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## Highlights

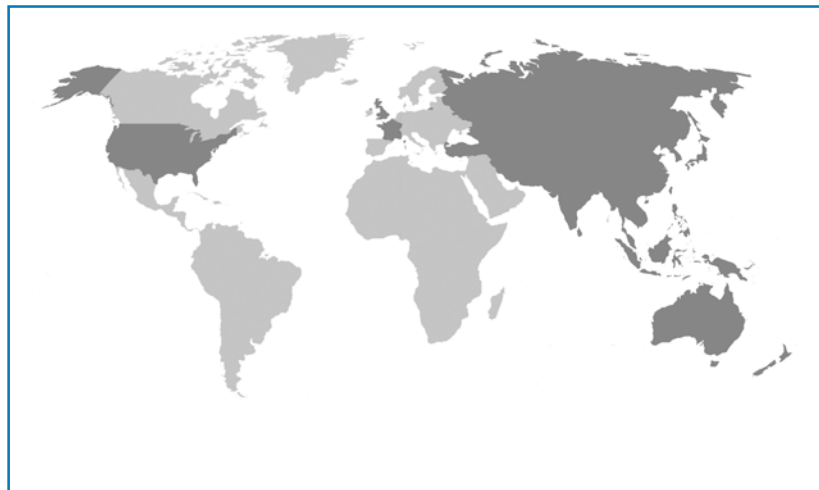
- Fertilizers deplete ozone, add to global warming
- New environment-safe refrigerant
- Aerosols to be made propellant-free
- Sustainable fire suppression fluid
- Foam insulation just turned greener
- Heat-based phytosanitation systems for forest products



The **Asian and Pacific Centre for Transfer of Technology (APCTT)**, a subsidiary body of ESCAP, was established on 16 July 1977 with the objectives: to assist the members and associate members of ESCAP through strengthening their capabilities to develop and manage national innovation systems; develop, transfer, adapt and apply technology; improve the terms of transfer of technology; and identify and promote the development and transfer of technologies relevant to the region.

The Centre will achieve the above objectives by undertaking such functions as:

- Research and analysis of trends, conditions and opportunities;
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- Dissemination of information and good practices;
- Networking and partnership with international organizations and key stakeholders; and
- Training of national personnel, particularly national scientists and policy analysts.



*The shaded areas of the map indicate ESCAP members and associate members*

#### **Cover Photo**

The United States Naval Air Warfare Centre Aircraft Division (NAWCAD) engineer Mr. Joe Wolfe recently developed a fine mist water nozzle that dramatically improves the ability to extinguish fires in small contained areas.

*(Credit: NAWCAD, the United States)*

**VATIS\* Update  
Ozone Layer Protection**

is published 6 times a year to keep the readers up to date of most of the relevant and latest technological developments and events in the field of Ozone Layer Protection. The Update is tailored to policy-makers, industries and technology transfer intermediaries.

Website: <http://www.techmonitor.net>

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**ASIAN AND PACIFIC CENTRE  
FOR TRANSFER OF TECHNOLOGY**

Adjoining Technology Bhawan  
Qutab Institutional Area  
Post Box No. 4575  
New Delhi 110 016, India  
Tel: (91) (11) 3097 3700  
Fax: (91) (11) 2685 6274  
E-mail: [postmaster.apctt@un.org](mailto:postmaster.apctt@un.org)  
Website: <http://www.apctt.org>

**OZONE CELL**

Ministry of Environment and Forests  
Government of India  
Zone IV, East Court, 2<sup>nd</sup> Floor  
India Habitat Centre, Lodhi Road  
New Delhi 110 003, India  
Tel: (91) (11) 2464 2176  
Fax: (91) (11) 2464 2175  
Telegram: PARYAVARAN NEW DELHI  
E-mail: [ozone-mef@nic.in](mailto:ozone-mef@nic.in)  
Website: <http://www.ozonecell.com>

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\* Value Added Technology  
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### Historical analysis tags importance of CFC/aerosol ban

In Spain, scientists from the Andalusian Centre for Environmental Studies and University of Granada have recreated the ozone column trends recorded between 1978 and 2008 that rose up over the Iberian Peninsula. The results highlight the influence that the prohibition of aerosols and chlorofluorocarbon (CFC) gases has had. According to Mr. Manuel Anton from the University of Granada's Department of Applied Physics, "Although these types of emissions were banned by the 1987 Montreal Protocol, our study reveals that stratospheric ozone did not show signs of recovery until 1995."

The second period studied, from 1995 to 2008, differed from the first. For example, ozone levels showed positive trends with greater recovery levels (2.5 per cent/decade) in the north-east part of the Peninsula, where levels were higher than other regions owing to industrial emissions. Mr. Anton observes that the troposphere ozone contributes in recovering total ozone levels. In contrast to the stratospheric ozone that acts as a filter against harmful radiation, the tropospheric or ground-level ozone found in the lowest layer of the atmosphere is a secondary pollutant. It mainly derives from the photochemical processes that transform nitrogen oxides and volatile particles from burning fossil fuels into ozone. Heat and light from the Sun stimulate such processes, which is why ground-level ozone is a common pollutant in Spain.

The results show that in highly industrial areas such as in the north-east of Spain, the recovery of the ozone layer was quicker, thanks

to the ozone contribution of the troposphere to the stratosphere. However, the scientists warn that other anthropogenic effects could complicate the recovery process and result in areas with altered ozone levels. The ozone level measurement data used for the study were taken from two satellites: the United States' Total Ozone Mapping Spectrometer (TOMS) satellite, which provided daily images of spatial distribution of the ozone between 1978 and 2005) and the European satellite Global Ozone Monitoring Experiment (GOME), which more recently took measurements from July 1995 to June 2011). The Portuguese University of Evora, the Italian Institute of Atmospheric Sciences and Climate, and the German Aerospace Centre also participated in the study.

Source: [www.sciencedaily.com](http://www.sciencedaily.com)

### Ozone layer slowly recovering

The ozone layer has slowly been recovering for some time, notes a recently published study that indicates a turning point might have been reached in the quantity of ultraviolet (UV) radiation reaching the Earth's surface. "The rise in UV radiation has been halted," stated Mr. Markus Rex, a physicist at the Alfred Wegener Institute for Polar and Marine Research, Germany. In the light of the situation over Europe, the turning point in the amount of radiation reaching the Earth had been reached about five years ago, he said. "In the case of the ozone layer, we have been observing a positive trend for a longer period. It has been increasing in thickness since around the turn of the century," Mr. Rex said.

UV intensity did not decline with reduced air pollution, but it even continued to rise. However, of late,

the recovery in the ozone layer is starting to take effect, Mr. Rex noted. "This has to do with cleaner air. We have made great strides with sulphur dioxide. This toxic gas is also responsible for acid rain and is being released into the air in much smaller quantities than a couple of decades ago," he said.

Source: [www.mb.com.ph](http://www.mb.com.ph)

### Fertilizers deplete ozone, add to global warming

A recent study has drawn on the 40 years of atmospheric samples collected by Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO), at its Cape Grim pollution station in Tasmania, to reveal that excessive and careless use of fertilizers is the driver of growing atmospheric nitrous oxide (N<sub>2</sub>O) concentrations. As lead author Dr. David Etheridge explains, recent advances in mass spectrometry have made it possible to analyse not just the concentration of N<sub>2</sub>O in the atmosphere but also its isotopic make-up. This isotopic signature provides the key to understanding where the rising concentration of the gas is coming from.

While N<sub>2</sub>O exists in vastly lower concentrations than carbon dioxide (CO<sub>2</sub>), its molecules are much more powerful as a greenhouse forcer, Dr. Etheridge states. As the long-banned chlorofluorocarbons (CFCs) eventually wash out of the stratosphere, N<sub>2</sub>O will become a more important ozone-depleting gas. Therefore, even though the change in atmospheric concentrations of the gas has only been from a pre-industrial 270 ppb (about a thousand times lower than the CO<sub>2</sub> concentration) up to about 320 ppb now, scientists are still keen to trace what is going on with the gas.



To identify the sources, the scientists had to take into account variations in the long term, annual and seasonal fluctuations as well as identifying the isotopic signatures of natural and human-made N<sub>2</sub>O.

