VATIS UPDATE

Ozone Layer Protection

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Highlights

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APCTT
Asian and Pacific Centre for Transfer of Technology

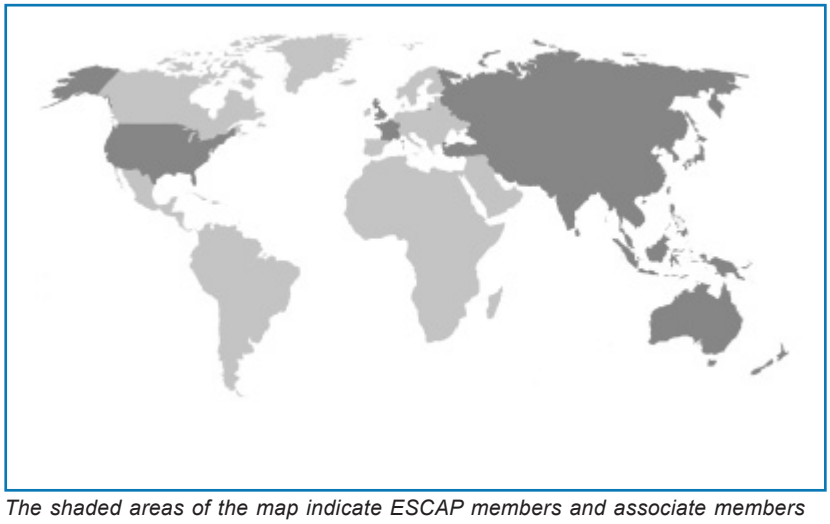
UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Ozone Cell
Ministry of Environment and Forests
Government of India

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;
- Advisory services;
- 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

South Pole staff release a high-altitude balloon, which carries ozone-measurement equipment up to 20 miles high in the atmosphere, in mid-September 2013.

(Credit: Kelli-Ann Bliss/NOAA, USA)

VATIS* Update
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Mercury and ozone depletion events in the Arctic

A new study published in *Nature* by Dr. Chris Moore and Dr. Daniel Obrist of Nevada's Desert Research Institute (DRI), the United States, has established a link between Arctic sea ice dynamics and the region's changing atmospheric chemistry potentially leading to increased amounts of mercury deposited to the Earth's northernmost and most fragile ecosystems. The opening and closing of sea ice leads (large cracks in the ice that expose warmer seawater to the cold polar atmosphere) create a pumping effect, explained Dr. Moore, an assistant research professor, that in turn causes atmospheric depletion events. These events are coupled with the destruction of ozone and ultimately the deposition of atmospheric mercury onto snow and ice, a portion of which can enter Arctic ecosystems during snowmelt.

"The atmospheric mixing created when thinner, seasonal sea ice opens to form leads is so strong," Dr. Moore said, "that it actually pulls down mercury from a higher layer of the atmosphere to near the surface." Dr. Moore and his colleagues measured increased concentrations of mercury near ground level after leads opened near Barrow, the United States, in 2012 during the NASA-led Bromine, Ozone, and Mercury Experiment (BROMEX) field project. They also used images from the Moderate Resolution Imaging Spectroradiometer (MODIS) instrument on NASA's Terra satellite to observe sea ice and a National Oceanic and Atmospheric Administration (NOAA), model of air transport to gain insight into what was upwind of their mercury measurements.

An aerial view of sea ice leads and the clouds near Barrow, Alaska
(Credit: Lars Kaleschke)

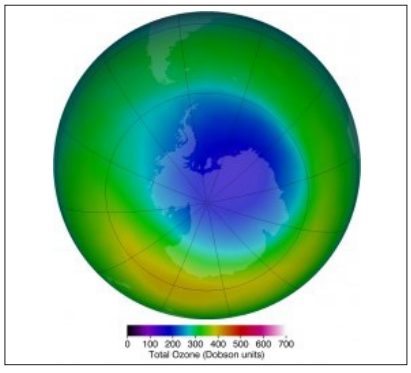
Dr. Obrist also a research professor said, "the 'aha' moment came when we combined satellite data with the air transport model and surface measurements. We considered a variety of chemical processes and sources to explain the increased levels of mercury we observed, until we finally realized it was this pumping process." The authors estimate the mercury pumping occurs about a quarter-mile (400 meters) above the Arctic surface, the height where visible roiling clouds spewing out of sea ice leads extend. Moore said while the initial findings support needed actions to curb mercury pollution across the globe, future research will be needed to establish the degree to which changes in sea ice dynamics across the Arctic alter ozone chemistry and impact mercury deposition throughout the sensitive region.

Source: http://www.eurekalert.org

Scientists reveal new results from inside the ozone hole

Scientists from the National Aeronautics and Space Administration (NASA), the United States, have revealed the inner workings of the ozone hole that forms annually over Antarctica and found that declining chlorine in the stratosphere has not yet caused a recovery of the ozone hole. More than 20 years after the Montreal Protocol agreement limited human emissions of ozone-depleting substances, satellites have monitored the area of the annual ozone hole and watched it essentially stabilize, ceasing to grow substantially larger. However, two new studies show that signs of recovery are not yet present, and that temperature and winds are still driving any annual changes in ozone hole size. According to the researchers Susan Strahan and Natalya Kramarova of NASA's Goddard Space Flight Center, the United States, "Ozone holes with smaller areas and a larger total amount of ozone are not necessarily evidence of recovery attributable to the expected chlorine decline." To find out what's been happening under the ozone hole's hood, Strahan and Kramarova, used satellite data to peer inside the hole.

Kramarova tackled the 2012 ozone hole, the second-smallest hole since the mid 1980s. To find out what caused the hole's diminutive area, she turned to data from the NASA-NOAA Suomi National Polar-orbiting Partnership satellite, and gained the first look inside the hole with the satellite's Ozone Mapper and Profiler Suite's Limb Profiler. Next, data were converted into a map that shows how the amount of ozone differed with altitude throughout the stratosphere in the center of the hole during the 2012 season, from September through November. The map revealed that the 2012 ozone hole was more complex than previously thought. Increases of ozone at upper altitudes in



The area of the ozone hole in October 2013
(Credit: NASA/Ozone Hole Watch)

early October 2013, carried there by winds, occurred above the ozone destruction in the lower stratosphere. "Our work shows that the classic metrics based on the total ozone values have limitations – they don't tell us the whole story," Kramarova said. The classic metrics create the impression that the ozone hole has improved as a result of the Montreal Protocol. In reality, meteorology was responsible for the increased ozone and resulting smaller hole, as ozone-depleting substances that year were still elevated. The study has been submitted to the journal of *Atmospheric Chemistry and Physics*.

Source:
http://www.nasa.gov

NASA says ozone hole is stabilizing

According to a new research by the National Aeronautics and Space Administration (NASA), the United States, the hole in the ozone layer is stabilizing but will take until about 2070 to fully recover. The assessment comes more than two decades after the Montreal Protocol, the international treaty that banned chlorofluorocarbons (CFCs) and other compounds that deplete the ozone layer, which shields the planet from harmful ultraviolet rays. Levels of chlorine in the atmosphere are falling as a result of the treaty, but have not yet dropped below the threshold necessary to have a shrinking effect on the ozone hole that forms each year over Antarctica, according to scientists at NASA's Goddard Space Flight Center, Maryland. They presented their findings at the annual meeting of the American Geophysical Union in San Francisco.

