# *VATIS Update Ozone Layer Protection . Jul-Aug 2006*

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TECH EVENTS


# THE SCIENCE OF OZONE LAYER

## Ozone protection protocols bearing fruit

Various international efforts aimed at protecting the ozone layer are yielding results. According to studies carried out by Dr. Betsy Weatherhead, a scientist working at the NOAA Earth System Research Laboratory, the United States, and Mr. S. B. Andersen, Danish Meteorological Institute, an apparent levelling off of ozone loss has been observed as a result of the Montreal Protocol. This international agreement was first enacted in 1987 to control ODSs in the atmosphere and is now being implemented in 180 countries.

Dr. Weatherhead expressed that she and her colleagues are seeing signs of ozone recovery in the right seasons, in the right latitudes and at the right altitudes. These first signs are hopeful, but the recovery process is still in its early stages. Dr. Weatherhead cautioned, however, that ozone remains at below normal levels at all latitudes and, therefore, ultraviolet rays from the sun are higher than they should be. People should continue to protect themselves from UV rays when they are outdoors. Unusual temperatures or a large volcanic eruption could trigger more ozone loss.

Website: www.noaanews.noaa.gov

## Will ozone hole vanish in 2050?

Japanese scientists report that the ozone hole over Antarctica is likely to begin contracting in the future and may disappear completely by 2050 as a result of significant reductions in the release of CFCs and other ozone depleting gases. This prediction takes root from a series of numerical simulations carried out by Mr. Eiji Akiyoshi at the National Institute for Environmental Studies, Japan, using projected emissions of CFCs and other ozone depleting gases blamed for the ozone hole. Some, however, opine that the hole will not heal until much later because old refrigerators and air-conditioning systems, many in the United States and Canada, are still releasing ozone depleting chemicals.

Website: www.abcnews.go.com

## New model defers date for Antarctic ozone recovery

A team of researchers in the United States have stated that the Antarctic ozone hole cannot be expected to recuperate earlier than 2068, 18 years more than the forecast by previous estimates. The team comprising researchers from NASA, National Oceanic and Atmospheric Administration (NOAA) and the National Centre for Atmospheric Research (NCAR) based their findings on a new computer simulation model. The mathematical model allows scientists to recreate, what they called, an accurate picture of the Antarctic ozone hole over the past 27 years. Researchers then projected future outputs of ODSs and calculated that the ozone hole would recover in 2068, and not in 2050, as estimated by earlier models. The research also showed that the ozone hole has not yet begun to improve and researchers predict that it will not start to significantly shrink before 2018.

Website: www.news.com

## Cold winter may widen ozone hole over North Europe

Scientists have confirmed that temperatures in the Arctic high atmosphere is reaching the lowest ever this winter. Under such circumstances, they warn that destruction of the ozone layer could increase substantially.

European researchers observe changes in the thickness of the ozone layer in the Arctic on a daily basis, as part of the European research initiative SCOUT-03. A very useful tool to predict future development of the ozone layer in global climate models, SCOUT-03, involves around 59 institutions and over 200 scientists from 19 countries. Measurements from a ground-based network of atmospheric observing stations are combined with those from satellites to investigate ozone losses. The extremely cold conditions are of concern and scientists will be addressing a number of questions such as: How large will the ozone loss be? What will be the increase in ultraviolet radiation and in which countries will they occur? Why has the Arctic stratosphere cooled in December over the past 50 years? Are the conditions more favourable now for large ozone losses than before?

Website: www.biox.cn

# ODS PHASE-OUT IN INDIA

## UNDP successes

United Nations Development Programme (UNDP) has achieved considerable success in phasing out ODS in India, with assistance from various agencies. Some of the major outputs/achievements, as of February 2006, have been listed sector-wise:

CFC phase-out in refrigeration (Manufacturing):

A total of 82 enterprises endorsed by the Ministry of Environment and Forests (MoEF) for participation in the National Phase-out Plan, upon verification of their baselines by the Sector Phase-out Plan Unit (SPPU);

For all of the above mentioned 82 enterprises, activities such as equipment procurement, delivery and installation, trials, technical assistance and training are presently underway;

An additional 20-25 eligible enterprises were included and verification of their baselines is being carried out;

MoEF continued monitoring of any reporting on plan implementation and coordination of the plan activities with other sector and national level plans; and

MoEF is implementing the Ozone Regulations on a continuing basis as applicable.

CFC consumption phase-out in refrigeration servicing:

Equipment to 60 ITIs distributed;

Packages identified for small servicing units;

Work plan targets for the year 2005 achieved;

Awareness generation workshops initiated for small refrigerant filler industry to facilitate more refrigerant fillers to take part in the project and make use of the assistance provided under the Montreal Protocol; and

Yearly technical audit for 2005 performed by external auditors.
Phase-out of carbon tetrachloride in the metal cleaning sub-sector:

Specifications of the equipment required by four unit finalized. The specifications (as endorsed by the recipient companies) were sent to the vendors (through UNDP Procurement Rules and Regulations) requesting for quotations. The bidding process is under way and the purchase order for the equipment was placed in 2005.

Phase-out of CFCs in the foam sector:

A total of 91 enterprises, inclusive of three system houses endorsed by MoEF for participation in the sectoral phase-out plan upon verification of their baseline by the SPPU.

For 12 of the aforementioned 91 firms, activities such as equipment installation, trials, technical assistance and training, including issuance of Handover Protocols completed, leading to a final phase-out of 116.50 t of ODS;

Preparatory steps to finalize the Memorandum of Agreement between MoEF and three system houses carried out. As of 2005, the Memoranda of Agreement have been signed and conversion at the three system houses have started; and

Additional enterprises have been identified and verification of their baselines is being carried out.

Website: www.undp.org.in

## US$52 million granted for CTC phase-out

Mr. Felix Nitz, a representative of the German Technical Collaboration (GTZ), has stated that India is expected to completely phase out the use and production of carbon tetrachloride (CTC) by 2010 with the help of a US$52 million grant from the Multilateral Fund. Mr. Nitz said that till 2005 India successfully phased out 85 per cent of its production and consumption. India is committed to phase out the chemical by 1 January

2010.

