VATIS UPDATE

Ozone Layer Protection

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Highlights

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- Keeping vaccines cool with hydrocarbons in remote areas
- Reusable industrial degreaser
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- Broad-spectrum soil fumigant

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

APCTT
ASIAN AND PACIFIC CENTRE FOR TRANSFER OF TECHNOLOGY

OZONE CELL
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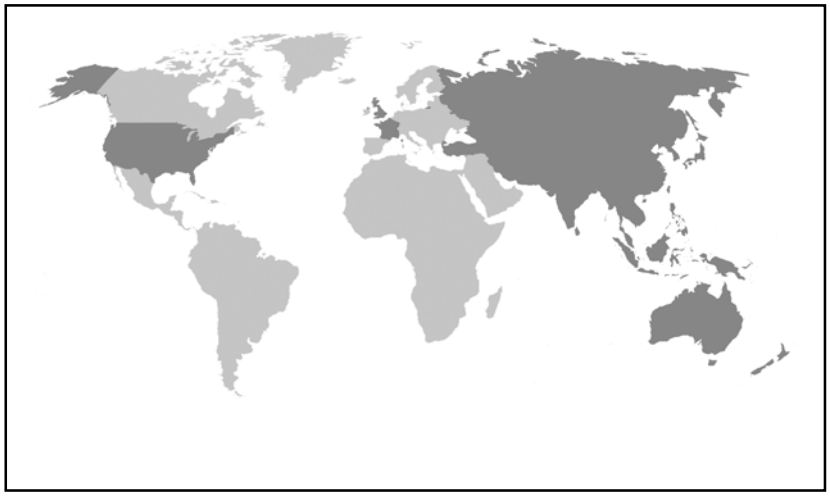
The **Asian and Pacific Centre for Transfer of Technology (APCTT)**, a subsidiary body of ESCAP, was established on 16 July 1977 with the objectives: to assist the members and associate members of ESCAP through strengthening their capabilities to develop and manage national innovation systems; develop, 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

enEX heat pump that uses carbon dioxide-based refrigeration systems

(Credit: eCO2 Technologies, Australia)

VATIS* Update
Ozone Layer Protection
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SCIENCE OF THE OZONE LAYER

WMO reports Antarctic ozone depletion for 2011

Signs of ozone depletion are again appearing over the Antarctic, the World Meteorological Organization (WMO) has reported, adding that prevailing temperatures and polar stratospheric clouds indicate that the degree of ozone loss this year will most likely be about average in comparison with the past decade. However, WMO noted that it is still too early to make a definitive statement on the level of depletion of ozone for 2011.

In mid-August, the ozone hole area was normal compared with recent years – larger than in 2008 and 2010, but smaller than in 2009, according to a WMO bulletin. As the sun returns to Antarctica after the polar night, it is expected that ozone destruction will speed up. The extent of ozone loss will depend to a large extent on meteorological conditions. The depletion of the ozone layer is also due to a very cold winter in the stratosphere.

WMO and the scientific community will use ozone observations from the ground, weather balloons and satellites, as wells as meteorological data, to monitor the development of the ozone hole in the coming months. Measurements with ground-based instruments and with weather balloons show first signs of ozone depletion at some sites close to the polar vortex edge. (Source: www.un.org)

Carbon emissions leave climate on the brink

Greenhouse gas emissions increased by a record amount last year, to the highest carbon output in history, putting hopes of holding global warming to safe levels all but out of reach, according to unpublished estimates from the International Energy Agency (IEA). The sharp rise means the goal of preventing a temperature rise of more than 2°C – which scientists say is the threshold for potentially dangerous climate change – is likely to be just "a nice Utopia", according to Mr. Fatih Birol, IEA's Chief Economist. It also shows the most serious global recession for 80 years has had only a minimal effect on emissions, contrary to some predictions.

Last year, a record 30.6 gigatonnes (Gt) of carbon dioxide poured into the atmosphere, mainly from burning fossil fuel – a rise of 1.6 Gt on 2009, according to estimates from the IEA regarded as the gold standard for emissions data. Mr. Birol said disaster could yet be averted, if governments heed the warning. "If we have bold, decisive and urgent action, very soon, we still have a chance of succeeding," he said.

IEA has calculated that if the world is to escape the most damaging effects of global warming, annual energy-related emissions should be no more than 32 Gt by 2020. If this year's emissions rise by as much as they did in 2010, that limit will be exceeded nine years ahead of schedule, making it all but impossible to hold warming to a manageable degree. Emissions fell slightly between 2008 and 2009, from 29.3 Gt to 29.0 Gt, due to the financial crisis. A small rise was predicted for 2010 as economies recovered, but the scale of the increase has shocked IEA. (Source: www.guardian.co.uk)

Geo-engineering could help close ozone layer hole

Geo-engineering research is in a new phase with the recent research on Stratospheric Particle Injection for Climate Engineering (SPICE) by scientists in the United Kingdom which will take on the growing accumulation of heat trapping gases in the troposphere leading to global warming. SPICE research is part of the moves to cap and cut heat trapping emissions over the medium and long term, and around the target point of the SPICE research is the ozone layer. The ozone hole puts part of the earth directly under it with dangers of harmful ultraviolet (UV) light and accompanying effects not safe for health and the environment. A research work presents that delivering oxygen gas carried as liquid (by a balloon as in SPICE or an unmanned aircraft) from planet earth to depleted parts of the ozone layer should help close it to a great extent. When oxygen is discharged under very high pressure, it is expected to join in reactions for protection against harmful UV rays. (Source: www.weeklyblitz.net)

ODS PHASE-OUT IN INDIA

Project to further the uptake of hydrocarbons

Under a project aiming to introduce ozone and climate-friendly hydrocarbon technology into the Indian market, a local manufacturer will be installing an R290 (propane refrigerant) production line for room air-conditioners (ACs). The production line will produce about 180,000 energy-efficient and hydrochlorofluorocarbon (HCFC)-free split and window-type ACs per year, saving an estimated total of 1 million tonnes carbon dioxide equivalent of direct refrigerant emissions as well as indirect energy-related emissions (assuming a product lifetime of 10 years).

The main goal of the demonstration project is to transfer know-how and to develop human, entrepreneurial and institutional capabilities for the hydrocarbon-based application of air-conditioning and refrigeration technologies. By making the project results available to other manufacturers it is hoped that hydrocarbon technology will diffuse into the region. The project will strengthen India's capacities in adopting environment-friendly technologies in line with international environmental agreements. Product certification and training of technicians will also be an important part of the project.

The new ACs will reduce consumption of ozone and climate-damaging HCFC-22, enabling the country to meet its obligation under the Montreal Protocol of accelerated phase-out of HCFCs by 2030. R290 has a Global Warming Potential (GWP) of 3 over a 100-year period, compared with a value of 1,810 for HCFC-22. In addition, hydrocarbon technology is also very energy-efficient, thus saving electricity costs and reducing indirect emissions.

This project is part of the International Climate Initiative supported by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. The project is implemented by GIZ Proklima in cooperation with the Government of India, represented by the Ozone Cell, Ministry of Environment and Forests, and the local air-conditioning manufacturer Godrej & Boyce Mfg. Co. Ltd. (Source: www.hydrocarbons21.com)

Avoidance of HFC-134a emissions in rigid PUF manufacture

Acme Tele Power Limited (ATPL) has installed a Greenfield project for the manufacture of rigid polyurethane foam (PUF) panels. Rigid PUF manufacture employs a blowing agent, which serves the purpose of reducing the viscosity of the other raw materials used and also gets entrapped in the closed cells of the foam to act as an insulating agent. Some amount of blowing agent is released during manufacture, usage and disposal of PUF.

