



DuPont Refrigerants Press Kit

Chillventa 2010



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CHILLVENTA 2010

DuPont at Chillventa 2010

Hall 4 / Stand 4-206

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**Press Conference DuPont
at Chillventa 2010**

Thierry Vanlancker



Thierry Vanlancker graduated from State University Ghent in Belgium in 1989 with a Masters in chemical engineering and a masters in philosophy. He joined DuPont in Belgium in 1989, and has held a wide variety of international assignments in sales, marketing, technical service, global product management, and regional sales and marketing management. He was named in 2004 regional director for DuPont Fluoroproducts, based in Geneva, Switzerland, before becoming the global business director for DuPont Fluorochemicals in 2006.



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**Press Conference DuPont
Chillventa 2010**

**Global Perspectives and DuPont Strategies
for Sustainable Refrigeration**

**Speech of
Thierry Vanlancker**

Global Business Director, DuPont Fluorochemicals

FLCH-2010-Chillventa-01e

(Chart #1)

Before sharing DuPont Refrigerant's latest development in terms of more environmentally sustainable refrigerants for the refrigeration and air-conditioning market, Thierry Vanlancker, global business director for DuPont Fluorochemicals, updated the audience on DuPont's corporate mission and how its refrigerant activities fit within its strategy to achieve it.

DuPont, with its headquarters in Wilmington, Delaware (US), is one of the leading globally active science companies. It employs 58,000 people in over 90 countries, and is involved in the development, production and marketing of approximately 500,000 different products to over 400,000 customers. Last year DuPont's overall sales were just over \$26 billion, \$1.4 billion of which was reinvested into research and development across the corporation.

(Chart #2)

The company has thirteen independently operating business units, one of which is DuPont Chemicals and Fluoroproducts (DC&F). This business is further subdivided into three chemical and fluoroproduct groups, with DuPont Fluorochemicals providing the umbrella for DuPont's activities in the refrigerants industry.

Megatrends as market opportunities

DuPont's mission is to achieve sustainable growth by being the world's most dynamic science company, creating sustainable solutions essential for a better, safer, healthier life for people everywhere. To fulfill this mission, DuPont has aligned its focus and investment along key opportunities created by what it refers to as 'megatrends', or the market opportunities fueled by world population growth and a rising middle class. According to DuPont, there are four megatrends for which it can uniquely apply its science and innovation

(Chart #3)

- increasing the quantity, quality and safety of food
- reducing our dependency on fossil fuels
- protecting people and the environment
- and serving growing populations in developing markets.

It is as a reflection of these 'megatrends' that DuPont continues to drive and grow its refrigerant activities.

(Chart #4)

Indeed, this year DuPont is celebrating 80 years of leadership in The Science of Cool™, its vision of how the company can leverage its science heritage to provide sustainable materials and solutions to enhance personal comfort, enable food preservation, improve industrial processing, and reduce the environmental footprints of its products.

The sustainability challenge driving legislation

These objectives are set against the background of a rising global demand for "cool" in the business segments where DuPont is active. Such increases in demand for refrigeration products are driven by a growing world population and developing economies around the world – on a planet where natural resources are becoming limited. Accordingly, the challenge for DuPont, and the global

refrigeration and air-conditioning (R&AC) industry as a whole, is to meet growing demands for “cool” in a more environmentally sustainable way. The ozone depletion issue has already been successfully addressed and now the industry’s attention is turning to climate change and reducing overall CO₂ emissions through the adoption of more energy-efficient equipment and by reducing the carbon impact of the refrigerants themselves, known as TEWI-concept.

(Chart #5)

To its credit, the European Union (EU) has taken global leadership in terms of the implementation of regulations to move the R&AC industry to more sustainable technologies:

- 2010 marked the first deadline towards the complete phase-out of use of ozone depleting refrigerants for servicing R&AC equipment
- the F-Gas regulations were developed to reduce refrigerant emissions and are currently undergoing revision to make further gains
- the Mobile Air Conditioning (MAC) Directive goes into effect in 2011 to transition the car industry to a lower carbon impact refrigerant
- the EU Commission proposed the 20/20/20 program to achieve overall carbon emissions reduction goals; this program calls for a 20% cut in emissions, a 20% improvement in energy efficiency and a 20% increase in renewables by 2020.

Such changes in legislation continue to present the R&AC industry with new challenges, and, as in past years, DuPont is well prepared to be at the forefront of addressing them.

Technology leadership in addressing legislative change

(Chart #6)

In response to EU environmental regulations which prohibit the use of 'virgin' ozone depleting HCFCs, such as R-22, for the servicing and maintenance of existing refrigeration equipment of 1 January 2010, DuPont established the DuPont™ ISCEON® family of non-ozone-depleting retrofit refrigerants as the global industry standard solution for transitioning cost-effectively and efficiently out of R-22. As confirmed by a recent industry survey conducted by DuPont, ISCEON® refrigerants have been an essential ingredient in enabling the European R&AC market to manage the 2010 deadline.

(Chart #7)

With regard to meeting MAC directive requirements set for 2011, DuPont jointly developed and has invested in HFO-1234yf as the best available low global warming potential (GWP) solution to replace HFC-134a in cars primarily due to its environmental, safety and cost benefits. HFO-1234yf has a 99.7 percent lower GWP than the current refrigerant and, since its introduction in 2007, has undergone extensive testing for safety and efficacy by independent testing groups such as the Society of Automotive Engineers (SAE). DuPont has also recently announced a manufacturing joint venture with Honeywell to design, construct and operate a world-scale manufacturing plant for the new refrigerant. Prior to construction of the world-scale plant, the joint venture will begin supplying the refrigerant from an interim production facility starting in the fourth quarter of 2011 in time to meet the EU regulatory requirement.

(Chart #8)

Finally, DuPont has achieved another milestone in its quest to help reduce the total carbon footprint of R&AC systems with the development of a new lower GWP refrigerant technology for use in commercial refrigeration systems. The new

developmental refrigerant, referred to as XP10, is based on HFO-1234yf technology.

