

## Table 2: “Energy Efficiency Requirements for Combination Ovens”

*The Cooking-Energy Efficiency limits for gas and electric ovens have been increased from, respectively, 41% to 44% and from 56% to 59%.*

### **Comments:**

In “Steam Mode” the energy efficiency is closely related to the steam saturation level (SSL). SSL is the amount of steam contained into the cooking chamber during a cooking process<sup>1</sup>. Today SSL is not considered by ASTM F2861. In the market of Combis there are two different approaches to generate steam inside the cavity: using a boiler or directly injecting water inside the chamber and using the heating elements to evaporate it. Regardless of the different approach used to produce steam, but according to the internal software settings of a specific oven, the request for Steam Mode of ASTM F2861-20 (10.4.7) “Maximum humidity” results in different outputs in terms of SSL that according to our knowledge of the market can vary from 75% to 95%.

In some circumstances, also a slight difference in SSL produces mild but significant differences in cooking output, and this can be crucial to satisfy the most demanding customers.

To declare the energy efficiency in Steam Mode of an oven without also specifying SSL, gives an incomplete and misleading information to the customer. It would be the same to declare energy efficiency in convection mode without specifying the temperature of the cavity.

To increase the threshold of cooking energy efficiency in Steam Mode without considering SSL will push all the manufacturers to decrease steam saturation compromising cooking quality.

### **Proposal:**

We propose to maintain the same Steam Mode limits of today.

Steam Mode limits can be rediscussed only after having further explored the relation between SSL and energy efficiency.

A possible roadmap to achieve this goal can pass through two main milestones:

- the definition of a protocol to measure SSL inside the cavity
- the collection of SSL data from the market according to this protocol

All the activities related to this topic will be managed in the task group ASTM WK70620.

There also exist a separate certification for steam cookers under energystar ([https://www.energystar.gov/products/commercial\\_food\\_service\\_equipment/commercial\\_steam\\_cookers/key\\_product\\_criteria](https://www.energystar.gov/products/commercial_food_service_equipment/commercial_steam_cookers/key_product_criteria)). Here it is the same case as with convection ovens, that these cookers are specialized products, but they have lower limits than the combination ovens in steam mode. The standard for this product group is a different one (ASTM F1484), but the test procedure therein is the same as in the standard for combination ovens. The requirements were never changed since 2003.

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<sup>1</sup> \*One physical quantity that can describe SSL is for example the molar humidity defined as the ratio between steam pressure and ambient pressure. Molar humidity can be easily measured using a lambda sensor.

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*The Steam Mode Idle Rate limit for 2/3 size electric ovens has been defined as < 0.6P.*

**Comments:**

As already reported during the Stakeholders Meeting, the proposed limit implies that a 3 trays 2/3 electric oven can use up to 1.8 kW whereas a 5 trays electric oven can use up to 1.3 kW. Why should a smaller oven should use more energy than a bigger one to do the same thing? The only possible reason to have such high values of Idle Rate in Steam Mode is a not-wise steam management that can be easily fixed by manufacturers simply modifying software settings.

We believe that here, to follow a blind “data-driven” approach to determine the limits leads to the reduction of the positive impact of EnergyStar program on customer’s energy and cost savings.

**Proposal:**

Until more data will become available, we propose to keep at least the same limit of Idle Rate in Steam Mode of half size (GN1/1) ovens.

Table 2: “Energy Efficiency Requirements for Combination Ovens” and Table 1: “Energy Efficiency Requirements for Convection Ovens”

*Combi VS Convection ovens limits*

**Comments:**

As already reported during the Stakeholders Meeting:

- From an energy-efficiency perspective, a Convection Oven is nothing else a Combi Oven without the possibility to operate in Steam Mode.
- All the technologies which can improve energy efficiency (such as new insulation materials, more efficient gas burners, etc...) available for Combi Ovens are potentially available also for Convection Ovens.
- Combi and Convection ovens are now subjected to different standards, respectively ASMT F2861 and ASTM F1496. Anyway, the two standards are totally equivalent in terms of energy-efficiency. All the differences (size of trays, temperature to be reached in the cooking test...) can be easily uniformed.

Both actual and new proposed limits are more demanding for Combi ovens than for Convection ovens. We believe that this choice unfairly penalises Combi Ovens, elevating products less efficient which use obsolete technologies at the same level of Combis in the energy efficiency perceived by the customers. More importantly, an opportunity to increase customers energy and costs savings updating convection ovens limits is lost.

**Proposal:**

We propose to uniform the limits for Combi Ovens and Convection Ovens.