

## 45-Degree Elbows are NOT Allowed in U.S. All-Fuel Chimney Systems

### The Issues

- A 45-degree elbow in any U.S. all-fuel chimney installation does not comply with UL 103, the standard for factory-built chimneys in the U.S.
- A 45-degree elbow in any U.S. all-fuel chimney installation does not comply with the International Building Code.
- The language of NFPA 211 can no longer be used to justify 45-degree elbows because the International Building Code requires factory-built chimneys to comply with UL 103.
- Building inspectors, especially in International Building Code jurisdictions, should be aware of the applicable governing documents and not allow chimney installations with 45-degree elbows.
- In the event of chimney fires, homeowners, inspectors and fire/casualty insurers should be aware of non-compliant installations.
- Distributors, dealers, and installers can be held liable for providing or installing non-compliant components. Chimney manufacturers do not have authority to override these governing documents.

### The Four Governing Documents That Apply

#### 1. UL 103 Factory-Built Chimneys for Residential Type and Building Heating Appliances

##### The applicable section of the UL103 standard as it relates to 45-degree elbows states:

**7.8** When a chimney assembly incorporates elbows, no part of the chimney shall be at an angle of more than 30-degrees from the vertical at any point in the assembly, and the chimney shall not include more than two offsets (four elbows).

(Note: UL 127, the standard for Factory-Built Fireplaces, has the same limitation on elbows as UL 103 limiting them to 30-degrees. Section 7.10 of UL 127 covers Chimney Elbows, "When a chimney assembly incorporates elbows, no part of the chimney shall be at an angle of more than 30 degrees from the vertical at any point in the assembly.")

#### 2. International Building Code

##### The applicable section of the International Building Code is found in the 2006 International Mechanical Code, and it states:

Chapter 8: Chimneys and Vents

Section 805: Factory-Built Chimneys

**805.2** Solid fuel appliances. Factory-built chimneys installed in dwelling units with solid fuel-burning appliances shall comply with the Type HT requirements of UL 103 and shall be marked "Type HT" and "Residential Type and Building Heating Appliance Chimney."

##### Exceptions:

1. Chimneys for use with open combustion chamber fireplaces shall comply with the requirements of UL 103 and shall be marked "Residential Type and Building Heating Appliance Chimney."
2. Chimneys for use with open combustion chamber appliances installed in buildings other than dwelling units shall comply with the requirements of UL 103 and shall be marked "Building Heating Appliance Chimney" or "Residential Type and Building Heating Appliance Chimney."

While NFPA 211 can be creatively interpreted to allow 45-degree elbows (see below), the language found in UL103 is clear. In order to be compliant with the 2006 International Mechanical Code the chimney must comply with UL103 requirements. And, UL103 (including UL 103HT) does not allow 45-degree elbows.



### 3. Uniform Building Code

**The applicable section of the Uniform Building Code as it applies to all-fuel chimneys is the Uniform Mechanical Code, 2006 and 2003 Editions. This sections states:**

Chapter 8: Chimneys and Vents

**802.5** Masonry, Metal, and Factory-Built Chimneys.

**802.5.1** Listing or Construction.

**802.5.1.1** Factory-built chimneys shall be installed in accordance with their listing and the manufacturers' instructions.

Factory-built chimneys used to vent appliances that operate at positive vent pressure shall be listed for such application.

**802.5.1.2** Metal chimneys shall be built and installed in accordance with NFPA 211, Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel-Burning Appliances.

### 4. NFPA 211, 2006 Edition

**The above referenced NFPA 211, 2006 Edition, as it applies to elbows in an all-fuel chimney system, states:**

Chapter 6: Factory-Built Chimneys and Chimney Units

**6.1.3** Listing Requirements

**6.1.3.1** Factory-built chimneys shall comply with the requirements of UL 103, Standard for Factory-Built Chimneys for Residential Type and Building Heating Appliance; CAN/ULC-S629-M87, Standard for 650 OC Factory-Built Chimney; or UL 959, Standard for Medium Heat Factory-Built Appliance Chimneys.

**6.1.3.2** Factory-built chimneys for use with wood-burning appliances shall comply with the Type HT requirements of UL 103, Standard for Factory-Built Chimneys for Residential Type and Building Heating Appliance, or the requirements of CAN/ULC-S629-M87, Standard for 650 OC Factory-Built Chimney.

Since NFPA 211 is a standard used for both Canada and America, the language used above is inclusive for both Canadian ULC and U.S. UL systems. However, this language has been incorrectly interpreted to imply that the Canadian ULC standards are appropriate to apply to American installations. This is a "reach", in our opinion, as the UL and the ULC standards are clear as to which countries are applicable. The current language in NFPA 211 is under review and is expected to clarify this ambiguity. It is this ambiguous language that has been the only justification for the 45-degree elbow in the U.S.

### Facts

If a 45-degree elbow is used in the U.S. on an all-fuel chimney system, then the installation does not comply with UL 103, including UL 103HT.

For any jurisdiction that has adopted the International Building Code, 2006, 45-degree elbows are not allowed in all-fuel chimney systems.

Regarding the use of 45-degree elbows in U.S. all-fuel chimney installations

UL 103 (including 103HT): non-compliant

International Building Code: non-compliant

Uniform Building Code: subject to interpretation of NFPA211

Therefore, 45-degree elbows cannot be used in an all-fuel chimney system in the U.S for jurisdictions that require either UL103, UL103HT, or International Building Code compliance.