The Montreal Protocol and its subsequent amendments have created a schedule to phase out the uses of ozone depletion substances (ODS) such as hydrochlorofluorocarbons (HCFCs) and chlorofluorocarbons (CFCs). The substitute chemicals developed to be used as alternative blowing agents include hydrofluorocarbons (HFCs) – like HFC-134a, HFC-245fa, HFC-365mfc and HFC-152a – and hydrocarbons – such as cyclopentane, isopentane and n-pentane.

HFC-134a and pentane are the most economical and commercially available alternative blowing agents. As pentane is inflammable, it requires substantial additional investment to ensure safer operations. Despite this, ATPL opted for pentane in its large-scale continuous PUF panel manufacturing facility to avoid greenhouse gas emissions, which would have occurred if HFC-134a had been used as the blowing agent. The PUF panels manufactured would be used as insulating material in green shelters, thereby resulting in energy conservation. (Source: eco2data.com)

Indian military officers visit Indonesian Halon Bank

To raise awareness among the military on ozone protection and the phase out of ozone-depleting substances (ODS), the Compliance Assistance Programme (CAP) of the United Nations Environment Programme (UNEP) facilitated a three-day visit of Indian defence officers to the Indonesian Halon Bank (IHB) from 8 to 11 August 2011. Prior to this visit, UNEP had organized national level

and regional workshops for the military of South and Southeast Asia to strengthen national level linkages between Ministries of Environment and Defence forces.

Group Captain Manoj Kumar of India's Centre for Air Power Studies (CAPS) was the lead resource person from UNEP during the visit. On the first day, the team went to IHB and Garuda Maintenance Facility (GMF). At IHB, the officers learned about the methodology of storage and transportation of halon cylinders (400 kg), including their environmental requirements. They also observed the halon recycling, identification and transfer equipment during the visit to the facility.

An awareness raising workshop, organized by Indonesia's Ministry of Environment (MOE), was conducted on the second day. On the third day, the team visited a cement plant of PT Holcim Indonesia, which had a programme called "Geocycle" for managing wastes including halons and other ozone depletion substances (ODS). In the plant, ODS are destroyed in the high temperature zone of cement clinker, which is reported to be an environment-friendly ODS destruction method.

Lessons from this cooperation activity include the need for awareness raising, interaction and capacity building on ODS issues in the military to institutionalize recommended policies in defence organizations. *Contact: Mr. Atul Bagai, Senior Regional Coordinator, OzonAction Programme, Compliance Assistance Programme, UNEP Regional Office for Asia and Pacific, UN Building, Rajdamnern Nok Avenue, Bangkok 10200, Thailand. Tel: +66 (2) 2881662; Fax: +66 (2) 2883041; E-mail: atul.bagai@unep.org.* (Source: www.unep.org)

CFC Consumption Phase-out Video

The informative video 'CFC Consumption Phase-out' (in English) highlights the need to abandon the use of ozone depleting substances such as chlorofluorocarbons (CFCs) and replace them with ozone-friendly alternatives for the betterment of the ozone layer and life on earth. It was produced by the National CFC Consumption Phase-out Plan, (NCCoPP) India.

For more information, access:

http://www.nccopp.info

IN THE NEWS

Iran gets help to phase out CFC-based inhalants

With support from the United Nations, the Islamic Republic of Iran has become the first country in the Asia-Pacific region to phase outchlorofluorocarbon (CFC)-based metered dose inhalers (MDIs) employed to treat asthma and other pulmonary ailments. Mr. Vahid Dastjerdi, Minister of Health and Medical Education of the Islamic Republic of Iran, made this announcement at a ceremony in Tehran organized by the United Nations Industrial Development Organization (UNIDO), the United Nations Environment Programme (UNEP) and the country's Department of Environment. The event also marked the closure of the Sina Darou Laboratories' manufacturing plant of CFC-based MDIs and considered ways to further promote ozone-friendly alternatives.

In 2007, the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol had approved funding for the conversion of CFC-based MDIs to alternative technologies manufactured by Sina Darou Laboratories. Mr. Mohammadi Zadeh, Vice President and Head of the Department of Environment, stated that the support of the industry that manufactures MDIs is a crucial part of the efforts to eliminate CFCs. (Source: www.un.org)

India-China efforts to phase out use of CFC-based inhalers

Indian and Chinese officials met in New Delhi during 23-26 May 2011 to seek the best solutions to ensure smooth transition from metered dose inhalers (MDIs) based on chlorofluorocarbons (CFCs) to CFC-free MDIs for treating asthma patients. The meeting was facilitated by the Compliance Assistance Programme, Regional Office for Asia and the Pacific (CAP ROAP), United Nations Environment Programme Division of Technology, Industry and Economics (UNEP DTIE), as part of its South-South cooperation activities.

China, the largest consumer of CFCs in the MDI manufacturing sector, uses CFCs for both local

consumption and export purposes. China has phased out CFCs since 1 January 2010, as stipulated by the Montreal Protocol; however, CFCs are available for the MDI sector via the Essential Use Nomination provisions of the Protocol. India is one of the Asian countries where the industry has taken the lead in phasing out CFC consumption in the MDI sector and has successfully converted CFC-based manufacturing into CFC-free one.

China's Foreign Economic Cooperation Office (FECO), the Ministry of Environmental Protection (MEP), as well as health officials and the MDI industry representatives from China, visited the Ozone Cell of India's Ministry of Environment and Forests (MoEF), the Ministry of Health, the Drug Controller General of India, and CIPLA India Ltd. to gain experience from India's CFC-based MDI phase-out approaches. *Contact: Mr. Atul Bagai, Senior Regional Coordinator, OzonAction Programme, Compliance Assistance Programme, UNEP Regional Office for Asia and Pacific, UN Building, Rajdamnern Nok Avenue, Bangkok 10200, Thailand. Tel: +66 (2) 2881662; Fax: +66 (2) 2883041; E-mail: atul.bagai@unep.org.* (Source: www.unep.org)

Inhalation spray for COPD gets FDA approval

The United States Food and Drug Administration (FDA) has granted approval for an ipratropium bromide and albuterol sulphate inhalation spray (Combivent Respimat Inhalation Spray developed by Boehringer Ingelheim, Germany) for patients with chronic obstructive pulmonary disease (COPD) who use a regular aerosol bronchodilator, but continue to have evidence of bronchospasm and require a second bronchodilator. This combination inhaler is considered to be a suitable alternative for patients who are currently using ipratropium bromide and albuterol sulphate (Combivent Inhalation Aerosol), which will be phased out by 31 December 2013, as it contains chlorofluorocarbon (CFC) propellant.

