VATIS UPDATE

Ozone Layer Protection

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Apprise yourself with the latest technological innovations

Highlights

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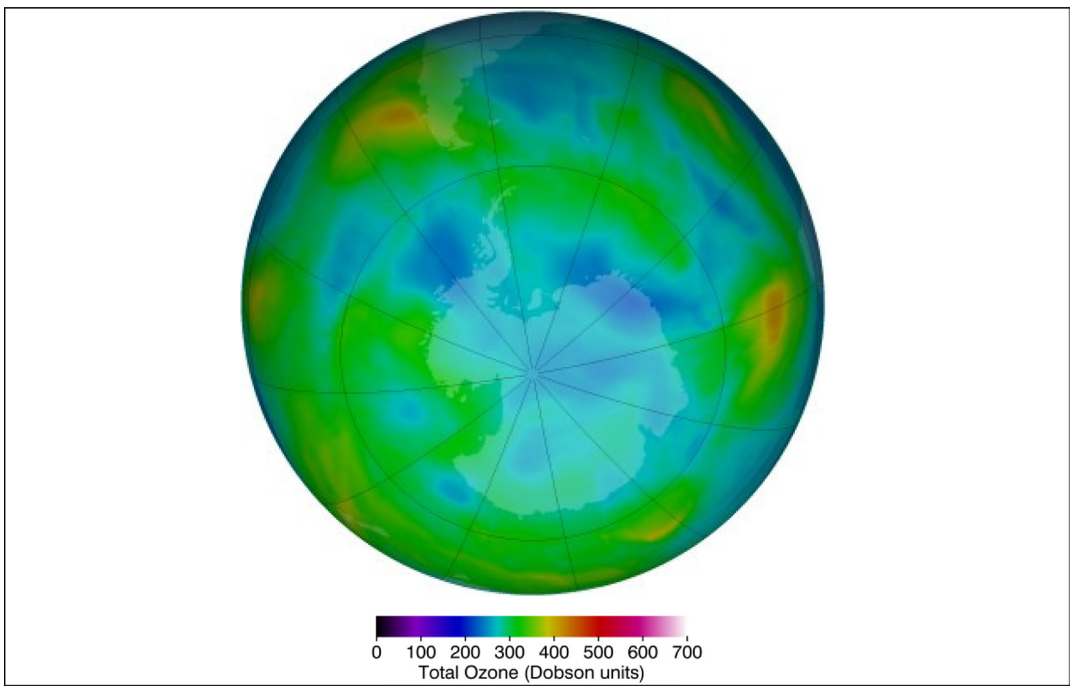


APCTT
Asian and Pacific Centre for Transfer of Technology

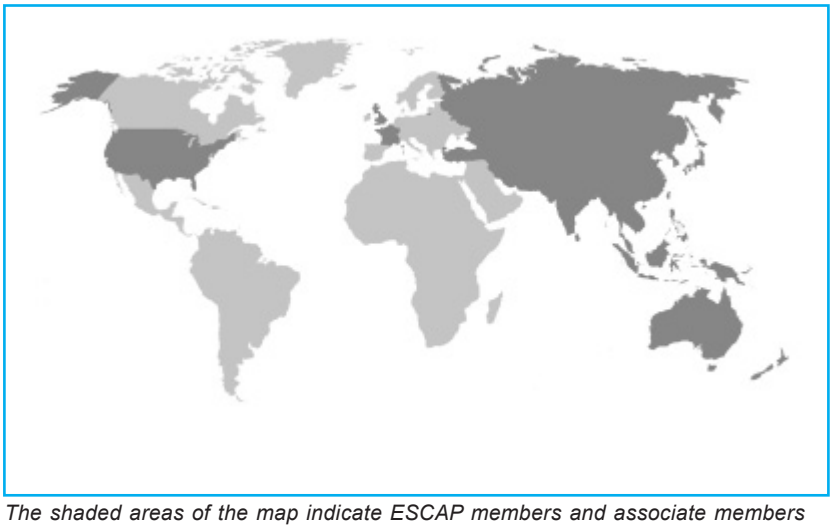
UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Ozone Cell
Ministry of Environment, Forests & Climate Change
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

The latest (09 August 2015) false-color view of total ozone over the Antarctic pole.The purple and blue colors are where there is the least ozone, and the yellows and reds are where there is more ozone.

(Credit: NASA, USA)

VATIS* Update
Ozone Layer Protection
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ASIAN AND PACIFIC CENTRE FOR TRANSFER OF TECHNOLOGY
Adjoining Technology Bhawan
Qutab Institutional Area
Post Box No. 4575
New Delhi 110 016, India
Tel: +91-11-3097 3700
Fax: +91-11-2685 6274
E-mail: postmaster.apctt@un.org
Website: http://www.apctt.org

OZONE CELL
Ministry of Environment, Forests & Climate Change
Government of India
Zone IV, East Court, 2nd Floor
India Habitat Centre, Lodhi Road
New Delhi 110 003, India
Tel: +91-11-2464-2176
Fax: +91-11-2464-2175
Telegram: PARYAVARAN NEW DELHI
E-mail: ozone-mef@nic.in
Website: http://www.ozonecell.com

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Ozone layer healing with 'hole' closing up

According to NASA scientists, the "hole" in the ozone layer of our atmosphere is finally beginning to close up. Currently 12 million miles wide, the hole will be eight million miles wide within three decades, and will have disappeared by the end of the century. NASA's Aura satellite and Suomi NPP partnership satellite measured the ozone in the southern hemisphere for each year from 1979-2013. "With this information, we can look into the future and confirm that ozone hole will be consistently smaller by 2040," said Susan Strahan, at NASA. The chlorofluorocarbon (CFCs) released by the products were found to interact with UV radiation to release chlorine, which in turn destroyed the ozone. One atom of chlorine can destroy more than a 100,000 ozone molecules, according to the US Environmental Protection Agency (EPA).

It was in 1985 that scientists from the British Antarctic Survey (BAA) first reported observations of large losses of ozone over Antarctica. With wind currents sweeping the CFCs toward the poles, the effect was pronounced there as the polar vortex trapped the chemicals which accumulated over time to high concentrations. "As the sun shines for long periods of the day, chlorine reacts with ultraviolet rays, destroying ozone on a massive scale of up to 65% creating the hole seen by the BAS team, said NatGeo. The ozone layer at 15 to 30kms above Earth shields the planet from harmful levels of ultraviolet rays, which can cause cancer, cataracts and sunburn.

Ultraviolet B radiation reaching Earth can inhibit the reproductive cycle of phytoplankton that make up the bottom rung of the food chain. However, some scientists believe that restoring the ozone layer will add to global warming as ozone is a greenhouse gas and can trap heat in the atmosphere. The effect of increasing temperature over the southern pole has seen many alarming studies on the rapid rate of ice melt in the Antarctic continent. The flip side is that ozone-depleting substances like CFCs are also powerful greenhouse gases and while substitutes are ozone safe, many are powerful greenhouse gases.

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

Ozone layer set to thicken

Researchers Darryn Waugh and Richard Stolarski at John Hopkins University, the United States, together with colleagues from NASA Goddard Space Flight Center, have run a computer simulation to find out what effect carbon dioxide and nitrous oxide will have on stratospheric ozone in years to come. The simulation is 2D, with one dimension for altitude and one for latitude – a simplification that reflects the smoothing-out of longitudinal variations at stratospheric altitudes – and is based on factors known to affect ozone. These include the presence of various molecules whose atmospheric concentrations are given in different future climate scenarios; "raining out" of water-soluble molecules; and solar radiation.

The researchers found that, regardless of the future scenario of carbon dioxide (CO_2) and nitrous oxide employed, there would be a thickening of the ozone layer. That will be due mostly to the predicted increase in carbon-dioxide emissions, although for all scenarios the thickening is neither as large nor as rapid as the thinning witnessed in the 1980s. The 1980s thinning caused global concern, but Stolarski points out there is no reason to believe a thickening is necessarily a good thing. "Now that we think that we understand the sensitivity of the ozone layer to many potential perturbations, perhaps we can go back and determine what kind of excursions the thickness of the ozone layer may have exhibited in the past," said Stolarski. The study has been published in *Environmental Research Letters*.

