VATIS Update Ozone Layer Protection . Mar-Apr 2003

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THE SCIENCE OF OZONE LAYER

Tropopause effect linked to ozone depletion

Researchers at Lawrence Livermore National Laboratory, the United States, have discovered another fingerprint of the human effects on global climate. Recent studies have shown that increases in the height of the tropopause over the past two decades are linked directly to ozone depletion and increased greenhouse gases. Tropopause is the transition zone between the lowest layer of the atmosphere, the turbulently mixed troposphere, and the most stable stratosphere. The tropopause lies roughly 10 miles above the Earths surface at the equator and five miles above the poles. The Livermore research supports the bottomline conclusion of the 2001 Intergovernmental Panel on Climate Change, which states that most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations.

Website: www.ornl.gov

Landfill sites emit banned ODS

Researchers claim that landfill waste dumps may be responsible for unexpected levels of methyl chloroform, a banned ozone-depleting chemical, in the atmosphere over Europe. Measurements recorded from aircraft in 2000 found far more traces of this chemical, at altitudes of about 4 km, than had been predicted. According to scientists from the Netherlands, Germany and the United Kingdom, the most probable sources of the chemical could be located in southern and central Europe.

(Website: www.ananova.com

Nanotechnology may help repair ozone layer

At the University of Ulm, Germany, researchers experimenting with tiny structures and a liquid used to produce synthetic blood have found a possible way to remove ozone-depleting chemicals from the atmosphere. The team conducted tests using perfluorodecalin, a compound that exhibits properties similar to chlorofluorocarbons. Perfluorodecalin was taken up by a water-based suspension of polystyrene nanospheres. Researchers theorize that the nanospheres could similarly gather CFCs, then fall harmlessly to earth as rain, hail or snow. This could allow for preventing and repairing ozone destruction. Furthermore, space technology could be employed to put specially designed non-toxic nanoscale particles directly into the ozone hole.

Website: www.betterhumans.com

UV blinds barnacles

According to researchers at the City University, Hong Kong, intensifying ultraviolet (UV) radiation, caused by the thinning ozone layer, is blinding barnacle larvae. The tiny crustacean larvae swim towards the oceans surface using light receptors in their eyes. However, UV rays are damaging the larvaes retinal cells, preventing them from foraging for food. This development is threatening their survival and potentially disrupting entire coastal ecosystems. Barnacles are a source of nutrients and energy to predatory snails, crabs and small fish.

The team exposed barnacle larvae to a dose of UV-B radiation comparable to the level Hong Kong receives on a typical summer afternoon. The larvae were blinded within 60 minutes and were unable to swim towards light. The sightless larvae were also unable to latch on to the surface of a glass beaker or settle. Additionally, a researcher at the International University of Bremen, Germany, reports that the eyes of rock lobsters, crabs and opossum shrimps can also be damaged by UV-B radiation.

Website: www.nature.com

ODS PHASE-OUT IN INDIA

ODS registration

The Small Industries Service Institute (SISI) in Andhra Pradesh recently announced that a majority of the 60 companies in Hyderabad had not properly registered with the institute. Under ODS Regulations and Control Rules 2000, all firms that produce refrigeration and air-conditioning equipment, fire extinguishers, perfumes, deodorants, furniture and automobile upholstery must register with SISI. This registration helps keep track of enterprises that use ODS, thereby assisting the government in identifying firms that require monetary aid to shift from ODS-based products to products that do not require ODS.

Contact: Ms. Usha Chandrashekar, Ministry of Environment and Forests, Ozone Cell, New Delhi, India. E-mail: ozone@del3.vsnl.net.in
OzonAction Newsletter, No. 43, December 2002

Amendments to Montreal Protocol ratified

The Indian government has decided to ratify two amendments to the Montreal Protocol. Ratification of the Copenhagen and Montreal amendments would formally reiterate Indias commitment to the Montreal Protocol on Ozone Depleting Substances and protecting the ozone layer. This step would enable trade-related and other benefits under the Montreal Protocol and facilitate technology transfer and funding of projects using hydrochlorofluorocarbons (HCFCs) and methyl bromide (MB).

While the Copenhagen amendment provides for measures to control HCFCs, hydrobromofluorocarbons (HBFCs) and MB, the Montreal amendment establishes a licensing system for export and import of new, used, recycled and reclaimed ODS, and also introduces a ban on the import and export of MB to non-parties. On ratification of the Copenhagen amendment, India is obliged to comply with the control measures and has to submit data annually on the production, import and export of HCFCs and HBFCs from 1989 and MB from 1991. While HBFCs are not used in India, the reduction schedules specified have already been included in ODS (Regulation and Control) Rules, 2000.

Website: www.rediff.com

Stricter laws mooted as the need of the hour

According to the Chairman of the Central Pollution Control Board, Mr. D. K. Biswas, as a signatory to the Montreal Protocol India has managed to phase out leaded petrol and, to a large extent, CFC-based refrigerators. However, ODS is still being used in the form of fire extinguishers, aerosol sprays and some types of mattresses. As such there is a need for more stringent legislation to empower individual states to tackle local industries. Mr. Biswas made this observation at the national workshop on ODS (Regulation and Control) Rules 2000 and the Montreal Protocol, conducted in Bangalore. Ms. Lata Krishna Rao, Secretary to the Karnataka Department of Environment and Ecology, also opined that the state and union governments should think in terms of incentives for manufacturers using green products and encourage others to switch over to products that do not affect the ozone layer. The Chairman of the Karnataka State Pollution Control Board observed that more awareness should be created among manufacturers and consumers with regard to the ozone layer.

Website: www.hinduonnet.com

Ozone-friendly centrifugal chillers

Blue Star Ltd. is one of the few companies selected in India for funding by The Multilateral Fund for Implementation of the Montreal Protocol. The company has launched ozone-friendly centrifugal chillers based on HCFC-123 and is also marketing absorption chillers, which utilize water as the refrigerant. Reciprocating chillers offered by the company use HCFC-22 refrigerant, a more eco-friendly alternative to R-12. Furthermore, Blue Star is actively promoting the use of large refrigeration systems using ammonia as the refrigerant.