GTZ has been running its technical assistance programme in India since 2004 to help industries find a substitute for CTC. At least 22 types of industries like iron and steel, power, air-conditioner and refrigerator manufacturers, printing industries, photo labs and others use the chemical but there is no single substitute for this. Substitutes are industry specific, Mr. Nitz added. GTZ has helped the textile industry in finding 30 alternatives and consumption in this segment has come down to nearly nil. GTZ plans to assist other industries too.

Website: www.cities.expressindia.com

# IN THE NEWS

## Raising awareness by making people environment-friendly

Ozone layer depletion has been a major cause for global concern since the 1980s, when scientists discovered that the ozone shield over the Arctic was being steadily subverted by emissions of human-made compounds, particularly chlorofluorocarbons (CFCs). For the first time, the United Nations Environment Programme (UNEP), along with the Centre for Environment Education, India, came up with an approach to engage the media at all levels in enhancing awareness about ozone depletion and the Montreal Protocol.

UNEP arranged an orientation workshop for media people of the Asia and Pacific Region (ROAP) at its regional office in Bangkok, Thailand, as part of its Information, Education and Communication (IEC) initiative. The principal objective of this event was to reinforce information dissemination activities in order to help access appropriate information in a timely manner for media people so that they can contribute in raising awareness among the general public on environmental issues, particularly on ozone depletion. About 25 representatives from 15 countries attended the workshop arranged with a vision that it will broaden UNEPs awareness raising efforts by congregating journalists in all types of mass media to bring out stories about why it is important to protect the ozone layer, what can be done to protect it and how we can involve policy makers to take correct and decisive actions for protecting the ozone layer.

Website: www.nation.ittefaq.com

## Certification for import of ODS

The Bangladesh Bank (BB) has issued a circular directing all banks to ensure that they facilitate importers to import ODS only after ascertaining that such transactions have the approval of the Department of Environment (DoE). This measure is the result of a directive from the Ministry of Commerce and is applicable on 96 ODS items. Noting the Statuary Regulatory Order issued by the Ministry of Commerce, BB reports that the government has introduced a licensing system to control the import and use of items such as CFCs, methyl chloroform and methyl bromide, under certain conditions. According to BB, Under the circumstances, all banks are directed not to open Letter of Credits for the items or mixtures as described under catalogue 1 of the Ozone Depleting Substance (Control) Rules 2004 without prior approval from DoE.

Website: www.independent-bangladesh.com

## Godrej and Boyce sign agreement with Refex

In India, Godrej and Boyce Manufacturing Co. Ltd. has entered into a strategic alliance with Refex Refrigerants Ltd. As per the agreement, Godrej will market world-class and eco-friendly HFC-based Refex refrigerant gases through its 780 dealers and service network. As such, consumers will now have easier access to the environment-friendly product.

Website: www.newstodaynet.com

## Low-grade products impeding adoption of CFC alternatives

In Bangladesh, low quality alternatives are posing a major obstacle for CFC-based refrigerators and air-conditioners to complete the transition from ozone depleting to ozone friendly equipment. Mr. Sanaullah Patwari, the owner of a refrigeration service centre, says that sub-standard HFC-134a (an alternative to CFC-11 and -12) now dominating the market is hindering conversion of CFC-run appliances into non-CFC. The proliferation of spurious alternatives is undermining campaigns against the use of ODS.

According to officials with the National Ozone Unit (NOU), in the absence of imports control, low quality alternatives have intruded into the country. Most of the HFC-134a gases used in the country are imported from Japan and the United States. However, low category and low price gas is being imported from other countries as well. Seven gas identifiers are being used by customs officials at different ports, and two by NOU, for training purposes. However, it is not possible for chilling servicing centres to install these costly identifiers.

Website: www.bangladeshobserveronline.com

## Accreditation of refrigeration service providers

In the Philippines, the Bureau of Trade Regulation and consumer Protection (BTRCP) is enforcing Department Administrative Order (DAO) 3 series of 2006 that further amends certain provisions of the Presidential Decree (PD) 1572, particularly on the standard classification for air-conditioning and refrigeration service and repair enterprises. This project, implemented by BTRCP under the Department of Trade and Industry (DTI), in cooperation with the National CFC Phase-Out Plan (NCPP) project of the Environment Bureau (EMB) of the Department of Environment and Natural Resources (DENR), is in support of the nations commitment to the Montreal Protocol.

The amendments include an accreditation system for all service providers working with ODSs in stationary and mobile equipment, which aims to lower ODS consumption in the servicing sector. In gist, beginning 1 July 2006, all service providers active in the installation and/or servicing of air-conditioning and refrigeration systems have to comply with upgraded requirements and undergo reclassification when they file for accreditation. This will allow DENR and DTI to ensure that good practice is implemented, and also to monitor and regulate the use of CFCs in this sector.

Website: www.sunstar.com.ph

## Ban on vehicles using CFCs

In the Philippines, the Land Transportation Office (LTO) plans to ban vehicles with air-conditioning systems that still use CFCs. Prior to renewal of registration, all motor vehicles that have been penalized for violating the provisions of Random Roadside Inspection are now required to get the validation service performed at any Environmental Management Bureau regional office, LTO regional office and LTO Motor Vehicle Inspection Service (MVIS). LTO will not renew the registration of vehicles with mobile air-conditioners (MACs) that contain CFCs.

Motor vehicle owners or operators will be required to specify the MAC system and refrigerant type information in the Motor Vehicle Inspection Report (MVIR) form during registration. All motor vehicles manufactured from 1 January 1999 must have HFC-134a or R-134a system. Any vehicle found to have converted to R-12 will not be registered unless converted back into HFC-134a.

Website: www.pia.gov.ph

## Standards on refrigerant usage

In the Philippines, the Department of Trade and Industry (DTI) has issued a new order that would set out the standards for the use of refrigerants by air-conditioning and refrigeration service and repair shops. DTI issued the DAO No. 3 Series of 2006 amending the rules on accreditation needs for air-conditioning and refrigeration service and repair shops under Ministry Order No. 32 of 1985. The issuance of DAO 3 is considered as one of the major strategies intended to ultimately phase out the use of CFCs.