That doesn't mean the ozone hole is getting worse. But scientists who track the ozone hole's uneven progress say it is still too soon to declare a recovery. For now, year-to-year variations in temperature and winds, which each year carry ozone from the tropics to polar regions, are the driving factors in the size of the hole. In 2006, the ozone hole grew larger than ever. It reached a similar extent in 2011, before shrinking to its second-smallest size in 2012. Naturally occurring meteorological conditions were mostly responsible for those fluctuations, two NASA studies found.

Over the next two decades scientists expect the ozone hole to continue to vary widely. "It's not going to be a smooth ride," said Susan Strahan, a senior research scientist at NASA. "There will be some bumps in the road, but overall the trend is downward." Not until chlorine falls below 1990s levels, a milestone scientists predict for sometime between 2015 and 2030, will the phase-out of ozone-depleting substances begin to have a discernible effect. At that rate, they project a full recovery by about 2070.

Source:
http://www.latimes.com

Researchers examined the beginning of ozone layer recovery

A group of researchers from Finland and the United States, have observed the weakening of ozone layer that protects the earth from ultraviolet radiation of the Sun has stopped and ozone levels have started to rise. "By using complex atmospheric models, it is possible to predict that the ozone layer will recover by the middle of this century," said Research Professor Erkki Kyrölä of the Finnish Meteorological Institute, Finland. A combined series of measurements over 27 years has been created with the help of the instruments on the GOMOS and SAGE II satellites.

The measurements indicate that a change took place in 1997. The year is the same when the levels of substances that destroy ozone reached their peak and then started to decline, according to the researchers. The positive development indicates that the 1988 Montreal Protocol banning the use of CFC gases, which destroy ozone layer, has been effective. Climate change speeds up the recovery of ozone in all areas except the Polar Regions where cooling of the upper atmosphere may accelerate the formation of polar stratospheric clouds, which also destroy ozone. SAGE II is an American satellite instrument, which measured ozone levels from 1984-2005 using solar radiation. The Finnish Meteorological Institute has GOMOS measuring instruments on the Envisat satellite of the European Space Agency. Envisat and GOMOS shut down in April 2013 for reasons that remained unknown.

Source:
http://www.finlandtimes.fi

India and UNEP organize workshop for spare parts dealers

The Ozone Cell, Ministry of Environment and Forests (MoEF), India, in association with the United Nations Environment Programme (UNEP), organized two and a half days awareness workshop for the Refrigeration Air-Conditioning (RAC) spare parts and refrigerant dealers on the HCFC Phase-out Management Plan (HPMP), India, in December 2013. The objective of the workshop was to build the capacity of the large population of HCFC users, refrigerant and RAC spare parts dealers, and other related key stakeholders to contribute towards not only preparing the country for use of alternatives to HCFCs, but also to help in the 10% reduction target for HCFCs of the baseline consumption of India by 1 January 2015 in the RAC servicing sector in compliance with the Montreal Protocol on substances that deplete the ozone layer.

Mr. Atul Bagai, Senior Regional Coordinator of the Compliance Assistance Programme (CAP), UNEP Regional Office for Asia and the Pacific, highlighted the challenges in the phase-out of HCFCs, particularly in the RAC servicing sector where technically proven, economically viable and environment-friendly alternatives to HCFCs are still emerging. This reality poses a challenge to RAC service technicians, spare parts dealers and refrigerant suppliers and other concerned stakeholders. He emphasized that workshops of this nature were not only creating awareness at the ground level but will also enable these stakeholders to develop capacity on alternatives to HCFCs, currently used as a refrigerant in the RAC sector. Considering the large population of service sector technicians operating in the country, there is an urgent need for preparing them to face the challenge.

The workshop focused on enhancing the skills and competencies of RAC service technicians, the need for recovery, recycling and reclamation, good tools and equipment for better servicing practices, including actual demonstrations by a representative from the academia and the industry. Discussions also highlighted the reuse of reclaimed refrigerants, safety aspects of flammable refrigerants as alternatives to HCFCs and the need of the RAC service technicians to adapt to the available alternatives. The workshop also highlighted the need for a RAC servicing sector association and its proposed role in the implementation of HCFC phase-out and to bring together all the technicians on the single platform to address all technical needs.

Source: http://www.unep.org

Progress on the implementation of HPMP

On behalf of the Government of India, the United Nations Development Programme (UNDP), has submitted a request for funding for the second tranche of stage I of the HCFC phase-out management plan (HPMP) at a total cost of US $8,846,064. The submission included a progress report on the implementation of the first tranche of the HPMP together with the tranche implementation plan for 2014 to 2015. For phase-out activities in the foam sector, 15 foam enterprises chose cyclopentane as the alternative technology and set milestones for performance-based Memorandum of Agreements (MOAs) signed with the Government of India by initiating the equipment procurement process and started seeking clearance for storage and use of a flammable foam-blowing agent on the manufacturing premises.

They have also submitted their modified production processes and layout drawings for conversion. UNDP expects to disburse US $8.98 million under this activity during the next eight months and technical assistance to the systems houses for customizing formulations using low-global-warming-potential (GWP) alternative blowing agents has also commenced. The small and medium-size foam enterprises (SMEs) have been also informed of the latest developments and emerging technological options. Once new foam formulations are developed, technical assistance activities, including outreach workshops for sharing information with SMEs, will be undertaken. To enable activities for compliance with stage I of the HPMP, the amended regulations for ODS control were approved and entered into force. The salient features includes:

- A ban on establishing new manufacturing capacity for products made with or containing HCFCs by 21 January 2013;
- A ban on issuance of licenses to import HCFC-141b pre-blended polyols from 21 January 2013;
- The introduction of a quota system for production, consumption and supply of domestically produced HCFCs for non-feedstock applications and reporting system for all feedstock applications; and
- A ban on imports of air-conditioning and refrigeration equipment and other products using HCFCs from 1 January 2015.

Source: http://www.multilateralfund.org

A drive towards natural refrigerants

The Building Services Research and Information Association (BSRIA), the United Kingdom, an instruments, research and consultancy organization, presented global heating, ventilation, and air conditioning (HVAC) market trends and drivers during the New York AHR Expo, organised on 21-23 January 2014. Drivers behind change in refrigeration markets are varied, and as a whole it can be argues that these markets move relatively slowly. However, across the world there is a trend towards natural refrigerants. This was the main conclusion of the BSRIA presentation by Anette Meyer Holley, which was based on a recent market study by the research group.

The study based on an in depth analysis of 9 markets (Brazil, China, France, Germany, India, Italy, Russia, UK and the USA), concluded that in Europe a key driving force is tightening legislation, with the new EU F-Gas Regulation pushing for more environmentally friendly refrigerants and higher energy efficiency. In developing markets, however, the central driver is often the need to reduce wastage of food and improve the cold chain.

In her presentation Holley suggested that in the period from 2011 to 2016 the fastest growth in the refrigeration market would be observed in India, where it was estimated to reach 14.5%, followed by Brazil, where it was predicted to reach 8.5%, and Russia and China, each with a respective growth forecast of 7.5% growth and 7%. Market growth in Italy, the USA, France, the UK and Germany is expected to be slower. Although the uptake of new technologies in these markets is still modest, it is a growing trend and BSRIA's analysis confirms a drive towards natural refrigerants.

Source: http://www.hydrocarbons21.com

Sri Lanka to keep a check on ozone-depleting substances

Mr. Susil Premajayantha, the Environment and Renewable Energy Minister, Sri Lanka, has announced that the importation as well as the use of equipment containing ozone-depleting substances (ODS) would be prohibited by 2020, adding that measures have already been taken to restrict the importation of these items gradually to meet the stipulated time line. Sri Lanka has already phased out 54 out of 96 ozone-depleting substances in harmony with the Montreal Protocol to which 197 countries have been signatory including Sri Lanka.

