VATIS Update Ozone Layer Protection . Jul-Aug 2003

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THE SCIENCE OF OZONE LAYER

Ultraviolet rays affect cotton

In the United States, investigations are underway to assess the effects of ultraviolet-B (UVB) radiation on cotton growth, development and yield. Mr. Raja Reddy, working with the Mississippi Agricultural and Forestry Experiment at the Mississippi State University, is the lead researcher for this USDA project. UVB is a part of the radiation coming from the sun and is measured in energy units known as kilojoules. Maximum UVB values in the country vary from eight in Mississippi to 11 in New Mexico. Studies have revealed that cotton grown under tanning bed lights may lead to the development of new varieties with increased tolerance to UV rays.

Mr. Reddys team is growing 15 cotton plants per chamber in 10 sealed Plexiglas chambers, which provide the unique ability to control and monitor all the environmental variables impacting a crop. Plexiglas lets natural sunlight in, to provide plants with energy for photosynthesis, while keeping UV rays out. Cotton plants grown in these chambers are exposed to higher than normal UVB levels that are predicted to occur in the future. At extreme levels, flowers are smaller and many appear cup-shaped rather than open. Additionally, the number of anthers (pollen-producing parts of the flower) is reduced and leaves show distinct patterns of damage in the form of discolored areas. An anticipated outcome of this study will be the identification of varieties that exhibit tolerance to increased UVB.

Website: www.msucares.com

Fuel cell leakage may harm ozone layer

A study undertaken by the California Institute of Technology, the United States, has uncovered that hydrogen leakage from fuel cells may decrease ozone, by nearly 10 per cent, if it accumulates in the atmosphere. Researchers estimate that if hydrogen were to replace fossil fuels entirely, 4-8 times more hydrogen would be released than at present, thereby doubling or even tripling inputs to the atmosphere from all sources, natural or human-based. Since molecular hydrogen freely moves up and mixes with stratospheric air, additional water would be created at high altitudes. This in turn would result in a cooler lower stratosphere and disturbance of ozone chemistry. Estimates of potential damage to ozone levels are based on an atmospheric modelling programme, which tests the various scenarios that might result from increased hydrogen.

Website: www.edie.net

Cattle breath affects ozone

Researchers in the United States report that the collective breathing of cattle accounts for nearly 20 per cent of methane gas released into the atmosphere. A typical cow breathes out about 450-680 l/d of methane. A team at

the University of Nebraska is developing an additive for cattle feed to decrease the amount of methane gas emitted by cows. Methane produced in a cows rumen, the first of a cows four stomachs, gets into the bloodstream and exits through the lungs. Researchers tested more than 200 compounds, trying to find the right formula that blocks methane but does not harm beneficial microbes in the cows rumen. In a related development, a six-year study undertaken by a range livestock nutritionist at the Utah State University uncovered better range management practices, like providing higher quality forage could make a small difference in the amount of methane released by cattle.

Website: www.cnews.canoe.ca

Ozone hole update

As of 30 May 2003, ozone values over Antarctica declined from the late spring peak and there are lower values over the centre of the continent than over the southern ocean. Ozone values at Halley decreased from the spring peak of 350 Dobson Unit (DU) to around 240 DU. During 2003, values at Rothera have remained at around 280 DU, with a long-period variation (about a month) of around 30 DU. Day-to-day alteration was around 15 DU. At Vernadsky, since the beginning of this year, values have hovered around 290 DU. The day-to-day variation is generally around 20 DU. The temperature of the ozone layer above Antarctica is now dropping towards winter values and is cold enough for polar stratospheric clouds (PSCs) to form. Satellite measurements do show a patchy distribution of PSCs.

Website: www.antarctica.ac.uk

Natures role in ozone depletion

In the United Kingdom, researchers at Queens University and the Department of Agriculture and Rural Development report that over 20 per cent of stratospheric depletion is related to naturally produced compounds. The most significant of these is the gas chloromethane, which is responsible for about 16 per cent of overall ozone destruction. Important sources of chloromethane identified to date include tropical trees and ferns, salt marsh plants and wood-rotting fungi, as well as burning of wood and vegetation. However, scientists were unable to explain how the destructive gas formed.

The British team reports to have found the answer to this mystery. Dr. Jack Hamilton at Queens University states that pectin, a key building block in plant cell walls, reacts with sodium chloride (common salt) to form chloromethane. According to Dr. Hamilton, This process is so efficient at higher temperatures (above 150C) that it can rapidly volatilize all chloride and explains the release of chloromethane, known to occur during forest and grassland fires, and the burning of wood and domestic bonfires. Surprisingly, in plant material with relatively low water content or high salt content the reaction can occur at normal temperatures. Fallen leaves lying on the ground in the autumn or hay drying in the sun can release chloromethane.

Website: www.belfasttelegraph.co.uk

Exposure increases cancer risk

A large-scale, long-term research study known as the Agricultural Health Study (AHS) undertaken in the United States, involving farmers and their spouses, has uncovered that exposure to methyl bromide (MB) and six other pesticides raises the risk of prostrate cancer. This latest report from AHS evaluated the role of 45 pesticides. The study included 55,332 men who were classified as either commercial or private pesticide applicators. Private applicators (92 per cent) are farmers or nursery workers while commercial applicators work for pest control firms or businesses such as warehouses or grain mills that use pesticides regularly. Among men with a family history of prostrate cancer only, exposure to six pesticides chlorpyrifos, fonofos, coumaphos, phorate, permethrin and butylate was associated with an increased risk of prostrate cancer.

Website: www.ens-news.com

ODS PHASE-OUT IN INDIA

Joint venture for hermetic compressor manufacture

A state-of-the-art manufacturing facility with an annual production capacity of 10 million hermetic compressors has been established by Applicomp (India) Ltd. Compressors manufactured presently are suitable for R-134a refrigerant, and low back pressure as well as commercial back pressure applications. The compressors can be used for refrigerators, bottle coolers, deep freezers and similar products. Applicomp, a part of the Videocon Group, was set up as a joint venture with Italy-based Necchi Compressori, wholly owned by Videocon. Commissioned in April 2000, the facility manufactures non-CFC compressors and refrigerators, air-conditioners, washing machines, microwave ovens, etc.