Field tests conducted by DuPont in close cooperation with refrigeration system component manufacturers, system partners, consulting engineers and retail chains have revealed promising results for XP10, which will help retailers significantly reduce the environmental impact of their refrigeration systems in preparation to meet current and future regulations. Our studies show that the use of XP10 technology in retail supermarkets can contribute to a more than 90 percent reduction in direct carbon emissions and more than 50 percent reduction of total carbon impact when compared to a standard HFC-404A direct compression system.

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Global Perspectives and DuPont Strategies for Sustainable Refrigeration

**Thierry Vanlancker – Global Business Director
DuPont Fluorochemicals**



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Chillventa 2010 Press Event
Nuremberg, Oct. 14, 2010

DuPont Chemicals & Fluoroproducts

13 DuPont businesses

Applied BioSciences	Nutrition & Health	Protection Technologies
Building Innovations	Packaging & Industrial Polymers	Pioneer Hi-Bred
Crop Protection	Performance Coatings	Safety Solutions
Electronics & Communications	Performance Polymers	Titanium Technologies

Chemicals and Fluoroproducts

3 Chemicals and Fluoroproducts businesses

Fluorochemicals

Refrigerants

FC Specialties

Fluoropolymer Solutions

- Fluoropolymers
- Fluoro Finishes
- Surface Protection Solutions
- Lubricants

Chemical Solutions

- Disinfectants
- Clean Water & Industrial Processes
- Industrial Chemicals



Megatrends

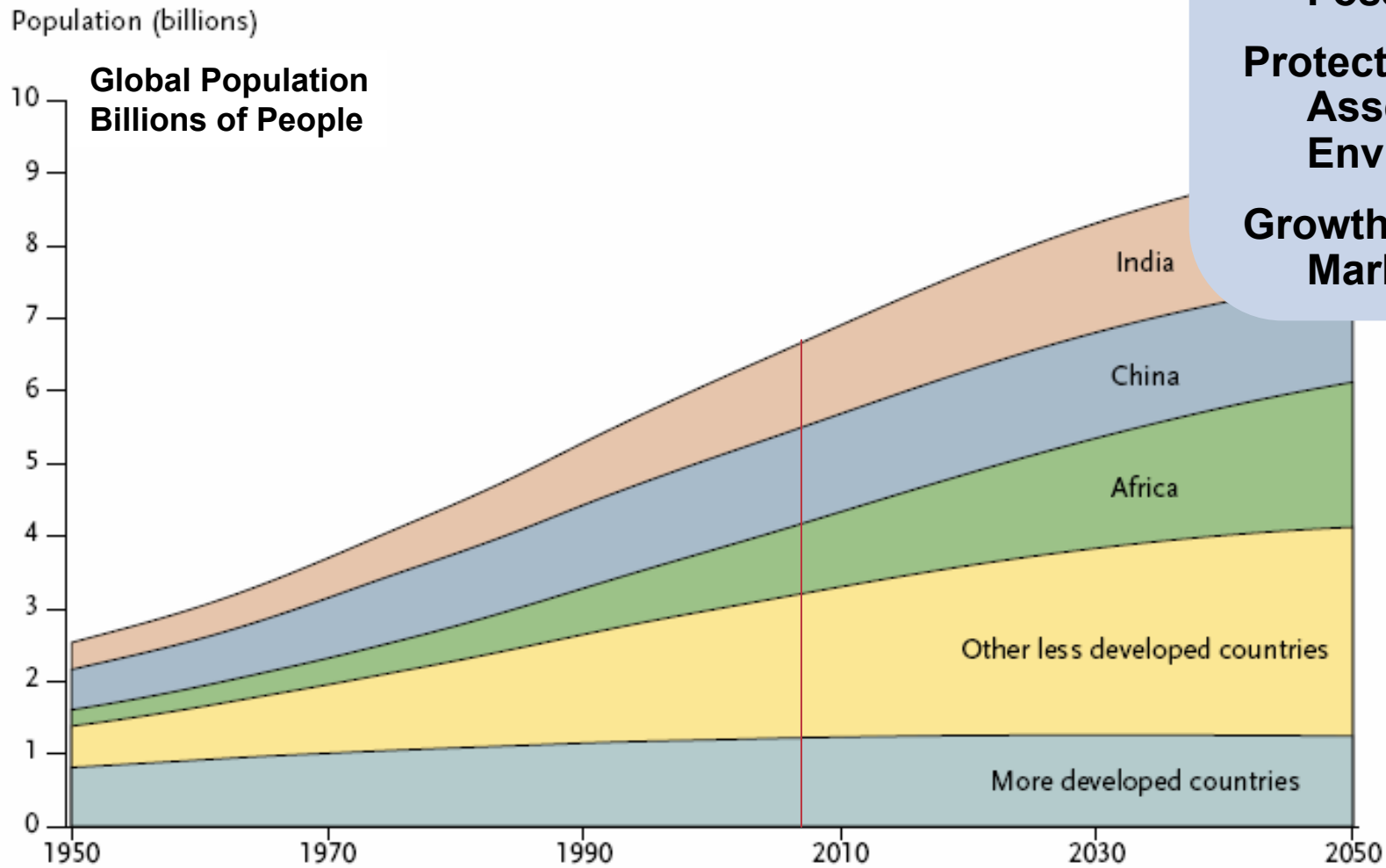
Driven by World Population Growth

Increasing Food Production

Decreasing Dependence on Fossil Fuels

Protecting People, Assets & the Environment

Growth in Emerging Markets



Source: 2008 World Population Data Sheet: www.prb.org.
DuPont Refrigerants. The Science of Cool.™