Source: [www.theregister.co.uk](http://www.theregister.co.uk)

## Arctic ice melting, ozone layer depleting

Research carried out by the United States National Aeronautics and Space Administration (NASA) in the Arctic Ocean has revealed the adverse effects of large-scale melting of ice that is depleting the ozone layer. Researchers found that the ice formation taking place in the Arctic region is seasonal and, unlike the ice usually found in the region, it is thinner and saltier. The formation has caused the release of bromine. The chemical reaction taking place when bromine comes in contact with heat from the Sun or cold temperature is a cause of worry because it tends to capture gaseous mercury from the atmosphere, leading to bromine explosions. The effect of the explosion contaminates snow that falls on the surface, releasing mercury that forms pollutant deposits.

While Arctic ice melting has been a cause of concern for scientists studying the region, it also offers to some an opportunity to explore business opportunities and trade routes. One of the discoveries also clarifies that bromine explosions are possible in the lowest layer, or the troposphere, as it failed to affect the interiors of Alaska rising to the height of mountains at about 6,500 ft high. This has confirmed that bromine explosions are only possible in the lowest layer of the atmosphere.

Source: [www.ibtimes.co.uk](http://www.ibtimes.co.uk)

## Springtime boundary layer ozone depletion at Alaska

In April 2008 and March-April 2009, near daily ozonesonde measurements were made over a several week period to study springtime Arctic boundary layer ozone loss in the vicinity of Barrow, Alaska, the United States. A detailed picture of the vertical structure of the depletion events was obtained from the soundings, showing that the depletion was confined to approximately the lowest 1,000 m with an average height of the top of the layer at 1-500 m. According to researchers from the Earth System Research Laboratory of the United States National Oceanic and Atmospheric Administration (NOAA) at Boulder, Colorado, results for the two periods were strongly contrasting in terms of the frequency of ozone depletion events, providing an opportunity for investigating the differing conditions under which these events develop. Short-term variability of the ozone depletion events is closely tied to the frequency of airflow that is primarily Arctic Ocean in origin (more depletion) or originates at lower latitudes (less depletion). The ubiquitous depletion events are interrupted by periodic mixing of ozone-rich air into the boundary layer with the onset of synoptic-scale weather changes that interrupt flow from off the Arctic Ocean.

A 38-year record of surface ozone measurements at Barrow provides a unique time series that reveals the strong year-to-year variability of ozone depletion event occurrences. During March, but not April or May, there has been a significant increase in the frequency of ozone depletion events. This long-term increase in March depletion events seems to follow the decline

in multi-year sea ice in the Arctic Ocean and its replacement by first-year ice. This significant change in the occurrence of boundary layer ozone events in March may signal a change in the oxidative chemistry in the Arctic that is related to climate change in this sensitive region. *Contact: Mr. Bryan J. Johnson/Ms. Joyce M. Harris, Global Monitoring Division, Earth System Research Laboratory, National Oceanic and Atmospheric Administration Boulder, Colorado, United States of America.*

Source: [www.agu.org](http://www.agu.org)

## Hint of recovery in the ozone layer

There may be a "hint" of recovery in the ozone layer, according to Mr. Daan Swart, Head of the Air Quality Department at the National Institute for Public Health and the Environment in the Netherlands, and one of the international scientists conducting global climate research at the National Institute of Water and Atmospheric Research (NIWA) in Lauder, New Zealand. "The modelling we have done says it will happen and we hope it will – all going according to plan," Mr Swart said. "There are, maybe, hints of its recovery, although we need to realize that this is a long-term thing," he added. The Netherlands had built a light detection and ranging (LIDAR) system at Lauder in 1994, for a national climate research programme. The equipment sends up laser pulses that record the amount of ozone at different heights in the atmosphere. Lauder is part of the Network for the Detection of Atmospheric Composition Change, a string of the more than 70 research stations around the world that monitor global climate change.

Source: [www.odt.co.nz](http://www.odt.co.nz)

## Key to India's ODS phase-out success

India has met successfully its obligations under the Montreal Protocol to phase out production and consumption of ozone depleting substances (ODS). The rapid progress in ODS phase-out was realized through, among others, the following measures:

- Identifying priority sub-sectors for early phase-out;
- Choosing a project portfolio with the right mix of investment and non-investment activities;
- Involving key stakeholders early in the phase-out process at both the planning and implementation levels;
- Awareness raising activities for key target audiences;
- Recognizing early the importance of building local capacities through training;
- Increasing the capacity of the Ozone Cell through its active involvement in the Regional Network of ODS officers and other international forums.
- Implementation of National Strategy for Transition to Non-CFC MDIs and Plan for Phase-out of CFCs in the Manufacturing of Pharmaceutical MDIs in India.
- The Essential Use Nomination (EUN) for use of pharmaceutical grade of chlorofluorocarbons (CFCs) for manufacturing of MDIs to cater the needs of asthma and chronic obstructive pulmonary diseases (COPD) patients during the transition period.
- Preparing the HCFCs Phase-out Management Plan (HPMP) Stage-I in consultation with the industry associations and other stakeholders for the freeze in 2013 on the baseline followed by 10 per cent reduction in 2015.

- Mechanism for more involvement of State level organizations in ODSs phase-out activities.

*Source: The Montreal Protocol: India's Success Story 2011*

## Blue Star's eco-friendly initiatives

Blue Star, India, has made significant progress towards minimizing and even eliminating the environmental hazards resulting from the use of chlorofluorocarbons (CFCs) in certain cooling refrigerants. It is one of the few companies selected in India for funding by the Multilateral Fund for the implementation of the Montreal Protocol. The company has already introduced ozone-friendly centrifugal chillers using the hydrochlorofluorocarbon HCFC-123, the safe refrigerant replacing CFC-11. Blue Star also markets absorption chillers that use water as refrigerant. The company actively promotes wider use of large refrigeration systems using ammonia as the refrigerant. Blue Star is a member of the International Institute of Ammonia Refrigeration, the United States.

*Source: www.bluestarindia.com*

## CFC phase-out in MDI manufacture

The National Strategy for Transition to non-CFC MDIs and Plan for phase out of CFCs in the Manufacture of Pharmaceutical MDIs in India was approved in November 2008 at the 56<sup>th</sup> Meeting of the Executive Committee (ExCom) of the Multilateral Fund (MLF) for Implementation of the Montreal Protocol, with a funding of US\$10.2 million, to be implemented with the United Nations Development Programme (UNDP) as the lead agency, and the United Nations Environment Programme (UNEP)

and Government of Italy as cooperating agencies. The strategy has been successfully implemented at an accelerated pace in close cooperation with the Ministry of Health and Family Welfare of the Government of India and the MDI manufacturers, against the completion schedule year of 2013.

*Source: www.ozonecell.com*

## Workshops on sustainability of CFC phase-out

The Ozone Cell, Ministry of Environment and Forests, Government of India, has undertaken comprehensive public awareness campaign to ensure that both the public and the industries responsible for actually phasing out the ODS understand and support the policies to protect the ozone layer. In this endeavour, the Ozone Cell, in collaboration with the United Nations Environment Programme Regional Office for Asia and Pacific, Bangkok, Thailand, recently conducted two workshops on "Sustainability of CFC phase-out in India." The workshops were held on 4 April 2012 at Chennai in Tamil Nadu and on 10 April 2012 at Guwahati in Assam.

The two workshops deliberated on several important aspects of CFC phase-out efforts being undertaken in India. The topics included:

- Implementation of Montreal Protocol in India;
- Policies and regulatory framework for ODS phase-out;
- Technology alternatives to CFCs and HCFCs;
- Good servicing practices; and
- Economics of recovery and reclamation.

