In Bread We Trust

07/23/2015

Energy Star
Kirsten Hesla

RE: Commercial ovens Draft 2 ver 2.2, Rack ovens

Dear Mrs. Hesla,

Revent respectfully submit our comments and recommendations with regards to the "Draft 2 Version 2.2 ENERGY STAR Commercial oven specification".

Revent is the world's leading manufacturer of Rack ovens used by commercial bakeries, with sales in more than 45 countries and manufacturing both in Europe and the US. As the company who invented the rack oven in 1958 we have the most experience in developing and manufacturing Rack ovens.

Revent has been selling and servicing Rack ovens in the US market since the early 70's. We are supplying ovens to all market segments and have a strong presence in the commercial bakery segment. Our broad market presence and long history gives us a unique understanding of all the market segments as well as ample data on sales volumes, product use and lifetimes for rack ovens.

From the start Revent has been committed to developing Energy efficient bakery ovens. We welcome the initiative of launching an Energy star category for Rack ovens and appreciate the opportunity to be involved in the process.

Best regards,

Daniel Lago
CEO Revent Incorporated

US Rack oven market

Manufacturers

Two companies with US manufacturing (Manufacturer A and Revent) and one importer (Manufacturer B) with US sales office together represent approximately 90% of the Double and Single rack ovens sold in the US. The rest of the market is made up of a few small manufactures in US and Canada and 10+ imported brands, mainly from Europe.

Technology

Looking at rack ovens from an Energy efficiency stand point there are two key areas with different technical solutions in the market:

1. Burner and heat exchanger systems

There are two types of system used for Rack ovens;

<u>"In-shot burners"</u>

Developed by Manufacturer A and also used by Manufacturer B.

Upside: Low cost for components and manufacturing. Lower mass results in reduced pre heat energy. Lower firing rate reduce the "idle rate" Energy consumption.

Downside: Does not work well in "heavy duty" applications. Burners are sensitive to flour & dust. Lower "baking efficiency" and lack of power gives low productivity. Lower technical limit for energy conversion vs welded heat exchanger.

<u>Welded heat exchanger with powered burner.</u>

Used by Revent and all European imports.

Upside: Higher efficiency and more "power" for heavy duty applications. Higher technical limit for energy conversion, i.e. higher potential for future improvement for "baking efficiency" compared to "in-shot burner" systems.

Downside: High cost for components and manufacturing. Higher mass that absorb more energy during pre heat. Higher firing rate increase the "idle rate" energy consumption.

2. Air Distribution

Basic “Slit system” with high air velocity

Used by Manufacturer A and B.

Benefits: Low cost to manufacture. Works with smaller fan motor which reduce the electrical consumption.

Downside: Less efficient heat transfer to the baked goods reduce the “baking efficiency”. Difficult to get consistent baking quality.

Advanced airflow with lower velocity

Developed and used by Revent. Most European manufacturers have some type of advanced air distribution system with even heat distribution and generally lower air speed or adjustable air speed.

Upside: More efficient transfer of heat into the baked goods. Better yield due to reduced drying of the products and fewer rejects.

Downside: Higher cost to manufacture. Requires larger fan motor to move the air which increase the electrical consumption.

Users of Rack ovens

There are several different types of end-users of rack ovens. In our analysis of the Energy usage and in our comments we divide them into two groups:

-“Light duty”. Primarily supermarkets but also some foodservice operators and low volume retail bakeries. Operates the ovens on average 8 hrs. per day and up to 70% of that time in idle mode. Represents 60-65% of the rack ovens sold annually in the US. This customer segment buy ovens mainly based on price and purchase mostly ovens with “in shot burner technology”.

-“Heavy duty”. Commercial bakeries, high volume retail bakeries, commissary operations, prisons, catering. Operates the ovens on average 2-shifts per day with 20% idle time. Represents 35-40% of the rack ovens sold annually in the US. This type of user buys ovens mainly based on performance and mostly ovens using welded heat exchangers and a single burner (pre-mix).

Comments to Draft 2 ver 2.2

Comments on suggested levels for "idle energy rate" and "baking energy efficiency"

We understand the logic behind the suggested qualification levels in Draft 2 ver. 2.2.

However this logic only applies to the "light duty" user of Rack ovens (mainly Supermarkets). For "heavy duty" baking operations that have a higher utilization rate (i.e. less "idle time") the suggested qualification levels would result in a paradox; an "Energy star" labeled rack oven would use significantly more energy than some ovens that does not qualify for Energy Star!

Some may argue that the majority of rack ovens are sold to "light duty" (Supermarkets) and thus more energy is saved by favoring low idle consumption as opposed to high Baking efficiency in the design of the ovens and as the qualification for Energy star. But when factoring in operation hours and utilization rates, the rack ovens operated by "Heavy duty" users, use significantly more energy than the "light duty users" despite having fewer ovens in operation. Table below show estimates of Total energy used by Rack ovens.

