VATIS Update Ozone Layer Protection . Jul-Aug 2004

Content

THE SCIENCE OF OZONE LAYER

New ultraviolet index guidelines

In the United States, the NOAA National Weather Service and the Environmental Protection Agency (EPA) have replaced existing UV reporting methods in the country with the new Global Ultraviolet (UV) Index. Global UV Index developed jointly by the United Nations Environment Programme, World Health Organization and other international agencies comprises a set of guidelines designed to help people better understand the precautions they need to take to protect themselves from different levels of UV radiation. The guidelines will standardize reporting of surface UV radiation levels in the United States with those in other countries. Canada is scheduled to follow the United States.

UV Index is a measure of the amount of skin-damaging UV radiation reaching the Earths surface. Presently, UV Index forecasts by the NOAA National Weather Service provide information about UV intensity during the solar noon hour (1 p.m. daylight saving time) of the following day. This informs people when UV radiation will be strongest so that they can protect themselves. Overexposure to UV rays can lead to serious health effects, especially skin cancer, which are preventable.

Website: www.noaanews.noaa.gov

Ozone depletion worse than previous estimates

A new study reveals that ozone depletion over the Arctic is three times worse than believed earlier. The report Climate change set to poke holes in ozone states that the phenomenon of polar stratospheric clouds absorbing more and more industrial chemicals like CFCs is a side effect of global warming. According to Dr. Markus Rex at the Alfred Wegener Institute for Polar and Marine Research, Germany, previous models had largely ignored the presence of these Arctic clouds. Dr. Rex et. al. found a strong relationship between ozone loss and the amount of polar stratospheric clouds that form 20 km above the ground during winter.

Website: www.radio.weblogs.com

Satellite to keep tab on the atmospheres constitution

In the United States, NASA has launched successfully a new satellite, on a Boeing Delta 2 rocket from Vandenberg Air Force Base, to check the condition of the Earths atmosphere. Aura will peer through the stratosphere and troposphere to study in detail the thin layer of gas on which the well-being of life on Earth is dependent. Among other objectives, the satellite will test whether international atmospheric treaties are

working. The spacecraft has been described as one of the most sophisticated environmental monitoring satellites ever built. This is the third in NASAs series of satellites aimed at providing definitive data on the global environment. The first two, Terra and Aqua, are studying the ground and oceans.

Website: www.platinum-celebs.com

Ozone loss caused palaeozoic genetic mutations

Research into the worlds worst mass extinction, which led to the loss of about 90 per cent of living species 250 million years ago, has brought to light that the historical tragedy also involved some disturbing genetic mutations. Dr. Mark Sephton of the United Kingdoms Open University was part of an international team of scientists, from the Netherlands and the United Kingdom, which uncovered the new information. The research team found that at the time of the end-Permian extinction, increased amounts of ultraviolet (UV) light filtered through the Earths surface and caused damage to the DNA in plant spores. This resulted in abnormalities that prevented reproduction of plant life, consequently leading to the collapse of terrestrial ecosystems.

The cause of the increased intensity of UV radiation was a disruption in the Earths ozone shield. Massive volcanic activity that was taking place in Siberia at this time forced gases containing chlorine and bromine into the stratosphere where they catalytically destroyed UV-absorbing ozone gases, said Dr. Sephton. He concludes that only after volcanic activity decreased, life on Earth started to recover from its biggest ever catastrophe, yet.

Contact: Website: www.open.ac.uk

Website: www.news-medical.net

ODS PHASE-OUT IN INDIA

SRF obtains patent for HFC-32

The United States Patent and Trademark Office has awarded a process patent to SRF Ltd., India, for manufacturing difluoromethane (HFC-32), an ozone-friendly refrigerant. HFC-32 can be used as a component in blends like HFC-407c and HFC-410a, which are replacing HCFCs like HCFC-22. Developed in-house, from start to finish, the SRF process efficiencies are comparable with the best in the world. The company is presently working on commercialization of HFC-32 and the manufacturing facility is expected to be commissioned in the third quarter of 2005. The new plant will also have the flexibility to produce HFC-134a, an ozone-friendly refrigerant used to replace CFC-12.