Website: www.jarn.co.jp

Workshop disseminates data to aid enforcement agencies

A one-day workshop on ODS for customs and other stakeholder departments was organized recently by the National Academy of Customs, Excise and Narcotics (NACEN), Southern Region. This seminar, aimed at training the enforcement agencies in environmental problems, addressed issues related to obligations under the Montreal Protocol, laws concerning control of production, use, export and import, the smuggling scenario, methods to combat illegal trade, and methods of identification. Eighteen trainee officers from the Coast Guard, Customs Chemical Laboratory,Customs and Central Excise took part in this workshop.

Website: www.hinduonnet.com

IN THE NEWS

Consultant for World Bank MB phase-out project

The World Bank has selected Mr. David Mueller President of Fumigation, Service and Supply Inc., the United States as the international consultant for its methyl bromide (MB) phase-out project. As the fumigation expert for Thailand in 1999, Mr. Mueller had designed demonstration projects for replacing MB in rice mills, cassava warehouses and grain bins. More than 25 per cent of the worlds rice exports comes from Thailand each year. MB is used in Thailand on rice, soil, cassava, rice mills, food factories, cut timber and maize. The purpose of these demonstrations was to test alternatives in the native developing countries to determine their feasibility. With assistance from the Montreal Protocol, Thailand is working to eliminate 650 t of MB ahead of the 2015 phase-out schedule.

Website: www.pestcontrolmag.com

Afghanistan ratifies Montreal Protocol

Afghanistan deposited the instruments of ratification on 17 June 2004 to become the 187th Party to the Montreal Protocol. Earlier, at a meeting of ozone officers from the Asia-Pacific region, held in India, delegates were informed that 100 per cent commitment to the Montreal Protocol from countries in this region was nearing reality. Afghanistan and Bhutan, not being Parties to the Protocol, had participated as observers to see at first-hand and through contact with other delegations what full participation in the Montreal Protocol family means. In bilateral meetings with Pakistan and Iran, the Afghanistan delegation had investigated the

ratification process and its requisite follow-up.

Contact: Mr. Atul Bagai, UNEP ROAP.

E-mail: bagai@un.org

Ozonaction Newsletter, No. 47, May 2004

Efforts to create awareness on ODS in Pakistan

The Karachi Chamber of Commerce and Industry (KCCI), Pakistan, plans to organize a seminar and also adopt other measures to disseminate information among its members, particularly relevant industrialists, to avoid using ODS and switch over to alternatives. Stating this in a high-level mission to UNIDO headquarters, Mr. Siraj Kassam Teli, President of KCCI, proposed the adoption of a two-pronged strategy in this connection. UNIDO will provide the mission with financial assistance totalling US$5 million over a three-year period, along with technical assistance, for implementing ODS phase-out projects in the country, which would be carried out in collaboration with federal and provincial governments, and private sector stakeholders.

Website: www.karachichamber.com

EPA honours climate and ozone protection efforts

In the United States, the Environmental Protection Agency (EPA) will honour 29 organizations and individuals from around the globe for their outstanding efforts in protecting the Earths climate and stratospheric ozone layer. Winners include those who have demonstrated ingenuity, leadership and public purpose by achieving reduction of ozone depleting and heat-trapping gas emissions. This year, there are 17 winners of the Stratospheric Ozone Protection Award and 12 winners of the Climate Protection Award from ten countries.

Website: www.ci.sf.ca.us

International award for pioneering work on ozone hole

Ms. Susan Solomon, an atmospheric scientist with the NOAA Aeronomy Laboratory, the United States, has won a prestigious award for her efforts in identifying the mechanism that produces the Antarctic ozone hole and contributions towards ozone layer protection. The Blue Planet Prize is an international award that recognizes organizations and individuals who have made major strides in solving global environmental problems. Sponsored by Asahi Glass Foundation, Japan, the award carries a prize of US$460,000.

Ms. Solomon was the leading scientist in identifying the cause of the Antarctic ozone hole, an unexpected geophysical phenomenon that began in about the early 1980s. She and her colleagues suggested that chemical reactions involving human-made chlorine interacting with icy clouds in the cold polar stratosphere could be responsible for the unprecedented losses of ozone during the Antarctic spring. Ms. Solomon led two scientific expeditions to Antarctica in 1986 and 1987 that succeeded in providing key observations supporting her theory.

Contact: Mr. Jana Goldman, NOAA Research, United States of America. Tel: +1 (301) 7132 483, ext. 181.

Website: www.noaanews.noaa.gov

Ozone layer protection in China

Since 1992, China has received US$450 million from the Multilateral Fund (MLF) for implementing the Montreal Protocol. The total amount of financial assistance approved is US$740 million. Funds received to date are being used to support more than 200 projects designed for enterprises and industries such as the foam and automobile air-conditioner production sectors. The production of CFCs in China now stands at nearly 30,000 t/y, down from 45,000 t in 1999, when the country began phasing it out. Though implementation of the protocol initially created hardships for related enterprises, it has now enhanced the development of a market catering for eco-friendly products. By 2010, as agreed by the Montreal Protocol, China will have completely stopped producing CFCs. China plans to utilize more of the grant in fields like process agents and pharmaceutical aerosol.

Website: www.china.org.cn

ODS phase-out in Pakistan

Mr. Tahir Iqbal, Pakistans Minister of State for Environment, has stated that with the cooperation of UNIDO the Ministry had launched three projects to phase out ODS under the Montreal Protocol. Addressing a three-day Train-The-Trainers workshop for customs officers, organized jointly by the Ministry and UNDP, Mr. Iqbal expressed that it was high time for both developed and developing countries to get together for protecting the ozone layer. We understand that global treaties, particularly those related to the environment, can only be effective through global interaction and cooperation and could be seriously jeopardized by the non-compliance of even one member state, Mr. Iqbal said. Similarly, implementation of any protocol at the national level needs interaction between all stakeholders, for which training and awareness play a key role.