Energy star oven per draft 2 ver 2.2

	Operating time	Volume baked	Energy used for baking	Energy used for idling	Est # of ovens in use	Tot energy used per year baking	Tot energy used per year idling	Tot energy used per year
	hrs/day	*lbs/day*	*Therm/oven/year*	*Therm/oven/year*		*Therm*	*Therm*	*Therm*
Single "light duty"	8	400	637	434	11,500	7,323,085	4,985,692	12,308,777
Double rack "light duty"	8	800	1,299	472	25,000	32,475,819	11,798,418	44,274,237
						39,798,904	**16,784,110**	**56,583,014**
Single "heavy duty"	12	1100	1,732	306	3,500	6,061,679	1,072,155	7,133,834
Double rack "heavy duty"	20	4500	7,133	385	15,000	106,989,155	5,782,229	112,771,384
						113,050,835	**6,854,384**	**119,905,218**
					55,000	**152,849,738**	**23,638,494**	**176,488,232**

Market share for "heavy duty users" is below 25 % for the Energy star qualified Double rack ovens per specification draft 2ver 2.2 vs 50-60 % for CEE Tier 1 qualified Double rack ovens.

The focus on "idle rate" at the cost of reducing the qualification level for "baking efficiency" will also favor the manufactures using "in shot burners". The majority (if not all) double rack ovens that meet the proposed "idle rate" qualification level for Double rack ovens have in shot burners. These ovens are developed to primarily cater to the "light duty" users and therefore have their burner and heat exchanger systems designed to be inexpensive and to provide lower "idle rate" energy consumption with the tradeoff of lower overall "baking efficiency". Examples of this is the test results of newer models of Rack ovens labeled "EE" or marketed as "energy efficient" with lower idle energy consumption but also lower baking efficiency than the previous model by the same manufacturer. So for customers that use the ovens for high

volume baking and low idle rates these “EE” or “Energy Efficient” ovens will use more energy than the older “standard” models.

Setting energy efficiency levels as proposed in Draft 2 ver. 2.2 will reinforce this trend by rewarding manufacturers that lower the baking efficiency of their ovens to achieve lower “idle rates”. As shown in the estimates of total energy used by rack ovens in Appendix 1, this will probably lead to increased total Energy consumption for rack ovens since the lower “baking efficiency” increase overall Energy consumption more than lower “idle” consumption will reduce the overall energy consumption.

Also the proposed efficiency levels risk reinforcing the current “wasteful” use of Rack ovens by most “light duty” users. As shown in the comparison below, many “light duty” users could have enough capacity with a Single rack oven instead of Double rack oven, resulting in Energy savings more than 4 times those of the potential savings from using a more efficient Double rack oven. By setting up Energy efficiency standards that present reduced “idle rates” as the path to be “Energy efficient” for this type of user; there will be no incentive to make changes to the way ovens are specified and used.

Energy Saving by using "Energy Star Double Rack oven" per draft 2 ver 2. vs CEE Tier 1 in In store baking

	Operating time	Volume baked	Energy used for baking	Energy used for idling	No of ovens in use	Tot energy used per year baking	Tot energy used per year idling
	hrs /day	lbs/day	Therm/oven/day	Therm/oven/day		Therm	Therm
Double rack (Energy Star)	8	800	1,299	472	25,000	32,475,819	11,798,418
Double rack (CEE Tier 1)	8	800	1,208	617	25,000	30,190,179	15,434,962
Potential Energy savings with "Energy Star oven"						**(2,285,640)**	**3,636,544**
							1,350,904

Energy savings by switching to Single Rack ovens in In-store baking

	Operating time	Volume baked	Energy used for baking	Energy used for idling	No of ovens in use	Tot energy used per year baking	Tot energy used per year idling
	hrs /day	lbs/day	Therm/oven/day	Therm/oven/day		Therm	Therm
Double rack (Energy Star)	8	800	1,299	472	25,000	32,475,819	11,798,418
Single (CEE Tier 1)	8	800	1,274	152	25,000	31,839,500	3,788,281
Potential Energy savings with switching to Single Rack ovens						**636,319**	**8,010,137**
							8,646,456

Comments on the use of “set back mode”

The “set back mode” should be a part of the Energy Star qualification criteria. The risk of end users “disabling” the setting is easily mitigated by making this a factory setting.

Energy Saving by using "set back mode" in In store baking	Operating time	Volume baked	Energy used for baking	Energy used for idling	No of ovens in use	Tot energy used per year baking	Tot energy used per year idling
	hrs /day	lbs/day	Therm/oven/day	Therm/oven/day		Therm	Therm
Double rack w/o set back	8	800	1,299	472	25,000	32,475,819	11,798,418
Double rack wit set back	8	800	1,299	283	25,000	32,475,000	7,079,051
Potential Energy savings with "set back mode"						**819**	**4,719,367**
							4,720,186

Making the use of “set back mode” standard would save more than three times more energy compared to the potential savings from the ovens with the lowest “idle rate”.