Contact: Blue Star Ltd., Kasturi Buildings, Mohan T Advani Chowk, Jamshedji Tata Road, Mumbai 400 020, India. Tel: +91 (22) 2202 0868; Fax: +91 (22) 2202 5813. Website: www.bluestarindia.com

IN THE NEWS

Decisions on ozone depletion and global warming

At recent meetings in New Delhi (UNFCCC COP-8, 23 Oct to 1 Nov 2002) and Rome (Montreal Protocol MoP-14, 25-29 Nov 2002), parties took a significant step in tackling the challenge of how to make policies to protect the ozone layer consistent with ongoing efforts to reduce greenhouse gas (GHG) emissions that cause climate change. The UNEP MoP decision XIV/10 pertains to the relationship between efforts to protect the stratospheric ozone layer and efforts to safeguard the global climate system, issues relating to hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). The Intergovernmental Panel on Climate Change and the Technology and Economic Assessment Panel of the Montreal Protocol were invited to develop a balanced scientific, technical and policy-relevant special report. This report comprises three areas:

A summary of up-to-date scientific information on the relation of ozone layer depletion and global warming, including concentrations of relevant ozone-depleting and greenhouse gases;
Technical information on practices and technologies for phasing out ODS and at the same time contributing to the objectives of the Convention and the Montreal Protocol. It should cover the relevant sectors, including heating, refrigeration and air-conditioning, foams, aerosols, solvents and fire-fighting applications. It should include the technical options, inter alia, of improved containment, use of fluids, gases or aerosols with negligible or lower global warming potential, use of not-in-kind technology, process improvement and end-of-life cycle recovery, recycling and disposal. It should present technical information relevant to evaluation, including cost, availability, health, medical, environmental and safety issues, technical performance, energy and resource efficiency, and all associated greenhouse gas (GHG) emissions utilizing life cycle climate performance; and
The future demand and supply of HFCs and the implication for developing countries, drawing upon relevant

reports.

Website: www.fluorocarbons.org

The Philippines to get US$10.8 million World Bank aid

The World Bank recently approved a US$10.8 million grant to stop the manufacture and use of ODS in the Philippines. CFCs are used mainly as active ingredients in aerosols and sprays, in the production of foam cushioning, as well as cooling agents in refrigerators and air-conditioners. According to Ms. Elisea G. Gozun, Environment and Natural Resources Secretary, this crucial funding will jump-start implementation of the Philippine National CFC Phase-out Plan (NCPP), a landmark phase-out schedule being the first to be jointly developed by the World Bank and a bilateral donor country, Sweden. This is the fourth phase-out plan submitted by a nation to the World Bank Executive Committee of the Multilateral Fund for Implementation of the Montreal Protocol. NCPP is the result of a careful study by DENR, with help from international experts, to identify problem areas in fields that could be affected by the shift to ozone-friendly chemicals. As a signatory to the Montreal Protocol, the Philippines is committed to gradually phase out CFC use by 2010, while meeting interim protocol obligations in 2005 and 2007.

Website: www.asia.news.yahoo.com

Monitoring station set up in Nairobi

Nairobi, Kenya, has become the key linchpin in a United Nations-supported effort to save the ozone layer and track pollution flows across the globe. A hi-tech monitoring station has been installed to detect ozone depletion and monitor air quality. Nairobi Validation Station, the first of its kind in tropical and subtropical Africa was set up within the grounds of the United Nations Environment Programme (UNEP). The new station would detect ozone emitted from the East African part of the tropics, formed from sources such as industry, transport, agriculture, forest fires and charcoal burning. One of the key roles of the new station is to unravel the fate of ozone damaging chemicals produced in the region, from both human-made and natural sources, such as vegetation. Scientists are as yet unsure as to the quantity of pollution that makes its way into the upper atmosphere and how much remains closer to the ground. Understanding this is crucial to determine how quickly the ozone layer may recover, after decades of destruction.

Website: www.europaworld.org

Philippine licensing system

In the Philippines, following a workshop organized in February by the United Nations Environment Programme (UNEP), together with the Department of Environment and Natural Resources (DENR), inspections for illegal ODS is being beefed up at major ports and government offices. Twenty port customs officers and 15 government officials took part in the train-the-trainers seminar. The UNEP-DENR workshop focused on very practical and effective ways to recognize shipping containers that have been tampered with or do not contain what they say they do. About 250 officers are to be trained by this year-end to intercept an estimated 400 t of CFCs being smuggled into the nation for use as refrigerants.

According to DENR estimates, nearly 15-20 per cent of CFCs shipped into the country last year arrived without permits, through mislabelling or fraudulent papers. UNEP programme officer Ms. Cecilia Mercado stated that the Philippines had implemented a pioneering import/export licensing system and the UNEP-DENR workshop aimed to ensure the systems implementation effectively. In the Philippines, illegal trade in ODS is being tackled under the Chemical Control Order under Republic Act 6969, otherwise known as the Toxic Substances, Hazardous and Nuclear Wastes
Control Act.

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Website: www.unepie.org

Chiller replacements to slash 25 per cent of costs

According to industry experts in Thailand, performance contracting, a novel energy conservation solution with guaranteed savings, will be a key driver for local conservation interests. Major players in air-conditioning systems like Trane, Carrier and York as well as Japans Daikin and Erbara, have evinced keen interest. Trane (Thailand), the only active player so far, has been granted seven contracts for the chiller replacement project, partially financed by a World Bank soft loan. Under the scheme, Trane has replaced 20 chiller units used by commercial buildings and industrial plants.

Performance contracting could help reduce energy costs by 25 per cent on an average air-conditioner. Commercial buildings where air-conditioning costs are as high as 60 per cent of total energy costs, stand to reap huge dividends. Since early last year, Trane has been providing comprehensive performance contracting, offering financial advice, installation and maintenance services. If energy savings do not reach the committed level, Trane will pay the difference to the clients. Under the second phase of the chiller replacement project, up to 400 units are being targeted.

Website: www.search.bangkokpost.co.th

Natural refrigerants in East Asia

BOC has extended distribution of its CARE range of hydrocarbons (HCs) to the Philippines, Malaysia and Thailand, owing to burgeoning demand for natural refrigerants worldwide. East Asia is a key market for air-conditioning and refrigerants with users eager to expand their range of solutions that are eco-friendly and minimize the industrys contribution to global warming.