Contact: Mr. Anurag Mantri, SRF Ltd., New Delhi, India. Tel: +91 (11) 5150 9805; Fax: +91 (11) 2331 8256

E-mail: amantri@srf-limited.com

Website: www.srf-limited.com

National phase-out plans

The Government of Germany would be the lead implementing agency in Indias National CFC Consumption Phase-out Plan, which will also have the cooperation of the Government of Switzerland, UNDP, UNEP and UNIDO. This final CFC phase-out project will assist the Indian government in fully eliminating the nations CFC consumption in all sectors. The largest part of the remaining consumption is in the refrigeration service sector, which will be dealt within one component of the plan through a series of training and equipment support measures enabling good practice and retrofit.

Indias consumption will be phased out through this plan and its components from an allowed level of 4,400 ODP tonnes of CFCs in 2004. To achieve this objective, the plan facilitates CFC phase-out on the basis of existing policies and regulations, and by integrating two existing sector phase-out plans. Training of refrigeration technicians will be held and equipment provided for the refrigeration and foam sectors. Enforcement will be strengthened through assistance to customs officials and facilitation of exchanges between state and central governments, along with the necessary technical assistance components to strengthen capacity.

On the other hand, GTZ-Proklima and AFD France will undertake activities required for implementing the National Carbon Tetrachloride (CTC) Phase-out Plan. While the World Bank is the responsible lead agency, GTZ-Proklima and AFD have agreed to implement the necessary measures for small-scale consumers in the sub-sectors of metal cleaning and garment cleaning, with an individual enterprise consumption of up to 10 t of CTC and an aggregate consumption of up to 3,200 t of CTC.

Website: www4.gtz.de

Phase-out of CTC

The textiles Committee (TC) has joined hands with GTZ-Proklima of Germany to phase-out the use of carbon tetrachloride (CTC) from the textile and garment sectors. The committee will provide technical and scientific support to GTZ- Proklima Through its facilities, know-how and networking in the industry. The TC will support with the verification of the translation of information dissemination handout prepared by GTZ-Proklima, and also distribute the handout to its members and clients and also garner support of various textile associations for the same. The TC will also carry out testing of alternative solutions identified and provided by the GTZ consultants, for any presence of the ozone depleting chemicals. The results of the same will be passed on to the GTZ consultants. The TC and GTZ-Proklima will also identify suitable altenatives to substitute CTC in the sector. GTZ-Proklima will provide technical support through its consultants, and testing expenses to the tune of Rs.2,000 for the complete set of tests on every sample.

Website: www.expresstextile.com

Replacing CFC refrigerants

Blue Star Ltd., a leading performer in central air-conditioning and commercial refrigeration systems, has been offering replacement and retrofitting solutions to phase out R-11 refrigerant. The firm has come up with an alternative, eco-friendly substance. R-123, the alternative refrigerant, minimizes ozone depletion and has close similarities with the thermodynamic properties of R-11. Blue Star has also introduced duct cleaning services and service solutions to phase out polluting CFCs.

Website: www.newstodaynet.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 (CO2) 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 CO2. 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

New threat to ozone: Emissions of CFC substitutes

In Japan, a business organization and the Ministry of Economy, Trade and Industry have made grim predictions regarding the future of ozone. Analysts report that CFC substitutes produce 2 per cent of total greenhouse gas emissions in the country. As per these forecasts, greenhouse gas emissions generated by CFC substitutes are expected to soar in the next decade. Emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6) are expected to triple around 2010 from their 2003 levels. HFCs are used as coolants in air-conditioners, refrigerators, foam-blowing sprays, etc. PFCs are utilized in manufacturing semiconductors while SF6 is used as an insulator.

Website: www.japantimes.co.jp

SAE to develop eco-friendly automotive refrigerant system

The United States-based Society of Automotive Engineers (SAE) has announced a cooperative research programme involving the industry and Environmental Protection Agency to develop and administer a new project for addressing improved R-134a refrigerant systems for mobile air-conditioning. The Improved R-134a Project (IRCRP) will build on previous studies and assess technologies that can take R-134a to the next level of performance and efficiency while avoiding costs associated with carbon dioxide systems.

