



## A "Sweeper's Dozen": Advice From a Chimney Sweep

# 13 Chimney System Issues Home Inspectors Can Detect

### Without Exceeding Their Standard of Practice

By Ashley Eldridge and Robert Priesing, Chimney Safety Institute of America

**T**he Chimney Safety Institute of America (CSIA) appreciates when home inspectors recommend CSIA Certified Chimney Sweeps to their clients. We also want home inspectors to be aware of some issues that they can detect without exceeding their Standard of Practice. Reporting on the defects described in this article will allow home inspectors to provide even greater value to their clients and determine when to recommend calling a sweep for specific reasons, not just as a disclaimer.

We understand that home inspectors often are hesitant to quote codes. One authoritative reference recognized by the CSIA and most building and firefighting officials is the National Fire Protection Association (NFPA) 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*. Much of the International Residential Code (IRC) writings about chimneys are similar to NFPA 211.

NFPA 211 defines three levels of inspections for chimneys, fireplaces, vents and solid fuel-burning appliances. Even the Level 1 inspection exceeds home inspection standards. It requires removal of connector pipes for freestanding stoves and viewing interior surfaces of fireplace smoke chambers.

This inspection is performed when the chimney is being swept or as part of the annual inspection recommended by NFPA 211.

A Level 2 inspection is called for during real estate transactions, among other occasions. The Level 2 inspection requires inspection of virtually all visible exterior portions of the chimney and an inspection of the interior surfaces of the flue. This is typically done with closed-circuit video equipment.

The Level 3 inspection is rarely performed. It encompasses all portions of the Level 1 and Level 2 inspections, as well as gaining access to concealed areas of the chimney. It requires some dismantling or destruction of parts of the chimney or home.

There are many issues that can be identified without performing a complete NFPA 211 Level 1 inspection. Read on to learn about these 13 important conditions.

#### 1. Chimneys That are too Short or too Tall

The issue of the chimney's height is all about performance and it is often misunderstood. According to Reference 2012 IRC R1003.9, a chimney must extend three feet above the roof penetration on the

shortest side, and the top of the chimney must be two feet higher than any portion of the building structure within 10 feet. Some say that this rule ensures safety by helping to make sure that anything hot coming out of the top of the chimney, including sparks or burning creosote in the event of a chimney flue fire, doesn't catch the adjacent roof or building on fire. Others say that this rule is for performance—that this minimum height ensures that the chimney is tall enough to provide draft and that it will help prevent other parts of the building from hindering draft. When the chimney is taller it is less likely to be influenced by air flowing across the roof.

For home inspectors not keen on climbing on a steep roof, one good trick is to measure the height of a single brick and then count the number of those bricks (this counting technique also works with uniform-cut siding). Remember: The three-foot



Measure from the top of the chimney on the high side (the right most corner). Do not include the rain cap in the measurement.



The brick veneer and sheetrock (left) and the chimney (on the right) has an embedded header between them. This picture—used for instructional purposes—shows a properly installed embedded header. While it may not be visible, it frequently lacks proper clearances.

measurement should be from the point of the chimney where its high side penetrates the roofline.

## 2. Inadequate Clearance From Combustibles

Inadequate clearances are common at the header supporting the stud wall above the fireplace opening; at points of passage through floors, ceiling and attic; and where exterior chimneys run up the outside wall of the house. Combustible materials frequently are sandwiched between the chimney masonry and building insulation, which increases the fire hazard enormously. The NFPA calls for a two-inch airspace between combustibles and interior chimneys or smoke chambers. The NFPA also calls for sheathing to be one inch from exterior chimneys. CSIA experts believe that although the clearance requirements have been in place for many years, virtually every fireplace and chimney contains at least one serious clearance deviation. You may even see this wood from the basement if the ceiling is unfinished (this applies to the outer and inner hearth). There is an exception in the IRC for exterior sheathing.

Obviously, not every such chimney causes a house fire. But when a chimney-related fire spreads to the house, lack of clearance is almost always a contributing factor. With today's increased use of fireplaces, the

number of fires owing to inadequate clearances is significant. The single most effective step to improve the fire safety record of fireplaces is to ensure proper clearance of combustibles and insulation from chimneys and fireplaces. If proper clearances cannot be created, then the chimney can be relined for "zero clearance" conditions.

## 3. Separated Fireplace Face

The finished face of the fireplace typically is constructed after the firebox, smoke chamber and chimney. The face often isn't bonded or even tied to the fireplace, leaving an open gap behind the lintel that leads to the header and stud wall above the fireplace. Most codes don't specifically address this issue of a separated fireplace face, but the implied goal of all codes is to have a firebox without voids. Any gap in a fireplace is an open invitation for heat to reach concealed combustibles or create a secondary chimney. Ideally, the facing should be an integral part of the fireplace. If not, it should be fully tied and the gap should be filled with mortar.

## 4. Wood Under the Hearth

Many fireplaces still have clean-out doors in the basement, the crawl space or outdoors. These clean-out doors are used to remove ashes that have been pushed into the ash dump. You can open the clean-out door and look in to determine whether you see wood supporting the hearth. If you do, that is not good and it's not allowed.