Manufactured by Calor Gas Refrigeration in the United Kingdom, from naturally occurring sources, HCs are gaining popularity as they are seen as the natural alternative to ozone-depleting CFCs, HCFCs and the global warming HFC refrigerants. The HC range of refrigerants supplement BOCs current product portfolio of fluorocarbons, HCFCs and HFCs, as well as ammonia, cryogenic liquid nitrogen and carbon dioxide.

Website: www.boc.com

Ban on use of CFCs

In China, Hainan Province has prohibited the use of CFCs from 31 December 2002 onwards. By promulgating the Decision on Creation of CFC-free Province in 1999, the Hainan government has been gradually endeavouring to create a province that does not use CFCs. The government has been promoting non-CFC refrigerants that comply with international industry standards and has implemented a control system for special equipment using CFCs.

Website: www.jarn.co.jp

Japanese firm to phase out HCFC-based insulation

Nippon Light Metal Co., Japan, plans to replace HCFC-based insulating materials utilized in the panels of its commercial refrigerator units with cyclopentane, a new hydrocarbon-based material. The HCFC replacement is commonly used in residential refrigerators and does not contain any ODS. Nippons new panel manufacturing facility at Shimonoseki, Yamaguchi Prefecture, will produce 144,000 panels per year, which represents approximately 17 per cent of the companys total panel output.

Website: www.unepie.org

Standard on refrigerant release

In the United States, the American Society of Heating, Refrigerating and Air-conditioning Engineers has published ANSI/ASHRAE standard 147-2002, Reducing Release of Halogenated Refrigerants from Refrigeration and Air-conditioning Equipment and Systems. This new standard establishes practices and procedures to reduce inadvertent release of chlorine-containing and other halogen-containing refrigerants, for example, halogenated CFCs, HFCs and HCFC refrigerants.

Website: www.fluorocarbons.org

Recyclers thwart disposal of automobile CFCs

In Japan, internal documents from the Environment Ministry and the Ministry of Economy, Trade and Industry show that only about 10 per cent of CFCs recovered from car air-conditioners are destroyed. Simple economics appear to be winning out over environmental concerns in the effort to dispose CFC coolants from air-conditioning systems of scrapped vehicles.

A new law enforced in October last year makes it mandatory for consumers to bear part of the disposal burden. Owners who discard their cars are required to purchase tickets, available from post offices and convenience stores, for the disposal of CFCs. Some scrap firms are reusing CFCs from older cars, rather than handing them over for disposal. If a company opts to reuse the coolant in car air-conditioners, the firm can reap several times the amount it receives for each unit of CFC sent for disposal. Many drivers are willing to pay to keep their old vehicles cool. Although production of automotive CFCs has been banned, there are still about 20 million cars that use old CFCs in their air-conditioners.

According to a study by the environment and economy ministries, last November and December saw approximately 101,000 automotive CFC units destroyed, only 11.7 per cent of all the automotive CFCs processed. Both the ministries issued a directive in January to prefectural government offices mandating on-site inspection of CFC recovery firms to investigate the reason for the low destruction rate. Money from tickets purchased by drivers is collected at the promotion centre. Although centre officials will not disclose how much money is in the pool, the low level of CFC destruction means the centre is awash in funds that should be going to the firms that destroy the coolants. A centre official said that the accumulated money would be spent on publicity to encourage consumers to have automotive CFCs recovered and destroyed.

Website: www.asahi.com

Malaysian government offers support for CFC recycling

In Malaysia, the Ministry of Science, Technology and the Environment (MOSTE) recently announced that it would provide financial support and training programmes to companies working to recycle CFC-based refrigerants in automobile air-conditioning and cooling system sectors. The projects, part of the nations efforts to eliminate CFCs from these sectors by 2010, are expected to reduce the amount of CFCs emitted into the atmosphere by nearly 700 t/y. There are presently over three million cars in the country with air-conditioning systems employing CFC-based refrigerants.

During a speech marking the International Ozone Day, a MOSTE spokesperson stated that Malaysia has reduced its use of CFCs by around 40 per cent and eradicated the use of more than 4,600 t of ODS in the manufacturing sector. The government hopes to completely ban the use of CFCs in the manufacturing sector by 2005. Contact: Mr. Lee Choong Min, Ministry of Science, Technology and Environment, Ozone Protection Unit, Malaysia.

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OzonAction Newsletter, No. 43, December 2002

INVENTIONS/NEW PRODUCTS

Mechanical cooler for HPGe detectors

Ortec, the United States, has achieved a breakthrough in HPGe detector cooling technology. X-Cooler incorporates patented technology, resulting in a simplified and low-cost design. For a cost comparable with that of a conventional detector with liquid nitrogen cryostat and dewar, Ortec supplies detector complete with an X-Cooler. The new system is designed to work with any Ortec detectors available in PopTop configurations up to 90 per cent relative efficiency. Degradation of resolution performance is guaranteed to be less than 10 per cent for energies less than 500 kVe and no degradation will be observed above 500 kVe. Key features of X-Cooler include:

Lightweight and compact design;
Low-power operation;
For HPGe detectors in a wide range of gamma spectroscopy applications;
No Dewar filling operations;
No liquid nitrogen safety hazard;
No bulky storage tanks or unwieldy plumbing systems; and
Compatible with all Ortec HPGe detectors.

Traditional mechanical coolers fail because oil from the compressor gets mixed up with the refrigerant, migrating to the heat exchanger and clogging it, thus causing the detector to warm up. X-Coolers patented design cleans the oil out of the refrigerant continuously. This system can be retrofitted in the field to existing PopTop detectors in 10 minutes. A list of the different models and accessories available are listed below:

The CFG-X-Cool-P-115 X-Cooler with PopTop connector using 110-120 V AC, 60 Hz power;
The CFG-X-Cool-P-230 X-Cooler with PopTop connector using 220-240 V AC, 50 Hz power;
X-Cool-Stand: Omnidirectional cold head stand (ideal when replacing 30 l dewar dipstick type cryostats);
X-Cool-Rackmount: A cold head rackmount bracket;
Cryosecure: Programmable compressor power controller (ensures that detector is fully warmed before commencing cool-down after power failure);
X-Cool-UPS-115: 30 minute back-up power system (1,440 VA) for maintaining mains power to the X-Cooler during brief power outages. Input/Output power - 110-120 V AC, 60 Hz; and
X-Cool-UPS-230: 30 minute back-up power system (1,440 VA) for maintaining mains power to the X-Cooler during brief power outages. Input/Output power - 220-240 V AC, 50 Hz.

