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**[MHAtch] NSPS : computer simulation**

1 message

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Mon, Jan 13, 2014 at 3:02 PM

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Here is everything that deals with computer simulation in the Proposed Rule :

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The current ASTM methods are ASTM E2817-11 "Standard Test Method for Test Fueling Masonry Heaters" and the draft work product ASTM WK26558 "Specification for Calculation Method for Custom Designed, Site-built Masonry Heaters." (<http://www.astm.org/DATABASE.CART/WORKITEMS/WK26558.htm>.) We propose that they be used for this rulemaking. We request specific comments on these methods and any changes that should be considered and supporting data for those changes.

(...)

As an alternative to testing, we are proposing that manufacturers of masonry heaters may choose to submit a computer model simulation program, such as ASTM WK 26558 noted above, for the EPA's review and approval. Masonry heater manufacturers and laboratories developed computer simulations as a way to encourage good designs without having to conduct emission tests for slight variations, especially because there are so few masonry heaters built every year per manufacturer. Since these units are built on-site, it is not easy to test each of them. These units are typically cleaner than pre-NSPS certified wood stoves. Considering all of these factors, we believe a simple computer simulation showing how new models would perform may be all that is necessary for many of these models.

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The masonry heater compliance costs included implementation of a software package based on a European masonry heater design standard. This software has been verified in the laboratory and under field conditions to produce masonry heaters that would meet the proposed NSPS emission limits. The cost of this software to the user is approximately \$1,500 for the package with an approximately \$450 annual fee that commences in the second year following purchase. In addition, we believe that some manufacturers will use this approach to demonstrate that "similar" model designs meet the proposed emissions standards.

(p 85)

The masonry heater industry recognized concerns about these costs, and it has developed an alternative compliance method based on computer simulations. The industry expects that this alternative will allow sharing licensing of cleaner designs such that the initial software purchase would cost approximately \$1,500 but ongoing annual licensing cost will be approximately \$450 per manufacturer.

(p 141)

(3) As an alternative to the certification process described in paragraph (a)(2) of this section, an applicant may choose to submit a computer model simulation program for review and certification by the certifying entity and subsequent review and approval by the Administrator for use as a surrogate for emissions testing. The Administrator will post the certified model on the EPA Burnwise website.

(p 254)

(c)(1) ASTM WK26558, New Specification for Calculation Method for Custom Designed, Site Built Masonry Heaters may be used as an alternative to certification testing as specified in paragraphs (a), (b) and (d) of this section.

(2) If the Administrator approves an alternative computer model simulation program pursuant to §60.5487(a)(3), the approved simulation program also may be used as an alternative to certification testing as specified in paragraphs (a) and (b) of this section.

(p 258)

The main points are :

1. An approved simulation program may be used as an alternative to certification testing
2. Such a program may be used to demonstrate that "similar" model designs meet emission standards
3. ASTM WK26558 may be used for this rule making
4. An alternative program (to ASTM WK26558) has to be submitted for the EPA's review and approval
5. The EPA has included the cost of the program (\$1500 + \$450/year) in the masonry heater compliance costs (about 300K\$)

The main issues are :

- the EPA makes ASTM WK26558 the standard for software certification without consulting with the industry
- the EPA seems to have adopted ASTM WK26558 without having gone through a formal review & approval process
- any other program that will have to go through a formal review & approval process

Why are those issues ?

- ASTM WK26558 is designed for Austrian style heaters (the heat exchanger must be made of channels with a cross section ratio under 1:3) and cannot be used with the majority of heaters built in North America (contraflows and bell heaters).
- ASTM WK26558 is nothing more than a duplicate of the European standard EN 15544 (check below). Is it legally acceptable ?
- ASTM WK26558 is not a computer simulation program but a calculation method for Kachelofen & Grundofen dimensioning. How can it be considered as an alternative compliance method ?
- the calculator sold by the Austrian Kachelofenverband is presented as the only choice and advertised as the result of a million dollar program. In reality it is based on the calculation methods detailed in European standard EN 15544 (Austrian stove dimensioning) and EN 13384 (chimneys). Anybody can use these methods and come up with their own calculator. Here is a free calculator made by a French masonry heater builder : [calcul et dimensionnement d'un poêle de masse](#)

Recommendation :

- support main points 1 and 2
- ask to cancel point 3
- ask to replace point 4 by : EPA asks for submission of computer simulation programs offering an alternative to certification testing and allowing modelling of "substantially similar". All these programs will be subject to a formal review & approval process.
- ask to cancel point 5

Note : MHA may want to purchase a copy of CSN EN 15544 (46 Euro) to be able to show the EPA what's inside.