DAO 3 mandates the use of a recovery machine to recapture and recycle refrigerants from air-conditioning and refrigeration systems. Additionally, it eliminates venting of CFCs. The new order also requires service technicians to obtain particular competencies and certification in accordance with training regulations of the Technical Education and Skills Development Authority or TESDA. This ensures that only qualified personnel can perform proper servicing.

Website: www.mb.com.ph

# REFRIGRATION/AIR-CONDITIONING

## CO2 heat pump water heaters

Mitsubishi Electric Corp., Japan, has commenced the sequential release of nine models of Mitsubishi Eco Cute natural refrigerant (CO2) heat pump water heaters from 15 June 2006. Featuring the industrys top COP of 4.9 (during the rated mode of operation) and improved versatility, all the models incorporate an efficient rotary compressor that has been favourably integrated into the heat pump units and the companys own high-efficiency Poki Poki (joint lap) motor with high winding density.

These models have also realized the industrys top-class quietness: the lowest operating noise level of 38 dB for a type with a tank capacity of 370 l. Water is efficiently heated by adopting the newly developed Twist and Spiral Gas Cooler with improved efficiency through an enlarged heat transfer area within the heat exchanger for water heating in the tank unit. The hot water storage tank is coated with a new heat insulator (EPS material), thereby realizing around 15 per cent improvement in the tanks temperature retaining performance.

Website: www.jarn.co.jp

## High-capacity, high-efficiency air-cooled chillers

Coolmation, the United Kingdom-based distributor for Rhoss range of chillers, has introduced the new Z Power R-134a range of air-cooled chillers. Available in cooling capacities varying from 750 to1,285 kW, Z Power range is the first of a new series of high-technology products developed by Rhoss to offer the best European Efficiency Ratio (EER) performances available on the market; more than meeting the ECA criteria for chillers in this range. The Z Power range from Rhoss is the result of a unique partnership between the manufacturer and the University of Udine. Notable features of the Z Power chiller include:

Screw compressors: The latest generation of semi-hermetic screw compressors, specifically developed for R-134a refrigerant;

New single pass counter-flow shell-and-tube evaporators: Designed and constructed in such a way that the water and refrigerant passes are always counter-flow and pressure drops across the tube bundle are minimized;

Economizer circuits: The novel microprocessor controlled economizer circuit comprises a sub-cooler and an expansion device that increases cooling capacity and EER by directly integrating with the control system;

Condensers with special fin technology: The air-cooled condensing section, coil and fans have been optimized by redesigning the tube geometry and fin formation; and

Electronic expansion valves: An electronic expansion valve accomplishes precise control of refrigerant mass flow. It allows the system to operate at lower condensing pressures, thereby resulting in significant reductions in compressor power input.

Contact: Coolmation, Unit 7, Millstream Ind. Estate, Ringwood, Hampshire BH24 3SD, United Kingdom. Tel: +44 (1425) 478 971.

Website: www.processingtalk.com

## Compressibility of oil/refrigerant lubricants

Researchers at Lulea University of Technology, Sweden, are investigating lubricant compressibility when refrigeration oil is diluted by a refrigerant with the help of a high-pressure chamber. The lubricant tested in the study is a polyol ester (POE) oil, POE diluted with non-chlorinated refrigerant R-134a, a naphthenic mineral oil and mineral oil diluted with chlorinated refrigerant R-22.
Trials have shown that by adding 20 wt% of R-134a to the POE oil, stiffness of the lubricant increases by approximately 38 wt% at 1 GPa and is much higher than for R-22 and mineral oil.

Contact: Mr. Roger Tuomas/Mr. Ove Isaksson, Division of Machine Elements, Lulea University of Technology, SE-971 87 Lulea, Sweden.

Website: www.scitation.aip.org

## Thermoacoustic refrigeration

Ben and Jerrys announced the development of a working thermoacoustic refrigeration prototype an environment-friendly, alternative refrigeration process that chills using sound waves. Traditional refrigeration relies on vapour compression, a resource-intensive process involving complex mechanical equipment and gases like HCFCs and HFCs, which are key contributors to ozone depletion and global warming. Thermoacoustic refrigeration uses sound waves at 173 db many times louder than an average rock concert instead of chemicals to provide cooling.

The prototype is based on a Bellows Bounce resonator and was developed by acousticians at Pennsylvania State University (PSU), headed by former drummer Dr. Steven Garrett, Professor of Acoustics and senior scientist. Ben and Jerrys partnered with PSU, with financial and scientific support from parent company Unilever, to develop a more eco-friendly prototype freezer cabinet. Dr. Garrett and colleagues have successfully used the refrigerator to cool to a temperature of -24C, well below the freezing point of water and more than sufficient to store ice cream.

Website: www.compukiss.com

## Efficient refrigerant dryers

Boge Compressors, the United Kingdom, has launched a new generation of energy efficient and eco-friendly refrigerant dryers. DX series provides energy-saving benefits of up to 90 per cent via suction pressure regulation on the DX 300 to DX 465 models, and through frequency control of the DX 580 model and upwards. An intelligent load dependent system underpins these features.

DX series covers Boges larger range of refrigerant dryers from 30-237 m3/min flow capacity. They are built to operate in standard ambient conditions of 25C, though options ensure ambients of 50C with compressor discharge temperatures of 70C feasible. A frost protection model is also available. All Boge refrigerant dryers utilize eco-friendly R-134a coolant.

Contact: Boge Compressors, Rastrick Common, Brighouse, West Yorkshire HD6 3DR, United Kingdom. Tel: +44 (1484) 719 921.

Website: www.processingtalk.com

## CO2 air-conditioning lines

ContiTech Fluid Technology, based in Germany, has devised a hose that gets along without the stainless steel tubing previously required for CO2 air-conditioning lines. A barrier layer of polymer on the inside of the hose ensures low permeation. As such, the hose is much more flexible than the previous solutions, making tighter bending radii possible. Also, the elastomer hose exhibits much better acoustic properties, allowing for significant cost advantages in comparison with corrugated tube hose solutions.