*Source: www.ozonecell.com*

### Indonesia: partnership to help build green economy

In Indonesia, the refrigerants currently used in the air-conditioning (AC) sector are hydrochlorofluorocarbons (HCFCs), which deplete the ozone layer and also have up to 2,000 times the global warming potential (GWP) of carbon dioxide (CO<sub>2</sub>). Under the Montreal Protocol, Indonesia has committed to phase out HCFCs and switch to technologies and substances that do not deplete the ozone layer. The country has also pledged to voluntarily reduce CO<sub>2</sub> emissions by 26 per cent by 2020 from the 2005 level. The United Nations Development Programme (UNDP) provided technical advice to the Indonesian government to help it adopt informed policy choices to ensure that the country's AC industry is environmentally sustainable and select HCFC alternatives that are climate-friendly. Experts analysed available viable alternatives that would bring benefits to both global climate and the ozone layer, and informed their Indonesian counterparts about the choices.

UNDP, as a lead agency for implementing HCFC phase-out in Indonesia, encouraged a public-private partnership among the Ministry of Economy, Trade and Industry of Japan, the Ministries of Environment and Industry of Indonesia, and Daikin and Panasonic – two of the largest AC manufacturers of Japan. Panasonic Indonesia, with about 40 per cent Indonesian ownership, is the sole manufacturer of room ACs in Indonesia and accounts for about 22 per cent of the market share. The partners agreed to introduce, support and promote a new climate-friendly technology, with enhanced energy efficiency and lower GWP, which will be the first

of its kind to be commercially implemented in the world. Toshiba, Fujitsu General, Hitachi and other Japanese AC manufacturers have also joined the partnership. This new technology could reduce over 15 million tonnes of direct and indirect CO<sub>2</sub> emissions per year from 2015 and bring about a deep market transformation across Asia-Pacific region, where demand for ACs has been sky-rocketing.

*Source: [www.undp.org](http://www.undp.org)*

### Bangladesh: CFC-based inhalers on the way out

A leading drug-maker has formally shut down its chlorofluorocarbon (CFC)-based aerosol inhaler plant in Bangladesh, complying with the Montreal Protocol that controls use of ozone-depleting gas. The transition Beximco Pharmaceuticals Ltd. from CFC-propelled inhalers to hydrofluoroalkane (HFA)-based ones coincided with the 25<sup>th</sup> anniversary of the Montreal Protocol. Marking the transition, Health Minister Mr. Ruhul Haque unveiled a commemorative plaque and inaugurated a new plant of HFA aerosol inhaler at Beximco's factory premises in Tongi. Bangladesh Association of Lung Foundation is working closely with the industries to phase out CFCs. Bangladesh exports inhalers after meeting its annual domestic demand of 6-7 million canisters, industry sources said.

*Source: [bdnews24.com](http://bdnews24.com)*

### Sri Lanka moves to streamline HCFC- affected trade

In Sri Lanka, the Environment Ministry and the Customs department are introducing a national licensing system from 2013 to keep better

track of imports and exports containing hydrochlorofluorocarbons (HCFCs). Environment Minister Mr. Anura Priyadarshana Yapa stated that imports containing HCFCs will be subjected to a system of annual import quotas parallel to the introduction of the new licence system. The import for trading purposes of products containing HCFCs will be limited with the implementation of the new system, he added.

Sri Lanka, in line with the Montreal Protocol's accelerated phase-out programme of HCFCs, is in the process of implementing the national HCFC Phase-out Management Plan (HPMP). Under HPMP, Sri Lanka has committed to limit the import of HCFCs gradually from 1 January 2013 and finally phase them out by 2030. In the implementation of these requirements, controlling the illegal traffic has been identified as a priority focus area. The Minister made these observations at the inauguration of a training workshop for Customs officers on World Customs Organization (WCO) 2012 Harmonized System Codes. The Sri Lankan Customs will adopt a new coding system of ozone-depleting substances from this year for import/export of goods referred to under Harmonized System (HS) introduced by WCO to address the environmental transboundary challenges.

*Source: [www.dailynews.lk](http://www.dailynews.lk)*

### Philippines awards environment-friendly companies

The Philippine Chamber of Commerce and Industry (PCCI) recently conferred the 2011 Excellence in Ecology and Economy Award to Kraft Foods (Philippines) Inc. (KFPI) and Jopa Enterprises Inc. (JEI). The award was presented by the Department of Trade and Industry



Secretary Mr. Gregory Domingo during the concluding plenary of the 37<sup>th</sup> Philippine Business Conference held 13 October 2011 at the Manila Hotel. The Excellence in Ecology and Economy Award recognizes companies that have demonstrated the most innovative and outstanding environmental programme and practice.

KFPI, a fully owned subsidiary of Kraft Foods Inc. from the United States, is involved in food manufacturing and won the Excellence in Ecology and Economy Award (Large Enterprise). KFPI was cited for its locally initiated projects that were implemented out of concern for the environment and not for cost-cutting purposes. Such projects include Project Ozone, under which KFPI replaced its R22 with non-ozone depleting and non-hydrochlorofluorocarbon (HCFC) refrigerant. Project Ozone, which aims to make

Kraft Foods 100 per cent HCFC-free business by 2012, also has Project Renaissance that aims to make KFPI's office a "Green Office". This requires, among other steps, upgrading chillers and centralized air-conditioning units to eliminate HCFC refrigerants. KFPI was also cited for its holistic environmental policy and principles and for the commitment of its management to protect the environment.

Source: [www.philippinechamber.com](http://www.philippinechamber.com)

## China's interest in natural refrigerants on the increase

In China, the most widely used hydrochlorofluorocarbons (HCFCs) are HCFC-22, 141b and 142b. In the air-conditioning (AC) industry, HCFC-22 represents more than 90 per cent of refrigerant use. At pre-

sent, R410A is the main alternative to HCFC-22. However, as R410A has a high global warming potential (GWP), and with the 2013 freeze and 2015 ten per cent reduction targets in HCFC consumption fast approaching, China is increasingly looking towards alternatives such as hydrocarbons. Shenzhen is the country's first officially approved pilot city for hydrocarbon-based AC. China's first technology road map for the home appliance industry in 2011 set a target to achieve industrialization of hydrocarbon technology in the AC industry and called upon AC producers to widely adopt low-GWP R290 as refrigerant. Industry insiders in China believe that with the lifting of the "essential" ban on hydrocarbons signalled by the government, the natural refrigerant could soon replace R410A in the AC market.

Many domestic producers in China either no longer manufacture or have reduced the production scale of HCFC-based ACs, which have become slow-selling products in many big cities. Most domestic consumers are planning to replace their HCFC ACs when the prices of HCFC-free ACs fall to affordable levels. Multinational end-users such as McDonalds, Tesco, the Coca-Cola Co., Carrefour and Nestle are planning to phase out the use of HCFCs in their refrigeration equipment as of 2015. These companies have either factories or large-scale cold storages in China. Tesco has already built two supermarkets with cascade carbon dioxide (CO<sub>2</sub>) refrigeration systems in China. Carrefour is also considering installing refrigeration systems using natural refrigerants. Therefore, demand for natural, low-GWP refrigerants like hydrocarbons and CO<sub>2</sub> is expected to be on the increase in China in the next decade.

Source: [www.hydrocarbons21.com](http://www.hydrocarbons21.com)

## Scientist who highlighted aerosols' danger passes away



*Dr. F. Sherwood Rowland in his laboratory*

Dr. F. Sherwood Rowland died at his residence in Corona del Mar, California, the United States. He was 84. Dr. Rowland's discovery in 1974 of the danger that aerosols posed to the ozone layer was initially met with disdain but was ultimately vindicated with the 1995 Nobel Prize in Chemistry. Industry

representatives at first disputed Dr. Rowland's findings, and many sceptical colleagues in the field avoided him. But his research findings, achieved in laboratory experiments, were supported more than a decade later when scientists in the United Kingdom discovered that the stratospheric ozone layer, which blocks harmful ultraviolet (UV) rays, had developed a hole over Antarctica. Dr. Rowland's discovery led to the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer, a landmark international environmental treaty to stop the production of chlorofluorocarbons (CFCs), the aerosol compounds, and other such ozone-depleting chemicals, as well as to eliminate inventories of them.

Source: [www.nytimes.com](http://www.nytimes.com)



## New direct-fired absorption chillers

Advanced Ergonomic Technologies (AET), the United Kingdom, has launched a range of direct gas-fired absorption chillers. These high-performance units can supply both chilled water and hot water for industrial and commercial building applications. AET's SAB-DF Series of dual-effect, direct-fired absorption chillers provides key environmental benefits. The chillers use water as refrigerant rather than chlorine-based compounds, such as hydrofluorocarbons (HFCs) and hydrochlorofluorocarbons (HCFCs).