Source: http://www.environmentalresearchweb.org

Severe ozone depletion avoided

According to a new study published in the journal in *Nature Communications*, we are already reaping the rewards of the Montreal Protocol, with the ozone layer in much better shape than it would have been without the UN treaty. "Our research confirms the importance of the Montreal Protocol and shows that we have already had real benefits. We knew that it would save us from large ozone loss in the future, but we are already past the point when things would have become noticeably worse," said lead author Martyn Chipperfield, at the University of Leeds, the United Kingdom. Although the Montreal Protocol came into force in 1987 and restricted the use of ozone-depleting substances, atmospheric concentrations of these harmful substances continued to rise as they can survive in the atmosphere for many years.

In the new study, the researchers used a state-of-the-art 3D computer model of atmospheric chemistry to investigate what would have happened to the ozone layer if the Montreal Protocol had not been implemented. Professor Chipperfield said, "Ozone depletion in the polar regions depends on meteorology, especially the occurrence of cold

temperatures at about 20km altitude – colder temperatures cause more loss. Other studies which have assessed the importance of the Montreal Protocol have used models to predict atmospheric winds and temperatures and have looked a few decades into the future. The predictions of winds and temperatures in these models are uncertain, and probably underestimate the extent of cold winters."

The researchers suggest that the hole in the ozone layer over the Antarctic would have grown in size by an additional 40% by 2013. Their model also suggests that had ozone-depleting substances continued to increase, the ozone layer would have become significantly thinner over other parts of the globe. Without the Montreal Protocol, the new study reveals that a very large ozone hole over the Arctic would have occurred during that cold winter and smaller Arctic ozone holes would have become a regular occurrence. The Montreal Protocol has been strengthened over time through amendments and adjustments, supported by ongoing research. The researchers behind the new study say that scientists must continue to monitor the situation to ensure all potential threats to the ozone layer are mitigated.

Source: http://www.phys.org

CFCs as a driver of climate change

Research from a physicist suggests man-made chlorofluorocarbons are the main culprits behind both atmospheric ozone depletion and global climate change.The view that human activities are likely responsible for most of the observed increase in global mean temperature ("global warming") since the mid-20th century is probably a correct reflection of current scientific thought. However, chlorofluorocarbons (CFCs), not carbon dioxide (CO2), are most likely to be the major driver of climate change, according to a forthcoming book authored by Professor Qing-Bin LU, a physicist in the University of Waterloo, Canada.

About sixteen years ago, Qing-Bin Lu and colleagues proposed that electrons arising from cosmic rays play an initiating/key role in ozone-depleting reactions and developed a prediction model for the ozone hole based on effective dissociative electron transfer reactions of CFCs and other halogen-containing molecules absorbed on ice surfaces. On the basis of his observations, Professor Lu further proposed that, currently, CFCs are the main drivers for global climate change.

In his forthcoming book, "New Theories and Predictions on the Ozone Hole and Climate Change", Professor Lu quantifies the contributions of the cosmic-ray-driven electron-induced-reaction (CRE) mechanism to the ozone hole and of the CFC-warming mechanism to global surface temperature change. In contrast to conventional theories that require sophisticated computer simulations and multiple parameters, these theories are of exceptional parsimony, predictability, and explanatory power, including zero or only one parameter.

The CRE theory made a unique prediction that there exists 11-year cyclic variations in polar ozone loss and the associated stratospheric cooling, both of which have now been well proven by the data collected over Antarctica in the past decades. Remarkably, a near perfect linear correlation with a coefficient of up to 0.98 between CFCs and global surface temperature has also been observed.

Despite using zero or few parameters, the author's conceptual physical models have shown excellent agreements with observed ozone and global surface temperature data with impressive accuracy (~90%). For instance, with respect to the mean temperature in 1950-1975, the predicted temperature was 0.620 ?C for the year 2014 in Professor Lu's theoretical calculation, while the actual observed temperature was 0.623 ?C for 2014, according to the UK Met office HadCRUT4 dataset released in early 2015.

The main conclusion of this book, supported by substantial and robust observations, is that CFCs are the major culprits behind not only the destruction of the ozone layer but also global climate change since the mid-20th century. The successful execution of the Montreal Protocol and its revisions has shown its effectiveness in controlling the ozone hole in the polar regions and reversing the global warming trend. However, it is important to continuously phase out the global use of all halogen-containing warming gases, including CFCs, HCFCs, HFCs, etc. This provides a strong rational for the international agreements reached recently by the US, China and European Union to further control the production and use of HFCs and other halogenated gases.

This book is self-contained and unified in presentation, hence making it suitable for non-expert readers and policy makers who wish to have an overview of the science behind atmospheric ozone depletion and global climate change. Graduates students and ambitious undergraduates who are interested in the field of physics, chemistry, environmental and climate sciences might also find this book as a useful reference to their understanding of ozone depletion and climate change.

Source: http://www.eurekalert.org

Indian railways uses methyl bromide alternative

The South Western Railway (SWR) has launched an eco-friendly initiative for bed bug treatment in which Neem oil diluted with water was used by the Mechanical Department to clear compartments of bed bugs. This replaced the Methyl Bromide used earlier for cleaning purposes which forced coaches to be detained for three days before use as the chemical was considered harmful to humans. The monthly savings on account of this bug treatment worked out to Rs 21 lakh.

Source: http://www.newindianexpress.com

ODS phase-out by Indian railways

In India, air-conditioned system for railway coaches was initially designed with R-12 refrigerant. This refrigerant is not environment friendly as it causes depletion of ozone layer in the atmosphere. As a part of Montreal Protocol, the Power Supply (PS) & EMU Directorate of Indian Railways was supposed to convert its entire air conditioning and refrigeration system of 1000 coaches to more environment friendly R-134 refrigerant. Now, the Research Designs & Standards Organization (RDSO) has finalized the design and method by which the existing system can be made suitable to work with R-134 refrigerant in place of R-12 refrigerant.

With the scheme issued by RDSO, the conversion work of 480 coaches was completed ahead of schedule in 2009, instead of 2010. Roof Mounted Air Conditioned Unit was developed initially in 1991 with R-22 refrigerant, which is also not environmental friendly. Basically, R-22 refrigerant is of the family of Hydro Chloro Fluoro Carbons (HCFC). HCFCs are not only depleting ozone but also are a potent greenhouse gas. The phase-out schedule for this refrigerant was accelerated through a decision of Montreal Protocol in September 2007.

RDSO has already designed an alternative system by which new roof mounted air conditioning unit is to be developed with eco-friendly R-407C refrigerant in place of R-22 refrigerant. Prototype has already been tested. It is expected that shortly all the new coaches shall have air conditioned equipment working with R-407C refrigerant. All the new air conditioning systems which were developed recently for Kolkata Metro and Double Decker are with eco-friendly R-407C refrigerant only.

Source: http://www.rdso.indianrailways.gov.in

New Publications from UNEP

The Montreal Protocol and Human Health

This booklet summarizes how the successful implementation of the Montreal Protocol has protected human health. It describes how ozone depletion would have led to increases in UV radiation and, based on current understanding of the mechanisms by which UV affects biological processes, how that would have led to a dramatic increase in skin cancers, cataracts and affected human health in other ways.

Financing the Climate Co-Benefits of the HCFC Phase-Out: A guide for Low Volume Consuming Countries

Hydrochlorofluorocarbons (HCFCs) are being phased out worldwide under the Montreal Protocol on Substances that Deplete the Ozone Layer. The Parties to this treaty encouraged countries to promote the selection of alternatives to HCFCs that minimise environmental impacts, in particular impacts on climate. The Protocol's Multilateral Fund encourages developing countries to explore potential financial incentives and opportunities for additional resources to maximise the environmental benefits from HCFC Phase out Management Plans (HPMPs).