Contact: ContiTech AG, Head of Public Relations, Mario Topfer, Vahrenwalder Str. 9, D-30165 Hannover, Germany. Tel: +49 (511) 9381 304; Fax: +49 (511) 9381 305

E-mail: mario.toepfer@contitech.de

Website: www.contitech.de

## Eco-friendly bottle coolers

Vestfrost, Denmark, is testing a new series of ground-breaking bottle coolers based on the eco-friendly refrigerant CO2. A natural gas that is safe and harmless, the influence of CO2 on the global warming is a factor 1 compared with a factor of 1,300 for HFC gases.

In 1999, Vestfrost developed the worlds most energy-efficient bottle cooler based on the hydrocarbon gas isobutane. Ever since, Vestfrost has focused its efforts on developing even less energy consuming refrigeration and freezing appliances based on natural refrigerants.

Contact: Vestfrost, Denmark.

E-mail: info@vestfrost.dk

Website: www.vestfrost.com

## Greener refrigeration

Researchers in Denmark and Germany have set up several demonstration units to test naturally occurring coolants for small-scale commercial and industrial applications. Three demo plants were developed in Denmark to test two heat pump chiller systems one for cooling milk and the other for marine applications and an ice flake machine. A further three were set up in Germany to analyse refrigeration systems for cooling cells one for normal cooling conditions and one for deep freezing and a brine chiller. These demo projects are a part of the European Union-funded programme looking into innovative small-capacity ammonia refrigeration plants (OSCAR).

In a report entitled Innovation in small capacity ammonia refrigeration plants a summary of the findings and recommendations for further research has been presented by OSCAR. Briefly, scientists admit that the use of natural refrigerants, either ammonia or a mixture of ammonia and dimethylether, is limited. Savings in energy costs (around 7 per cent) by using these alternatives indirectly lowering the global warming potential of these sorts of refrigeration plants have been recorded. For instance, the ammonia-based milk chilling system performed between 5 and 7 per cent more efficiently than CFC- and HFC-cooled systems. The marine chiller

and flake machine demos also proved that it is possible to produce competitive, efficient systems with low initial cost. However, while it is still legal to use HFCs, the authors suggest these applications are not likely to be developed.

Website: www.azom.com

## CO2 for refrigeration

Linde Kaltetechnik, a division of Carrier, is the first manufacturer in the world to have successfully combined a low-temperature system with a new design of normal temperature refrigeration pack that works with CO2 in a transcritical cycle. When compared with competing systems, the CO2 unit uses up to 10 per cent less energy, delivering higher capacity while entailing lower investment and operating expenses.

Contact: Carrier Linde Kaltetechnik, Marketing Services, Am Mainzer Weg 7, D 55246 Mainz-Kostheim, Germany. Tel: +49 (6134) 607 170; Fax: +49 (6134) 607 681

E-mail: presse@linde-kt.de

Website: www.corp.carrier.com

# SOLVENTS

## Non-CFC stencil cleaner

Aoki Laboratories Ltd., Hong Kong, offers a non-CFC cleaner for effectively cleaning SMT stencils without leaving any residue. SC-22 is a super strong, non-CFC, halide-free and non-corrosive cleaner designed to replace HCFC-141b. It has been formulated utilizing the latest ingredients developed, allowing it to be environment-friendly without compromising cleaning power. Potential applications of SC-22 include:

SMT pinhole cleaning: can replace alcohol, IPA, degreaser, HCFC-141b, toluene and other organic solvents;

A replacement solvent for HCFC-141b, AK-225 and IPA cleaning solvents, which are widely being used in cleaning SMT stencils; and

Suitable for cleaning all kinds of stainless steel stencils.

Contact: Aoki Laboratories Ltd., G/F., Tung Ming Industrial Bldg., Hong Kong. Tel: +852 2498 9313; Fax: +852 2498 9692.

Website: www.alibaba.com

## Multipurpose cleaner

GlobeTech Management Ltd., Hong Kong, offers TechniClean LCD/Plasma/Screen/CD cleaner + protector. The specifically formulated TechniClean has been proven to be antistatic, anti-fingerprint, anti-smudge, non-drip, non-corrosive, CFC-free and non-inflammable. It effectively removes dirt, dust and oily fingerprints from both plastic and glass surfaces, while improving clarity.

Contact: GlobeTech Management Ltd., 3905, 2 Exchange Square, 8 Connaught Place, Hong Kong. Tel: +852 2858 7166; Fax: +852 2858 3466

Website: www.globetechmgnt.com

Website: www.alibaba.com

## Ultrasonic cleaner

Branson Ultrasonics Corp., the United States, offers B300 ultrasonic cleaner that features a stainless steel cleaning tank using industrial style ultrasonic transducer technology at 40 kHz. Available in 115 or 230 V models, the tanks interior dimensions are 11.8 3.9 2.9 inches with a capacity of 2.273 l. The cleaner comes with an automatic 15 minute timer, cover and perforated stainless steel basket. Applications include difficult soils or contaminations, removal of brazing fluxes, polishing compounds and lens cleaning.

Contact: Branson Ultrasonics Corp., 41 Eagle Rd., Danbury, CT 06813 1961, United States of America. Fax: +1 (203) 7969 838

Website: www.bransonultrasonics.com

Website: www.news.thomasnet.com

## Pre-saturated wipes for safe cleaning

JNJ Industries Inc., the United States, is offering fleet and mass Transit CleanTM aqueous general purpose cleaner/degreaser wipes (TRC) to clean interior as well as exterior areas of transportation vehicles. The disposable wipes easily remove food stains, blood and other bodily fluids. They can also be used for cleaning engines, machinery, tools and accessories. Available in 20 and 100 count reclosable canisters, they are CFC- and HCFC-free, will not freeze and leave no residue. TRC wipes are safe for use on all ferrous and non-ferrous metals, plastics, linoleum, ceramics, glass, formica and most synthetic fibres. The wipes are part of JNJs GlobalTech SuperSaturated SmartWipes family of products.

Contact: JNJ Industries Inc., 290 Beaver Street, Franklin, Massachusetts 02038, United States of America. Tel: +1 (508) 5530 529; Fax: +1 (508) 5539 973.