The decision to phase out these products is the latest in a series of decisions related to the removal of CFC inhaler products from the market, as required by the Clean Air Act of the United States. Following up on a proposal made in 2007, the FDA had announced in April 2010 that will it phase out seven different CFC-based metered dose inhalers (MDIs) used to treat patients with asthma, COPD, or both. The FDA arrived at its final decision after reviewing more than 4,000 public comments and documents that were submitted as part of a public meeting. The combination ipratropium bromide and albuterol sulphate inhalation spray will give COPD patients another treatment option and a suitable alternative when the inhalation aerosol is no longer available. (Source: www.medscape.com)

Philippines to phase out HCFC in the foam sector

In the Philippines, the Environmental Management Bureau of the Department of Environment and Natural Resources (EMB-DENR), in collaboration with the United Nations Industrial Development Organization (UNIDO), is currently implementing a project to phase out HCFC-141b, a hydrochlorofluorocarbon (HCFC) used as blowing agent, from the foam sector. Funded by the Multilateral Fund (MLF) and the Government of Japan, the project will assist the country in meeting its commitment to phase out HCFCs in the manufacturing sector.

Under the project, foam-manufacturing companies are entitled to receive technical and financial help for the conversion of their manufacturing process to alternative blowing agents based on eligibility and cost-effectiveness criteria established by MLF. EMB-DENR has already issued a call for expression of interest to identify companies that are currently using HCFC-141b or polyol system pre-blended with HCFC-141b as foam blowing agent in foam applications such as appliance, automotive, polyurethane panel, panel and spray, and polyurethane spray with manufacturing line/equipment. (Source: www.emb.gov.ph)

China secures funding for HCFC phase-out

China, the largest producer and consumer of hydrochlorofluorocarbons (HCFCs), has been granted US$265 million to cut its use of these gases by 2015. The funding approved by the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol will support China's commitment to the global environment

and green economy. China has made a significant step towards achieving the first reductions in HCFCs mandated by the Montreal Protocol.

In recent years, China's consumption of HCFCs has been soaring owing to its rapidly growing economy. In 2009, the country accounted for over 58 per cent of HCFC consumption in developing countries. The projects agreed between China and the Executive Committee represent the first stage of China's HCFC Phase-out Management Plan (HPMP). Once implemented, the HPMP will eliminate 3,320 Ozone Depleting Potential (ODP) tonnes of HCFC consumption in the country and the new technologies adopted will significantly contribute to global efforts to combat climate change by reducing the emission of greenhouse gases.

The overall reduction to be achieved will represent about 17 per cent of China's total amount of controlled HCFC use. China will be assisted in its efforts by the United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United Nations Industrial Development Organization, the World Bank and the Governments of Germany and Japan. (Source: www.unep.org)

Viet Nam to start phasing out HCFCs in 2012

Viet Nam will start phasing out the use of hydrochlorofluorocarbons (HCFCs) from early 2012 under its international commitments to protect the ozone layer, a government official said at a meeting of ozone officers from 11 Southeast Asian countries in Ho Chi Minh City recently. Mr. Luong Duc Khoa from the Department of Meteorology, Hydrology and Climate Change, of the Ministry of Natural Resources and Environment, said his department would initially support 12 enterprises in phasing out such ozone-depleting substances. Viet Nam will use US$10 million grant from the Multilateral Fund (MLF) for the Implementation of the Montreal Protocol to finance the 12 enterprises in eliminating HCFC-141b in their foam production, Mr. Khoa said. These enterprises will be assisted to substitute HCFC-141b in production technologies with alternative blowing agents. The country will need some US$30 million in the coming few years to carry out programmes to phase out the use of HCFC-R22 and HCFC-141b.

At present, Viet Nam has some 70 enterprises producing foams, 30 enterprises producing freezing systems for cold storages, 10 enterprises producing air-conditioners and nearly 400 enterprises using freezing systems for processing aquaculture products, Mr. Khoa said. Last year, these enterprises imported and consumed some 3,700 tonnes of HCFC-141b and HCFC-R22 in their production activities. Viet Nam is committed to cut HCFC consumption by 10 per cent in 2015 and to completely eliminate HCFC use by 2040. (Source: www.dztimes.net)

Fiji approves a policy on HCFC phase-out management

Fiji's Cabinet has approved a national policy on hydrochlorofluorocarbon (HCFC) phase-out management, based on a submission by Col. Samuela Saumatua, the Minister for Local Government, Urban Development, Housing and Environment. The policy will now be submitted to the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol.

The Minister said that the policy is expected to incorporate components that would ensure minimum costs to the industry, consumer and the government. It aims at reducing HCFC demand systematically to achieve 2020 targets, that is, 35 per cent reduction of Fiji's baseline of 152.83 metric tones, he added. The implementation of the polcy will commence once the Executive Committee grants its approval so as to meet the 2013 and 2015 targets. (Source: www.isria.com)

European Commission bans the use of industrial gas credits

The European Commission has formally adopted a ban on the use of industrial gas credits in the European Union Emissions Trading System (EU ETS) from May 2013. The ban will apply to credits from projects that destroy two industrial gases: trifluoromethane (HFC-23), produced as a by-product of chlorodifluoromethane (HCFC-22) principally in air-conditioners and refrigerators, and nitrous oxide (N_2O) from adipic acid used in the manufacture of nylon. HFC-23 and N_2O are both powerful greenhouse gases that contribute to climate change. (Source: ec.europa.eu)

REFRIGERANTS/ AIR-CONDITIONING

HFO-1234yf in bus air-conditioning trial

Hispacold, a Spanish bus air-conditioning (AC) system company, has reported a 99.77 per cent reduction in direct emissions when using the new low-global-warming-potential refrigerant HFO-1234yf from Honeywell International Inc., based in the United States. The company states that for a typical bus fleet size of a medium-sized city, using HFO-1234yf as the refrigerant would help eliminate direct emissions of 14,000 tonnes of carbon dioxide equivalent per year. In addition, bus manufacturers could use 20 per cent less refrigerant should they choose HFO-1234yf. The Hispacold work also suggests that HFO-1234yf is a near drop-in replacement refrigerant for the current refrigerant, HFC-134a, in the tested bus AC systems.

"HFO-1234yf is being readily adopted for use in car AC systems, and now this testing shows that its energy-efficiency, proven safety, environmental compliance and cost performance can help reduce the environmental footprint of buses too," said Mr. Paul Sanders, Managing Director for Honeywell Fluorine Products in Europe, Middle East, Africa and India. The bench test, co-funded by the Centre for the Industrial Technological Development of the Spanish Ministry of Science and Innovation, examined the use of HFO-1234yf in Hispacold's 12S roof-top AC unit and compared the performance with that of HFC-134a in drop-in and optimized configurations.

Honeywell claims that HFO-1234yf, with a global warming potential of just 4, has an atmospheric lifetime of only 11 days, compared with 13 years for HFC-134a. (Source: www.racplus.com)

Keeping vaccines cool with hydrocarbons in remote areas

SolarChill vaccine cooler model MKS 044, commercially produced by Danish company Vestfrost, has a storage capacity of 20 litres and can keep vaccines at temperatures between 2° and 8°C for five days after one initial charge of solar energy. It combines several "breakthrough" technologies, such as environment-friendly Greenfreeze refrigeration technology with hydrocarbon refrigerant and insulation foam. Unlike other solar coolers, it does not rely on batteries to store the energy of the sun; it uses of a direct current (DC) compressor to store solar energy in ice, which keeps the vaccine cabinet cool overnight.

SolarChill vaccine cooler was field-tested for two years under extreme conditions in Senegal, Cuba and Indonesia and was pre-qualified in March 2010 by the World Health Organisation (WHO). In spring 2011, WHO reviewed and revalidated the approval of SolarChill. The current generation of SolarChill is pre-qualified for 20°to 32°C ambient temperatures. However, in field tests, the units have operated under lower and higher ambient temperature ranges of 10° to 42°C.

