butane-air (Test Gas G) gas for designs being tested for use with natural gas or butane (Test Gas D) for designs being tested for use with propane.

    f. These tests shall be conducted following 15 minutes of operation.

    g. On designs intended to operate at a min rate, flashback shall be verified with the input rate adjusted to 87% of min rate.

Section 2.5.2 – Back Pressure on Mixer Face

1. The test shall be conducted at both hot and cold conditions.

2. When operated at the 3 test pressures specified in Table IX strike a match and blow out the flame. Move the smoking match around the inlet to the burner venturi. Smoke should be drawn into the venturi verifying that there is no backpressure.

   If necessary for sealed front burners, a small hole should be drilled in the front opening to permit the entrance of the smoke to verify that there is no back pressure at the mixer face.

3. This test shall also be conducted with the pressure to the appliance is adjusted to deliver 1/3 of full input rating. This is to be accomplished by reducing the pressure in a manual valve external to the appliance. If the design shuts off prior to achieving the 1/3 rate, the test shall be conducted at the lowest rate in which the controls will permit burner operation. This test does not apply to heaters equipped with snap acting controls. These controls are equipped with manual valves that do not permit reduction in the manifold pressure when turned from full on to off position.

4. This test shall be repeated using either 1400 butane-air (Test Gas G) gas for designs being tested for use with natural gas or butane (Test Gas D) for designs being tested for use with propane

Section 2.5.3 – BOC at 40 F Water

1. The water heater shall be filled with 40 F water after which the outlet water valve shall be closed.

2. The appliance shall be operated at normal pressure and rate until the condensation in the combustion chamber stops.

3. During this period, the burner flames shall not extinguish.

Section 2.5.4 Flame Flashout

1. The test shall be conducted at both hot and cold conditions.

2. Flames shall not flash outside the combustion space when ignition is made at test pressure conditions in Table IX. For this test, the outer door shall be removed. Flames flashing out of the inner door shall be considered a failure.

3. Ignition is to be conducted at least 2 times to verify compliance.

Section 2.5.5 3 MPH Wind Test

1. The heater shall be operated for 15 minutes at normal conditions.

2. With the heater operating, a 3-mile per hour wind shall be directed to the heater at the front, sides and rear of the heater. The blower shall be held in place for a

period of one minute. The burner flames shall not become permanently extinguished.

3. The test shall be repeated with only the pilot burner, (if equipped) in operation.

4. Tests shall be repeated using test gas G (1400 Butane-air) or test gas E (Butane).

Section 2.5.6 Back Pressure

1. Heater shall be tested under both hot and cold conditions.

2. It shall be tested at both 85% and 110% of rating plate voltage and at both normal and reduced inlet pressure conditions.

3. Determine if there is any back pressure at mixer face and that burners light without delay as determined by ignition within 4 seconds.

4. Tests shall be repeated using test gas G (1400 Butane-air) or test gas E (Butane).