Phasing out of hydrochlorofluorocarbon (HCFC), which has 40 varieties, is the main challenge Sri Lanka has faced in order to meet the intended target. Sri Lanka could successfully phase-out chlorofluorocarbon (CFC) by 2010. As the next step, the importation of second hand air conditioners and refrigerators containing HCFC has been restricted with effect from January 1, 2013. Tool kits to detect ODS in imported goods have been introduced to Sri Lanka Customs. The minister said the disposal of refrigerators and air conditioners that release ODS including HCFC is now in progress, adding that new items free of ozone-depleting substances have been introduced to replace them. He said the ministry has paid attention towards proper disposal and maintenance of such equipment to prevent environmental hazards.

He said a network meeting of the officers of the South Asian Montreal Organization would be held in Sri Lanka from May 27-31, 2014. The US, Australia, Japan and the European Parliament are to send observer teams to the summit. International advice and corporation on controlling ozone-depleting substances in South Asian countries are expected at this meeting.

Source: http://www.dailynews.lk

UNIDO helps China convert AC production to R290

With the funding from the Multilateral Fund for the implementation of the Montreal Protocol, the United Nations Industrial Development Organization (UNIDO), has helped China to convert a production line for residential air conditioners to ozone and climate-friendly propane, improving energy efficiency of systems by 10-15%. This project provides useful experience for other developing countries seeking alternatives to ozone-depleting substances, especially in West Asia and Africa.

The conversion of the production line from ozone-depleting R22 to an alternative refrigerant propane (R290), which does not deplete the ozone layer and has a very low global warming potential (GWP), took place at Midea, a manufacturing company that has one of the largest air-conditioner production set-ups in China. The air conditioner production line converted by UNIDO has a production output of 200,000 units per year.

The project contributes towards China's commitment to freeze the consumption of hydrochlorofluorocarbons (HCFCs) by 1 January 2013, in line with the country's

obligations under the Montreal Protocol. In addition, this project could have an important impact on the entire Chinese market since hydrocarbons as an alternative technology to HCFC-22 with minimal climate impact has proven as viable and can now be adopted by other refrigeration and air conditioning manufacturers. The project has also significant demonstration value for the safe manufacturing, installation and servicing of products with flammable refrigerants.

Source: http://www.hydrocarbons21.com

Training programme on good practices in the servicing sector

The UNEP ROAP OzonAction Branch, Malaysia's Department of Environment, and Malaysia's Manpower Department, jointly organized a four-day workshop between the 12th-15th November 2013, where more than 40 national master trainers in good practice in the refrigeration servicing sector and National Ozone Officers from 21 countries of the Southeast and the Pacific and South Asia networks gathered at the Industrial Training Institute (ILP), Kepala Batas, Penang, Malaysia.

YBHG. Dato' Haji Ramli Bin HJ. Hassan, Director General of Manpower Department, Malaysia, said, "The aim of this workshop is to provide an opportunity for the national master trainers in this region to exchange views and ideas on delivering good practice in the refrigeration and air conditioning (RAC) sector by reducing significant consumption of HCFCs, and to build the capacity for hands-on skills of master trainers in the country." He further added that, "The refrigeration and air-conditioning servicing sectors are the major consumers of HCFC-22, thus the implementation of HPMP in these two sectors will significantly reduce the consumption of HCFCs. Hence, this Workshop on Good Practices in the Refrigeration and Air-Conditioning Servicing Sector is most timely and of upmost importance." The technicians training programme on good practices in the servicing sector is widely recognized as the most effective technical option. All countries in South Asia and Southeast Asia have included the promotion of good practices under their HCFC Phase-out Management Plan (HPMP).

"It is very encouraging to note that the master trainers have reached a common understanding that good practice training under the approved HPMP must include a new session on safe handling of flammable refrigerants, and a compulsory certificate system for servicing technicians might be a good option to ensure safe application of flammable refrigerants," said Shaofeng Hu, Regional Network Coordinator for the Southeast Asia region, UNEP ROAP, Bangkok.

Source: http://www.unep.org

Plasma arc destruction system for Canadian fridge recycling firm

PyroGenesis, a plasma gasification waste to energy technology developer in Canada, has signed an agreement with a Canadian end-of-life refrigerator and freezer recycler to provide additional equipment and services (including onsite optimization) for its patented Steam Plasma Arc (SPARC) destruction system for ozone-depleting substances (ODS). As part of this agreement, PyroGenesis said that its unnamed Client will commercialise the SPARC technology on an exclusive basis within Canada. This agreement was said to be worth around $1.5 million and include several options for follow-on service contracts, all of which are expected to be executed within 2014.

The technology developer explained that its SPARC system allows clients to safely destroy ozone-depleting substances (ODS), and can achieve 10x greater destruction efficiency as compared to current requirements. According to the company, the conservative estimates show that there are at least 25,000 tonnes per year of ODS that require destruction – representing over $100 million of business potential to PyroGenesis. "Our client intends to incorporate PyroGenesis' SPARC technology into its existing appliance recycling business," explained Gillian Holcroft, Executive Vice President, at PyroGenesis.

Source: http://www.waste-management-world.com

Researchers develop a catalyst to destroy CFCs

Researchers at the Universitat Jaume I (UJI), Spain, have developed a new catalyst for the "activation" of carbon-fluorine bonds. This process has many industrial applications, among which stands out the possibility to be used to reduce existing stocks of CFCs (chlorofluoro-carbonated compounds), known as "greenhouse gases". CFCs experienced a huge boom in the 80s, but later they were found to destroy the ozone layer because of their photochemical decomposition when they reached the upper layers of the atmosphere.

The Organometallic Chemistry and Homogeneous Catalysis Group coordinated by Eduardo Peris at the UJI has developed "the most

active catalyst that exists so far for the activation (in chemical jargon, "break") of carbon-fluorine bonds, which are the strongest bonds in organic molecules, and also the most difficult to break; hence the great difficulty of decomposing organic fluorinated compounds". The relevance of the results obtained has led the work, co-directed by Dr. José A. Mata and with the participation of the doctoral student Sara Sabater, to be published in the prestigious journal *Nature Communications*.

Source: http://www.alphagalileo.org

Permission for import-export of ozone-depleting substances

The Ministry of Natural Resource and Environment (MONRE) of Lao People's Democratic Republic, has issued an instruction (5615/MoNRE, dated 28 August 2013) on the registration and license permission for import-export, transit and import for re-export of ozone-depleting substances (refrigerant), manufacture of refrigeration and air-conditioning, and identification for import quota for the year 2014. Currently, the implementation of full compliance with obligations under the Montreal Protocol on phase-out the ozone-depleting substances (ODS) is aimed at the termination of using HCFCs that damage Ozone, specifically to refrigerant or R-22 which apply in general to the servicing and maintenance of refrigeration and air-conditioning equipment. In year 2014, the control of inspection on import-export, transit, and import for re-export will be applied as per the given procedure:

- ODS related Business Operators require to register and request an import-export and transit permit for refrigerant and refrigerant R-22 included in refrigerating equipment and air-conditioners from the Department of Pollution Control, Ministry of Natural Resource and Environment;
- ODS related Business Operators need to register and request permission and a license from the Department of Pollution, Ministry of Natural Resource and Environment for refrigerants and other refrigerant substances such as R-134a, R-404A, R-406A, R-407A, R-410A, R-600a, Ammonia; and
- Refrigerants or refrigerant substances, after receiving an import permission and license from the Department of Pollution Control, need to pass a quality inspection and obtain a certification sticker every time from the Customs authority at the border checkpoint.