Web-site: www.news.thomasnet.com

## Ultrasonic cleaner

JNJ Industries Inc., the United States, is offering fleet and mass Transit CleanTM aqueous general purpose

cleaner/degreaser wipes (TRC) to clean interior as well as exterior areas of transportation vehicles. The disposable wipes easily remove food stains, blood and other bodily fluids. They can also be used for cleaning engines, machinery, tools and accessories. Available in 20 and 100 count reclosable canisters, they are CFC- and HCFC-free, will not freeze and leave no residue. TRC wipes are safe for use on all ferrous and non-ferrous metals, plastics, linoleum, ceramics, glass, formica and most synthetic fibres. The wipes are part of JNJs GlobalTech SuperSaturated SmartWipes family of products.

Contact: JNJ Industries Inc., 290 Beaver Street, Franklin, Massachusetts 02038, United States of America. Tel: +1 (508) 5530 529; Fax: +1 (508) 5539 973.

Web-site: www.news.thomasnet.com

## Apparatus for cleaning electronic components

Lucent Technologies Inc., the United States, has developed a cleaning apparatus that utilizes co-solvent cleaning wherein the solvents are eco-friendly and which meets the specified criteria for cleanliness. The system is a closed, recirculating system in which pumps are used to recirculate both the washing solvent and, separately, the rinsing solvent, with appropriate filtering where essential. Preferably, sump tanks are contained in a protective housing, and, for optimum cleanliness of the product, the entire system is contained, and the process performed within a clean room.

In a preferred embodiment of the invention, a tank has a transverse weir therein forming first and second sumps. The first sump contains as wash agent, e.g. a mixture of a solvating liquid agent and an ether, which is non-ozone depleting and of very low toxicity. The second sump contains a liquid rinse agent composed of an ether or a mixture of two or more ethers. The wash solvent and rinse solvent are both binary compounds and environmentally friendly. Also, their use is not restricted by EPA regulations. In addition, both materials are of low toxicity and only minimally hazardous in use. Contact: Lucent Technologies Inc., Murray Hill, NJ, United States of America.

Website: www.freepatentsonline.com

## Ozone-friendly cleaner

Ultrasolve cleaning solvent from Computronics Corp. Ltd., Australia, is a specially formulated fast-drying solvent for quick and efficient cleaning of electrical equipment. It can replace CFC solvents like 1,1,3-trichloroethane. The 100 per cent ozone-friendly cleaner is excellent at removing greases, oils, flux residues and acrylic conformal coatings from printed circuit boards.

Contact: Computronics Corp. Ltd., Locked Bag 20, Bentley WA 6983, Australia. Fax: +61 (8) 9470 2844.

Website: www.computronics.com.au

## Alternative cleaning agent

Scientists at the Research Institute for Innovation in Sustainable Chemistry, Japan, have developed six hydrofluoroethers (HFEs) as alternative cleaning agents to ozone depleters. The HFEs were chosen from 88 compounds scrutinized for various criteria, including physical properties, atmospheric life time and toxicity.

The team has also developed an efficient synthetic process of HFEs using water as a solvent in the addition reaction of alcohol to fluorinated olefin.

Contact: Mr. Junji Mizukado, Research Institute for Innovation in Sustainable Chemistry, Japan.

Website: www.aist.go.jp

# AEROSOLS

## Ciclohale-targeted activation

Cipla Ltd., India, offers a new generation inhaled non-halogenated glucocorticoid with high local anti-inflammatory properties. Ciclohale (Ciclesonide) is an ester prodrug, essentially devoid of oral bioavailability, which is hydrolysed enzymatically by esterases to its active metabolite desisobutyryl ciclesonide in the lung. Ciclesonide has many characteristics of an ideal inhaled corticosteroid, including high potency and affinity for the glucocorticoid receptor, high local tissue uptake and retention at the site of action and lipid conjugation. It has an extensive first pass metabolism in the liver and high protein binding, both of which reduce unwanted systemic side effects. Ciclesonide is indicated for treating mild to severe persistent asthma in patients 12 years and above.

Ciclesonide has been demonstrated to achieve and maintain clinical efficacy in patients with mild to moderate asthma with a single daily dosing of 160 g. The recommended starting dose of this medication is 160 g once daily, with 640 g set as the maximum. Once control is achieved, the dose of Ciclesonide should be individualized and titrated to the minimum dose needed to maintain good asthma control.

Contact: Cipla Ltd., Mumbai Central, Mumbai 400 008, India. Tel: +91 (22) 2308 2891/2309 5521; Fax: +91 (22) 2307 0013/0393.

Website: www.cipladoc.com

## Ventolin HFA with dose counter

Ventolin HFA (albuterol sulphate HFA inhalation aerosol), the first and only metered dose inhaler (MDI) with built-in dose counter technology, is now available in the United States. Ventolin HFA is a rescue inhaler used to treat sudden symptoms of asthma like coughing, wheezing and shortness of breath. It is indicated for the prevention and relief of bronchospasm in patients above four years with reversible obstructive airway disease. As such, patients can now determine the number of doses remaining in their rescue medication and refill accordingly. A dose counter could also help patients and physicians track albuterol use accurately.

Website: www.medicalnewstoday.com

## New dry powder inhaler

Triamcinolone acetonide (TAA) is an effective and safe corticosteroid that is marketed as an MDI (Azmacort) for asthma treatment. A dry powder inhaler (DPI) has been developed by Aventis, the United Kingdom, to

deliver Azmacort as another alternative to provide non-CFC formulation for asthma patients. Ultrahaler is breath actuated and, unlike an MDI, does not require coordination of inhalation with the actuation of the device.

In vitro studies and two clinical pharmacokinetic studies were conducted in a sequence that helped to establish optimum doses for the Ultrahaler. In vitro data were used to guide the initial selection of doses that were then compared in vivo using a pharmacokinetic study with a charcoal block. The in vitro tests included quantifying the target delivered dose and dose uniformity throughout the life of the device. Particle size distribution was measured using multi-stage liquid impinger or Andersen Cascade Impactor. Researchers concluded that in vitro and in vivo data were in agreement and good control over the target dose delivery and dose proportionality could be achieved in the early stages of the development of Ultrahaler and were critical in guiding and ensuring the success of the reformulation efforts for Azmacort.