IRCRP would identify technologies for reducing atmospheric leakage by 50 per cent and improve cost vs. benefits of the above objectives while investigating potential passenger compartment load reduction strategies. This project is expected to commence in the third quarter of 2004 and continue through 2006. Results will include SAE J-standards on R-134a system components leakage procedures and methods, SAE J-standards on Measurement and Testing of HVAC energy/power consumption/efficiency and consensus ranking of cost vs. benefits of various technologies.

Contact: Mr. Ward Atkinson, Society of Automotive Engineers, United States of America. Tel: +1 (602) 9569 313

E-mail: wast@ix.netcom.com

Website: www.sae.org

Matsushita shifts to hydrocarbon refrigerant

Following the non-fluorination of refrigerants for small refrigerators below 100r by the end of April 2004, Matsushita Electric Industrial Co., Japan, plans to shift all refrigerants for household fridges to hydrocarbon (HC). As such, refrigerators produced in Japan will be totally shifted to those using HC refrigerant. Matsushita is reported to be the first in the industry to adopt non-fluorinated refrigerants in all models.

Website: www.jarn.co.jp

DENR reinforces ODS phase-out

In the Philippines, the Department of Environment and Natural Resources (DENR) revised the chemical control order (CCO) for ODS in an effort to strengthen phase-out efforts in the country. The Department Administrative Order No. 08-2004 accelerates the ban on the use of CFC-11 by 1 January 2005. According to Ms. Elisea G. Gozun, DENR Secretary, the ban on CFC-11 is in compliance with the National CFC Phase-out Plan, a collaborative effort between government and various stakeholders supporting the nations commitment to the Montreal Protocol. The DENR Chief also called on all importers, dealers, retailers and service providers of ODS to register before they are accredited and allowed to sell or use these substances. The registrations and clearances are valid for a year only. By 1 January 2010, all kinds of importation of substances such as CFC-12, -113, -114 and -115 will be prohibited, except for essential uses.

Some of the prohibited acts in the order are back conversion, installation of CFC-using systems, sale and use of small disposable containers with CFCs, use of CFCs in mobile air-conditioners starting 2006, use of CFC-11 as blowing agent for manufacturing foams, intentional venting of ODS when servicing equipment and flushing ODS. Violators of the CCO will be held liable under the Republic Act or the Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 and its Implementing Regulations and Rules. This would also mean cancellation of the certificate of registration of importers, dealers and retailers, including the accreditation of service shops and technicians.

Website: www.denr.gov.ph

REFRIGRATION/AIR-CONDITIONING

HC blend refrigerants

HC-Tech Inc., Canada, offers patented hydrocarbon (HC) blend refrigerants HC-12a and HC-22a. Though some groups have termed HC blends as unacceptable, owing to their inflammability, qualified engineering and appropriate work practices make it possible to design and operate air-conditioning and refrigeration systems safely. The present deficiency in codes and formally adopted safe standards and practices is no excuse to

refrain from using HCs as refrigerants. HC-12a and HC-22a are one-stop long-term solutions to phase out environmentally harmful HCFCs, CFCs and HFCs.

Contact: HC-Tech Inc., 865, Woodward Avenue, Hamilton, Ontario L8H 6P5, Canada. Tel: +1 (905) 5475 693; Fax: +1 (905) 5473 155

E-mail: info@hc-tech.com

Website: www.hc-tech.com

Nanomaterial breakthrough in magnetic refrigeration

Researchers at the National Institute of Standards and Technology (NIST), the United States, report to have achieved a major breakthrough in the field of magnetic refrigeration. A pinch of iron was found to dramatically raise the cooling performance of a material considered crucial to the development of magnetic refrigerators. By adding a small quantity of iron (about 1 per cent by volume), the team enhanced the effective cooling capacity of the so-called giant magnetocaloric effect material by 15-30 per cent, resulting in a much-improved magnetic refrigerant for near-room temperature applications.