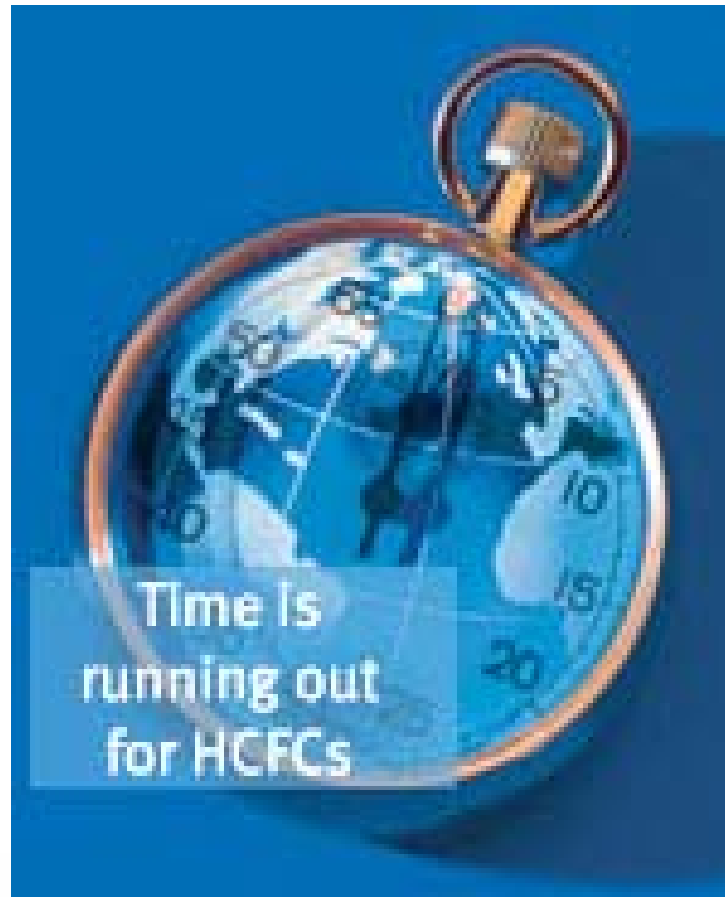
The Science of Cool™

EU Leadership



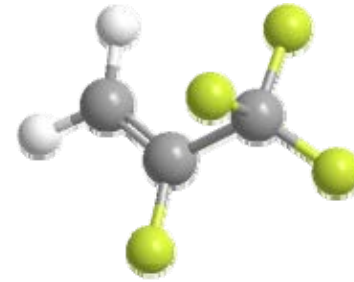
- **EG1005/2009 regulation** → **Phase-out of HCFCs**
- **F-Gas Regulation** → **Refrigerant emissions control**
- **MAC Directive** → **R-134a phase-out in cars**
- **20-20-20 Program** → **Emissions, energy efficiency, renewables**

DuPont™ ISCEON® Refrigerants



Time is
running out
for HCFCs

HFO-1234yf



	<u>R-134a</u>	<u>HFO-1234yf</u>
Formula	CH₂FCF₃	CF₃CF=CH₂
Molecular Weight	102	114
ODP	0	0
GWP₁₀₀ (TAR)	1300	4
Critical Temperature	102 °C	95°C
Normal Boiling Point	-26°C	-29°C

DuPont™ Opteon™ XP10



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Press Conference of DuPont at Chillventa 2010

Pascal Faidy



Pascal Faidy, 53, has been business and marketing manager DuPont Fluorochemicals for Europe, Middle East and Africa (EMEA) since late 2007. A graduate in agronomic engineering, French-born Faidy joined DuPont's agriculture business in 1983 where he carried out a number of roles within its international marketing organisation. Eleven years later he moved to the company's automotive refinish business, where, over the course of the next eight years, he went on to become both business manager for Europe and Asia and marketing and strategy manager EMEA. In 2004 he held a corporate role as sales and marketing effectiveness project leader.



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**Press Conference DuPont
Chillventa 2010**

**DuPont Fluorochemicals in Europe –
Innovations for Commercial Refrigeration**

**Speech of
Pascal Faidy**

Business and Marketing Manager EMEA, DuPont Fluorochemicals

FLCH-2010-Chillventa-02e

(Chart #1)

Pascal Faidy is the business and marketing manager of DuPont Fluorochemicals in Europe, Middle East and Africa (EMEA). DuPont Fluorochemicals is part of the DuPont Chemicals and Fluoroproducts business unit and covers DuPont's activities in both refrigerants and fluorochemical specialties such as aerosol propellant, clean agent fire extinguishants and foam expansion agents.

(Chart #2)

For 80 years, DuPont has a history of leadership and innovation that are cornerstones of its Refrigerants business. DuPont has played and continues to play an important role during times of critical industry transition.

(Chart #3)

The European refrigerants market is an important part of the global business for DuPont. DuPont has a leading role in Europe, offering the broadest range of refrigerant solutions for new and existing equipment in refrigeration and stationary and automotive air conditioning through its ISCEON® and Suva® brand refrigerants

DuPont has advanced its leadership in 2010 with the dramatic growth of the ISCEON[®] retrofit solution driven by the EG1005/2009 regulation requiring the final phase-out of HCFC-22 for service of installed R&AC equipment. At present, DuPont sales combined with market estimates suggests that over 10% of the EU R-22 installed base has been retrofitted to ISCEON[®] refrigerants.

In line with the global vision for the business, DuPont Refrigerants in Europe is committed to leveraging The Science of Cool™ to lead the search for new cooling solutions that improve comfort and enhance the quality of life and are in line with current and future legislation. There is an increasing awareness, particularly in the European Union (EU), of the impact of carbon emissions on the environment. This increasing awareness is being translated into increasingly specific emission reduction targets across sectors and has led to the European Council's commitment to the 20-20-20 targets:

- A reduction in EU greenhouse gas emissions of at least 20% below 1990 levels
- 20% of EU energy consumption to come from renewable sources
- A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency

It is to be expected that more legislative initiatives will be presented in the future aimed at reducing emissions in many sectors.