Safe use Of HCFC Alternatives in Refrigeration and Air Conditioning: An Overview for Developing Countries

Many of the alternative refrigerants to hydrochlorofluorocarbons (HCFCs) have particular characteristics in terms of toxicity, flammability and high pressure which are different from those used previously. It is therefore important that the refrigeration and air-conditioning industry adapts to both the technical and safety issues concerning these refrigerants. This publication provides an overview of the alternatives, their general characteristics and their application in the context of the safety issues.

Phasing-out HCFCS in Small and Medium-Sized Enterprises

This booklet aims to assist foam enterprises, especially SMEs, to better understand policies on HCFC phase-out, access to assistance from the Multilateral Fund for the Implementation of the Montreal Protocol and access alternative technologies in different foam applications taking into account challenges in converting to alternative technology. It also discusses some tips on how to identify enterprises that may use HCFCs and verify the HCFCs consumption of enterprises.

Guide on Good Practices: Phasing out HCFCs in the Refrigeration and Air-conditioning Servicing Sector

This guide was developed to help National Ozone Units and training institutions create HCFC phase-out training sessions for refrigeration servicing technicians. Countries can adapt and develop these guidelines further to suit their specific needs.

For more information, contact:

UNEP DTIE OzonAction Branch
15 rue de Milan, 75441 Paris CEDEX 09, France
Tel: +331 4437 1450; Fax: +331 4437 1474
E-mail: ozonaction@unep.org
Web: www.unep.org/ozonaction

Thailand to promote ozone damage free refrigerant

In a process to reduce global warming and stop refrigerant from destroying the ozone layer, the Department of Industrial Works (DIW), Thailand, urges the producers of air conditioners in Thailand to shift to the use of the refrigerant HFC-32 or R-32 instead of the current hydrochlorofluorocarbons (HCFC or R-22). Dr. Pasu Loharjun, DIW Director said that the new refrigerant available for use by all air conditioning companies in the near future, will help to reduce the impact of air conditioning units on the environment by 2.68 times. The traditional R-22 refrigerant has an Ozone Depletion Potential (ODP) rate of 0.05 while having a Global-Warming Potential (GWP) rate of 1,810. The new R-32 refrigerant however does not damage the ozone layer (ODP = 0) while having a lower GWP rate of 675.

Despite the higher cost of new equipment, the higher cost of buying the new liquid, and having to redesign the unit to work well with the new refrigerant, the department will be helping air conditioner producers through funding and technology sharing, involving support by both Japanese companies and the Japanese government. Dr. Pasu emphasized that the new refrigerant, despite having a 10% higher purchasing cost, is more efficient, meaning less refrigerant liquid is required to generate cold air from the unit, resulting in an air conditioner smaller by 30-40% while having about the same capacity as before to cool down a domestic living room.

Source: http://news.thaivisa.com

Recycling HFCs can eliminate tons of GHGs

According to a white paper released by EOS Climate, the United States, if 30 percent of hydrofluorocarbons (HFCs) refrigerants are reclaimed for re-use by 2040, approximately 18 billion metric tons carbon dioxide equivalent would be prevented from reaching the atmosphere over the next 25 years. HFCs are powerful greenhouse gases when released to the atmosphere. Pound for pound, HFCs have global warming potentials hundreds to thousands times higher than carbon dioxide (CO_2). The US, with support from a number of countries, has proposed a gradual phasedown of HFC production, but any production phasedown would not address HFC refrigerants in use.

EOS Climate's Refrigerant Asset System distributes software and systems on top of the existing refrigerant supply chain to make it more efficient, enabling refrigerant users to track every pound of refrigerant from purchase through to its recovery and reclamation and its eventual end-of-life. "The simplest and most cost-effective way to avoid emissions from HFCs is to recycle these refrigerants. However, until HFC refrigerants are tracked from production to reuse in the supply chain, and metrics are established that incentivize their re-use, the likelihood of voluntary recycling will remain low," said Joe Madden, co-founder of EOS Climate and white paper co-author.

Source: http://www.environmentalleader.com

WMO/UNEP release updates on ozone layer

The UN Environment Programme (UNEP) and the World Meteorological Organization (WMO) have published 'Twenty Questions and Answers about the Ozone Layer,' which complements the 2014 Scientific Assessment Report of Ozone Depletion. The publication aims to enhance understanding regarding the relationship between ozone depletion, ozone-depleting substances (ODSs) and the Montreal Protocol. As a result of broad compliance with the Montreal Protocol, as well as industry's development of 'ozone-friendly' substitutes for controlled chemicals, total global accumulation of ODSs has slowed and begun to decrease, and ozone layer recovery is expected by the middle of the 21st century, as long as compliance continues.

The questions in the publication focus on: the nature of atmospheric ozone; the chemicals that cause ozone depletion; how global and polar ozone depletion occur; the extent of ozone depletion; the success of the Montreal Protocol; and the future of the ozone layer. Computer models project that the impact on the ozone of greenhouse gas (GHG) emissions and climate change will increase significantly and surpass the importance that ODSs have had on ozone in most atmospheric regions by the end of this century. Ozone and climate are indirectly linked because both ODSs and their substitutes are GHGs and contribute to climate change.

For example, the Antarctic ozone hole has a direct impact on the

surface climate in the Southern Hemisphere during the summer. The answers to the questions are based on information presented in the 2014 report, as well as previous assessment reports and other scientific assessments. The assessment reports are conducted under the auspices of WMO and UNEP, and are co-sponsored by the US National Aeronautics and Space Administration (NASA), the US National Oceanic and Atmospheric Administration (NOAA), and the European Commission.

Source: http://www.chemicals-l.iisd.org

Daikin to help Thailand for next generation refrigerant

Recently Daikin Industries, Ltd., Japan, one of the world's leading companies in air-conditioning, participated in a Japanese Ministry of Economy, Trade and Industry (METI) project to support refrigerant conversion of air conditioning equipment in Thailand, to provide technical assistance to 12 local air conditioning manufacturers. With the intention of actively promoting support of emerging countries utilizing the Multilateral Fund for the Implementation of the Montreal Protocol, the executive committee of the Multilateral Fund granted approval for this project in December 2012. In addition to protection of the ozone layer based on the Montreal Protocol, emerging countries have been quickening the pace for conversion to refrigerants with low impact on global warming.

Thailand has been one of those countries and formulated a policy to complete conversion from conventional refrigerant by year 2017. METI launched the project to provide support for refrigerant conversion in Thailand from the perspective of measures for the ozone layer and global warming as well as support of emerging countries based on a policy that provides not only financial aid to emerging countries for environmental measures but also technological support. The project objective is to enable Thai manufacturers to develop, manufacture, and sell air conditioning equipment that uses HFC32. Several companies, including Daikin, were approached for the project, and because Daikin was the first company in the world to adopt HFC32 in air conditioners its involvement in support of the project.

In addition to basic knowledge, including refrigerant properties, and safety education for production facilities, Daikin provides guidance for installation and maintenance. Even after each local manufacturer has prepared production facilities for air conditioning equipment, Daikin will visit each local manufacturer individually and provide support corresponding to the company's progress. Having comprehensively examined the various aspects regarding HFC32, including impact to ozone layer, global warming, and safety, Daikin believes the new refrigerant is the most suitable refrigerant for residential and commercial use air conditioners and has exchanged information with United Nations organizations and each country of the world.

Source: http://www.daikin.com

EU submits proposal for global HFC phase-down

The European Union (EU) has submitted a proposal to amend the Montreal Protocol to control hydrofluorocarbons (HFCs). The EU move follows similar proposals submitted since 2009 by the USA, Canada, Mexico and Micronesia, and would significantly reduce HFCs in developed countries by following a phase-down schedule closely matching the EU F-Gas Regulation, "The EU clearly expects developed countries to lead by example. The EU has upped the ante significantly and is now calling on other developed countries to match it," said Clare Perry, at the Environmental Investigation Agency (EIA). In developing countries, the EU proposes a new approach, aimed at initially limiting the growth of HFCs, followed by an agreement to negotiate a phase-down schedule by 2020.

