VATIS UPDATE

Ozone Layer Protection

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Highlights

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- Refrigerant helps convert solar heat into power
- Healthier, safer cylinder-cleaning solution
- Pentane process technology replaces CFC
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- Non-fumigant alternatives for methyl bromide

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Economic and Social Commission for Asia and the Pacific

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ASIAN AND PACIFIC CENTRE FOR TRANSFER OF TECHNOLOGY

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

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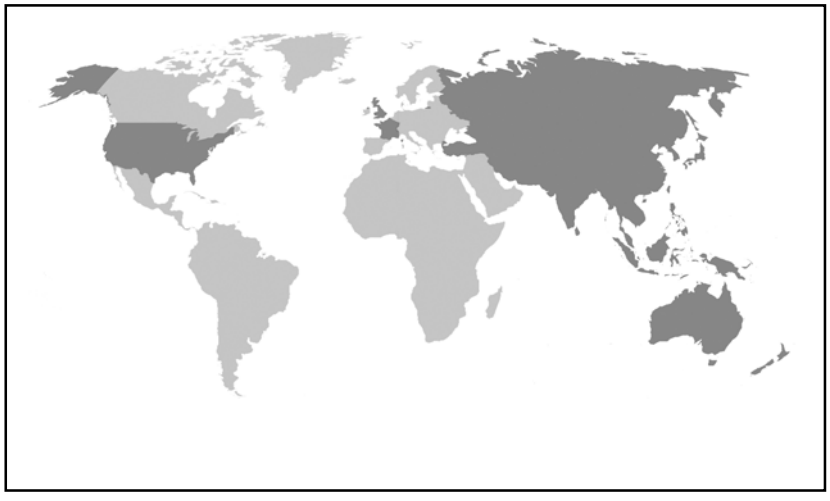
- Networking and partnership with international organizations and key stakeholders; and
- Training of national personnel, particularly national scientists and policy analysts.



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

Cover Photo

Dr. El Sayed Arafat, from NAWCAD's Materials Lab, prepares a washing effectiveness test using the new Type II cleaning solvent called NAVSOLVE recently patented by the United States Navy.

(Credit: United States Navy)

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SCIENCE OF THE OZONE LAYER

Data show evidence of significant Antarctic ozone hole

The Antarctic ozone hole, which yawns wide every Southern Hemisphere spring, reached its annual peak on 12 September – it stretched to 26.03 million square kilometres, the ninth largest ozone hole on record. Above the South Pole, the ozone hole reached its deepest point of the season on 9 October, tying this year for the 10th lowest in this 26-year record. The United States National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) used balloon-borne instruments, ground-based instruments and satellites to monitor the annual Antarctic ozone hole, global levels of ozone in the stratosphere, and the man-made chemicals that contribute to ozone depletion.

"The colder-than-average temperatures in the stratosphere this year caused a larger-than-average ozone hole," said Dr. Paul Newman, Chief Scientist at NASA's Goddard Space Flight Centre. "Even though it was relatively large, the area of this year's ozone hole was within the range we would expect, given the levels of man-made ozone-depleting chemicals that continue to persist in the atmosphere," he added. The satellite-monitoring legacy of NASA will continue with the launch of its National Polar-orbiting Operational Environmental Satellite System Preparatory Project. The satellite carries a new ozone-monitoring instrument, the Ozone Mapping and Profiler Suite. The instrument will provide more detailed daily, global ozone measurements than ever before to continue observing the ozone layer's gradual recovery.

While the levels of most ozone-depleting chemicals in the atmosphere have been declining gradually as the result of the 1987 Montreal Protocol, most of those chemicals remain in the atmosphere for decades. Global atmospheric computer models predict that stratospheric ozone could recover by mid-century, but the ozone hole in the Antarctic will likely persist one to two decades longer, according to the latest analysis in the 2010 Quadrennial Ozone Assessment issued by the World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP), with co-authors from NASA and NOAA. (Source: www.nasa.gov)

Ozone hole closing, albeit slowly

One set of human-created gases is starting to relinquish its hold on Antarctic climate as another group of emissions produced by human activity is starting to take hold, according to a paper co-authored by Australian Research Council (ARC) Laureate Fellow Professor Matthew England, co-director of the University of New South Wales' Climate Change Research Centre. The paper highlights how the influence of the Antarctic ozone hole on Southern Hemisphere climate is slowly dissipating and will be gradually overtaken by human-induced emissions of carbon dioxide (CO_2) and other greenhouse gases (GHGs).

"Our study shows how ozone depletion over the past three to four decades has had a marked impact on Antarctic and Southern Ocean climate," says Prof. England, who is also a Chief Investigator in the ARC Centre of Excellence for Climate System Science. However, this will be surpassed shortly by the influence of GHGs, he adds. CO_2 resides in the atmosphere for many hundreds of years, unlike chlorofluorocarbons (CFCs) that decline over a few decades. Therefore, while the ozone hole will repair over the coming decades, the legacy of CO_2 emissions would be felt many centuries from the present, he says.

The ozone hole has significantly transformed the Southern Annular Mode (SAM), which sets the latitude of the Southern Hemisphere jet stream and storm track, and has a profound influence on the oceans and average temperatures. As the influence of the ozone hole on the SAM begins to decrease and GHGs increase, dramatic shifts in climate are expected across Antarctica and many regions of the mid-latitude the Southern Hemisphere. (Source: www.science.unsw.edu.au)

Ozone hole over the Arctic studied

Ozone depletion occurs naturally each year in the Arctic and the Antarctic when low temperatures in winter cause polar stratospheric clouds

(PSCs) to form. These clouds help convert harmless forms of chlorine – hydrogen chloride and chlorine nitrate – into the more reactive chlorine monoxide that destroys ozone. Normally, annual Arctic ozone loss is small compared with that in the Antarctic. For the first time however, a study has identified an 'ozone hole' over the Arctic, in addition to the well-known ozone hole over the Antarctic. Unusually persistent low temperatures over the Arctic in early 2011 caused an unprecedented amount of chemical destruction of stratospheric ozone there. The scientists warn that this is likely to happen again, although it is presently difficult to predict when this might be.

The scientists measured ozone loss over the Arctic using instruments attached to observation balloons and a satellite orbiting the Earth. Despite some uncertainty over precise levels of ozone depletion, the scientists estimate that 80 per cent of Arctic ozone in the 18-20 km altitude range was lost between January and late March 2011. The chemical ozone loss was nearly double that in 1996, 2000 and 2005, the years with the next highest Arctic ozone depletion. According to the study, which was partly supported by the "Reconciliation of essential process parameters for enhanced predictability of Arctic stratospheric ozone loss and its climate interactions (RECONCILE)" funded by the European Commission, the Arctic ozone hole was mainly caused by an unusually long period of low stratospheric temperatures (over the Arctic) that persisted from December through the end of March, much later than in other years. The low temperatures also extended over a larger altitude range than previously. Together, these factors led to a higher volume of PSCs forming over a longer time period, causing greater ozone loss than usual.