Contact: Ortec, the United States. Tel: +1 (865) 4824 411; Fax: +1 (865) 4830 396;

E-mail: info@ortec-online.com
Website: www.ortec-online.com

Leak detectors

Yokogawa Corp. of America, the United States, offers a variety of leak detecting systems. GA500 Plus is a rugged, hand-held tool that identifies and measures percentage purity of R-134a, R-12, R-22 and hydrocarbons with 98 per cent accuracy. Audible and visual alarms are included for inflammable hydrocarbons. Easy operation is ensured at the press of a button and this system indicates the presence of blends and contaminated refrigerants. A 12 V DC or optional Universal AC power adapters can be used.

H10M, H10PA and H10G refrigerant leak detectors can detect all CFC, HFC and HCFC refrigerants. Available in manual or automatic, auto-zero balance control versions, these units incorporate a unique sensor calibration system and pinpoint both small and large leakages. They combine and enhance all features of the previous General Electric and Yokogawa H10 series into one full-featured unit. The H25C industrial refrigerant leak detector is highly sensitive to both chlorine- and fluorine-based refrigerants. It has a built-in R-134a leak standard with a 10 s automatic calibration for R-12 or R-134a. An optional mini-probe ensures easier access for confined applications. It incorporates a long-life sensor and switchable search mode with up to 10 times the sensitivity of the alarm set-point. Contact: Yokogawa Corp. of America, the United States. Tel: +1 (800) 8886 400;

E-mail: info@yca.com
Website: www.yca.com

REFRIGRATION/AIR-CONDITIONING

CO2-based transport refrigeration systems

Thermo King, the United States, offers transport refrigeration systems that employ cryogenics technology and liquid carbon dioxide (CO2). The new systems achieve efficient temperature control without using ozone-depleting refrigerants. Consumers in Europe have been using such units on trailers successfully for more than four years. This led the company to include two models for trucks the ST-CR 300 and a CO2 hybrid unit. ST-CR 300 is designed for urban markets where there is a need for multiple stops. It runs entirely on the cryogenic system, using liquid CO2 to eliminate the need for ODS. The hybrid system utilizes a second coil to improve cooling capacity by pulling down temperatures when vehicle doors are opened.

Thermo Kings first North American cryogenics truck customer, Market Day Corp., has placed an order for 12 ST-CR 300 cryogenic truck units. Thermo King and Market Day have partnered with Praxair to supply recycled CO2, a by-product from the refining process like petroleum or fertilizer. The cryogenic unit is also available for trailers, SB-III CR. Both truck and trailer cryogenic systems offer rapid pull-down, quick temperature recovery after deliveries and improved temperature control.

Contact: Ms. Kim Wickline, Thermo King Corporate Headquarters, 314 West 90th Street, Minneapolis, Minnesota 55420, the United States. Tel: +1 (952) 8979 461; E-mail: kwickline@kerker.com ;
Website: www.thermoking.com OzonAction Newsletter, No. 43, December 2002 and
Website: www.thermoking.com

Cooler uses solar power

Coolmax Pty. Ltd., Australia, offers an innovative air-conditioning unit that is ozone-friendly and can be powered using solar energy. Coolmax CM50 is an evaporative cooler that does not use any refrigerant. It needs 220 W when operating at high speed, around 90 per cent less than conventional units. The new model is presently undergoing field trials in Australia and Ethiopia, where it is being used to cool an operation theatre in a remote medical facility powered solely by solar energy. The cooler is best suited for hot dry climates than humid ones and works well up to a wet bulb temperature of around 22C, with a standard rated capacity of 3 kW.

Contact: Mr. Clive Blanchard, Coolmax Pty. Ltd., 78 West St., Torrensville, South Australia 5031, Australia.
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OzonAction Newsletter, No. 43, December 2002

Rooftop package units

Petra has introduced a new compact rooftop package unit series for the United States market. This series covers a wide range of capacities starting from 4 TR up to 190 TR. The systems are supplied as a complete package ready for operation, with no extra controls or other items to be installed, a single power entry point and simple connectors. Key features of the new series include:

Heavy-gauge welded galvanized structural steel C channel base;
Weatherproof construction with an oven-baked polyester-epoxy electrostatic powder coating;
Access doors for quick and easy maintenance of key components;
Microprocessor-based control;
Fully charged unit with R-22;
Independent refrigeration circuits; and
External charging ports with caps for easy servicing of units.

Optional accessories available with this series are belt guards for fan/motor sheaves, spring vibration isolators for fan-motor assembly, low ambient head pressure control, stainless steel drain pan and coin casings, hot water coils, copper fin coils, premium efficiency fan motors, etc.

Website: www.jarn.co.jp

New chillers

Blue Star Ltd., India, offers millennium centrifugal chillers and millennium rotary screw chillers, under a licensing agreement with the United States-based York International Corp. These eco-friendly models are energy-efficient and designed to minimize maintenance costs. The chillers work on HCFC-123 and a control centre facilitates access to performance information. Ranging in capacities from 150 TR to 700 TR, millennium centrifugal chillers feature unsurpassed performance (down to 0.20 kW/t with variable speed models), is designed to utilize tower water down to 13C entering condenser water temperature, employs high-efficiency heat exchangers, and uses proven open motor technology and flexible millennium packaging. Benefits offered by these chillers include:

Ensures higher energy savings;
Provides continuous run reliability;
Lowers compressor workload to reduce energy consumption;
New design that minimizes tube fouling;
Simple chiller control;
Easy access and easy reading data retrieval;
Eliminates mechanical control problems;
Precise set-point control prevents drift, saves energy; and
Matches capacity requirements exactly.

Millennium rotary screw chillers range in capacity from 100 TR to 565 TR. Key features include reliable HCFC-22 performance, uses Frick twin screw compressors, easy transitions from 100 per cent down to 10 per cent of unit capacity and flexible factory packaging.