A SAB-DF series chiller from AET

Heat is supplied to the absorption cycle using natural gas. Using gas reduces the chillers' reliance on electricity and as a result, they are particularly suitable for facilities where electricity supply is either expensive or insufficient. Further, as the direct-fired units can supply both cooling and heating, they help reduce the amount of space that would otherwise be required. The chillers have very few moving parts and therefore, AET's units have very low noise and vibration levels. The SAB-DF absorption chillers are economical to install and run. They use an innovative cooling water flow system to provide a large temperature differential on both the chilled water and cooling water circuits. Increasing the temperature difference between the

chilled water flow and return connections enables the same amount of cooling to be achieved, but with a lower circulating water flow rate. In addition, the cooling water outlet temperature has also been raised to enhance the temperature differential on the heat rejection circuit. These innovations reduce the energy used by the circulating pump and heat rejection fan, while enabling the chilled water and cooling water pipe sizes to be reduced, saving space and cutting costs. The large temperature differential models have flow and return temperatures of 7°C/15°C. A standard model is available with flow and return temperatures of 7°C/12°C.

The 17 high-efficiency models come with capacities starting from 422 kW cooling and 378 kW heating. The largest chiller in this range has a cooling capacity of 3,516 kW and a heating capacity of 3,163 kW. *Contact: Mr. Glan Blake Thomas, Managing Director, Advanced Ergonomic Technologies, The Centre, No. 201-203 London Road, East Grinstead, West Sussex, RH19 1HA, United Kingdom. Tel: +44 (1342) 310 400; Fax: +44 (1342) 310401.*

*Source: www.cisionwire.com*

## Record set in chiller efficiency

Evergreen® 23XRV from Carrier Corporation, based in the United States, has surpassed the industry standards for energy efficiency in chillers, and now offers Integrated Part Load Values (IPLVs) as low as 0.299 kW/t, which exceeds the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 90.1 efficiency standards by up to 44 per cent. The water-cooled, variable-speed screw chiller uses HFC-134a, a non-ozone-depleting refrigerant, and

Foxfire® compression technology, making it one of the most efficient, reliable and durable chillers, according to Carrier. Evergreen® 23XRV features robust and flexible operation with surge-free compression and a wide operating envelope.

Evergreen® 23XRV water-cooled chillers are reportedly the world's first integrated variable-speed and water-cooled screw chillers that incorporate major breakthroughs in water-cooled chiller technology to provide excellent reliability and achieve superior efficiencies at true operating conditions without degrading the environment. High-quality design and construction make the Evergreen® 23XRV chillers ideal for modern chilled water plants. They are also the first full series of seismic-compliant chillers.

*Source: www.marketwatch.com*

## VRF systems based on R410A refrigerant

Mitsubishi Heavy Industries Europe Ltd., the United Kingdom, is offering KX6 variable refrigerant flow (VRF) systems based on R410A refrigerant and compressor design. DC fan motors are employed with serrated-edge fan blade design to deliver increased air volume using less power input. Electronic expansion valves constantly adjust during operation to ensure efficient use of refrigerant, while an up-sized accumulator stores unused refrigerant during low demand periods, optimizing the flow of gas-phase refrigerant and oil into the compressor. R410A is used as the refrigerant because of its zero ozone-depleting potential rating, among other benefits. This refrigerant also has much better heat transfer properties than other common refrigerants. Its higher density allows reduced tube diameter in the heat exchangers and inter-connecting

pipework, thus reducing the overall amount of refrigerant required in the system.

KX6 uses a new 3D scroll compressor that improves the compression ratio by compressing the refrigerant radially as well as axially to deliver dramatically higher energy efficiency than previous models. Three-dimension compression is more efficient even if the compression ratio is high. The company has also applied new vector control to the inverter to improve energy efficiency further, even at reduced speed. *Contact: Mitsubishi Heavy Industries Europe Ltd., 4th Floor, International Buildings, 71 Kingsway, London WC2B 6ST, United Kingdom. Tel: +44 (20) 7421 6208; Fax: +44 (20) 7421 6209; E-mail: enquiries@mhie.com.*

*Source:*  
[www.mitsubishiaircon.co.uk](http://www.mitsubishiaircon.co.uk)

### Energy-saving water-cooled screw chiller

Johnson Controls Inc., the United States, is offering its York YVMA water-cooled screw chiller, which is reported to reduce energy costs by 25 per cent. The company says that the variable-speed drive saves energy during the 97 per cent of operating hours spent at off-design conditions, when building loads and/or tower water temperatures are lower. As a result, the unit delivers an integrated part load value (IPLV) that is up to 30 per cent better than traditional screw chillers, making it the best in its class. YVMA increases sustainability by using HFC-134a refrigerant, which has zero ozone-depletion potential and no phase-out date. Its innovative design reduces the number of potential leak points by 35 per cent. Furthermore, Johnson Controls' proprietary falling-film evaporator reduces the refrigerant charge of

the chiller by as much as 30 per cent compared with conventional designs. The YVMA screw chiller can be used with very high efficiencies in both heat pump and thermal storage applications. It can also utilize a wide range of heat-rejection methods, including an open cooling tower, dry cooler, adiabatic cooler, heat recovery or heat pump.

*Source: [www.racplus.com](http://www.racplus.com)*

### New environment-safe refrigerant

The Japanese companies Japan Petroleum Exploration Co., Showa Tansan Co. and Toyota Tsusho Corp. are jointly patenting an invention pertaining to a refrigerant composition that comprises carbon dioxide (CO<sub>2</sub>) and dimethyl ether (DME). DME forms 3-6 per cent by mole of the composition and CO<sub>2</sub> 97-94 per cent by mole, on the basis of total number of moles of DME and CO<sub>2</sub>. The refrigerant composition does not cause ozone depletion, has a low global warming potential and is non-toxic.

The inventors found that CO<sub>2</sub> is dissolved well in DME and that a mixture of these compounds can be used as refrigerant for hot water supply and heating. They utilized the fact that as the boiling point of DME is -25°C while the boiling point of CO<sub>2</sub> is -78.45°C, a decrease of vapour pressure is promoted by mixing the two. Condensation (liquefaction) in a condenser can then proceed, thereby constructing a vapour compression cycle (condensation cycle) under the cooling conditions. Further, by using the new refrigerant composition for an automotive air-conditioner makes a vapour compression cycle under cooling conditions possible, with a higher coefficient of performance (COP) than can be achieved with

a refrigerant containing CO<sub>2</sub> alone. At the same time, working pressure of the compressor can be decreased, thereby eliminating the need for a specific device for cooling the periphery of condenser, as is necessary for CO<sub>2</sub> refrigerant.

*Source: [www.faqs.org](http://www.faqs.org)*

### R134a replacement

Oz-Chill, Australia, offers Oz-Chill 134a replacement, a hydrocarbon-based refrigerant blended from environmentally safe hydrocarbons and a direct replacement and retrofit refrigerant option for replacing R134a and R12. The replacement for R134a operates at much lower head pressures and offers better cooling properties and performance compared with R134a. The benefits of Oz-Chill 134a replacement include:

- Lower running cost: Savings of up to 30 per cent possible;
- Less refrigerant: Oz-Chill 134a replacement only needs approximately 30-40 per cent charge as compared with the original R12 or R134a charge amount;
- Environmentally safe: Oz-Chill 134a replacement is a natural, organic and non-ozone depleting refrigerant that is in full compliance with the Montreal Protocol;
- Safe to use: The product does not become caustic when contaminated with moisture or oxygen, and is non-toxic, non-carcinogenic and has an auto-ignition temperature above 674.4°C; and
- Good compatibility: The product is compatible with most common refrigerant materials, such as metal components, mineral as well as synthetic (ester and polyalkylene glycol) lubricants, seals, gaskets, hoses, compressors, O-rings, and the like.