A long-term trend towards decreasing stratospheric temperatures in the Arctic means that an ozone hole is likely to appear again, say the scientists, but huge differences in winter conditions from year to year make it extremely difficult to predict when this might be. For example, the last decade has had four of the warmest Arctic winters in the past 32 years and also two of the coldest. The variability in Arctic temperatures is also affected by increasing greenhouse gas emissions, which further complicates predictions. Although the Arctic ozone hole in 2011 was confined to a smaller area than the Antarctic hole, there are concerns that if one occurs in the future, it may reach parts of the well-populated mid latitudes, as it did briefly in 2011, increasing the risk of mass exposure of people, plants and wildlife to harmful UV radiation from the sun. (Source: ec.europa.eu)

Cancer and cataract on the rise as ozone layer diminishes

As the ozone layer thins, medical experts have warned people to be aware of sun exposure to avoid health problems such as skin cancer and cataracts. During the last two decades, the stratosphere has thinned by 3 per cent, causing the sun's exposure to the earth to increase by 12 per cent, adding to the prevalence of skin cancer and cataracts.

The world has seen an increasing number of skin cancer cases, with the United States experiencing a 69 per cent increase between 1950 and 2001. In Indonesia, the prevalence of skin cancer is still relatively low compared with other types of cancer, such as cervical cancer, lung cancer or breast cancer. The GLOBOCAN 2008 data estimation of skin cancer cases was still under 5,000. However, instances of this cancer have been on the increase. Bali-based dermatologist Dr. Laksmi Duarsa said that skin cancer cases ranked third in 13 hospitals in 1984. She also found skin cancer cases were in the top three most common health problems in Yogyakarta in 1995. In Sanglah Hospital, the number of skin cancer cases had been increasing since 2007, with the percentage of melanoma cases having increased from 2 per cent in 2007 to 4 per cent in 2008, she said.

Besides skin cancer, another disease caused by the thinning ozone layer is cataract. Indonesia has the highest prevalence rate of blindness among Southeast Asian countries – 1.5 per cent. Dr. Nila Djuwita Moeloek, an ophthalmologist from University of Indonesia and special envoy on Millenium Development Goals to the Indonesian President Mr. Susilo Bambang Yudhoyono, said that 410 patients had received radical surgery between 1980 and June 2010. She estimated that 13 to 14 patients were receiving radical surgery per year. (Source: www.thejakartapost.com)

ODS PHASE-OUT IN INDIA

National transition strategy for phase-out of CFCs in MDIs

India developed the National Strategy for 'Transition to Non-CFC Metered Dose Inhalers (MDIs) and Plan for Phase-out of CFCs in the Manufacture of Pharmaceutical MDIs'. This project articulates India's national strategy for transition to non-CFC MDIs gradually without affecting the asthma and chronic obstructive pulmonary diseases (COPD) patients and the elimination of chlorofluorocarbon (CFC) consumption in MDIs manufacture in India by 2013. The National Strategy is being implemented successfully with the United Nations Development Programme (UNDP) as the lead agency in close cooperation with the Ozone Cell, Ministry of Environment and Forests (MoEF), and the MDI manufacturers. The MDI manufacturers have converted a large number of MDI formulations from CFCs to CFC-free propellants.

As the progress made by MDI manufacturers was commendable, they decided not to seek any CFCs for manufacturing of MDIs for 2011 and beyond. India was one of the first countries to withdraw the Essential Use Nomination (EUN) from the year 2011 onwards and the 22nd Meeting of the Parties congratulated India on its outstanding achievements. (Source: Ozone Cell, MoEF, Government of India)

National Halon Banking Facility

The Ministry of Environment and Forests (MoEF) has established a National Halon Banking Facility at Centre for Fire, Explosive and Environment Safety (CFEES), Defence Research and Development Organization (DRDO), Ministry of Defence, with financial assistance from the Multilateral Fund (MLF) for the Implementation of the Montreal Protocol. This facility has the capability to recover, recycle and store the halogenated hydrocarbons (halons) for future use in the existing equipment. It is worth mentioning that all the three defence forces have also established their own Halon Banking Facility to meet the future requirements. (Source: www.ozonecell.com)

Duty exemption and discounts for non-ODS technology

Duty exemption benefit has been available for new capacity with non-ozone-depleting substance (ODS) technology since 1997. These benefits have been extended for the financial year 2011-2012 also. The Indian financial institutions have decided not to finance/refinance new ODS producing/consuming enterprises. The Tariff Advisory Committee (TAC) – a statutory body under the Insurance Act, 1938 – has decided to grant suitable discounts on fire insurance premiums if alternative fire-extinguishing agents are used in place of halons in fire-extinguishing systems. (Source: www.ozonecell.com)

Essar Steel first beneficiary of IDBI Bank's energy drive

Essar Steel Ltd. has become the first beneficiary under the India Chiller Energy Efficiency Project (ICEEP) for encouraging energy-efficient systems. IDBI Bank, the state-run bank that is implementing ICEEP project in association with the World Bank and the Ministry of Environment and Forests (MoEF), has released around Rs 3.4 million in grant as incentive to Essar Steel. The grant was for the company's sub-project for replacing three chlorofluorocarbon (CFC) centrifugal chillers (300 TR each) with three energy-efficient non-CFC chillers (350 TR each) in its integrated steel plant at Hazira in Gujarat, an IDBI Bank statement said. Under ICEEP, 78 chillers have been identified and 54 chillers registered for grant. The project is financed by the Global Environment Facility (GEF), Multilateral Fund for Implementation of the Montreal Protocol (MLF), to the extent of US$7.3 million. (Source: www.moneycontrol.com)

E-Learning module on ODS phase out

The United Nations Environment Programme and the World Customs Organization have created an e-learning module to assist Customs officers phase out the ozone depleting substances under the Montreal Protocol. The modules are available in English, French, Russian and Spanish. For further information, contact:

WCO E-learning team
World Customs Organization
E-mail: elearning@wcoomd.org
Web: http://e-learning.wcoomd.org

IN THE NEWS

Twenty-four Asia-Pacific countries reach Goal Zero

Twenty-four Asia-Pacific countries were recognized and conferred the Montreal Protocol Recognition Award recently for complying with the ozone-depleting substances (ODS) phase-out target of 1 January 2010 set under the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer. The award was presented by the United Nations Environment Programme (UNEP) Ozone Secretariat and OzonAction Programme at a ceremony during the Joint Network Meeting of South Asia and Southeast Asia and the Pacific Ozone Officers from 17 to 19 October 2011. The Asia-Pacific region is important to ozone protection because it is home to the largest producers and consumers of ODS. China and India were the largest producers of chlorofluorocarbons (CFCs) until 2007 and 2008, respectively, and currently the largest producers of hydrochlorofluorocarbons (HCFCs) globally.

"The countries deserve acknowledgment for fulfilling their commitments to completely phase out their production and consumption of CFCs, carbon tetrachloride and halons by 1 January 2010. The compliance of all Asia-Pacific countries has played a significant role in the success of the Montreal Protocol as the best example for multilateral cooperation to protect the environment," said Ms. Megumi Seki, Senior Scientific Affairs Officer, UNEP Ozone Secretariat. "We congratulate the Asia-Pacific countries for this achievement because compliance is not an easy task for governments. To attain this, governments have to synchronize their policies and legislations on ODS with programmes to assist affected sectors to ensure the smooth transition to alternative chemicals and technologies," said Mr. Atul Bagai, Senior Regional Coordinator, UNEP Regional Office for Asia and the Pacific. *Contact: Mr. Atul Bagai, Senior Regional Coordinator, OzonAction Programme, Compliance Assistance Programme, UNEP Regional Office for Asia and Pacific, UN Bldg., Rajdamnern Nok Avenue, Bangkok 10200, Thailand. Fax: +66 (2) 2883041; E-mail: atul.bagai @unep.org.* (Source: www.unep.org)

China launches ozone and climate change project

China's Ministry of Environmental Protection has launched the Hydrochlorofluorocarbon (HCFC) Phase-out Management Plan (HPMP), a US$270 million project to cut consumption of HCFCs by 1 January 2015. The Plan will impact chemical production, foam, industrial and commercial refrigeration, air-conditioning, refrigeration servicing and solvent sectors, involving tens of thousands of enterprises and millions of workers. At the launch, China's central government ministries, industrial associations, local environmental protection bureaus, research institutes and universities, and over 100 large companies that produce and use HCFCs pledged their support to the programme.