Contact: Blue Star Ltd., Kasturi Buildings, Mohan T. Advani Chowk, Jamshedji Tata Road, Mumbai 400 020, Maharashtra, India. Tel: +91 (22) 2202 0868; Fax: +91 (22) 2202 5813.Website: www.bluestarindia.com

Mini absorption chiller heater

Century, the Republic of Korea, has developed a residential absorption chiller heater in 3.4 TR range. This product is designed to use natural gas energy for cooling and heating, comprises water as the refrigerant, lithium bromide as a solution and second-stage generator, etc. Salient features are:

Self-containing;
Wide range of application feasible;
Hot water available for panel (floor) heating;
Most efficient and self-controlled system to current load conditions; and
Auto de-crystallization for restart.
Website: www.jarn.co.jp

Website: www.jarn.co.jp

E-Fridge cooling

Bartech Systems International, the United States, has developed automatic E-Fridge cooling unit technologies. The compressor cooling unit is a smaller version of the standard compressor-driven system found in industrial and residential cooling and refrigeration systems. It comprises an electrically powered compressor that pumps a CFC-free refrigerant, R-134a, through a sealed system. Since the refrigerant gas is compressed and then allowed to expand, heat is extracted from within the e-fridge. Latest technology developed recently for compressors minimizes the audible output to a level of 24.9 decibel. In addition, the system is provided with a

guest-controlled shut-off that allows the compressor to be turned off when desired. The system will then be reactivated during its next compressor-on cycle.

In the Bartech E-Fridge system, the electronic on-line thermostat controls power to the compressor. As an added feature and to allow minimal compressor cycles typically two cycles of 3 h the Bartech e-fridge uses a eutectic device or cold sink inside the fridge. This is similar to the cold packs that are frozen and then put inside beverage coolers to sustain cold temperatures. It is a water-based solution that freezes during the compressor-on cycles. During compressor-off cycles, this pack maintains the cold temperature within the E-Fridge. The system is factory-set to maintain the internal temperature at 6C to 9C.

The (ammonia) absorption cooling unit is a sealed system that works on the principle of expansion and contraction of an ammonia-water mixture and its corresponding drop that enables heat extraction. There are no moving parts within the system as it utilizes a heating element to provide the energy required to circulate the mixture. An electronically controlled thermostat located within the E-Fridge and controlled through on-line software regulates power to the heating element. Since the E-Fridge system is always on-line, the computerized energy savings system feature allows for customization of the cooling cycle for every room and according to the hotels needs.

Contact: Bartech Systems International, 251, Najoles Rd., Suite A, Millersville, Maryland 21108, the United States. Tel/Fax: +1 (410) 7297 725/916. Website: www.bartech.fr

SOLVENTS

Alternative cleaners

Se Young Oil and Chemical Co., the Republic of Korea, is offering alternatives for detergents and cleaners based on ODS. The substitutes are available in 20 l and 200 l packages. Cleaner 7000 is a substitute for 1,1,1-TCE detergent that offers outstanding melting power and is safe. It can be used on automotive engine, parts cleaning, machinery repairing, bronze items and tank cleaning. Cleaner 8000 is a CFC-113 alternative that offers outstanding melting power and is safe. Its usage includes parts, PCB pipe, electric motor, dynamo generator, optical lenses, etc. Cleaner 9000 is a Freon substitute detergent for use on engine parts, hard disk, optical devices and ceramic packages.

Contact: Se Young Oil and Chemical Co., 948-14, Gamjun-Dong, Sasang-Gu, Pusan 617 051, the Republic of Korea. Tel: +82 (51) 3254 053; Fax: +82 (51) 3254 055;

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Website: www.syochem.koreasme.co

Oxygen line cleaning system

In the United States, several types of oxygen supply systems that are incorporated in the Department of Defences (DoD) weapon systems are normally cleaned before installation on aircraft. In case of contamination problems, the pilot switches over to auxiliary supplies and returns to an airbase where the oxygen plumbing is dismantled, removed and cleaned using CFCs, prior to reinstallation. This procedure is extremely costly, releases ODS and lowers mission readiness while the aircraft is idle. In 1999, the Environmental Security Technology Certification Programme (ESTCP) funded a project to develop an on-board oxygen line cleaning system (OLCS) for use with DoDs weapon systems. The goal of this project was to design, develop and construct a portable OLCS and cleaning process, to precision-clean critical support oxygen distribution system for the Air Force B-1B weapon system, while all equipment and tubing remains installed on-board the aircraft. The Joint Group on Pollution Prevention (JG-PP) partnered with ESTCP in this project to apply the JG-PP methodology and resources to enhance the implementation and transfer of the non-ODS technology.

A portable (trailer mounted) OLCS is currently being tested and designed based on laboratory results achieved using a replica B-1B oxygen line cleaning system. The envisioned OLCS is required to be fully transportable and operable in climate conditions ranging from about 5C to 49C. The solvent/surfactant solution recommended for replacing CFC-113 in the OLCS is a mixture of the solvent hydrofluoroether (HFE-7100), manufactured by 3M, and Krytox alcohol (Hexafluoropropylene oxide homopolymer alcohol), made by DuPont, as surfactant. The OLCS should meet or exceed the cleaning ability of CFC-113. The system is fully automated and the solvent/surfactant solution can be distilled for reuse.

Contact: Mr. John Herrington, HQ AFMC LGP-EV, the United States. Tel: +1 (937) 2578 090.

Website: www.versar.com

Perfluorinated cleaning solvent

Structure Probe Inc., the United States, offers a viable CFC-free cleaning substitute for ozone-depleting solvents to clean perfluorinated polyether fluids and greases. Perfluorosolv PFS-2 is a low molecular weight perfluoropolyether solvent and diluent. It is safe, inert, non-toxic, has zero ozone depletion potential (ODP) and is not classified as a VOC by the Environmental Protection Agency. It requires few safeguard precautions or use-restrictions and is completely compatible with all metals, rubbers and commercially available elastomers and plastics.

Perfluorosolv PFS-2 has been formulated to be fully miscible with perfluoropolyether (PFPE) oils and greases (Fomblin, Krytox and some Braycote) and perfluorocarbon (PFC) fluids such as those often used in the semiconductor and electronic manufacturing operations. PFS-2 is also completely miscible with chlorotrifluoroethylene (CTFE) oils above 45C. It is the recommended solvent/diluent for Ausimonts wide range of fluids and lubricants marketed under the Fomblin and Galden trademarks. Whether used alone or along with other solvents, Perfluorosolv PFS-2 performs well in many electronic and semiconductor cleaning functions such as pump cleaning, degreasing, dewatering, vapour blanketing, reducing flashpoint, eliminating trace residue and other niche cleaning applications. Key benefits of PFS-2 include:

Does not contain CFCs, bromine or chlorine;
Reduced consumption through less evaporative loss;
Is inert, non-toxic, odourless and colourless;
Has no flashpoint - used as an aid in improving the flashpoint of organic solvents; and
Can be used as a vapour blanket miscible above 45C.