The original material, a gadolinium-germanium-silicon alloy, is considered an attractive candidate for a room temperature magnetic refrigerant. However, its cooling potential is undercut by significant energy costs exacted during the on-and-off cycling of an applied magnetic field, the process that drives the refrigeration device. These costs, or hysteresis losses, translate into commensurate losses of energy available for cooling. The iron supplement overcomes this drawback. It eliminates hysteresis and associated energy costs, allowing the material to perform near the peak of its capacity. Potential benefits of magnetic refrigerators include substantial gains in energy efficiency, lower cost of operation, elimination of ozone damaging coolants and nearly noise- and vibration-free operation.

Contact: Mr. Mark Bello, NIST, the United States. Tel: +1 (301) 9753 776.

Website: www.nist.gov

Eco-friendly freezer

Unilever Ice cream and Frozen Food, the United Kingdom, has launched eco-friendly freezers that are energy efficient. Multiple and independent retailers could thus save on electricity bills. Vision 12 and Maxivision employ hydrocarbon refrigerants and is reported to save up to 15 per cent on the cost of running existing models. The company aims to replace 75,000 of its existing freezers, at various outlets, with the latest versions within 10 years. Nearly 3,000 systems are planned for 2005.

Website: www6.lexisnexis.com

Heat pump with R-410a

In Japan, Hitachi Home and Life Solutions Co. and Kansai Electric Power have together developed a commercial instant-type heat pump water heater using R-410a refrigerant. The system design allows heavy hot

water users to connect multiple units to raise capacity. The new model enables energy savings compatible with high power by incorporating pulse amplitude modulation (PAM) control technology adopted in air-conditioners. With only 5 kW of power consumption, this space-saving unit heats 17C water to 42C in the intermediate season, when outside temperature is 16C, while realizing high-efficiency water heating by 23 kW of high output. As such, a COP of 4.6 has been realized. Hot water is dispensed into a storage tank, which can be connected to a commercial dishwasher to reduce running costs.

Website: www.jarn.co.jp

HFC substitutes tested

In Spain, researchers assessing the performance of a variety of eco-friendly refrigerants at the University Jaume I have found that the new gases behave much like those that they were designed to replace. Gases used in three HFC-free refrigerant technologies were subjected to a compression cycle to study a series of parameters, such as cold production and energy consumption. Results from these tests were compared with data obtained from analyses of gases from the HCFC family. It was observed that the so-called environmentally friendly R-407c offers the same performance specifications and behaves in a manner akin to HCFCs. The study also ruled out a potential disadvantage of the new gases, loss of efficiency resulting from possible variations in the composition of the gas due to leaks. Though the gases tested do not destroy ozone, they do play a role in worsening the greenhouse effect and can be 1,700 times more harmful than carbon dioxide.

Website: www.edie.net

New refrigerants

Genetron brand of refrigerants from Honeywell are non-ozone depleting alternatives and an eco-friendly choice for refrigerant technology. Genetron 134a complies with industry standards for all automotive air-conditioning units that use R-134a or HFC-134a refrigerant. On the other hand, Genetron 134aUV refrigerant comes with a fluorescent dye pre-mixed and specially formulated to make leak detection simple and easy.

Other automotive refrigerants available include FRAM, Bendix, Autolite and Prestone. Genetron and Prestone refrigerants can be used for charging or topping-off air-conditioning systems in cars and trucks while Genetron can also be used for charging new vehicles on the assembly line and for servicing.

Contact: Honeywell Singapore Pte. Ltd., 17, Changi Business Park, Central #01-01, Honeywell Building, Singapore 486073. Tel: +65 6355 2828; Fax: +65 6783 2949.

Website: www.honeywell.com

Propane used in ground-source heat pump

In the United Kingdom, a ground-source heat pump using propane as its refrigerant has been set up to heat the Buntingsdale Infant School. Geological conditions enabled a horizontal ground heat exchanger to be used instead of vertical boreholes. Slinky coils were arranged in 50 m long trenches, 1.3 m deep and 1.5 m wide. In this indirect system, a glycol solution is circulated in the coils. Fan coils are used for supplying heat to the building. The heat pump, an Earthcare Wesper CWP21, is reported to provide 36.4 kW with a COP of 4.3 when the outgoing heating water is 46C and the incoming glycol temperature is 0C. This installation is one of

the few large ground-coupled heat pumps in the country and one of even fewer to use a natural refrigerant.