Ms. Perry added that the EU proposal is trying to be sensitive to the fact that HFCs are generally used to replace ozone-depleting HCFCs, which developing countries have only just begun to phase-out under the Montreal Protocol. For this reason, HFCs cannot be considered in isolation and this is the first proposal to try and address that specifically within an HFC amendment proposal – as such, it has the potential to unlock negotiations. The EU estimates global cumulative reductions in all countries would amount to 127 gigatonnes of CO_2-equivalent over 40 years.

Source: http://www.racplus.com

Blending rights for eco-friendly refrigerants

Technische Gase und Gasetechnik (TEGA) GmbH, Germany, a subsidiary of The Linde Group, Germany, has signed an agreement with A. S. Trust & Holdings, Inc., the United States, to blend the climate-friendly, ASHRAE-listed hydrocarbon refrigerants HCR188C/R441A and HCR188C/R443A. TEGA, will have exclusive blending rights within the European Union. Work is underway for the TEGA blending facility to be ETL safety certified by Intertek Germany for this production; the company expects to go into production within 30 days.

HCR188C/R441A, a substitute for R134a refrigerant, and HCR188C/R443A, a substitute for R22 refrigerant, are both patented and trademarked zero-ozone-depleting/extremely low global-warming-potential (GWP) hydrocarbon blends. Their formulations were developed over the past fifteen years by Hawaii businessman and inventor, Richard Maruya, of A.S. Trust & Holdings. HCR188C/R441A has been listed on the U. S. Federal Register for use in vending machines, household models of refrigerators, stand-alone freezers and window-air-conditioners, and commercial models of refrigerators, freezers and stand-alone refrigerated display cases.

Applications have been submitted for additional uses, including motor-vehicle air-conditioning systems, refrigerated transport (refrigerated trucks and shipping containers), and residential models of heat-pumps, portable room air-conditioners and split-system air-conditioning units. TEGA, a wholly-owned subsidiary of The Linde Group, is ISO 9001:2008 certified, and is one of the main distributors for flammable and non-flammable refrigerants in Europe.

Source: http://www.prnewswire.com

New range of modular water cooled chillers

Hitachi Air Conditioning Europe has launched new modular high seasonal efficiency water cooled chillers. The Samurai RCME-WH Series consists of four basic modules: 140kW, 180kW, 220kW and 260kW. Combining these modules up to a maximum of 8, it is possible to achieve a chiller combination of up to 2,080kW. With the world-renowned Hitachi screw compressor optimised for R134a and part load performance, the units achieve seasonal efficiencies up to 6.80.

Utilising true dual type plate heat exchangers, twin electronic expansion valves, and cyclonic oil separator means the units also have a very low refrigerant charge, up to 60 per cent less than similar capacity chillers. According to Hitachi, site flexibility has also been enhanced with two Operating modes (Standard and High Efficiency), internal power demand limitation and two pump operating modes all configurable from the colour LCD control panel.

Furthermore, with continuous capacity control from 3% ~ 100% (dependant on module combinations), water outlet temperatures can be controlled to +/-0.5°C. “With the forthcoming European ErP legislation plus the new European F-GAS Regulation, our new Samurai RCME-WH Series units are in the best position to meet these requirements, with their market leading seasonal efficiencies and low refrigerant charge,” said Glyn Jones, European Product Manager.

Source: http://www.racplus.com

Green technology based adsorption chillers

Bry-Air (Asia), India, has launched its new Adsorption Chiller (ranges: 35 to 1180 kW). The Bry-Air Adsorption Chiller is based on an innovative green technology, and is the first of its kind in India, and will be manufactured in India under license from Power Partners, Inc., the United States. The Bry-Air Adsorption Chiller provides Energysmart Cooling using waste heat; it is the first ever product being launched in India to tap the abundant low grade waste heat available in process industries and use it for process cooling or air-conditioning (HVAC).

A lot of low grade process heat (50°C-100°C) generally goes waste, which now can be used for cooling. This eco-friendly solution also cuts down carbon dioxide (CO_2) emission and reduces energy expenses. “Adsorption chillers use energy from waste heat, with negligible electricity consumption, to provide chilled water for process cooling and air conditioning, and they do this with ‘green’ refrigerant (water) and desiccant (silica gel). We are excited about the opportunities that this technology provides,” said Deepak Pahwa, at Bry-Air (Asia).

The Adsorption Chiller has unbeatable advantages like ultra-low electricity consumption, negligible noise and vibration, life expectancy of more than 20 years, negligible maintenance, etc. It is ideal for process industries like power plants, food and beverages, chemical manufacturer, etc. and for commercial

areas like offices, buildings, hotels, malls, etc. *Contact: Bry-Air (Asia) Pvt. Ltd. Tel: +91-124-4091-111; E-mail: dharmendra@pahwa.com*.

Source: http://www.prnewswire.co.in

New line of energy efficient HVAC products

Carrier, the world's leader in high technology heating, ventilation and air conditioning (HVAC) solutions, has launched a new line of energy-efficient residential and light commercial HVAC systems that use Puron®, the R-410A non-ozone depleting refrigerant. Carrier, which operates in Saudi Arabia through Arabian Air Conditioning Company Limited and Carrier Saudi Service Company Limited, its joint venture companies with E.A. Juffali & Brothers Limited, is part of UTC Building & Industrial Systems, a unit of United Technologies Corp.

Featured products included the new Xpression™ Pro Hi Wall unit with a unique ionizer filtration system and the DesertMaster™ roof top package units with an extended range, both of which run on Puron, the R-410A non-ozone depleting refrigerant. Carrier's new Creation Pro Hi Wall unit, Comfort Pro floor standing unit and Décor™ Pro Cassette unit feature advanced filtration and distinctive air management systems. The new Carrier Naseem™ window room air-conditioner series offers good performance in an efficient package for residential customers, as the unit is easy to maintain and offers optimum comfort with a 3 speed control system.

Carrier's line of residential products fully complies with the new Saudi Arabian Standards Organization (SASO) regulations, offering reduced energy consumption and improved performance. "We play an active role in the Saudi green building segment and are committed to environmental stewardship and sustainable innovation. Our new products are the latest in a series of energy-efficiency developments designed specifically for the Saudi Arabian market and distributed with the support of our dealers' network across the country," said Nader Antar, at UTC Building & Industrial Systems, Saudi Arabia.

Source: http://www.utc.com

Eco-friendly zero ozone-depleting refrigerants

DuPont has developed ISCEON® MO99™ ozone-friendly refrigerant – a zero-ozone-depleting HFC refrigerant designed to replace R-22 in existing air conditioning and refrigeration systems. It provides similar cooling capacity and energy efficiency to R-22, and with a significantly lower discharge temperature that can help prolong compressor life. ISCEON® MO99™ refrigerant retrofits are quick and cost-effective for most R-22 systems – simply recover the R-22, replace critical seals, charge refrigerant, and restart. DuPont and industry groups also collaborated to create a website www.phaseoutfacts.org, which details responsible use of refrigerants, as well as pointing users towards the DuPont Refrigerant Reclaim Program and its options for recovering and recycling R-22 at authorized centers.

Implementing a refrigerant management plan that includes retrofitting to HFCs such as ISCEON® MO99™ ozone-friendly refrigerant, and recycling existing R-22, allows business owners to move away from HCFC usage and its negative impact on the environment, while remaining efficient and operational. By working together and taking advantage of DuPont programs and product offerings, equipment owners and facility managers will be protecting their businesses and protecting the environment.

Source: http://www.dupont.com

A new refrigerant to reduce GWP

Asahi Glass Co. Ltd. (AGC), Japan, has announced that it has successfully developed 'AMOLEATM', a new refrigerant for air-conditioning systems that can reduce the global-warming potential (GWP) to about one-sixth that of conventional products, while delivering equivalent performance to the conventional hydrofluorocarbon R-410A. AGC aims to launch commercial production in 2016, and will promote the development of refrigerants with even lower environmental impacts from global warming. Application of HFC, which is used as a refrigerant for air-conditioning systems and automobiles, is being re-examined globally due to its high GWP and large environmental load.

