

High performance heat pumps and chillers are available in the market



Introduction

The results of the European data collections on manufacturers' sales by the Eurovent Market Intelligence (EMI - <http://www.eurovent-marketintelligence.eu>) statistics bureau on the performance of chilling packages and heat pumps (LCP-HP) are unmistakable: data taken consistently from the same manufacturers' panel show that sales of heat pumps in "heating only" or "reversible" applications have been increasing over the past five years. Established at 32% of value sales in 2004, they surpassed the sales of "cooling only" equipment to account for 54% of value sales in 2009. Aided by a favourable legislative environment, manufacturers are placing more and more energy-efficient equipment on the market.

RES (Renewable Energy Source) Directive

Directive 2009/28/CE of the European Parliament and Council of 23 April 2009 promotes the use of energy from renewable sources and energy produced by renewable sources (ground, air and water). Thermal power generated by heat pumps is taken into account, providing that the final energy efficiency significantly exceeds the primary energy input. Appendix VII b of the directive describes in greater detail the method used to qualify equipment and label heat pumps as a "renewable energy" solution. Finally, it should be pointed out that there are also constraints in terms of objectives sought by the Member States. Appendix I B of the directive defines the renewable energy production thresholds to be achieved. The body of regulations evolving in favour of the selection of equipment that consumes less energy promotes increasingly intense competition among manufacturers and the entry onto the market of a product

offering whose energy efficiency is constantly improving. In this rapidly changing market, a look at the real distribution of the products according to the energy efficiency criterion (here EER – energy efficiency ratio) can prove highly useful for understanding the demographic composition of the supply on the market, and for knowing in greater detail the comparative weights of product sets showing similar efficiency characteristics.

EER of Chillers based on the Eurovent Certification data

The analysis will cover the family of the liquid chilling packages and heat pumps, since this Eurovent certification program is the most developed. [Liquid Chilling Package Heat Pumps] (LCPHP). The analysis was applied to 2009 data; it examines a sample of 6,711 models produced by 31 manufacturers and distributed among ten product families.

Four major equipment families account for 86% of the sample¹.

- aerothermal, cooling only: 43%, or 2,900 models
- aerothermal, heating and cooling: 26%, or 1,700 models
- aquathermal, cooling only: 11%, or 750 models
- aquathermal, heating and cooling: 6%, or 400 models

Air-cooled, cooling only units analysis (2,900 models)

The analysis will be limited to the following two capacity power bands:

- From 0 to 99 kW
- From 100 to 599 kW

Since 2004, the LCPHP certification program has included an energy efficiency classification scale. The classes range from A to G, with specific thresholds for each application. The analysis will thus apply to the sample distribution in accordance with energy efficiency classes and the distribution sensitivity.

¹ The geothermal units are not included in this sample.

Table 1. Distribution of EER class for air-cooled cooling only units.

EER class	Threshold	Distribution in %	Cumulative %	Distribution in %	Cumulative %
		0-99 kW	0-99 kW	100-599 kW	100-599 kW
A	Above 3.1	7	7	10	10
B	2.9 to 3.1	19	26	13	23
C	2.7 to 2.9	27	53	31	54
D	2.5 to 2.7	28	81	25	79
E	2.3 to 2.5	15	96	14	93
F	2.1 to 2.3	4	99	6	99
G	Below 2.1	1	100	1	100

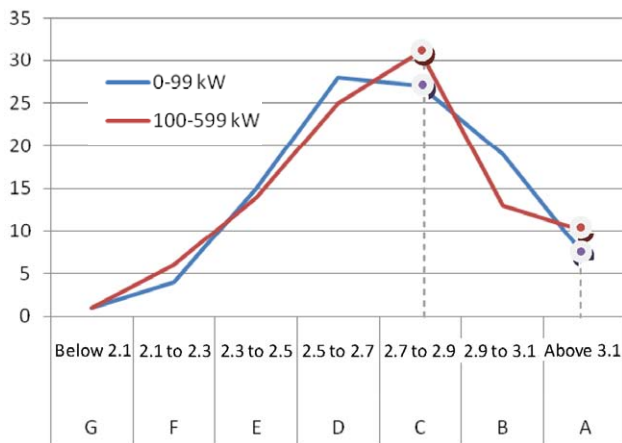


Figure 1. Distribution of the equipment (in %) according to EER energy class.