PFS-2 solvent is well suited for cleaning operations where extended immersion baths are required or solvents are either applied to hot components or heated prior to application or used in forced air stream cleaning or pressure sprayed on to components.

Contact: Structure Probe Inc., P.O. Box 656, West Chester, PA 19381 0656, the United States. Tel: +1 (610) 4365 400; Fax: +1 (610) 4365 755;

E-mail: spi3spi@2spi.com
Website: www.2spi.com

CFC-free process for flip chips

Epoxy Technology, the United States, offers an integrated solution to flip chip bumping and interconnection. Flip chip packaging is expected to play a key role in the continuing drive towards miniaturization. However, high temperatures and complex layers required for traditional solder flip chip technology keep packagers from reaping the full benefits of the switch to flip chip. Epoxys polymer flip chip (PFC) technique promises advances in throughput, yield and cost containment. The patented process employs advanced chemistry polymers, with or without dielectric coatings, conductive bumps and underfill encapsulants.

PFC bumping is performed in one or two steps, compared with the several depositions of metal required for solder bumping, lowering equipment and processing costs. Expensive evaporation equipment and mask aligners are not required. Replacing solder with polymers allow processing at temperatures lower than 160C.

This reduces processing costs and enables packagers to bond chips to less costly substrates that cannot tolerate the temperatures needed for solder connections. The PFC process does not use lead, flux or CFC-laden solvents. Cleaning of processed parts is not required, thereby reducing environmental impact. The conductive polymers used to form PFC bumps are optimized for stencil printing at extremely fine pitches and, unlike solder, they do not flow with heat. Exceedingly dense I/O patterns are achieved with single-pass stencilling, enhancing chip performance, miniaturization and manufacturing efficiency.

Contact: Epoxy Technology, 14, Fortune Drive, Billerica, MA 01821, the United States. Tel: +1 (978) 6673 805; Fax: +1 (978) 6639 782.

Website: www.epotek.com

CFC and HCFC replacements in medical products

Petroferm Inc., the United States, offers Lenium DF for use as a diluent and carrier fluid with many silicone-based lubricants, that includes fluids and polymers. This product is a direct replacement for CFC-113, HCFC-141b and perfluorocarbons as well as heptane and hexane. The proprietary blend of 3M HFE-7100, Dow Corning OS-20 fluid and isopropanol exhibits physical properties on par with that of CFC-113. Tests have shown that no detectable non-volatile residues or pyrogen-containing materials were quantified. Lenium DF offers excellent solubility for silicone lubricants and is compatible with most plastics, elastomers and metals encountered in medical device applications, when used at room temperature.

Lenium TS is a blend of 3M HFE-7100 and Dow Corning OS-20 fluid specifically developed for temporarily swelling silicone and urethane tubing. It is an excellent replacement for CFC-113 and HCFC-141b in medical tube swelling applications. Lenium TS swells silicone and urethane tubing, and is also compatible with many types of plastics, elastomers and metals. Tubing swelled by the product returns to its original dimensions.

Lenium CP is a ternary azeotrope of 3M HFE-7100, n-propyl bromide and isopropanol. It is ideal for removing oils, silicones, particulate and light ionic residues from sensitive plastic components and medical parts. Solvent alternatives to CFC-113 and HCFC-141b must have a combination of desired properties, including low ozone depletion potential, low toxicity, non-inflammability, fast drying and compatibility with the articles being cleaned. Lenium CP exceeds all these requirements and is a direct replacement for HCFC-141b, 1,1,1-trichloroethane, CFC-113 and other ozone-depleting solvents.

Contact: Petroferm Inc., 2416, Lynndale Road, Fernandina Beach, FL 32034, the United States. Tel: +1 (904) 2618 286; Fax: +1 (904) 2616 994.

Website: www.petroferm.com

AEROSOLS

New alternative MDI

Germanys ac-Pharma AG offers salbutamol-isobutane metered dose inhaler (MDI) as a CFC- and HFC-free alternative for treating asthma. Developed together with Hagepharm and IGS, one can of the new alternative for salbutamol (100 mcg) contains approximately 15 ml of isobutane. One puff injects about 0.050 ml of isobutane. Clinical tests have demonstrated therapeutic equivalence to salbutamol HFC and display a favourable safety pattern. Benefits offered by the new product include:

Stability as excellent as with CFC;
Legal patent protection;
Positive comments of the Batelle-Institute;
300 doses;
Attractive design, easy handling attributed to corrugated thumb rest; and

Environmentally friendly propellant.

Contact: ac-Pharma AG, Bajuwarenring 14, Oberhaching 82041, Germany. Tel: +49 (089) 666 496-0; Fax: +49 (089) 619 346; E-mail: info@ac-pha rma.de; Or Hagepharm GmbH, Flugplatzstrasse 33a, Mainz-Finthen 55126, Germany. Tel: +49 (06131) 475 068; Fax: +49 (06131) 475 069; Or IG Spruhtechnik GmbH & Co. KG, Postfach 1129, Wehr 79656, Germany. Tel: +49 (07762) 80070; Fax: +49 (07760) 4412;

E-mail: info@ig-spruehtechnik.de
Website: www.ig-spruehtechnik.de
Website: www.ac-pharma.de

Microstructures boost drug delivery system

In the United States, a group of researchers and Inhale Therapeutic Systems Inc. (ITS) have developed an improved propellant system for use in aerosol drug delivery. Using hollow, porous, perforated particles or microstructures that have been likened to little Wiffle balls, the team discovered that drugs administered with the propellant are more likely to enter the lungs, leading to consistent and beneficial results. The PulmoSphere process is currently under clinical study. According to ITS, a very stable supply of propellant can be formed in the nanosize media. The companys product line includes 21 products that have completed or are undergoing human clinical testing.