True Energy, a company in the United Kingdom, also offers a solar-powered vaccine cooler. The "True Energy Vaccine Refrigerator" features Sure Chill technology – meaning that it can operate on intermittent or poor mains supply, battery-free solar power or a combination of the two – to make sure vaccines are stored safely even in tough environments. According to the company, the cooler can operate safely even when power is lost for over 10 days at ambient temperatures as high as 43°C. The DC version of the vaccine cooler is free of hydrofluorocarbons, and uses the hydrocarbon refrigerant R600a. (Source: www.hydrocarbons21.com)

Prototype R290 heat pump testing

Under the Heat Pump Programme of the International Energy Agency (IEA), a 2.9 kW R290 (propane) water-to-water heat pump prototype for space heating and domestic hot water (DWH) has been developed, tested and trialled in a low-energy house in Norway.

The prototype was developed at the Norwegian University of Science and Technology (NTNU) in cooperation with SINTEF Energy Research, Norway. It was designed for space heating (connected to a floor heating system), DHW production (300 litres) or to work in a simultaneous mode by de-superheating. The prototype contained a propane

charge of 250 g, and has been built to comply with safety requirements set out in standard EN 378:2008.

The prototype heat pump system, tested in the NTNU laboratory, showed a Carnot efficiency of 0.30-0.40 and 0.45-0.50 when including and excluding the heat exchanger losses, respectively. The main reason for the relatively low coefficient of performance (COP) and low Carnot efficiency was attributed to the poor performance of the evaporator and unstable superheat control for the expansion valve. The average seasonal performance factor (SPF) during the entire measuring period (2.5 years) was 3.7 when only the energy to drive the compressor was taken into account, and 3.1 when the total energy input to both the compressor and the pumps was considered. The SPF values correspond to ~70 per cent energy savings compared with an electric heating system. (Source: www.hydrocarbons21.com)

Energy-efficient liquid chiller

Carrier Corp., based in the United States, has strengthened its building solutions portfolio with the launch of AquaThrust 30XA, an air-cooled liquid chiller with Pro-Dialog Plus Control interface. This chiller is designed to meet current energy efficiency requirements and feature flexibility of use, compact size and highly reliable technology.

AquaThrust 30XA chiller uses HFC-134a, the non-ozone depleting hydrofluorocarbon refrigerant. Value-added features of the chiller include a twin-rotor screw compressor, multi-pipe evaporator and electronic expansion device. AquaThrust 30XA liquid chiller is also claimed to offer several other features that enhance comfort and ease-of-use. (Source: www.indiainfoline.com)

Testing a hydrocarbon drop-in replacement for R22 in AC units

Tests on the energy saving potential of the hydrocarbon refrigerant HCR188C2 as drop-in replacement for R22 in 50-tonne air-conditioners have started at Jerico Energy in California, the United States. HCR188C2, developed by inventor and entrepreneur Mr. Richard Maruya, is a pure hydrocarbon formulation, blended specifically as a drop-in replacement for the hydrochlorofluorocarbon (HCFC) R22. The tests will compare the required energy for holding a specific temperature when using either of the two refrigerants.

The tests will be run side-by-side on two identical rooftop Carrier 50DJ104 Weathermaker IV systems that are used for commercial building air-conditioning. The units serve as an ideal test bed, since the two large compressors come on together at all times, while two pairs of smaller compressors only come on as needed to hold the required temperature. The test-equipment will update the following values once a minute: evaporator temperature; air temperature; compressor discharge temperature; circuit refrigerant pressure; compressor power; and daily compressor energy. (Source: www.hydrocarbons21.com)

Energy-efficient AC unit with green refrigerant

Ruud, a leading manufacturer of air-conditioning and heating systems in the United States, has received the Energy Star Most Efficient designation from the United States Environmental Protection Agency (EPA) for its air-conditioners (ACs) with Ultra Series UASL-JEC condensing unit. The Ruud Ultra Series units have a seasonal energy efficiency ratio (SEER) of 18 and employ the earth-friendly R-410A refrigerant. To qualify for Energy Star Most Efficient designation, ACs must have efficiencies of 18 SEER or greater for split central ACs and efficiencies of 16 SEER or more for packaged central ACs. (Source: houston.blockshopper.com)

Environment-friendly vehicle air-conditioning system

A new environmentally friendly air-conditioning system (AC) launched by Delphi Automotive, the United States, marks one of the industry's first uses of the new air conditioning refrigerant R-1234yf, which has a Global Warming Potential (GWP) of 4 compared with 1,430 for R-134a. Delphi is targeting vehicle AC systems with R-1234yf for the European market. It is supplying an electronically controlled variable compressor can adjust displacement or capacity to meet the varying needs of the power train and passenger compartment comfort. (Source: www.4-traders.com)

SOLVENTS

ODS-free cleaner/degreaser series

Idemitsu Lube (Singapore) Pte. Ltd. offers two cleaner/degreaser product series free of ozone depleting substance (ODS). Daphne Alpha Cleaner is a highly purified synthetic hydrocarbon cleaner/degreaser series that can meet stringent requirements for industry-level degreasing and cleaning. Daphne Cleaner NM/NH is a highly purified and totally environment-friendly napthenic hydrocarbon series. Both products are recommended as cleaner/degreaser for all types of metals, and rubber and plastic parts. *Contact: Idemitsu Lube (Singapore) Pte. Ltd., 37 Pandan Road, Singapore 609280. Tel: +65 62685888; Fax: +65 6265 5610.* (Source: www.idemitsu-ils.com.sg)

Reusable industrial degreaser

MTec Materials Technology, an innovative industrial solutions company in Brazil, has introduced Purisolv, a recyclable green degreasing solvent extracted from cashew nuts, for use in metal finishing, plastics, ceramics, printing, electronics and automotive repair industries. Purisolv uses chemical fractions extracted from cashew nut liquid and a sucrose ester used as surfactant. It is less costly than citrus-derived limonene-based 'green' degreasers and is highly reusable due to its unique properties. It is ideal for spray or immersion degreasing or parts cleaning processes.

"Aside from offering users greater upfront economy over alkaline formulations or petroleum-derived degreasers and cleaners, once the initial volume of Purisolv has been established impurities can be skimmed or filtered off and only 10 to 20 per cent of the product needs to be replenished," claimed MTec's Director and Chief Scientist, Mr. Mauricio de Castro.

Purisolve thoroughly and quickly removes leftover residues such as process oils, greases and dirty stains to prepare metal, plastic and other surfaces for further processes such as painting, bending, galvanizing or final packing. It eliminates or reduces workplace environmental health and safety risks otherwise associated with handling and applying toxic or volatile chemicals. It also reduces costs associated with individual protection equipment, and special materials handling and storage issues. (Source: www.prweb.com)

Airless vacuum cleaning systems

Serec Corp., the United States, manufactures standard and customized precision and industrial cleaning systems. The company says its airless vacuum cleaning systems feature closed-loop vacuum technology and low emission levels. Serec systems process inflammable and non-inflammable solvents such as hydrofluoroethers (HFEs), hydrofluorocarbons (HFCs), n-propyl bromide, isopropyl alcohol, perchloroethylene, trichloroethylene, hydrocarbons and azeotropic solvents.