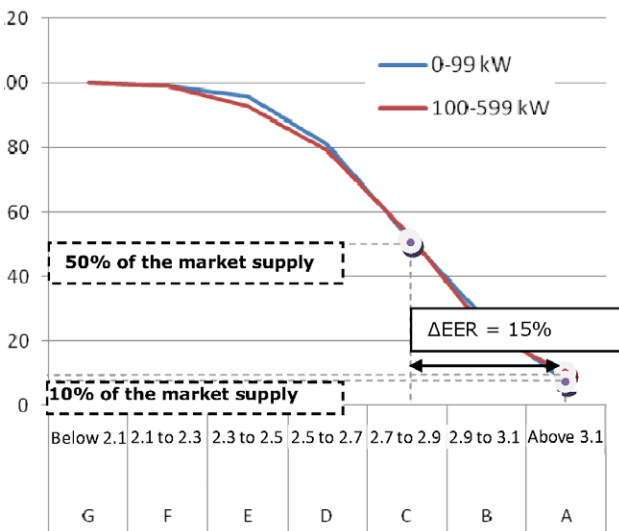


Figure 2. Distribution of the equipment (cumulative %) according to EER energy class.

Here are the conclusions of these graphs:

- Only 7 to 10% of the machines have a EER greater than 3.1
- 50% of the machines have a EER above 2.7

Fifty-five certified products have a EER of 2.7. On the other hand, for a 15% higher EER - i.e. a EER of 3.1

- only one product in ten among the supply analysed meets the criterion.

Water-cooled package, cooling only units analysis (750 models)

Table 2. Distribution of EER energy class for water-cooled cooling only packages.

EER class	Threshold	Distribution in %	Cumulative %	Distribution in %	Cumulative %
		0-99 kW	0-99 kW	100-599 kW	100-599 kW
A	Above 3.5	24	24	11	11
B	4.65 to 5.05	20	44	5	16
C	3.85 to 4.25	22	66	37	53
D	3.45 to 3.85	15	81	20	73
E	3.45 to 3.85	11	92	21	94
F	3.25 to 3.45	7	99	6	100
G	Below 3.25	1	100	0	100

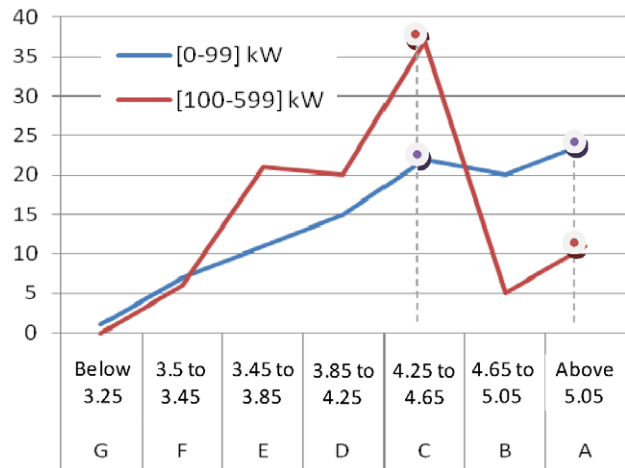


Figure 3. Distribution of the water-cooled cooling only packaged units (in %) according to EER class.