Contact: Mr. Nicholas Cox, Earthcare Products Ltd., United Kingdom. E-mail: njc@earthcareproducts.co.uk.

(IEA Heat Pump Centre Newsletter, Vol. 22, No. 1/2004)

Gas heat pump includes R-410a

Sanyo Electric Co., Japan, offers K1 series gas heat pump air-conditioners (GHPs) adopting R-410a for commercial applications. Since R-410a has zero ozone depleting potential (ODP) and a small pressure loss, the K1 series lowers operating costs by improving efficiency. By realizing the adoption of R-410a for commercial GHPs, the company plans to commercialize systems whose COP is higher than 1.4 (cooling/heating average). When recalculated by presupposing the use of electricity (secondary energy), this COP becomes higher than 3.6, thus excelling the COP of electric heat pump air-conditioners that adopt R-410a.

The new models are equipped with an energy saving operation mode function, which automatically detects the outdoor units operating conditions and thereby controls the compressor/gas engines total efficiency to the highest value. Also, adoption of R-410a helps decrease the refrigerant piping diameter by one size and realize a maximum of about 20 per cent reduction in additional refrigerant charge into field piping. The company plans to release five models of VRF system (8, 10, 13, 16 and 20 hp) and three models of high-power VRF system incorporating a generator (13, 16 and 20 hp) through Sanyo Commercial Equipment Co.

Website: www.jarn.co.jp

SOLVENTS

Replacements for degreasing fluids

Product Name (Chemical Description)	Applications
Fensclean A (Mixture of pentaflouobutane and pentafluropoluether	Rinsing fluid in Fensclean A/B co-solvent cleaning process. Rinsing fluid in the Fensdry water displacement process
Fensclean B (Hydrocarbon solvent)	Solvent agent in Fensclean A/B co-solvent cleaning process
Fensclean 3000 (Mixture of pentafluorobutane and perfluoropolyether)	Cleaning agent for electronic and semiconductor processing equipment
Fensclean 3115	Light soil removal from solvent-sensitive substrates

(Azeotrope of Fensclean A with an alcohol)	
Fensclean 3140 *(Azeotrope of Fensclean A and Trans, 1,2-dichloroethylene)*	Heavy soil removal from metal and many plastic surfaces
Fensdry *(Fensclean A with fluorinated surfactant)*	Removal of water from parts by displacement drying process
Fensblend (5000) *(Blend of pentafluorobutane and perfluoropolyether)*	Carrier fluid for latent fingerprint development
Fenssolv 25 *(Non-toxic and non-inflammable blend of pentafluorobutane and perfluoropolyether)*	Diluent for fluorinated oils and greases

Contact: FenS Chemicals b.v., Amundsenweg 28, 4462 GP GOES, the Netherlands. Tel: +31 (113) 573 220; Fax: +31 (113) 573 776;

E-mail: info@fens.nl

Website: www.fens.nl

Cleaning aircraft bearings

Product Name
(Chemical Description)

CFC-113 alternative for precision cleaning systems

Applications

New ultrasonic cleaning technology

Fensclean A
(Mixture of pentaflouobutane and pentafluropoluether

Solvent cleaning systems

Rinsing fluid in Fensclean A/B co-solvent cleaning process. Rinsing fluid in the Fensdry water displacement process

Use of ODS solvents eliminated

Cleaner manufacturing

AEROSOLS

ODS-free delivery mechanism for asthma drug

SkyePharma, the United Kingdom, has completed Phase III trials of a new delivery system for AstraZenecas Pulmicort (budesonide), an asthma drug. The metered-dose aerosol inhaler uses a hydrofluoroalkane propellant to offer the same accuracy and consistent delivery provided by traditional Pulmicort inhalers. SkyePharma is responsible for all preclinical and clinical development of Pulmicort HFA-MDI as well as compiling regulatory filings for marketing approval in Europe, while AstraZeneca will pursue filing of marketing application and, following approval, will market the product in Europe and other regions.