Regulations have already been imposed on HFCs in Europe and the use of HFCs is to be restricted in Japan beginning in 2015. In addition, the United Nations is considering limits on its use. In line with this trend toward restricting the use of HFC, some manufacturers of room air-conditioning systems and professional-use air-conditioning equipment have begun to adopt alternative refrigerants such as HFC-32. Meanwhile, there are needs for refrigerants with a lower GWP from the viewpoint of preventing

global warming. AMOLEATM is an environmentally responsive mixed refrigerant, whose main ingredient is hydrofluoroolefin (HFO)-1123, which has an extremely low GWP, and AGC worked on its development as part of a New Energy and Industrial Technology Development Organization (NEDO) subsidized project.

The new refrigerant, with a very low GWP of about half that of a possible alternative refrigerant – HFC-32 – (about one-sixth of GWP of the conventional refrigerant HFC-410A), while providing equivalent performance to conventional refrigerants, will achieve both low GWP and energy efficient economic performance. The AGC Group will accelerate its efforts to commercialize new refrigerants and focus on developing refrigerants with even lower GWP. In cooperation with equipment makers, the Group will contribute to the early provision of air-conditioning systems with significantly low environmental loads. *Contact: Junichi Kobayashi, Asahi Glass Co., Ltd. Japan. Tel: +81-3-3218-5603; E-mail: info-pr@agc.com*.

Source: http://www.fliphtml5.com

Zero-emission transport refrigeration technology

A new zero-emission refrigeration system for transportation applications, is being developed by a consortium of MIRA, Dearman, Air Products, and Loughborough University, the United Kingdom, as part of an innovate project 'Cool-E', which delivers both power and cooling from liquid nitrogen, has begun on-vehicle testing and will continue through the summer, but initial test results have indicated that the system is able to cool a trailer more quickly than a conventional diesel refrigeration unit. The system, which features the company's liquid nitrogen-powered engine, has already produced promising results. The new liquid nitrogen-powered technology has been developed as a zero-emission alternative to existing diesel transport refrigeration units.

Initial testing has also served to validate the principles behind the system, demonstrating that it can successfully provide a zero-emission alternative to conventional cooling equipment. "This is a key moment in the development of cutting edge, zero-emission clean cold and power technology. With the global demand for cooling, and transport refrigeration in particular, growing extremely rapidly, we are faced with an environmental challenge but also an economic opportunity. The fact that our system is running, and that it has already delivered very promising results, highlights the role that Dearman technology can play in meeting the inescapable need for sustainable cooling," said Toby Peters, at Dearman.

This system has the potential to displace a significant amount of diesel fuel. A diesel-powered transport refrigeration unit accounts for up to 20 percent of a vehicle's total diesel usage, so moving to this technology would enable operators to achieve substantial operational cost savings per vehicle each year, as well as see major environmental benefits. Building on the Cool-E project, the first Dearman engine powered transport refrigeration unit is expected to go into commercial field trial later this year, with larger scale European and international trials to begin in 2016.

Source: http://www.achrnews.com

Students develop new refrigeration system

A group of final-year Mechanical Engineering students of the Sree Chithra Tirunal College of Engineering (SCTCE), India, have developed a prototype of a refrigeration system using direct sunlight, without converting it into electricity using solar panels.

According to the students, the system, which was developed as part of their final-year project, does not use a solar panel, instead uses a parabolic-shaped solar concentrator made of stainless steel to concentrate the heat.

"This method is much cheaper compared to solar panel. In conventional system, a compressor driven by electricity is used to pump the refrigerant and then a solar panel converts solar energy into electrical energy. This drives a compressor that has lesser efficiency owing to loss of power during conversion.

To overcome the maximum possible heat loss, we integrated a component called heat pipe that provides effective heat transfer from the parabolic concentrator," said K. Krishna Raj, one of the team members.

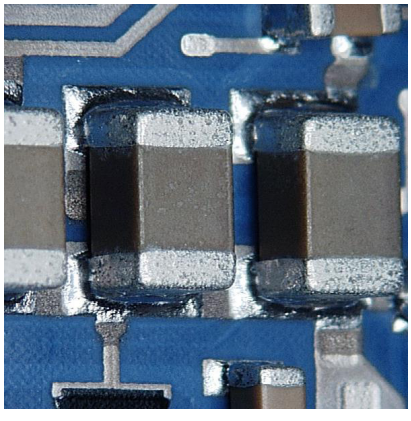
A prototype of a refrigeration system that uses direct sunlight.

Source: http://www.thehindu.com

Precision vapour cleaning solvent

The new Micronox® MX2501 developed by KYZEN, the United States, is an engineered precision vapor cleaning solvent designed as a drop in replacement for modern era vapor degreasing equipment. MX2501 has "Zero" ozone-depletion potential and can replace TCE & TCA in many cleaning applications. This product is effective in removing no-clean and rosin flux residues from electronic assemblies including low stand-offs and micro BGA's. MICRONOX® MX2501 has superior performance characteristics over other fluorinated based cleaning solvents due to its unique patented design.

Micronox® MX2501 is a non-flammable, non-corrosive fluorinated solvent. This product contains no CFC's and has a calculated TLV of approximately 200ppm. MICRONOX® MX2501 has proven compatible with all materials commonly used in electronic assembly, wafer bumping and advanced packaging manufacturing and cleaning processes. *Contact: KYZEN Global Corporate Headquarters, 430 Harding Industrial Dr., Nashville, TN 37211, USA. Tel: +1-615-831-0888.*



KYZEN Micronox MX2501 Vapour Cleaning Solvent.

Source: http://www.e-tronics.ie

Non ozone-depleting semi-aqueous cleaner

Petroferm Inc., the United States, has introduced 'BIOACT 288', as the latest addition to the BIOACT 280 Series. BIOACT 288 Precision Cleaner is a water-rinsable, bio-based cleaner designed to operate in heated immersion applications. This semi-aqueous cleaner is effective in removing high melt-point soils such as waxes, pitches, greases, fixturing and buffing compounds. The new cleaner is also effective in removing general metal working fluids, oils and lubricants. Compatible with all aircraft alloys and substrates, BIOACT 288 is an effective alternative to caustic cleaners, halogenated and petroleum-derived solvents.

Developed for very high soil loading, the cleaner has greatly extended the bath life in many high-throughput operations. It is a non-ozone-depleting cleaner that is also readily biodegradable, non-corrosive and non-hazardous. *Contact: Petroferm Inc., Cleaning Products Group, 3938 Porett Drive, Gurnee, IL 60031, USA. Tel: 904-277-5247.*

Source: http://www.us-tech.com

Bio-renewable cleaner for non-ferrous alloys

Bio-Circle, a division of Walter Surface Technologies, the United States, has introduced CB 100 ALU to its bio-renewable lines of cleaners and degreasers. CB 100 ALU is a heavy duty cleaner and degreaser that is specially formulated for use on aluminium and non-ferrous alloys. Similar to the original CB 100 cleaning solution made for steel and stainless steel, CB 100 ALU is a water-based solution that leverages the power of Nature Boost. Nature Boost is a raw material derived from plant extracts that is exclusive to Bio-Circle. It can be used to clean ink, paint, rubber marks, tar, wax, resins, carbon, soot, pastes, adhesives, and many other hard to clean contaminants.

By using a bio-renewable product such as CB 100 ALU with Nature Boost, the by-products that are produced float to the surface, allowing workers to easily skim the contaminants out of the cleaning solution. CB 100 ALU is a great alternative to solvent and petroleum-based cleaning products, as it lasts 5 times longer. In addition, it is a safer solution as it is VOC free, non-flammable, and softly scented. It can be used with industrial parts washing machines, immersion tanks and ultrasonic baths. CB 100 ALU works well at room temperature or heated, is non-corrosive and bio-degradable.