Website: www.smalltimes.com

Fluticasone propionate inhaler

GlaxoSmithKline NZ Ltd., New Zealand, offers CFC-free fluticasone propionate inhalers. Flixotide inhaler comprises a suspension of fluticasone propionate in the non-CFC propellant HFA-134a. The suspension is contained in an aluminium alloy can sealed with a metering valve. The canisters are fitted into plastic actuators that incorporate an atomizing orifice and dust-caps. The inhaler has been formulated in three strengths 50 mcg, 125 mcg or 250 mcg of fluticasone propionate per actuation, 120 actuations per canister.

Flixotide 50 inhaler delivers 50 mcg of fluticasone propionate per actuation into the mouthpiece of a specially designed actuator. While Flixotide 125 inhaler delivers 125 mcg of fluticasone propionate per actuation, Flixotide 250 delivers 250 mcg of the drug per actuation.

Contact: GlaxoSmithKline NZ Ltd., Quay Tower, Cnr Albert and Customs Streets, Private Bag 106600, Downtown, Auckland, New Zealand. Tel: +64 (09) 3672 900; Fax: +64 (09) 3672 506.

Website: www.medsafe.govt.nz

In-flight deodorizer/disinfectant

Royale Wings International Pte. Ltd., Singapore, offers a new formula to eliminate offensive odours without compromising respiratory health and aviation safety. Based on natural vegetable extracts, Kitz Aero 10 provides a combination of effective odour control and bio-disinfecting capability. Tests have shown that Kitz Aero 10 conforms with the United States aero-industrial test standards on compatibility with aircraft materials and germicidal and deodorizing action. The water-based product is non-inflammable, safe, eco-friendly and propelled by nitrogen. It eliminates odour biologically at the molecular level, whether it is on surfaces or in the air. Additionally, its natural cleaning properties enable instant cleaning and removal of fresh coffee, tea, wine or food stains without damaging even the most delicate fabric or surface.

Contact: Royale Wings International Pte. Ltd., 87, Amoy Street, Singapore 069906. Tel: +65 6223 9929; Fax: +65 6223 9193.

Website: www.royalewings.com

FOAMS

CFC-free refill systems

Fomo Products Inc., the United States, offers Handi-Foam two-component refill systems in a variety of sizes and densities that suit specific requirements. Using the patented Handi Gun II dispensing unit, Handi-Foam refill systems are available with a choice of 30 or 60 feet dispensing hoses and are ideal for large commercial/industrial applications, including building insulation, spa manufacturing and van conversion. The slow rise Handi-Foam cures tack-free in less than a minute and does not contain CFC or formaldehyde. The different Handi-Foam models and their features are listed in the table below:

Model	Free-rise density (kg/m^3)	In-place density (kg/m^3)	In-place yield (m^3)
P22045	28.03	32.04	3.6
P22245	28.03	32.04	6.0
P22445	28.03	32.04	13.0
P22645	28.03	32.04	22.3

All models fulfil Coast Guard specification requirements for Flotation in Title 33 Code of Federal Regulations. The refill tanks are tracked by state-of-the-art software, thereby enabling Department of Transportation compliance and detailed data.

Website: www.fomo.com

CFC-free PU foam

Polyfoam, Turkey, is offering a modified single-component polyurethane (PU) foam with CFC-free propellant for filling and sealing joints in applications requiring fire resistance. Apart from soundproof and insulation properties, key features of Polyfix Gold includes:

Self-extinguishing foam, containing special flame retardants;
Expansion up to 50 l, and less wasted foam;
Fills and insulates cracks, holes, connections and spaces caused by installation of heat insulation systems, electrical outlets, ventilation, aspiration units, air-conditioners, etc.;
Excellent dimensional stability (no shrink or post-expansion); and
Excellent thermal, sound and water insulation.

The application surfaces must be dry and capable of bearing loads. Must be applied at temperatures between 5-25C.

Contact: Polyfoam, Muallim Nau Cad No. 1, Tr 80840 Ortakoy, Istanbul, Turkey. Tel: +90 (212) 2366 032; Fax: +90 (212) 2616 445;

E-mail: info@polyfoam.com.tr
Website: www.polyfoam.com.tr

Foam pipe insulation

Kingspan Insulation, the United Kingdom, offers foam pipe insulation for the petrochemical and building service sectors that comply with the latest legislation. The quality of pipe insulation is critical to energy saving. High conductivity and emissivity of metal piping results in high heat loss over un-insulated sections. Manufactured utilizing HFC-365mfc, the zero ODP Kingspan phenolic foam pipe insulation range fulfills fire performance and thermal efficiency requirements.

Contact: Mr. John Garbutt, Kingspan Insulation, Pembridge, Leominster HR6 9LA, the United Kingdom. Tel: +44 (1544) 861 611; Fax: +44 (1544) 387 299;

E-mail: info.uk@insulation.kingspan.com
Website: www.insulation.kingspan.com

TPI News, Spring 2003

Polystyrene foam extrusion

Adams Plastics Inc., the United States, offers a new process to produce extruded polystyrene foam products. The process employs raw polystyrene pellets that are run through an extruder and mixed with a proprietary CFC-free blowing agent. The resulting foam product is then used for thermoforming or processed into a laminated product. The thermoforming process is designed for mass production of products like polystyrene foam plates. Adams thermoforming machinery incorporates the latest technology and provides parts at high speed, thus lowering costs. This process begins with product design, followed by the design of custom tooling. The lamination process involves bonding a customized material to the surface of the manufactured foam, which allows it to perform a specific task.

Contact: Adams Plastics Inc., 5955, Crossroads Commerce Wyoming, MI 49509, the United States. Tel: +1 (616) 2614 400; Fax: +1 (616) 2498 955.

Website: www.adamsplasticsinc.com

FUMIGANTS

Methyl bromide replacement

Aberco Inc., the United States, reports that its propylene oxide-based product is proving to be an all-purpose methyl bromide replacement for both pre-plant and post-harvest fumigation. Tests conducted at a strawberry farm and flower farm have shown that Propozone is effective against fungal pathogens when compared with standard treatments, including methyl bromide, and nematodes that cause rootgall. Successful results were obtained with Propozone in controlling a heavy infestation of mixed yellow and purple nutsedge.