Source: http://www.laotradeportal.gov.la

Indonesia optimistic about slashing HCFC use by 97.5%

Indonesia is optimistic about slashing the production and use of ozone-depleting hydrochlorofluorocarbons (HCFCs) by up to 97.5 percent as part of the country's commitment under the Vienna Convention and Montreal Protocol. "We are optimistic the target can be achieved since Indonesia managed to phase-out the use of chlorofluorocarbons (CFCs) in 2008, two years earlier than the target set by the Montreal Protocol," said Arief Yuwono, deputy for environmental destruction and climate change control to the environment minister, in Jakarta.

At a meeting in Montreal, Canada, on September 2007, all parties to the protocol agreed to expedite the phase-out of HCFC production and consumption between 2013 and 2030, he said. The parties also agreed to freeze production and consumption of HCFCs at the baseline level, the average of 2009 and 2010 consumption, as of January 2013, he said. The level will then be reduced by 10 percent starting in 2015; 35 percent in 2020; 67.5 percent in 2025; and 97.5 percent in 2030. Arief said the Indonesian government, through its national HCFC phase-out strategy, will achieve the target by switching from HCFC to non-HCFC technology, issuing new policies and regulations and educating the public about the importance of protecting the ozone layer.

Source: http://www.cleanbiz.asia

Research findings on low-global warming refrigerants

The Air-Conditioning, Heating and Refrigeration Institute (AHRI), the United States, has presented its research findings of low-global warming potential alternative refrigerants. The three-year program involved 20 technical experts investigating 38 refrigerants of low global warming potential (low-GWP) against baseline refrigerants such as R-22, R-134a, R404A and R410A which are in common use. The low GWP refrigerants were either single components or blends. The results showed that their GWP values "were significantly lower than their baseline refrigerants," said Karim Amrane, AHRI's vice president of regulatory policy and research. The refrigerants were tested in a range of systems, including air conditioners, heat pumps and chillers.

Source: http://www.canadianconsultingengineer.com

German carmakers make air conditioning breakthrough

Daimler, Germany, has developed a prototype mobile air conditioning system that makes the most of CO_2 as a coolant and it has already started lab testing. Meanwhile, Volkswagen is developing a CO_2MAC system, but testing has not yet begun. CO_2 is seen as a low global warming coolant that offers a legitimate alternative to R-1234yf. There are safety concerns surrounding the latter: indeed Daimler initially objected to its use back in 2012.

Since the late 1990s, greenhouse gas emissions from mobile air conditioning systems have been under investigation. Vehicles fitted with R134a MAC systems can produce emissions of 7g/km of CO_2. The industry created three alternatives: R744 (CO_2), R152a and R1234yf. CO_2 is seen as a good option because it is an A1 refrigerant with non-flammability and minimal toxicity. It is available worldwide at a low cost and has a high cooling capacity.

Source: http://www.thegreencarwebsite.co.uk

New refrigeration technology to cool drinks

The new V-Tex technology developed through the 'Rapidcool' project consortium, led by Enviro-cool and Pera Technology, the United Kingdom, has patented a technology that uses a unique spin cycle to achieve optimum cooling. As a result, it can cool a standard 350 ml can of drink in just 45 seconds. Steps have already been taken to cool multiple cans simultaneously, so the cooling time is expected to plummet even further to around 10 seconds. The innovation will mean that rather than storing cans for extended periods in energy hungry refrigeration units, consumers will be able to cool drinks at the point of purchase.

Paul Tattersall, Project Manager at Pera Technology, says, "Across Europe an estimated 85TWh of electricity is used; comparable to around 25 million households. Although incremental advancements in typical refrigeration technology are being made, these are unable to offset increasing use and pose a significant risk to the EC's overall commitment to reduce energy use by 20% to 2020. This is not the case with our solution. Enviro-Cool is now taking this technology forward, the product family is already growing, on top of the commercial unit a smaller compact unit is also in the pipeline which is ideal for domestic use."

The main challenge faced by the team was to optimise cooling efficiency to meet consumer demand for extremely fast cooling without 'slushing'. This occurs when the outer layers of liquid freeze before the inner liquid is cooled. The V-Tex technology rotates the drink under optimised conditions to create a 'Rankine vortex' and obtain cooling speeds better than other approaches whilst avoiding the effects of slushing and fizzing when the drink is opened. The cooling chamber can be easily integrated into existing vending machines or open-cabinets, in addition to working as a stand-alone cooling unit.

Source: http://www.foodanddrinktechnology.com

New Hybrid ground source heat pump

Kensa Heat Pumps, the United Kingdom, has developed a new Hybrid ground source heat pump to add to its product range. Designed to address cost concerns and peak heating and hot water demands of larger new builds and well insulated homes, the Hybrid ground source heat pump is available in 15kW and 21kW single phase models. According to Kensa, twin compressor Hybrid heat pump harnesses the properties of two separate refrigerants in its compressors to deliver heat outputs similar to those provided by Kensa's Standard models, along with hot water temperatures typically produced by their High Temperature models. This blended design is said to allow customers to enjoy both defining benefits of Kensa's product ranges in one affordable unit.

Guy Cashmore, technical director of Kensa Engineering, said "The properties of different refrigerants can meet specific needs, but each come with a compromise. For example, Standard Kensa models use R407C refrigerant to provide space heating outputs but as a result hot water temperatures are compromised to approx 50°C. The introduction of R134a refrigerant transforms the Standard into a High Temperature model, allowing the unit to produce hot water up to 60°C, but this reduces its space heating output. So to achieve space heating demand and hot water up to 60°C, traditionally we supplied a High Temperature model with a larger compressor to allow for the de-rating in the systems space heating output, which regrettably cost the customer more money. However, The Hybrid provides both space heating (up to 50°C) and hot water (up to 60°C) by using both refrigerants, one in each of the unit's compressors.

Source: http://www.renewableenergyinstaller.co.uk

Using CO_2 to reduce carbon footprint

Carrier Corp., the United States, recently announced its NaturaLINE marine container refrigeration system. This system, with its CO_2-based refrigerant, reduces the carbon footprint by 35 percent compared to its predecessor, primarily due its higher energy efficiency. Its carbon footprint also shrinks due to the fact that CO_2 is a far less potent greenhouse gas (GHG) than its CFC-based predecessor, Freon. NaturaLINE systems also recycle CO_2 that has been pulled out of the environment, making them carbon neutral in this regard. The amount of refrigerant used in each system is relatively small, so this does not represent a substantial opportunity for carbon sequestration. Still, no new CO_2 is being made, and when a system is decommissioned the refrigerant is collected and reused as it is with conventional refrigerants. The market for this product is the 175,000 refrigerated container ships that ply the ocean cooling roughly $6 billion worth of cargo every year.

This was a technical challenge for Carrier, since the use of CO_2 as a refrigerant requires high pressures, which typically involves a good deal of power consumption. Carbon dioxide is unusual because it cannot exist in a liquid form under ambient conditions but instead goes directly from a solid to a gas through a process called sublimation. That is what you observe when a piece of dry ice is exposed to room temperature. Engineers at Carrier have found a way to compress the CO_2 gas to the point where it becomes a liquid (a critical step in the refrigeration cycle) using relatively little energy. In fact, the efficiency of NaturaLINE matches the best in its class.