"China is the largest producer, consumer and exporter of HCFCs in the world: more than 70 per cent of global HCFC production and 50 per cent of total consumption of developing countries. The phase-out of HCFCs in China will therefore play an essential role for the successful implementation of the Montreal Protocol", said Mr. Lijun Zhang, Vice Minister of Environmental Protection, China. China's HCFC phase-out is an ambitious mission that impacts industries, which will have to convert hundreds of assembly lines to meet national obligations as a signatory to the Montreal Protocol. Through HPMP, 45,000 metric tonnes of HCFCs – about 17 per cent of China's total amount of HCFCs use – will be eliminated. In addition, as part of the project, the new technologies to replace the HCFC technologies currently used by the industries will significantly reduce greenhouse gas emissions in the country. The funding for the HPMP was approved by the Executive Committee of the Multilateral Fund for the implementation of the Montreal Protocol in July 2011. *Contact: Mr. Chen Hao, UNEP China Office, 2 Liangmahe Nalu Road, Beijing 100600, China. Tel: +86 (10) 85320921; Fax: +86 (10) 65322567; E-mail: hao.bath@gmail.com.* (Source: www.unep.org)

Project in Malaysia to study ozone depletion by atmospheric halogen

Research findings by environmental physicists from Heidelberg University, Germany, suggest that the ozone layer may be damaged by natural

halogenated hydrocarbons (halons) formed in significant amounts by water plants and micro-organisms on the oceanic coasts. This conjecture, recently supported by other research findings, is to be tested by an international field measurement campaign in the South China Sea within the framework of the Stratospheric Ozone: Halogen Impacts in a Varying Atmosphere (SHIVA) project funded in part by the European Union. Malaysia will host this project coordinated by Heidelberg University's Institute of Environmental Physics.

The project was detailed in a briefing held at University of Malaya by Principal Investigator, Prof. Klaus Pfeilsticker from the University of Heidelberg. It aims to measure the levels of halogen elements emitted by the tropical oceans which are known to destroy the ozone layer in the stratosphere, resulting in the formation of the "ozone hole" in Antarctica. Of particular concern are the bromine levels in the atmosphere as they have a greater potential in degrading the ozone layer. The project, which will receive 10 million euros in funding and involve about 130 scientists from 17 institutions in Malaysia and Europe, has the potential to greatly increase the understanding of how the ocean affects the ozone layer.

Biologists from University of Malaya, University Malaysia Sarawak and University Malaysia Sabah as well as scientists from the National Oceanic Department (NOD) and the Malaysian Meteorological Department (MMD) will participate in this project to see the impact of the ocean, human activity as well as sea life on the levels of ozone in the atmosphere. "Malaysia is a country with the infrastructure and human resource to support our project in the Western Pacific. Also, this region is of particular interest as the waters are warm and the rainy season has the most intense convection, where gases are transported vertically naturally," stated Prof. Pfeilsticker. (Source: www.asianscientist.com)

Philippines in preparation to phase out HCFCs

Mr. Ramon J. Paje, the Environment and Natural Resources Secretary of the Philippines, has said that the government is set to freeze the importation of hydrochlorofluorocarbons (HCFCs) in 2013. Mr. Paje said the import ban on HCFC is pursuant to the Montreal Protocol on Substances that Deplete the Ozone Layer, to which the Philippines is a signatory. "Starting 2013, we are putting a cap on the importation of HCFC to 2,644 metric tonnes (MT) – the country's average import of HCFC from 2009 to 2010," he said.

From the base level of 2,644 MT, the HCFC import will be gradually reduced by 10 per cent, to 2,379 MT by 2015; 35 per cent to 1,718.6 MT by 2020; and then 67.5 per cent, to 859.3 MT in 2025. From 2030 to 2039, however, the Department of Evironment and Natural Resources (DENR) will allow the import of the substance to only 66.1 MT annually, representing 2.5 per cent of the base level, for the continued use of the servicing sector.

HCFCs – HCFC-22, HCFC-141b, HCFC-123 and blends of HCFC-225 – are commonly used as substitutes for chlorofluorocarbons (CFCs) in the foam blowing, refrigeration, fire-extinguishing, solvent and servicing sectors. Of these HCFCs, Mr. Paje said, DENR will prioritize the phase-out of HCFC-141b because it has the most ozone-depleting potential (ODP) of 0.11 as compared with HCFC-22 with an ODP of 0.055 only, HCFC-123 with 0.02 and HCFC blends, from 0.025 to 0.033. It will initially cover the foam sector, particularly the polyurethane rigid foam in appliances, panels and sprays. A total of 364.34 MT of HCFCs is projected to be phased out under the project, which is being implemented by DENR through the Environmental Management Bureau (EMB) in collaboration with the United Nations Industrial Development Organization (UNIDO). (Source: www.gov.ph)

Maldives at the forefront of environmental measures

The Government of the Maldives showcased its success story in ozone protection and achieving carbon neutrality in an event organized by the Ministry of Housing and Environment of Maldives in cooperation with the OzonAction Programme of the United Nations Environment Programme (UNEP) on 24 November 2011, at the sidelines of the 23rd Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer in Bali, Indonesia. "We want to share our ozone story – how the HCFC Phase-out Management Plan (HPMP) of Maldives was the first to

be approved, how our government was able to pledge the total phase-out of hydrochlorofluorocarbons (HCFCs) 10 years ahead of the Montreal Protocol deadline and how our ozone-depleting substances programmes are linked with the country's carbon neutrality policy," stated Mr. Akram Kamaluddeen, Minister of State for Housing and Environment, Maldives.

The HPMP of Maldives – approved at the 60th Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol – follows a single-stage approach, freezing the consumption of HCFC gases by 2011 and gradually reducing it until 97.5 per cent phase-out by 2020, with 2.5 per cent allowance for servicing the needs of existing equipment until 2025. "Maldives is the first country to get funds for HPMP. We have started implementing our HPMP. We have two targets to achieve by the end of 2020 – phase-out of HCFCs and become carbon neutral," said Mr. Ahmed Saleem, Permanent Secretary, Ministry of Housing and Environment. Being the first country to have HPMP approved, Maldives faced several challenges on how to initiate the programme. The country learned some lessons during HPMP preparation, initiation and implementation, including establishing an HCFC licensing and quota system. (Source: www.miadhu.com)

Three alternative refrigerants approved in the United States

Through its Significant New Alternatives Policy (SNAP) programme, the United States Environmental Protection Agency (EPA) has added three hydrocarbons as acceptable alternatives in household and small commercial freezers and refrigerators. EPA took action after requests from three business units, which are helping to clear the way for the United States companies to use ozone layer-protective hydrocarbon refrigerants. Ms. Gina McCarthy, Assistant Administrator for EPA's Office of Air and Radiation, characterized the move as "a great example of how businesses and EPA can work together to protect our planet and drive innovation" and one that "increases the options for effective, climate-friendly refrigerants in the United States."

