



Consulting, Resource, Education, Training, and Support Services for Home Inspectors
"A candle loses no light when it lights another candle."

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FLAME SHIELD OPENING/REMOVAL WHEN INSPECTING RIBBON BURNER FUEL GAS-FIRED FURNACES AND BOILERS

As older gas-fired furnaces and boilers with ribbon burners reach the ends of their serviceable lives they are typically replaced with higher efficiency models with monoport burners (also referred to as inshot or injection-type burners). These higher efficiency furnaces often do not have flame shields. Many incorporate induced or forced draft systems and some have sealed combustion chambers and obtain all of their combustion air from the exterior. However, inspectors will continue to come across the older, ribbon burner type units.

A question was asked by a **ProSpex** subscriber regarding whether or not to open or remove flame shields when inspecting furnaces with ribbon burners. It is not clear whether a flame shield is what some home inspection standards term a "readily accessible access panel." Also, is it not clear whether a flame shield meets the ASHI Standards' definition of a "Readily Openable Access Panel" or even whether removing a flame shield would meet the ASHI Standards' definition of the term "Dismantle" which the ASHI Standards define as: "To take apart or remove any component, device or piece of equipment that would not be taken apart or removed by a homeowner in the course of normal and routine homeowner maintenance." The "General Limitations and Exclusions" section of the ASHI Standards state in part G. 3. that "Inspectors are NOT required to: dismantle any system or component, except as explicitly required by these Standards of Practice" and there is no explicit requirement regarding the opening or removal of flame shields in section 8. "Heating System" of the ASHI Standards. In fact, the ASHI Standards state in part 8.2 A. 2. of section 8. that "The inspector is NOT required to: inspect: the heat exchanger."

Inspection standards requirements and exclusions notwithstanding, opening or removing flame shields permits burners to be inspected for flame pattern, evenness, strength, and color as well as for flame impingement on the surfaces of the heat exchanger. They can also be examined for scale or rust accumulation that can obstruct burner orifices. In addition, opening or removing flame shields permits inspection of the visible portions of heat exchangers for cracking, holes, corrosion, rust, and for other types of damage. Using a flashlight to carefully examine the burners and the visible portions of heat exchangers can disclose adverse conditions behind flame shields which cannot be seen without opening or removing them.

If home inspectors elect to open or remove a flame shield on a furnace, it is extremely important to be certain that the furnace is turned off at the service disconnect device before opening or removing the flame shield.

Once the burners and the heat exchanger are exposed and examined, then the flame shield can be closed or temporarily set back in place and the unit energized. As soon as possible after the burners have ignited, the flame shield can be reopened or removed again and burner flames can be assessed for pattern, color, evenness, strength, and impingement. If inspectors elect to remove flame shields, they should always make sure that the flame shield is properly closed or reinstalled subsequent to completion of inspection of the burners and/or heat exchanger.

If a ribbon burner furnace has no flame shield, look for any evidence indicating that it was originally equipped with one – screws, screw holes, wear patterns, etc. A missing flame shield can permit flashback and flame rollout when the burners initially ignite causing scorching of the area above the heat exchanger openings, heat damage to wiring insulation and other components in the vestibule area, and can permit combustion by-product rollout as well. If no flame shield is present and conditions are consistent with one having been installed, this should be documented in the report as a condition for which **IMMEDIATE ACTION** is recommended.

Remember, home inspection standards are minimum standards and do not limit inspectors from exceeding them. Even though neither the Arizona nor the ASHI Standards or any other standards which we have reviewed specifically state whether or not flame shields are **READILY ACCESSIBLE**, “readily openable access panels” (this term is defined in the glossaries of both the ASHI and the Arizona Standards) or even include any specific reference to flame shields, given the potentially important information that can be obtained by opening or removing readily accessible/readily openable flame shields on older furnaces, it is worth considering doing so.

ProSpex subscribers can see a definition of **IMMEDIATE ACTION** and **READILY ACCESSIBLE** in the **ProSpex** prototype *Home Inspection Report Glossary* in the **BUSINESS** documents section of the **SUBSCRIBER** area of the **ProSpex** website at: www.prospex.us