Source: http://www.news.thomasnet.com

CO_2 compressor unit for ice arenas

Developed by Sytemes LMP, Canada, the 'Crystal Module' is one of many different refrigeration modules which is ideal for artificial cooling of arena ice slabs. Suitable for new constructions and ice rinks undergoing renovation, the Crystal Module has an operating capacity of 30 to 240 tons and includes heat recovery and the possibility for preheating domestic water. With over 15 years of experience in the field of refrigeration, Systems LMP is highly regarded in the field of energy-efficient and reliable CO_2 cooling modules and heat recovery systems. The Crystal ice rinks module using CO_2 is equipped with an optimised control system for maximised lifespan of the compressors and other various components. The use of CO_2 provides a high temperature fluid for heat recovery, and the heat recovery CO_2 coils can be used for heating and dehumidification.

The Crystal is a state of the art cooling module specifically designed for cooling ice slabs and is engineered to recover 100% of the heat rejected by the compressors. The ice temperatures can be easily adjusted depending on the activity, with our innovative control strategies. Like all our CO_2 technologies our Crystal module comes with our oil control system so as to eliminate any oil problem. If you are looking to reduce your costs in energy, maintenance and completely eliminate your CFC's and HCFC's, the Crystal is your best option," says Jeff Gringas, Vice President of Sales, Systemes LMP.

Source: http://www.r744.com

Safety tests for Mercedes CO_2 refrigerant

Mercedes-Benz has been developing its own CO_2 air conditioning system as the row surrounding its use of R134a refrigerant shows no sign of abating. The European Commission (EC) has launched its first steps in a potential infringement procedure against Germany, with Berlin rapidly informing Brussels by reply it believes it adheres to climate emissions reductions.

The automaker contends the alternative R1234yf coolant can be a fire hazard in certain circumstances, with manufacturer Honeywell, vigorously defending its properties, while the German Transport Ministry told that it was "not wise in the view of safety to use something that obviously bears risk." However, at the same time as the long-running saga echos around the corridors of power, Mercedes is undertaking its own CO_2-based air conditioning tests in order to meet a 2017 target for entry into service.

"We are at full throttle developing our CO_2 air conditioning systems," a spokesman from Mercedes-Benz, Germany said. "We have our first prototype in testing since December. These are vehicles from three different model ranges – we will expand our fleet of prototypes step by step. "We will do this in every type of climate zone this year, for example, northern Sweden and Death Valley." The Mercedes spokesman added this process was currently being undertaken "with every German car manufacturer" as well as suppliers.

Source: http://www.just-auto.com

New precision cleaning agent

Vertrel® Sion™ azeotrope is a higher solvency precision cleaning agent developed in response to worldwide market demand for safe, non-flammable and low environmental impact products for high end industrial cleaning applications such as vapour degreasing and manual cleaning. Based on new fluorinated chemistry developed by DuPont, the United Kingdom, under its brand name DuPont™ Vertrel®, has launched a new range of fluids that allows users with special applications, including precision cleaning, heat transfer (cooling) and carrier fluid (lubricants, oils, greases, etc.) to exceed stringent environmental standards, while maintaining high levels of performance. DuPont has started the introduction of these next-generation fluids as cost-effective replacements for PFCs and PFPEs, HFCs and HFEs.

Vertrel® Sion™ azeotrope is a binary azeotropic mixture based on this new fluorinated chemistry. It offers a higher solvency precision cleaning agent developed in response to worldwide market demand for safe, non-flammable and low environmental impact products for high-end industrial cleaning applications such as vapour phase degreasing, manual cleaning and open top, closed or hermetic equipment. The solvent is based on new extremely low (<1) Global Warming Potential (GWP), HFO-fluorinated chemistry. As well as providing powerful cleaning performance (Kb > 100) with reduced cycle times, Vertrel® Sion™ also has a very favourable toxicity profile, is recyclable and reusable, non-flammable and has a low boiling point (47°C), making it fast drying and immediately ready for handling and use.

Mark Hughes, Business Development & Sales Manager EMEA DuPont™ Vertrel® Specialty Fluids says: "Vertrel® Sion™ can successfully replace many high cost HFE materials, as well as nPB, HFC-365 blends and other hazardous chlorinated solvents in existing equipment. It can also be used as a safe, viable alternative to fast evaporating, flammable materials typically used in cold cleaning applications such as IPA, acetone, thinners and MEK. Furthermore, Vertrel® Sion™ is cost effective and is the lowest cost fluorinated solvent available on the market today." *Contact: Dean Palmer, SilverBullet PR Ltd., United Kingdom. Tel: +44-1780-753-000; E-mail: dean@silverbulletpr.co.uk.*

Source: http://www.us.vocuspr.com

US to ban HCFC 225 production by 2015

The United States Environmental Protection Agency (EPA), will ban HCFC 225 production and importation on January 1, 2015 because of its ozone depletion potential. In this regard an Occupational Safety and Health Administration (OSHA) alert has been issued concerning the health hazards of n-Propyl Bromide (nPB). Occupational exposure to nPB has been linked to non-reversible neurological illnesses. Animal studies show that nPB may also cause cancer and reproductive disorders.

Miller-Stephenson, the United States, has developed safer and non-ozone depleting alternatives to nPB and HCFC 225. Their products have superior cleaning for a wide range of contaminates, non-ozone depleting, low order of toxicity, evaporates quickly, leaves no residue, nonflammable, compatible with most plastics, metals and elastomers and existing equipment can be used with minor or no modifications. Some formulations are ideally suited for vapor degreasing applications and provide excellent cleaning performance. High purity industrial cleaning is vital in maintaining component and system reliability. Therefore, Miller-Stephenson ensures the highest-grade manufactured-certified solvents for your cleaning needs. *Contact: Miller-Stephenson, 12261 Foothill Blvd., Sylmar, CA 91342, USA. Tel: +1-800-771-8161; Fax: +1-818-896-6086; E-mail: ca.sales@miller-stephenson.com.*

Source: http://www.miller-stephenson.com

Water-based heat sealing and heat activation coating

Developed by Aqua Based Technologies, (a division of ADM Tronics Unlimited, Inc.), the United States, the Aqualene® 1185HS is a new, eco-friendly, water-based heat sealable or heat activated coating, for a wide range of plastic films, such as polyester (PET), polystyrene (PS), vinyl (PVC), paper, paperboard, and aluminum foil. This heat-seal coating technology is suitable for a wide range of packaging applications where heat sealed or heat activated combinations are required.

Aqualene® 1185HS was designed to be applied by flexographic presses and other roller coating applicators used in both web and sheet-fed production equipment. Heat sealing or heat activation is

achieved at only 210°-230°F (98°-110°C) allowing for use in a wide range of packaging structures. Aqualene® 1185HS is completely water-based, containing no volatile organic compounds (VOC-free) or ozone-depleting ingredients, making it environmentally safe, without requiring emission controls or safety procedures as are necessary for competitive, hazardous, solvent-based coatings. It is easy to clean up without the use of caustic or hazardous cleaning products. *Contact: Aqua Based Technologies, 224 Pegasus Avenue, Northvale, New Jersey 07647, USA. Tel: +1-201-767-6040; Fax: +1-201-784-0620; E-mail: sales@aquabased.com.*

Source: http://www.news.thomasnet.com

Cable cleaning kit

The 3M CC Series Cable Cleaning Solvent is a full strength non-ozone depleting cleaner, degreaser for use as an effective replacement for 1,1,1-Trichloroethane and other hazardous solvents. Formulated to exhibit excellent cleaning and degreasing properties. Supplied as a liquid solvent, or in a saturated pad. Its features includes:

- The solvent is a colourless non-conducting liquid that emanates a light orange peel scent;
- It is compatible with all solid dielectric cable insulations; and
- It will not cause cracking on insulation surfaces and it evaporates completely.

The solvent is suitable for use on transformers, generators, motors, vehicles and metal parts to remove surface oils, tars and heavy greases.