Under the Clean Air Act, the SNAP programme evaluates substitute chemicals and technologies for ozone-depleting substances (ODS). The three hydrocarbon refrigerants approved as acceptable substitutes are propane, isobutane and R-441A. These newly-approved refrigerants can be used to replace CFC-12 and HCFC-22 in household refrigerators, freezers, combination refrigerator-freezers and commercial stand-alone units. SNAP is unique and globally recognized as the only programme designed specifically to evaluate substitutes for ODS and to focus on the industrial sectors that use them. (Source: yosemite.epa.gov)

Indonesia to cut HCFC consumption by 10 per cent

Indonesia plans to gradually halt the consumption of hydrochlorofluorocarbons (HCFCs) through reducing consumption by 10 per cent by 2015. Indonesia still sees the need to use several types of hydrofluorocarbons (HFCs) in air-conditioners, domestic fire extinguishers and foam industries due to technical, economic and work safety considerations. The country collected US$61 million from 1993 to 2010 for reducing the use of ozone-depleting substances (ODS). Developed nations have granted US$12 million to Indonesia to help it reduce the use of ODS over seven years.

Mr. Arief Yuwono, Deputy Minister of Environmental Degradation Control and Climate Change in the Environment Ministry, said that the government drafted an HCFC Phase-out Management Plan (HPMP) to reach the freeze target by 2013 and to reach a 10 per cent reduction of HCFCs by 2015. As part of the HPMP, the government will be adopting technology transfer, and policy and regulation interventions. "We hope that it can also support the target to reduce emissions by 26 per cent from the business as usual scheme that we hope to reach by 2020," Mr. Arief said. (Source: www.thejakartapost.com)

SolarChill large-scale demo and technology transfer project

The Global Environment Facility (GEF) has approved US$2.7 million funding for the "SolarChill Development, Testing and Technology Transfer Outreach" project in Colombia, Kenya and Swaziland. The project is expected to address some of the challenges to the wider deployment of the

SolarChill technology, which integrates the use of solar energy with "Greenfreeze" hydrocarbon refrigeration. It also eliminates the need for lead storage batteries by using solar direct drive compressors to create an ice bank, thus storing the energy of the sun in ice.

The project plans to include installing up to 75 SolarChill vaccine coolers and 25 SolarChill food refrigerators in each country. The units will be monitored and performance data collected. The vaccine coolers will be installed in community clinics that are off the grid. The food refrigerators will be installed in a variety of settings, including community centres, schools, small commercial enterprises, hospitals, etc. The plans also include technology transfer-related initiatives. This will involve country-wide and regional market analysis and outreach to potential manufacturers.

The SolarChill Project involves a unique partnership between seven international organizations – Danish Technological Institute (DTI); the German government development agency, GIZ ProKlima; Greenpeace International; Programmes for Appropriate Technologies in Health (PATH); United Nations Environment Programme's Division of Technology, Industry and Economics (UNEP-DTIE); United Nations Children's Fund (UNICEF); and the World Health Organization (WHO). The SolarChill technology was developed at DTI and currently four factories are manufacturing products based on SolarChill technology. (Source: www.hydrocarbons21.com)

New preferential tariffs in Viet Nam

Viet Nam's Ministry of Finance has introduced 336 preferential tariffs recently at a conference that that had the participation of representatives from about 400 enterprises, increasing the total to 9,500 tariffs, according to the General Department of Customs. The new list of preferential import and export tariffs includes major changes including classification of goods reduced from a 10-digit to an 8-digit code, classification of chemical substances, plant protection provisions and provisions on ozone-depleting substances, and removed over 40 groups of tariffs with low import turnover. The conference also detailed compliance with the Law on Environmental Protection. (Source: vietnamnews.vnagency.com.vn)

REFRIGERATION/ AIR-CONDITIONING

Hydrocarbon refrigerant replacement for R22

RED TEK® 22a, a hydrocarbon-based refrigerant from Thermofluid Technologies, the United States, is a blend of environmentally safe fluid mixture designed as a direct replacement and retrofit refrigerant option for replacing R22 refrigerant in commercial air-conditioning and refrigeration systems. Possessing similar volumetric refrigerating effects to R22 refrigerants, it operates at lower head pressures and features improved cooling properties and performance compared with R22. RED TEK 22a is compatible with most common refrigeration materials and lubricants. The 100 per cent natural organic refrigerant has zero ozone-depleting potential (ODP) and no global warming potential (GWP). It does not become caustic when contaminated with moisture or oxygen, and is non-toxic and non-carcinogenic. RED TEK 22a has an autoignition temperature above 426°C. It is claimed to offer energy savings up to 30 per cent. *Contact: Thermofluid Technologies Inc., P.O. Box 1114, Alcoa, Tennessee 37701, United States of America. Tel: +1 (865) 983 1633; Fax: +1 (865) 983 0068.* (Source: www.redtek.com)

Natural refrigerant for transport refrigeration

While there have been many improvements to transport refrigeration systems since they became popular for delivering fresh and frozen cargo more than 40 years ago, the basic concept of using chemical refrigerants as the cooling agent had not changed. Carrier Transicold, a unit of Carrier Corp. headquartered in the United States, has announced two significant innovations using the natural refrigerant carbon dioxide (CO_2), revolutionizing refrigeration technology for temperature-controlled transport applications. NaturaLINE™ container refrigeration system is the world's first to use natural CO_2 for marine applications. The company has also developed a CO_2 concept trailer refrigeration model for road applications.

The introduction of natural refrigerant technology comes at a time when transport refrigeration customers face increasing pressure to reduce their carbon footprint. As Carrier uses CO_2 recycled from the atmosphere for refrigerant cooling, it does not add a new environmental risk. The design of NaturaLINE – which includes a patented, multi-stage compressor and several other innovations that equal the energy efficiency of the industry's most energy-efficient unit, also produced by Carrier – comes exactly one year after the company announced the technology and successfully completed three demonstration voyages with Hapag-Lloyd, a leading global container shipping lines.

Carrier Transicold's CO_2 concept trailer refrigeration unit is reported to compare very favourably with the conventional units that it is tipped to eventually replace. The global warming potential (GWP) of CO_2 is lower than other alternative natural refrigerants, such as propane and ammonia. Hence, even in the event of a leak, the use of CO_2 adds no new environmental risk. (Source: www.marketwatch.com)

Refrigerant helps convert solar heat into power

Honeywell International Inc., the United States, has revealed that its Genetron® R245fa refrigerant is being used to help homeowners generate electricity from the solar heat while offsetting energy costs. Honeywell's energy-efficient refrigerant is being used in an organic rankine cycle (ORC) called the 35Z Micro Power Plant, manufactured by Germany-based Turbolina GmbH & Co. KG. The 35Z Micro Power Plant has a unique design that uses water heated by thermal solar panels to evaporate the refrigerant, which in turn drives a turbine to generate electricity. Because no fuel is burned to create the electricity, the unit does not produce any carbon dioxide emissions. The remaining heat from the 35Z can be used to supply heating and hot water.