"CB 100 ALU is a great choice for companies looking to improve health and safety in the workplace. Not only is CB 100 ALU a safer alternative to toxic solvents, but the solution lasts much longer, allowing companies to reduce their consumption cost, and eliminate the need for expensive hazardous waste removal and ventilation equipment associated with using toxic solvents", said Patrick Lapointe, at Walter Surface Technologies. CB 100 ALU is available immediately in the following formats; 3.78L/1Gal, 20L/5.3 Gal, 208L/55 Gal and 1000L/264 Gal. *Contact: Walter Surface Technologies, USA. E-mail: sing@walter.com.*

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

Benchtop vapor degreaser system

Developed by Baron Blakeslee, the United States, the 'Equinox' degreaser is the first of its kind created specifically for Solstice® Performance Fluid (Solstice® PF), the latest advancement in solvent technology developed by Honeywell, the United States. Equinox provides an ideal solution for users of AK-225 who are considering Solstice® PF as a replacement solvent. Vapor degreasing is a process used to thoroughly clean a variety of materials without the use of water. Many current and prospective users of vapor degreasing processes are considering Solstice® PF due to its favorable environmental, health and safety characteristics. Solstice® PF has low ozone depletion potential (ODP) and lower global warming potential (GWP). In addition, it has superior cleaning performance on a variety of substrates.

Honeywell's Solstice® solvent is a highly effective cleaning solution that is nonflammable, has favorable toxicity properties, a low global warming potential (GWP) of 1, negligible ozone depletion, does not contribute to ground-level smog and is not a volatile organic compound (VOC) as determined by the U.S. Environmental Protection Agency (EPA). It has low surface tension and is suitable for cleaning electronics, metal parts, medical devices and precision cleaning of mineral, silicone, cutting, vacuum, and fluorinated oils as well as silicone and heavy grease. Equinox Benchtop Degreaser was created exclusively for Solstice® PF Solvent, and is an ideal solution for new Solstice® PF users wanting to begin cleaning with Solstice® PF in a low risk, low cost way.

Equinox is a fully featured benchtop vapor degreasing system with a unique design made specifically for efficient and effective use of Solstice® PF. It provides a solvent-efficient benchtop equipment solution for former AK-225 users, an HCFC degreasing solvent, prohibited for most uses by the Clean Air Act under the Montreal Protocol. Solstice® PF is an ideal replacement for AK-225, and Equinox provides an affordable, more environmentally-friendly solvent. Equinox is also compatible with any fluorinated or brominated vapor degreasing solvent. Equinox is available with optional process enhancing features such as ultrasonic spray, to enhance the cleaning of an immersed part, integrated material handling and automatic sliding cover.

Source: http://www.prweb.com

Non-petroleum based solvent cleaner

Typical petroleum-based solvents such as mineral spirits, Stoddard Solvent, PD-680, and MIL-PRF-680 contain significant quantities of these compounds that release into the air during cleaning processes and contribute to the level of ground-level ozone (photochemical smog), which can damage lung tissue, cause respiratory illness and damage vegetation. To address this problem, NAVAIR, the United States, has developed NAVSOLVE™, a non-petroleum-based solvent cleaner which meets stringent low-VOC and HAP-free specifications such as those of California's South Coast Air Quality Management District, as well as the DoD's own MIL-PRF-32295A "Cleaner, Non-Aqueous, Low-VOC, HAP-Free."

NAVSOLVE™ is currently the only composition that meets MIL-PRF-32295A for Type II cleaners, which involve immersion cleaning for aircraft parts and ground support equipment. Earlier validation field tests for NAVSOLVE™ were conducted at seven DoD testing sites (Navy, Air Force, Army, and Marine Corps) to clean aircraft and ground support equipment metallic parts. The current ESTCP program extends the validation to the typical polymer based composites, adhesives, and cores used in aircraft components. First, coupon level mechanical tests are being conducted to ensure NAVSOLVE™ compatibility with several composite materials and structures used on a range of DoD aircraft.

Next, several field tests will be executed to validate successful NAVSOLVE™ substitution for current hazardous solvents in DoD cleaning and repair procedures for composite aircraft parts and cores. The three demonstrations sites are the Navy Fleet Readiness Center-East (Cherry Point, NC), Fleet Readiness Center-Southeast (Jacksonville, FL), and Hill AFB (Ogden, UT). The demonstration test articles include components from the F-35, V-22, and MC-4Q Triton UAV/Globalhawk aircraft. NAVSOLVE™ is a low-VOC, HAP-free, non-ozone depleting substance which is recyclable, high flash point, fast drying, and compatible with metal and non-metal materials. This makes it an overall safer and more environmentally friendly alternative for DoD cleaning applications.

Source: https://www.serdp-estcp.org

Halon-replacement fire extinguisher

AOA, Germany, a division of Diehl Aerosystems, Germany, has developed 'FIREX' water-mist fire-suppression system for aircraft cargo compartments, which it says is the only halon replacement system to have passed all US FAA proof-of-concept tests. FIREX comprises a water tank and nitrogen bottles linked to a common pipe and several spray nozzles that distribute water vapour and nitrogen throughout the cargo hold to extinguish fires. It has been developed as an alternative to existing halon fire suppression systems, which are to be excluded from new European Aviation Safety Agency (EASA) aircraft programme certifications from 2018 due to environmental concerns.

"Halon has huge global warming and ozone depletion effects," said Karsten Kirbach from AOA. FIREX is at technology readiness level three and has passed all of the FAA trials carried out at Diehl's specialist Munich testing facility. The next step is to begin the development of aircraft components before achieving full certification for the system. "We're aiming for flight readiness in 2018," said Kirbach, adding that alternative chemicals to halon have so far all failed aerosol can explosion tests.

Source: http://www.flightglobal.com

New high pressure water mist sprinkler series

Marioff Corporation, Finland, has launched the new generation HI-FOG 3000 sprinkler series for marine applications. The new generation HI-FOG 3000 sprinkler series, is designed to protect accommodation, public and service areas on ships. It replaces and provides even greater efficiency and wider coverage than earlier HI-FOG 1000 and HI-FOG 2000 sprinkler series. Marioff has carried out comprehensive testing of the new generation HI-FOG 3000 sprinkler series, which is designed, tested and type approved according to International Maritime Organization (IMO) Res.A800(19) as amended in IMO Res.MSC.265(84).

"With the launch of this new generation of HI-FOG 3000 sprinklers, we are offering to our marine customers enhanced HI-FOG systems with faster activation, more efficient suppression and improved passenger and crew safety. We take reliability and robustness of sprinkler systems to the next level, leveraging our three decades of field experience in marine fire protection systems," said John Hemgård, Marioff.

Source: http://www.cruiseindustrynews.com

Mobile water mist solution for quick-fire response

Wilhelmsen Technical Solutions, Norway, (WTS) and Wilhelmsen Ships Service (WSS), Norway, have launched the Unitor XFlow mobile water monitor and the Unitor XFlow water mist lance to tackle fires on ships carrying containers on or above the weather deck. Both products have been developed to meet regulatory requirements. The mobile monitor is tested and approved to meet the SOLAS regulations IMO MSC.1/ Circ. 1472, and both are type approved according to IMO regulations under SOLAS II-2/10.7.3. Containership fires have been identified as a serious hazard by the insurance community and owners need to be equipped to tackle them whatever the size and configuration of their vessel.

The Unitor XFlow mobile water products have proved themselves highly effective in varied applications and are a natural choice for ships carrying containers on deck. With nominal water pressure of 4 bar at the nozzle, the monitor can protect up to 10 tiers of containers, and even more at higher pressure. It is highly portable and can be quickly assembled and operated by a single crew member if required. It features a single waterway connection, saving time when rolling out the hose, and hose and hydrant adaptors can be supplied to fit customer demands.

The monitor has a dual purpose nozzle for spray and jet functionality combined with an easy elevation feature to ensure precise and efficient fire fighting. Based on the proven XFlow technology, the low pressure system has been developed with large bores to avoid clogging. In addition, there are no moving parts in the nozzle, making the monitor reliable and easy to maintain. The water mist lance and drill are fitted with an extension to protect the operator from hot surfaces. A special holder enables the water mist lance to be left unattended while in operation, allowing crew to focus on other tasks.