The closed loop design with its patented vacuum distillation, recovers 97 per cent of distilled solvent from the waste stream for reuse, says the company. Serec systems have been certified by the Los Angeles South Coast Air Quality Management District (SCAQMD), the most stringent air quality governing body in the United States, and have met the environmental requirements of Best Available Control Technology (BACT), Maximum Achievable Control Technology (MACT), Lowest Achievable Emission Rate (LAER), as well as National Emissions Standards for Hazardous Air Pollutants (NESHAP). (Source: www.processcleaning.com)

Non-ODS solvent compositions

3M Innovative Properties Company, the United States, is patenting solvent compositions, which include blends that consist essentially of 1,1,1,2,2,3,4,5,5,5-decafluoro-3-methoxy-4-(trifluoromethyl)pentane, trans-1,2-dichloroethylene and a third component. The third component is selected from methanol, ethanol, isopropanol, t-butanol and 1-propanol. The blends form ternary azeotropes and can be useful for cleaning electronic parts, as coating solvent components, as heat transfer fluids and as lubricants, extending the range of applications provided by hydrofluoroethers (HFEs). The solvents address the need for non-ozone depleting compositions that have good solvent strength, low inflammability, and a relatively short atmospheric lifetime so that they do not contribute to global warming in any significant manner.

The invention also provides a process to deposit a coating mixture on a surface that includes applying a coating material that includes one of the above compositions to at least a portion of a surface, wherein the at least one coating material is soluble or dispersible in the provided composition. Also, a process is provided for lubricating metal, cermet or composite, using one of the compositions as the lubricant fluid.

In yet another aspect, a process is provided for assisting in the removal of contaminants from the surface of a substrate that includes contacting the substrate with one or more of the compositions until the contaminants are dissolved, dispersed or displaced in or by the composition, and removing the composition containing the contaminants from the surface of the substrate. Also, a process is provided for heat transfer wherein one or more of the provided compositions described above can be used as a heat-transfer fluid. *Contact: 3M Corporate Headquarters, 3M Centre, St. Paul, MN 55144-1000, Minnesota, United States of America. Tel: +1 (888) 364 3577.* (Source: www.sumobrain.com)

Wafer-level cleaning solution

Kyzen Corporation, based in the United States, is launching its Micronox® MX2302 wafer-level cleaning solution – an engineered semi-aqueous solvent blend designed to remove difficult flux and paste residues including lead-free, rosin, no-clean and tacky flux from wafer bumps found in flip chip, chip scale, etc. The solution is effective in ultrasonic, centrifugal and semi-aqueous spray under immersion cleaning systems. Easy to use, it has excellent compatibility with all soldering materials, passivation layers (lead, nitride, silicon dioxide, benzocyclobutene, etc.) and metal layers. Micronox MX2302 is safe on most metals, and removes even baked-on flux from high-temperature reflow. *Contact: Kyzen Corporation, 430 Harding Industrial Drive, Nashville, TN 37211, United States of America. Tel: +1 (615) 831 0888; 1 (615) 831 0889; E-mail: contact_usa@kyzen.com.* (Source: www.kyzen.com)

Silicon wafer cleaning agent

Central Glass Company Ltd., Japan, is patenting a silicon wafer cleaning agent, which includes at least one water-based cleaning liquid and one water-repellent cleaning liquid for providing water repellence to an uneven pattern at least at recessed portions during a cleaning process. The water-repellent cleaning liquid is a liquid composed of a water-repellent compound containing a reactive moiety that is chemically bondable to silicon in the silicon wafer, and a hydrophobic group. Alternatively, it is a mixture of 0.1 mass per cent or more of the water-repellent compound (relative to the total quantity of 100 mass per cent of the water-repellent cleaning liquid) and an organic solvent.

In the production of semiconductor devices, the surface of silicon wafer has a fine uneven pattern. An object of the invention is to provide a silicon wafer cleaning agent for improving a cleaning process that tends to induce a pattern collapse – a method of producing a finely uneven pattern on the silicon wafer surface. While the surface of the silicon wafer is cleaned by the cleaning agent, the recessed portion of the wafer surface will temporarily retain the water-repellent cleaning liquid and become water-repellent. After cleaning, the water repellence can be removed by irradiating the silicon wafer surface with light or heating the silicon wafer. (Source: ip.com)

Water-based parts washing system

Mantek, Australia, offers Torrent 400, a patented water-based parts washing system. Torrent 400 is designed to clean machine parts, easily, safely and with low environment impact. Unlike traditional parts washers, the fully integrated and enclosed Torrent 400 combines heat, chemistry and high pressure to clean machine parts of greases and oils. Torrent 400 parts washing system a high efficiency and maintains workplace safety. Users of Torrent 400 will also be free from harmful hydrocarbons, noxious fumes and fire hazards – risks commonly associated with solvent-using traditional parts washers. In addition to manufacturers and workshops, the system can also benefit automotive service centres, and marine, construction, transportation and mining industries. *Contact: Mantek, No. 5-9 Ralph Street, Alexandria, NSW 2015, Australia. Tel: +61 (2) 9669 0261; Fax: +61 (2) 9693 1562; E-mail: salesquery.mantek@nch.com; Website: www.mantek.com.au.* (Source: www.mmdnewswire.com)

FOAMS

Surfactant technology for voids reduction in rigid PUF

Momentive Performance Materials Inc., a leading global provider of silicones and advanced materials based in the United States, has expanded its offering of polyurethane foam (PUF) additives with the launch of Niax™ silicone L-6891, an excellent candidate to consider for resin-side addition in the manufacture of rigid PUF. This highly efficient surfactant has been shown to be useful for improving insulation foams, particularly those used in refrigerators and cool-store applications.

Testing has shown that Niax silicone L-6891 can be used to provide extremely fine cells, good foam flow, even density distribution and improved surface quality through significantly reduced void formation. The combined effect of fine cells and void reduction can help create foam with constantly low thermal conductivity in all areas of the foamed cabinet, thereby helping to improve the overall energy savings of the end product. L-6891 is ideal for use with hydrofluorocarbons (HFCs) and hydrocarbons such as cyclopentane. *Contact: Momentive Performance Materials Inc., 180 East Broad Street, Columbus, OH 43215, United States of America. Tel: +1 (614) 225 4000; E-mail: info @momentive.com.* (Source: www.marketwatch.com)

Foam systems to reduce post-demould expansion

Along with density and thermal conductivity, the amount of post-demould expansion exhibited by a foam is one of the most critical properties to processors of rigid polyurethane foams (PUF). High post-mould expansion can hurt the foam's performance, detract from the final product's appearance and reduce productivity. In household refrigerators, the use of rigid PUF insulation contributes greatly to energy efficiency. An obvious way to increase the insulating ability of the foam is to increase its thickness. However, with increased thickness comes increased post-demould swelling.

At Bayer MaterialScience LLC, the United States, Senior Technical Service Specialist Mr. Kerry Ingold and Senior Principal Scientist Mr. Steven Schilling conclude that post-demould swelling is primarily a result of high temperatures reached in the foam's core soon after it is poured. This is due to the foam's expansion to fill spaces left by vaporized and expanded blowing agents, and foam core softening after it reaches its glass transition temperature.

