



EFCTC NEWSLETTER

An update on fluorocarbons and sulfur hexafluoride

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Supermarket Refrigeration Equipment using HFCs: The Energy- and Cost-efficient Solution

According to a study /1/ presented at this year's IIR Conference in Vicenza/Italy, hydrofluorocarbons (HFCs) in supermarket refrigeration equipment are a competitive technology from an economic and also an environmental perspective. Their superior energy efficiency saves electricity, thereby reducing CO₂ emissions. This advantage can more than compensate the climate impact of refrigerant leakage. Due to their cost effectiveness, further optimisation of energy performance and minimisation of leakages can be accomplished. Compared to HFC technology, not-in-kind alternatives using ammonia or carbon dioxide as refrigerants turned out to be less favourable than expected: combinations of HFC134a/HFC404A and HFC134a/CO₂ were found to be the most eco-efficient solutions. The study was conducted in collaboration with the research institute FKW /2/ and supported by an advisory board of European equipment manufacturers and retailers.

Supermarket refrigeration technology is a key element in today's food logistics chains to keep food fresh and healthy for the consumer. A recent survey /3/ has shown that the retail phase offers the greatest opportunities for energy saving along the entire food chain. Hydrofluorocarbons (HFCs) are commonly used in commercial refrigeration equipment, because of their excellent technical and safety properties as well as energy-efficient performance. However, HFCs are greenhouse gases and can have an impact on climate when released into atmosphere: this is why they should be used in closed applications with emissions minimised.

Six commonly used supermarket refrigeration systems for low- and medium-range temperatures were investigated: among them were HFC technology and not-in-kind solutions, direct expansion, indirect (brine), and cascade systems. A Life Cycle Assessment (LCA) was performed to analyse environmental impacts. In a second step, a Life Cycle Cost Analysis covered installation costs and operational expenses. The results were combined in an eco-efficiency analysis to show the relative performance of the investigated options in terms of total climate impact versus total costs of ownership – with clear advantages for HFC134a/HFC404A and HFC134a/CO₂ combinations.

/1/ A. Diehlmann (Solvay Management Support GmbH), C. Stadtländer (FKW GmbH): Eco-efficiency Considerations for European Supermarket Refrigeration Systems. Proceedings of the IIR Conference, 30. August 2005, Vicenza (Italy).

/2/ Refrigeration technology research institute FKW Forschungszentrum für Kältetechnik und Wärmepumpen GmbH, Hannover (Germany).

/3/ C. Meurer (Solvay Fluor GmbH), W. Schwarz (Öko-Recherche GmbH): The Fish Cold Chain – Basic Ecological Evaluations. Proceedings of the International Congress of Refrigeration 2003, Washington D.C.



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HFC SYSTEMS DELIVERING BETTER ENVIRONMENTAL PERFORMANCE THAN CO2 SYSTEMS

An [EFCTC Position Paper](#) addresses the case for the new generation of HFC- based systems.

Optimized HFC-systems in [refrigeration](#) or [air-conditioning](#) systems, build with improved efficiency and reduced refrigerant emissions compared to older HFC systems, will deliver a better environmental performance than equivalent CO2-based systems.

The Position Paper is based on theoretical considerations and on practical examples; it presents results from [containment measures](#), and recalls that [energy consumption](#) is the most critical factor determining the climate impact of refrigeration and air conditioning systems.

Its conclusions is that banning HFCs in any refrigeration and air-conditioning application would have a negative impact on overall environmental performance, reduce the competitiveness of EU industry, and impose considerable additional costs.

