Working document on possible Commission Regulations implementing Directive 2009/125/EC with regard to professional refrigeration products

Brussels, 09.12.2011

INTRODUCTION AND OVERVIEW

Professional refrigeration products were subject to a preparatory study (ENTR Lot 1[1]). These products include professional refrigerated cabinets, blast cabinets, walk-in cold rooms up to 400m³, refrigeration process chillers and remote condensing units. All these are deemed eligible for Ecodesign requirements against the criteria of Article 15 of the 2009/125/EC Framework Directive on Ecodesign of Energy-related products. In addition, professional refrigerated cabinets are deemed eligible for Energy labelling requirements.

Professional refrigeration products are distinguished from commercial refrigeration products (ENER Lot 12). The latter include refrigeration appliances used to display and sell foodstuff. These are found in areas where customers have access. Professional refrigeration products include refrigeration appliances used to store but not to display and sell foodstuff. These are found in areas where customers do not have access, such as back shops and professional kitchens. These are intended exclusively for professional use.

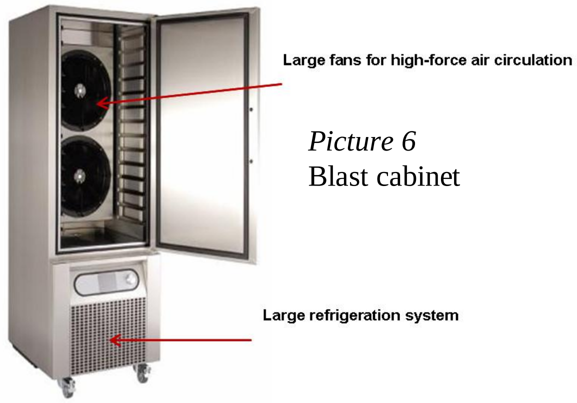
Due to the different technical characteristics and market operators for the various products falling in the scope of ENTR Lot 1, it is proposed to adopt 5 different Implementing Regulations.

Professional refrigeration products are found in food retail outlets such as supermarkets, groceries and butcheries, restaurants, hotels, pubs, cafés, industrial facilities and professional kitchens (e.g. schools, hospitals, canteens etc.). Professional refrigeration products are primarily used for compliance with hygiene rules related to food safety (HACCP). Professional users often perceive these refrigeration equipments as a necessary investment due to hygiene constraints, but with no great added value for their "core business" (i.e. cooking). Besides, professional refrigeration is used mainly for storage, not for selling foodstuff (contrary to ‘commercial’ refrigeration). Therefore, customers tend to focus on purchase price only and to overlook possible (money and energy) savings over the life cycle. This ‘myopic behaviour’ can be considered as a market failure.

Pictures 1-5 Common designs of professional refrigerated cabinets

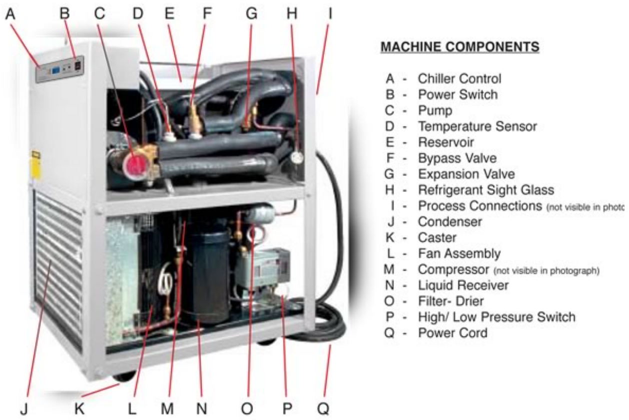
[1] Final report published on 26 May 2011on http://ecofreezercom.org/documents_1.php

The 5 professional refrigerated cabinets shown above account for common designs placed on the market: vertical single door, under-counter, chest, vertical double-door, and vertical pass-through. Professional refrigerated cabinets with transparent doors are a recent but growing trend.
The pictures below show typical blast cabinets and walk-in cold rooms.



Picture 6
Blast cabinet

Picture 7
Walk-in Cold Room



Picture 7
Packaged refrigeration chillers, with coolant circuit pump and buffer tank

Picture 8
Packaged remote condensing unit (single compressor)

Overall, the professional refrigeration products under consideration have an aggregated energy consumption of 295 TWh per year in the EU, with 1.3 million units sold and a total stock of more than 11 million units[2]. These figures split as follows:

Product	Operating temperature	2008 energy consumption (Twh)	2008 sales (units)	2008 stock (units)
Service cabinets	positive	4,6	278.211	2.282.114
	negative	4,9	119.233	978.049
Blast cabinets		4,0	173.655	1.331.197
Walk-in Cold Rooms		18,5	88.289	1.521.659
Chillers	positive	8,4	3.607	19.941
	negative	9,2	2.834	15.668
Remote condensing units	positive	131,2	479.807	4.194.641
	negative	114,3	119.952	1.048.660
Totals		**295,1**	**1.265.588**	**11.391.929**

The market is expected to grow slowly at an annual rate of 1-2%, except for the sales of remote condensing units, which are expected to slow down in the coming years (negative

[2] 2008 is the year of reference for all figures and estimates.

growth of -1.15%). But even with lower sales, the stock of remote condensing units will continue to grow.
Therefore, with a "freeze" scenario[3], the aggregated energy consumption of the product group will continue to grow to reach 344 TWh in 2020 and 365 TWh in 2025.