Bayer's new foam formulations use different blowing agents, including HFC-134a, HFC-245fa and cyclopentane, to reduce post-mould swelling. These formulations help increase foam performance and manufacturing productivity by reducing demould time and improving appearance through flatter sides. *Contact: Mr.* Tom Erdner, *Bayer MaterialScience LLC, 100 Bayer Road, Pittsburgh, PA 15205-9741, United States of America. Tel: +1 (412) 777 5200; E-mail: thomas.erdner@bayer.com.* (Source: www.bayermaterialsciencenafta.com)

Low-GWP foam expansion agents

DuPont, based in the United States, offers a wide range of innovative foam expansion solutions. DuPont's Formacel® foam expansion agents can be blended with each other as well as with co-expansion agents to produce a desired combination of properties for a specific application. DuPont currently markets three blowing agents: Formacel S (HCFC-22), Formacel Z-2 (HFC-152a) and Formacel Z-4 (HFC-134a). Formacel S, best known for its use as a refrigerant, has been used to produce polystyrene (PS) foam food packaging and as a blend with HCFC-141b in the manufacture of polyisocyanurate (PIC) and polyurethane (PUR) foams.

Formacel Z-2 is an inflammable compound with zero ozone-depletion potential (ODP), negligible photochemical reactivity, and extremely low global warming potential (GWP). It has been approved by the United States Food and Drug Administration (FDA) for use in PS foam for food service and packaging. It is also used in PS foam insulation and graphics art board. Formacel Z-2 has not been used in PUR or PIC foams to date, but is being evaluated for these applications because of its favourable pricing, low molecular weight and excellent environmental properties.

Formacel Z-4 is a non-inflammable compound with negligible photochemical reactivity and zero

ODP. This compound, used widely as a refrigerant, also has an affinity for polyols, although not as great as Formacel S. The use of Formacel Z-4 in PUR and PIC foams also offers a number of benefits such as improved foam dimensional stability, better insulation value at low temperatures and excellent compatibility with plastic liners in appliances. (Source: www2.dupont.com)

Foams with halogenated olefin blowing agents

In the United States, Honeywell International Inc. and three inventors have jointly patented foam forming methods that comprise preparing a foamable system having at least one hydrohaloolefin – such as a hydrofluoroolefin (HFO) – and ensuring (a) the substantial absence of long-term decomposition-inducing contact between the HFO and an amine-containing catalyst; (b) the availability of an effective amount of surfactant in the system under conditions that prevent exposure of the surfactant to a long-term decomposition reaction environment; or (c) a combination of (a) and (b). Related methods, foamable systems and foams are also disclosed.

Preferred embodiments provide polyurethane and polyisocyanurate foams, including closed-celled foams, and methods for their preparation. The preferred foams are characterized by a fine uniform cell structure and little or no foam collapse. The foams are preferably produced with a polyol premix composition that comprises a combination of a HFO blowing agent, a polyol, a silicone surfactant and a catalyst, and is substantially free of added water.

Patent applicants have found that a problem may arise with the long-term stability, and hence the shelf life, of foamable systems in which HFOs, particularly HFO-1234ze(E) or HFCO-1233zd(E), are used as the blowing agent. Detrimental decomposition can occur, for example, when water is present in the composition in adequate amounts. Likewise, HFO-amine interaction has a negative effect on the performance of surfactants, particularly silicon-containing surfactants. The new compositions overcome these issues, the applicants claim. *Contact: Honeywell International Inc., 101 Columbia Road, Morristown, NJ 07962, United States of America.* (Source: www.sumobrain.com)

Natural fibre-reinforced bio-foams

Starches and polylactic acids (PLAs) represent the main bio-based and biodegradable polymers with potential industrial availability in the coming decades for “bio-foam” applications. Two scientists – Ms. Anne Bergeret and Mr. Jean-Charles Benezet – from Centre des Matériaux de Grande Diffusion in France have studied the incorporation of natural fibres into bio-foams to improve material properties and processing parameters.

Starch foams were obtained by melt extrusion in which water is used as blowing agent. The incorporation of natural fibres (hemp, cellulose, cotton linter, sugarcane and coconut) in the starch foam induced a density reduction of up to 33 per cent, a decrease in water absorption, and an increase in mechanical properties according to the fibre content and nature. PLA foams were obtained through single-screw extrusion using of a blowing agent that decomposed at the PLA melting temperature. A void content of 48 per cent for PLA and 25 per cent for cellulose fibre-reinforced PLA foams and improved mechanical properties were achieved. *Contact: Ms. Anne Bergeret, Centre des Matériaux de Grande Diffusion, Ecole des Mines d’Alès, 6 avenue de Clavières, 30319 Alès, France.* (Source: www.hindawi.com)

Foam extrusion machinery heads for the laboratory

In Germany, KraussMaffei Technologies GmbH has produced the first laboratory-scale version of its Schaumtandex line for the Fraunhofer Institute for Chemical Technology. The unique machine concept is ideal for physical foaming of plastics with environmentally compatible blowing agents.

The Schaumtandex line is composed of a ZE 30 UTX twin-screw extruder for melting and a KE 60 single-screw extruder designed for cooling the melt. The twin-screw extruder can process all standard polymers and many high-temperature plastics up to a maximum temperature of 350°C. Environmentally friendly blowing agents in liquid form are injected via nozzles directly into the processing chamber of the twin-screw extruder. The laboratory line is a scaled-down version with all technical characteristics of a production line. (Source: www.kraussmaffei.com)

AEROSOLS

Improved medicinal aerosol formulation for pMDI

Jagotec AG from Switzerland, along with two individual inventors, is patenting an improved medicinal aerosol suspension formulation for pressurized metered dose inhaler (pMDI) administration. The formulation comprises a micronized Beta2 agonist, a micronized corticosteroid, sub-therapeutic quantity of a moisture-scavenger excipient and a hydrofluoroalkane (HFA) propellant (such as HFA-134a and HFA-227). The relative amounts of pa-agonist, corticosteroid and excipient in the formulation are such that they associate to form floccules having a density that is substantially the same as that of the HFA propellant, which are used as an alternative to chlorofluorocarbon (CFC) propellants.

Formulations administered via pMDIs can be in the form of solutions or suspensions. In suspension formulations, the drug is manufactured as a fine particle powder, which is then suspended in a liquefied propellant or propellant blend. The suspension formulation can be stored in a sealed canister with sufficient pressure to maintain the propellant in liquid form. In solution formulations, the drug is solubilized in the liquefied propellant phase. When the metering valve is actuated, a dose is delivered in rapidly deployed fine droplets. Suspension formulations are usually preferred because of generally improved chemical stability of the suspended particles in comparison with solubilized drugs. *Contact: Jagotec AG, Eptingerstrasse 61, Muttenz, CH-4132, Switzerland.* (Source: www.sumobrain.com)

Budesonide suspension in HFA-propelled pMDI

In Thailand, researchers from the Drug Delivery System Excellence Centre and the Department of Pharmaceutical Technology of Prince of Songkla University have examined the use of budesonide in a suspension-based pressurized metered dose inhaler (pMDI) employing hydrofluoroalkane (HFA) propellants (HFA-134a, HFA-227 and the mixture of the two) and stabilizing agents (oleic acid and sorbitan trioleate). A factorial design method was applied to investigate the effects of two factors (vapour pressure of the propellant system and concentration of stabilizing agents) on formulation performances. Each factor was studied in three levels, using 24 designed formulations of budesonide suspension-based pMDIs.

The results indicated that the vapour pressure of the propellant system was an important factor that affected the content of the active ingredient ($p < 0.05$). The formulations containing HFA-134a (high vapour pressure) gave drug contents above the maximum limit (> 120 per cent), whereas the formulations containing HFA-227 (low vapour pressure) gave low budesonide contents of approximately 50 per cent. However, when a propellant mixture with intermediate vapour pressure was used, the budesonide contents were close to the acceptable range (80-120 per cent). Thereafter, eight formulations containing the HFA mixture together with different types and concentrations of stabilizing agent were tested for their aerosol properties.