Source: http://www.solutions.3m.co.uk

Ultrasonic vapor degreaser

The new Ultrasonic Vapour Degreaser (UVD) from Soniclean, Australia, provides precision cleaning of various components including oxygen, nitrogen, hydraulic, gyrosystems, airframe and engine parts. The UVD has been designed to be used with solvents that have been made to impact minimally on the environment, prevent pollution and conserve resources.

Soniclean's UVD uses pulse swept power to clean with superior penetration, precision and reliability. This technology uses pulsed ultrasonics to ensure powerful, reliable, uniform cleaning to fine parts without the risk of damage to delicate items. Our commitment to excellence means that all of our units are made to the highest standards. The units are designed to exceed the Australian Standards 2661 and to provide software driven precision cleaning process control, with an incredible small footprint powered from a standard 15 amps electrical supply. Its features includes:

- Safe and environmentally friendly;
- Easy to use: Unique Access Chamber with solvent recovery system and viewing window;
- Microprocessor control for precise process management,

Ultrasonic Vapour Degreaser

cleaning and maintenance; and
- Easy access to maintenance areas such as the boil tanks.

Contact: Soniclean, 38 Anderson Street, The Barton, South Australia-5031. Tel: +61-8-823-483-98; Fax: +61-8-823-483-91; E-mail: sales@soniclean.com.au.

Source: http://www.soniclean.com.au

Drop-in solvent replacement

VaporFlor™ 4.5 Solvent from Florachem, USA, is the ultimate drop-in replacement for trichloroethylene (TCE), perchloroethylene (PERC), HCFC-225 and other regulated solvents in open top and vacuum vapor degreasers. VaporFlor 4.5 is non-flammable, SNAP approved and has outstanding solvency. Used as directed, VaporFlor 4.5 will help reduce hazardous emissions, minimize environmental reporting and is considered the low cost alternative when switching from chlorinated solvents.

VaporFlor 4.5 is a precise mixture of n-propyl bromide (nPB), alcohol and stabilizers. This powerful azeotrope is perfect for cleaning, rinsing and drying all types of precision parts in a waterless process. VaporFlor 4.5 should only be used in tightly controlled open top or vacuum vapor degreasers to minimize operator exposure and emissive losses. VaporFlor Solvent is compatible with most materials and parts typically cleaned with chlorinated solvents in vapor degreasers. *Contact: Florachem Corporation, 5209, San Jose Blvd., Jacksonville, Florida, USA-32207-7663. Tel: +1-904- 733-5759; Fax: +1-904-733-5950; E-mail: cleaning@florachem.com.*

Source: http://www.cleaning.florachem.com

Water mist based compressed air foam system

The fire extinguishers from Advanced Firefighting Technology (AFT) GmbH, Germany, represent the state of the art technology in efficient firefighting produced with high quality precision parts and German engineering expertise. AFT has applied advanced aerodynamic technology from flow engineering applications involving liquid/gas mixtures to create water mist firefighting systems.

Portable and mobile water mist based compressed air foam system (CAFS) extinguishers reduce response time, increase efficiency and control the fire hazard in the initial stage. The specially designed atomization nozzle creates optimum droplet sizes for extensive heat absorption with maximum lancing distance. AFT products are designed to operate with either water or most available foam agent and are manufactured in different sizes from 9 to 1000 liters. *Contact: Advanced Firefighting Technology GmbH, Heggenkamp 15, D-49163 Bohmte, Germany. Tel: +49-5471-97307-0; Fax: +49-5471-97307-20; E-mail: info@aftgmbh.com.*

Source: http://www.intersec.german-pavilion.com

Water mist extinguishing system

The Aquatech® from Tema Sistemi S.p.A., Italy, is a highly innovative high-pressure water mist fire extinguishing system, characterized by a high level of modularity and by advanced operational performance in order to be able to extinguish the most dangerous fires due to the generation of a fog through the turbulent motion of directional water droplets.

The technological solutions based on water mist are contained in two product lines Aquatech® which uses only high-pressure water and Aquatech® Plus which operates at a low pressure and uses water mixed with a special additive wetting agent type. Thanks to the many progresses in Aquatech® water mist technology, water-based fire suppression works in the best intelligent and efficient way, in a wide variety of applications. *Contact: Tema Sistemi S.p.a., 48123, Via Romagnoli, 4, Italy. Tel: +39-0544-4550-65; Fax: +39-0544-4591-40; E-mail: info@temasistemi.com.*

Source: http://www.temasistemi.eu

Engineered clean agent systems for larger environments

Firetrace International, the United States, a leader in special hazard fire suppression, offers a full range of engineered clean agent systems for larger environments and complements the Firetrace line of in-cabinet fire suppression systems. Firetrace E4 clean agent fire protection systems, featuring 3M Novec 1230 Fire Suppression Fluid, are poised to change the industry by offering dramatic systems performance improvements utilizing low-pressure hardware.

In developing Firetrace E4 systems, traditional conventions were thrown out, allowing a fresh look at how E4 could benefit from the unique flow characteristics of Novec 1230. Novec 1230 doesn't share the same volatility as HFC 227ea, and as such can be safely charged to 500 psi (35 bar) in the same hardware that would limit HFC 227ea pressurization to 360 psi (25 bar). This increased pressure, combined with the liquid flow characteristics of Novec 1230 in the discharge piping, has enabled unparalleled flexibility in discharge network design, enabling designs that require less piping, lower installation costs, and well as designs that simply could not be achieved without the incorporation of expensive nitrogen driver systems.

E4 system cylinders are available in fill ranges ranging from 8 to 1300 lbs. (3.5 to 588 kg) that can be combined to create fire suppression systems sized appropriately for any room. Firetrace Engineered Clean Agent Systems can be activated either manually or automatically using electrical activation. *Contact: Firetrace International, LLC, 8435 N. 90th St., Suite 2, Scottsdale, AZ 85258, USA. Tel: +1-480-607-1218; Fax: +1-480-315-1316.*

Source: http://www.firetrace.com

Non-halon fire suppression system

Eclipse Aerospace, the United States, has developed the first new engine fire suppression system in 50 years, PhostrEx. Used exclusively on the Eclipse Jet, PhostrEx is the only non-Halon engine fire suppression system approved by the Environmental Protection Agency (EPA) and Federal Aviation Administration (FAA) and is the first new engine fire suppression system to be approved since 1954. The result of these dual approvals is that PhostrEx is the only fire suppression system today that can meet the standards of the Montreal Protocol. The patented PhostrEx fire suppression system is superior to Halon systems in all respects. *Contact: Eclipse Aerospace, Inc., USA. Tel: +1-843-284-1164; E-Mail: info@phostrex.com.*

Source: http://www.eclipse.aero

Foam blowing agent technology for superior insulation

Whirlpool Corporation, the United States, has announced that it has implemented the use of Honeywell's Solstice® Liquid Blowing Agent (LBA), into its environmentally responsible and energy efficient insulation used in U.S. made refrigerators and freezers. The global warming potential (GWP) of the new foam blowing agent is 99.9% lower than 245fa the most common foam blowing agent widely used within the U.S. industry, resulting in a more environmentally-responsible household refrigerator. The conversion of all U.S. manufacturing centers is scheduled to be completed by the end of 2014 and the impact to the global warming effect will be the equivalent of removing more than 400,000 cars from the road.

"Whirlpool Corporation and Honeywell believe we have responsibility to be as proactive as we can to preserve our environment, and meet the demands of our consumers," said Joseph Liotine, president of Whirlpool U.S. operations. "By introducing this new insulation to our refrigerators, we've taken steps to reduce global warming potential, the most significant contributor to environmental impact for refrigerators without compromising quality or the energy efficiency of our appliances."