"When we began designing the 35Z, we knew we needed a reliable, low-temperature working fluid, and Honeywell's R245fa refrigerant was the perfect choice," said Mr. Hermann Helmbold, General Manager of Turbolina. R245fa is a non-ozone-depleting, non-inflammable refrigerant with low toxicity. Its heat transfer properties, including its low boiling point (15.3°C), make it ideal for use in ORC systems that employ low-temperature heat and waste heat to generate electricity. The 35Z offers an electrical power output of 3.5 kW, which is ideally suited to the needs of homeowners. (Source: www.prnewswire.com)

New semi-hermetic compressors

3

Frascold S.p.A., Italy, specialized in commercial and industrial air-conditioning and refrigeration compressors, is adding a complete new range of reciprocating semi-hermetic compressor series AHX, which is optimized for the work with hydrocarbons and features high safety and reliability. AHX compressors are suitable for all the most commonly used hydrocarbons – R290 (propane), R1270 (propylene) and R600a (isobutane). The AHX range features the safety standard required by the ATEX 94/9/EC Directive for the inflammability of hydrocarbons in classified areas.

Hydrocarbons do not have any corrosive effect on copper and can be easily employed with semi-hermetic compressors having enclosed electric motors. Compared with standard type compressors, AHX compressors have several features such as: mechanically optimized for use with hydrocarbons; special oil charge; crankcase heater; positive temperature coefficient (PTC) sensor for discharge temperature control; electronic oil differential pressure switch; electronic control module for remote installation; and capacity control head/unloaded start head. (Source: www.hydrocarbons21.com)

High-efficiency automotive air-conditioning refrigerant

Opteon™ yf from DuPont, based in the United States, is claimed to be a reliable, high-quality and efficient refrigerant solutions for demanding systems, especially mobile air-conditioning (MAC) systems. Opteon yf, a hydrofluoro-olefin (HFO-1234yf), meets the European Union's 2011 MAC Directive to replace the hydrofluorocarbon HFC-134a in MAC systems. The refrigerant is claimed to offer significant reduction of the total environmental footprint associated with automotive air-conditioning systems, including indirect emissions due to energy efficiency. Opteon yf offers lower

lifetime greenhouse gas emissions than HFC-134a or carbon dioxide – its atmospheric lifetime is just 11 days – and comparable cooling efficiency to HFC-134a in all regions. (Source: www2.dupont.com)

Chiller saves 50 per cent energy

Airedale International Air-Conditioning Limited, the United Kingdom, has launched a free-cooling chiller claimed to save over 50 per cent in energy consumption and can spend over 95 per cent of the year in free-cooling. The OptiChill FreeCool is a large capacity, free-cooling version of its high-efficiency, air-cooled OptiChill screw chiller that works with R134a. The application of concurrent free-cooling and cutting-edge technology driven by smart control logic ensures OptiChill FreeCool gives excellent energy balance for all operating conditions. For up to 30 per cent of the year, the new chiller can operate purely in free-cooling mode, with free-cooling Energy Efficiency Ratios (EERs) – at 15°C return water, 20 per cent ethylene glycol, 3°C ambient temperature and based on total input power of fans – of up to 75, significantly reducing operating costs throughout the product's lifetime.

With four case sizes, two free-cooling variants (two and three rows of coils), three fan variants and two sound level variants in each range, OptiChill FreeCool presents a choice of over 200 model permutations. This flexibility, together with a number of options, allows optimum selection based on specification. The new modulating screw compressor technology offers high performance coupled with low sound and vibration levels, and has a 12.5°C increase in the operational evaporating temperature range. This allows supply water temperatures to be increased, raising the free-cooling threshold and giving enhanced compressor efficiency and reduced power input (1°C increase in fluid temperature can give a 10 per cent increase in chiller energy efficiency). The compressors also offer eight stages across dual refrigerant circuits for optimum efficiency, performance and reliability. The efficient shell-and-tube evaporator with freeze protection offers an extremely high evaporating temperature for any given supply water temperature. Large surface area condenser coil has enhanced tube and fin for greater heat exchange. (Source: www.racplus.com)

SOLVENTS

Products to make oil fields cleaner and greener

Green Earth Technologies Inc., the United States, manufactures a full range of products specifically engineered to help overcome the challenges of working in oil fields. "Our cleaning products are a natural for the oil and gas well service industry," said Mr. Jeffrey Loch, President and CMO of the company. G-CLEAN products are based on colloidal chemistry, where plant-based, non-toxic, nano-sized particles work at the molecular level to penetrate larger hydrocarbon molecules, creating a colloidal micelle that disrupts the molecular bonding of long chain hydrocarbons to make nanoscopic emulsified droplets with larger surface areas that allow resident bacteria to metabolize. This proprietary base is listed on the National Contingency Plan (NCP) for oil spill clean-ups of the United States Environmental Protection Agency (EPA).

Whether restoring tired, non-producing oil wells, treating "frac" tanks or simply cleaning and degreasing a drilling rig, the G-CLEAN assortment of well service products can help make the oil fields greener and contribute to a cleaner environment, Mr. Loch claims. When used as a part of a comprehensive maintenance programme, G-CLEAN products can help reduce work hours and the need for transportation of waste fluids while reducing the volatile organic compounds (VOCs) present in the well environment. Non-inflammable, non-corrosive and odour-free, these highly concentrated products will not react with other chemistries and have no ozone-depleting substances. All G-CLEAN Oil Field Products are prepared from renewable resources, fully biodegradable and safe for people, pets and plants. (Source: www.marketwatch.com)

Heavy-duty degreaser certified as clean air solvent

The GlobalTech® heavy-duty degreaser (HDD) has been from JNJ Industries, the United States, has been certified by the South Coast Air Quality Management District (SCAQMD) as a "Clean Air

Solvent", meeting their stringent requirements of 25 g/litre or less of volatile organic compounds (VOCs). The certification is in effect for 5 years. In order to be qualified as a Clean Air Solvent (CAS), the solvent can have a VOC concentration of not more than 25 g of VOC per litre of material, meet other criteria, and contain no hazardous air pollutants (HAPs), ozone-depleting compounds or global warming compounds.

GlobalTech HDD is an aqueous cleaner that is more than 90 per cent water-based, with 100 per cent active ingredients. It has been specially formulated to remove all types of grease, oil, grime and dirt from all types of surfaces including tools, farm equipment and other machinery, engines, trucks, buses, trains, work benches, floors, walls and kitchens. It is available in concentrate form, pre-mixed with water, or in handy, pre-saturated disposable wipes. HDD has a unique ability to penetrate crevices and orifices to dislodge microscopic contaminants. This method of cleaning dramatically improves the cleaning efficiency by minimizing the amount of rinse water needed. Because HDD leaves no ionic residue behind, it is an excellent cleaner to be used when cleaning electric or electronic equipment and hardware.