The annual turnover of the sector is estimated to € 2.1 Bn. A survey by AREA[4] identified 5000 specialised firms in the commercial/ professional refrigeration sector in 12 European countries[5], employing 73,000 staff.
As shown by the table below, installers are key market players and thus "prescribers" for walk-in cold rooms, chillers and condensing units. Installers include many small businesses below 20 employees, on top of the numerous SME distributors and manufacturers.

Distribution channels in % of sales			
	Manufacturer to Customer	**Distributor**	**Installer**[6]
Refrigerated cabinets	**70**	30	
Blast cabinets		**100**	
Walk-in Cold Rooms	5	30	**65**
Process Chillers	40	5	**65**
Condensing units		15	**65**

On average, installation costs are 1% of purchase price for plug-in products, 10% for remote products and condensing units, and 30% for chillers. Compared to energy costs, they remain relatively negligible over the life cycle (see table below).

Energy costs in % of life cycle costs	
Refrigerated cabinets (positive t°)	78
Refrigerated cabinets (negative t°)	61
Blast cabinets	27
Walk-in Cold Rooms	51
Process chillers (medium t°)	90
Process chillers (low t°)	91
Condensing units (medium t°)	76
Condensing units (low t°)	81

Overlaps with other Ecodesign Regulations

Professional refrigeration equipments include **fans** with electric power input above and below 125W. Therefore, a significant part of the fans integrated into professional refrigeration equipment is covered by Ecodesign Regulation 327/2011. However, the bulk of the efficiency potential of professional refrigeration equipment does not depend on the choice of the fan itself but on the compressor efficiency and on the overall sizing and adjustment of the equipment.
Most **electric motors** found in professional refrigeration equipment are completely integrated into a compressor, fan or pump, and therefore do not fall into the scope of Ecodesign Regulation 640/2009.

[3] The "freeze" scenario takes the sales and stock growth into account, but assumes that the individual energy consumption of the various refrigeration products remains constant over time.
[4] Air-conditioning and Refrigeration European Association
[5] Belgium, Denmark, Finland, France, Germany, Greece, Hungary, the Netherlands, Norway, Spain, Sweden, and the UK
[6] Installers are usually "refrigeration contractors" in charge of installation, maintenance and repair, and sometimes end-of-life.

Saving potential and rationale for regulatory action

Annual savings of 28.6 TWh by 2020 are deemed possible with the proposed legal requirements. This would not prevent the aggregated energy consumption of the product group from further going up, but would limit its growth. The estimated savings split as follows:

Estimated savings per yeare as of 2020 in TWh, compared to a freeze scenario	
Refrigerated cabinets	2.4
Blast cabinets	1.4
Walk-in Cold Rooms	1.8
Process chillers	2.1
Condensing units)	20.9
Total	**28.6**

These savings are achieved through a reduction of energy consumption in the range of 10 to 20%, due to the implementation of existing technologies such as efficient compressors and electric motors (in condenser and evaporator fans), improved heat exchangers, control of defrost and anti-sweat heaters, capacity modulation, and better insulation (in particular for walk-in cold rooms).

The proposed legal requirements have been set principally on the basis of the preparatory study, the results of which have been complemented by informal stakeholder consultation and in-house expertise.

The preparatory study identified two major environmental impacts from professional refrigeration, namely energy consumption in the use phase and direct greenhouse gas emissions for refrigerant fluids. As explained above, the market is cost-driven and thus market forces are not expected to optimally address environmental issues. Therefore, minimum energy efficiency requirements and product information requirements are proposed, combined when appropriate with energy labelling (for professional refrigerated cabinets only). Product information requirements, based on harmonised standards, are meant to provide customers with comparable information on the energy efficiency of products.

Professional refrigeration causes some emissions at its end of life. These emissions have a significant GWP. This is mainly due to the fact that, despite high recovery rate[7], 90% of plastics from professional refrigeration equipment are incinerated rather than recycled and reused. However, the preparatory study concluded that this issue is not best addressed through measures related to product design.

[7] Only 5% of professional refrigeration equipments end up in landfills.

In terms of industrial policy, the proposed legal requirements are expected to support the manufacturing of higher added-value products in the sector of professional refrigeration, while reducing total costs of ownership for the users (including a large number of SMEs). The proposed requirements should allow manufacturers to go up the learning curve and thus gradually reduce production costs and selling price of more energy efficient products. However, the EU will be the first region of the world to regulate some products (i.e. blast cabinets, condensing units), and the new requirements may imply significant compliance costs for SME manufacturers. Therefore, the impact assessment will include a competitiveness-proofing and a specific consultation of SMEs (manufacturers or users) will be organised.