Website: www.inpharma.com

New MDIs

In the United States, researchers at the University of North Carolina and GlaxoSmithKline Inc. have investigated into aerosol generation by metered-dose inhalers (MDIs) containing dimethyl ether (DME) and propane inverse microemulsions. Water-soluble compounds were incorporated into the MDIs using water-in-propellant lecithin microemulsions, in which DME and propane acted as both continuous phase and propellant. Lecithin, water and water-soluble compounds were added to glass MDI containers, valves were crimped on and propellants added using a pressure burette. Aerosols were produced using commercially available actuators and inertial impaction employed to determine the mass median aerodynamic diameter (MMAD), geometric standard deviation (GSD) and fine particle fraction (FPF) of the resulting aerosols.

It was found that the DME/propane/lecithin microemulsion MDIs generated aerosols with particle size distributions suitable for pulmonary delivery (e.g. MMAD 3.1 m, FPF 59 per cent for DME with lecithin content 3 per cent water content 2.5 per cent [wt/wt]). Increasing water concentration (up to 8 per cent wt/wt) was correlated with a reduction in FPF. Freezing and rewarming had no adverse effect on MMAD, GSD or FPF. Storage of microemulsion samples for up to three weeks did not adversely affect MMAD, GSD or FPF.

Contact: Mr. Mark L. Sommerville, GlaxoSmithKline Inc., Research Triangle Park, NC 27709 3398, United States of America. Tel: +1 (919) 4830 239; Fax: +1 (919) 4834 210

E-mail: mark.I.sommerville@gsk.com

Website: www.aapspharmscitech.org

HFA vs. CFC aerosols

The bronchoprotective and bronchodilator effects of a single dose (12 g) of formoterol delivered by HFA/CFC aerosols and dry powder have been compared by a team of researchers from Italy and the United Kingdom. The double blind, double dummy, randomized, placebo-controlled crossover study tested HFA Modulite, Foradil Aerolizer (dry powder inhaler) and Foradil CFC inhalers on 38 subjects with mild to moderate asthma (mean forced expiratory volume in 1 s [FEV1] 87.5 per cent predicted). The primary end point was methacholine challenge provocative dose required for 20 per cent fall in the FEV1 (PD20) 90 min post-dose. Bronchodilation was assessed with spirometry (FEV1, FVC, FEF25-75) and impulse oscillometry (resistance at 5 and 20 Hz, reactance at 5 Hz and resonant frequency) over the 90 min post-dose. In a subset of 12 subjects, formoterol plasma levels, serum potassium and glucose were determined up to 480 min post-dose.

Results have shown similar efficacy, pharmacokinetics and systemic effects of the HFA formoterol inhaler as with CFC and DPI preparations. As such, this formulation has potential applications in the treatment of asthma. Contact: Mr. C.M. Houghton, Medicines Evaluation Unit, North West Lung Research Centre, Wythenshawe Hospital, Manchester, United Kingdom.

Website: www.blackwell-synergy.com

HALONS

HFC fire extinguishing agents

Solvay Fluor, a multinational subsidiary of Solvay S.A. based in Hannover, Germany, offers new-generation HFCs for use in fire extinguishants. Solkaflam 125 (pentafluoroethane) and Solkaflam 227 (heptafluoropropane) are halon substitutes, primarily in sectors where space and weight are constraints or speed of suppression is vital.

Manufacturers in most European countries can freely choose their supplier of HFC-227 in fire extinguishing systems. However, the recently confirmed European patent EP-B-0570367 of DuPont de Nemours does not cover the use of HFC-227 as a fire extinguishant, but only the products very specific use for fire prevention in enclosed spaces like telecommunication switch stations or semiconductor clean rooms. This patent is only effective for France, Germany, Great Britain, Italy, Spain and the Netherlands.