Source: http://www.hellenicshippingnews.com

New technology for high pressure mixing heads

SAIP Equipment, Italy, has launched its brand new technology for "third stream direct injection" in high pressure mixing heads**.** The aim of this project is to retrofit existing equipment or supply new ones to the use of HC's, HFO's, methyl formate and other blowing agents with a cost saving investment and proper results and performances. The new mixing head permits the use of a third blowing agent on any kind of foaming units (SAIP or other ones) either new or in revamping.

Compared to other products on the market the novelty of SAIP HP Third Stream Mixing Head is the recycle of the third component directly in the head with components radial mixing. Thanks to the flows imprinted direction and to the high kinetic energy of each component, a perfect nebulization is determined as well as an optimal foam mixture. The HP third stream mixing head represents the new generation of SAIP heads: it is the result of experience and targeted research that have demonstrated the mixing in the radial type head gives better mixing results than the axial one.

The third component is installed on SAIP mixing heads with diameter from 10 mm to 24 mm which is easy to install and use. It requires low maintainance and service and it is really cost effective. Due to the great results achieved in our laboratories and by our customers, SAIP has decided to patent the technology. *Contact: Saip S.u.r.l., Via Bressanella 13, 22044 Romanò di Inverigo, Como, Italy. Tel: +39-031-605762; Fax: +39-031-606934; Email infosaip@saipequipment.it.*

Source: http://www.saipequipment.ru

Eco-friendly PE blowing foam agent

Developed by Guangzhou Longhi Rubber & Plastic Co. Ltd, China, LH-DH9 blowing agent is a kind of eco-friendly blowing agent without ammonia smell. Its decomposition temperature is 165℃ to 175℃. It can easily dispersion in the plastic, improve the flowing ability of EVA compound, and effectively reduce energy consumption. LH-DH9 is stability at low temperatures, and can be quickly foam molding at high temperature (170℃), which can improve the production efficiency (30-50s/mm).

Foam products with LH-DH9 have excellent physical and mechanical properties, stability of heating performance and small heat shrinkage rate. It can be widely used in plastic foam products, especially suitable for EVA, PE MD extrusion and compression molding, to product Eco-friendly production, such as sole, insulation materials, sports equipment materials, etc. *Contact: Guangzhou Longhi Rubber & Plastic Co. Ltd, South Zhongxin Road, 23rd Nanyang Team, Qingbu Village, Xinhua Street, Huadu District, Guangzhou, China. Tel: +86-020-6661-6216; Fax: +86-020-6661-6213.*

Source: http://www.chinalane.org

New foam blow molding process

At the recent NPE2015 show in Orlando, W. Müller USA Inc., the United States, the maker of blow molding extrusion heads launched its foam blow molding process, after more than a year in development. "At NPE, we started talking to selected customers about our new blow molded foam technology for packaging. They had a lot of questions about things like physical properties, and I had to tell them that we're still at the very beginning, in terms of application development. But we have proven that the process works very well," said Wolfgang Meyer at W. Müller. The process uses a special head design for three-layer coextrusion with solid inner and outer skins and a foamed center.

The machine's main horizontal extruder provides the middle foamed layer, while two separate vertical extruders provide the skins. (A single extruder would suffice for both skins, but two extruders allow savings by putting color and additives in just the outer layer.). It uses no chemical blowing agent – only talc as a nucleating agent, so it is acceptable for food packaging. Another feature of the head – which is retrofittable to any brand of continuous-extrusion machine – is a "pineapple" dynamic mixer to disperse the gas. Higher mixer speed yields finer cell structure. Cell structure thus can be controlled independently of extruder speed, unlike other processes.

Source: http://www.ptonline.com

Researchers study impacts of biofumigation

Researchers at University of Tennessee, the United States, and North Carolina State University, the United States, recently studied the impacts of Biofumigation and Anaerobic Soil Disinfestation on Strawberry Plant Nutrition and Fruit Quality. Anaerobic soil disinfestation and biofumigation are two non-chemical methods for controlling soilborne plant pathogens of strawberry. Due to their high mineral contents, both treatments could potentially increase mineral content in strawberry plants and thus impact fruit quality, but research in this area is limited.

A trial was conducted with 11 preplant soil-incorporated treatments arranged in a randomized complete block design with 6 rows (blocks). Biofumigation treatments consisted of deactivated mustard meal, deoiled mustard meal, mustard pellets, and Biofence mustard seed meal. Other treatments included dried molasses as a carbon source for an anaerobic treatment and a Basamid® chemical treatment. Additional combination treatments of deactivated mustard meal combined with molasses, deoiled mustard meal combined with molasses, and molasses combined with soybean meal (to lower amendment C:N ratio) were also applied, as well as an untreated control.

Harvested strawberry fruit were analyzed for sugars, organic acids, and mineral content. Harvested leaves were analyzed for mineral content. Data were analyzed using mixed model analysis of variance and least squares means were compared with ten orthogonal contrasts of scientific interest. There were no differences among treatments for glucose and fructose. However, fruit from the plots treated with the combination treatment of molasses with deoiled mustard meal did have significantly more sucrose than the control (P<0.05). In general, the alternative methods of biofumigation and soil anaerobic disinfestation produced fruit of equal quality to that produced using the Basamid® chemical treatment.

Source: https://ashs.confex.com

Destruction of methyl bromide in aqueous solution

In a research, scientists from University of Nevada, the United States, Stanford University, the United States, and San Joaquin Valley Agricultural Sciences Center, the United States, studied methyl bromide (CH_3Br) which is widely used as a fumigant for postharvest and quarantine applications for agricultural products at port facilities due to the short treatment period required, but it is vented from fumigation chambers to the atmosphere after its use. Due to the potential contributions of CH_3Br to stratospheric ozone depletion, technologies for the capture and degradation of the CH_3Br are needed to enable its continued use.

Although granular activated carbon (GAC) has been used for CH_3Br capture and thiosulfate has been used for destruction of CH_3Br in aqueous solution, this research explored techniques for direct destruction of CH_3Br sorbed to GAC. Submerging the GAC in an aqueous thiosulfate solution achieved debromination of CH_3Br while sorbed to the GAC, but it required molar concentrations of thiosulfate because of the high CH_3Br loading and produced substantial concentrations of methyl thiosulfate. Submergence of the GAC in water and use of the GAC as the cathode of an electrolysis unit also debrominated sorbed CH_3Br.

The reaction appeared to involve a one-electron transfer, producing methyl radicals that incorporated into the GAC. Destruction rates increased with decreasing applied voltage down to ~-1.2 V vs the standard hydrogen electrode. Cycling experiments conducted at -0.77 V indicated that >80% debromination of CH_3Br was achieved over ~ 30 h with ~ 100% Coulombic efficiency. Sorptive capacity and degradation efficiency were maintained over at least 3 cycles. Capture of CH_3Br fumes from fumigation chambers onto GAC, and electrolytic destruction of the sorbed CH_3Br could mitigate the negative impacts of CH_3Br usage pending the development of suitable replacement fumigants.

Source: http://www.ncbi.nlm.nih.gov

Soil fumigation to control disease in apple tree

Researchers at TRIS International SRL, Italy, Centro Regionale di Sperimentazione e Assistenza Agricola, Italy, Department of Horticulture of the Rheinlandpfalz Institute, Rheinbach, Germany, Steiermark GmbH, Austria, evaluated Specific Apple Replant Disease (SARD), which is a complex of soil pathogenic micro flora and abiotic factors, causing severe damage to root and vascular system of apple trees, effecting tree rooting, growth, vigor and yield. During 2010/2011, chloropicrin soil fumigation was conducted in order to evaluate its efficiency against a group of pathogens causing SARD.

Trials were set up with a commercial formulation of Tripicrin (chloropicrin 94%) at intensive apple tree monoculture areas in Germany, Rheinland-Pfalz and Austria, Steiermark. Soil microflora dynamics were investigated 0, 14, 40 and 180 days after treatment, using a semi selective media, in order to determine the effect of chloropicrin soil fumigation on dynamics of pathogenic populations of fungi and bacteria, as well as their natural antagonistic fungi (Trichoderma) and bacteria (Pseudomonas and Bacillus). Tree growth indicators (stem diameter and crown volume) as well as yield were observed for a 3 year period after treatment.