GlobalTech HDD utilizes a proprietary electrochemistry technology that works by reversing the normal polarity of the contaminant. The reversal of the polarity causes the like charges of the contaminant and the work surface to repel each other, thereby preventing reattachment to the surface, enabling them to be rinsed or wiped away with ease. *Contact: JNJ Industries Inc., 290 Beaver Street, Franklin, Massachusetts, MA02038 United States of America, Tel. +1 (508) 553 0529; Fax: +1 (508) 553 9973.* (Source: ipc.goexposoftware.com)

Hydrochlorofluoroolefin compositions

Arkema Inc., the United States, is patenting an invention relating to solvent/cleaner and heat transfer fluid compositions comprising at least one hydrochlorofluoroolefin (HCFO). Solvent/cleaning applications can be, for example, to clean electronic circuit boards such as in defluxing operations. The HCFO employed is HCFO-1233, including but not limited to, 1-chloro-3,3,3-trifluoropropene (HCFO-1233zd), preferably the trans-isomer of HCFO-1233zd alone or in a combination. This combination provides effective solvent/cleaning and heat transfer activity while being of negligible ozone depletion potential (ODP), low global warming potential (GWP) and low toxicity. The HCFO can be used in combination with co-agents including, hydrofluorocarbons (HFCs), hydrofluoroolefins (HFOs), hydrocarbons, ethers including hydrofluoroethers (HFEs), esters, ketones, alcohols, 1,2-transdichloroethylene and their mixtures. (Source: www.freepatentsonline.com)

Industrial cleaning solution

PF Solvent Degreaser from PT Technologies Europe, Ireland, is designed to replace traditional fast-evaporating solvents such as trichloroethane (TCE), as well as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs). It is a full strength solvent/degreaser for cable cleaning prior to jointing, maintenance of cables, switchgear and network equipment, and electrical equipment cleaning and degreasing. It removes oils, soils, tar and bitumen residues. PF Solvent is 100 per cent volatile and leaves no residue. While this ensures no earth tracking or local hot spots, the controlled evaporation allows a significant reduction in solvent consumption and volatile organic compound (VOC) emissions.

The product is worker-friendly and non-ozone depleting. It is suitable for use on low, medium and high voltage applications and on live systems (up to 39 kV). The solvent is non-inflammable, and has low toxicity and odour. As it is used as a wipe, the logistical issues of having to transport and store a hazardous liquid are eliminated. PF Solvent is designed to IEEE recommendations. *Contact: PT Technologies Europe, Meenane, Watergrasshill, Co Cork, Ireland. Tel: +353 (214) 889922; Fax: +353 (214) 889923; E-mail: info@pttechnologies.com.* (Source: www.pttechnologies.com)

Electric motor and equipment cleaner/degreaser

CRC Lectra Clean from CRC Industries Inc. the United States, is a non-inflammable degreaser and cleaner for electric motors and other heavy duty electrical and mechanical equipment. It evaporates quickly, leaves no residue and has no flash

or fire point, making it an excellent alternative to 1,1,1-based cleaners. Lectra Clean effectively removes grease, oil, tar, etc., and increases operating efficiency and equipment life by cleaning and removing foreign substances that can cause leakage, excessive resistance and hazardous operation of electrical equipment. It is chemically stable, non-conductive, non-staining and non-corrosive.

Lectra Clean is ideal for cleaning equipment in place since disassembly is not required. It is also suitable for cleaning water and contaminants from flood damaged equipment. The solvent does not contain carbon tetrachloride, CFC-113, methyl chloroform or silicones. *Contact: CRC Industries Inc., 885 Louis Drive, Warminster, PA 18974-2869, United States of America. Tel: +1 (215) 674 4300; Fax: +1 (215) 674 2196; E-mail: crcwebmaster@crcindustries.com.* (Source: www.crcindustries.com)

Healthier, safer cylinder-cleaning solution

BOC, a unit of Linde Group based in Germany, has invested in a new gas-cylinder valve-cleaning solution that improves health and safety and reduces annual cleaning costs by as much as 60 per cent. The new process sees a traditional trichloroethylene operation replaced by an environmentally friendly bath system that is healthier for operatives, makes for cleaner cylinders, cuts energy requirement, reduces vapour loss and lowers lifecycle costs.

When used oxygen cylinders are returned to BOC for cleaning, it is imperative that any existing valve residue is removed and with it the risk of contamination. The new, automated cleaning process utilizes Novec HFE 71DE engineered solvent with an ultrasonic vapour cleaning unit and is very effective at degreasing all component parts. It is operationally efficient, and the equipment requires less cooling time, which enables faster throughput. Novec HFE 71DE is based on a hydrofluorether (HFE) formulation that is non-ozone depleting and does not contain any hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) or hazardous air pollutants (HAPs). *Contact: Mr. Simon Napper, BOC Communications, United Kingdom. Tel: +44 (7500) 815166; E-mail: simon.napper@boc.com.* (Source: www.espritassociates.com)

FOAMS

Non-ozone-depleting XPS foam insulation

Owens Corning, the United States, has announced that it has started manufacturing zero ozone-depleting FOAMULAR® extruded polystyrene (XPS) rigid foam insulation. The new blowing agent technology developed by Owens Corning meets the requirements of the Montreal Protocol to phase out the ozone-depleting HCFC-142b. FOAMULAR is recyclable and reusable, and is claimed to have an insulating performance of R-5 per inch, based on real-time aging. It is virtually impervious to moisture penetration, preventing loss of R-value, and comes with a 20 year thermal performance warranty. FOAMULAR has a minimum of 20 per cent certified recycled content, and the company says that utilizing insulation can help builders secure major green building certifications. (Source: www.prnewswire.com)

New polyurethane foam insulation technology

Dow Polyurethanes, a business within the Dow Chemical Company based in the United States, is launching in cooperation with Cannon SpA, Italy, PASCAL™, a new polyurethane (PU) foam insulation technology that improves energy efficiency of refrigerators and freezers. Using a proprietary PU foam specifically formulated for this application, PASCAL technology doubles the efficiency of insulation while continuing to provide thermal conductivity and adhesion – qualities that distinguish PU from alternative types of insulation.

Compared with standard PU insulation processes, PASCAL out-performs both side-by-side models and bottom freezer models by up to 10 per cent. PASCAL technology incorporates vacuum equipment from Cannon during the insulation process to bypass the deficiencies of standard insulation. The vacuum, paired with a hydrocarbon blowing agent, allows PASCAL PU foam to fit into the small spaces traditional insulation might miss, especially in modern designs, and also mould to the appliance's contours, reducing the amount of energy lost during consumer use. The resulting

system can also decrease the insulation reactivity time from a standard of about five to three minutes. (Source: www.dow.com)

Supercritical CO_2 for physical foaming of advanced polymers

While foams from high performance polymers find more and more interest, the processes to generate them can be difficult. In Germany, a group of researchers from Friedrich-Alexander-University and Fraunhofer Gesellschaft demonstrated how physical foaming with carbon dioxide (CO_2) can be used as a first step to assess the potentials of such high performance polymers. In the study, the scientists used a laboratory-scale autoclave that allows pressure variations up to 300 bars and temperatures up to 300°C. The samples are saturated with supercritical CO_2, which acted as a foaming agent. Depending on the process and material parameters, different foam characteristics and cell morphologies were obtained and characterized.