Website: www.dawn.com

Coca-Cola opts for CO2-based refrigeration

Four years of intensive research undertaken by cola giant Coca-Cola has lead to the conclusion that refrigeration technology based on carbon dioxide (CO2) is presently the best option for the companys global needs of sales and marketing equipment coolers and vending machines. Even though Coca-Cola business systems comprise only about 1 per cent of total compressor sales and less than 0.2 per cent of total HFC sales worldwide, the company plays a key role in the evolution of environmentally friendly refrigeration.
More than a decade ago, much of the world followed suit when Coca-Cola decided to move to an ozone-friendly alternative for new equipment. Unilever and McDonalds are currently moving in the same direction as Coca-Cola. Apart from replacing HFC-based refrigeration systems, Coca-Colas vision also includes energy efficiency of the new equipment. By 2010, the HFC-free equipment will be 40-50 per cent more energy efficient that those used in 2000.

Website: www.shecco.com

Halon alternatives could expand market

A report prepared by Frost and Sullivan reveals that the ban on using halon-1301 for fire suppression has resulted in a US$480 million halon-1301 alternatives market in 2003. According to Fire Suppression Systems Markets, this market could see a total turnover of US$630.3 million in 2010. Mr. Girish Kachroo, an analyst with the international consulting firm, states that alternatives, which emerged as a result of the Montreal Protocol-stipulated ban on the production of halon-1301, have to be used in more quantities than halon-1301 to suppress a similar fire and are also more expensive to replace in a fire suppression system. These factors negate alternative benefits of lower ozone depletion. Market players have to develop other options that are cost-effective and environmentally sustainable in the long term in order to become as popular as halon-1301.

Similar to the impact of halon-1301 on the market, the success of traditional fire suppression methods, such as fire sprinklers, has restricted the growth of better though costlier means of fire suppression. The eco-friendly

fire sprinklers are reliable, inexpensive, foolproof and require minimal or no maintenance. However, they may damage property if they are set off accidentally. This drawback is being addressed by using pre-action automatic sprinkler systems instead of the conventional wet pipe sprinkler systems. New technologies, such as water mist systems and fluorinated ketone-based fire fighting fluid technologies, are slowly making inroads in certain applications. Carbon dioxide, yet another traditional extinguishant, is effective, colourless, odourless and electrically non-conducting. It can extinguish fires in various applications without affecting the surroundings.

Contact: Ms. M. Gonzalez, Frost and Sullivan.

E-mail: melina.gonzalez@frost.com

Website: www.home.businesswire.com

Spray cans warm planet

Each gust of air from an aerosol can to remove dust, e.g. from a computer keyboard, releases a gas into the atmosphere linked to global warming hydrofluorocarbon (HFC). A 500 g spray can is estimated to contribute as much to global warming as the carbon dioxide (CO_2) an average person causes to be released by consuming energy in the home for six months. As computers, and with them sprays for cleaning, continue to proliferate, HFC emissions from aerosol cans are also on the rise. The Aerosol Industry Association of Japan reports that 1,850 t of HFCs were distributed in about 4.5 million cans in 2003. About 80 per cent of these cans are used to blow away dust. But the gas specifically used for this purpose, HFC-134a, has a global warming potential 1,300 times that of CO_2. A can of spray contains about the same amount of HFCs as a cars air-conditioning system. Apart from computer appliances, these sprays are also used to clean cameras, ATMs and pachinko machines.

Website: www.asahi.com

Guidelines to control methyl bromide

The Council of Agriculture, Taiwan Province of China, released a rule book called Guidelines for Controlling Methyl Bromide in 1994 and an import permit system was implemented according to it in the following year. On the lines of managing HCFCs, the authority for issuing methyl bromide import permits was shifted from the Council of Agriculture to EPA following the enactment of the fourth amendment to the Air Pollution Control Act in 2002. Immediately EPA organized an experts examination meeting and stakeholder hearing on 14 March and 10 April 2003, respectively, to revise the original version. After taking into account the rules on reporting format for quarantine and pre-shipment uses, a final version was adopted and enacted on 21 May 2003.

Website: www.uneptie.org

REFRIGRATION/AIR-CONDITIONING

Multiple air-conditioning

Sanyo Electric Co., Japan, is scheduled to launch new models of its Super W Multi series multiple air-conditioning systems (VRF) for commercial buildings. This series comprises four DC inverter models in 6, 8, 10 and 12 hp class (16.0~33.5 kW) for either independent or combined use and three constant speed models in 8, 10 and 12 hp class (22.4~33.5 kW) for combined use. Systems of up to 48 hp can be configured. A key feature of this series is that it has realized the industrys top cooling/heating average COP of 3.63 (16.0 kW

class), drastically reducing energy consumption. These units employ R-410a as the refrigerant. Benefits offered by the new series include:

The compact design of the outdoor 36 hp class combined model (101 kW) realized the industrys top-class space savings and as such can be installed more freely than before;

When multiple outdoor units are installed, they can operate in rotation depending on the heating/cooling load conditions.

Website: www.jarn.co.jp

New absorption chiller-heater packages

Kawasaki Thermal Engineering Co., Japan, has released New M Series of middle-sized absorption chiller-heater packages with improved energy saving feature (JIS Standard COP 1.16). The four models in this series have cooling capacities varying from 141 to 264 kW (40-75 RT). Absorption chiller-heater is a cooling/heating unit that utilizes gas or oil as fuel and water as the refrigerant.