(Chart #4)

At the same time, the carbon contribution of the HFC refrigerants used in refrigeration and air-conditioning (R&AC) equipment is also being targeted, leading, for example, to the EU MAC Directive which is driving the phase-out of HFC-134a used in car air-conditioning. In addition we have the Fluorinated Gas (F-Gas) regulations, aimed at controlling and reducing overall HFC emissions from new and existing stationary R&AC equipment.

The F-Gas regulations are currently under review and an updated version is expected to be issued in 2011. Among other potential improvements being discussed there is a suggestion to introduce a cap, or fixed limit based on their GWP equivalent, on the placing in the market of HFCs, and the gradual reduction of this cap over a longer period of time.

This approach, which was initially proposed by US legislators, has the advantage of providing industry (producers and users alike) with a predictable yet flexible environment for investment and implementation, while providing regulators with significant, easily verifiable and immediate emissions reductions.

The carbon emissions associated with the R&AC industry are not only a direct consequence of the refrigerants themselves, but are also produced indirectly as a result of the energy consumed by the refrigeration systems in which they are used. The food retail industry is one of the major operators of such equipment.

(Chart #5)

This is one of the reasons why food retailers in many EU countries are being proactive in their quest to reduce the carbon footprint of their operations, including adopting refrigeration technologies and refrigerants that deliver reduced direct and indirect carbon emissions. The search for more sustainable refrigerants and energy efficient refrigeration are part of this effort, and DuPont is playing a leading role.

One potential alternative might have been the use of the new low-GWP refrigerant, HFO-1234yf, for such purposes. However, in light of current safety standards and regulations, this is not possible in all applications. HFO-1234yf is mildly flammable and is proposed as the new ASHRAE Class 2L. The charge size limitations based on the current industry norms and standards imposed for Class 2 refrigerants, as well for the new proposed 2L, for use in retail stores render its use in many applications with sizeable charge impractical.

(Chart #6)

However, DuPont has leveraged HFO-1234yf technology to develop a new lower GWP refrigerant technology that can help retailers significantly reduce the total carbon footprint of their refrigeration systems. The new refrigerant innovation, called XP10, has a GWP close to 600, and is the lowest GWP, non-flammable (ASHRAE Class 1) refrigerant possible based on the new HFO-1234yf - technology. XP10 is a very close match in properties and performance to HFC-134a and is therefore highly compatible with current HFC-134a system technology, enabling the efficient transition in new equipments.

Development of new, more environmentally sustainable refrigerants requires applying science and technology to identify refrigerants with the optimal balance of properties for each specific application – these properties include zero ozone depletion, low direct GWP, high efficiency, safety and total cost of ownership (first and operating costs). Considering the long list of properties that must be optimized, the days of hoping to find a single refrigerant with the ideal balance of properties for most all applications are well behind us. Our search for new innovative refrigerants to enable the food retail market to meet its carbon reduction goals has led us to XP10, which as a non-flammable ASHRAE Class 1 refrigerant and with a significantly lower GWP, offers an optimal balance of properties for the food retail application.

(Chart #7)

Our development work has also revealed that XP10 offers the attractive opportunity for it to be used along with CO₂ as a refrigerant in a hybrid system – XP10 for medium temperatures and CO₂ for low temperatures. Studies show that such a solution would provide retailers with a 90 percent reduction in direct carbon emissions and a minimum 50 percent reduction in the total carbon impact of retail commercial refrigeration systems when compared to the current global industry standard direct expansion technology based on HFC-404A.

The main advantages of this innovative combination can be summarized as follows:

- Significant reduction of the GWP of the total refrigerant charge while maintaining the safety benefits that made HFCs the refrigerant of choice for retailers for use in occupied commercial areas;
- Considerable reduction of potential leakages from the system due to a 30% lower operating pressure;
- Increased energy efficiency compared to traditional R-404A direct expansion equipment.

Indeed, DuPont is already seeing retailers in some countries migrating from 404A DX technology to 134a/CO₂ hybrid systems in order to improve system energy efficiency and reduce their overall carbon impact. XP10 is an efficient and logical choice in making a further step change reduction in carbon impact. XP10 can also be used in stand-alone systems for smaller applications where hybrid systems are not practical, such as in discounter applications. A further key benefit of XP10 is that by adopting this new refrigerant technology in combination with systems using other low carbon refrigerants such as CO₂ or hydrocarbons, retailers can make a significant contribution to the EU 20/20/20 goal.

(Chart #8)

(Chart #9)

With regard to the development and market testing of XP10, DuPont is conducting laboratory-based compressor and system tests in close cooperation with several leading equipment manufacturers. DuPont is also currently conducting a series of field trials in food retail operations both within and outside Europe. Results to date have been very encouraging in terms of operating performance and ease of use. Retail supermarket test partners in Europe include Ahold Netherlands, Aldi Süd Germany, Penny Germany, Spar Austria and several others.

(Chart #10)

Current European equipment, engineering, and contracting partners of DuPont include Bitzer, Bock, Danfoss, DKA, Emerson Climate Technologies, Epta, Frascold, Hauser, Johnson Controls France, Tebeg, Teko, Tecumseh Europe, and Wurm Systems.

Additional lab, system and field tests are planned to fully prepare XP10 for commercial use.

At present DuPont is finalizing its plans for the commercial availability of XP10. DuPont is considering an initial limited market launch of XP10 in the EU between 2012 and 2013. DuPont will monitor market demand for XP10 to define timing for broad market availability.

(Chart #11)

DuPont is excited about the potential for XP10 to become a competitive and sustainable global technology standard to enable the retail supermarket sector to meet their carbon footprint reduction goals.