**More on hearths:** Frequently, the inner and outer hearths are laid or poured on combustible forms that are never removed. Often the inner hearth is poured on plywood over an ash pit, with a rectangular cutout for the ash dump. The outer hearth frequently rides on the house floor joists rather than on the fireplace foundation. All combustibles under the hearth and hearth extension should be removed.

## 5. Smoke Stains Outside or Above the Firebox

If you see smoke stains outside or above the firebox, you can tell your client that something is amiss! It could be that there was negative air pressure in the house

causing smoke to be pulled out of the fireplace. Another possibility is that the grate was too large. Other possible issues include flue sizing and other draft or flow issues. It is likely they will tell you they simply forgot to open the damper one time, that is very different from a fireplace with obvious smoke staining above the opening unless they routinely build excessively large fires.

## 6. Orphaned Appliances

You might run into a situation where you are on the roof and you notice that the cap is easy to remove with just a few screws. Interested in taking a look? If you do, you might see evidence of damage inside the flue. Many older homes have chimneys that were sized to vent less efficient appliances than those manufactured today. In some cases, we find oversized chimney flues that originally vented multiple appliances, such as a furnace and a water heater, but now have only a single appliance connected. The existing flue is grossly oversized for this single, appliance. As a result, there is excess condensation in the flue, as exhaust gases cool before they exit the chimney. Often this is indicated by moisture visible on the outside surface of the chimney, efflorescence or spalling of visible brick. There also may be stains indicating that moisture has been leaking from the chimney at the point the appliance connector enters the flue.

## 7. Inadequate Hearth Extensions

According to NFPA 211, if the fireplace is less than six square feet, then the hearth extension (in front of the fireplace) has to extend 16 inches to the front and eight inches beyond the opening on either side. (The idea is to keep sparks from catching the house on fire.) If the fireplace is six square feet or more, the outer hearth should extend 20 inches to the front and 12 inches beyond the opening on either side.

## 8. "Clean Areas" in a "Dirty" Chimney

If you open the damper and see an area in the smoke chamber (or in the flue) that appears to be "clean" in an otherwise dirty chimney, this signifies that air is leaking into the system. This situation generally

occurs because the surface has holes, allowing dilution air into the system, since it is under negative pressure when in use.

### 9. Colorization Changes

On the exterior, colorization changes can relate to damage from water entry and freeze thaw. Dark staining near the top of the chimney, often thought to be smoke staining, may be mildew growing as a result of water penetrating the masonry. Interior staining can be the result of water, but if the staining is near the appliance connection or above the fireplace, the issue could relate to the spillage of flue gas. Many newly constructed American homes simply do not have sufficient available combustion air to operate the fireplace. Proper air exchange rates create better indoor air quality. The fireplace acts like an exhaust device and may pull fresh air into the home to replace what is being exhausted up the chimney.



Here's an example of exterior colorization changes. This is efflorescence, which can be an indicator of moisture issues.

### 10. Obvious Blockages

If the chimney is blocked with animals, leaves or other debris, deadly carbon monoxide gases and smoke can back up into the home, threatening the health of the occupants. In addition, if the inside of the chimney is wet, it may be because a highly efficient appliance was introduced into an

old-fashioned, oversized chimney. Wind can create downdrafts that force smoke into the home or cause cold air to enter the home.



The simplest of obstructions, such as a bird's nest, can be a big issue for an unsuspecting home-owner who can't see what the home inspector can.

### 11. Missing Cricket

A chimney cricket diverts the water around the chimney instead of letting it pool at the the roof penetration of the chimney. It is a common building code that chimneys more than 30 inches wide need a cricket. CSIA Certified Chimney Sweeps often find that the cricket isn't there or find that the cricket was installed improperly.



Snow, ice or water standing atop a chase cover, instead of draining, is an indicator of a poorly designed cover.

### 12. Chase Cover

Instead of a masonry crown, a prefabricated chimney chase has a sheet metal top called the "chase cover." Many of these covers are field-fabricated and perform poorly; some are even concave in the middle. They retain moisture and are prone to water leakage, water pooling and rust, particularly from

snow that accumulates and melts. Water can show up at ceiling lines, in the firebox and behind the louvers of the prefabricated fireplace. Rust running down the exterior chase siding indicates a significant problem.

### 13. Fireplace Issues

**Improperly sized grate:** Fireplace grates keep firewood or wax logs from rolling during burning and allow air to flow beneath the solid fuel. Grates also allow for a central ash pile. Many people like these hearth accessories for the traditional look they lend to their fireplaces and fireplace inserts. Most people tend to purchase the largest grate that will fit into the fireplace instead of the recommended size, which is two-thirds the width and one-half the depth of the fireplace. As a result, they'll usually load their fireplace with too much firewood. Lastly, ashes should never build up as high as the grate.

**Damper handle:** You'd be surprised at how often we notice that the home inspector did not open, check or even rattle the damper handle's lever. Simply documenting the style and type—and even whether it opens and closes, pushing front to back or side to side—can be a big help to the client.