Based on the earlier M Series released in 1982, the New M Series offers improved energy saving performance without changing the machine size by adopting new-type of heat exchangers developed for the large absorption chiller-heater Sigma Ace Series. This has enabled the latest models to fulfil the reference COP value (1.05) designated in the Law on Promoting Green Purchasing of the Land, Infrastructure and Transport Ministry. Some of the notable features include:

Weatherproof casing enables the system to be installed outdoors;
By combining several units, this series can meet the need for replacing existing large absorption chiller-heaters;
Both gas- and oil-fired models are available; and
Energy savings can be realized for an absorption chiller-heater integrated with cooling tower.

Website: www.jarn.co.jp

Alternative for CFC-12 and HFC-134a

China North Industries ShenZhen Corporation, China, offers a new replacement for CFC-12 and HFC-134a used in refrigerators and automobile air-conditioners. THR02 has zero ODP and a GWP 1/25th that of HFC-134a. This blend of three non-toxic compounds is non-inflammable and tests conducted by Castrol International Co. have shown that THR02 is miscible with the mineral oil used in CFC-12 systems and HFC-134a units. This drop-in substitute does not require any major alterations in the system and production line.

Contact: China North Industries ShenZhen Corporation, International Science and Technology Bldg., Shennan Zhong Road, Shenzhen, China. Tel: +86 (755) 8366 4099/3529; Fax: +86 (755) 8366 3649/8360 4758

E-mail: contact@sznorinco.com

Website: www.sznorinco.com

Variable refrigerant flow system

Daikin Europe NV has introduced the worlds first R-410a operated variable refrigerant flow (VRF) system. Model VRV-II is available in both heat pump and heat recovery versions and represents a notable advance over earlier VRV systems. Salient features of VRV-II include:

Its operating range of 5 hp to 48 hp in 2 hp increment steps (22 system combinations) is wider than currently available counterparts; and
Its ability to operate no less than 40 indoor fan coil units in heat recovery as well as heat pump format cannot, yet, be matched by other systems.

The application of purpose-designed DC reluctance inverter-controlled scroll compressors throughout the range is an important factor and results in high COPs. The DC motor maintains high efficiency levels in the most frequently used mid to low settings, thereby reducing electricity consumption and costs. Powerful neodymium magnets within the motor increase torque and produce much higher power output to electrical input than can be generated using conventional motors. A significant improvement in heating mode is also realized with the extension of the operation range down to -20C.

Website: www.jarn.co.jp

Magnetic cooling

Two Japanese companies, Chubu Electric Power Co. Inc. and Toshiba Corp., have jointly developed a new type of magnetic refrigeration system. The compact unit realizes high efficiency by reducing the driving power of permanent magnets and optimizing the magnetic circuit. The magnetic refrigeration system utilizes a phenomenon in which heat is generated when the magnetizing substance is altered magnetically and temperature drops when the magnetic field is removed. Since it features higher energy conversion efficiency and smaller environmental load compared with conventional gas refrigeration systems, this system is drawing considerable attention.

The current development comes as a rotary driving system rotating the permanent magnet. Since magnetic field changes are given to the magnetic action substance by turning around the permanent magnet, it is possible to dramatically reduce the driving power. Also, optimization of the magnetic circuit enables 50 per cent improved performance compared with the reciprocating system. The rotary symmetrical structure enables the system to be 70 per cent more compact than the reciprocating system and about 1/20th that of a magnetic refrigerating system using superconductive magnets.

Website:www.jarn.co.jp

New chillers

Mitsubishi Heavy Industries (MHI) of Japan has developed a centrifugal chiller that exhibits the worlds highest COP level of 6.4, using HFC-134a. The new AART series achieves 5 per cent more efficiency than the previous NART series. The higher efficiency was realized mainly by improving the compressors vane wheel, adopting a vaned diffuser that rectifies the refrigerant gas flow, thereby facilitating improved efficiency and optimizing the heat exchanger performance. MHI plans to sell 150 units each year by lining up 12 models ranging in chilling capacity from 350 RT to 4,000 RT. MHI has also released NART-1 series, an inverter-driven version of the conventional NART series. Very high efficiency operation is feasible when the main motor is subjected to variable speed control and the inlet temperature of cooling water is kept at 13C.

Website:www.jarn.co.jp

Energy-efficient air-conditioner

Lennox Industries new HSX19 is a very quiet and efficient central air-conditioner presently available with a seasonal energy efficiency ratio (SEER) of up to 19.20. This system is the latest addition to Lennoxs Dave Lennox Signature Collection. The two-stage scroll compressor, which uses chlorine-free R-410a refrigerant,

operates at low speeds up to 80 per cent of the time, bringing down operating costs. Its outdoor coil provides exceptional heat transfer and low air resistance for high efficiency operation. SilentComfort technology incorporated in the system ensures low noise levels. It also includes a patent-pending fan design, a compressor with new vibration isolators, a new sound-dampening fan grill and a Hushtone cabinet.

Website:www.jarn.co.jp

Ammonia absorption refrigeration system

Hitachi Zosen Corp., Japan, offers an ammonia absorption refrigerator claimed to be the most compact unit in the world. Developed in cooperation with Osaka Gas Co. Ltd. and Sumitomo Precision Products Co. Ltd., the system provides cooling and heating using ammonia as refrigerant, water as an absorption agent and heat (steam/gas) as a power source. Key features include: it can operate using waste heat, few rotation parts enable noiseless operation and easy maintenance, and the volume of ammonia required is one-fifth that of conventional systems.

Contact: Hitachi Zosen Corp., 7-89, Nanko Kita 1-chome, Suminoe-ku, Osaka 559 0034, Japan. Tel/Fax: +81 (6) 6569 0061/0079.

Website:www.nett21.unep.or.jp

SOLVENTS

New cleaning systems

Austin American Technology Corp., the United States, is offering a semi-aqueous PNA cleaning system and a closed loop regenerative cleaning system. Model 6307 semi-aqueous PNA cleaning unit is a cost-effective CFC alternative that removes rosin-based and paste fluxes using biodegradable non-toxic solvents. Automatic timing, monitoring and interlocking systems ensure simple and easy operation. Pressurized nitrogen is used for safety. Temperature of the wash chamber, sump and drive motor are continuously monitored and fumes are vented from the unit as a further safety measure. A built-in printer provides documentation of the test programme and process test results. Fabricated using stainless steel, the system is mounted on a stainless steel backsaver stand, which contains the semi-aqueous solvent holding tank. Once cleaned in this system, PC assemblies should be thoroughly rinsed with water in a Model 9300 rinser or Model 9600 closed-loop rinser.