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DuPont Fluorochemicals in Europe – Innovations for Commercial Refrigeration

**Pascal Faidy – Business & Marketing Manager
DuPont Fluorochemicals EMEA**

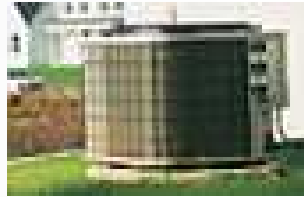


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Chillventa 2010 Press Event
Nuremberg, Oct. 14, 2010

DuPont Fluorochemicals

Refrigerants – The Science of Cool™



Stationary AC
OEM & Aftermarket



Mobile AC
OEM & Aftermarket



Refrigeration

Specialty Markets



Propellants



Fire Extinguishants



Foam Expansion Agents



Electronic Gases

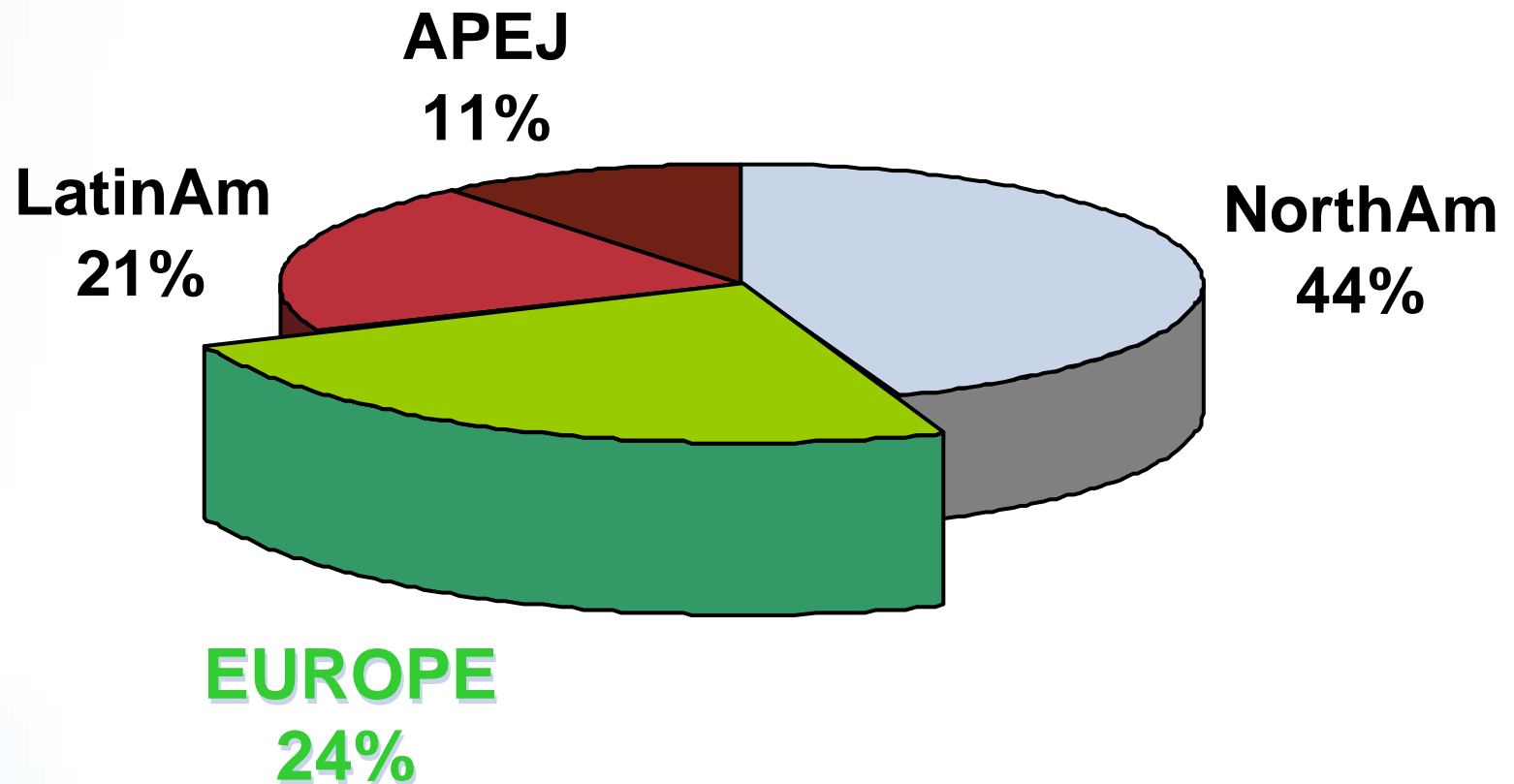


Specialty Fluids



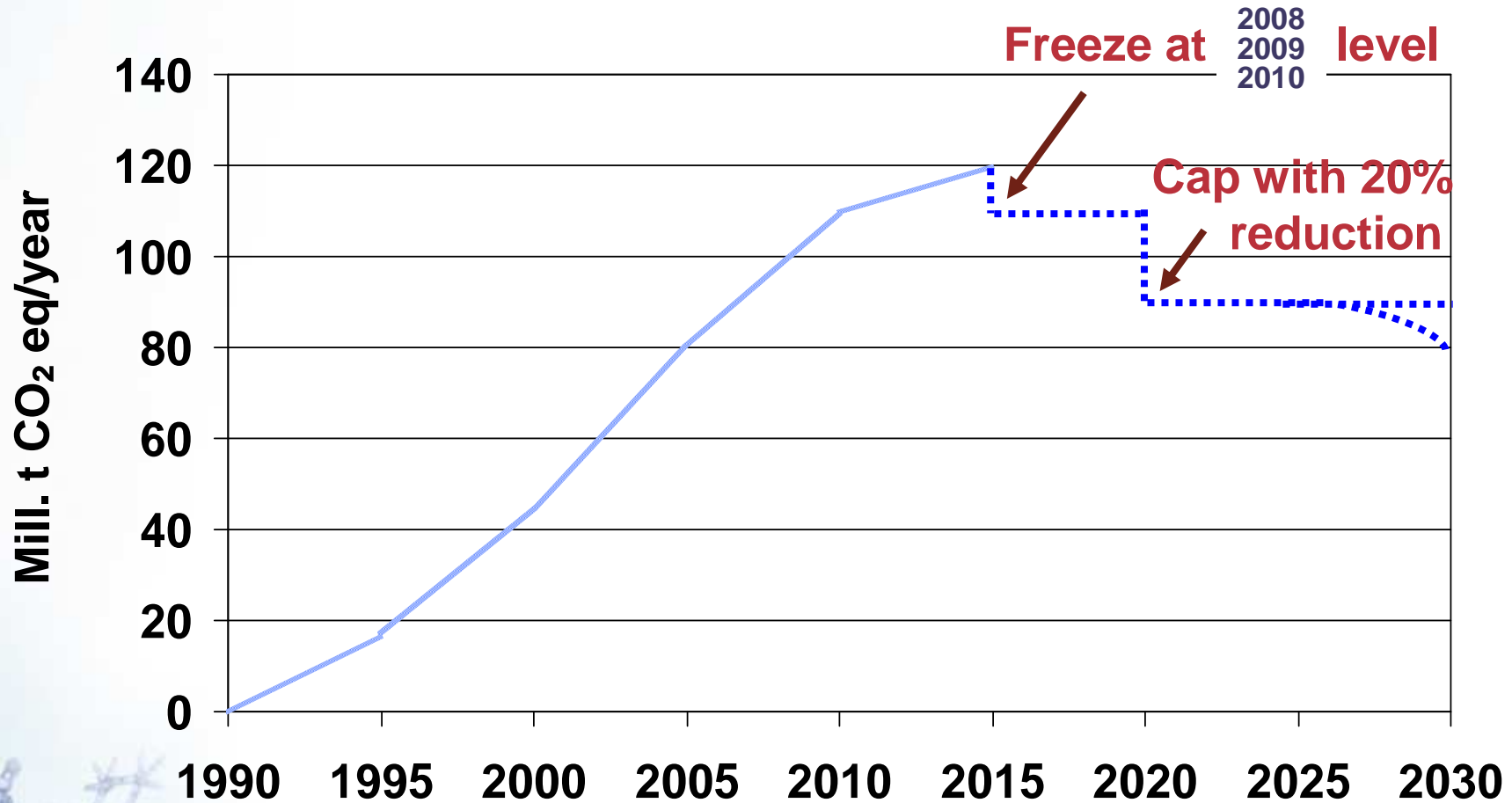
Pharmaceuticals

DuPont-Global Refrigerant Business



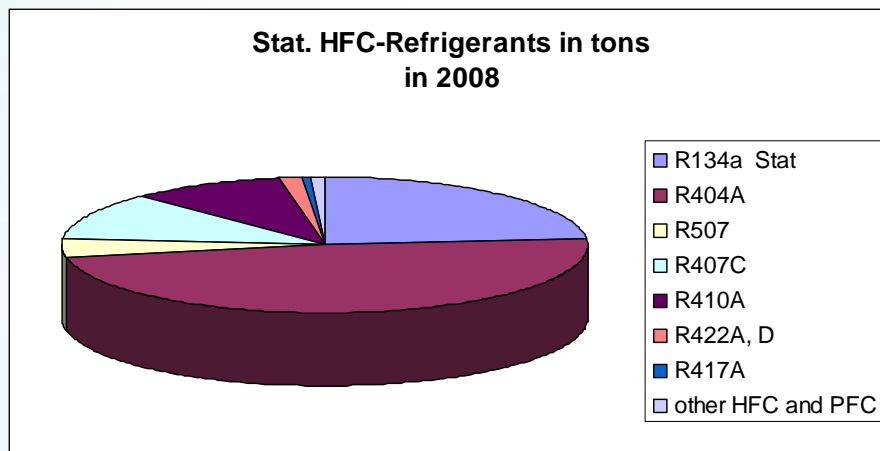
EU: Potential Cap & Allocation Policy

- Stationary Refrigeration and AC -

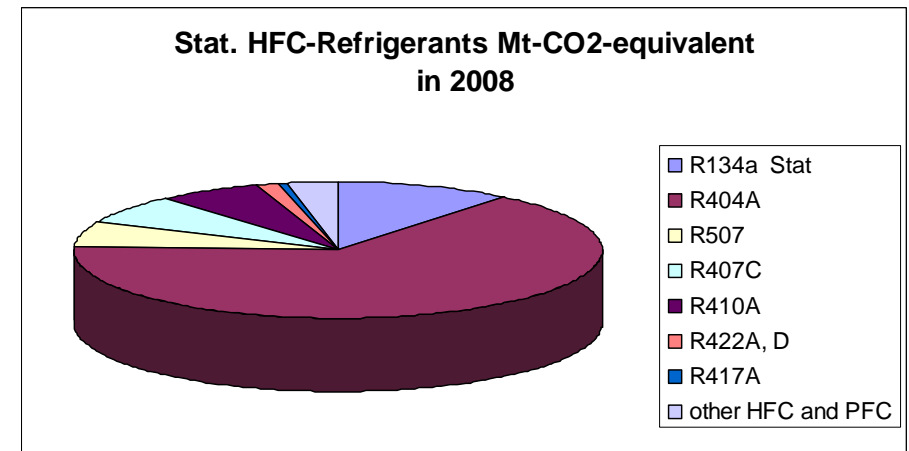


Calculation based on IPCC 3rd Assessment Report 2000

HFC Refrigerants in Stationary Refrigeration and AC in EU 2008



Sales volume = 38kt



~111 Mill. tons CO₂-equivalent ⁽¹⁾