The potential of this method was demonstrated for two classes of advanced polymer materials – thermoplastic fluoropolymers (FEP) and a silicone resin. In the case of FEP, previously prepared films were foamed and the effects of various process parameters on the foam characteristics were examined. Besides the general potential of FEP foams, they are candidates for polymeric piezoelectric materials with relatively high temperature stability. Silicone polymers have some properties superior to common organic polymers. *Contact: Mr. F. Wolff, Institute of Polymer Materials, Friedrich-Alexander-University, Erlangen-Nürnberg, Germany.* (Source: www.polymer-process.com)

Process for closed cell rigid polyurethane foams

Dow Global Technologies LLC has applied for a United States patent on a process for preparing a cavity-filling, fast-gelling closed cell rigid polyurethane (PU) foam. The process comprises preparing a formulation including at least a polyisocyanate, a relatively high-viscosity (at least about 5,000 cP at 25°C) polyol system (including at least about 10 per cent by weight of an amine-initiated polyol), a non-chlorofluorocarbon physical blowing agent, a blowing catalyst and a curing catalyst. Optionally, less than about 1.6 weight per cent of water based on the polyol system can be present, besides other components such as a chain extender, cross-linker and surfactant.

The reactive foam-forming system is injected at a reduced atmospheric pressure into a cavity, wherein the reactive foam-forming system forms a gel in no more than about 25 seconds. The reduced atmospheric pressure is maintained at least until the gel forms a closed cell rigid PU foam having a density of less than about 40 kg/m^3, an average cell diameter of less than about 250 microns, and a thermal conductivity of less than about 19 mW/mK at 10°C average plate temperature, according to ISO 12939/DIN 52612. Among possible selections for the physical blowing agent are liquid CO_2, alkanes, cycloalkanes, dialkyl ethers, cycloalkylene ethers, fluoroalkanes and their mixtures. The physical blowing agents may be used alone or, preferably, in combination with water. Particularly preferred embodiments include at least one low-boiling compound with a boiling point below about 40°C, which mixes homogeneously with cyclopentane/cyclohexane. (Source: www.freepatentsonline.com)

Pentane process technology replaces CFC

Pentane is an ecologically safe blowing agent having zero ozone depletion potential (ODP). In addition, pentane-blown rigid polyurethane (PU) foam provides almost the same insulating quality, demould time and filling quantity as traditional R-11-based insulating materials.

Pentane Process Technology (PPT) from Novathermo, Canada, is an environmentally compatible and cost-efficient method of foam-filling refrigerated appliances. As pentane is likely to form explosive atmospheres at specific gas concentrations, Novathermo has added a comprehensive, interlinked safety process in cooperation with Bayer AG, Germany, and South-German Technical Inspectorate (TÜV). The PPT system has two safety levels ensuring primary and secondary safety. *Contact: Novathermo, 1617 Trans-Canada Highway, Dorval Quebec, Canada H9P-1J1. Tel: +1 (514) 2220766; Fax: +1 (514) 6207612; E-mail: info @novathermo.com.* (Source: www.novathermo.com)

HALONS

A better way for fire suppression in nacelles

The Stat-X fire suppressant from X-Out Fire, the United States, is a patented aerosol that suppresses fire by chemically interfering with the free radicals of flame. It is ecologically safe and without ozone depletion or global-warming potentials. Tests on class B fires have shown it to be five times more effective than halons and 10 times more effective than halon alternatives.

The unit's aerosol generator contains the aerosol-forming compound. A controlled combustion in the aerosol generator produces an ultra fine extinguishing agent that passes through oxidation and cooling filters, where its temperature is reduced, before it discharges through ports at low pressure. The Stat-X aerosol stream contains 1-2 micron particles of potassium compounds that provide a large surface area interaction with the fire. Free potassium radicals in the fire zone bind with the free radicals of the fire (O, OH, H) to rapidly slow down and extinguish the fire.

The small self-contained generators mount at ceiling height and hence, take no floor space. The units have a patented thermal detector integral to the generator – eliminating need for ancillary detection and releasing devices. Units are available in several temperature settings to ensure applicability to the equipment being protected. The electrically actuated units range in weight from 30 g (covering up to 0.5 m^3) to 2,500 g (covering up to 40 m^3). *Contact: X-Out Fire, 5344 Burwash Landing, Hilliard, OH 43026, United States of America. Tel: +1 (614) 774 8545; Fax: +1 (614) 771 2445; E-mail: richard@xoutfire.com.* (Source: www.windpowerengineering.com)

Water mist puts out fires at low pressure

With Sinorix H2O Jet, a new water mist system from Siemens Building Technologies, Germany, fires can be extinguished even from a distance of 8 m. The device is meant for industrial environments, including turbines, painting lines and production equipment. Special nozzles generate a fine mist of tiny water droplets. The water and the propellant nitrogen are non-hazardous, environmentally friendly and leave no residues. In the past the water mist has been generated using high pressure, which makes the installation relatively expensive.

Sinorix H2O Jet was specially developed for the protection of physical assets and their environment. The two-phase technology uses a mixture of water and nitrogen to generate a maximum cooling effect – at a pressure of less than 16 bar with water droplets of 150-200 µm in diameter. The system works with two different types of nozzles. One is for protection of the objects; it is a patented nozzle that operates according to the Laval principle, to target and extinguish from a distance of up to 8 m. The other nozzle protects objects as well as their surroundings and controls the fire. (Source: www.innovations-report.com)

Novec 1230 fire extinguisher

Minimax USA LLC, the United States, has developed the MX-1230 fire extinguishing system using 3M's Novec™ 1230 fire protection fluid. Novec 1230 has zero ozone depletion potential (ODP), an atmospheric lifetime of just five days and a global warming potential of 1.0, making it a sustainable alternative to halons. The MX-1230 system, which leaves no residue, is suitable for class A, B and C type fires and is used as a total flooding agent. It is available in both 360 psi and the advanced delivery 725 psi system.

The MX-1230 system suppresses fire through its cooling effect, and is stored as a liquid that turns into gas upon discharge. The advanced delivery 725 psi system is approved for use with selector valves. The 360 psi and advanced delivery 725 psi options permit greater design flexability that allows for complete optimization of the fire suppression system. The MX-1230 system is suitable for protecting data processing and telecommunication facilities, computer and server rooms, historical and cultural assets, medical facilities, etc. *Contact: Minimax USA LLC, 4030 E Quenton Drive, Suite 112, Mesa, AZ 85215, United States of America. Tel: +1 (480) 5535670; Fax: +1 (480) 5535701; E-mail: bfreeman@minimaxfp.com.* (Source: www.minimax fp.com)

FUMIGANTS

New film traps fumigants and increases strawberry yields

The strawberry industry in California, the United States, is highly dependent on methyl bromide soil fumigation to control pests and maintain high yields. One alternative to methyl bromide, which is being phased out, is 1,3, dichloropropene (1,3-D). But 1,3D can be used only in certain quantities near urban areas. Scientists at University of California (UC) Davis, the United States, report that use of totally impermeable film (TIF) in fields can significantly reduce the amount of 1,3-D required to maintain strawberry yields. In a recent trial, TIF was laid out over fields when they were fumigated to prevent the fumigant from leaking. The new film was compared with the standard film used by growers. Fumigant concentrations under TIF were 46-54 per cent higher than under standard film and correlated with higher strawberry yields and better weed control.