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Here is

## CSN EN 15544

(CSN is a designation of Czech technical standards while CSN EN have status of European Standards.)

### One off Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) - Dimensioning

Add to cart

Number of Standard: **CSN EN 15544**

Category: **061235**

Released: **2009**

Language: **English**

#### DESCRIPTION

EN 15544

This standard specifies calculations for the dimensioning of Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) **based upon the required nominal heat output of the stove as declared by the producer**. The Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) are of individual one-off construction design. The standard can be used for log wood fired Kachelöfen (tile stoves) that burn one fuel load per storage period with a maximum load between 10 kg and 40 kg and a storage period (nominal heating time) between 8 h and 24 h. This standard is valid for Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) equipped with fireclay as interior material, with an apparent density between 1,750 kg/m<sup>3</sup> and 2,200 kg/m<sup>3</sup>, a degree of porosity from 18 % up to 33 % by volume and a heat conductivity from 0,65 W/mK up to 0,90 W/mK

(temperature range 20 °C to 400 °C). This standard is valid for Kachelgrundöfen/Putzgrundöfen (tiled/mortared stoves) with sidewise combustion air supply of the combustion chamber and an inflow speed from 2 m/s to 4 m/s, whereas the height of the lowest opening is at least 5 cm above the bottom of the combustion chamber. This standard is not valid for combinations with water heat exchangers for central heating or other heat absorbing elements like glass plates greater than 1/6 of the combustion chamber surface, open water tanks, etc. It is also not valid for combinations with heating/fireplace elements according to EN 13229. Furthermore this standard is not valid for mass-produced prefabricated or partly prefabricated slow heat release appliances according to EN 15250. NOTE Although for the purposes of this standard these calculations are applicable only to the requirements of this standard, the same calculations can be used for other purposes, e.g. to verify emission levels and energy efficiency in case of burning log wood or wood briquettes according to the producer's manual.

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to be compared with

# ASTM WK26558

Work Item: ASTM WK26558

New Specification for Calculation Method for custom designed, site built  
Masonry Heaters.

One off Kachelgrundofen/Putzgrundofen (tiled/mortared stoves)

Developed by Subcommittee: [E06.54](#) | Committee [E06](#) | Contact [Staff Manager](#)

## 1. Scope

This standard contains specifications for the dimensioning of Kachelgrundfen/ Putzgrundfen (tiled/mortared stoves). The Kachelgrundfen/ Putzgrundfen (one off tiled/ mortared stoves) are constructed technically individual. The standard can be used for log wood fired Kachelfen (tile stoves) that burn one fuel load per storage period with a maximum load between 10 and 40 kg and a storage period (nominal heating time) between 8 and 24 hours. This standard is valid for Kachelgrundfen/ Putzgrundfen (tiled/mortared stoves) equipped with fireclay as interior material, with an apparent density between 1.750 and 2.200 kg/m, a degree of porosity 18 up to 33 percent by volume and a heat conductivity from 0,65 up to 0,90 W/mK (temperature range 20 400 C). This standard is valid for Kachelgrundfen/ Putzgrundfen (tiled/mortared stoves) with sidewise combustion air supply of the combustion chamber. This standard is not valid for combinations with water heat exchangers for central heating or other heat absorbing elements like glass plates greater than 1/6 of the combustion chamber surface, open water tanks etc. It is also not valid for combinations with heating/fireplace elements according to EN 13229. Furthermore this standard is not valid for mass-produced prefabricated or partly prefabricated slow heat release appliances according to EN 15250. This calculation method can be used to proof requirements of emissions and energy efficiency in case of burning log wood or wood briquettes according to the manual of the producer.

**It would be used for the design of site built masonry heaters. For use in R&D and by regulatory agencies for approval for emissions, efficiency and other requirements.**

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