Website: www.solvay-fluor.com

Aerosol fire extinguisher

Pyrogen Ltd., the United Kingdom, is offering the worlds first commercially available aerosol fire extinguishing system. Based on solid rocket fuel technology, Pyrogen is designed as a safe and practical alternative to halons, chemical powders, halocarbons and inert gases. Available in a wide range of canister sizes, Pyrogen is an inert, non-toxic solid that remains stable until electrically or thermally activated. On activation, it produces a gas-like extinguishing aerosol that attacks the fire chemically and physically, enabling virtually instant extinguishment and preventing re-ignition.

Pyrogen employs a unique principle of extinguishing action. It has a special solid chemical, which produces micron-sized dry chemical particles and gases when electrically or thermally ignited. The dry chemical

particles (mainly potassium carbonates) and gaseous mixture (carbon dioxide, nitrogen and water vapour) mix together into a uniform fire-extinguishing aerosol. Before being released into a protected area, the hot aerosol propels itself through a unique solid chemical coolant, which decomposes absorbing huge amounts of heat to ensure flameless discharge and uniform distribution of the cool aerosol within the area. The high rate of aerosol discharge ensures a tremendous knock-down effect. Benefits of the eco-friendly and cost-effective Pyrogen include three times more effective than halon, no need for pressurized cylinders or pipe work, compact and weight saving, simple to install/recommission, and low toxicity.

Contact: Pyrogen Ltd., Gilnow Mill Business Centre, Spa Road, Bolton, BL1 4LF, United Kingdom. Tel: +44 (1204) 373 300; Fax: +44 (1204) 373 355

E-mail: pyrogen@btconnect.com

Website: www.pyrogen.com

Marine automatic fire extinguishers

Marclear International and Reflex Safety Systems offer the most up-to-date range of trace tubing type marine automatic fire extinguisher systems. Marclear Fireflex marine systems are available for all sizes of craft from speedboat to super-yacht. A range of halon replacement gases can be provided to suit all types of installations. Supplied in sizes varying from 2 kg to 35 kg, these systems can cover small engine compartments as well as super-yacht engine rooms, and are fully interfaceable with the crafts electronic systems.

Contact: Marclear International, Mallorca, Baleares, Spain. Tel: +34 (971) 137 781

E-mail: info@marclear.com

Website: www.marclear.com

New fire suppression method

NanoMist Systems LLC, the United States, has succeeded in accelerating the development of new fire suppression technology using computer simulation, computational fluid dynamics (CFD). NanoMist is the trade name for the proprietary process technology of producing, scaling, transporting and delivering the ultra-fine fine water mist system (<10 m in diameter). It exhibits extremely high-energy absorption behaviour owing to the huge droplet surface area combined with the high vaporization rate of nearly micron-size droplets. Additionally, the gas-like dispersion adds to its ability to act as a total flooding agent. NanoMist could be a potential alternative to clean gaseous fire suppression agents like HFC-227ea, while complying with both government and industrial fire protection needs, pending full-scale testing.

Website: www.cfdreview.com

FUMIGANTS

Post-harvest control of arthropods on strawberry

At the University of California-Davis, the United States, researchers studied the use of acetaldehyde (Aa) and carbon dioxide (CO2) for post-harvest control of arthropods on strawberry fruit. Objectives of the project were to:

Determine the efficacy of Aa fumigation alone and in combination with CO2 to kill western flower thrips and two-spotted spider mites;

Determine the effect of fumigation with Aa and CO2 on fruit quality and post-harvest life; and

Demonstrate commercial feasibility of the treatment within methyl bromide fumigation facilities.

In addition to Aa, tests with ethyl formate (EF) on both western flower thrips and two-spotted spider mites were performed. Secondly, a repeated exposure technique with Aa was developed to find out if target pest mortality could be enhanced without significant fruit quality loss. The fruit was exposed to EF and the effects on quality evaluated.

Dose response curves for western flower thrips and two-spotted spider mites were developed for exposure to Aa. The fruit tested with 0, 1, 2, 3 or 4 per cent Aa in air or CO2 and stored at 0C or 20C were evaluated for changes in fruit quality. Volatile compounds in strawberry juice after treatment were also quantified. It was found that western flower thrips were susceptible to Aa; however, quarantine levels of control were not achieved. Two-spotted spider mites were more resistant to Aa than western flower thrips and concentrations necessary to elicit high mortality were well above those tolerated by strawberry fruit. Aa concentrations greater than 3 per cent caused calyx browning and drying. Initially, fruit exposed to 2, 3 or 4 per cent Aa in the presence of 20 per cent CO2 showed slightly less calyx damage than those exposed to Aa in air, however, no significant differences were found after 24 h.