The data demonstrated that professional targeted fumigation with chloropicrin of soils devoted to intensive apple replant do not induce biological vacuum effects and suppresses the negative effects of replant disease. The most important detrimental effects were observed on Fusarium populations, while Trichoderma, fluorescent aerobic bacteria and Bacillus, enhanced their population density after the fumigation treatment. The data also confirmed previous efficacy findings and explained the increase in aerial and root vigor and plant yield in trees transplanted on fumigated soil. To conclude, chloropicrin soil fumigation affects both target and non-targeted soil microflora and can be used in the rhizosphere for intensive apple tree monoculture.

Source: http://www.mbao.org

Essential oils as alternative fumigants

In a recent study researchers from Urmia University, Iran, evaluated fumigant toxicity, repellent property and durability of essential oils of Eucalyptus dundasii Maiden, Eucalyptus floribunda F. Muell and Eucalyptus kruseana F. Muell against the adults of Rhyzopertha dominica (F.). The essential oils were isolated with hydro-distillation method by Clevenger apparatus. Results of fumigant toxicity showed that as the concentration and exposure time increased, the mortality also increased. LC50 values for E. dundasii, E. floribunda and E. kruseana were achieved as 41.69, 34.39 and 27.98 µl/l air, respectively. For Repellent Index, it was found that all essential oils have repellent effect at concentrations of 70, 140 and 280 µl/l air and E. kruseana oil showed the highest repellency as compared to other essential oils.

The essential oils investigated in the present study are used as pharmaceuticals and in flavoring and are therefore considered less harmful to humans than most conventional insecticides and they can use as safe fumigants for controlling R. Dominica. Also, we need some additional studies for formulating and improving methods of application. The study has been published in the *Journal of Entomology and Zoology Studies*.

Source: http://www.entomoljournal.com

Replacing ozone-depleting pesticides

Researchers from Kansas State University, the United States, and Mississippi State University, the United States, have found that *Tyrophagus putrescentiae* (Schrank), also known as the mold mite, is a cosmopolitan pest species that infests stored food products with high fat and protein contents, including dry-cured ham. Methyl bromide (MeBr) is a broad spectrum fumigant that can eliminate a wide range of pest species. Several dry cured ham plants in the U.S. use MeBr to control mold mite. However, methyl bromide is classified as an ozone depletion substance and will be phased out in the near future. Therefore, there is a significant need to find an economical and effective alternative compound and method to control mite infestations.

Various types of food additives have indicated high efficacy on mortality or fecundity of stored product mites. First part of studies were done to evaluate a simple method for coating hams with food-safe compounds to effectively suppress mold mite populations. Sulfuryl fluride (SF) is a broad spectrum fumigant. Studies showed SF killed all life stages of mold mites but the eggs. Extreme temperature has been known as a management tool to control insect and mite pests. Second part of studies were done for evaluation of effectiveness of SF combined with heat on mortality of mold mites. The number of adults and nymphs after 2 weeks of incubation were determined.

Variation in fumigant exposure time, temperature and fumigant concentration was evaluated. 20 unsexed adult and nymph mites and 10 eggs were transferred to 4 ml ventilated vials. Replications were exposed for different time periods ranging from 12 to 48 hrs. and variable SF concentrations at 25, 30, 35, and 40°C. Results revealed that examined food additives were effective at controlling mite infestations and mite population suppression increased by applying higher concentrations of these food additives to cubes of ham.

Source: https://www.aaas.confex.com

RECENT PUBLICATIONS

Guide to Natural Refrigerants in China - State of the Industry 2015

This guide has been prepared in collaboration with the Chinese Association of Refrigeration (CAR), is about a world region's potential for f-gas free substances in heating and cooling, and the largest in terms of industry views captured in a country-wide survey. Exclusive information on current and future trends in China is presented in a new-look guide designed with info graphics that clearly explain key market trends. The guide provides a clear analysis of the progress China has made and outlines the opportunities but also challenges through a thorough examination of market, policy and technological trends.

Contact: shecco SPRL, Wetenschapsstraat 10, 1000 Brussel, Belgium, Tel: +32-2230-3700; E-mail: klara.skacanova@shecco.com

Phasing-out Methyl Bromide in Developing Countries: A success story and its challenges

This book addresses the efforts undertaken to phase-out MB in developing countries, the lessons learned and what is pending to reach final phase-out. It further analyses factors that may impact or put at risk the continuity of the phase-out and possible ways to mitigate them. It aims to promote the south-south and north-south-south cooperation, facilitate information exchange on advanced technologies for materials, varieties, rootstocks, etc. and raise awareness on risk of reversibility to MB uses and encourage policy to avoid it happening.

Contact: UNEP DTIE OzonAction branch, 15 rue de Milan, 75441 Paris CEDEX 09, France. Tel: +331 4437 1450; Fax: +331 4437 1474; E-mail: ozonaction@unep.org

CO_2 as a Refrigerant

This guide highlights the application of carbon dioxide in supermarkets, industrial freezers, refrigerated transport, and cold stores as well as ice rinks, chillers, air conditioning systems, data centers and heat pumps. It is for design and development engineers needing instruction and inspiration as well as non-technical experts seeking background information on a specific topic.

Contact: International Institute of Refrigeration, 177, boulevard Malesherbes, 75017 Paris, France. Tel: +33-142-273-235; Fax: +33-147-63-1798

TECH EVENTS

2015

14–16 Aug
Bangkok, Thailand
BANGKOK RHVAC '2015
Contact: Thai Trade Fair, 44/100 Nonthaburi 1 Road, Bang KraSor, Nonthaburi 11000, Thailand
Tel: +66 2 507 7842; Fax: +66 2 547 5683-4

16–22 Aug
Yokohama, Japan
The 24th IIR International Congress of Refrigeration(ICR2015)
Contact: Secretariat
ICS Convention Design, Inc., Chiyoda Bldg., 1-5-18 Sarugakucho, Chiyoda-ku, Tokyo 101-8449, Japan
Tel: +81-3-3219-3541; Fax: +81-3-3219-3577
E-mail: icr2015@ics-inc.co.jp
Web: http://www.icr2015.org

10–11 Sep
Kyoto, Japan
13th International Conference on Advances in Foam Materials & Technology (FOAMS® 2015)
Contact: Professor Masahiro Ohshima, Conference Chair
Tel: +81-75-383-2646
E-mail: foams15@cheme.kyoto-u.ac.jp
Web: http://www.cheme.kyoto-u.ac.jp/foams15/

20-23 Oct
Dalian, China
8th International Conference on Cold Climate-Heating, Ventilation and Air-Conditioning (Cold Climate HVAC 2015)
Contact: Dalian University of Technology
Tel: +86-411-84709612
Fax: +86-411-84674141
E-mail: hvac@dlut.edu.cn
Web: http://www.coldclimate2015.org/

28-29 Oct
Amsterdam, the Netherlands
15th International Water Mist Conference
Contact: International Water Mist Association
Poststraße33(imHBC)
20354 Hamburg, Germany
Tel:+49-40-35085-215
Fax:+49-40-35085-80
E-mail:info@iwma.net
Web: http://www.iwma.net

8–11 Nov
Manila, Philippines
HVAC/R PHILIPPINES 2015
Contact: Global-Link
Unit 1003 Antel 2000 Corporate Center, 121 Valero, St. Salcedo Village, Makati City, Philippines
Tel: +632-750-8588
Fax: +632-750-8585

9–11 Nov
San Diego, USA,
Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions
Contact: Methyl Bromide Alternatives Outreach, 6556 N. Dolores Ave., Fresno, CA 93711, USA
Tel: +1-559-449-9035;
Fax: +1-559-449-9037
E-mail: gobenauf@agresearch consulting.com
Web: http://www.mbao.org

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