

IRC SECTION R1007

MASONRY HEATERS

Proposed Addition to IRC Code:

R1007.1 Definition. A Masonry Heater is a solid fuel burning heating appliance constructed predominantly of concrete or solid masonry having a total mass of at least 500 kg (1,100 lb.), excluding the chimney and foundation, which delivers heat by radiation from the masonry surface of the heater.

It is designed to absorb and store a substantial portion of heat from a ~~solid fuel~~ fire built in the firebox, by routing exhaust gases through internal heat exchange channels ~~in~~ which where the flow path downstream of the firebox includes at least one 180-degree change in flow direction before entering the chimney.

R1007.2 Installation. A Masonry Heater shall be installed according to one of the following:

1. The terms of its listing, or
2. ASTM E 1602 and the manufacturer's instructions, or
3. ASTM E 1602 and ~~under~~ the supervision of a skilled masonry heater builder.

R1007.3 Seismic Reinforcing: Masonry heaters shall be anchored and reinforced as required in this chapter. In Seismic Design Categories A, B or C, reinforcement and seismic anchorage is not required. In Seismic Design Categories D, E and F, masonry heaters shall be anchored to the foundation. Seismic reinforcing shall not be required within the body of a masonry heater whose greatest height is either less than 8 feet (2.43 M), or whose greatest height is equal to or less than 3.5 2.5 times its narrowest body width (and where the ratio for greatest width to narrowest depth of is no greater than 3 to 2) 1.5, and where ~~the~~ a masonry chimney serving venting the heater is not supported by the body of the heater. ~~Where the~~ a masonry chimney is supported by the body of the heater or shares a common wall with the facing of the masonry heater, the chimney portion of the structure shall be reinforced in accordance with Section ~~2413~~ R1003.3.

R1007.4 Masonry Heater Clearance. Any portion of a masonry heater shall have a minimum air space clearance to combustibles of either:

1. no less than 4 inches (102 mm) provided that the wall thickness of the firebox is not less than 8 inches (203 mm) of solid masonry, of which at least 4 inches includes firebrick conforming to ASTM C27 or ASTM C1261, laid with refractory mortar conforming to ASTM C199 and the wall thickness of the heat exchange channels is not less than 5 inches (127 mm) of solid masonry, or
2. distances specified according to the terms of its listing, or
3. distances specified according to the manufacturer's instructions.

Unless otherwise stated by the terms of the listing ~~or the manufacturer's instructions~~ or the specifications of ASTM E 1602, clearances to combustibles shall be no less than 4 inches, and the required airspace between the heater and the combustibles shall be vented and not be filled, except to provide firestopping and fireblocking according to Section R1003.14. A clearance of at least 8 inches (203 mm) shall be provided between ~~the~~ a gas-tight capping slab of ~~the~~ a heater and a combustible ceiling.

Reasons and Comments

R1007.1 Definition. Although I believe we have a potential compromise solution for the definition, I think that you inadvertently left out “predominantly” masonry construction. All of us have metal components, insulation, etc. By adding “total”, the 500 kg number does not just represent the masonry weight alone, but the total appliance weight. My other changes are nonessential grammatical suggestions.

R1007.2 Installation. Once again: potential compromise solution, nonessential grammatical suggestions.

R1007.3 Seismic Reinforcing. What you presented was the rough draft text that I faxed to Chip Clark. Rod is correct; we still have to confirm details based on Tulikivi's engineering analysis. However, we also don't want to eliminate traditional vertically rectangular Scandinavian designs that are less than 8 feet tall. My proposal is that we add that clause and let the seismic reinforcing restrictions apply for units that are more than 8 feet tall. When we add the depth-to-width ratio, the allowable ratio would have to include “narrowest,” since most masonry heaters are not simple six-sided boxes. I am willing to concede to a 2.5 ratio (and a 1.5 ratio for width) for heaters that are greater than 8 feet tall, subject to further review of the issue. Note that all of the Tulikivis evaluated by their engineers were less than 8 feet tall, some of them violated the 2.5 assumption, but none of them were deemed to require internal seismic reinforcement. Let's not strangle our products with rebar until we have better documentation. This would be a great start in an arena where nothing has previously existed, exceeds the current minimum for masonry fireplaces and is consistent with the ubiquitous status of masonry fireplaces that do not have masonry chimneys.

R1007.4 Masonry Heater Clearance. I have reviewed Norbert's concerns with Heikki and John, and we are willing to further compromise by limiting non-listed products to “not less than 4-inch” clearances (in spite of safe European clearances that are less than 4 inches). I believe we could develop a chart of materials that would provide guidance for wall construction based on thermal conductivity or density on a variety of appropriate parameters, but I cannot imagine a simple solution that could be universally adopted by November 1. I'm open to suggestions, but I also believe that an industry goal for the coming year should be to write a reasonable testing protocol and verify all of the undocumented solutions, including the MHA 4-inch/8-inch/5-inch assumption.

On that note, I believe you should also add the full detail of the MHA prescription, including the 5-inch channel thickness, from their current IBC submittal. (Perhaps this was also an inadvertent omission.) I believe that the correct statement should be: “no less than 4 inches” for the MHA heater. Some of their masons already know that 4 inches is not safe with certain facings and geometries. Your wording would force unsafe solutions.

Finally, on the venting issue, I have proposed the addition of venting to the language, but not the version that the MHA wrote for the IBC. This was another ASTM-violating solution, and it conflicts with the construction specifications of ASTM which allows for wing walls, for example. The industry did not agree to “fully venting” because it seems to outlaw legitimate masonry connecting walls. Heater masons and manufacturers are once again to be relied upon for safe construction details, just as the steel fireplace unit manufacturers have to self-regulate their own convection requirements. Your language parallels the current IRC masonry fireplace language and assures that heaters don’t penetrate floors and ceilings without appropriate fire protection methods.

Now is the time for all good men to come to the service of their [industry]! Let’s review everyone’s comments and reconvene by phone early next week. OK?