Website: www.ncbi.nlm.nih.gov

## Anti-nerve agent inhaler

In the United States, Prof. Augustine Choi has been awarded a three-year US$3.8 million grant by the Army for developing an inhaled dry powder delivery system to administer atropine. The device development programme and pilot clinical trial for self-administered, piezo-electric, dry powder inhaler (DPI) attempts to demonstrate that the device, devised by MicroDose Technologies, is a viable replacement for the militarys Medical Aerosolized Nerve Agent Antidote (MANAA). Replacement of this metered dose inhaler is essential as MANAA utilizes a CFC propellant to administer atropine.
The project is structured to provide fundamental in vitro and in vivo information to support the viability of the DPI as a replacement for MANAA. As such, deliverables from the project will provide data to rapidly advance replacement of MANAA. Also, the new technology should provide more dependable and consistent dose administration.

Contact: The University Times, 308 Bellefield Hall, University of Pittsburgh, Pittsburgh, PA 15260, the United States. Fax: +1 (412) 6244 579

E-mail: delraso@pitt.edu

Website: www.umc.pitt.edu

## Advair HFA approved as inhalation aerosol

On 8 June 2006, the United States Food and Drug Administration approved GlaxoSmithKlines Advair HFA (fluticasone propionate and salmeterol xinafoate) inhalation aerosol for use in the long-term treatment of asthma in patients 12 years of age and older. The combination is also available as a powder inhalation, Advair Diskus.

Contact: GlaxoSmithKline, Glaxo Wellcome UK Limited, Stockley Park West, Uxbridge, Middlesex, UB11 1BT, United Kingdom. Tel/Fax: +44 (20) 8990 9000/4321.

Website: www.factsandcomparisons.com

## Novel inhalation formulations: A microscopic approach

Colloidal probe microscopy (CPM) is a powerful approach that can be employed to quantitatively determine the forces between drug particles or particles with surfaces. Researchers at Wayne State University, the United States, have used CPM to address issues relevant to dry powder inhalers (DPIs) and pressurized metered dose inhaler (pMDI) formulations. A series of biocompatible and biodegradable amphiphiles have been designed to stabilize dispersion-based composition of a drug compound (salbutamol) in HFA propellants. Drug-drug interaction with or without surfactants in 2H, 3H-perfluoropentane (HPFP), a mimic solvent for HFAs, has been quantitatively studied using CPM. However, the interactions are generally measured using drug crystals (probes) of irregular shape. Thus, comparison of different excipients and formulation conditions are generally hard if not impossible to be made. In order to address this limitation, a low energy, single-step method for making smooth spherical particles of hydrophilic solutes (without excipients) was developed.

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Website: www.aiche.confex.com

# AEROSOLS

## Blowing agent for the expansion of polymers

Atofina, France, offers compositions that can be used as a polymer blowing agent comprising 60-98 per cent HFC-134a and 2-40 per cent cyclopentane a polymeric composition comprising it and process for manufacturing an expanded polymer using it. The composition, because of its solubility in molten polymers, especially polystyrene, similar to those of HCFC-142b and HFC-152a, makes it possible to achieve a homogeneous expanded polymer with uniform distribution of closed cells in the material, imparting it the desired mechanical properties.

A polymeric composition has also been developed for use in the production of an expanded polymer, comprising:

5-15 per cent, preferably 7-12 per cent, of a blowing agent as defined above; and

85-95 per cent, preferably 88-93 per cent, of a thermoplastic polymer.

This composition is produced by hot-blending its ingredients in the extrusion chamber at 100-300C, preferably between 110-200C, and at a pressure between 5 and 30 MPa. The blowing agent may be utilized in combination with any thermoplastic resin suitable for extrusion, such as polyethylene, polypropylene, polystyrene and polyvinyl chloride. Auxiliary compounds may also be included in the composition, e.g. one or more fire retardants, nucleating agents, colouring agents and plasticizers. The process offered is a method to produce an expanded polymer by extrusion through a die of a polymeric composition as stated above.

Website: www.freepatentsonline.com

## Foamability of thermoplastic vulcanizates

Thermoplastic vulcanizate (TPV) is a special class of thermoplastic elastomer (TPEs) made of a rubber/plastic polymer mixture in which the rubber phase is highly vulcanized. Researchers at the University of Toronto, Canada, conducted a study to understand the foaming behaviour of commercial TPVs in general, with various blowing agents. The effect of blowing agent type and concentration on the expansion behaviour, cell number density and foam structure under various processing conditions have been examined.

Furthermore, experimental studies were carried out to manufacture TPV foams in extrusion using various physical blowing agents. It was observed that the volume expansion ratio and cell density increased as the amount of blowing agent was increased. TPV foam with N2 and CO2 exhibited a better cell structure than n-butane and water. However, TPV foam with N2 produced a very fine and uniform cell structure with a smooth surface, indicating that N2 could be a very good physical blowing agent for TPV material.

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Website: www.mpml.mie.utoronto.ca

## CFC-free foam blowing

Hennecke Machinery Group, the United States, offers two advanced, alternative technologies for producing flexible foam mouldings. NovaForm provides a full spectrum of manufacturing and environmental benefits. It utilizes liquid CO2 as the blowing agent, which can be added to either of the reaction components depending on the raw materials and additives in the formulation. NovaForm can achieve density reductions of 20 per cent and densities up to 35 kg/m3 and does not require overpacking in large surface moulds. Typically, NovaForm plants are configured for variable in-line metering where the percentage of CO2 can be varied from shot to shot for maximum production flexibility. NovaForm can even be utilized for batch manufacturing where CO2 content and the reaction component mixture is fixed.

The HK-R 5000 metering unit is designed for discontinuous production of foam blocks. HK-R 5000 processes CFC-free Baynat foam blocks and other polyurethane foams with basic 1:2 or 2:1 formulation where high shot output and high shot weights are required. Benefits to the Baynat headlinings are:

Lightweight with a possible density of 20 to 35 kg/m3;

Self-supporting with high degree of dimensional stability;

Is stable under heat and has noise reducing effects; and

Resistant to buckling and breaking during fitting.