Comments on using Models for Annual Energy cost calculation

We agree with Energy Star comment that using “annual energy cost calculation models” is not a good method to measure or compare “energy efficiency” since the annual cost is dependent on how each customer operate the ovens.

Recommendations

Adapt the CEE’s Tier 1 baking efficiency levels for Double rack ovens as the Energy Star qualification levels. Use the “total idle energy rate” by adding the electrical consumption to the Idle rate.

-Double rack ovens represent the majority of the market both in terms of units sold and energy consumption. By adopting the more stringent baking efficiency levels of CEE’s Tier 1 the Energy Star program will achieve:

- Increased total Energy savings
- Product performance can be maintained or enhanced with increased energy efficiency. Using the CEE Tier 1 standard would make Energy Star certified ovens available also for the “heavy duty users” that need ovens with high productivity (i.e. high baking efficiency).
- Minimize confusion for end users and utility companies as to what constitutes a “High efficiency” Rack oven. It would be difficult for end users to understand the difference between the “CEE Tier 1” and “Energy star” ovens if there are different qualification levels.
- A strong incentive for manufacturers to continue to invest in product development to improve the overall energy efficiency of their Rack ovens, not only the “idle rate”.

- Good availability of Energy Star certified ovens for “light duty” users as well as “heavy duty” users.

Leave the Single rack oven std as proposed in Draft 2 Version 2.2 with the intent to harmonize the standards with CEE during the next revision.

As stated by CEE there is currently no Single rack oven that meets the Tier 1 efficiency levels. Thus we can’t at the present time recommend Energy Star to adapt that qualification level. Also, due to the relatively small share of the market and total energy consumption that Single Rack ovens represent, having a lower qualification level will not have a significant impact on the overall energy consumption.

Recommended Energy Efficiency Requirements for Rack ovens:

	Baking efficiency %	Idle rate* (btu/hr)
Double Rack ovens	55%	32,000
Single Rack ovens	48%	25,000

**Idle rate calculation model is based on Energy Star’s proposal to use “total Energy Idle rate” including the electrical consumption. Thus the CEE Tier 1 idle rate is increased to compensate for the added “load”.*

Revent’s proposal supports Energy Stars guiding principles

Positive impact on Energy Savings

As shown in the estimates in Appendix 1, the total Energy used by rack ovens would be lower by adopting the efficiency levels we propose compared to the Draft 2 ver 2.2. Total energy used for “idling” is increased some, but idle energy can be reduced further by promoting the use of “set back mode” and educating end users of the potential energy savings by “right sizing” their oven capacity. Also the “heavy duty” users will see larger energy savings by increasing the qualification level for “baking efficiency”.

Maintain or enhance product performance with increased energy efficiency

By “balancing” the qualification levels for Baking efficiency and Idle rate energy, Energy Star products will be readily available in all customer segments. End users that need ovens designed for “heavy duty” baking will have Energy Star labeled ovens that meet their needs and “light duty” users will have Energy star labeled ovens available that meet their needs of lower idle

consumption as well as a lower cost. No customer would be forced to sacrifice performance and key features in order to buy an Energy Star labeled Rack oven.

Purchasers are able to recover their investment in Energy Star labeled Rack ovens

The manufacturers that qualify under our proposed efficiency levels represent both ovens in the lower price range as well as the upper price range. "Light duty" users will able to get an Energy Star labeled oven in a price range that gives them a good payback. With our proposal the same can be said for the "heavy duty" users that tend to buy the more expensive ovens. By baking greater volume and using the ovens more hours they will see greater savings from the ovens that have high Baking efficiency.

Energy efficiency can be achieved through one or more technologies and products are broadly available

The three manufactures currently qualifying for CEE Tier 1 have a combined market share of 60-70% in the US market. Both of the qualified single rack and two of the double rack ovens are readily available for purchase all over the US market. The table on the following page shows the number of manufacturers and the market share of ovens that would be Energy Star labeled at our proposed efficiency levels.

	Energy Star Draft 2 ver 2.2		**Revent proposal**	
	% of market	**# of manufacturers**	**% of market**	**# of manufacturers**
Double Rack ovens- Current	60-65%	3	45-50%	2
Double Rack ovens- By end of 2015	*85-90%*	*4*	*65-70%*	*3*
Single Rack ovens- Current	>5%	1	>5%	1
Single Rack ovens- *By end of 2015*	*~20%*	*3*	*<20%*	*2-3*

Based on internal research and analysis of our competitors' products and Energy efficiency test results we're comfortable "forecasting" the additional number of ovens that will meet the proposed efficiency levels.

What does not show in neither our analysis nor those made by EPA or CEE of the market is the underlying technology used by the qualified ovens. Our proposal is "technology neutral" since

there are ovens that would qualify using both “in-shot” burners and welded heat exchangers with traditional powered burners.

Our proposal improves the availability in the “heavy duty” user segment. The focus on lowering the idle energy consumption at the cost of lower baking efficiency in Draft 2 ver 2.2 would lead to a lack of Energy Star labeled ovens that meets the needs of these end users.