The fine particle fraction measured by a twin-stage liquid impinger ranged from 32 to 38 per cent. The mass median aerodynamic diameters obtained from the Andersen cascade impactor were approximately 3 ìm for all formulations. No significant difference was found among those formulations. After 3 months of storage, the aerosol properties did not change, and good physical stability was noted. The particulate budesonide readily re-dispersed in the HFA mixture and a homogeneous suspension could be maintained for up to 20 min. *Contact: Mr. Teerapol Srichanaa, Department of Pharmaceutical Technology, Faculty of Pharmaceutical Sciences, Prince of Songkla University, Hat Yai, Songkhla 90112, Thailand. E-mail: teerapol.s@psu.ac.th.* (Source: www.scienceasia.org)

New inhaler without CFC/HFA propellant

Boehringer Ingelheim International GmbH, Germany, has introduced a unique inhaler device – Respimat® Soft Mist™ Inhaler (SMI) – that delivers medication accurately and effectively to patients who require inhaled respiratory therapy. SMI, which does not employ a chlorofluorocarbon (CFC) or

hydrofluoroalkane (HFA) propellant, is claimed to represent a significant development in inhaler technology.

The benefits of Respimat SMI include the following:

- High lung deposition – Long-lasting SMI has a high fine particle fraction (less than 5.8 µm) that is easily inhaled and results in high lung deposition;
- Low mouth and throat deposition – SMI moves much slower than aerosol clouds from MDIs and therefore, it leads to lower deposition in the mouth and throat compared with CFC and HFA metered dose inhalers (MDIs);
- Easy and convenient to use – Respimat SMI is actuated using a dose-release button, and the soft mist lasts about six times longer (1.2 s) than conventional MDIs, offering the patient more time between actuation and inhalation;
- Independent of inspiratory flow – The soft mist produced by the inhaler is generated independent of the patient's inspiratory flow; and
- No propellant – Respimat SMI is propellant-free (and therefore environmentally friendly), with a spring providing the power to force the medication through the uniblock to provide the unique soft mist.

(Source: www.respimat.com)

Combination therapy via pMDI

Chiesi Farmaceutici S.p.A., Italy, has applied for a United States patent on aerosol formulations comprising glycopyrronium chloride in combination with formoterol, administered by means of a pressurized metered dose inhaler (pMDI) for the prevention or treatment of chronic obstructive pulmonary disease (COPD). The formulation uses hydrofluoroalkane (HFA) propellant, a co-solvent, and an inorganic acid to stabilize both the glycopyrronium chloride and formoterol. Optionally, the formulation may further comprise beclometasone dipropionate. The inventors have observed that glycopyrronium chloride has several advantages over glycopyrronium bromide with respect to pharmaceutical formulations. In particular, glycopyrronium chloride has better solubility properties than glycopyrronium bromide. Furthermore, it has also been found to have better compatibility with other active ingredients, especially with formoterol. (Source: www.freepatentsonline.com)

FUMIGANTS

Broad-spectrum soil fumigant

Yokafume from Arysta LifeScience, Japan, is a broad-spectrum soil fumigant with iodomethane (methyl iodide) as the active ingredient. First developed in the United States as a replacement for methyl bromide, iodomethane effectively controls a broad range of soil-borne diseases, nematodes, weed seeds and insects that threaten high-value crops, according to the company.

Yokafume is recommended for use with crops such as tomato, melon, chrysanthemum, ginger and carnation. It is applied to bare soil prior to planting. When used according to label directions, Yokafume does not pose a threat to human health or the environment, the company says. *Contact: Arysta LifeScience, 38/39th Floor, St. Luke's Tower, 8-1, Akashicho, Chuo-Ku, Tokyo 104-6591, Japan. Tel: +81 (3) 3547 4500; Fax: +81 (3) 3547 4699.* (Source: www.farmchemicalsinternational.com)

Non-chemical alternative for methyl bromide

Heat treatment, which has been used since the 1900s as an effective strategy to manage stored product pests, is increasingly becoming popular again owing to environmental concerns. Heat remains an effective alternative to ozone depleting fumigants like methyl bromide and other fumigants with high global warming potential (GWP). Some of the distinct advantages of heat are:

- Kills all the life stages from eggs to adults;
- Non-corrosive and non-residual;
- Untreated areas may remain operational;
- Allows shorter treatment times, low downtime, and higher productivity;
- No extensive sealing required;
- Environment-friendly and cost-effective; and
- Allow the identification of pockets of infestation, enabling post-heat corrective treatment on cracks and crevices.

The patented Thermal Remediation® process from Temp-Air Inc., the United States, uses 100 per

cent outside air to create positive pressure within the structure being heat-treated while managing the hot air flow using a configuration of high temperature, duct work, fans and a real-time wireless temperature monitoring system. The process involves increasing the internal temperature of the structure between 49°-60°C. *Contact: Temp-Air Inc., 3700 West Preserve Boulevard, Burnsville, MN 55337, United States of America. Fax: +1 (952) 707 5297; Website: www.temp-air.com.* (Source: www.thermalremediation.com)

Azeotropic fumigant compositions of methyl iodide

Honeywell International Inc., the United States, has secured patent on azeotropic and azeotrope-like compositions of methyl iodide and at least one fluorocarbon or hydrofluorocarbon such as 1,1,1,3,3-pentafluoropropane (HFC-245fa). The compositions are in gas form at temperatures of 30°C and below. The inventive compositions serve as non-ozone-depleting gaseous fumigants useful as methyl bromide (MBr) substitutes in a variety of applications. These compositions serve as a drop-in replacement for gaseous MBr, providing the benefits of a methyl iodide fumigant while also utilizing existing MBr equipment.

Methyl iodide, also known as iodomethane, has a boiling point of about 42.5°C and a density of about 2.3 g/cc. It has been conventionally known as a useful fumigant, and serves that purpose in the invented composition. An added benefit of methyl iodide is that it is not associated with ozone depletion. The fluorocarbon or hydrofluorocarbon in the invented compositions facilitates the application of the compositions, increases the time that a given volume of methyl iodide is exposed to a material to be contacted and enables a more uniform and easily controlled application of the compositions.

In preferred embodiments, the fluorocarbon or hydrofluorocarbon has an average ozone depletion potential (ODP) of about 0.05 or less: chlorodifluoromethane (R22), for example, has an ODP of 0.05. Similarly, the hydrofluorocarbon or fluorocarbon has a global warming potential (GWP) of about 1,000 or less. The azeotrope-like compositions of the invention may optionally include additional components or additives such as chloropicrin (preferred), acrolein, dimethyl disulfide, 1,3-dichloropropene, furfural and propylene oxide. The compositions could be pumped through existing fumigation pipes and systems designed for MBr. (Source: www.patentgenius.com)

Fumigant films keep the air clean

Researchers at the Agricultural Research Service (ARS) of the United States Department of Agriculture (USDA) have found a way to help growers minimize emissions of fumigants used as soil treatments. Led by Ms. Sharon Papiernik, with the North Central Agricultural Research Laboratory, the researchers used specially designed chambers to test the permeability of dozens of films used to cover fumigated soil. They sandwiched each film between two chambers, injected fumigants into one chamber and measured both the fumigant that passed through the film into the second (receiving) chamber and the fumigant that remained in the source chamber.