The Model 9600 closed loop regenerative cleaner facilitates aqueous cleaning of water-soluble fluxes and no-cleans. This system is a true closed-loop cleaning system that washes assemblies to a pre-selected resistivity level using only recycled DI water. During the wash cycle, water is continuously purified by a series of filters. Replenishment is required only to replace evaporative and drag-out losses. All functions of this unit are programmable from a control panel, which also incorporates a printer for programme and process documentation. Completely contained in a single stainless steel cabinet, this model requires a small footprint and is easy to install.

Contact: Mr. Steve Stach, Austin American Technology Corp., United States of America. Tel: +1 (512) 3356 400; Fax: +1 (512) 3355 753.

Website:www.aat-corp.com

New cleaners

Tarksol Inc., the United States, offers two new general purpose heavy-duty degreasing and cleaning solvents Tarksol Biosoy-60 and Tarksol HTF-85B. While Tarksol Biosoy-60 is based on a novel blend of Tarksol 97, a biomass alcohol and a soya bean solvent derivative, Tarksol HTF-85B is based on a novel blend of Tarksol 97, a biomass alcohol and esters. Both products do not contain any CFC or chlorinated solvents, which contribute to ozone depletion, environmental damage and human health concerns. A carefully slowed evaporation rate ensures maximum amount of oils, grease, polymers, urethane, etc. are removed without re-deposition.

Tarksol Biosoy-60 is ideal for use in all engineering applications, especially as a resin and clean-up solvent. Tarksol HTF-85B is very effective in resin clean-up and as a solvent for urethane production. It can be utilized in all engineering applications, especially as a urethane flush and clean-up solvent. The new solvents do not leave behind any residues. Application areas for these solvents include coil coatings, hard surface cleaners, printing, foundry core binders, acrylic lacquers, etc.

Contact: Tarksol Inc., PMB 300, 3400 Ridge Road W., Rochester, NY 14626, United States of America. Tel: +1 (585) 6633 346; Fax: +1 (585) 6212 303

E-mail: info@tarksol.com

Website:www.tarksol.org

Contact cleaner

Ecolink, the United States, offers a new environmentally preferred contact cleaner. ECC aerosol is a unique contact cleaner that is virtually odourless and evaporates immediately. It offers performance comparable to that of chlorinated solvents and is economical than HFE- and HFC-based contact cleaners. ECC is approved by EPA-SNAP as a replacement for CFC-113 and 1,1,1-trichloroethane. It is safe for use on virtually all plastic and rubber compounds, as well as metals.

Contact: Ecolink, Corporate Headquarters, 2227, Idlewood Road, Tucker, GA 30084, United States of America. Tel: +1 (770) 6218 240; Fax: +1 (770) 6218 245

E-mail: info@ecolink.com.

Website:www.ecolink.com

Precision surface processing system

Eco-Snow Systems, the United States, is offering carbon dioxide precision surface processing equipment to remove particulate contamination, etch residues and thin organic films for yield enhancement in semiconductor (Si and GaAs), disk head and media, flat-panel display and fibre-optic production operations. The automated WaferClean 1600 and semi-automated 1100 cleaning systems are for front-end wafer applications, including metal lift-off, post-metal lift-off and post-CMP cleaning.

Contact: Eco-Snow Systems, 4935A Southfront Road, Livermore, CA 94550, United States of America. Tel: +1 (925) 6062 000; Fax: +1 (925) 3710 798

E-mail: info@ecosnow.com

Website: www.micromagazine.com

Ultrasonic cleaning

Cooper Cameron, a leading manufacturer of oilfield completion equipment, has installed an automated Microsolve M350/2M cleaning unit manufactured by Kerry Ultrasonics, the United Kingdom. The new system helps maintain a stock of NAS<6 clean valve fittings. The Microsolve unit ensures rapid processing of stainless steel parts of various sizes, up to 250 mm in length. Using 3Ms non-toxic HFE Samsol 72DE, Kerrys three-stage process ensures that the components are free of hydraulic oils and general dirt. Baskets are first lowered into the unit by a single-axis lift, where parts undergo an ultrasonic wash. A vapour rinse is followed by a dwell in the freeboard to complete the drying process.

Contact: Kerry Ultrasonics, Hunting Gate, Wilbury Way, Hitchin, Herts SG4 0TQ, the United Kingdom. Tel: +44 (1462) 450 761; Fax: +44 (1462) 420 712.

Website:www.manufacturingtalk.com

PCB cleaner

Electrolube, the United Kingdom, offers Safewash cleaning solvent to remove adhesive residues safely and quickly. The aqueous Safewash is a biodegradable, 100 per cent ozone-friendly, non-inflammable solvent with a toxicity lower than that of conventional products. Though designed for use in the electronics and associated industries, the Safewash range has products equally effective on screens, stencils and PCBs as on acrylic panels. Originally formulated to rapidly remove the most hardened adhesive and paste deposits from PCBs, the Safewash range has expanded to include Safewash X, a screen and stencil cleaner that results in swift and efficient screen printing with fewer misprints and reduced wastage. Performance of the multi-purpose Safewash range has been comprehensively verified on most leading brands of solder paste and adhesives in a range of ultrasonic and pressure wash automated cleaning systems.

Electrolubes Australian office recently supplied over 3,000 l of the high-powered, water-based solvent to the New South Wales Road Traffic Authority (RTA) to remove superficial glue residues from the walls of M5 motorway tunnel. RTA had originally employed a contractor to reclad the walls of the tunnel with acrylic, a process that involved bonding panels using PV adhesive, and had failed to clean up residues from the panels.