*Source: [oz-chill.com](http://oz-chill.com)*

## Air dusters and freezer sprays with new propellant

Electrolube, Australia, is offering some of its key products featuring Solstice, a propellant that has low global warming potential (GWP). The propellant, also referred to as HFO-1234ze, is an ultra-low GWP, zero ozone depletion propellant and blowing agent that can decrease equivalent carbon dioxide (CO<sub>2</sub>) emissions by more than 99.5 per cent over the preceding technology. Electrolube is now leveraging the low-carbon benefits of Solstice in air dusters and freezer sprays.

Both Electrolube's FREH freezer refrigerants and EADH air dusters use Solstice propellant, offering the electronics industry the benefits of low environmental impact, combined with high performance and safety. For instance, replacing one 200 ml can of duster containing HFC-134a with the equivalent containing Solstice 1234ze results in a reduction of 347.5 kg in CO<sub>2</sub> emissions. Other benefits include: 20 per cent more blasts per can; a measured atmospheric lifetime of two weeks compared with 14 years for HFC-134a; and extraordinary low-carbon benefits. *Contact: HK Wentworth, 3/98 Old Pittwater Road, Brookvale, NSW 2100, Australia. Fax: +61 (2) 9938 1467.*

*Source: [www.ferret.com.au](http://www.ferret.com.au)*

## 'Dry' nasal aerosol for the treatment of allergic rhinitis

Israel's Teva Pharmaceutical Industries Ltd. has announced the approval by the United States Food and Drug Administration (FDA) of its QNASL™ Nasal Aerosol, a new "dry" nasal aerosol corticosteroid for treating nasal allergy symptoms

in adults and adolescents of 12 years and above. The product will be the first marketed non-aqueous or "dry" nasal aerosol in a product category that reports annual sales of US\$2.5 billion. QNASL™ is delivered as a non-aqueous, pressurized, hydrofluoroalkane-propelled aerosol that is environment-friendly and offers a built-in dose counter. *Contact: Mr. Shir Altay-Hagoel, Teva Pharmaceutical Industries Ltd., 5 Basel Street, PO Box 3190, Petach Tikva, Israel. Tel: +972 (3) 926 7267; Fax: +972 (3) 923 4050.*

*Source: [www.marketwatch.com](http://www.marketwatch.com)*

## Reformulation using HFA propellant mix

In Japan, researchers at Astellas Pharma Inc. and the Graduate School of Pharmaceutical Sciences have reformulated Stmerin® D with two hydrofluoroalkanes – HFA-134a and HFA-227 – as alternative propellants instead of mixed chlorofluorocarbons CFC-11, CFC-12 and CFC-114. The researchers prepared metered dose inhalers (MDIs) using HFAs with different surfactants and co-solvents and investigated the effect on suspension stability by visual testing.

The drug suspension stability was found to be poor in both HFAs but improved, especially for HFA-227, when a middle chain fatty acid triglyceride was added to the formulation. However, the higher vapour pressure of HFA-227 to that of the CFC mixture increased the fine particle dose. Spray performance was adjusted by altering the actuator configuration, and the performance of different actuators was tested by cascade impaction. The spray performance could be controlled by the configuration of the actuator. A 0.8 mm orifice diameter and a 90° cone angle provided a spray performance comparable to

that of the original formulation. The results demonstrate the feasibility of reformulating Stmerin® D, using a mixture of HFA-227 and middle chain fatty acid triglyceride as the suspension agent and modifying the actuator configuration. *Contact: Mr. Saburo Murata, 180, Ozumi, Yaizu-shi, Shizuoka 425-0072, Japan. Tel: +81 (54) 6274 912; Fax: +81 (54) 6274 933; E-mail: [saburo.murata@astellas.com](mailto:saburo.murata@astellas.com).*

*Source: [informahealthcare.com](http://informahealthcare.com)*

## HFA-propelled nasal aerosol mist

In the United States, Acton Pharmaceuticals Inc. has announced completion of a licensing agreement with Sanofi U.S. for Nasacort HFA™ (triamcinolone acetonide), a prescription nasal aerosol for the treatment of nasal allergy symptoms. Nasacort HFA is an intranasal steroid formulation with a hydrofluoroalkane (HFA) propellant and delivered as a fine, dry mist in a small volume pressurized metered dose. Currently, only water-based liquid spray formulations of nasal steroids are available in the United States. Nasacort HFA is in development as a treatment for nasal symptoms associated with seasonal allergic rhinitis and perennial allergic rhinitis in adults and children 6 years of age and older. In addition to Nasacort HFA, Acton is currently developing Aerospan® inhalant, an HFA-propelled aerosol for inhaled corticosteroid (flunisolide) for the treatment of asthma. Aerospan is the first HFA inhaled steroid to incorporate a built-in spacer device, designed to assist patients in delivering their medication to the lungs. Acton has plans to commercialize the formulation soon.

*Source: [actonpharmaceuticals.com](http://actonpharmaceuticals.com)*



## Investigational nasal aerosol in an HFA propellant

Sunovion Pharmaceuticals Inc., the United States, announced results from a large Phase III clinical study of ciclesonide nasal aerosol, a corticosteroid formulated with a hydrofluoroalkane (HFA) propellant, intended for the treatment of allergic rhinitis. The 26-week study investigated 74 µg or 148 µg doses of ciclesonide nasal aerosol once daily in 1,111 perennial allergic rhinitis (PAR) patients aged 12 years and older. Statistically significant improvements in nasal symptoms were noted in the patients, compared with placebo after the first six weeks of double-blind treatment, for both doses. Results of the full double-blind treatment period demonstrated tolerability of both doses of ciclesonide nasal aerosol compared with placebo. *Contact: Sunovion Pharmaceuticals Inc., 84 Waterford Drive, Marlborough, Massachusetts, MA 01752, United States of America. Website: [www.sunovion.com](http://www.sunovion.com).*

*Source: [www.fiercebiotech.com](http://www.fiercebiotech.com)*

## Phospholipid-based inhalation system

Next Breath LLC from the United States has patented a phospholipid-based inhalation system that includes a method for delivering medications deeper into the lungs and to the medications' pulmonary targets, such as bronchioles and alveoli. The invention provides a method for delivering deposited drug particles or droplets containing dissolved drug deeper into the respiratory tract of a patient, thus increasing the fraction of drug that reaches the desirable targets in the bronchioles and alveolar spaces of the lung.

A preferred embodiment of the invention describes the use of two steps for delivery of a medication. In the first step, an aerosolized (inhaled) therapeutic composition or medication is administered into a patient's (animal or human) respiratory tract. In the second step, an aerosolized surfactant is administered into the patient's respiratory tract that facilitates delivery of the aerosolized medication to the pulmonary target. The patient first inhales the medication from an inhaler (a pressurized metered dose inhaler or pMDI, for instance) that contains the desired medication. The patient then inhales a dose of surfactant from a second inhaler containing surfactant (phospholipid molecules) particles or droplets larger than the drug particles. The larger surfactant particles deposit higher in the airway. As the surfactant dissolves and spreads deeper into the respiratory tract, drug particles are pushed deeper into the lungs ahead of the expanding surfactant layer. Another embodiment of the invention discusses an apparatus for delivering the aerosol surfactant. HFA-227 and HFA-134a are among the aerosol propellants discussed.

*Source: [www.freepatentsonline.com](http://www.freepatentsonline.com)*

## Aerosols to be made propellant-free

Engineers at 42 Technology Ltd., the United Kingdom, are investigating an aerosol technology that could potentially eliminate pressurized propellants from personal and household aerosol canisters. Many of the current aerosols have propellants that deplete the ozone layer, contribute to global warming or emit volatile organic compounds. Mr. Howard Biddle, Managing Director of 42T, and his team have been investigating how a simple impact



*Mr. Howard Biddle with his new aerosol spray*

aerosol could be used in conjunction with new materials to provide a greener and less costly solution.

The conversion efficiency of the aerosols is low, partly because the jet wets the surface of the material and forms puddles of liquid. The 42T team realized that by using superhydrophobic materials, they could create an aerosol spray with much greater conversion efficiency. It found that when a drop of liquid hits the surface of the superhydrophobic material, it spreads out, forming a corona owing to air and surface resistance. At a point, the leading edge of the corona breaks up into uniformly sized droplets – a valuable feature for any potential uses of the technique in an aerosol.