In post-harvest applications, Propoxide 892 (a mixture of 8 per cent propylene oxide and 92 per cent carbon dioxide) exhibited good insecticidal properties.

Contact: Mr. Morris Warren, Aberco Inc., 9430, Lanham Road, Seabrook, MD 20706, the United States. Tel: +1 (301) 4597 090; Fax: +1 (301) 5779 041;

E-mail: morriswarren@erols.com
Website: www.aberco.com
OzonAction Newsletter, No. 43, December 2002

Ozone provides protection for grains

Researchers at Purdue University, the United States, report that ozone can eliminate insects in grain storage facilities without harming food quality or the environment. Ozone has a very short half-life and relatively low doses can be used to kill an insect. In a study, researchers used ozone to treat rice, popcorn, soft red winter wheat, hard red winter wheat, soya beans and corn. The treatment process included application of ozone in two phases. Ozone first applied moved through the grain slowly since it reacts, or bonds, with matter on the grain surface. The second dose of ozone moves quickly as it is not slowed by reactions with the grain. This allows ozone to eliminate insects by reacting with them rather than the grain. No significant difference was observed in the appearance and nutritional values of grains treated with ozone and untreated grain. The team is investigating new ways to use ozone as a preventative treatment, perhaps by sealing grain storage facilities with layers of ozone.

Website: www.greenbiz.com

HALONS

New fire extinguisher

Fire Service Plus Inc., the United States, offers FireAde 2000 16oz fire extinguisher that is charged with FireAde 2000 The Ultimate Fire Quencher. The unique delivery system employed in this product does not contain CFCs; a specially designed air delivery system containing a non-inflammable organic propellant is used. The FireAde 2000 16oz fire extinguishing units incorporate a proprietary sealing system that immediately seals after discharge. This prevents air from leaking out of the system after use, unlike traditional counterparts wherein once the seal is broken the extinguisher looses its charge over a short period of time.

FireAde 2000 16oz units are maintenance-free compared with traditional extinguishers that must be turned upside down once a month.

Contact: Fire Service Plus Inc., 256, Commerce Drive PMB 424, Peachtree City, GA 30269, the United States. Tel: +1 (770) 4607 793; Fax: +1 (770) 4607 717;

E-mail: fsp1@mindspring.com
Website: www.ph7technology.com

Substitute for halon-1301

In the United States, DuPont Fluoroproducts is introducing DuPont FE-25 fire extinguishing agent as a retrofit replacement for halon-1301 in existing commercial flooding units. Fire suppression systems using DuPont FE-25 will be marketed both in Europe and in the United States by Fike Corp. under the ECARO-25 brand. While the European Union has banned the use of halon products after 2003, resulting in a regulatory need to replace halon-1301 in existing total flooding systems, the United States NFPA 2001 Clean Agent Standard has listed HFC-125 as an acceptable substitute for halon-1301.

DuPont FE-25 is not a ozone depleter and is an environmentally preferred alternative to halon that safely protects people, high value assets and business productivity. Since this product exhibits properties similar to halon-1301, it eliminates the need for major investment or redesign of facilities required for a retrofit. Fike ECARO-25 system is the easiest and most cost-effective drop-in replacement for halon-1301 fire extinguishing systems. The ability of ECARO-25 to use existing piping structure reduces the cost of conversion and minimizes business interruption. Only the system nozzles and agent storage container must be replaced to be in compliance with environmental standards.

Website: www.dupont.com

Self-contained fire suppression system

Kingsway Sales and Marketing LLC, the United States, offers the first self-contained fire suppression system that has an independent back-up air charge in case the first pneumatic unit has external damage. Developed by Stanley Manufacturing, the patented Tri-Max 30 has been approved by the Department of Army as a replacement for halon-1211 wheeled flight line fire extinguishers and wheeled powdered chemical extinguishers. Over 2,000 Tri-Max units are currently providing fire protection throughout the world.

Stanley Manufacturing also produces effective and highly mobile vapour suppression units that can quickly seal inflammable vapours and hazardous material spills.

Contact: Mr. David Mahrt, Kingsway Sales and Marketing, 2566, Christian Lane, Redding, CA 96002, the United States. Tel/Fax: +1 (530) 7220 272;

E-mail: Dmahrttrimax@aol.com
Website: www.tri-max.info

New halon substitutes

In the United States, three new halon substitutes have been approved under the SNAP programme, wherein EPA identifies acceptable and unacceptable substitutes for ODS and lists these decisions. The 27 January 2003 rule-making appended the following three substitutes to SNAP programme listings codified at Appendix L to Part 82, Subpart G, subject to the use conditions listed below:

HFC227-BC (a combination of HFC-227ea and sodium bicarbonate) is approved for total flooding and end-

uses provided that:
Individuals required to be in areas protected by HFC227-BC units are given special training;
Sodium bicarbonate releases are targeted so that increased pH levels will not adversely affect exposed individuals; and
Each HFC227-BC extinguisher is clearly labelled with the potential hazards and safe handling procedures;
H Galden hydrofluoropolyethers (HFPEs) are approved for streaming end-uses in non-residential areas only; and
C6-perfluoroketone [1,1,1,2,2,4,5,5,5-nonafluoro-4-(trifluoromethyl)-3-pentanone] is approved for streaming end-uses in non-residential areas only.

Contact: Ms. Bella Maranion, Environmental Protection Agency, the United States. Tel: +1 (202) 5649 749; Or Cogent Regulatory Science Inc., 8079 S. Williams Way, Littleton, CO 80122, the United States. Tel: +1 (303) 7956 055

E-mail: general@cogentregs.com
Website: www.cogentregs.com

Fog to douse fires

A new commercial fire-fighting system that puts out blazes with a fine water mist is to be tested. Dr. Thomas McKinnon, lead researcher for the study at the Centre for Commercial Applications of Combustion in Space (CCACS) at Colorado School of Mines states that, We are working to find an acceptable replacement for halons, and water mist appears to be the best choice. The water mist research team is working with MicroCool Inc. and FOGCO Systems Inc. These companies manufacture water mist systems for putting out fires and for other purposes, such as outdoor cooling and industrial humidification. According to Mr. Mike Lemche, General Manager of MicroCool, fire-fighters have tested the companys ultra-fine mist nozzles. The cooling effect of the mist removes heat, a key component of fire.

Website: www.newswise.com