Contact: Electrolube, HK Wentworth, Kingsbury Park, Swadlincote, Derbyshire DE11 0AN, United Kingdom. Tel:+44 (1283) 222 111; Fax: +44 (1283) 550 177.

Website:www.electronicstalk.com

Precision cleaning systems

Forward Technology, the United States, offers SA-Series solvent precision cleaning systems that have been designed to cater to present and future cleaning requirements. Apart from the fact that these units use HFCs, HCFCs, HFEs, PFCs and other non-CFC, non-inflammable solvents and low flashpoint solvents (such as isopropyl alcohol and cyclohexane), these systems are similar to CFC solvent degreasers. A distinct benefit of the SA-Series over other systems is that it allows the use of a wide range of different solvents and drastically reduces solvent consumption through the application of superheated vapour drying, extended freeboard, sub-zero freeboard refrigeration, automated parts handling system and a full, sealed upper enclosure with a sealed Load Lock chamber. Typical applications include removal of contaminants from PC boards/hybrid circuits/MCMs/C4 packages, precision mechanical/electromechanical parts, optical instruments, disk drive

components and medical devices and components.

SA-Series is available in two basic configurations single and double sump each with optional features. Custom tank sizes and alternate cleaning configurations are also available. The use of superheated vapour zone above the immersion tank eliminates the need for a separate drier. All components that come in contact with the solvent including tanks, solvent plumbing and heating and cooling surfaces are made of 300 series stainless steel.

Contact: Forward Technology, Precision Cleaning Division, 3050, Ranchview Lane North, Minneapolis, MN 55447, United States of America. Tel/Fax: +1 (763) 5591 785/5593 929;

E-mail: info@forwardtech.com

Website:www.forwardtech.com

Cleaners for the electronics industry

ConRo Electronics of the United Kingdom offers Surclean line of Screenclean solvents for fast and easy removal of solder paste, uncured adhesive and ink residues from surface mount stencils, dispensers and production tooling. Screenclean 100 is a powerful solvent blend capable of removing even hardened solder paste deposits. Screenclean 200 is an extremely powerful and effective water-washable, non-evaporating stencil cleaner based on proprietary Surclean synthesized aprotic solvent technology. Screenclean 300 is a highly effective yet economical screen and stencil cleaner.

Surclean line of solvent flux cleaners is a comprehensive, versatile range of materials covering the majority of cleaning requirements in production and servicing within the electronics industry. While Ecosolve 100 is a mild, plastic-safe blend of solvents with ultra-pure DI water, Ecosolve 200 is a medium strength solvent blend for more demanding tasks and Ecosolve 300 is a powerful solvent blend for difficult cleaning applications. Isosolve is Surcleans brand of ultra-pure anhydrous isopropanol. Labelsolve 20 is a strong and safe solvent blend for removing many types of porous pressure-sensitive labels and tapes. Surclean SPR1150 is a very aggressive and powerful aromatic and aliphatic solvent blend for use in applications where normal cleaning products are inadequate. Other cleaners offered are Surclean SPR2050 for removing flux residues and soils from electronic assemblies, SPR2100 for enhanced removal rates of flux residues and SPR2300, an exceptionally strong blend.

Surclean stencil cleaning rolls ensure high-performance automatic under-stencil cleaning operations. Based on the latest synthetic non-woven materials technology, Surclean Ultrarolls are custom-specified for both mechanical and vacuum type cleaning systems. Cleaning wipes available include Superwipes (100 sheets/bag), Ecowipes (150 sheets/tub) and Ultrawipes (200 sheets/tub). Ecowipes and Ultrawipes are also available saturated with IPA/DI water or Screenclean 100/200/300.

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FOAMS

Azeotrope-like compositions as blowing agents

In the United States, Mr. Ian Robert Shankland has developed azeotrope-like compositions that include 1,1,1,3,3-pentafluoropropane and at least one hydrocarbon selected from the group n-pentane, isopentane, cyclopentane, n-hexane and isohexane. These environmentally safe substitutes for CFC and HCFC blowing agents are useful in producing rigid and flexible polyurethane foams and polyisocyanurate foams as well as aerosol propellants. Foams produced utilizing the new compositions exhibit improved properties such as thermal insulation efficiency, solubility in foam raw materials and foam dimensional stability, when compared with foams made using hydrocarbon blowing agents alone. Polyurethane foams expanded with the azeotrope-like compositions offer superior performance to foams with hydrocarbon blowing agent alone. Moreover, thermal conductivity of the former is lower and hence it is superior than the latter.

Website:www.patft.uspto.gov

New insulation system

Icynene Inc., Canada, offers a proprietary spray-in-place soft foam insulation free from formaldehyde, CFCs or HCFCs. Icynene foam is a water-based open-celled polyicynene material. In addition to efficient thermal performance, it is particularly effective in air-sealing the building envelope thereby reducing the transfer of air-driven moisture and airborne particulate matter through building cavities. Icynene competently seals small crevices and gaps in the building envelope, creating a draft-free, condensation-free and low-noise indoor environment while reducing energy costs dramatically. It can be employed in new construction projects, restoration projects or injected into existing walls that are not presently insulated. In steel-framed buildings, Icynene provides an effective seal for metal C-channels, completely filling in spaces. This virtually eliminates convection and moisture damage that commonly occurs whenever metal buildings are insulated with batt-type material. The polyicynene foam becomes inert after installation, emitting no VOC off-gas.

Icynene is manufactured and installed on-site using two components that are heated, pressurized and blended to react and rapidly expand at a ratio 100:1. The two components are isocyanate MDI (methyl diisocyanate) and a proprietary water-based resin formulation, which is a blend of polyols, surfactants and catalysts. The product is applied in a liquefied state using a metering unit or proportioner. The water-based resin reacts with isocyanate MDI to produce carbon dioxide, which acts as the foaming agent.