ANTARCTIC OZONE HOLE

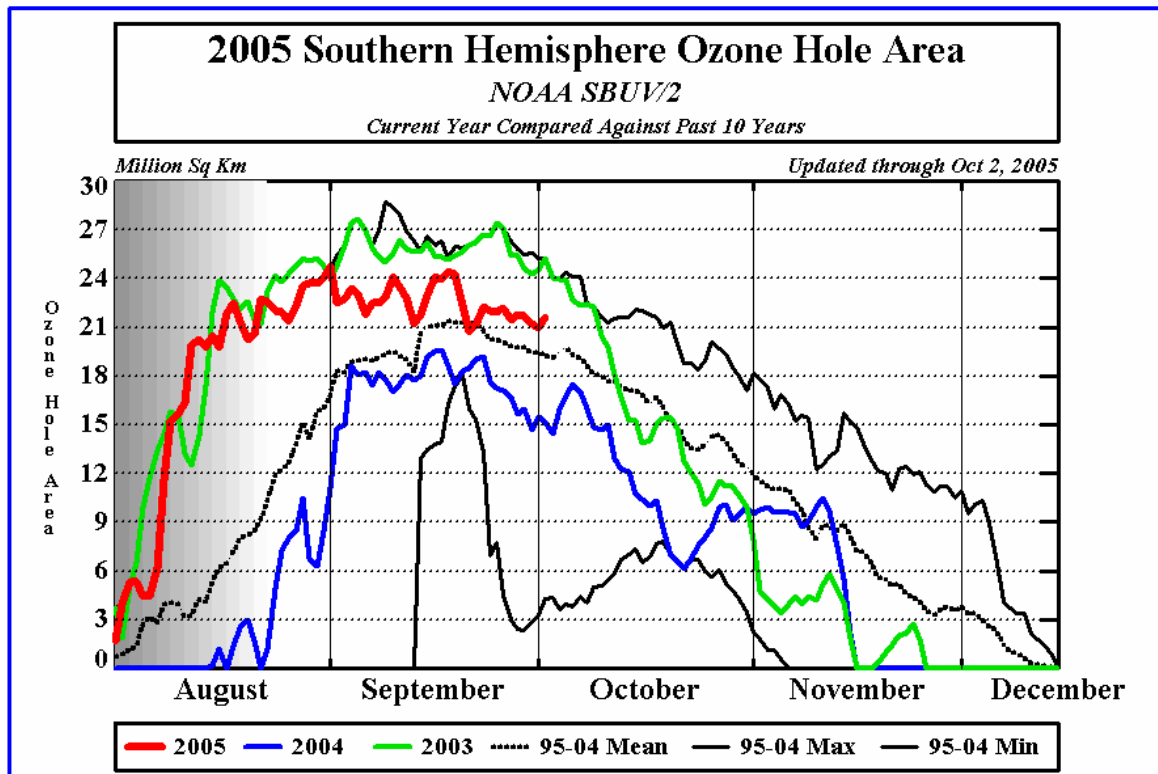
Much is presently written about the [Antarctic ozone hole](#). Indeed, this year's hole area was similar to the previous largest ozone hole until early September. Afterwards, its area came closer to previous averages. The 2004 hole was smaller but, as already explained (see [Factsheet nr 4](#)), such variations are in line with natural variations in stratospheric circulation and temperature.

The extent of the Antarctic ozone hole is not due to an increase of the concentrations of chlorine and bromine arising from [ODS](#) (ozone depleting substances), because, as long the stratosphere will contain an excess of ODS, the amount of ozone loss will be dependent upon prevailing meteorological conditions in the stratosphere, particularly during September and October.

This situation is expected to continue as long as the stratosphere contains an excess of ODS.

Source : [Global Atmosphere Watch](#)

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Source :
Climate Prediction Center.

HFCs HELP TO IMPROVE THE ENERGY VALUE OF WASTE BURNING

Nordic countries have a record of [energy efficient district heating and cooling](#). One such case is the Dáva combined heat and power plant, one of the world's most energy effective waste-fuelled plants.

The Dáva plant converts 20 tonnes/h of municipal and wood industry waste into energy and electricity, where a HFC-134a heat pump is used to transfer the flue gas medium temperature to the district heating system. The HFC-134a heat pump, driven by a 3.4 MW electric motor, has an installed capacity of 14 MW, which represents around 20 % of the plant heat production.

The heat recovery with the heat pump considerably improves the profitability of the plant, raising the heat recovery from the waste incineration from 94% (without heat pump) to 107% (with heat pump).



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The Dáva plant is possibly the first power plant in the world to have a heat recovery system with an integrated 14 MW compression heat pump.

Electricity, heating and cooling is supplied for 55 000 customers in the area, replacing thousands of polluting oil boilers and reducing the amount of energy used for heating



References :

http://www.heatpumpcentre.org/Publications/Case_Ume%E5.asp and
<http://www.umeaenergi.se/default.asp?id=1571>

NEW ON OUR SITE

["European Advances in Supermarket Refrigeration Leak Reduction"](#) (PPT 0,5 MB)