Impermeable films have three benefits, according to lead author Mr. Steven Fennimore, a weed scientist in UC Davis Department of Plant Sciences: the films trap the fumigant in the soil for a longer time and thereby increase its effectiveness; they reduce fumigant emissions, which after reacting with nitrogen oxides, can convert to ozone; and they reduce the amount of fumigant needed for effective pest control. Emissions are a chief concern with fumigants. Comparing TIF with standard film, and methyl bromide plus chloropicrin with varying amounts of 1,3-D plus chloropicrin, the scientists rated the effectiveness of TIF. The results, reports Mr. Fennimore, suggest that to achieve fruit yield and weed control similar to methyl bromide and chloropicrin, 33 per cent less 1,3-D plus chloropicrin is needed under TIF than standard films. (Source: caes.ucdavis.edu)

Compositions for drip fumigation

Honeywell International Inc., the United States, is patenting soil fumigation compositions – and methods of preparing such compositions – that include methyl iodide, at least one fluorocarbon or hydrofluorocarbon, at least one surfactant and water. The fumigant can be produced by combining water and surfactant with an initial mixture that is an azeotropic or azeotrope-like mixture of methyl iodide and at least one fluorocarbon or hydrofluorocarbon. The fumigant compositions can be utilized in drip fumigation processes, and have increased volatility as compared with methyl iodide alone. This can reduce the risk of water contamination when utilizing methyl iodide as fumigant. *Contact: Honeywell International Inc., 101 Columbia Road, Morristown, New Jersey, NJ 07962, United States of America.* (Source: www.sumobrain.com)

Non-fumigant alternatives for methyl bromide

Root-knot nematodes, nutsedges and soil-borne pathogens are among the most troublesome pests in plasticulture-grown vegetables, and have been traditionally addressed by methyl bromide fumigation. Following the phase-out decision on methyl bromide, intensive efforts have been made to develop alternatives, with the majority of studies focusing on soil-applied fumigants. However, buffer restrictions, rising costs and efficacy of the fumigants limit their use. Given the availability of non-fumigant pesticides that offer good suppression of nematodes, soil-borne pathogens and weeds, effective pest control without fumigants should be an attainable goal, according to researchers from University of Georgia, the United States.

Led by Mr. Pingsheng Ji from the Department of Plant Pathology, they conducted a study to develop an integrated system for managing soil-borne diseases and weeds in vegetable production using non-fumigant nematicides, fungicides and herbicides. The results of the study indicated that combinations of clomazone, *S*-metolachlor and halosulfuron provide acceptable weed control and do not cause season-long injury. The results also indicated that certain nematicides and fungicides have the promise to be used as an alternative to methyl bromide for control of root-knot nematodes and important soil-borne diseases such as *Phytophthora* blight. *Contact: Mr. Pingsheng Ji, Department of Plant Pathology, Coastal Plain Experiment Station, University of Georgia, Tifton, GA 31794, United States of America.* (Source: www.mbao.org)

RECENT PUBLICATIONS

Operation of Split Air-conditioning Systems with Hydrocarbon Refrigerant

This guide discusses some of the considerations to take into account before deciding the conversion of a particular system, such as the type and complexity of the equipment to be modified or the quantities of refrigerant involved. It also discusses the type of systems that are typically suitable for conversion to hydrocarbons, and provides a decision chart to assist with evaluating the suitability of the equipment. The important stages in evaluating and carrying out conversions are described in 14 steps, from estimating the required hydrocarbon refrigerant charge size, to design changes, sealing of the system to refrigerant charging.

Contact: Mr. Bernhard Siegele, Programme Manager, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, German International Cooperation, Programme Proklima, Dag-Hammarskjöld-Weg 1-565760 Eschborn, Germany. Tel: +49 (6196) 791968; Fax: +49 (6196) 7980 1968; E-mail: bernhard.siegele@giz.de.

Guide 2012: Natural Refrigerants – Market Growth for Europe

The first edition of a series, this global guide to natural refrigerants is aimed at industry and policy decision makers, and has a particular focus on Europe. It also features market forecasts for each industry sector until 2020, the end-users' views, an industry directory and Europe's first carbon dioxide transcritical supermarket map. It is said to be the first-ever approach to quantify the market potential for natural working fluids: carbon dioxide, ammonia and hydrocarbons. The Guide is useful to both experts and new entrants to the market for more sustainable heating, cooling and refrigeration.

Contact: Shecco SPRL, Rue Royale 15, 1000 Brussels, Belgium. Tel: +32 (2) 2303700; Fax: +32 (2) 2800436; E-mail: info@shecco.com; Website: guide.shecco.com.

TECH EVENTS

18 Apr
Moscow
Russia

1st International Conference on Innovation Technologies in Refrigeration Engineering
Contact: Exhibition Management,
EC "Mir-Expo",
22 Yu. Andropov Prospekt,
Moscow 115533, Russia.
Tel/Fax: +7 (499) 618 0565, 618 3683;
E-mail: info@cryogen-expo.com.

11-13 Apr
Beijing
China

CHINA REFRIGERATION 2012
Contact: China Refrigeration and Air-conditioning Industry Association,
Floor 7(N), Guangan Mansion,
No. 6, Guangan South Street,
Henghua International Mansion,
Xuanwu District, Beijing, China.
Tel: +86 (10) 8356 0063, 8351 0099;
Fax: +86 (10) 83560060;
E-mail: craa@chinacraa.org.

08-09 May
Berlin
Germany

Blowing Agents & Foaming Processes 2012
Contact: iSmithers Rapra,
Conference Department,
Shawbury, Shrewsbury,
Shropshire, SY4 4NR,
United Kingdom.
Tel: +44 (1939) 250383, 252421;
E-mail: conferences@ismithers.net.

26-28 Jun
Kuala Lumpur
Malaysia

REVAC 2012 Expo & Forum
Contact: United Business Media (M) Sdn. Bhd., Suite 1701,
17th Floor Plaza Permata (IGB Plaza),
6, Jalan Kampar, Off Jalan Tun Razak,
50400 Kuala Lumpur, Malaysia.
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Fax: +60 (3) 4045 4989;
E-mail: Michelle.Ha@ubm.com.

29 Jul-01 Aug
Kobe
Japan

10th IIR Conference on Phase Change Materials and Slurries for Refrigeration and Air-Conditioning
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05-07 Sep
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PUBLICATIONS from APCTT

PERIODICALS

(Free access at www.techmonitor.net)

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BOOKS	Indian Rupees* (India, Bhutan and Nepal)	US Dollars*
❑ Managing Innovation for the New Economy: Training Manual, 2002 Volume 1: How to Guide & Quick reference materials Volume 2: Articles & Lectures	1,000.00	50.00
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❑ Small Rural Industries in the Asia Pacific Region: Enhancement of Competitiveness of Small Rural Industries in a Liberalized Economic Environment and the Impact of Poverty Alleviation, 2000	600.00	30.00
❑ Technology Transfer and Technological Capacity-building in Asia and the Pacific		
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❑ Development and Utilization of S&T Indicators: Emerging Issues in Developing Countries of the ESCAP Region, 1998	300.00	15.00
❑ ODS Phase-out: A Guide for Industry, 1998	500.00	25.00
❑ Proceedings of the Consultative Meeting on Technology Management Education and Training for Developing Countries, 1997	800.00	40.00

Notes: Amount less than Rs 500 should be sent through a demand draft only. Otherwise, payment should be made by cheque/ demand draft/UNESCO coupon in favour of the Asian & Pacific Centre for Transfer of Technology, payable at New Delhi.

 # Print version supported by the Ozone Cell, Ministry of Environment & Forests, Government of India, for distribution to a select target group.

** Amount to be sent to APCTT with the order for covering costs and handling charges.*