**Missing accessories:** The CSIA recommends that all fireplaces and other hearth appliances have a protective barrier [such as a screen] to keep curious children from touching flames or hot glass.



This is an example of an ideal grate size.

**And that's the "Sweeper's Dozen"**

**These 13 points represent issues that are easy to detect. A home inspector should be able to see these issues quickly with the naked eye. If the home inspector detects an issue, he or she should make general notes about it and suggest contacting a specialist.**

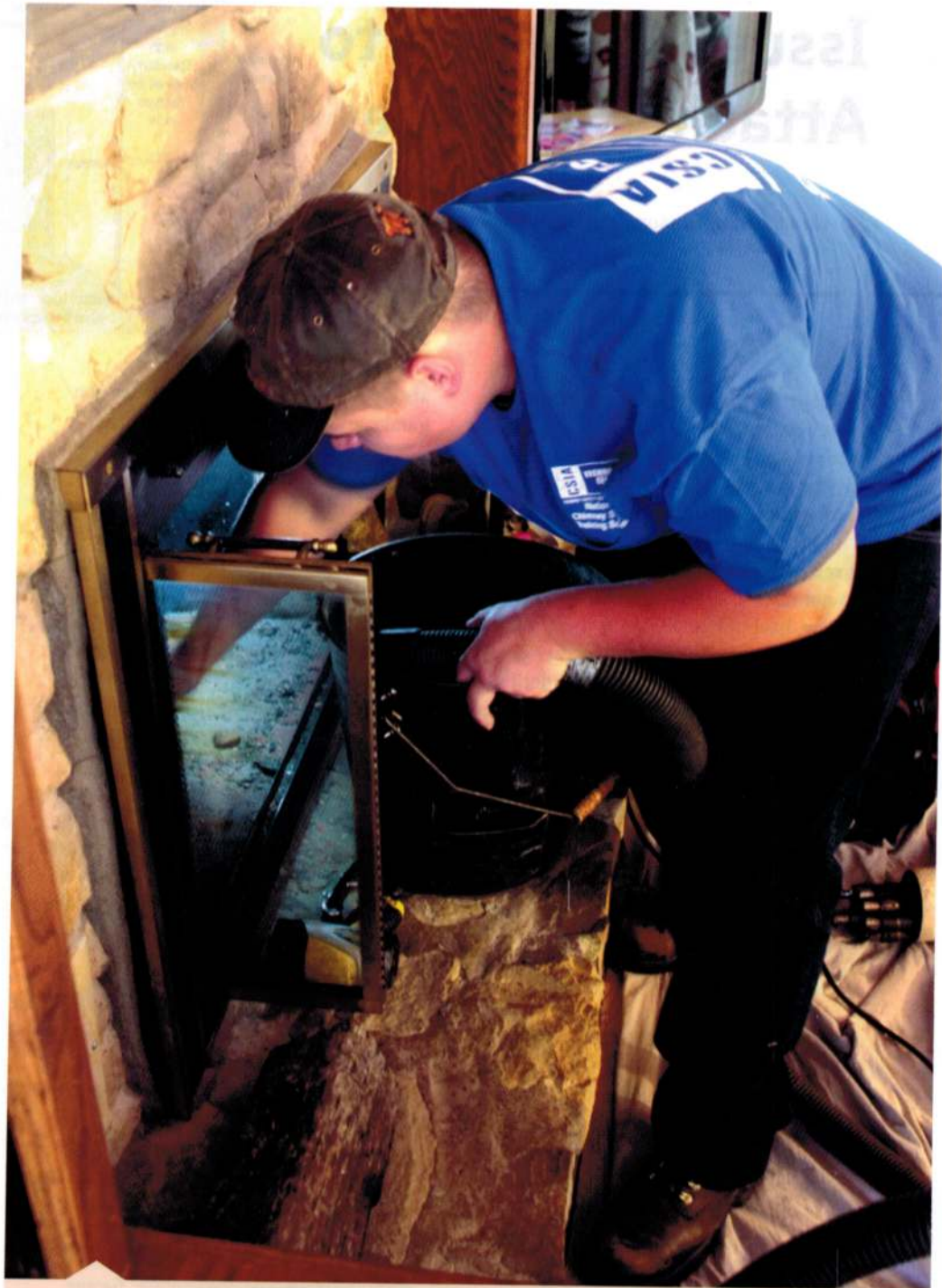
**A final note:** CSIA favors the recommendation for a, NFPA 211 Level 2 inspection conducted by a qualified professional. There should be no expectation that a home inspector should find or disclose defects inside the chimney, including the smoke chamber, the damper and the flue lining. In addition to identifying these easily identified defects, the home inspector should explain the nationally accepted standard of recommending a NFPA 211 Level 2 inspection to their client. It is important that this inspection be done by a qualified inspector such as a CSIA Certified Chimney Sweep. 🧹



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**Home inspectors, do your clients a favor: Recommend a chimney and fireplace inspection so they can lower their risk when lighting that cold-weather, holiday fire. [CSIA.org/search](http://CSIA.org/search) has a free zip code locator of CSIA Certified Chimney Sweeps.**