(1) IPCC 3rd Assessment Report 2000 as used for (EC) 842/2006

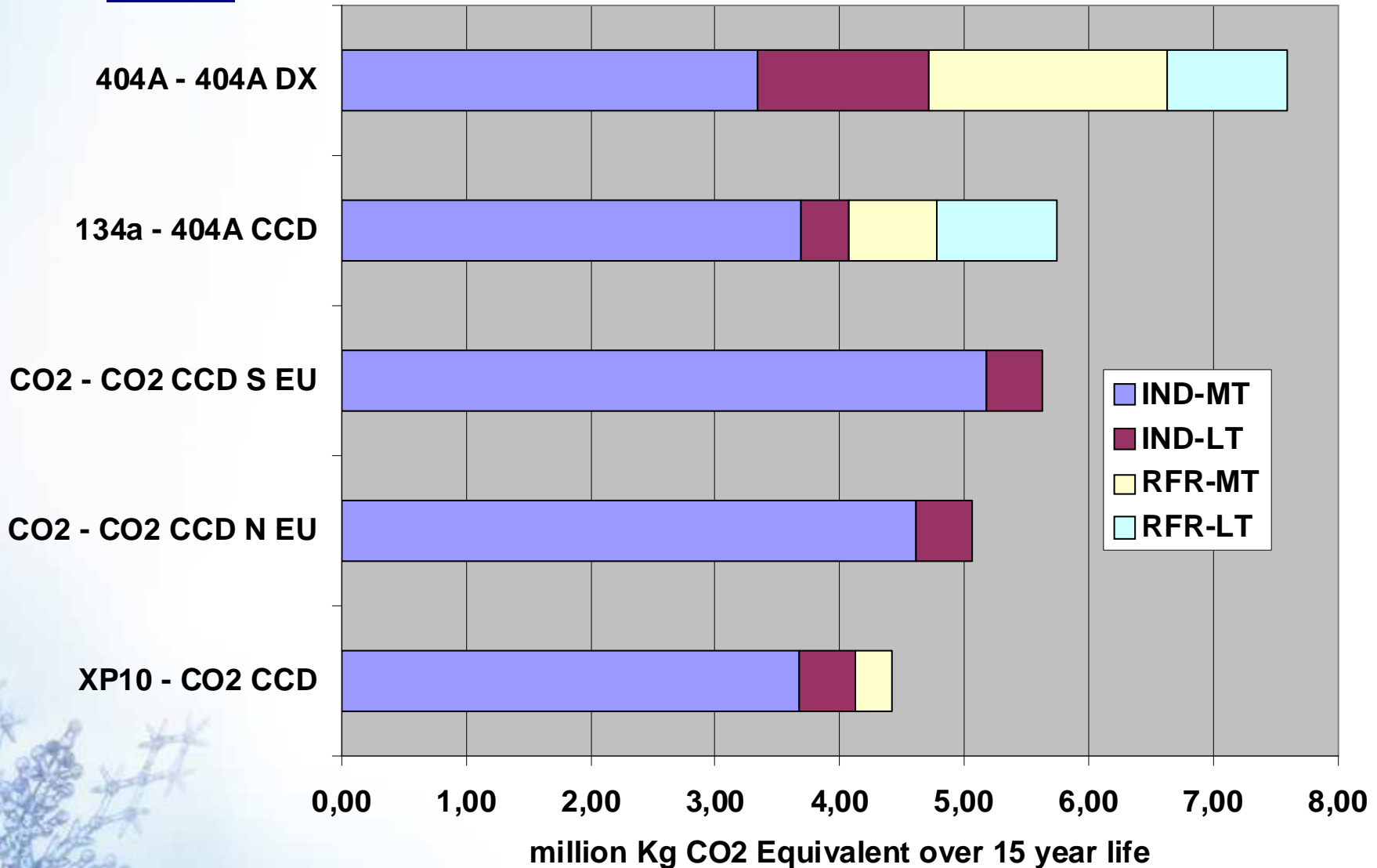
Source: European Commission statistics reported sales from producers, importers and exporters pursuant to regulation (EC) No 842/ 2006

HFO-1234yf and XP10 - Basic properties

Property	R-404A	HFC-134a	HFO-1234yf	XP10
Chemical Formula	Blend; Near- Azeotrope	$\text{CH}_2\text{F}-\text{CF}_3$	$\text{CF}_3\text{CF}=\text{CH}_2$	Blend; Azeotrope
Safety Class (ASHRAE Std 34)	A1	A1	A2L	A1 (expected)
ODP	0	0	0	0
GWP_{AR4}	3922	1430	4	Approx. 600
Cooling Cap ⁽¹⁾ [%]	100	58	57	61
COP ⁽¹⁾ [%]	100	108	107	108
BP [°C]	-46,5	-26,1	-29,4	-29,2
Glide [K]	0,5	N/A	N/A	N/A

Europe TEWI Results for lower GWP Refrigeration Options

MT - LT



ALDI SÜD Mönchengladbach/ Germany



Partners: tebeg & DKA

*XP10 for MT-Cabinets
& Coldstores*



SPAR Kundl/ Austria – Hybrid System



Installer Company: Hauser GmbH Linz

XP10 / CO₂ - Cascade



XP10: Technology Development Partners



Danfoss



Summary - XP10

- **XP10 supports the reduction of overall carbon impact (TEWI)**
 - GWP-Reduction vs. R404A is 85%
 - GWP-Reduction vs. R134a is 58%
 - Significant leakage rate reduction (vs. R404A), due to lower working pressure
 - Improved COP vs. R404A and same as R134a
- **Can be used for MT and in combination with LT-CO₂-CCD or stand-alone hydrocarbon cabinets**
- **Expected to comply with ASHRAE Std 34 class A1 and EN-378**
- **Further component modifications and field trials are ongoing**
- **Opportunity to be used as cost effective retrofit option for R134a-Systems**



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Pilot project at an Austrian SPAR supermarket:

New DuPont refrigerant successfully adopted in the food retail sector



This image can be downloaded as a hi-resolution file at:

<http://uk.news.dupont.com>

under the category *Sectors & Markets > Refrigerants*

FLCH-2010-Chillventa-03e

Photo: DuPont/SPAR Österreich

As part of a field test started in July 2010, SPAR Österreich, of Salzburg, Austria, converted a medium-temperature compound refrigeration unit belonging to a R134a/CO₂ cascade system to the new DuPont refrigerant XP10, which provides a significantly lower global warming potential.