This is the first use of the innovative blowing agents in home appliances. Through the partnership Whirlpool Corporation is the world's first home appliance manufacturer to begin implementing Honeywell's new Solstice® blowing agent in its foam insulation. The company has already voluntarily begun phasing out its use of hydroflurocarbons (HFCs) in its U.S. refrigerators and freezers utilizing the co-developed foam that provides more energy efficiency than commonly used hydrocarbons and the lowest global warming potential in its class.

Source: http://www.einnews.com

Foam-making machine to phase-out ODS

The Federal Ministry of Environment, Nigeria, has announced that it had fabricated a foam-making machine in Ozone village at Irolu in Ogun in a bid to phase-out ozone-depleting substances (ODS). The National Ozone Officer, Kasimu Bayero, said that a locally-made prototype ozone-friendly chlorofluorcarbons (CFCs) recovery and recycling machine had also been developed and installed at the village. "The idea of ozone village came up as a technology development centre that will be able to promote indigenous technology, to be able to sustain all the gains that we have made in this drive to protect the ozone layer through the phase-out of ozone-depleting substances.

Bayero, who is also a deputy director in the Department of Pollution and Environmental Health, said that most of the activities for phasing out ozone-depleting substances in Nigeria were funded through the multilateral funding mechanism of the Montreal Protocol. According to him, multilateral funding is an international arrangement to assist the developing countries to phase-out the use of ozone-depleting substance and meet their obligations under the protocol. He said that in early days of the protocol Nigeria played a prominent role, adding that "the idea was that most of these substances, we don't manufacture them but we only use them".

The official said that for Nigeria to be able to meet its obligations, the protocol must be able to assist developing countries. He said, "We have phased out CFCs (Chlorofluorcarbon) in over 110 foam industries in Nigeria and in over 26 refrigerator manufacturing companies." There are 26 training centres in Nigeria that have been identified, that have also been supported with recovering and recycling equipment for refrigerator servicing. The project was guaranteed by the growing demands for OD and low Global Warming alternatives to OD substances, presently used in the refrigeration sector and other industrial applications.

Source: http://www.telegraphng.com

Biodegradable surfboard foam

Tecniq LLC, the United States and Synbra, the Netherlands, have teamed up to develop the new surfboard foam technology named 'Bióm' which is the world's first certified 100% biodegradable and 99% bio-based surfboard foam. The new product utilizes converted locally abundant sugarcane biomass that is polymerized and expanded into rigid foam. The first manufacturing site will be located in the Netherlands, with production commencing in the third quarter of 2014.

"Surfboards have been overwhelmingly made out of petroleum products since the 1950s. We've worked really hard to create an alternative that doesn't compromise performance and that delivers tried-and-true characteristics for surfers, shapers, and glassers alike," explains developer Rob Falken. Bióm will also find use in stand up paddleboards, wakeboards and other types of watercraft, and the foam boasts the ultra-eco use of benign CO_2 as the sole blowing agent in the expansion process.

Source: http://www.surfertoday.com

Researchers look for methyl bromide replacements

Researchers from the University of Florida's Citrus Research and Education Center, the United States, are looking for methyl bromide replacements to help vegetable growers to achieve similar results from substitute fumigants. "Methyl bromide was special," says Joe Noling, professor of nematology. "Replacing it was a challenge." Growers have several fumigant choices but the new materials require more management and are more affected by moisture, temperature and other environmental conditions, says Gary Vallad, associate professor of plant pathology at the University of Florida's Gulf Coast Research Center in Wimauma.

To get the best results from methyl bromide substitutes, "You've got to be on your game," says Stanley Culpepper, extension agronomist in weed science at the University of Georgia, the United States. Culpepper helped develop Trifecta, a mixture of Telone II (1,3-dichloropropene), chloropicrin and dimethyl disulfide (DMDS). Trifecta achieves that by putting three fumigants into a single application cylinder. "Methyl bromide was idiot-proof," producing acceptable results under all conditions, says Scott DiMare, director of farm operations for DiMare Fresh Inc., the United States. "Now all these little mistakes show up and show up big time." DiMare has tested most methyl bromide alternatives and has settled on Pic-Clor 60 (a mixture of 1,3-dichloropropene and chloropicrin) as his best bet so far. "Some have better weed control, some are better with disease," he says.

Weeds are the main ongoing problem for Georgia growers, Culpepper says. "Usually when we have a problem, we missed nutsedge. But that was also an issue with methyl bromide," he says. Trifecta is effective on nutsedge, but does little against annual grasses and broadleaf weeds. "In almost all situations, growers are going to have to use herbicides," Culpepper says.

Source: http://www.thegrower.com

Scientists study organic alternatives to soil fumigants

Scientists from the University of California, the United States, have reported that they are finding alternatives to Methyl Bromide and other dangerous soil fumigants. Soil fumigation is needed in large scale agriculture for production of strawberries, nut crops and nursery stock. The fumigants commonly used include Methyl Bromide, a soil sterilant tied to ozone layer depletion and chloropicrin, a chemical linked to cancer. These and other sterilants are volatile and drift away from the fields, often into adjacent housing.

Practices and regulations have tried to define safe buffer zones around fumigated fields, but ever expanding housing and public outcry over chemical exposure dangers are forcing changes in the industry practices. Scientists examined everything from reducing exposure to eliminating MB use entirely. They examined films covering the fields to retain the vapors released. These films reduced the chemicals needed and reduced, but did not eliminate, emissions. Scientists also studied soil-less growing in Coir (coconut husk fibers), pea-moss, wood chips and other sterile media. The problem is this isn't sustainable, needs drip irrigation, continuous chemical monitoring and nutrient adjustments, plus the overhead of obtaining, distributing and disposing of the substrate after a season.

A research has shown a promising and organic method of soil sterilization that rivals the nastiest of ag chemicals but is 100% organic and toxin free. This is called 'anaerobic soil disinfestation'. The method has had varying success in widespread trials but is somewhat dependent on technique, soil and weather. This technique appeals to the sustainable gardener. Oleg Daugovish, Ventura County Farm Advisor says, "Florida used composted chicken manure and molasses and it worked for them", the goes on to suggest a local option of "onion waste which is rather watery but is free and we had some good preliminary results with it."

Source: http://www.gardening-coaches.com

New methyl bromide recapture system

Genera Limited, New Zealand, has invested in new methyl bromide recapture equipment for use at CentrePort in New Zealand. Genera have installed the latest Nordiko system for fumigant gas recapture. The system can recapture fumigant gases from four 40 foot shipping containers simultaneously. Installation of this system is a win-win, greening up biosecurity treatment at CentrePort while giving Genera an opportunity to operate the latest recapture equipment and compare the performance of equipment that we are developing as part of our in-house research and development strategy against the best equipment currently available. Genera will sub-lease use of this equipment to other port operators to enable methyl bromide to be recaptured from all fumigations performed at CentrePort.

Contact: Genera Limited, PO Box 4106, Mount Maunganui South 3149, New Zealand. Tel: +800-100-399.

Source: http://www.genera.co.nz

Biopesticide soil treatment system

Isagro, the United States, has received approval from the U.S. Environmental Protection Agency (EPA) for DOMINUS, a broad-spectrum product that controls soil-borne fungi, nematodes, weeds and insects. DOMINUS is registered as a biopesticide, a pesticide based on natural materials, and is the first biofumigant created for use on both conventional and organic farms. DOMINUS has been submitted to the USDepartment of Agriculture for addition to the National Organic Program's (NOP) list of approved substances for organic crop production. The company expects NOP approval by 2015.