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Website:www.icynene.com or www.oceta.on.ca

New polymer additive

Great Lakes Chemical Corporation, the United States, is offering a high reactivity flame retardant for rigid polyurethane and polyisocyanurate foam applications. Firemaster 520, with its primary hydroxyl reactive groups, provides faster reaction rates, lower viscosity and improved compatibility in water-blown foams. Reduced surface friability helps improve the adhesion of facing sheets to the foam surface. In spray foam, a lower viscosity, higher reactivity flame retardant is needed to prepare low viscosity, fast curing spray foam

systems.

Contact: Great Lakes Chemical Corporation, World Headquarters, 9025, North River Road, Suite 400, Indianapolis, IN 46240, United States of America. Tel: +1 (317) 7153 000;
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Website: www.e1.greatlakes.com

ODS-free rigid foam insulation

Truefoam, Canada, produces rigid foam insulation without using ODSs such as CFCs or HCFCs as the expanding agent. During the manufacture of expanded polystyrene (EPS) products, tiny beads of polystyrene are expanded and consolidated by steam heating and pressure treatment. When heated, the expanding agent enlarges the beads by as much as 40 times, after which they are fused by pressure into huge blocks of EPS. These blocks are cured, then cut and shaped to produce a variety of Truefoam sheet, board and panel products. Polystyrene beads used by Truefoam contain pentane as the expanding agent. A new pre-expander allows the use of beads with 33 per cent less pentane.

A water-cooling tower installed by Truefoam allows the company to recycle process water, resulting in reduced water consumption (65 per cent). Moulding equipment with the ability to change dimensions to suit special products enables the company to limit the production of waste trimmings. Reuse of trimmings and other waste EPS generated by the cutting/shaping of blocks have been maximized. Truefoams product lines facilitates its clients to practice pollution prevention by assisting with energy conservation and product protection. The companys unique insulation products Truewall, Insul-Wall and IceBlock place less demand on the environment for construction resources.

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Website:www.truefoam.com or www.ns.ec.gc.cab

PET foams

M&G Group of the United States has developed PET with modified rheological properties, which allow easy foaming in a conventional foaming line achieving density up to 60 kg/m3. The new product will be marketed under two brands Cobitech for use in all non-food applications, and Cobifoam for use in all food applications. The PET foam is produced from a mix of PET polymer, a nucleating agent (optional) and a blowing agent mixed into an extruder and kept under pressure until exiting from the die. The melt exiting the die comes from high pressure to atmospheric pressure outside the die lips and the blowing agent transforms from a liquid state to gas. Cobitech/Cobifoam can be used along with the following blowing agents: HFC-134a, -152a, a 152a/134a blend, n-hexane, iso-pentane, n-heptane, carbon dioxide and nitrogen.

Cobitech foam-grade PET can be produced starting also from recycled PET bottle scraps without affecting the final quality of the material. M&Gs proprietary technique for the production of Cobitech thus offers an alternative way to dispose post-consumer PET bottles. All edge trims and scraps produced during the foaming process of Cobitech/Cobifoam can be recycled at the inlet of the foaming line with environmental and economic benefits. Application areas for the new PET foam include piping insulation, foamed pipes, furniture industry, automotive industry, buildings, wood substitution, etc.

Contact: Mr. Don Richeson, Senior R&D Engineer, M&G Polymers Technical Centre, 6951, Ridge Road, Sharon Centre, OH 44274 0590, United States of America. Tel/Fax: +1 (330) 2397 428/403.

Website:www.mgpolymers.com

CO2 aid delivers plastics processing savings

Faraday Plastics-Rapra Technology, the United Kingdom, has developed CO2-assisted plastics processing that offers a plethora of cost-saving and performance-enhancing benefits. These include:

Eco-friendly CO2 can be used as a cheap and effective blowing agent to create foamed items;
CO2 can be utilized as a processing aid over a wide range of temperatures and is not limited by temperature stability;
CO2 can be used to create solid products if the processing conditions are controlled;
CO2 acts to plasticize polymer melts, enabling either processing temperatures to be reduced or viscosity to be reduced for more effective filling of moulds; and
CO2 has been shown to be compatible with a wide range of thermoplastics including PEEK, PPS, SMA, PC, PPO (Modified), PP, PS, PE and Acetal.

Contact: Faraday Plastics-Rapra Technology, Shawbury, Shrewsbury, Salop, SY4 4NR, United Kingdom. Tel: +44 (1939) 250 383; Fax: +44 (1939) 251 118.

Website:www.manufacturingtalk.com

Physical blowing agent

In the United States, researchers have developed a new process to produce thermoformable foam sheets. This method involves contacting a molten monovinylidene aromatic or olefinic polymer with a physical blowing agent. The polymer/blowing agent mixture is foamed into a region of lower pressure within a sheet extrusion line, wherein the extrudate is pulled and compressed to form a thermoplastic foam sheet of uniform thickness. This technique is especially suited for producing high-density foamed packaging materials, particularly thermoformable foam sheet having consistent gauge and density, which can be used in traditional non-foam thermoformed applications such as dairy containers.

Website:www.patft.uspto.gov

FUMIGANTS

Eco-friendly tobacco cultivation

A two-year research methodology developed in Croatia, with the help of UNIDO and its specialists, has tested the use of new alternatives for methyl bromide in the production of tobacco. The focus was on three alternatives, namely solarization plus biofumigation, the use of low-dose chemicals and non-soil cultivation. Trials included various control treatments, application of Dazomet,biofumigation and the floating tray system. It was found that better quality seedlings could be obtained using the floating tray system than by other methods. Floating trays resulted in higher yields, better quality dried leaves and maximum environment protection.

Institutions involved in this programme include the Tobacco Institute, Institute for Plant Protection in Agriculture and Forestry, Ministry of Environmental Protection and Physical Planning, and UNIDO.