Contact: Hennecke Machinery Group, 100 Bayer Road, Pittsburgh, PA 15055, the United States. Fax: +1 (412) 7773 692

E-mail: poly.hennecke@bayer.com

Website: www.henneckemachinery.com

## Polymeric foam sheet using ambient gas blowing agent

Sealed Air Corp., the United States, has developed a process for manufacturing an extruded thin sheet foam from a polyolefin resin in which the blowing agent comprises a blend of 1-25 per cent by weight of carbon dioxide and the balance of C3 to C4 VOCs. Thin foam sheets produced with the blowing agent age about twice as fast as foams prepared with VOCs, are remarkably stable and can be produced at high throughputs. The blowing agent is used for continuous extrusion foaming of thin sheets of low density polyolefin foams at relatively high extrusion throughputs, acceptable pore structure and with short ageing characteristics. Extruded thin foam sheets of 0.01-0.5 inch thickness and having a low density of 10-60 kg/m3 can be produced at throughput rates of 100-250 kg/h. The foams expand and contract less than about 10-15 per cent of their original as-extruded dimensions.

Website: www.freepatentsonline.com

## Thermoformable foam sheet

A thermoplastic foam sheet production method offered by the United States-based Dow Global Technologies Inc. involves contacting a molten monovinylidene aromatic or olefinic polymer with a physical blowing agent to form a polymer/blowing agent mixture. Next, the mixture is foamed into a region of lower pressure within a sheet extrusion line, wherein the extrudate is pulled and pressed to obtain a thermoplastic foam sheet having a uniform thickness. The blowing agent used in this process can be any physical blowing agent, including but not restricted to, CO2, N2, H2O or combinations thereof. The physical blowing agent can be in any form but is preferred in gas or liquid state.

Website: www.freepatentsonline.com

# HALONS

## Mixed gas fire extinguisher

Shanghai Jindun Fire-Fighting Security Equipment Co. Ltd., China, offers a fire extinguishing system that uses a blend of nitrogen, argon and carbon dioxide. IG541 is a pure and natural green fire protection product. This ozone-friendly product does not contaminate the protective target, is non-conductive and is not harmful to the ecosystem. The colourless, tasteless and non-toxic IG541 can replace halo-alkane extinguishants.
IG541s mechanism of fire fighting is to lower the concentration of oxygen in fires to below that required for maintaining combustion.

Contact: Shanghai Jindun Fire-Fighting Security Equipment Co. Ltd., No. 365, Hengqiao Road, Fanrong Indl. Area, Zhoupu, Pudong, Shanghai 201318, China. Tel: +86 (21) 5109 5888 / 8024; Fax: +86 (21) 6806 67884

Website: www.shjd.com

Website: www.shjd.en.alibaba.com

## Water mist system

LPG Tecnicas en Extincion de Incendios S.A., Spain, offers LPG Aquafog fire suppression system that is formed either by an independent system, comprising a basic set of cylinders, or through dependent systems, formed by combinations of basic sets of cylinders. A basic set comprises 50 l cylinders with a discharge valve containing water at atmospheric pressure, nitrogen cylinder pressurized at 200 bar with an opening valve and release system. The set comes complete with pressure switch, pressure gauge, manifold, discharge hoses, non-return valves, strainer and bracket. The systems are designed to be actuated through manual/electric or manual/pneumatic release. The system ensures that once one of the nitrogen cylinders is actuated, the other nitrogen cylinders in the system will actuate, automatically pressurizing the water cylinders.

Contact: LPG Tecnicas en Extincion de Incendios, S.A., C/o Mestre Joan Corrales, 107-109, 08950 Esplugues de Llobregat, Barcelona, Spain. Tel: +34 (93) 4802 925/33; Fax: +34 (93) 4737 492

E-mail: export@lpg.es

Website: www.lpg.es

Website: www.railway-technology.com

## Halon-alternative extinguishers

China National Air Separation Plant Corp., China, offers two alternatives as substitutes for halon fire extinguishers. The nitrogen fire extinguisher can separate oxygen and nitrogen in air. A simple process flow and compact structure guarantees savings on investment cost while a small footprint accommodates indoor installation. The highly automated system can operate without personnel intervention and is easy to maintain.

The low-pressure carbon dioxide fire extinguisher is more economical than the high-pressure system. Up to 30 per cent savings in investment feasible for large systems when compared with high-pressure system. Low-temperature storage allows for huge storage volume, high extinguishing efficiency and small footprint. Pre-timed for automatic ejection, it can also be manually operated to control ejection. Both the master valve and select valve are reliable and facile to operate.

Contact: China National Air Separation Plant Corp., 462 Dongxin Road, Hangzhou City 310004, Zhejiang Province, China. Tel/Fax: +86 (571) 8538 7724 / 8537 4411;

Website: www.cnaspc.com

Website: www.cnaspc.en.alibaba.com

## Eco-friendly fire extinguishers

SK Trading Co., Republic of Korea, is offering environmentally friendly fire extinguishers. Notable features of these systems include:

Patented, UL listed and EPA certified fire-fighting agent;

Not harmful to humans, unlike existing halon gas or powdered extinguishers;

Following application, the agent automatically decomposes into water and carbon dioxide;

A unique aroma restrains burning smell and poison gas;

Eliminates secondary fires; and

There is no need to refill the agent for a long time. The agent remains unchanged in a container semi-permanently under normal internal pressure.

Contact: SK Trading Co., #504, Hyundai Bldg., 35-1, Mapodong, Mapogu, Seoul 121 737, Republic of Korea. Tel: +82 (2) 7022 096; Fax: +82 (2) 7022 098.

Website: www.alibaba.com

# FUMIGANTS

## New ideas ensure ozone safety

Mr. David De Paoli, Chairman of the Bundaberg Fruit and Vegetable Growers (BFVG), Australia, was awarded the internationally recognized Ozone Protection Award in recognition for collaborative work carried out to find an alternative to methyl bromide (MB). BFVG worked with the government, industry bodies, researchers and growers towards implementing natural and environmentally friendly alternatives to MB before the phase-out deadline. We found that alternatives to MB included soil and crop rotation, Mr. De Paoli said. Crop and soil rotation prevents the build-up of pest and disease, and allows natural predators to build up and create the right natural balance. Mr. De Paoli reported that solarization involved laying plastic over the soil and using heat from the sun to control pests, weeds and disease.