The 42T team then calculated how the pressure of the liquid fired at the surface of the superhydrophobic material related to the size of the droplets produced and how these parameters were affected by the energy conversion efficiency of the material used. The team surmised that superhydrophobic materials with 100 per cent conversion efficiency should produce 20 µm droplets at a pressure of around 0.25 bar. Smaller 5 µm droplets could be created at the higher pressure of 0.75 bar. The team succeeded in creating an aerosol of droplets of around 20-30 µm employing a water jet pressurized to as little as 1 bar.

*Source: [www.theengineer.co.uk](http://www.theengineer.co.uk)*



## High-pressure water mist fire suppression system

Gangwon Institute of Health and Environment, Republic of Korea, offers a high-pressure water mist fire suppression system that was developed to meet a requirement by the International Maritime Organization (IMO). The new system is suitable for use in narrow places and areas where movement is restricted. It is excellent in early fire suppression, compared with other general fire suppression systems, in terms of smoke removal effect and reduction of the temperature around a fire. The institute has registered patents in the United States and the Republic of Korea related to a nozzle and a filter. In addition, two utility model patents on water mist nozzle heads have been registered in the Republic of Korea. *Contact: Gangwon Institute of Health and Environment, Chuncheon 200-822, Republic of Korea. Tel: +82 (33) 2486 403; Website: [www.gihe.re.kr](http://www.gihe.re.kr).*

*Source: [www.apec-vc.or.kr](http://www.apec-vc.or.kr)*

## Inert gas-based fire extinguishing system

Nanjing Fire Protection Technology Co. Ltd., China, offers a fire extinguishing system based on IG-541, a fire extinguishing agent that comprises a mixture of three inert gases – carbon dioxide, nitrogen and argon. IG-541 has zero ozone depletion potential (ODP) and global warming potential (GWP). It is a clean agent and an ideal substitute for halon agents. It is not corrosive and does not contaminate equipment. The fire extinguishing system is composed of cylinder, actuation cylinder, solenoid valve, head valve, manifold pipe, gas release valve, pressure switch, safety

valve, nozzle, emergency button and so forth. *Contact: Nanjing Fire Protection Technology Co. Ltd., 12, Shiyang Road, Nanjing, Jiangsu, 210007 China.*

*Source: [www.made-in-china.com](http://www.made-in-china.com)*

## Environment-friendly fire suppression systems



*Wormald fire extinguisher systems*

Wormald, Australia, offers environmentally friendly fire suppression systems that protect buildings and their occupants from fire. Both Inergen and SAPPHIRE systems contain agents that neither deplete ozone layer nor produce synthetic greenhouse gases. The Inergen fire suppression systems use an inert gaseous fire suppressant consisting of the natural gases, nitrogen, argon and carbon dioxide. Inergen is dry, electrically non-conductive and leaves no residue behind.

Inergen fire suppression systems are ideal for buildings that contain sensitive electronic instruments or high-value electronic equipment such as data centres. Museums and art galleries will also benefit as the risk of damage to important and unique artefacts is minimized. Inergen effectively smothers the fire by reducing the oxygen level

in a room to below 15 per cent: the point at which most combustibles will no longer burn. The SAPPHIRE suppression system consists of 3M Novec 1230 fire protection fluid. The fluid is a clear, colourless and odourless clean agent that looks like water; however, it does not create the type of damage usually associated with water. The atmospheric lifetime of the fluid is only five days, while the closest chemical alternative has an atmospheric lifetime of 33-36 years. It is stored as a liquid, and once discharged it vaporizes and interferes with the combustion process to suppress the fire.

*Source: [www.infolink.com.au](http://www.infolink.com.au)*

## Sustainable fire suppression fluid

Metalcraft Inc., a leading company in fire suppression, equipped both the cockpit and fuel cell area of a No. 16 3M Ford Fusion racecar with its new Fire-Trak™ branded fire suppression system. The Fire-Trak system uses Novec™ 1230 fire protection fluid from 3M, the United States. Novec™ 1230 was approved by the National Association for Stock Car Auto Racing (NASCAR) earlier this year. 3M developed Novec brand products as a safe, sustainable chemistry used to replace ozone-depleting substances, such as halons, being phased out under the Montreal Protocol or those chemistries that have high global warming potential (GWP) or toxicity.

Novec 1230 fluid has an excellent environmental profile – zero ozone depletion potential (ODP) and a GWP of one. It stays in the atmosphere only for five days compared with HFC-236fa that lingers for 240 years. Novec 1230 fluid is a chemical agent that is stored as a liquid but is discharged as a gas

that leaves no residue. It does not damage sensitive electronics or equipment in the racecar and provides a wide margin of safety when deployed in an enclosed area such as the car's cockpit. It also does not affect the surface of the race-track, keeping it safe for other cars. Contact: Mr. Colleen Harris, 3M Corporate Headquarters, 3M Centre, St. Paul, MN 55144-1000, United States of America. Tel: +1 (651) 7331 566.

Source: [www.marketwatch.com](http://www.marketwatch.com)

## Powdered aerosol fire extinguisher

The Spectrex A-100 aerosol fire extinguisher is an environmentally friendly powdered aerosol, listed by the United States Environmental Protection Agency (EPA) as Halon Alternative under the Significant New Alternative Policy (SNAP). It is listed as Powdered Aerosol A, designed for total flood fire suppression applications. It has zero ozone depletion and global warming potentials. The Spectrex A-100 aerosol extinguishes and provides inertization for type A (solid fuel), B (liquid fuel), C (gas fuel) and E (electrical) fires in defined enclosures. The extinguishant delivered by the system is a powdered aerosol created *in situ* by a chemical reaction that takes place in a non-pressurized container, delivering small (1-5 µm), dry, highly effective particles floating in inert gases.

The Spectrex A-100 aerosol produces large amounts of powdered aerosol, designed to extinguish a fire in a 1 m<sup>3</sup> enclosure. The system is compatible with standard detection and control systems and can be installed inside or outside. Contact: Spectrex, Headquarters, 218, Little Falls Road, Cedar Grove, New Jersey, NJ 07009, United States of America. Tel: +1 (973)

239 8398; Fax: +1 (973) 239 7614; E-mail: [spectrex@spectrex.net](mailto:spectrex@spectrex.net).

Source: [spectrex-inc.com](http://spectrex-inc.com)

## Safer fire protection in the data centre

Fire protection in occupied or unoccupied areas where equipment is either very sensitive or irreplaceable often constitutes a difficult task. The task demands increased reliability while reducing the overall impact on the environment. The Pyroshield fire suppression system from Alien Systems & Technologies, South Africa, offers such a solution. The system comprises a mixture of two inert (oxygen diluting) gases – 50 per cent nitrogen and 50 per cent argon – derived from gases present in the Earth's atmosphere. As such, the agent has no ozone depleting potential or global warming potential. It does not contribute any unique chemical species with extended atmospheric lifetimes. Pyroshield's production meets all the criteria set out in the Montreal and Kyoto Protocols.

Pyroshield gas extinguishes fire by lowering the oxygen content to approximately 12.5 per cent, below the 15 per cent level that supports combustion. When the Pyroshield agent is discharged into a room, it also introduces the proper mixture of gases that allow a human to breathe in a reduced oxygen atmosphere. The Pyroshield system can extinguish surface burning fire in Class A, B and C hazards. The system can be actuated by detection and control equipment for automatic system operation, along with providing local and remote manual operation as needed. Accessories are provided for effecting alarms, ventilation control, door closures or other auxiliary shutdown functions. Contact: Ms. Samantha Wright, Alien Systems

& Technologies, South Africa. Tel: +27 (11) 949 1157; E-mail: [sam@astafrika.com](mailto:sam@astafrika.com); Website: [www.astafrika.com](http://www.astafrika.com).