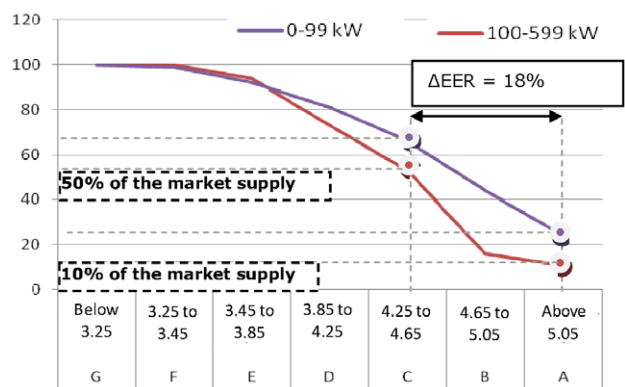


Figure 4. Cumulative percentage of water-cooled cooling packaged unit by EER class.

On the basis of these certified data, we can therefore make the following remarks:

For units of less than 100 kW capacity:

- 24% of the units have a EER above 5.05
- 67% of the units have a EER above 4.25

We can thus see that 7 in 10 certified products have a EER of 4.25. But only 2 in 10 units have energy efficiency levels above 18% (equivalent to a EER of 5.05).

For 100 to 599 kW capacity units:

- 11% of the units (100-599 kW) have a EER above 5.05
- 53% of the units (100-599 kW) have a EER above 4.25

Five certified equipment units have a EER of 4.25. However, only one in ten products can aspire to the highest efficiency category on the market (EER of 5.05), with 18% greater efficiency than a EER of 4.25. This slight difference between the quantitative core of the market and the top-scoring equipment shows the need to be able to compare these products in a perfectly controlled environment. Indeed, a swing of just 15%, with an error margin of +/- 7.5% in calculation or measurement, significantly alters the demography of a product family, since we move from a category representing 50% to one representing only 10% of the supply.

The distribution sensitivity of these products on the basis of the energy efficiency criteria shows the importance of the measuring rules. The following section is devoted to the qualification and measuring procedures of the Eurovent Certification certifying body for the program of chillers and heat pumps.

Eurovent Certification helps in developing and selecting best products

Voluntary third-party certification makes it possible to have a consistent supply of products whose energy efficiency is labelled by efficiency class. For this program, the Eurovent Certification mark requires a measurement tolerance less than 5% for the COP and the EER, which means latitude that is three times more limited than the tolerance authorised by the European regulation on residential air-conditioners (with some exceptions) and based on the self-declared claim regarding efficiencies made by the manufacturer.

*Directive 2002/31/EC concerning air-conditioners of less than 12 kW of cooling output, making reference to the EN14511-2007 standard.

Eurovent Certification is supported, among other elements, by:

- The free publication and export of all values certified for each product in the on-line catalogue: www.eurovent-certification.com
- The Eurovent Certification mark:



- A yearly certification update
- The preceding binding statement of numerous product characteristics
- The application of the certification principle to all ranges of a same product family by the manufacturer
- A scientific sampling by the certifier of the equipment to be tested
- Tests in independent laboratories accredited under ISO / EN 17025
- A certification protocol including the control of the test success rate
- In-plant auditing of manufacturing statements
- On-site auditing of compliance in the use of selection software by customers
- A certification protocol according to EN 45011 or ISO 65.

Conclusions

Heat pumps are definitely on the energy-saving hit parade; the directive promoting renewable energy source (RES) has granted this technological solution a lasting place. The importance of third-party certifications is growing and increasingly spreading. For example, certified efficiencies acquire all their significance for obtaining the Energy Saving Certificates or White Certificates as called in some countries. However, we should not limit their roles to the regulatory area: an EER, a real (certified) ESEER of equipment above 15% amounts to 30 cumulative years of energy savings, and above all, to savings on energy bills each year.

In order to be able to quickly validate the energy efficiency of products in the selection process, a new on-line catalogue, Certiflash citing Eurovent Certification references is now available. Certiflash will display on your screen the efficiencies certified under the Eurovent Certification mark, product by product. www.certiflash.com Certiflash

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