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RE: 2009 IECC 402.4.3 and IRC R1001.11 Regarding Gasketed Fireplace Doors

To Whom It May Concern:

The issue with respect to the 2009 IRC section R1001.11, exception # 1 and 2009 IECC 402.4.3 requirement for gasketed doors on fireplaces has been problematic as this requirement runs counter to safety requirements. This provision was added to the code as a means of attempting to reduce potential energy losses associated with air infiltration caused by air leakage through an open fireplace and chimney system. However, it is clear that the impact of this requirement on the safe operation of affected fireplaces was not understood or fully considered. When this issue was brought to the industry's attention, ICC-ES was asked for an interpretation. I am attaching the response from ICC-ES engineer Darren Meyers.

It is my view that the addition of tightly sealed doors to either masonry or factory-built fireplaces presents a significant safety hazard. These products are normally used only on an occasional basis and require a large air flow (dilution air) both to keep flue temperatures low and prevent smoking, flame spillage and overheating. Fitting tightly sealed doors could allow the user to operate a fireplace for much longer periods with significantly higher firebox and flue gas temperatures than occur in normal "open combustion" operation. This could lead to overheating of the outside of the fireplace and chimney and increases the potential for ignition on nearby combustibles. It could also result in less efficient combustion, greater creosote accumulation in chimneys and increased particulate emissions. In experiments with long term burning of masonry fireplaces in the early 1980's it was found that virtually all code compliant masonry fireplaces would exceed safe outer surface temperatures if operated continuously for 12 to 16 hours. One lab conducting these tests even had its test enclosure ignite while conducting this type of test - 4 hours after the firing had been stopped.

There is a UL safety standard that applies to doors for masonry fireplaces. This is UL 907 – Safety Standard for Fireplace Accessories (2010). This standard requires steady continuous firing of a masonry fireplace, built per the current code, until equilibrium temperatures are reached. However, experience has shown that this fireplace design, with or without doors installed, will not reach equilibrium conditions before the maximum allowable temperatures of the combustible surrounding structure are exceeded. Thus, to my knowledge, there are no accessory type fireplace doors for masonry fireplaces that are listed to UL 907.

Almost all factory-built fireplaces I know of have unsealed doors which are necessary to prevent over heating and glass breakage. I believe most all of these units would not meet



the safety test requirements if fitted with tightly sealed doors. Certainly, the addition of sealed or gasketed doors to UL 127 certified fireplaces would void the safety certification. In fact, some factory-built fireplaces are certified without doors and when this is the case the following, quoted from UL 127, applies:

“61.2.3 r) Installation of doors when doors are provided. When the fireplace has been tested with doors, the instructions shall include the manufacturer’s specific part numbers for doors that are used. When the fireplace has not been tested with doors, the instructions shall include the word "WARNING" and the following or equivalent statement: "THIS FIREPLACE HAS NOT BEEN TESTED FOR USE WITH DOORS. TO REDUCE THE RISK OF FIRE OR INJURY, DO NOT INSTALL DOORS.”

Given that gasketed or tightly sealing flue dampers and dampers in outside combustion air ducts are standard equipment and perform the intended function of preventing excessive air flow to the outside when the fireplace is not in use, there is little justification for the gasketed door requirement. Users simply need to close the dampers when the fireplace is not in use to avoid excessive air infiltration.

The addition of gasketed doors to either listed factory-built fireplaces or code compliant masonry fireplaces represents a potentially substantial increased risk of building fires. It is much safer to attack the air leakage problem by assuring that a flue damper is present and closes properly than trying to seal the fireplace front opening. It is our recommendation that the requirement for gasketed doors be withdrawn from the codes as soon as possible and that the presence of a tightly fitting flue damper and a damper in an outdoor combustion air duct be considered as equivalent to the gasketed door requirement in the interim. The addition of gasketed tightly sealing doors to masonry or factory built-fireplace not certified with the doors should be prohibited.

Sincerely,

A handwritten signature in black ink, appearing to read "Rick Curkeet", written in a cursive style.

Rick Curkeet, PE
Chief Engineer-Building & Hearth Products

Attachment: E-Mail from Darren Meyers – ICC, 4 May 2010

>>> "Darren Meyers" <dmeyers@icccsafe.org> 5/4/2010 10:43 AM >>>

Greetings Bob,

This is in reply to your inquiry below, during which you posed a question regarding the interpretation of the 2009 IECC relative to Section 402.4.3 and the phraseology, "new wood-burning fireplaces" having "gasketed doors". Please note that our interpretation of this provision has been conveyed to the Hearth Patio and Barbecue Association (HPBA), relative to their involvement in the IgCC draft development process, as well as a number of building officials and stakeholders throughout Illinois.

My answer follows:

The provisions of Section 402.4.3 are derived from International Energy Conservation Code (IECC) Change EC64-07/08, Part I (AM). In the supporting reason to this proposal, the conditions for adding language for better performing fireplaces, including gasketed doors and outside combustion air, were produced to address concerns for energy savings derived from the mitigation of air leakage during periods of non-use, as well as indoor air quality concerns.

To be clear, Section 402.4.3 addresses "wood-burning fireplaces." We interpret this to mean "masonry fireplaces" constructed in accordance with the International Building Code - Section 2111, and NOT "factory-built" fireplaces manufactured in accordance with the International Mechanical Code - Section 903. Our rationale is derived from the confusion with respect to requirements for "gasketed doors," since certain "factory-built" fireplaces are listed and labeled to burn wood (i.e., UL 127). In this regard, the intent of the Section 402.4.3 proviso is to mitigate air leakage during periods of non-use, but not where the conditions of fireplace installation are in violation of the UL 127 listing. Worth noting here, and as occurred during draft development proceedings of the International green Construction Code Draft v4, The HPBA submitted its approach proposing new language in lieu of the language similar to IECC Section 402.4.3 as follows:

605.1.4.4. Fireplaces. ~~New, wood-burning fireplaces shall have gasketed doors and outdoor combustion air~~ Wood-burning fireplaces shall be provided with combustion air directly from the outdoors and shall be provided with a means to tightly close off the chimney flue and combustion air outlets when the fireplace is not in use.

In support, HPBA offered the following "Rationale" as excerpted: Rationale. "These units [factory-built fireplaces] are to be UL 127 [factory-built] fireplaces and there are no gaskets allowed on these products. The addition of gaskets voids the safety testing on these products. The goal here seems to be to not allow any air loss or gain within the structure, which in the original version was accomplished by gasketing the doors. However, there are numerous ways to accomplish that without requiring gasketed doors. For example, there are several low emission units which are a part of the new EPA Cleaner Burning Fireplace Program (<http://www.epa.gov/burnwise/fireplacepartners.html>) which are "tightly sealed," yet do not have gasketed doors. HPBA understands that this requirement already exists in the 2009 IECC."

Accordingly, and solely for "factory-built fireplaces," I recommend pursuing relief from the proviso for "gasketed doors" administratively vis-à-vis IECC Sections 101.3 ("this code is not intended to abridge safety requirements contained in other applicable codes or ordinances.") and 102.1 ("provided that such construction [or] design has been approved by the code official as meeting the intent of this code").

We hope this electronic-mail response answers your question in full. The above opinion is based solely on the information which you have provided. We have made no independent effort to verify the accuracy of your submitted information nor have we conducted a review beyond the scope of your question. Remember that the code official has the authority to interpret the code, and that the opinions of ICC Staff are only advisory.

Thank you for your inquiry, -Darren