Source: [www.instrumentation.co.za](http://www.instrumentation.co.za)

## Clean agent fire suppression systems

Fenwal Phoenix Systems Inc., the United States, is marketing a high-performance suppression system developed to provide economic protection for large fire protection projects and specialized applications. The Phoenix system is considered a very effective drop-in replacement of halon systems. It is widely used in the protection of large telecommunications facilities, museums and data storage systems for banks and financial institutions. Incorporating patented "piston flow" technology, the system is capable of delivering greater mass flow rates – 2.5 to 3 times more than those achievable with a standard FM-200 system. This innovation allows networking of longer pipe runs with more agent in complex configurations with smaller pipe sizes for protection of larger hazard areas. Other salient features include:

- Active fire protection when linked with Fenwal's various 24 hour detection and control systems;
- Increased flow performance that allows for remote location of cylinders; and
- Listed and approved with three-way directional valves for economic protection of multiple enclosures.

Contact: Fenwal Protection Systems, 400 Main Street, Ashland, Massachusetts, MA 01721, United States of America. Tel: +1 (508) 8812 000.

Source: [www.fenwalfire.com](http://www.fenwalfire.com)

## Foam insulation just turned greener

Polarfoam PF-7300-0 Soya Spray foam insulation from Thermo Seal Insulation Systems, Canada, is a closed-cell, medium-density spray foam made from renewable vegetable oils, soybean oil and recycled plastics. Polarfoam Soya is produced using a unique manufacturing process patented by Demilec of Canada. The spray polyurethane foam offers high-performing, durable insulation to reduce energy consumption. The product has zero impact on the ozone layer.



*Polarfoam Soya being sprayed on*

Spray foam insulation will not sag, shrink, settle or biodegrade. By acting as an air and vapour barrier, medium-density it provides an all-in-one complete wall system. Advantages of Polarfoam Soya are:

- High R value (R33 in 2 ft × 6 ft wall);
- Ideal for new as well as retrofit construction;
- Adheres directly to substrate;
- Seamless permanent coverage;
- Increases structural integrity of framing;
- Uses renewable resources;
- Meets vapour barrier requirements;
- Eliminates heat loss and saves money; and
- GreenGuard Certification and Leadership in Energy and Environmental Design (LEED) credits.

*Contact: Thermo Seal Insulation Systems, 51 Stephenson Road, #12 West, Utterson, Ontario, Canada. Tel: +1 (705) 7891 962; Fax: +1 (705) 7891 963; E-mail: sales@thermosealinsulation.ca.*

*Source: thermosealinsulation.ca*

## Polyether polyol production process

Asahi Glass Co. Ltd., Japan, has patented a process for producing polyether polyol and process for producing rigid foamed synthetic resin using the same. Polyether polyol production process can form rigid foamed synthetic resins low in viscosity, with excellent strength, dimensional stability and flame retardancy. The invention offers a process for producing a polyether polyol that uses water instead of hydrofluorocarbons (HFCs) as the blowing agent and features good miscibility with isocyanate compounds to form good rigid foamed synthetic resins. Polyether polyol is produced by reacting a phenol component (molar ratio 1), selected from phenol and phenol derivatives having a hydrogen atom at one or more ortho-positions to the phenolic hydroxyl group, an aldehyde component (molar ratio 0.3 to 0.9), selected from formaldehyde and acetaldehyde, and an alkanolamine component (molar ratio 1.5 to 3.5), selected from monoethanolamine, diethanolamine and 1-amino-2-propanol, and then adding an alkylene oxide to the resulting reaction product.

*Source: www.freepatentsonline.com*

## High-pressure CO<sub>2</sub> metering system

Manufacturers of extruded polystyrene (XPS) foam can reduce the use of hydrocarbon and hydrofluorocarbon (HFC) blowing agents with the controlled addition of carbon dioxide (CO<sub>2</sub>) – made possible by a 500 bar, high-pressure metering system from Linde North America, the United States. The DSD 500 system delivers precise amounts of liquid CO<sub>2</sub> through a proportional control valve at injection pressures up to 420 bar. The compact unit easily retrofits to existing equipment to help foam manufacturers reduce the cost of using traditional blowing agents.

Precise metering is essential for a homogenous foam structure. DSD 500's patented mass flow design provides extremely accurate flow rates despite variations in extruder back pressures. This is especially useful for producing low-density XPS foams. CO<sub>2</sub> is an inert gas that is non-inflammable and non-toxic. DSD 500 metering system keeps CO<sub>2</sub> gas consumption low and makes it a more efficient and economical supplement. *Contact: Ms. Amy Ficon, Corporate Communications, Linde North America, New Jersey, United States of America. Tel: +1 (908) 7711 491; Fax: +1 (908) 7711 460; E-mail: amy.ficon@linde.com; Website: www.lindeus.com.*

*Source: www.lindeus.com*

## Polyurethane foam production method

Evonik Goldschmidt GmbH, Germany, is patenting an invention related to a method for producing polyurethane foams using ingredients that contain at least one expansion agent having halogen-containing (fluorine-containing) olefins and at least one siloxane of a specific type capable of performing siloxane-typical functions in foaming without additional free-radical scavengers, for example, or even in the presence of non-acid-blocked



amines. These siloxanes can also be generated as a mixture in a suitable carrier medium. Halogenated compounds having an olefinic double bond in the molecule – that is, hydrohaloolefins (HHOs) – are increasingly being used as alternative blowing agents to halogenated hydrocarbons, which have disadvantages due to their ozone depletion potential (ODP) and/or global warming potential (GWP).

The new method has the advantage that optionally pre-formulated mixtures of polyols and/or catalysts, water/blowing agents, foam stabilizer and other additives, which are marketed as ready-to-use polyurethane foam systems, survive the commercially customary storage periods without deterioration in foam properties.

Source:  
[www.freepatentsonline.com](http://www.freepatentsonline.com)

## Foam expansion agent with zero ODP and low GWP

FEA-1100 from DuPont Fluoroproducts, the United States, is a novel blowing agent for polyurethane (PU) foams in construction and appliance insulation. According to the United States National Oceanic and Atmospheric Administration (NOAA), the product features zero ozone depletion potential (ODP) and a very low global warming potential (GWP) value of 8.9 (100<sup>th</sup> year) and an atmospheric lifetime of just 22 days. Maximum incremental reactivity (MIR) of FEA-1100 is 86 per cent less than ethane. The other salient features claimed are low vapour thermal conductivity, non-inflammability, low toxicity, chemical and thermal stability, and low diffusion rate.

Having a relatively higher boiling point (33°C), FEA-1100 is a liquid

at room temperature, eliminating problems with the use of lower-boiling agents such as HFC-245fa. According to DuPont, rigid PU and polyisocyanurate foams produced with FEA-1100, blended with either HFC-365mfc or cyclopentane, show uniform cell size and good dimensional stability. The R values match or exceed those of other agents such as HFC-245fa. No significant difference in reactivity was noticed when compared with the hydrochlorofluorocarbon HCFC-141b, and the hydrofluorocarbons HFC-245fa and HFC-365mfc. In the case of panels, the foam and core densities were marginally less than those for HFC-245fa and HFC-365mfc. In spray formulation, the physical and chemical stabilities of FEA-1100 favourably compared to those of HFC-245fa formulation, while the mechanical properties showed significant improvement.

Source: [www.ptonline.com](http://www.ptonline.com)

## Insulation boards and methods for their manufacture

Firestone Building Products Co., the United States, is patenting a method for producing polyisocyanurate insulation foam. The pro-

cess comprises contacting an A side stream of reactants that includes an isocyanate with a B side stream of reactants that includes a polyol and a blowing agent. The blowing agent includes isopentane and n-pentane, in a substantial absence of cyclopentane, with isopentane in a weight fraction that is greater than the weight fraction of n-pentane. By using the blowing agent system described, the invention overcomes many of the problems associated with earlier methods and allows for the economic and efficient manufacture of insulation boards.

The preferred embodiments do not employ chlorinated or fluorinated carbon compounds and are thus environmentally friendly. While the process uses hydrocarbon blowing agents, the substantial absence of cyclopentane provides for insulation boards that are not as susceptible to dimensional instability concerns that may be caused by cyclopentane. Moreover, the use of a blend of isopentane and n-pentane has surprisingly provided insulation boards with good insulating efficiency despite the substantial absence of cyclopentane.