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Demonstration project on alternatives to methyl bromide

In Syria, a project on alternatives to methyl bromide (MB) fumigation for disinfestation of bagged wheat is testing the efficacy of carbon dioxide (CO2) and phosphine. Grain sacks stacked indoor and outdoor are both being treated. During the treatment, phosphine gas is released from commercial formulations of aluminium or magnesium phosphide containing various other ingredients to slow the rate of release of gas. Phosphine works at very low concentration levels but requires a long time, when in contact with some insect stages, to achieve complete control. It is highly penetrative and airs off rapidly after treatment. Normally, there is little sorption of the gas during treatment.

Though CO2 is currently not used in Syria, the project aim was to demonstrate the use of CO2 from a local supplier, or use of phosphine supplied from a conventional solid formulation (aluminium phosphide sachets) or from the new cylinder-based source of 2 per cent phosphine in CO2 offered viable alternatives to the use of MB in terms of cost, safety and efficacy.

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Controlling pests in tobacco and horticultural production

In Macedonia, a demonstration project entitled Alternatives to the use of methyl bromide was completed in the year 2000. The main objective of this project was to test feasible alternatives to the application of methyl bromide, such as soil-less cultivation, use of low-dose chemicals and solarization/biofumigation, and to demonstrate their technical and economical viability. The project was developed in two cycles. The first project year focused on selecting the most feasible alternative. Based on these results and experiences of the growers involved in tobacco seedling production, the floating tray system was chosen for deeper scrutiny. For vegetable production, the most feasible alternative was solarization and biofumigation treatment. With conclusions from the previous year as a starting point, treatments with Dazomet, biofumigation and solarization were excluded from the tobacco trials, while soil-less cultivation was left out from vegetable production trials. The second cycle of vegetable trials tested the effectiveness of different soil sterilization treatments like solarization and biofumigation, Dazomet, MB and low doses of Mocab as a control treatment.

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Fumigation of timber and soil

In Australia, the CSIRO Stored Grain Research Laboratory (SGRL) is scrutinizing the potential of carbonyl sulphide (COS) and ethanedinitrile (C2N2) as fumigants for timber. Research has involved collaborative studies in China and the United States on quarantine fumigation of timber to control the Asian long-horned beetle (ALB), or Anoplophora glabripennis, and in Malaysia for control of insects and microflora. ALB is a species of wood boring beetle indigenous to China and is a primary pest of a variety of deciduous broadleaf tree species, particularly poplar, willow, elm and maple.

Cooperative field trials being undertaken in China, along with USDAs Animal and Plant Health Inspection Service and the Chinese State Administration for Import and Export Commodities Inspection and Quarantine, will evaluate the effectiveness of COS, sulphuryl fluoride, phosphine and methyl bromide (MB) against ALB in small Populus species timbers used for packing or pallets in container commerce. Collaborative research in Malaysia involving UNEP and UNIDO is aimed at evaluating the effectiveness of COS and C2N2 in controlling insects, moulds and pathogens in timber. In preliminary studies, C2N2 has been shown to be more effective than MB and other potential alternative fumigants for the treatment of freshly sawn timber, which is typically stored and transported at high moisture contents.

With regard to soil fumigation, SGRL is assessing the potential of C2N2, which has exhibited better diffusion and penetrative characteristics in soil than MB. In lab-scale trials, C2N2 was five times more effective in controlling soil insects, nematodes, pathogens and moulds. C2N2 also occurs naturally in the environment and is not an ozone depleting substance or greenhouse gas (GHG). Commercial collaborative trials with CSIRO Entomology, South Australian Research and Development Institute, University of Adelaide and the Victorian Natural Resources and Environment have shown that C2N2 can be easily applied through an existing irrigation system or by direct injection into the soil.

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New fumigant

At Auburn University, the United States, a team of researchers have developed a new substitute pesticide for methyl bromide (MB). According to plant pathologist Mr. Rodrigo Rodriguez-Kabana, SEP-100 (a liquid formula of sodium azide) significantly outperforms MB in controlling diseases, weeds and harmful, root-eating nematodes. SEP-100 is applied by drip irrigation under plastic sheeting without spraying or release into the atmosphere.

Auburn has applied for two patents on sodium azide one for the new liquid formulation of the chemical, which was previously marketed only in granular form, and the other for the chemicals soil enhancement properties. Mr. Rodriguez-Kabana states that sodium azide decomposes in soil, breaking down into fertilizer and leaves the soil healthier than it was before the application of the new pesticide. Moreover, unlike MB, which kills all nematodes and insects, sodium azide does not harm beneficial nematodes and insects.

Website: www.pctonline.com

New phosphine fumigant

Cytec Industries, the United States, has obtained approval from the Environment Protection Agency for the use of VAPORPH3OS phosphine fumigant to control pests in post-harvest commodities and storage structures. As such, the 100 per cent phosphine fumigant can be blended directly with the surrounding air as a dilution gas, thereby eliminating the need for a bulk source of carbon dioxide. VAPORPH3OS is designed for use along with Cytec-approved blending equipment to safely dilute phosphine. Fumigators can easily adjust the concentration levels and exposure periods. The cost-effective fumigant does not create any waste by-products and is environmentally friendly. Pests controlled by VAPORPH3OS include Indian meal moths, warehouse moth, weevils, lesser grain borer and a large variety of beetles. One cylinder of the fumigant can fumigate 1,750,000 ft3.

Website: www.pctonline.com

Fumigant for turf use

Dow AgroSciences LLC, the United States, has developed and manufactured a fumigant to control parasitic nematodes, microscopic organisms that feed on and damage turf grass roots. The Environmental Protection Agency has granted a 24(c) label to Dows new Curfew soil fumigant. Curfew is applied with coulters and knife-shanks that open the turf before injecting the fumigant at least five inches below the soil surface through a delivery tube located behind the knife-shank. The cut turf seam is later closed and sealed by a press-wheel or roller drum. Injection slits normally heal and disappear in approximately 10-14 days after application. Turf fully recovers from the treatment in 14-21 days. Additionally, investigations are afoot to evaluate the use of Curfew to control mole crickets, grubs and other soil-borne pests.

Website:www.grounds-mag.com