Pilot project at an Austrian SPAR supermarket:

New DuPont refrigerant successfully adopted in the food retail sector

Nuremberg, 14 October 2010. As part of a field test started in July 2010, SPAR Österreich of Salzburg, Austria, has been using the new DuPont refrigerant XP10 for the medium-temperature section of a R134a/CO₂ cascade system at a supermarket in Kundl/Tyrol. The azeotropic refrigerant blend has a significantly reduced global warming potential (GWP) when compared to R134a, yet with equivalent thermodynamic properties. It is therefore an ideal alternative to R134a in new, medium-temperature refrigeration systems or as a drop-in replacement in existing ones. The new refrigerant is based on HFO-1234yf, which has recently received global acceptance for use in mobile air-conditioning.

The medium-temperature refrigeration unit (consisting of three Bitzer 4NES-12Y compressors) cools a total of 15 metres of refrigerated shelves for dairy and cold meat products, 10 metres of sales counters and two cold stores for meat and dairy products. The conversion was carried out by technicians from the refrigeration system specialists HAUSER GmbH of Linz, Austria. They initially replaced the filter drier and then reprogrammed the Frigolink HKS regulator with the corresponding data for XP10. No further components needed to be exchanged, nor was an oil change required. All work was carried out without a hitch. The refrigerant charge measured before and after the conversion came in at 83 kg. In line with DuPont recommendations, a minor adjustment to the expansion valve was made to ensure the correct superheat setting. The refrigeration system showed no sign of leakages or other problems during operation.

The new, non-flammable refrigerant blend XP10 is highly suitable for use in combination with CO₂ in hybrid systems: XP10 for medium temperatures and CO₂ for low temperatures. Research done by DuPont and development partners reveals that supermarket retailers can use this solution to achieve an approximate 90 percent reduction in direct carbon emissions resulting from leakages when compared to the current global industry standard based on HFC-404A. Correspondingly, the TEWI (Total Equivalent Warming Impact) value, which measures the overall carbon impact of retail commercial refrigeration systems, can be reduced by around 50%.

“We agreed to test XP10 because, in our opinion, it currently provides the most future-oriented solution on the market when used in combination with CO₂ for low temperatures,” says Gerald Geiger, construction, energy and technology manager at

SPAR. “We are delighted with the results of the field test and are planning to use XP10 again in such a hybrid system.”

DuPont Refrigerants is a leading global supplier of refrigerants, using science and technology, market knowledge and global reach to provide sustainable materials and solutions to enhance personal comfort, enable food preservation, improve industrial processing and reduce environmental footprints. Further information can be found at: <http://refrigerants.dupont.com>.

DuPont is a science-based products and services company. Founded in 1802, DuPont puts science to work by creating sustainable solutions essential to a better, safer, healthier life for people everywhere. Operating in more than 70 countries, DuPont offers a wide range of innovative products and services for markets including agriculture and food; building and construction; communications; and transportation.

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Successful trial of new DuPont refrigerant with significantly lower global warming potential



This image can be downloaded as a hi-resolution file at:

<http://uk.news.dupont.com>

under the category *Sectors & Markets > Refrigerants*

FLCH-2010-Chillventa-04e

Photo: DuPont/ALDI Süd

As part of a pilot project, ALDI Süd has recently charged a R134a-based refrigeration system at one of its stores with the new DuPont refrigerant XP10 – a refrigerant characterised by its particularly low global warming potential. The system cools seven refrigerated shelves and three cold stores used to display and store dairy products, fresh meat, fruit and vegetables.



Successful trial of new DuPont refrigerant with significantly lower global warming potential

Nuremberg, 14 October 2010. ALDI Süd GmbH & Co. KG of Mönchengladbach, Germany, has recently charged a R134a-based refrigeration system with the new DuPont refrigerant XP10 as part of a pilot project. The azeotropic refrigerant blend is based on HFO-1234yf, which has recently received global acceptance for use in mobile air-conditioning, and is characterised by its particularly low global warming potential (GWP) as well as its similarity to R134a in terms of its thermo-dynamic properties. It is suitable for use as an alternative refrigerant for new, medium-temperature commercial refrigeration systems based on R134a technology, or as a drop-in replacement for R134a in existing systems.

The medium-temperature refrigeration system at the ALDI Süd branch consists of four Bitzer 4NCS-10.2Y piston compressors and cools seven refrigerated shelves and three cold stores used to display and store dairy products, fresh meat, fruit and vegetables. The engineering firm tebeg - Thomas Bader Technische Beratung of Würzburg, Germany, was responsible for coordination of the work. The conversion was carried out during May 2010 by technicians from Dresdner Kühlanlagenbau GmbH, supported by specialists from Wurm GmbH & Co. KG Elektronische Systeme (Remscheid, Germany) and DuPont. Following removal of the original R134a refrigerant, the system was charged with the corresponding amount of XP10 and re-started. Neither an oil change nor a replacement of components was required. Service contractors solely carried out a minor adjustment of the expansion valve to ensure the correct superheat setting. Measurements taken before and after the conversion showed a slight fall in energy consumption (approximately 2 to 3%) with XP10 when compared to R134a at the same external temperatures.

The new, non-flammable, low GWP refrigerant blend is particularly well-suited for use in commercial refrigeration as well as other areas where high levels of energy-efficiency are required. With its beneficial thermo-dynamic properties, which are the equivalent of standard, non-hazardous refrigerants, it is appropriate for use both in new systems as well as for the cost-efficient conversion of refrigeration systems at medium temperatures. Accordingly, this new solution can contribute to a more than 50 percent reduction of total greenhouse emissions, resulting from leakages and the system's overall energy consumption, when compared to a standard R404A direct expansion system.

DuPont Refrigerants is a leading global supplier of refrigerants, using science and technology, market knowledge and global reach to provide sustainable materials and solutions to enhance personal comfort, enable food preservation, improve industrial processing and reduce environmental footprints. Further information can be found at: <http://refrigerants.dupont.com>.

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