The researchers tested 200 film-chemical combinations and came up with a “resistance factor” that could be used to determine emission rates for each film and fumigant under a wide range of growing conditions and weather patterns. As each fumigant had a different chemistry, each behaved differently with each tarp. The results showed that some films were much better barriers to fumigant diffusion than others, but the effectiveness varied – some were less effective under higher humidity levels. The work is part of a special project to find the best alternatives to methyl bromide. It is also intended to help the United States Environmental Protection Agency (EPA) and other regulators charged with developing new fumigant requirements to better protect those who use them and neighbours of treated fields. (Source: www.sciencedaily.com)

UNEP HCFC Help Centre

The United Nations Environment Programme (UNEP) HCFC Help Centre helps developing countries phase out ozone depleting hydrochlorofluorocarbons (HCFCs). The Centre promotes information exchange on HCFC replacement technologies and on hydrofluorocarbons (HFCs) in the mobile air-conditioning sector.

For more information, access:

http://web2.unep.fr/hcfc/

RECENT PUBLICATIONS

Air-Conditioning Systems: Performance, Environment and Energy Factors

This book discusses the application and performance on thermal comfort, indoor air quality and energy efficiency of room air distribution modes. Efficient energy performance of heating, venting and air-conditioning (HVAC) systems with active and passive control of energy consumption are also addressed. This book explores a passive energy system, called air-conditioning cupboard, and discusses the use of artificial neural networks for air-conditioning systems, the ventilation concepts using ambient energy, and different types of air-conditioning systems with energy-saving potential.

Contact: Nova Science Publishers, 400 Oser Avenue, Suite 1600, Hauppauge, NY 11788-3619, United States of America. Tel: +1 (631) 231 7269; Fax: +1 (631) 231 8175; E-mail: main@novapublishers.com.

Blowing Agents and Foaming Processes 2011

Blowing Agents & Foaming Processes conference returned for the thirteenth consecutive year to highlight the academic and commercial developments in existing and new polymeric foam applications. As the only conference tailored to the specific needs of the polymeric foam industry, this conference presented the latest thinking and best practices in new materials selection and processing technologies. These proceedings cover all the presentations from the conference, bringing updates on cost-effective alternatives to traditional choices by discussing the solutions on offer, including new materials, resins, technology, processes and additives.

Contact: ChemTec Publishing, 38 Earswick Drive, Toronto, Ontario M1E 1C6, Canada. Tel: +1 (416) 265 2603; Fax: +1 (416) 265 1399; E-mail: info@chemtec.org.

TECH EVENTS

12-16 Oct
Bangkok
Thailand

BANGKOK RHVAC '2011
Contact: Thai Trade Fair,
22/77 Rachadapisek Road,
Chatuchak, Bangkok 10900,
Thailand.
Tel: +66 (2) 511 6020;
Fax: +66 (2) 511 6008;
E-mail: titfd@depthai.go.th.

31 Oct-02 Nov
San Diego
United States

2011 Intl. Research Conference on Methyl Bromide Alternatives and Emissions Reductions
Contact: Methyl Bromide Alternatives Outreach, 6556 N. Dolores Avenue, Fresno, California CA 93711, United States of America.
Tel: +1 (559) 449 9035;
Fax: +1 (559) 449 9037.

07-09 Nov
Shanghai
China

China Mobile Air-Conditioning Show 2011
Contact: Shanghai Gehua Exhibition Service Co. Ltd.,
Room 1403, Shengli Building,
No. 9120, Humin Road,
Shanghai, 200235 China.
Fax: +86 (21) 6451 6467;
E-mail: kim.yang@gehuaexpo.com.

09-11 Nov
HCM City
Viet Nam

REVAC VIETNAM 2011
AMB Events Sdn Bhd,
Suite 1701, 17th Floor Plaza Permata,
6, Jalan Kampar, Off Jalan Tun Razak,
South East Asia and the Pacific,
50400 Kuala Lumpur, Malaysia.
Tel: +60 (3) 4045 4993;
Fax: +60 (3) 4045 4989;
E-mail: mha@ambexpo.com.

14-18 Nov
Bali
Indonesia

Joint 9th Conference of the Parties to the Vienna Convention and 23rd Meeting of the Parties to the Montreal Protocol
Contact: Ozone Secretariat, United Nations Environment Programme,
United Nations Avenue, Gigiri,
Technology Centre (KSTC),
P.O. Box 30552, Nairobi 00100,
Kenya.
Fax: +254 (20) 762 46 91/92/93;
E-mail: ozoneinfo@unep.org.

18-19 Nov
Bali
Indonesia

Meeting of the Pacific Island Countries Network of Ozone Officers
Contact: Mr. Shaofeng Hu,
Programme Officer, UNEP-ROAP,
United Nations Building,
Rajdamnern Nok Avenue,
Bangkok 10200, Thailand.
Fax: +66 (2) 280 3829;
E-mail: shaofeng.hu@unep.org.

PUBLICATIONS from APCTT

PERIODICALS

(Free access at www.techmonitor.net)

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- ❑ VATIS Update (6 issues/year)
  - ❍ Biotechnology (e-version)
  - ❍ Non-conventional Energy (e-version)
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  - ❍ Ozone Layer Protection # (e-version)
  - ❍ Waste Management (e-version)

BOOKS	Indian Rupees* (India, Bhutan and Nepal)	US Dollars*
❑ Managing Innovation for the New Economy: Training Manual, 2002 Volume 1: How to Guide & Quick reference materials Volume 2: Articles & Lectures	1,000.00	50.00
❑ Regional Capacity-building for the Adoption of ISO-14000 and Transfer of Environmentally Sound Technology: Training Manual, 2000	600.00	30.00
❑ Small Rural Industries in the Asia Pacific Region: Enhancement of Competitiveness of Small Rural Industries in a Liberalized Economic Environment and the Impact of Poverty Alleviation, 2000	600.00	30.00
❑ Technology Transfer and Technological Capacity-building in Asia and the Pacific		
❍ Volume 1: Big Countries and Developed Economies, 1999	600.00	30.00
❍ Volume 2: ASEAN, NIEs, SAARC and the Islamic Republic of Iran, 1999	600.00	30.00
❍ Volume 3: Least Developed and Pacific Island Countries and Economies in Transition, 1999	600.00	30.00
❍ Volume 4: Emerging Issues in Regional Technological Capability-building and Technology Transfer, 1999	600.00	30.00
❑ Rural Industrialization as a Means of Poverty Alleviation: Report of the Regional Seminar on the Enhancement of Partnerships among Governmental, Non-governmental and Private Sector Entities for the Promotion of Rural Industrialization for Poverty Alleviation, 1999	600.00	30.00
❑ Institutional Development for Investment Promotion and Technology Transfer, 1999	500.00	25.00
❑ Ozone Depletion Substances Phase-out Technologies: Problems & Issues on Technology Transfer, Absorption and Generation, 1998	300.00	15.00
❑ Development and Utilization of S&T Indicators: Emerging Issues in Developing Countries of the ESCAP Region, 1998	300.00	15.00
❑ ODS Phase-out: A Guide for Industry, 1998	500.00	25.00
❑ Proceedings of the Consultative Meeting on Technology Management Education and Training for Developing Countries, 1997	800.00	40.00

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

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