Source:  
[www.freepatentsonline.com](http://www.freepatentsonline.com)

### Guidance on the Process for Selecting Alternatives to HCFCs in Foams: Sourcebook on Technology Options for Safeguarding the Ozone Layer and the Global Climate System

This Sourcebook builds upon earlier technology and policy materials, developed by UNEP OzonAction to assist the foam industry in Article 5 countries to phase out CFCs, and seeks to continue and further develop that same capacity-building and information sharing service.

For more information contact:  
UNEP DTIE OzonAction Branch  
15 rue Milan  
75441 Paris Cedex 09, France  
Tel: +33 1 4437 1450  
Fax: +33 1 4437 1474  
Email: [ozonaction@unep.org](mailto:ozonaction@unep.org)



## Heat-based phytosanitation systems for forest products

Heat-based phytosanitation systems that meet temperature and time criteria for the pasteurization of forest products for export/import are offered by AEON/West Creek Energy Group, the United States. The non-ozone depleting, chemical-free systems come in sizes that can handle up to 453,500 tonnes production per year per unit. All units are fully adjustable to the output moisture that the customer requires. The units meet or exceed the International Plant Protection Convention (IPPC), International Standards for Phytosanitary Measures No. 15 (ISPM 15), as well as regulated European Union phytosanitation standards.

The use of methyl bromide-based fumigation is banned in the European Union as of March 2010 for environmental and health reasons. Canada too has adopted this position, and nearly 125 countries are in the process of phasing out methyl bromide from fumigation of forest products. To date, the only effective acceptable alternative to methyl bromide fumigation of forest products is a "pasteurization" process utilizing heat. *Contact: AEON/West Creek Energy Group Inc., 533 Corbinville Road, Albertville, Alabama 35951, United States of America. Tel: +1 (256) 677 4011; Fax: +1 (877) 641 1328; E-mail: oemajka@aeonnrg.com.*

*Source: world.einnews.com*

## Strawberry industry searches for methyl bromide alternatives

In the United States, University of California researcher Mr. Steve Fennimore is turning to nature to



*An experimental strawberry cultivation in California*

try to replace methyl bromide. Mr. Fennimore is using a tractor outfitted with a boiler to steam soil. Working with a company in California, Mr. Fennimore imported a machine that was used in Italy to prepare soil for greenhouse basil plantings. The machine has a 100 x 74 inch platform fitted with 99 10-inch spikes that inject steam into the ground. The machine will take 15.5°C soil and heat it to 93°C within two minutes. However, running the machine is expensive and slow; it takes about 30 hours per acre. Mr. Fennimore says that applying steam to raised beds instead of the entire field could make the expense comparable with that for fumigation. The phase-out of methyl bromide because of ozone depletion has led to intense research into alternatives in recent years. Methyl iodide was cleared for use as one alternative, but was pulled from the market amid criticism of the product from farmers and environmentalists. California's Department of Pesticide Regulation is working with the California Strawberry Commission on a US\$ 500,000, three-year project that will build on previous research on the potential for growing strawberries on substrate.

*Source: www.capitalpress.com*

## Agrocelhone: a methyl bromide substitute for crops

Agrocelhone is a chemical substitute for methyl bromide that provides for a control on nematodes, fungi, bacteria and insects, besides offering a slight herbicide action on sprouting weeds. It has been trialled extensively by many companies and cooperatives in Spain, and was proven to be more economical than traditional soil fumigant compounds. Agrocelhone is already registered for use with many major crops such as strawberry, tomato and pepper. It can be applied by both machine injection and drip irrigation, thanks to a new concentrated emulsifier formula named Agrocelhone NE. The biocide action of Agrocelhone, composed of 1,3-dichloropropene + chloropicrin, concentrates in the external soil surface (20-30 cm), thus enabling micro-organisms that inhabit deeper layers to emerge to the surface and regenerate. It is less harmful than methyl bromide, since direct contact with the product is almost avoided and its high boiling point (107°-112°C) keeps it in a liquid state.

*Source: www.revistamercados.com*

### Establishing an HCFC Import Quota System

Developing countries seeking further assistance from the Multilateral Fund for the hydrochlorofluorocarbon (HCFC) phase-out beyond 2012 need to provide confirmation that they have an enforceable national system of licensing and quotas in place for HCFC imports and, where applicable, production and exports. This practical, step-wise guide is intended to guide National Ozone Units in Article 5 countries in designing and implementing such quota systems. The 27-page guide addresses policies facilitating implementation of the HCFC phase-out, principles and method of establishing an import quota system, additional measures that may help in the enforcement of HCFC import quota systems and import quota systems for equipment containing or relying on HCFCs. It also provides examples and lessons learnt, as well as suggested formats for questionnaires and accompanying letters to be used in a survey of potential HCFC importers and exporters.

### Customs and Enforcement Officers Quick Guide: Changes in the 2012 HS Nomenclature for HCFCs and Certain other Ozone Depleting Substances

Since the last harmonized system (HS) revision in 2007, trade patterns in ozone-depleting substances have changed much. In view of this, the Parties to the Montreal Protocol requested the World Customs Organization (WCO) for a revision of HS codes for hydrochlorofluorocarbons (HCFCs). Consequently, the WCO Council recommended to the Contracting Parties to the HS Convention to amend heading 29.03 of Chapter 29 with the objective of assigning specific six-digit HS codes to the five most commonly used HCFCs, and at the same time deleting individual HS codes previously assigned to chlorofluorocarbons (CFCs). The HS Contract Parties then amended the HS code, which entered into force on 1 January 2012. This four-page guide provides key information related to these new classifications and briefly explains the changes.

*For the above publications, contact: United Nations Environment Programme, 15 Rue Milan, 75009, Paris, France. Tel: +33 (1) 4437 1450; Fax: +33 (1) 4437 1474; E-mail: [ozonaction@unep.org](mailto:ozonaction@unep.org); Website: [www.unep.org/ozonaction](http://www.unep.org/ozonaction).*

**29 Jul-01 Aug**  
Kobe  
Japan

**10th IIR Conference on Phase Change Materials and Slurries for Refrigeration and Air-Conditioning**  
Contact: Mr. Hiroshi Suzuki,  
10th IIR Conference Chairperson,  
Kobe, Japan.  
Tel: +81 (78) 803 6490;  
Fax: +81 (78) 803 6490;  
E-mail: [hero@kobe-u.ac.jp](mailto:hero@kobe-u.ac.jp);  
Website: [www2.kobe-u.ac.jp/~komoda/pcms](http://www2.kobe-u.ac.jp/~komoda/pcms).

**21-23 Aug**  
Guangzhou  
China

**Guangzhou International Refrigeration and Air-Conditioning, Ventilation & Air-Improving Fair**  
Contact: Mr. Vic Chan,  
Room 2303-2305, 4th Tower,  
Dong Jun Plaza,  
No. 836 Dong Feng Dong Road,  
Yuexiu District, Guangzhou,  
510660 China.  
Tel: +86 (20) 2896 1166;  
Fax: +86 (20) 8257 9220;  
E-mail: [sales10@grandeurhk.com](mailto:sales10@grandeurhk.com);  
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Contact: Mr. Wangyang Hu,  
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10/F, Yindu Mansion,  
No. 67 Fucheng Road,  
Beijing, 100142 China.  
Tel: +86 (10) 6843 4683;  
Fax: +86 (10) 6843 4679;  
E-mail: [acra2012@car.org.cn](mailto:acra2012@car.org.cn);  
Website: [acra2012.car.org.cn](http://acra2012.car.org.cn).

**15-19 Oct**  
Antalya  
Turkey

**9th International Conference on Controlled Atmosphere and Fumigation in Stored Products**  
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Faculty of Agriculture,  
Department of Plant Protection,  
Ankara University,  
06110 Ankara, Turkey.  
Tel: +90 (312) 596 1136;  
Fax: +90 (312) 318 7029;  
Website: [www.caf2012.org](http://www.caf2012.org).

**06-08 Nov**  
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United States

**Annual International Research Conference on Methyl Bromide Alternatives & Emissions Reductions**  
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Fresno, CA 93711,  
United States of America.  
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Fax: +1 (559) 449 9037.

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