DOMINUS is based on Isagro's patented technology and contains the active ingredient allyl isothiocyanate (AITC), a compound created as a natural defense by plants (from glucosinolate and myrosinase interaction) and known commonly as oil of mustard. AITC was first registered by the EPA in 1962 and has been in continuous use in a variety of products including pesticides for more than 50 years. Oil of mustard is also a flavoring agent and is approved by the U.S. Food and Drug Administration (FDA) and listed as Generally Regarded as Safe (GRAS).

"DOMINUS is effective and versatile and will be a welcome addition to the growers' crop protection tools," said Alessandro Mariani, Isagro USA president. "We are very proud to deliver DOMINUS as the first product fully developed by our USA team, capable of addressing many of the challenges facing growers today." Because DOMINUS is a biopesticide based on natural plant defenses, it is considered to be inherently less toxic and therefore allows for greater ease of use than conventional fumigants and can be applied with tractor mounted shank injection or diluted in drip injection equipment. *Contact: Mike Allan, Global Project Leader, Biofumigants, Isagro, USA. Tel: +1-415-254-5711; E-mail: mallan@isagro-usa.com.*

Source: http://www.farmchemicalsinternational.com

A new soil fumigant

MustGrow™ developed by Mustard Products & Technologies Inc. (MPT), Canada, offers a broad range of soil borne nematodes such as Root Knot, Sting, Ring and Spiral along with the management of soil diseases such as Verticillium, Fusarium, and Pythium. The majority of MPT field studies have focused on the use of the product as a pre-plant plant granular treatment applied 14 days prior to transplanting the crop. Although any crops can follow a MustGrow™ treatment, MPT has focused on it's use in strawberry, raspberry and tomato crops.

It is the performance of MustGrow™ in the field that is truly intriguing, especially when looking at yields; quite often it out performs those obtained from Methyl Bromide and InlineR. MPT the manufactures of MustGrow™ have been adamant about launching the product on a solid foundation of scientific research and product performance data. MPT has committed an extensive amount of research across North America, most significantly in California.

Soil disease control was recorded in 10 trials 14-28 days after application. Results as expected with MustGrow™ alone were not as good as with the synthetic products but no disease systems were evident in the crop and yields were not affected. Additional trials found that reduced MustGrow™ rates with a sequential application of Chloropicrin, also at low rates, resulted in outstanding soil pathogen and disease control.

Source: http://www.mbao.org

Fumigants for strawberry production

Scientists from the University of California, the United States, have studied the minimum application rates of allyl isothiocyanate (IRF-135) and dimethyl disulfide (Paladin) applied under totally impermeable film (TIF) for strawberry production. Allyl isothiocyanate was bed shank applied at 170, 255, and 340 lbs/acre. Two mixtures of dimethyl disulfide with chloropicrin were applied at 500 lbs/acre (79% dimethyl disulfide +21% chloropicrin) and 400 lbs/acre (50% dimethyl disulfide +50% chloropicrin). Fumigants were applied in October, 2012. Strawberry (Albion variety) was transplanted in November, 2012. Each treatment was 100 feet long and was replicated 4 times. Yield data were taken weekly throughout the production season and were graded into marketable and nonmarketable yields. Weed data were collected three times and combined.

Results suggest that 340 lbs/ac of allyl isothiocyanate applied under totally impermeable film (TIF) can produce fruit yields equivalent to PicClor-60. Also, 400 to 500 lbs/ac of DMDS mixtures with chloropicrin can be effective soil treatments for strawberry production.

Source: http://www.mbao.org

RECENT PUBLICATIONS

Adsorption Refrigeration Technology: Theory and Application

Systematically covering the technology of adsorption refrigeration, this book provides readers with a technical understanding of the topic as well as detailed information on the state-of-the-art from leading researchers in the field. Introducing readers to background on the development of adsorption refrigeration, the authors also cover the development of adsorbents, various thermodynamic theories, the design of adsorption systems and adsorption refrigeration cycles. *Contact: John Wiley & Sons Singapore Pte. Ltd., 1 Fusionopolis Walk, #07-01 Solaris South Tower, Singapore-138628. Tel: +65-6643-8333; Fax: +65-6643-8397; E-mail: csd_ord@wiley.com*

GUIDE 2014: Natural Refrigerants – Continued Growth & Innovation in Europe

Following the first edition in early 2012, the GUIDE Europe 2014 edition features completely updated information to keep up with the fast-moving natural refrigerant market. For newcomers and experts alike, the latest GUIDE will analyse the essentials of the rapidly evolving European market. The contents include: Commercial/Light-Commercial Market Maps; About Natural Refrigerants & Ecosystems; Natural Refrigerants in the Food Chain; Europe-wide Industry Survey; Policy & Legislative Drivers. *Contact: Shecco SPRL, Rue Royale 15, 1000, Brussels, Belgium. Tel: +32-2-230-3700; Fax: +32-2-280- 0436; E-mail: europe@shecco.com*

Ozone and Ozone Depletion: Sources, Environmental Impact and Health

This book fills that void in the literature by providing a unique collection of our understanding of the "good" and "bad" of ozone gas. The one-of-a-kind compilation of chapters written by leading experts in the field from all over the world will serve world scientists, teachers, students, and regulators as a single reference to a global perspective. The book's objective is to try and give the 'overall picture' to the readers on different topics in the field of ozone. *Contact: Nova Science Publishers, Inc., 400 Oser Ave Suite 1600, Hauppauge NY 11788-3619, United States of America. Tel: +1-631-231-7269; Fax: +1-631-231-8175; E-mail: nova.main@novapublishers.com*

TECH EVENTS

9-11 Apr
Beijing, China
China Refrigeration Expo
Contact: Mr. Jeff Malley
E-mail: eiusa@optonline.net,
Web: http://www.cr-expo.com

13-14 May
Vienna, Austria
International Blowing Agents and Foaming Processes 2014 Conference
Contact: Smithers Rapra
E-mail: info@smithersrapra.com
Web: http://www.foamblowingagents.com

18-21 May
Jeju Island, Republic of Korea
The 7th Asian Conference on Refrigeration and Air Conditioning
Contact: Congress Secretariat
#902, KSTC New Bldg, 22, 7-gil, Teheran-ro, Gangnam-gu, Seoul, 135-703, Republic of Korea
Tel: +82-2-554-8571
Fax: +82-2-552-3929
E-mail: acra2014@nate.com
Web: http://www.acra2014.org

10-12 Jun
Tehran, Iran
The 5th International Conference on Heating, Ventilating and Air Conditioning
Contact: Mr. Sina Mostowfie
Conference Project Manager
Office of International Relations
No. 53, Mansoor St. Motahari Ave.
Tehran, Islamic Republic of Iran
Tel: +98-21-887-159-0810
Fax: +98-21-887-264-78
E-mail: info@hvac-conference.ir, sina@mech.ir
Web: http://www.hvac-conference.ir

14-17 Jul
West Lafayette, USA
The 22nd International Compressor Engineering Conference, The 15th International Refrigeration and Air Conditioning Conference
Contact: Kim Stockment
Conference Coordinator
Purdue University,
140, S. Martin Jischke Drive,
West Lafayette, IN 47907-2031, USA
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E-mail: herlconf@purdue.edu
Web: http://www.engineering.purdue.edu

31 Aug-2 Sep
Hangzhou, China
11th IIR-Gustav Lorentzen Conference on Natural Refrigerants
Contact: Mr. Wangyang HU
Tel: +86-10-684-346-83
E-mail: gl2014@car.org.cn
Web: http://www.gl2014.org

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