Strawberry fruit and target pests were exposed to varying concentrations of EF in treatments utilizing both single and multiple exposures. Although EF was toxic to both target pests, concentrations necessary for complete control of two-spotted spider mite were well above those tolerated by strawberry. It was thus concluded that neither Aa nor EF appeared to be particularly promising for post-harvest insect control in strawberry.

Website: www.sarep.ucdavis.edu

Containerized strawberry transplants to counter MB use

In the United States, researchers at the University of California-Davis investigated into the use of containerized strawberry transplants produced in disease-free, soil-less media as a replacement for methyl bromide (MB) soil fumigation in nurseries. The study focused on developing protocols for producing high-quality strawberry plugs that have performance traits similar to, or better than, conventional (field grown) nursery planting stock.

By propagating runner tips at about two week intervals from mid-July to mid-August and using different container (cell) sizes, researchers were able to compare the effects of plug plant size and plug physiological maturity on yield performance. To compare the effect of conditioning environment on yield performance, investigators propagated plug plants at a low elevation (LE) nursery site in California and then conditioned a

subset of these plugs at a high elevation (HE) nursery for 3-4 weeks prior to transplanting. In the third year of trials, researchers propagated and conditioned plug plants at both HE and LE, thereby lengthening the HE conditioning period. Yield performance for all plant material was then assessed under commercial strawberry management systems typical of the farming practices.

In these trials, the effect of cell size and nursery environment on plug yield performance varied somewhat from year to year, while the results demonstrated significant effects of rooting date, plug cell size and nursery environment on early season yield performance, and early and total season fruit quality in most years. Early rooting date (July), use of a large plug cell size and HE conditioning generally maximized early season yields compared with later rooting dates, smaller cell size and LE conditioning. Compared with LE conditioning of plugs, conventional bare-root transplants, HE plugs generally produced greater early-season yields but had reduced fruit quality. However, in the third year, propagation and conditioning of plugs at HE resulted in fruit quality equal to that of conventional transplants and yields that were superior to either conventional transplants or LE conditioned plugs. There was little or no difference in total yield (December-June) among bare-root plants and plugs in most years.

Website: www.sarep.ucdavis.edu

Fungal culture as MB alternative

At Hebron University, Israel, a team of researchers have embarked on a project to isolate Tricoderma fungus from the Palestinian soil to fight major fungal diseases in plants. The project, funded by the world environmental organizations and small projects programme of UNDP, aims to develop Tricoderma fungal culture in the soil and identify the most effective lineage against diseases caused by other fungi such as Botytis cinera and Rhizoctonia solani. This organic fighting technique is expected to lead to the reduction of using methyl bromide as soil fumigant and chemical pesticides, thus reducing damage to the environment, human beings and animals. According to Dr. Radwan Barakat, this method will also lower the economic burden on farmers by reducing production costs and the need for pesticides.

Tricoderma belongs to the negative fungal culture group and is widely spread in rich soils that have organic constituents and also on old wood. Dr. Barakat found that the ideal temperature to culture the fungus was 25-30C. The spread of fungal plant diseases is affected by the physical and chemical traits of the soil as well as other environmental elements. Tricoderma fungus attacks the disease-causing fungi by producing antibodies that work to neutralize their growth. Furthermore, Tricoderma competes with disease-causing fungi for favourable conditions and nutrients.

The spread of the fungus was extensively studied in agricultural soil, through more than 262 surveys in different locations in the West Bank. Laboratory tests proved that the fungus could be cultured in different soils, especially in lands irrigated with water full of organic fertilizers or sterilized by plenty of natural sunlight or planted with vegetable and fruit crops. Tricoderma can be mixed with seeds and sown to achieve 55-92 per cent reduction in diseases.

Website: www.jerusalem-times.net