Electrolux - Professional spa

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Project	**Energy Star Draft 2, Version 1-Convection Ovens**		
Subject:	Proposal of methodology for measuring energy consumption		
Written by:	Erika Menosso	Date:	08/04/2009
Contribution	Daniele Turrin		
Area:	Ecotech		

Reference document: ENERGY STAR Program Requirements for commercial ovens. Draft 2: Eligibility Criteria

1.   *Comments and feedbacks*

Row 149. **Note:** EPA received questions from stakeholders regarding ovens that provide moist heat. To reduce the potential for confusion between convection ovens with moist heat capability and combination ovens, as defined in 1B above, this Version 1.0 specification considers moist heat ovens as combination ovens. Stakeholders are encouraged to provide feedback on this clarification.

If the concept of the note (in row 149) will be maintained, the definitions 1)B. and 1)C. shall be modified. The saturation of the oven cell with steam can be reached only with an external generator of steam and not with an internal instantaneous one. If the ovens with internal instantaneous steam generator are considered as combination oven, then this shall be clearly indicated in the definition.

Proposal: "…all ovens provided with a system, internal or external, for steam generating, independently from partial or complete saturation of the cell, are combination ovens"

Row 265. *Convection oven cooking energy efficiency is based on the heavy-load (potato) cooking test.
Row 328. • ASTM F1496, *Standard Test Method for Performance of Convection Ovens*
Row 340. **Note:** Commercial ovens should be tested at heavy-load conditions per ASTM F1496 and F2093 test methods for purposes of qualifying ovens for ENERGY STAR.

Electrolux Professional doesn't agree with this methodology: using food in this kind of test is an uncontrolled variable which influences directly the repeatability of the test. ASTM F1496 uses standardized potatoes, but the position of the temperature sensor inside the vegetable, the position of the "potato probe", the environmental condition (storage conditions and so on) are elements which increase the variability of the test final result.

Proposal: instead a heavy load of potatoes, a inert, standardized material is used. The material could be Hipor, at disposal in bricks shape. Below, the specification of this kind of material, already used for household ovens performance in EU:

Annex D
(normative)

Description of the test brick

D.1 Specification

Name	Hipor[2)
Bulk density, dry	(550 ±40) kg/m^3
Total porosity	77 %
Dry weight	(920 ± 75) g (without thermocouples), see 8.3.1.1
Water absorption	(1 050 ± 50) g, see 8.3.1.2
Height	(64 ± 0,5) mm

The brick is brittle. Tolerances of dry weight, water absorption and height are critical and have to be checked.

D.2 Supplier and order specification

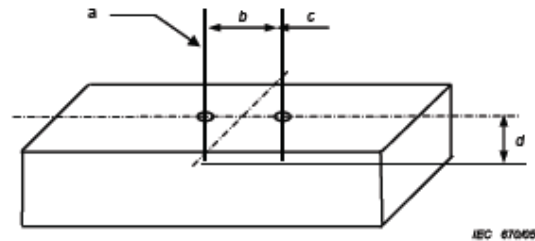SKAMOL INSULATION
Östergade 58 – 60
DK – 7900 Nyköbing Mors

When ordering please state:

— the brick name "Hipor", according to Electrolux agreement,

— length x width × height: 230 mm ×114 mm × 64 mm (see sketch in Figure D.1),

— machined on all six surfaces, tolerances ±0,5 mm.

NOTE 1   According to Electrolux agreement, a minimum of 126 bricks have to be ordered. Alternatively quantities of 168, 282 or 504 bricks can be ordered to take advantage of a reduced price range.

NOTE 2   The diameter of the hole need not and should not be bigger than the diameter of the thermocouple.

NOTE 3   If it is not possible to drill the holes 32 mm deep, drill the holes to a depth of about 25 mm, insert the thermocouples into the holes and push them carefully further down the remaining 7 mm. Alternatively, a self-made rigid wire with 1 mm diameter could serve as a drill.

IEC 670/05

Key

a	Two metal sheet tube thermocouples
b	50 mm, with holes at b/2
c	1 mm Ø, both thermocouples and holes
d	32 mm both thermocouples and holes (see NOTE 4 above)

Figure D.1 – Position of the thermocouples

Insert, after new Annex D, the following new Annexe E:

Electrolux proposal is to use this simulating food material instead vegetables, meat and so on, order to have the reproducibility of the test. Other conditions are:

- a single temperature sensor in the middle of the brick is enough,
- the oven load is performed with 3 brick for each pan
- the pan number is equal to the maximum loadable pans divided by 2
- before cooking test, the bricks are immersed in water (in order to increase their weight of 1 kg)

The simulating food material isn't new in this kind of test: we can think about the M-packages used in refrigeration sector.