Website: www.news-mail.com.au

## Materials and methods for the control of plant pathogens

Researchers at the University of Florida, the United States, have developed new compositions that are useful in the control of plant pathogens. The breakthrough specifically pertains to essential oil compositions that are effective in controlling fungal and bacterial plant pathogens. These compositions can be used to control bacterial and fungal soil-borne diseases of vegetables, ornamental plants and other plants. As such, the formulations provide a viable alternative to methyl bromide and other pre-plant fumigants.

The essential oils are obtained from the following plants Palmarosa (Cymbopogon martini), tea tree (Melaleuca alternifolia), lemongrass (Cymbopogon flexuosus) and Eucalyptus citriodora. Additionally, thymol, which is a fraction of thyme (Thymus vulgaris) oil, was found effective in controlling plant diseases. In a specific embodiment, geraniol, which is a fraction of palmarosa, can also be used to effectively control plant pathogens. The essential oils and their derivatives offer significant benefits as pesticides as they occur commonly in nature, are compatible with other biological control strategies, have little mammalian toxicity and readily break down into harmless components.

Website: www.freepatentsonline.com

## MB alternative for nematodes

Researchers in Israel have developed a biological product to eliminate nematodes. Intended as a methyl bromide (MB) alternative, Bionem WP is based on the microbe Bacillus firmus reinforced by non-poisonous additives in powder form. It remains active for weeks, sometimes even for months, thanks to the survivability of the germs. Bionem does no harm to either the micro-flora or environment. B. firmus destroys eggs of the nematodes. Application of the product is simple and easy. Extensive field trials have confirmed Bionems effectiveness.

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Website: www.freshplaza.com

## Eco-friendly bug sucker

Researchers at the University of California-Davis, the United States, have come up with a pest control system that does away with the need for toxic agents. In this sterilization method for fruits and vegetables, the life is quite literally sucked out of the bugs. The technique, called metabolic stress disinfection (MSDD), could be used in place of ozone depleting chemicals, e.g. methyl bromide, currently used to sterilize fresh produce.

MSDD works by exposing insects on vegetables and fruits to vacuum and carbon dioxide alternately. This effectively suffocates organisms because they require oxygen to live. Also, ethanol gas is used to kill fungi and bacteria. Though the initial hardware cost of an MSDD system is higher than MB, the cost of chemicals is much cheaper. As such the system eventually pays for itself. MSDD also offers additional benefits to the environment as the gases can be recovered and recycled.

Website: www.eurekalert.org

## Hunt for replacements to banned pesticides

In the United States, University of Georgia students are joining an international effort to find an earth-friendly alternative to the use of methyl bromide (MB). Mr. Alex Cisnos, a plant pathologist, and other researchers at the Universitys Coastal Plain Experiment Station have been testing an alternative fumigant, metam-sodium, at a 0.25 acre test plot of vegetables.

Though the deadline for the United States and 32 other industrialized countries to stop using MB was 1 January 2005, the United Nations agreed to allow critical exemptions on a few crops. Florida strawberry growers have a critical use exemption through this year, which will cover next seasons planting in the fall. The alternatives being developed may involve a cocktail of chemicals that are more expensive, costly to apply, less efficient and possibly toxic for days or weeks, stated Mr. Csinos.

Website: www.theledger.com

## Ethyl formate for controlling stored grain insects

Researchers at CSIRO Entomology, Australia, have evaluated the use of ethyl formate (EF) as a fumigant for stored grains. EF is a potential alternative to the ozone depleting fumigant methyl bromide and phosphine. The latter is under great pressure owing to the development of strong resistance in stored grain insects.

The team found that a combination of 5-20 per cent carbon dioxide (CO2) with EF greatly increased efficacy of the fumigant against external living stages of the rice weevil Sitophilus oryzae (L.), the lesser grain borer Rhyzopertha dominica F. and flour beetle Tribolium castaneum (Herbst). Dynamic application of EF and CO2 mixture (100 mg/l EF and 20 per cent CO2) pumped through a model silo containing wheat (50 kg) for one gas exchange was also investigated. A flow rate of 6 l/min exhibited a relatively even distribution of fumigant throughout the grain column and similar mortality levels among cultures of S. oryzae and T. castaneum placed at three positions top, middle and bottom of the column. Mortality of 99.8 per cent of mixed stage cultures of T. castaneum and 95.1 per cent of S. oryzae was achieved during 3 h exposures to 111 and 185 mg EF/h/l, respectively, applied by the dynamic method.

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## Bioreactors treat methyl bromide contamination

Researchers at the United States Geological Survey (USGS) have developed and patented a bioreactor treatment system designed to remove gaseous methyl bromide (MB) from the exhaust resulting from fumigation of shipping containers. The bioreactor contains a culture of methylotrophic bacteria that remove MB from the exhaust by oxidizing it to carbon dioxide, hydrobromic acid and water. A 1,000 l bioreactor can remove 10 kg of MB in 50 hours.

Development of the bioreactor is a practical application of the extensive research by the team on micro-organisms in the natural environment that degrade MB and other methyl halides.

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## Beneficial yellow weeds

In the United States, researchers are studying the potential of using weeds to control agricultural pests. In this regard, wild mustard, a winter annual plant that looks similar to cressleaf groundsel, has evinced considerable interest. The control of Fusarium (that causes wheat head scab, wilts in tomatoes and certain fruit rots), Rhizoctonia (soybean seedling blight and soybean stem rot), and Verticillium (wilts in tomatoes, potatoes and peppers) may be achieved by growing wild mustard or one of its cousins.

Plants in the brassicaceae (mustard) family that contain a secondary metabolite, glucosinolate, have been used in a pest management approach. Turnips, broccoli, cauliflower, horse radish and Brussels sprouts are all in the mustard family of plants. Though glucosinolates have low biological activity, their derived products (isothiocyanates) constitute a key group of bioactive molecules and have pesticidal activity. Isothiocyanate-producing plant residues have been found to be effective against weeds, nematodes and fungi.

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